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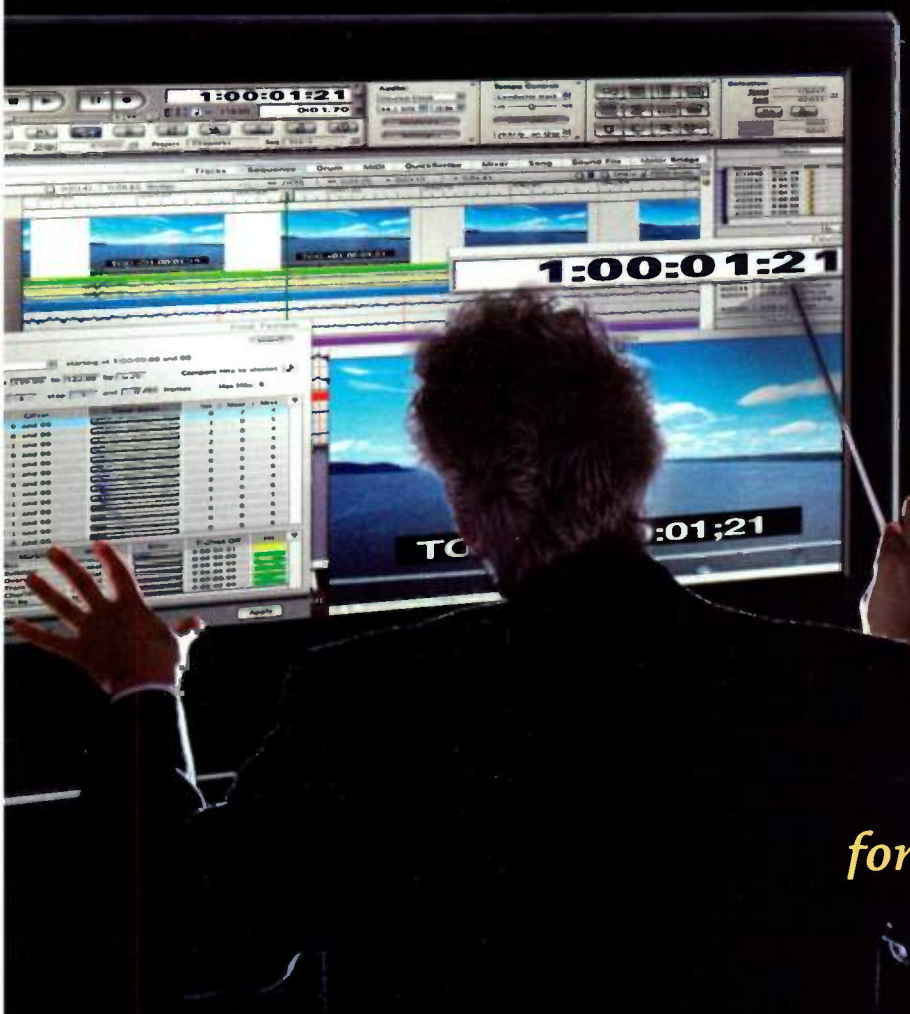
Electronic Musician®

MAY 2007

PERSONAL STUDIO | RECORDING | PRODUCTION | SOUND DESIGN

SCORING TO PICTURE



Video Composing Features of 11 Top Sequencers

Post-Production for Film

Digital Video Basics

Studio Solutions

for Disabled Musicians

REVIEWS

Cakewalk Sonar 6 Producer Edition

Focusrite Liquid Mix

Steinberg Cubase 4.0.1

and 6 more

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KORG

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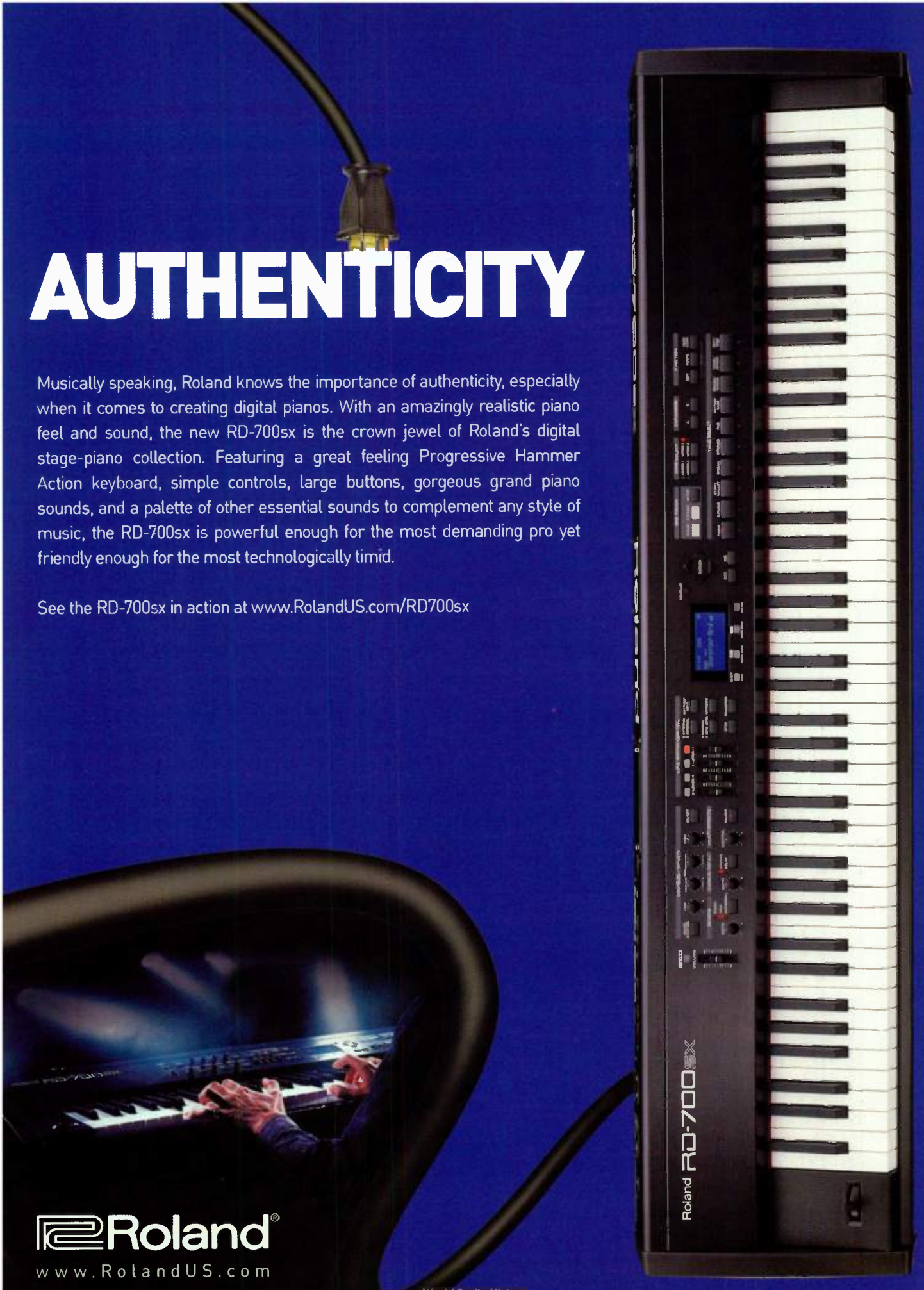

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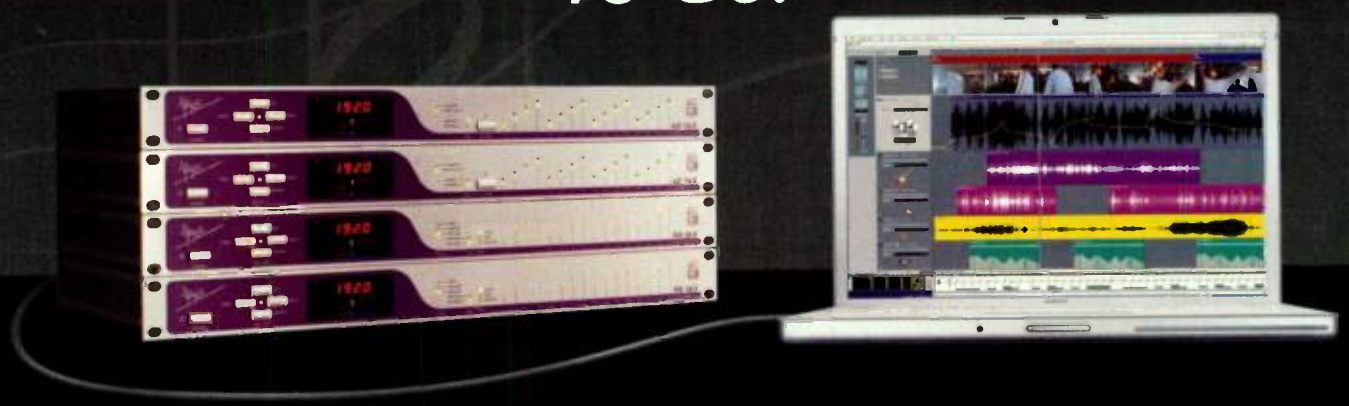

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May 2007

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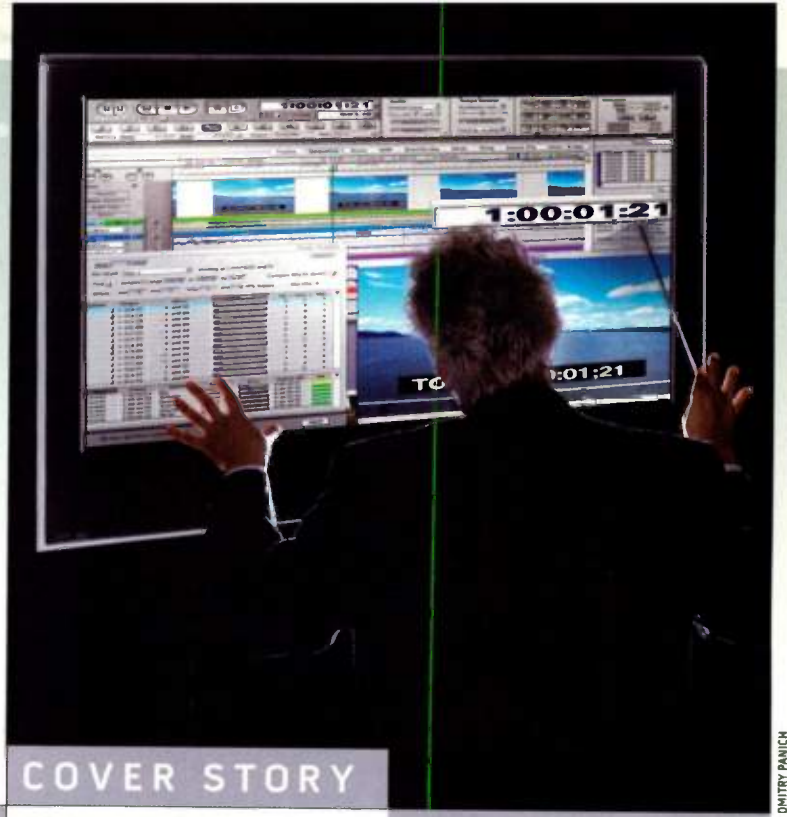

DMITRY PANICH

FEATURES

COVER STORY

40 PICTURE WINDOW

With TV, film, online videos, and video games, we have more opportunities to compose to picture than ever. But how does your digital audio sequencer stack up as a scoring environment? We look at all the top sequencers and evaluate their abilities to work with video.

By Mike Levine and Dennis Miller

33 THE SOUND OF A CRAVING HEART

Many of the skills you use to record music are well suited for motion picture projects. We show you what's involved in doing audio postproduction on an independent film. By Jeffrey P. Fisher

63 OVERCOMING ADVERSITY

Physically disabled musicians face obstacles that can make even the simplest studio task, such as accessing the controls of a sequencer, a major challenge. But blind, hearing-impaired, paralyzed, and other disabled musicians have adapted technology to help them record and perform. Find out how they do it and what challenges they still encounter. By Joanna Cazden and Scott Wilkinson

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Learn the basics of digital video.

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Dave Smith Instruments Evolver Keyboard keyboard synthesizer

Bleep Labs Thingamagoop hardware synthesizer

Primera Bravo SE Disc Publisher CD/DVD duplicator/printer

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Get the Picture

It hopefully has not escaped your notice that we have increased our coverage of audio for picture lately. For example, in our February 2007 "Music Business Insider" column, we interviewed Los Angeles music supervisor Jack Rudy about placing independent music in films and TV shows. In the April issue, we discussed producing and composing for mobile games, a rapidly emerging market. In this issue, we've doubled the ante with two features about producing audio for picture (see "Picture Window" on p. 40 and "The Sound of a Craving Heart" on p. 33).

"But I produce music for CD," you may say. "What's with the sound-for-picture coverage all of a sudden?" It's true that although we have covered sound for picture in the past, it has not been a major focus of the magazine. That's because until recently; the opportunities to do sound for picture in a personal studio were quite limited, especially if you wanted to make money doing it. But no longer. Today, thanks to the tremendous power of computers and software, you can produce pro-quality sound for independent films, animation, industrial videos, local TV, video games, and video for the Web—all in a personal studio.

JULIE BIRUM

In response, we are increasing our coverage of audio for picture. We aren't going to write a lot about video production per se, although we will discuss it occasionally. We'll continue to concentrate on audio production and sound design. But sound for picture is likely to eventually become a part of your studio world, and we'll help you prepare for that.

Composing, arranging, and producing music is a challenge, and producing sound for picture presents additional difficulties. But for those electronic musicians who have physical disabilities, producing music of any sort presents very special and daunting challenges.

Over the years, I have gotten to know a number of these dedicated and talented musicians, especially several sight-impaired musicians. We contact each other in person, via email, and on the phone to discuss, among other things, ways to make studio tools more accessible to them. In addition, we periodically receive letters from musicians with disabilities who need to find accessible tools. These folks have taught me much about what one can do if one is determined, talented, persistent, and patient.

As a result, I have long wanted to publish an article on studio solutions for musicians with disabilities. And I knew from the beginning that Joanna Cazden and Scott Wilkinson were the right authors for such a story. Cazden is a speech therapist whose work and training, as well as her experience writing for our magazines, made her a natural choice. A former EM technical editor, Wilkinson has a voracious appetite for science that is well known to anyone who reads his monthly "Tech Page" column. Perhaps more important is that they have big, warm hearts and a deep interest in helping others. Wilkinson and Cazden are a natural team—they're husband and wife, as well as musical partners. The resulting article (see "Overcoming Adversity" on p. 63) is a bit different from our usual fare, but I think you will agree that it's a welcome and refreshing change.

Steve Oppenheimer
Editor in Chief

Electronic Musician

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Eight Channel Tube Preamplifier with Firewire

The ART TubeFire8™ delivers the best of all worlds in one tube driven digital audio interface package. Ideal for any recording application, the TubeFire8™ adds eight incredibly warm tube driven microphone or line inputs and eight balanced outputs to any FireWire equipped computer.

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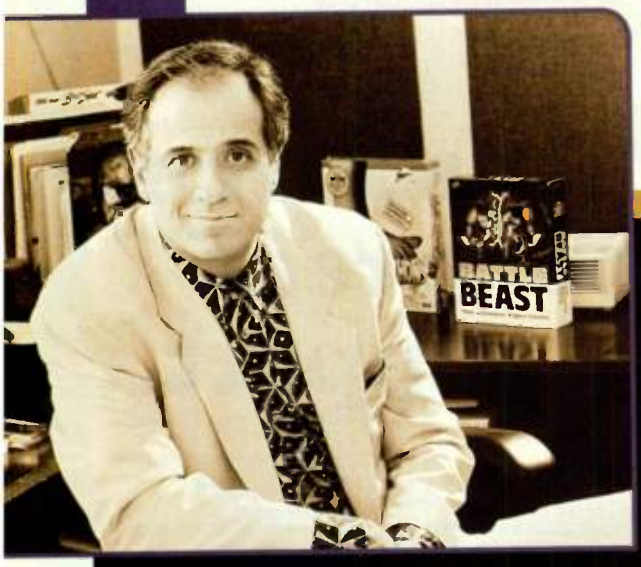

EMspotlight

Bob Ezrin on the Wild Side

Legendary producer Bob Ezrin was only 19 when he helped Alice Cooper craft *Love It to Death*, but he went on to create chart toppers with Peter Gabriel, Kiss, Pink Floyd, and Lou Reed. In this interview from the EM archives, Ezrin talks about suspending Gabriel from a 10-foot pillar, bringing circus performers into the studio, and other superstar production techniques. By Greg Pedersen.

emusician.com/em_spotlight

GET ON THE BUS!

The Bus is the exciting new blog by the EM editors that includes tips and tricks on a variety of recording topics, covers the latest technologies and industry trends, and offers a behind-the-scenes look at trade shows, product demos, and the creation of *Electronic Musician* magazine.

blog.emusician.com/the_bus

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

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– Butch Vig

(Artist/producer: Garbage, Nirvana, Smashing Pumpkins, Sonic Youth)

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– *Sound On Sound* Magazine

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Redmatica Keymap

Keymap (Mac, $273), from Italian software developer Redmatica (www.redmatica.com), may be the most advanced commercially available sampler utility ever. Keymap lets you quickly and intuitively edit, loop, arrange, resynthesize, and organize samples into sampled instruments and loop libraries for Apple EXS24. You don't have to be a Logic user, however, because Keymap is a standalone application that doesn't need EXS24 or EXS24P to run. You can open instruments that you create with Keymap in any software that supports or imports the EXS24 sampler format.

Keymap's audio engine works directly with AIFF, WAV, AAC, and MP3 file formats, and it automatically loads samples from disk as needed. Its harmonic-resynthesis capabilities allow you to reshape sounds by controlling pitch, formant, amplitude, and time parameters. You can turn a single sample into a polyphonic multisample or create time slices and then rearrange them without audible glitching. Using a variety of looping algorithms, you can quickly locate loop points that might otherwise be impossible to identify. Keymap detects pitch to automatically map samples too.

Keymap is available by itself or as part of Compendium (Mac, $413), a software suite that includes AutoSampler (which generates EXS24 programs from hardware and software instruments) and ExsManager (which inspects and optimizes your EXS24 and GarageBand instruments).

Download of the Month

REFUSE SOFTWARE LOWENDER (MAC)

Lowender ($49) is a subharmonic synthesizer designed for bass enhancement. This capability, common in classic analog hardware, is rarely found in software, especially at a reasonable price. You can purchase Lowender and read the documentation, user testimonials, and reviews on the reFuse Software Web site (www.refusesoftware.com). Lowender uses

the Cycling '74 Pluggo plug-in framework, so you will need to install the free Pluggo Runtime if you don't already have some version of Pluggo installed (you'll find download links on reFuse Software's Web site).

Lowender adds a couple of welcome twists to subharmonic synthesis. You get a choice of three frequency ranges to match your source material. Classic is the standard boombox range of 24 to 56 Hz. The Guitar and Bass settings match the lowest octave on a guitar (38 to 76 Hz) and a bass (19 to 38 Hz). The chosen range is split into two bands, which you balance with the Bass Synthesis knobs and corresponding level LEDs (see Web Clip 1).

The subharmonic generator is followed by a gating circuit with a threshold control. You use that to restrict subharmonic generation to louder sounds such as a kick drum. The gate is followed by an overdrive/saturation circuit and a lowpass filter with a cutoff range of 55 Hz to 1 kHz. You use those together to fatten the signal by adding some upper harmonics while filtering out higher frequencies that might conflict with other tracks. Blender (wet/dry) and output-level sliders round out the control panel.

You probably won't use Lowender on your next harpsichord recording, but when you want to get the dance floor shaking, there's nothing like it. Lowender is capable of producing subtle effects, but it's mostly in-your-face. When you need it, you need it.

EM WEB CLIPS

—Len Sasso

Hearing is Believing.

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By Geary Yelton

Blue Woodpecker

If you've never seen a Blue Woodpecker, you're in for a treat. The first thing you'll notice is its beautiful exotic-wood and brass finish. The Woodpecker ($1,299) is the first and only active ribbon condenser mic from Blue Microphones (www.bluemic.com). It contains an aluminum-ribbon pressure-gradient transducer and has a bidirectional figure-8 polar pattern. According to the manufacturer, the Woodpecker was designed to provide the smooth sound associated with vintage mics, with a focused midrange and outstanding bass response, and it excels at capturing room tone with intimate detail.

With Class A electronics and active circuitry, the Woodpecker can handle sound-pressure levels of up to 136 dB with 0.5 percent THD into 2.5 kΩ. It has a dynamic range of 114 dB, and it requires a minimum 35V of phantom power. The Woodpecker comes with a solid-brass shock-mount and a wood storage box.

Frontier Design AlphaTrack

Frontier Design Group (www.frontierdesign.com) is shipping its AlphaTrack ($249), a compact control surface that works with audio and video software for Windows and Mac OS X. The USB-powered desktop device has a single motorized fader and a handy assortment of buttons and knobs for controlling track and plug-in parameters and transport functions.

The AlphaTrack's touch-sensitive 100 mm fader has 10-bit resolution, yielding finer accuracy than you could achieve with MIDI. The unit has a jog and shuttle strip for quickly and accurately scrolling through a project's timeline and navigating through markers. A 32-character backlit display lets you see the active parameters and their values, which you can control using three touch-sensitive rotary encoders with push-button functionality. When you touch an encoder knob, the display shows context-sensitive details about the selected parameter (pan, send, EQ, plug-in, or automation). Below the knobs are buttons for loop control, editing, and user-programmable functions. The AlphaTrack also has five buttons for transport, a footswitch jack for punch-in recording, and backlit buttons for recording, muting, and solo.

Digidesign 003 Rack, Rack Factory, and Factory

Digidesign (www.digidesign.com) has introduced the 003 Rack ($1,295), 003 Rack Factory ($1,695), and 003 Factory ($2,495)—the next generation of Pro Tools LE–based recording systems for Windows and Mac OS X. Each 003 model offers an abundance of I/O connections and 24-bit recording at rates as high as 96 kHz. Each also comes with a bundle of software that is made up of Pro Tools LE 7.3 and Pro Tools Ignition Pack 2 (Mac/Win), which contains more than 60 instrument and effects plug-ins, applications, and sound libraries.

The 003 Rack is an audio/MIDI interface with FireWire connectivity, housed in a 2U rackmount chassis with 18 channels of simultaneous audio I/O. It has 8-channel analog I/O, 8-channel Lightpipe I/O, 2-channel optical and coaxial S/PDIF I/O, and two headphone outputs. Four mic preamps have XLR inputs, DI inputs for guitar or bass, and 48V phantom power. The 003 Rack also has one MIDI In and two MIDI Out ports, word-clock I/O, and a footswitch jack. The 003 Rack Factory adds the Pro Tools Ignition Pack 2 Pro bundle and a collection of premium Bomb Factory and Digidesign plug-ins.

The 003 Factory is a tabletop version that furnishes a hands-on control surface for Pro Tools, plug-ins, and other audio software. In addition to the same I/O and software bundle as the 003 Rack Factory, it has eight channel strips—each with a motion-sensitive motorized fader, a touch-sensitive rotary encoder, a 2 × 6–character LCD, LED meters, and dedicated buttons—as well as transport buttons, a jog/shuttle wheel, and dedicated automation controls.

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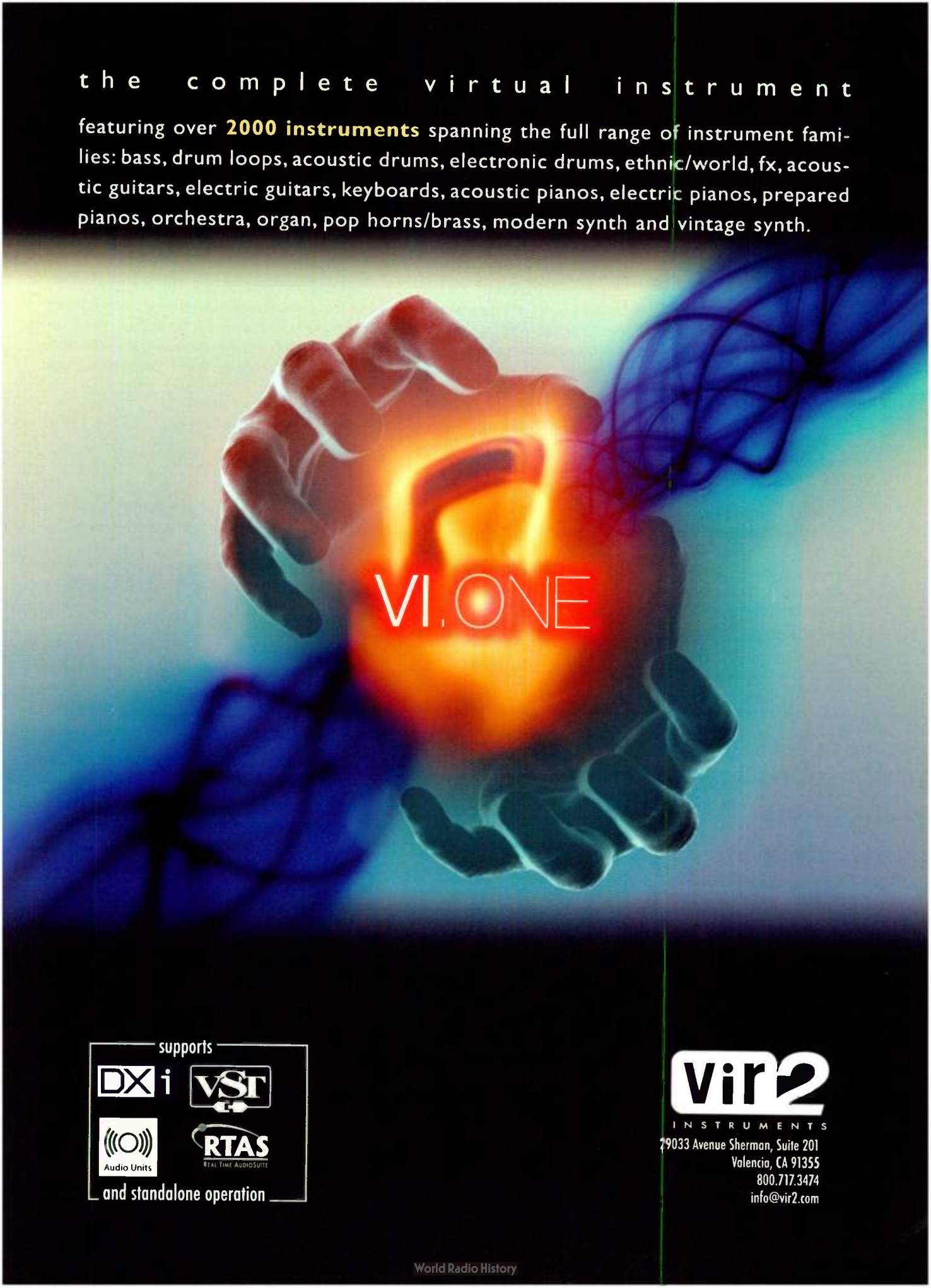

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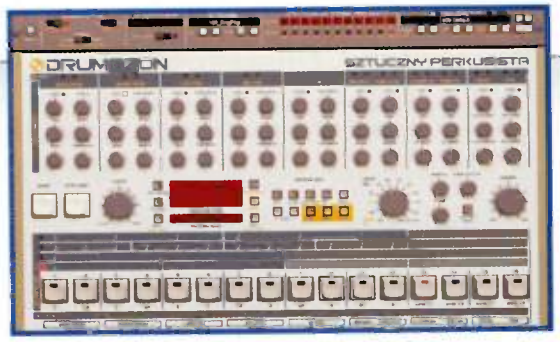
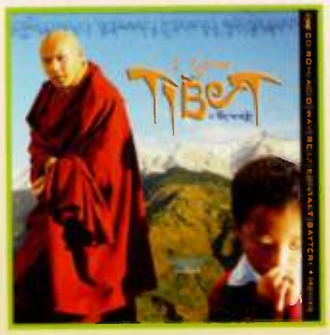


Drumazon (Mac/Win, $182) is a VST plug-in from D16 Group Audio Software (www.d16.pl) that realistically emulates the legendary Roland TR-909 drum machine. It captures all the original's sounds and front-panel layout in complete detail and adds new functionality. You can trigger Drumazon by playing MIDI notes or using its internal sequencer. The sequencer stores 8 banks, each containing as many as 12 patterns, with up to 16 steps in each pattern. You can specify shuffle, flam, and accent parameters, and stretch patterns to fit selected measures. You can chain patterns to play in a circular fashion or trigger them individually by assigning a MIDI note to each pattern.

Drumazon's output configuration lets you route any instrument to an individual output, giving you the option of processing sounds with effects plug-ins. You can mute or solo any instrument, as well as store and load presets individually for each instrument. Most parameters can be automated in the host or controlled by external hardware using Drumazon's MIDI Learn function. A collection of presets for each of the 11 instruments is included.

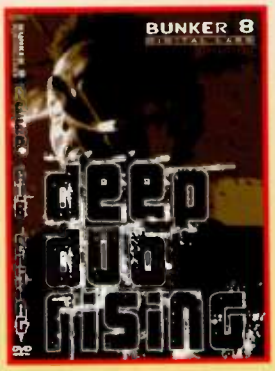
Sound Advice

New from **Discovery Sound** (www.discoverysound.com) is *I Love Tibet* ($91), a multiformat CD-ROM containing 16-bit, 44.1 kHz loops, one-shots, and multisamples. The 645 MB disc features percussion, stringed and wind instruments, and voices indigenous to Tibetan sacred and secular music. In addition to individual WAV files, it has a percussion kit for Battery, stringed instruments for Kontakt, and a variety of loops in REX2 format. Percussion instruments include eka (a bell), nga (a drum), and tingsha (hand cymbals), and stringed instruments include dranyen (a lute), yangzin (a dulcimer), and piwang (which has one string). There's also dhung (a conch horn) and Tibetan flute, and the sounds of men, women, and children singing and speaking. A folder called In the Temple contains chanting, instrument ensembles, and an enormous ritual horn called the dhunchecn. In addition, *I Love Tibet* features an 83 MB video clip of Tibetan monks, musicians, and dancers performing traditional music. Discovery recorded the samples while visiting a refugee settlement in northern India. The purchase price includes free shipping worldwide.



Vital Drums: The Vitale Collection ($99.95) is the latest drum-loop library from **Sony Media Software** (www.sonymediasoftware.com). It shines the spotlight on Joe Vitale, a drummer renowned for recording albums with Crosby, Stills, Nash & Young; the Eagles; and Joe Walsh. *Vital Drums* comprises two CD-ROMs containing over a gigabyte of Acidized 24-bit loops and one-shots. You get more than 600 royalty-free grooves that deliver tried-and-true rock rhythms played on vintage Gretsch and DW drum kits at various tempos. You also get single hits played on '42 Radio King, '65 Ludwig Supraphonic, and '69 Ludwig Black Beauty snares. The set includes an Acid project, a copy of Acid Express software, and video clips of Vitale discussing drum-miking techniques and performing in the studio and in concert.

If you want to spice up your tracks with some international flavor, check out *Deep Dub Rising* ($99.95), from **Big Fish Audio** (www.bigfishaudio.com). Produced by Sigmund Droid for Bunker 8 Digital Labs, the 4.35 GB DVD-ROM contains Acidized WAV files and Apple Loops of grooves played by musicians from around the world. For assembling your own arrangements, dozens of folders with titles such as Twinkie Mon and Cerebral Ecstasy supply construction kits with names like Trippy Saxes and High Imposter Rinkie Dingle Guitar. *Deep Dub Rising* puts Caribbean steel drums, Afro-Cuban guitars, Indian tabla patterns, African kpanlogo drums, Azerbaijani ghaval, and many other exotic instruments at your dumbek and call.



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Redmatica Keymap

Keymap (Mac, $273), from Italian software developer Redmatica (www.redmatica.com), may be the most advanced commercially available sampler utility ever. Keymap lets you quickly and intuitively edit, loop, arrange, resynthesize, and organize samples into sampled instruments and loop libraries for Apple EXS24. You don't have to be a Logic user, however, because Keymap is a standalone application that doesn't need EXS24 or EXS24P to run. You can open instruments that you create with Keymap in any software that supports or imports the EXS24 sampler format.

Keymap's audio engine works directly with AIFF, WAV, AAC, and MP3 file formats, and it automatically loads samples from disk as needed. Its harmonic-resynthesis capabilities allow you to reshape sounds by controlling pitch, formant, amplitude, and time parameters. You can turn a single sample into a polyphonic multisample or create time slices and then rearrange them without audible glitching. Using a variety of looping algorithms, you can quickly locate loop points that might otherwise be impossible to identify. Keymap detects pitch to automatically map samples too.

Keymap is available by itself or as part of Compendium (Mac, $413), a software suite that includes AutoSampler (which generates EXS24 programs from hardware and software instruments) and ExsManager (which inspects and optimizes your EXS24 and GarageBand instruments).

Download of the Month

REFUSE SOFTWARE LOWENDER (MAC)

Lowender ($49) is a subharmonic synthesizer designed for bass enhancement. This capability, common in classic analog hardware, is rarely found in software, especially at a reasonable price. You can purchase Lowender and read the documentation, user testimonials, and reviews on the reFuse Software Web site (www.refusesoftware.com). Lowender uses the Cycling '74 Pluggo plug-in framework, so you will need to install the free Pluggo Runtime if you don't already have some version of Pluggo installed (you'll find download links on reFuse Software's Web site).

Lowender adds a couple of welcome twists to subharmonic synthesis. You get a choice of three frequency ranges to match your source material. Classic is the standard boombox range of 24 to 56 Hz. The Guitar and Bass settings match the lowest octave on a guitar (38 to 76 Hz) and a bass (19 to 38 Hz). The chosen range is split into two bands, which you balance with the Bass Synthesis knobs and corresponding level LEDs (see Web Clip 1).

The subharmonic generator is followed by a gating circuit with a threshold control. You use that to restrict subharmonic generation to louder sounds such as a kick drum. The gate is followed by an overdrive/saturation circuit and a lowpass filter with a cutoff range of 55 Hz to 1 kHz. You use those together to fatten the signal by adding some upper harmonics while filtering out higher frequencies that might conflict with other tracks. Blender (wet/dry) and output-level sliders round out the control panel.

You probably won't use Lowender on your next harpsichord recording, but when you want to get the dance floor shaking, there's nothing like it. Lowender is capable of producing subtle effects, but it's mostly in-your-face. When you need it, you need it.

EM WEB CLIPS

—Len Sasso

Ultimate Sound Bank Retro Keyboards

Retro Keyboards (Mac/Win, $199) is the fifth volume in the UVI SoundCard series from Ultimate Sound Bank (www.ultimatesoundbank.com). It bundles the Universal UVI Player with 6 GB of content focusing on Clavinet and six electric pianos. The manufacturer doesn't name names regarding which instruments were sampled, but if you enjoy the sounds of electromechanical keyboards from Fender Rhodes, Hohner, Wurlitzer, and Yamaha, Retro Keyboards is right up your alley. Instruments were sampled direct and through amps, with up to 12 Velocity layers.

Retro Keyboards organizes instruments by type and supplies presets whose names indicate traits such as hard, soft, bell, effects, and tremolo. Tine-based samples were recorded from a '72 Mark I, a '79 Mark II, and an '84 Mark V. You also get Electric Grand, Funky Clav, Planet H, and Super W. You can change the polyphony, adjust the tuning, and toggle disk streaming and effects off and on. In addition to the standalone version, Universal UVI Player supports AU, DXi, MAS, RTAS, and VST plug-in formats. If you want more parameter control, Retro Keyboards is also compatible with Plugsound Pro and MOTU MachFive 2.

Roland MV-8800 Production Studio

Roland (www.rolandus.com) has launched its MV-8800 Production Studio ($2,699), a portable DAW that weighs less than 20 pounds and contains its own synthesizer and a complete sound library installed on its internal 40 GB hard drive. Out of the box, the MV-8800 lets you connect an external VGA monitor and an optical mouse to supplement its color LCD and dozens of front-panel controls.

The MV-8800's top panel furnishes 16 Velocity- and Aftertouch-sensitive pads for triggering sounds. You can load as many as 128 simultaneous instruments (including drum kits, loops, and vocal phrases) and apply beat matching and transposition in real time using pitch- and time-stretching algorithms. Onboard effects have emulations of Roland legends such as the SRV reverb and the RE-201 Space Echo, and you can automate your changes to multi-effects parameters. The MV-8800 incorporates a 24-channel stereo mixer and linear and drum-machine–style pattern sequencing with 480 ppqn resolution. Standard I/O features include two TRS and two RCA audio inputs, two TRS outputs, one MIDI In and two MIDI Out ports, optical and coaxial S/PDIF outputs, and a USB 1.1 port for data transfer. The MV8-OP1 multichannel expansion card ($445) is also available.

Sonoma Wire Works RiffWorks Standard

RiffWorks Standard 2.1 (Mac/Win, $169) is a multitrack audio recording program specifically for guitarists. Developed by Sonoma Wire Works and distributed by IK Multimedia (www.ikmultimedia.com), the software allows you to quickly capture musical ideas into an audio phrase sequencer and then assemble songs using a linear recorder. RiffWorks rolls digital recording, modeled effects, a virtual drum machine, and online collaboration into a cost-effective package for computer-savvy guitarists. It even provides you with a copy of IK Multimedia's AmpliTube 2 Live plug-in.

You begin by recording and layering your guitar parts, either with or without effects. RiffWorks has seven effects processors with factory presets ranging from compression and EQ to flanger, quad delay, and WahFuzzSubOctave. Then you add backing tracks using the built-in InstantDrummer, which comes with a collection of sessions to get you started. If you change tempo or swap backup patterns, your tracks stay in sync. When you've completed all your parts, the RiffCast function will mix down your song and upload it to the RiffCaster Web site. RiffWorks Standard supports ASIO, Core Audio, ReWire, REX file import, odd time signatures, tempo detection, and volume automation. EM

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Polarization Express

By Scott Wilkinson

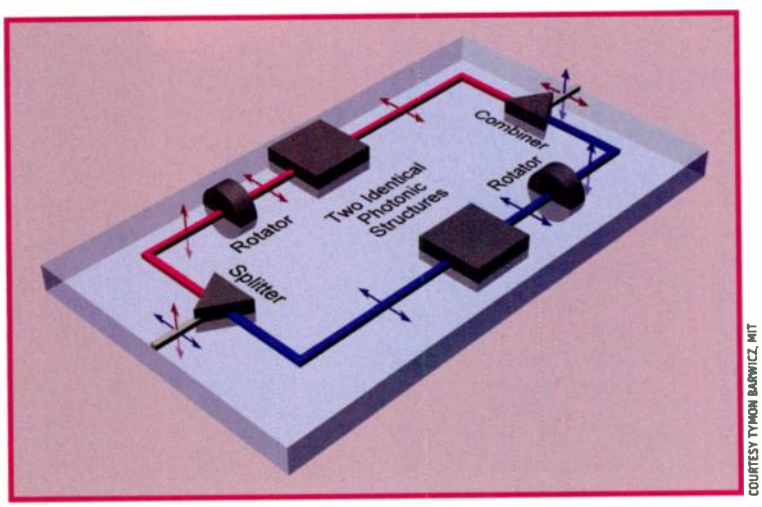
Photonics could lead to better musical tools.

I've said it before, and I'll say it again: any advancement in computer technology—be it increased processing speed, data throughput, or storage capacity—has the potential to impact the tools used by electronic musicians and is therefore fair game for this column. So I always keep my eye out for interesting research in any of those areas.

One technology that promises to greatly increase processing speed and data throughput is *photonics*, which uses light (photons) instead of current (electrons) to carry and process information. Because photons are much smaller and faster than electrons, photonic devices have the potential to surpass conventional electronics dramatically in those areas.

Recent advancements have brought photonics closer to commercial reality. For example, the incompatibilities between optical and electronic materials have been bridged by bonding the two together. In addition, silicon has been coaxed into manipulating light, leading to silicon light modulators.

Among the remaining obstacles that researchers face is the difficulty of mass-producing photonic devices. For one thing, microscopic structures designed to move light around on a chip must be manufactured to extremely precise tolerances; even the slightest imperfection can lead to significant light loss. In addition, these structures are very sensitive to the polarization of light that enters them. (*Polarization* refers to the direction of a photon's vibration, which is always perpendicular to the direction of the photon's travel. A photon's polarization can be vertical, horizontal, or anything in between.) Even if photonic structures could be manufactured with atomic-level precision, some devices would still be sensitive to polarization.



COURTESY TYMON BARWICZ, MIT

FIG. 1: MIT's "optics on a chip" prototype splits light of any polarization into its horizontally and vertically polarized components, rotates the polarity of one component, processes both components identically, rotates one component back, and recombines the two components into an output signal with the same polarization as the input signal.

Up till now, this sensitivity has required photonic devices to be assembled carefully by hand so that the polarization of light entering them can be precisely controlled. Recent developments at the Massachusetts Institute of Technology (www.mit.edu), however, could put an end to this arduous approach. Led by professors Erich Ippen, Franz Kaertner, and Henry Smith, the MIT team has successfully demonstrated a photonic device on a silicon chip that can accommodate light of any polarization.

As illustrated in **Fig. 1**, the MIT chip accepts arbitrarily polarized light (say, from a fiber-optic cable) and splits it into horizontally and vertically polarized components. The polarization of one component is rotated 90 degrees so that both share the same polarization. The two components then pass through identical structures that process them in some way, after which the polarization of one component is rotated 90 degrees and the components are recombined to form an output signal with the same polarization as the original input signal.

This ingenious approach to overcoming polarization sensitivity still requires some delicate machinations. For example, the polarization splitter and rotators manipulate light in an intricate three-dimensional structure consisting of just two layers of silicon. In addition, the photonic processors (in this case, *microring add-drop filters* that extract one wavelength of light out of many in a multiplexed data stream) must offer nearly identical responses for the system to operate correctly.

For electronic musicians, photonics could facilitate many more audio and video channels flowing through a system than today's technology allows. The technology could also be used to perform more-extensive signal processing on all of those channels, opening heretofore unimagined creative possibilities. The MIT team's work brings us one step closer to realizing those possibilities. EM

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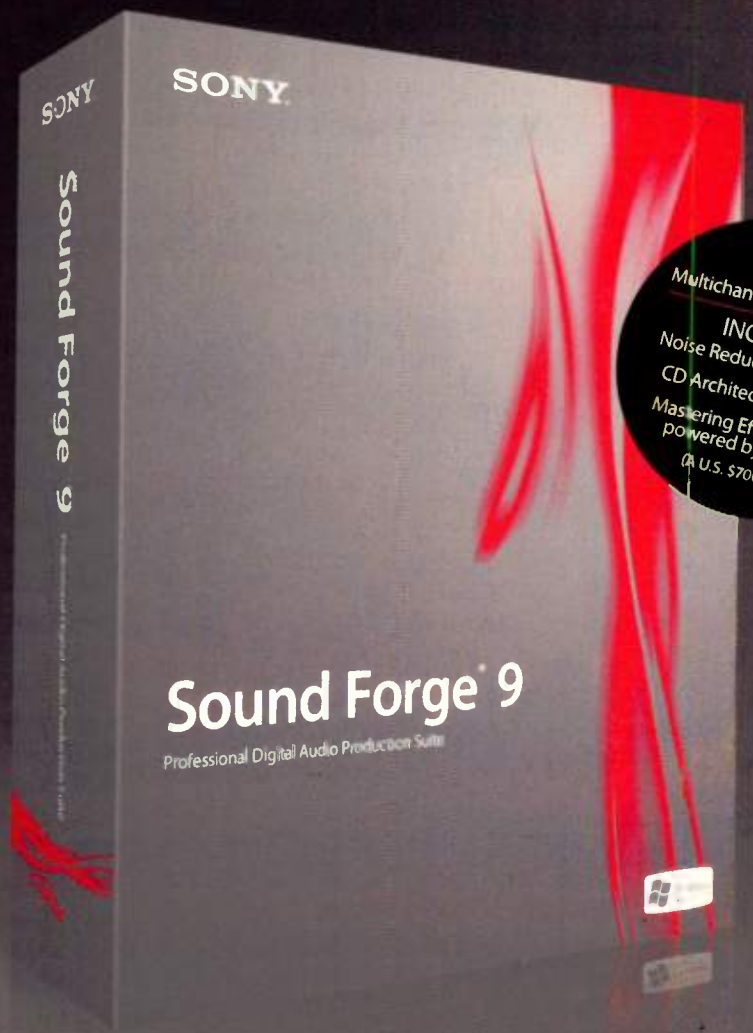

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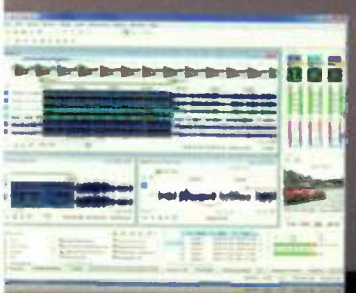
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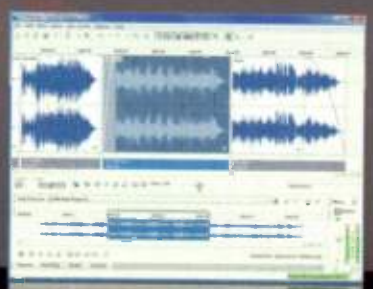
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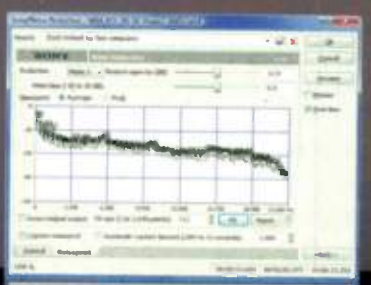
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LISA FISHER

The Sound of a Craving Heart

By Jeffrey P. Fisher

A case study in audio postproduction for film.

The same gear used to record your music is well suited for audio postproduction for commercials, documentaries, animation, and narrative projects. I recently finished editing and sweetening the sound for an award-winning indie feature, *The Craving Heart*, and in this article I will share tips gleaned from the experience to provide insight into the process of working with sound for picture.

Getting the Job

The gig came through my colleagues Douglas Spotted Eagle and Mannie Francis at VASST (www.vasst.com), who oversaw postproduction duties for the film. The project arrived in its raw form as a nonlinear editing (NLE) file, and the various media files accompanied it on a single external hard drive. Director-editor Stan Harrington had used Sony Vegas 6 for video editing as well as for placing the initial music and effects (see the sidebar "Stan the Man" online at www.emusician.com). Because I use the same software, I simply plugged in the drive and watched the movie directly from the Vegas timeline.

Although the film was shot in the high-definition HDV format, I worked from a proxy DV version for smoother real-time playback because it is difficult for a computer to play HDV in real time if video effects, such as color correction, are involved: the performance may drop well below

29.97 frames per second (fps), and for sound-design elements to sync properly, the video playback must be rock solid. When the project was finished, my work was married to the full-resolution cut of the film.

This was a long-distance project: I was in Chicago and the director was in Hollywood. To handle work-in-progress approvals, I sent Harrington my Vegas project files by email. That worked because we both had the same media (my drive was a copy of his). I would still need to send my sound files, but I would avoid using audio plug-ins the director lacked. With a three-week deadline looming, I put everything in that I felt was needed and deleted whatever the director disagreed with, rather than wasting time getting an approval for every little detail. This approach ultimately saved me time and effort.

The soundtrack I received had all the dialog and a few key sound effects. The music cues—including songs by Katy J (see the sidebar "Scoring Craving" online), an instrumental by Douglas Spotted Eagle, and a sparse underscore by the director himself—were present, as were some crucial sound-design elements. My jobs included cleaning up dialog, building convincing backgrounds, finding and adding missing sound effects, sweetening elements, and creating a mix. Fortunately, the film was full of sound possibilities, and my head was swimming with creative ideas.

Initial Preparations

Always clone the project's hard drive and work on the copy. Regularly back up your changes to the original drive as well as to an off-site location, such as an online storage facility.

Being organized from the beginning is important; otherwise, you'll waste time hunting for missing elements in a highly complex project. For example, *Craving* had over 520 media files, equaling more than 200 GB of data. With a project of that magnitude, you have to develop a methodical work flow and be thoroughly organized on the hard drive and timeline.

The editor kept his audio tracks to a minimum by placing different types of sounds on the same tracks. However, mingling dialog, music, and sound effects never works because each type of element requires different approaches to EQ, volume, and panning.

Starting with the original 7 tracks, I moved dialog, sound effects, underscore, and Katy J's songs to dedicated tracks, which brought the track count to 20. As a precaution, I worked on duplicates of the tracks but kept and muted all the originals, moving them to the bottom of my Vegas timeline. I also locked the video into place so it couldn't be inadvertently nudged.

The eventual track count topped 40. I also added buses and routed tracks to them accordingly (see **Fig. 1**): these three bus tracks, known as *stems*, were dedicated to the primary soundtrack elements of dialog, music, and effects (also known as DM&E).

There are two important things to remember about audio postproduction. One: dialog rules—what the actors say is always the main focus and what the entire soundtrack should be built around. Two: it's the mix that matters—just like in music production, individual elements may sound horrible on their own but may work within the context of a mix.

Dialog First

Always start with the dialog, because it takes the most time and is the most tedious and noncreative part of a project. We live in a noisy world, and much of that noise gets into dialog recordings. Although audiences can tune out steady noise, when unwanted sounds jump around, they become noticeable. These jumps in presence require extensive smoothing if the dialog track is to sound right.

Noise gates are useless for dialog work because their opening and closing action is too noticeable. Expanders are better for reducing softer noises without completely cutting them off, resulting in a more natural sound. To the dialog bus I added an expander set for 12 to 15 dB of expansion, which was effective 90 percent of the time. Manually drawing volume automation envelopes and using short fades also helped. I prefer manual volume adjustments because they make the dialog sound smoother.

EQ can also be used to clean up noisy dialog tracks. Use a highpass filter with a 24 dB-per-octave rolloff set at around 100 Hz. An equally aggressive lowpass filter set between 12 and 15 kHz is also useful. You will improve speech intelligibility with an EQ bump in the range of the consonants, around 2.5 kHz. Use a slight EQ cut at 600 Hz to overcome the muffled sound of lavalier mics hidden under clothing.

A dedicated noise-reduction tool is a must for serious audio postproduction work, and Sony's Noise Reduction 2.0 plug-in is my go-to tool. Using too much of this type of effect can make a track sound swirly and artificial. However, you can avoid getting unwanted artifacts by doing several passes on the noisy track and dialing in just a few decibels of noise reduction each time.

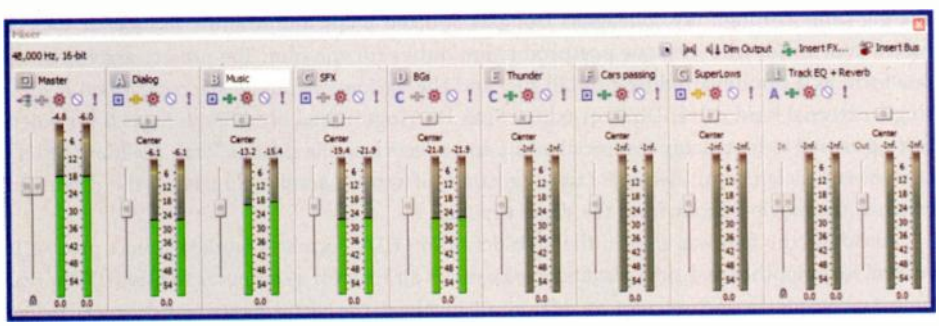

FIG. 1: Buses work for premixing similar sound elements into stems and for applying the same audio effects to multiple tracks.

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Many editors cut the picture and dialog at the same place. Unfortunately, any change in the audio gets magnified when it occurs simultaneously with a picture edit. Good dialog editors overcome this by using split edits, or *J and L cuts*, along with crossfades. A J cut places the dialog edit before the picture edit. An L cut edits the dialog after the picture and extends the noise from one shot into the next. Cutting on hard consonants and using crossfades will help hide edits too. Be aware that split edits require you to unlink the audio from its video file, and you risk losing lip sync if you move the audio.

Although cameras can record in stereo, dialog is usually tracked in mono. Harrington prudently used the camera as a 2-track recorder and isolated the actors on their own tracks. These recordings appear as stereo files on the timeline, with each actor panned hard left and right. I split the tracks and converted them to mono in order to move the dialog back to the center of the stereo field.

Unfortunately, the dialog tracks suffered from phase problems caused by the actors' lines bleeding into each other's mics. As a remedy, I isolated each of their tracks and intercut between them using volume automation.

The hardest problem to fix is distortion caused by overloaded recording levels. If there isn't an alternative take and you are unable to rerecord the distorted lines, you can take the edge off the harshness and make the track more tolerable using EQ to cut 8 to 10 dB between 8 and 9 kHz.

Backgrounds and Room Tone

Every location has a sound, called *room tone* or *presence*, that gets recorded and is useful for filling in dialog gaps. Because there was no separate room tone included with the project, I had to steal it from ends of phrases and between words.

Background (BG), also called *natural* or *nat* sound, shouldn't be confused with room tone. Ambiences, such as traffic noise during a street scene, are usually built entirely in post-production. Although I created some conventional backgrounds, I also used some nonliteral sounds, such as low rumbles, to underscore emotion and create moods.

With dialog occupying the center position in the stereo field, I gave the backgrounds a wide stereo image using iZotope Ozone 3 (www.izotope.com) to open up the mix. My favorite trick is to combine two mono recordings of different ambiences and hard-pan them. Another approach is to use duplicates of the same sound and hard-pan them, but with one copy offset by half its length.

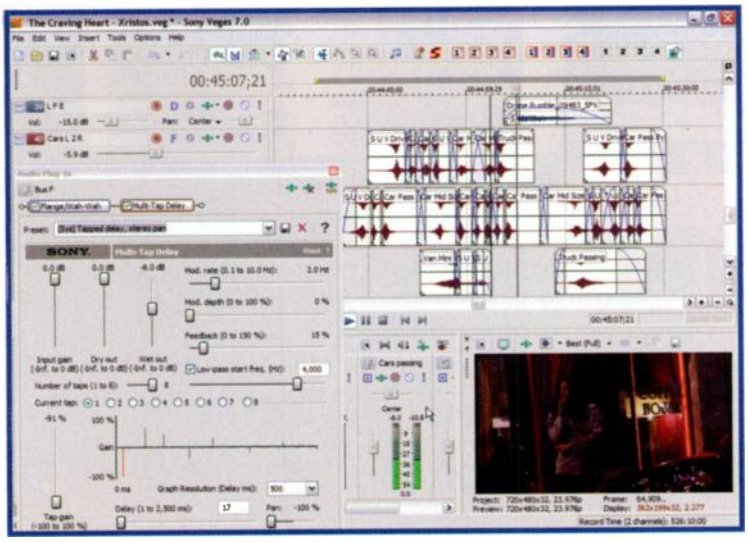

FIG. 2: Several stereo car-bys were layered and sent to a flanger and delay to emphasize a scene.

For Effect

Although sound effects often get recorded on location along with dialog, they are usually not of high-enough quality for the finished movie. Rather, they serve as inspiration and help with synchronization. In this project, only a handful of the original effects remained, and the rest were replaced with better recordings.

You don't have to match a sound to every onscreen action. Focus on covering the obvious sound cues. Generally, when nobody is talking, I add more realism to a scene with sound effects, and I back them off during dialog.

I spent a day auditioning sound effects from my libraries for literal sounds, such as car-bys, footsteps, and doors closing. But I searched for nonliteral sound-design elements as well. Next, I used UltimateSoundBank's X-Treme FX (www.ultimatesoundbank.com) soft synth for layering and audio effects to generate more car-bys, thunder, rain, and general backgrounds. I recorded these MIDI performances—if holding down a key for 20 seconds can be considered a performance—using Sony Acid Pro 6 and then rendered the tracks to 24-bit, 48 kHz WAV files. (DV audio's sampling rate is 48 kHz.)

I also did some field recording with an M-Audio Microtrack 24/96 and a pair of inexpensive binaural mics from Core Sound (www.core-sound.com). I prefer grabbing backgrounds, such as traffic and restaurants, in stereo. I used a Marshall Electronics MXL DRK mic for recording close-up mono tracks, like car doors and footsteps.

By the end, I had amassed about a gigabyte of sound effects. Building such a complex sound toolbox takes time, but once it is in place, much of it can be reused. For example, once you build a location's ambience, you can use it again in subsequent scenes taking place at that same location.

Adding everything to a scene to make it work can take a lot of time. For instance, I spent four hours tweaking minimal production dialog, footsteps, car doors opening and closing, clothes rustling, and a car pulling up, idling, and driving away. It is a completely realistic scene that nobody will notice because it seems natural to the casual viewer, as if it had been captured on location perfectly. Subtle details, such as a little bell chime whenever a door opened in the coffee shop, further enhanced scenes.

One of my favorite sound moments in the film shows a woman waiting in vain for another person while

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cars whiz by in front of her. I carefully selected stereo car-bys to match the screen action and checkerboarded them on several tracks. Though it was time-consuming to sync every sound element to every onscreen car, the effect was realistic, if slightly exaggerated.

These particular tracks were sent to a single bus, which had a flanger and stereo multitap delay in series, to add an otherworldly sound to the passing cars (see **Fig. 2**). The scene begins with normal sounds, and then gradually the effects increase as the wait grows longer (see **Web Clip 1**). There is also a dark, heavy drone to fill in the low-frequency area of the mix.

Another segment that required a lot of effort was when the director had expressed how unhappy he was with the original screams he had used for the final scene. I opted for heavily processed and layered screams to make the scene far more effective (see **Web Clip 2**).

Music: the Director's Cut

With no budget for underscore, Harrington experimented with Sony AcidXpress and was immediately hooked by how easy it was to come up with music that worked. "I'm no musician, but I had a good feel for the emotion I was trying to convey," he says.

Harrington's musical sequences were straightforward and unprocessed, so I dressed them with reverb, EQ, doubling, pitch-shifting, volume envelopes, and panning. Though some of Katy J's music came directly from her *Stand Still* CD, a few tracks were roughs. I placed iZotope Ozone 3 on the music bus to use its EQ, multiband compression, spatial enhancement, and limiting to bring up the volume and give her tracks and the underscore a final bit of sweetening.

It's in the Mix

I premix many of the tracks into stems as I go along, and perform the final mix at the bus level by recording automation in a few passes. I follow the Hollywood standard using a fixed monitor gain that has –20 dBfs, which is equal to 0 VU in the analog realm, yielding 86 dB SPL. The speaker calibration is done using pink noise.

Soundtracks have a much wider dynamic range than music—about 20 to 30 dB compared with a range of less than 12 dB. The dialog averages –27 dB RMS, which most musicians would find remarkably low. There are opportunities for huge dynamic swings in film soundtracks, which is part of the thrill of working on them.

Be sure to check the mono compatibility of your mix, because many theaters have less-than-stellar audio playback systems. I also check mixes at a low volume on small, bass-challenged close-field monitors, such as the Avant Electronics Avantone MixCubes. Referencing my mix on such a system gives me a good idea of what it will sound like on a consumer playback system.

Typically, wind and rain are hard to mix because of their noise components. In the opening scene of the film, I used different rain perspectives (close, far, and midfield) and a lot of equalization (high-frequency

boost, low cuts, and carving out the middle mud). For thunder I layered loud, close-up crashes with distant rumbles. Some thunderclaps were actually explosions, and I used reverb with a long predelay to thicken them up.

Some of my bass sounds were routed to a bus with a lowpass filter and pitch-shifter set down an octave. The resulting deep rumble was mixed in at key points for low-frequency enhancement.

Another idea added during the mix happens when a character is awakened by a cell-phone ring. I made the first ring sound as if it were off in the distance, like you might perceive it as you come out of a dream, by soaking it with reverb. The second ring had about half as much of the effect, and the final ring, before the character answers, was dry and up front (see **Web Clip 3**).

I sent Harrington updates nearly every day, and he made suggestions that were incorporated right away. Because the drive also had the video files, I began making DVDs of the project with the new soundtrack and overnighting them for approval. This became more important when I switched to the newly released Vegas 7 and began using audio effects the director lacked. Near the end of the process, Spotted Eagle added his invaluable insight into the mix, and the audio portion of *Craving* was finally complete.

All that remained was some video work, such as color correction, and the final swap of proxies for the high-definition HDV media. Spotted Eagle handled the video tweaks while I pulled the project file together for the final rendering, which took more than six hours. I also authored the initial DVD for film festivals.

In Focus

If you do sound for picture, you have to learn to live with the fact that most of your work goes completely unnoticed. As the saying goes, "Nobody leaves the theater whistling your sound effects."

Despite the amount of tedious grunt work involved in audio postproduction, creative sound design and mixing can make the process fulfilling. Every project has a unique set of challenges that force you to employ every ounce of your knowledge and creativity. Finally, when you see and hear your work in a darkened theater and experience the audience's reactions, you know all that effort has paid off. EM

EM WEB CLIPS

Jeffrey P. Fisher's latest book is Soundtrack Success: A Digital Storyteller's Guide to Audio Post-Production *(Thomson Course Technology, 2007). Learn more about his work at www.jeffreypfisher.com.*

Picture Window

Scoring to picture—the composition and placement of music to fit with video—has moved beyond the worlds of film, TV, and industrials to the mainstream. Thanks in large part to the stunning growth of YouTube and other Web-based video, the opportunities to put music to picture have never been greater.

Virtually every major digital audio sequencer offers video support of some kind. Import a video file and hit play in your audio app, and the video plays in sync with your sequence. But beyond that basic implementation, how does your application stack up as a scoring environment? To answer that question, we took a look at 11 of the most popular digital audio sequencers, covering both Windows and Mac. Though the recording, editing, and mixing capabilities that are their primary focus are all first rate, we were surprised at the differences in their abilities to work with video.

We'll start with an overview of the key video and scoring features that are common to most of the programs. Then we'll look at the highlights of each individual program.

We didn't cover multitrack audio editors because they don't use tempo as a timing reference, and they have little or no MIDI functionality. However, such programs are useful for postproduction mixing or for simply adding sound effects (see the sidebar "Mix to Pix").

The programs covered in this story are Ableton Live 6, Apple GarageBand 3, Apple Logic Pro 7.2, Cakewalk Sonar 6 Producer Edition, Digidesign Pro Tools HD 7.3 and LE 7.3, Mackie Tracktion 3, MOTU Digital Performer 5.11, Sony Acid Pro 6, Steinberg Cubase 4, and Steinberg Nuendo 3. Many of these programs have lower-priced, reduced-feature versions. You may want to check manufacturer Web sites to be sure that those other versions have the features you want (see the sidebar "Manufacturer Contacts" online at www.emusician.com).

11

Video-scoring features of 11 top sequencers.

By Mike Levine
and Dennis Miller

DMITRY PANICH

Start Me Up

If you sync up almost any piece of music against any video, some of the important moments of the video will likely be "hit" by important beats of the music, just by chance. But if you're doing a scoring job, chance won't cut it. You need to control which moments get those musical accents.

Taking into account the usable tempo range for the type of music you plan to write for a particular segment of the video (aka a *cue*), you typically want to come up with a tempo setting or tempo map that allows you to hit as many of the key points, within a frame or two, as possible with strong musical beats. Even if there aren't specific hit points that you need to accent, the tempo you choose should help the music "feel good" against the picture.

Besides tempo, another helpful variable when scoring is the start time of the music relative to the video. Changing how many "frames in" your music starts can impact whether a particular tempo will work. You typically finesse both the tempo and the start time to find the best combination. You can also experiment with the meter of the music, throwing in an occasional measure in a different meter (for instance, a 3/4 bar in a 4/4 composition) to change rhythmic emphasis.

Make Your Mark

When you're *spotting* your video (scanning through it and deciding what to emphasize), it's critical to be able to drop markers on the fly, and all of the programs covered here let you do that. Once you've got markers on the work space, the programs all make it easy (to varying degrees) to name and number them. With the exception of Live and GarageBand, they all let you lock those markers to absolute time values so that while you're experimenting with different tempos, preexisting markers stay at the same point relative to the picture.

Moving an audio clip to a specific SMPTE time is also a handy option. Sonar's Clip Properties menu, for example, lets you type in the exact location where you want your audio clip to start. Pro Tools' Spot mode makes it a snap to drop an audio clip at a specific SMPTE time. Logic Pro and Digital Performer have event lists that let you do the same thing. In Cubase and Nuendo, as you drag an event backward or forward in a track, its SMPTE position updates in real time, making placement easy.

Notable Additions

Some composers, especially those who work in the orchestral realm, prefer to work in standard notation when they write to picture. Several of the sequencers,

MIX TO PIX

Though a digital audio sequencer is clearly the best tool for scoring to picture, dedicated multitrack audio editors can be very useful if you're using precomposed music (for example, from a production library). In fact, several such programs include helpful features for working with video.

Adobe Audition (Win; $349) has a terrific feature called Link Multitrack sessions that lets you bounce a multitrack audio mix down as a stereo file for export to Premiere or After Effects, which are both part of the Production Studio bundle that Audition comes in. (Audition can also be purchased as a standalone application.) If you then need to change anything in the mix, you can open the stereo file in Premiere or After Effects and it will split back out to a multitrack version in Audition. All the programs in the bundle can access the included Adobe Bridge, which is an excellent media-assets manager.

If you want to match the duration of an audio clip to a scene in your video, you can enable Audition's time-stretching option in the audio clip's properties, and then manually drag the clip's edge to the beginning or end of the scene. You can also set markers at the boundaries of the scene, then enable snapping to markers to make aligning the audio and video even easier.

Magix Samplitude 9 Professional (Win; $1,099) supports a large number of SMPTE time displays, including standard video rates (NTSC and PAL) as well as two common film rates: 40 frames per feet (used for 16 mm) and 16 frames per feet (used for 35 mm). It can import the most common video formats (AVI, MPEG, QT, and WMV) but can export video only in AVI format. Among its features is the ability to watch your video file update in real time as you change the start time of an audio clip. This lets you see exactly where in the video the clip will be placed. Samplitude 9 ships with Magix's Movie Editor, a very capable multitrack video editor.

Although Steinberg's WaveLab 6 (Win; $699.99) may not have the reputation of its sibling Nuendo when it comes to audio for picture, it's still quite useful. You can move video clips anywhere in the dedicated video track and change the clip's start and end points. You can also split a clip repeatedly and move the parts around at will. The program lets you choose from a number of timecode formats and will even display increments as small as hundredths of a frame.

WaveLab's Time Stretch To Cursor feature is especially handy. It lets you change the duration of an audio clip to match the length of a video clip. WaveLab can also export all markers in a project as a text list, which could be useful to take to a spotting session with your film's director.

—Dennis Miller

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2004 SurroundBridge introduced for using stereo FX in surround

2003 1st DAW with advanced multi-processor support, Universal Bussing Architecture introduced

2002 MIDI Groove Clips introduced, 1st DAW to support both ASIO & WDM

2001 SONAR introduced: 1st DAW to combine MIDI & audio, ACID-style looping, & virtual instruments

1999 WavePipe technology for low latency audio streaming

1998 1st DAW with synchronized host-based playback of MIDI, audio, & video; MIDI FX introduced

1997 1st native DAW for Windows NT, 1st with real-time DirectX FX; StudioWare introduced

1995 Cakewalk Pro Audio: 1st native 32-bit MIDI & digital audio workstation for Windows 95

1993 Real-time MIDI editing introduced

1991 Cakewalk Professional for Windows: 1st sequencer for Windows 3.1, CAL (Cakewalk Application Language)

1987 Cakewalk for DOS introduced, 256 tracks

to an external device if, for instance, you are printing your final audio and video to a DV camcorder or other recording device.

Normally, your software passes the picture to the external monitor using a FireWire port, which means you'll need an external FireWire-to-RGB converter such as the Canopus TwinPact. All the programs except Tracktion, Live, and GarageBand can output video through FireWire.

In high-level TV and film work, surround sound is often called for. Most of the programs we looked at, including Acid, Pro Tools, Logic, Sonar, Digital Performer, Cubase, and Nuendo, are surround capable.

Ins and Outs

With all the video formats that exist, it's handy to have an audio app that handles different video-file formats. On the Mac, QuickTime (which uses a .mov or .qt file extension) is the most common type of digital video format. On the PC, QT, AVI, and Windows Media Video (WMV) are the most frequently found. But professionals at the high end and Web video users at the low end use numerous other formats. For example, many professionals require support for Avid OMF or Sony MXF formats (both of which are supported in Pro Tools HD), while work intended for the Web might require SWF (Flash), RMV (Real Media Video), MPG (MPEG-1 or MPEG-2), and other formats. (See the table "Video-Scoring Features Compared" for a list of formats supported by each program.)

Many of these programs can import QT and AVI, and some of the Windows programs support Windows Media Video. But beyond that, things vary dramatically. To handle some formats, you may need a dedicated video-editing program or format converter. RMV shows up only in Acid, which is also the only program to support Flash files.

Moreover, although all of these programs let you import various types of files, you can't assume that you can export a video (along with your newly recorded soundtrack), much less to a different format than you imported. For example, Tracktion and Live have no support for exporting video, and Sonar lets you import but not export MPG files. Convenient as it is to import QuickTime movies directly into your sequencer, remember that running a movie from your sequencer will add to the drain on your processor.

Fortunately, the ability to import a video file into your sequencer or audio application has obviated, for the most part, the sometimes dicey process of syncing to an external video deck. But if you do need external sync, all the programs but GarageBand sync to external timecode (with the appropriate peripheral hardware).

COMPOSER SPOTLIGHT: CHRIS JORDAO

Chris Jordao is a staff composer at Big Foote Music and Sound (www.bigfoote.com), a busy music-production company based in New York City. Jordao, along with the other composers at Big Foote, uses Apple Logic Pro for his scoring work.

Jordao explains the work flow on a typical TV-commercial score. "The client sends us the picture, and it's not necessarily a QuickTime movie; sometimes it's a DV file," he says. "There are multiple formats that they send us. We have a guy here that cuts the movie to 2 seconds before the first frame of the picture, which would be 00:59:58:00."

COURTESY CHRIS JORDAO

Chris Jordao

Jordao then sets the Movie Start parameter at the bottom of Logic's movie window to 00:59:58:00, ensuring that the first frame of the picture will be at 01:00:00:00. "It's pretty standard here," he says, "so we always know that our sessions are going to have that starting point."

Once that's set up, Jordao can experiment with the tempo and SMPTE start time of the music to see how various combinations work with the picture. In Logic, both these variables are located in the Tempo List window. "Sometimes we want to have the movie start a little later, to make it hit the picture better to the music, so we play around with that," he says.

According to Jordao, he'll often use Logic's markers as well, locked to absolute time. "Since we work in a 30-second format all the time, I'll put markers at 0 seconds and 30 seconds, so I have a clear view of how many bars I have for a track, and if it [the tempo] is going to fit my needs."

He'll also frequently use the markers to outline the hit points. "That's an important thing too," he explains. "Each composer here will work slightly different. Some will rely more on the markers, some less. I use the markers a fair amount."

But Jordao doesn't get too wrapped up in all the sequencing features. "I try to keep Logic as just an intuitive program for me," he says. "I probably only use about 50 percent of what it can do—I just want to have the music come through."

—*Mike Levine*

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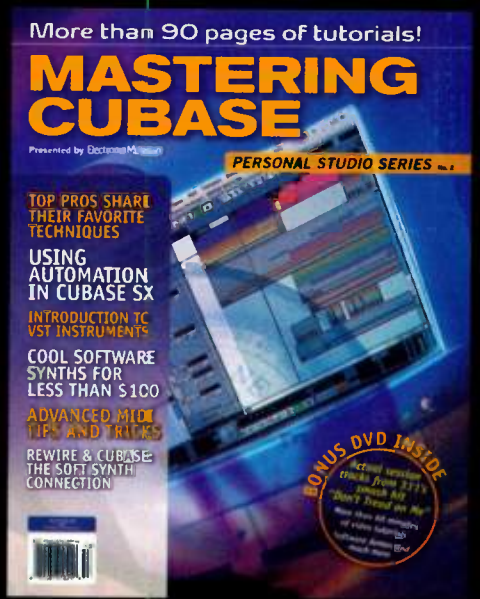

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One by One

Next we'll look at the individual programs (listed alphabetically by manufacturer) and give you a few ideas about each one's suitability for scoring. When reading our synopses of the various programs' scoring-related features, keep in mind that there is no right way to score to picture; it's only the results that count. Every composer has his or her own method for scoring and will use only the features in a sequencer that fit his or her work style. The sequencers that will appeal to the largest swath of audio-for-picture composers, therefore, are the ones that can provide a wide range of features that are both intuitive and efficient.

Ableton Live 6 (Mac/Win; $599 boxed, $499 download)
Live's video support is in its infancy, having just been added in version 6. According to Ableton, a lot more functionality will be added in subsequent releases. Currently, Live allows you to import several different movie formats and edit the imported video using cut, copy, and paste. But you can't export your finished product as a movie file. Import is easy, though: just drag the video file into an audio track in the Arrangement view. The QuickTime movie window that pops up is of the floating variety (that is, it always remains on top of the other windows), and its audio waveform display appears like a regular audio track (see Fig. 1).

FIG. 1: Importing a video into Live is as easy as dragging-and-dropping it into the Arrangement view. You can cut, copy, and paste the video from its audio track.

Setting the start point of your music is a breeze.

Just select the video track and drag the Start Marker in the clip display. The movie will follow what you're doing, and you can stop at the point you want your sequence to start. If later you want to change the start point, no problem: just drag it again. Live's excellent manual even describes a method that allows the program to temporarily disable any video prior to the start point of your music.

The easy start-time manipulation, combined with Live's adroitness with tempo, makes it an excellent app for quickly finding workable tempos for your cues. A good way to do this is to drop in a drum loop of the style you're looking to compose in, set it to loop throughout the length of the video, and then start finessing the combination of tempo and start point until you find values that work well with the picture.

You can even experiment with using Live's Warp Markers on the video track (with that track set as the Master) to alter tempos within your sequence to hit particular events. You'll have to be careful that any changes you make are subtle, or they won't sound natural.

Live is missing some important scoring features. For example, it doesn't display timecode, only bars:beats:ticks. This complicates your ability to go to a particular frame location by scrolling to it with the counter, because except at ridiculously fast tempos, a single counter tick is larger than a frame. The work-around is to click on an empty track, as close on the timeline as you can to your event. The video will jump to the point in time corresponding to where you clicked. If you're zoomed in enough, you'll be able to move the transport to an exact frame location. If your video has SMPTE numbers burned in on it (aka *window burn*), it will be even easier to find specific frame locations.

You can mark spots with Live's Locators, which are similar to standard sequencer markers, but they can't be locked to absolute time. Also, the program doesn't let you change meter within a song.

With its unique work flow, Live is a good choice for less-demanding scoring situations such as band and Web-site videos. Although it doesn't have the breadth of features to be the primary sequencer on a complex film or TV scoring job, its creativity-inspiring features make it an excellent ancillary scratch pad for composing your cues.

Apple GarageBand 3 (Mac; $79 for iLife bundle, included on new Macs)

GarageBand (see **Fig. 2**) is by far the least expensive application that we looked at, and considering its price point and the fact that it's a consumer program, it has surprisingly robust video support.

You can import a range of video types into GarageBand, and you can even drag-and-drop the files into the timeline. The video's audio track is immediately split off into its own track, a video thumbnail track appears at the top of the main window, and a video window pops up in a window fixed on the right-hand side. The

counter can read out in bars:beats:ticks or in absolute time, but not timecode.

With GarageBand's well-implemented support of Apple Loops, it's easy to insert loops and start experimenting with tempo. You even get a modest collection of sound effects as part of the large Apple Loop collection that comes with the program. If you zoom in sufficiently, you can scroll to any frame location by dragging the Playhead.

GarageBand offers a number of different screen-size and compression options for exporting your movie/soundtrack combination: Full Quality, Video Podcast (iPod), Web Streaming, Web, and Email. The program is also integrated with the other iLife apps, so you can import movies directly from iMovie, and export to iDVD and iWeb. You can even add chapter markers for video Podcasts.

If you try to do anything more than simple scoring in GarageBand, you will run into its limitations. For one thing, you can use only one time signature and tempo setting per song. In addition, the markers can't be locked to absolute time, and they don't show bars:beats:ticks or timecode. Further, there's no way to offset music or video start times.

For adding music to a Web site or composing some incidental music for a basic video project, GarageBand may be all you need. But for professional scoring work, you'll want a more fully featured application.

Apple Logic Pro 7.2 (Mac; $999)

Logic Pro, Apple's flagship audio application, is stocked with useful features for video scoring. Movies can be opened in a floating or nonfloating window, and you have the option of opening a video thumbnail track as well.

Markers can be dropped in with a key command and viewed and edited in the Marker List. Within that window, you have the option to lock the markers and to toggle back and forth between their SMPTE and bars:beats:ticks positions by pressing the U key. You can view your markers against the timeline by opening up the Marker Track.

FIG. 2: Although GarageBand's scoring tools are limited compared with those of pro sequencers, it offers a number of export options, including letting you save your movie and soundtrack as an iPod-compatible video.

FIG. 3: You can adjust tempos to fit events in Logic Pro using its Scene Markers and its Beat Mapping Global Track (top).

Logic also makes the process of constructing a tempo map easy with its Scene Markers features. When used with Logic's Beat Mapping Global Track, you can graphically adjust the tempo to hit your marked locations (see Fig. 3).

Also handy is the Tempo List window, which provides fields for entering tempo and for offsetting the audio start against the movie. Once you've set locked markers that correspond to your important hit points, open both the Tempo List and the Marker List. You can then drag up and down to change values in the Tempo field of the former, watch the effect on your markers in the latter, and find the bpm setting that most closely hits your markers.

Logic Pro lets you easily program tempo and meter changes, and the Loop Browser window gives you access to the huge collection of tempo-flexible Apple Loops that are included with the program. You also get the same sound-effects collection that is in GarageBand. Logic's comprehensive group of soft-instruments and effects plug-ins gives you access to a wide range of sonic ingredients for your scores. Logic's EXS-24 sampler is extremely useful in scoring situations, particularly because it can convert Tascam GigaSampler libraries (a favorite of film composers) and stream their contents from disk.

When you're finished composing and mixing, the Export Audio To Movie command lets you combine whatever audio you recorded with the movie file in a new QuickTime movie file. New in Logic Pro 7.2, you can export a selected portion of the movie. That could be handy if you're working on a long-form project and are scoring small sections of it at a time.

With its scoring-friendly and comprehensive tool set, it's not surprising that Logic is the sequencer of choice for many professional film and TV composers.

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Cakewalk Sonar 6 Producer Edition (Win; $619)
Sonar's handling of file import and export is a cut above the rest and will be especially handy if you need to prepare files for different purposes (see **Fig. 4**). After you've completed your score, select Export Video and you'll find WMV, Video for Windows, and QuickTime as the available formats. Once you pick a format, you have access to an extensive set of encoding options. For example, you can change the frame rate of a file, enable a setting to automatically optimize it for downloading, and change its frame size (all the standard NTSC and PAL sizes are supported). You can also add filters to alter your video's color, adjust its brightness and contour, and more. You'll find a number of options in the same window for modifying the audio, which is a convenient touch.

Like most of the apps in this roundup, Sonar can display the individual frames of a video file and send those to an external DV device for viewing or recording. It will also show your video in a dedicated window and as single frames in its video track simultaneously. Right-clicking on the Video Preview window brings up a host of settings for customizing the video display. These include manually stretching the display to any arbitrary size, expanding it to full screen, setting the time-display format (minutes:beats:ticks, SMPTE, Frames, or None), and changing the background color. You can also adjust the resolution at which video will be displayed—a low resolution may be adequate for finding cue points and will save CPU cycles during playback. More important, you can change the time in your sequence at which the video will start to play and also set in and out points within the video file.

Sonar lets you drop markers on the fly and then lock them to specific SMPTE times. This is handy if, for instance, you need to hit a cue at a specific time in the video file and want to change the tempo of your sequence. It's also easy to import a video file without importing its preexisting audio track—just leave Import Audio Stream unchecked when you load the video. You can also have Sonar split an existing stereo audio track into separate mono files when importing.

Sonar 6's new AudioSnap feature can be used to easily align a beat or transient within a clip to hit a particular

VIDEO-SCORING FEATURES COMPARED

	Acid Pro 6	Cubase 4/Nuendo 3	Digital Performer 5.11	GarageBand 3
Cut/Copy/Paste Video		X		
Display SMPTE	X	X	X	
Export Movie and New Audio	X	X	X	X
Extract Audio from Video File	X	X	X	X
File Formats Imported	AVI, MOV, MPEG, SWF*, WMV	AVI, DV, QT, WMV**	DV, MPEG, QT	AVI, DV, MPEG, QT
File Formats Exported	AVI, MOV, MPEG, RMV, WMV	AVI, DV, QT, WMV**	QT	QT
Markers: Lock to Absolute Time	X	X	X	
Auto Move Audio to Video Frame Start		X	X	X
Notation Editing		X	X	
Offset Music Start	X	X	X	
Offset Video Start	X	X	X	
Output Video to FireWire	X	X	X	
Offset SMPTE Display		X	X	
Rerender Video in New Format	X			X
Surround Capable	X	X	X	
Visual Cues			X	

*SWF = Flash. **Windows versions only.

video cue. You can also use AudioSnap to fit the tempo of an audio track to match the length of a scene. In addition to just typing in a new duration for your clip, which is one of its less unique features, you can hold down the Ctrl key and drag the end of the audio clip to align with the end of the video, and Sonar will automatically change the speed of your audio without changing its pitch.

You can choose from several stretching algorithms to find the one that works best for your material (percussion, mono or polyphonic, and so on), and select either the real-time stretch or "offline" stretch function depending on the amount of stretching you're doing and the quality of output you're after.

With its robust surround features, extensive video-file support, and built-in V-Vocal VariPhrase and Perfect Space convolution reverb tools, Sonar is well equipped for a wide range of scoring tasks.

Digidesign Pro Tools HD 7.3, LE 7.3

(Mac/Win; price depends on hardware purchased)

Out of the box, the video functionality of Pro Tools HD and LE are quite different. HD offers a robust set of video- and scoring-to-picture-related features, whereas LE has very little. However, LE users can expand their capabilities significantly with the purchase of the DV Toolkit 2 software ($995), an add-on that gives them most of the same video support as is in HD. Unfortunately, DV Toolkit 2 is not compatible with Pro Tools M-Powered. The features described here apply to both Pro Tools HD and LE, except where noted.

Pro Tools imports a number of formats, including QuickTime, AVI, and MPEG. Your video opens in both a thumbnail track and a resizable video window. You get a set of basic video-editing tools, so you can cut, copy, and paste video sections right from the thumbnail track (see **Fig. 5**). There are two different ways to scrub your video with the Scrubber tool: scrub in the video track and the video will move with no audio sounding, and scrub in an audio track, in which case both video and audio will play.

The video track's audio is automatically displayed in its own audio track. Pro Tools' Playlist feature, which lets you have multiple nested versions (takes) of a track, is also supported for the video track. You can even have multiple video tracks, although only one can be active at a time. These would allow you to alternately

Live 6	Logic Pro 7.2	Pro Tools HD/LE 7.3	Sonar 6 Producer Edition	Tracktion 3
X		X	X	
	X	X	X	
	X	X	X	
X	X	X	X	
AVI, DV, MPEG, QT	AVI, DV, MPEG, QT	AVI, MPEG, QT	AVI, MOV, MPEG, WMV	QT
	QT	QT	AVI, MOV, WMV	
	X	X	X	X
	X	X	X	X
	X		X (limited)	
X	X	X	X	
X	X	X	X	X
	X	X	X	
	X	X		
			X	
	X	X	X	

view, say, two different edits of the same video with your music.

The program lets you export your finished video to a variety of QuickTime formats, supporting both PAL and NTSC, and gives you options for pull-up and pull-down (which compensate for speed changes when converting from film to video and video to film, respectively). You can also choose from a number of audio sampling rates. Pro Tools gives you flexibility with tempo, meter, and audio and video start times. The Identify Beat command lets you set the downbeat of bar 1 at any point on the timeline. The Current Time Code Position window lets you easily offset the timecode in the counter to match any burned-in timecode in your video.

One of Pro Tools' most useful features for video is Spot mode. It allows you to place events (both audio and MIDI) at precise SMPTE locations, making tasks like adding sound effects a breeze. Pro Tools also supports REX and Acid files by converting them into Region Groups, which then respond to tempo changes in the session.

Because Digidesign is owned by Avid, Pro Tools has been designed to interface with Avid products in several ways. For example, if you import an Avid video sequence into Pro Tools, you can see the Avid edits.

With a Pro Tools HD setup, you've got a top-notch industry-standard professional scoring environment. Pro Tools LE with DV Toolkit 2 offers almost as much functionality. However, with either of those options (especially HD), you will be spending more than you would with most of the other applications in this article.

Mackie Tracktion 3 (Mac/Win; Ultimate Bundle $319.99, Project Bundle $129.99)

At the time of this writing, Tracktion 3 was in the late stages of beta, and Mackie expected to release it well before this issue's press time. Our observations are based on a late beta version of the application.

FIG. 4: Sonar 6's import and export options for video are especially robust. You can edit many aspects of a video file, including its file format and frame rate.

FIG. 5: Pro Tools lets you display videos in both a QuickTime movie and a thumbnail track, and its Spot Dialog makes placing events easy.

Tracktion 3 has a number of video- and scoring-related features. It lets you import a QuickTime video file and open up a movie window. You can choose how big to make the window and whether or not the movie window will float. (Be aware that when you set it to float, it even floats over other programs you've opened above it.)

Tracktion 3 lets you view its ruler and counter in either bars:beats:ticks, SMPTE, or elapsed time, but you can view only one format at a time. The program offers good flexibility with meter and tempo. It supports REX, Acid, and Apple Loop files, giving you the ability to import such files and then experiment with the tempo—always a plus when scoring. It's also worth noting that Tracktion 3 Ultimate Bundle comes with an entire DVD of looped content.

Tracktion's markers (limited to a total of nine) can be displayed in the timeline or in a separate marker track (see Fig. 6), and they can be locked to absolute time. There's no way to offset the beginning of bar 1 in relation to the video, but you can set an offset for the start of the video clip in either SMPTE or bars:beats:ticks, which gives you some flexibility.

The program doesn't let you split a movie's audio file onto a separate audio track (although you can mute the movie's audio), nor can it export your finished movie and audio into a new movie file.

In its current incarnation, Tracktion doesn't have a feature set to match its larger and more expensive competitors, but for those who only dabble in scoring, it offers a lower-cost alternative.

MOTU Digital Performer 5.11 (Mac; $795)

When it comes to the sheer number of audio-for-picture features, Digital Performer (DP) is the hands-down winner. It's got what you need for everything from adding music to a video destined for your Web site to scoring a major TV show or Hollywood movie.

When you import a video file, a separate Movie window opens. The Movie window has a Mini-menu that offers options for FireWire video output, window size,

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Acid supports a fair number of frame rates, including those used with 16 mm and 35 mm film, and though you can easily move audio clips to line up with points in your video, there's no way to automatically snap an audio clip to a SMPTE start time. You can preview your video on an external monitor and change several aspects of the dedicated video-preview window, such as whether it displays square pixels, used when displaying video on a computer monitor, or nonsquare pixels, as seen on a TV screen.

Acid's Time Markers are the key to its scoring capabilities. Unlike a standard position marker, a Time Marker stays locked to a certain SMPTE time even if the tempo of the music changes. Using the Adjust Tempo To Match Marker feature, you can force Acid to automatically adjust your soundtrack's tempo to ensure that key points in the music align with a scene in your video. For example, if you have an audio event in the middle of your third measure that must occur on frame 2,017, put your cursor at the start of the audio event and drop a Time Marker at frame 2,017, and Acid will change the tempo of your music so the event occurs at the correct frame.

Like some others in this roundup, Acid allows you to import a video file with or without an existing soundtrack, and then save the video with a new soundtrack. The included loop library will give you a lot of raw material to use in your scores. Sony continues to improve Acid's MIDI features, and with luck, you'll find all the MIDI tools you need.

Acid is missing many of the audio-editing features of its sibling Sound Forge, but either standalone or particularly in combination with that program, it is a very robust environment for scoring to picture.

Steinberg Cubase 4 (Mac/Win; $999.99) and **Steinberg Nuendo 3** (Mac/Win; $2,499)

Cubase's and Nuendo's video- and scoring-to-picture-related features are, for the most part, very similar. As a result, we'll cover both programs in a single section and point out where there are differences.

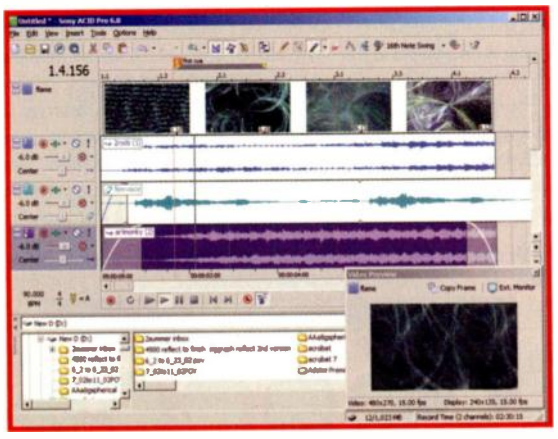

FIG. 8: Acid Pro 6's Video Preview window can be moved anywhere on the screen. Its single video track will show the individual frames of a video file.

FIG. 9: Both Cubase (shown here) and Nuendo offer a wide range of audio-for-video capabilities.

Both Cubase (see Fig. 9) and Nuendo give you a high-level, professional tool set for composing music to picture. Import a video to the Media Pool and drag it to a track, and a floating QuickTime window pops up, as does a video thumbnail track. For the latter, you can choose Snap Thumbnails, which ensures that the thumbnail track will be frame accurate in relation to the transport. You can also opt to show frame numbers (starting from 0).

Rudimentary video editing is also available, letting you cut and paste your video (or videos) at will. Both Cubase and Nuendo offer more than one way to scrub audio and video, including the Jog Wheel, a rotating circular control on the Transport Panel. Using the Jog Wheel, you can scrub or press buttons to move forward or backward one frame at a time.

Markers in both programs can be viewed in either a separate marker window or the dedicated Marker track. In the Marker window, you can view your markers' positions in bars:beats:16th notes:ticks, timecode, elapsed time, samples, or a user-definable frame rate. In both programs, you can jump to a marker position by clicking next to it in the Marker window.

Cubase and Nuendo give you a multitude of ways to offset the start points of the video and audio. One method is through the Bar Offset feature in the Project Setup window, which lets you slide the entire starting point (of both audio and video) ahead by a specified number of measures. Set Timecode At Cursor makes it easy to synchronize your timecode start point with what's on your video's SMPTE burn window (if you have one). Both programs also give you total control of tempo and meter.

For putting together a tempo map, the Time Warp feature lets you graphically drag the timeline to match specific events, and when you do, the program changes tempo accordingly. It must be applied subtly if you want

a natural-sounding track, but it can be very helpful for creating a tempo map that fits your hit points.

If you want to combine your newly recorded audio with the video track, the process is a bit more involved than in some other programs. First you have to mix your audio down. Then you choose the Replace Audio In Video File option. The program will prompt you to select the video file and then the audio file, at which point it will mix them together. The advantage is that your video stays in the same format it was imported in.

Although their video and scoring capabilities are mostly similar, the much-more-expensive Nuendo (which is intended more for postproduction environments) has a more robust feature set. For instance, Nuendo offers Insert Into Project At Timecode Position, a command that's handy for adding effects (in Cubase you can insert events at the cursor position, which is almost as useful). When you activate Nuendo's Edit mode, you can drag an event to any location in the timeline, and the video display will follow it in real time. It makes placing events at specific locations really easy. Nuendo also gives you pull-up and pull-down commands for working with projects originally in film, and it offers a lot more external hardware support options.

Overall, Cubase and Nuendo both offer a comprehensive tool set for professional video-and-film scoring work. Either program is a solid choice, but unless you're planning to do a lot of postproduction work, Cubase should give you all the functionality you need at less than half the price of Nuendo.

It's a Wrap

Deciding which sequencer to use for your audio-for-picture projects depends a lot on both the nature of the work and your budget. If you're doing only occasional Web-related video scoring, you may be able to get by with one of the less expensive programs. However, if you have the budget to buy one of the full-featured sequencers (Pro Tools, Logic Pro, Digital Performer, Cubase, Nuendo, or Sonar), you won't regret it. The control and flexibility that those programs give you is a necessity in the high-pressure world of professional scoring. EM

Senior Editor Mike Levine (www.mikelevine.com) has scored many national commercials, and has written music for CNN and the History Channel. Associate Editor Dennis Miller is a composer and animator. Check out his work at www.dennismiller.neu.edu.

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Overcoming Adversity

By Joanna Cazden and Scott Wilkinson

Studio solutions for musicians with physical disabilities.

Since the passage of the Americans with Disabilities Act (ADA) in 1990, people have grown accustomed to blue stripes in parking lots, wheelchair-size restrooms, and sign-language interpreters in classrooms and churches. Disabled musicians have benefited from the increased recognition of accessibility as a common good, just as nondisabled folks have benefited from a richer, more diverse community environment.

But how accessible are the tools of the musician's trade? How has technology helped disabled musicians practice their art and profession, and where does technology fall short? The answers may surprise you.

Mobility Crisis

Musicians coping with spinal-cord injury or systemic conditions such as muscular dystrophy, cerebral palsy, or multiple sclerosis must learn to compensate for the limited mobility of some or all of their limbs. Like ALS-afflicted physicist Stephen Hawking and wheelchair athletes, mobility-impaired musicians manage their creative work using a variety of methods.

Georgia musician Greg Harry (see **Fig. 1**) played guitar professionally for 15 years before suffering a fall in 1991 and becoming paralyzed below the shoulders. He didn't play music for five

years after having his accident, until he began to realize that computers and music technology might actually help him make music again. Producer and friend Chris Blackwell helped set up a studio in which Harry could control everything with a simple wooden mouth stick. He credits a grant from Georgia's Brain and Spinal Injury Trust Fund, a program funded by DUI fines, for making the studio setup possible.

Harry explains that using the stick is easier than talking to the computer using voice-recognition software. Furthermore, he says, "It doesn't conflict with any other software." With the help of Microsoft Windows' Accessibility and Sticky Keys functions, he uses the numeric keypad (with the number 5 key for Enter) to move the mouse cursor anywhere on the screen. He can also modify cursor speed and acceleration for different tasks.

Slowly but Surely

Harry's process in the studio is similar to any able-bodied musician's, only slower. Composer Don Taylor (see Fig. 2), who is a quadriplegic, likewise explains that he can do almost anything he wants to in his studio, but "it takes four or five times as long as the average guy."

Taylor was a multi-instrumentalist until he was injured in a hit-and-run accident in 1990. Unlike Harry, Taylor's use of music technology predated his injury. He started a company called Syntech in his garage, making MIDI interfaces and software for Apple IIe and Commodore 64 computers. He also started Sonus, a company that created sequencers, MIDI interfaces, and other music gadgets for Atari, Apple, and Commodore computers.

Taylor's accident left him with permanent spinal-cord damage, paralyzed from the chest down with only limited arm movement. To operate his computer, he straps a pencil to each of his two hand braces and uses them to hit the keyboard and manipulate a trackball, painstakingly entering one note at a time.

FIG. 1: Greg Harry's studio is designed so that he can access what he needs to make music despite a severe spinal-cord injury.

COURTESY GREG HARRY

"It's very tedious," he says. "I have to hear everything clearly in my head and try to get it right the first time, but I can't know how it sounds until I hear it played back." His current studio is based on a Macintosh G5 running Apple Logic Pro. He also requires extra time to make any changes in his setup; installing a new piece of software can take hours.

"When I first started in music technology, I remember thinking, 'This could be really helpful for disabled people,'" says Taylor. "I never expected to become one of my own candidates."

Drummer Donald Jaeger tells a slightly different story. In 1981 he suffered a fall that seriously injured his spinal cord. When he was able to resume playing again, access to his instrument was not the problem. "I could still play drums," he recalls, "but my endurance was limited because of chronic pain. I needed to find people to play with me who understood."

His desire to connect with others led him to found the Coalition for Disabled Musicians (CDM), which now has a Web site of resources and support (see the sidebar "Resources"). The coalition has created three ensembles so far: two rock bands (Range of Motion and Rockin' Chair) and a jazz-swing group (the CDM Orchestra). Jaeger has also developed many adaptive devices for his colleagues, mostly instrument stands to aid physical accessibility and help support weight.

Composer Taylor has launched a service project called Artists, Musicians, Composers Against Paralysis (AMCAP), which advocates for research into curing that affliction. He donates a portion of his CD sales to the Christopher Reeve Foundation. "So far, no big-name musicians have taken on paralysis as a cause," he says. "Maybe someone reading this article will step up to the plate and help."

Stands, pencils, mouth sticks—the mobility-impaired musicians we spoke with do not use as much advanced technology as one might expect. In some cases, the coolest gear is just too expensive for musicians who have steep, ongoing medical bills. In other cases, creative mechanical adaptations are enough.

Eyes, Jaws, and Hal

Blind or visually impaired musicians make up a large and professionally active community that has long embraced technology. Famous members of this group include Ray Charles, Diane Schuur, and Stevie Wonder. From composing to engineering and from teaching to publishing, blind musicians and their allies have brought important adaptations to music technology.

Central to this effort is screen-reader software. The primary screen readers for Windows are Jaws, Window-Eyes, and Hal. Macintosh had a screen reader called outSpoken for OS 9, but it was incompatible with the initial releases of OS X. A new one called VoiceOver was introduced in OS X Tiger.

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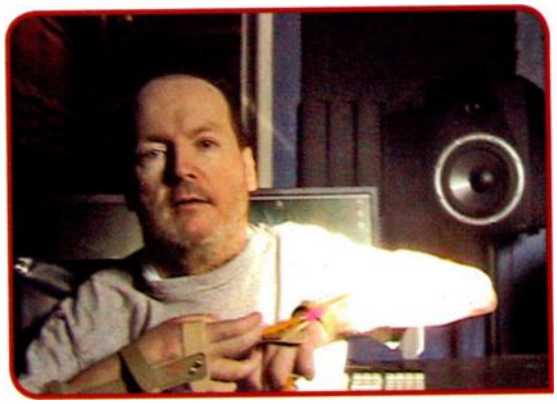
In contrast with many other tech-savvy artists, blind musicians generally prefer the Windows platform, partly because of its lineage from text-based DOS. By comparison, the Mac began life with a graphically oriented interface. Screen readers can read only text information and not bitmapped graphics. "We can't see the pretty pictures of sliders on the screen," says Mike Mandel, a keyboardist-composer who is blind. "We need the information that's *under* the slider, and screen readers can only read that from a text code."

The Windows platform includes Microsoft Active Accessibility (MSAA), a standard built into all Windows releases since 1995. Windows applications have followed the Mac toward more-graphically based interfaces, so screen-reader access to a given program depends on whether the developer has followed MSAA guidelines.

Among the most cooperative music companies in this regard are Cakewalk and Sibelius (recently acquired by Digidesign). As multi-instrumentalist Gordon Kent, who is also blind, says, "Cakewalk has been great. There's a button in Tool Tips called CW Access that opens a special window for us. It can be queried, and it exposes the parameters of effects and soft synths so that we can modify them. The sound-font player SFZ is also text based, so we can create our own sample definitions. Some other software, however, is either completely bitmapped and invisible to us or doesn't allow us to do much except load patches." Blind users praise Cakewalk for including them in its beta testing and for its stated commitment to improving access with each upgrade.

To further help sight-impaired musicians access Cakewalk and Sibelius software, programmer and music educator Dave Pinto has written scripts for Jaws under the names of CakeTalking and Sibelius Speaking (see **Web Clip 1**). These scripts automate much of the interaction between the programs and the screen reader, allowing blind musicians to use the Tab and Arrow keys to navigate around the screen and select controls to manipulate.

In some cases, a screen reader can work faster than a mouse. "Blind musicians can sometimes get things done very quickly," says Pinto. "It's amazing to watch them once they learn how to navigate."



COURTESY DON TAYLOR

FIG. 2: Don Taylor straps pencils to his hand braces in order to manipulate a trackball, entering one note at a time.

Any Day Now

The company that has frustrated blind music professionals most is Digidesign (perhaps its acquisition of Sibelius will change that). Under Mac OS 9, Pro Tools was accessible to the outSpoken screen reader. But recent upgrades have not been compatible with screen readers, and that has had serious consequences.

For example, sight-impaired engineer-producer Rick Boggs had not only based his entire studio on OS 9 with Pro Tools but had also helped Digidesign uncover and solve an early incompatibility with outSpoken. When screen-reading technology disappeared in the first OS X releases and Pro Tools' OS X version became inaccessible, the impact of that on his business was shattering. Boggs initiated a petition drive that has recently convinced Digidesign to work with the blind-musician community toward restoring screen-reader accessibility.

Hardware synthesizers and other gear have also become more difficult for blind musicians to use. Early products often had single-function buttons and knobs that could be labeled in Braille. Mandel, who played with Larry Coryell in the 1970s, recalls his early ventures with the Yamaha DX7. "I just had to memorize the membrane switches. I could recognize the feel after they'd been used. I got the manual transcribed into Braille, taped some Braille markers on the front panel for orientation, and it was fine."

But products now use multifunction controls, often with labels in LCDs that change according to mode and context. As Peter Elsea, director of the electronic-music studios at the University of California, Santa Cruz, says, "Programmers are so smart—they can make five buttons do a thousand things. But who wants that? Even in college classes for sighted musicians, a lot of time is spent learning that a button means one thing in one position

RESOURCES

GENERAL

Americans with Disabilities Act guidelines
www.ada.gov

International Technology and Persons with Disabilities Conference
www.csun.edu/cod/conf/index.htm

Universal Design
www.udeducation.org

MOBILITY

Artists, Musicians, Composers Against Paralysis
www.nexstaraudio.com/content/view/3/4

Coalition for Disabled Musicians, Inc.
www.disabled-musicians.org

SIGHT

Abletec
http://abletec.serverheaven.net

Blind Producers
www.blindproducers.com

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Saving Grace

Of all the abilities for a musician to lose, hearing is probably the most devastating. In some cases, hearing loss is caused by disease or injury, but for most musicians, it is the result of too much exposure to loud sounds, such as rock bands and even orchestras.

Kathy Peck, bassist for the punk band the Contractions in the 1980s, lost a significant portion of her hearing and developed *tinnitus* (ringing in the ears) as a result of the tremendously high levels at which the group played. She went on to found Hearing Education and Awareness for Rockers (H.E.A.R.) and continues to host its information and referral Web site as well as consult for the San Francisco Symphony.

Beethoven, of course, composed powerful works after becoming deaf. Percussionist Evelyn Glennie currently tours the world, performing skillfully with orchestras by feeling the vibrations through her feet. But these are exceptional artists. Peck emphasizes the need for all musicians to preserve whatever hearing they have, using custom-molded earplugs and in-ear monitors (see "Say What?" at http://onstagemag.com/ar/performance_say/index.htm for details on in-ear monitoring).

Once hearing loss becomes significant, hearing aids are the best way to compensate. But just like adaptations for mobility and visual impairments, hearing aids for musicians are not yet problem-free.

Musician and audiologist Jillian Barrett sees many musicians in her practice. "A lot of people in their late 20s and early 30s come into the office complaining that their hearing isn't as good as it used to be," she says. "It takes more effort for them to hear and enjoy music the way they want.

"Now hearing tests are designed for the frequency ranges important to speech perception, and they use pure tones," says Barrett. "Music encompasses a wider frequency range, and different aspects of the signal are important. Current test procedures are just not designed to catch mild, subtle degradation. So these folks test 'normal.'"

Barrett recognizes that her musician clients' complaints are real, and she is frustrated with the lack of attention

MUSIC OCR

One way to get printed music into a computer is to use music OCR (optical character recognition) software. Using MusicXML (Extensible Markup Language), a data-format standard, some music OCR programs can create files that Lime and Goodfeel can translate into Braille music. Here are some music OCR programs to consider:

PhotoScore (www.neuratron.com/photoscore.htm)
SharpEye (www.visiv.co.uk)
SmartScore (www.musitek.com)

they receive from hearing-aid companies. In particular, she'd like to see these companies offer a hearing aid that provides signal processing rather than amplification—what she calls *signal clarification*. For instance, such a device might alter the reverb or control the attack and release parameters that contribute to recognition of different instruments. "No one offers a hearing aid designed with real signal manipulation, so that a person could hear music the way they wanted to without as much effort."

If a musician has a measurable loss, they may need amplification as well as signal processing specific to music. But hearing aids, like the tests, are built for speech. "The 'music' presets available in some hearing aids are really only tweaks to the basic speech profile. The high-end models, which cost thousands of dollars, do have more bands of EQ, more ability to customize, and more memory for presets. But there is still little signal above 7 kHz."

Barrett believes that the stigma of wearing hearing aids may be lessening. "These young people who need signal clarification more than amplification are also the folks who walk around all day wearing iPod earbuds or a Bluetooth earpiece for their phone," she points out. "This generation doesn't mind all that bionic stuff. They are a ready market that manufacturers aren't paying attention to yet."

Things Have Changed

Music can be a challenging occupation for musicians who have disabilities. But those musicians are steadily solving the problems with a mix of mechanical ingenuity, creative technology, collaboration, and public advocacy. They challenge manufacturers and developers to stay committed to access, and the results are worth the trouble.

As Jaeger says, "Music is an important outlet. I forget everything when I am playing. I even forget my pain for a while. It is very therapeutic."

Peck concurs, saying, "It's extremely important not to give up your music, no matter what happens to you. Even if you have to change the way you make music or stop for a little while, don't deny it. It's not just your career—it's your creativity, something deep inside that must be expressed." EM

EM WEB CLIPS

Joanna Cazden is a singer and speech pathologist who has written about vocal health and technique for EM and Onstage *magazines. Scott Wilkinson was a technical editor for EM for ten years and writes the "Tech Page" column.*

Name That Patch

By Babz

Create your own MIDI patch lists with CherryPicker.

Apple adopted a universal MIDI patch-list management system as part of Core MIDI in Mac OS X. The scheme uses two XML (Extensible Markup Language) documents: a middev file describing the MIDI device and a midnam file containing patch names along with MIDI bank- and program-numbering protocol.

Many Mac sequencers, including MOTU Digital Performer, Digidesign Pro Tools, and Steinberg Cubase, support this scheme and include a large selection of patch lists as part of their installation. (Ironically, Apple Logic still relies on an Environment-based patch-naming system.) For those times when you need to add a patch list for a new MIDI device or modify an existing patch list, Rob Martin's invaluable little application, CherryPicker, makes the task easy.

Easy Pickin's

CherryPicker is a donationware utility that streamlines the process of creating, editing, and converting midnam files. You can download a fully functional copy of the program from www.alterspective.com. If you like it, it is well worth making a donation to ensure continued development.

CherryPicker saves you from having to dig into XML code, and you may not even need to do much typing. With it you can modify existing patch-name lists, and you can create your own custom lists if your sequencer supports that (see Fig. 1). I'll take you through the basics using the Lexicon MPX-100 effects processor as an example (see "Step-by-Step Instructions" on p. 74). Although the exact steps vary from device to device, the basics remain the same.

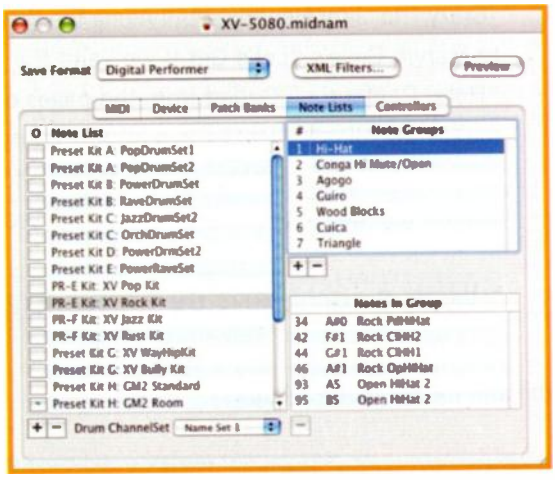

FIG. 1: CherryPicker is a utility designed for creating and editing OS X midnam patch-list files.

With CherryPicker you can copy and paste entire blocks of patch name text, avoiding the arduous task of typing in all your patch names by hand. You can save yourself a lot of time by locating a PDF version of the owner's manual that lists the device's presets. Armed with the PDF, copy and paste the patch list into a text editor and edit the text so that it contains only the patch names organized into banks. Watch out for odd characters such as dashes that are illegal in XML. If you can't locate a PDF with the patch names, it's still a good idea to type them into a text editor for editing before copying them into CherryPicker.

It's in the Bank

Launch CherryPicker and choose New from its File menu. The New Device Setup Assistant will walk you through the steps to set up your device. It will prompt you to launch Audio MIDI Setup and make the necessary settings to establish MIDI communication with your device. After working through CherryPicker's remaining setup screens, you will be presented with a blank CherryPicker document into which you will enter your bank and patch information.

To add your first bank, click on "+" in the CherryPicker window. You will be prompted to give your bank a name and to specify MIDI Bank Select values. MIDI devices use different combinations of two MIDI Control Change messages to select banks. Some use CC 0, some use CC 32, and some use both. Consult your owner's manual or the manufacturer's Web site to determine the proper values for your device.

The Lexicon MPX-100 is a relatively simple device, with 16 banks containing 16 patches each. It uses only CC 32 with the values of 0 through 15 to select banks. To tell CherryPicker how to select the first bank, enter 0 in CherryPicker's B Sel32 field and leave B Sel0 set to its default value (-). Then click on OK to bring up a window for entering your patch names.

In your text editor, select and copy the text for the first bank's patch names, and then paste them into the CherryPicker Patch List window. That brings up a dialog box for specifying patch-numbering options and the patch name delimiter in your text file (typically End Of Line).

Get with the Program

The MPX-100 uses MIDI Program Change numbers 0 through 15 for its patches, but they are displayed as 1 through 16 on the front panel. In CherryPicker set

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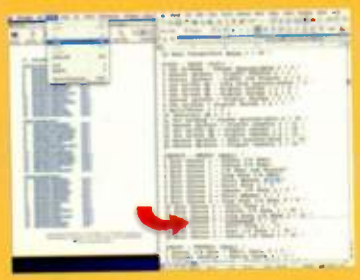
STEP-BY-STEP INSTRUCTIONS

1

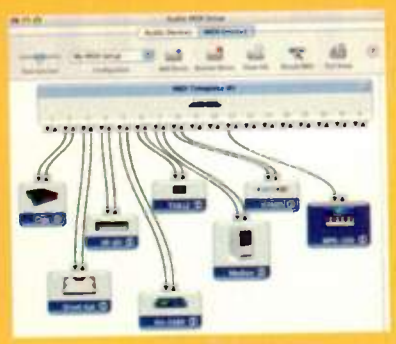


Select patch name's text in a PDF manual and copy it into a text editor. Organize the list into banks.

2

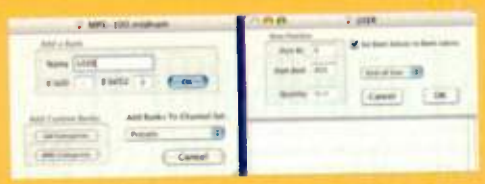
Use CherryPicker's New Device Setup Assistant to set up your device.

3



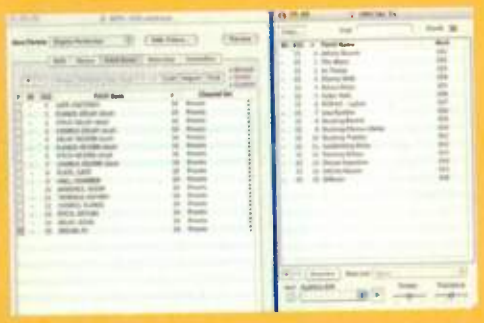
Set up your new device in the OS X Audio MIDI Setup utility.

4



Add your first bank, give it a name, and specify MIDI Bank Select information. Copy a bank of patch names from your text document to CherryPicker's Patch List window.

5



Repeat step 4 for each patch bank.

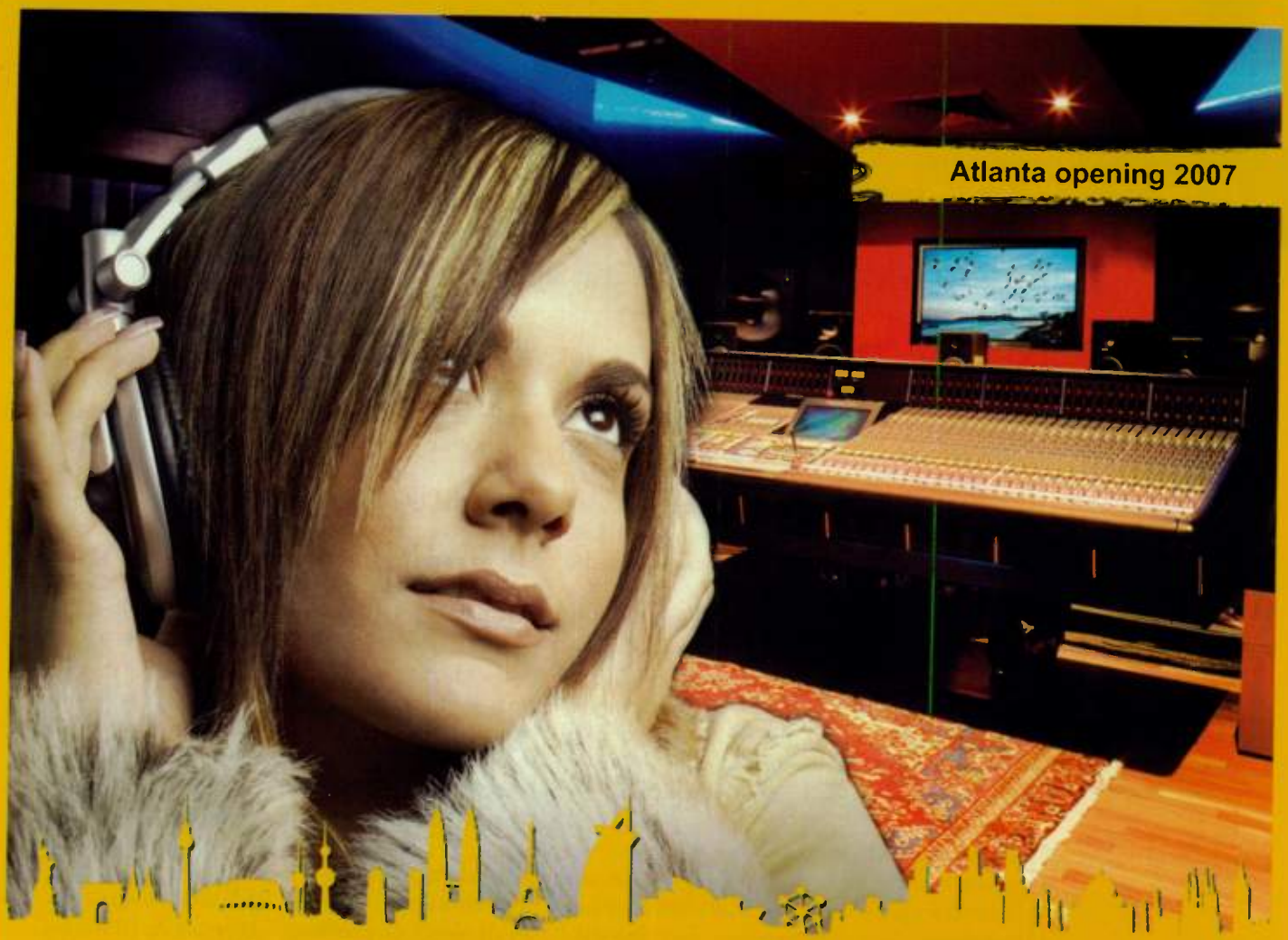
6

Test the list in your host sequencer.

Start At to 0 and Start ASCII At to 001 to ensure correct program changes behind the scenes and the correct program numbers displayed in your sequencer. Repeat those steps for each bank, and you're done.

There are many sources for midnam files on the Internet, so it is always a good idea to see if someone else has already done the work for you. Try Googling as well as asking on user forums. Check out the links on the CherryPicker and manufacturer Web sites. Even if you have to enter the names by hand, you will get back the time you spend many times over in enhanced work flow. EM

Babz is a composer, multi-instrumentalist, and music-technology writer based in New York City.



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Amped Up

By Steve Skinner

Add sparkle to your tracks with an amp simulator.

One of the best ways to create a unique sound is to use a device in a way other than originally intended: use headphones as a microphone, an aluminum ladder as a percussion instrument, or a resonating filter to play a bass line. Here I'll discuss how to use guitar-amp simulator plug-ins to process vocal, synth, drum, and other nonguitar tracks.

The sounds produced by analog synths aren't as complex as those produced by acoustic instruments; a synth's basic waveforms and envelope shapes are simpler. One way to increase the complexity of analog-synth sounds is to run them through a guitar-amp plug-in without using the full-blown distortion of the classic guitar sound. To do that, use a low gain setting and no drive so that there is no audible clipping. Experiment with the speaker simulator turned on and off, because the simulator introduces additional distortion and EQ that may not be desirable.

Back on the Farm

Amp Farm is one of my favorite plug-ins for that, and **Fig. 1** shows my preferred setting: a 1960 Vox AC30 amp with no speaker. That gives a more complex tone quality to the synth sound. Davide Barbi of IK Multimedia points out that amp simulators at low input levels create additional overtones in the high midrange and introduce nonlinear dynamic responses to the signal. Not only is the basic waveform richer, but the tonal qualities change in complex ways over time (see **Web Clip 1**).

Amp simulators also work well with vocals. I've recently been working with Ari Gold, a fine singer who likes to build multiple, interweaving backup-vocal parts. I use different forms of compression, EQ, effects, and guitar simulators in the mix to give each part its own character. Two of my favorites are Waves MetaFlanger for flanging and Eventide Quadravox for creating new harmonies (see **Web Clip 2**). I keep the speaker simulator off and the drive low. This sound is not a distorted one, even though those extra overtones are a form of distortion.

FIG. 1: Line 6 Amp Farm has a good setting for synths and vocals.

Most guitar-amp simulators are designed to run with a mono input, because most electric guitars have a mono output. Many synths and most backup vocals, however, are stereo. IK Multimedia AmpliTube, IK Multimedia SVX, and Line 6 Amp Farm work most easily with a stereo input (using their multimono mode). Native Instruments Guitar Rig 2 sums a stereo input to mono in its amplifier section. You will therefore have to open two instances of Guitar Rig 2 on two mono aux tracks and bus your stereo signal to it to maintain stereo integrity. (Guitar Rig 2 maintains the stereo integrity of the signal if the amp simulator is not engaged.)

For Added Effect

The effects sections of Guitar Rig 2, AmpliTube, and SVX are also useful in sound design and mixing (Amp Farm has no effects). These effects emulate the cruder electronics of vintage stompboxes, so you get more crunch and character from them than from high-end effects plug-ins. Guitar Rig 2 even has a section of presets for nonguitar use.

My favorite effect in Guitar Rig 2, AmpliTube, and SVX is the wah. You can draw in automation for the wah effect or, in Guitar Rig 2, use any MIDI continuous controller. SVX even has a bass wah. The flanger and chorus effects also have that characteristic guitar-flange sound, which is interesting when applied to other tracks. Between the distortion effects and the amp simulators, you can get just about any kind of distortion you want.

Guitar-amp simulators are usually optimized for the frequency range of a guitar. For synth-bass sounds, I like SVX's Ampeg bass-amp simulator. It creates overtones, as do guitar-amp simulators, and has special compression and EQ algorithms that can add lots of punch (see **Web Clip 3**). With just the amp and compressor sections active (EQ, speaker, effects, and mic bypassed), SVX sounds good on an entire drum kit. EM

EM WEB CLIPS

Steve Skinner has worked as an arranger-programmer for the Bee Gees, Celine Dion, Jewel, R. Kelly, Chaka Khan, Bette Midler, and Diana Ross. He arranged the musical Rent *and coproduced the cast album.*

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Get the Picture

By Brian Smithers

A musician's guide to digital video.

We live in a world that's increasingly defined by the term *multimedia*. It's rare to find a studio these days that isn't equipped with a video monitor, and even video-editing capabilities are becoming commonplace. The only concerts that don't involve video displays are those performed by symphony orchestras, and many of us find that new creative and commercial opportunities require us to marry sounds to images (for more on this subject, see this month's cover story, "Picture Window," on p. 40).

It's useful, then, to have a grasp on the essential characteristics of digital video so that we can better embrace its possibilities. In this article, I'll discuss video basics from formats to standards to codecs.

See Me

As you know, there's no such thing as a moving picture—the illusion of movement is created by a rapid-fire slide show of still images. Each successive image shows a scene captured at (or created to represent) a subsequent moment in time, and our brains happily draw the connecting thread between them. If the slide show is too slow, however, our brains distinguish the slides as individual images. The speed of the slide show is called the *frame rate*, and a frame rate of about 10 frames per second (some experts believe it is closer to 16) is the point at which we make the leap from still images to a perception of motion.

There are several common frame rates in professional video use. In the world of film, 16- and 35-millimeter cameras operate at 24 fps (see **Fig. 1**), and digital video often uses the same frame rate to achieve a film look. In most parts of the world, however, analog video follows either PAL or SECAM standards, which operate at 25 fps. The NTSC video standard, used primarily in North America and Japan, operates at 29.97 fps *drop-frame*. For complex reasons dating to the transition from black-and-white to color, NTSC counts 30 frames per second, runs a bit too slowly to display them all, and therefore skips a couple of them each minute. Never fear, however—only frame numbers are dropped, not the video information itself. For NTSC compatibility, digital video can use 23.976 fps (sometimes 23.98 for short). Depending on the application, it can be drop-frame or not.

If the notion of frame rate sounds suspiciously similar to that of sampling rate, there's good reason. A frame of film or video is analogous to a single sample word of PCM audio. Just as a minimum sampling rate is required for acceptable audio quality, a minimum frame rate is required for acceptable video quality. However, a frame of film or video can stand on its own as a still image, whereas an audio sample is useful only in context. Describing an image is therefore proportionally more complex than describing an audio sample.

Frame Rate (fps)	Use	Notes
30	NTSC video	black-and-white only: 30 fps correlates well with 60 Hz electrical systems
29.97 drop-frame	NTSC video	color: frame numbers are skipped periodically to realign timecode with clock time
25	PAL, SECAM	25 fps correlates well with 50 Hz electrical systems
24	film, digital video	slower frame rate increases image blur for film look
23.976	digital video	slowed by 0.1% for compatibility with NTSC color

CHUCK DAHMER

FIG. 1: This table shows common video frame rates.

Image Is Everything

On a computer screen, the resolution of an image is defined by its width and height in *pixels* (from *picture element*); for example, an image might be 800 pixels wide and 600 pixels high. By contrast, the resolution of analog video is defined in number of *scan lines*, which for NTSC is 480. Digital video retains the notion of horizontal scan lines while defining vertical resolution in terms of pixels. Typical resolutions range from 704 × 480 for standard-definition digital television (SDTV) to 4,096 × 2,160 for Digital Cinema 4K, the current state of the art for theatrical presentation. The highest resolution allowed for high-definition (HD) digital television, also known as HDTV, is 1,920 × 1,080.

Each frame of video is projected in two passes, or *fields*, doubling the effective frequency of the light's modulation to prevent flicker. In analog television, the

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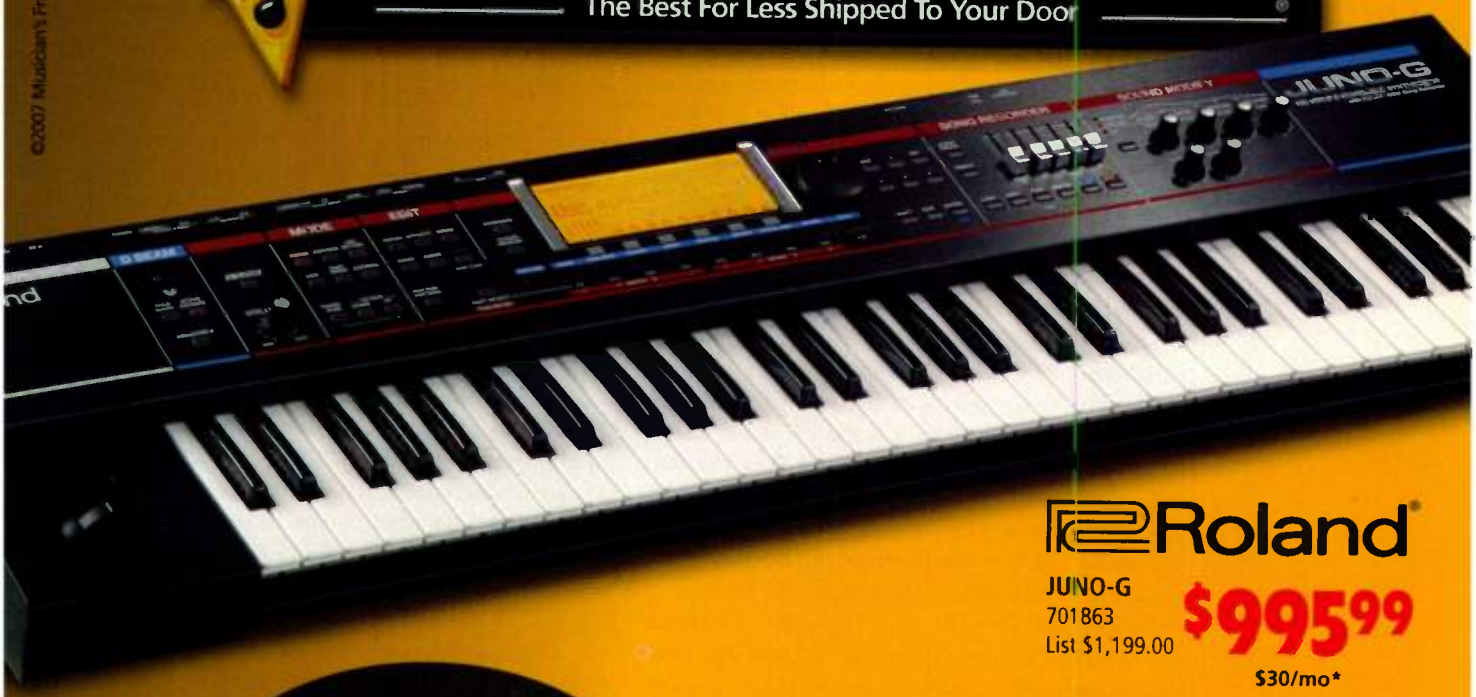

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odd-numbered fields consist of only the odd-numbered lines of the frame; the even-numbered lines are scanned in the even-numbered fields. This is known as *interlacing* or *interlaced scan*. In digital video, it is common to draw each frame in its entirety twice—once in each field—a technique called *progressive scan*. Progressive scan usually results in a clearer, sharper image than other techniques do. Video resolutions are often described in shorthand that drops the number for width and uses *i* for *interlaced* and *p* for *progressive*. For example, the two most common HDTV broadcast resolutions are 720p (meaning 720 progressively scanned lines of 1,280-pixel resolution), used by ABC and ESPN, and 1,080i (meaning 1,080 interlaced lines of 1,920-pixel resolution), used by CBS and NBC.

It's important to distinguish between resolution and *aspect ratio*. On a computer monitor, pixels are essentially square, so the ratio of an 800 × 600 image's width to height is 4:3 (or 1.33:1)—the same shape as analog television (see **Fig. 2**). SDTV (704 × 480) uses rectangular pixels to achieve a 4:3 aspect ratio even though its pixel width-to-height ratio is 4.4:3. HDTV's aspect ratio is 16:9 (or 1.78:1), while theatrical releases commonly use an aspect ratio of 1.85:1 or 2.39:1.

If each pixel were either black or white, one bit per pixel would be sufficient to describe its state in a given frame. Representing shades of gray or color, however, requires multiple values per pixel. Computer displays address this directly, defining the color of each pixel by a binary number: 8-bit color provides 256 (2^8) colors, 16-bit color provides 65,536 (2^{16}) colors, and so forth. *True color* display uses 24-bit words, allocating 8 bits each to the red, green, and blue (RGB) color *channels*. Variations include Digital Cinema's 12 bits per channel and a 32-bit variation of true color that allocates 8 bits to the *alpha channel*, a measure of the pixel's transparency. The alpha channel is used in computer graphics manipulation but plays no direct role in video playback.

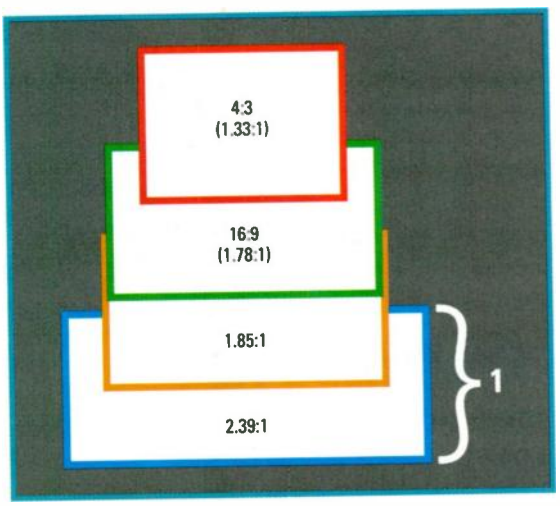

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FIG. 2: This figure shows a variety of film and video aspect ratios.

MPEG-1	H.264	DV
MPEG-2	MOV	3GPP2
MPEG-4	AVI	Motion JPEG

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FIG. 3: This is a partial list of video formats that are supported by QuickTime.

By the Numbers

Electronic musicians are well accustomed to multiplying bit depth by sampling rate by number of channels to calculate digital audio bandwidth and storage requirements, but video's extra dimension (color depth) raises the stakes significantly. Consider the relatively modest example of SDTV: 704 × 480 equals 337,920 pixels per frame. Multiply that by 30 fps, and you get 10,137,600 pixels per second. If the color depth is 24 bits per pixel, this comes out to 243,302,400 bits per second, or about 1.7 gigabytes per minute.

At that rate, even an HD-DVD or Blu-Ray disc would hold only between 9 and 15 minutes or so, respectively, so data compression is required to make digital video practical, especially at high resolutions and color depths. Like MP3, AC-3, and other audio codecs, video codecs take advantage of a variety of practical and perceptual coding techniques to bring the bit rate down to a manageable size.

The most common digital video format standard, Apple's QuickTime (QT), is actually a *container* file rather than a codec that can be extended to support nearly any codec (see **Fig. 3**). As you watch a movie in your QuickTime Player, you usually don't need to worry about whether the video uses the Sorenson 3 codec or MPEG-1—QT makes it all work the same way. You can even download additional compatible codecs for use within QuickTime.

A codec that is increasingly popular for its exceptional ratio of quality to bit rate is ITU-T H.264, also known as MPEG-4 Part 10. H.264 excels at both low- and high-bit-rate applications, and it is a mandatory video codec for both HD-DVD and Blu-Ray players. By reducing resolution and accepting lower-quality encoding, one can achieve a viable bit rate for almost any production or delivery scenario.

Just as audio-production standards adapt and grow, so do video-production and delivery standards. The race to higher-definition video formats and their associated delivery media ensures a lively learning environment for those of us who embrace the multimedia future. EM

Musician, educator, and author Brian Smithers lives in Orlando, Florida, with his wife Barb and their three cats. His latest book is Mixing in Pro Tools: Skill Pack *(Thomson Learning, 2006).*

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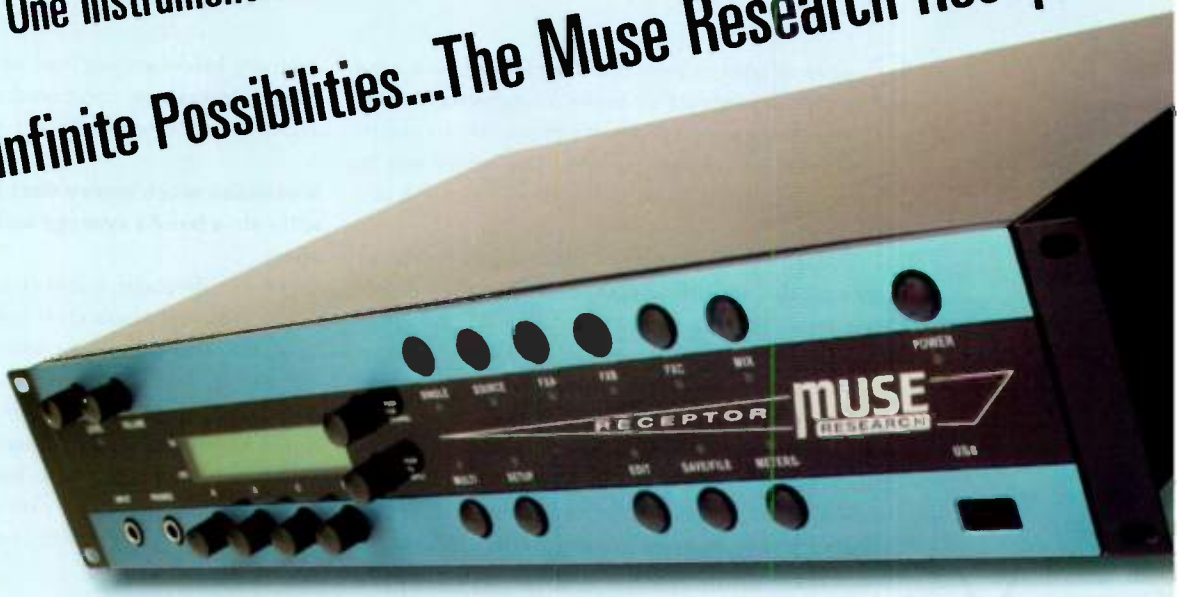

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Receptor: A New Way to Play.

Q&A: Bev Green

By Mike Levine

Practical advice from a music attorney.

Sooner or later in your musical career, you'll need to sign a contract or make an agreement. But before putting pen to paper, it's important to understand what you're getting into. The surest way to protect yourself is by enlisting the help of a music attorney.

To find out what some of the common legal mistakes are that musicians make and when they should seek legal advice, I contacted Bev Green (www.musiclawyer.com). Bev (see Fig. 1) is a highly experienced Bay Area–based entertainment attorney who has represented countless musicians, songwriters, and bands, including the Doobie Brothers, Zakir Hussain, Huey Lewis & the News, and Joe Louis Walker. Green is also a member of the board of governors for the San Francisco chapter of NARAS (the National Academy of Recording Arts and Sciences) and has taught music-business law at San Francisco State University. She had so much useful legal advice to give during our interview that the article grew into a two-part story. Here is part 1.

What are some of the most common mistakes that musicians make in the legal realm?

One big area is with contracts: signing bad contracts and signing contracts before getting legal advice. Another problem is thinking that you don't need a written agreement—within a band, for example.

COURTESY BEV GREEN

FIG. 1: Attorney Bev Green recommends that bands or songwriting partners make agreements between themselves *before* they achieve any success.

Musicians often worry that bringing lawyers in will ruin a band's synergy and break the members apart.

Right, I understand, but that's like living in a dream world. If things aren't clear between the band members, these [legal] issues will come up if a band is successful. And there might also be outside forces like record labels, or managers, or other people who might be trying to split them apart. That happens. So it's kind of putting your head in the sand not to want to invest in taking care of business up front. Sometimes people get into really horrible messes if they don't.

Another thing that keeps musicians from turning to a lawyer is that they don't want to spend money on a situation that may never bring in big bucks.

The problem is that the agreements that artists enter into early on are likely to affect them for most, if not all, of their career.

What areas of intraband agreements are the most important to iron out?

One is the business format—how band members are going to run the business. Is it going to be one person's business, with that person hiring the others, or will it be some other kind of business, like a partnership or a corporation or an LLC? Then, in that context, there's always the issue of continuity of membership, termination of members, who can fire whom, who can continue, who keeps the copyright, and who keeps the trademark. It's also important to work out what's going to happen in the worst-case scenario: if the band terminates or if somebody dies or something unexpected happens. Or if band members who leave will continue to get some sort of compensation for what they did while in the group. That may be a continuing money participation or a continuing ownership interest. The consequences are very different for each. And it should all be worked out in advance.

audio ease

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"At Audio Ease we're almost all over 35 now, so there's really a lot of things that we don't like. The software boxes on the top shelve. Couldn't reach them. But now we have a ladder. We didn't like stale bread for lunch either. So we got a bread maker.

Me, I hated waiting for my editing software to boot just to extract a snippet from a sound file. Or the Finder preview not playing back split stereo sound files, or having to jump through hoops just to e-mail an MP3 of some WAV that I can just see sitting there on my Desktop. Or importing a 5 minute song even if I just need 5 seconds of the break in the middle.

A sound file in the Mac Finder just feels so, well, closed. Like you have to open it up in something just to get to the data. Hated that. So we made Soundabout." Arjen (37)

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When musicians write songs together, whether in a band or just as songwriting partners, should they have some sort of an agreement?

Yes. When they write songs together, when they record together. People's memories differ as to what actually happened or what their agreement was. Or there could even be downright fraud or stealing if people grow into a negative relationship. So it's really important to have an agreement in place, while you're all still friends and while you don't think you need one. That's the easiest time to take care of business.

So if someone is in a band or has a songwriting partner, would you recommend that each person get their own attorney and have them all work something up?

It can get awkward if everybody has their own attorney. Sometimes, of course, it makes sense to do that; it always depends on the particular circumstances and relationships. Often what will happen as a practical matter is that the band will ask one attorney to represent them collectively.

A neutral attorney, I presume—not someone that one of the band members has already been using.

Right. Sometimes a band that's in a neutral situation comes in to me—I don't know any of them yet, and they want me to help them write up a band agreement of some kind or help them work through various issues that they have to deal with, such as who's going to own the copyright, the trademarks, the band name, that kind of thing. I might even act as a scribe in preparing the agreement and help them think through the issues by giving them questions and maybe even asking them to come back to me with what their oral understanding is. Then I'll help them work out the rough edges and help them write it up. In the course of writing it, dealing with the issues that come up, and putting together a complete agreement that has all kinds of contingencies, I'll raise some of these questions that might come up later.

Getting good legal advice must be important when an artist, a composer, or a band is negotiating a contract with an outside party such as a producer.

Whether it's a producer, a production company, a small record label, a major record label, or an agent, getting good legal advice is very important.

Some people think that it's advantageous if they're offered a contract that's only a page or two in length. Is that a mistaken opinion?

Yes. Even though I like to keep contracts as short and clear as possible, it's no good to have a contract where the other side says something like "We own everything, and you get screwed." That could be real short, but it's not going to work. And, of course, [a clause like that] won't be that obvious, but it could be in there. Sometimes one- or two-page agreements that come from the other side just cover all the things they want, and they don't mention the things that you want.

What kinds of issues are you referring to?

For certain commitments or conditions to happen or for certain controls or certain rights to terminate if things don't work right. Making sure to spell out clearly what you get. So shorter isn't always better, and people shouldn't be fooled by somebody saying, "Well, it's just a one-page agreement—why don't you sign it."

If the other side has drafted the agreement, you've got to be particularly cautious, right?

Yes. A lot of times, the other side that musicians are dealing with has more money. And they might have an attorney, and the musicians might think, "Well, let's rely on their attorney to do the work—they'll pay their attorney and we'll save money." Of course, it's pretty obvious that in that case, that attorney is working for the other side and they're going to be slanting that agreement. And even though they might be real friendly and hang out with you, it doesn't matter.

So you recommend that a musician should bring in an attorney as soon as some kind of contract seems to be a possibility, and that they have their attorney negotiate the terms with the other attorney.

Yes, for a couple of reasons. You mentioned musicians not wanting to wreck the vibe by bringing in a lawyer. But if they turn it over to an attorney, then they're not personally involved; it keeps them from getting in each other's faces about those things that are uncomfortable to discuss. Also, if they find an attorney that they're comfortable with, they shouldn't have that problem. If they have an attorney that they think is a shark, then that attorney might well be a shark, and they shouldn't work with him or her. It's like going to a dentist: if you've got a toothache, you want to go to a dentist sooner rather than later because it's only going to get worse and become more expensive and painful to deal with. I think that's a great analogy for dealing with legal issues. EM

Be sure to check in next month for part 2 of this interview, in which Green will talk about the specific legal issues faced by composers and songwriters.

Mike Levine is an EM senior editor.

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

Jenna Drey – TAXI Member – www.jennadrey.com

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

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

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CAKEWALK Sonar 6 Producer Edition (Win)

More power for this flagship digital audio sequencer.

By Allan Metts

Like clockwork, the fine folks at Cakewalk release a new and significant version of their flagship digital audio sequencer each year. This year is no exception. Sonar 6 Producer Edition includes several new tools for working with audio and MIDI, as well as some major productivity enhancements that will let you spend more time making music.

Snap Judgment

Perhaps the most important new feature in Sonar 6 is AudioSnap, which is really a collection of many powerful features. Using AudioSnap, you can line up your project's beats and bars to a previously recorded, free-form performance. You can then quantize an audio track almost as easily as a MIDI one and tighten up the timing of sloppy performances (such as a drummer and bass player playing out of sync) *after* the performances have been recorded.

Transients in the audio are computed when you first record or import an audio file, so when you enable AudioSnap, you can immediately use a palette of tools to manipulate them (see Fig. 1). If you're dealing with a passage that was recorded without a metronome or other timing reference, you'll first want to align the project's timeline to it. You can navigate among the transients using the Next and Previous buttons or the Tab To Transients command and designate a bar and beat for any or all of them. Sonar will establish the appropriate tempo changes to line everything up the way you want it.

Manually setting the bar and beat for individual transients can be tedious work, so Sonar gives you an Extract Timing feature to do this automatically. You simply specify how much musical time your transients represent, and Sonar will figure out the tempos.

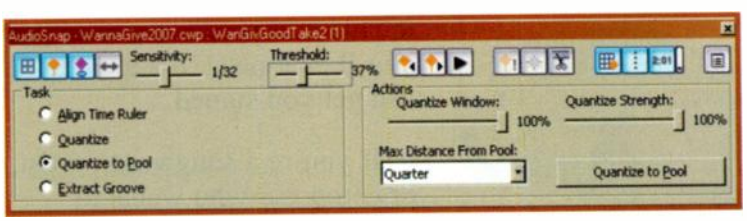

FIG. 1: Sonar's AudioSnap palette provides access to four different tasks. Here you can adjust project tempo to match existing audio, quantize the audio, quantize to audio in another track, or extract data for groove quantizing.

GUIDE TO EM METERS

5 = Amazing; as good as it gets with current technology
4 = Clearly above average; very desirable
3 = Good; meets expectations
2 = Somewhat disappointing but usable
1 = Unacceptably flawed

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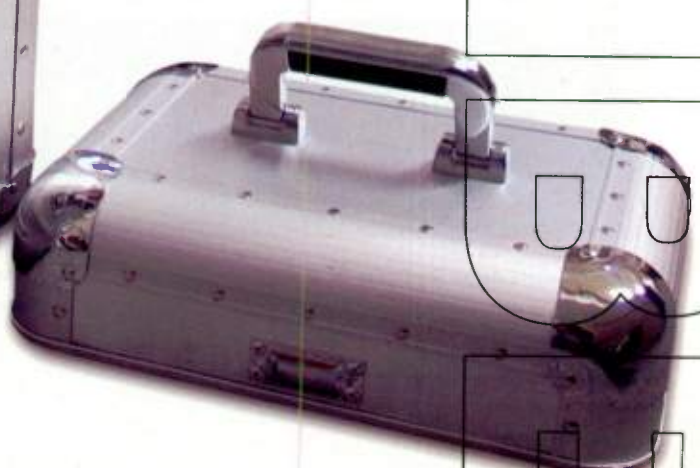

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But your audio may have more or fewer transients than it needs for this feature. For example, if you're extracting timing based on quarter notes, you may not have transients spaced exactly on quarter-note boundaries. To help matters here, Sonar provides Sensitivity and Threshold sliders. The Sensitivity slider enables only the transients that fall near musical intervals (you determine the interval). The Threshold slider enables only the transients above a certain volume level.

You can also enable or disable individual transients or insert new ones if the Threshold and Sensitivity sliders don't finish the job. A transient marker can even be "promoted" to prevent it from being disabled by the Threshold and Sensitivity sliders. That gives the marker a special status that makes it immune to the effects of the sliders. (You would do this, for example, when you know that a particular transient is falling on the beat.)

AudioSnap's Extract Timing feature works well on percussion and other parts with a well-defined rhythm. But I tried manipulating an acoustic piano solo and had a little trouble finding a set of transients that fell on regular musical intervals, which is what AudioSnap depends on.

After a bit of tweaking, I finally arrived at a set of transients that fell only on the first downbeat of each measure. But then I discovered an omission in the Extract Timing feature: my piano solo was in 6/8 time, meaning that each of my transients was spaced a dotted half note apart. Unfortunately, there is no option to use dotted half notes as the expected pulse duration for timing extraction. (Cakewalk is aware of this problem and plans to address it in a future update.)

Quantifiably Speaking

When your audio track is lined up with Sonar's beats and bars, the real fun begins. Now that the program has an idea of the relationship between the audio transients and the timing of your music, the beats *within* this audio track can be manipulated. If your drummer wasn't playing right on the beat, you can fix the performance. Or maybe you'd like to transform a straight rhythm to one with swing. Both things are possible with AudioSnap's Quantize feature, which works essentially the same way as quantizing a MIDI track. The AudioSnap palette supports both the traditional and groove forms of quantizing.

FIG. 2: Sonar's Active Controller Technology provides excellent support for Edirol PCR controllers. Also available is a generic ACT surface that supports many common controllers.

FIG. 3: Sonar's redesigned Synth Rack provides access to common settings in your software synths. You can establish easy access to the synth settings of your choice directly in the Synth Rack.

Or perhaps you like the feel of the original performance and want your *other* tracks to fall in line. AudioSnap can do this too. To perform this operation, you add the transients from the source track to the Pool (which allows them to be used by other tracks). Now go to the track you want to change, and select Quantize To Pool in the AudioSnap dialog box.

When you Quantize To Pool, you are quantizing to the reference track's transients, just as you quantize to established musical intervals in traditional quantizing or to a previously saved groove in groove quantizing. You have control over both the strength and window threshold of the quantizing operation, and you can perform the operation on both audio and MIDI tracks. With audio tracks, you are moving portions of the audio. With MIDI tracks, you are moving the MIDI events.

I used this feature to align the bass and snare drums of a recording with the acoustic piano part. Instead of these instruments playing a straight rhythm, the bass and snare emphasis aligned with the accents of the piano part, which really tightened up the performance. I also used AudioSnap to clean up a sloppy performance after the fact (see **Web Clips 1 and 2**).

AudioSnap has other features as well. You can have audio clips stretch automatically to follow changes in tempo, split beats into individual clips, or extract MIDI events for use in establishing a reference for groove quantizing. (Only the timing of the audio transients—not the specific pitches—is written as a series of MIDI note messages. AudioSnap is not a pitch-to-MIDI converter.)

Control Freak

Software synths and plug-in effects are more popular than ever, as are hardware control surfaces that give you real knobs and sliders to turn. But as your projects

contain more tracks, more software synths, and more plug-in effects, you begin to run out of knobs and sliders. It becomes tedious to constantly map and remap the knobs you see on the screen to your hardware controls.

That's where Sonar's Active Controller Technology (ACT) comes in. ACT maintains the bindings between the controls on the screen and the controls on your desk and switches them appropriately as you change tasks in Sonar. So while you're working in the Track or Console view, your hardware knobs and sliders control track levels and panning. Switch the program's focus to a soft synth, and those same knobs and sliders will automatically start controlling filter cutoffs and LFO speeds.

Edirol PCR controllers have a particularly nice ACT implementation in Sonar (see Fig. 2). An onscreen visualization lets you see exactly what each button, rotary control, and slider maps to. You can also see the current value of each control. As you change context in Sonar, the control labels and values change instantly as well.

If you don't have an Edirol PCR controller, you'll probably use the generic ACT MIDI Controller surface, which provides essentially the same functionality for hardware devices with up to 16 continuous controllers and eight buttons. By default, the ACT MIDI Controller shows you eight buttons, eight buttons with a shift key, eight sliders, and eight rotary controls (a common configuration). Unlike the Edirol PCR surface, the generic ACT surface provides the capability to learn which MIDI message corresponds to which control (the Edirol mappings are predefined for use by this specific family of controllers).

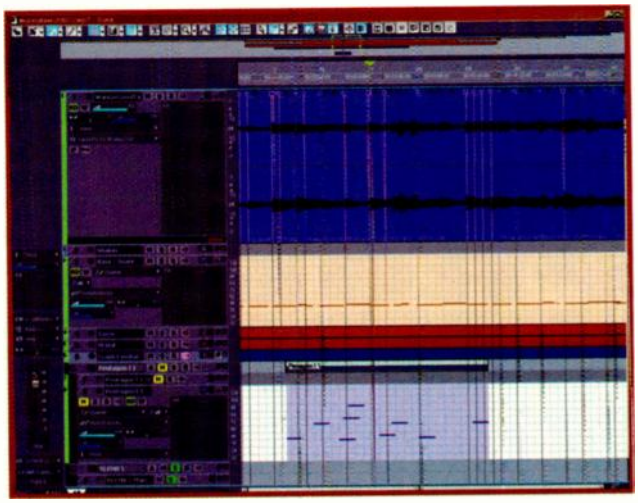

FIG. 4: Sonar's Track view received cosmetic and usability enhancements, including more control over clip placement and indicators to show which hardware device controls which track.

Multiple Personalities

Both of these ACT controllers provide up to four banks of controls, so your eight sliders can really control up to 32 different things in a given context. You can map a button to do the bank switching or do it onscreen. When you're focused on the Track or Console view, you can choose whether the controls apply to the tracks, buses, or mains. You can also choose whether your rotary controls manipulate a single parameter across all tracks or multiple parameters within a single selected track.

Note that ACT does not support DXi-only plug-ins (the included TTS-1 synthesizer, for example). For those plug-ins that are supported, each has a default set of controller mappings that is easy to change. Simply click on the Learn button, touch multiple controls on the screen, touch multiple controls on your hardware, and click on the Learn button again. The assignments are made in the order in which the controls were touched.

You can exclude commonly used controls (such as transport controls) from ACT so that their mappings stay consistent. You can also temporarily lock the current context so that it doesn't change when you switch to other windows.

I think ACT is a wonderful addition to Sonar, but I wish Cakewalk would have taken the implementation just a bit further. Only the Edirol PCR and the generic ACT surface provide what I could consider to be complete ACT capabilities. (The original Cakewalk generic surface interface received limited support for 16 ACT parameters, but I found these to be undocumented and cumbersome to use.)

Cakewalk has had dedicated support for specific hardware control surfaces for some time, but many of the models that Cakewalk supports, such as the CM Labs MotorMix, Mackie's HUI, and the Cakewalk/Peavey

SONAR 6.2

Right at the end of the review period for Sonar 6, Cakewalk released Sonar 6.2 as a free upgrade to registered 6.x customers. I wasn't able to put the new version through its paces, but some of the new features on the list certainly appear to be worth mentioning.

AudioSnap received automatic fill and crossfade capabilities, which should be useful as audio clips are now quantized without being time-stretched. You can also specify fractional beats in the Set Measure Beat At Now option, which is very effective for working with syncopated alignments. Active Controller Technology now has dedicated configurations for several additional hardware controllers (unfortunately, my StudioMix controller still isn't on the list). ACT also received support for additional MIDI messages and import/export capabilities for the settings.

Other notable features in Sonar 6.2 are support for Windows Vista, X-Ray windows (which stay visible but become see-through and immune to keyboard presses and mouse-clicks), and quantizing during MIDI import. You can find the complete list of new features on Cakewalk's Web site.

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StudioMix controller, received no ACT capabilities whatsoever. And unfortunately, I couldn't use my StudioMix controller with the generic ACT surface because the latter doesn't support the NRPN messages the StudioMix emits. (Cakewalk has enhanced ACT in version 6.2, which was just released. See the sidebar "Sonar 6.2" for details.)

Perhaps the most significant new feature in Sonar 6 is AudioSnap.

Rack It Up

When working with soft synths, I often wind up with a ton of open windows and a cluttered screen. (The new X-Ray windows in version 6.2 are intended to help in this regard.) Sonar's redesigned Synth Rack helps prevent clutter problems (see Fig. 3). Each soft synth appears with its own icon in the Synth Rack, complete with mute, solo, and freeze controls. You can access preset and automation settings from here as well, and even choose which track the synth's automation is written to.

But my favorite new Synth Rack feature is the assignable controls. Any control you choose from the soft synth can be inserted directly into the Synth Rack, providing easy access to that control without opening the synth's property page. What's more, clicking on the synth changes the context in your ACT-enabled hardware controller—an even easier way to change the setting.

There are other enhancements to help keep your plug-ins in order. Preset menus are now unified, which puts your most recently used presets, VST presets, Cakewalk presets, and user presets all in one place. And an enhanced plug-in manager lets you customize the arrangement of your plug-ins in folders and subfolders.

Cosmetic Surgery

The remaining enhancements in Sonar 6 are really too numerous to mention, but I'll try to hit the highlights. Menus, toolbars, and the large transport control became customizable, automation controls have been made consistent, and the Console view received usability enhancements. The Snap-to-Grid dialog box now

supports multiple resolutions at once and can remain open as you work in the Track view.

The Track view received cosmetic and usability improvements (see Fig. 4), including a time ruler that can display measures, SMPTE, samples, and milliseconds simultaneously. Clips can be locked into place and set to absolute time positions, which is useful for syncing to video events. A Where Am I display shows you color-coded bars, indicating which hardware controller is affecting a particular track or bus. You can also drag the bars to change the assignment.

Cakewalk also threw in some new goodies that are exclusive to the Producer Edition. The VC-64 Vintage Channel offers a warm analog-style channel strip that includes dual EQ and compressor stages, a noise gate and de-esser, and professionally designed presets. Cakewalk's Session Drummer also received an overhaul; it provides a large collection of sampled instruments and drum patterns for a variety of musical genres.

Rounding out the notable enhancements are support for file versioning, 64-bit audio importing, additional track controls in the Staff view, and improved mouse-wheel support. The product's documentation is solid, although the complete printed reference manual has been replaced with a much thinner user's guide that covers only the basics and new features (you can still purchase the full reference manual on Cakewalk's Web site).

All in all, Sonar 6 represents yet another solid upgrade from a company that consistently improves its products. AudioSnap and ACT by themselves make the upgrade worth the price. And if you haven't yet given Sonar a try, now is a great time to have a look.

EM WEB CLIPS

Allan Metts is an Atlanta-based musician, software/systems designer, and consultant. Check him out at www.sonicbids.com/AllanMetts.

PRODUCT SUMMARY

CAKEWALK Sonar 6 Producer Edition

digital audio sequencer
$619

FEATURES	4
EASE OF USE	4
QUALITY OF SOUNDS	4
VALUE	4

RATING PRODUCTS FROM 1 TO 5

PROS: Powerful quantizing and time adjustment in the audio realm. Hardware control that follows your work flow. Cosmetic and usability enhancements.

CONS: Incomplete Active Controller support for legacy hardware devices. No dotted note support in AudioSnap extract timing.

MANUFACTURER
Cakewalk
www.cakewalk.com

FIG. 1: The Konnekt 24D offers superior sound quality, built-in effects, and flexible I/O options.

TC ELECTRONIC Konnekt 24D (Mac/Win)

A FireWire audio interface with built-in effects.

By Mark Nelson

TC Electronic's Konnekt 24D is an impressive new 24-bit, 192 kHz FireWire-based audio interface. It features two outstanding mic preamps, stellar audio converters, a wide range of I/O (up to 14 ins and 14 outs, including ADAT/Toslink and S/PDIF digital connections), anti-jitter technology, and direct hardware monitoring. You also get two high-quality built-in effects, designed for use in both tracking and mixing scenarios. The unit can also function as a standalone digital mixer.

The Konnekt 24D handles monitoring in a couple of interesting ways.

Konnekt It Up

The Konnekt 24D's front panel (see Fig. 1) has two combo connectors that each accept XLR or ¼-inch jacks. Each input has a switch labeled Pad/Inst, which behaves differently depending on what's connected to it. Plug in a mic, and it attenuates the signal by –20 dB; plug in an instrument, and it routes the signal through a separate high-impedance input stage. Each front-panel input has a gain/trim pot and 3-stage input LEDs. A front-panel switch globally turns on the 48V phantom power; there's no status light for that switch on the unit itself, but there is one on the software control panel. The mic pres sound clear, clean, and detailed.

The rear panel (see Fig. 2) sports four balanced ¼-inch analog outputs and four balanced ¼-inch analog inputs. The Line In button switches the active inputs for channels 1 and 2 between the front- and rear-panel jacks; this is handy if you have a sound module or some other source you don't use often. The 24-bit S/PDIF I/O can be configured as a digital insert. ADAT Lightpipe I/O can accommodate up to eight channels. If you want to use both ADAT and

S/PDIF, your ADAT channel count drops to six.

The Konnekt 24D has no word-clock I/O, but it can lock to external clock using its digital inputs. According to TC Electronic, its new DICE chip and antijitter technology create a very stable platform. I can attest that the converters sound worlds ahead of just about everything else in this price range. (TC also offers the less expensive Konnekt 8 [$375], which has a lower I/O count and no built-in effects.)

For the ultimate in portability, the unit can operate on FireWire bus power. However, I was unable to get the bus powering to work reliably on my aging Apple iBook, nor did it work on my G5 desktop. According to TC Electronic's tech support, many computers, particularly laptops, do not meet the FireWire bus-power specs. Be sure that yours does before taking the Konnekt 24D into the field. Be aware that when running on bus power, using the phantom power will accelerate the rate of battery drain. For in-studio applications, the Konnekt 24D can be powered with its included 12 VDC adapter.

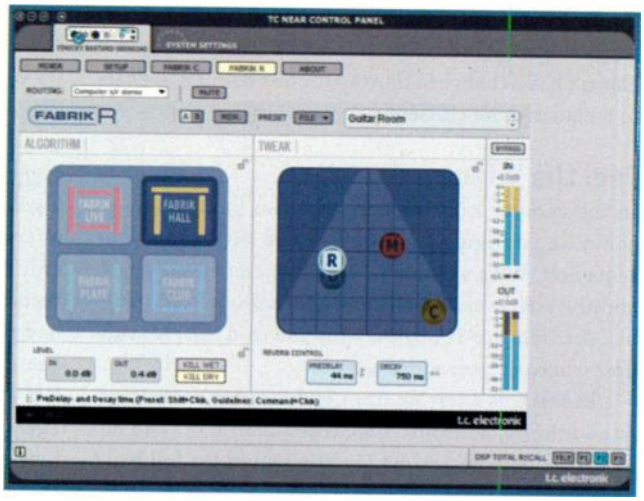

FIG. 3: The two built-in effects—the Fabrik R reverb (shown here) and the Fabrik C channel strip—can be tweaked using the software control panel.

In the Cans

The Konnekt 24D handles monitoring in a couple of interesting ways. First is the analog output-level control. Unlike the digital controls found in most interfaces, the Konnekt's output level comes after the converters, ensuring that you will hear all your precious bits. Two headphone jacks let you and a colleague listen simultaneously. The upper headphone jack instantly mutes the main outputs, so you don't have to turn off the monitors when tracking.

The Source Level knob controls the level or pan of the various input channels. It's encircled by bright red LEDs, referred to as the Light Ring, which gives a good visual indication of your settings. The Ch Select button lets you choose which input to adjust. You can select channels 1 and 2 and the channel 3/4 stereo pair, or a User option that recalls assignments made using the TC Near Control Panel software. One very handy feature: three user patches with all your software settings are instantaneously available, even when the device is in standalone mode.

The Konnekt 24D's direct-monitoring option lets you listen without latency. What makes it a cut above what you get with many other audio interfaces is the Fabrik R reverb—the same innovative reverb found in TC's PowerCore effects system—and Fabrik C channel strip. These effects are part of the Konnekt 24D's built-in DSP, so they'll work even when the unit is in standalone mode. When it comes time to mix, both effects can be accessed as plug-ins by any recording software that supports VST.

Konnekt the Dots

The TC Near Control Panel software is the heart of the system. Here you change routings, adjust effects parameters, set the sampling rate and clock sources (in most Mac applications, you set these in your DAW), and tweak the presets to be recalled from the device.

The initial version of the software that I tested (1.03) required a lot of CPU power—TC recommends at least a 1 GHz PowerPC or Intel Mac or a 1.6 GHz Pentium 4 PC. I experienced glitches and audio dropouts in several audio applications on my 2.1 GHz Apple iMac G5. Running MOTU Digital Performer 4.6, audio playback became unstable as I added the TC effects or upped the track count. In Steinberg Cubase LE or Apple GarageBand, opening a second application (such as Adobe Acrobat, needed to read the Konnekt manual) led to audio dropouts.

A TC product specialist confirmed my hunch that these glitches were likely related to the CPU drain from the TC Near

FIG. 2: Other than the front-panel combo jacks and the headphone outputs, the Konnekt 24D's I/O is all located on its rear panel.

Control Panel software. A new driver (version 1.10) became available just as this story went to press; I haven't had a chance to thoroughly test it, but it appears to be much more efficient.

Feel the Effects

In the version 1.03 software, the two built-in effects could be configured as send/return effects in your sequencer. With version 1.10, the scheme has changed and the effects now appear as conventional VST plug-ins. According to TC, by the time you read this, AU support will have been added as well.

Fabrik C is a terrific front end for your recordings. In addition to a flexible 4-band parametric EQ and de-esser, the compressor may be configured for full-band or 3-band operation. Taking advantage of standalone operation, I used the Konnekt 24D as both an acoustic guitar DI, and as a mic pre with the effects optimized for my vocal idiosyncrasies on a gig.

PRODUCT SUMMARY

TC ELECTRONIC Konnekt 24D

FireWire audio interface with effects
$625

FEATURES	4
EASE OF USE	3
AUDIO QUALITY	4
VALUE	4

RATING PRODUCTS FROM 1 TO 5

PROS: Excellent mic preamps and A/D/A converters. Built-in effects add value. Many I/O options.

CONS: Bus powering doesn't work on all FireWire-equipped computers. No word clock.

MANUFACTURER
TC Electronic
www.tcelectronic.com

Fabrik R sounds great. It's far richer and more transparent than all but the best high-end native reverbs. I really like that it can be used with Konnekt 24D's direct monitoring (nothing turns off a singer faster than a dry vocal). I wouldn't hesitate to use Fabrik R on a mix, either. It's that good.

The unusual interface design shared by the Fabrik effects is a model of simplicity: instead of tweaking dials and inputting numbers, you just grab a colored ball and move it around a triangular grid (see **Fig. 3**). Considering that the PowerCore versions of these two effects retail for $375 each, their presence adds tremendous value to the Konnekt 24D.

Another addition in the version 1.10 software is Konnekt Tuner, a guitar tuner. You can tune onscreen as part of the control panel, or on the front of the interface itself, with the Light Ring serving as the display.

You Will Be Assimilated

Konnekt 24D owners are entitled to download TC's Assimilator Konnekt plug-in, a match EQ that can be accessed only through the software control panel. Assimilator analyzes the sonic fingerprint of a reference file and applies it to another—in essence letting you clone the EQ of the source file. If you have ever tried to match your mix to the sound of a commercial CD, you'll appreciate this effect.

I was skeptical, so I gave it a hard test. As a reference, I took a guitar track recorded and mixed by a golden-ears engineer using the kind of boutique microphones and gear we home-studio owners can only dream about. Then I applied it to a similar track recorded at home on an inexpensive desktop DAW I had reviewed earlier (see **Web Clips 1a through 1c**). Same guitar, same player, vastly different recordings. Did the Assimilated track sound as good as the reference? No, but it sounded terrific. I could not believe how much Assimilator improved the recording—all the woodiness and harsh midrange I had struggled to tame vanished in a flash. I'm curious to hear how Assimilator will work on better material.

Assimilator Konnekt operates as a normal VST plug-in. Although it is not mentioned on the download page, you need TC's VST wrapper application to use it as an AU effect.

Konnektions Are Everything

Overall, you get a lot with the Konnekt 24D. The stellar mic preamps and quality converters provide impressive sound quality. The flexible and plentiful I/O is more than ample for most small studios. (Although I did not test it, multiple units can be daisy-chained to increase I/O count without sacrificing direct monitoring.) Assuming your laptop has sufficient bus power, the Konnekt 24D is an excellent solution for a portable recording rig. The unit's ability to handle high sampling rates and its stable clock are also pluses. However, the lack of word clock might be an obstacle in some setups.

The built-in Fabrik C and Fabrik R effects add a lot, and when you factor in Assimilator Konnekt, you have almost $1,000 in extra value. The effects are so good that I would be willing to buy a Konnekt 24D for them alone.

With the version 1.10 software, the Konnekt 24D's performance appears to be greatly improved. On the downside, I had to try numerous stupid computer tricks like rebooting, cycling power on and off, and unplugging and replugging the USB cable before I could get the 1.10 TC Near Control Panel software and the Konnekt 24D to recognize each other. TC promises additional software fixes in the near future, as well as the aforementioned AU support. Assuming the company delivers, the Konnekt 24D could well become the benchmark audio interface for small and not-so-small studios.

EM WEB CLIPS

Mark Nelson is the author of Getting Started in Computer Music *(Thomson Course Technology, 2005).*

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FIG. 1: The Control Room Mixer lets you feed your musicians independent mixes.

STEINBERG Cubase 4.0.1 (Mac/Win)

Cubase takes a big leap forward.

By Marty Cutler

Digital audio sequencers have become increasingly complex, replicating most recording-studio components in virtual form. First, audio recording found its way into the sequencer, taking on much of the nonlinear nature of MIDI editing. A few years later, Steinberg introduced Virtual Studio Technology (VST), which replaced racks of outboard processors with virtual effects plug-ins. Shortly after that, the company added VSTi: synthesizers that load into a virtual rack. Never content to rest on its laurels, Steinberg has imbued Cubase 4 with significant new features and a redesigned user interface while retaining enough familiarity to keep longtime Cubase users happy.

You'll find reviews of previous versions of Cubase in the October 2003, May 2004, and March 2005 issues of EM, all of which you'll find online at www.emusician.com. Furthermore, an excellent collection of tutorials called *Personal Studio Series: Mastering Cubase 4* has just been released in collaboration with Thomson Course Technology. Here I'll focus on the new features in Cubase 4, the flagship of Steinberg's line of sequencers.

Installing the program is easy. Authorization requires a Syncrosoft USB key (included), which you must activate online. I've never been a fan of hardware copy protection, but I do like the fact that I can use the program on multiple USB-equipped Mac and Windows computers. For this review, I tested Cubase 4.0.1 on my 3.06 GHz Windows XP notebook with 1.5 GB of RAM and an M-Audio Ozonic audio interface, and on my 1.42 GHz dual-processor Power Mac running Mac OS X 10.4.8 with 2 GB of RAM and a MOTU 896 audio interface.

Cue Ball

Steinberg maintains its tradition of moving outboard real estate inside the computer with Cubase 4's new Control Room feature. If you run a MIDI studio in your bedroom and record live performance only occasionally, Control Room may not be a big deal, but it is tremendously useful if you need to monitor different audio sources or feed independent cue mixes to several musicians.

You click on the Studio tab in the VST Connections panel to set up a virtual control-room console. Once that's set up, you use the Control Room Mixer panel to choose whether to feed an individual musician the main mix, aux send, click track, or talkback (see Fig. 1). Control Room preferences include the options to automatically reduce the level of the cue mix during talkback

and to set an optimum gain reduction. The Control Room Overview window displays a schematic diagram of the signal flow you have set up. The display highlights in green any changes you have made to the Control Room Mixer.

The Bay Area

The Cubase 4 MediaBay and the SoundFrame Universal Sound Manager let you combine and organize diverse media under a single browser-style interface. Media includes MIDI files, audio files in a variety of formats, synthesizer patches from hardware and software instruments, and even video.

SoundFrame resembles Apple GarageBand's easy-to-use browser (see Fig. 2). You can select sounds by category (bass, pad, keyboard, and so on), subcategory (such as African, beats, and drum set), and style (alternative, blues, and electronica, for example). You can further refine your search by character and personal rating. A set of icons lets you filter by media type, so if you want to import a loop, a MIDI file, or an amp-modeling VST effects preset, it's easy.

Furthermore, you can integrate all your third-party plug-ins and hardware instrument presets. The Tag Editor lets you assign attributes to new items, and you can even create your own attribute tags. You can audition virtually anything, including audio files and plug-ins and their associated presets, without ever leaving the context of the track you're working on. That's a terrific way to streamline the creative process.

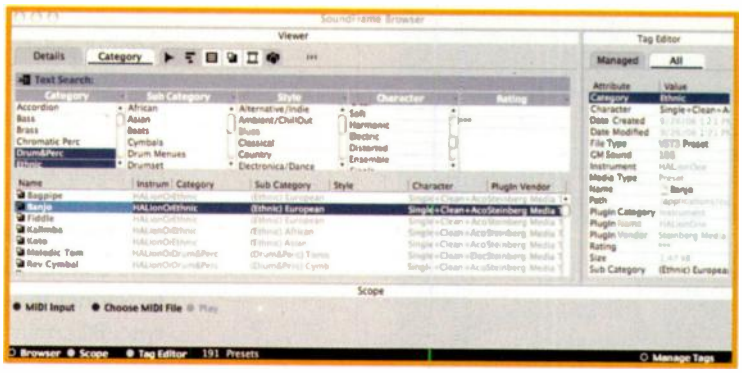

FIG. 2: SoundFrame organizes audio, video, MIDI, and hardware and software instrument and effects presets into a single browser.

Into the Mystic

Arguably the most compelling additions to Cubase 4 are its four new synthesizers: Mystic, Prologue, Spector, and HALion One. These instruments are a major advance

over earlier Cubase plug-ins in terms of programmability and sonic resources. Although there's plenty to keep you busy creating your own sounds, the new instruments' control panels avoid visual overload with a clean and intuitive design. All the new instruments except HALion One have a lower panel with rectangular buttons to access parameters for two LFOs, four envelopes, modulation, and effects. The presets are well done, giving good examples of each instrument's considerable potential for rhythmic and timbral motion.

Mystic uses a combination of impulses, comb filters, and feedback delays in an approach similar to some types of physical modeling—albeit with results that can often sound more otherworldly than real (and that's a good thing). Each of the two oscillators has a drop-down menu to select a waveform. The waveform's spectrum is then displayed in a window where you click-and-drag to customize the level of each partial. For a gentler tweak, you can adjust the filter and the envelopes. Sounds range from impressions of giant, coruscating glass-harmonica ensembles to short, percussive guitar-Clavinet hybrids (see **Web Clip 1**).

Prologue is a 3-oscillator, analog-modeled subtractive synth. A simple interface masks the instrument's capabilities; it has plenty of sound-shaping tools. In addition to the usual suspects, you get a variety of special oscillator waveforms such as formant, vocal, and partials configurations. A Wave MOD control adds a phase-shifted copy of the waveform to itself for phase cancellation and reinforcement effects.

Prologue also gives you FM and oscillator sync, and you can turn oscillator keyboard tracking off, which is particularly useful with FM. For filters, you get 12, 18, and 24 dB lowpass, 12 dB notch and bandpass, and 12 and 24 dB highpass. The filters are conveniently arrayed in a wheel at the instrument's center. This synth is terrific at producing rich analog-sounding tones (see **Web Clip 2**).

PRODUCT SUMMARY

STEINBERG **Cubase 4.0.1**

digital audio sequencer
$999.99
upgrades from $199.99

FEATURES	4
EASE OF USE	4
QUALITY OF SOUNDS	4
VALUE	3

RATING PRODUCTS FROM 1 TO 5

PROS: Control Room can replace hardware mixer. SoundFrame integrates all relevant media. Terrific-sounding new synths. Instrument tracks combine VSTi, MIDI, audio, and automation in a single track. Clear and plentiful documentation.

CONS: Instrument tracks can't handle multitimbral instruments.

MANUFACTURER
Steinberg
www.steinberg.net

Spectral Diversions

Spector gives you up to six oscillator pairs with differing signal-flow arrangements and frequency relationships (see **Fig. 3**). Each oscillator in each pair is fed through a dedicated spectrum filter for further waveform shaping. You can edit the oscillator waveforms and the filter spectra by clicking-and-dragging across the spectra with the mouse. The sound-generation tools—and, not surprisingly, the sounds—are reminiscent of my beloved Kawai K-5000, which rests in my attic to make room in my studio.

Spector is capable of anything from analog synth emulations to swept, gauzy digital pads to throaty lead sounds (see **Web Clip 3**). The sonic fodder for Spector and Mystic is vast and ridiculously immediate owing to the editable spectrum displays and other onscreen controls.

HALion One is the simplest instrument in the new lineup; it's a

player for HALion presets. You can load any compatible HALion preset, and you can add to the factory library, which already has a nice collection of eminently playable instruments, including a GM set. HALion One gives you access to attack and release along with other patch-specific parameters such as cutoff frequency, resonance, preset-effects levels, and Velocity sensitivity. There is no deep editing here (for that you need the full version of HALion), but Steinberg's programmers have provided an excellent startup sample library.

Efficiency Experts

As part of the new VST3 specification, VST instruments and effects plug-ins can dynamically alter the number of buses based on the channel type they are assigned: surround, mono, or stereo. Any instantiated VST3 plug-in that is not producing sound does not drain CPU cycles. You can also save CPU cycles by defeating unused outputs of multiple-output plug-ins such as samplers.

The new Instrument track class is a great time-saver for single-timbre stereo instruments. You can insert such instruments with an associated MIDI track, automation, and audio output in one fell swoop. A handy parameter box lets you set up a batch of instruments along with their track and I/O assignments at once. However, to use several instruments and outputs on a multitimbral VSTi, you still need to use the VSTi rack and assign multiple MIDI tracks and channels, as well as audio outputs. Not surprisingly, none of the built-in instruments are multitimbral.

No sequencer that I'm aware of offers multitimbral instruments in its built-in collection. Nonetheless, plenty of third-party software instruments are multitimbral, and it would be a great convenience to have the option to include multitimbral setup capabilities within Instrument tracks.

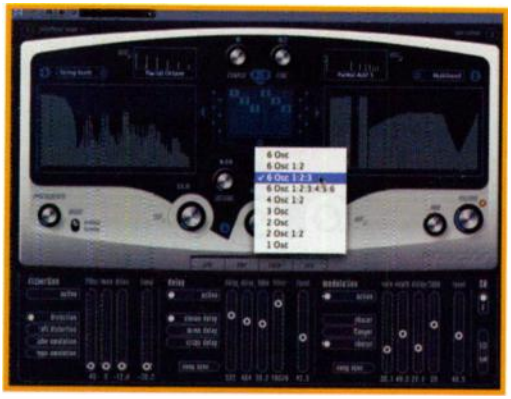

FIG. 3: You use Spector's Oscillator pop-up menu to set the relative tuning of up to six oscillator pairs.

Down by the Docs

Steinberg has reintroduced hard-copy documentation with *Getting Started*, an introduction to Cubase 4 and its sibling Cubase Studio 4, and a nearly 600-page *Operation Manual*. *Getting Started* is an excellent orientation to essential functions such as setup, recording audio and MIDI, and editing. It contains thorough explanations and lucidly written tutorials. When that isn't enough, there's plenty of online help, including a plug-in guide, remote controller information, a MIDI devices reference, a menu reference, and the entire *Operation Manual* in PDF format. Contextual help is also available at the tip of your mouse.

With Cubase 4, Steinberg has knocked the ball out of the park. MediaBay and SoundFrame provide a huge speedup in work flow. Control Room is a major milestone in centralizing the computer's role in the studio. The new synthesizers offer a fresh sonic contrast to the typical analog-modeling and sample-playback fare accompanying many software workstations. Devotees of earlier versions of Cubase owe themselves an upgrade. If you use other sequencing software, you should have a look at what Cubase 4 has to offer. I recommend it enthusiastically. EM WEB CLIPS

Marty Cutler will soon debut his new band, the Nigerian Banjo Scam. Kindly purchase your tickets in advance.

FIG. 1: The Onyx Satellite is a FireWire audio interface that hosts a preamp pod, which is removable for use in remote recording sessions.

MACKIE Onyx Satellite

This unique audio interface proves you can take it with you.

By Rusty Cutchin

Mackie's Onyx Satellite system is a computer audio interface with a twist—or, more accurately, a dock. The bulk of the unit consists of a base station that hosts inputs, connections, and monitoring controls. Nestled in a large top-panel slot is a compact preamp module that you can easily carry to a remote studio, live gig, or other location (see Fig. 1). You don't have to remove cables to take the module, which Mackie calls the pod, out of your studio. The pod has its own input connections for use at another site, and its onboard gain and volume controls serve the same functions whether docked or running independently, with one exception: when docked, two of the pod's knobs control headphone levels; when undocked, they control the levels of the control room outputs.

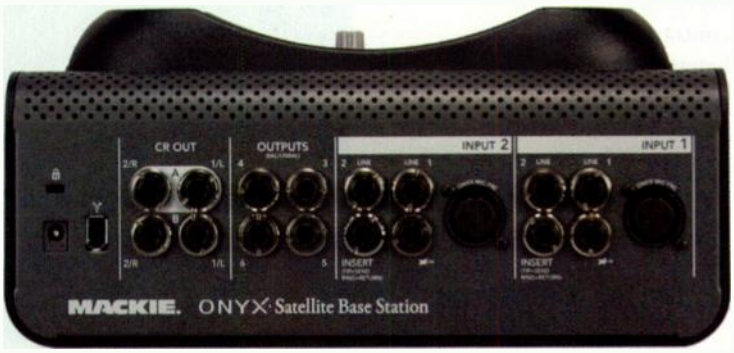

FIG. 2: On the base station, channels 1 and 2 each provide two line-level inputs, an instrument input, an XLR input, and an insert jack. Eight TRS output connectors allow you to set up a surround mix in your audio software.

Both dock and pod are clad in sturdy gray metal housings. When the pod is docked, it becomes part of the Onyx Satellite's top panel, which is angled about 22 degrees for easy access. The base station can be powered by a full-size FireWire port or the supplied 12 VDC wall-wart adapter. The pod can also run on bus power if your laptop has the standard FireWire connector. If the connector is the smaller 4-pin version, you'll need the wall-wart cable. The unit works with all WDM, GSF, and ASIO applications on PCs and with Core Audio–compatible software on Macs.

On the Launchpad

The base station's top panel gives you selection buttons for the unit's two input sections, A and B. You can connect mics, instruments, and line-level sources to the rear

GET IN THE ZONE

AND STAY THERE

FIRESTUDIO™

26x26 FireWire recording system with DSP mixer/router

Sweetwater customers have dozens of Firewire audio interfaces to choose from, yet FIRESTUDIO is among Sweetwater's best sellers. That's because Sweetwater recognizes that FireStudio is a cut above the rest. Utilizing next-generation technology, superior analog circuitry, XMAX Class A mic preamps, ultra-tight word clock with JetPLL™ jitter elimination technology, 52 channels of Firewire I/O and MSR remote capability, FireStudio has the hardware horsepower to be the center of any pro recording rig. Add rock solid Mac and PC drivers, zero-latency mixing/routing software and our ProPak software suite, and you've got an unbeatable system capable of putting you IN THE ZONE and keeping you there.

FEATURES

- High-speed FireWire (IEEE 1394) audio interface
- 24-bit resolution, up to 96k sampling rate
- 26 simultaneous inputs and outputs
- 8 XMAX Class A microphone preamps w/ trim control
- 8 analog line inputs, 2 instrument inputs
- 16 channels of optical ADAT I/O (8 ch. via 96k dual SMUX)
- S/PDIF I/O, MIDI I/O
- JetPLL™ – jitter elimination technology – improved clarity and imaging
- Zero latency DSP mixer/router

Monitor Station Remote (Optional)

- Talkback, dim, mute & mono
- 3 modes: track, surround, mix
- Speaker/input source switching
- Dual headphone amps

Control Console DSP mixer/router (Included)

PreSonus ProPak Complete Software Suite (Included)

- Cubase LE
- Reason Adapted
- Amplitube LE
- BFD Lite
- Drumagog LE

Plus over 2GB of plug-ins, virtual instruments, drum loops & samples!

panel and select the source from the top panel. Phantom power, input gain, and headphone controls are on the pod, as are two headphone outputs.

The base station's rear panel provides five connectors each for inputs 1 and 2: two ¼-inch line level, one ¼-inch instrument, one ¼-inch insert, and one XLR, which accesses one of Mackie's well-regarded Onyx mic preamps (see Fig. 2). Eight balanced ¼-inch outputs, the power-adapter receptacle, and a single FireWire connector complete the rear panel.

A few interesting features help the Onyx Satellite stand apart from standard-issue FireWire interfaces. On the base station, the Talkback section has two buttons: one that sends the operator-engineer's voice to the headphone outputs, and another that sends it to your audio software for *slating* (vocally identifying a track). A talkback mic is built right into the base station, behind three nearly invisible holes above the Talkback-level knob.

The Onyx Satellite offers convenient monitoring of stereo or surround systems. A switch on the base station's top panel lets you choose between configurations labeled 1–2, for basic stereo monitoring, and 1–6, for monitoring six discrete outputs on the rear panel. Four control room (CR) outputs let you connect two separate pairs of monitor speakers, and an A/B button lets you engage one or the other. When only one pair is connected, you can use the button as a mute switch.

Ready for Takeoff

A single 48V phantom-power switch provides current for condenser mics at the base station's rear-panel mic inputs. (Actually, the voltage is +34V, so some condenser mics could potentially lose headroom or wouldn't work at all, but Mackie has had no reports of such issues.) If you want to use electric guitars or other instruments with high-impedance outputs, you must engage buttons marked with guitar icons on both the pod and the base station; that's four buttons total if you have two guitars plugged into the two input channels.

FIG. 3: The pod's rear panel features two combo connectors, two control room outputs, and its own FireWire connector.

For each of the two inputs, select a signal source by pressing one of the four buttons marked Mic, 1, 2 (for line 1 and 2), or with a guitar icon. Note that pressing a button does not disable the others on either channel. Although you can press all four to simultaneously activate four inputs on one channel, the signals don't intermingle cleanly. An electric guitar I connected seriously degraded the sound of a dynamic mic plugged into the same channel. However, when I plugged a synth and a guitar processor into the line-level inputs, I heard no degradation.

Pulling the pod out of its dock leaves you with what must be one of the smallest FireWire interfaces around, but with the all-important Onyx preamps and monitoring functions intact. The pod's rear panel features two combo connectors, two CR outputs, a FireWire connector, and the exposed female multipin plug that connects the pod to the base station (see Fig. 3).

The pod's remaining features include two 4-stage LEDs for monitoring levels and two more indicating that the unit is powered up and has an active FireWire connection. When undocking the pod, remember that it gets very warm after prolonged operation in the base station. And don't forget to always mute your speakers and power down the Onyx Satellite before removing the pod; otherwise, you could damage the unit and your speakers, or at least hear a loud, unpleasant pop.

A FIX FOR NOISY G5s

Unfortunately, certain Macs emit unwanted noise, including a high-pitched whine, when an audio interface is connected to a FireWire port. As soon as I connected mine, this indeed was the case. I began the often-aggravating task of trying to isolate the noise problem.

As I had suffered this problem before with other FireWire interfaces, I was thrilled to find that the fix was relatively easy. Many users had reported online that a suite of programs for Mac developers, the utilities in CHUD Tools (available at http://developer.apple.com/tools/download), adds a Processor panel to your System Preferences that eliminates this noise with one click. Interested Power Mac G5 users can get more info at www.xlr8yourmac.com/G5/G5_noise_tips.html. I installed the utilities, opened the new panel, and clicked on the designated box, and my Mac became quiet as a mouse.

Countdown

The Onyx Satellite was consistently easy to use and delivered dependably high-quality sound. Although PC users must load drivers from the included CD-ROM (Windows XP SP2 is required), the Satellite is ready to run in Mac OS X 10.3.9 and later. Setup was a breeze, and was slowed only by a condition that affects owners of certain Power Mac G5s (see the sidebar "A Fix for Noisy G5s").

I connected my powered monitors to the Onyx Satellite's control room A outputs. I plugged a keyboard synth's stereo outputs into

input 1 of channels 1 and 2 and a guitar directly into the instrument input of channel 2.

Although the Onyx Satellite includes Mackie Tracktion 2, I was curious to see how well it worked with MOTU Digital Performer (DP). With the Control Room section's Source switch set to Inputs and with converted audio passing directly to the CR outputs, the Onyx Satellite sounded very clean, with lots of headroom. Switching the Source button to DAW, I set up DP to record some stereo tracks. The program defaulted to a 64-byte buffer setting and 44.1 kHz resolution (the Satellite itself is set to 48 kHz at power-up). When I pounded on my keyboard, I could hear no difference between monitoring in the Satellite's direct-input mode and monitoring through a stereo track in DP. (There's no mix control or other option for directly monitoring an input while listening to recorded tracks, but FireWire speed and the unit's design should make latency a nonissue in most applications.) A couple of quick vocal takes with a Studio Projects C3 condenser mic confirmed clean audio, problem-free phantom power, and unnoticeable latency.

Into Orbit

After enjoying the Onyx Satellite's smooth operation with the pod docked, I powered down the unit and slid the pod out of its receptacle. I switched the cables feeding my monitors from the base station's CR outputs to the pod's CR outputs and connected a FireWire cable to my upgraded Apple PowerBook G3 Pismo. The Pismo is definitely getting long in the tooth for serious audio work, but the pod connected smoothly and exhibited the same strong audio quality running from the laptop's FireWire bus.

In a real-world situation, of course, I would keep the laptop's and the pod's power cables both connected whenever possible, but for relatively quick field recording, the pod appears to work well with modern laptops that have strong batteries and full-size FireWire connections. In fact, the Onyx Satellite may have the best mic preamps available in a FireWire unit this size. I captured a vocalist at her house using the pod and laptop, transferred the recorded vocal tracks back to my G5 over Ethernet, and slid the pod right back into the base station for guitar overdubs—pretty nifty.

PRODUCT SUMMARY

MACKIE Onyx Satellite

FireWire audio interface
$519.99

FEATURES	4
EASE OF USE	5
AUDIO QUALITY	4
VALUE	4

RATING PRODUCTS FROM 1 TO 5

PROS: Easy setup. Excellent sound quality. Removable preamp pod. Surround monitoring. Built-in talkback mic.

CONS: Phantom power may not be adequate for certain mics. No way to directly monitor an input while playing tracks.

MANUFACTURER
Mackie
www.mackie.com

Touchdown

Mackie, which has made smooth transitions from its early triumphs with analog mixers to products such as monitors and digital recording devices, appears to have another winner with the Onyx Satellite. The unit should appeal primarily to users who do a lot of off-site recording and need to maintain preamp consistency. If you need to record overdubs with musicians at various locations or run out for a quick interview to top off a Podcast, the Onyx Satellite delivers a ton of flexibility for a very reasonable price.

Rusty Cutchin is a former editor of EM and a producer, engineer, and music journalist in the New York City area.

FIG. 1: Massive's outsize control panel puts all controls at your fingertips. Color-coded modulation routings make unraveling patches easy.

NATIVE INSTRUMENTS Massive 1.1 (Mac/Win)

A sparkling new synth that lives up to its name.

By Len Sasso

Massive 1.1, the latest behemoth virtual instrument from Native Instruments, lives up to its name in several ways. Its morphing wavetable oscillators give you a huge starting sound palette. Filters, effects, and a flexible signal path can bend those sounds to your every need. Envelopes, LFOs, sequencers, and MIDI remote control bring your sounds to life, and a categorized browser gives you easy access to more than 500 factory presets. All this coupled with a high-resolution audio engine for aliasing-free wavetable interpolation comes with a massive CPU hit and a somewhat outsize control panel (see Fig. 1).

Massive will run standalone or as a plug-in under both Windows and Mac OS X. VSTi, DXi, and RTAS plug-in formats are supported on the PC; AU, VSTi, and RTAS formats are supported on the Mac. The Mac version is Universal Binary and, therefore, Intel ready.

For this review, I tested Massive on my dual 2 GHz Power Mac G5 running Mac OS X 10.4.8 and on my 3.2 GHz Pentium 4 laptop running Windows XP. It performed well both standalone and as a plug-in in several hosts on both machines. Because Massive's audio thread always runs on a single processor, or on a single core of a dual-core processor, you'll need a fast CPU to get high polyphony from the synth's more demanding presets. But choosing the lowest of its three quality settings (Ultra, High, and Eco), freezing tracks if your plug-in host supports that, and using multiple instances of Massive to distribute the processing on multiple-processor machines will significantly improve performance.

More than Meets the Eye

At first glance, Massive looks like a fairly standard subtractive synth: three oscillators followed by filters followed by an output section consisting of an amp and two effects. For modulation you get envelopes, LFOs, pattern sequencers, and MIDI remote. A closer look reveals a dedicated Modulation oscillator, a noise generator, a feedback circuit, a couple of insert effects, and a Macro Control section. Interesting but not that out of the ordinary. It's only when you dig into Massive's individual modules and beneath-the-surface features that you begin to see and hear how different this synth really is.

Massive belongs to the burgeoning category of semimodular soft synths. You get considerable leeway in reorganizing the signal path, but you don't need to wire it from the ground up, and logical limitations are in force. The Routing tab of the Central window reveals the signal flow, and you click on various icons to change

things around (see **Fig. 2**). For example, clicking on one of the B (bypass) icons routes the associated oscillator or noise generator directly to either of the master effects or to the EQ. Clicking on the Ins 1 and Ins 2 icons controls where the insert effects appear in the signal path. And clicking on one of the FB (feedback) icons determines where the feedback signal originates.

Several of Massive's sliders also affect the signal path. The oscillators, noise generator, and feedback circuit all have sliders for balancing their output between the inputs to Massive's two filters. The filter section's F2 slider balances the input to filter 2 between the output of filter 1 and the mix of the sound sources allocated to filter 2. For instance, with the F2 slider all the way up, the filters are in series, and filter 2 does not receive any of the source mix. With the slider all the way down, the filters are in parallel, and filter 2 receives only the source mix. In intermediate positions, filter 2 receives a portion of both signals. The filter section's Mix slider balances the output of the two filters to the output section. That means you can arrange the filters in series and still use the Mix slider to balance their outputs.

Direct from the Source

Massive's morphing wavetable oscillators are the heart of this synth. Each wavetable consists of between 2 and 128 single-cycle waveforms. These are actually multi-wavetables with different wavetables used for different pitches (similar to multisampling), resulting in nearly aliasing-free operation. The 89 wavetables are allocated among 4 categories: Basic, Analog/Electric, Digital/Hybrid, and FX/Chord. You select an oscillator's wavetable using a drop-down menu. The menu's 128-slot capacity suggests that more wavetables may be on the way. Additional banks of wavetables and a utility for creating your own would be welcome additions, though the 89 provided are plenty to keep you busy.

An oscillator's Wt-position knob chooses a waveform from the selected wavetable, and there are lots of ways to modulate that knob to morph between the waveforms in the wavetable. An Intensity knob controls waveshaping-like processing of the oscillator's output, and three modes are available: Spectrum, Bend, and Formant. Spectrum and Formant apply lowpass and formant filtering, respectively. Three varieties of Bend modulate the waveform scanning rate based on the position within the waveform. That can radically change the harmonic spectrum of the output.

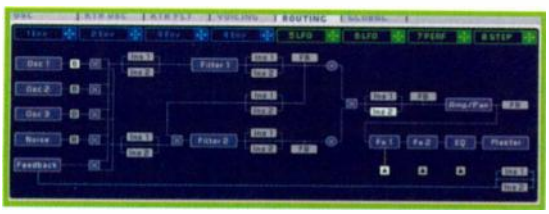

FIG. 2: You can reconfigure Massive's signal path by clicking on the icons in the Routing tab of the Central window.

FIG. 3: The sustain stage of Massive's envelopes allows you to morph between pairs of preset shapes and loop the chosen shape a fixed or unlimited number of times.

A new virtual-analog oscillator mode (VA Osc) has been added in version 1.1. Pulse-Saw PWM and Pulse-Saw Sync variations enable morphing between pulse and sawtooth waveforms. The Intensity knob is replaced by a Pulse-Width or Sync knob for controlling pulse-width (PWM) or hard-sync-style resetting (Sync). The aforementioned waveshaping feature is disabled in VA Osc mode.

The noise generator is standard fare, with 12 flavors of noise and a Color knob to shift the spectrum of the chosen flavor. The feedback circuit, which can take its input from various points in the signal path, has a slider for balancing its output between the two filter inputs. High feedback can push the signal over the top, but when used with discretion, this circuit adds a new dimension to Massive's sound. Try placing a delay or pitch-shifting insert effect in the feedback loop and enveloping the feedback amount (see **Web Clip 1**).

More or Less

The Modulation oscillator in the source section is not wired into the signal path; it is an audio-frequency sine-wave oscillator that you use to modulate the other oscillators and filters. You can apply each of its modulation types—ring, phase, wavetable position, and filter cutoff frequency—to one target. Phase modulation produces results similar to FM and was in fact used in the original Yamaha DX-7. A single knob sets and displays the modulation amount for each modulation type, but the settings are independent. You'll see how important the Modulation oscillator is to Massive's sound by stepping through the factory preset bank; most of the presets use it, and many use it to modulate several targets.

As with all subtractive synths, Massive's filters are key to sculpting the sound. Aside from the flexible routing scheme, the feedback circuit, and the option to place insert effects before, after, and between the filters, you'll find some uncommon features. In addition to the standard 2- and 4-pole lowpass and highpass filters, you get bandpass and band-reject filters with variable bandwidth. Allpass, comb, and double notch filters are useful for phasing and flanging effects. Three lowpass variants called Scream, Daft, and Acid round

out the filters. Scream has built-in feedback. Daft makes an especially good target for the Modulation oscillator. Acid is modeled on a famous mono bass synth (read: Roland TB-303).

Massive's two master effects, which appear before the EQ at the end of the signal path, include the usual suspects: reverb, flanger, chorus, phaser, and stereo delay. In addition, you get three tube-amp simulations and a room simulator called Dimension Expander that produces subtle and clean spatial effects. The EQ offers low and high shelving with a tunable center band that you can boost or cut.

The insert effects lean toward distortion. You get a bit crusher, two styles of waveshaping, a hard clipper, and an unusual sample-and-hold effect that quantizes the incoming waveform by sampling it at regular intervals and holding the sampled level in between. You also get a simple delay line (mono, no sync, no feedback), lowpass and highpass filters in series, and a frequency shifter. The frequency shifter is an unusual and welcome inclusion; it shifts all of a sound's overtones by an equal amount, thereby completely changing its timbre as well as shifting its pitch.

A Novel Twist

I've saved one of Massive's most impressive features for last. The design and implementation of modulation in Massive is as stunning as the signal routing. To start with, you get eight modulation sources: four envelope generators and four LFOs that double as pattern sequencers. The envelopes are delayed-ADSR generators, and the attack (A) and decay (D) stages have level controls. You can use that, for example, to attack quickly to one level, then decay more slowly to a higher level. The sustain stage is a morphing looper. You choose 2 shapes (from 22 preset possibilities), the number of iterations of the loop (from off to continuous), the beginning and ending level of the loop, and the morph amount between the chosen shapes (see Fig. 3).

Massive's LFOs allow you to crossfade between two shapes, and they have their own fade-in/fade-out envelopes. In addition to the standard sine, saw, pulse, and triangle waveforms, you get 31 unusual shapes, including 4 random-step patterns. You can swap any of the LFOs out for either of two kinds of pattern sequencer. A standard 16-step sequencer is useful for pitch sequencing. The 16-step Performance sequencer resembles the step sequencer, but each step is actually a curve. The Performance sequencer can generate very complex repeating patterns, and it becomes even more powerful with the addition of a pattern-randomization scheme in version 1.1 (see Fig. 4). As with the LFOs, you can crossfade between two Performance sequencer patterns.

FIG. 4: Massive's Performance sequencer uses shapes as modulation sources at each step in the sequence.

The scheme for assigning modulators in Massive couldn't be simpler. Each modulator is numbered, and for easy recognition they are color coded by type. Virtually every control on Massive's panel, including the modulator settings, has one or more empty boxes below it. You apply modulation to a control by dragging a cross-shaped handle from the modulator to one of those boxes. The modulator's number and color appear in the box, and you drag it vertically to set the modulation amount. As you do, a color coded ring (knobs) or bar (sliders and numericals) appears to show the modulation amount. A glance at the control panel shows all the modulation in place, and the numbering and color coding make it easy to unravel.

On the Side

Sidechain modulation is another Massive innovation. For many of the controls, the rightmost modulation box is labeled SC. You can use that box for normal modulation, but alternatively, you can use it to control the amount of the other modulation inputs. For instance, you could assign an envelope to control the amount of an LFO or Performance sequencer applied to the Wt-position knob, or you could assign MIDI Velocity to control the envelope amount applied to filter cutoff.

Massive has a standard MIDI Learn implementation; you assign incoming MIDI continuous controller messages to any knob or slider by means of a context menu. But Massive also provides eight macro knobs along with direct access to key tracking, Velocity, Aftertouch, and a clever random-value trigger. You assign each of these sources to target knobs and sliders by dragging its handle, just as you do with the modulators. The random-value trigger emits a random value each time a MIDI note is received. Apply that to pitch for a sample-and-hold effect

PRODUCT SUMMARY

NATIVE INSTRUMENTS Massive 1.1

software synthesizer
$339

FEATURES	4
EASE OF USE	4
QUALITY OF SOUNDS	5
VALUE	3

RATING PRODUCTS FROM 1 TO 5

PROS: Best modulation routing scheme on the planet. Controlled randomization. Huge sound palette. Clever sidechain modulation scheme.

CONS: Could use more wavetables or a utility for creating your own. Needs a fast CPU.

MANUFACTURER
Native Instruments
www.native-instruments.com

or to attack and decay time for subtle variations in volume contour (see **Web Clip 2**).

A highly customizable randomization scheme produces surprisingly useful results. You access it from the Global tab of the Central window and select random-deviation ranges for the oscillator, filter, master effects, and insert effects sections. You can randomize each section separately or all at once, and you can toggle randomization on or off for parameters, modulation depth, type, connections, matrix, and oscillator pitch. Randomization in the 5 to 10 percent range with oscillator pitch protected typically yields sounds close to the original but different enough to be useful.

Browse Awhile

Like many Native Instruments updates and new synths, Massive incorporates a Kore-compatible browser, and presets are saved in the proprietary SingleSound format. All the Massive presets are accessible in the latest version of Kore, and Massive's macro controls are automatically mapped to the knobs on the Kore controller. Twenty-eight Kore MultiSounds use Massive.

The browser classifies presets by attributes in five categories: Instrument, Source, Timbre, Articulation, and Genre. You can select multiple attributes in the last four categories to further refine your selection, and you can leave some categories blank. You can also search text attributes such as the author's name or text in the Comment field. Unfortunately, you can't mix methods, for example, to search for all presets in a certain category by a specific author. Nonetheless, the browser is very handy for finding your way through the large collection of factory presets. And you can, of course, categorize your own presets as you go.

Massive is a fascinating synth capable of an enormous range of sounds. For all of its advanced features, it is surprisingly easy to understand and program. In particular, the modulation scheme is the best I've seen in terms of both ease of use and flexibility. Whether browsing factory presets or creating your own, you won't soon tire of this synth. EM WEB CLIPS

Len Sasso is an associate editor of EM. For an earful and free refreshments, visit his Web site at www.swiftkick.com.

FIG. 1: Liquid Mix gives you up to 32 channels of EQ and 32 channels of dynamics control using processing that's independent of your CPU.

FOCUSRITE Liquid Mix (Mac/Win)

FireWire multichannel EQ and compressor.

By Eli Crews

A convolution revolution is taking place. A huge market is developing to take classic effects-processing chains, sample their effect on audio, and come up with affordable models with all the perks of the digital realm.

Focusrite's new Liquid Mix takes dynamic convolution and combines it with hardware DSP. The result is a system that gives you 32 channels of compression and EQ, a processing engine that's independent of your computer's CPU, and complete control from the unit's front panel.

Knobs and All

The hardware component of Liquid Mix packs a heavy helping of functionality into a compact and well-designed interface (see Fig. 1). It's about half the size of a typical laptop and has a slight slant for easy manipulation of the knobs and viewing of the display. The LCD, although monochrome and relatively small, imparts quite a bit of information, ranging from which parameter you are controlling to representations of the active compression and EQ curves. Four 12-segment LED meters on the unit's face indicate input level, gain reduction, Mid level (the level between the compressor and EQ stages), and output level. Red LEDs alert you to limiting and clipping. Green LEDs indicate which controls are available in the selected emulation.

In addition to the input level knob, you get dedicated rotary encoder knobs in the compressor section for threshold, ratio, attack, release, and gain makeup. In the EQ section, you'll find Gain, Frequency, Q, and EQ Output knobs. You use a data encoder to scroll through menus on the LCD screen, and you select menu items by pressing down on the knob. The data encoder doubles as a band select for the EQ. Buttons are equally plentiful, including Snapshot Save and Load, Emulation Select, Track Select, and Go Back/Compare to compare the current and previous models. The Free button gives you control over parameters not normally included in the model, such as Attack and Release on the LA-2A emulation.

Button Up

You also get buttons for setting the compressor to post-EQ (the default is pre-EQ), linking the left and right sidechains of a stereo signal, and monitoring the sidechain of the compressor. (The software doesn't currently allow external sidechaining, so this is just a duplicate of the precompression signal.) Activation buttons for the compressor, individual EQ bands, the entire EQ section, and a global bypass round out the bottom row. A button labeled Shape lets you change certain qualities of the selected EQ band.

The only two jacks on the unit are a FireWire 400 port to connect to the computer (there's no second port

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for daisy chaining, so you can hook up only one Liquid Mix to a computer at a time), and an input for the included 12V wall-wart power supply. If your computer supplies bus power over FireWire (most do), you won't need to use the power supply.

Focusrite recommends a dedicated FireWire bus for Liquid Mix. On many models of Macs and PCs, you have only one FireWire bus unless you get a third-party expansion card. If you try to run Liquid Mix and your other FireWire peripherals on the same bus, you may experience some performance issues. That said, I had no problems running Liquid Mix from the extra FireWire port on my Digidesign Digi 002 interface.

Very GUI

On the software side of things, the graphical user interface looks a lot like the hardware unit (see **Fig. 2**). At the top are fields for the plug-in name (which you can change by clicking in the box), active compressor model, active EQ model, active EQ parameter, snapshot name, and a disk icon that opens a menu allowing you to save, load, and rename your snapshots. The Windows installer comes with a number of factory-supplied snapshots, and snapshots for the Mac are available on Focusrite's Web site.

The GUI has a much more detailed view of the compression and EQ curves than the hardware unit does, and it offers more accurate metering. You see the parameter settings for all seven of the available EQ bands, whereas on the hardware you can see only the one you are controlling. The EQ band over which the hardware unit has control is highlighted in red on the GUI, making it easy to see which parameter will get tweaked when you start turning knobs. A box below each EQ band informs you of the band type.

Any function available from the hardware unit is controllable from the software, and with a few exceptions, the reverse is also true. You can't rename the plug-in instantiation (for example, Kick Drum or Lead Vocal), rename a snapshot, or clear the clip indicator from the hardware unit. I understand the omission of the first two, but why you can't clear the clip indicator is a mystery.

PRODUCT SUMMARY

FOCUSRITE Liquid Mix

multichannel FireWire effects processor
$1,099.99

FEATURES	4
EASE OF USE	3
QUALITY OF SOUNDS	4
VALUE	4

RATING PRODUCTS FROM 1 TO 5

PROS: Lots of features for the price. Hardware control surface looks and feels great. Bus power makes it very mobile. Can add a lot of processing power to a modest system. EQ functionality and sound above average.

CONS: GUI doesn't update when you switch channels from the hardware and vice versa. Some of the compressor emulations aren't totally convincing. Clip reset not possible from hardware.

MANUFACTURER
Focusrite
www.focusrite.com

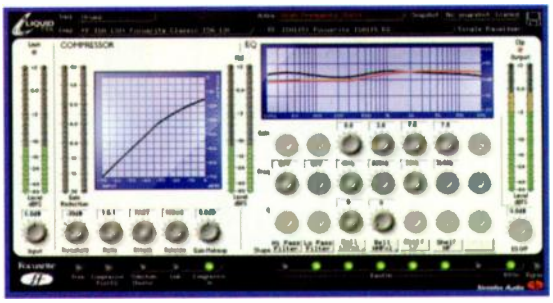

FIG. 2: Liquid Mix's graphical user interface offers a more detailed look at the workings of the plug-in.

The physical buttons and knobs of the interface are easy to use. One quirk, however, is that for many of the parameters, it takes more than one step to increment the numerical value. For instance, sometimes it takes two clicks of the detented encoders to change from a value of 2 to a value of 3, yet there are no half values. According to Focusrite, this mimics the original hardware, but it can lead to confusion when trying to duplicate settings or run comparison tests.

Artful Install

I installed the Liquid Mix plug-ins, the Liquid Mix Manager software, and the emulation (modeling) data on three computers: a 3.4 GHz HP Intel Xeon PC with 3 GB of RAM running Windows XP Pro Service Pack 2, a dual 2 GHz Power Mac G5 with 4 GB of RAM running Mac OS X 10.4.8, and a 1 GHz PowerBook G4 with 1 GB of RAM running Mac OS X 10.3.9. I wasn't able to test the software on an Intel Mac, although Universal Binary drivers are part of the installation package.

The installer lets you choose which emulations you want to install, and the 192 kHz versions take nearly 400 MB of space, so if you won't be working at that sampling rate you can save yourself some disk space. AU versions are available for the Mac, and RTAS-wrapped versions of the VSTs are available for Digidesign Pro Tools users. I installed all available types for each of the computers, almost without a hitch. It did take me a little while to figure out how to load the emulations onto the PC, because I wasn't installing from an installer disc. If you are installing from the Web, be prepared for a little more work trying to figure out where things go.

On the PC, I tested Liquid Mix in Pro Tools HD 7.3.1. Between the two Macs, I tested it in Pro Tools LE 7.1, MOTU Digital Performer 4.61, BIAS Peak 4.02, and i3 DSP-Quattro 2.1.2. Liquid Mix worked fine in all the applications except DSP-Quattro, in which it appeared to load fine, but nothing displayed on the meters, and the Liquid Mix controls had no effect on the audio. I also had to reinstall the RTAS plugs on the Power Mac G5 because the stereo versions mysteriously disappeared after a few days of use.

An important thing to know about using Liquid Mix

is that it introduces 2,056 samples of latency to the channel it's on. (Fortunately, it's the same latency for a compressor, an EQ, or both.) If your audio sequencer compensates automatically for plug-in latency, that's not a problem. If you're using Pro Tools LE, you have to compensate for the latency by either having an instantiation of Liquid Mix on every channel or using a delay plug-in like Digidesign Time Adjuster on all non-Liquidated tracks. Alternatively, you can slide the Liquidated tracks earlier in the timeline, but I'm not really a fan of that method because it can cause even more confusion. (You get 32 mono or 16 stereo channels at 44.1 and 48 kHz, 8 mono or 4 stereo channels at 88.2 and 96 kHz, and only 2 mono or 1 stereo channel at 192 kHz. A yet-to-be-released optional expansion card will provide increased counts at the higher sampling rates.)

Model Student

I enjoyed using Liquid Mix's 20 EQ models. Not only do they sound good, but you can mix and match emulations—a very cool feature. You can have the low-shelf boost from a Pultec model mixed with the HMF band from an SSL E-series mixed with a high-shelf filter from a 1073. I don't have any of the modeled hardware EQs for comparison, but the Focusrite did hold up well compared with other hardware and software models of classic EQs that I own.

The 40 compressor models also performed quite well, and I could definitely hear characteristic differences between the models. In comparison tests, the Manley Vari-Mu setting on Liquid Mix actually did a pretty good job of sounding like its $3,600 hardware counterpart. In addition, the Teletronix LA-2A, UREI 1176LN, and Fairchild 670 models sounded remarkably similar to my hardware Universal Audio LA-2A and 1176LN reissues, as well as to other software versions of these revered units.

I do have a quibble with Liquid Mix's compressors in general. When you bypass the compressor, whether manually or through automation, it can take considerable time for the compression to stop affecting the signal. That's a function of the release time and the aforementioned latency.

But my biggest gripe with Liquid Mix's operation is that the software interface and the hardware unit don't update each other when you switch instantiations. If you switch tracks using the hardware unit, the active window in the software still shows the previous track; a mouse-click is necessary to bring up the proper window. This not only requires extra clicking, but also makes it very easy to inadvertently tweak parameters on the wrong track, and there is no undo when that happens. According to Focusrite, this and a few other minor inconveniences I found will be fixed in future software updates.

Liquidity

If you are used to working with the hardware units that Liquid Mix emulates, you may be pleasantly surprised by the sound of this device (see **Web Clips 1 through 8**). If you are in the market for a relatively inexpensive (in terms of cost per channel) way to expand your system, prefer actual knobs and buttons to using a mouse, and are willing to deal with some minor inconveniences, it just might be the box you're looking for.

Liquid Mix's portability, flexibility, and expandability make it a contender for the most unusual product I have seen in a long time. The control surface really sets it apart from other hardware DSP boxes and makes it just plain fun to use. For those who may not be able to get their hands on a real Fairchild 670 or Manley Massive Passive, this unit fits the bill nicely. EM WEB CLIPS

Eli Crews convolves whenever possible at New, Improved Recording, his studio in Oakland, California. Look him up at www.newimprovedrecording.com.

QUICK PICKS

DAVE SMITH INSTRUMENTS

Evolver Keyboard

By Nick Peck

EM ★★★★★ hot pick

Legendary synth designer Dave Smith has released the Evolver Keyboard ($1,329), a 3-octave performance version of the 1-voice tabletop Evolver. Like the original synth, the Evolver Keyboard includes two analog oscillators, two digital oscillators, highpass and lowpass analog filters, three envelopes, four LFOs, a 16 × 4 sequencer with extensive routing capabilities, a variety of distortion effects, audio inputs for external signal processing, and an analog delay. EM associate editor Geary Yelton's extensive review of the Evolver from June 2003 is available online at www.emusician.com, so I will cover only the features of the keyboard version.

All the Mod Cons

Yelton commented on the Evolver's lack of a headphone output, a power switch, and a master volume knob; this has all been corrected on the Evolver Keyboard. Additionally, the original Evolver's 3-LED display has been replaced with a 40-character LCD, and the buttons and knobs on this unit feel very sturdy.

The Evolver Keyboard's rear panel has two audio inputs and two audio outputs as well as a headphone jack; a sustain pedal input; two control voltage inputs; MIDI In, Out, and Thru; and a MIDI Poly Chain Output port (which I will discuss in a moment). And thanks to its reduced size (26 inches wide by 12 inches deep and weighing 13 pounds), the Evolver Keyboard is perfect for gigging.

The instrument is powered by a universal wall-wart supply, which runs on 100 to 240 VAC at 50 or 60 Hz. Although I understand the economic necessity of using an external power supply, I prefer an onboard power supply with IEC power jacks. That is particularly important at gigs, where wall warts have an unfortunate tendency to vanish.

The Evolver Keyboard is a performance-oriented monosynth based on the hybrid analog-digital Evolver.

Where the Action Is

Dave Smith designed the Evolver Keyboard to be a monosynth with minimal menus, clear signal routing, and deeply expressive synthesis capabilities. The attractive user interface not only makes the signal flow easy to understand, but it also invites experimentation. Although the instrument has a nice collection of 512 presets, if you buy the keyboard solely for its preprogrammed sounds, you are missing out on all the fun. This instrument is a sound tweaker's delight.

As a Hammond organist, I am quite picky about the feel of a keyboard's action. Smith did not scrimp with the Evolver Keyboard, choosing a high-quality action built by Fatar in Italy. Although it is only a 3-octave keyboard, dedicated transposition buttons allow you to quickly access the full 7-octave range.

The keyboard action is light and springy yet solid, and it generates Velocity and Aftertouch. The mod and pitch wheels are made of thick rubber and feel great under the fingers. The 58 knobs are continuous-turn digital encoders, which means you won't have crackly pots ten years down the road. They have a bit more resistance to the touch than most synth knobs I have used.

Touching any of the pots brings up the corresponding parameter name and value instantly in the LCD window, which is very useful. The 35 buttons are a bit smaller than a pencil eraser and light up bright red when touched. Add to that the instrument's bright blue LEDs, and the Evolver Keyboard is almost as much fun to watch as it is to play.

Soloist

The Evolver Keyboard's single voice can certainly be a limitation at times. However, on a recent recording with this synth, I overdubbed six separate passes in order to achieve the polyphony I was looking for. The resulting chords sounded huge and interesting, with subtle sonic variations that I wouldn't get by simply playing the six notes of a chord simultaneously on a polyphonic instrument.

For those occasions when more voices are needed, the Evolver Keyboard can serve as a front end for other instruments in the Evolver family, using the MIDI Poly Chain Output port. Once connected, the Evolver Keyboard's knobs and buttons will control the parameters of the other instruments.

It's a Winner

The Evolver Keyboard's superb sound quality, terrific controller layout, and high-quality keyboard action make it a synthesist's dream. Add to that a reasonable price point and its ability to control other Evolver synths, and the Evolver Keyboard earns a perfect score.

Value (1 through 5): 5

Dave Smith Instruments
www.davesmithinstruments.com

BLEEP LABS

Thingamagoop

By Gino Robair

EM ★★★★★ hot pick

Bleep Labs has taken the lessons learned from the circuit bending craze and put them to good use in a portable instrument that is sure to put a smile on your face. The Thingamagoop ($100) is an analog sound generator that resembles a child's drawing of a robot: it has a photocell for a nose, a power switch/volume knob and a ¼-inch line-level output for ears, controls on its chest, and a bendable antenna with an LED at the end called a LEDacle.

Four rubber feet raise the Thingamagoop enough that you can hear its sound coming from the tiny speaker on its underside. At 4.25 inches tall (not

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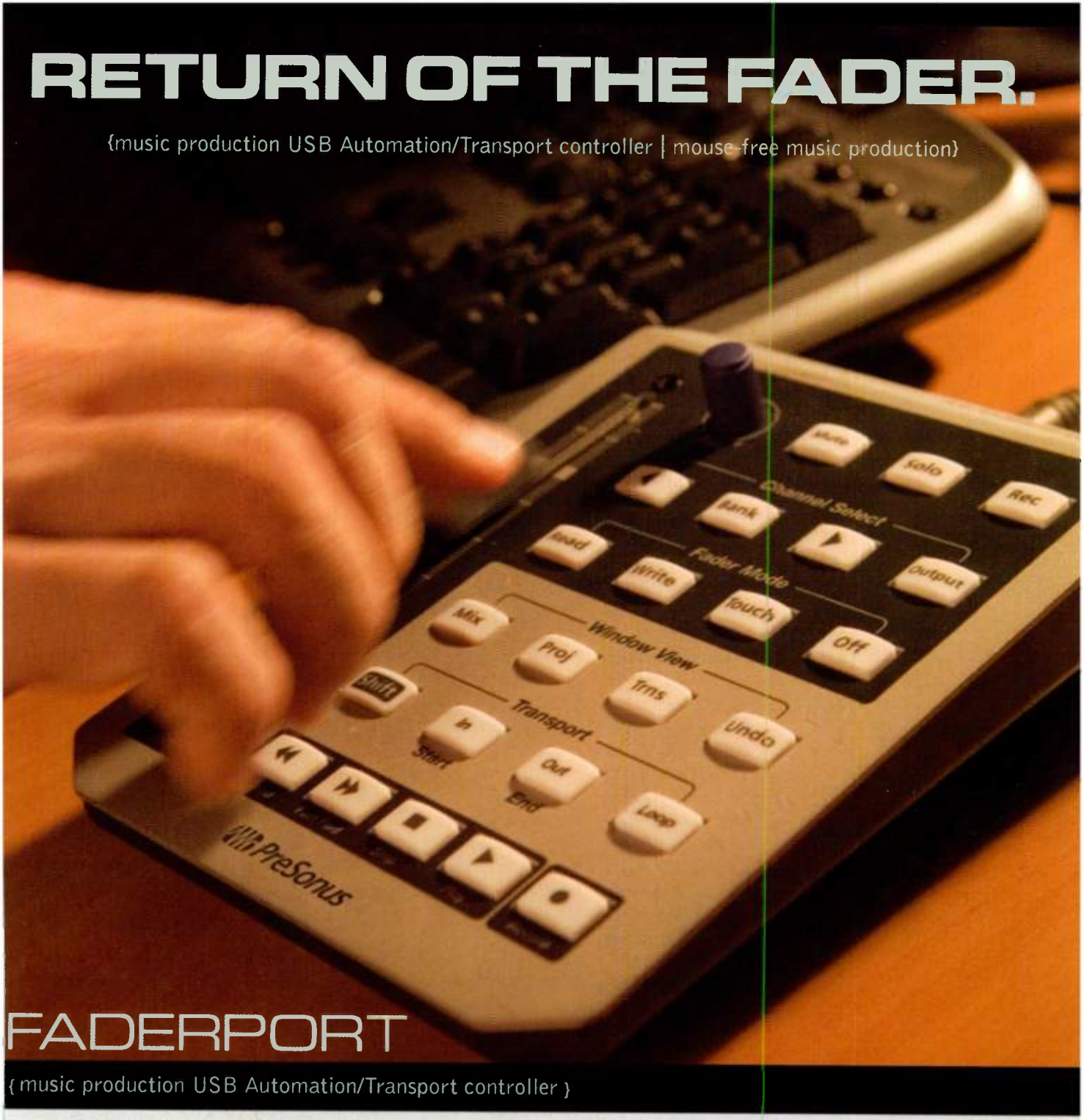

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PreSonus

Don't let the cute exterior of the Bleep Labs Thingamagoop fool you: this noisy little synth can really scream.

including the antenna) and 2.25 inches deep, and powered by a 9V battery, the aluminum instrument is perfect for noisy play onstage and in the studio.

The Thing

Inside are two oscillators, one of which acts as a square-wave LFO. The knob on the front controls the LFO's frequency. When the left switch is down, the LFO controls the speed of the blinking LED, which in turn can affect the photocell. In the up position, the LFO, which goes into the audio range when the knob is fully clockwise, amplitude-modulates the oscillator.

The right switch sets the main oscillator's frequency range: high in the up position; low in the down position. The oscillator's frequency rises and falls depending on the brightness of the light hitting the photocell—the brighter the light, the higher the pitch.

The type of light source makes a sonic difference as well, with sunlight and incandescent light yielding the highest pitches and cleanest timbre, and fluorescent light adding grit to the sound. The combination of the LEDacle and another light source offers plenty of rhythmic potential as you cover and uncover the photocell and the antenna's flashing bulb.

Glitchfarben

Obviously, the Thingamagoop is designed for people who like noisy rhythmic sounds. With the knob cranked up, you can get the instrument to scream by slowly uncovering the photocell with a finger (see **Web Clip 1**). When the knob is in the range of 7 to 3 o'clock, you can set up interesting noisy pulses, depending on the lighting conditions and the position of the LEDacle.

Although it may seem like a one-trick pony at first, the Thingamagoop offers quite a bit of sensitivity thanks to its photocell, making it a joy to play (when you can get it back from the kids). The controls are easy to manipulate with one hand due to the instrument's diminutive size. And even if you cover the photocell with your thumb, the light from the LED will shine through your skin somewhat, allowing you to add animation to the sound as you bottom out the oscillator's pitch.

Of course, echo and spring reverb can be used to enhance the sci-fi qualities of the Thingamagoop's sound. For a recent session with the rock band P.A.F., I was asked to add a "noisy psychedelic solo" over an open jam, and the Thingamagoop fit the bill. We ran the signal into a guitar amp in a live room and miked the amp. With some stereotypical delay effects, the results were reminiscent of '60s-era swooping guitar feedback, but with greater intensity (see **Web Clip 2**).

It's a Scream

With the Thingamagoop, Bleep Labs puts a friendly face on noisemaking. Getting the most out of it requires a creative and open mind, as well as a healthy sense of humor. Each one is made to order, and you can customize your own from a palette of 25 colors online.

Whether you're listening to its unadulterated sound through the built-in speaker or running it through a chain of stompboxes (which I highly recommend), the Thingamagoop is a blast to record, and even more fun to play live.

EM WEB CLIPS

Value (1 through 5): 5

Bleep Labs
www.bleeplabs.com

PRIMERA

Bravo SE Disc Publisher

By Gino Robair

EM ★★★★★ hot pick

Whether destined for demo use or concert sales, printed CD-Rs and DVD-Rs are far more impressive than off-the-shelf media with a paper label. However, color disc duplicator/printers are typically beyond the budget of individual artists. With the release of the Bravo SE Disc Publisher ($1,495), Primera now offers a CD/DVD duplicator/printer that is priced for musicians yet retains many of the pro-level features of the company's more expensive Bravo Disc Publisher (see the review in the February 2004 issue, available at www.emusician.com).

The Bravo SE includes a 4,800 dpi ink-jet color printer and a Pioneer DVR-111 drive, which burns CD-Rs at up to 40× speed and DVD±Rs at 16× speed (or 8× for dual-layer media). Like the Bravo, the Bravo SE uses a robotic arm to completely automate the process of duplicating and printing. One of the biggest differences between the two units is that the Bravo SE has a lower capacity—20 discs—which I doubt will be a problem for most artists. (The Bravo can do 50 discs at a time.) I don't mind reloading the disc tray more often if it saves me $1,200.

The other important differences are that the Bravo SE uses a single 3-color ink cartridge rather than dedicated color and black cartridges, and it doesn't have a networking option, which would probably be of little interest to the personal-studio owner. In addition, the Bravo SE lacks a design application for Mac users, although it does give you EPS disc templates. Windows users get SureThing CD Labeler Primera Edition for editing graphics. The unit comes with PTPublisher SE (Win) and CharisMac Discribe 5.3.19 (Mac) for burning the discs.

The Bravo SE is a USB 2.0 peripheral that requires at least a Mac G4 or Pentium III with a 700 MHz processor. I tested the device with my 1.33 GHz Mac G4 laptop running Mac OS X 10.4.8.

Burn, Bravo, Burn

The steps for getting the Bravo SE up and running are like those for any other printer and are outlined in the Quick Start guide: install the driver from the CD-ROM, plug in the power supply, load the blank media, connect the printer to your computer and select it onscreen, install the ink cartridge, and perform a cartridge-alignment routine (which, in this case, requires you to use up a blank disc,

The Bravo SE from Primera is a high-quality duplicator and 4-color printer with a 20-disc capacity. It supports CD and DVD media.

and two blanks are included). Once the printer is set up and your songs and art file are ready, creating discs is a snap.

The Bravo SE can burn data and audio discs from scratch or copy a source CD or DVD. Novices will appreciate the included software's simple drag-and-drop interface for creating data and audio discs. For example, if you drag an MP3 file into the window when using Discribe, the program will create an AIFF version of the file so your disc is Red Book compatible. It also lets you set the gaps between songs, from 0 to 9 seconds in length. Experienced CD creators will appreciate the Bravo SE's well-written manual, which guides you through the tweakier aspects of the unit.

The files are burned to disc before the image is printed, and both processes operate at the same time when you're creating multiple discs. The combined printing and duplicating time for a full-length CD with 4-color graphics was less than six minutes in my tests. The finished discs drop into a tray in the middle of the printer, and the ink dries before the next disc is completed. Out of the dozens of discs duplicated during the review period, I didn't get a single reject.

On the Media

Primera's own line of blank media gave me the best results during the review. I highly recommend the TuffCoat discs with WaterShield, which have a glossy finish and are smear and water resistant. Spools of 50 discs list for $34.95—a reasonable price.

I was particularly interested to find out if the printing would hold up after being subjected to the CD player in my car, which accepts discs through a felt-covered slot. The discs still look and sound great after several weeks of abuse.

Lookin' Good

One of the things I appreciated most about the Bravo SE was how easy it was to use when creating informal demos, yet how many features were available when I wanted to adjust the quality of an important project. If custom discs are part of your business and high-quality presentation is essential, the Bravo SE is a no-brainer when it comes to price and performance. EM

Value (1 through 5): 5
Primera Technology, Inc.
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EM Marketplace

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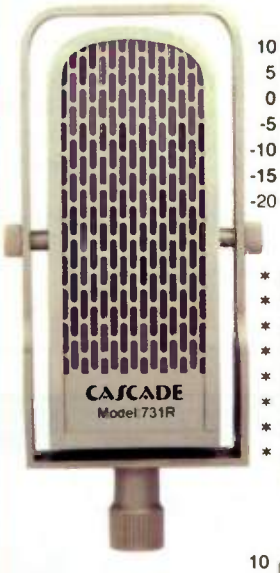
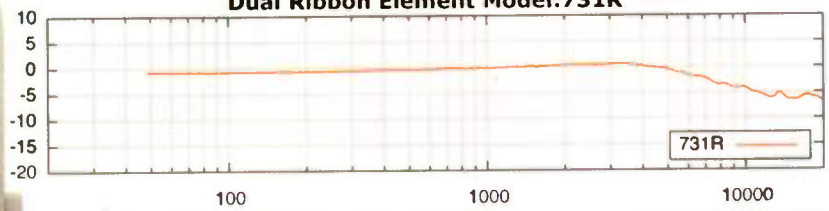
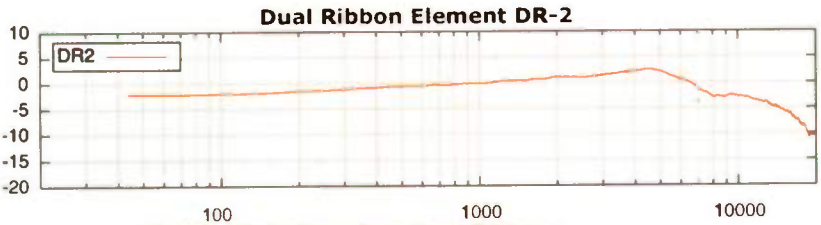




Deco Vibe Premium Dual Ribbon

* Ribbon type: Dual 2.5um, 99% Pure aluminum element
* Polar pattern: Symmetrical figure 8
* Sensitivity: -57.1 dB (1.4 mV/Pa)
* Frequency response: 30 - 15kHz (±3dB)
* Max. SPL (1% THD@1,000Hz): 165dB
* Equivalent noise level to IEC 651 (a weighted): 17dB
* S/N ratio re 1Pa: 70dB
* Connector: 3-pin XLR

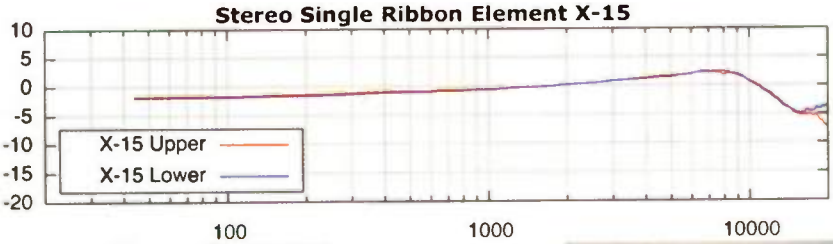
$399.00



Classic Style Premium Dual Ribbon

* Ribbon type: Dual 2.5um, 99% Pure aluminum element
* Polar pattern: Symmetrical figure 8
* Sensitivity: -57.1 dB (1.4 mV/Pa)
* Frequency response: 30 - 15kHz (±3dB)
* Max. SPL (1% THD@1,000Hz): 165dB
* Equivalent noise level to IEC 651 (a weighted): 17dB
* S/N ratio re 1Pa: 70dB
* Connector: 3-pin XLR

$239.00



Stereo Single Ribbon

* Type: Stereo Ribbon (velocity) Microphone
* Ribbon type: 99% Pure aluminum, 2.5um
* Polar pattern: Symmetrical Figure 8
* Sensitivity: -51.7 dB +/- 2 dB (2.6 mV/Pa)
* Frequency response: 30 to -18,000 Hz (+/- 3dB)
* Output Impedance: <=200 Ohms
* Recommended load impedance: >1000 Ohms
* Max.SPL (1% THD @1000 Hz): 165 dB
* Connector: Heavy gauge 5-Pin male XLR

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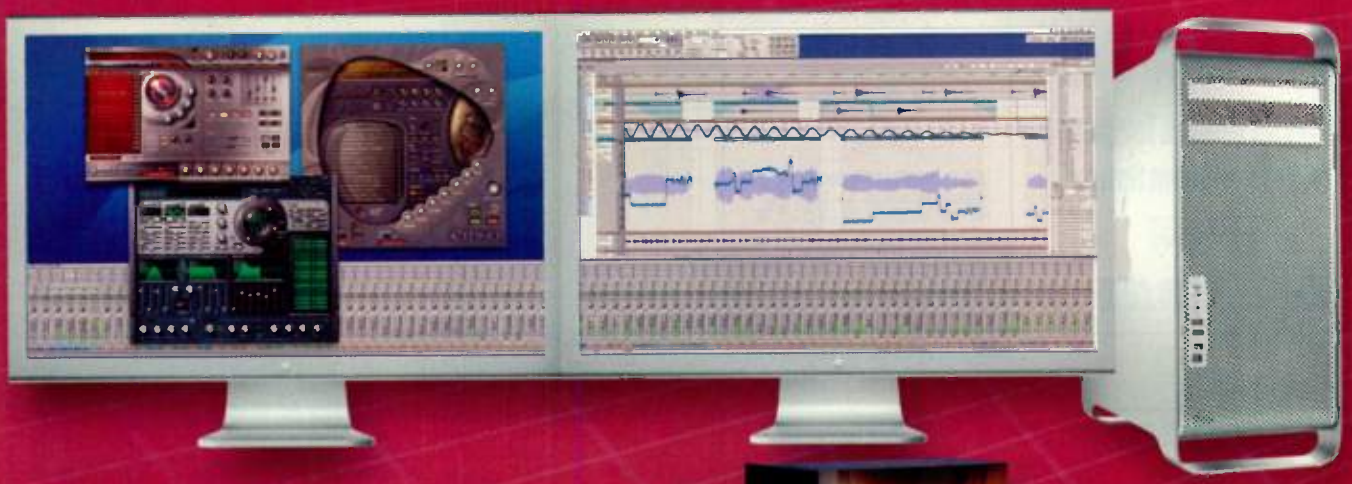

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The MOTU PCI-424 core system lets you connect up to four interfaces to a single card for up to 48 channels of 192kHz recording and playback (shown) or 96 channels 96kHz recording and playback. Mix and match any combination of three interface models to suite your I/O needs. The two-rack HD192 interface provides 12 XLR in/out with AES/EBU digital I/O (with sample rate conversion), 19-segment front panel metering and an incredible measured signal to noise ratio of 120dB. The 24io offers an astonishing 24 TRS analog inputs and outputs in a single rack space, all at 96kHz. And the 2408mk3 provides 24 channels of ADAT optical (3 banks), 24 channels of TDIF (3 banks), 8 channels of TRS analog, S/PDIF and seamless mixing across all connected interfaces.

Waves native processing

Waves has long been synonymous with quality plug-ins, and the Waves Platinum Bundle contains a huge range of top-quality Waves processing for your DP5 studio. The Platinum Bundle now includes Waves Tune LT, L3 Ultramaximizer, and IR-L Convolution Reverb as well as all the plug-ins found in the Waves Gold and Masters bundles. Platinum brings extraordinary signal processing power to DP5, for tracking, mixing, mastering, and sound design. From dynamics processing, equalization, and reverb to pitch correction, spatial imaging, and beyond, Waves Platinum Bundle is a must-have for every MOTU studio.

The MOTU experts at Sweetwater can build the perfect DP5 desktop rig for you. We'll help you select the right components, and we can even install, configure and test the entire system for you. Why shop anywhere else?

FilterFreak and SoundToys

Rejoice! The SoundToys Native Effects bundle is now Audio Unit compatible, so DP5 users can experience the incredible sound of EchoBoy, FilterFreak, PhaseMistress Crystallizer, and Tremolator. With the focus on fat analog sounding effects, versatile control and easy of use, SoundToys plugs get you great sounds fast. These are the tools the pros use to make a mix into a hit. Trent Reznor of Nine Inch Nails says, "Calling EchoBoy a delay plug-in is doing it a disservice. It has become the first thing I turn to for treating a wide variety of sources."

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- Sonik Synth 2
- Miroslav Philharmonik

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The IK Multimedia Total Bundle Series offers professional quality production tools at prices every musician can afford. IK's Total Studio Bundle with 7 award-winning plug-ins, 90 DSP Effects, 8000 sounds and over 21.5 GB of samples offers a diverse collection of instruments and effects for every mix. The Total Workstation Bundle delivers 3 award-winning virtual instrument workstations covering every style of music and genre, powered by SampleTank's advanced sample technology, built-in DSP, and easy to use interfaces. The Total Effects Bundle includes 4 award-winning effect plug-in suites for guitar, bass, mixing and mastering, all modeled after the most sought-after hardware gear, with 90 ultra accurate, analog modeled DSP emulations. Musicians First.

On-demand processing

The RECEPTOR PRO from Muso Research is the ideal way to run your favorite plug-ins live, and when in the studio it integrates seamlessly with Digital Performer and adds additional horsepower to your host Mac. Available with 400GB or 750GB drives, you'll love the way RECEPTOR PRO hosts your favorite plug-ins, making it easy to create or find any sound, then playing that sound with world-class sonic quality. Whether you play keyboards, guitar, electronic drums, or use effects plug-ins for mixing, Receptor gives you a stable, convenient, and easy way to run your plug-ins.

Komplete control

For DP5 users who want it all: Reaktor5, Kontakt2, Guitar Rig 2 software, Absynth4, Battery3, FM8, B4II, Akoustik Piano, Elektrik Piano, Vokator, Spektral Delay and Pro-53 in a unified interface with hands-on control — Native Instruments KOMPLETE 4 and KORE put an infinite universe of sound at your finger tips. Every preset included in NI KOMPLETE 4, more than 8,500 in total, has been preconfigured and categorized in KORE with searchable musical attributes and hands-on controller assignments. This seamless integration of software and hardware turns Native Instrument's award winning synthesizers and samplers into tactile instruments.

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Control room monitoring

The PreSonus Central Station is the missing link between your MOTU recording interface, studio monitors, input sources and the artist. Featuring 5 sets of stereo inputs (3 analog and 2 digital with 192kHz D/A conversion), the Central Station allows you to switch between 3 different sets of studio monitor outputs while maintaining a purely passive signal path. The main audio path uses no amplifier stages including op amps, active IC's or chips. This eliminates coloration, noise and distortion, enabling you to hear your mixes more clearly and minimize ear fatigue. In addition, the Central Station features a complete studio communication solution with built-in condenser talkback microphone, MUTE, DIM, two separate headphone outputs plus a cue output to enhance the creative process. A fast-acting 30 segment LED is also supplied for flawless visual metering of levels both in dBu and dBfs mode. Communicate with the artist via talkback. Send a headphone mix to the artist while listening to the main mix in the control room and more. The Central Station brings all of your inputs and outputs together to work in harmony to enhance the creative music production process.

Advanced waveform editing

Your DP mastering and processing lab awaits you: BIAS Peak Pro 5 delivers award winning editing and sound design tools, plus the world's very best native mastering solution for Mac OS X. With advanced playlisting. Superb final-stage processing. Disc burning. Plus PQ subcodes, DDP export (optional add on), and other 100% Redbook-compliant features. Need even more power? Check out our Peak Pro XT 5 bundle with over $1,000 worth of additional tools, including our acclaimed SoundSoap Pro, SoundSoap 2 (noise reduction and restoration), Sqweez-3 & 5 (linear phase multiband compression/ limiter/upward expander), Reveal (precision analysis suite), PitchCraft (super natural pitch correction/ transformation), Repli-Q (linear phase EQ matching), SuperFreq (4,6,8, & 10 band parametric EQ) and GateEx (advanced noise gate with downward expander) — all at an amazing price. So, when you're ready to master, Peak Pro 5 has everything you need. It's the perfect complement — and finishing touch — to Digital Performer 5.

Professional pad controller

The Akai Professional MPD24 is the velocity sensitive pad controller for musicians and DJs working with sampled sounds. The MPD24 features 16 MPC-style velocity and pressure sensitive pads plus transport controls for interfacing with Digital Performer and your virtual instruments. You get Akai's exclusive feel: either MPC 16 Levels or Full Level features for ultimate pad control. Now add four selectable pad banks totaling 64 pads, six assignable faders and eight assignable and 360 degree knobs for transmitting MIDI Control Change data. Included editor/librarian software gives you complete, intuitive programming and control for DP5 all of your other software titles. The MPD24 provides unprecedented creative freedom for manipulating sampled material.

The MOTU experts at Sweetwater can build the perfect DP5 desktop rig for you. We'll help you select the right components, and we can even install, configure and test the entire system for you. Why shop anywhere else?

Accurate monitoring

The Mackie HR-Series Active Studio Monitors are considered some of the most loved and trusted nearfield studio monitors of all time, and with good reason. These award-winning bi-amplified monitors offer a performance that rivals monitors costing two or three times their price. Namely, a stereo field that's wide, deep and incredibly detailed. Low frequencies that are no more or less than what you've recorded. High and mid-range frequencies that are clean and articulated. Plus the sweetest of sweet spots. Whether it's the 6-inch HR-624, 8-inch HR-824 or dual 6-inch 626, there's an HR Series monitor that will tell you the truth, the whole truth, and nothing but the truth.

New hands-on control for DP5

The new Mackie Control Universal Pro control surface gives you ultimate hands-on control of your Digital Performer desktop studio. Nine motorized, touch-sensitive Penny + Giles faders, eight V-Pots and more than 50 master buttons let you tweak parameters to your heart's content. Unlike generic MIDI controllers, the MCU Pro employs a sophisticated communication protocol that delivers ultra-precise control, makes setup easy - no mapping required - and enables you to see your mix in action with real-time visual feedback via the huge backlit LCD and eight LED rings. Apply the custom overlay for Digital Performer for dedicated labeling of DP-specific functions. The MCU Pro is the ultimate way to mix in DP5!

Power conditioning

The Monster Power Pro 900 is designed for high-performance hookup of digital and analog components to AC power for all your MOTU studio equipment, providing optimized Monster Clean Power and surge protection for AC power lines. Advanced features include Monster's unique Clean Power Stage 1 filtering for high quality sound and Dual Mode Plus protection with audible alarm for maximum protection and performance. For even more complete protection, the Power Pro 5100 features Monster's Clean Power filtering, color-coded outlets, audible and visual indicators for ground and protection status monitoring, extra-long high current Monster PowerLine cords for optimum power delivery, 24k gold plated contacts on grounded plug for maximum conductivity, 12 programmable outlets, a digital volt meter, Clean Power Stage 1 filtering, 5 filters, sequenced AC power on/off, 3145 joule rating, built-in rack mounts and handles. Get Monster Power today.

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Truly Gritty

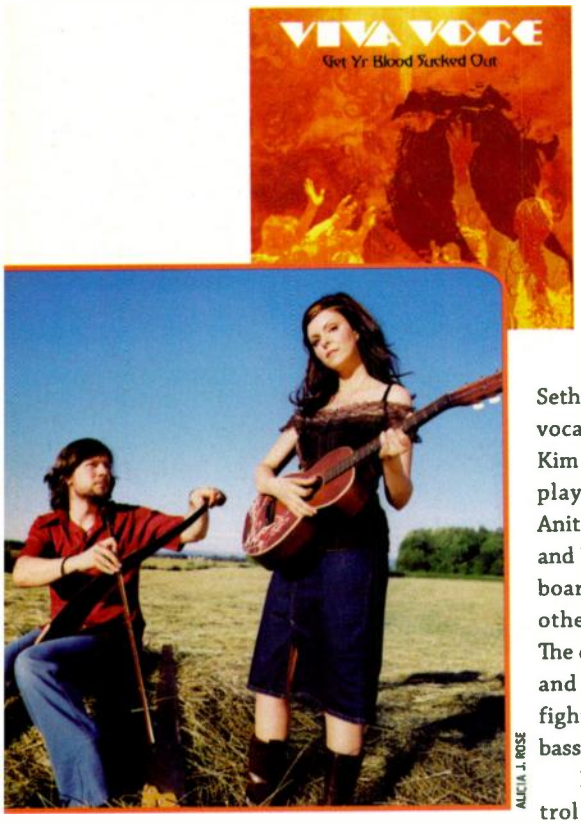
By Heather Johnson

Viva Voce go for the dirt on their latest CD.

Kevin and Anita Robinson, who constitute the Portland, Oregon–based guitar-drum duo Viva Voce, like to keep their fans guessing. Their previous three CDs have each had their own individual stylistic bent. On their latest, *Get Yr Blood Sucked Out* (Barsuk, 2006), the pair combined stripped-down, dirty material with radical recording techniques to create an album rooted in classic rock, yet rich with modern sonic elements.

Darkness and light do battle on *Get Yr Blood Sucked Out*. "A lot of the themes in these songs were about revenge, vengeance, and darker topics," says Kevin. "Anita and I both liked the idea of juxtaposing a lot of themes. So if there are really dark lyrics about cutting people's heads off, we'll put them in a song where the music is really upbeat, so that it feels a little wrong, or vice versa."

The Robinsons recorded the CD in their home studio, which has gradually taken over almost every room of their house. "When you record at home digitally, there's a threshold for the fidelity you're going to get," says Kevin. "So we made a conscious effort to keep the tones really dirty."



Get Yr Blood Sucked Out/Viva Voce

Except for trumpet parts from Cory Gray on "So Many Miles," a bowed bass track from Seth Lorinczi, and background vocals and handclaps from Kim Baxter, Kevin and Anita played every instrument. Anita handled electric guitar, and Kevin played drums, keyboards, acoustic guitar, and other random instruments. The couple shared vocal, bass, and percussion duties. "We fight over who gets to play bass," laughs Anita.

Kevin manned the control room (the spare bedroom), which contains a 1970s "no-name" mixing board, a five-year-old PC that's been upgraded with a TerraTec sound card, Joemeek and Millennia mic pres, and other select outboard gear. After recording their previous three albums using Nuendo, they switched to Steinberg Cubase SX. "SX uses the same audio engine as Nuendo, so we get all the benefits of both."

Kevin usually records Anita's guitars with an Audix D3 mic into a Millennia HV-3 preamp straight into Cubase. He mixes with a number of PSP and Waves plug-ins. "Those plugs are world class and not unbearably expensive, so you can actually come out with a really good-sounding record and not have to spend $40,000 on outboard gear."

To create a thick rhythm-guitar sound, Kevin ran Anita's Gibson through a tiny 1965 Gibson Skylark amp miked with the D3. A Shure 520DX Green Bullet served as room mic. "Planets" was recorded in the kitchen, with Anita playing a Rickenbacker guitar through a Sears Silvertone amp stashed in the oven. Kevin miked the outside of the stove to create a "strange plate-reverb effect."

They mixed the album at home, taking time to distort tracks that sounded too clean and douse everything with spring reverb. They reamplified the vocals, sending them out of Cubase into a guitar amp and back into the computer. On "Believer," they bused out the drums through a fuzz box, and then mixed the fuzzed-out drum tracks with the original takes.

Despite the unconventional recording tactics, *Get Yr Blood Sucked Out* is Viva Voce's most sophisticated release to date. "On the first record, we completely let loose of restraint," says Kevin. "One song had 300 tracks. On our previous record, we used Arturia software and VSTi plug-ins pretty heavily. Now we've refined our abilities. In any art form, hopefully, you progress as you go along." EM

RIFFS

Viva Voce

Home base: Portland, Oregon
Sequencer of choice: Steinberg Cubase SX
Guitar-amp mic: Audix D3
Web site: www.vivavoce.com

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— Michael Giacchino
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Mission Impossible 3 "Bridge Battle" Digital Performer project courtesy of Michael Giacchino and Chad Seiter. Mission Impossible 3 image courtesy of Paramount Pictures. All rights reserved.

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