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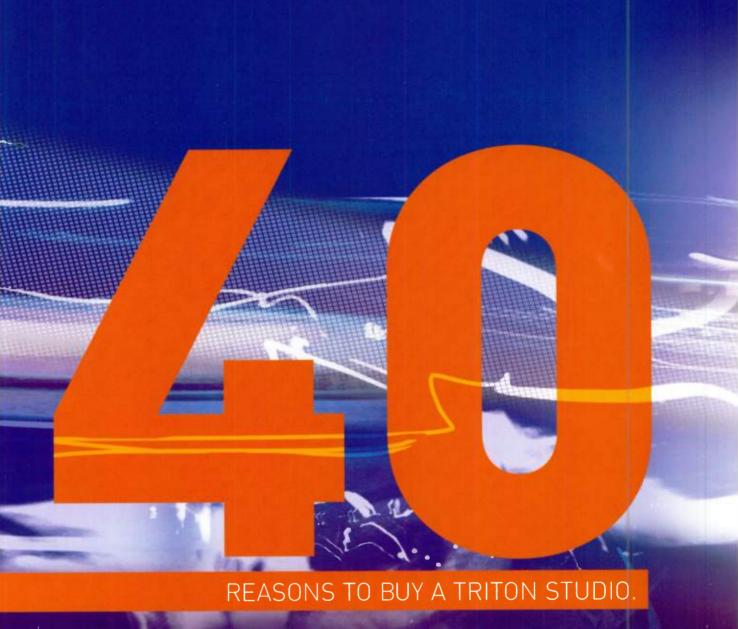
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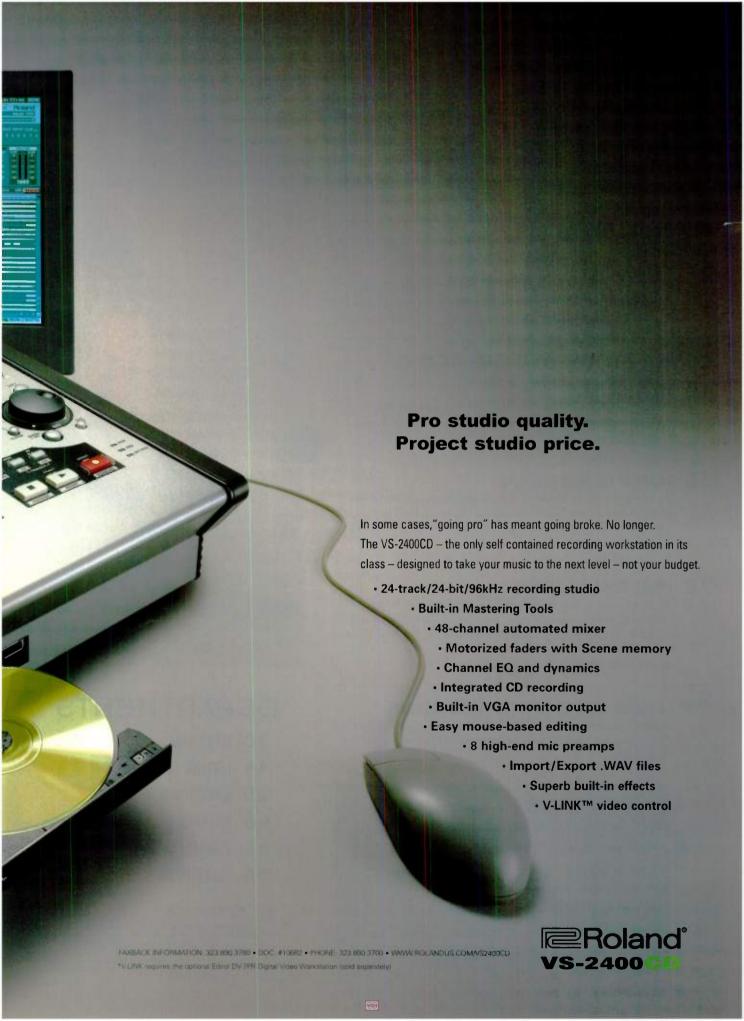
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I N S

FEATURES

31 PLAYING WITH FIRE

FireWire and its offshoots, including Yamaha's mLAN, have brought a new level of connectivity to the personal studio.

By Mike Overlin and John Strawn

COVER STORY: DVD CREATION

40 THE INSIDE TRACK

Making DVDs on the desktop is a complex process that involves a number of steps. Here's what you need to know to make the most of this exciting medium.

By Dennis Miller with Chris Armbrust

56 THE VIEW THROUGH WINDOWS

Windows users can choose from an astounding abundance of DVD-creation software, ranging from entry-level to advanced tools. We break down their features and compare their performance.

By Dennis Miller

72 POWER TOOLS FOR THE MAC

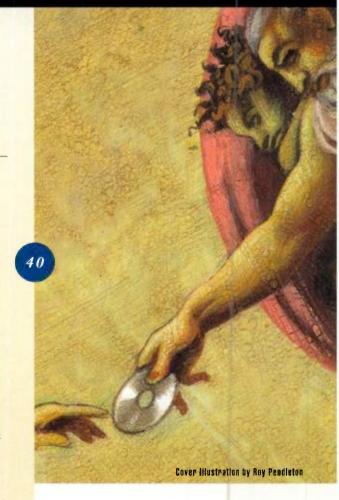
The bad news is that Mac users have considerably fewer DVD-authoring choices than Windows users. The good news is that Apple's iDVD and DVD Studio Pro are among the best tools on any platform.

By Dennis Miller with Chris Armbrust

79 IN SEARCH OF... THE ULTIMATE STRING ENSEMBLE

In EM's continuing pursuit of the finest sample libraries, we turn our attention to violin, viola, cello, and double-bass ensembles. By Rob Shrock





DEPARTMENTS

- 10 FIRST TAKE
- 14 LETTERS
- 20 WHAT'S NEW
- 146 AD INDEX
- 148 MARKETPLACE
- 154 CLASSIFIEDS

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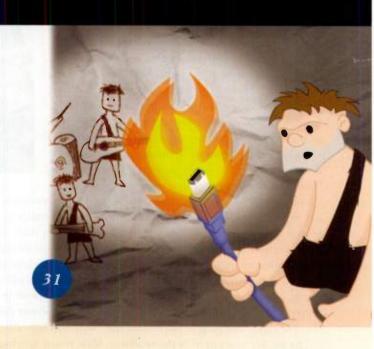
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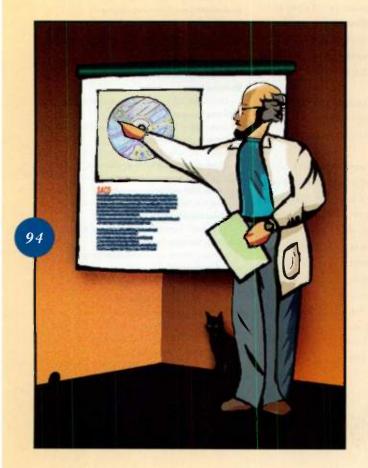
COLUMNS

- 94 SQUARE ONE: A Better Mousetrap Sony's SACD format uses groundbreaking technology to challenge DVD-A.
- 102 WORKING MUSICIAN: Time Tactics

 Make more time for musical pursuits by working smarter.
- 162 FINAL MIX: Is It Real or Is It Cynicism?

 Maintaining a balanced perspective while pursuing your dreams.



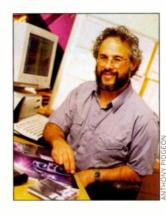


REVIEWS

- 110 NATIVE INSTRUMENTS Kontakt 1.1 (Mac/Win) software sampler
- 120 MACKIE DESIGNS Baby HUI
 MIDI control surface
- 124 TC WORKS Spark XL 2.6 (Mac) audio-editing software
- 130 EDIROL UA-700 (Mac/Win)
 USB audio/MIDI interface
- 138 QUICK PICKS: Groove Tubes Ditto Box tube DI;
 Destroy FX Buffer Override, Geometer, and
 Rez Synth (Mac/Win) effects plug-ins;
 Roland TMC-6 Trigger MIDI Converter;
 A-R Editions Cooking with Csound, Part 1:
 Woodwind and Brass Recipes (book)

The Land of Opportunity

ost EM readers had the opportunity to attend elementary- or high-school music classes, where they could learn about traditional folk and patriotic music, and even get a taste of classical music. If you were lucky, your school might even have had a jazz band. My high-school class produced several professional musicians, but more important, many students learned to appreciate a variety of musical genres. If we preferred rock 'n' roll, it wasn't because we lacked exposure to other genres, and those who wished to read music and get a handle on the fundamentals of performing were able to do so.



Unfortunately, times have changed. The ongoing economic mess, combined with the current emphasis on the "three Rs," often results in slashed funding for school music programs. As a result, it's increasingly difficult to maintain a good program in many districts. If this trend continues, the next generation is likely to have narrower and less-informed musical interests than previous generations, and many students who might have become performers will never develop that interest. Even if some budding musicians find mentors on their own, that doesn't help the far larger number of kids who will never discover their talent or will never learn to enjoy listening to music that they wouldn't have discovered on their own.

The problem is not with the teachers. Most music teachers work absurd hours and buy at least some of their materials using their own inadequate pay. Good tools exist, too: developments in music technology have produced software and hardware that could revolutionize music education at all levels and dramatically increase students' excitement about music appreciation and music-making. Furthermore, new national standards for music education demand that teachers learn to apply at least some of these tools.

To use a tool, however, teachers must have access to it, and then they need sufficient time and training to learn to use it. Only then can they integrate the new tool into lesson plans. For teachers who aren't technology whizzes, that prospect is scary, if promising.

The situation can be saved, but only if concerned parents and members of the music industry are willing to speak out. In my April 2002 editorial ("The Front Page: A Time for Us"), I wrote about the Technology Institute for Music Educators (TI:ME; www.ti-me.org), whose training programs are surely part of the solution. But even with TI:ME training and certification, what good does it do students if teachers know how to use a sequencer but don't have computers, or if music departments are savaged by budget cuts and the teachers get laid off?

Of course, if you don't care whether the next generation gets a chance to learn about music other than what they hear on commercial radio, then you need do nothing. But if you want music programs in the schools to prosper so that today's children can learn a bit about Beethoven and Basie, let your local and state officials hear about it loud and clear—soon. Otherwise, be prepared for a generation that knows a lot about Brittany (Spears) but nothing about (Benjamin) Britten.

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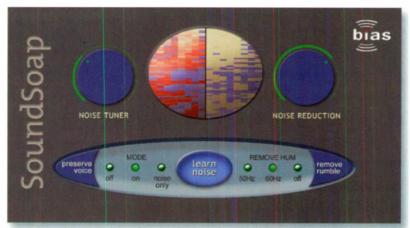
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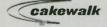
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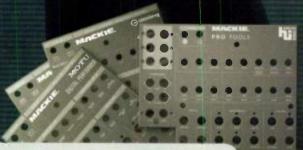
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LETTERS



TAXTIPS TO THE MAX

commend Jeffrey P. Fisher on his "Working Musician: Tax Tips for Musicians" (March 2003). In it he deftly traverses the tree of tax incentives that are relevant to the music professional, and he succinctly demystifies much of what has taken me years to learn.

Having recently successfully survived an audit, I feel that it's worth discussing one detail regarding Form 8829-Expensing Business Use of Your Home on Schedule C, which is mentioned on p. 92 under the subhead "Home Sweet Home." You may deduct only a portion of your home rent or mortgage if your business is profitable. For those living in San Francisco or New York City especially, the amount that we try to deduct for our home studios could easily be as much as \$5,000 to \$10,000 per year, for which the IRS will nail us two or three years later-with interest. The good news is that if you make a profit in the future you can cumulatively deduct home-business expenses from past years.

Raj Lathigara

Dolby Laboratories

DARETO SHARE

What is the best method for exchanging tracks recorded in Pro Tools version 5.1.1 with someone who uses

version 4.3? We both use Mac G4s; my computer is an AGP/350 MHz, and his is a PCI/350 MHz. Whenever I send him native Pro Tools, Sound Designer II, WAV, or AIFF formats—or Pro Tools 5 or Pro Tools 4 files—none of them work.

The only work-around that I've found is to save my files as audio files (.cda), and then import and convert them. That is tremendously time-consuming: if you have 16 tracks on a 4-minute song, it takes 64 minutes! There has to be a better way. I've even thought of trying different media such as Smart Media cards or the new USB drives that would be easy to transport.

Thanks. I really enjoy EM.

Mike Butler

via e-mail

Digidesign's Tom Siebo replies: Mike—in your Pro Tools 5.1.x system, create a folder on your hard drive where you will place the files you want to transfer. Save a copy of your session document (not the audio files) in the new folder as a Pro Tools 4.x session. The audio in your 5.1.x session is normally saved in the native Sound Designer II format, which is preferred. Open the Audio folder within the 5.1.x session folder, select all of the audio files, drag and drop them into your new folder, and let them copy.

Once they are copied, launch your CD-burning application. I use Roxio Toast, but other programs perform the same utility functions. Drag the new folder—the one with the saved 4.x session document and the audio files—into your CD-burning application. (Note: This is how the procedure works in Toast. If your application functions differently, follow its instructions.) Once the new folder is in the archive application, make sure that you're archiving data as opposed to music files or another type of file. Then burn the CD and send it to your partner who uses Pro Tools 4.x.

Your partner should copy the folder onto

his hard drive (preferably the drive that's reserved for audio data, not the system drive) and launch the Pro Tools application. Navigate to the session folder that you just copied and open the session by double-clicking on it or selecting it and pressing Enter. Pro Tools will post a dialog box that will ask him, "Where is file [4.x file name]?" He must highlight the session folder and click "Search in Selected Folder." Repeat that process until the session opens. At that point, he should resave the session. Now his Pro Tools system has established the path between the session document and the audio, so he's good to go.

If you receive an error message during this process, write it down and contact Digidesign's tech-support department at (650) 731-6100. Let a qualified technician resolve the error for you. It's worth the time.

SURROUND BOUND

Recently I was at a friend's place listening to music on his hometheater system. He has a standard surround-sound arrangement: five speakers and a subwoofer with a surround-sound receiver. When he played an audio CD, the two rear speakers were silent during verses; during choruses, backup vocals came pouring out of them. I couldn't figure out how a standard CD could play intelligently in surround sound—I thought that only DVDs were capable of that.

He gave me a modest explanation about how Dolby Pro Logic works. Being an electronic musician, I want to learn how to mix a standard audio CD so that it plays intelligently on a Pro Logic system. I understand that there are limitations to what is possible, but I would love to learn as much as I can about this subject. As an EM subscriber, I've read a few articles on mixing for 5.1, but I don't recall a



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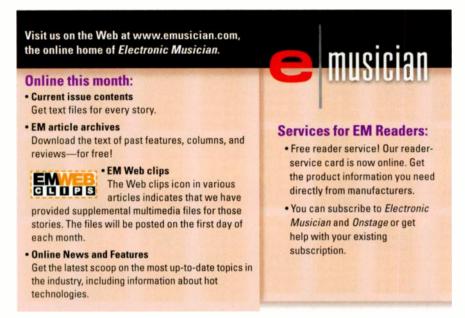
the tie at home.

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discussion of this subject. Perhaps you could point me in the right direction?

I love EM. It's an invaluable resource for me. Keep up the good work.

Matthew Miller via e-mail

Contributing editor Larry the O replies: Matthew-first of all, it's helpful to distinguish between Dolby's original Pro Logic, also known as Dolby Surround, and the more recent Pro Logic 2 (PL2). Pro Logic is a 4-channel system (Left, Center, Right, and mono Surround, abbreviated "LCRS"), while PL2 generates stereo surrounds, yielding five channels, and relies on the bass-management feature of the listener's receiver to create the ".1" feed to the subwoofer. Pro Logic's surround channel was limited to a 7 kHz bandwidth, while PL2's surrounds offer full bandwidth. Furthermore, PL2 can decode Pro Logic and even regular stereo signals, in addition to PL2-encoded signals. How can that be?

The secret—and the key to your question—lies in how multiple channels are encoded into the stereo signal produced by both Pro Logic and PL2 encoders. The essence is matrix encoding, in which phase is used to fold the center and surround channels in with the left and right channels, yielding the final stereo signal that is referred to as LL/Rt, which stands for "Left total" and "Right total."

It's accomplished in this way: any signal that appears identically in both left and right channels is steered to the center, while signals that appear identically in left and right channels, but with opposite phase between the two channels, are directed to the surround channel(s). Amplitude discrimination is also used to steer the signals to the correct channels. PL2 uses additional phase and amplitude discrimination to obtain the stereo surrounds.

Thus, feeding a signal to both stereo channels while flipping the phase on one side will steer that signal to the surround speakers. That yields a near-surround experience, even when listening to the encoded signal without decoding, because out-of-phase signals are heard as unlocalized sources coming from outside the arc of the front stereo speakers, yielding a surroundlike effect. Since the surround signal is encoded using out-of-phase signals, it disappears in mono. Big deal.

There's more to Dolby encoders. For instance, the phase shift is accomplished by shifting 90-degree and -90-degree phase shifts, rather than 0- and 180-degree shifts. Also, the process is decidedly imperfect: normal phase and amplitude shifts in signals can fool the decoder, which causes unexpected image shifts. If you've ever listened to a movie through the Dolby decoder in your home receiver, you may have noticed odd things like dialog sliding momentarily off to one side and then coming back because of some other signal that briefly becomes amplitude-dominant and messes with the steering.

For that reason, engineers creating Dolby Pro Logic or PL2 mixes always monitor through an encode/decode chain, so that they are hearing the final result and can catch any peculiarities. Frankly, it's rather a pain in that context, but I have often turned a bug into a feature by deliberately introducing dynamic phase variations into an ambience, for instance, to get it to move around some when decoded.

In your example, my guess is that the background vocals had been run through a chorus or some other processor intended to spread them into stereo, which probably created enough phase anomalies to steer them to the surround speakers. Note that if you run any stereo signal through a Pro Logic or PL2 decoder, you could get some activity in the surrounds. However, PL2 does a much nicer job of it and actually produces very enjoyable surround from a regular stereo mix. If you try this, you will probably notice that reverb is steered to the surrounds because it contains lots of phase activity.

Dolby's Web site (www.dolby.com) offers a number of white papers and other information on Pro Logic, Pl.2, Dolby Digital, and their other technologies.

ERROR LOG

February 2003, "Ain't it Grand," p. 54, Product Information table: Post Piano Suite, vol. 1, is currently distributed by EastWest; tel. (800) 969-9449 or (310) 271-6969; e-mail sales@eastwestsounds .com; Web www.soundsonline.com.

March 2003, "In Search of...The Ultimate Brass Library," pp. 43 and 44: Prosonus's Orchestral Gollection is distributed by Big Fish Audio; tel. (800) 717-3474 or (818) 768-6115; e-mail info@bigfishaudio.com; Web www.bigfishaudio.com.

March 2003, "Sweet Fruit, Strange Fruit," p. 73: In the table "Fruityloop Formulas," two fractions were converted to underscore characters during the printing process. The underscore character in the left-hand column should be ½, and the underscore character in the right-hand column should be ¾.

WE WELCOME YOUR FEEDBACK.

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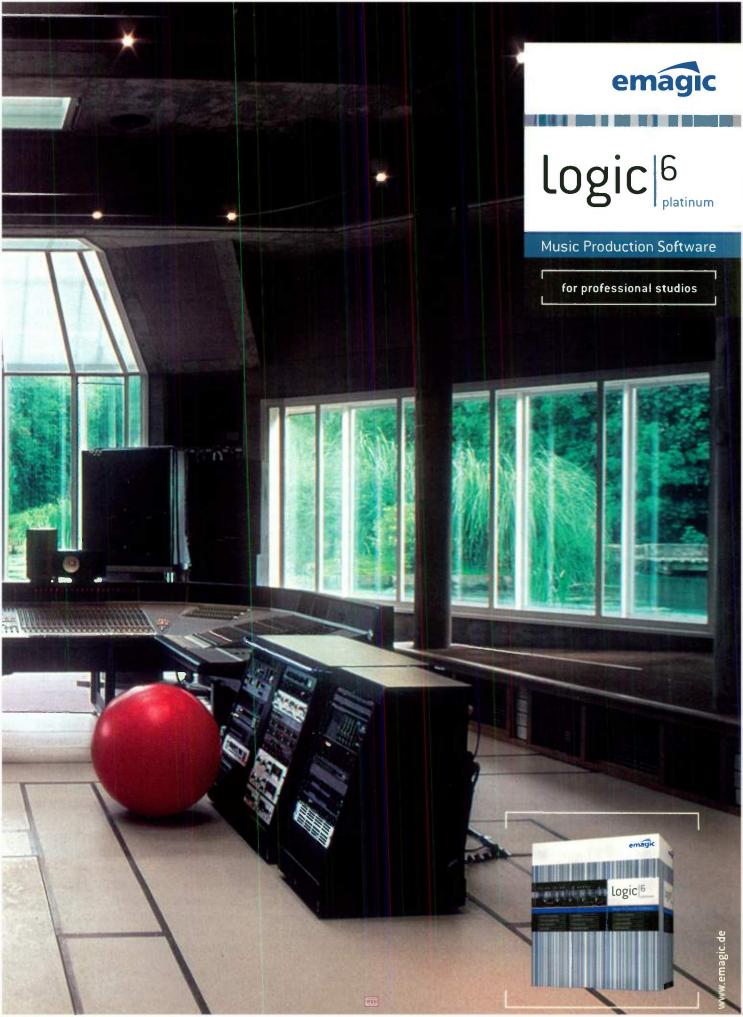
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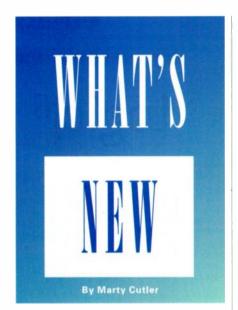
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ALESIS PROACTIVE 5.1

he ProActive 5.1 (\$499) is a THX-certified surround monitoring system equipped with Dolby Digital and DTS hardware decoding. The ProActive 5.1 is targeted for the personal studio and can be used with PCs, home audio and recording equipment, and DVD players. The system includes Dolby Pro Logic II for creating realistic 5.1 surround sound from stereo sources.

The 450W RMS system features an 8inch, long-throw subwoofer with a flared bass port for distortion-free low end. The front, rear, and center monitors have 3inch drivers, with a frequency response of 100 Hz to 20 kHz. The satellite speakers are crossed over to the subwoofer at 100 Hz.

The ProActive 5.1 offers optical and coaxial S/PDIF digital inputs and discrete 6-channel analog inputs. The system includes a wireless remote, so you can adjust the monitors from anywhere in the room. Alesis; tel. (401) 295-9000; e-mail info@alesis.com; Web www.alesis.com.

OPEN LABS EKO OPENSYNTH

he Open Labs eKo OpenSynth is a keyboard-based digital audio workstation that ranges in price from \$1,995 to \$5,200, depending on the features you choose. The eKo OpenSynth is powered by

an industry-standard micro-ATX motherboard and comes with your choice of Windows XP or Linux operating systems, digital audio sequencer, plug-ins, and VST Instruments. You can directly access the Internet with the instrument to download new synths, plug-ins, or OS updates.

The eKo OpenSynth is available in 61-, 76-, or 88-key configurations, with Aftertouch as a standard feature. Provided are a built-in backlit 15-inch color LCD (and support for an external 1,024 × 768-pixel monitor); a QWERTY keyboard; a touch



pad: an array of programmable buttons, knobs, and sliders; and a built-in CD-RW drive for mastering and data import and export.

The eKo OpenSynth offers eight balanced %-inch analog inputs and outputs; a pair of balanced XLR outputs; MIDI In, Out, Thru, and a switchable Out or Thru jack; and S/PDIF I/O. You can also swap I/O modules with any supported PCI, FireWire, or USB interface. Open Labs; tel. (512) 444-4666: e-mail info@opnlabs.com; Web www .opnlabs.com.

ROLAND VARIOS

ollowing the lineage of the VP-9000 Variphrase, Roland's Varioo hardware and software system allows musicians to process, slice, reconstruct, and build audio files into tracks in much the same way they would in MIDI sequencing. The VariOS hardware module assumes all processing duties under the control of the bundled V-Producer software (Mac/Win).

The 1U VariOS module can play as many as 14 phrases simul-

taneously with six multitimbral parts. A simple **USB** connection between the com-

puter and the module gives V-Producer control of the hardware.

The V-Producer software lets you search your computer's hard drive for WAV and AIFF files for batch encoding and transfer to the VariOS module. Once the encoding is complete, you can build your arrangement with V-Producer using simple drag-anddrop commands.

V-Producer's GrooveScope editor lets you reconstruct loops by rearranging audio regions in a graphical editing window. Pitch, time, formant, and dynamics can be independently manipulated for each slice, all in real time and nondestructively. The PhraseScope editor can isolate the melodic content of solo vocal and instrument phrases, providing the tools to create new melodies or harmonies without pitch-shifting artifacts typical of that process. You can input melodies graphically or with a MIDI keyboard in real time. Likewise, you can tweak the VariOS module's pitch, time, and formant knobs and record the data into V-Producer.

Because VariOS supports synchronization through MIDI Clock

> and MTC, it can integrate with vour existing digital audio se-

quencer. V-Producer arrange-

ments can also be saved as Standard MIDI Files; you can export processed audio files in WAV or AIFF format for use in other programs. The VariOS module's firmware can be updated with optional PC cards from Roland, and the company claims the system can become an entirely new product just by loading new control software.

The VariOS module provides a stereo pair of unbalanced 1/4-inch line inputs, two stereo pairs of unbalanced 1/4-inch line outputs, a coaxial S/PDIF digital output, a stereo headphone jack, MIDI In and Out, and a USB port. Roland Corporation U.S.; tel. (323) 890-3700; Web www .rolandus.com.







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NOVATION REMOTE 25

eMOTE 25 (\$399) is a 25-key MIDI controller with a small footprint that features two octaves of semiweighted keys with Aftertouch. The controller can run for over 18 hours on six C batteries or it can be powered from USB or an external power supply. You can also use rechargeable batteries, which can be refreshed using the USB connector or the power supply.

The controller includes 24 buttons, 8 knobs, 8 encoders, and 8 sliders. All of the controls are user programmable. The combined pitch-bend and modulation joystick offers a choice of static or spring-loaded action. Capping off the programmable controls is an x-y touch pad that can control multiple parameters at once. A backlit blue

and silver LCD shows the generated data stream in real time.

The ReMOTE 25's 64 programmable memory slots hold a number of controller templates for popular hardware and software synths, such as Propellerhead Reason, as well as software workstations and their associated plug-ins. You also receive controller templates for Novation's V-Station, KS-series, and Supernova II-series synths.

The digital audio sequencer templates provide dedicated buttons for control functions, including Start, Stop, Record, and marker placement. To keep you oriented, the unit comes with color-coded identification strips for specific applications and blank user-definable strips. The MIDI In,

Out, and Thru jacks let you use the ReMOTE 25 as a 16-channel MIDI interface and keyboard controller away from the computer.

The ReMOTE 25 ships with USB drivers for Windows 98SE, 2000, ME, and XP. A Mac OS X driver should also be available by the time you read this. EBlitz Audio Labs

(distributor); tel. (310) 322-3333; e-mail salesusa@novationaudio.com; Web www

.novationaudio.com.

GMEDIA ODDITY

ddity (Mac/Win, \$129.95) is a VSTi software emulation of the ARP Odyssey. Oddity gives you two oscillators with



sawtooth, sine, square, and variable pulse-width waveforms as well as white

and pink noise. You can tune the oscillators across a 6-octave range, play them in monophonic or duophonic mode, and take advantage of the oscillator sync fea-

> ture. The LFO can synchronize to the tempo of the host application. Included modules are a ring modulator, a resonant lowpass filter, a highpass filter, sample and hold, portamento, two envelope generators, and a variety of complex modulation routing options.

Unlike the Odyssey,

Oddity is Velocity sensitive. Because Oddity is a collaborative effort with plug-in manufacturer Ohm Force, the instrument offers patch-morphing capabilities and a Flying Slider feature that lets you grab faders with the mouse and throw them at varying speeds. Your VSTi host application can record the slider movement.

Oddity ships with a full printed manual and five banks of 64 presets. AU, RTAS, and MAS versions are in development. Oddity runs on any Mac G4 running Mac OS 8.6, with 64 MB of RAM and a VST-compatible host program. Windows users need a Pentium III with 64 MB of RAM; Windows 98, 2000, ME, NT, or XP; and a VST-compatible host program. Q Up Arts (distributor); tel. (800) 454-4563 or (801) 486-8225; e-mail gforce@gmediamusic.com; Web www.gmediamusic.com

AUDIX MICROS

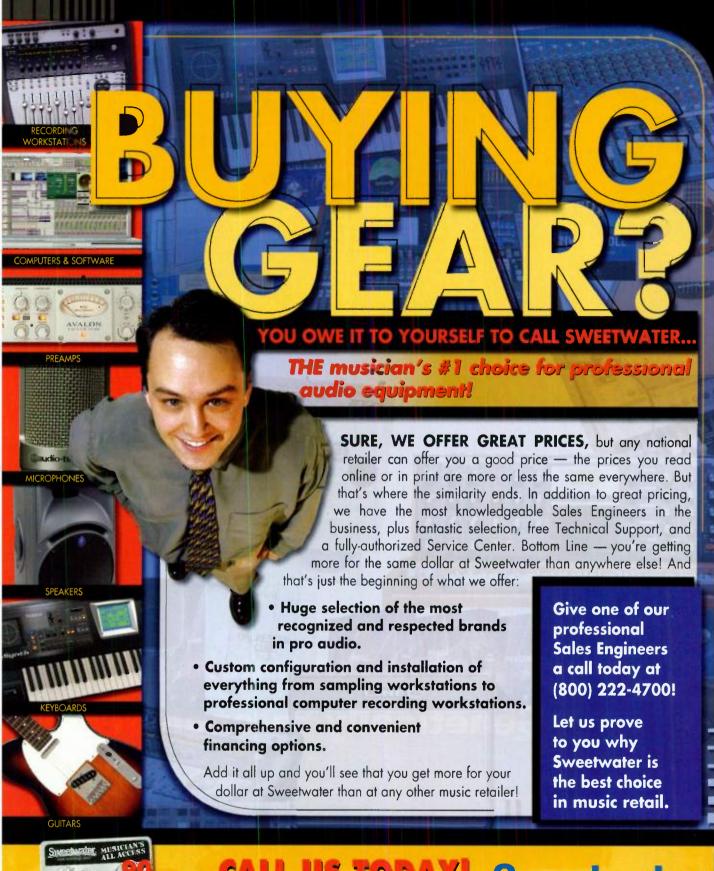
he first two mics in the Audix Micro series are the M1245 (\$379) and M1290 (\$429). Both models offer a precision machined-brass body and black finish. Individual models offer capsules with cardioid, hypercardioid, omnidirectional, and shotgun polar patterns. The M1245 is less than 2 inches long and weighs a mere 0.6 ounces. The 3.5-inch M1290 weighs in at 1 ounce.

The Micros feature the same built-in preamp used in the SCX-series mics. Audix boasts an Equivalent Noise Level of 19 dBA, a wide dynamic range, and a signal-to-noise ratio of 75 dB. According to Audix, the M1245 has a uniform frequency response from 80 Hz to 20 kHz, and the M1290 ranges from 40 Hz to 20 kHz. Requiring phantom power of 48V to 52V, the Micros are capable of cable runs as long as 150 feet without degradation of signal or frequency response.

The mics ship in a rosewood case and come with a 12-foot cable that has a mini-XLR connector on one end, a mic stand adapter, and a snap-on foam windscreen. Optional accessories include 10- and 25foot cables, a rubber-insulated shockmount clip, and a special clip for overhead mic positioning. Audix U.S.A.; tel. (800) 966-8261

or (503) 682-6933; e-mail info@audixusa .com; Web www.audixusa.com.





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A BIG FISH AUDIO

avid Garibaldi has won Modern Drummer's Reader's Poll six years in a row. He is largely responsible for the influential "East Bay Funk" sound, his inimitable groove long having been the propelling force behind the legendary Tower of Power. Tower of Funk (\$99.95) presents 800 of Garibaldi's grooves and fills, along with a collection of individual hits, in Acidized WAV-file format on a CD-ROM as well as in audio format on a CD.

The tempos of the grooves and fills range from 66 to 136 bpm. Sampled individual hits include kicks, snares, snare side sticks, toms, and cymbals. Tom and snare flams are also included.

Big Fish also offers Mixtended Drums (EXS24, Battery, HALion, and LM4, \$99.95), a sample collection of five drum kits from drummer Simon Phillips. Each of the library's Programs takes advantage of the multitimbral capabilities of the samplers.

Each kit offers a close-miked dry kit with signals routed to individual outs, a kit recorded with overhead mics, and a kit recorded with room mics. The Programs offer up to 12 Velocity levels per kit. You can mix, match, and process the three component kits to combine drums with their natural room sounds and tweak placement of individual instruments. Big Fish Audio; tel. (800) 717-FISH or (818) 768-6115; e-mail info@bigfishaudio.com; Web www.bigfishaudio.com.

V USEFUL NOISE

leith Hillebrandt is the former sound designer, programmer, and remix artist for Nine Inch Nails. *Useful Noise*, vol. 2 (\$99.95), is Hillebrandt's new sample CD-ROM and the sequel to his Diffusion of Useful Noise collection.

The samples run the gamut from atmospheric, pad-type sounds to hard-sounding, distorted drums. The collection also includes rhythmic loops and complex, evolving sounds.

In all, *Useful Noise*, vol. 2, provides over 1,000 license-free, 16-bit, 44.1 kHz AIFF files. The CD-ROM includes sounds that are fully mapped as Emagic EXS24 MkII



instruments and rhythmic loops in REX2 format. Upon registration, owners of the CD-ROM automatically gain membership to usefulnoise.com, where Hillebrandt will post new sounds on a weekly basis. Useful Noise; e-mail info@usefulnoise.com; Web www.usefulnoise.com.

EASTWEST

enowned Grammy winner Professor Keith O. Johnson recorded the Quantum Leap Symphonic Orchestra (Mac/Win, \$3,480) in a state-of-theart concert hall using custom-built recording equipment. The CD-ROM collection is in Native Instruments' Kontakt format, but the package includes a limited playback-only version of the pro-

gram. The collection offers four volumes: Strings, Woodwinds, Brass, and Percussion. Each volume features a wide variety of articulations for individual instruments and sections.

The 24-bit, 88.2 kHz sample library (a 24-bit, 44.1 kHz version is also available) includes three simultaneous stereo mic setups—close-miked, stage, and hall. The three setups let you change the tone and ambience of any instrument or section in real time by changing the balance between close-miked, stage-miked, and hall-miked samples. This multiple-perspective approach eliminates the need for additional reverb processing.

The playback engine includes automatic sample switching of up and down strokes, which provides more realistic articulation of stringed-instrument samples in rapid-fire passages. All of the instruments and sections are chromatically sampled at multiple dynamics.

The Quantum Leap Symphonic Orchestra supports VST 2.0, MAS, DXi, ASIO, Sound Manager, FreeMIDI, and OMS. Support for Audio Units, Core Audio, and RTAS will be available as a download soon. Using the sample-player engine requires a Pentium III or Athlon 400 MHz computer; Windows 98, 2000, ME, or XP; and 256 MB of RAM. Macintosh users will need a G3/500, Mac OS 9.2, and 256 MB of RAM. EastWest; tel. (800) 969-9449 or (310) 271-6969; e-mail sales@eastwestsounds .com; Web www.soundsonline.com.



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APOGEE MINI-DAC

he latest addition to the Apogee Mini Series is the Mini-DAC (\$1,195), a compact 192 kHz D/A converter that Apogee says is suitable for studio reference monitoring as well as high-end home audio systems. The Mini-DAC's USB port lets you interface the device directly with your computer, and the Digital Thru mode lets you interface non-USB digital devices through the Mini-DAC to your computer. This allows you to connect any 2-channel

A/D converter—such as Apogee's Mini-Me, Trak2, or Rosetta—to your computer's USB port using the Mini-DAC.

The Mini-DAC supports AES/EBU, S/PDIF coaxial and optical, and ADAT Lightpipe digital inputs. Analog outputs are on balanced XLR jacks. The device also includes %-inch and %-inch headphone jacks.

Drivers are available for Windows 98, 2000, and XP, and for Mac OS 9.1. The Mini-DAC also supports Core Audio in Mac OS X



10.2.4. Apogee Electronics Corp.; tel. (310) 915-1000; e-mail info@apogeedigital.com; Web www.apogeedigital.com.

▼ METASONIX TM-3

he TM-3 (\$399) from Metasonix is an analog voltage-controlled oscillator with an all-tube signal path. Containing two parallel-wired thyratron-tube oscillators, the unit dishes up a pair of sawtooth waves that you can offset with front-panel tuning controls.



According to Metasonix, the TM-3's waveform is "very imperfect" and unlike waveforms produced by any other VCO. You can soft-sync the oscillators, forcing oscillator 1 to slave to oscillator 2. The TM-3 also offers a suboctave square wave that is one octave below oscillator 2, as well as brief pulses in the same octave as oscillator 2. Adjusting the Suboctave Stability control in conjunction with the suboctave waveform can produce inconsistent and unique effects.

The TM-3 adheres to the Hz/V CV standard—each successive octave requires doubling of the control voltage—so it is compatible with vintage Korg MS-series and Yamaha CS-series synthesizers. The oscillator accepts CVs from any MIDI-CV

converter with Hz/V capability, including the Synhouse MIDIJACK II, the Philip Rees Little MCV, the Kenton Pro-Solo and Pro-2000, and the Encore Expressionist. Metasonix offers a version of the TM-3 with a built-in Synhouse MIDIJACK II MIDI input (\$549).

The TM-3 has two %-inch TRS inputs that accept CV and audio signals, as well as a %-inch TRS jack for audio output. Metasonix offers mounting kits for its TM-series modules that work within the Synthesis Technology MOTM, Synthesizers .com, Doepfer, Analogue Systems, and Analogue Solutions modular-synthesizer formats. Metasonix; tel. (707) 263-5343; e-mail synth@metasonix.com; Web www .metasonix.com.

ARTURIA MOOG MODULAR V

rturia's Moog Modular V (Mac/Win, \$329) models all of the functions of the original Moog modular synthesizer. It can function as a standalone synthesizer or as a VST Instrument with support for ReWire. But unlike the original Moog modular, Arturia's software counterpart offers 64-note polyphony.

Arturia's sound engineers created a new algorithm (and acronym) for reproducing analog synthesizers, called True Analog Emulation (TAE). Arturia claims that TAE completely avoids aliasing and that the algorithm successfully emulates the typical instability of older hardware oscillators.

Moog Modular V has nine oscillators modeled after the Moog 921-series module and two LFOs. The synth also offers a choice of filter types based on those in

the Moog 904-series: a 24 dB lowpass, a 24 dB highpass, a filter coupler, and a 20 dB multimode filter with seven modes.

The noise generator is modeled after the Moog 923 module and offers white and pink noise. The six ADSR envelope generators are modeled on the Moog 911 module. Arturia gives you a dedicated envelope for each of the two VCAs and a pan pot for stereo effects. There are 16 auxiliary VCAs with modulation inputs. Moog Modular V also includes a model of the Moog 960 step-sequencer, a 16-band filter bank with adjustable bandwidth, and stereo delay and chorus. The synth ships with more than 400 presets created by a team of sound designers that includes Celmar Engel and Wally Badarou.

Moog Modular V requires a Pentium III/500; Windows 95, 2000, ME, or XP; and 128 MB of RAM. On the Mac, you'll need a

G3/500, 128 MB of RAM, and Mac OS 9 or Mac OS X 10.2. Arturia; tel. (33) 438-020-555; e-mail info@arturia.com; Web www .arturia.com. €



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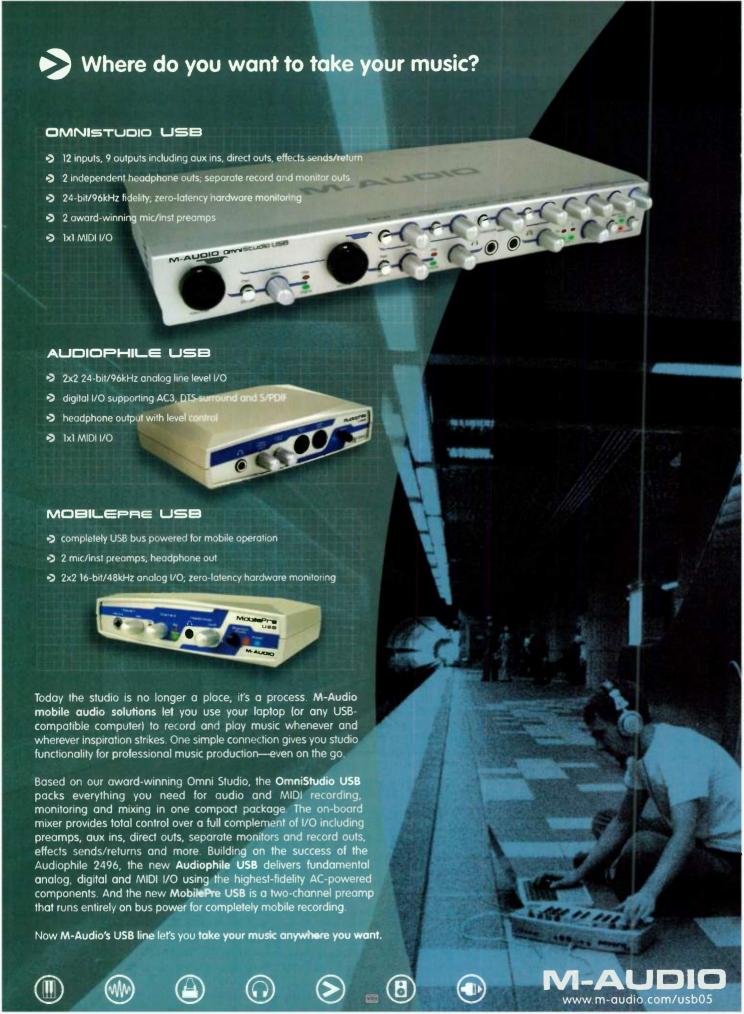


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Playing with Fire



FireWire and mLAN are music to the ears of studio owners, performers, and desktop musicians.

RireWire (like USB) is a bus for connecting digital gear, and it is amazing for the kinds of data that it can carry at one time over a single cable. MIDI data, audio data, video data, control data, computer files; all can travel through the same path (see Fig. 1). What's more, the amount of data

that FireWire can carry is huge, and the amount gets larger as the data rate increases. (Faster data rates are on the horizon.)

FireWire's data is not just limited to the sounds that we know and love. You can hook up diverse equipment such as a synthesizer, a hard drive, and a scanner to a single FireWire setup. All the peripherals coexist without bumping into each other. FireWire cables have an advantage over USB in that FireWire can stretch for long distances. That makes FireWire ideal for wiring up studios and performance spaces (see Fig. 2). To better understand how we got where we are today, and to see where FireWire will go from here, let's take a look under the hood. FireWire was originally developed in the 1990s by a team at Apple Computer. The published standard as finally released by the IEEE (Institute of Electrical and

By Mike Overlin

and

John Strawn

Electronic Engineers) is about an inch thick and is officially known as IEEE 1394-1995. The number 1394 was simply the next

available number chosen by the IEEE in its running list of standards. Originally, the term *FireWire* was owned by Apple Computer. Sony came up with its own term, *i.LINK*. The term FireWire has now been released by Apple for everyone to use; therefore, that's the term that we'll use in this article. (For a list of FireWire resources, see the sidebar "FireWire Sites.")



WHAT FIREWIRE DOES

Like USB, FireWire lets you hook things up to a computer. Drivers are now available for the usual operating systems such as Windows, Macintosh, and Linux. Unlike USB, however, FireWire will run quite happily without a computer. That makes it ideal for situations in which a computer would be unnecessary, such as in permanent audio installations like theaters or churches. It also gives FireWire another advantage, because devices can talk directly to each other without having to go through a computer's operating system.

If you use FireWire in its original form, you can run up to 400 Mbps (megabits per second) over a copper wire. (Apple's new desktop computers now support 800 Mbps FireWire as well.) Each "hop" in the bus can be up to 4.5 meters long. Up to 64 devices (called nodes) can be connected to one bus; all 64 devices, however, must be within 16 hops of each other. With a maximum of 16 hops, a single FireWire bus can handle devices up to 72 meters apart (in the original FireWire spec).

The FireWire specification has contin-

ued to develop since it was first released. You'll see references to 1394a and 1394b (finalized in 2002). With those standards, faster bus speeds and longer cable lengths became possible. The chips used to implement FireWire got simpler to manufacture, and different kinds of cable, such as fiber optic, were introduced. Most of today's FireWire products conform to the 1394b standard.

Power line. Like USB, most FireWire cables (except Sony's i.LINK) carry power. You can therefore have a small module, such as a guitar stompbox, powered directly from

the bus without needing a wall wart.

Self-configuration. FireWire supports plug-and-play and is self-configuring. In other words, while the bus is up and running, you can plug in a new device or unplug something. There are limits to the way you can connect devices. You can, for example, connect all the nodes in a single line or connect the nodes in a star configuration (see Fig. 3). There is only one configuration that is not allowed: a circle.

Connectors. As things currently stand, you may encounter up to four



FIG. 2: One or two FireWire cables can replace many audio and MIDI cables. The top photo shows a typical rear panel (the I/O unit for Yamaha's PM1D mixer) without the benefit of FireWire or mLAN. In the bottom photo, the same rear panel is shown reconfigured with FireWire and mLAN.

kinds of FireWire connectors. The standard FireWire connector goes back to 1995. Sony's i.LINK connector is smaller, has the smallest number of pins, and doesn't carry power. Since 1394b supports faster data rates, two new connectors were developed for it. You can safely connect a 1394b device to any other FireWire device. But if you have several 1394b devices, you may want to connect them together, then connect any older FireWire devices The reason is that the faster 1394b devices can talk at least to each other at faster data rates. But once the data encounters an older FireWire device, the slower data rates may be imposed.

By the way, there is a fundamental difference between older ways of connecting gear, such as MIDI, and FireWire. A MIDI cable shovels data in just one direction. But with FireWire connectors, there is no "FireWire Out" or "FireWire In" because data travels over the FireWire cable in both directions.

Bus reset. In the original FireWire (1394-1995), a short amount of time (called the bus reset) is required for the bus to configure itself. If you're performing onstage and someone wants to plug in, that could lead to an audible gap in the audio. Fortunately, 1394b introduced a way for the bus to reconfigure itself much more quickly, at least some of

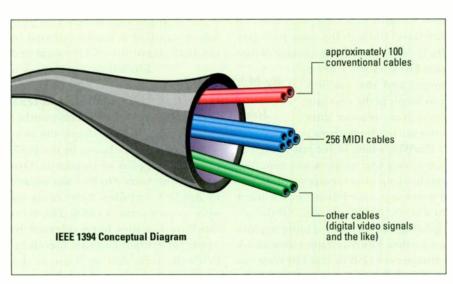


FIG. 1: FireWire is a digital bus that can carry many kinds of data at the same time, including audio, MIDI, and other signals such as digital video and control data.



REMOTE

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the time. As a result, in many cases you won't even hear a break in sound when you plug in to a bus that's active.

In use. Several popular products currently make good use of FireWire. For example, Mark of the Unicorn's 828 and the more recent 896 offer eight channels of audio at 48 and 96 kHz sampling rates respectively. Euphonix has used FireWire for years for sending control messages. Digidesign's Digi 002 control surface uses FireWire to send control messages, MIDI, and audio back and forth to the control computer running Pro Tools. All of these devices should, in theory, run at the same time on the same FireWire bus without breaking each other or the bus.

In progress. An important new development is still being worked out: 1394.1, which finalizes how to use bridges. A bridge allows you to hook up more than one FireWire bus. You could then have one bus in Studio A, another bus in Studio B, and gear in one studio could "see" and "talk with" gear in the other studio across the bridge. Having separate buses connected by a bridge has one great advantage: when you hot-plug a new device into the bus in Studio A. there is no bus reset for the bus in Studio B. The original FireWire specification lets you connect up to 1,023 buses (each containing up to 64 nodes). The details of how to do so are what will be established in 1394.1.

SAFE AT ANY SPEED?

FireWire connections are classified according to how fast they can work. An S100 cable can carry data at about 100 Mbps. There are higher speeds at multiples of 100: S200, S400, S800, S1600, even S3200. They represent data rates of 200 Mbps, 400 Mbps, and so on. The top two speeds of S1600 and S3200, matching 1.6 Gbps (gigabits per second) and 3.2 Gbps, give rise to the name "gigabit FireWire."

An S200 cable connected with today's hardware can carry about 80 channels of 24-bit audio at a 48 kHz sample rate (or correspondingly fewer audio channels at higher sample rates). The same cable can alternatively carry the equivalent of about 100 MIDI cables, or it can carry a mix of the two.

PACKET POWER

FireWire works by sending packets of data over the bus. There are two fundamental kinds of FireWire data: asynchronous, meaning "any ol' time" and isochronous, meaning "same-time." The asynchronous way to transmit data is used for data that needs to be transmitted reliably, but perhaps not very quickly. For example, control information has to be reliable as does the data in a file passed over the bus. About 20 percent of the bus capacity is reserved for asynchronous traffic.

Fortunately for musicians, the Fire-Wire designers put an emphasis on delivering the kind of data that we most often use. When you play a key, hit a drum, or stream a file, you have to know that the musical data arrives in a timely fashion. For that kind of data, isochronous messages are used.

Up to 80 percent of the bus traffic is available to isochronous traffic. When you plug a new device into the bus, the device "asks" the bus for the bandwidth it needs. If the bandwidth is available, it is reserved for the device. In that way, the device doesn't have to worry about whether the bus is overflowing. Because isochronous packets were available, they inspired Sony to adopt FireWire many years ago for its video products. Isochronous packets allowed several companies to develop audio for FireWire, which ultimately led to Yamaha's mLAN.

STANDARD FARE

It would be a good idea here to become familiar with some new terminology because you'll see these words used when referring to audio and music boxes that connect to FireWire.

As we said, it is the FireWire specification that tells how to bundle data into isochronous packets. Yamaha and some other companies have figured out

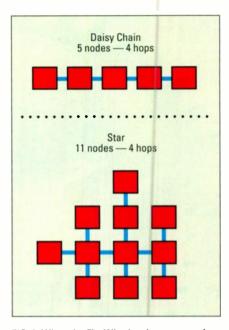


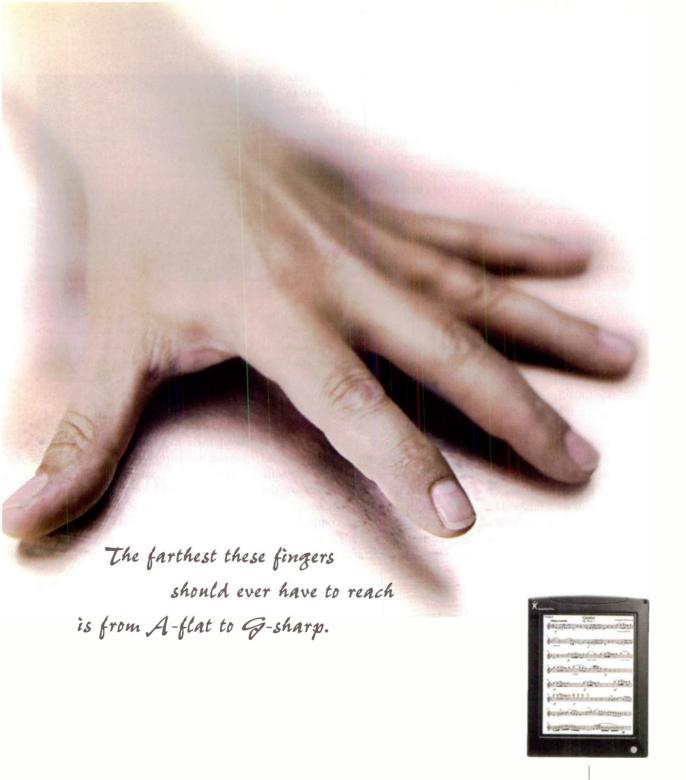
FIG. 3: When the FireWire bus becomes active, it figures out what devices are connected to it. This diagram shows two of the many ways to connect your gear with FireWire.

how to send audio over FireWire, building on standards set by various groups.

Working separately from the IEEE, the 1394 Trade Association, commonly known as the "T-A," has members from all over the world; many are consumer-electronics manufacturers. The Trade Association has developed standards on top of FireWire, especially for carrying audio and video data (see Fig. 4).

Because the 1394 Trade Association was not yet a formal standards body, it turned to the IEC (International Electrotechnical Commission) to bless the new standards. The IEC has assigned to the standard the basic number 61883, and there are subsets of the 61883 standard numbered 61883-1, 61883-2, and so on. The IEC 61883-1 standard defines a common way to handle audio and video.

The most interesting standard for musicians is 61883-6, which builds on 61883-1 and defines an exact way to handle audio and MIDI in FireWire isochronous packets. The IEC 61883-6 standard has formats for audio samples ranging up to 196 bits, floating-point audio, and MIDI messages. Yamaha made the original proposals for the formats given in 61883-6, which is sometimes also



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known as the Audio and Music Protocol (AMP). Even though Yamaha contributed significant parts of the 61883-6 standard, it is a public standard available for anyone to use.

The MMA (MIDI Manufacturers Association) chimed in also. It became interested because FireWire is capable of carrying MIDI without a MIDI cable. The MMA has now produced guidelines for extending MIDI (RP-027), which ensure compatibility with legacy MIDI devices.

In addition, the 1394 Trade Association has developed a set of standards known as AV/C, the audio/visual control protocol. It allows each device to implement what are effectively plugs—not plugs in the sense of the FireWire connectors, but rather plugs in the sense of, say, inputs and outputs on a mixer. The AV/C protocol also includes commands, such as Start, Stop, and Reverse, that are especially useful for consumer devices.

Some networks and buses make you patch in a separate cable to carry a clock signal, such as house sync. That is not required for audio over FireWire. If you adhere to 61883, there is a clever way for a receiver to derive the clock from the data being transmitted.

THE MLAN CONNECTION

In addition to the 61883 standards, Yamaha has developed some improvements known as mLAN (pronounced "em-lan"). The mLAN standard gives FireWire audio and music devices some added capabilities (see Fig. 4).

One of the biggest improvements contributed by mLAN is in connection management. Why is connection management important? As we mentioned earlier, you can plug a new FireWire node into the bus, and the bus configures itself automatically. Then how do you connect the kinds of inputs and outputs that we normally associate with, say, a mixer, to other devices on the bus? Connection management is the answer. For example, a computer connected to the bus runs a connection management program that can talk to



the "plugs" in each mLAN device. Using a graphical user interface, musicians can connect inputs and outputs just as they've always done it. If you don't have a computer, you can use a user interface on some mLAN devices to do the same thing.

What's more, mLAN remembers a setup even when there's a power failure or the bus is powered down. Suppose you set up your equipment where your band usually rehearses. With mLAN, you can "memorize" whose equipment is connected in which way. When it's time for a live gig, you power down the gear. At the club where you're performing, you reconnect the mLAN gear using FireWire cables. When it's powered up again, the mLAN gear automatically remembers the inputs and outputs, even if you connect the gear differently. That makes setup much easier.

MLAN INTHE MARKET

A computer is often the heart of a studio, and the good news is that Yamaha has released mLAN drivers for OS 9. In a future update of OS X, Apple will release Core Audio mLAN support. That OS X capability was demonstrated at the winter NAMM 2003 convention in the booths of many mLAN licensees. Yamaha has released beta versions of mLAN drivers for Windows XP.

Several music and audio products already support mLAN. For example, Apogee offers an mLAN option for its Big Ben Master Word Clock unit introduced at NAMM 2003. Apogee's AMBus FireWire card supports mLAN and fits into the company's Trak2 microphone

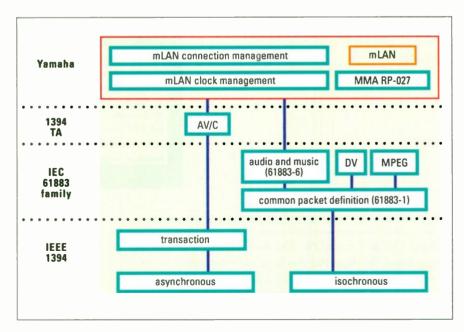


FIG. 4: When you send audio and music over FireWire, you may be using standards from many different sources. For example, Yamaha's mLAN includes the MMA's recommended practice for MIDI, and Yamaha's own connection management and clock management functions were added to earlier FireWire standards.



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preamp and A/D converter and its AD-8000 A/D converter. Presonus offers the FireStation, a converter and interface with mLAN built in. The Kurzweil KSP8 signal processor has an mLAN option called the KMLN8.

Tamura's Oolle mixer line includes a 5.1 surround mixer called the izm125 with mLAN built in. The Tamura izm821 controller allows you to synchronize audio and video over mLAN. Korg offers an expansion option called EXB-mLAN for its Triton series. Otari's ND-20 audio distribution unit connects to other audio gear, including more ND-20s over mLAN. The FS96 digitalformat and sampling-rate converter from Otari can be augmented with Otari's I/O Card for mLAN connectivity.

Of course, Yamaha also makes mLAN devices. The mLAN8P lets you connect legacy devices to the FireWire bus. It offers up to eight channels of audio in and out as well as two MIDI connectors. To retrofit the gear you already have, Yamaha offers expansion cards that fit into synthesizers, such as Yamaha's Motif series, A4000 and A5000 samplers, and the S80 and S90. Yamaha has also developed mLAN expansion cards to connect virtually all of its digital mixers to the mLAN network, from the 01V to the PM1D (see Fig. 2).

The mLAN connection management lets you connect inputs and outputs from all of this mLAN gear, even though it comes from so many manufacturers.

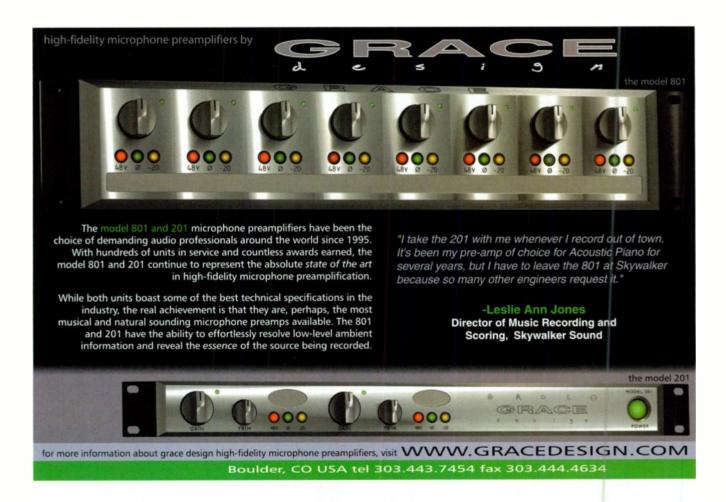
WHAT WILLTHE FUTURE BRING?

Now that we've been through the world of FireWire, audio, and mLAN, let's take a glance at what is coming down the pike. We've already mentioned that the IEEE is working on 1394.1, which will determine how bridges connect separate buses. In addition, you can expect that gear will become less expensive in the near future. That could happen because companies such as Yamaha, Philips, and Texas Instruments are producing individual chips that combine the functions of two or more other chips.

Given how computer-related technology advances, you can surely expect major advances in FireWire technology. In fact, in the not-too-distant future, you might even be running your Fire-Wire gear over a wireless network.

Mike Overlin (moverlin@yamaha.com) is the mLAN licensing manager for Yamaha Corporation of America. John Strawn (jstrawn@s-systems-inc.com) took his first computer music course in Fortran on an IBM mainframe in 1973 and hasn't recovered since.

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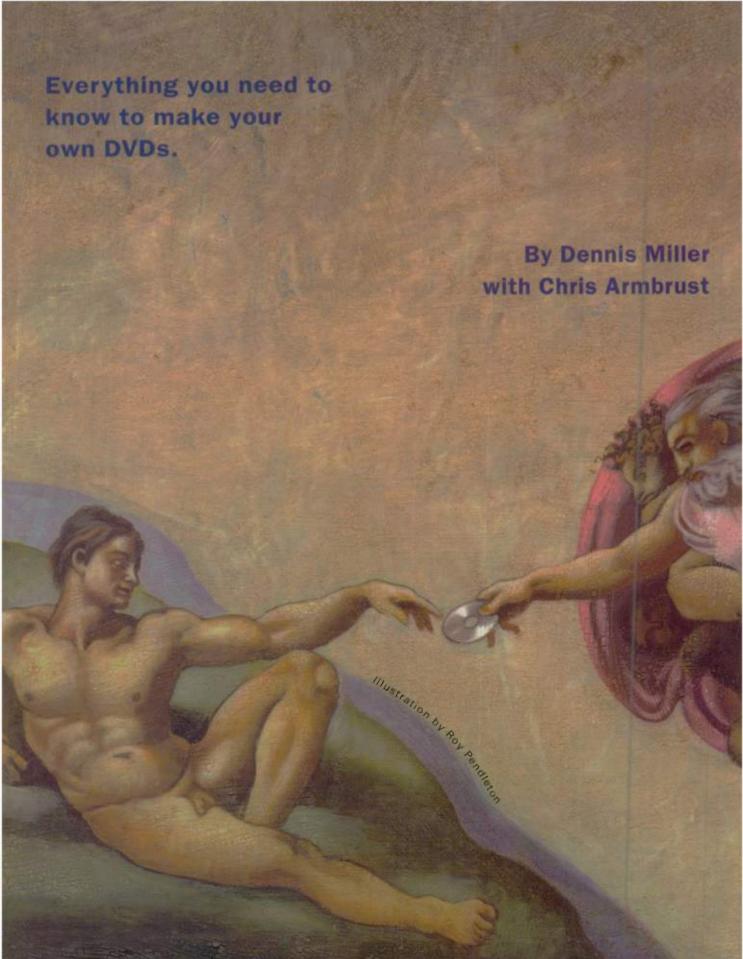
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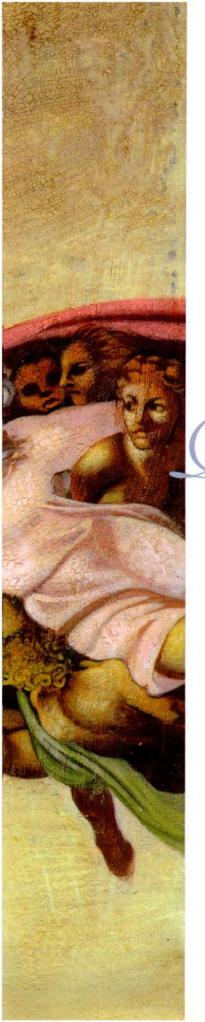
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Remember how exciting it was when you burned your first CD? Making your first DVD can be just as a big a thrill, and the medium offers creative musicians and artists an ideal platform for their work. DVD-R and DVD-Audio are still unfamiliar to most recording musicians and producers, and as with any new technology, if you want to take advantage of these exciting delivery and storage media, you need to have the right tools and a clear understanding of how to use them.

Finding the right tools is fairly easy because we've done the initial legwork for you. In the second and third articles in our triple feature ("The View Through Windows" and "Power Tools for the Mac"), we discuss the leading affordable programs you should consider for transcoding, authoring, and burning DVDs on the PC and Mac. Armed with this information, you can figure out which program is likely to be right for you.

However, the process of creating your own DVDs is a lot more involved than that of burning a CD. There are a number of potential pitfalls because of the variety of steps creating a DVD-Video disc entails; the vagaries of DVD hardware, software, and media; incompatibility among the various DVD formats; and other problems.

Fortunately, we have you covered there, too. The first of our three features on DVD creation explains what you're up against and how to get the job done right, with minimal frustration and wasted effort. So take your time and study these three stories carefully. The test comes when you make your first DVD, and we're going to help you make it a work of art.

THE INSIDE

Track

By Dennis Miller with Chris Armbrust

Making your own

DVDs can be tricky

but worthwhile.

We show you how

to do it right.

Making a DVD on the desktop involves three basic stages: transcoding, authoring, and burning. Some software can handle all three steps, but as is often the case with integrated programs, the range of features and customization options within each stage is usually far more limited than with dedicated software. In this article, we will take a look at these and other issues involved with making DVDs and discuss representative products for Mac and Windows that you might find useful.

We'll also explore some of the creative possibilities that DVD presents and will share comments from developers who are working with the medium. (For a more general overview of the technical aspects of DVD, see "World of Options" in the August 2001 issue of EM.) DVD-Audio is of particular interest to musicians and music producers, so we'll look at the current status of DVD-Audio and discuss some reasonably priced software you can use for making DVD-Audio discs (see the sidebar "What About DVD-Audio?").

TRANSCODING

Transcoding is the process of converting your media files from their native format to MPEG-2, a lossy compression

format that is required for DVD. The amount of compression used is variable and is determined primarily by the selected bit rate. The MPEG-2 standard was developed by the Moving Picture Experts Group (MPEG) for use with a broad range of source materials and for a variety of different applications (including satellite transmission). It includes a number of different profiles and levels, which are subsets of the full standard that have been defined to handle different types of implementations.

Transcoding (also called encoding, especially when video is being converted during transfer from a device such as a camcorder to a computer's hard drive) is easily the most important step in determining the final quality of your DVDs, and the process can involve a maze of adjustable parameters. If you have a video capture card such as the Canopus DVStorm2 (\$1,088) or the Pinnacle AVDV Capture Card (\$299; part of the Studio Deluxe bundle), you can capture video from an analog or digital camcorder and encode it directly to MPEG-2 format using the card's hardware encoder. (There are some applications that can do this entirely with software as well; more about that later). Depending on the type of video-capture



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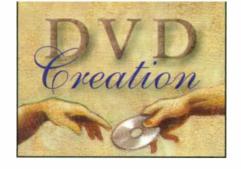




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hardware you own, you'll find various adjustable settings to control the encoding process.

If, on the other hand, you're working with QuickTime or AVI files, perhaps in a video editor such as Adobe Premiere (\$549) or Apple Final Cut Pro (\$999), you'll need to transcode your program material before authoring can begin. Versions of Premiere prior to 6.5 and all versions of Final Cut Pro are unable to perform this task on their own. so you'll need an application such as Ligos LSX-MPEG or Canopus Procoder if you're running Windows. On the Mac, discreet cleaner (\$599; also available for Windows), Apple's iDVD, or the MPEG encoder included with Apple's DVD Studio Pro will do the job. LSX-MPEG and Procoder can run standalone or plug-ins with Premiere.

ALPHARET SOUP

There are two basic methods of transcoding: constant bit rate (CBR) and variable bit rate (VBR). As its name implies, CBR uses a single rate for the entire transcoding process; it is especially appropriate for program material that runs 30 to 40 minutes or less. Transcoding is faster with CBR because the transcoder does not have to alter the

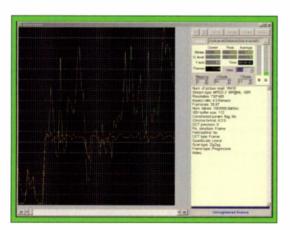


FIG. 1: Teco's BitRate Viewer (Win) can determine if the bit rate in a file exceeds the maximum level allowed on a DVD.

bit rate as it does using VBR. With VBR, the transcoder adapts to your material: complex scenes and transitions get more bits and simple scenes and transitions get fewer. VBR typically uses a two-pass process; the transcoder does an analysis of the material the first time through; then it uses that analysis to determine how to "spend" the bits. Depending on the material, VBR often allows you to put more data onto a disc with quality equal to or better than CBR would provide.

When planning your projects, you'll generally need to do some bit budgeting to en-

sure that you encode your assets (video, music, and still images) at the highest quality possible—that is, using the least amount of compression-without exceeding the capacity of a disc. DVDs have a capacity of 4.7 GB, and it's a good idea to stay at least 5 percent under the maximum.

If you encode the video at a reasonably high bit rate of 7 Mbps (7,000 Kbps) and encode one stereo 48 kHz, 16-bit PCM (uncompressed) audio stream at the rate of 1.536 Mbps (sampling rate × bit resolution × 2 channels), you can fit about an hour of material on one disc. (DVD can handle different types of audio and a variable number of channels, each of which requires a different amount of bandwidth. See the sidebar "Audio Options for DVD-Video".) To fit

> two full hours of material (such as a Hollywood movie) onto a disc, lower rates are used for the video, and the audio is compressed. It is also possible to put audio only on a DVD-Video disc.

> You might assume that you can just calculate the highest bit rate for the total playing time of your material and proceed. That's not exactly correct: the DVD spec allows for a top rate of 9.8 Mbps, which is the maximum bandwidth that the medium can handle. This rate is the combined total of

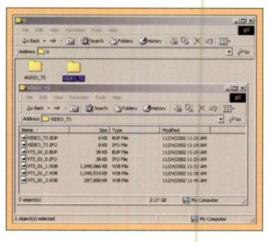


FIG. 2: The folder structure of DVD files includes a Video_TS folder and an Audio_TS folder. Program data is in the VOB files; the other files include navigation data.

all the rates used for your visual images and audio tracks. (Other information on the disc extends the capacity, but that is not a concern here.) If the total for all your material exceeds that rate, the disc won't play. Also keep in mind that most modern computers use software decoders to play DVDs, and it's a good idea to stay well under the 9.8 Mbps maximum rate if you want your discs to play on a wide range of desktops or laptops.

Even if you specify bit-rate settings for your audio and video that fall below 9.8 Mbps, transcoders often allow spikes well above the maximum to remain in the file. If you happen to create a file with too high a rate, then when you load the file into your authoring software, some authoring programs will inform you that your material exceeds the maximum rate and will simply refuse to go on. Other software will allow you to proceed without any warning, which means that you'll end up with useless files, perhaps after having run an all-night transcoding job. You can use a utility such as Teco's BitRate Viewer (\$27) for Windows to find out the maximum bit rate in an MPEG-2 file (see Fig. 1).

TRANSCODING PRÉSETS

Most programs provide presets for different types of transcoding. No doubt you'll find "NTSC DVD" or something similar in the list of default options, and the default settings often work fine. If you dig a little deeper, you'll come



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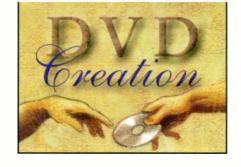
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across a vast range of settings, including things such as DC coefficient, motion estimation, and field order. In the case of the first two, the higher the setting, the better—enough said. However, settings such as field order require that you know some specifics of your program material—in this case, whether it uses upper, lower, or no fields—in order to pick the correct option.

Unfortunately, when you look at the documentation of your transcoding software, you'll often find cryptic messages such as "Changing the VBV (Video Buffer Verifier) size may produce an MPEG clip that is not playable on your playback device. Make sure your VBV setting is compatible with your playback device." Good luck trying to find any information about "VBV" in the manual of your new DVD player; it's best just to leave the setting at its default and experiment with other parameters that are more familiar.

Often the best way to determine the ideal settings for your DVD is trial and error. This makes a strong case for using

DVD-RW or DVD+RW, which, like CD-RW, allows you to reuse your discs. For material such as animation, where there can be rapid changes between scenes and a wide color gamut, you may need to experiment with many different settings to get the best quality. On the other hand, a simple, slow-moving video of a placid lake will probably look fine using the default DVD presets, everything else being equal.

MANUFACTURER CONTACTS

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Creative Labs tel. (800) 998-1000 or (408) 428-6600; Web

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PREPARE THYSELF

As with audio, knowing how your video is going to be delivered makes a huge difference in your transcoding settings. There isn't room here to go into all the fine points of preparing your video material for different delivery methods, but a few pointers are in order. For DVDs that are going to be played back on a TV, you'll want to use nonsquare pixels, keep the color range limited, and use interlaced frames. For DVDs that are intended for playback on a computer screen, you should use

square pixels, an expanded color range (computer monitors can display many more colors than TVs), and progressive (aka noninterlaced) frames.

Whatever transcoding software you end up with, be sure to spend *lots* of time at the users forum of the company you buy from. No doubt you will find many people with the same questions you have.

AUTHORING

Authoring is the step that provides the most creative opportunities in the DVD-production process. What happens when the user first puts a disc in his or her player? How many chapter (index) points will the disc have that the user can jump to randomly? What about multiple subtitles or soundtracks? These and many other aspects of a DVD are determined with authoring software. With a little effort, you can create your own Hollywood-style DVDs.

This section explores a number of authoring concepts. Before you jump in, take a look at the sidebar "Anatomy of a Disc" for background on the various elements of a DVD that you can control, along with definitions of some relevant terms. See the sidebar "Top 10 Authoring Tips" for additional suggestions.

WHAT'S THE PLAN?

Even for a simple DVD, you need a plan. More up-front preparation results in a better disc and a less frustrating creation process. Aauthoring tools let you do a lot of improvising as you go along, but you need to give serious thought to how you want the viewer to experience your DVD before you start.

One of the first things you need to determine is what the viewer will see when the disc is loaded into a player or drive. Most often, a disc will either begin to play automatically or will present the viewer with a menu of options. You determine the sequence of events by specifying a startup action. For example, many authoring programs let you define one of your video clips as the first play. The clip might be your actual video, or it might be a sequence that includes an opening or splash video (and/or the FBI warning), then a transition to the main or top-level menu.

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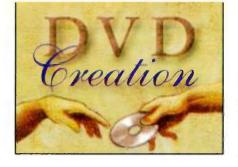
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You'll often find discs that are configured to auto play and stop. This approach works just like linear tape in

that the user loads the disc, it plays, and when it is done, it stops (no rewinding is necessary, though!). To create this type of DVD, just define your movie as the first play of the disc; you don't need to define any end action. Another approach is auto play and loop. Discs configured this way are great for trade-show booths or kiosks and are easily created by having the

end action of the video point back to the beginning.

Creating a disc that can "play one scene or play all" gives you even more flexibility. DVDs of this sort use various types of menu structures and are more interactive than the basic configurations described earlier. Depending on the number of scenes you wish to make accessible, you can have just a single menu

WHAT ABOUT DVD-AUDIO?

When most people think of DVD, what they have in mind is DVD-Video, the fastest-starting consumer-entertainment format in history. As you'd expect, the DVD format was defined from the start with an emphasis on video presentation.

Of course musicians know that the "other" DVD format is DVD-Audio (DVD-A), which uses the same physical medium as DVD-Video. DVD-A has different content definitions that emphasize audio fidelity and offers navigation features designed to appeal to the music listener. For music producers, it might seem natural that DVD-Audio would be the format of choice. Alas, the situation is not that simple.

DVD-Video has had a mature specification for several years and has an installed base of many millions, but the specification for DVD-Audio was only truly finalized in 2001. Today, "combi" players for both DVD-Video and DVD-Audio discs are available, but they represent a small fraction of players in the field, and sales of DVD-Audio titles have languished.

DARE TO COMPARE

What's so great about DVD-Audio? The table "DVD-Video Versus DVD-Audio" compares the features of DVD-A and DVD-Video. Both can deliver uncompressed 24-bit PCM stereo at sampling rates well beyond those of CD, although DVD-Audio is capable of sampling rates as high as 192 kHz, while DVD-Video tops out at a "mere" 96 kHz.

When it comes to surround, though, DVD-Audio wins the fidelity contest hands down. In DVD-Video, all multichannel audio data is compressed, using either Dolby AC-3 or DTS. Depending on the format and data rate selected, audio fidelity will be affected to a greater or lesser degree. In DVD-Audio, on the other hand, up to six full-bandwidth channels can be rendered, without compression, at resolutions as high as 24 bits and sampling rates as high as 192 kHz (stereo).

Though DVD-Audio does not use data compression as such, it does make use of lossless bit-packing to deliver multiple channels at higher resolutions and sampling rates and to extend playing time. The bit-packing technique, Meridian Lossless Packing (MLP), guarantees bit-for-bit accuracy of audio data, eliminating any potential loss of fidelity.

In terms of user features outside the audio realm, DVD-Video mostly has the upper hand. For visual content, DVD-Audio defines still pictures only, while DVD-Video can provide either stills or full-motion video. Many current DVD-Audio titles include video by placing video segments in a DVD-Video "zone" on the disc, thus creating a DVD-Video/DVD-Audio hybrid disc that lets viewers jump from a selection menu into a DVD-Video clip and then return to the main program. However, whenever a motion-video clip is invoked, the audio options and fidelity revert to those of DVD-Video.

In DVD-Video, still pictures are always tied to sound, so that it becomes impossible for the viewer to switch to a different still picture without also jumping the audio to a new location. In DVD-Audio, the listener can surf liner notes, artist pictures, or lyric sheets freely while audio continues uninterrupted.

DVD-Video also includes options for

DVD-Video Versus DVD-Audio

Both DVD-Video and DVD-Audio are capable of rendering stereo audio with higher fidelity than CD. For multichannel surround, DVD-Video requires data compression (Dolby AC-3 or DTS), but DVD-Audio can render up to six channels of uncompressed audio at high resolutions and sampling rates.

render up to six channels	of uncompressed audio at high resolu DVD-Video	itions and sampling rates. DVD-Audio
Stereo Audio Options	data-compressed stereo (Dolby AC-3, DTS, MPEG-2); uncompressed PCM at 16-, 20-, or 24-bit resolution; sampling rates of 48 or 96 kHz	uncompressed PCM at 16-, 20-, or 24-bit resolution; sampling rates from 44.1 (CD standard) to 192 kHz
Multichannel Surround Options	5.1 discrete surround using Dolby AC-3 or DTS data compression	6-channel surround, uncompressed, at resolutions as high as 24 bits and sampling rate of 96 kHz
Visual Presentation	full-motion video or still pictures (fixed presentation)	still pictures only, with user navigation independent of audio; video may be added by creating DVD-V/DVD-A hybrid discs
Interactivity	extensive user interaction possible	limited user interaction possible

or a hierarchy of menus that allows jumps to any number of points on the disc.

YOU'RE MY TYPE

DVD authoring packages differ in terms of the number of features and the amount of flexibility they offer, and features are presented in varying ways from program to program. You need to be sure that the software you pick

provides the features to create the type of disc you are after. In general, you'll find three different approaches to working with your material.

Menu or wizard based. This style is found in many entry-level programs, such as those bundled with DVD drives. It provides menus for importing assets and determining navigation paths and is best for simple, straightforward DVDs

without too many buttons or menus.

Timeline based. Here, movies, menus, and slide shows are presented on a timeline or in a list. You connect the various assets by picking the destination you want from a list provided in a window or menu. This style of program can work well for complex projects, but you don't have a visual overview of your project's structure.

user interactivity, driven by small sequences of commands that are embedded in the navigational structure of the disc. Commands available include conditional logic, randomnumber generation, and full Boolean and hexadecimal arithmetic, so that user interaction can be fairly rich. In DVD-Audio, such options are severely limited.

GET ON BOARD

Although the number of DVD-Audio players in the field is tiny in comparison to that of DVD-Video, there are good reasons for musicians to use the DVD-Audio format. Though DVD-Audio releases for the mass market have not been successful so far, the medium has a following among serious audiophiles. If you're interested in targeting that market, then DVD-Audio may be a viable option for you. Also, although the current penetration is small, it's growing, and record labels and manufacturers are lining up to push the format more strongly into the market.

Maybe the best reason for musicians to look at DVD-Audio today is the opportunity it provides for multichannel and high-resolution production. A DVD-Audio/Video combi player is the only device you can buy in a standard consumer-electronics store that will play stereo audio at 192 kHz and play multichannel surround audio without data compression. With low-cost DVD-R burners and media and the advent of reasonably priced DVD-Audio authoring packages, DVD-A becomes an excellent way for professionals to exchange uncompromised reference discs during production and promotion.

DVD-A PRODUCTION TOOLS

Because of DVD-Audio's limited popularity, far fewer tools are available for production, and

the tools are generally more expensive than the equivalents for DVD-Video. Until recently, in fact, any DVD-Audio capability involved an investment well into five figures.

Fortunately, that is changing. Vendors of professional DVD-A solutions, such as Sonic Solutions, have introduced significantly less expensive versions of their systems, and new entrant Minnetonka Audio Software offers DVD-Audio tools that are affordable to a wide range of production professionals.

For several years, Sonic Solutions was the only company that

offered tools for DVD-Audio production. Facing a narrow market, their DVD-Audio Creator package was priced high and tied to the company's high-end audio workstations, for a total system price in the tens of thousands. More recently, Sonic has reduced the price of DVD-Audio Creator and has introduced a lite version, DVD-Audio Creator LE, which incorporates technology licensed from Matsushita. This Windows 2000 program is capable of standalone operation and can be combined with Sonic's higher-end DVD-authoring tools for the creation of DVD-Audio/Video hybrid discs that are compatible with any DVD player. DVD-Audio Creator LE supports most of the provisions of the DVD-Audio spec and includes capability for CPPM copy protection.

Minnetonka offers two versions of its disc-Welder DVD-Audio authoring software, which runs under Windows 98, 2000, NT, or XP (see Fig. A). DiscWelder Steel (\$495) provides barebones DVD-Audio capability, suitable for creating DVD-Audio reference discs with high-resolution stereo or multichannel PCM. The program is a snap to use and is certainly

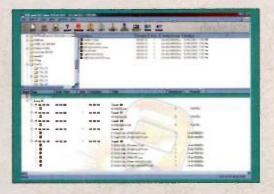
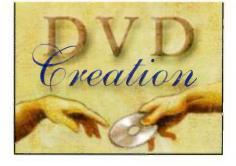


FIG. A: Both versions of Minnetonka's discWelder support DVD-Audio production with simple, easy-to-use interfaces that provide access to most of the DVD-A spec's features.

the easiest and fastest way to produce a basic DVD-Audio disc. DiscWelder Chrome (\$2,495) is a substantially enhanced version that supports multistill slide shows with transition effects, navigation from multiple menus, and DVD-Audio/Video hybrid-disc formatting. Chrome also accepts high-resolution/high-sampling rate surround as MLP-packed audio files. The company offers its MLP encoder SurCode MLP under license for \$2,495 or bundled with Chrome for \$4,490.

Reviewing a DVD-Audio title during its production has always been an issue. Creative Labs has announced that the top-end version of its Sound Blaster line, Audigy 2 (starting at \$129), will support DVD-Audio. However, it seems the playback of DVD-Audio data sets will not be possible from a hard drive—you'll have to play them back from a DVD disc, somewhat limiting the value of Audigy's DVD-Audio capability for production. Fortunately, the low cost of DVD-R burners and media make it easy to do a quality-assurance review from a burned disc in a player.

—Gary Hall



Flowchart or graphical layout. This approach is the most flexible. It typically assigns each asset an icon on the screen. You create the navigation path and the various links you want by drawing connections between the various icons or accessing a dialog showing each asset's attributes and specifying what action you want it to have (for example, defining what action should occur when a button is pressed). This type of interface allows you to see the structure of a disc, but if you use numerous menus and links, the screen can become cluttered and a bit overwhelming.

NEXT STEPS

After you've gathered your assets and configured the structure of your DVD, you can preview the project to see how things line up. The preview will give you a good idea of what the disc will look like when played. If things look and

sound good, then you'll finish the authoring phase by creating the various DVD files on your hard drive. Files are stored in a very specific directory structure that includes folders called Video_TS and Audio_TS (see Fig. 2). To get a last look at how your project will appear on disc after you've created these files, point your software DVD player to a file with the extension VOB in the Video_TS directory and start playback.

Keep in mind that most set-top DVD players will manage the basic features of DVD just fine, but the handling of advanced features such as multiple angles,

AUDIO OPTIONS FOR DVD-VIDEO

DVD-Video includes a bewildering array of options for audio. DVD is the first medium in which not only the format but the resolution and data rate of audio are variable. To make things more confusing, various formats can be combined in different sections of the same disc or be offered as parallel streams to be selected by the viewer. (Only one stream plays at a time, by the way.)

Stereo audio can be included on a DVD-Video disc in data-compressed or linear PCM (uncompressed) formats. Audio datacompression standards provided by the specification include Dolby AC-3; MPEG-2, Layer 2; or DTS formats. In order to conserve space and bandwidth for video, which generally requires much higher rates, most commercial DVD titles use audio-data compression.

Uncompressed stereo PCM audio is supported in DVD-Video at resolutions of 16, 20, or 24 bits and sampling rates of 48 or 96 kHz (any combination of these resolutions and sampling rates can be used). Note that a sampling rate of 44.1 kHz, the standard for CD, is not supported in DVD. That means that if you are preparing audio releases on both CD and DVD-Video, you will have to do sampling-rate conversion at some point.

Stereo audio may also be prepared using data compression. Although options for DTS stereo and MPEG audio exist in theory, Dolby's AC-3 format predominates. For multichannel (5.1) surround, audio is always data compressed in DVD-Video. Dolby AC-3 is also the dominant format for 5.1 on DVD and is

widely supported by the authoring tools, AC-3 encoders are readily available and are included with many midrange systems.

Many aficionados feel that the DTSaudio compression format offers better sound, although it uses more bits. Sadly, DTS is supported only by the most expensive professional DVD authoring tools, and DTS encoders

(hardware or software) are more expensive and harder to find than those for AC-3. Also, not all DVD playback systems can decode DTS audio. Discs with DTS audio generally include alternate versions in AC-3 and/or linear PCM.

A certain amount of confusion exists regarding which types of audio the DVD-Video spec requires. The spec states that a stream of either uncompressed linear PCM or data-compressed audio must

be included with each track of a disc (there can be up to eight streams), and that if audio is in data-compressed format only, then at least one stream must be AC-3.

DTS 5.1

Though the DVD-Video specification provides for the use of MPEG-2, Layer 2, audio compression (not MP3), the wording is ambiguous, and it turns out that many DVD players do not play MPEG audio at all. As a result, that audio format for DVD is, for all intents and purposes, dead.

All audio formats for DVD-Video con-

sume a defined amount of data bandwidth (bit rate). DVD has a finite data-transfer rate of 9.8 Mbps, and under no circumstances can the total transfer rate of audio and video be allowed to exceed that number, DVD-Video allows for multiple streams of audio on disc, and these streams may be in different formats or have different content. (Commentary tracks,

DVD-Video The total bit rate for audio and video cannot exceed 9.8 Mbps, the maximum transfer rate defined by the DVD-V specification. Video bit rates are generally much higher than those for audio. Stereo PCM at 16-bit/48 kHz 1.535 Mbps Stereo PCM at 24-bit/96 kHz 4.608 Mbps Dolby Stereo AC-3 228 Kbps (typical) Dolby Stereo 5.1 448 Khps (typical)

for example, are very popular for movie releases.) If multiple audio streams are used, the total bit rate of audio plus that of any accompanying video must remain under the magic figure of 9.8 Mbps. The table "DVD-Video" lists the bit rates for various formats of audio used in DVD-Video. As you might expect, the bits rates for uncompressed PCM are much higher than those for data-compressed audio, especially at higher resolutions and sampling rates.

754 Kbps or 1.509 Mbps

-Gary Hall



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computer and substituting a DVD drive. Some drive manufacturers, such as Pioneer, recommend that selected drive models use Programmable Input Output (PIO) mode for data transfer rather than the more current (and common) DMA mode. Look at your IDE controller settings in Windows Device Manager to see if you can locate this option if your drive requires it.

As of this writing, Pioneer had just introduced the A05 DVD-R/RW burner (\$299). Hewlett Packard's latest models are the dvd200e (external; \$449) and dvd200I (\$499; internal) DVD+R/RW burners. Sony offers a hybrid drive, the DRU-500A (\$349), which has the unique ability to burn DVD-R/RW, DVD+R/+RW, and, like the others, CD-Rs. Typically, add-on drives such as these include entry-level authoring and burning software.

Mac owners can find both USB and FireWire DVD burners starting at around \$399 in both DVD-R and DVD+R formats. For example, the Formac devideon superdrive, an external FireWire unit,

comes with transcoding and authoring software (see "Power Tools for the Mac" on p. 72). Not all Apple software supports such drives, though—for example, iDVD only works with Apple's internal SuperDrive—so look on the Apple Web site to see if your drive is compatible with the Apple software you want to use.

Keep in mind that the designation used to measure DVD burn speeds is different from that used for CD. A rating of "1x" on a DVD equals 1.385 Mbps; "1x" for CDs equals 150 Kbps. Also, most DVD drives are somewhat slower at burning CDs than dedicated CD burners. The Pioneer A05, for example, is one of the fastest DVD drives around, yet offers burn speeds of only 16× for CD-R and 8× for CD-RW, and its read speed for CDs is 32x. If you have an extra drive bay and IDE connector, you might want to keep your existing CD burner onboard, especially if it is fairly new and fast.

SET-TOP BURNERS

One solution that allows you to avoid many of the potential problems of DVD creation is to use a set-top DVD burner/player. Units such as the Philips DVDR985 (\$799; see Fig. 3) and the Pioneer DVDR 7000 (\$1,295) offer tremendous advantages over doing it all on the desktop. For starters, they

both have FireWire inputs, so you can capture audio and video directly from a DV camcorder or computer-based digital-video output card with no signal loss. And with their included composite and S-video connectors, you can even convert your old home movies from analog to digital and/or send them to your computer through a FireWire input. Both also provide several recordingquality levels, typically allowing from one to two hours of recording time per disc. Because the units use custom chips to do the encoding in real time, the highest quality levels produce output easily equal to the best output you'll get using dedicated transcoding software.

One downside of using an external burner is the limited authoring abilities such units offer. You won't find nearly the range of options that even the most basic authoring software provides, which means you can't configure your DVD to auto-play when it is put into a DVD player or even to restart when it ends. However, most units allow you to add chapter points either while recording or afterward (or both), and you can add titles to the videos on your disc. Moreover, because the operating systems of such devices are typically upgradeable, it won't be surprising to find that ever more features are added to this type of unit.

Also, if you're in the market for a new camcorder, you might look at a model that records directly to DVD, such as the recently announced Hitachi Ultra-Vision Digital DZ-MV350A (\$995) and DZ-MV380A (\$1,095). Both record MPEG-2 video directly to a DVD-RAM or DVD-R disc, which you can then drop into your computer's DVD drive. Here again, you'll save time on the encoding stage by creating video files that are ready for authoring.

MEDIA MATTERS

Take a look at an ad for DVD media these days, and you'll see dozens of options. What you won't see immediately is whether the medium in question is actually suitable for video or is only able to store data. For example, a recent ad for inexpensive DVD-R blanks mentions that the product is rated

TOP 10 AUTHORING TIPS

- Always start your DVD with a video, even if it is very short.
- Lay out your menus so that movement between buttons is logical. Remember that people may be viewing your DVD on a computer or set-top player.
- Don't have too many buttons on your menus; seven or fewer is a good number.
- Make sure that your menus are title safe.
 Most authoring software will have a template to check your work for title safety.
- Remember to include a Return to Main button in all menus.
- The first (or top) button is often the default button. Make sure the graphic design of your menu and button placement make this obvious to the user.
- Add 15 seconds or more of black at the end of your video source material. If your work is being presented at a public concert or screening, you don't want the DVD player's menu screen to pop up immediately after the grand finale of your piece.
- View your disc on a computer and on a set-top DVD player so that you aren't surprised by how it looks or sounds.
- Media is cheap, so use two types of stock: inexpensive for testing and for use on a DVD drive and best quality for discs that you send out of your studio.
- Include a 5.1 and a 2-channel stereo mix so users will be able to hear your work in the best format their systems can provide.

"Grade A," but when pressed, the supplier couldn't explain what that rating represented. One thing is certain: a 50-cent DVD disc of any format is not going to play in many DVD players.

Even among major brands, there are significant compatibility issues. A test reported in the July 2002 issue of Digital Video magazine gave Maxell DVD blanks the highest rating for compatibility among various brands of set-top DVD players. Pioneer, which makes its own media, reported in its tests that its brands were the most compatible. For the most part, you're best off staying with one of the more familiar names in the blank-media market, and you can probably find out from the manufacturer of your hardware what specific brands they recommend.

To complicate matters, just as we were going to press, a consortium of nine major companies has agreed on a spec for a new type of video-disc recording format to be called Blu-ray Disc. This format supports up to 27 GB of data on a single-sided disc. The format is targeted at high-definition images and should start to appear late in the summer of 2003. These discs will not be compatible with existing players.

OUT THE DOOR

Once you've completed your masterpiece, no doubt you'll want to send it out to the world. As with CDs, there are two means of mass producing your disc: replication and duplication. Replication is the process used by Hollywood for commercial DVDs and offers nearly a 100 percent guarantee that your discs will play in any machine. Disc replicators usually require a minimum run of around 1,000, and you can expect to pay about \$2,500 for the disc and four-color packaging. Some companies, such as Disc Makers, are starting to offer replication runs for quantities as small as 300.

Duplication is the same process that is used to burn a disc on the desktop. You'll find companies that will do as few as 100 or even 50 discs, but the per-disc price is not cheap, and the discs are no more likely to play than homemade discs.

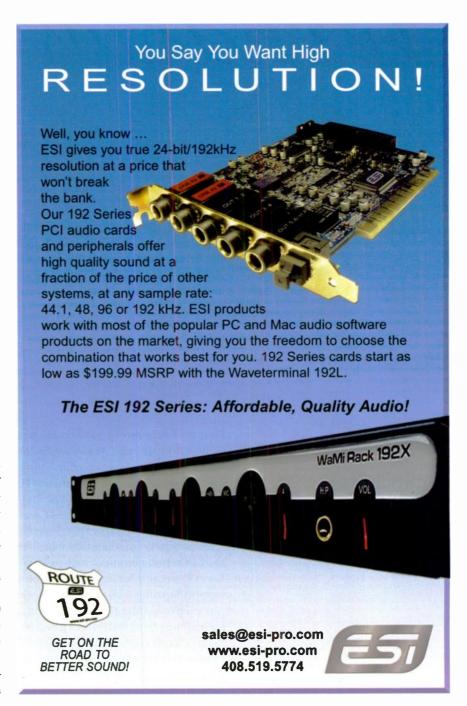
Until recently, disc manufacturers required a DLT (digital linear tape) as a

master, which meant you needed yet another piece of gear to get in the game. Fortunately, most manufacturers now accept DVD-Rs for either type of production job. And don't overlook small-run duplicators such as Microboards' two-drive, manual-loading QD-DVD (\$895). The same company's Orbit DVD (\$2,495) is an automated loader with a 50-disc capacity. Both units can record DVD-Rs at 4× speed and will also duplicate CDs at 16×. Nei-

ther unit will connect to your computer, but Microboards offers other models that add that capability.

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THE VIEW THROUGH

Windows

By Dennis Miller

PC users can

choose from a

wide variety

of tools.

When it comes to DVD-creation tools, the Windows world excels. You'll find numerous products designed for users at all levels, from entry level to the highest end of the spectrum, including integrated tools that combine all aspects of the process and dedicated software that focuses on only one or two key areas.

Another trend seems to be the appearance of DVD creation utilities in more general-purpose audio software. For example, MPEG-2 transcoding features are now available in Sonic Foundry's Acid Pro 4.0 (\$399 packaged; \$349 download) and Vegas 4.0 (\$699; see Fig. 1), and Acid supports direct burning of multichannel audio onto a DVD using the optional 5.1 Surround Plug-In Pack (\$399; see the sidebar "Creating Audio-Only Titles for DVD-Video").

Keep in mind that familiar names in the CD-burning business, such as Roxio Easy CD Creator 5.x and Nero 5.5, only support burning *data* onto a DVD; you can't make a video DVD for use in a standalone player with either program. Roxio's newly released Easy CD & DVD Creator 6 (which I'll describe later) includes authoring features and fully supports DVD-Video creation.

INTEGRATED DVD SOFTWARE

Integrated DVD software typically offers all three of the main DVD-creation operations: encoding/transcoding, authoring, and burning. These programs are often aimed at consumers, usually sell for under \$100, and are typically used by people who want to transfer movies from either a DV camcorder or an analog source to DVD. Software of this type also works with preexisting audio and video files that you have on your system and is a good place to start your DVD explorations. What's more, because it's often bundled with DVD hardware, the price is right.

In this niche, Sonic Solutions MyDVD 4.0, several products from Pinnacle (including Expression 2.1 and Studio 8.0), and Roxio Easy CD & DVD Creator 6.0 are among the key players. (Sonic Foundry's DVD Architect 1.0 is somewhat different in design.) All of these programs allow you to work your way through the DVD-creation process, from capturing source material (you'll need a FireWire card installed to capture DV, of course) to adding menus and titles to burning your disc. During capturing, the material is encoded

directly to MPEG-2 format, which is a huge time-saver, although you get only a few adjustable settings.

These programs offer helpful features such as Expression's scene detection, which automatically adds index points to your captured footage so you can find your way through the various scenes, and MyDVD's ability to automatically add chapter points while capturing. You can add music tracks, menus, and titles, and style templates are included to get you started. Output formats for these programs include DVD, VCD (video data on a CD), and SVCD; of all the integrated DVD software packages available for Windows, only Easy CD & DVD Creator can burn audio CDs.

Sonic Solutions MyDVD 4.0 (\$79). MyDVD's Direct-to-DVD feature is a simple way to create a complete disc in just a few steps (see Fig. 2). First configure the program for your hardware and temporary data-storage location, then pick a menu and output medium. Also

change the recording quality (Good, Better, or Best) and menu style if needed. Press the Start Capturing button, and you are on your way: MyDVD will capture the source video to your hard drive and then burn the disc without user input. You can burn multiple discs (up to 99) in one session, though of course you will have to feed your DVD drive a new blank after each burn is completed.

When you add existing files from your hard drive in any of the supported formats (MOV, AVI, WMA, MPEG-1, and MPEG-2), MyDVD will automatically add a button to your project for each new clip. You won't find a large number of authoring features, but you can add chapter points to your discs either manually or automatically while capturing or after. You can also select whether all the clips on a disc will play in succession or whether the player will stop after each clip and display a menu.

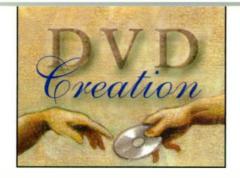
The program allows you to use your

own bitmaps for buttons that link to the start of a video clip but not for chapter points within a clip, and you can perform simple edits to a clip (such as changing its start and end time) using the dedicated Trimmer window.

MyDVD includes a basic but useful video editor (titled Showbiz) that can save files in several common formats, including WMV, MOV, AVI, MPEG-1, and MPEG-2. Among its features are a number of real-time transitions and effects, an interface that toggles between a timeline and a storyboard, and the ability to output to an external DV device. Showbiz integrates well with the authoring side of the program and is a nice enhancement to it.

Pinnacle Expression 2.1 (\$49). Expression is the entry point into Pinnacle's large line of DVD-creation tools. It's shorter on authoring tools than the other software in this group but allows you to make DVDs with more than a bit of style and personality.





The Expression interface is largely graphics based and consists of three main work areas: one for capturing and importing video and other assets, one for previewing your project and choosing menu styles, and the third for burning the disc (see Fig. 3). There's no timeline on which you can lay out your video clips visually; instead, you use the Edit Video Dialog box to arrange the clips in a playlist format. This dialog is also where you can trim or rename clips or add still images that you want to use for a slide show. You can set the duration for every image in the slide show, add transitions between images, or even force the duration of the slide show to fit a preexisting audio file that you have imported. You can also edit your images in various ways, such as rotating, mirroring, or color-correcting them.

When you're ready to burn your disc, click on the Settings button, and you'll see a screen where you can pick one of three default transcode settings (Automatic, Best, or Good) or manually enter a bit rate between 2,000 and 8,000 Mbps. Expression's Disc Meter tells you how much time will remain on the type of disc you have chosen (DVD, VCD,

COCOCOCIONO

Company Control C

FIG. 1: Sonic Foundry's Vegas 4.0 video editor includes tools for transcoding video into MPEG-2 format. You can customize the program's many settings in order to fit the type of source material you have.

or SVCD) and updates as you change your settings. After burning, you can use the included label-marker program, which will automatically add the names of the graphic and text elements of your DVD project to the label.

Other Pinnacle software. Among the other programs in the extended Expression family are Studio 8.0 (\$199) and Studio Deluxe (\$299), which includes a combo analog-video and Fire-Wire card. These bundles

offer ever more video-editing features, which is not surprising, given Pinnacle's major position in the video world. The Studio series provides features such as preset transitions, fast- and slow-motion effects, and sophisticated titling options. On the audio side, both programs allow you to rip audio data from a CD and import MP3 files for use as background music.

Pinnacle's software-only tool set tops out with Edition DV (\$699), which is a high-end video editor that includes a direct-to-DVD option. Pinnacle's Impression DVD-Pro authoring program (which I will describe shortly) is part of the Edition DV bundle.

Roxio Easy CD & DVD Creator 6.0 (\$79). Brand new to market, Roxio's

latest release expands on the features of its CD-only predecessor and now supports both data and video DVDs. The software's DVDauthoring features are found in an application called DVDBuilder, which is one of a number of programs included in the bundle. (Creator Classic, the newest version of the original Easy CD Creator application, has also undergone a major overhaul.)

Like the other programs in this group, Easy CD & DVD Creator can encode video from a camcorder directly to



FIG. 2: MyDVD 4.0 from Sonic Solutions combines entry-level authoring features with capture and burning options.

MPEG-2 format, but it can also import images from a digital camera or scanner. Each time you start capture or import a file from your hard drive, a new video clip, complete with a menu button, is added to the project window (see Fig. 4).

It's easy to reorder your clips by dragging them to new positions, and you can start or end each clip with a transition by assigning it one of a number of preset transitions that you'll find in the Transition Library. (Transition times are set as 1, 3, and 5 seconds.) Adding audio to a video clip is also a snap: just right-click on the clip and select Attach Audio. You can also replace any existing audio using the same menu option. This is especially handy because the preset menu styles come complete with their own canned music, which you'll probably want to replace.

Easy CD & DVD Creator doesn't allow you to pick a directory when you save a project; instead, it uses the default capture directory that you specify in your Preferences. And some of its modular windows (such as the Import Files screen) seem to disappear at unexpected times; a Window or View menu option would be useful. But overall, the program offers major enhancements over the previous version and includes all the tools you'll need to complete a wide range of projects.

Sonic Foundry DVD Architect 1.0 (in Vegas+DVD bundle, \$999 packaged, \$699 download). Another integrated program, DVD Architect 1.0 is very different from

simplydifferent.

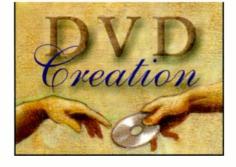


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The result is, quite simply, something special, for a lot less than you'd expect.



the three I've just discussed. You can only buy DVD Architect in a bundle with Sonic Foundry's video editor, Vegas, and the application supports transcoding and burning but not capture. (A capture utility is included with Vegas.) The two programs run separately but play well together. For example, you can set chapter points on the Vegas timeline that can be read in DVD Architect.

DVD Architect's main work area, called the Workspace, is where you drag the media assets for your DVD (see Fig. 5). There's a host of tools for laying out and aligning menus and buttons, and you have extensive control over how the screen will look when the disc is loaded into a DVD player. Simulating playback is easy using the Preview screen, where you'll find a virtual remote control. When you're ready to burn the DVD, hit the Prepare button, and DVD Architect will alert you to any errors or problems with your files.

Although DVD Architect's interface is very graphical, it doesn't give you quite the flexibility of a timeline-based, dedicated authoring application such as Pinnacle's Impression DVD-Pro. For example, DVD Architect lets you associate an audio track with your video tracks, but you can't manually align the audio track with any arbitrary point in the video. You would be wise to prepare all your source materials elsewhere, then import everything into the program.

DVD Architect can transcode video files in a number of different formats to MPEG-2, but maximum bit rate is the only adjustable setting. If you want more options for fine-tuning transcoding jobs, you can use the

MainConcept Professional MPEG Plug-In included with Vegas. That will be a good resource if your video assets are varied or if you want to customize your settings.

TRANSCODING SOFTWARE

A dedicated transcoding program is the right tool for the professional who wants it all. Among this group are Ligos LSX-MPEG 2.0, Canopus Procoder 1.2, Heuris MPEG Power Professional (MPP) 2.5, and Pegasys's TMPGEnc Plus 2.5. TMPGEnc is available only as a standalone application. LSX-MPEG is available in a standalone version and

separately as a plug-in for Adobe Premiere. The same version of Procoder will work either standalone or as a Premiere plug-in. MPP runs standalone or as a plug-in for Quick-Time on both the PC and Mac.

In this group, you'll find a vast range of parameters to tweak every aspect of the transcoding process. From common settings such as bit rate to the most esoteric settings imaginable, almost nothing has been left out. Fortu-



FIG. 4: Easy CD & DVD Creator will automatically add a new icon to your project every time you capture a video clip. The interface uses a timeline metaphor, which makes it easy to add or rearrange clips.

nately, templates are also included for many types of jobs; one of them will probably be a good starting point for your projects.

Procoder and MPP both include excellent printed documentation-some of the best I've seen. LSX-MPEG only offers a help file, though it is extensive and covers nearly every aspect of the program, and TMPGEnc offers contextsensitive help through an included HTML file. Procoder, MPP, and TMPGEnc have a batch-encoding feature that allows you to transcode large numbers of files, even if you're using different file formats for input or are converting to different types of output. LSX-MPEG can take advantage of Premiere's batch capabilities when running as a plug-in.

Because transcoding time can be extensive, I ran a test to compare the speeds of these four programs. I intended to use a full-size (720 × 480 pixels) 5-minute DV-encoded AVI file (just over 2 GB) consisting of an abstract animation with music, but MPP crashed when I attempted to transcode the audio and video in the same pass. (Heuris reports that it uses QuickTime for its DV transcoding under Windows and that there are known problems with that aspect of the program.)

I rerendered the animation without music and loaded it into each program. At first I planned to use the default



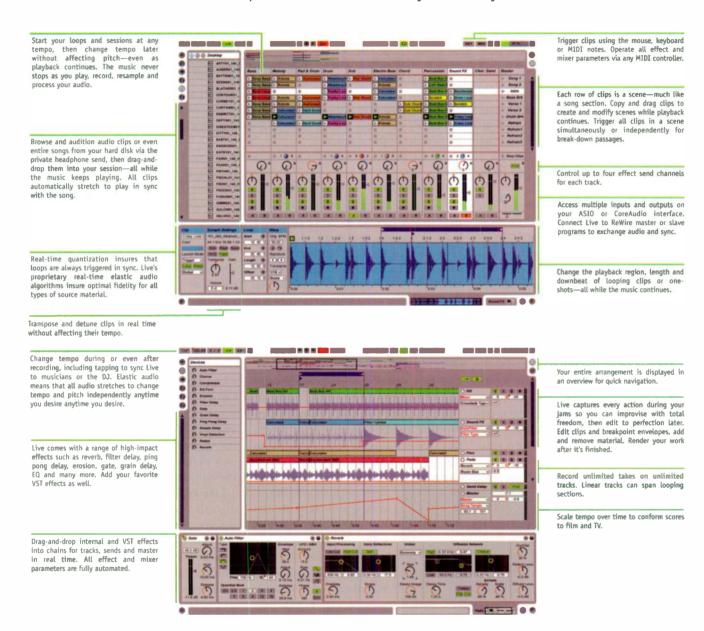
FIG. 3: The main screen in Pinnacle's Expression provides access to the program's work areas and includes a virtual remote control for simulating playback of a disc. You select a basic template from the drop-down window that appears at the left of the screen.

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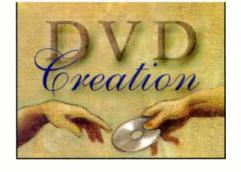












DVD NTSC presets, but it turns out that the default settings were quite varied: Procoder, LSX-MPEG, and Heuris use different constant bit rates (CBR); TMPGEnc uses a variable bit rate as the default. The programs also have different default audio settings, which range from 224 to 384 Kbps. In order to level the playing field, I set each program to use a CBR of 6,000 and left all other parameters at their default. (The tests were run on a dual-processor 1 GHz system with 1 GB RAM, running Windows 2000.)

MPP finished first at 5 minutes (all times are rounded to the nearest minute), followed by LSX-MPEG at 11 minutes, Procoder at 16 minutes, and TMPGEnc at 23 minutes. There were slight variations in the output when I viewed it on my monitor—Procoder's colors seemed a bit richer than the others, and motion in the LSX-MPEG seemed a bit smoother—but overall, there was very little difference.

Running at a higher bit rate or a twopass setting (or both) will obviously ramp up the transcoding time dramatically. For example, I loaded a DVencoded 30-minute animation into

A Company of the control of the cont

FIG. 5: DVD Architect, which is available only in the Sonic Foundry Vegas+DVD bundle, offers numerous page-layout tools to help customize the look of your DVD. Dedicated dialog boxes make it easy to add audio and graphics to your projects.

TMPGEnc and raised all its settings to the maximum; the job took 17 hours to complete. Be prepared to spend lots of time waiting for your job to run if you choose any of the programs' best-quality settings.

Heuris MPEG Power Professional 2.5 (\$999). MPP is a standalone application that does one thing—transcoding—and it does it well. The package includes a disc full of tutorials to get you going and extensive printed doc-

umentation that describes each parameter.

The MPP interface consists of multiple screens, each containing a variety of parameters (see Fig. 6). After picking a Base Template, you'll spend most of your time in the Edit Settings dialog, where you can modify default settings and save your changes as new presets. You can also assign preferences for many of the program's operations, such as picking the file extensions it will use for video and audio files, whether you want to view all templates at start up, and how often the program should search for updates.

You can get the best output by performing an analysis pass prior to the final transcoding. If you use the Auto

> Analyze option, MPP analyzes the video material, then performs the transcoding automatically. But if you choose Analysis only, you can tweak the analysis file prior to performing the transcoding. In either case, the separate analysis pass improves on standard two-pass variable bit-rate transcoding by making fine adjustments to the transcoding parameters that handle changes or other variations in the original video material (or so the

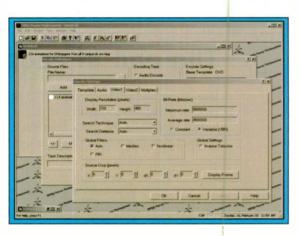


FIG. 6: The Heuris MPP transcoder has an interface that is split into a number of screens. Bit-rate settings are found in the Encoder Settings window.

company claims). You can also improve the quality of your output by raising the bit rate in the MPEG2 Fields template well above the default 5,000 Kbps setting.

MPP can make files in the VOB format that are ready to burn directly. There's no authoring available, but this is still handy for making quick prototypes and checking discs before committing, for example, to a large replication run.

Ligos LSX-MPEG. Ligos has been in the vanguard of transcoding on the Windows platform for some time and updates its tools on a regular basis. Currently available are the standalone encoder, LSX-MPEG Encoder 3.5 (\$79), and the plug-in, LSX-MPEG 2.01 (\$129) for Adobe Premiere. Both are available only as downloads, and the Help file is the only documentation.

Like Procoder, LSX-MPEG 2.01 runs directly from within Premiere, which means you don't have to prerender your video project as an AVI file before transcoding. The newly released version 2.01 offers more settings and runs more quickly than previous versions and is even better integrated with Premiere. For example, you can assign markers in Premiere that will be used by LSX-MPEG for placing I-frames that help the transcoder deal with fast scene changes and cuts.

When you're ready to export your Premiere movie to MPEG-2 format, load the LSX-MPEG DVD Assets NTSC preset and click on the Advanced Settings.



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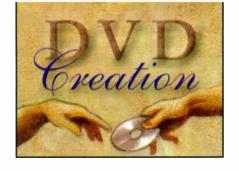
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There you'll find a tabbed interface that provides access to the transcoder's numerous settings (see Fig. 7). The first screen, labeled Bit Rate, is where you set either a constant or variable bit rate and specify minimum, maximum, and average rates. The Audio tab has only a single setting that allows you to change the bit rate from 64 to 384 Kbps. The Input tab lets you apply one of four filters to your video source material, and the Detect tab is where you can enable scene detection. Other tabs include Motion Vectors and Group of Pictures, but those parameters are probably best left untouched.

Sections at the top and bottom of the interface, which are accessible regardless of which tab you are in, contain other important parameters. For example, you can raise the Motion Estimation setting if you are transcoding a high-speed animation with significant changes between frames, and you can change the output format from NTSC to PAL. You can also pick a different output type (VCD and SVCD, for example) if your material is not headed for a DVD.



FIG. 7: LSX-MPEG operates both as a standalone application and as an Adobe Premiere plug-in. You can export a movie directly from the Premiere timeline without first rendering your project.

As noted above, LSX-MPEG runs very quickly at its default settings and produces excellent output. Tweaking its settings to produce best-quality results raises the transcoding time significantly, but that's an acceptable trade-off.

Canopus Procoder 1.2 (\$699). Procoder is a powerful toolkit that offers many different features for the media professional. More than just an MPEG

transcoder, it can transcode uncompressed AVI or QuickTime files to DV format (among others) and is also useful for preparing files for Internet delivery. You can also convert from NTSC to PAL (or vice versa) and can adjust the frame rate or aspect ratio of your video sources.

Procoder offers its basic functions in a single work area and provides access to more advanced options in other screens (see Fig. 8). That's nice for beginners because it avoids exposing them to parameters that won't be needed for many simple jobs. If you do tweak the advanced parameters, you can save your settings in Droplets, which are, in effect, "self-running" presets onto which

you drag and drop your source material. After dropping, the Droplets begin to run automatically. Droplets can live on the Windows Desktop, so you don't even have to start the program to run them.

Procoder includes a number of filters that you can apply while transcoding. For example, there's one that limits your video materials to colors that are "legal" for TV broadcast and another that optimizes material shot on film for use on videotape (many video-editing programs, including Premiere



FIG. 8: Users can access advanced features in Proceder or work exclusively with the program's presets.

and Vegas, supply similar tools). There are also audio filters for lowpass filtering, normalizing, and adjusting the volume of your sources. An excellent text by Ben Waggoner, Video Compression Concepts, is included in the package. The text offers explanations on nearly every topic related to compression and also gives numerous suggestions on various aspects of video production.

Pegasys TMPGEnc Plus 2.51 (\$48). Well outside the commercial mainstream is Pegasys Inc.'s inexpensive TMPGEnc Plus. According to the manufacturer, the fully working free version has been downloaded more than two million times. The free version will only transcode MPEG-2 files for 30 days, but that might give you enough time to decide whether you really want to stay in the DVD game. The commercial version, available boxed and as a download, has no time constraints.

TMPGEnc Plus's feature set is as extensive as any you'll find in this roundup (see Fig. 9). If you consider yourself a transcoding master, you'll be pleased to find esoteric options such as the ability to adjust the type of cosine transform the program uses during transcoding. There's a wizard to walk you through nearly any transcoding job, and you can customize the program in numerous ways, such as tweaking it to take best advantage of your host computing environment.

Although you wouldn't expect a dedicated transcoding program to have



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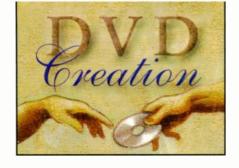
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extensive audio features, TMPGEnc Plus offers more than most and even allows you to add fade-ins or -outs to your audio files. It also offers a large number of versatile video filters that you'll use if, for example, you want to color correct or adjust the brightness or contrast of your video material.

The batch-encoding feature is very easy to use once you've saved the various projects you wish to run sequentially, and you can even output a video file as a sequence of still graphic images, a feature more often found in video-editing software.

Overall, TMPGEnc is an exceptionally good value and may be all the transcoder you'll ever need.

AUTHORING SOFTWARE

When you're ready to step up from the software that was bundled with your

DVD hardware, you'll want to find a dedicated authoring program that will give you the features professionals need. In this group, Sonic Solutions ReelDVD 3.03 and Pinnacle's Impression DVD-Pro 2.2.1 are two of the best. Either of these will allow you to make great looking DVDs with enough buttons and menus to keep even the most dedicated interactive couch potato happy.

Both ReelDVD and Impression DVD-Pro support nearly the full range

of features described by the DVD spec. They allow use of up to 8 audio streams and 32 subtitle streams in each DVD title, along with unlimited still or animated menus, submenus, and more. ReelDVD supports only one video track (the maximum allowed by the DVD spec is nine), and Impression DVD-Pro is limited to two. (Multiple tracks can be used, for example, to give the viewer

multiple camera angles, but they eat up bandwidth quickly.) Both programs offer a timeline interface, so it's easy to drop in chapter markers wherever you need them. Creating navigation links in ReelDVD is a bit easier than in Impression, however, which doesn't offer a storyboard area where you can see all your assets at once.

Neither program has an auto-insert chapter-point feature, which you will find both on low-end integrated applications and on many dedicated hardware units. That is a handy option when you want the viewer to be able to skip through your video in increments of, say, one or two minutes. Be aware that both pro-

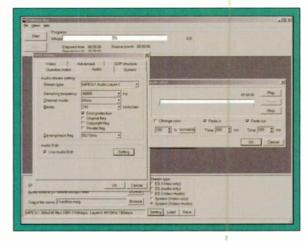


FIG. 9: TMPGEnc is a low-cost program that offers features as advanced as any dedicated-transcoding program in this roundup. It also includes several basic audio effects.

grams also use a hardware dongle for copy protection.

If you've scanned in a large number of photographs or other images and want to make interactive slide shows, perhaps with your own music, either program will be suitable. You can also make DVDs that replay upon completion. Impression can load DV-encoded AVI files, which saves you the time-consuming step of transcoding first, and either program will write data suitable for CD-R, DVD-R, and DLT drives. Impression also allows you to embed Web links directly into the video stream, and ReelDVD supports HTML data in the ROM (or "DVD Others") zone on your disc.

Both applications offer resizable preview windows, and both include a separate software DVD player. Combined, these give you several opportunities to see what your disc will look like before you burn it.

Sonic Solutions ReelDVD 3.03 (\$999). The simplicity of ReelDVD's interface belies the power of its tools for authoring complex projects. The single screen splits into four resizable panes: the Storyboard, Track window, Preview window, and Explorer window. The Storyboard is where you drag assets, then connect icons to create navigation paths through your disc. It's simple to create a looping DVD that automatically restarts at the end or to create menu options that allow the user to jump directly to chapter points within a movie clip. The program is also well-suited

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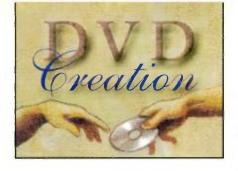


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for highly complex projects containing slide shows, motion menus, multiple soundtracks, and more.

ReelDVD's strength is in the clarity of its layout and the logic of its operation. Every video clip you import into the program is represented in the Storyboard as a Track. Each Track has an associated icon containing the four Command Links (Next, Previous, Return, and Command) that define the Track's role in

the scheme of things (see Fig. 10). Connect one Track's Next link to some other Track's Previous link, and the DVD player will play the second clip automatically if there's no user intervention and will jump to the second clip if the user presses the Next button on the remote while the first Track is playing. There are also icons for designating what Track will play when the disc is first inserted into the player, what Tracks will be designated as the Title and Menu tracks, and more.

Below the Storyboard is ReelDVD's Track window, which offers a timeline for aligning music and video. An integrated subtitle editor lets you type captions directly over the Timeline where

you want them to appear. There's no Undo command, and you can't start playback from anywhere but the beginning of a project, which can be troublesome even with a short video. But you can quickly move through the Timeline and insert any number of chapter points, then move among them freely to locate the spot you need.

The Preview window lets you preview your disc before moving to the burning stage, but I wasn't able to get my audio tracks to play back when previewing. (Sonic is currently looking into this problem.) ReelDVD also ships with a copy of Sonic's CinePlayer, which you can use to play DVDs or VOB files on your computer.

CREATING AUDIO-ONLY TITLES FOR DVD-VIDEO

As musicians, we usually focus our interests on sound and music, often divorced from any visual program. It seems perfectly natural to us to approach DVD as an audio-only medium, like a CD with capability for higher fidelity, more channels, and very long play time. It's possible to treat DVD in this way, but the provisions of the DVD-Video specification and the feature sets of many authoring tools do not make doing so as simple or obvious as it might be.

In fact, according to the spec for DVD-Video, there is no such thing as an audio program without picture. In DVD-Video, a clip of audio is always accompanied by visual content, which can be either video or a still image.

To create "audio only" DVD-V discs,

you have to insert a single still picture (even a simple black image if you wish) along with the audio program. Unfortunately, many lowercost DVD authoring tools do not support the use of still pictures. If that is the case, then the only option is to make a section of video to fit the length of audio. This presumes you have some means to create and handle video.

Apart from the question of whether your authoring software can support the DVD-Video construct of a single still image along with audio, many lower-priced authoring packages do not support the audio formats that are of interest to musicians. Nearly every program today supports uncompressed (linear) PCM audio, but most "affordable" tools limit resolution to 16 bits and sampling rate to 48 kHz. If

you're interested in higherresolution options, you may have to purchase a more professional package or use a service bureau that has the necessary tools.

Although the least expensive DVD-production tools tend to support stereo audio only, multichannel surround in Dolby AC-3 format is available in most midrange and higher tools. Be sure to check if AC-3 encoding is provided with the authoring

software or if it must be purchased separately. As of this writing, only the most expensive versions of "professional" DVD-authoring systems are able to import audio in the DTS format that many audiophiles prefer.

The bottom line is this: if you're interested in creating DVDs that focus on sound rather than picture, take a close look at the feature set of any authoring tool you plan to use. Trying to produce audio-oriented DVD titles with the wrong tool set can be a frustrating experience.

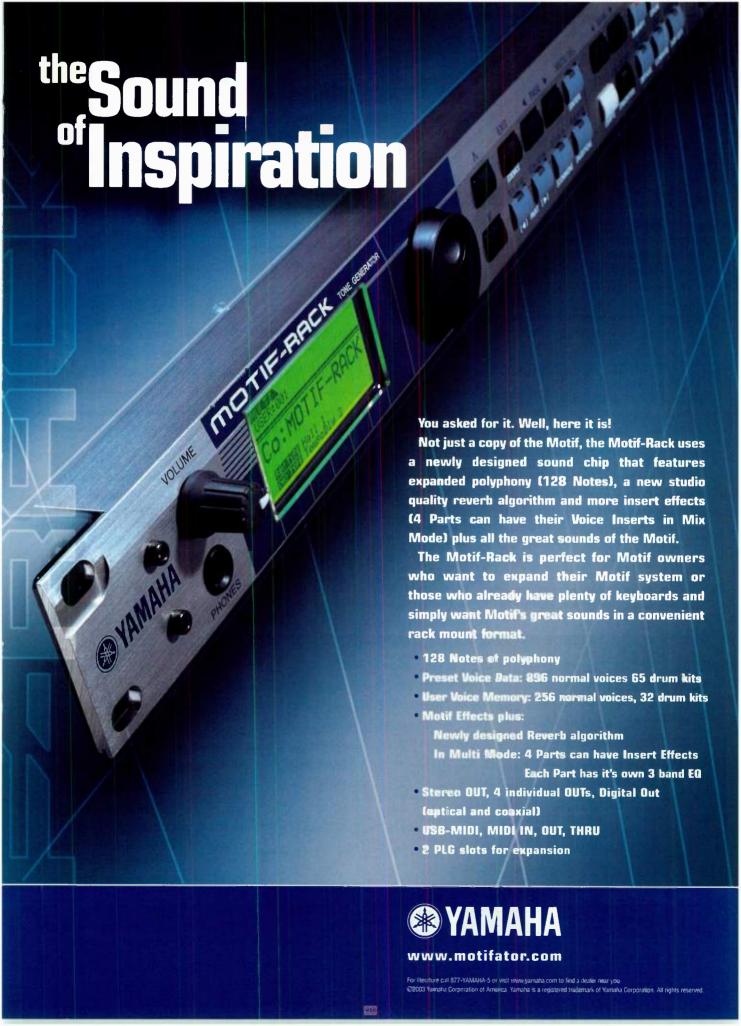
On the other side of things, a few companies are starting to introduce products designed specifically for audio on DVD. Sonic Foundry recently released a 5.1 Surround Plug-In Pack that provides rendering, encoding to AC-3, and transfer to DVD-R in DVD-Video format for surround mixes or stereo mixes produced in Acid Pro 4.0 or Vegas 4.0 (see Fig. A). The resulting discs play in linear fashion, displaying song titles as background images.

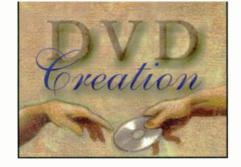
Ego Systems is taking a different approach: it is developing the first standalone DVD recorder for audio. The M-Fire 9600 (\$1,995), which is still under development, includes 24-bit, 96 kHz stereo A/D converters. An analog or digital audio input is recorded directly to DVD-R in DVD-Video format, with pure black as the visual background.

—Gary Hall



FIG. A: Sonic Foundry's 5.1 Surround Plug-In Pack for Acid Pro 4.0 provides a simple interface to encode 5.1 surround mixes to Dolby AC-3 and transfer a list of encoded tracks to DVD-R in DVD-Video format.





Pinnacle Impression DVD-Pro 2.2.1 (\$399). Impression DVD-Pro is somewhat more consumer oriented than ReelDVD and comes with a large collection of sample menu images. It also offers features that evidence its connection to the video-editing side of the Pinnacle family, such as the ability to change the size of the thumbnails that represent your video clips or the option to split clips on the Timeline. DVD-Pro supports DV-encoded AVI files (but not uncompressed AVI files), and you can burn discs directly from the program.

You import assets into Impression using the Import Assets option in the right-mouse menu or by dragging files from the Windows Desktop directly into the program's Assets Library (see Fig. 11). The Library is split into three tabbed sections (Clips, Menu, and Images), which helps you organize the different types of media you'll use in a project.

Impression's navigation options come in two main categories: Button links



FIG. 11: The Assets Library (lower left) in Impression DVD-Pro is where video, audio, and graphics are stored for use in your projects. The timeline is at the top of the screen, and the Preview window is at lower right.

trigger certain actions by the user, and Go To Links specify what action should occur when a video clip ends. Creating a Button link is simple: drag a still image or video clip to the Menu track on the Timeline, then drag the images that you want to use as buttons onto the menu image. The menu will appear in the Preview window, and you just

right-click on any button to access its Properties dialog, then set the action you want the button to have. Creating a Go To Link is just as easy and involves dragging any video clip in the Timeline to the Go To arrow (which appears at the end of every clip) of another clip.

The Preview window shows the titlesafe area and a grid as overlays and is used both for design purposes and for simulating playback. Control-dragging in the Timeline scrubs the video in the Preview window, making it easy to locate exact spots where you might want, say, a new chapter point. Unfortunately, the audio does not scrub along with the video.

The program also requires that all video tracks have the same number of audio tracks—if you have more than one track on any video track, you'll have to create some bogus audio files to add to the other video tracks.

Impression wins the prize for the manual with the smallest type; to my aging eyes, it was nearly impossible to read. Fortunately, the online help is extensive and gives detailed information about every aspect of the program.

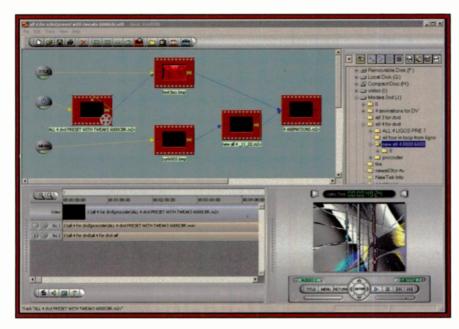


FIG. 10: Navigation paths in ReeIDVD are created by linking icons in the Storyboard.

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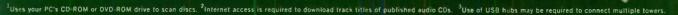
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POWER TOOLS FOR

the Mac

By Dennis Miller with Chris Armbrust

Two integrated

DVD programs

from Apple

lead the way.

Mac 7 have for some time had the opportunity to buy systems with internal DVD burners, including new Super-Drives that burn DVDs at up to 4× speed. However, there are few authoring tools for the platform. Two products from Apple dominate the Mac DVD market, and we'll focus on those. Apple's iDVD 3, which is part of the company's iLife suite, is a powerful yet easy-to-use tool on the lower end of the spectrum, and Apple's DVD Studio Pro 1.5.2 is the reigning king of the hill.

Two other integrated programs are sold in conjunction with add-on hardware. Capty DVD is part of ADS's USB Instant DVD for Mac bundle (\$499), which includes an analog-video capture device. Formac's devideon x.2 (\$399) is included with a Pioneer A05 DVD-R/RW burner for those who don't have an internal SuperDrive. Both offer various levels of authoring support. The ADS capture device is analog only, so if you have a DV camcorder, you're better off capturing over a FireWire input using Apple's iMovie. However, if you have analog-video source material (for example, VHS tapes), and you don't have a DV camcorder through which you can pass the signal for conversion to digital, then USB Instant DVD could come in handy.

There are also a few dedicated transcoding programs for the Mac, such as Heuris MPP 2.5 (described in "The View Through Windows" on p. 62), Innobits BitVice 1.2 (\$297), and discreet's cleaner 6 software. The everpopular Roxio Toast 5 Titanium (\$99) includes an MPEG-transcoding feature that allows you to create files you can burn on DVD. Hardware-based solutions from Sonic Solutions are also an option, though beyond the scope of this article.

Apple iDVD 3 (in iLife bundle, \$49). Apple's iDVD 3 is an efficient and easy-to-use tool for authoring and burning DVDs. You can use it to quickly and easily create basic DVDs with multiple levels of menus and access to multiple videos or videos with chapter markers (see Fig. 1). It is well integrated with the other members of the iLife suite, such as iMovie, where you capture video from an external source and add chapter markers that

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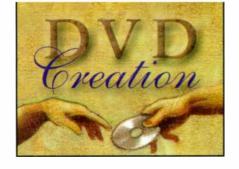






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appear in iDVD. When you export your iMovie to iDVD, iDVD will automatically generate a menu or set of menus, depending on the number of chapters you've defined (up to a maximum of 36). You can then change the menu theme using any of the 36 predefined Themes, some of which allow you to have chapter thumbnails and motion backgrounds. You can also save your customized theme settings as favorites.

You can use QuickTime files created in Final Cut Express or Final Cut Pro in your iDVD projects. (Apple recommends against using Final Cut's "selfcontained" QuickTime option when exporting.) Movies can be exported in DV-encoded QuickTime format (which, like all DV-encoded video, has a fixed compression ratio of 5:1) or as uncompressed QuickTime files if you want to retain maximum quality. And if you intend to make a DVD that plays in its entirety, with no user input, just combine all your video clips into a single Final Cut project; individual clips that are loaded into iDVD will each have their own menu, and the player will stop after each clip plays and display all the menus.



FIG. 1: Apple's iDVD offers tools for transcoding video files to MPEG-2 format and can simulate the look of a finished DVD. It includes a number of preset Themes that can be customized by the user.

The underlying rendering engine in iDVD transcodes video and audio in the background while you work. By the time you have your menus and buttons looking the way you want, the transcoding task will probably be completed. (A status bar shows you how much time remains.) Video transcoding is preset at either 8 Mbps, which nets around 60 minutes of playing time, or 5.5 Mbps for about 90 minutes. Encoding at 8 Mbps creates very clean video but could cause

discs to skip or stutter when played from DVD-R on some set-top players and on slower computers. The 5.5 Mbps rate generates fair-quality video, slightly better than VHS. Audio encoding is PCM only, which, though very high quality, leaves less room for your video.

The included templates, accessible through the Themes icon at the bottom of the screen, are adequate, but a little more variety in style would have been useful. Fortunately, you can use your own pictures or video as backgrounds for your DVD menus.

IDVD only works with an internal Apple SuperDrive and requires a G4 running OS X. Also, there's no way to export directly from iMovie 3 to older versions of iDVD (you can export to

QuickTime, then load those files), so it's best to stay current with all versions of the various tools you'll be using.

Apple DVD Studio Pro 1.5.2 (\$999). Towering above the other players in the Mac DVD world is Apple's own DVD Studio Pro 1.5.2. This top-of-the-line authoring software is a robust tool for making professional-looking DVDs and is packaged with a number of useful applications, such as QuickTime Pro,



FIG. 2: DVD Studio Pro's interface consists of four main work areas. The program has dedicated menus for completing many common tasks.

BIAS Peak DV for audio editing, A.Pack for Dolby 5.1 audio compression, and even a subtitle editor. DVD Studio Pro integrates nicely with Apple's professional video editor Final Cut Pro. For example, you can set chapter or compression markers in Final Cut Pro that will be imported by DVD Studio Pro. (Compression markers guide the transcoder in dealing with areas of your video that could otherwise be problematic.) It also offers the most comprehensive support for the DVD spec of any program in this or the Windowssoftware roundup.

DVD Studio Pro is organized into four separate work areas: the Graphical Overview, the Property Inspector, the Project View, and the Asset container (see Fig. 2). There are dedicated menus for performing many of the most common authoring tasks, such as defining a startup action and setting markers.

You bring assets into the program by using the Import command or dragging them directly into the Asset container from the Finder. Next, you drag the audio or video clip onto the Graphical Overview, and a small icon (called the Track Tile) appears on the screen. On the Track Tile, you'll see additional icons that are used to perform various tasks. For example, click on the Audio icon to open the track's Audio Stream container, where you can add, remove, or name an audio stream. (You can also add an audio stream by

DVD STUDIO PROFILES

Apple's DVD Studio Pro 1.5.2 is being used by a wide range of content developers and has an extensive user base. We spoke with some DVD professionals who use the software and asked them to comment on its features.

STUDIO PRO LOOPS

George Fifield, curator of video at the DeCordova Museum in Lincoln, Massachusetts, and founder and director of the Boston CyberArts Festival, uses DVD Studio Pro to make the DVDs that screen in the museum's Media room. Fifield, who runs Mac OS 9 on his G4, uses a Media 100 video-editing system, which outputs QuickTime movie files. He uses the DVD Studio Pro MPEG encoder that is installed with DVD Studio Pro, though he wishes that it had more comprehensive settings.

"I use DVD Studio Pro to create DVDs that run 24/7 in a loop. I like that the program gives me several different ways to accomplish my goals. For example, though you can use a Jump command to make a single clip loop indefinitely, the clip will freeze for a few seconds when it ends before restarting. As a simple work-around, I just make multiple copies of the clip on the Graphical Overview and set each clip to Jump to the next. That way, the clips play in sequence nearly instantaneously."

Fifield's background is in video, and he appreciates the fact that you don't need to be an authoring professional to achieve good results with DVD Studio Pro. "Like any piece of software, it takes time to learn all the ins and outs of the program. But I found that the learning curve for the types of things we need to do was not bad at all."

STAY RELEVANT

Jim Swaffield, a New York filmmaker whose company Relevant (www.relevant-nyc.com) creates music videos for Jive Records, Def Jam, Warner Brothers, and others, is excited about the creative potential of DVD and feels that tools like DVD Studio Pro are helping that creativity to evolve. Swaffield uses DVD Studio Pro's scripting feature to make DVDs that randomly play different sequences of tracks each time they are viewed. "Imagine putting on an audio CD and hearing live versions of all the

songs one day, then studio recordings the next, or hearing only the fast songs one time and only the slow songs the next. We can do things like that with some fairly simple scripting in DVD Studio Pro, and I think it makes the final product much more enjoyable to the viewer."

The interactivity of DVD is also a major attraction for Swaffield. "DVD Studio Pro allows me to combine still images, audio, and video in many different ways, and I can pass on lots of control to the user" (see Fig. A). He is also impressed by the program's active users

community, which is filled with people who want to help it evolve.

Swaffield is working to convince record companies that they should be more concerned about the delivery medium of their artists' work. "The days of the audio-only 12-track CD are numbered. Artists need to be thinking not only about what an album sounds like, but about how it will be 'experienced' by the listener. I see new forms of media evolving in the future, and DVD, because it is so interactive, will be a great means by which artists can make their statement without restricting themselves to preexisting forms or packaging."

IN THE MITTEL

Mike Mittelman is founder and publisher of Aspect, a new DVD-only magazine that focuses on new media (www.aspectmag.com). Among Mittelman's main interests is the documentation of live-performance art. Artists supply Mittelman with preedited video with audio, and he adds a second audio track that includes commentary about the works.

Mittelman uses DVD Studio Pro's scripting feature to create a structure wherein viewers can start the video with or without commentary or switch between the two options while the disc plays. "There's a slight

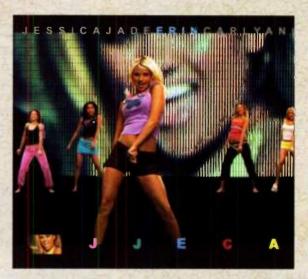
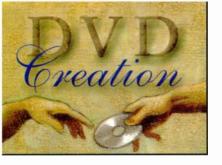


FIG. A: Jim Swaffield of Relevant produces DVDs that give the user control over many aspects of playback. This screen shows the options available to the viewer of a disc he created for the song "That's What Girls Do" by the band No Secrets.

gap when the user switches audio tracks, but I account for that when I edit the audio." He also likes the control DVD Studio Pro gives him over the visual elements of a DVD. "I like to do creative things with menus and buttons that use multiple Photoshop Layers. For example, I can use different Layers for different button states (highlighted, activated, and normal). When I import a Photoshop file, DVD Studio Pro's Matrix screen displays all the button states along the left axis and all the layers along the right axis, which makes it really easy to make associations between the two."

Mittelman thinks DVD Studio Pro's Preview feature still needs work because it doesn't give an accurate enough representation of how the DVD will look. "Things like looping video in a motion menu may not work properly in Preview mode." Conversely, things that work in Preview mode might not work when burned onto a disc. "I highly recommend that you use the Build function to create DVD files on your hard drive, then simulate playback with Apple's DVD Player." Still, Mittelman feels that DVD Studio Pro is the best tool for his application and expects it to become still more powerful in the coming years.

—Dennis Miller



lragging the audio file from the Asset creen and dropping it onto a Track File.) The Track Tile also provides access to the Angles container, which is used to add multiple camera angles to the track, as well as containers for markers, subtitles, and more.

You create navigation links by assigning Jump commands to an asset (see Fig. 3). DVD Studio Pro assists in this task by showing you every available destination for a particular asset in that asset's Action Menu—just open the Menu and select the target you want. Given the large number of assets you can have in a project (markers, scripts, menus, and so on), it's very

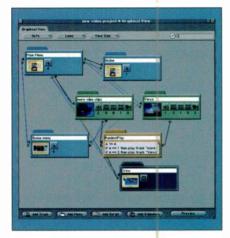


FIG. 3: When you assign a Jump command to an asset in DVD Studio Pro, a line representing the link becomes visible on the screen.

useful to have everything available in a single screen.

Among DVD Studio Pro's high-end tools is a scripting feature that you can use to make complex navigation paths. (See the sidebar "DVD Studio Profiles" for some examples of how scripts are being used.) The program also allows you to add CSS copy protection to your project and create links on your DVD title that activate Web pages. Though DVD-R drives don't support the CSS feature, it's useful if you are sending a DLT tape or hard drive off to a commercial manufacturer for replication.

DVD Studio Pro's Story feature offers some very creative options for interactivity. For example, perhaps you're making a video of a live performance of your band You could allow the DVD to play the show in its entirety, or you could use the Story feature to piece together several different sequences of songs. If the concert was taped using multiple cameras, you could create a disc that allowed the viewer to choose which camera angle they wanted. In addition, you can create a DVD that has a commentary track and up to eight soundtracks: viewers could, for example, choose light, classical-sounding music if they wanted a casual tone or something you've provided in the minor mode to add formality or a somber quality to the viewing experience.



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DVD Studio Pro provides transcoding services by means of the included MPEG encoder, which will also appear under QuickTime Pro and Final Cut Pro when DVD Studio Pro is installed. Unfortunately, there aren't a lot of adjustable parameters; bit rate is one of the few. If you plan to get serious about creating projects that use a wide range of source materials, you might consider buying a dedicated transcoder, such as Innohits BitVice.

Other tools in the DVD Studio Probundle complement the authoring application and extend your content-development options significantly. For audio encoding, the included A.Pack software supports AC-3 compression for Dolby Surround with up to 5.1 channels. A.Pack also supports audio intended for both DVD-Video and DVD-Audio and offers numerous rates up to a maximum of 640 Kbps. Corel Photo-Paint 10 will come in handy for touching up scans or for processing

graphic images, and BIAS Peak DV 3.0 is included in case you don't have a stereo audio editor that you're satisfied with. Peak DV is a somewhat scaled back version of BIAS's best-selling Peak 3.0: it supports audio only up to 16-bit, 48 kHz, for example, but it has a vast number of editing features and can import both QuickTime and DV-encoded video.

There are a few areas where DVD Studio Pro falls short. Its manual is less than comprehensive, and its burning features are not as robust

as, for example, Roxio Toast Titanium's. It also allows you to create projects that contain more than 99 tracks and therefore won't play in any DVD player. (You do get a warning when you try to "build" the project.)

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In pursuit of the world's best string-sample libraries.

few months ago, EM began a series of features that spotlight the best collections of sounds in specific categories. The first installment (in December 2002) covered bass guitar sounds; solo and ensemble brass sounds were next (March 2003). This month, we'll explore the best of the best in sampled string ensembles.

One of the most soughtafter prizes in the world of sampling is the sound

of a convincing string orchestra. For more than 600 years, the string ensemble has figured significantly into the repertoire of Western music. Even though our highest levels of formal art music—often mistakenly referred to as classical music—have long embraced the string orchestra as a staple, modern pop, jazz, rock, and film music have also taken great advantage of the string section's sonic versatility.

Among the many strengths of a full string ensemble are uniformity of timbre, expression, and dynamic range, from the lowest notes of the contrabasses all the way up to the highest notes of the violins. Other than the piano, no other instrument or instrument group possesses such uniformity over such a

By Rob Shrock

wide range of pitches, in addition to being equally at home serving in melodic and harmonic settings.

The sound of a great string ensemble is not only desirable, it is also expensive. After budgeting for players, studio costs, orchestration, and copying, a modest string date on a commercial pop recording can easily run more than \$10,000 for a single afternoon. Faced with such costs, it's no wonder that live string sections were the first to be challenged by the power of sampling technology.



Very little in life sounds as impressive as a good live string section. I am fortunate to have played with some of the best studio musicians and live orchestras in my more-than-15-year tenure with Burt Bacharach, Dionne Warwick, and a host of other great artists who record and perform with live string sections. I have written plenty of orchestrations for symphonies, pop recordings, film dates, and television commercials, and nothing is as satisfying as hearing your music played by a good section of musicians who can transform a line of written musical notes on paper into a unique, living, breathing musical phrase that is greater than the notes themselves.

In this technological time, you can get extremely close to fooling highly trained ears with samples if you have a great set of sounds, excellent sequencing chops, and a lot of patience for detail. This is not a master class on either sequencing or patience, but I'll at least cover the best string-ensemble sounds available for anyone who wants to create good string-orchestra emulations.

BEST SERVICE

Peter Siedlaczek's Advanced Orchestra Peter Siedlaczek's Advanced Orchestra was originally created in the mid-'90s, but the Giga version I recently evaluated has been updated from the earlier Akai and Roland versions. Editions with ambient release samples have been included, and keyswitching programs are available throughout the library. (Keyswitching combines several programs into one large program that uses notes outside the playback range to switch between various articulations on the fly.)

String sections are divided into violins, violas, cellos, and basses. All sections include sustains, sordino (with mutes), tremolo, and spiccato articulations along with a handful of useful runs, trills, and short phrases. In addition, programs of vibrato strings and soft sustains cover the entire range of the string section; all sustained patches are looped.

Overall, the samples are good, though they lack bite and clarity and most of the notes contain only one sample stretched over two or three pitches. As I also noted about Advanced Orchestra's brass samples in a previous "In Search of . . . ," the strings have a touch of cloudiness that you can usually remedy with a bit of equalization. Undoubtedly, the problem is because the original 16-bit samples were created in an earlier era of sampling and intended for hardware samplers with limited RAM.

The library contains a few clams, the most notable of which is in the cello section. The note C2 (and the adjacent B1 and C#2) contains the open C an octave lower very prominently in the attack. Whether that was an oversight or intended for authenticity, the result is that it's practically impossible to play melodic passages using those three notes. The fix is to eliminate the sample altogether and further stretch nearby samples. For my own use, I have also customized many of the envelopes in patches to give them more defined articulation.

Advanced Orchestra has a smaller, more distant sound compared to many of today's larger, in-your-face recordings; however, you may find that quality desirable when you're creating orchestral simulations. Although I wouldn't turn to this library as a starting point, I find good uses for the sordino sections and pizzicatos as doubling layers, because their faraway sound adds depth. In addition, because the samples require less RAM than those of more recent libraries, Advanced Orchestra is not a heavy draw on computer resources.

GARY GARRITAN

Garritan Orchestral Strings

In comparison to most sample libraries, Garritan Orchestral Strings (GOS) is in a whole other league (see Fig. 1). The full Giga version is available now, as is a three-CD Lite edition in Akai, Giga, Kurzweil, and Unity formats. A

Kontakt version is in the works. The Garritan library set the standard for modern sampling a couple of years ago, and several other major developers have wisely copped techniques that Garritan pioneered. GOS now consists of 20 CDs, with more updates on the way. Garritan even provides continuous free updates on CD as the library evolves—no need for extended downloads. I can't do justice to this collection within the limited confines of this article, but the attention to detail is mind-boggling.

GOS provides uniformly consistent articulations for first violins, second violins, violas, cellos, and basses, as well as all violins, full strings, and looped, light versions of all instruments (except second violins). In all of the stereo samples, each section of the string orchestra is already in its proper panning location. Practically all common articulations have been included: sustain (with and without vibrato), sul altra corda (played in higher position on lower strings), slides, sordino, detaché, marcato, sautille, sul tasto, tremolo, halfand whole-step trills, harmonics, pizzicato (tight, loose, and Bartok-style), and col legno (loose, tight, and ricochet). As if those weren't enough, almost all articulations are provided in keyswitched and warm versions (featuring judicious use of a controllable lowpass filter), and a recent two-disc update supplies tender versions of many programs (with new sample material included).

In addition, GOS provides almost all



FIG. 1: Registered owners of the groundbreaking Garritan Orchestral Strings can expect free CD updates for as long as the library grows.

WHO REALLY CARES HOW THE MUSIC SOUNDS?



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programs in versions that include release samples, expressive patches, and legato phrasing. The ambient release samples are gorgeous and strike a perfect balance between creating a sense of depth and not making the samples sound muddy. The expressive versions use the mod wheel to crossfade seamlessly between the layers (usually four layers per note). The legato phrasing is accomplished by also using a Garritan innovation called MaestroTools.

MaestroTools is a small application that intercepts the incoming MIDI data and processes it in a way unique to the program assigned on a particular MIDI channel. So that you can create convincing legato lines, programs marked with LEG in their names contain hidden goodies that become available when used with MaestroTools. When you check the Mono box for a particular channel in MaestroTools and play

in an overlapping legato fashion, for example, the samples' initial slow attack portions are removed and transition samples are inserted between the previous note and the next.

It is a sophisticated process; to the user, however, it simply results in gorgeously connected legato lines that don't suffer from the slight fade-in on each note's attack that's typical of string parts. The patch responds like a synth in mono/ legato mode, so you have to build chords one note at a time using multiple programs with MaestroTools in mono mode. MaestroTools also switches automatically between the down-bow and up-bow samples in the short bow articulations, creating a much more convincing effect in fast passages. The results must be heard to be fully appreciated.

GOS has little to criticize, but I do have a few minor complaints. There are no sordino samples for the second violins, an odd omission given the completeness of the library otherwise. The sul tasto samples are provided only as short articulations and are incorrectly described as being used only in fast passages. (As an alternative to mutes, I fre-

quently write for sustained sul tasto strings to mellow the timbre.) Finally, the overall sound has a slightly glassy hardness that some might describe as edgy; it's probably a result of the mics, preamps, and converters used on the sampling sessions at New York's Lincoln Center. Fortunately, you can attenuate that edginess somewhat using impulse responses or performance file setups supplied by Garritan. The warm programs can also mellow the sound a bit; however, the simple lowpass filter in GigaStudio is effective only up to a point.

GOS's naming scheme is consistent throughout all of the sections, so it isn't especially hard to keep up with the multitude of individual programs. The finest and most detailed documentation for a sample library to date is in-



FIG. 2: The Vienna Symphonic Library is an impressive undertaking that provides a modern collection of beautifully realistic string sounds.

cluded; it not only explains the technical details of the library itself but also serves as an excellent master class on strings and string writing in general. At the risk of sounding corny, I was nearly moved to tears the first time I read through the beautifully bound documentation. It was so abundantly clear that this library is the work of a talented man who truly loves music and musicians and that he put much more of his heart into it than he will probably ever be repaid for in the way of monetary profit. GOS is a stunning achievement.

ILIO ENTERTAINMENTS

Miroslav Vitous String Ensembles I

The Vitous library is a classic of the 1990s. It was one of the first to create a sophisticated collection of symphonic samples and has been used widely for years. The price is now roughly half of what it was initially, so some users who were scared off by the original price tag may want to check it out.

Sections are divided into 11 violins, 23 violins, violas, 8 cellos, 4 cellos, and basses. Articulations include sustain (with and without vibrato), fast legato (violins only), espressivo, staccato, tremolo, sordino, pizzicato, soft sustained (violins), detaché, and sul ponticello. The Giga version provides keyswitched programs and both looped and unlooped samples.

Disappointingly, the Giga version I evaluated does not take full advantage of MIDI controllers. The mod wheel—which does so much in many other

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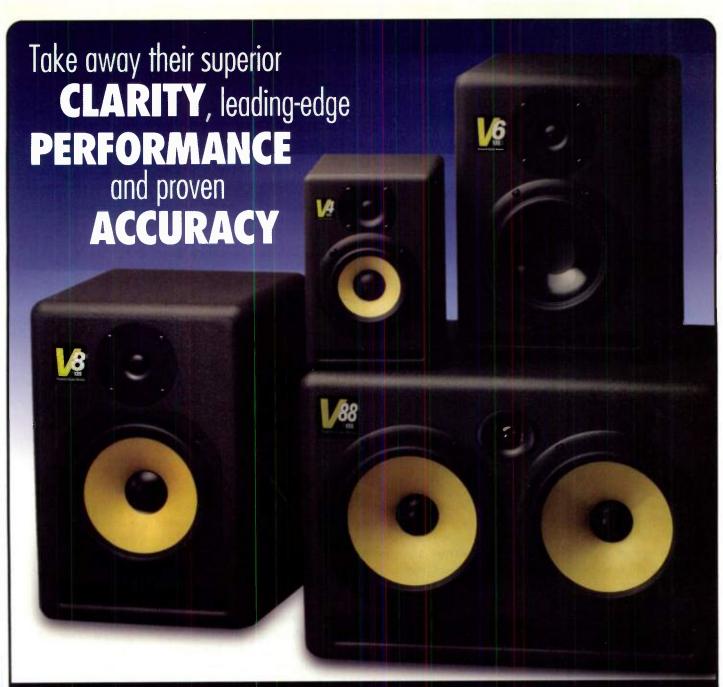
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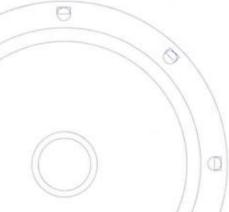
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libraries, such as filtering, crossfading, or expression—acts as a reverse-Volume control on some patches (increasing the mod wheel lowers the volume) or simply adds a nauseating LFO vibrato that should have been disabled altogether on others.

To a lesser degree than Advanced Orchestra, Vitous String Ensembles has a dark, distant sound compared to some of the newer libraries. However, I find that many Vitous samples still hold up very well today, and I use them regularly, especially for layering. Some of the attacks on the sustained sounds are rather slow (as was common in most earlier string samples), and most programs use only a single Velocity layer per note. However, the library is still amazingly uniform and musical, even by today's standards.

Of particular note is the inclusion of a four-person cello section. That's a great addition, as it provides a better sound for cello *divisi* writing; it's also a great sound to use as a layer for other cello samples.

ILIO ENTERTAINMENTS

Vienna Symphonic Library

The mother ship has arrived. Already weighing in at 93 GB of samples in the 16-bit, 44.1 kHz First Edition, there's



FIG. 3: Edgy and in-your-face, Kirk Hunter's Virtuoso Series Strings collection overflows with rock 'n' roll attitude.

no telling what the 24-bit Pro Edition will encompass in terms of size and content. One of three sample libraries that I can't fully cover in this article, *Vienna Symphonic Library (VSL)* promises to emerge as the new state of the art in sampling (see Fig. 2).

A privately funded team in Europe was practically given a blank check to create the most detailed, most realistic sampled orchestra in existence. After a custom recording facility was built for the sampling sessions, the hard drives started filling up with amazing-sounding samples. You'll have to explore the VSL Web site (www.vsl.co.at) for more details, but the undertaking was massive, to say the least. For now, digital orchestrators have the 16-bit Orchestral Cube and Performance Set in Giga and EXS formats, with a larger 24-bit Pro Edition awaiting support in Giga-Studio (reportedly on its way). The Pro Edition will also include many more instruments and articulations than are currently available in the Orchestral Cube. If you don't need the entire orchestra, the Orchestral Cube's Strings is available separately.

Currently, the string ensembles in VSL include violins, violas, cellos, basses, and full-range string ensembles. There are no separate samples for first violins and second violins at this time, and I am not sure whether that will remain the case in the Pro Edition. The articulations currently include sustain (with and without vibrato), staccato, detaché, tremolo, trills, pizzicato, fortepiano, sforzato (sfz), and sforzatissimo (sffz). Sordino samples are planned for the Pro Edition release, but are not currently included in the First Edition.

VSL programs have from two to four Velocity layers. Crossfading programs that use the mod wheel and keyswitching programs are included, and instruments marked with +RS contain release samples. Staccato and detaché samples are provided in two different lengths, allowing the user to choose the samples most suited to the musical passage.

Up and down bows are provided for the short bows. VSL also features an Alternation Tool application—very similar to MaestroTools in GOS—that can control the up- and down-bow sample switching in a more sophisticated way.

VSL's sound is larger and more closeup than most of the other orchestral libraries. That's because of miking techniques, modern advances in sampling, and the damping of the custom room that was built for the sampling sessions. The samples are surprisingly dry for an orchestral library, though you do hear a touch of room buildup when you use several programs simultaneously. The idea is to let you use your own ambience on these neutral samples, especially because many VSL users will have access to good hardware reverbs or impulse-response-convolution software (such as Audio Ease Altiverb) or hardware (such as the Sony DRES777). Still, a minor criticism I have of the overall VSL sound is that all the instruments sound fairly close-miked, which arguably makes them more versatile but less symphonic sounding.

Nonetheless, the sounds are gorgeous. The sound exhibits an immediacy and realism that are rarely found in sample libraries. I received the first commercial release of VSL, so many of the programs need to be further tweaked for smoother crossfades between Velocity layers, balance of release samples to the main sample, and so on; in addition, more articulations are still needed. In fairness, VSL is a work in progress that already sounds pretty stunning. It will surely continue to improve dramatically in the coming months-the size of this library will probably triple before it's done. Purchasing VSL now will provide you with a discounted upgrade path when the Pro Edition is released, so if you're serious, now is the time to invest in what will surely be a staple of film and television composers and music producers in the very near future.

ILIO ENTERTAINMENTS

Virtuoso Series Strings

Large and aggressive are two words that immediately come to mind when I think of Kirk Hunter's Virtuoso Series Strings (see Fig. 3). I wouldn't start here

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when I'm looking for tender, ambient strings, but they work great for rock 'n' roll. Overall, the samples are dry and edgy, which is perfect for cutting through a barrage of distorted guitars. Hunter has customized the library to take advantage of the programming features of each available platform. As the most detailed collection, the E-mu library appears to be his favorite.

Virtuoso Strings provides programs with 24 violins, 8 violins, 2 violins, 1 violin, 16 violas, 2 violas, 10 cellos, 6 "edgy" cellos, 2 cellos, and 5 double basses. Sustain, marcato, octave, hard, fast, sordino, trills (half- and whole-step), tremolo, nonvibrato (24 violins only), and slides are included. From one to three layers per note are provided, with most programs typically employing two layers.

The overall sound of *Virtuoso Strings* is hard and in-your-face to the extreme, with liberal application of EQ, so the sound is anything but neutral. However, the fizzy nature of the samples is precisely what makes these strings good for pop and rock tracks, because they usually require only a splash of reverb and perhaps a touch of compression to speak well in a dense track.

When auditioning programs in Virtuoso Strings on their own, I have to fight



FIG. 4: The Prosonus *Orchestral Collection* contains new recordings of the original source material and is rich in variety.

the urge to immediately dismiss them; their beauty is found in working them into a track. Many of the programs have too much attack in the sample; consequently, some envelope tweaking may be in order for some users (like me). If you're savvy enough at programming, assigning the mod wheel to adjust the envelope start time can take off some of the edge when necessary.

The 8-violin, 6-cello, and 2-player sections are great for layering with other libraries to create more immediacy and "rosin" sound. The slide effect sounds pretty good in native Akai and E-mu formats but suffers in Giga translations.

PROSONUS

The Orchestral Collection

Perhaps the oldest of the libraries featured here, the Prosonus Orchestral Collection (POC) paved the way for later orchestral libraries. What it lacks in detail, it makes up for in variety. Even today, many of its samples are still useful. The recently updated Giga version has given POC a shot in the arm through creative programming (see Fig. 4). The programmer even made new recordings of the original source material using current audio equipment to create longer, more realistic samples.

The provided articulations of the string ensembles are well-rounded: sustain, marcato, pizzicato, pizz snap (Bartok), col legno, sordino, and tremolo. Add some chromatic runs and string effects to the mix, and you have a heck of a useful library. The Giga update provides additional keyswitch programming, mod-wheel-controlled release samples, and mod-wheel crossfades.

As with many early sample libraries, multiple layers are at a minimum. POC has some sonic inconsistencies, such as a few monophonic cello and violin samples. It has a few programming inconsistencies, too; for example, the keyswitched Violin Sec Sus/Pizz Key Sw program won't let you return to the sustain layer after activating the pizz key because the keyswitch assigned to activate the sustain layer also plays a sample in the program.

However, you can find a lot of good material here, and sometimes you can

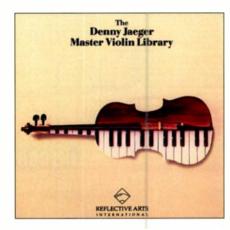


FIG. 5: Concentrating on violins only, the *Denny Jaeger Master Violin Library* stands up well to more recent competition.

find the right sound for a particular musical phrase in these older libraries. Whether you're looking for the right standalone timbre for a passage or a pizzicato sound to double another library's sound, the Prosonus Orchestral Collection is a great value, especially when you consider that its price includes solo strings, brass, woodwinds, and percussion.

Q UP ARTS

Denny Jaeger Master Violin Library
Another oldie, the Master Violin Library
concentrates solely on violins, the string
section most often called on (see Fig. 5).
Basic bread-and-butter articulations include p, mf, and f sustains, tremolos,
trills, and pizzicato samples, but no sordino samples are on hand.

The raw samples are very good, and the balance between ambient space and immediacy is excellently attained for many applications. The timbre is very clear and articulate, making this library great for adding a little immediacy to your overall sound by layering its samples with other violin sounds. The matched tuning of the players on these samples is so good that there's very little pitch deviation, resulting in an austere sound that is a bit generic on passages that should sound rich and thick.

In the original versions for hardware samplers, mono and stereo programs are provided, as are 44.1 and 22.05 kHz versions. (The latter is intended to conserve sample RAM.) The updated Giga

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version does away with the mono and low-res versions; however, it does not take advantage of programming features such as keyswitching. In fact, the Giga version doesn't even provide Velocity cross-switching between the multiple dynamic layers, and the mod wheel either does nothing or adds an LFO vibrato that should be disabled. In addition, the Giga version's program-naming scheme is unclear because the included documentation on the CD insert was for the Ensoniq EPS version.

I almost didn't include the Master Violin Library in the roundup; in its current state, it barely met my criteria for "best of the best." However, the quality of the raw samples makes this library a winner. The Master Violin Library provides a great alternative set of violin samples that can be very effective with a little coaxing.

ROLAND

Strings & Orchestral Percussion

In the early '90s, Roland raised the bar with the Strings & Orchestral Percussion library. Roland's flagship orchestral library for the \$700 series has seen a lot of mileage in the professional world. Until just a few years ago, a large por-



FIG. 6: Despite its age, Roland's *Strings & Orchestral Percussion* has a lot of usefulness left in it.

tion of my orchestral sounds was rooted in this library, though that situation has shifted over time as better libraries have emerged. With the release of the XV-5080 synthesizer, the collection has been reintroduced in different packaging (see Fig. 6). Still in native S700 format, the Solo Strings and String Ensembles are bundled with the Orchestral Percussion library in a two-CD set. To my knowledge, the contents of the original string and percussion libraries are included in their entirety in this newer, less expensive version.

It is impossible to extract from the powers at Roland the exact sizes of the string-ensemble samples, but there's a boatload of programs to choose from and a wide variety of articulations, including all the usual suspects. The library also offers a good number of runs, hits, clusters, glissandi, and other effects. But be warned: a lot of this specialty material has been used quite a bit already-think of the string run in the intro to Mariah Carey's "Forever" or the obnoxious number of songs that have used these orchestra hits. I'd dump all that stuff and focus on the multisampled patches, which are quite good overall.

A few samples have tuning problems, and a few sounds leave me scratching my head, but this library is still an overall winner, even today. These samples have largely dictated the sound of recorded strings in pop productions over the past decade, and they're still worth having in your arsenal. I hope that Roland will someday go back to the original highresolution sampling sessions and completely revamp the collection for today's technological standards without imposing the limitations of last decade's hardware samplers. In the meantime, Roland's superior SRX-04 Symphonique Strings are available on a synthesizer expansion board.

SONIC IMPLANTS

Symphonic String Collection

Symphonic String Collection (SSC), the last collection in this roundup that I don't have space to fully cover, is another über-library. Shipping on 20 CDs, SSC provides the most complete set of string

articulations to date, raising the standard for string-sample libraries another degree with the thoroughness of its sampling and programming (see Fig. 7).

Sonic Implants has made navigation of this mammoth library a breeze by using a meticulously consistent naming scheme that applies to all of the string sections: first violins, second violins, violas, cellos, basses, and fullrange ensembles. Only Symphonic String Collection and Garritan Orchestral Strings treat the first and second violins as separate sections (as they should be) by creating completely different sets of samples and placing them in their proper perspectives on the soundstage. Happily, both SSC and GOS locate all violins in their more common orchestral position-on the left of the conductor, with first violins more to the left than second violins-rather than simply splitting the first and second violins (firsts left and seconds right).

Articulations include legato, col legno, sordino, espressivo, natural and artificial harmonics, pizzicato (tight, loose, and Bartok snap), spiccato, staccato, tremolo, and trills (half- and wholestep). Effects such as bowing on the bridge, tremolo behind the bridge, scratches, and glisses are included. Additionally, almost all programs sport versions with release samples that sound incredible. There are two-layer and three-layer programs, including versions that use the mod wheel to crossfade between layers. Slow-attack versions of most sustained programs are also provided.

Like GOS and VSL, Symphonic String Collection provides up and down bows for greater authenticity. SSC takes realism a step further by also providing alternating up and down bows for the legato sustains. In those programs, you can use the mod wheel to alternate up and down bows, which is quite easy to record in a sequencer. Unfortunately, SSC does not contain an intercepting MIDI application like GOS and VSL do, which means you might have to live with slightly undesirable attack characteristics when you're using the legato samples. I hope that Sonic Implants will consider jumping on the bandwagon



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with GOS and VSL in this technical area only because the results are so stunning when applied correctly.

If you're in a hurry, the full-range Ensemble programs sound great all by themselves. The day I received the library, I immediately used the Ensemble Con Sordino R(elease) bank on a quick string arrangement for a pop ballad. I didn't even call up the muted sections individually—I just duplicated the one bank on four separate MIDI channels and blazed ahead. Less than six hours later, I was in the studio over-

seeing the mix when a producer whom I had never met dropped in to check out the facility. He heard the track we were mixing, commented on how great the strings sounded, and hired me on the spot to write a string arrangement for one of his projects. How's that for a personal testament? Within six hours of opening the box, the library had helped get me more work!

The sound character of SSC is very warm and tender in the legato samples, but the instruments can also bite deliciously in the marcato, staccato, and spiccato samples. Incidentally, Symphonic String Collection is the only library that truly makes the distinction between staccato and spiccato articulations (spiccato is the much more common string equivalent of the staccato found in the rest of

the orchestra). SSC also contains the most room ambience, but that's okay because the room used for the sessions sounds exquisite. I have had no problems blending SSC samples with other libraries, even if it meant withholding some of the room sound I was applying to the other samples to match the perceived distance. If you prefer a dryer sound, you can use programs that lack the release samples, which still sound great.

My one slight criticism is that some of the Velocity-layer transitions are abrupt, making several Velocity-switched programs challenging to control while playing live. Of course, it's a simple task to edit Velocities in the sequencer after the fact, but I had to tweak MIDI Velocity a little more in SSC and VSL than in the others. However, the results

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llio Entertainments	Miroslav Vitous String Ensembles I	Akai, E-mu, Giga, Kurzweil, Roland, SampleCell	1 CD	\$795
lio Entertainments	Vienna Symphonic Library	Giga, EXS	2 DVDs, Strings; 8 DVDs, Orchestral Cube; 7 DVDs, Performance Set; 15 DVDs, Complete Orchestral Package	\$940 Strings; \$1,890 Orchestral Cube; \$1,490 Performance Set; \$3,090 Complete Orchestral Package
llio Entertainments	Virtuoso Series Strings	Akai, E-mu, Giga, Kurzweil, Roland, SampleCell	4 CDs	\$995
Prosonus	Orchestral Collection	Akai, Giga, Kurzweil	1 CD	\$295
Ω Up Arts	Denny Jaeger Master Violin Library	Akai, E-mu, EPS, Giga	3 CDs, Akai or E-mu; 1 CD, E-mu, EPS, or Giga Condensed	\$699 Akai or E-mu; \$299 E-mu or Giga Condensed; \$149 EPS Condensed
Roland	Strings & Orchestral Percussion	Roland	2 CDs	\$395
Sonic Implants	Symphonic String Collection	Giga, SoundFont	20 CDs or 3 DVDs, Giga; 7 CDs, Giga or SoundFont Mini	\$995 Giga; \$449 Giga or SoundFont Mini

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The Ultimate String Ensemble

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IN THE REAL WORLD

Not long ago, I orchestrated a Christmas musical that was recorded in Indianapolis. The composer and I wanted a large symphonic sound, but because the string section was not as large as we would have liked, I sequenced a mock-up of the entire string section. We had several reasons for the detailed mock-up: It gave us a good representation of the musical's overall flow, which in turn helped the players on the recording dates get a quick sense of the tone and intent of each piece in the suite. The brass, woodwind, and percussion dates were scheduled to precede the string dates (though I would not have planned it that way), so the mock-up also served to substitute for the live strings and to hold the pitch center together. Finally, the mock-up added depth and weight to the live strings, a technique that's becoming more common in modern pop recordings.

In an ideal world, we would have booked the New York Philharmonic and knocked it out in a single threehour session. But it wasn't that kind of top-dollar project.

I knew that the sampled strings had to sound great up front; I would not be able to revisit the sequences after the live dates due to the tight production schedule. That meant that the articulations, timing, feel, and dynamics had to be spot-on or it could get messy later in the mix (see the online sidebar "Creating Realistic Ensemgle UPS bles" for more details).

I spent about a day and a half going through the Big Three libraries—Garritan Orchestral Strings, Vienna Symphonic Library, and Symphonic String Collection—with a specific mission in mind. I had become somewhat familiar with their contents over the course of writing this article, and I set out slowly building a new GigaStudio string template for this

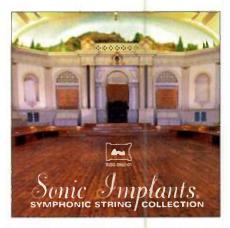


FIG. 7: Symphonic String Collection from Sonic Implants is one of the most recent and most complete string compilations available.

specific project. Little did I know that I would squeeze every bit of performance out of my single GigaStudio-equipped PC by filling all 64 available slots and using 98 percent of my available RAM. I settled on approximately equal doses of all three libraries to create a super string setup that contained all the sustains, marcatos, spiccatos, pizzicatos, and sordinos I wanted.

However, the resulting drain on my PC was so high that I had to sequence and later record each of the five sections in chunks because I was chewing through the 160 available notes of polyphony like crazy. Part of the problem was that I really liked a lot of the three-layer programs that use the mod wheel to crossfade between dynamic layers. Unfortunately, every single note played all three stereo samples simultaneously, even if they weren't all heard. If the sound also contained a release sample, then I was using eight notes of polyphony for every note. Add to the situation that I write a lot of divisi parts within sections and I like to layer sounds for timbre and performance variety, and it was impossible to hear everything on playback with a single GigaStudio 160 setup.

One solution would have been to avoid using the crossfade programs and use the Velocity-switched programs, thus recovering some polyphony. Unfortunately, that would have eliminated the ability to swell from a pp to ff on a single note, so I had to make that deci-

sion based on what the music called for. Another possibility would have been to simply set up multiple Giga-equipped PCs or possibly use a spare Mac running software that reads Giga samples properly and spread it around. I mention that solution only because it can quickly become a real-world performance challenge with such exquisitely large sample libraries.

I haven't tried it yet, but Garritan has just shipped a free update to GOS that addresses memory problems by offering versions that use one-third or half the RAM or offer reduced polyphony.

ULTIMATE DECISION

Without a doubt, Garritan Orchestral Strings, Symphonic String Collection, and Vienna Symphonic Library are the current state of the art in string samples (see the online sidebar "On the Horizon"). If you're serious about string emulations, then you just have to bite the bullet

and own all three. (Remember, VSL also gives you a full orchestral palette of sounds, but the strings are available separately.) If your budget is really tight, then at least check out the Akai version of GOS or the Giga Lite versions of both GOS and SSC. I checked out the three-disc Akai version of GOS, which is more tightly looped than the full version; it still sounds fantastic, and I would have no problem using it.

No matter how great any one library is, sometimes you still need options and alternate choices. That applies to string sections just as much as (if not more than) it applies to other sampled instruments. The humbler libraries often fill the void perfectly. Strings & Orchestral Percussion and Miroslav Vitous String Ensembles have a lot of useful life in them, and they offer a few sounds that I still prefer to the new megalibraries. Advanced Orchestra, Prosonus Orchestral Collection, and Denny Jaeger Master Violin Library are all very good, but they're

showing their age. When I use them only as doubling or thickening agents, even in small doses here and there, my mock-ups sound better with them than without them. Virtuoso Series Strings is unique in that it has more rock 'n' roll attitude than all of the others combined. I don't know if that was Kirk Hunter's intent, but that's how it works for me.

No matter what arsenal of string sounds you choose for creating really good string emulations, you still have to add the other two elements I mentioned earlier: sequencing chops and patience. If your orchestra mock-ups sound like a big accordion, you can no longer blame the samples.

Rob Shrock has worked with a multitude of artists, from Burt Bacharach to Stevie Wonder. He currently serves on the Board of Governors for NARAS.

We welcome your feedback. E-mail us at emeditorial@primediabusiness.com.





A Better Mousetrap

Why use 24 bits when 1 will do?

By Brian Smithers

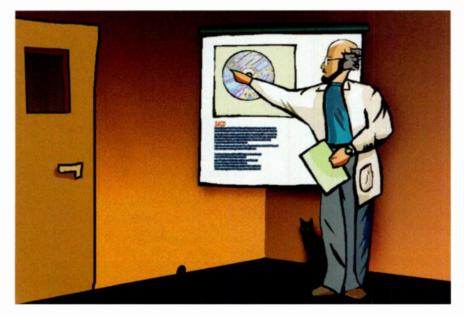
ven as consumers continue to flock to the low-res world of MP3, RealAudio, and Windows Media Audio, the recording industry is moving steadily in the opposite direction, toward higher bit depths and higher sampling rates. Despite that irony, virtually nobody on the production side of the equation doubts that our efforts to improve audio quality are worthwhile.

There are, however, certain voices questioning whether higher bit depths and higher sampling rates alone are the best path to sonic nirvana. Perhaps a fundamental shift in our approach to digitizing and delivering audio is in

Sony and Philips have made just such a shift and are promoting their Super Audio Compact Disc (SACD) as an alternative to traditional digital audio media such as CD and the newer DVD-Audio discs. SACD takes quite a different approach to representing audio in the digital domain, and advocates say it combines the best of what we think of as "analog" and "digital" characteristics.

FORGET WHAT YOU KNOW

The principles of Pulse Code Modulation (PCM) audio encoding are so ingrained in our thinking about digital audio technology that it may not have occurred to many people that there are other ways to represent audio with ones and zeros. In the same way that movie film simulates motion by capturing a series of still images and then playing them back in rapid succession, CD-quality PCM measures (captures) the amplitude of a waveform 44,100 times per second and stores each a measurement as a 16-bit value. On playback these binary numbers are used to modulate an output voltage &



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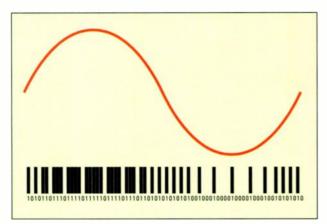


FIG. 1: In the 1-bit world of DSD, a string of ones represents high positive amplitude and a string of zeros represents high negative amplitude. For this reason the technique is also known as Pulse Density Modulation.

into a convincing representation of the original waveform.

SACD uses a different digital technique that Sony calls Direct Stream Digital (DSD). In DSD, the amplitude of the waveform is represented by the relative density of the ones and zeros within the bitstream: for that reason the technique is also known as Pulse Density Modulation (PDM). A full positive waveform results in all ones, whereas a full negative waveform results in all zeros (see Fig. 1). Silence would yield a string of alternating ones and zeros. (Alternating ones and zeros reflect the "neutral" density of silence.) Sony claims a resulting dynamic range of 120 dB for DSD.

In the simplest terms, DSD compares the energy of a waveform at each sample point to the accumulated energy of previous sample periods. If the energy is higher, a value of 1 is recorded; if the energy is lower, a value of 0 is recorded. Because the bitstream represents the change (delta) in energy compared to the sum (sigma) of the previous energies, another name for this technique is Sigma-Delta Modulation (SDM).

DSD uses a sampling rate of 2.8224 MHz, 64 times the rate CD-Audio uses. As you might expect, this has a positive effect on frequency response, which is said to extend to 100 kHz. One of the important limitations of PCM is described by the Nyquist theorem, which

states that the highest frequency you can capture with any given sampling rate is one-half that sampling rate. As a result, CDs by definition can contain no frequencies higher than 22.05 kHz, and 96 kHz PCM audio must filter anything over 48 kHz.

If you're asking, "Why would I want to record frequencies no one can hear?" you're not alone. One reason is that frequen-

cies we can't hear as pure tones may nevertheless audibly influence the color of complex tones. In particular, the character of transients may be influenced by components whose frequencies are above the official range of our hearing.

Another point in favor of high sampling rates is that timing differences smaller than 1/44,100 of a second may affect our ability to localize sounds. That suggests that DSD should be capable of superior imaging in stereo and surround applications, and naturally Sony and Philips claim that that is the case.

One more justification for DSD is

that the steep filters required for PCM to conform to the Nyquist theorem can themselves degrade the sound due to their sharp cutoff. In fact, it has become common for PCM analog-todigital (A/D) converters to start with a 1-bit conversion stage and then apply a digital decimation filter to convert the bitstream to PCM format. DSD essentially bypasses the decimation filter and stores the 1-bit data directly.

Similarly, a PCM digital-to-analog (D/A) converter typically uses oversampling and interpolation to return the bitstream to a 1-bit signal before output. Put simply, oversampling creates numerous new samples between the original samples, and interpolation makes an educated guess at the proper values for these in-between samples. You may have seen the term "1-bit/64x oversampling DAC" on CD players—this is what that means.

Interpolation and oversampling are unnecessary with DSD because it is already in the 1-bit form. If the terms "decimation" and "educated guess" make you suspicious about the accuracy of PCM A/D and D/A conversion, you have great company among DSD advocates, who claim that those steps degrade the audio quality. DSD neatly avoids decimation and interpolation by staying in the 1-bit form from beginning to end.

DISC FORMAT

Physically, SACD is part of the DVD family. (If Sony and Philips had had their way, it would have been the basis of the DVD-Audio specification, but the other members of the DVD Forum opted to stay with PCM.) It therefore has a single-layer capacity of 4.7 billion bytes and can hold almost twice as much with the addition of a second layer. SACD currently doesn't take

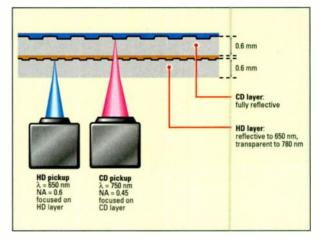


FIG. 2: A hybrid SACD features a Red Book layer and a high-density DSD layer. To the CD player's laser, the semireflective coating of the DSD layer is invisible, so it reads the Red Book data without noticing the disc's high-resolution properties.



advantage of DVD's double-sided possibilities.

When the DSD audio is encoded with Philips' lossless Direct Stream Transfer (DST) codec, a single layer has enough room for two 74-minute versions of the audio, one in stereo DSD and the other in 6-channel surround DSD. Like other lossless audio codecs, DST typically achieves a data reduction of about 50 percent.

Available nonaudio enhancements include text or lyrics, still graphics, and video. However, audio is clearly SACD's raison d'être, so don't expect to be watching *The Matrix* on SACD any time soon.

One of the most intriguing possibilities of SACD, though, is a low-resolution application of the second data layer. A hybrid CD/SACD disc can accommodate a high-density (HD) layer of DSD audio and a Red Book layer that's readable by current CD players (see Fig. 2). An "old-fashioned" CD player's laser sees through the HD layer's semireflective coating to the reflective Red Book layer and never knows the disc is anything other than a simple CD-DA. With its shorter wavelength, however, the laser of an SACD player is able to focus on the HD layer and take full advantage of its additional capacity. It just doesn't get any more backward compatible than that.

DSD IN THE PROJECT STUDIO

So how long before we're all burning SACDs in our own studios? My trusty Magic 8 Ball says, "Outlook is murky." There are, as I see it, three basic obstacles between the typical project studio and cost-effective SACD production: conversion, processing, and production. In time, all three may fall away nicely.

For starters, your current A/D/A converters are useless for SACD. Even though they probably use 1-bit processes as discussed earlier, they don't have a switch to turn off the decimation and interpolation filters. But then again, you were just looking for an excuse to buy new gear, weren't you?

A handful of DSD recorders and converters are available, ranging in price

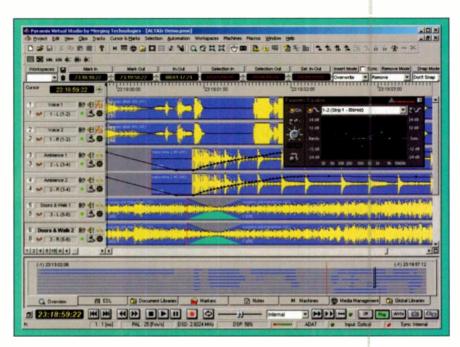


FIG. 3: Pyramix, from Merging Technologies, is the first moderately priced DAW to feature DSD support. It currently supports up to eight channels of recording, mixing, and editing. Notice the sampling rate of 2.8224 MHz shown at the very bottom center of the screen.

from \$4,000 to about \$30,000. One such option is the Pyramix DAW from Merging Technologies (see Fig. 3). Its current DSD option supports up to eight channels of 1-bit recording, editing, mixing, and playback. That happens to equal the track capacity of Sony's own Sonoma system, which is not commercially available. Until there are more DSD recorders with significantly higher track counts, don't expect to see too much popular music going the DSD route.

Once you have your bitstream on disc or tape, you may want to edit, process, mix, and master it. The math involved in processing DSD, however, is fundamentally different from the math used in the well-developed world of PCM processing. In fact, Pyramix converts the bitstream to high-resolution PCM for dynamics, EQ, and reverb processing. Other systems use decimation to PCM for metering and waveform display.

So is processing DSD's Achilles' heel? Not necessarily. After all, it's not uncommon for engineers to record to digital and then mix through an analog console, or to insert analog processors within an otherwise all-digital signal path. If we need to use PCM or analog processors within a DSD project, it doesn't entirely negate the benefits of the technology. It does, however, undermine the claims of the format's most over-the-top advocates, who have been proclaiming the imminent—indeed, overdue—demise of PCM.

REFERENCE THIS

These days it's expected that any studio, no matter how modest, will be capable of burning a reference CD-R of a session or mix, enabling the client to audition it on any home, car, portable, or personal CD player. That is currently not possible with SACD, and the format may never reach that level of ubiquity.

Although it's possible that SACD authoring software will eventually take advantage of recordable DVD drives, at this point you must use digital data tapes such as DLT or AIT to deliver assets to the replication facility. That represents a backward step of about a decade even for commercial studios—back to the days when you didn't really know how a project had turned out until FedEx delivered a reference disc from the manufacturer for your approval.

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Even if DVD-R is leveraged for burning one-off SACDs, the format's layers of copy protection may still get in the way. SACD content is protected by an impressive combination of techniques, from visible watermarks that recordable drives can't produce to a scrambled lead-in that confounds CD-ROM drives to encryption of the disc's data. The most troublesome element, though, is an invisible watermark called the Pit Signal Processing Physical Disc Mark (PSP-PDM).

The PSP-PDM must be detected by an SACD player to initiate playback, and it also contains part of the decryption key. Since it can't be created by a recordable DVD drive, a reference disc will not be playable in a normal SACD player. Philips and Sony claim to be committed to keeping copy protection from getting in the way of recording and authoring, but it appears that the convenience we enjoy in creating CDs (to say nothing of short-run production of CDs) will not be matched in SACD production.

AND THE WINNER IS

There's no doubt that with SACD Sony and Philips are aiming squarely at the same niche as DVD-Audio. It would be a classic format war except that so far most of the world has failed to take notice. A glance at the shelves of any electronics superstore demonstrates that consumers are still too satisfied with CDs, too enthusiastic about MP3s, and too comfortable with DVD-Video to turn their attention to either audiophile format.

Let's look at the scorecard anyway. SACD offers producers some heavy-duty copy protection and offers consumers backward compatibility with existing CD players. It also requires studio owners, many of whom are still paying off their upgrades to 24/96 PCM, to invest in new gear.

DVD-Audio is not compatible with existing CD players, but it is compatible with existing PCM recorders and processors. Affordable software for burning reference or short-run DVD-Audio titles on DVD-R is already available.

Both of the formats offer creative possibilities such as surround sound, graphics, text, lyrics, and video. Neither is compatible with existing DVD-Video players. Both offer sound quality that surpasses existing formats, but which sounds better? With all due respect to each camp, I have to conclude that the jury's out, and it probably will be for some time. Rereleased analog recordings account for much of the material that is being released on both formats, so there are a lot of variables other than the inherent differences between PCM and DSD. Furthermore, the use of PCM processing in the DSD



production chain or of analog processing in either format plus the various techniques used to extrapolate surround channels from stereo masters muddy the waters sufficiently to keep me undecided for the time being.

The deciding factor may turn out to be what consumers find on the store shelves, in which case SACD has a decided advantage. Sony has one of the world's largest catalogs of recordings, and they've been aggressively releasing them in SACD format. Although the few hundred SACD titles available outnumber the DVD-Audio catalog, they are still short of critical mass in the minds of consumers. In the end, regardless of who wins the format war, when John and Jane Musiclover find a reason to get excited about buying recordings, we're all in a position to benefit.

Brian Smithers plays, teaches, records, writes, and occasionally relaxes in sunny central Florida.

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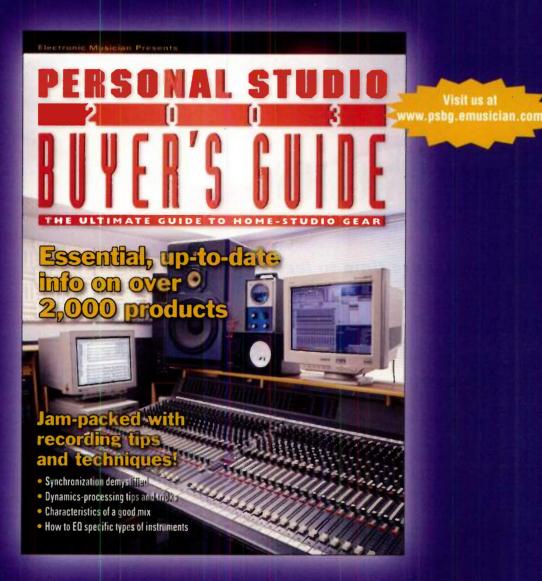


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Time Tactics

Carve out more time to feed your muse.

By Jeffrey P. Fisher

oes it seem as if there's never enough time to chase your musical dreams? You probably feel that if you only had more time, you'd get so much more music finished. The whole concept of "more time" is misleading. We all get the same time allotment each day: 24 hours. Spending those hours productively is what separates those who accomplish more from those who only wish they could.

When you complain about not having enough time to complete musical projects, you probably mean there's not enough creative time available. Trying to impose time-management tactics on your creative time will probably make you feel less creative. The secret is to manage everything else that you do. Then, you can free up time to spend on your music, where cutting time corners simply doesn't work.

Two ways to manage your time better involve using your available time more wisely and getting more done in less time through increased productivity. Use your time better by choosing the important tasks and focusing on those jobs that you do well. Increase your productivity through outside assistance and technology. Multitasking—doing more than one thing at once—also works for more mundane matters, such as reading while waiting in line.



START FRESH

Lack of time can really stress you out. You feel as though you're forever moving and getting nowhere, and that can seriously interfere with your music. Stop. Take a step back and evaluate your life. You need to clear the clutter from your mind.



"I Landed a Record Deal in a Week Because I Joined TAXI"

Brian Allan - TAXI Member

I know it sounds almost too good to be true, but I really did land a record deal about a week after arriving in America on my first visit. That's me signing my contract with 2K Sounds/EMI President Michael Blakey on the left, and V.P. of A&R, Laura Becker on the right.

My name is Brian Allan, and I'm from Scotland. I thought landing a deal with a U.S. label was just a pipe dream, but I was really determined. I figured all I needed was a "vehicle" to get my music heard by American labels.

The vehicle I chose was TAXI. And let me tell you why I'm so incredibly happy I did.

I found out about TAXI on the Internet, and it looked like just what I needed. So, I decided to take a shot and sign up right away.

Before I'd even taken advantage of TAXI's phenomenal industry connections, I heard about their annual convention, The Road Rally. I decided to fly out to Los Angeles and give it a try.

I was amazed by what I saw. Nearly two thousand songwriters and artists were there. Plus more high-level music industry executives than I had ever seen in one place. The panels were brilliant, but what happened next was a dream come true.

A fellow TAXI member heard my music, and introduced me to an A&R person who was a panelist at the convention. She liked my music so much that she asked me to extend my stay in the States. Needless to say, I was more than happy to oblige.

The next thing you know, I was auditioning for the president

of the label right in his office. I guess I passed the audition, because I got signed a few days later.

The ironic part is that I got my record deal so quickly, I never got to pitch my music to the hundreds of companies that use TAXI to find songs, bands, artists, and tracks for film and TV projects.

Will your TAXI membership get you a record, publishing, or Film & TV deal? That all depends on your music. As my friends in Scotland always say, "You can't win the lottery if you don't buy a ticket."

But TAXI offers a lot more than a great way to get your music heard by key people in the music industry. Their monthly newsletter, personal feedback, and private convention are worth much more than the price of investing in a TAXI membership.

If you are a songwriter, artist, composer or band, then I highly recommend that you make the call to TAXI right now. I did, and it changed my life!



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Keep a journal of how you spend your time for a week or two. Include as much detail as you can, including your feelings about what you did. After the fortnight, take a long, hard look at how you fill your days. Identify the time wasters and the stuff that you hate doing and reduce the time you spend on them or jettison them completely. Weed out those commitments that interfere with your music goals. Also, look for unproductive time and decide how

to fill those scrap moments with more productive musical undertakings.

MENTAL ROADBLOCKS

Grab a piece of paper and write your most important "need-to" along the top: "Make more music." Below that, make a list of your "have-tos," which are all those things you must do to maintain your current lifestyle. Include the obvious things such as sleeping, eating, and earning a living, along with

the mundane elements such as doing laundry, paying bills, and so forth.

Notice how your have-tos and needtos conflict? Emotions pull you to your dream; logic drags you back to reality. If you could only remove the have-tos, you'd have more time. So, circle the least important have-to on your list. Is there some way you can eliminate it? Can you pay somebody else to do it? With that have-to crossed off, you instantly create a time gap that can be filled with your music. Not only that, by forcing yourself to carefully choose what is of immediate importance in your life, you give yourself permission to pursue that which holds the most meaning and satisfaction for you.

Now, draft a detailed plan by setting realistic goals, both short- and long-term, and indicate how you will achieve them. Plans serve as road maps that keep you focused on your destination every day. With major goals in place, start a to-do list that indicates specific tasks that you must accomplish to reach your goals. Now plan each day by asking, What is the most important thing to do today? Do that first, then move on to the next most important task.

GOT FIVE MINUTES?

It's possible to accomplish more with your music using whatever time you have available. In Jerry Cleaver's book Immediate Fiction: A Complete Writing Course (St. Martin's Press, 2002), he offers this simple yet effective method for making time for your creative pursuits. Set aside five minutes each day to work on your music for a month. Take no time off. For any reason. And don't bank the minutes. Spend five minutes every day for 30 full days. Although five minutes isn't much time, the two and a half hours that you accrue can add up to some significant progress. You also make music part of your daily, must-do routine. That's important if you have a day job: work your five music minutes before your regular job-your mind is fresher and your subconscious learns that music is more important to you.

After your first month, bump up the time to 10 minutes, then 15 the next month, then 20, 30, and so forth. By



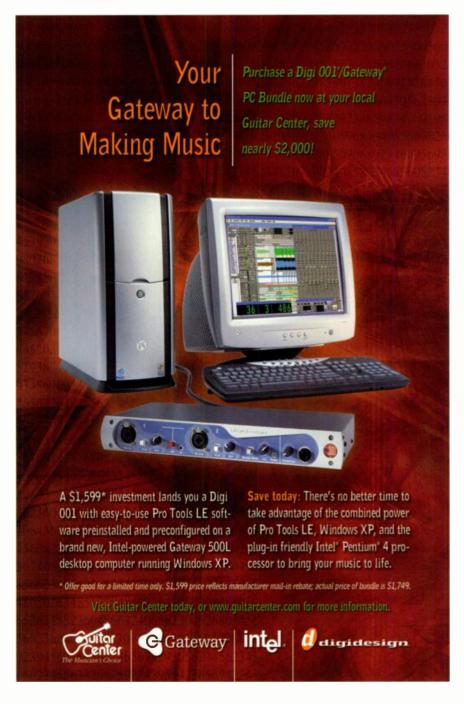
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slowly making time in your schedule for music, you establish a genuine groove that both satisfies your musical needs and substantially increases your output.

There may be days when you're unable to work on your music as much as you would like. The distractions of daily life can keep you from your music goals. Don't fight those days. Keep reminding yourself of your primary need-to and look for other musical im-

mersions instead. Listen to other artists. Throw in a CD of your works-inprogress as you drive to your day job or to an appointment. Read magazines that pertain to your music. Practice your instrument of choice. Scribble a few ideas down about a song, lyric, or production technique. Promote your music in some small way. Whatever it takes. You can work on your music for at least five minutes every day even when it seems as though you can't.



FINANCIAL WOES

A major time vortex is your job. If music isn't your main gig, your day job can zap a considerable chunk out of your time allotment. If music is your main gig, you still must spend time managing your affairs. It all comes down to money. (Doesn't it always?) If you have any number of adult responsibilities, paying your bills is your albatross. Can you work less and free up more time for your musical pursuits? Examine your lifestyle and see if you can cut back on expenses. Living on less money precludes your need for working as much.

I focus on gigs that pay well and eschew nickel-and-dime clients. Volume sales means more work and less time for other pursuits. Well-paying gigs mean I can work fewer hours on client projects and gain more time for my personal work. Moreover, if you're primarily a music-service provider, come up with alternate ways to make more money in less time; for example, develop products to sell in addition to your services. Pushing \$600 or more in product sales through my Web site each month provides a sound financial cushion.

GET ORGANIZED

Good organizational skills are crucial to successfully managing your time. Prioritize those tasks that are most important to you. I'm a bit mercenary and always prioritize by money, choosing projects that will pay me money now as opposed to later. I also tend to get the busy work and jobs I most hate out of the way fast. Clearing the minutia helps me concentrate on more important duties.

Set aside specific work time each day and don't let anything or anyone interfere with it. Even if your music is a part-time venture, keep regular hours. Musicians often dread the tyranny of a daily grind because routine and creativity just don't mix. Instead, schedule flexible time blocks for music creation and other sessions to take care of everything else that needs your attention.

Know and understand your particular strengths. For example, I'm sluggish



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and less creative in the morning. Therefore, I use my mornings to catch up on all those little things that steal time away from creative endeavors but have to be done anyway. I then hit the ground running with main projects after lunch. That really works for me because I rid my desk and mind of daily details before pursuing more creative possibilities.

The distractions of telephones, e-mail, and people can really soak up your time fast. Let the voice mail grab your calls while you work on your music. Leave the e-mail for later. It really is okay to say "No" to people. Tell them that you're busy and then give a time when you will be available to them.

Don't let paperwork, e-mail, phone calls, and such pile up, though. Putting them off only exacerbates your time crunch. Set aside time each day to deal with them promptly. Handle your e-mail once or twice a day. Use e-mail filtering that automatically deletes spam,

sends personal messages to a separate folder, and leaves important business information in your inbox. Make all your phone calls in one marathon session. When postal mail arrives, shred the junk, separate personal mail from business, and take care of it right away.

Group related duties together, too. For example, make one errand run that hits all the spots you need in one trip. Better still, shop on the Internet and have the things you purchase delivered (or download them right away) instead of wasting time driving to the store.

Play too much phone tag? Send an e-mail or fax instead. Schedule a telephone meeting just as you would an in-person meeting. Also, have people come to see you rather than traveling to them.

Create a logical filing system both in your computer and for physical files. Have short-term storage (for current and pending projects) and long-term storage for completed items, record keeping, and so on. On my computer, I set up folders for each of my projects and carefully file everything pertaining to the project in subfolders off the main one.

Set up your work area for efficiency (see Fig. 1). If your room is nothing but a big hassle, rethink it. Put the things you need in easy reach. Find the right basic settings for your gear, keep it set up, and dial up what you need quickly. Use templates and other shortcuts to automate your work in whatever ways make sense for you. Organize separate workspaces for specific tasks such as a shipping area stocked with labels, tape, envelopes, and products.

Most importantly, get to know your music tools really well. You'll waste less time learning new software/hardware or troubleshooting. With a few well-chosen tools, your productivity will increase exponentially.

GET HELP

You'll gain precious time when you concentrate on the work that you do best and find other means to get the rest done. Get help from a family member or hire an assistant to reduce your workload. Don't feel you have to hire permanent help. Rely on temporary aid or subcontractors to fill your skill-set voids.

Technology will definitely help you get more done in less time, especially computers. I use two to automate many tasks. One handles word processing, Internet surfing, e-mail, bookkeeping, printing material, and burning CDs; the second works for music, sound, and visual content only.

With this configuration, I burn CDs, print material, download software, and manage my business affairs on one computer, while working on a music or sound project on the other. Some days my main computer is tied up rendering a video project. I then use my other computer to take care of business. Even though music (and video) production requires a more robust system, you can use any low-end machine for basic tasks. You'll accomplish more and easily justify the extra cost.

Get a PDA, too (see Fig. 2). The typical

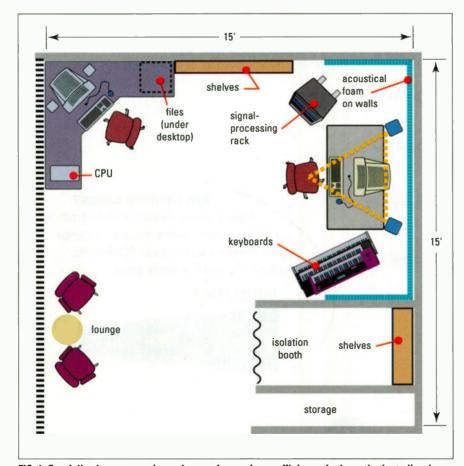


FIG. 1: Carefully plan your music workspace for maximum efficiency. In the author's studio, shown above, he uses two computers, one for business and another for music projects.



FIG. 2: A PDA, such as the Toshiba Pocket PC shown here, can help you organize appointments, projects, and more. PDAs are especially handy for musicians who must juggle clients and gigs.

handheld packs an address book, calendar, to-do list, and more into a few inches. Add-in programs give you additional power. For keeping track of the people, appointments, and projects that comprise a busy music life, these wonder boxes can't be beat. Plug in all your contact information, use the to-do list, track and manage your shortand long-term goals, schedule your days with the calendar, program reminder alarms, and keep all this with you as your portable office. When you waste less time keeping track of information, you'll gain more time for your music.

THE BIG ONE

Big projects are scary. Cut them into smaller chunks and digest them until the whole meal is finished. Planning a new CD? Set a future date for the finished product and then set interim deadlines for major milestones (composition, tracking, mixing, mastering, and duplication) by working backward through your calendar. When scheduling large projects, add a 20 to 40 percent margin of error, because it will

take longer than you think. Finally, establish deadlines and do whatever it takes to meet them. Also, work on your project every day—even if you do only a little work—to keep you on track.

Give yourself permission to mess up now and again and don't feel guilty about it. So what if you took half a day off and neglected other business and personal chores—it's no big deal. To use your time wisely, you do not need to fill every waking moment with productive activities. When you're particularly inspired, let your creativity breathe and your music flow. When the muse wanes, grab the to-do list and check off a few items.

Jeffrey P. Fisher's latest book, Moneymaking Music (Artistpro, 2003), is a guide to making, keeping, protecting, and growing your music success fortune. Check it out at www.jeffreypfisher.com.

We welcome your feedback. E-mail us at emeditorial@primediabusiness.com.



REVIEWS

TC Works Spark XL 2.6 (Mac)

Mackie Baby HUI

Edirol UA-700

138

Quick Picks: Groove Tubes Ditto Box; Destroy FX Buffer Override, Geometer, and Rez Synth (Mac/Win); Roland TMC-6 Trigger MIDI Converter; A-R Editions Cooking with Csound, Part 1: Woodwind and Brass Recipes

Native Instruments Kontakt 1.1. (Mac/Win)

NATIVE INSTRUMENTS

KONTAKT 1.1 (MAC/WIN)

This modular software sampler is a sound designer's delight.

By Peter Freeman

ell-known for its popular software synths, Native Instruments recently put forth its bid for host-based sampling supremacy with Kontakt. This powerful and feature-laden software sampler and sound-design environment addresses the needs of prosamplists in a comprehensive way through its well-designed graphical user interface and modular approach.

Kontakt can function as a standalone application and as a VST 2.0, Direct-Connect, and MAS plug-in. It supports AIFF-, SDII-, and WAV-format samples, as well as EXS files generated by Emagic's EXS24, KIT files from Native Instruments' Battery, FXP files from Steinberg's HALion, SND files from Akai's MPC2000, and Giga files from Tascam's GigaStudio. The program supports resolutions as high as 24 bits.

I tested the program on a Dual Mac G4/1 GHz with 1 GB of RAM and Mac



FIG. 1: Most of Kontakt's activities take place in its main window, with a Browser area on the left and a virtual rack of modules on the right.

Only the Best Will Do.

Introducing the Kurzweil KSP8 — an 8-bus MDSP (Multi-Bus Digital Signal Processor) that redefines the standards for quality and power in the digital studio. In fact, the KSP8 redefines a whole lot of things — including who can afford to own the very best in audio processing.

Inside its satin-silver skin each KSP8 packs a top-end 8-bus digital mixer, awesome stereo reverbs and surround processing, a huge range of other outstanding effects, and a complete set of synth-style sound modulators — all put to work by powerful patching, automation, and control functions. You get the idea: *Instant world-class Studio-In-a-Box*.

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in thousands of ways.

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Run a digital workstation? Buying a KSP8 is like getting 200+ of the very best plug-ins—only better-sounding—with a couple of outboard rendering engines thrown in for free.

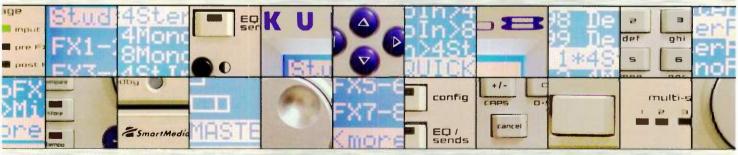
Do live sound? Buying a KSP8 gives you the power of entire racks of the best outboard gear, all of it instantly reconfigurable per set,

per performer, per song, even per beat!

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Oh yeah, it's affordable. Even with all the amazing stuff we've packed into it, the KSP8's suggested retail price is less than \$3,000. Expand your system by adding an RSP8 remote (with direct rotary control of 8 parameters in each virtual processor plus joystick panning), then add your choice of optional mLAN, AES/EBU, ADAT, TDIF or analog I/O – and you've still barely crossed \$4,000 list. Not bad for sound and power you could easily spend \$40,000 trying to match!

Trying to describe the KSP8 in an ad is like trying to hold the ocean in a thimble. But why take our word for that, when you can find out so easily for yourself? Call 800-930-KSP8 or send an email to best@ksp8.com for info on how to get your hands on a KSP8 today. After all, it's your sound, your project, your gig, and your money. Get the best.



"...I set up a Studio with one stereo and three mono inputs feeding four stereo effects buses. I configured a stereo Chain for the sax on effects buses 1 and 2 and placed a warm plate reverb on buses 3 and 4 for the vocal. Next I submixed all the bass and drum tracks to stereo and inserted a mastering effects Chain across buses 7 and 8 to pump up the low end and tame the dynamics. Last, I set up a basic club ambience for the entire mix.

"The fact that I was able to process an entire mix of this complexity through a single device is amazing. Better still, it sounded great! If I could only have one piece of gear in my rack, this would be it."

—Mark Nelson, Electronic Musician Feb. 2003

KURZWEIL®

KONTAKT

OS 9.2.2. For audio, I used a Digidesign Pro Tools Mix system with DirectConnect 5.1.1. Kontakt's audio was routed through DirectConnect into either Emagic Logic Platinum 5.3 or Pro Tools 5.2. The DirectConnect environment proved to be the only troublesome area (more on that later).

Native Instruments says Kontakt will provide at least 256 stereo notes of polyphony on any computer meeting the minimum system requirements. During the review process, I never exhausted the polyphony even when I ran two instances of Kontakt with 16 Instruments per instance (and 32 notes of polyphony per instrument) in a dense MIDI sequence. I also built some very elaborate drum maps without encountering polyphony problems, even though each sound comprised a set of two mono and two stereo samples and I used as many as 20 sets at varying dynamics for each drum.

Kontakt can provide 32 mono or 16 stereo outputs under VST (depending on the host) and 16 mono or 8 stereo outputs under ASIO, depending on the hardware. It is possible to freely choose the number of mono and stereo outputs according to your needs, as long as you don't exceed those limits. That's a nice provision, because it means that you don't have to use stereo outputs for mono samples.



FIG. 3: Kontakt's Loop Editor window provides an excellent set of tools for working with loops.

Among other things, it lets you apply crossfades and multiple loop points per sample.

FIRST KONTAKT

Kontakt is laid out in a fairly straightforward manner. Almost everything takes place in a single main window (see Fig. 1). The right side is presented as a virtual rack that is somewhat like the one in Propellerhead Reason. Various elements of the program (such as the sampler Instruments, modulation sources, and effects processors) are presented as modules that appear stacked in the rack as you add them. Most elements can be hidden to allow you to view only the ones that you're working with at any given time. On the left side, a Browser area lets you view samples, Instruments, and Multi-Instruments. This arrangement makes most operations in Kontakt simple and fast.

When you work with samples in Kontakt, they're always part of a Zone. A Zone can span one or multiple keys in the MIDI range, as well as any specified MIDI Velocity range. It's possible for a Zone to contain as little as one sample. One or more Zones can be associated with a Group, which allows easy global editing and processing of multiple Zones. You can have as many Groups as you need (the actual upper limit is 4,096). A collection of Zones and Groups is called an Instrument, and you can combine as many as 16 Instruments into a Multi-Instrument. Each Instrument in a Multi-Instrument can have its own MIDI channel and audio output setting, as well as a specific number of available Kontakt voices allocated to it.

The Sampler module in Kontakt is the heart of the program. A Sampler module contains a Mapping Editor and a Loop Editor, both of which can be hidden. The Mapping Editor uses a familiar graphical keyboard design (see Fig. 2). A Sampler module also includes an Amplifier—a final output stage for each Instrument. Sampler outputs can be sent to Kontakt's effects or straight out the selected output. The Amplifier provides just two controls, Volume and Pan, but you can apply numerous modulation sources to either.



FIG. 2: Kontakt's Mapping Editor offers fast, intuitive setup of sample layouts.

"The compatibility champion is clearly the US-428."

- Brian Smithers, Electronic Musician, February 2002



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Visit your TASCAM dealer or www.tascam.com for more info on the world's leading control/interface solution (and the compatibility champion): the US-428.

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Here are some of the innovative software developers who offer support for the US-428, with more apps added all the time.

See the TASCAM web site for the latest info.

KONTAKT

You can save and load Multi-Instruments or individual Instruments. However, the program does not allow you to select and load only some of the Instruments contained in a Multi-Instrument; it's all or nothing. Also, you don't access the Save and Load operations from the usual File menu; instead, you have to use a tiny submenu that appears in the main window itself.

OPERATION

Setting up multisamples in Kontakt is easy and straightforward. Let's say that you want to create a new Instrument with a group of several progressively louder snare drum samples. First, you use the Browser to choose the samples from any mounted hard drive. The Browser is divided into upper and lower panes; the upper pane shows available hard drives and their subfolders. You can preview the samples by clicking on the Preview button in the Browser; you can also activate the Auto feature to make samples play automatically when selected. Once you've chosen the samples you want, they are ready to be dragged into the Mapping Editor in the Sampler module of a newly created Instrument.

The mapping process, one of Kontakt's best features, becomes invaluable at this point. When you drag your selected samples into the Mapping Editor window, where you position the cursor determines how the samples are auto-mapped. If you hold the cursor over the top portion of the sample area, the entire area turns light blue to indicate that you are about to create a single Zone spanning the entire MIDI range.

As you move the cursor slowly downward in the sample area, the program

creates adjacent Zones for each of the selected samples. The Zones span multiple keys as you start near the top of the window; they gradually shrink to single-key width as you near the bottom. When the cursor is below the bottom border of the sample area (on the keyboard graphic), Kontakt assumes you want to create a Velocity stack, and it flips all the samples into an alphabetical, vertical arrangement. If you've ever spent hours putting together elaborate sample maps, you can appreciate how cool this is. It's great for quickly creating complex maps, and it's easily the fastest mapping process I've found among currently available samplers.

Kontakt initially sets up Velocity stacks in which each sample takes an equal portion of the MIDI Velocity range. You can easily adjust the upper and lower boundaries of each Zone's Velocity range by simply dragging the borders with the mouse. Unfortunately, Kontakt's lack of key commands is a bit of a drawback; it would be far simpler if there were keyboard shortcuts that let you jump between Zones and nudge the upper and lower Velocity ranges.

Kontakt allows both Velocity and Positional crossfades between Zones. The Velocity crossfades let you create smooth transitions between Velocity-switched samples instead of the usual hard switch. Positional crossfades let you morph smoothly from one note to the next as you travel up and down the keyboard. By zooming in on the desired Zone, you can gain easy access to its crossfade grab-handles and graphically adjust Velocity and Positional crossfades by dragging with the mouse.

Kontakt has its own integrated Loop

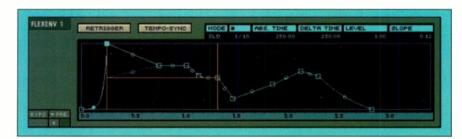


FIG. 4: The Flexible Envelope lets you create complex envelope shapes with up to 32 breakpoints.

PRODUCT SUMMARY **Native Instruments** Kontakt 1 1 software sampler \$399 **FEATURES** 4.0 **EASE OF USE** 3.5 DOCUMENTATION 3.0 VALUE 4.0 **RATING PRODUCTS FROM 1 TO 5** PROS: Extremely powerful. Simple layout. Very convenient mapping. Handles many sample formats. CONS: No key commands. Use with DirectConnect can be problematic. Nonstandard file access. Manufacturer **Native Instruments**

Editor window for creating and adjusting up to eight sets of loop points per sample (see Fig. 3). Each loop can play a selected number of times (you designate the number using the Count parameter), and each can be a crossfade loop if desired.

e-mail info@native-instruments.com Web www.native-instruments.com

Kontakt's looping tools are excellent. They are useful and musical thanks to the well-executed crossfade capabilities and especially the Count feature. Count allows rhythmic material to be reconfigured into different variations for some unique effects.

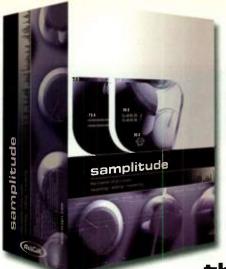
MACHINE AGE

tel. (866) 556-6487

So far I've only discussed Kontakt's Sampler mode. But Kontakt offers two other modes, Time Machine and Tone Machine, that take the program out of the realm of ordinary sample-playing and into sound-design territory.

Tone Machine is essentially a granular synthesizer that uses "grains" of the currently loaded samples to superimpose tonal information over the samples. This process is performed independent of the actual sample speed or pitch, so those can be adjusted as desired. When you first switch to Tone Machine mode,





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Low Latency Audio-Engine - VST* and DirectX-Plugins - Automatic Latency Compensation in the complete signal flow External Remote Control - Realtime Room Simulator with Convolution

Outstanding Sound and POW-r Dithering

One of the strongest suits in the Samplitude family is absolute sound neutrality — Comparable in fact with high end analog consoles. The sound always remains full and transparent, retaining its depth without tingeing. Highly developed digital algorithms, absolute phase stability and constant use of floating point computation ensures that the sound retains its positive sound nuances during intensive digital editing. These are: transparency, neutrality, preservation of transients and stereo field, best possible receipt of the signal form.

Samplitude 7 now comes with POW-r, a high-quality dither algorithm. Developed and patented by the POW-r Consortium, it reduces word lengths of 20, 24 or 32 bits to the standardized 16 bit CD format with a high degree of perceptible signal dynamics and low noise level.

Comprehensive Editing Functions

Sampliftude offers a huge range of professional editing functions. Recorded samples can be arranged in any way, cut, and be reworked into soft crossfades. Dozens of tools are available. Precision volume and pan envelopes that can be automated while remaining true to the original sample round off the tool pallet. Of course, editing is performed virtually – and therefore non-destructive – so that every parameter can at any time be altered without losing valuable material.

Unique Object-Oriented Editing

As an enhancement to the traditional concept of mixer-supported editing of complete tracks, all versions offer countless possibilities for direct real-time sample editing. Recorded audio tracks can thus be cut into as many objects as you wish. Every object can be edited with individual fades and effects, such as Equalizer, Timestretching, Pitchshifting or plugins. Samplitude also offers Aux-Sends on the object level, the well-known linearphase mastering effects, and a widely variable signal flow.

First Class Effect Setups

From mixing to mastering, all production needs are met: Award-winning equalizers, various dynamic processors, Timestretching, Pitchshifting, Reverb and Delay, plus the high-end mastering effects: Multi-tape compressor, Multi-band stereo enhancer, FFT filter with over 30,000 bands, Amp Simulator, Vocoder, room simulator with folding principle, Denoiser (utilizing the noiseprint method) and Dehisser for real-time noise reduction. Besides routing possibilities for all effects that allow a freely configurable signal flow, these possibilities are not only available to the object level, but also in each mixer channel.

Further features: improved solo effects, unlimited routable busses and Aux-send busses, VST and DirectX plugin support, flexible routing of all integrated and plugin object effects and mixer channel effects.

Burning CDs

It couldn't be easier: Red Book-compatible audio CDs can be burned on-the-fly from the arrangement, without having to take any destructive intermediary steps. The continuously updated support makes sure that even the latest models burn perfectly with Samplitude.

Track Speed and Stable Playback

Intelligent cache management means that the harddisk installed will be used to its fullest capacity – confining to history the old problem of too few tracks while producing with 24 bit/96 kHz. Stable playback: Arrangement playback has priority over all other operations such as opening menus. No more crashing or bumping playbacks!

2 GB File Breakthrough

The Windows WAV file size limit of 2 GB is history. Now you can record up to 2 billion stereo samples. That means 10 hours of sounds in just one file with 44,1 or 48 kHz. Complete radio broadcasts can now be recorded in one take.

Further Features

- Easier handling: Work area presets offer Interface clarity whereby only the pallet of the function being used currently is displayed
- 5.1 Surround capability (only Samplitude Pro /Sequoia)
- Midl and VST* instruments (Samplitude Pro/Sequoia)
- Support of all audio and internet file formats, such as Broadcast WAV, MP3, OGG Vorbis and WMA
- Visualizer: optimal metering with highly precise and size-variable peakmeter and spectroscope
 Total control via configurable shortcuts: Samplitude is renowned for its flexibility and effective functionality. For almost every
- command there's an individually configurable shortcut available (only Samplitude Pro /Sequola)
- Support of all important driver models: ASIO*, WDM, MME
- Outstanding helpful user community.
- * ASIO and VST are trademarks of Steinberg Media Technologies AG

TO FIND A DEALER OR

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Kontakt performs an analysis on all samples in the current Instrument to allow the granular synthesis to take place.

Tone Machine can be useful in a sound-design context or simply to "tune" an unpitched sample to a track. While it's not something that everyone is likely to use every day, it is a nice feature.

Also based on a granular-synthesis algorithm, Kontakt's Time Machine is designed to let you manipulate your samples' timing without affecting their pitch. It has the same Smooth, Speed, and Tracking controls as Tone Machine and adds two further parameters: Hi Quality and Grain.

Hi Quality determines whether the Time Machine operates on the preanalyzed sample data or on the fly, without knowing the sample's characteristics. The latter method produces a less refined (but arguably more interesting) sonic result and is particularly audible when playing samples at slower speeds less of their original character is evident. The Time Machine's Grain parameter governs the size of the sample grains used for resynthesis and has more audible effect when Hi Quality is off.

I had quite a bit of fun with the Time Machine, particularly using rhythm loops as source material. By turning off Hi Quality, slowing the tempo of my loops with the Speed control, using Kontakt's Legato function, and switching loops midbar, I instantly got some wonderfully destroyed-sounding grooves. The Legato function made it easy to, for example, use the beginning of one loop, the middle of another, and the end of a third to create a new hybrid on the fly, simply by playing my controller keyboard. That is an excellent example of Kontakt's power as a sound-design tool. Needless to say, accomplishing the same result any other way would re-



FIG. 5: The 32-Step Modulator lets you "paint" control changes using a series of vertical bars.

quire quite a bit of tedious editing and processing.

MOD STYLES

Kontakt allows extensive modulation routings from four categories of sources:

External, LFOs, Envelopes, and Others. External sources include MIDI Velocity, release Velocity, key position (MIDI note number), MIDI continuous controllers, Pitch Bend, and Mono and Polyphonic Aftertouch.

The LFO modulators offer a choice of Sine, Triangle, Rectangle, Sawtooth, and Random waveforms, as well as a Multi waveform that combines all of the others. LFOs can be retriggered or free-running, and controls are included for Frequency, Delay, and (for the Rectangle waveform) Pulse Width.

Kontakt offers three types of envelope modulators: AHDSR, DBD, and Flexible Envelope. AHDSR (Attack, Hold, Decay, Sustain, Release) is a variation on the classic ADSR type; it includes the Hold phase for greater flexibility. DBD (Decay, Break, Decay) is a simple two-stage envelope with a center breakpoint, intended for the quick pitch sweeps found in many classic electronic drum and percussion sounds. The DBD is available only for the Sampler modules. Finally, the Flexible Envelope (see Fig. 4) will be familiar to Absynth users; it allows 32 breakpoint stages and can produce envelopes lasting several minutes. Such flexibility hasn't been common since the days of the late '60s and early '70s modular synths, and it's a very welcome feature.

The Flexible Envelope allows its first eight times and levels to be modulated by external controllers (Velocity, release Velocity, key position, MIDI controller,

Pitch Bend, Poly Aftertouch, and Mono Aftertouch). The intensity of the envelope can also be modulated.

The 32-Step Modulator allows you to "paint" control changes using a sequence of vertical bars



FIG. 6: The 3×2 Multimode Filter is an exceptionally powerful and versatile processor with the ability to morph between filter types.

that run above and below a central zero line (see Fig. 5). You can create sequences with a maximum of 32 steps. The 32-Step Modulator also provides Frequency (rate) and Retrigger controls, the latter of which determines whether the sequence will restart whenever a new incoming MIDI note is received.

Kontakt's Envelope Follower converts the amplitude of the currently playing sample into a control signal, in much the same way that the classic analog envelope followers of yesteryear did. The Envelope Follower provides Attack and Decay controls to further shape the envelope signal; a Gain control governs input sensitivity; and an Adapt parameter sets a baseline transient response time for the Envelope Follower.

Last on the list of modulation sources is Glide (also known as Portamento), which adds a sliding pitch transition between consecutively played notes. Extensive as these modulation options are, not all sources are available to all possible destinations at all times, and not all parameters can be modulated. Still, there's more than enough flexibility to do some sonic damage.

FLEXIBLE EFFECTS

Kontakt boasts a number of varied effects modules. You can apply them in three ways: as Group Insert effects, as Instrument Insert effects, or as Send effects. Group and Instrument Insert effects are, as their names suggest, applied in an "insert" signal configuration either to to a Group or globally to an Instrument. Send effects are added after the Amplifier module and are connected in the traditional send/return configuration.

The main difference between Group and Instrument effects is that Group effects are "polyphonic." They are computed separately for each voice that you

play. That lets you apply voice-dependent modulations to an effect parameter for example, routing Velocity to Distortion Drive. That kind of processing does, however, take its toll on CPU cycles. For that reason, Kontakt's manual recommends the use of Group Effects only when you absolutely need their "polyphonic" processing. I found that Instrument Insert and Send effects were sufficient most of the time.

There is one potentially serious limitation in Kontakt's implementation of Group Insert effects: only one instance per effect type is allowed per Group, so if you've inserted a lowpass filter in a Group, for example, you can't also insert a notch filter or an equalizer in the same group. In such a situation, you would have to use a Send or Global Insert effect instead.

The practical result of this limitation depends on how you use the program. I prefer to do all processing in the TDM mixer where I can insert TDM plug-ins

or actual analog outboard gear, so the restriction doesn't bother me much. But if you prefer to do more "local" processing in Kontakt, it could be an issue.

Kontakt's Group Insert effects include Distortion, Saturation, Compression, LoFi, and Stereo Enhancer. Three types of filters are also available as Group Insert effects: Sampler Filters, Equalizers, and Effects Filters.

The Send effects include Panning Delay, Stereo Chorus, Stereo Flanger, Stereo Phaser, and Reverb. There isn't enough space in this review for a detailed discussion of all of Kontakt's effects, so I'll cover the ones that I found most useful and interesting.

While I liked the general sound of Kontakt's filters, the 3x2 Multimode Filter module (see Fig. 6) is particularly noteworthy because of its power and flexibility. It comprises three 2-pole, 12 dB-per-octave multimode filters, each with the ability to morph between Lowpass, Highpass, and Bandpass

modes. Each filter also has its own Resonance and Amount controls. There's a master Cutoff parameter on Filter 1; the other two filters offer Shift controls that provide a variable amount of offset from the master Cutoff.

All of that represents a significant amount of power to begin with, but when you take into account that each of the controls can be remotely automated using MIDI controllers, the vast potential of this Filter module becomes clear. Using that automation capability by sequencing control changes in Logic yielded varied and subtle results on just about every type of sample I experimented with. It was particularly effective on sustaining drones, and equally interesting on drum and percussive sounds as well.

Another technique that worked very well was modulating the 3×2 Multimode Filter's master Cutoff with Kontakt's 32-Step Modulator and feeding the result to a Kontakt Stereo Panning Delay. Because both the 32-Step Modulator and

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KONTAKT

Minimum System Requirements

Kontakt 1.1

MAC: G3/350 (G4/733 recommended); 128 MB RAM (512 MB recommended); Mac OS 9.2 or higher

PC: Pentium/Celeron/Athlon/400 (1 GHz recommended); 128 MB RAM (512 MB recommended); Windows 98/2000/ME/XP (XP recommended)

the delay can be synced to the tempo of the VST host, it was easy to create locked, hypnotic effects using complex sustaining textures as the source material. That configuration allowed many variations, because Kontakt's temposync facility lets you choose any standard rhythmic subdivision from whole notes to 64th-note triplets.

I had my doubts about Kontakt's Reverb algorithm, but I was pleasantly surprised when I tried it on a variety of sources. While I wouldn't put it up in the pantheon of Lexicon and other world-class reverbs, it certainly is more than adequate for utility reverb and ambience. I found it useful for creating space around drums without tying up my expensive outboard boxes and also liked it for pure effects washes on more ambient material. Strangely, there is no reverb Time parameter, just Size. Still, it was serviceable and exceeded my expectations.

I also liked the sonic quality of Kontakt's Phaser effect; it suited my ears better than many of the other digital approximations of analog phasing that I've heard. That's mainly because it was possible to produce a phasing effect that wasn't overly resonant, yet still did something musical to the sample I was using.

AUDIO CONNECTIONS

Routing audio out of Kontakt VST is, of course, done inside the host. With standalone instantiations, you can use Sound Manager, MOTU Audio System, an ASIO sound card, or (if you have a TDM Pro Tools system) DirectConnect. Because I work solely with Logic and Pro Tools TDM, I chose DirectConnect. That method was, however, not without its problems.

Though not entirely bug free, DirectConnect has worked well in the past with such programs as Native Instruments' B4 and Spektral Delay. However, with Kontakt, I had considerable difficulty getting it to work reliably.

When I was working in Logic, quite often the connection between Kontakt and TDM would simply die, and I'd loose the audio link altogether. That inevitably forced me to remove and reinstantiate the Kontakt DirectConnect plug-in in TDM. That didn't always fix the problem, however; often it simply froze my system and I'd have to reboot my computer, which was very frustrating.

Although this is a known issue at Native Instruments, it was thought to have been fixed during the Kontakt test phase. The problem might, in fact, result from the combination of Logic, TDM, and Kontakt, but that was never completely determined. I had slightly better results with Pro Tools and Kontakt, but never found a definitive solution to the problem. The good news, however, is that DirectConnect is likely to vanish entirely now that Pro Tools has migrated over to OS X, so this issue is a temporary (if annoying) inconvenience.

I didn't test Kontakt under Sound Manager, because its excessive latency makes Kontakt (among other programs) pretty much unusable. However, I did test Kontakt using just an RME Hammerfall 9652 card and encountered no problems whatsoever, so the DirectConnect problem is clearly related to DirectConnect itself and not Kontakt.

KONTAKT HIGH

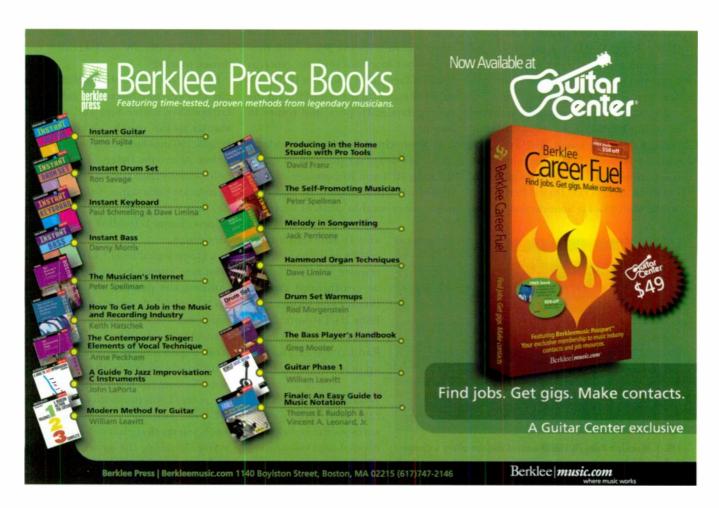
With its simple, modular approach and well-designed layout, Kontakt is a brilliant first effort for Native Instruments' sampling flagship. The modulation and effects capabilities only add to its power. The mapping method makes for superspeedy creation of Instruments, and

the Time and Tone Machine modes let you bend and twist samples well beyond their original form.

On the minus side, the lack of key commands makes operations that should be fast far too mouse intensive. Another minor but noteworthy gripe is that you can't freely resize Kontakt's main window. Instead, you must choose between Normal, Bigger, and Large sizes, which can be customized only by actually typing in the desired size in pixels (for example: 1024×768). That's an annoying limitation.

Overall, however, Kontakt is an elegant and powerful tool with tremendous creative possibilities. I have completely switched over to it, and that should give you an indication of my verdict: highly recommended.

Peter Freeman is a bassist, composer, and producer in Los Angeles. He has worked with John Cale, Seal, Jon Hassell, Shawn Colvin, and Nile Rodgers, among others.



M A C K I E

BABY HUI

Motorized-fader-based mixing can now fit on any desktop.

By Nick Peck

he original Mackie HUI (Human User Interface) MIDI control surface debuted in 1997 and transformed mixing in Pro Tools by offering a physical interface with knobs, faders, and buttons that closely resembled their software counterparts.

Since that time, several moderately priced MIDI control surfaces with touch-sensitive motorized faders have arrived on the market. Many have adopted the HUI's MIDI protocol as a standard. With the release of the Baby HUI (see Fig. 1), Mackie has joined its competitors by offering a small-footprint device with many of the most common control-surface functions.

The Baby HUI's feature set is a subset of its big brother's, so any DAW that recognizes the original HUI will work with the Baby HUI. The current list of compatible DAWs includes Digidesign Pro Tools and MOTU Digital Performer on the Mac, Mackie Soundscape 32 and

FIG. 1: Mackie's Baby HUI MIDI control surface offers a compact automated 8-channel mixer/controller for most popular DAW software.

Mixtreme on the PC, and Steinberg Nuendo on both platforms.

EASY BABY

I ran the Baby HUI through its paces with Pro Tools 5.1.1 and Digital Performer 2.72. In both environments, the Baby HUI behaved exactly as promised. Setup was effortless, and within minutes I was mixing away. The Baby HUI's fader motors are quiet and smooth, and the faders mimic onscreen fader movements perfectly. As with most touch-sensitive motorized control surfaces, the hardware faders respond best when your finger touches the top of the fader knob. Pushing the fader from below provides too little contact area between finger and fader and may not always register properly.

The Baby HUI's rear panel is sparse, consisting of MIDI In and Out jacks, a connector for the line-lump power adapter, and an On/Off switch (see Fig. 2). Installation and setup is as straight-ahead as it gets: connect the MIDI In and Out cables to your MIDI interface, turn on the Baby HUI, configure your interface software (such as OMS or FreeMIDI) and your DAW software to recognize the Baby HUI on the appropriate MIDI port, and you're in business.

At approximately 14 inches wide by 10 inches deep, it's possible to nestle the Baby HUI into virtually any desktop recording environment. By contrast, many more-sizable control surfaces,

such as the original HUI and Digidesign's Control|24 and Pro Control, require that the studio be configured around them. Even some of the Baby HUI's more direct competitors, such as the Radikal SAC-2.2K, take up more workspace.

FADER SECTION

Like most MIDI control surfaces, the Baby HUI is divided into two areas: a Master section on the right and a Channel secPRODUCT SUMMARY

Mackie Designs

Baby HUI MIDI control surface \$799

FEATURES 3.0
EASE OF USE 4.5
DOCUMENTATION 3.5
VALUE 3.0

RATING PRODUCTS FROM 1 TO 5

PROS: Small footprint. Easy to use. Affordable way to get started mixing in Pro Tools with motorized faders.

CONS: No Zoom buttons. No track-name LEDs. No plug-in control support.

Manufacturer

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

tion with individual faders on the left. The simple, straightforward layout has relatively few controls, which makes the Baby HUI a friendly and incredibly easy device to learn.

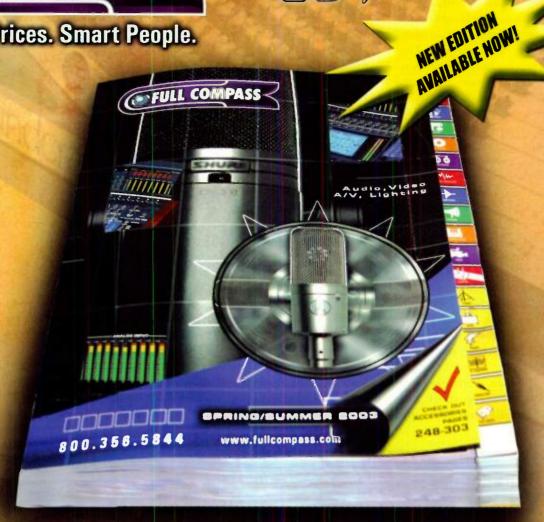
Each of the eight identical channels has a 60 mm touch-sensitive fader. The faders have a nice feel and react instantly to the touch, although full-length 100 mm faders would have been better. Above the faders, the Mute and Solo buttons have red and yellow LEDs to indicate their status. Soloing a channel causes the Mute lights on the non-soloed channels to blink red—that's a nice touch.

A green signal-level LED serves as a poor man's meter bridge, lighting up to indicate the presence of activity on each channel. A rotary encoder at the top of each channel functions as a pan control or as one of four send-level controls, depending on which assignment buttons are active in the Master section. No cool LEDs light up to indicate the rotary knob positions as on the big HUI, but pushing down on the rotary knob selects that channel as currently active. Holding the nearby Shift key and pressing the knob arms the channel for recording.



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MASTER SECTION

The Master section is divided into three subsections providing buttons for transport functions, automation, and encoder assignments. The Transport section has five large controls (Rewind, Fast Forward, Stop, Play, and Record) with built-in LEDs so you can easily see which transport mode you're in. Return-to-Zero and End buttons are just above the transport controls. Holding down the Shift key causes those buttons to double as Selection-In and -Out buttons. That's a good feature, but In and Out are common enough controls to merit their own buttons.

A pair of Bank Select buttons with a numeric LED screen indicate which bank of onscreen faders is currently controlled. Holding Shift while pressing the Bank Select buttons lets you move the Baby HUI's fader assignment a channel at a time, rather than in banks of eight.

The Automation section consists of ten buttons. The Transport, Mixer, Memory Location, and Edit buttons



FIG. 2: The Baby HUI's rear panel sports only MIDI in and Out ports, a power connector, and an On/Off switch.

bring their respective software windows to the foreground on the computer. That's a terrific time-saver when working with limited screen space. The automation buttons work in tandem with the rotary encoder knobs to set the Automation mode for a given channel. Hold down one of the buttons: Bypass/Off, Read, Write, or Touch, then press the encoder knob to assign the mode for that channel. Automation latch mode is not supported. When you hold down the Shift key, each automation button selects a specific automation parameter (Volume, Mutes, Panning, and Send Levels) to enable or disable. That's another nifty and useful feature.

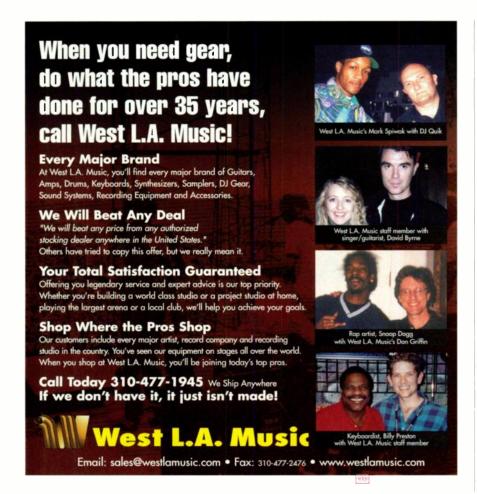
The Encoder Assignment section consists of five buttons that control Pan and four Send Level assignments. The Baby HUI's encoders are always in the same mode, so pressing the Pan button assigns all the encoders to control pan position.

MACKIE VERSUS MACKIE

With all of the Baby HUI's benefits, I still have some mixed feelings about the product. I'm a huge fan of MIDI control surfaces and applaud Mackie for making a small, easy-to-use affordable controller with motorized faders. But while I'm not expecting a Mercedes for the price of a Yugo, some of the features left out of the Baby HUI would have made it much more versatile.

Leaving out niceties such as a meter bridge, an analog monitoring section, 100 mm faders, a numeric keypad, and even a scrub wheel is understandable. But leaving out a 4-character LED display above each fader makes bank switching a confusing experience. Without the track names listed above the faders, you have to constantly refer back to the DAW's mixer screen to determine which tracks each fader controls. (According to Mackie, adding features such as 100 mm faders and 4-character LED labels would have raised the price of the Baby HUI significantly, making it less suitable for low-end systems like Digidesign's Digi 001.)

Leaving out Zoom buttons is another big oversight; I use the Zoom buttons on my big HUI all day long. But the biggest problem with the Baby HUI is that it doesn't let you address plug-ins. Having the ability to control four send levels is great, but my preference would have been to use that precious toppanel real estate to include plug-in control buttons, which are conspicuously



absent. Indeed, there is enough empty space in the Master section that dedicated plug-in buttons could have been added without removing anything else.

In a way, Mackie's biggest competitor is itself. With a list price of \$1,299, the Mackie Control is a far superior product to the Baby HUI and most other products in that price range. All of the features that I miss in the Baby HUI are provided in the Mackie Control, and though its footprint is bigger, it's still reasonably svelte. Unfortunately, the Mackie Control doesn't support Pro Tools at this time (although it does support most other sequencers and DAWs). However, Mackie has begun work on a HUI emulation mode for the Mackie Control that should be finished some time this year.

BABY BUY

In the Baby HUI, Mackie has created a small, reasonably priced MIDI control surface that boasts many of the features found in larger, more expensive units. If you're ready to kick the mouse-mixing habit and you're a heavy Pro Tools user with a small workspace or a small budget, the Baby HUI can get you rolling in style. But if you have a bigger budget and a bigger studio, you might want to consider some of the Baby HUI's bigger brethren, especially the Mackie Control.

Nick Peck creates sound for film and games and plays jazz on a 75-year-old piano with no MIDI port. E-mail him at nick@ perceptivesound.com.





T C W O R K S

SPARK XL 2.6 (MAC)

An all-in-one sample-management tool that gets the job done.

By Len Sasso

C Works Spark XL 2.6 is a multipurpose sample-management tool. Like its high-end Macintosh competitors, BIAS Peak and Prosoniq's SonicWorx Studio, Spark XL performs a wide range of sampleediting tasks, emphasizing some areas over others. Version 2.6 represents a significant update in several respects: a new state-of-the-art noise-shaped dithering algorithm called Megabitmax has been added, the price has been significantly reduced, and there is now only one version of the program. In addition, OS X features have been upgraded, including Direct I/O support, MP3 recording, and CD burning with iTunes. According to TC Works, XL 2.6 will be the last version supporting systems earlier than OS X.

Spark's design emphasis is on mas-

tering and effects processing, but it does include several waveform-editing tools that were not available when Spark was last reviewed in EM in November 1999. One of Spark's strongest features is still its expandable VST-effects matrix, which allows you to build arbitrarily complex effects combinations. In a unique twist, Spark lets you combine effects and VST instrument plug-ins, and the program even comes with a basic complement of modular-synth components for building your own synth plug-ins.

For this review, I used a Titanium PowerBook/800 MHz with an RME MultiFace/CardBus audio interface running both OS 9.2.2 and 10.2.2. The overall performance was good, but I did find that I had to use a large ASIObuffer setting to avoid audio dropout warnings. That's no problem for most sample-editing tasks, but it does result in significant latency when using MIDI and plug-in instruments. I was able to use low buffer sizes by turning off the warnings, and the dropouts, if they occurred, did not cause audible problems, although the program also seemed less stable.

BROWSE AND EDIT

Spark's main window is the Browser View (see Fig. 1). It is divided into three parts: File View (top left), Play List (top



FIG. 1: Spark's Browser View has three parts: the File View (top left), the Play List (top right), and the Wave Editor (bottom). The currently active part is indicated by a blue border.

Minimum System Requirements

Spark XL 2.6

G3/300; 128 MB RAM; OS 8.5 (OS X supported)

right), and Wave Editor (bottom). The Browser View is where all recording, playback, editing, and file management takes place. Understanding how to get around in the Browser View is the key to understanding how Spark works.

Spark is optimized for working with multiple audio files simultaneously. The File View is for organizing the audio files in the current Project by dividing them into groups and then by creating regions within each audio file. Groups are indicated in the File View by folder icons, and they are at the top of the three-level File View hierarchy. Audio files are at the next level, and regions are at the lowest level.

How many groups you have and how you divide the audio files among them is completely up to you. The only rule—and the most annoying aspect of the File View—is that you can't move things around. Once you add an audio file to a group, you can't move it to a different group, and if you create several regions in an audio file, you can't reorder them in the File View to reflect some new logic or naming. Those handicaps aside, however, the File View is a great way to organize Projects.

Spark has menu entries and buttons for loading and saving audio files, but it also supports full drag-and-drop capability from the Finder, and that is by far the easiest way to get files into and out of a Project. You simply drag audio files or folders containing audio files directly into and out of the File View. You can also import WAV, AIFF, SDII, MP3, and any format supported by QuickTime. (When you drag in a QuickTime movie, you get a movie viewer that is automatically synchronized to Spark; you can then instantly begin to edit the movie's soundtrack.) You can export audio in the same formats, with the proviso that QuickTime Pro is needed to export some Quick-Time formats. TC Works has licensed

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the original Fraunhofer MP3 Codec, which is the real deal for MP3 import and export.

In addition to the audio-file formats just mentioned, you can drag CD tracks directly into the File View. That provides the fastest and most convenient way I've seen for extracting data from CD-Audio-format sample libraries. Just pop the CD in and drag some tracks or the whole CD into the File View. After Spark has digested the tracks (which can take a while for a whole CD), you can create regions for the samples you want, add processing as desired (more on that later), and drag the samples to the Desktop or to a folder of your choice. That works equally well for loops, clips, and instrument samples. Spark currently supports SCSI and MIDI transfer to and from a number of popular hardware samplers, although OS X support for some SCSI devices is not necessarily assured.

The Play List is for arranging regions from the File View. A region can occur more than once in the Play List and can be separated from the regions before and after it or crossfaded into them. A sophisticated Cut Editor (see Fig. 2), reminiscent of the crossfade editor in Sound Designer II, is provided for fine-

11.080

Center

Equal Power

11.120

Over

50.0 -

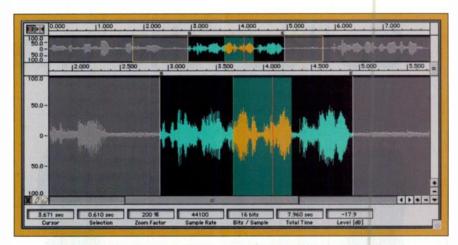


FIG. 3: In the Wave Editor, the dark area indicates the current region within the parent audio file, the blue region indicates the current selection, and the green and red vertical lines indicate the current edit and playback positions, respectively.

tuning the transition between regions. The Play List serves two purposes: creating CDs and creating new audio files from diverse regions. If you wanted to do the latter, you could, for example, splice two loops together or cut in a few notes from an alternate take as is illustrated in the MP3 example Guit-Splice. Spark supports Roxio's Toast and Jam as well as Apple's iTunes for CD burning, and it will transfer the Play List directly to those CD burners.

13,080

And a Dog

Save *Equal

13.040

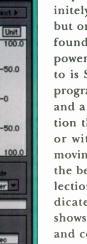


FIG. 2: The Cut Editor controls the transitions between items in the Play List. Items can be separated by a pause or crossfaded with a choice of curves.

Trigger 10 1 1 10 ms w Pre 3.0 sec

MAKING WAVES

The remaining Browser View part is the Wave Editor, which always displays the audio file or region chosen in the File View. If a region is chosen, its parent audio file is displayed with the parts outside the region grayed out. You can make selections outside the region, and in fact, if you want to control where in the File View hierarchy a new region is placed, that's the only way to do it—when you create a new region, it always appears below the currently selected region in the File View.

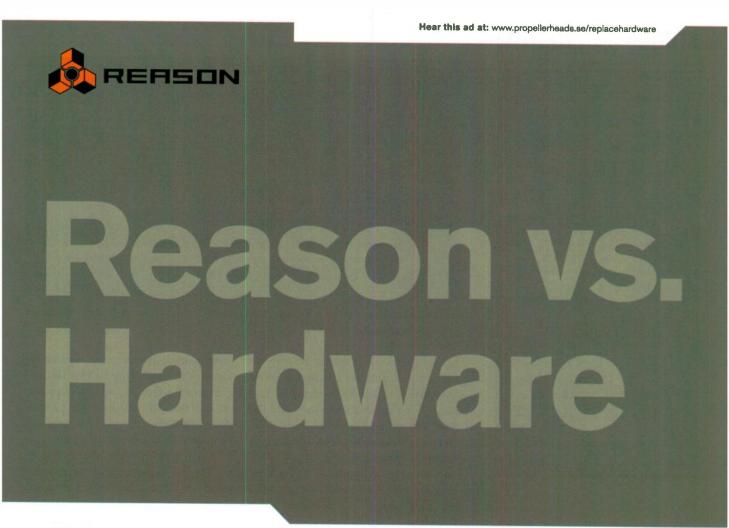
Spark's Wave Editor (see Fig. 3) definitely takes a little getting used to, but once I learned my way around, I found it both convenient and quite powerful. The first thing to get used to is Spark's two-cursor system: The program employs a green Edit Cursor and a red Playback Cursor. You position the Edit Cursor with the mouse or with various key commands for moving it to specific locations such as the beginning or end of a region, selection, or audio file. As its name indicates, the Playback Cursor always shows the current playback position, and conveniently, the Return key returns the Playback Cursor to the Edit Cursor position. (Option + Return moves the Edit Cursor to the Playback Cursor position.)

Aside from clicking and dragging, Spark provides several ways to select areas within the Wave Editor. Double-clicking

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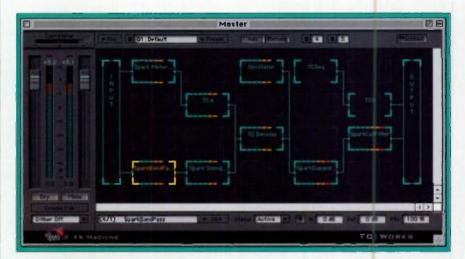


FIG. 4: FX Machine allows you to arrange plug-in effects in a signal-flow matrix. VST effects and instrument plug-ins are supported.

between the cursors selects the area between them, and key commands move the cursors in handy increments. The same key commands when used with the Shift key let you extend or shrink a selection. You can also click and drag to extend or shrink a selection from either end. Once you've selected the desired area, Command + R turns it into a new region that automatically shows up in the File View.

One thing that is often confusing in Spark when it comes to playback is the relationship between the File View regions, the Wave Editor selections (which are remembered on a perregion basis), and an optional loop. (You can define one for each audio file.) Three playback options affect what you hear when you choose a region or audio file in the File View: Play Selection, Cycle Mode, and Loop Mode. With Play Selection turned on, you always hear the Wave Editor selection, unless there is none, in which case you hear the region if a region is chosen. You hear the whole audio file if that is chosen, unless Loop Mode is turned on, in which case you hear the loop. As you might imagine, things can quickly degenerate into a "Who's on first?" situation, and I frequently found myself listening to something other than what I had intended to audition.

In addition to its Pencil and Eraser tools, the Wave Editor offers a basic com-

plement of destructive signal-processing algorithms, including normalization, gain change, fade in and out (on a perchannel basis with variable fade curves), reverse, inverse, channel swapping, mix to mono, DC removal, sampling-rate conversion (with three quality levels), and independent pitch shifting and time stretching. You can also destructively apply any VST plug-in, although the FX

PRODUCT SUMMARY

TC Works

Spark XL 2.6 audio-editing software \$599

FEATURES	4.0
EASE OF USE	3.5
DOCUMENTATION	3.5
VALUE	4.0

RATING PRODUCTS FROM 1 TO 5

PROS: Complete kit of sample management tools. Sophisticated effects processing. Supports multiple sample formats including MP3 and QuickTime. High-end noise-shaped dithering.

CONS: Navigation can get confusing. Limited complement of included effects. Wave Editor takes some getting used to.

Manufacturer

TC Works/TC Electronic (distributor) tel. (805) 373-1828 e-mail info@tcworks.de Web www.tcworks.de

Machine (which I'll discuss in a moment) offers much more extensive plugin processing.

Although the Wave Editor DSP is destructive, Spark uses temporary files and prompts you before making changes permanent. You can drag or save from the File View to get a copy of the changed file, leaving the original unchanged.

Spark lets you place loop markers (one per audio file), but offers no special loop-editing tools similar to the Cut Editor previously described, nor is there any provision for tempo matching. Loop management is the one area in which Spark in general, and the Wave Editor in particular, could use some juicing up.

JUST FOR EFFECT

Spark's FX Machine (see Fig. 4) and its consequent effects-processing capabilities are among the program's most powerful features. The FX Machine is a plug-in matrix that by default offers four parallel rows of five effects each. (The matrix can be expanded to 99 by 99, but given that effects tend to be CPU intensive, four by five is probably a reasonable limit.) Spark comes with a basic collection of VST effects as well as five modular-synth modules, including a little step sequencer. Of course, you can apply the power of the FX Machine's flexible routing to any of your own VST effects or Instruments as well. Moreover, the FX Machine itself is a VST plug-in and can be used in any compatible host.

Mastering effects include a versatile compressor-limiter, a maximizer, a denoiser, a de-clicker, and a junior version of the TC Native Reverb. The processing effects include five filter variations, an expander, a saturation-distortion unit, a stereo feedback-delay with tape emulation (quality deteriorates for later echoes), and a wah-wah effect with built-in envelope follower. There are also two monitor plug-ins: a 30-band, ½-octave Metergraph spectral analyzer and a Sonograph display.

The synthesizer modules (formerly marketed separately as Spark Modular), although basic, can be combined

in the FX Machine matrix to produce an intriguing synth. But it's really the modules' use in effects configurations that is the most interesting. Combined with the 16-step pattern-sequencer, the modules can be used to build complex gating and enveloped-filter effects. The MP3 example droneFX was created using the sequencer to process a drone sample.

Entire FX Machine setups can be saved individually or in banks of eight, so you don't have to re-create your favorite matrix every time you run Spark. Once you have your FX Machine set

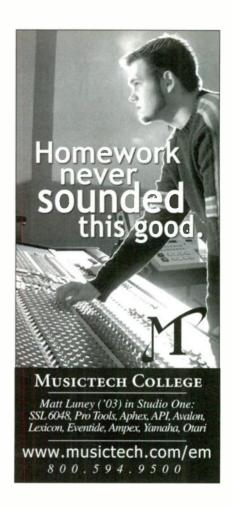
Entire FX Machine
setups can be saved
individually or in
banks of eight.

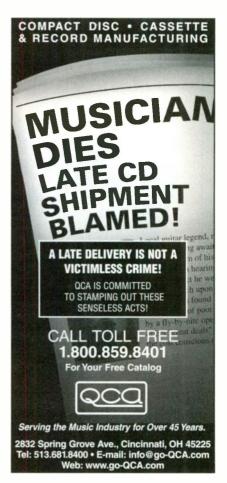
up, processing an individual region or the complete playlist is simply a matter of clicking the Create File button in the Master window. The pop-up menu below the button is for selecting among several Megabitmax noise-shaping and dithering options.

NEW REGIONS

In developing and refining Spark XL, TC Works has clearly set out to cover a lot of territory, and it does so remarkably well. XL would definitely be the tool I'd grab for extracting regions from large sample collections, for cutting and splicing diverse samples, and for complex processing tasks. Built-in MP3 and QuickTime support are also a big plus. For the minutia of wave editing, XL wouldn't be my first choice, but the tools are there to get the job done. At \$599, XL is at the high end of the price range for comparable products, but if you spend a lot of time doing sample management and DSP sound design, Spark XL 2.6 is worth considering.

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





E D I R O L

UA-700 (MAC/WIN)

This low-cost

audio/MIDI interface

does it all.

By Mark Nelson

dirol has introduced a number of inexpensive USB audio interfaces during the past several years, making the dream of an affordable high-quality laptop or desktop studio a reality for many electronic musicians. In fact, Edirol released the first USB audio interface, the UA-100, back in 1999.

The UA-700 moves Edirol's product line up a notch in terms of power and versatility by adding Composite Object Sound Modeling (COSM) technology that models various microphones and guitar amplifiers. But that's not all. The UA-700 also provides an assortment of built-in effects, a phono preamp for

digitizing your antediluvian LPs, a USB MIDI interface, and S/PDIF I/O with on-the-fly sampling-rate conversion. Can you say Swiss Army knife?

INTERFACE AND LAYOUT

The UA-700 packs an impressive amount of processing power into a compact metal box with a decidedly retro look; I haven't seen so many knobs per square inch since the '70s. Although it serves as both an audio and a MIDI interface, the UA-700 doesn't provide faders, pan knobs, or any of the usual mixer functions. Instead, its top panel is arranged by task: microphone-related features on the left, controls for amp modeling and guitar effects to the right (see Fig. 1).

Each section is further subdivided by function. You enable effects blocks by pressing a small button that glows red when engaged. Blocks on the microphone side include Mic Modeling and Dynamics & De-esser; on the guitar side you can select the amp- and speaker-modeling functions as well as a few guitar effects. The system effects at the bottom of the panel (Noise Suppressor & EQ and the Chorus & Reverb sections) operate globally.



FIG. 1: The top panel on Edirol's UA-700 is packed with knobs, providing direct control over the microphone and guitar-amp modeling functions as well as the built-in effects.

Minimum System Requirements

UA-700

MAC: G3/300; 128 MB RAM; Mac OS 9.x or 10.x (OS 9.0.4 or later when using Sound Manager)

PC: Pentium/Celeron/other Intel-compatible processor/400 (600 or higher for Windows XP); 64 MB RAM (128 MB for Windows 2000/XP); Windows 98/2000/ME/XP

One of two knobs in the lower right corner adjusts the volume of the master bus. Curiously, it affects only the analog and digital outputs and not the USB port. Another knob (Input Mon) lets you mix in some of the input signal for direct monitoring—a vital feature when recording in situations with high latency. Metering is restricted to a tiny five-LED ladder for the Master output and a single input-overload indicator. A Play/Stop button can directly control recording software with MIDI Note On messages.

Conveniently located on the top of the unit are all of the analog input jacks: two mic/line inputs on Neutrik connectors, a dedicated guitar input, and a pair of RCA jacks that serve double duty as phono or aux inputs. A nearby switch engages a phono equalizer and selects the proper input level—that's a nifty feature. A Center Cancel switch is even provided to eliminate vocals. That's right: with the UA-700, you can make your own karaoke recordings (depending on how the original was panned).

The Master analog output uses a pair of unbalanced %-inch jacks on the top panel and a couple of RCA jacks on the rear panel; they operate at the same level and are active simultaneously. S/PDIF digital I/O is handled by both coaxial and optical connectors (see Fig. 2). A tiny switch removes the analog inputs and effects from the mix bus for direct digital transfers between a MiniDisc, say, and the computer. You have to be careful, though; there's no way to mute a digital input, so it's easy to create a feedback loop when recording to a digital device. The manual

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suggests physically disconnecting any inputs you won't be using. In the course of trying out all of the UA-700's functions, I had to repatch repeatedly—a real bother.

All of the UA-700's processing is in 24-bit resolution. Although you can select 16-bit resolution for the USB output, there is no way to dither to the digital outputs. One nice touch, however, is that the UA-700 can perform sampling-rate conversion from 32, 44.1, and 48 kHz on the fly.

MIDI In and Out jacks, a standard USB port, and a 1/2-inch stereo head-phone jack are also included on the UA-700. Unfortunately, the headphone jack does not have a separate volume control. A large wall-wart transformer supplies the juice to the unit.

EASY EDITS

All of the UA-700's regular and advanced parameters are readily accessible through a software editor that is available free from Edirol's Web site. The company has also posted some additional guitar patches and encourages users to post their own.

In use, the UA-700 Editor is simplicity itself (see Fig. 3). You can edit parameters onscreen using a mouse or directly by twisting the UA-700's knobs. Patches are easily saved and recalled, although, as with most passive controllers, the hardware knobs do not reflect the changes made onscreen.

Selecting a style in the editor's Amp section changes the graphics to one of several designs, including a tweed pattern with chicken-head knobs, a black panel with familiar black and silver controls, and a gleaming chrome design.

Incidentally, the Editor's layout doesn't match that of the UA-700 ex-

actly. Some functions, such as the Center Cancel switch, appear in different locations, while others, such as the roll-off frequency control and the microphonemodeling effect level, have no counterpart on the device itself. (According to Edirol, the UA-700 was designed to be simple and tactile for quickly dialing in sounds. The software provides deeper access to the unit, so it offers many more control options.)



FIG. 3: Edirol's UA-700 Editor offers easy onscreen control of all hardware parameters.

USB OPERATION

The UA-700's Advance mode supports 44.1, 48, and 96 kHz sampling rates. The Normal mode rates are limited to 44.1 and 48 kHz sampling rates. What's the difference? Advance mode uses the ASIO drivers for improved latency and sync and supports MIDI I/O. Normal mode selects audio drivers that are bundled with Windows or the Mac OS.

Once you get everything set up correctly, USB operation is (for the most part) transparent, though my iMac lost sight of the drivers every now and then.

Although the UA-700 supports a 96 kHz sampling rate, it cannot play and record simultaneously at that rate. (According to Edirol, USB doesn't have enough bandwidth for full-duplex 24-bit, 96 kHz recording.) To hear your work, you must quit the application, reboot the device with the correct setting, and restart the software. If you need a retake, you must go through the whole process again. What's more, you can't use any of the UA-700's modeling or effects at the highest sampling rate.

MIDI operation is fairly straightfor-

ward. Regardless of the density of audio and MIDI data, I never heard a hiccup, although with only one In and one Out, I was admittedly running a pretty light load.

However, because all of the analog (and digital) inputs are sent directly to the mix bus, it's impossible to record while monitoring a MIDI instrument track through the aux inputs. The only way around that problem is to use an external mixer. True, the unit is designed as an interface, not an all-in-one desktop recording solution. Nonetheless, for many users, that could be a serious limitation.

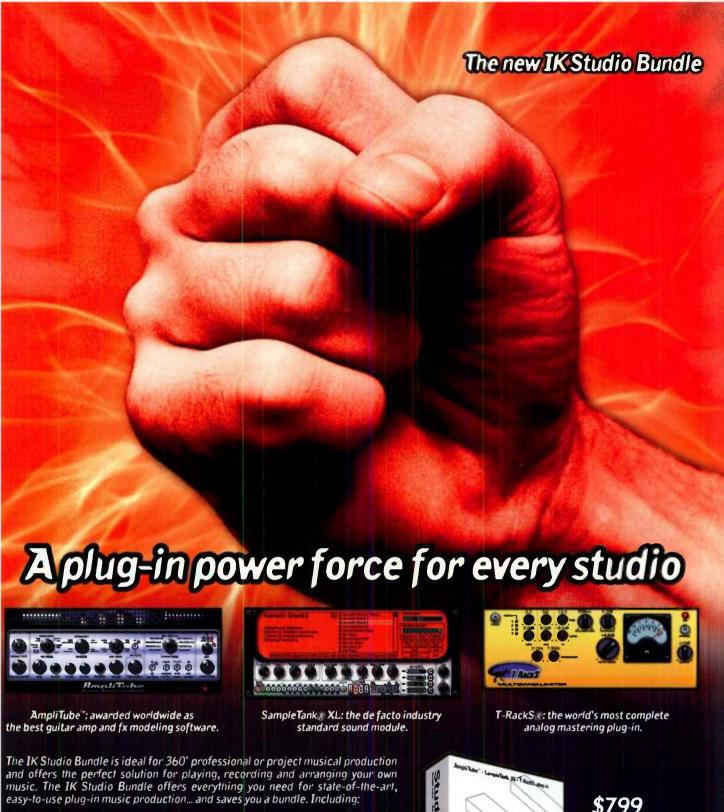
MODEL BEHAVIOR

The UA-700 uses the same microphonemodeling algorithms as Roland's highend digital workstations. Although it's optimized for the Roland DR-20 dynamic and AKG C 3000 B microphones, curves for typical small dynamics, a headset dynamic, and small-capsule condenser mics make selecting the input source a snap. (An additional selection, Flat, is intended for line inputs.) Modeled mics include large and small dynamics, large and small condensers, and something called Vintage Condenser (a tube-condenser emulation). A rotary knob simulates the effect of moving closer or farther from the mic, though I found it more useful simply as a quick EQ adjustment.

All in all, the mic modeling is first rate. With very little effort, I could make fundamental improvements (or



FIG. 2: In addition to its main outputs, the UA-700 boasts coaxial and optical S/PDIF I/O and MIDI ports on it rear panel.



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add low-tech grunge) to my recordings. I doubt anyone would be fooled into thinking that I used a Neumann U 87 instead of a Shure SM57, but it's still a great tool for getting the most out of a limited mic cabinet.

Farther down the signal chain lies a simple de-esser and a rudimentary preset compressor. The only way to make direct changes to the compression ratio is with the UA-700 Editor, though the Advance mode provides access to more parameters than appear at first glance.

The two mic/line inputs are normally summed to mono; in stereo operation, Mic 1 is panned hard left, Mic 2 is panned hard right. Each input has a dedicated sensitivity knob, but they share the 20 dB pad and the low-cut switch. Stranger still, the mic-modeling effects and dynamics are also applied equally to both inputs, which is a drag when using two disparate mics or a mic and a line source simultaneously. Moreover, the phantom power is global, and

PRODUCT SUMMARY

Edirol

UA-700 USB audio/MIDI interface \$595

FEATURES	3.5
EASE OF USE	2.5
AUDIO QUALITY	3.0
VALUE	25

RATING PRODUCTS FROM 1 TO 5

PROS: COSM mic modeling extends the range of limited mic cabinets. Guitar-amp modeling adds versatility. Built-in effects. On-the-fly sampling-rate conversion. Lots of knobs for direct control of parameters. Phono preamp.

CONS: Cannot use mic and guitar inputs for simultaneous stereo recording. Requires external mixer to monitor MIDI instruments when recording. No status LED for phantom power. Limited inputs.

Manufacturer

Edirol Corp. North America tel. (360) 594-4273 e-mail info@edirol.com Web www.edirol.com

Channels	(2) record; (2) playback (full duplex except at 96 kH
Sampling Resolution	24-bit
Sampling Rates	44.1, 48, 96 kHz
Inputs	(2) TRS/XLR combo with phantom power;
	(1) high-impedance guitar; (2) RCA aux line;
	(1) S/PDIF coaxial; (1) S/PDIF optical
Outputs	(2) 1/2" line; (2) RCA line; (1) S/PDIF coaxial;
	(1) S/PDIF optical; (1) 1/2" stereo headphone
MIDI I/O	(1) In, (1) Out
Audio-Driver Compatibility	ASIO 2.0 (Mac OS 9.x/10.x and Win 98/ME);
	WDM (Win XP/2000); MME (Win 2000/XP);
	Sound Manager (Mac)
Built-in Effects	3-band EQ, noise gate, reverb, chorus,
	center cancel, guitar-amp modeling, mic modeling
Dimensions	10.1" (W) × 2.3" (H) × 7.2" (D)
Weight	2.86 lb.

there is no warning light to indicate that it is active.

INS AND AMPS

I have been favorably impressed with Roland's COSM amp modeling in the past, so for my first recording with the UA-700, I dialed up a juicy preset and got ready to track a rhythm-guitar part and a scratch vocal. Unfortunately, I couldn't proceed, because the mic and guitar sections are summed to mono! The unit is capable of stereo recording, but surprisingly, you can't use a mic and the guitar input simultaneously.

Although I liked the ease of choosing an amp style and speaker cabinet, the controls seemed a bit coarse; the Advance mode allows a bit more finetuning. But don't look for exact re-creations of your favorite amps; when was the last time you saw a '50s vintage tweed amp with controls for Drive, Predrive, and Edge?

Although getting a good clean sound proved challenging, the wide range of crunchy and distorted tones fairly dripped with attitude. I was pleased with how the cabinet simulations rounded out bass and acoustic guitar parts.

Stompbox-style effects add to the fun, although the choices are limited to Flange, Phaser, Tremolo, a basic delay, and compression. How do they sound? Pretty darn close to a stompbox without

the extra noise. Whether or not that's a good thing depends on how you feel about basic pedal effects. And speaking of noise, the Noise Suppressor (located in the Master Effects section) comes before the reverb and chorus effects. That's very cool, because you can tame the buzzes and whooshes of a heavily processed guitar without affecting the reverb tails.

The guitar section is generally a bit weak considering the UA-700's pedigree. Some basic effects such as multitap delays, wah-wah, and auto panning are noticeably missing, and the ampmodeling effects are better at heavy distortion than chunky tube warmth.

MASTER EFFECTS

Regardless of its origin, the signal flow passes through a Master Effects section that is composed of a noise gate; bass, middle, and treble tone controls; a single knob for chorus depth; and a reverb section. That means that both mic channels, or a mic and guitar, share the setting. Even the aux and digital inputs are affected!

Reverb presets include plate, large hall, small hall, room, and spring. Overall, they're a disappointing lot; the plate in particular sounds darker than I'd like for vocals, and the room reverb is somewhat choked. Worse, you must use the editing software to gain access to

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any reverb parameters beyond the depth level available on the unit.

The UA-700 lets you globally bypass everything but the USB input to use any of the microphone, guitar, or master effects in a send/return configuration. That's handy if you want to spice up previously recorded tracks.

DIGGING DEEPER

Holding down any of the buttons that enable the Compressor & De-Esser,

Chorus & Reverb, Guitar Amp Modeling, or Input Mon sections takes you to Advance mode. In this mode, the three Guitar Effects knobs assume new functions. For example, in the master effects section they set predelay, rate, and depth for the chorus function. In the guitar section they control amp level, predrive, and edge, and they're also used to edit compressor settings. Sound confusing? It's actually far easier than it sounds.

The unit's external control through MIDI is extensive and it's easy to save and restore settings to a sequencer by using bulk dumps. You can't, however, use the UA-700 as a MIDI control surface.

A quick tap on the Patch button saves or recalls all of your settings to any one of six user locations accessed by twisting the Sample Rate knob. Of course, when a patch is recalled, the knob positions don't reflect the actual settings. And you can't name patches because the UA-700 has no display, not even an LED to indicate the currently active patch. So, you'll need a good memory or a pencil and paper.

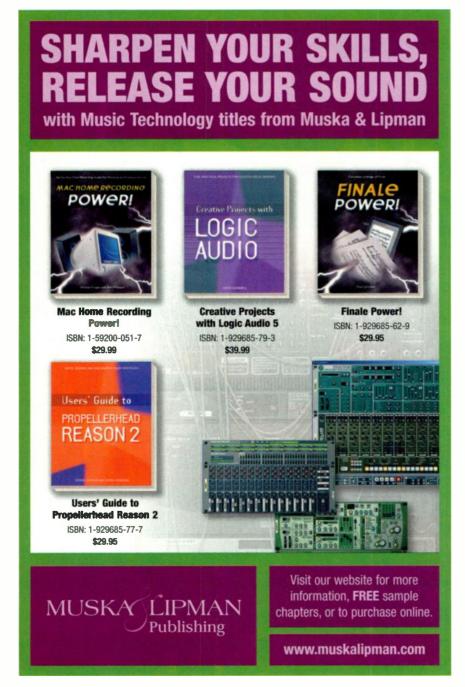
LOOSE ENDS

Edirol has packed the UA-700 with a number of very cool tools: a couple of swell mic preamps with Roland's excellent microphone-modeling technology, a handy guitar-effects module, a MIDI interface, a sampling-rate converter, and even a phono preamp. Each of the features is fine on its own—in fact, the mic modeling is excellent—but unfortunately, they don't always work well together.

While using the UA-700, I kept running into walls; either I ran out of inputs, or I had to remember to yank out a patch cord before I could proceed. It's unfortunate that the designers couldn't find some way to let you use the mic modeling and the guitar effects simultaneously. Even if that's asking too much in terms of processing power, you should at least be able to pan the microphone and guitar inputs to individual outputs. Furthermore, you should also be able to keep the aux inputs out of the mix bus to allow monitoring and recording at the same time.

To be fair, the UA-700 is clearly designed to be versatile, not universal. Still, I'd rather have fewer bells and whistles in exchange for a more thoroughly integrated set of features.

Mark Nelson lives and works in southern Oregon. He's still wondering when he's going to find the time to record that CD he built his studio for.



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Quick Picks

GROOVE TUBES

Ditto Box

By Michael Cooper

The Ditto Box (\$399) is a tube DI with a new wrinkle: a variable gain control that provides a whopping 30 dB of gain. Capable of dishing out robust line-level signals from passive electric guitar or electric bass input, the Ditto Box is the only DI box (line-level preamps aside) that does not typically require a downstream microphone preamplifier to attain adequate record levels.

The Ditto Box is built like a humvee, encased in a heavy, well-ventilated steel chassis with large rubber feet. Its front-panel controls are straightforward. The high-impedance instrument input and unbuffered loop output are both on unbalanced phone jacks and wired in parallel: what goes into the input comes out the loop output unchanged. Just patch the loop output to your guitar, bass, or keyboard amp if you want to mic up your cabinet in addition to going direct.

Making Connections

The Ditto Box's transformer-balanced XLR output gets the benefit of the all-tube,

The Ditto Box tube DI from Groove Tubes can dish out hearty line levels courtesy of its onboard variable-gain circuitry.

transformer-coupled audio path. You can connect the XLR output directly to an outboard A/D, DAW input, or console insert-receive jack when the Ditto Box's rotary gain control is cranked fully clockwise, and, in most cases, you'll have adequate gain. A ground-lift switch (to reduce hum) and neon-blue power-status LED complete the front panel's feature set.

The Ditto Box's spartan rear panel provides a power switch, fuse holder, and IEC receptacle for the detachable AC cord. The front- and rear-panel controls are protected on the top and both sides by the extruded chassis, making the Ditto Box ready for the road.

The Ditto Box features two triode tubes in its audio path. A 12AX7 buffers the input signal and provides the gain. The unit's gain control adjusts the amount of negative feedback returning to this input stage, thus varying the amount of gain output by the 12AX7. Following the gain-control circuit is a 12AU7 tube that drives the unit's custom-wound output transformer.

Tech titans will be pleased by the Ditto Box's professional specs. The unit's frequency response is stated to be 6 Hz to 200 kHz (± 3 dB) at unity gain. Its dynamic range is cited as 118 dB, and the equivalent input noise spec is -90 dB. The Ditto Box's input impedance is 1 M Ω .

In Session

To its credit, the Ditto Box is quiet even when its onboard gain is maxed. But even with its gain control adjusted to its lowest setting of 0 dB, the Ditto Box's output level is

competitive with that offered by other DIs.

I got great results using the Ditto Box to record electric bass guitar tracks. The sound was very round and lush, with the bass frequency response nicely extended. In an A/B test with my more expensive Demeter Tube Direct box, the Demeter offered a little more top end, but the two boxes sounded quite similar otherwise.

When I recorded my '62 Strat first through the Ditto Box and then through my Demeter Tube Direct, the sonic differences between the two DIs were more audible. The guitar track recorded through the Demeter DI sounded a little more sparkly and clear than the one I recorded with the Ditto Box. The Ditto Box's guitar track, on the other hand, offered a tad more body. The differences were no doubt due in part to the Ditto Box's much lower input impedance (1 M Ω , compared to the Tube Direct's 27 M Ω input impedance). Synth tracks recorded with the Ditto Box also sounded plenty round but a hair wanting for top end. Keep in mind that we're talking subtleties here.

Going Direct

Overall, the Ditto Box sounds great and is built to last. At \$399, it's less expensive than other tube DIs offering this level of quality (beating the Editors' Choice award—winning Valvotronics Tube Amplified Direct Box by only \$1 on this front).

When you consider that the Ditto Box's variable gain control gives you the equivalent of an instrument preamp at no additional cost, you can come to only one conclusion: the Ditto Box is a winner.

Overall EM Rating (1 through 5): 4.5 Groove Tubes; tel. (818) 361-4500; e-mail sales@groovetubes.com; Web

www.groovetubes.com

DESTROY FX

Buffer Override, Geometer, and Rez Synth (Mac/Win)

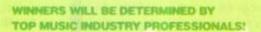
By Len Sasso

Destroy FX (DFX) offers an impressive collection of effects plug-ins by programmers Marc Poirier and Tom Murphy. All DFX plug-ins are free, but donations are happily accepted. Most DFX plug-ins are available in VST format for all recent versions of Windows and the Mac OS, and Audio Units versions for Mac OS X are appearing regularly. As the name implies, DFX plug-ins are bent on destruction and plumb the extremes of audio processing. If you're not into mangling your audio beyond recognition but are willing to invest some time learning how these plug-ins really work, you can also achieve some very subtle results. I'll cover three plug-ins in the space



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provided here. You can find dry and wet versions of MP3 demo files for all of them on the Destroy FX Web site.

Buffer Stuff

Two DFX effects, Buffer Override and Geometer, make essential use of the fact that audio files are read and processed in chunks, often called buffers or frames. Typically, you can set the size of the buffer, which is under the control of the host audio software. Small buffers make for low-latency processing—especially crucial for audio instrument plug-ins. Both DFX plug-ins achieve their effect by overriding the host's buffer settings, and the purpose of Buffer Override in particular is to do just that. Knowing how the buffers are used is key to understanding how the plug-ins work.

Buffer Override is a two-step rebuffering process. You first set a buffer size. which overrides the host's buffer setting; then, you set a Divisor parameter that determines how much of the buffer is played back. In effect, that defines a smaller buffer that loops continuously until the main buffer is refilled. If, for example, the buffer holds a single beat at the current tempo and the Divisor is set to four, the first 16th note of each beat (one quarter of the beat) will play four times before the next beat of audio is moved into the buffer. It can be convenient to set the buffer size relative to song tempo, and that option is provided.

Because the buffer is looped continuously, its size will correspond to pitch if it is very small. To that end, you can use MIDI notes to set the Divisor in semitone increments and MIDI Pitch Bend to modulate it. In addition, Buffer Override provides separate multiwaveform LFOs for modulating the buffer size and the Divisor, and those LFOs can run free or synced to tempo. The MP3 file BO is an example of extreme Buffer Override processing of a simple bass line.

Geometer, the newest DFX effect, is also buffer based. It selects individual points, called Landmarks, in the buffered audio and interpolates between them to create waveforms. The Landmark values and therefore the resulting waveforms change each time the audio buffer refills. Geometer's controls allow you to select how the Landmarks are chosen (for example, at reg-

ular intervals, at random intervals, or at zero-crossings and peaks) and how the gaps are filled in (for example, using straight lines, short pulses, or sine-wave segments). Geometer produces interesting results with speech and single-cycle waveforms. With the wrong settings, it can turn just about anything into noise.

Controlled Resonance

Rez Synth is probably my favorite DFX plug-in. It turns virtually any audio material into

a playable synth, while retaining some of the sound's original characteristics. Rez Synth works by passing the incoming audio through a bank of bandpass filters whose resonant frequency is controlled by MIDI notes. The bank can have from 1 to 30 filters, and you can set their frequency spacing. Using from five to ten banks spaced in harmonic intervals (major or minor thirds, for example) effectively reprograms the pitch of the incoming audio. The MP3 example RezBrass processes a single-pitch brass loop with pitch controlled by both MIDI notes and Pitch Bend.

Other DFX effects include a dual delay line with feedback and variable playback speed (an effect similar to moving the heads on a tape machine), two gating effects, and a bidirectional scrubbing effect with MIDI-controlled scrub speed. Given that the price is right and the fun factor is high, it's hard to think of a reason not to visit the Destroy FX Web site for a listen.

Overall EM Rating (1 through 5): 4
Destroy FX; Web www.destroyfx.org

ROLAND

TMC-6 Trigger MIDI Converter

By Scot Gresham-Lancaster

The TMC-6 (\$295) Trigger MIDI Converter is designed for the person who wants to complement an acoustic drum set with electronic sounds or expand the sound palette of an electronic kit. The TMC-6



Destroy FX's Buffer Override effects plug-in supercedes the size of the host's audio-processing buffer to loop a small segment for playback. You can use MIDI notes and Pitch Bend to control the loop size, which in some instances determines the playback pitch.

works with Roland V-Drums and V-Cymbals as well as other types of triggers.

To use the TMC-6, you simply plug in your pads or triggers and then choose a setting that corresponds to the pad or trigger you're using. The six trigger inputs are compatible with 2-way (head and rim) triggers (such as the PD-120 and PD-80R V-Pads), 3-way (bell, shoulder, and edge) triggers (including the CY-15R, CY-12R/C, CY-14C V-Cymbals), and hi-hat (such as the FD-7 Hi-Hat Control Pedal) triggers.

All the World's a Trigger

For me, the most exciting aspect of the TMC-6 is that it lets you use any acoustic-drum pickup or homemade piezo transducer to trigger a sound module or create MIDI sequences. I tested the TMC-6 extensively with acoustic drums and was impressed with its responsiveness and flexibility in a variety of setups.

In addition, I made six piezo-based sensors and tested them on a variety of drums and metal objects and even a tabletop. I was able to fine-tune the TMC-6's response to work with a wide range of playing techniques and sensor mounting positions. The TMC-6 offers 12 user memory slots for storing custom settings.

A host of parameters that allow the user to fine-tune the TMC-6's response are available: Sensitivity, Scan Time, Retrigger Cancel, Mask Time, Crosstalk Cancel, Threshold, and Velocity Curve. This is a big improvement over the Roland PM-16, a trigger-to-MIDI converter that I have worked with extensively over the years.

There are two ways to select a trigger input for editing. You can select the input



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using the Trigger Select button or use Trigger Chase mode, which lets you select an input by hitting the trigger that is plugged in to it.

Occasionally I needed to adjust the TMC-6 to minimize false triggers and crosstalk, even when using the presets. The terms crosstalk and false triggering are often used interchangeably, but there is a difference. False triggering refers to the broad category of any unintentional and undesirable triggering. Crosstalk, a subcategory of false triggering, is the undesirable triggering that occurs when you strike one pad but trigger another (often because the vibrations travel through the drum rack to the pad). The TMC-6 has specific and well-thought-out controls to deal with these problems, and it handles them better than any other trigger-to-MIDI device I have used. The weakest part of the TMC-6's design is the choice of a 7-segment display for the user interface.

Audio Realms

To use a microphone or line-level source as a trigger, set the desired trigger input to Aud. I tested the Aud setting by sending recorded percussion tracks into the TMC-6 and recording the MIDI information onto separate channels of a MIDI sequencer. I was then able to create a notated version of the recording by importing the MIDI sequence into a notation program.

Next, I tried triggering from the six channels of a surround mix. By changing the EQ on each of the individual audio channels, I got very interesting results from the TMC-6, including a bit of unexpected triggering. The TMC-6's inputs were sensitive up to about 11 kHz, after which the re-

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The Roland TMC-6 trigger-to-MIDI converter accepts any kind of trigger and can be used to augment an acoustic or electronic drum set.

sponse fell away. However, the frequency response was dependent on the parameter settings.

Hi-yo, Trigger

Compared to the earlier trigger-to-MIDI converters and home-brew technology I have used over the years, the TMC-6 offers specific solutions to the problems of taking analog trigger signals and converting them to MIDI information. Its extensive parameter list gives the user a great deal of flexibility. The TMC-6 would make a great addition to any percussionist's setup.

Overall EM Rating (1 through 5): 4

Roland Corp. U.S.; tel. (323) 890-3700; Web www.rolandus.com

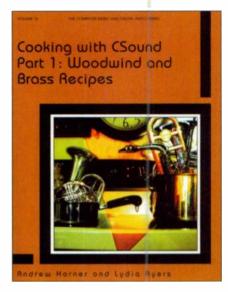
A-R FDITIONS

Cooking with Csound, Part 1: Woodwind and Brass Recipes
By Dennis Miller

One measure of the far-reaching success that Csound is having in the music community is the number of "third-party" books cropping up that discuss various aspects of the language. In addition to recent texts by Richard Boulanger and Riccardo Bianchini and Alessandro Cipriani, there is a new text from A-R Editions: Cooking with Csound, Part 1: Woodwind and Brass Recipes (\$49.95). It offers insights into working with this powerful yet complex language.

Coauthors Andrew Horner and Lydia Ayers waste no time getting to the heart of the matter. After a brief explanation of the

syntax Csound uses for its instrument-design and scoring components, the authors explain in detail the generic model for the instruments they will be building. This design is based on a multiple-wavetable model of wind instruments and includes parameters for vibrato, reverb, filter, pitch, and attack and decay times. Given the generality of the model, the authors make it clear that some compromises are necessary when dealing with the



A-R Editions' Cooking with Csound, Part
1: Woodwind and Brass Recipes explores
the wavetable model for synthesizing wind
instruments. A CD-ROM with orchestra and
score examples accompanies the text.

unique aspects of certain instruments, such as the breathiness of the flute and piccolo.

Code Breaker

By chapter 3, the authors present some Csound orchestras that extend across three pages of text. This amount of code is not at all unusual for a complex Csound orchestra, but it negates somewhat the authors' premise that the book will be of use to "near novices." A near beginner needs considerably more explanation and detailed commentary to fully comprehend such instrument designs. Then again, many Csound newcomers are used to rendering preexisting scores and orchestras and modifying various parameters to suit their own uses. To facilitate that, all of the examples presented in the text appear on the accompanying CD-ROM.

Chapters 4 and 5 step through each of the major woodwind and brass instruments and illustrate important aspects of their acoustic properties. Much of this information, such as the amplitude-envelope characteristics of the instruments, is general enough to be applied to other synthesis platforms. Excerpts from standard orchestral literature are used to demonstrate each instrument, and other musical works are suggested for additional study. (However, no comprehensive discography is included.)

The spectral graphs that are shown for each instrument are not very high in resolution; in fact, they appear almost handdrawn. High-quality spectrographs would have better illustrated the authors' points.

Chapters 6 and 7 discuss the use of global and "note-specific" effects, respectively. Filters, time-based effects, ring modulation, and others are explained in some detail. Here again, the techniques covered are general enough to be applied to any type of Csound instrument design, making them very valuable indeed. Especially noteworthy is the design of a "multi-effects processor," in which a number of effects can easily be toggled on or off. Chapter 7 ends with some brief remarks about a short composition by Ayers that illustrates many of the techniques covered in the two previous chapters.

Chapter 8 explores Csound's representation of pitch and aspects of microtonality in general and moves well beyond the initial focus of the text. In fact, nothing here relates exclusively to wind instruments. Though the information is useful, it might

have been more appropriate to discuss, for example, the use of alternate fingerings on wind instruments to produce microtones and how those techniques can best be modeled in Csound.

Season to Taste

The final chapter, "Seasoning Touches," is the most problematic as it includes information and a number of comments that seem hugely out of context. For example, ideas such as "syncopated music gives stronger emphasis to offbeats," "performers use slurs and legato to shape phrases," and "tempo can really help shape a piece of music" seem inappropriate and even banal in the context of a book ultimately aimed at advanced musicians. Other material, such as the brief discussion of Csound's Tempo and s (section) statement, adds little that can't be found in the Csound manual. The question of the book's focus arises more strongly here than anywhere else.

Horner's and Ayers's instrument designs are generic—which means they can be

used on any Csound platform—but I hope that some avid Csounder will "transcribe" them for use in one of the recent graphical Csound environments, such as Joo Won Park's Csound Max or Gabriel Maldonado's CsoundAV. I would also hope that in later parts of this series, the authors will reference works by other members of the vast Csound community that employ acoustic-instrument designs, thereby giving some idea of other approaches to acoustic modeling (Perry Cook's opcodes come to mind).

Reservations aside, the book will be very useful to any Csound user wishing to explore wind instruments in particular or methods for coding realistic acoustic instruments in general. The material on mixing, effects, and tuning is an added bonus.

Overall EM Rating (1 through 5): 4
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Media Services	www.mediaomaha.com	149
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Omnirax	www.omnirax.com	148
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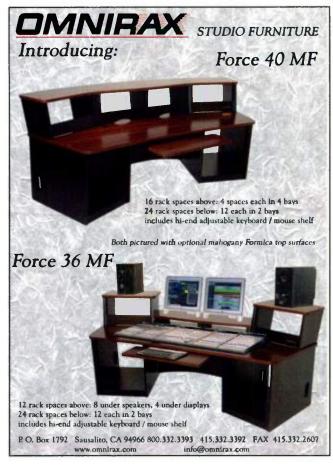
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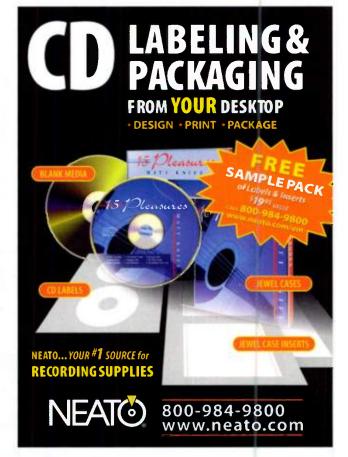
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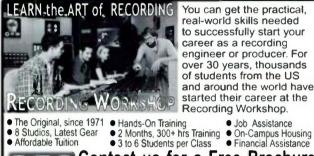












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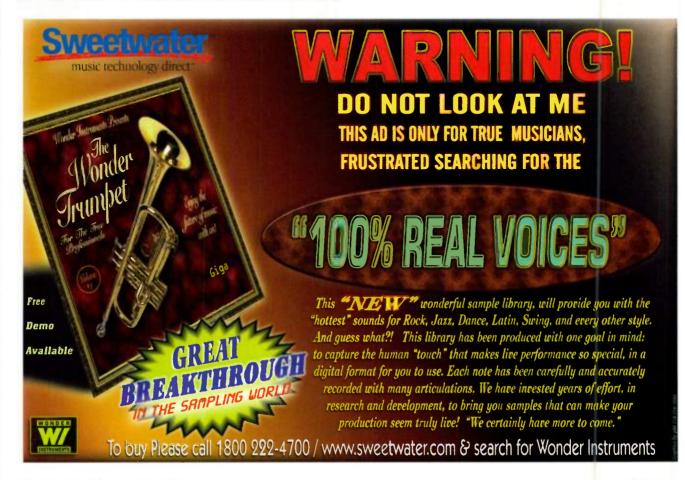
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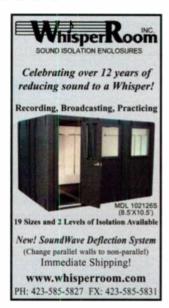
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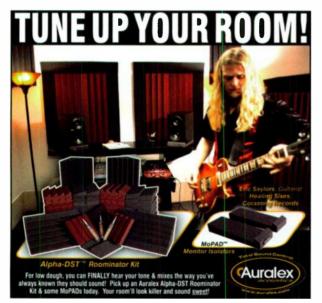
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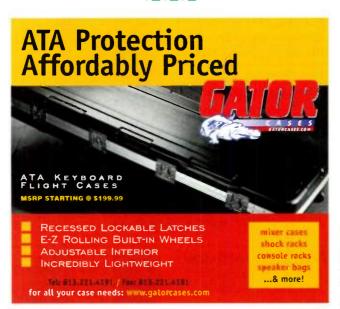
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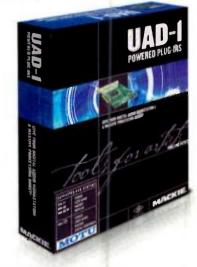


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UAD-1 Version 3 is here, with multi-card support and many other enhancements. Run dozens of sophisticated effects plug-ins inside Digital Performer without bringing your Mac to its knees. What's the secret? UAD-1 is a custom DSPequipped PCI card. It's like adding an extra \$20,000 worth of effects gear to the dozens of native plug-ins included with DP. UAD-1 ships with a growing list of powered plug-ins, including Nigel, a complete palette of guitar tones combined with every effect a guitarist could ever need. Authentic vintage sounds include the Pultec Program EQ, a stunningly realistic recreation, and the 1176LN Limiting Amplifier and Teletronix LA-2A Leveling Amplifier, two more analog classics reborn inside Digital Performer. Apply liberally with host CPU cycles to burn.





Universal Audio Cambridge EQ for UAD-1

Add smooth British equalisation without taxing your CPU

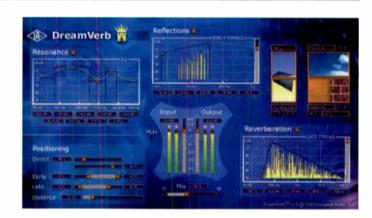
The Cambridge EQ, with its surgical precision, is the perfect complement to the warm, musical Pultec. In addition to its five-band fully parametric EQ, Cambridge features high and low cut filters with a wide variety of filter types and curves, and switchable shelving filters for each EQ band. Cambridge uses complex lattice filters and a special algorithm to achieve a warm analog sound without oversampling. An A/B function allows for quick comparison of two different settings. Cambridge also features a graphic display of the EQ curve, which has "edit handles" for click and drag control of the EQ parameters, plus editable text displays for parameter values. A must-have addition to your Digital Performer plug-in arsenal.



Universal Audio DreamVerb for UAD-1

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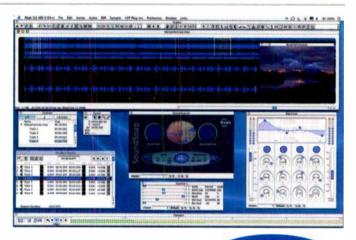
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Is It Real or Is It Cynicism?

aithful readers know my proclivity for making up proverbs, and it's time for one now: "There are two types of dreams: those never meant to be more than fantasy and those you would like to make real. The former requires only imagination, while the latter also takes hard work."

I wouldn't rate either one of those types better than the other, but, clearly, turning a dream into reality is more difficult. It's not the work that makes it harder, though; it is the necessity of having the pragmatism and toughness to slog through the hard work while still keeping the dream alive in your heart to give you reason to carry on when the slogging wears on you. Grasping and maintaining the balance to successfully bring a vision to fruition challenges optimists and pessimists alike.

Are you one of those people who sees the glass as either half empty or half full? No matter which you choose you're basically fooling yourself, because life is more Zen than that. The fact is that the glass is both half empty and half full. To say otherwise is nothing more than denial. The optimists in the crowd may find this a cynical viewpoint—one that injects negativity into every situation—while the pessimists will say, "John Lennon was a dreamer, and so are you if you think there's always that much good in everything."

Both perspectives ascribe value judgments, which is fine, but that in no way defines a need for those judgments to impose an overarching emotional frame of reference for seeing the world. Good and bad both exist in abundance, and you can love and support the good and despise and oppose the bad without letting either rule your universe unilaterally. Surmount this fundamental hurdle, and you may realize a dream without experiencing permanent emotional damage.

Let me give you an example. Your band drives 65 miles through a New England winter evening to get to a club in a blue-collar town. You walk in, and the place is more or less a dump, and an empty one at that. First reaction:

"Oh gosh golly, this sucks!" (I hope no one is offended by this dialog, but the rugged life of the musician often provokes such strong language as "gosh golly.") Indeed, that is the truth: this is not a scenario anyone gives as their motivation for playing music.

Second reaction: "Well, at least no one will give a flying hoot if we try out some of the new material we don't quite have together yet. Hey, it's a (very poorly) paid rehearsal!" That is also true.

Expressing disappointment about a gig does not have to mean that you are a downer any more than appreciating the "public" rehearsal means that your head is

in the clouds.

It's easy to label someone as "negative" if his or her response to a new situation is to see the difficulties in it. But the picture becomes more complex if the same person works the hardest to make it happen and to overcome all those difficulties. You also have to question your dismissal of the happy hippie who says "it's all good" if it is that same hippie who does all the negotiations with club owners or deals with (shudder) your business taxes. The point here is balance; appearances may not reflect the reality of a situation as well as do words coupled with actions.

Of course, all that would be much easier to see if there weren't so many truly negative so-and-sos and airy-fairy flakes throughout our industry. Separating the wheat from the chaff isn't easy. What is easy is falling into the trap of seeing the glass part full or part empty and believing that to be the absolute truth. Absolute truth is damned hard to come by.

Relative truth is slippery, but it's all we have, and only in trying to grasp it is there any hope of succeeding. We should all raise a toast to that. Allow me to pour you another half a drink.

We welcome your feedback. E-mail us at emeditorial@ primediabusiness.com.



Charlie Steinberg needs no introduction. His products have had a major impact on the way we make music. Over the last 20 years Steinberg's innovative approach to the user interface, native processing and the plug-in concept, amongst many other things, has established the company's products as market leaders worldwide.

Charlie remains a driving force for new development, most recently System Link technology enabling multiple computers to function as a single integrated workstation.

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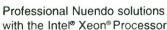
The Carillon is one of my main development machines. It's extremely fast for the level of processor and it's so quiet. It has to be, I sit right beside it every day!"

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