MONITOR REVIEW SPECIAL: Alesis, Event, KRK, Tapco

Electronic Musician

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May 2004

BARGAIN HUNTER'S DELIGHT

9 low-cost software synths that deliver the goods

NO MORE BAD NOTES!
Using Pitch Correction

WHAT YOU CAN DO
to Save Your Hearing

REVIEWS:
Steinberg Cubase SX 2.0.1
Cakewalk Sonar 3.1
Studio Projects LSD2
M-Audio Tampa
and 8 more

BT'S SONIC SURGERY CRETS

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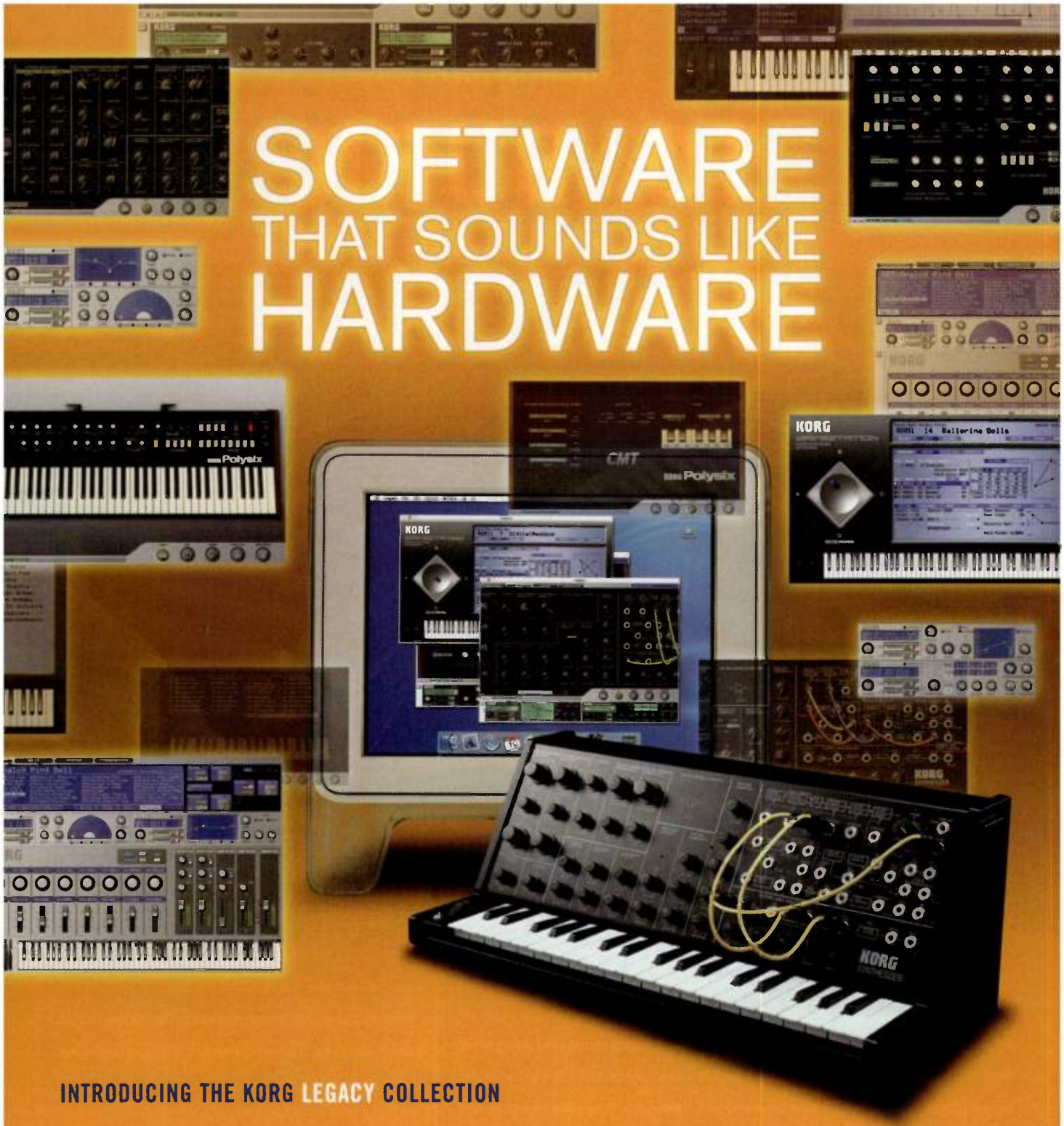

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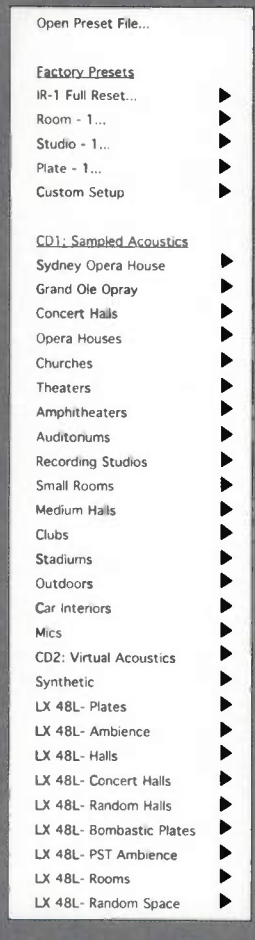

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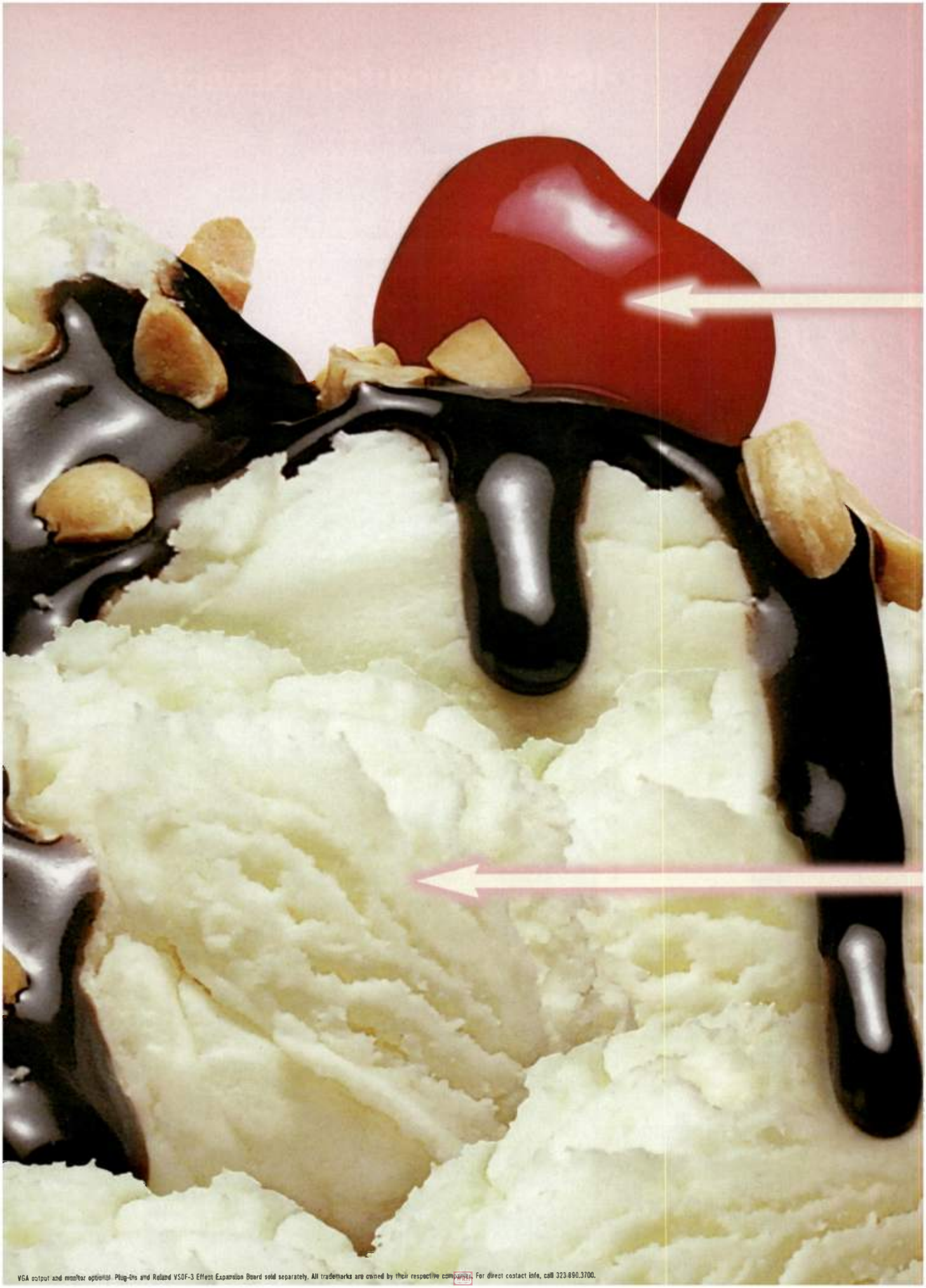

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I N S I

FEATURES

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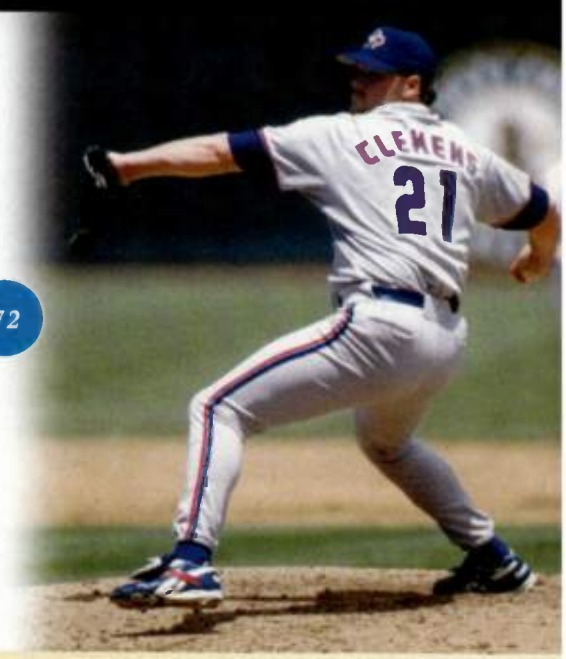

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Spring Cleaning

ANTHONY PIDGEON

Spring cleaning is an ancient and honored tradition in many cultures, and for good reason: after the long winter ends, we crave light, fresh air, and a clean environment. Besides, spring is as good an excuse as any for catching up with your cleaning. If you spend much of your life holed up in a studio, now is a great time to take a break from your production work and get your place ready for the next round of projects.

Of course, spring cleaning in the studio should not be limited to dusting surfaces, vacuuming behind racks and furniture, replacing light bulbs, and airing the place out. Here are a few additional suggestions:

- Get broken gear repaired first. You can reinstall the repaired gear while you are finishing the rest of the cleaning.
- Check any questionable cables for continuity to make sure all conductors and connectors are working properly.
- Unplug every analog audio cable and connector and clean the jack and the plug. That includes hardware synth, signal processor, and patch-bay jacks, as well as mixer patch points. Don't just dust them off; use a cleaning agent designed for the purpose. The best of these not only cleans but improves conductivity. You can find various contact cleaners and related products, but I'd start by looking at the products from Caig Laboratories (www.caig.com). While you're at it, make sure cables are properly labeled, preferably at both ends.
- Exercise and clean potentiometers and rotary encoders on your mixer and outboard gear. Be sure to use nonresidue potentiometer cleaner.
- Clean the heads of tape recorders (analog and digital).
- Exercise and clean between the keys on MIDI and computer QWERTY keyboards.
- Check all AC cables and power strips for cracking and other damage to the wires and especially to the plugs. If you use consumer power strips with surge protection and a lighted switch, make sure the power switch lights properly; in some power strips when the switch light fails, that indicates the varistor (the part that protects from surges) has failed as well. If you use an uninterruptible power supply that offers a battery self-test feature, use it. You don't want a weak UPS battery to fail when you need it.
- Clean all display screens. To avoid damaging the displays, use a soft cloth, such as a chamois or a cloth designed for cleaning LCDs and CRTs. Radio Shack has such cloths and offers a spray cleaner specifically for computers and TV screens.
- Review and reorganize your software, sample libraries, and backup media.
- Back up your drives, run antivirus and optimizing software, update your applications and drivers, and purge old drivers, extensions, files, and other garbage.
- Look over your acoustic conditioning to ensure everything is securely in place.
- Finally, review your storage and labeling of cables, adapters, removable media, and parts.

A freshly refurbished studio won't necessarily improve your music, but a thorough spring cleaning will improve your studio's comfort, convenience, and reliability.

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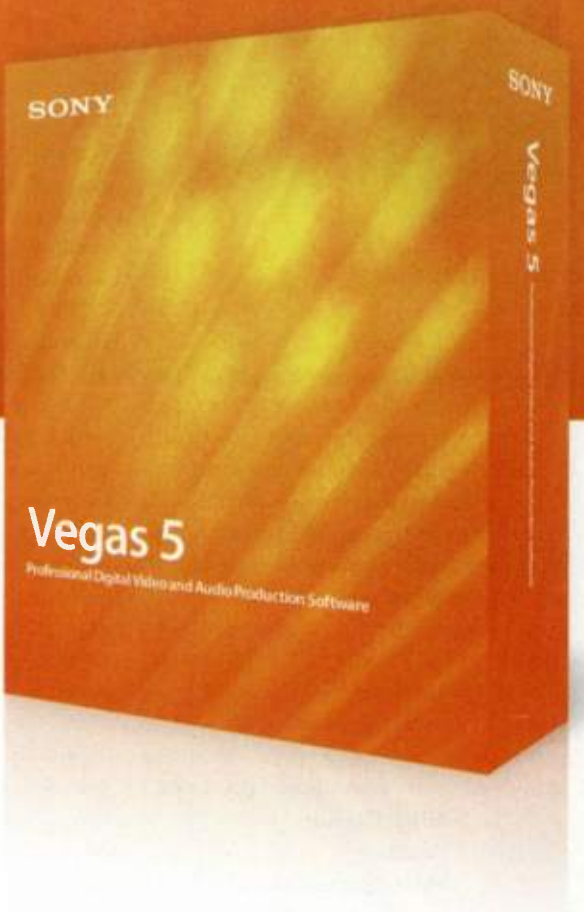

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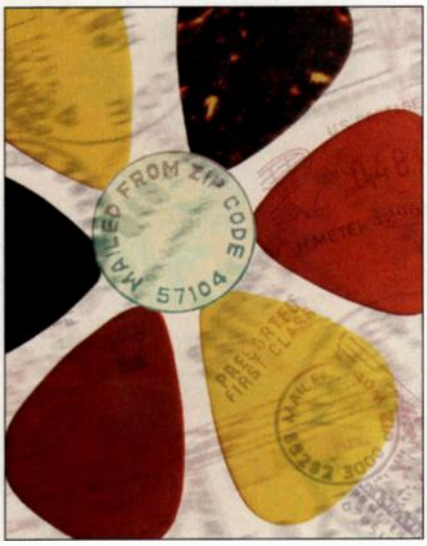

LIZABETH HEAVERN

ROUND 'EM UP

I've been an **EM** subscriber since 1996 and have watched your magazine grow to accommodate the ever-expanding electronic-music marketplace.

I was about to send off an e-mail stating that I hadn't seen many articles with comparative testing of studio equipment for some time. Well, your March 2004 issue more than made up for that. Your review of small-diaphragm condenser mics, "Smokin' Condensers," was just what I was looking for. Please keep it up. These articles are so important because many readers make purchasing decisions based on them.

Mitch Clyman
Founder
Muso Productions, Ltd.
Jerusalem, Israel

THE UNION LABEL

Nick Peck's article "Recording Dialog for the Digital Arts" (March 2004) aroused my interest at first, and then my temper. Having been both an audio engineer and a voice-over talent for close to 40 years, when it comes to recording dialog I am a veteran of both sides of the studio window. What raises my hackles is the casual suggestion that if you desire a quality performance, you should stick to using union talent.

Those of us who prefer to remain nonunion were depicted as being less polished and unprofessional rubes—more trouble than we're worth! That may be the case in insulated areas like the Left Coast and New York City. But there is a planet full of nonunion performers in nonunion regions who are certainly equal to, or better than, their cousins in SAG and AFTRA.

This is never more obvious than when the unions conduct a strike and clients are forced to find nonunion talent to fill the interim gaps. When the strikes end, why are those of us who filled the gaps asked to give up the juicy gigs? Not because we aren't good enough. After the last strike, many clients begged us to join so they could continue to use us. But the union works very hard to keep experienced, professional nonunion talent away from as much of the premium work as possible, regardless of experience, talent, and capability.

Not all union members are good talent. Some get work just because they have a card. Not all nonunion members are bad talent. Some just don't like unions and prefer to remain free. Out here in the real world, those are the facts of the voice-over business.

Your magazine reaches far beyond the localized reality about which Mr. Peck wrote. I sincerely hope that producers will check with their local recording studios for recommendations of who, in their experience, may be best for a job—not who is carrying a card.

Joe Van Riper
via e-mail

Author Nick Peck replies: Joe—Thanks for your thoughtful letter. I can see that this union issue struck a nerve. Please go back and reread the section of my article on this topic. It begins with questioning whether to use union or nonunion talent and outlines the pros and cons of both. It says that going with union talent means stricter rules, more expense, and more paperwork, but that many studios and projects require union talent. It also states that "nonunion talent can be a viable option for many reasons," including being in a location with a smaller union presence, and that "many nonunion talents can do your job justice."

Darragh O'Farrell's sense that the union members he has worked with are more experienced "in general" is simply a statement that here in California, voice-over talent in unions tend to work more, logging more hours behind the microphone, and are thus more at ease there. He also states that he works with nonunion talent and has helped them get more work by bringing them into the union.

I agree that not all union members are good talent and not all nonunion members are inferior talent. I have personally worked with terrific and mediocre talents in both categories. Just like budget and schedule, the union/nonunion issue is a parameter that comes into play when making casting determinations. I think you should always start by getting recommendations, then screen the demo tapes of potential candidates yourself to determine the best fit for your project.

BE REAL

This is regarding Steve Nemeth's letter published in the March 2004 issue ("Letters: Loops, Schmoops").

Well, here we go again. I thought that we as a community were getting past this whole "real" music versus "fake" music thing. Alas, after reading your letter, I realize that I am mistaken.

Okay, Mr. Nemeth, check this out: you put your finger on a guitar string sending electricity to a speaker cone that causes it

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to vibrate, which in turn causes vibrations in the air that our ears perceive as sound. I put my finger on a button sending electricity though a series of circuits causing a speaker cone to vibrate, which in turn causes vibrations in the air that our ears perceive as sound. Are those two examples really so different? Is one more "real" than the other?

Although the methods and mechanical devices used are different (and yes, an electric guitar *is* a mechanical device), both are equally valid. Once your screaming guitar track is laid down in Steinberg's Cubase and digitized, does it suddenly become fake? Of course not, because musical style and feeling lives on in those 0s and 1s. And whether something is "music" or "noise" (a subjective distinction in itself) depends on the intentions and skills of the musician, not on the fact that we are in a "digital age."

Now for some really crazy statements. My synthesizer, drum machine, sampler, and computer are "actual instruments." Finally (TR-909 drumroll, please), I am an "actual musician," not because of the particular musical instruments that I choose to express myself with, but simply because I choose to express myself through music, whatever form that may take.

With that said, I think I'll fire up my PC, flick on my controllers, samplers, and synths, and play some "real music."

Scott Orlans
Down Time Productions

HOLD THE PHONE

I was interested in your very comprehensive coverage of ringtones in the February 2004 issue ("Desktop Musician: Phone It In!"). I'm a ringtone developer based in Medellín, Colombia. We produce ringtones in all monophonic formats (including some obsolete ones), as well as SP-MIDI, SMF, and SMAF for Latin American carriers. I'd like to point out a couple of practical points to your readers.

In monophonic formats, most of the current generation of handsets that support monophonic tones in iMelody format (for example, the Motorola C330) accept only a modified version of the iMelody standard. This format restricts the size of the string to 128 bytes, removes most of the header and footer information, and limits the number of octaves.

Also, when creating SP-MIDI files, you mention only the Beatnik Editor. There is another way to create SP-MIDI files, which is free if you already own Steinberg's Cubase SX. You can become a member of Forum Nokia (Nokia's Developer Community) for free at www.forum.nokia.com/main.html, and then go to www.forum.nokia.com/main/0,,034-62,00.html. This is the download page for the Nokia Audio Suite, a VST plug-in designed to ease the creation of SP-MIDI content, help you with the MIP values, and create the SysEx information. It has an effect called the Auralization tool, which allows you to hear what the content will sound like on the handset.

I tested the plug-in with Cakewalk's Sonar, and it didn't work. Cakewalk's VST Adapter gave me an error with the .dll. So I assume that it works only with applications that use VST natively (such as Cubase and Nuendo, for example).

Congratulations on a great magazine that's always filled with excellent content.

Tjebbe Donner
Cyclelogic

Michael Hoover of Cakewalk replies: Tjebbe—We've tested the Nokia Audio Suite, v. 1.0.2, in Sonar 3.1.1, by wrapping it with the Cakewalk VST Adapter, v. 4.4.1, and the plug-ins worked just fine.

To use the Nokia Audio Suite in Sonar, click the Insert | DXi Synth menu item, and select SP-MIDI Creator to create a MIDI track and an audio track for the synthesizer. The SP-MIDI Creator emulates the MIDI capabilities of a variety of Nokia phones, which are stored as presets. Use the synth's MIDI track to compose your ringtones. Next, in the synth's audio track, insert the Auralization tool plug-in into the FX bin. The Auralization tool simulates the acoustics and digital signal processing of Nokia phones listed in the presets. If you have problems with this procedure, please contact Cakewalk's tech support (provided at www.cakewalk.com).

FONT OF INFORMATION

Your site (www.emusician.com) is an excellent research tool. I've subscribed for several years, and recently I began to collaborate with my friend, who is somewhat new to project-studio recording. I want to fill him in on several things, so I've been searching your site for all those great articles I have buried in a giant stack of **EM** issues. It has been a pleasure to easily find so many of the basic tips and tricks scattered over several years' worth of the magazine.

You've made my life easier, as both a teacher and as a research assistant.

John David Duke, Jr.
St. Louis, Missouri

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WHAT'S NEW

By Geary Yelton

BOSS BR-1600CD

The new BR-1600CD ($1,595) can record 256 audio tracks (8 of them simultaneously) and play back 16 tracks at a time—more than any previous Boss portable digital recording studio. It records directly to an internal 40 GB hard drive. A built-in CD-RW drive allows you to burn audio CDs and load and save data. To accompany your performances, the BR-1600CD supplies drum, bass, and loop patterns that you can arrange according to your needs, and you can import sampled loops. Polish your mixes with 16 compressors and 16 3-band track EQs, and apply multiband compression for mastering CDs. A selection of onboard COSM effects includes reverb, chorus, delay, pitch correction, harmony sequencing, mic modeling, overdrive/distortion, and guitar-amp modeling.

In addition to eight unbalanced ¼-inch and eight balanced XLR inputs with 48V phantom power, the rear panel furnishes two RCA line outputs, coaxial S/PDIF I/O, one USB port, and MIDI I/O (for synchronization with a sequencer). A high-impedance instrument input and two headphone outputs are located in front. Ample front-panel controls and a backlit graphical LCD simplify recording and mixing. Footswitch and pedal jacks permit hands-free operation. Other features include user-definable markers, tap tempo, speaker modeling, and a chromatic tuner. A Discrete Drums sample CD-ROM is also included. Boss/Roland Corporation U.S.; tel. (323) 890-3700; Web www.rolandus.com.

AUDIX i5

Audix recently introduced the i5 ($179), a dynamic microphone for recording and sound-reinforcement applications. Unlike models specifically designed for vocals or drums, the i5 is a general-purpose instrument mic that should be equally well suited for miking everything from acoustic pianos to guitar amplifiers.

The i5 has a cardioid polar pattern and off-axis rejection greater than 23 dB. Its specifications state that the i5's frequency response is uniform from 50 Hz to 16 kHz, and that it can withstand sound pressure levels exceeding 140 dB. The i5's rugged cast-zinc-alloy body has a black finish, and the serial number has been laser-etched into each one. A microphone clip and a carrying pouch are included. Audix USA; tel. (800) 966-8261 or (503) 682-6933; e-mail info@audixusa.com; Web www.audixusa.com.

GFORCE IMPOSCAR

Virtual-instrument maker GForce (formerly GMedia) is shipping impOSCar (Mac/Win, $249), a plug-in emulation of the OSCar, a mid-'80s Oxford Synthesizer Company monosynth (see the March 2002 issue of **EM**, online at www.emusician.com). The OSCar had two digital oscillators, two analog multimode filters, and an arpeggiator, and stored 24 user-defined waveforms generated by additive synthesis.

ImpOSCar duplicates the OSCar in almost every respect. Like its namesake, impOSCar can generate sounds impossible to achieve by any other means. It ships with over a dozen banks of 36 Patches, and it can import programs created for the OSCar in SysEx format. New features include 16-note polyphony, Velocity response, additional filter modes, and chorus and delay effects. You can define user waves by specifying 36 harmonics, and you can assign every control to MIDI CC.

ImpOSCar supports Audio Units in Mac OS X and VST in Mac OS 9, Mac OS X, and Windows. PC users need a minimum Pentium II/400 MHz and Windows 98, 2000, ME, or XP. Mac users need at least a G4/400 MHz and Mac OS 9 or OS X 10.1. Both platforms require 64 MB of RAM and 25 MB of hard-drive space. GForce/eBlitz Audio Labs (distributor); tel. (805) 258-1465; e-mail contact@eblitzaudiolabs.com; Web www.gmediamusic.com.

emagic

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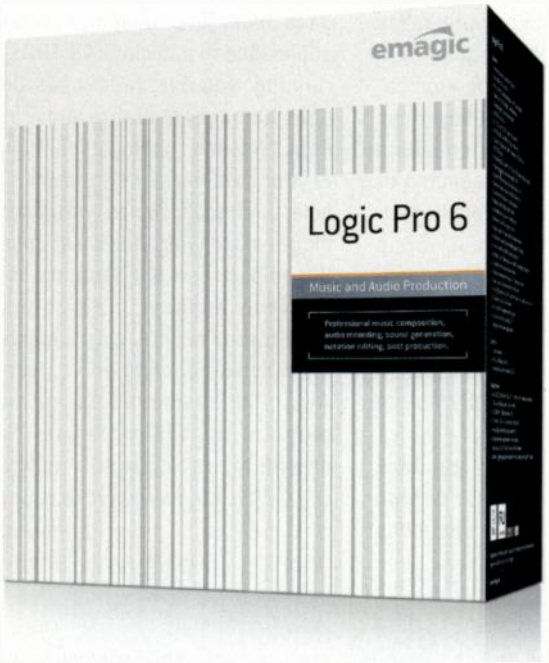
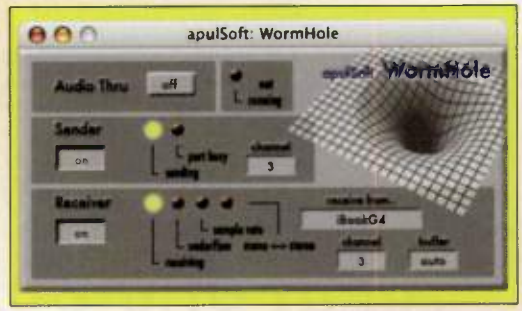


The most widely used program of its kind for professional music creation and audio production is now more attractive than ever before. The new Logic Pro 6 contains all Emagic's superb plug-ins and software instruments, making it not only the best-equipped music production software available, but also the one with the most unbelievable price/performance ratio. Emagic's considerable expertise and experience in music composition, audio recording, sound generation, notation editing and publishing, post production, and film scoring is now all in one box – in Logic Pro 6.

www.emagic.de or www.apple.com/software/pro

DOWNLOAD OF THE MONTH▲▲▲▲

SOUNDFLOWER, WORMHOLE, AND JACK TOOLS



Until recently, Propellerhead Software's ReWire was the only tool for routing audio between Mac software applications. Now three new utilities for Mac OS X offer audio connectivity between applications, and they approach the task in slightly different ways. Each has its merits, and which you choose depends mainly on the audio input and output options available in the applications you want to connect and the complexity of the routings you need.

Soundflower (free) from Cycling '74 provides 2-channel and 16-channel CoreAudio ports that are available to all CoreAudio applications. Audio applications that allow you to choose their CoreAudio output ports can be routed to either of the Soundflower ports. In addition, applications that support multiple output channels can have their outputs routed to individual channels of the 16-channel Soundflower port. That allows you to route individual tracks in Emagic Logic, for example, to the inputs of another audio-recording application, such as Ableton Live. You can use Soundflower with applications that don't allow you to choose their CoreAudio port by selecting the 2-channel Soundflower device as CoreAudio's Default Output in the Audio MIDI Setup application. You can download Soundflower from the Cycling '74 Web site (www.cycling74.com).

Wormhole 1.1 ($25) from apulSoft is an Audio Units (AU) and VST plug-in that uses TCP/IP to route as many as 100 audio channels between applications that support either of those plug-in formats. Because it uses TCP/IP, it can also be used to route audio between computers. You simply insert one Wormhole plug-in in the source bus of the sending application and another in the target bus of the receiving application. You then select audio channels and enable sending or receiving in both Wormhole control panels. You can use multiple plug-ins to route different signals to different applications or to different buses within the same application. You can buy Wormhole or download a time- and feature-limited demo from the apulSoft Web site (www.apulsoft.ch).

Jack Tools 0.4 (free) from the Jack OS X Team gives you the best of both worlds: TCP/IP data transfer should be available by the time you read this. Jack Tools provides interconnectivity through a CoreAudio driver called the Jack Audio Server (JAS). You interact with Jack Tools by launching the JackPilot application to activate JAS. Once JAS is running, you use JackPilot's Connections Manager to create audio connections between running applications and to your hardware interface. Like Wormhole, Jack Tools comes with AU and VST plug-ins, allowing you to set up multiple buses between applications or within the same application. That gives you total control in setting up an audio routing matrix, allowing you to use CoreAudio buses as well as AU and VST plug-ins for audio routing. You can download Jack Tools from the Jack OS X Web site (www.jackosx.com).

—Len Sasso

M-AUDIO OCTANE

M-Audio continues its tradition of bringing down the cost of pro audio with its new 8-channel microphone preamp, the Octane ($749). Its 8-channel ADAT Lightpipe output and two BNC word-clock connectors make it suitable for multichannel digital recording setups. The 2U Octane can also operate as a 24-bit, 8-channel A/D converter. You can switch its clock rate from 44.1 to 48 kHz, and it slaves to external sync rates from 33 to 59 kHz. If eight channels aren't enough, you can link together as many Octanes as necessary.

On the rear panel are eight balanced XLR mic inputs, eight balanced ¼-inch TRS line inputs, and eight balanced ¼-inch TRS outputs, which allow interconnection with analog mixers and recorders. Additional ¼-inch instrument inputs for channels 1 and 2 are on the front panel, and channel 1 has a 12 db-per-octave low-cut rumble filter. Channels 7 and 8 offer optional M-S matrix encoding with a Width knob for controlling stereo imaging. Channels 1 through 4 and 5 through 8 have switchable 48V phantom power, and a phase-reverse switch is available for each channel. The Octane employs the same technology used in M-Audio's DMP3 mic preamp. M-Audio; tel. (800) 969-6434 or (626) 633-9050; e-mail info@m-audio.com; Web www.m-audio.com.

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SOUND ADVICE▲▲▲▲

▲ CYCLING '74

Ron MacLeod, creator of the legendary *Poke in the Ear with a Sharp Stick* series of sample discs, has produced the first title in Cycling '74's new Cycles series of Audio Source Libraries. *Sustained Encounters* ($99) is packaged on two discs: a DVD-ROM of 24-bit, 44.1 and 48 kHz WAV files, and an audio CD for easy auditioning.

Cycling '74 describes *Sustained Encounters* as "long evolving aural environments and unfolding atmospheres . . . an accumulation of years of film design and sonic exploration." Its contents are divided into three main categories: Immersion, Other Realms, and Textural. All Immersion files are in 5.1-surround format, and Other Realms are recorded in stereo. Textural files, also in stereo, are divided into several subcategories: Atmospheres, Environs, Lifeforms, Textural Complex, Textural Events, Textural High, and Textural Low. Documentation for the Textural Low files warns that a subwoofer may be required. *Sustained Encounters* conveniently provides Excel and PDF files that list the contents of both discs. Cycling '74; tel. (415) 974-1818; e-mail info@cycling74.com; Web www.cycling74.com.

▶ DISCOVERY SOUND

Several recent CD-ROMs showcase the diversity of samples offered by Japanese soundware developer Discovery Sound. *Didgeridoo* ($25) contains 97 phrases played on the ancient Australian Aboriginal wind instrument. A didgeridoo is traditionally made from a section of eucalyptus trunk hollowed out by termites. Using circular breathing, the player creates low drones and staccato tones that have become popular for ethno-ambient and tribal-trance styles of music.

Similarly, *Shamisen* ($25) focuses entirely on the traditional 3-string Japanese folk instrument. The disc contains dozens of phrases and loops played by Hisao Suginaka and ranging from one to eight measures long. *Shamisen* and *Didgeridoo* both contain Acidized WAV and

REX2 files, but very little documentation.

Other new discs embrace the sounds of the Western world. One of these is *8 Bit Family* ($38), a collection inspired by the video games of the early 1980s. In addition to Acidized WAV and REX2 files, the CD-ROM provides sound files and preset instruments for Steinberg HALion and Emagic EXS24.

Anyone itching for some scratched-vinyl sounds will want to check out *Vinylism* ($38). It features more than 300 samples that demonstrate the art of scratching in Acidized WAV and REX2 formats. Samples are organized by tempo: 75, 80, 90, 100, 120, and 130 bpm. Most of the sounds began as vocal recordings, but *Vinylism* also provides 30 drum scratches. Discovery Sound; e-mail overseas@discoveryfirm.com; Web www.discoverysound.com.

▼ ZERO-G

Ian Boddy is a major British synthesist whose music has long influenced electronic musicians the world over. His forte is creating atmospheric soundscapes, and that's just what he's done in *Morphology* (Mac/Win, $199.95), a virtual sound module based on Native Instruments' Kompakt Instrument. *Morphology* is packaged on a single DVD containing over 3 MB of samples and instruments that range from Dark Drones and Abstract FX to Harmonic Loops and Industrial Feedback.

Morphology is 8-part multitimbral and offers a variety of synthesis and effects parameters. Most Instruments are single samples rather than multisamples, and all samples are 24-bit recordings. *Morphology* operates either standalone or as a plug-in that supports VST, DX, and RTAS in Windows; VST in Mac OS 9; and VST, RTAS, and Audio Units in Mac OS X. It requires at least a Pentium III/500 MHz with Windows 98, ME, or XP, or a Mac G3/500 MHz with Mac OS 9.2 or OS X 10.2. Zero-G/EastWest (distributor); tel. (800) 833-8339; e-mail sales@eastwestsounds.com; Web www.soundsonline.com.

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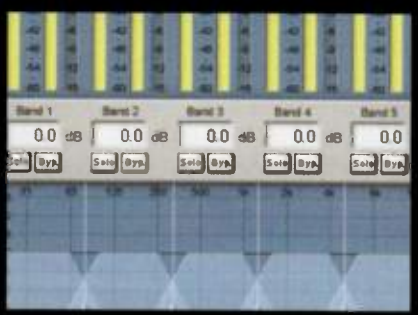

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KEY CHANGES

BIAS (www.bias-inc.com) has announced Peak 4.1, an upgrade that includes Roxio Jam and SFX Machine Lite at no additional cost. Jam will let Peak users burn Redbook-standard audio CDs, and SFX Machine Lite will provide 21 additional DSP presets to Peak's processing capabilities. The upgrade is free for owners of Peak 4.0 ($19 on CD-ROM) or $149 for owners of previous versions . . . A free update to Project5 1.5 (www.Project5.com), available from **Cakewalk**, features a revised step sequencer, a new Resource Browser, the means to disable unused synth outputs to ease CPU load, and the ability to save a track's instrument, effects chain, and plug-in settings with a single click . . . **VirSyn** (www.virsyn.com) is shipping Tera 2.0.1 and Cube 1.5.1. Tera now offers six types of synthesis and supports ReWire 2 and RTAS. Cube now has the ability to resynthesize audio files no matter what their length or level of complexity. Other new features include automatic extraction of formants and up to 512 partials, each with envelopes for frequency, level, and pan . . . **Applied Acoustics Systems** (www.applied-acoustics.com) has announced a $99 upgrade to Tassman 4 (free if you purchased Tassman 3 this year), which features an expanded synth and preset library, live audio processing, and new effects modules. Applied Acoustics is also offering Tassman downloads to current owners of Clavia Nord Modular and Native Instruments Reaktor for $199, $300 below MSRP . . . **IK Multimedia** is shipping a Mac OS X–compatible version of AmpliTube (www.amplitube.com), a VST and AU plug-in that turns your computer into a virtual guitar amp and effects rack. Upgrading from the Mac OS 9 version is $79, and you can download additional presets for free. Another excellent source is www.GuitarLearning.co.uk, which offers 250 AmpliTube Presets for $9.95.

ARTURIA MINIMOOG V

Arturia, the company that developed the Moog Modular V and CS-80V virtual synthesizers, is shipping a software emulation of the Minimoog Model D. Like Moog Music's more recent Voyager synth, Minimoog V (Mac/Win, $199) offers modern features such as preset storage, MIDI control, and expanded modulation routing. Unlike the Voyager, Arturia's version offers 32-note polyphony, an arpeggiator, and stereo chorus and delay. The software handles sampling rates as high as 96 kHz with 64-bit floating-point resolution. The modulation matrix provides 6 connections with 12 sources and 32 destinations from which to choose. Minimoog V ships with a printed manual and more than 500 presets; additional presets will be made available for download on Arturia's Web site.

The installation CD includes standalone and plug-in versions for both platforms. The plug-in supports DX and HTDM in Windows; MAS in Mac OS 9; Audio Units and HTDM in Mac OS X; and VST and RTAS on all three operating systems. Minimum system requirements for the PC are a Pentium III/500 MHz, Windows 95 or later, 128 MB of RAM, and an ASIO or DirectX sound card. Macintosh users will need a minimum G3/500 MHz, Mac OS 9.2.2 or OS X 10.2, and 128 MB of RAM. (Because Minimoog V supports Sound Manager, an ASIO- or CoreAudio-compatible audio interface is optional on the Mac.) Arturia; tel. 33-438-020-555; e-mail info@arturia.com; Web www.arturia.com.

ELEKTRON MONOMACHINE SFX-6 AND SFX-60

From the manufacturer of the SidStation and the Machinedrum come two new synthesizer workstations: the Monomachine SFX-6 37-note keyboard ($1,950) and SFX-60 tabletop ($1,350). Five sound engines encompass synthesis techniques that Elektron calls SuperWave, SID, DigiPro, FM+, and VO. The Monomachine's pattern-based, 6-track step sequencer lets you select either a multi-effects processor or one monophonic sound engine for each track, or one track with 6-note polyphony.

SuperWave is analog-modeling synthesis; SID is based on the sound-generating capabilities of the Commodore 64. DigiPro furnishes digital waveforms and a percussive source called the BeatBox. FM+ supplies unique frequency-modulation algorithms, and VO synthesizes singing voices in any language or dialect, according to Elektron. Monomachine's five simultaneous track effects are resonant multimode filter, tempo-synced delay, distortion, sampling-rate reduction, and one band of EQ. Master effects include reverb and chorus.

The Monomachine's drum-machine-style sequencer provides comprehensive control over synthesis and effects parameters. Pitch sequencing is separate from envelope sequencing, with individual triggers for filter envelope, amplitude envelope, and LFO. Three tempo-synced LFOs for each track are assignable to any of 56 parameters. Other features include external audio processing and an assignable joystick. GSF Agency/TSI International Sales (distributor); tel. (310) 452-6216; e-mail info@elektron.se; Web www.elektron.se or www.monomachine.com.

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By Scott Wilkinson

Getting Holographic

Data storage on optical discs has been of critical importance to electronic musicians and consumers ever since CDs first appeared two decades ago. Since then, the capacity of those 12 cm plastic discs has increased from 650 MB to 4.7 GB on DVD to 25 GB on blue-laser discs, which will hit the U.S. market within a year or two.

While 25 GB sounds like a lot, experience teaches us that we will soon outgrow even that capacity, and the basic idea of representing bits of information as pits and lands in a spiral track on the disc probably can't be extended much further. However, there is hope for creating optical discs with much greater capacities, thanks to a different approach: holographic encoding. What seemed like a sci-fi dream just a few years ago will soon be an actual commercial product, thanks in large part to a company called InPhase Technologies (www.inphase-tech.com).

Holographic storage could blow the top off optical-disc capacities.

For those who aren't familiar with holographic storage, it begins with a laser beam that passes through a beam splitter, thus forming two identical beams (see **Fig. 1a**). One beam, called the signal beam, passes through a spatial light modulator (SLM), which is an array of pixels that represents one "page" of data. In the simplest SLM, each pixel is binary, either blocking the light or letting it pass. In more sophisticated SLMs, each pixel could exhibit a gray scale, allowing more or less light to pass through, which would allow it to represent, say, an 8- or 16-bit value.

Once the light passes through the SLM and reaches the recording medium, it is recombined with the other laser beam, called the reference beam, which creates an interference pattern that is recorded in a light-sensitive material. In fact, many different interference patterns can be recorded at the same physical location by changing the angle of the reference beam with respect to the signal beam and medium for each page of data. To read a page of data, the reference beam is directed to the medium at a certain angle, and the interference pattern is picked up by a detection array (see **Fig. 1b**).

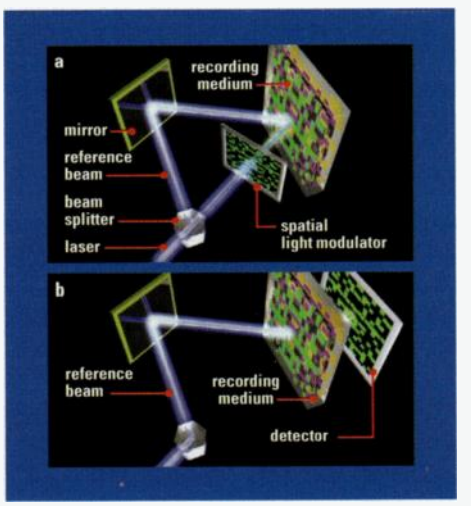

FIG. 1: Data is encoded as an interference pattern formed by the interaction of the signal beam passing through the SLM and the reference beam (a). The pattern is read by directing the reference beam through the medium to a detector array (b).

InPhase has been working on holographic storage for several years, first introducing a medium that reacted to green laser light. Now they've introduced a medium that reacts to shorter-wavelength blue light, which allows more data to be packed into a given region. Called Tapestry, the new medium will first be implemented in the form of a 12 cm write-once disc that will come in a light-tight cartridge, much like a magneto-optical disc of today. These discs should be available later this year for developers of holographic-storage hardware, including most current manufacturers of CD and DVD drives.

The company is also working on its own recording drive that has an SLM composed of on/off LCD pixels in a 1,280×1,024 array, yielding 1.3 Mb of data per page. Each storage location on the disc will hold 500 to 1,000 pages of data. With thousands of separate storage locations, the first generation system is slated to have a total capacity of 200 GB per disc and a data-transfer rate of 20 MBps. Compare that to blue-laser DVD with 25 GB at 4.5 MBps, and you can see where this is going. Future generations of holographic discs could easily have capacities in the terabytes.

Other form factors, such as memory cards and chips, will also emerge. Imagine a slice of plastic the size of a postage stamp with a capacity of 1 GB. That's still a few years down the road, though the company's first-generation disc drive could reach the market by 2006. It's all good for musicians, whose insatiable thirst for capacity and bandwidth just might be slaked by holographic storage—at least for a while. ❀

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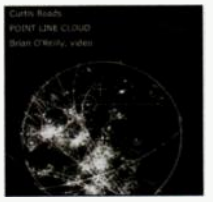
PROFILE

By Dennis Miller

Cloud Formations

Curtis Roads creates a granular world of sound.

Curtis Roads is best known as the author of several landmark texts on computer music and as former editor of the prestigious *Computer Music Journal* (MIT Press). Fewer people, however, know Roads as a composer and software engineer. That could change with the recent release of *Half Life*, a new work available both as a standalone musical composition and as the musical component of a mixed-media (music and video) collaboration. *Half Life* is found on a new CD+DVD boxed set of Roads's music entitled *Point Line Cloud* (Asphodel, 2004).



Roads spent two years creating *Half Life* and describes it as portraying "a virtual world in which sounds are born and die in an instant or emerge in slow motion." This description fits well with the synthesis approach Roads used, called *pulsar synthesis*—a technique that bears much in common with granular synthesis. After many years of research and experimentation in the area of creating music with minute segments of sound, Roads and collaborator Alberto de Campo developed pulsar synthesis and released software for the Mac called PulsarGenerator that employs the technique. PulsarGenerator is available for download at www.create.ucsb.edu/PulsarGenerator.

Half Life is based on a 14-second sample that Roads synthesized using his own software. He applied a variety of techniques to manipulate the sample and used the results as the source material for the work. "Pulsar synthesis generates a train of sound particles," Roads says. "Each pulsar particle repeats at a fundamental frequency with a formant peak in the spectrum above the fundamental. Depending on the fundamental frequency, one can produce either rhythms or tones. I controlled the fundamental and formant frequencies using separate time-varying envelopes that I drew on the screen."

In *Half Life*, one hears a flurry of sonic gestures ranging from short, fluttering sounds to dense and colorful cloud-like clusters. The piece has an almost tactile quality, as if you could feel the different textures and surfaces. Roads applies meticulous control to each grain's spatial location, and though the work is presented in stereo on his CD, it is easily adapted to more complex sound systems. In fact, for its first live performance, Roads used 28 loudspeakers scattered around a large auditorium.

Roads isn't afraid to let chance play a role in his music. For the second part of *Half Life*, he created an algorithm to randomly select a unique center frequency for the filter on each grain. "At high-grain densities, this produced a texture in which up to several hundred independent filters were operating at any given second, leading to highly animated microtextures," Roads says. Yet for *Half Life*'s large-scale design, Roads worked on an intuitive level, even throwing out sections of music that didn't fit the grand scheme.

Roads thinks granular and pulsar synthesis have a huge potential for modern composers and sound designers. "Granulation can spawn a vast amount of output sound material from a tiny amount of input," he says, "A given sound can be time-stretched by a factor of 100 or more. Along with this telescoping effect, other processes may also be occurring, such as pitch shifting, filtering, and spatial scattering. By shrinking the grain duration one can cause the sound to dissolve into broadband noise, and by varying the grain density one can play with the sound's transparency and mass."

INTERAMERICAN DEVELOPMENT BANK

***Half Life*/Curtis Roads**

The existence of granular-synthesis features in many commercial and shareware programs—including Native Instruments Reaktor, Symbolic Sound's Kyma System, and Rasmus Ekman's Granulab—would seem to support his claim.

For more information, contact Curtis Roads; e-mail clang@create.ucsb.edu, Web www.asphodel.com.

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Ears to You!

LAURA WILLIAMS

Mixes sound muddy? It might all be in your head.

By Charles J. Limb, M.D.

Like many artists, musicians can be obsessive perfectionists. Modern technology offers so much control over sound that you can spend hours or even weeks on achieving just the sound you desire. With such attention to detail, you naturally want to use studio hardware that will provide the finest audio quality possible. You might fret over whether a piano multisample affords enough Velocity cross-switching, or if a condenser microphone is the right choice for the job at hand. Even the most transparent studio monitors, however, can't compensate for deficiencies in that final filter before sound reaches our brains: our ears.

CAN YOU HEAR ME NOW?

That humans can hear and make sense of anything at all, much less something as complex as speech, stereo imaging, or the release contour of a guitar note, is truly mind-boggling. For us to hear the way we do, an amazing series of events must take place as our auditory systems transform vibrations into music.

Sound waves travel through the air and are collected by the outer ear, known as the *auricle* or the *pinna*. (Until recently, the function of the outer ear was largely unknown, but we now realize that the human ear's particular shape alters the spectra of incoming sounds in ways that help us localize sounds in three-dimensional space.) From the outer ear, sound travels down the external ear canal to the point at which it hits the eardrum, or the *tympanic membrane* (see **Fig. 1**). The tympanic membrane acts like the head of a drum and is stretched taut over the delicate contents within.

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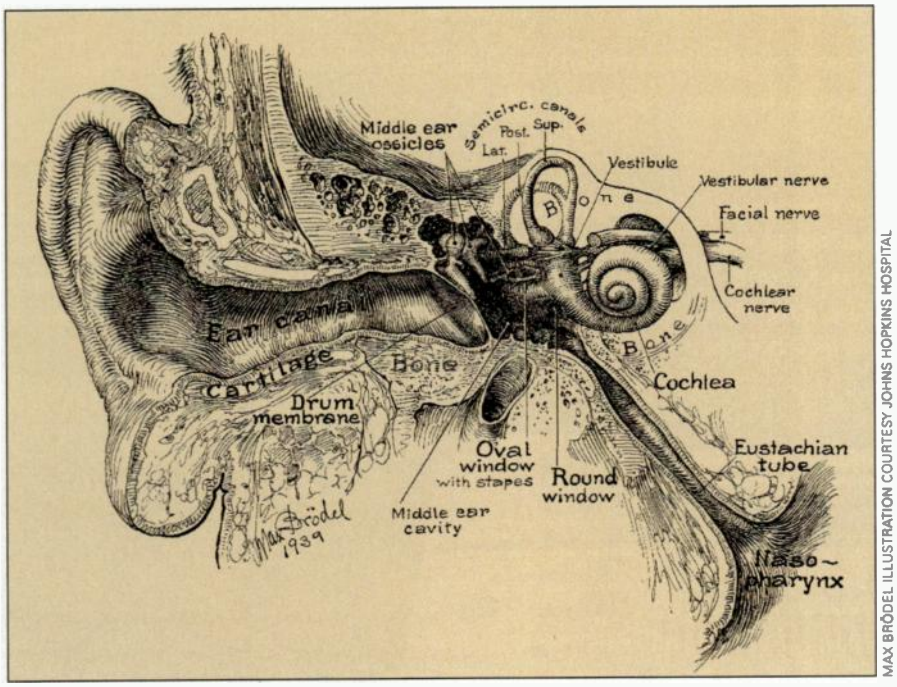
Ears to You!

The eardrum, however, is no ordinary drum. The size of the vibrating portion of the eardrum averages only about 0.085 square inches. The drum's underside is attached to the first of the three hearing bones, or *ossicles*. These bones are the *malleus* (which resembles a hammer or mallet), the *incus* (which resembles an anvil), and the *stapes* (which resembles a stirrup). In a fascinating system of leverage and impedance matching, audible vibrations travel down the malleus to the incus and then to the stapes, which sits at the entrance of the *cochlea*, also known as the inner ear. (The term *external ear* refers to the outer ear, ear canal, and outer portion of the eardrum; the *middle ear* is the space between the eardrum and the cochlea.)

Within the cochlea—which is a snail-shaped structure encapsulated in dense bone—the fluids of the inner ear receive the mechanical movements of the stapes bone in much the same way that waves are produced when you throw a pebble into water. The incoming fluid wave stimulates neural hair cells that are spatially organized according to frequency. Somehow, all of the incoming sound is divided and received by the appropriate frequency-specific hair cell, which sends it to the auditory nerve.

What is the point of such a complex system? Why doesn't sound traveling through the air stimulate the fluid directly? This elegant system of conductive transmission matches the impedance of sound traveling through an air-fluid interface, which amplifies the original sound more than 20-fold to produce a gain of approximately 25 to 30 dB.

The process described here, however, is probably the least complicated part of the auditory system. How the brain makes sense of the signals coming up the auditory nerve—how it simultaneously extracts melodies, harmonies, rhythms, timbres, and lyrics—is a mystery that science is just beginning to unravel.



MAX BRÖDEL ILLUSTRATION COURTESY JOHNS HOPKINS HOSPITAL

FIG. 1: The human auditory system carries sound from the outer ear through the external ear canal to the middle and the inner ear, where neural hair cells stimulate the auditory nerve, which transmits signals to the brain.

BREAK IT DOWN

Naturally, with such an intricate system for sound transmission, the auditory system is susceptible to degradation over time. The sad fact is that hearing tends to decline with age, primarily because human cochlear hair cells do not regenerate once they are damaged. (They do in some animals, such as birds.) You start out with a fixed number of auditory nerve fibers and hair cells at birth, and that number only decreases over time.

Physicians categorize hearing losses as one of two types: *conductive* or *sensorineural*. With a conductive hearing loss, the neural elements of the auditory system are in place, but sound is not getting to them. It's like having a mixing console that works, but trying to record with a broken microphone. The cause of conductive hearing loss can be as simple as an ear full of wax or a hole in the eardrum, or it might be more complex—a middle-ear infection, for example, or arthritis of the hearing bones (a condition known as *otosclerosis*). As a general rule, conductive hearing losses can be medically or surgically treated and improved.

In contrast to conductive hearing loss, sensorineural hearing loss is caused by the failure of the auditory system's neural elements. One analogy would be having a collection of beautifully functioning microphones and a broken mixing console; the sound might reach the mixer, but nothing would be recorded because the mixer isn't working. The causes of sensorineural hearing loss can be as diverse as aging, a congenital defect, acoustic trauma, or tumors of the auditory nerve. Generally, such losses can't be corrected by surgery unless they have already led to deafness.

Someone can also have a mixed hearing loss, in which both conductive and sensorineural components are present. Hearing loss has literally hundreds of causes, ranging from genetic syndromes to getting punched in the ear. All hearing loss, however, can be categorized as purely sensorineural, purely conductive, or a combination of sensorineural and conductive.

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Dan Steinberg is the product manager for Big Knob. He has repeatedly exercised his right to veto several previous captions.

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Ears to You!

Although it is daunting to realize that some hearing loss is beyond repair, it's important to determine the cause of the loss and ensure that some underlying disease isn't responsible. In some cases, hearing loss is only the tip of the iceberg indicating a more threatening condition.

THE SOUND OF MUSIC

Most musicians like their music loud; it just sounds better. Although I am an ear surgeon and the treatment of deafness (and musicians) is my specialty, even I prefer to turn the volume up. Increasing the level lets you hear the nuances of a recording, to feel surrounded by the music. But how loud is too loud? (See the table "Noise Exposure.")

Some musicians turn up the volume because they have so much hearing loss that they can't hear anything unless it is really loud. Acoustic trauma à la Pete Townshend is one of the most common causes of sensorineural hearing loss (see Fig. 2). The Occupational Safety and Health Association (OSHA) has set out clear guidelines for how loud is too loud. These guidelines state that anybody exposed to a sound-pressure level (SPL) greater than 85 dB is at risk for noise-related hearing loss and requires ear protection. OSHA has set firm guidelines for allowable noise exposures in the workplace (see the table "OSHA Guidelines"). These rules are intended to prevent hearing loss in people whose occupations place them at high risk, such as airport traffic workers who listen to airplanes take off throughout the day.

The justification for these rules is simple: acoustic trauma produces permanent hearing loss. Hearing loss first occurs by a process known as *temporary threshold shift*. After an acute exposure to a loud rock concert, most concertgoers know all too well the cotton-in-the-ears feeling they have. The auditory world is muffled, and the volume of all sounds is diminished. That muffling is the result of a temporary threshold shift, in which the threshold sound level at which hair cells fire is increased, thereby requiring the sound to be louder in order to be heard. Normally, this shift is most pronounced in the high-frequency region. Over the course of hours or even days, the feeling slowly subsides until hearing thresholds have returned to normal.

After repeated assaults on the auditory system and recurrent temporary threshold shifts, however, things start changing. The system loses its ability to rebound from the threshold shift. Eventually, the threshold shift becomes permanent and irreversible. No medication or surgery in the world can effectively undo such changes, and the affected individual will lose the full frequency spectrum of his or her hearing forever. For a musician or sound engineer, the consequences can be downright devastating.

To compensate for hearing loss caused by acoustic trauma, the natural tendency is to increase the volume again, causing the entire cycle to repeat. Acoustic trauma that occurs in short, loud bursts causes its worst hearing loss at about 4 kHz on an audiogram (a test that quantifies the frequency and severity of hearing loss), but this is variable. I have seen many patients with nearly complete high-frequency hearing loss caused by acoustic trauma. Even if both ears are not equally affected, the effects of single-sided hearing loss for a musician can be disastrous, as the ability to perceive sounds in stereo and localize sounds in auditory space is diminished.

THE SOUNDS OF SILENCE

It would be bad enough if hearing loss were the only consequence of acoustic trauma, but unfortunately, it isn't. Many people with hearing loss, particularly high-frequency loss caused by continued exposure to loud volumes, find that lost frequencies are replaced by something worse than silence: the phenomenon of *tinnitus*.

Tinnitus refers to the perception of a sound in the absence of external

COURTESY GIBSON

FIG. 2: The Who's Pete Townshend never intended to become the poster boy for tinnitus, but years of exposure to high-decibel rock 'n' roll gradually took an undeniable toll on his hearing.

stimuli. At one time or another, most people have had short-lived bouts of tinnitus, which is usually described as a high-pitched ringing. With hair-cell loss, however, it is possible (and quite common) for tinnitus to become permanent. Tinnitus can even affect people who are deaf. Patients suffering from tinnitus have to deal with a constant whine that can affect either one or both sides. Also described as buzzing, humming, or whistling, the sound ranges in annoyance from a mild nuisance in the evenings to a constant, debilitating condition that can lead to depression or even suicide.

How do you cure tinnitus? That is a million-dollar question, and if a reliable cure for tinnitus is discovered, it will have a tremendous impact on humanity. As of now, no reliable cure has been found, although some measures are reported to help. Medical science is beginning to understand that tinnitus is not simply an auditory percept generated from aberrant firing of cochlear hair cells. Even if you were to cut someone's auditory nerve (which connects the inner ear to the brain stem), you wouldn't necessarily reduce tinnitus; in fact, you might make it worse, and you would definitely make the patient deaf on one side.

MIKE CRUZ

FIG. 3: Loud headphones pose a particular threat to hearing health. Whenever monitoring through headphones, take special care to keep the volume at a comfortable level.

Tinnitus is an auditory percept generated from disorganized neural activity within the portions of the brain stem that are responsible for sound perception. One leading theory is that the loss of neural hair cells (say, from acoustic trauma) causes disinhibition (a loss of suppression) of auditory brain stem neurons that typically respond to that frequency range. This disinhibition causes an increase in the brain stem's neural activity that the auditory cortex (the higher brain structure responsible for sound processing) perceives as a sound—namely, tinnitus—despite the lack of external acoustic stimuli.

Noise Exposure

This table shows common sound sources and average decibels. Because the decibel scale is logarithmic rather than linear, doubling the decibel level is not the same as doubling the volume. Instead, a 10 dB increase in sound is equivalent to a tenfold increase in total sound energy.

SOURCE	AVERAGE VOLUME
Soft whisper	30 dB
Rainfall	50 dB
Normal conversation	60 dB
TV audio	70 dB
Toilet flushing	80 dB
Boom box, volume on high	100 dB
Shouting	110 dB
Symphony concert	110 dB
Rock concert	115 dB
Ambulance siren	120 dB
Car stereo, volume on high	125 dB
Percussion section, orchestra	130 dB
Airplane taking off	140 dB
Shotgun	170 dB

CHECK YOUR HEAD

As annoying as tinnitus can be, however, it usually isn't a sign of anything more dangerous. If severe tinnitus has a clear cause, such as a long history of standing in front of a Marshall rig, it is generally benign. However, certain other conditions, such as tumors of the hearing nerve, can cause tinnitus on the affected side. Although such ailments are certainly less common than tinnitus caused by acoustic trauma, they are much more serious and early diagnosis is the key to successful management.

So what can you do? Get checked out. Anybody who has one-sided tinnitus or tinnitus of a pulsatile character

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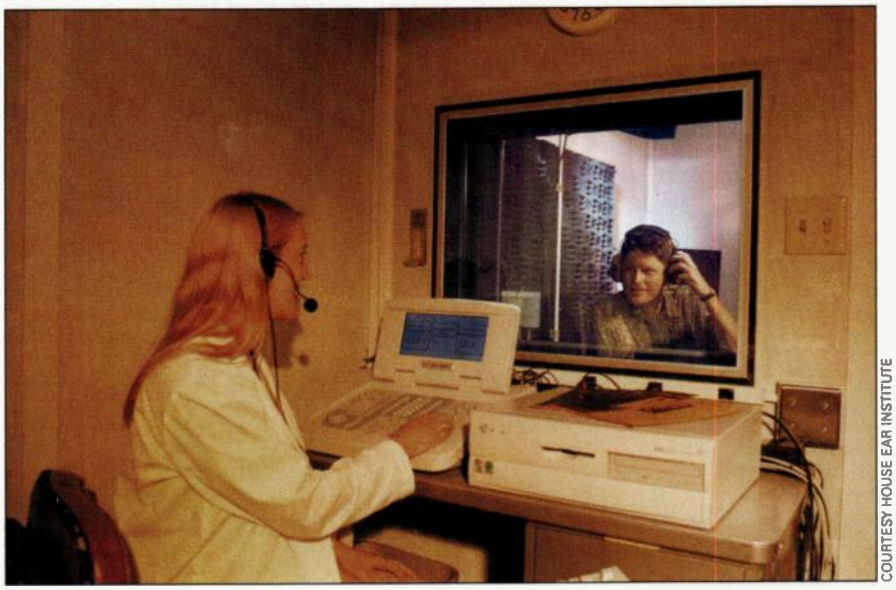
Ears to You!

(in rhythm with the heartbeat) should be evaluated. In addition, anybody who recognizes (or has been told frequently) that he or she has hearing loss should be evaluated. Make an appointment with an otolaryngologist (ear, nose, and throat specialist), or better yet, with an otologist or neurotologist (ear specialist). Get your hearing formally tested by an audiologist and have your ears examined.

I'm continually amazed by how few musicians have ever had their hearing examined, even though they suffer from auditory complaints and their livelihood and joy are dependent upon their hearing. That's like a painter with blurry vision not seeing an ophthalmologist or getting eyeglasses. Perhaps some people are afraid of finding out they have a serious ailment, or they hate the idea of needing a hearing aid.

The one thing that anyone with hearing complaints must be sure to do is to see a medical professional skilled in audiology. Regardless of whether anything can be done about your hearing problems, it's still important to quantify the amount and the frequency range of any hearing loss. Whether you are a musician, an engineer, or a composer, you need to know if you have any hearing loss so that you can account for it when you listen to music and make critical decisions in the studio. If you know that you have a high-frequency hearing loss, you will learn to stop boosting the highs just so you can hear them, because what sounds right to somebody with hearing loss sounds bad to somebody with normal hearing.



COURTESY HOUSE EAR INSTITUTE

FIG. 4: Musicians who are regularly exposed to loud music should have their ears examined annually. Here, an audiologist performs a high-frequency hearing test on an audio professional.

OSHA Guidelines

According to OSHA, noise exposures greater than the maximum allowed will lead to permanent hearing loss. Because the effects are cumulative, the most accurate way to estimate sound-level exposure is to consider the total throughout the day.

MAXIMUM SOUND LEVEL	ALLOWABLE DURATION PER DAY
90 db	8 hours
92 db	6 hours
95 db	4 hours
97 db	3 hours
100 db	2 hours
102 db	90 minutes
105 db	60 minutes
110 db	30 minutes
115 db	15 minutes or less

PUMP DOWN THE VOLUME

Unfortunately, OSHA's guidelines for sound exposure don't translate well for musicians. First of all, musicians need to hear. You can't expect musicians to just put on protective earmuffs and be satisfied or even able to perform their jobs. If earplugs (even musician's earplugs, which are designed to attenuate frequencies evenly) were a perfect solution, they would be in much wider use; however, ear protection does reduce one's ability to hear accurately.

In addition, the type of noise exposure that musicians are subjected to is difficult to quantify and control. For example, do you have any idea how many decibels you're exposed to every day? No one can ensure that the drummer who bangs away in the basement or the guitarist who wails in front of an amplifier uses ear protection. It's a free country, and if you want to play at the loudest possible volumes, nobody (except maybe the police or your spouse) can stop you.

General guidelines can be established, though. As a very basic first step, accept that any sound that causes pain is too loud. If your ears hurt every time you gig or rehearse, you are certainly suffering from hair-cell injury that could become permanent. Turn down the volume. Get farther away from the

WHY PAY LESS?

I'm amazed at the recent price drop of entry level condenser microphones. $99, $49.

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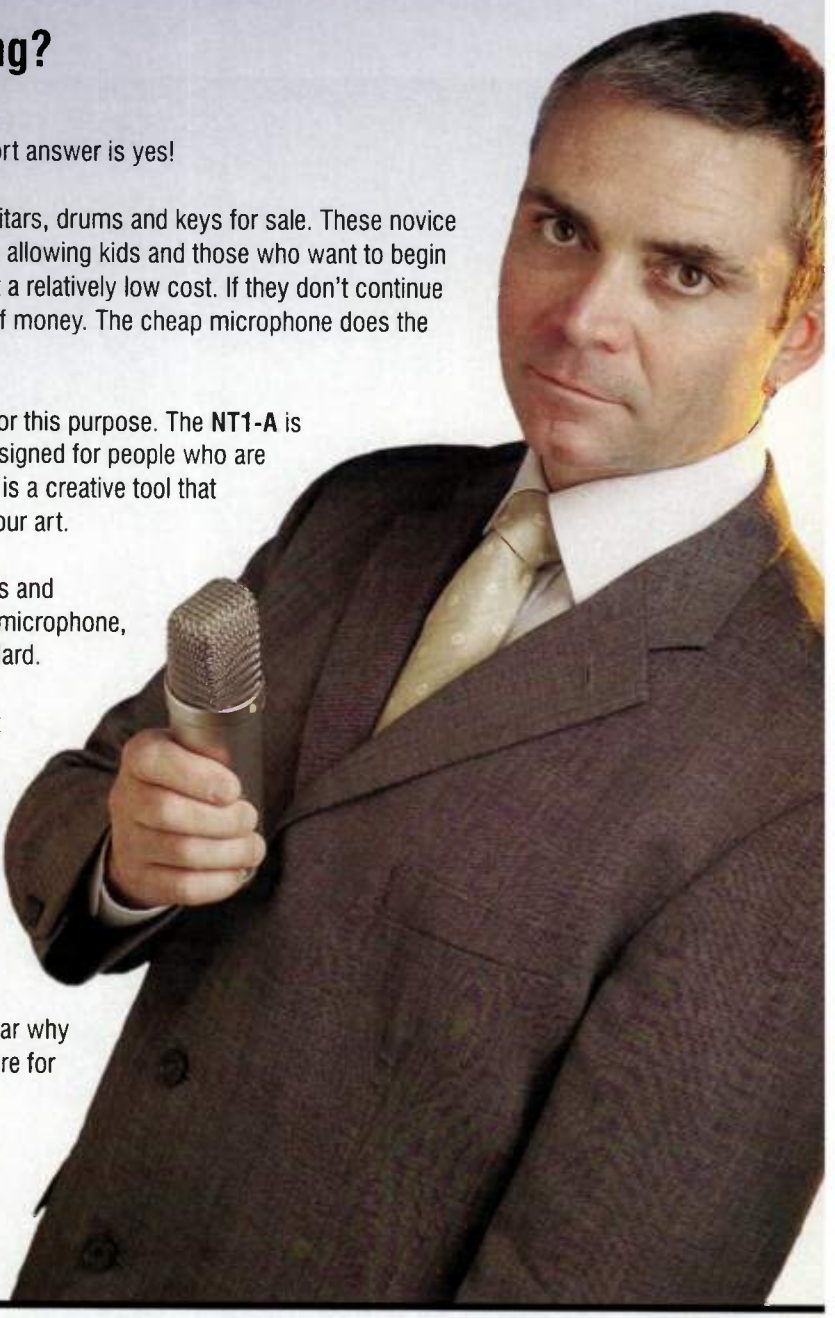

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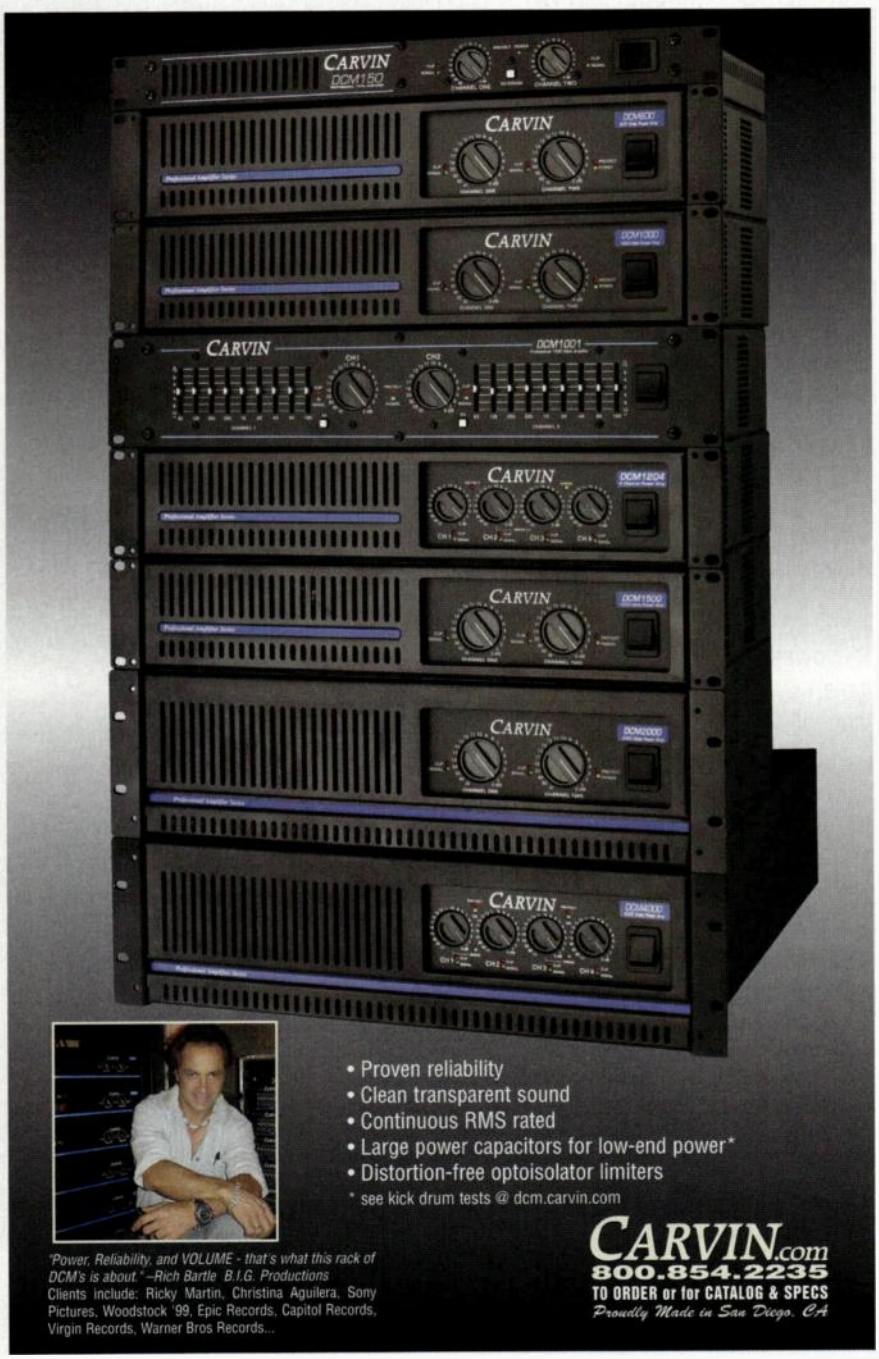
Ears to You!

speakers. Leave the mosh pit. At the very least, get earplugs to protect your ears when they hurt; otherwise, you won't be hearing for long.

If, however, you notice that your ears feel plugged up after listening or performing but they don't hurt, you are experiencing a threshold shift from assaulting your hair cells—one that will eventually become permanent. If that's the case, you can completely avoid permanent injury by paying judicious attention to ear protection, by lowering volumes, and by avoiding excessive noise. Like the hair that's lost from a balding head, hair cells don't come back.



For reasons that I have never understood, headphones lead people to turn volumes up loud. Maybe it's the crisp sound, the feeling of immersion, or the sense of isolation from the world. People at risk for hearing loss, however, need to be aware that just because the sound is coming from a tiny speaker (or even an earbud), it is no less damaging at high levels than larger speakers are. I encourage you to monitor through headphones only when absolutely necessary, and be mindful that headphone volumes can become intense but don't need to be (see **Fig. 3**). You will probably find after lowering the volume that you adjust to it rather quickly, and you will soon experience the same enjoyment you had previously with louder levels—with the full range of sonic immersion and crisp sound.

When monitoring through loudspeakers, keep track of how long you are listening and at what volumes. The same goes for musicians who rehearse or perform for extended sessions. If possible, try to measure the output in decibels, so you can get a sense of the amount of energy your ears are processing. Music tends to be loud in spurts, with peaks and valleys that correspond to sounds such as cymbal crashes and song-ending flourishes. Such peaks can damage your ears even if the average volume level is not excessive. If you are getting close to the OSHA recommendation (say, listening for four hours a day at 95 dB), you are at risk for hearing loss. You'll need to take breaks, turn down your levels, and get your hearing checked on an annual basis (see **Fig. 4**).

FIXING A HOLE

If you do have hearing loss, take heart; in most cases a lot can be done to help, though the prognosis depends mostly on the cause. The great majority of reasons for conductive hearing loss, including a hole in the eardrum, arthritis of the hearing bones, and obstructions in the ear canal, can be fixed with surgery. Although surgery is no fun, it's better than having no options at all. Some hearing losses are

caused a by disease that would be dangerous to leave undiagnosed, such as cholesteatoma, a skin cyst that forms within the middle ear, destroys the hearing bones, and can eventually erode into the brain. These nasty cysts usually produce a combination of recurrent infections, drainage out of the ear, and hearing loss. In such cases, the first goal is not to restore hearing, but to remove the disease, as it does not improve on its own.

Like music technology, medical technology has accelerated at an astounding rate in recent years. In most cases, we are now able to treat complete deafness in both ears. Deafness, which is usually caused by complete sensorineural hearing loss in both ears, can be treated with a device known as a *cochlear implant.* This device, surgically implanted into the inner ear, bypasses the defective hair-cell system and stimulates the hearing nerve directly. The user of a cochlear implant wears a microphone and sound processor attached to the ear, which uses a magnet to communicate with the internal implant. Sounds crazy, doesn't it? What is really crazy about it is how well it works. The cochlear implant is the only successful neural prosthesis available to date. There is an active and growing community of cochlear implant users that have musical backgrounds and are now learning once again to enjoy the benefits of music through their implants. For people with less severe sensorineural hearing loss, hearing aids (basically a small microphone, amplifier, and speaker) remain the mainstay of rehabilitation.

▼

Early diagnosis is the key to successful management.

THE EARS DON'T LIE

Take care of your ears! They're the only ones you have. Musicians' ears work overtime on a daily basis, and that can take its toll. Be aware of how loud things are, and try to recognize any signs of hearing loss. Avoid excessive volume levels and use ear protection when it is reasonable. If you think you might have a problem with your hearing, you're probably right. Don't ignore it—go see an ear specialist, because these things usually only get worse with time. In the end, the ears have it, and as long as they do, they'll give you that most perfect gift: the ability to hear.

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Bargain Hunter's Delight

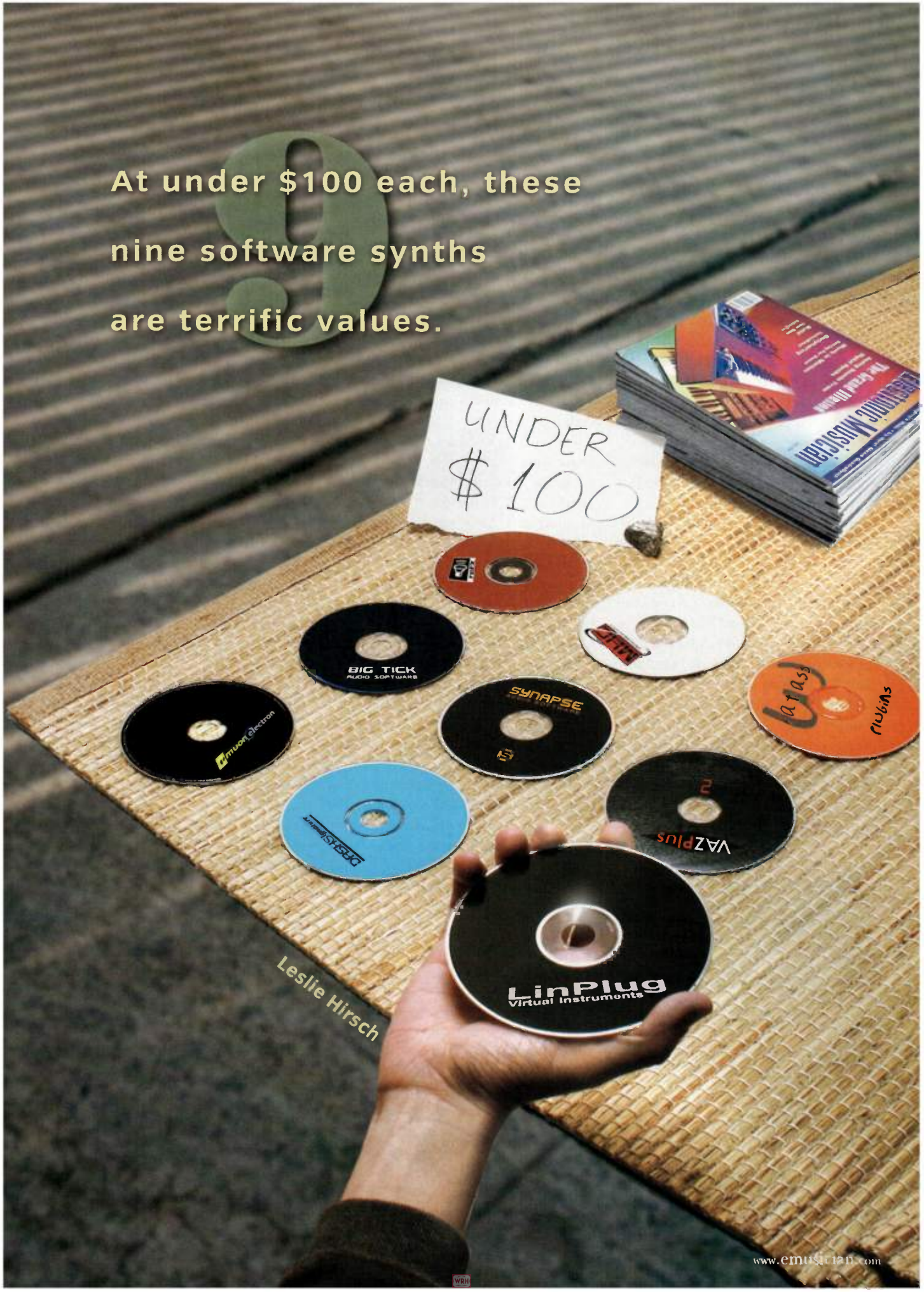
By Brian Smithers

Hey, I'll admit it—I'm a cheapskate. My aversion to spending money is almost pathological. So when the idea of an article looking at inexpensive soft synths was bandied about, I jumped at the chance. There are plenty of amazing virtual instruments available to anybody with a big bankroll, but what's out there for those of us who don't want to spend an arm and a leg? I'm happy to report, my fellow skinflints, that there's a lot of good inexpensive stuff to be had.

There's so much, in fact, that whittling the list down to a manageable size was quite a challenge. The virtual instruments discussed in this article are just the tip of the proverbial iceberg, a sampling to whet your appetite for the larger world of lesser-known and less costly synth plug-ins. Many interesting and deserving instruments didn't make the cut, so I encourage you to check the listings at places like www.kvr-vst.com and www.synthzone.com and uncover additional gems.

So what's included? First and foremost, the synths examined herein are instruments that I found particularly great-sounding, innovative, fun, or just plain useful. A subjective test, no doubt, but that's the nature of this thing we call music. I further restricted the list to one instrument per manufacturer, so check out the rest of the product line where applicable. Also, all of these synthesizers are just that—they synthesize sound rather than triggering samples or loops. Last but not least, these are practical, mainstream, utilitarian instruments that you'll use frequently: analog-modeling synths, electromechanical-keyboard emulations, and a couple of guitar simulations.

If the list seems a bit Windows-heavy, that's not for lack of trying. There just seems to be a lot more Windows-based development activity in this price range. In particular, the world of inexpensive Audio Units soft synths is sparsely populated right now, but have faith, Mac fans, because this is bound to change before long.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SYNTH YOU'VE GONE

Interest in analog-modeling synths shows no signs of abating, and this is particularly evident in the under-$100 class (all prices listed are for download versions). It may be because the principles of subtractive synthesis are well-known and therefore more accessible for developers without deep pockets, or it may be due to the insatiable appetite for new synths that meet the expectations of certain musical styles without sounding exactly like last week's hit.

Whatever the reason for virtual-analog synths' popularity, the following four specimens only hint at the variety of square-wave-slinging instruments out there. Whether you're after fat basses, searing leads, spacey pads, or special effects, you don't have to take out a second mortgage to fill the bill.

Fat-Ass Plugins BCG Monosynth 1.0 (Win; £15 [about $27]). What else would you call a company whose premier product was a bass synth with a big bottom? BCG Monosynth is Fat-Ass's VSTi for keeping the subwoofers busy. It's not the fanciest synth on the block, and it's not the most flexible, but it's easy to use and does exactly what it sets out to do.

BCG's primary interface consists of only eight sliders and three switches (see **Fig. 1**). The switches toggle between square and sawtooth waveforms and also determine the instrument's root octave. There's an octave-up switch and an octave-down switch, and it took me a minute to figure out that they can cancel each other. Having both switches off yields the same result as having both switches on.

The sliders control transposition, glide time, cutoff, resonance, filter-envelope amount, attack, decay, and overdrive. BCG is a good example of an interface made simple by making good default assumptions. For example, there is no fine-tuning slider, but the transposition slider can be set to fractional values down to 0.001 semitones by typing a value into a number box. Glide (portamento) between notes can be varied from none to way slow, and it occurs only when notes overlap. Lousy keyboard player that I am, it took me only seconds to be able to control when gliding happened. Only one filter type is available, but it's a sharp lowpass with resonance that self-oscillates at its highest setting. The simple 2-stage envelope doesn't let you sustain a note forever, but the Decay curve at its highest setting is shallow enough that it resembles about a 2-second hold before decay actually begins.

FIG. 1: If bass is your bag, BCG Monosynth is right up your alley. It's as simple as can be, but it can really pump out the low tones.

One key to BCG's ability to get your attention is its Drive slider. It provides a nice bit of overdrive distortion that lends heft to any basic patch. Another key is the built-in chorus. I must admit a general bias against built-in effects, but BCG's chorus has an aggressive character that is perfectly suited to its overall attitude. In fact, a number of the presets lose a lot of guts when you turn off the chorus.

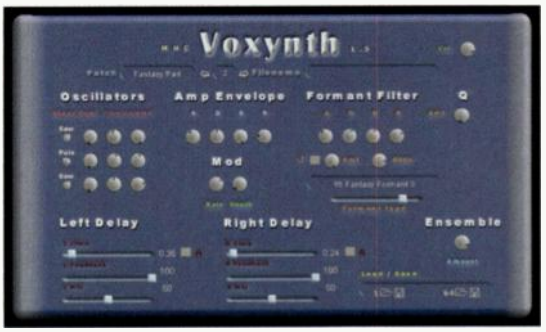

FIG. 2: Voxynth's raison d'etre is its formant filter, which not only gives it its vocal character but also morphs the timbre over time.

The delay is a nice touch, too, but it loses something by not syncing to the host's tempo. Every control has an assigned MIDI Control Change message, so you can tweak on the fly or automate tweaks in the host sequencer.

If you're into fat bass lines, BCG is definitely worth a look. It's probably not the instrument you're going to use on every track, but when you need that big bass sound, it delivers.

MHC Voxynth 1.5 (Mac/Win; $89). If ethereal is your bag, you'll want to check out MHC's Voxynth (see **Fig. 2**). As the name suggests, it's useful for sounds suggesting choirs, particularly of the surreal kind. Its primary weapon for achieving this end is a formant filter that can be modulated by an envelope generator or directly from your MIDI keyboard. For $89 you get a bundle of synths (called the Studio Setup) including Voxynth, Fatsondo, and Space Synth, along with several standalone effects plug-ins. The bundle is available in two versions, one for Windows VST hosts and one for Mac OS X VST or AU hosts.

Voxynth provides three oscillators per voice. Each oscillator offers four waveforms: one sawtooth, one square, a pulse wave whose symmetry is neither explained nor adjustable, and an undefined "distorted" wave that is hard to categorize. (The documentation lists "sine wave" instead of distorted wave, but this is incorrect.) The distorted wave is said to be useful for adding a breathy component, and indeed it has more fizz than fundamental.

The heart of Voxynth's vocal character

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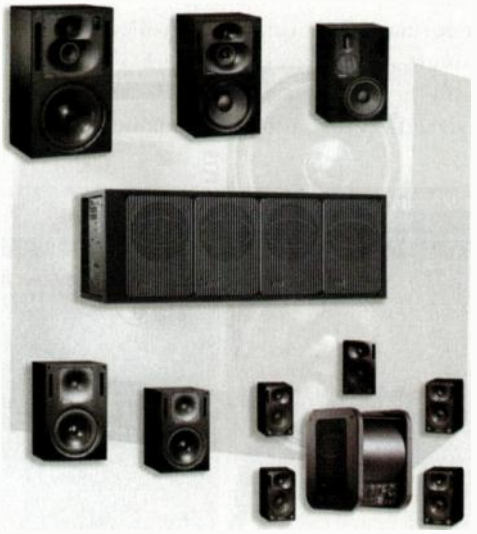

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Bargain
Hunter's
Delight

is its formant filter. The formant filter is designed to emulate the sonic character of various vowel sounds, thereby lending a human quality to the synthesized tones. Twenty formant modes are available, each representing a "morph" from one vowel to another. For example, a sound could start as an *e* and change to an *o*. The filter doesn't let you choose any morph you want (which would be nice), but the 20 modes provide a good deal of variety. The entire spectrum of formants consists mainly of bass vowels but also includes some alto and even countertenor vowels. Additionally, there are *fictives*, formants not found in nature that nevertheless contribute a vocal quality, and a few formants that have been frequency-shifted for effect.

If you're looking to make your keyboard talk or trying to create an electronic *Carmina Burana* choir, you'll find that Voxynth is not that articulate. It's not trying to be a vocoder—it's subtler than that.

The formant filter can be controlled by a single ADSR envelope. The EG's affect on the filter is variable, and it can be inverted—a nice touch. The bandwidth of the formant filter can be tweaked with the Q control. Furthermore, Voxynth puts the formant filter under the control of "performance keys," namely the C0 octave of your controller. These keys raise and lower the frequency of the formant filter, giving you real-time control over the brightness of the effect. A Glide control determines whether the change is abrupt or gradual.

FIG. 4: VAZ Plus is more than just a feature-laden and flexible instrument: it also sounds terrific.

Voxynth's toolkit is rounded out by pitch modulation, left and right delays, and an Ensemble switch that essentially layers detuned clones of the basic program to thicken the sound. Voxynth is a one-trick pony, but it's a decent trick. For the money, it ranks high on the value scale, but be aware that its siblings don't stray too far from Voxynth's sonic turf. Watch for a revamped version with new graphics and additional features around the time you read this.

Muon Software Electron 1.2 (Mac/Win; $80). Electron is a 3-oscillator synth with dual multimode filters, two envelope generators, and two LFOs. It runs as a DXi or as a VSTi under Windows or Mac OS 9 or OS X. At first glance, it's a straightforward, unassuming instrument. But when you consider its flexibility, you'll start to see its potential.

For example, its filters can operate in parallel, in series, or linked, or you can opt to use only one filter to save processing power. With the filters running in parallel, you can use the Mix slider to crossfade from one filter to another to shape the sound in real time. Although EG1 is always assigned to Electron's final output volume, it can also control other parameters at the same time. EG2 is assignable, as are the two LFOs. Available LFO waveforms include sine, square, saw, and triangle, and rate and depth can both be modulated by Velocity, Aftertouch, or Mod Wheel.

Interestingly, Electron's oscillators offer fewer options. Oscillator 1 is always a sawtooth wave (although it does sync to Oscillator 2 or 3), and Oscillator 3 is always a square wave. Oscillator 2 is a pulse wave with variable pulse width, which can be modulated by either of the LFOs or EGs.

Perhaps the coolest thing about Electron is its *x-y* control pad. Click on the X-Y button at the bottom of the window, and the usual knob-based interface disappears, revealing a virtual touch pad that gives you real-time control over two parameters simultaneously (see **Fig. 3**). You can choose from 28 parameters for each axis and then drag your mouse on the pad to tweak them. This is the answer to the age-old

FIG. 3: Electron's *x-y* pad lets you control two parameters, such as cutoff and resonance, simultaneously in real time.

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problem of trying to adjust cutoff and resonance at the same time with a mouse.

Electron's sounds range from bright leads to tense pads and articulate basses. They are generally colorful, but not inherently gutsy. I solved this quite easily by running Electron through Sonar's default Tape Sim plug-in. The sound was immediately warmer and more compelling. I'm sure that a bit of experimentation with your favorite amp-simulation or tube-simulation plug-in would prove most rewarding.

All of Electron's knobs have preassigned MIDI controllers, including the very cool Mix slider. You can opt for circular or vertical mouse movements to adjust the knobs and can choose whether the current value is updated while the knobs are being moved. Muon gets high marks for a tweakworthy interface.

Software Technology VAZ Plus 2 (Win; £50 [about $91]). Where do I begin? VAZ Plus is simply one of the best-sounding analog-modeling synths you could ever hope to buy for under a hundred bucks. From fat to smooth to gritty, its lively and malleable timbres leave no doubt as to why subtractive synths remain popular across generational and stylistic divides. Its feature set is every bit as impressive as its sound, with flexible modulation routing, an arpeggiator, and a step sequencer packed into an efficient and accessible interface (see **Fig. 4**). It runs under Windows as a standalone synth, a VSTi, or a DXi.

FIG. 6: For all the non-Hammond organ sounds, Combo Sister is the ticket. It emulates various transistor combo organs such as the Vox Continental.

VAZ Plus features "only" two oscillators, but they're powerful. Oscillator 1 gives you a sawtooth wave that can be tilted into a triangle wave or a variable pulse wave. Oscillator 2 adds a multisaw, four layered sawtooths (sawteeth?) with variable detuning, and a multisample. Both oscillators support frequency modulation, and oscillator 2 can sync to oscillator 1. Each oscillator's frequency and waveshape (triangle) or pulse width (pulse) can be modulated by any 1 of 15 sources, including LFOs, EGs, Velocity, and more.

Between the two LFOs you can find just about any variation you could want. LFO 1 can be a variable sawtooth or a variable pulse wave, and LFO 2 can be either a triangle or sample-and-hold. LFO 2 lets you delay the onset of the modulation, and both LFOs let you retrigger the waveform at the beginning of each note. Only a single filter is available, but it offers eight different modes and variable resonance. Cutoff can be modulated by up to three different sources, and resonance can also be modulated. Two ADSR envelope generators and a flexible amplifier section with overdrive round out the feature set.

FIG. 5: EP-Station is packed with electric-piano emulations and authentic features.

VAZ Plus can be operated in Mono, Poly, or Unison mode with high, low, "duo," or last-note priority. Duo assigns the lower note to oscillator 1 and the higher note to oscillator 2. Pitch-bend range can be as high as two octaves, and portamento can be set to occur all the time or only when notes overlap.

Every control slider can be modulated by 1 of the 15 modulation sources and can have its modulation source inverted, so that, for example, an EG assigned to cutoff could start wide open and get lower through the attack stage. Virtually every control can be modified by MIDI, either by using the Controller Mappings page or by right-clicking and invoking MIDI Learn. Yes, you can even change from Mono to Poly mode or change pitch-bend range in the middle of a solo.

As if that weren't enough, VAZ Plus gives you an arpeggiator with five modes (up, down, up/down, and two random modes) covering from one to four octaves, as well as a full-featured step sequencer. You can create 16 different patterns of up to 16 steps and 16 voices each, and then you can chain together up to 256 individually transposable patterns. Better still, each step gives you 2 control sliders that are among the 15 modulation sources mentioned earlier. I'm not easily impressed by step sequencers, but this one's a doozy.

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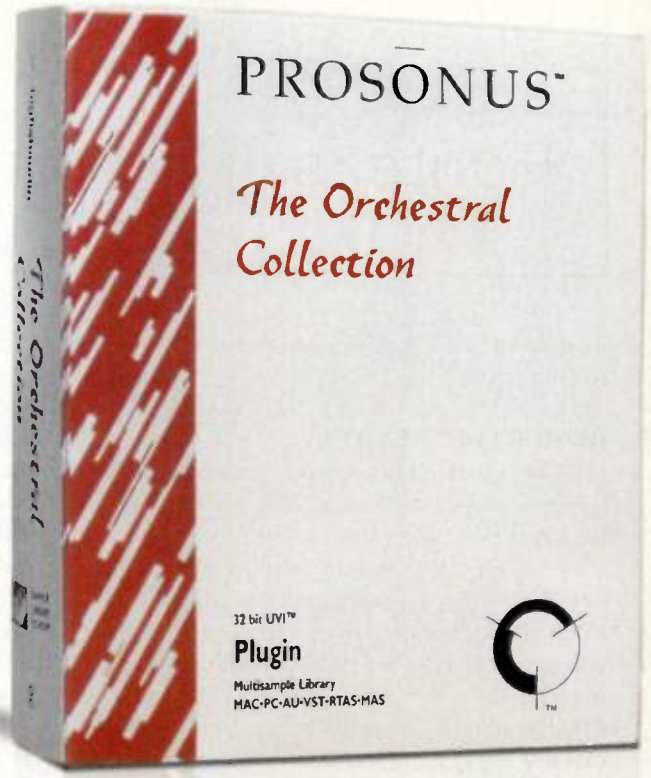

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KEYS TO MY HEART

Models of electromechanical keyboards (electric pianos and organs) are equal to analog-modeling synths on the utility scale but way ahead on the number-of-hernias-saved scale. Sure, analog synths can be bulky, but they're nothing compared to a Rhodes Suitcase or a Hammond B-3.

The field is not as thick with competitors in this category, but there are nevertheless some worthy contenders. These three virtual keyboards cover a lot of sonic ground without breaking the bank.

Big Tick EP-Station 1.0 (Win; EUR 40 [about $50]). That's *EP* as in Electric Piano, of course, and for not a lot of cash you get a standalone or VSTi plug-in that covers an awful lot of bases. EP-Station layers up to three different electric-piano models taken from a library of 97 different models (see **Fig. 5**). The result is a flexible and usable set of Rhodes and Wurlitzer emulations that, although they probably wouldn't survive direct comparison with their role models, are quite rich and satisfying.

Each of the three layers can be fine-tuned extensively. The balance of the three is variable, and each can have one of three Velocity curves: linear, exponential, or inverse exponential. The layers can be transposed and detuned. The Velocity response of the volume and harmonics of each layer can be tuned independently, so that, for example, you could have a piano whose volume tracked Velocity but whose timbre stayed constant or a piano whose volume stayed constant but got brighter with higher velocities. Each level's decay time and overall brightness can also be adjusted, as can the overall decay of the patch.

The basic models sound quite good, but the built-in effects add a lot to the realism. Tremolo and autopan were always part of the classic electric-piano arsenal, and EP-Station provides good versions of both. Speed and depth are adjustable in each. What else comes to mind when you think of classic EP sounds? Why, phaser and chorus, of course, and EP-Station delivers the goods here as well (a standalone VST version of the phaser effect also comes with the software). Each of the effects brings a little more character to the emulation. I confess to being a big fan of suitcase-style autopan and tremolo, and EP-Station covers it nicely.

With so many electric-piano sounds covered and the flexibility to go beyond mere emulations, EP-Station is a lot of fun to play. I found it lacking in only two ways. First, I could not get it to run in standalone mode at low latency, but since it worked perfectly as a plug-in I didn't lose any sleep over that. My other gripe is that its sustain is too long, yielding a bit of a synthy characteristic when notes are held for long times. Even when I shortened the decay time, the shape of the decay seemed slightly off. These are minor quibbles at any price, and at EP-Station's price they're more than forgivable.

DASH Signature Combo Sister 1.4 (Win; $30). Too often when we think of organs we think only in terms of the Hammond B-3. But the B-3 isn't the only organ with a place in rock 'n' roll history. Transistor-based combo organs such as the Vox Continental and instruments from Rheem and Farfisa had their own personalities, and Combo Sister is a VSTi tribute to these workhorses. It represents a hybrid of the various transistor organs and can cover a broad range of their sounds.

Combo Sister's interface is about as straightforward as they come (see **Fig. 6**). In addition to six drawbars and a handful of knobs, it features the same sort of rocker switches that characterized combo organs. You build a

FIG. 7: For big, fat B-3 tones, daOrgan has all the bases covered, including a flexible rotary-speaker emulation.

MANUFACTURER CONTACT INFORMATION

Big Tick
e-mail bigtick@pastnotecut.org
Web http://bigtick.pastnotecut.org

DASH Signature
e-mail info@dashsignature.com
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Fat-Ass Plugins
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Web www.fat-ass.tk

Linplug
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PLATINUM FUNKMASTER

Masters of Funk, Vol I: Bootsy Collins

You'll find Focusrite's award-winning Platinum range in the studios of thousands of musicians around the world, but few squeeze more groove from their gear than the Godfather of Funk, Bootsy Collins. Legendary performer and bassist with everyone from James Brown to Snoop Dogg, Bootsy has gone Platinum since the dawn of funk, and each new Focusrite model has been eagerly embraced into the Bootzilla rack. He won't funk without them.

The Platinum range offers all the classic Focusrite circuits in a series of individual tools that are not only professional sounding, but affordable as well. Visit your local Focusrite dealer and find out how the versatility of the Platinum range can enhance your DAW, and fulfill your live setup or personal recording needs. Or, as Bootsy says: "Dope-a-delic size your Gig, with the whole Platinum series 'Future Funkateer' rig." We couldn't agree more.

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sound starting with the two oscillator switches marked Osc and Bass. These determine the basic waveforms, and then the stops build the sound at harmonic intervals. The 5⅓-foot stop has two alternate modes, Hp1 and Hp2, that control two higher banks for additional brightness. The timbre stops Add, Strings, Reed, and Flute provide additional control over the color of the sound.

Percussion adds a bite to the sound's attack, and Sustain rounds off the release of a note. Booster emulates analog saturation and can be switched on and off and varied in intensity. There's a Soft knob to "smooth" the tone and a Transistor knob to add noise and key click. Vibrato and Tremolo are available independently and can be varied in both depth and rate.

Combo Sister can be set to recognize Velocity or to ignore it, a setting that is remembered at the patch level. Assigning controllers is a snap with the MIDI Learn function. Just right-click on any control and move the desired controller, and Combo Sister will attach that controller to the selected knob, switch, or stop. If you paint yourself into a corner, there's a MIDI Forget function that will take you back to square one.

FIG. 8: Slayer 2 will bring out the inner guitar god in you. It models not only the guitar itself, but also the amp, the cabinet, the stompboxes, and the guitarist's performance techniques.

FIG. 9: Plucked String offers numerous variations on clean or chorused electric and acoustic guitars.

The sound of Combo Sister is just what you remember from classic recordings, and it's a great complement to the more common B-3 sims. It won't take you long to start playing sci-fi themes and reach for a theremin to overdub. You'd have to be a curmudgeon or a zealous B-3 purist not to get 30 bucks' worth of pure fun out of this one.

Linplug daOrgan 2.01 (Mac/Win; $49). Speaking of B-3s, daOrgan, a VST instrument for Windows or Mac OS X (10.2 minimum; AU support is planned) gives you a single manual of a B-3 emulation, with MIDI-controllable drawbars and a rotary speaker (see Fig. 7). If your host supports multiple MIDI inputs, you could easily fire up two copies of daOrgan, split your keyboard, and have a dual-manual instrument in no time. (If you launch a third instance for pedals, you're far more coordinated than I am!)

DaOrgan offers control of virtually everything you need to make realistic Hammond sounds, including variable key click, drive, percussion, and even motor noise. The Vibrato section lets you vary the speed and depth of the effect and includes a tremolo dial to add intensity variation to the pitch variation.

You can choose to have daOrgan respond to Velocity or not. Of course, "not" is the realistic choice, but who says realism is always your goal? This choice is saved with presets, so you could have Velocity and non-Velocity versions of the same patches if you wanted. Interestingly, most of the included presets have Velocity sensitivity turned on; keep that in mind when auditioning sounds.

The Leslie rotary speaker is an instantly recognizable part of the B-3 sound, and daOrgan includes a rotary function to complete the package. It offers fast and slow modes, each of which can be fine-tuned, and separate low and high zones with adjustable crossover pitch. Even the speed at which it accelerates and decelerates can be tweaked.

MIDI control is extensive, with a learn mode (called ECS) that lets you set up knobs and sliders easily. All speed controls in the Vibrato and Rotary Speaker sections can be synced to the

Four!

INTRODUCING THE NEXT GENERATION OF THE WORLDWIDE STANDARD IN PROFESSIONAL PITCH CORRECTION

Since its introduction in 1997, Auto-Tune has stood alone as the overwhelming tool of choice for professional pitch correction. Featuring transparent processing, superb audio quality, and an easy-to-use interface, Auto-Tune is used daily in thousands of commercial, project, and home studios around the world to save editing time, ease the frustration of endless retakes, save that otherwise once-in-a-lifetime performance, or create unique special effects.

Now, with Auto-Tune 4, we've added a host of new features that are designed to provide powerful new capabilities, while at the same time actually streamlining operation.

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*If you purchase any version of Auto-tune 3 after December 1, 2003, you will be entitled to a free upgrade to Auto-Tune 4. See our web site for details.

ANTARES

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host sequencer's tempo at up to 32nd-note resolution.

If all this doesn't quite get you there, dial in the Spread option to play five slightly detuned organs simultaneously. DaOrgan is a well-thought-out, great-sounding instrument. Combined with a MIDI control surface to help you mold the sound on the fly, it'll almost make you wonder why your back isn't hurting.

GETTING PICKED ON

Our tour of the low-budget virtual bandstand ends with a pair of guitar simulators. They take different approaches, but both strive to model the behavior of strings being picked or strummed. Using a keyboard synth to create convincing guitar parts is always a challenge, but these instruments attempt to resolve some of those difficulties in order to help you come closer to the real thing.

ReFX Slayer 2 (Mac/Win; $90). Slayer 2 is a VSTi for Mac OS 9, OS X, or Windows that covers almost every aspect of a guitarist's bag of tricks. From string and pickup characteristics to amp and cabinet models to pick position to stompboxes, Slayer 2 has it covered (see **Fig. 8**). Its sounds range from good to great, and it even includes some intelligent performance features, strum patterns and power chords among them.

Slayer 2 gives you nine string models from which to choose, up to two pickups with adjustable position, variable pick position, and variable guitar size and material. All of this runs through any of five amps and five cabinets. Two effects bins—one before the amp and the other after—let you line up any of 16 stompboxes. Effects include wah-wah, distortion, chorus, flanger, EQ, harmonizer, and more, and they can be reordered with drag-and-drop ease. All this flexibility would mean nothing if it didn't sound good, but it does.

Achieving convincing guitar articulations is always a challenge without a guitar controller, but Slayer 2 includes several performance modes. It will automatically arpeggiate a chord in any of five patterns at an adjustable speed. Similarly, five strumming patterns with adjustable speed are available. Slayer 2 will also generate power chords—you get either root-fifth-octave (for example, C-G-C) or root-fourth-octave (as in C-F-C) from single-note triggers. The Autochord feature offers complete strummed chords created from single-note triggers. Each octave of the keyboard creates a different chord type, so with planning and practice you can play a wide variety of chord progressions.

The more I dig in to the various performance modes, the more useful I find them in creating authentic-sounding guitar parts. Slayer 2's MIDI implementation extends the potential even further. Virtually every control has a controller assignment. You could, for example, change pick position and strum speed in real time as you're recording a rhythm part so that the strum isn't predictable and static.

It's easy to get a number of basic guitar figures happening with Slayer 2, and it's deep enough that some research and practice will pay off with even more realism. The sounds are very useful, and the performance modes add a good deal of realism. Last, and certainly least, there's a Hue slider that lets you change the color of the onscreen guitar body.

Synapse Audio Plucked String 4 (Win; $49). Plucked String 4 is a much simpler guitar emulation than Slayer 2, but it has its own charms (see **Fig. 9**). Available in VSTi and DXi versions, its strength is acoustic and clean electric sounds. It has no amp effects or stompboxes, but it offers a great deal of control over articulation.

You get five models to choose from, although their names won't do much to help you decide which one to use: Noise, String, Gourmet, Nylon, and Acoustic. In addition to coarse and fine tuning, you have control over timbre, strength, and pluck. A simple filter section lets you control cutoff and damping for muted sounds.

A 3-stage envelope provides control over attack, decay, and release, letting you transcend the literal behavior of a guitar string and create interesting not-quite-a-guitar sounds. A vibrato section features independent control of rate, amount, and the too often overlooked delay. Once you have your basic sound dialed in, you can double or triple it with panned detuned copies for a choruslike effect that sounds quite good. A fine-tuning parameter lets you control the amount of detuning.

It would be nice if Plucked String had built-in strum capability, but I was able to accomplish the same thing running it through some MIDI plug-ins. Similarly, it responded quite well to a couple of amp-simulation plug-ins. Its essential sound and attack characteristics do a nice job of conveying the feel of a pick on a string.

CHEAPSKATES REJOICE

It's a good time to be a penny-pincher, as this is just a small portion of what's out there. Most of the companies mentioned here have additional offerings that you should check out, and of course there are many more folks waiting for you to discover their offerings. An inexpensive tool that does one or two things well is a great value, and an inexpensive tool that covers all the bases is a thing of beauty. Every instrument discussed has a demo version waiting for you at its maker's Web site, so why not give them a try?

Brian Smithers *is Course Director of Audio Workstations at Full Sail Real World Education in Winter Park, Florida.*

Sonic Surgeon

MITCH TOBIAS

BT slices, dices, and time-corrects music like nobody else.

By Mike Levine

When BT starts talking about music technology, he seems almost like a kid in a candy store; everything to him is "mind-blowing," "amazing," or "insane." He practically bubbles over with enthusiasm about the latest, greatest gear or some cool, new software that he's used. He could seemingly go on for hours about plug-ins, software instruments, surround mixing, time correction, and the incredible and meticulous detail that he puts into the production of his music. But awed though he might be by the technology at his disposal, he's in control of it to a degree that few others are—bending and twisting digital audio and synthesis to fit his unique musical vision.

One comes away from talking to BT convinced that he's not only a pioneer of new and different ways to use digital processes such as waveform editing and time stretching, but that he uses them with a level of detail that's truly remarkable. He approaches the production of his music with almost surgical precision. Yet with all the digital manipulation that he brings to bear, there's nothing machine-like about the end product. He's a highly talented songwriter and producer, and his recordings exude musicality.

A case in point is his recent CD, *Emotional Technology* (see **Fig. 1**), a sparkling collection of catchy, driving dance music mixed with elements of rock, pop, and hip-hop. It features intricate sound design and frequently distorted, heavily processed vocals, and it is made up of tracks that have been meticulously (almost obsessively) chopped up, rearranged, and time-corrected.

For more ReCycle 2.1 details: **www.propellerheads.se**

ReCycle!
THE ULTIMATE TOOL FOR SAMPLED GROOVES

New Mac OS X compatible ReCycle 2.1 has gone from tool to toolkit.

Free to registered ReCycle 2.0 users!
The ReCycle 2.1 upgrade is free to registered users of ReCycle 2.0. Or if you haven't registered yet, now is the time. Good news!

Your favourite loop chopping software now comes with Reason Adapted and Reload included, for instant cutting, converting and composing. Creative loop sequencing in a box.

ReCycle 2.1 → Creative loop sequencing

With multiple undos, true Mac OS X support, and full 24-bit resolution, new ReCycle 2.1 makes your sampled loops and grooves more managable then ever. ReCycle 2.1 lets you slice up your samples into rhythmical sound chunks and create your own REX2 files, a format used and recognized by virtually all audio sequencers and software samplers on the market. Don't have all those other programs?

Don't worry. Included in the ReCycle 2.1 application suite are three separate pieces of software – ReCycle, Reason Adapted and Reload – allowing ReCycle users to turn their REX:ed files into music, right out of the box!

The ReCycle Toolkit
ReCycle 2.1 + Reason Adapted and Reload. Not just files. The complete toolkit.

Got hardware?

Due to the diminishing use of hardware samplers, ReCycle 2.1 only supports software samplers and other music software. But don't despair. If you own a computer, and we think you do, chances are you already own one or two of the supported music applications in the list below. And even if you don't, you're still in the clear: the ReCycle 2.1 toolkit contains all the software you need to get creative with your ReCycled loops, grooves and breaks.

Reload

A small utility program for smooth AKAI conversion. Gives you access to the huge variety of sounds and program files available in the AKAI format. Load up any AKAI formatted sound disk, convert, and import into Reason or ReCycle.

New in ReCycle 2.1:

- Mac OS X Support
- True Windows XP Support
- Multiple Undos
- Full 24-bit resolution
- Reason Adapted and Reload included

Reason Adapted

The stripped down, but oh so powerful, version of Reason. Comes fully equipped with all you need to turn your REX2 files into music: three renditions of Dr REX, Reason's mighty REX2 file player, a mixer, effects, the versatile NN-XT sampler, plus the lightning-fast Reason Sequencer.

Supported applications

Propellerhead Software **Reason** / Emagic **Logic Audio 6** / Emagic **EXS24mkII** / Emagic **EXS24** / Steinberg **Cubase VST 5.x** / Steinberg **Cubase SX** / Steinberg **Nuendo 2.0** / Steinberg **Halion** / MOTU **Digital Performer 4** / MOTU **Mach 5** / Native Instruments **Kontakt 1.5** / Native Instruments **Intakt** / Native Instruments **Kompakt** / Native Instruments **Battery** / Synapse Audio **Orion** / Bitheadz **Unity Session** / Bitheadz **AS-1** / Cakewalk **Project 5** / IK Multimedia **SampleTank** / Mirian **Mixman Studio** / AKAI **s-5000/s-6000** / AKAI **e-series**

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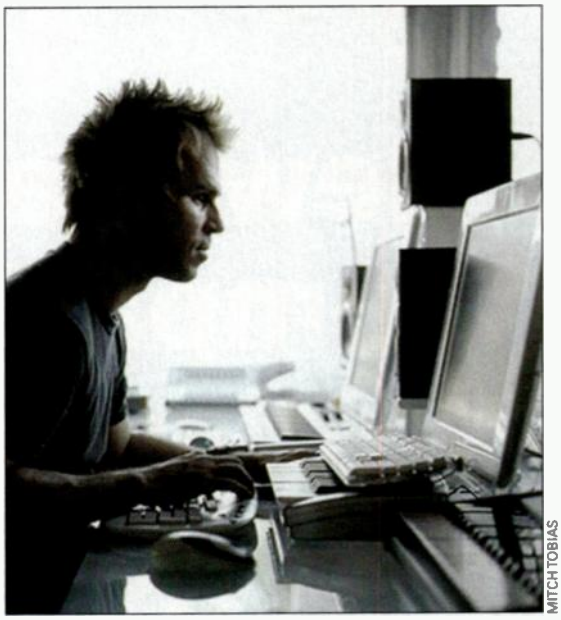
propellerhead SOFTWARE

Sonic Surgeon

BT, whose full name is Brian Transeau, is firmly established as a fixture on the electronica and pop scene. His initial claim to fame was as one of the key figures in the development of the electronica subgenre of trance (aka epic house). Subsequently, however, he has branched out in a variety of creative directions. Besides being a solo artist, he has worked as producer, arranger, mixer, and remixer for a diverse group of artists, including Tori Amos, 'N Sync, Britney Spears, Mike Oldfield, Paul Van Dyk, and Lenny Kravitz. He's also an in-demand film scorer; his credits include *Fast and Furious*, *Monster*, *Under Suspicion*, and *Zoolander*.

BT grew up in the Washington, D.C. suburb of Rockville, Maryland, where, at age four, he got his start in music studying classical piano. As a teenager, his attention shifted from Bach and Beethoven to synthesizers and sequencers. He writes on his Web site (www.btmusic.com), "After being introduced to artists like Cabaret Voltaire and Depeche Mode, I turned my back on classical music for quite a while."

He enrolled in Boston's Berklee College of Music but dropped out in 1990 after only a year in order to pursue his music full-time. His path took him from Boston to Los Angeles, and back to the D.C. area. Eventually his music was heard by British DJ Sasha, who helped him find an audience for it in England. BT's first release, *IMA* (Perfecto/Kinetic Records, 1996), became huge on the English dance scene and catapulted him to fame in the world of dance music.



MITCH TOBIAS

FIG. 2: In his cushy, computer-based studio, BT now uses mostly soft instruments and plug-ins; many of his vintage synths and other hardware devices are in storage.

Eight years, four CDs, countless remixes, and a slew of film scores later, BT lives in the Los Angeles area and works mainly from his personal studio. By his own admission, he spends ungodly amounts of time holed up in there working. "I sit there 40 hours straight sometimes," he says.

To ease the strain of such marathon hours, he's made his studio environment as pleasant as possible (see **Fig. 2**). To that end, it's now stocked with three Apple Cinema Displays. "It takes half an hour to drag something to the trash," he jokes. His computers, which form the heart of his studio, include a Macintosh G5 (which is just now being integrated into his setup), a pair of Macintosh G4s, a custom PC running Windows XP, and a Symbolic Sound Kyma system. (See the sidebar "Inside BT's Studio" for a complete list of his studio gear.)

FIG. 1: BT's recent CD *Emotional Technology* shows off his unique techniques, which include meticulous time correction and unusual effects and editing on vocals.

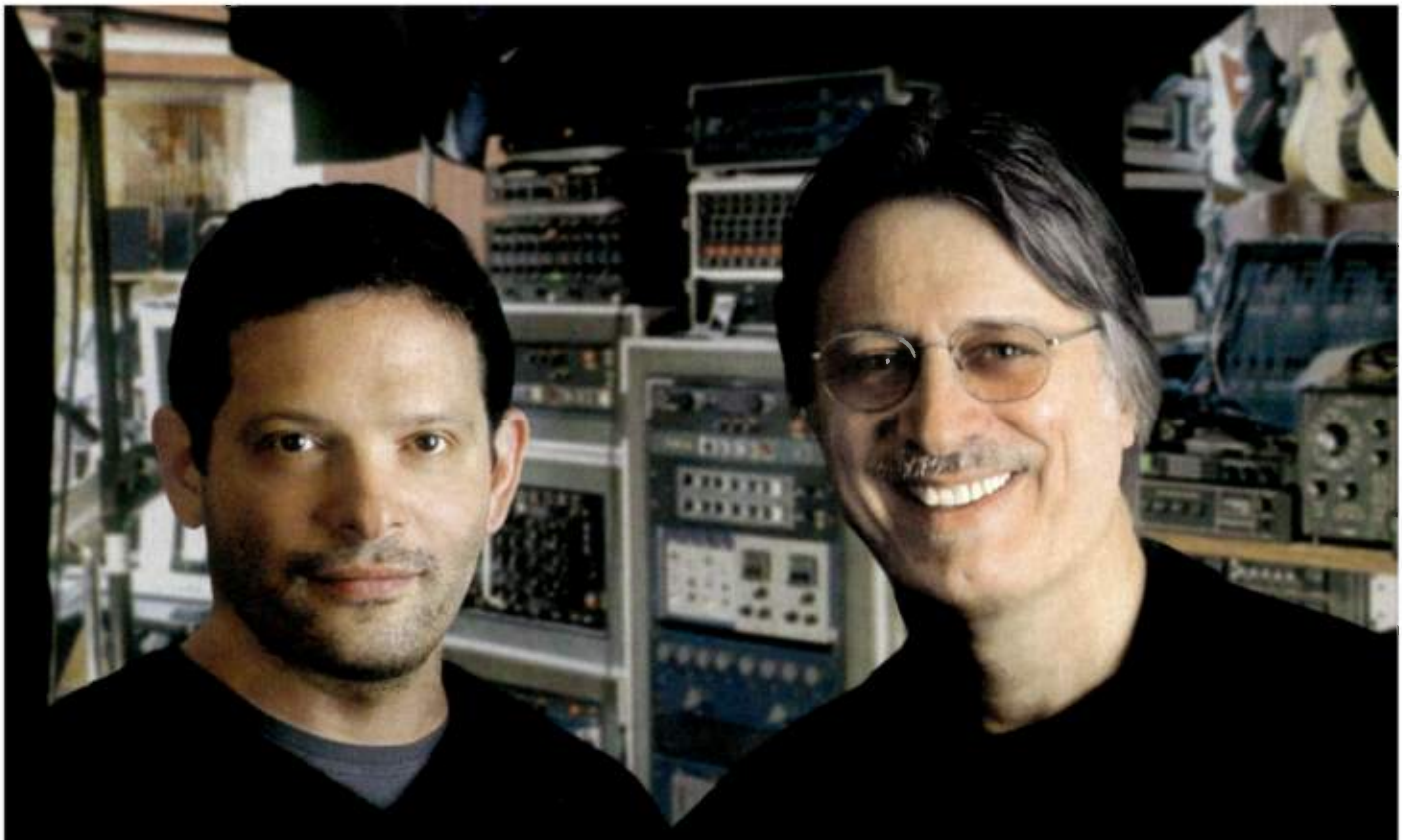
My initial interview with BT for this story took place not long after the release of *Emotional Technology*. We spoke at the bar of a trendy New York hotel, and BT was accompanied by Tootsie, his ubiquitous Boston Terrier, who sat quietly in the chair next to him.

There's a lot of sound design mixed in with the music on *Emotional Technology*. Have you always done that on your records?

I have, actually. The sort of soundscape; the designing of a space. I like to create compositions individually as an environment, and within that environment it's all about setting space. So sound design has always been an integral part of what I do. And, obviously, the better the tools get, the better my programming chops get; the better I get at coding, the more interesting the soundscapes become.

When you use the word *soundscape*, are you also talking about the ambiences that you include in your music?

Definitely. There's so much attention to detail put into building a space in these tracks. Take, for example, a song like "Paris": that track has the sound of me scuba diving—which I've time-corrected in unreal note values above 64th notes (128th notes, 256th notes, 512th notes)—which is a technique I call *nano correcting*. I developed it while doing this record. So I time-corrected the sound of my scuba regulator.



Three-time Grammy®-winning mixer and producer **Frank Filipetti** (at right) has distinguished himself by being an early proponent of digital recording and surround sound. He has over a dozen 5.1/DVD projects (for clients like Billy Joel and James Taylor) on his resumé, which also includes work for KISS, Luciano Pavarotti, Barbra Streisand, Korn, Elton John, Carly Simon, and Rod Stewart.

Musician and producer **Michael Beinhorn**, who got his start as keyboardist for the legendary group Material, has gone on to Grammy-winning success with clients such as Korn, Marilyn Manson, Fuel, Soundgarden, Hole, Red Hot Chili Peppers, Aerosmith, and Ozzy Osbourne.

Whether working solo or as a team (as they've done for Fuel and Korn), these two industry powerhouses have created quite a musical chronicle with the help of 40 Series microphones from Audio-Technica. Take it from Frank: "The A-T 40 Series microphones have become indispensable, especially the **AT4047**. Recording drums, bass, guitars or a swinging horn section, it handles high SPL while retaining the subtle details. I don't leave home without it!" Adds Michael, "A-T mics have become mainstays for me. They offer exceptional clarity and detail, which are crucial to my recordings."

Take a tip from these music industry pros and try 40 Series mics on your next session. Who knows? You might just be making musical history – like they have.

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(40) SERIES

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Is there a simple way to explain nano correcting?

I just finished outlining a book I'm writing on time correcting and stutter editing. There will be a chapter on nano correcting. There's going to be a chapter on frequency-specific swing and on gravitational swing and swing templates—it's really complicated. It's funny, because I sat down to try to explain it to myself as if I were going to articulate to another person how to do it from step one, and it's not simple. *[Laughs.]* Basically, nano correction is correcting unreal note values. So anything above 64th notes.

So what does the listener hear when you nano-correct a piece of audio?

I think what happens when you're correcting into unreal note values, or when you're correcting things too small to be perceived as notes, is that your brain is drawn to the symmetry, because symmetry is a reoccurring, aesthetically pleasing thing all throughout nature. What your brain attaches to is the symmetry in the event, rather than something being rhythmic.

Beyond sound design, you've said that you also use time correction to tighten up and alter all the instrument tracks in your music?

There are literally 50 different approaches to time correcting, depending on the source material. I'll use a different time-stretch algorithm for fuzz guitar, for repetitive wave cycles, as opposed to ones that have a lot of upper and harmonic content. I'll cut things that have a lot of subharmonic activity in them off-axis, and conjoin things off-axis instead of doing fade-ins and fade-outs. It's such a crazy technique.

FIG. 4: BT's favorite sampler is the Emagic's EXS24, which runs on his sequencer of choice, Logic Platinum.

So the time-correction process—which you've said can include cutting up audio, EQing it, compressing it, time-stretching it, and correcting to a particular note value—opens up an entire other world of control for you.

It's infinite, man. And I feel a big sense of responsibility having the kind of tools to be able to do stuff like this. I think of my heroes who I know would have wanted them. A guy like Stravinsky. I have a responsibility to do something interesting with these tools.

FIG. 3: BT uses a wide range of PC soft synths, including Istvan Kaldor's Rotopuker, shown here. He also has a huge array of soft instruments for Mac OS 9 and OS X.

After you record live instrument tracks, do you time-correct them, too?

I do it all the time.

So you alter them pretty radically?

Radically. You see the thing is, I love completely live music. I love it. Jazz, classical music, I love that. In terms of the performance aesthetic of that sort of music, I absolutely love it. It's not the kind of music I'm trying to make. If I'm doing something that's with a live band, I'm always going to be gelling it with programming. I can make it sound like it's live, but I'm always going to want to have percolating Acid lines or cool granular synthesis or a breakbeat augmenting the live drums. The only way that I've found that you can sort of sell it to your ears—that this acoustic performance is happening in tandem with programming—is time correcting. They gel together like they were meant to go together. Otherwise it's always like flamming snares, and hi-hats from the loop are flamming against this, that, and the other thing, and the live drums, and it just sounds unnatural.

How long does it take you to time-correct an entire song?

It can take two months.

K2661 Evolution of a Species

Kurzweil's newest member of the K2600 family is more powerful than ever. The K2661 truly has it all: Kurzweil's award-winning V.A.S.T. synthesis, mind-blowing effects, KB3 Organ Mode, Live Mode, and Triple Modular processing are joined by exciting new features including built-in 8-channel ADAT I/O, a SmartMedia™ card slot for storing patches and samples, 24-bit D/A, and General MIDI mode. Program memory expansion and 128MB of sample RAM* are also included as standard. All in a very portable, 61-note, synth-action keyboard. Now, you can take it with you!

And of course, the K2661 sounds amazing. With the Orchestral and Contemporary ROM options built-in, the K2661 features the new "Best of V.A.S.T." sound set, which is also available for download for K2600 users. The Stereo Dynamic Piano and Vintage Electric Pianos ROM options are available for both K2661 and K2600 users. The optional sampling card is also available.

The new K2661 - a highly evolved instrument, limitless in sonic potential, control, and musicality. Better for your music, and better for your back. You bring your craft, your ideals, your heart and soul. We bring you the K2661. Your vision will be realized.

* Note: Sample RAM is standard with models sold in the USA only.

K2661 Features

- 61 note synth action keyboard
- ADAT 8-channel I/O ports
- 24-bit D/A
- SmartMedia™ card slot
- V.A.S.T.™ synthesis
- Triple Modular Mode™
- KB3 Mode™
- KDFX™ processing
- Vocoder
- Orchestral & Contemporary ROM
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So time correcting is more of a time drain than mixing?
Absolutely. The funny thing is, though, that when you time-correct something, you wouldn't believe how much your mix issues resolve themselves.

Because in the process you also get rid of the rhythmic slop and unnecessary frequency information?
All the stuff that you're always trying to EQ out or compress is gone—oftentimes—when you time-correct something well.

I noticed some pretty unusual vocal treatments on *Emotional Technology*.
In my compositions, if the vocals don't sound like some sort of fractal collage, I'm bored witless. Vocals are the one thing on which radical effects treatments really stand out. That's why I like doing it to them.

Because they're so up-front in the mix?
Exactly. You really, really hear it. On "Somnambulist," the lead vocal had 6,178 edits to it. It's going in the new *Guinness Book of World Records* as the most edits in a piece of music. It's a fun thing to do on vocals because they're usually front and center and you realize, "Oh my God, it sounds like this person is in a blender in time."

You use a lot of distortion and other effects on your vocals. What effects in particular do you like to use on them?
Literally—and this is not to hoard secrets, because you can see how open I am to talking about it—thousands of plug-ins: everything from standalone applications like SoundHack, to Yowstar Girl for granular synthesis, right through to Wave Mechanics PitchBlender and FilterFreak, or an Arboretum plug-in, or things coded in Kyma. Literally thousands, right down through running it through a $125 Z.Vex Woolly Mammoth guitar pedal and out the amp, and miking it and back in.

Let's take your creative process from point A to point B. Do your compositions always start with just a musical idea?
Absolutely. That's how it always starts for me. It never starts for me sitting at the computer, ever. It has started for me sitting at a guitar or sitting at the piano and noodling. I won't allow it to start at the computer. I want to impose my will on the technology, I don't want to have it impose its will on my artistic sensibilities. I refuse to be defined by machinery.

But isn't it difficult to avoid having the parameters and limitations of the technology shape your music?
The tools have to be an extension of your fingertips in the same way a guitar is supposed to be, or in the same way that a pencil and staff paper are supposed to be. I'll give you a perfect example: if you look at modern electronic music, the way that computer-based sequencing is set up has totally defined what electronic music sounds like. One hundred percent defined it, down to the not-so-subtle things like you load it up and the default setting is in 4/4 at 120 beats per minute.

So how do you keep it from influencing you?
You've got to constantly hold [your work] up to the light and say, "Did I make this sound like this because I was using Reason?" If so, I'm not going to use Reason for a couple of months. I'm gonna build it from scratch. As opposed to being handed a sand castle and then finding a nice piece of beach to plant it on, I want to build the thing grain by grain, and I want it to be my own.

Let's get back to your creative process. Generally do you get an idea for a melody first?
Usually a melody, or a harmonic idea like for a progression. And I'll be working it out in my head, thinking, "What inversion is that chord in?" And, "Damn, I tried to forget my performance ear-training classes and now I wish I remembered them." You know, that kind of stuff. I'll start making myself a little chord chart with a melody line if I'm not near an instrument. Or I'll sing an idea into my cell phone. And then

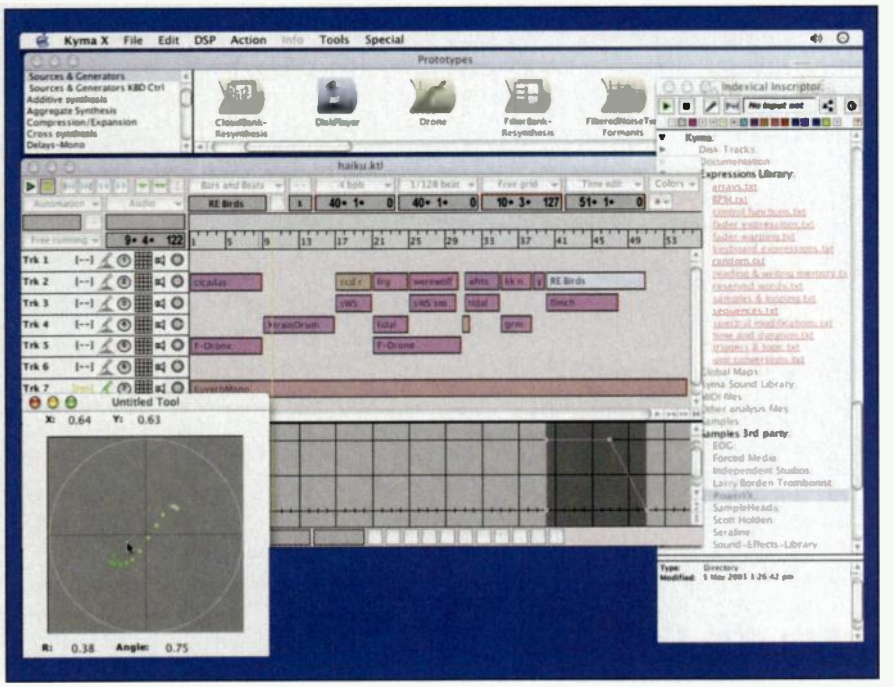

FIG. 5: BT does much of his intricate sound-design work on Symbolic Sound's Kyma, which includes both software and the Capybara 320 Sound Computation Engine. "Every instrument that you build in Kyma is unique unto itself," BT says.

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I'll sit at an instrument and write a song, and then I'll sit at the computer and make it happen, make it interesting.

What's your main sequencer?
Logic Audio.

Do you have much hardware-based sound gear—synths, modules, samplers—anymore, or is it all software based?
Hardly anything. It's so funny because on my last record, *Movement in Still Life* [Nettwerk Productions, 2000], I made a point on the track "Dreaming"—I said that this entire sound was composed using soft synths. And people freaked out. They're like, "That's not possible, blah blah blah."

When were you producing that album?
In '98. And so people were just completely thrown by that. Now people come to my studio, and all my old beautiful vintage synthesizers—EMS VCS3 "Putneys," ARP 2600s—are in storage. I don't use any of that stuff [anymore]. I got a bay of computers and each one functions as a synthesizer. I run OS X on one so I've got all my AU plug-ins on that. I've got a PC that I run Tascam GigaStudio and Native Instruments Reaktor on. I have another Mac that I run OS 9 plugs on, and then I have my main computer.

Are they all connected by MIDI?
They're all connected by several things. They're all on an intranet at my home, so they can all use shared drives and stuff like that.

Do you have any particular soft instruments that are your favorites?
I have literally thousands of soft synthesizers. That's not an exaggeration. Just in Steinberg V-Stack on the PC—I detest PCs, but they're kind of a necessary evil—I have at least 1,200 Synth-Edit synths, and I use all of them. And then the AU—I probably have 200 AU plug-ins, and 500 to 600 OS 9 ones. Some of my favorites—just to throw some out there, because I'm one to talk about anything I use—I love Big Tick Rhino for the PC. I love Istvan Kaldor's Rotopuker—it's amazing [see **Fig. 3**]. For OS 9 I love Native Instruments Absynth and Absynth 2. Synapse Scorpion is an amazing one; Synapse Junglist [now called Hydra] is amazing. The Emagic EXS24 [see **Fig. 4**] is my favorite sampler ever made. I love that thing so much. I like Atmosphere a lot; it's really useful. My main sound-design box is Kyma, the Capybara system [see **Fig. 5**].

I've heard that it's amazing.
It's the wormhole. It's the sort of door you open, and on the other side are infinite possibilities in sound.

I gather that you prefer Macs to PCs?
Let's start at the beginning. I prefer Macs to PCs just because of the whole design ethos. Apple is a company of forward-thinking people trying to do exciting and interesting stuff, and executing that with a groundbreaking and pioneering team of creative, non-suit-wearing hippie types. That's totally my vibe. Second, aesthetically, nothing holds the appeal of a Macintosh. There's not a computer you can show me in the world that's sexier than a Mac. Third, and most important, the Mac operating system lets me be creative; the architecture of the machine and the system that I'm working on become totally secondary to my creative process. I'm never going, "Goddammit, I want to eject this CD!" Everything is fluid and easy to work. I love that. It makes working on a computer so much fun. I don't want to think about using a computer while I'm composing. I want it to be like having a guitar in my hand. Using a Macintosh is like that.

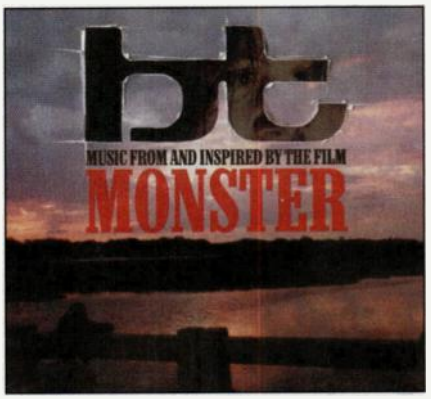
One of the great things about Logic is how much you can customize it. I imagine you do a lot of customizing.
It's just obnoxious how customized my Autoload is. The equivalent would be the most pimped-out, dropped-suspension, rice-rocket car possible. With a booming 5.1 system and dual 15 subs in the trunk. That's my Logic Autoload.

So somebody used to the stock Logic setup wouldn't recognize it?
They'd say, "What the hell is this?" The cool thing is a lot of my friends who use Logic—we have discussions about implementing new key commands. We're all on the same set of key commands. So there's a group of about 15 of us—the Real World guys at Peter Gabriel's place are on my key commands, Sasha's on my key commands, we're all on the same key commands. So when we go to work on one another's computers, we can work. We don't have to swap. We have this consortium, this think tank for deciding on key commands.

You compose, record, and edit at your home studio, but do you mix someplace else?
No, I mix at home.

Do you mix mostly in the computer with a control surface?
No control surface; I'm a mouse mixer.

And you do all your mixes that way? You don't have a big console?
No. A lot of my mixes are committed [with the effects and EQ on the tracks before mixdown]. I'm a huge Audio-Suite fan, and it's one reason why right now I could never move off of Pro Tools hardware. Because I'm all about committing those processes to the audio.



To be released in early June, BT's *Music from and Inspired by the Film* Monster (DTS Entertainment) will include a stereo CD and a DVD with the surround mixes.

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If I like a compression, why have it on a fader? I'm not going to change it. If the dynamic of the track starts being affected by how dramatic a compression is, I'll trim back other elements. I'd rather hard-process things—that's part of what helps me finish tracks, too. I'd rather make a commitment.

But if you're writing something, and building it up one track at a time, might not the stuff that comes later affect how much of that compression, or any other effect, you want to use?

Never. You build it around it. As an engineer friend of mine put it, "The way that you write is the way that we were taught to do shelving. You pick sounds that are in specific frequency ranges, and then they all end up fanning together and fitting." It's something that I realized I do subconsciously.

So writing, arranging, editing, and mixing are an integrated process for you. You don't say, "Okay, all my tracks are done; now I'm going to mix."

Never. By the time the song is written, it's also mixed and time-corrected. It's a weird way of working.

So the main thing in your mixes is getting levels right, but not a lot of equalizing?

No, there's not a lot of post stuff. There are insanely intricate things going on, but they're done during the writing process. The things that I will always use live [during the mix] are reverbs and delays, because those I change. But compressions, no; filters, maybe. If I'm sweeping something, I'll leave that on a fader. But for the most part, it's reverbs and delays—wet effects. It's never the crux, the core component of how that sound is sounding.

What in your music really grabs the listener's ear?

One thing that stylistically I do a lot, that I think resonates with a lot of the people who like technologically based music or make technologically based music themselves, is insane—and I picked that word carefully—insane attention to detail. That's one of the things that people pick up on in what I do. It's the real care and attention to detail. Nothing is in there by accident. There's not an extraneous reverb tail in my music, there's not a single ringing frequency below 150 Hz on a single hi-hat on any one of my last three albums. There's a psychotic attention to detail. There's also a lot of ear candy because of that attention to detail.

MITCH TOBIAS

BT is shown here tweaking a sound on his Hartman Neuron, one of the few hardware synths he still uses.

Can you give an example of what you mean by ear candy?

I like having these dramatic transitions in my songs; an extraordinary amount of detail to facilitate huge set changes. I might come out of a section with a live band playing: live guitar, live bass, live drums. Then maybe one or two synth lines and go into a breakbeat from Kyma and Reaktor and distort the vocals. I like to change dramatically like that. There needs to be all kinds of intricate spills, reversing noises, rising sounds, reverb tails across a conjoin—just crazy stuff to join those areas together. So I like to think that the attention to detail in what I do resonates with people.

Do you ever worry that you're going to overdo it and mess up the groove?

Yeah, definitely. But once the composition is there, everything is time-corrected, the beats are right, the bass is hitting right, you've written a great melody, the lyrics are strong, you've got interesting harmonic things happening—at that point it's just a wide-open canvas. I don't think you can overthink it at that point. For me, making music is a two-stage process. There's the initial cathartic, creative blah, in which you get out the feeling, the emotion, the idea. In that phase, you can't overthink anything. That's a 5- to 15-minute thing, writing a song. But then after I make a commitment to that idea, the lab-coat part of me takes over and I get nano-technology on it. At that point I don't think there is such a thing as overthinking it.

With all these possibilities at your fingertips, how do you know when to stop?

You know, I must have an enzyme in me that tells me when a piece of music is complete. It's really strange. I'll be noodling until the cows come home, but there's just a switch in me. People ask me that question all the time. And I tell them, "The song tells me 'you're done,'" and then I'm done.

Have you done a lot of surround work?

I will never mix in stereo ever again, ever.

What about *Emotional Technology*? That was stereo.

It's my last thing ever in stereo. I mean ever. I recently just started mixing in surround, and there's absolutely no going back for me. I cannot.

Have you put out anything yet that's mixed in surround?

I just wrote the score to *Monster* in surround sound, and it's a completely different experience.

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So is it boring to you when you do a stereo mix now?
I can't do it anymore. I'm not even joking.

What are you going to do on future records?
I'll never do stereo mixes anymore. I can't, man. After sitting in the middle of this immersive environment and being a part of it, instead of being a listener.

So you think eventually everything will be multichannel?
Absolutely.

Is 5.1 okay for you, or do you need more, like 7.1?
No, 5.1 is great. One of the key things I've discovered already about 5.1, the format, is to forget about the center channel. That's because it kills the stereo imaging in the front. If you're going to use the center channel, use it creatively. Don't ever use it glommed with the left and right channel. It just kills the stereo imaging. But I've done weird things like having a bell in the center channel and then throwing a reverb with different predelays in the back speakers. I love 5.1, it's so much fun. Beware—if you set up a 5.1 system, you're screwed. I swear to God. *[Laughs.]*

Many of the surround mixes that I've heard don't take a lot of chances. They seem so conventional.
They're terrible. They're horrible.

Why are so many engineers scared to take surround mixes out?
Most of the people who have access to surround mixing right now are film guys. And most film guys are just nine-to-fivers: "Send the same 20 kHz spike to the sub-channel. It's my lunch break." I'm intimidating to a bunch of people like that, because I walk in and I say, "Let's f—k

INSIDE BT'S STUDIO

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Apple Power Macintosh dual G4/1.42 GHz (OS X)
Apple Power Macintosh dual G5/2 GHz (OS X)
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Symbolic Sound Capybara 320 Sound Computation Engine (for the Kyma system)
Expansion chassis for Pro Tools system (contains two Mix Core and six DSP farm cards)

DJ SETUP
Pioneer CDJ-1000 (CD turntable)
Pioneer DJM-600 (mixer)
Technics SL-1210Mk2 Quartz turntables (2)

KEYBOARDS
Access Indigo 2
Hartman Neuron synth
M-Audio Radium MIDI controller
M-Audio Oxygen8 MIDI controller
Roland JP-8000

MIXERS
CM Labs MotorMix (used for Kyma)
Rolls RM203 stereo line mixer (used as a volume knob)

RACK
Digidesign 1622 audio interfaces for Pro Tools (2)
Digidesign 24-Bit ADAT Bridge interface for Pro Tools
Digidesign 888 audio interfaces for Pro Tools (2)
Digidesign Universal Slave Driver sync box for Pro Tools
Emagic Unitor8 MIDI patch bay
Esoteric Audio Research Limiting Amplifier 660
Focusrite Red 7 mic preamp/dynamics processor
Furman PL-8 power conditioner
Glyph dual SCSI removable hard-drive bay (with 2 Cheetah drives)
Glyph single SCSI removable hard-drive bay (with Cheetah drive)
Hafler Trans-nova power amplifier
JVC 3/4-inch tape deck
Korg 03R/W rack synth (instrument)
Kurzweil K2500RS sampler (instrument)
Lucid GENx6-96 Word/Super Clock Generator
Neve vintage 1073 preamp
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Video reference clock (black burst generator)
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SOFTWARE APPLICATIONS
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this up, let's do something interesting. Put the kick drum in the back channels. I want to run the brass parts through a Marshall amp coming out through the center channel." And they're like, "Wait a minute dude, my lunch is in 15 minutes." So now I've taken to mixing the stuff at my house and delivering 5.1 sound."

Have you done the mixes for the movies that you scored?

Monster is the first one that I've done.

Is creating a film score different for you musically than working on your records?

It is, but in a good way. Because I studied so much orchestrating and counterpoint and theory and stuff.

What did you major in at Berklee?

I didn't graduate, which is a funny thing because when I go back there now, they call me a graduate. But I studied this stuff starting real young. I studied string writing and fine orchestration and harmony theory.

So you were learning classical back then.

Yeah, a classical kid, big time. So all that stuff I learned as a kid, I haven't been able to implement into my records because it's cost-prohibitive. I can't hire an A-list string section for three hours, because it costs $200,000 to get the best players. But I get to use them on a film, because the studio pays for it. It's great. I stand there with a baton and conduct it.

Since you're writing these things for orchestras and live musicians, I assume you can't get into all the manipulation of audio like you do on your records?

Oh, I do. I time-correct all that stuff.

How has the response been to your *Monster* score?

Really positive, man. One of the coolest things about the response to the *Monster* score is that everyone keeps telling me they can't believe it's me. And I love hearing that. I know I've done something good when everybody says, "I can't believe *you* did that." I don't know if that's an insult or a compliment; I'm taking it as a compliment, though, because that says to me it's so off-the-beaten-path for what I'm known for, that I'm making progress.

Can you offer any advice to our readers that will help them with their composition and production?

The first thing I'd say is to get a copy of *The Artist's Way*, by Julia Cameron (J.P. Tarcher, 2002). Read it, and practice it. It's the greatest book ever written for creative people. If you haven't read it, if you haven't done the exercises, it's a must-do for anyone creative. The

second thing, whatever your chosen field of music, is to make sure to study other fields of music, because they will inspire and influence your work in a way that you can't yet imagine. If you're looking to be a DJ, study jazz; you might not want to just be a DJ. The other thing is to pick an instrument and learn to play it. It's cool to be a computer jockey, but it helps immensely to have a fundamental understanding of an instrument. Keyboard is always the best one, because you end up studying melody and harmony at the same time.

You attended the recent Winter NAMM show. What were some of the cool things you saw?

Oh my God, I saw the most amazing stuff ever. My favorite thing wasn't related at all to computers, software, or synthesis. What I saw is going to change my entire life. This one guy is a luthier, and his company is called Palm Guitar. I'm going to order two guitars or a guitar and a bass from him. They're full-fret-sized guitars, but the entire instrument—along with the electronics—is the size of the fretboard. And they sound incredible. He makes just a guitar and a bass, and he makes a custom carrying case that holds both instruments. Together, the guitar and the bass weigh less than seven pounds. You could fit the case in a backpack, no problem. And for a hotel room: you could have a TiBook—I have my 17-inch—a FireWire 410, a microphone, and a guitar and a bass with a USB keyboard. I'd have my entire studio, do you know what I mean?

What else did you see that you liked?

The new Logic looks like it's going to be ridiculous. What else: Vocaloid [the vocal synthesis software from Zero-G using technology licensed from Yamaha] blew my mind. I've been waiting for that forever. I can't wait to get my hands on it. And the way stuff's changing is just so cool. You know, you're going to have kids with a copy of Reason and Vocaloid making the most amazing records in their bedrooms. That excites me so much; technology and the tools to make really evocative electronic music are becoming so readily available. We're putting those tools in the hands of everyone. There's just better music that's going to come out of that than we've ever heard before. It's so exciting.

Considering where things are going technologically, what do you envision your studio being like in five years?

My studio will be a coconut with an umbrella in it, and a straw in the coconut, and a 17-inch laptop hooked up to a USB keyboard, and two flat-panel speakers stuck in the sand with a wraparound subwoofer on my neck, and sand in my toes. That will be my studio. Yeah, man. And my Palm guitars too, dude. Got to get those things.

Mike Levine *is a senior editor at* **EM**.

RECORDING MUSICIAN

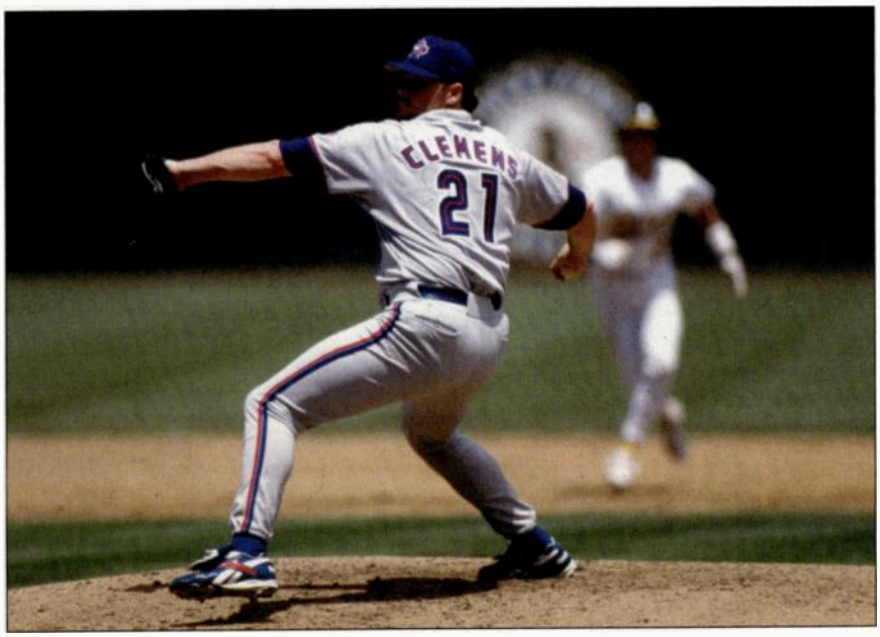
The Winning Pitch

Smart use of intelligent pitch correction.

By Sean D. Carberry

I used to be a cynic on the subject of pitch correction; I thought that those who needed it shouldn't be singing. I also worried that it was increasingly being used as a tool to further the careers of Britney Spears knockoffs who can dance and look great in slinky outfits but couldn't sing if their lives depended on it.

Well, I've changed my tune. I now believe that pitch correction is a perfectly valid and important studio weapon, and one worth having in every arsenal. In fact, pitch correction has saved my tail in the studio many times. That said, it should be used sparingly; you should always strive to obtain a performance on tape that needs no correction.



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Although pitch is a critical factor when recording vocals, it's the emotional qualities of a vocal performance that make a track really sing. Sometimes the feel of a take is perfect, but the intonation is a little shaky. When that happens, your options are to have the singer try again, in hopes of duplicating the feel with better intonation, or to try to fix the pitch problems on that initial take with a little electronic magic. In the past I would lean toward the retake route, which sometimes resulted in more harm to the vocal track than would have occurred from the sonic degradation of pitch correction. (I have yet to hear pitch correction that doesn't compromise fidelity, which has always been the main reason I have avoided using it.)

A few years ago, I engineered an album in which the singers had a tough time singing in tune. In an effort to get the notes where they needed to be, we did countless takes and punches. In hindsight, I wish that I had kept the

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first-take energy of their performances and used the miracles of modern science to do the rest. Nonetheless, I learned my lesson and have come to appreciate pitch correction, and I've even become pretty adept at using it.

GET SMART

Whether you're running a project studio, a production house, or a basement special, sooner or later you'll have need for pitch correction—especially if you record projects in which time is of the essence. Just to be clear, in this column I am discussing the use of intelligent pitch correction as opposed to fixed pitch shifting. The latter is simply adjusting an entire track by raising or lowering the pitch by a fixed amount (every note will be affected equally).

Fixed pitch correction is useful if an instrument is slightly but consistently out of tune. Consistent flatness or sharpness can also be dealt with by adjusting the tape speed while recording (when working with analog technology). For example, you record tracks at one studio and the tape machine's speed control is a hair off, and you go to another studio to overdub the piano and it's out of tune because of the different speed of the second machine. At that point you can either pitch-shift the piano track or varispeed the machine to get the tracks and the piano matched up.

Intelligent pitch correction, on the other hand, is a much more complicated technology. A box or plug-in will continuously sample every note, determine the actual pitch, and if it doesn't match a prescribed note, it will change the pitch. This requires the box to know what pitch the singer meant to hit, and this usually means you need to tell the pitch corrector a thing or two.

In terms of devices to choose from, there are quite a few options on the market these days. There are several outboard models ranging in price from home-studio affordable to "if you have to ask." In addition, there are a handful of plug-ins available for computer-based recording systems. I have used Antares Auto-Tune (probably the best-known pitch-correction product) for most of my correction. I have yet to try the latest TC-Helicon boxes, but by all accounts they sound great and do some amazing things in addition to correcting pitch. Regardless, when purchasing your system, find the product that pleases your ears as well as your wallet.

▼

Most devices will allow you to dial some (artificially produced) vibrato back in.

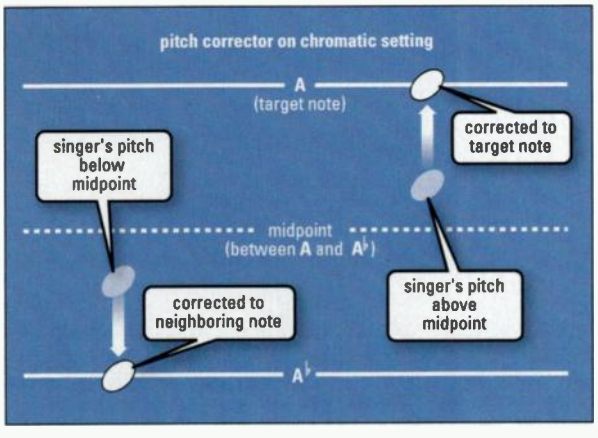

FIG. 1: The danger of using a chromatic setting on a pitch corrector is that if the singer's intonation is so far off that a note is closer to a neighboring note than it is to the target note, it will get corrected to the wrong pitch.

BEFORE OR AFTER

The first thing you need to decide when using pitch correction is whether to use it as you're recording or during mixdown. The former can be immediately pleasing because you hear things in tune right off the bat. But I never use pitch correction during the recording process, and I doubt I ever will. There are several reasons why.

First, you often need very little of it. Sometimes a vocal track might have only one or two notes out of tune. In that case, why subject an entire vocal to a process that could harm the sound quality and also introduce artifacts—glitches introduced by improper settings, or a loss of fidelity from mediocre A/D/A. I find it better to spot-correct by running the offending passages through a pitch corrector and recording onto another track (or automating the process, but more on that later). Then I can comp the tracks or punch in the phrases by recording over the original bits with the pitch-corrected version from the other track. That will preserve the integrity of the whole track and minimize the loss in sound quality.

The second reason that I wait until mixdown to use pitch correction is that it's not an exact science. No matter how sophisticated your pitch corrector is, and no matter how carefully you use it, it will not always achieve perfect results. It can miss notes, correct too slowly, correct too quickly, or even correct to a wrong note. Then you'll have to rerecord or use pitch correction again to fix those mistakes. Because of the complex balance of parameters involved, it's a far safer and smarter approach to use it after the fact, instead of as tracks are going down.

The third reason is courtesy. It's much better to give yourself the luxury of tweaking the settings while mixing rather than annoying the singer (and possibly distracting his or her concentration and ability to perform) by trying to adjust pitch-correction parameters during the vocal session. In addition, there are times that you don't want the singer to know you're using pitch correction. It can be a distraction for singers to hear the box doing its thing, because they will be hearing a clash between the note they are singing and the corrected note they are hearing in the headphones. In addition, some egos don't handle it well when you tell them you have to use a pitch-correction device. All the more reason to do it after the singers have left the studio.

One important rule as an engineer is to keep confidences. I make a point never to mention the names of the

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artists whose vocals I've pitch-corrected. Anyone who was not in the room when the technology was used will not know about it.

FIG. 3: In addition to extensive pitch-correction features, TC-Helicon's VoiceOne 2.0 offers vocal effects like vibrato modeled from actual singers, the ability to add grittiness to a vocal sound, and intelligent pitch shifting.

THE KEY TO GET IN

Whether you're using a plug-in on a computer or a hardware-based pitch corrector, there are a few parameters you'll need to tweak. The first is the scale and the key. The simplest way to go is to set the corrector to a chromatic scale. That means the unit will shift any wrong note that triggers it (based on a user-selectable threshold—more on this in a minute) to the nearest half step. Most singers don't miss by much, so a nudge to the nearest note will usually do the trick. However, this can actually create problems if the singer's pitch is particularly bad.

On a recent project that I engineered, the singer was going sharp on a regular basis. He was so sharp that on a chromatic setting the pitch corrector would often correct to a half step *above* the intended note (he was singing more than 50 cents sharp). The result was a perfectly intonated wrong note (see **Fig. 1**). In that case, you have to set the device to the key and scale of the melody.

If the song is in E major, and the entire vocal conforms to that scale, set the unit to "E Maj" (see **Fig. 2**). That means that any misplaced note will be shifted to the closest note within that key—pretty smart. The more sophisticated the pitch-correction device, the more scale options you will have, as well as the option to create your own scales or to exempt notes from correction. You can even set most units to detect and correct a particular pitch if a singer consistently misses only that note. Obviously, it is crucial to know the key of the song, and it's helpful to know the melody so that you can set up the unit or the plug-in effectively.

On the aforementioned project, I mixed all the analog tracks down to two stereo tracks, kept the vocals on a separate track, and ran it all into Digidesign Pro Tools. I then used the Antares Auto-Tune plug-in on the vocals; I preset it to the appropriate key for each song and then modified the scale to fit the melody. That way, there was no chance of the pitch corrector spitting out a wrong note.

FIG. 2: Here, the Antares Auto-Tune plug-in is set to correct to an E-major scale in Auto mode. The Retune and Tracking controls are set about half way, which is a good setting when only mild correction is needed.

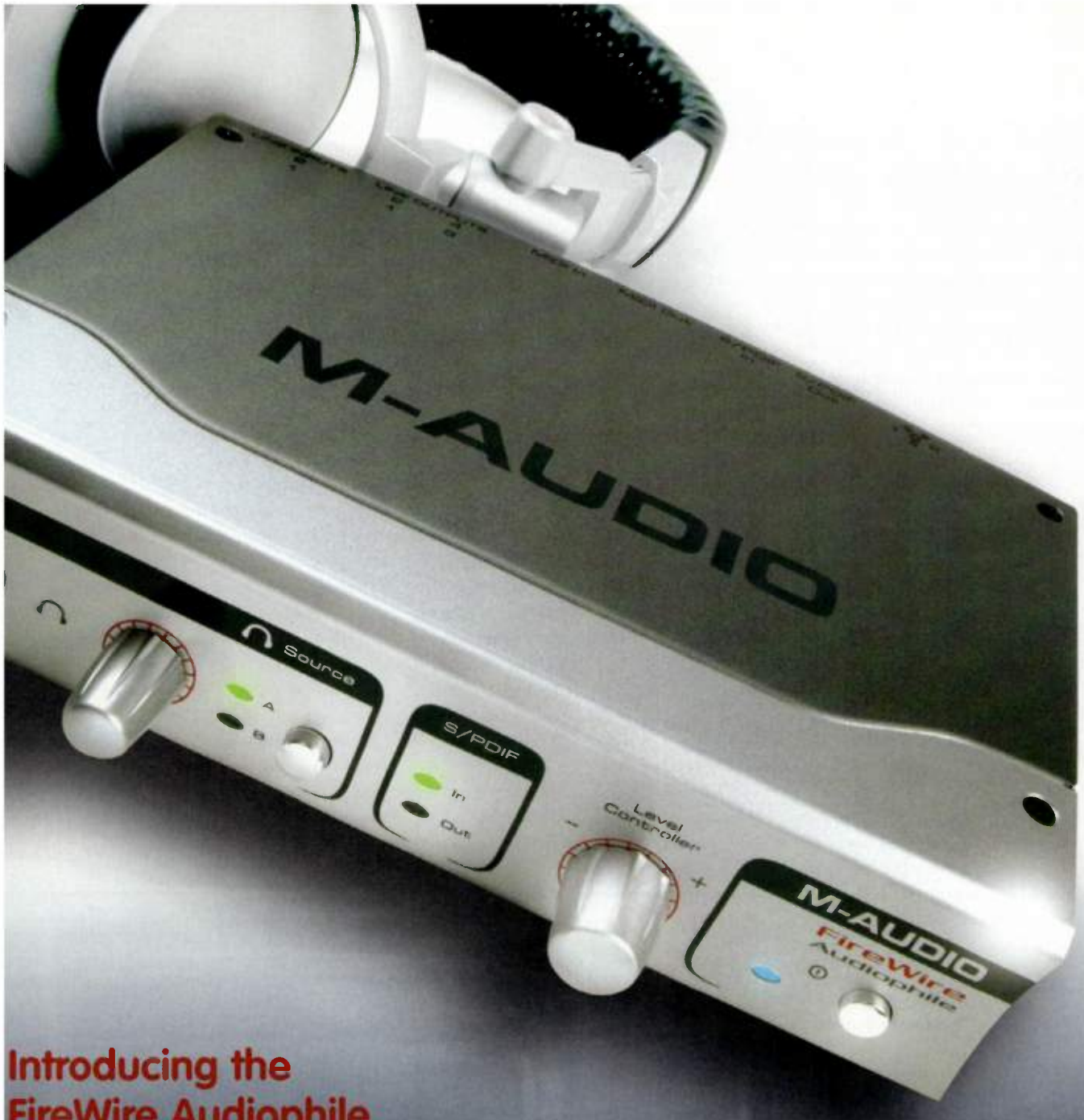
MR. PICKY

In addition to setting the scale, pitch correctors have various parameter controls that determine how exact the automatic pitch-correction effect will be. Finding the optimal settings for a given situation can be tricky and can frequently require trial and error.

The terminology and functions differ from product to product. For example, the main determinant of correction on Antares's Auto-Tune plug-in is the Retune Speed parameter. On the TC-Helicon VoiceOne 2.0, the key parameter is called Window; it adjusts how choosy the correction will be.

You'll find plenty of occasions when you don't want to set your device or plug-in for maximum correction. One reason is that singers often intentionally slide into a note by approaching it just from below (aka *scooping*). In other cases, being just slightly off pitch might be a cool sound. But if the pitch corrector is adjusted too high or too fast, it will treat any pitch that's the slightest bit off the grid as one that needs fixing. That could end up canceling out those intentional microtonal effects and making the vocal sound unnatural. (Many people now use these types of extreme settings as deliberate effects thanks to singers like Cher.)

Whereas overly high settings can sound unnatural, settings that are too low or too slow can cause off-key notes to sail by uncorrected. I start out with the settings in the middle and work from there. Getting it right takes precision listening and subtle tweaking. I never want the effect to be heard, so as soon as I hear a note bending too



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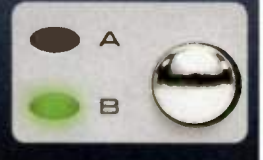

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PITCH CORRECTION TIPS

Fix it in the mix: When recording to multitrack, it's best to save the pitch correction for the mixing stage.

Keep it natural: Be careful not to use settings so high that they eliminate microtonal effects such as scoops and vibrato. Unless you're going for an artificial effect, make sure that the settings are subtle enough to leave the vocal sounding natural and unaffected.

Correct only where it is absolutely needed: If there are only a couple of bad notes on an entire vocal track, selectively pitch-correct those rather than running the entire track through. Otherwise, you could cause more problems, both in pitch and fidelity.

Don't make it worse: Be careful that far-out-of-tune notes don't get corrected to the wrong note.

Watch what you say: If the vocalist has a sensitive ego, it's better not to tell him or her that you're going to use pitch correction. And never tell those who weren't at the session that you used pitch correction on a particular artist.

Get graphic: For the most precise control, use a corrector that features a "graphic" or "manual" mode.

quickly or sounding at all like an effect, I back off the settings ever so slightly. Depending on the singer, it can really be a compromise. Sometimes it's not possible to cleanly correct every bad note using automatic settings, and you have to decide which you prefer—a note that's a little off key or a note that sounds slightly artificial.

If you're just starting out using pitch correction, I recommend you spend some time playing with the parameters on your unit to get a sense for how they interact. Run each control through its range and listen to hear what happens. You will gradually find what works best. I still end up with settings in the central range of the parameters because I am always shooting for a natural, transparent sound. Your demands may vary.

SPIN CYCLE

One additional factor to contend with is vibrato. A forcefully pitch-corrected note will inherently be stripped of any natural vibrato (because vibrato is a rhythmic pitch fluctuation, any pitch correction device will want to correct the wavering and smooth out the pitch of the note), and sometimes that's a bad thing. So, most devices will allow you to dial some (artificially produced) vibrato back in. Standard parameters include delay, speed, and depth.

Again, be careful because it can sound very mechanical since few people have a rhythmically perfect vibrato. If I dial any in, I use a shallow depth and adjust the speed to fit with the tempo of the tune. If you want vibrato that is more accurate sounding, you might consider the TC-Helicon VoiceOne 2.0 (see **Fig. 3**), which offers vibrato based on models of a variety of actual human voices.

GET GRAPHIC

Some pitch correctors offer graphic or manual modes. Rather than setting the parameters as discussed above and letting the pitch corrector loose in hopes that it will do what you want it to, you can take matters into your own hands and remove the element of chance.

In Antares Auto-Tune, Graphical mode tracks the notes in a selected region and then draws them on a grid (see **Fig. 4**). You can see the notes and how close they are to the correct pitch. You can manually redraw any notes that missed the mark, and then adjust the speed setting to control how quickly the note will go from the original pitch to your drawn pitch.

This mode of operation is more time-consuming but ultimately more precise, because you're telling the processor exactly what to do. It takes a little practice to draw with the mouse, but anyone adept at freehand computer graphics will have no problems.

Pitch correctors can also be controlled through MIDI. Devices typically give you control of functions ranging from basic automation (triggering the device in and out) to more advanced melody setting. Some pitch correctors can alter the vocal using a melody you

FIG. 4: This screen shot shows Antares Auto-Tune in Graphical mode. A section of the vocal track was selected and then analyzed by Auto-Tune. The resulting waveform appears in red and is clearly sharp. The yellow line represents the hand-drawn correction, and it still maintains some of the vibrato of the original note.

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play on a keyboard either to define a scale or to correct pitch in real time based on the MIDI notes played.

FLAT AND SHARP

All of the above parameters and approaches can be used for any instrument, not just vocals. Some devices have an input setting that is designed to help the sampling software adapt to the input signal. For example, there might be presets for high voice, low voice, instrument, as well as other sources. If a saxophone player lays down a track but goes sharp here and there, pitch correction will fix things up just as it will on a vocal. And you can store all of your settings, so if you routinely record the same musicians and instruments, you are able to keep the settings you have already created that work so magically.

Again, I always caution people to use pitch-correction devices or plug-ins only when necessary. There is no question that they are invaluable in production studios when time, rather than sound quality, is the driving dimension, and they are often a lifesaver in the professional studio. Nevertheless, I'll take an off-key, emotionally charged vocal by Robert Plant over a technically correct, but soulless Britney vocal any day. Of course, with the proper use of your pitch corrector, you can have your emotion and your intonation, too.

Sean D. Carberry, *a freelance producer in Boston who loves to complain about new technology, can no longer live without hard-disk recording and intelligent pitch correction.*

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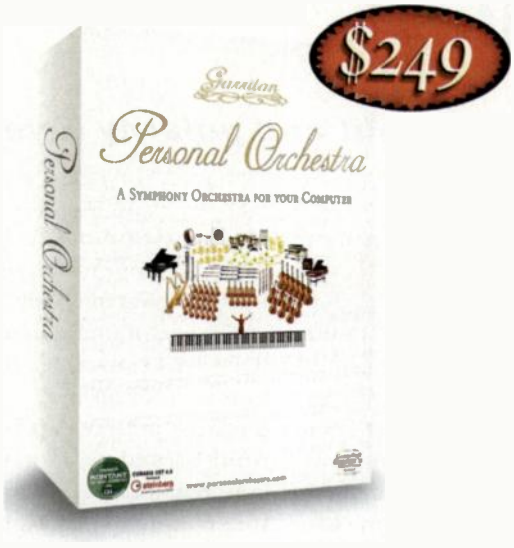

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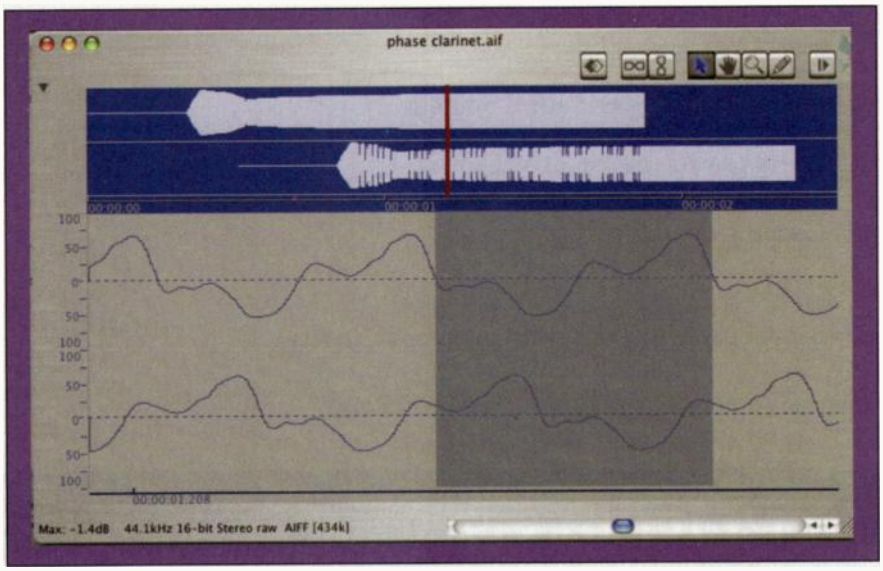
About Phase

Get in step with phase shift and polarity reversal.

By Dave Moulton

Phase shift is one of those truly confusing topics in audio, yet along with frequency and amplitude, phase is one of the primary conceptual building blocks of any audio waveform. Why is it so confusing?

The confusion arises in large part because our hearing uses phase in ways that are wondrous but not obvious, and phase issues are inherent to many musical behaviors. In addition, the term *phase shift* has been misused and abused by many audio engineers for the past century.



THE CONCEPT OF PHASE

Along with a *period* (that is, the length of time it takes to complete one cycle of wave motion) and an *amplitude*, every audio wave has a characteristic called *phase*. Phase is simply a way of talking about time in terms of a wave's period.

Fig. 1 shows a sine wave with a frequency of 1 kHz. It has a period of 1 millisecond (the period is equal to 1 divided by the frequency.) This sine wave starts at some point in time, which we have arbitrarily labeled 0.000 ms. The starting point for the wave is traditionally the point at which the wave begins to build up positive amplitude, beginning at "average" pressure, which is defined as 0 volts, or, in air, one atmosphere of barometric pressure (1 bar).

The phase of the wave is a way of expressing a specific point in its time cycle. The entire time cycle of the wave is divided into 360 equal parts, called *degrees*. The beginning of the cycle's phase is labeled 0 degrees, halfway through the cycle is labeled 180 degrees, and the end of the cycle is labeled 360 degrees (also 0 degrees again). Thus, we can talk about the wave in terms of degrees and use that term as a reference point. For example, you might say, "the positive peak occurs at a phase of 90 degrees and the negative peak at 270 degrees."

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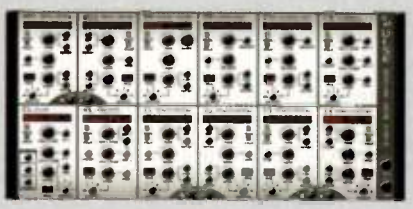

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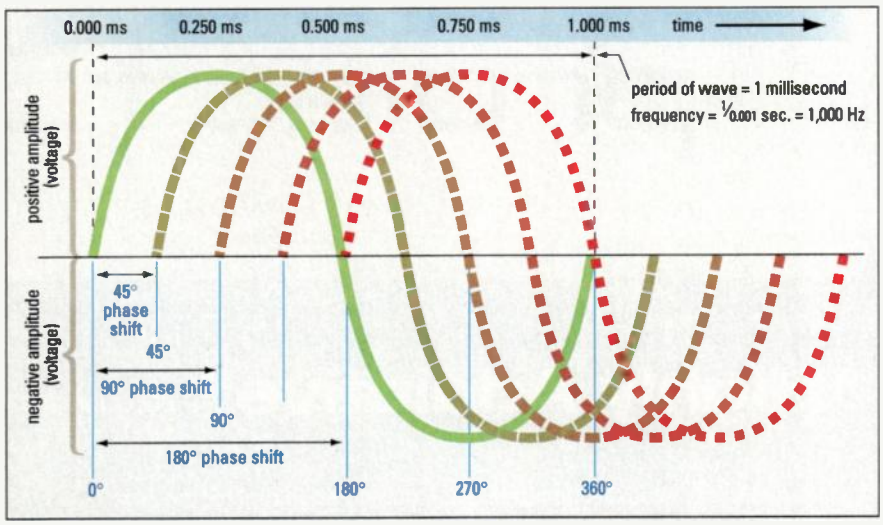

FIG. 1: This figure shows a single cycle of a 1 kHz sine wave, with additional iterations at 45-, 90-, 135-, and 180-degrees phase shift, relative to the original wave. Note the period of the wave, which is the frequency (1,000 cycles per second) inverted.

SHIFTING PHASES

The term *phase shift* refers to an offset in time of the original wave, a copy of that wave, or a wave of a slightly different frequency. In the first and second cases, some force (latency, for example) causes the wave to be delayed. We can express that delay in time or in degrees (as shown in the drawing for the various iterations). When referring to the relationship of the delayed wave to the original, it's best to express the delay in degrees.

For example, a wave with a phase shift of 180 degrees starts halfway through the cycle of the original wave, so that it crosses zero going positive at the same point in time as the original crosses zero going negative. This occurs in the case of sine waves and most artificially generated test signals (see **Fig. 2**). To recap, phase shift refers to the offset in time relative to the starting point of the original wave.

ON THE BEAT

Beating is an interesting phase-related phenomenon. It occurs when two waves of slightly different frequencies (for example, 1,000 Hz and 999 Hz) sound simultaneously. In such a case, there is continuously varying phase shift between the original wave (1,000 Hz) and the second wave (999 Hz). The second wave has a period of 1.001 ms, so that for each cycle of the original, the second wave shifts in phase by 0.36 degrees (360/1000), trailing the original by an additional 0.36 degrees for each cycle.

The result is that the second wave goes *in and out of phase* with the original—once a second, here. Every 500 ms, it is 180 degrees *out of phase* with the original.

If these two waves are mixed together (summed), the resulting signal is a sine wave whose amplitude swings from 6 dB louder than the original (when the phase shift is 0 degrees) to complete cancellation (when the phase shift is 180 degrees). This amplitude modulation is called *beating*, and the rate of beating (called the *beat frequency*) is equal to the *difference* in frequency between the original and the second wave—in this case, 1 Hz (see **Fig. 3**).

In music, we use the presence of beats to tune our instruments (by getting the beating to occur as slowly as we can). The effect of chorusing is a simulation of the beating phenomenon that occurs when a large number of sources sound approximately the same pitch simultaneously. This is extraordinarily important for music, of course.

TIME OFFSETS

Although phase shift and time delay both refer to offsets in time, they do so in different ways. A time delay of 1 ms is exactly what it says, regardless of the signal. How many degrees of phase shift equal a 1 ms delay? It depends on the period (and therefore frequency) of the signal.

A 1 ms delay represents an infinite possible number of degrees of phase shift for an infinite possible number of frequencies. A 1 ms delay for a frequency of 250 Hz causes a phase shift of 90 degrees, whereas for 500 Hz it causes a phase shift of 180 degrees. The amount of phase shift is derived from the length of the delay as a fraction of the period of the waveform.

THE COMB FILTER

As we have seen, a given time delay yields a range of phase shifts for the various frequencies present in the signal. A delayed signal summed with its original has the following behavior: all phase shifts of 180 degrees yield cancellations, and all phase shifts of 360 degrees yield 6 dB boosts. For a 1 ms delay, 360-degree shifts occur at 1 kHz, 2 kHz, 3 kHz . . . *n* kHz, while 180-degree shifts occur at 500 Hz, 1,500 Hz, 2,500 Hz . . . *n*500 Hz. The result is

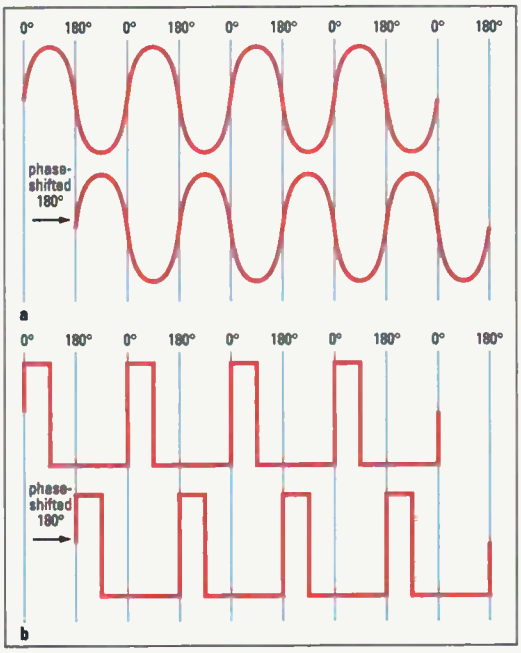

FIG. 2: In this figure, you can see a sine wave with an exact iteration of itself phase-shifted by 180 degrees (a), and a pulse wave with the same period and an exact iteration of itself, also phase-shifted by 180 degrees (b).

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

Brian Allan – TAXI Member

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

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

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

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

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

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

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

The next thing you know, I was auditioning for the president of the label right in his office. I guess I passed the audition, because I got signed a few days later.

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

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

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

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

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called a *comb filter*, and it is a highly distinctive pitched sound that is the basis for the entire family of phasing and flanging effects, as well as being a primary stereophonic compatibility issue and a troublesome artifact in audio.

When we vary the delay time, the frequencies and pitch of the comb filter vary, producing the effect of flanging.

POLARITY REVERSAL

Polarity reversal (or PolRev) is a term that is often confused with phase but involves no phase shift or time delay. Polarity reversal occurs whenever we "change the sign" of the amplitude values of a signal. In the analog realm this can be done with an inverting amplifier, a transformer, or in a balanced line (by simply switching connections between pins 2 and 3 on one end of the cable). In the digital realm, it is done by simply changing all pluses to minuses and vice versa in the audio-signal data stream.

The top of Fig. 4 shows two sine waves (which are symmetrical over both the vertical and horizontal axes). Below them are two pulse waves (which are symmetrical over the vertical axis but not the horizontal). Both sets of waves are out of polarity. The two sine waves also appear to be 180 degrees out of phase. However, because there is no time offset, there is no phase shift. Nevertheless, when summed together, they will cancel, just like sine waves that actually *are* 180 degrees out of phase (such as the ones in Fig. 2a).

Unlike the sine waves, the pulse waves in Fig. 4b do not appear to be 180 degrees out of phase when their polarity is reversed (compare Fig. 4b with Fig. 2b). Like the sine waves, two pulse waves with reversed polarity will cancel each other, while two pulse waves (or any asymmetric waves) will *not* be cancelled when simply phase-shifted by 180 degrees.

So, to recap: when two signals are out of polarity, there will be no phase shift and no comb-filtering. The two signals will simply cancel when summed. They are not out of phase, they are *out of polarity*.

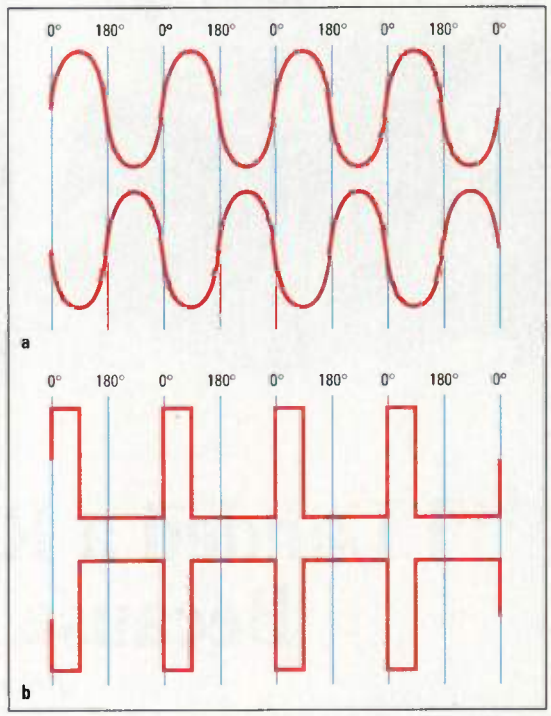

FIG. 4: Both the sine waves (a) and pulse waves (b) are out of polarity.

IN PRACTICE

Since at least 1950, many in the recording industry have been incorrectly referring to polarity reversal as being out of phase. On consoles, you'll often find a "phase" button that inverts the polarity. In many cases, the Greek letter theta (Ø) is used to refer to a polarity reversal, when the more formal and correct application of that symbol in physics is to indicate phase shift. Yet PolRev is a special trick that has nothing to do with phase shift.

Polarity reversal is an essential tool in your stereo toolbox and a key element in the various stereophonic miking techniques of the middle-side (MS) family. It can similarly be used to great effect in synthesis for developing powerful and effective pseudostereo voices. Such voices have a middle element and a side element, and the relationships between the two can be modified over time using separate envelope generators. The side element is split into a polarity-reversed pair, while the middle element is mixed in mono with both side elements.

Awareness of the existence of polarity reversal, as both a working tool and also a potentially disastrous production problem, is essential to your studio craft. When you are working with multiple iterations of a signal and suddenly the resulting signal disappears or attenuates by 50 dB, you can be pretty sure that one of the signals has its polarity reversed.

Many hardware manufacturers are fairly casual about the actual polarity of the signal; for example, many line-amp topologies invert the signal as a function of their design. I've encountered numerous consoles where various outputs have their polarities reversed. Nor can you count on sound cards to be much better in this regard, although I haven't done a survey recently. Once you know the nature of the problem, it is usually easy to correct.

The concept of phase refers to an offset in time during the cycle of a given wave, and it is a fundamental quality of the audio signal. The concept of polarity refers to the relative "sign" or polarity of two otherwise identical signals. The only real relation between the two is that they share the same jargon.

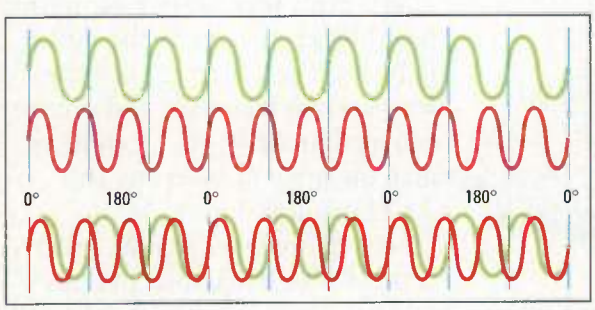

FIG. 3: Here, the green wave has a longer period than the red wave, by a ratio of 4:3. The red wave goes in and out of phase with the green wave every four cycles. When these are summed, beating will occur.

Dave Moulton *has been working on The World's Best Loudspeaker, also known as TWBL. You can complain to him about anything at his Web site, www.moultonlabs.com.*

"I Switched"

Who: "Prince Charles" Alexander

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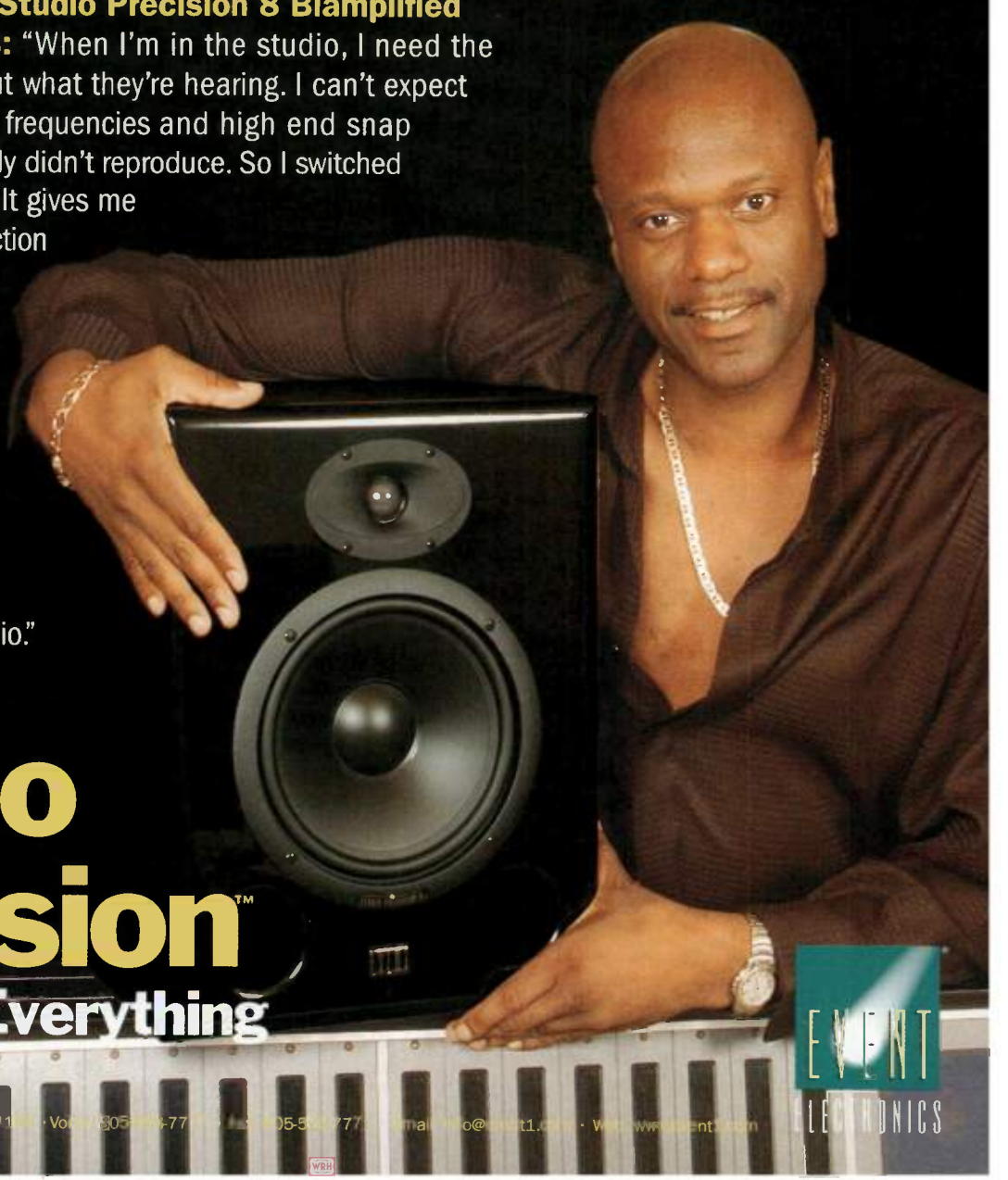

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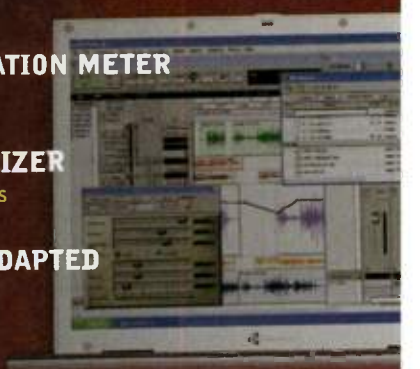

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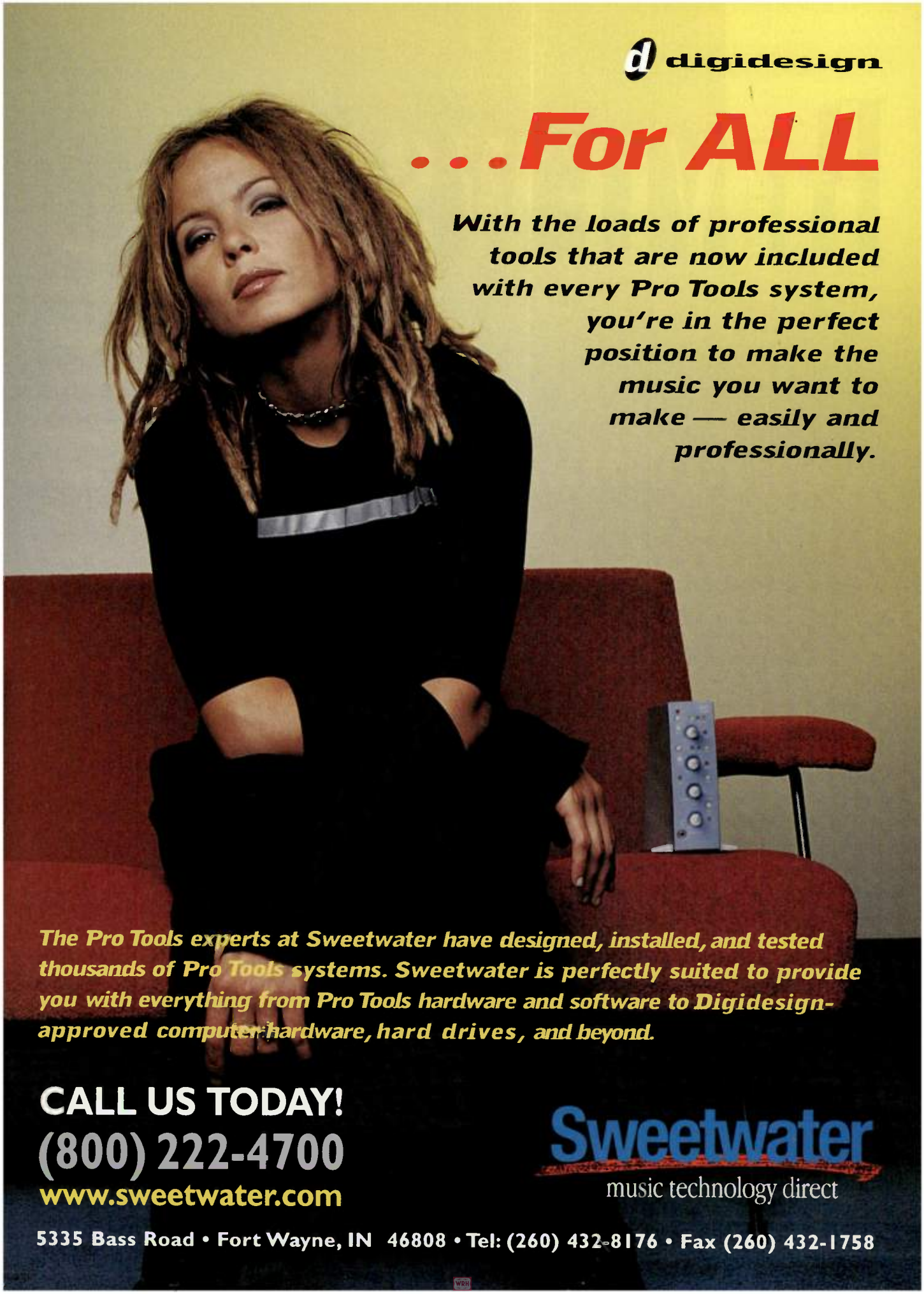
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STEINBERG

CUBASE SX 2.0.1 (MAC OS X/WIN)

A face-lift and a new engine enhance Steinberg's top-of-the-line sequencer.

By Len Sasso

With the release of Cubase SX 2.0, Steinberg has responded to users' requests for a number of features; the company has also revamped its VST audio engine. New in this version are major enhancements such as the Time Warp Tool, convenience upgrades such as the redesigned mixer, and under-the-hood improvements such as full latency compensation. With over 100 new features, this is an easier-to-use, better-performing, and better-sounding Cubase. In this review I'll concentrate on the changes since Cubase SX 1.0. For a full review of the major upgrade from Cubase VST to Cubase SX, see the October 2003 issue of EM.

To take full advantage Cubase you'll need a fast computer with a large, fast hard drive and lots of RAM. Steinberg recommends a dual G4/1.25 GHz Mac or 1.4 GHz Pentium-class machine; the minimum requirements, however, are somewhat lower. In practice, performance was severely limited on a G4/800 MHz PowerBook. A 2.0 GHz dual

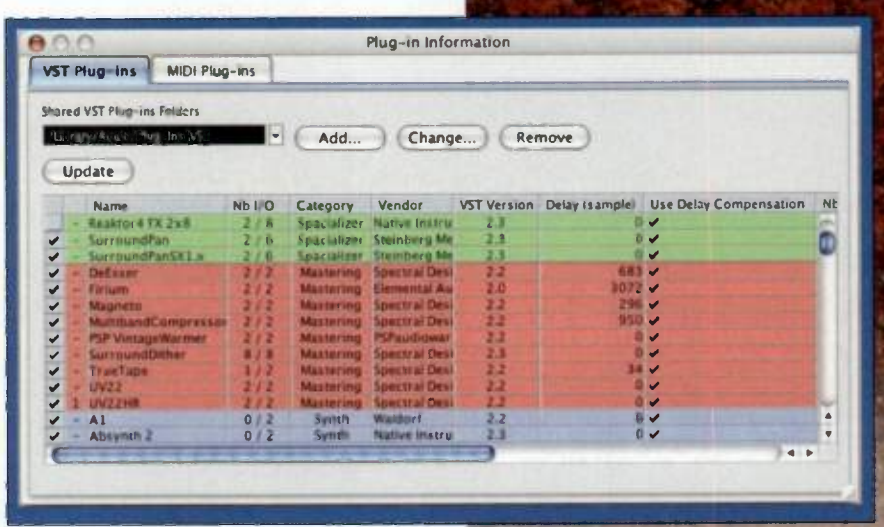

FIG. 1: Cubase SX's Plug-in Information window shows all installed VST and MIDI plug-ins. Among other details, it shows the required delay compensation for VST plug-ins. The Use Delay Compensation column allows you to toggle delay compensation on and off for individual plug-ins.

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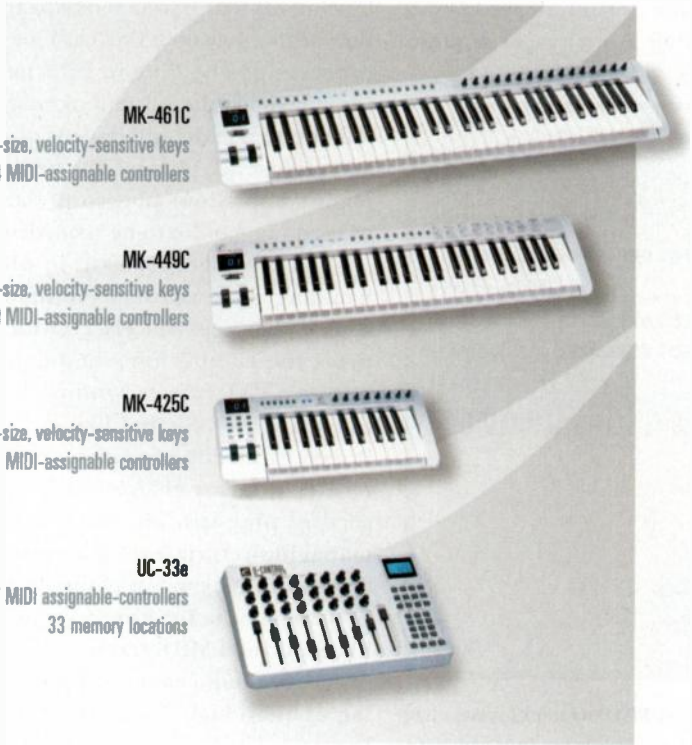

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Just about everything on Evolution keyboards is an assignable controller—including knobs, faders, buttons, pitch wheel, mod wheel, sustain pedal input and expression pedal input. You can even trigger specific MIDI notes from assigned buttons.

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One touch on our smooth, solid action will tell you that we haven't forgotten that keyboards are also meant to be played. 12 different velocity curves let you choose the response that's perfect for your touch. Slide controls are high-quality Alps faders.

More Features

Program while you play with our unique keypad entry method—complete with dedicated function buttons, inc/dec controls and 10 memory presets. Organ Drawbar mode reverses the faders to respond just like the real thing. Controller Mute allows you to preadjust controller positions without sending data, then use Snapshot to send all current settings at once.

More Intuitive

Evolution controllers are USB class compliant, making installation as simple as plug-and-play. Our large LCD panels provide for words and graphics that numeric displays alone can't touch. You also get presets set up to control popular music software right out of the box.

More MIDI Support

Evolution controllers support the full range of MIDI messages, including SysEx, RPN/NRPN, and General MIDI 2. You can also assign MIDI channels independently for each controller.

More Value

Note for note, all this adds up to more features for the dollar. All Evolution keyboards ship with a wide assortment of demo software to get you started.

EVOLUTION

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G5 machine, on the other hand, was easily able to handle a large number of audio tracks and plug-ins.

Cubase also requires a good bit of screen real estate—a 1,152 × 864-pixel, dual-monitor setup is recommended. I felt somewhat graphically constrained on a single 20-inch (1,680 × 1,050-pixel) Apple Cinema display, mainly because minimum window sizes for the mixers, editors, and Project window are quite large. I also had frequent redraw problems, with buttons disappearing on the Track list, the Inspector, and the Transport. Toggling some element of the display would bring them back, but it became a bit of a nuisance. However, that only occurs with Mac OS X 10.3.x (Panther), and Steinberg is aware of the problem and is working to correct it.

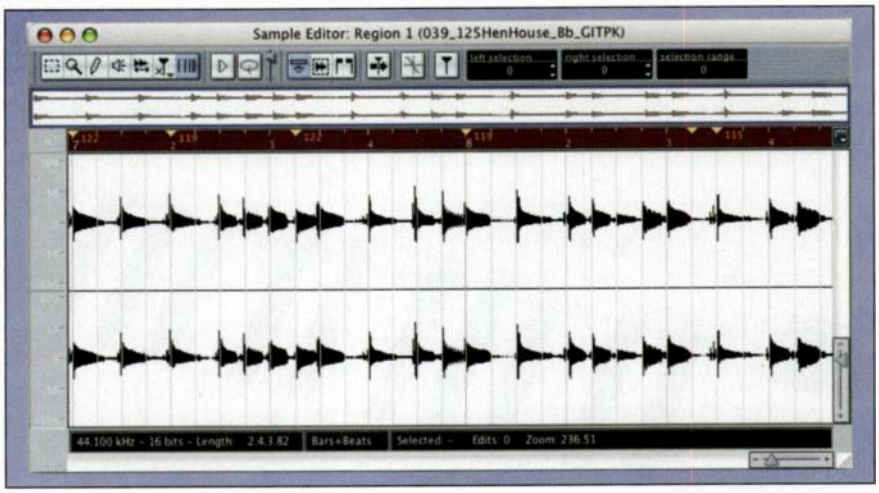

FIG. 3: By inserting tempo changes in the Tempo Track as you drag a beat position to a time position in an audio or video file, the Time Warp Tool allows you to align time positions with bar and beat locations. Here the yellow wedges indicate beat positions that have been dragged to hits in the guitar audio track.

UNDER THE HOOD

SX 2.0 sports a new audio engine with 32-bit floating-point resolution and a multichannel audio path throughout. The new VST 2.3 audio engine includes a VST Connections window for managing input and output buses. That allows you great flexibility in matching Cubase SX to your audio hardware and to specific project requirements. Because the bus setup is saved on the Project level rather than globally, you can either create a single template with a maximal input and output configuration or create templates for different Project types. For example, you might have one setup for Projects that involve live recording and another setup, without input buses, for Projects using only audio files and virtual instruments.

The whole audio signal path is now multichannel. Individual audio tracks can play separate or interleaved audio files containing as many as six audio channels—accommodating 5.1-surround processing, for example. Multichannel processing applies to send and insert effects buses as well.

Effects plug-in handling is better in two ways. Automatic delay compensation (see **Fig. 1**) adjusts for any delay introduced by VST effects plug-ins—delaying all other audio by the same amount. Delay is most often introduced by plug-ins that have a look-ahead feature or that rely on a DSP card for their processing. The Plug-in Information window shows the amount of delay and lets you toggle delay compensation on and off for each plug-in. The new audio engine also allows plug-in processing of incoming audio to be recorded.

The other improvement in plug-in handling is the introduction of effects return channels (see **Fig. 2**), which replace the cumbersome and counterintuitive VST Effects window. Effects buses are now created like any other Project track and are automatically allocated a mixer channel strip for inserting plug-ins, applying EQ, and managing return level, pan position, and so on. All plug-in parameters can be automated in the Project window just like audio and MIDI tracks.

The new audio engine supports freezing of individual VST-instrument plug-in tracks. The VST Instruments window now has a freeze button for each plug-in.

FIG. 2: The mixer here displays channel strips for a MIDI track (left), a DSP effect track (center), and a VSTi track (right). The Channel Settings window for the VSTi track appears at top right above the control panel for the new Magneto tape-simulation plug-in inserted into that track.

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Clicking on it creates a temporary audio file with the instrument's output and all subsequent processing. As long as freezing is active, the temporary file is played instead of the instrument, which generally saves a significant amount of processing. Freezing can be turned off when changes need to be made to instrument parameters or MIDI data. Level and pan can be adjusted while freezing is active. If you face CPU limitations, the freeze function can be a lifesaver.

BELLS AND WHISTLES

Many of the new features and enhancements in Cubase SX are designed to streamline the workflow, and they do make life easier. You can now edit multiple parts in both the MIDI and audio editors. In the MIDI editors, you can choose to have one or all open parts be active. When only one part is active, lasso-selecting is restricted to events in that part, making it easy to edit data in a single part while viewing its relationship to events in other parts.

A new Ruler track class has been added that allows you to place rulers at any position within the track list. Each ruler can have its own display format (Bars:Beats, Seconds, Samples, and so on), so you can easily place markers or locate video snapshots on a timeline while arranging MIDI parts and events by bars and beats.

A number of windows have been improved. The Transport and the Project-window toolbars can now be customized by toggling view options in a context menu that opens when you right click in an empty area of the display. You can also customize the display, arrangement, and grouping of buttons for each track type. You can now have three mixer views (as opposed to two in previous versions), each with its own configuration. More is better here because considerable clicking is involved in setting it up the highly flexible mixer display to show exactly

PRODUCT SUMMARY

Steinberg
Cubase SX 2.0.1
digital audio sequencer
$799
upgrade from SX 1.0 $149

FEATURES	4.0
EASE OF USE	3.5
DOCUMENTATION	3.5
VALUE	4.0

RATING PRODUCTS FROM 1 TO 5

PROS: New audio engine with multichannel routing throughout. Easy tempo matching with new Time Warp Tool. Improved effects handling. Enhanced custom layout options. Individual freezing of plug-in instrument tracks. Cycle recording on multiple lanes per track.

CONS: Requires a lot of screen real estate. Redraw problems in OS X Panther. No Audio Units support. No copy and paste for tempo changes. Help system is inoperable on the Macintosh.

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what you want the way you want to see it, and it's handy to then be able to save that work as one of the mixer views.

WRINKLING TIME

The new Time Warp Tool (see **Fig. 3**) allows you to quickly adapt the Tempo track to specific audio or MIDI events as well as video hitpoints. In the various editors as well as the Project window, you simply drag lines of the bar:beat grid to the desired audio, video, or MIDI events. Tempo events are automatically added as needed to make the bar:beat grid positions match the time of the selected events. If you are warping to audio or picture and you have MIDI on adjacent tracks, the MIDI timing changes to match. If you are warping to MIDI events, their timing won't change, but their bar:beat alignment will. That is a better solution for scoring rubato playing than quantizing, which actually removes the time variations.

The Warp Tool would be even more useful if there were a convenient way to copy and move tempo changes. If you Warp to an audio loop, for example, you would naturally like to be able to copy or move the tempo changes with the loop. The only way to do that is to select the related tempo events in the Tempo Track window and drag them to the new location—a process that becomes tedious with repetition.

A new Stacked Cycle Record mode greatly facilitates recording multiple takes. When enabled, each cycle of audio or MIDI being recorded is placed on its own lane on the record track. You can then edit the lanes individually as needed and invoke the Remove Overlaps option to collapse all lanes to a single take.

In the scoring department, you can now assign MIDI meaning to dynamics symbols, resulting in more accurate MIDI playback of scored parts. Other MIDI enhancements include drag-and-drop importing of Standard MIDI Files, chord recognition in the MIDI editors (select a chord and the appropriate chord symbol will appear in the Info display), and automatic scale correction during transposition.

Those are just a few of the many new features in Cubase SX 2.0. Taken together, they significantly improve the work flow. Beyond that, the new audio engine results in a noticeable improvement in performance. If you're a Cubase user, you need it.

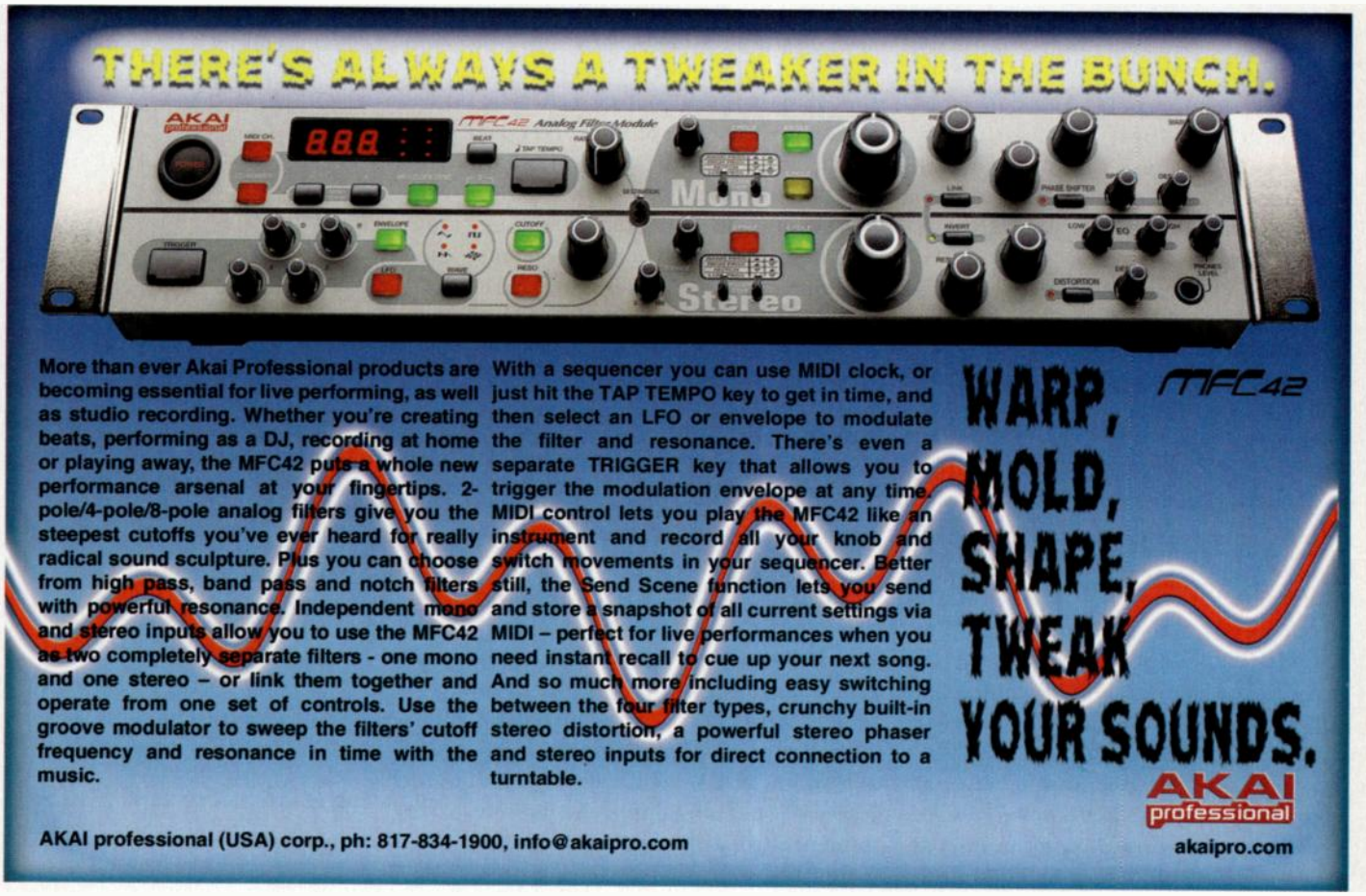
Minimum System Requirements

Cubase SX 2.0.1

MAC: G4/867 MHz (dual G4/1.25 GHz recommended); 384 MB RAM (512 MB recommended); Mac OS X 10.2.5

PC: Pentium or Athlon/800 MHz (1.4 GHz recommended); 384 MB RAM (512 MB recommended); Windows 2000/XP

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



STUDIO PROJECTS

LSD2

A versatile stereo large-diaphragm condenser microphone.

By Rob Shrock

Studio Projects' LSD2 is a stereo large-diaphragm condenser microphone with a unique design. It essentially consists of two Studio Projects model C3 mic capsules stacked vertically in the upper half of the casing. Because sounds hit the capsules at virtually the same time, this microphone avoids the phasing issues that can arise when mics are positioned some distance from each other.

The LSD2's top mic housing rotates 270 degrees in relation to the fixed bottom capsule. That lets you point the capsules in the same direction, rotate one capsule 180 degrees (to point them in opposite directions), or arrange the capsules anywhere within the 270-degree range. Each capsule can be set independently to a cardioid, omnidirectional, or figure-8 pattern, which allows you to control the width of the stereo image and use a variety of XY-coincident miking techniques, including Blumlein and middle-side (M-S). In addition to the independent pattern switches, each capsule has a –10 dB pad and a highpass filter.

The LSD2 does not require a special power supply; it operates on normal phantom power. However, a proprietary cable connects to the LSD2 chassis with a 7-pin connector and fans out at the other end to two XLR connectors. The included 25-foot cable is generously long, and additional XLR cables can be connected if longer cable runs are required. (Each channel of the LSD2 requires its own phantom power and preamp.) The LSD2 comes in a nice carrying case that holds the microphone, the cable, the included well-built shockmount, and a foam windscreen. It's an elegant package.

HIT THE RED BUTTON

I happened to be playing electric guitar when the LSD2 review unit arrived, so I decided that my first task was to capture an ambient stereo image from my electric-guitar rig.

I keep two small amps—a Vox and a Marshall—set to basic clean sounds and positioned on stands about three feet apart. I use various preamps, pedals, and effects units for overall tone creation. Each amp responds differently, creating a cooler stereo sound than two identical amps. In front of the grilles of each amp, I've permanently mounted a pair of Shure SM57s pointed at the speakers. However, close-miking alone doesn't always result in the ideal sound for many guitar tones. I had experimented a few times with a stereo pair of condenser mics placed about six feet back, but had always felt lukewarm about the results. Based on my previous experiments, I wasn't really expecting too much from the LSD2 in this particular application.

After reading through the instruction booklet, I learned that the two switches on the front of the LSD2 control the bottom capsule, while the identical switches on the back apply to the top rotating capsule. I set both capsules to cardioid patterns with no rolloff and positioned the LSD2 at ear level where I stand when working on the guitar sound. I angled the mic toward the Vox on my left, rotated the top capsule so that it pointed at the Marshall, and hit the Record button.

After playing a few licks, I gave it a listen. The sound was almost identical to what I heard when standing in front of my rig. There seemed to be a hole in the center of the image that hyped the stereo spread a little, so I switched both mics to the omni position and recorded a little more. I liked that sound even better. It was more even across the stereo spectrum (though the stereo effect was less exaggerated) and more natural in tone, although the added ambience from the omni patterns revealed the sound of my hard drives purring away in the background. (I was recording in a single big room partitioned with gobos and panels.) Blending in the SM57s with the LSD2 capsules set to omni created a huge guitar sound with more clarity and depth. It was impressive.

ON THE OTHER SIDE

I was now ready to try some different miking techniques with different settings. I had to record some quick versions of songs on an acoustic guitar for a rehearsal CD. Rotating the LSD2's top capsule to the 270-degree position properly aligned the capsules for middle-side recording. That provided

The Studio Projects LSD2 offers flexible stereo mic placement with its rotating upper capsule.

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an ideal configuration for recording a solo acoustic guitar.

In M-S recording, a cardioid microphone is pointed directly at the sound source, and a bidirectional microphone is placed perpendicular to the cardioid microphone. The figure-8 pattern picks up the sides of the room, with the pattern's null points aimed directly at the source and directly opposite the source. The figure-8 signal is then fed to two separate mixer channels and panned hard left and right with one channel switched out of phase.

Adding the cardioid mic's signal and blending the three channels to taste results in a stereo sound that is also mono-compatible. (When summed to mono, the out-of-phase figure-8 signals completely cancel each other, and you're left with the cardioid signal only.) M-S is a great choice for single-point sources—such as acoustic guitar, voice, or cello—that you want to capture in stereo without specific left-right imaging. (Sources such as piano and drum overheads are better recorded with another coincident-pair technique if you want to hear the imaging of the source.)

The guitar sound that I recorded with the LSD2 in an M-S configuration was nothing short of brilliant. I could hear the air around the guitar, and on practically every monitoring system I tried, it sounded like someone was playing the guitar right in front of me. In mono, the guitar was solid and clear without any phasing artifacts.

SPREADING OUT

I decided to record a more common stereo acoustic guitar sound by setting the capsules to cardioid and spreading them out. Again, there seemed to be a little hole in the center phantom image—it definitely sounded like two separate mics pointing in different directions. However, that's not the fault of the LSD2; it's often the sound you get with two cardioid mics creating a stereo sound field. I played with the spread of the capsules a bit, and the sound improved. No matter how widely I spaced the capsules, the combined mono sound was solid and pure. The proximity of the two capsules makes good on the manufacturer's claims for mono-compatible stereo recording.

I then switched the two capsules to the omni pattern and the acoustic guitar sound just fell into place. The hole in the center went away, and the tone improved dramatically. Of course, I was also getting a sense of true left and right, and any movements I made while playing affected the sound. I also heard more room sound in the recording, so I moved the mic in a little closer, and it sounded even better. The omni pattern let me get in closer to the source and minimize the room sound without the proximity effect of the cardioid pattern.

In the end, I preferred the M-S sound for the acoustic guitar. I wasn't interested in capturing a left-right perspective as I would be on piano or drum overheads, and I liked that the M-S stereo image was rock solid. Moreover, it just sounded the best for this application, although I really liked the omni-pattern recording too.

PRODUCT SUMMARY

Studio Projects
LSD2
stereo large-diaphragm condenser mic
$999.99

FEATURES	4.5
AUDIO QUALITY	4.0
VALUE	4.0

RATING PRODUCTS FROM 1 TO 5

PROS: Provides a mono-compatible stereo signal from any source. Rotating top capsule allows easy adjustment of stereo spread. Variable patterns allow a variety of miking techniques. Excellent sensitivity. Sounds especially good in omni and middle-side configurations.

CONS: Highpass filter is fixed at too high a frequency (150 Hz) for many applications. Slightly noisy on extremely quiet sources with lots of gain added.

Manufacturer

Studio Projects/PMI Audio Group (distributor)
tel. (877) 563-6335 or (310) 373-9129
e-mail sales@pmiaudio.com
Web www.pmiaudio.com

LSD2 Specifications

Element	(2) condensers (vertically coincident)
Diaphragm	1.06" dual-membrane 6 µm mylar
Polar Patterns	cardioid, omni, figure-8
Frequency Response	30 Hz–20 kHz
Maximum SPL	146 dB SPL (1% THD at 1 kHz)
Self-Noise	18 dBA
Signal-to-Noise Ratio	76 dB
Power	24–52.5V phantom power
Circuit Type	transformerless
Low-Cut Filter	6 dB/octave at 150 Hz
Pad	–10 dB
Dimensions	10.75" (H) × 2.1" (diameter)
Weight	1.8 lb.

A few days later, I took the LSD2 to another studio and tried it on an acoustic piano. This particular piano was extremely bright, and the LSD2 did a nice job of catching the strident sound of the hammers. I got a completely acceptable sound using the LSD2's cardioid patterns, although it took several adjustments to get the capsule spread just right. Setting both capsules to omni and opening the piano's lid completely to eliminate reflections produced the best sound. (I've become so accustomed to using cardioid patterns that I had forgotten how unnatural the resulting sound could be compared with a good omni-pattern microphone.)

MAKE A WISH

While working with the LSD2, I did notice a few things that I would have liked in the design. There are no markings on the rotating capsule to indicate its current position; I would prefer a graded scale that showed the degrees of rotation to aid in matching previous settings. Although you can configure the capsules at a 90-degree angle for M-S recording, for example, you have to eyeball the setting. Thankfully, rotating the capsule all the way locks it and aligns the capsules at 270 degrees. However, being able to repeat particular settings would be especially helpful when using the more sensitive cardioid patterns.

Another small complaint is that the highpass filter is set at 150 Hz. Although the rolloff is a mild 6 dB per octave, the setting is a bit high for my taste. I would rather it be a little steeper and at a lower frequency, such as 80 Hz. I chose not to apply the built-in filter and instead used outboard EQ or a plug-in to filter the subsonics. Also, though the LSD2 is not particularly noisy, there is some audible noise when boosting the mic to high gain settings. In these days of high-resolution DAWs and whisper-quiet mics, any apparent self-noise is noticeable.

STEREO STANDOUT

I really like the LSD2. For stereo recording, it's a capable and versatile multipattern microphone that maintains phase coherence and mono compatibility. It wouldn't be my first choice in a single-channel cardioid application; there are plenty of great-sounding, affordable cardioid mics on the market. But when it comes to stereo recording, the LSD2 shines, especially in omni and M-S configurations. The LSD2 sounds great up close on instruments, and it's also ideal for recording ambience. And to top it off, the price is right.

Composer, producer, and keyboardist **Rob Shrock** *recently worked on projects for Aretha Franklin, Ronald Isley, and* American Idol II. *He has recorded and performed with Burt Bacharach, Elvis Costello, Dionne Warwick, David Foster, and a host of others.*

CAKEWALK

SONAR 3.1 PRODUCER EDITION (WIN)

Cakewalk's flagship sequencer gets even better.

By Allan Metts

Since its inception, Cakewalk has produced a string of consistently high-quality tools for PC musicians. The PC has come a long way since then, and Sonar, Cakewalk's flagship product, has kept pace, becoming a powerful digital audio sequencer.

Sonar 2.0 was reviewed in the October 2002 issue of **EM**, so I'll concentrate on what's new in version 3.1. I'll cover the Producer Edition, which has more features than the lower-priced Studio Edition, but most of the new items are found in both versions.

Many of Sonar 3.1's improvements are obvious immediately. The program has a brand-new look and feel, with cool colors and intuitive icons (see **Fig. 1**). You can customize the color scheme and work with user-definable color presets. (Oddly, only the Track view's colors can be customized to a significant degree.)

The Track view is now clean and intuitive as can be. Track parameter names have been replaced with icons whose names pop up as you roll over them with the mouse. Tracks dim when muted; armed tracks take on a reddish hue. Unused controls disappear when you archive a track, and track names take on specific colors to indicate type. (A new Soft Synth track type joins the previously existing MIDI, Audio, and Bus types.)

Those changes may seem superficial, but they really improve the Sonar experience, especially when many tracks are visible at once. I run my monitor at a high resolution, so I appreciate no longer having to decipher itty-bitty text. And I like the program's increased ability to help me focus on what's important.

OPEN FOR INSPECTION

An optional new Track Inspector now appears along the left edge of the Track view. The Inspector is identical to the channel strip you see in Console view. You can lock the Track Inspector so that it always shows a specific track or bus.

Handily, the Track Inspector provides access to several controls that aren't available as Track Properties (more on those in a moment). For Track Properties that appear in both places, the Track Inspector displays knobs, faders, and buttons instead of the less ergonomic controls you get in the Track Properties display.

Minimum System Requirements

Sonar 3.1 Producer Edition

Pentium III or Athlon/800 MHz; 128 MB RAM; Windows 2000/XP

Sonar's meters are now highly customizable. They can display peak, RMS, or RMS and peak, and there are six meter ranges, from 12 dB to 90 dB. You can choose whether peaks are held, and you can lock peaks, which preserves the peak values until you reset them. A Reset All Meters command lets you clear all held peaks and overload indicators. Finally, meters can be displayed vertically or horizontally, and they can be prefader, postfader, or postfader and effects.

Peak values are also displayed numerically in the Track view and the Console view. I especially like that numeric values continue updating even after clipping has occurred. In case of clipping, the peak value shows how far over 0 dB the signal went, so you know exactly how much to back off to avoid clipping.

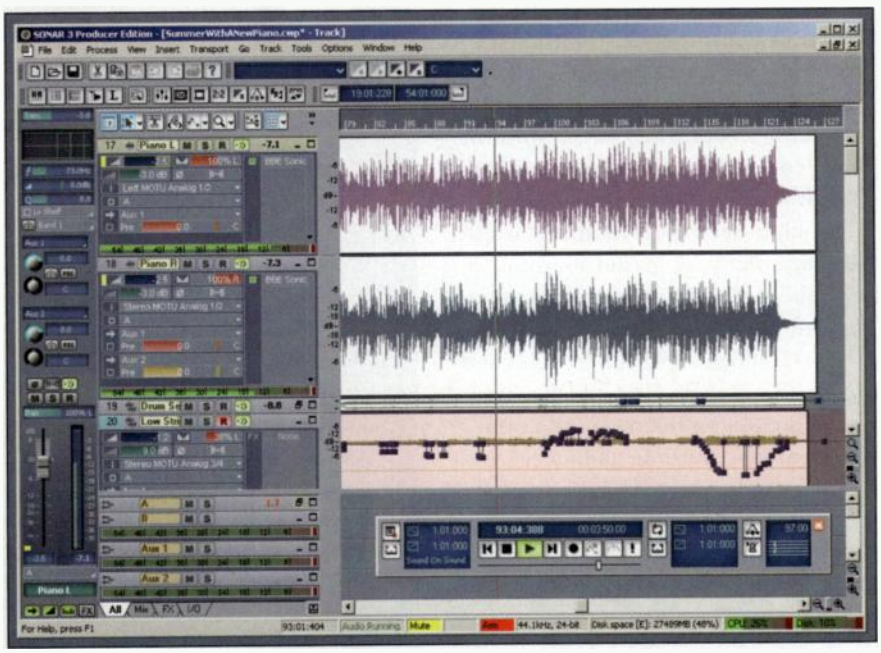

FIG. 1: Among the many improvements to Sonar's Track view are a new Track Inspector, easier identification of track types and properties, and track-based input monitoring.

BEHIND THE CONSOLE

Sonar's Console view has gotten a facelift as well (see **Fig. 2**). You can now have a 4-band EQ on every track and bus. Each band can be set to lowpass, highpass, low-shelf, or high-shelf filtering or band boost or cut. A graphic EQ plot appears above each set of EQ controls, letting you see the EQ setup at a glance. To save CPU power, you can switch on only the bands you need in each channel, and a master switch is provided to turn EQ on or off for the whole channel.

You can instantly access four parameters for each effect in the Console view. (Your effects must support DirectX or VST automation for instant access to work.) That lets you quickly tweak the most important effects settings across all of your tracks and buses without having a bunch of effects Property Sheets cluttering up your workspace. What's

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1st through 3rd chair Trombone Section

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C Tuba
Eb Tuba

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Muted Staccato
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SONIC IMPLANTS

FIG. 2: Sonar's Console view has customizable channel strips, EQ available on every track and bus, graphical EQ plots, and easy access to plug-in effects parameters.

more, you can easily change the parameters displayed in the Console view. Sonar remembers your chosen parameters and displays them in Console view any time you reuse that effect.

Sonar's bus and send structure is now completely customizable. Want to create a submix of the horn section? Add a new bus. Want another aux send on the vocal track? Add it and route it to an existing bus or a newly created one. Sonar monitors what you're doing and prevents you from making choices that might cause a nasty audio-feedback loop.

With so many new controls in the Console view, you might wonder how they all fit. Cakewalk has done a remarkable job of keeping everything neat, orderly, and accessible. Furthermore, you have complete control over what appears in the Console view. A row of buttons along the view's left side lets you show or hide each group of channel-strip controls. Some of those buttons, such as the ones that control the FX, Send, and EQ displays, let you cycle through varying amounts of detail. You can create a Console view with nothing but channel names, or you can create channel strips that go right off the top of your display. You also have control over the horizontal aspect of the Console view. Each Channel strip can be shown at normal or narrow width or hidden completely.

UNDER THE HOOD

Sonar's audio engine has been significantly enhanced. There is better support for multiple processors and hyperthreading CPUs. Cakewalk claims Sonar's performance is much improved by its ability to efficiently share mixing and DSP tasks among available processors.

New sampling rates are supported—you can record and play back at any rate your hardware supports. More notably, high-quality resampling algorithms have been added to audio-file importing and exporting. I exported a 48 kHz recording to a 44.1 kHz file and then reimported it at 48 kHz, and I couldn't tell the difference between the original and the twice-resampled copy.

Live-input monitoring is more convenient now. You no longer have to dig through the Audio Options settings to switch on input monitoring for the appropriate channels of your audio hardware. Instead, you simply toggle the Input Echo button on any audio track (the buttons are prominent in both the Track and Console views). I set up my hardware control surface to control this feature, which made it even easier.

The Input Echo buttons work in MIDI tracks as well. By default, Sonar echoes your MIDI input to the port and channel of the currently selected track. But you can switch on Input Echo for a different MIDI track, and the MIDI will be echoed there no matter which track is selected. That is especially handy for playing several software synths at once with a single MIDI controller.

Improvements in Sonar's effects include support for VST effects (using the bundled Cakewalk VST Adapter) and the handling of missing effects. Missing plug-ins are indicated as such in the Track and Console views (you even get a Replacement Property page). That's a useful feature when you collaborate with someone who hasn't licensed the same effects that you have. Your Sonar project can run on their computer without the missing effects, then return to your machine with the original effects still intact. This works with MIDI effects, DirectX instruments, and the built-in EQ.

Other effects-related improvements include a choice between vertically or horizontally oriented effects bins, a single command to bypass all of the effects in a bin, and visual indicators that show whether a particular effect supports automation. You can also add or remove effects during playback without drastically disrupting the audio stream. I typically experienced a single pop when I patched effects during playback, which wasn't too bad.

THE BIG PICTURE

As Sonar's capabilities have grown, so has the number of toolbars. Recent versions have more than a dozen toolbars with all sorts of buttons, indicators, and other controls. Although each of the toolbars can be independently hidden, docked, or left floating on your desktop, the sheer number of them often makes specific controls hard to find.

Enter the new Large Transport toolbar, which contains some of the more commonly used controls. Among these are sliders and Now Time indicators for setting the starting or ending times for looping or punch recording and setting the current song position. Also, Large

PRODUCT SUMMARY

Cakewalk
Sonar 3.1 Producer Edition
digital audio sequencer
$719

FEATURES	4.5
EASE OF USE	5.0
DOCUMENTATION	5.0
VALUE	4.0

RATING PRODUCTS FROM 1 TO 5

PROS: Intuitive user interface simplifies complex tasks. Easy access to plug-in effects parameters. Track-based input monitoring. Useful effects and DirectX instruments included.

CONS: Color preferences don't affect the Console view.

Manufacturer
Cakewalk
tel (888) 225-3925 or (617) 423-9004
e-mail sales@cakewalk.com
Web www.cakewalk.com

FIG. 3: The Producer Edition of Sonar comes with Lexicon's Pantheon Reverb, which has six reverb types and sounds great.

Transport gives you a full set of transport controls and easy access to recording options; time signature, metronome, and tempo settings; and a panic button.

As soon as you start recording, you'll notice another change—audio waveforms and MIDI-data representations appear within the Track view's clips as you record. Cakewalk calls this *confidence recording*, and it's a welcome addition. I can't tell you how many times I've accidentally rendered a completely silent performance by recording with an incorrect audio configuration.

There are several other transport-related improvements. The maximum tempo has been increased to 1,000 bpm. A new feature, Sticky Now Time, lets you prevent the transport from jumping back to its original position when you finish a take. And Sonar finally has the ability to transmit MIDI Time Code. You have complete control over which MIDI ports transmit MTC, which transmit MIDI sync, and which transmit no synchronization messages at all.

THE GOODIE BAG

The Producer Edition of Sonar ships with some tasty add-ons. A few are especially noteworthy. First up is the Lexicon Pro Pantheon Reverb (see **Fig. 3**). With 6 reverb types, 35 factory presets, and plenty of adjustable parameters, this plug-in sounds great.

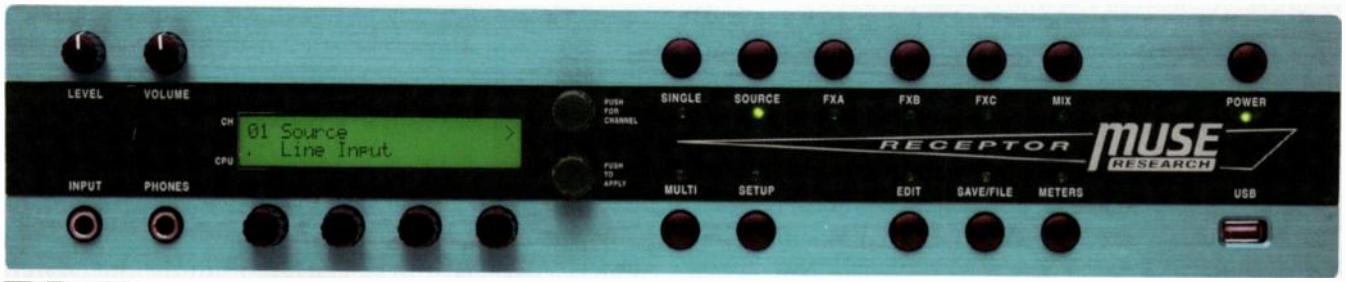
Ultrafunk's Sonitus:fx effects suite adds high-quality compression, modulation, delays, and other effects to your toolbox. What's more, all of those effects provide support for DirectX automation.

SpeedSoft's powerful DXi sampler, VSampler 3.0, rounds out the add-ons. It comes with comprehensive editing support, over 1 GB of sampled sounds, and the ability to import instruments in other sampler formats, including GigaSampler, Akai, and HALion.

The list of Sonar improvements goes on. There are cosmetic and usability improvements, new keyboard shortcuts, bug fixes, and support for MIDI Groove clips and karaoke files. In addition to the comprehensive online help, Sonar ships with a 600-plus page printed manual (a rarity these days). Sonar 3.1 is a solid upgrade to an already solid product.

Allan Metts *is an Atlanta-based musician, software/systems designer, and consultant.*

Receptor features hundreds of plug-ins, including freeware and commercial software from companies such as Applied Acoustic Systems, Arturia, Dash Signature, discoDSP, FXpansion, GMEDIA Music, Kjaerhus Audio, LinPlug, Native Instruments, Ohm Force, reFX, rgc:audio, PSP Audioware, and WaveArts. For a complete list of freeware, visit our website at www.musersearch.com. While you're at it, you should check out www.kvr-vst.com for all the latest news and information about audio plug-ins. By the way, you have successfully passed the Muse Research visual acuity test. Congratulations.



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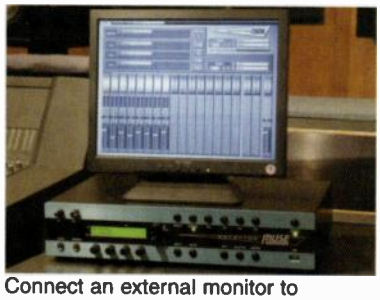

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TAMPA

A full-featured preamp with plenty of character.

By Karen Stackpole

The Tampa is a Class-A, solid-state preamp that takes an innovative approach to achieving tubelike characteristics. According to the manufacturer, the Tampa's Temporal Harmonic Alignment (THA) technology controls the phase alignment of added harmonics in a way that preserves the original sound while emulating tube characteristics in high-gain situations. M-Audio asserts that the effect goes beyond the midrange enhancement that tube circuitry typically offers and affects the entire frequency spectrum equally.

In addition to the new technology, the 2U, single-channel Tampa offers a symphony of bells and whistles at a reasonable price. These include a dual optical-servo compressor, a digital output with selectable sampling rate, and variable input impedance.

A SHINING FACE

With its chicken-head knobs, sturdy toggle switches, VU meters, and metal handles, the Tampa exudes vintage class (see **Fig. 1**). At the far left are the power switch and a 48V phantom-power switch with associated red LED. The input section, outlined in black, includes a Neutrik combo jack that accepts balanced and unbalanced ¼-inch and XLR inputs, and a toggle switch to select microphone or instrument level. Above that is the variable input-impedance selector, which offers four choices: 300Ω, 600Ω, 1.2 kΩ, or 2.4 kΩ. The gain control gives you 34 dB of level, with an additional 20 dB of boost available at the flip of a switch. To the right of the input section is a switchable highpass filter that rolls off 12 dB per octave beginning at 80 Hz.

Next is the compressor, which includes a bypass switch and controls for threshold (–20 dB to +20 dB), ratio (1.1:1 to 10:1), attack (1 ms to 10 ms), and release (250 ms to 5 seconds). The left-hand VU meter shows the amount of gain reduction.

To the right of those controls are a switchable –20 dB pad, which affects the analog output only; an output VU meter that doesn't reflect the setting of the pad switch; a phase-inversion switch; a red LED that illuminates when the signal reaches +26.5 dBu (4 dB below the digital-clip level of +30.5 dBu); and the sampling-rate selector, which offers rates of 44.1, 48, 88.2, and 96 kHz.

The rear panel has 24-bit dual-mono S/PDIF and AES/EBU digital outputs on RCA and XLR jacks respectively; separate ¼-inch and XLR analog outputs; and a receptacle for the lump-in-the-line power supply (see **Fig. 2**). The ¼-inch analog output jack accepts balanced TRS or unbalanced TS cables. Both analog jacks pass signal simultaneously.

DIRECTLY SPEAKING

I tested the Tampa next to a number of other preamps—a Universal Audio 2-610, a Peavey VMP2, a Grace Design 101, a Langevin Dual Vocal Combo, an FMR RNP8380, a TubeWorks DI, a Digidesign Digi 001, and the preamps in a Mackie 1202-VLZ mixer—to get a sense of how it sounds against a broad range of popular products. I used the preamp and compressor functions on acoustic guitars, vocals, and percussion; I checked the DI on electric guitar; and I finished up with a comprehensive loudspeaker test. For the recordings, I used Neumann KM 184 and AKG C 3000 B microphones and tracked to Digidesign Pro Tools LE and a Sony PCM800 digital multitrack. I was assisted by engineers Steve Orlando and Myles Boisen.

For a rowdy session with the band Jingle Punx, I ran the output of a distorted Fender Stratocaster through a Line 6 PodXT into the instrument input on the Tampa. Then I ran the Stratocaster-PodXT combo into a TubeWorks DI going direct into the Digi 001 preamp/converter. Both signals were sent digitally into Pro Tools.

Orlando, the engineer on that session, was initially frustrated that the Tampa's 20 dB pad couldn't be applied to the digital output, because he wanted to overdrive the signal and maximize the tubelike effects of the THA circuitry. As a work-around, he cranked the Tampa's input gain and squashed the signal with 20 dB of gain reduction through the optical compressor before it hit the digital output. This method was very effective for getting the tubelike sound he wanted, and it enabled the Tampa to compare favorably to the TubeWorks DI, with the added advantage of clearer and slightly brighter highs.

M-Audio informed me that there is

FIG. 1: Tampa's retro-looking front panel includes continuously variable controls for the compressor's threshold, ratio, attack, and release parameters.

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FIG. 2: The rear panel includes 24-bit S/PDIF and AES/EBU dual-mono digital outputs.

less headroom in the digital signal than the analog signal, which is why the pad isn't applied to the digital output. The 20 dB gain-boost switch at the input is meant to be used in conjunction with the 20 dB pad at the output so that the input gain can be driven hotter without overloading the analog output. This trick allowed me to reap the benefits of the THA's distortion effect. Simply turning up the input gain and engaging the 20 dB boost to capture a quiet sound source yielded quite a bit of noise, so I preferred to use the 20 dB boost for its recommended overdrive function.

LOW-PRESSURE SYSTEM

Surprisingly, the Tampa seemed to increase the low-end and midrange sustain on certain sound sources, such as toms, acoustic guitar, and the *dum* of a dumbek, which added greatly to the character of each. The result was a reverblike blossoming effect, which I suspect is the THA circuit enhancing the decay of the lower frequencies. However, M-Audio suggested that the Tampa is merely revealing the individual characteristics of the microphones. None of the other preamps exhibited this behavior.

While the preamp enhanced the *dum* on a dumbek, it also altered the midfrequencies, turning the *bek* into a *bawk*, which sounded great. Female vocals recorded with an AKG C 3000 B through the Tampa sounded warm and detailed. In addition, the Tampa brought out some of the high harmonic content of a classical guitar track, which the other preamps did not. This added depth to the sound of the instrument.

The Tampa exhibited more character than the understated RNP8380 and the Mackie 1202-VLZ. Compared to the Grace 101, the Tampa wasn't quite as detailed and clear in the high end, and the transients sounded somewhat compressed dynamically. The Tampa sounded closer to the Peavey VMP2 tube pre, but it wasn't quite as defined and crisp and was less dynamic. The Universal Audio 2-610 sounded drier and clearer in comparison with the Tampa's fat, wet sound. The Tampa's A/D converter held its own against the Digi 001's converter.

I also put the Tampa through some loudspeaker tests at Myles Boisen's Guerrilla Recording studio, and the results were revealing. Placing a Neumann KM 184 two feet in front of a single speaker, with baffling behind the mic to absorb reflections, we played several tracks of vocal pop and instrumental music through the system. In some instances, the Tampa's blossoming effect muddied up the mix. In addition, it diminished the airiness of a female vocal part slightly and reduced the punch of a kick drum. Overall, however, the Tampa sounded good.

THE SQUEEZE

The Tampa's dual optical-servo compressor is one of its major assets. Compared with the Langevin Dual Vocal Combo (which is one of my favorites for transparent optical limiting and preamp warmth), the Tampa performed well, although it didn't sound quite as smooth. The Tampa wasn't particularly transparent in radical compression situations, but it maintained clarity and didn't have the woolly sound you might expect.

Although it's not an application that's mentioned in the manual, I also used the Tampa as a standalone compressor to fatten up a vocal in a mix by giving it an overdriven, tubelike sound. The results were pleasing.

For my tastes, the Tampa's maximum attack time of 10 milliseconds is on the fast side, and 250 milliseconds as a minimum release time is a bit slow. In addition, the lack of makeup gain in the

Tampa Specifications

Analog Input	(1) balanced/unbalanced ¼" TRS/XLR Neutrik combo connector
Analog Outputs	(1) balanced/unbalanced ¼" TRS; (1) XLR
Digital Outputs	(1) S/PDIF; (1) AES/EBU
Input Impedance Settings	300Ω, 600Ω, 1.2 kΩ, or 2.4 kΩ
Sampling Rates	44.1, 48, 88.2, and 96 kHz
Word Length	24-bit
Gain Range	34 dB (12 dB–46 dB with +20 dB switch off)
Output Impedance	600Ω
Frequency Response	20 Hz–40 kHz (±0.25 dB)
Signal-to-Noise	110 dBA
Power Consumption	12 VAC
Dimensions	2U × 5.5" (D)
Weight	5 lb.
Compressor	
Gain Reduction	20 dB minimum
Threshold	–20 dBu to +20 dBu
Compression Ratio	1.1:1 to 10:1
Attack Time	1 ms–10 ms
Release Time	250 ms–5 seconds

PRODUCT SUMMARY

M-Audio
Tampa
mic preamp/compressor
$799.95

FEATURES	4.0
EASE OF USE	4.0
AUDIO QUALITY	3.5
VALUE	4.0

RATING PRODUCTS FROM 1 TO 5

PROS: Temporal Harmonic Alignment feature. Dual optical-servo compressor. Overdrive feature with 20 dB boost on input and 20 dB pad on output. Highpass filter. Variable input impedance. Digital output. Variable sampling rate. Phase inverter.

CONS: Compressor's maximum attack time is too fast and minimum release is too slow. No makeup gain on compressor. Enhanced low-end sustain can reduce clarity in some sounds. High-end transients sound dynamically flat.

Manufacturer
M-Audio
tel. (800) 969-6434 or (626) 633-9050
e-mail info@m-audio.com
Web www.m-audio.com

compressor was inconvenient. However, the Tampa's compressor is a useful feature that sounds great overall.

VISITORS WELCOME

The Tampa is a versatile preamp with a host of features you don't usually find on preamps in its price range. It has plenty of character, with a decent amount of clarity in the high end and a fat-sounding midrange and low end that sets it apart from other preamps. In addition, the THA feature is effective for adding tubelike characteristics. If you're looking to enhance your project studio with a quality preamp that has dynamics processing and digital converters, the Tampa is worth a visit.

Karen Stackpole *operates Stray Dog Recording Services and is Director of Studio Maintenance at Ex'pression Center for New Media.* *Thanks to Myles Boisen and Steve Orlando.*

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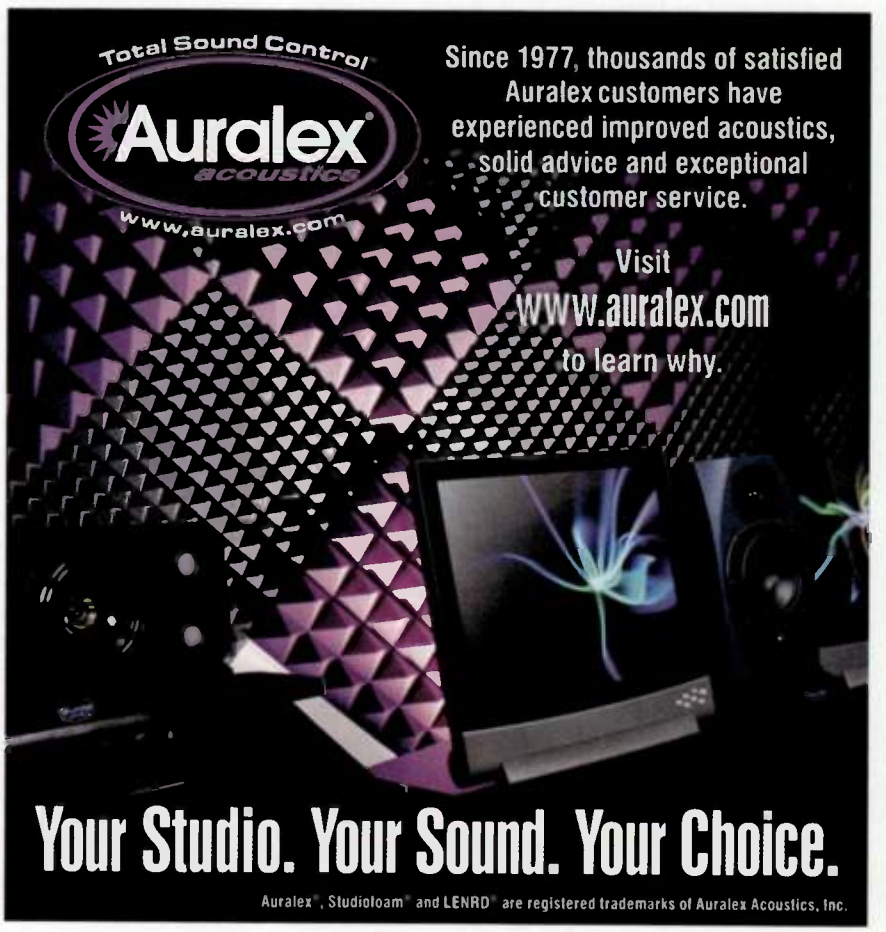


EVENT ELECTRONICS

STUDIO PRECISION 8 ACTIVE

A superior close-field powered monitor.

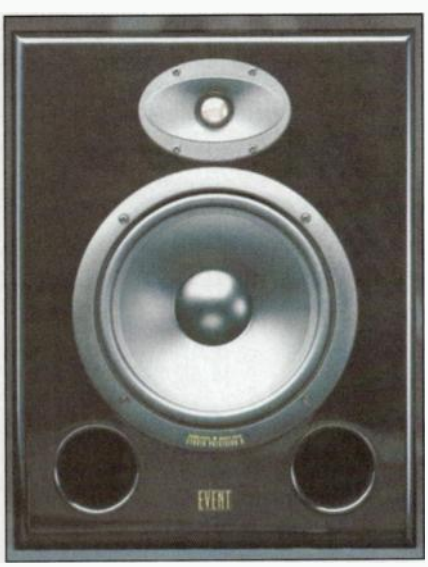
Rob Shrock

Event Electronics' new Studio Precision 8 Active monitor is part of the Studio Precision line, which consists of two powered and two passive models with 8-inch or 6.5-inch drivers. Event has always made good monitors, and the Studio Precision 8 Active, or ASP8, is as good as any close-field monitor on the market at any price.

THE DETAILS

The face of the Studio Precision 8's cabinet sports a high-gloss black finish and attractive gold lettering. The monitor looks gorgeous, and the quality of its sound is even better. I knew after a few minutes of listening that it was a great speaker.

The active ASP8 includes controls for contouring the monitor to your room.



The Studio Precision 8 Active has a striking look, with sound to match. It offers 280W of power to the monitor's 8-inch woofer and 1-inch tweeter.

High- and low-frequency trims allow you to adjust the response by ±3 dB above 2.6 kHz and below 100 Hz. An 80 Hz highpass filter can be used when a subwoofer is added to the system. I initially set the input trim to maximum (it is variable down to –20 dB), set the frequency-response trims to flat, and disengaged the filter. I didn't need to touch these settings again other than to verify that they did what they claimed. I was quite pleased with the ASP8's response in its neutral configuration.

Listening to some favorite CDs, I was surprised at details I heard for the first time in recordings I thought I knew inside out. It was especially fun to listen to old standards that aren't overly compressed, like Steely Dan's *Aja* and Fleetwood Mac's *Rumours*, and hear all of their depth, dynamics, and dimension. I could even discern a few questionable punches and overprocessed moments I hadn't noticed before. Modern titles by Juanes, Josh Groban, Maroon 5, and Liz Phair all sounded great within the context of their respective production styles. (And yes, the excessive compression of today's pop music was apparent.)

These monitors sounded pleasantly flat and even. The low end was smooth and extended without any noticeable rippling. The ASP8's 80 Hz highpass filter is specifically designed for use with a subwoofer, and Event's 20/20 S250 sub is designed to be a perfect match, especially if you're setting up a surround system of Studio Precision monitors. However, for normal stereo music mixing a subwoofer isn't necessary. The ASP8's low-end response is so good I wouldn't hesitate to mix a whole record on these speakers alone.

The midrange and high end were equally impressive. The mids were neither strident nor scooped but simply neutral. I had no particular awareness of any anomalies at the crossover point, which can be obvious in other speaker designs. I suspect that that has partly to do with the tweeter (or *radiator*, as Event calls it), which has a concave housing similar to the one used in Mackie's HR824. The result is a smooth top end with a wide sweet spot that sounds very accurate rather than hyped and scooped, a sound popular in other monitors.

The transient response is very good, which gives the ASP8s a stable stereo image with a lot of front-to-back dimension. The active models are well powered with 200W amplification for the low-frequency driver and 80W for the tweeter.

To my ears, there is always a trade-off in warmth between monitors with faster and slower transient response. Those with a faster response have good imaging but can sound unnaturally hard and tight. Slower responses can mean a monitor that sounds warmer but has a smeared image. The ASP8 possesses a balance that ultimately sounds very natural.

IN THE MIX

Having grown tired of most of my monitors and of how hard I was working to get good mixes, I was just days away from dropping about $3,000 for a new set of large close-fields when the ASP8s arrived for review. When I pulled up my first mix on the ASP8s I immediately

PRODUCT SUMMARY

Event Electronics
Studio Precision 8 Active
active close-field monitor
$1,499 per pair

FEATURES	5.0
EASE OF USE	5.0
AUDIO QUALITY	5.0
VALUE	5.0

RATING PRODUCTS FROM 1 TO 5

PROS: Compares favorably with the best close-field monitors on the market. Flat frequency response with extended low end and smooth top end. Good imaging and wide sweet spot. HF and LF trims allow adjustments to room. 80 Hz highpass for use with subwoofer.

CONS: None.

Manufacturer
Event Electronics
tel. (805) 566-7777
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"Arturia has done it again. The minimoog V's sound quality captures the magic of the original classic Minimoog. The graphic interface looks classy and responds smoothly, making it fun and easy to use. We at Moog Music are happy to lend our name to this fine product." **Bob Moog**

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Studio Precision 8 Active Specifications

Audio	
Frequency Response	35 Hz–20 kHz (±3 dB)
High-Frequency Equalization	trim control, continuously variable, ±3 dB above 2.6 kHz
Low-Frequency Equalization	trim control, continuously variable, ±3 dB below 100 Hz
Highpass Filter	80 Hz in/out, second-order slope
Peak Output	111 dB SPL
Amplifiers	
Power Rating	80W (HF amplifier); 200W (LF amplifier)
Signal-to-Noise Ratio (HF amplifer)	104 dB (unweighted, 22 kHz bandwidth); 106 dBA
Signal-to-Noise Ratio (LF amplifer)	102 dB (unweighted, 22 kHz bandwidth); 105 dBA
Input Impedance	40 kΩ (balanced)
Total Harmonic Distortion	<0.04% (HF amplifier); <0.03% (LF amplifier)
Power Consumption	10W (idle); 350W (full program)
Speakers	
High-Frequency Driver	1" soft-dome neodymium radiator
Low-Frequency Driver	8" mineral-filled polypropylene cone
Input Connectors	XLR, ¼" TRS
Crossover	
Crossover Slope	2.6 kHz, active fourth-order asymmetrical
Enclosure	
Material	0.75" vinyl-laminated MDF (internally insulated)
Dimensions	12.5" (W) × 16.0" (H) × 11.9" (D)
Weight	32.5 lb.

noticed compression artifacts, EQ flaws, and ambience level problems that had not been apparent on my older monitors. I quickly grew to trust what I was hearing on the ASP8s.

At one point, the proprietary amplifier for my NHT A-20 speakers died. Those have long been my "small" closefields of choice. Having only the ASP8s (and my little Apple speakers) as references, I trudged along without resorting to another pair of speakers from the storage closet. As it turned out, I didn't need any other monitors, and I was as happy with the resulting mixes as I've been with any I've done. Mixing is an elusive task, but it sure helps when you can trust what you're hearing, and with the ASP8s I didn't have to work as hard as I usually do to get good results.

HOME RUN

I wouldn't change anything in the design of the ASP8. Although I don't believe a "perfect" monitor exists, I do believe Event has hit a home run—no, a grand slam—with these monitors. I think their value is particularly great because I actually prefer these monitors to a very popular studio mainstay that costs double their price.

Above a certain level of high-end performance, choosing monitors becomes very subjective. However, there are a handful of specific monitors that show up in a lot of control rooms around the world for a good reason: experienced professionals are familiar with them, trust them, and can consistently work well with them. Without qualification, I believe the Studio Precision 8 should be in that select group of speakers that comprise the professional's short list. I also can't think of a better combination of monitors and subwoofer than Event's ASP8 and 20/20 S250 for a surround system that provides this combination of bang for the buck and critical monitoring quality. ●

STEP UP TO ADK!

"I have become a huge fan of ADK Mics lately. After hearing the ADK TT, I was not surprised that Ray Charles and Johnny Matthis selected two of the TT tube mics for their vocals. The fact that the TL Decca-Tree set-up works well on Grand Piano was a nice bonus. But what surprised us the most was how many uses we found for the original model A-51s. Tracking Guitars for James Taylor to Drums and Horns, these mics were everywhere!"

–Terry Howard, Recording Engineer: Ray Charles, James Taylor, Michael McDonald, Willie Nelson, Pancho Sanchez, Ellis Hall.

"The Vienna is an absolutely beautiful sounding microphone! It has all the warmth of a rare vintage mic, but adds a slight presence boost in the high end that just screams 'expensive'!"

–Ted Perlman, Producer, Arranger, Composer: Ron Isley, Bob Dylan, Burt Bacharach, Young MC, Chicago, Kellie Coffey

---

"I've now used the ADK Model "S" on almost everything including vocals, guitars, and drums. They remind me of very expensive German mics I have tracked with before."

–Adam Kasper, Producer/Engineer, Cat Power, REM, Pearl Jam, Soundgarden, Foo Fighters

---

"ADK Commemorative Tube Mics are a Gas! We used them with the Cincinnati Pops Orchestra and our Vocals Really Soared!!"

–Tim Hauser, Vocalist, Manhattan Transfer

"I use ADK LE Matched Pairs for recording my toms, and two ADK Transformerless for overheads. Warm and accurate, the perfect complement to my sound!"

–Joel Rosenblatt, Spyro Gyra Drummer

"The sound is huge and wide open when tracking vocals. The accurate and transparent sound reproduction, especially on the acoustic grand piano, is nothing short of amazing!"

–Dale Sticha
Piano Tech for Sir Elton John

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K R K

ST8

An affordable passive monitor with a high-end pedigree.

By Richard Alan Salz

Bucking the trend toward powered speakers, KRK has introduced the ST8 and ST6 passive monitors. The company suggests choosing these monitors as replacements for aging passive speakers. However, the freedom they give you to choose your own power amplifier might be reason enough for considering passive monitors, regardless of your current monitoring situation. The ST8 provides a taste of high-end performance at a low-end price: many of the design features of the company's higher priced models have made their way into the ST8.

INSIDE THE BOX

The ST8 features an attractive cabinet, and the beauty is more than just skin deep. The box is constructed entirely from 0.875-inch MDF, a relatively inert material acoustically. The ST8 weighs 26 pounds, which is pretty hefty for a passive speaker with an 8-inch woofer.

The passive KRK ST8, which features a double-layer aluminum woofer, weighs in at a hefty 26 pounds.

Tapping the sides or top of the ST8 yields a well-damped thunk, a sound I identify with much more expensive monitors. The monitors are magnetically shielded, making them safe to use near CRT displays.

The ST8 bears a strong resemblance to other members of the KRK line. Although it's a budget-priced monitor manufactured in China, the overall fit and finish of the ST8 is superb. I have seen other more expensive speakers that were not constructed nearly as well.

The tweeter is a fairly conventional 1-inch-diameter silk-domed unit that is recessed nicely into the speaker's baffle. This mounting arrangement eliminates early reflections that can occur when the tweeter flange rests on top of the baffle.

The woofer is a newly developed unit that features a double-layer anodized aluminum cone. KRK claims that the dual-layer process allows the company to take advantage of the aluminum's stiffness while mitigating the material's tendency to ring. A smoothly sculpted trim ring around the woofer also helps keep the front of the speaker free from sharp corners that can cause sonic problems.

Standard five-way binding posts for speaker-wire connection are featured on the rear panel. Only one pair of posts is included, so biwiring or biamping is not possible.

BURNING IN

To audition the ST8s, I placed them on 36-inch-high cement-loaded speaker stands. The monitors were driven by a Yamaha P2201 power amp (a 250W-per-channel bipolar design) that was connected to a Neotek IIIc console. I also used a Bryston 3B-ST power amp during the review process. For listening I played stereo mixes and commercially recorded CDs on a Studer A80RC deck. I also used the ST8s during the recording of pre-production demos by The Originals, a local singer-songwriter duo.

PRODUCT SUMMARY

KRK
ST8
passive close-field monitor
$499 per pair

AUDIO QUALITY	3.5
VALUE	4.0

RATING PRODUCTS FROM 1 TO 5

PROS: Rock-solid cabinets. High-tech woofer. Excellent low-frequency response.

CONS: Shallow soundstage. Rolled-off high-frequency response.

Manufacturer
KRK Systems
tel. (805) 584-5244
e-mail sales@krksys.com
Web www.krksys.com

My first impression was that the ST8 has a well-defined and extended bass response compromised by a dark and congested midrange and a rolled-off treble response. I was also surprised by a rather lifeless soundstage. The monitor's sound was almost the opposite of what I expected based on the presence of the aluminum-cone woofer and the sound of other KRK products I have used in the past. In my experience, most speakers with aluminum cone woofers have been bright and strident through the midrange. It was clear that the ST8 was going to challenge some of my assumptions about its lineage and technology.

Manufacturers often put monitors through an extended burn-in period, a quality-control practice that involves pre-stressing the speaker and allowing the suspension structure of the drivers to relax. I felt the ST8 would benefit from a burn-in period, and I decided to take a two-pronged approach to the process.

The first step was to face the speakers front-to-front and wire them out of phase with each other to limit their frequency response. I then ran pink noise through them at a reasonably loud volume for about eight hours. Next, I played several rap CDs at loud volumes. I'm not sure which method helped more, but after

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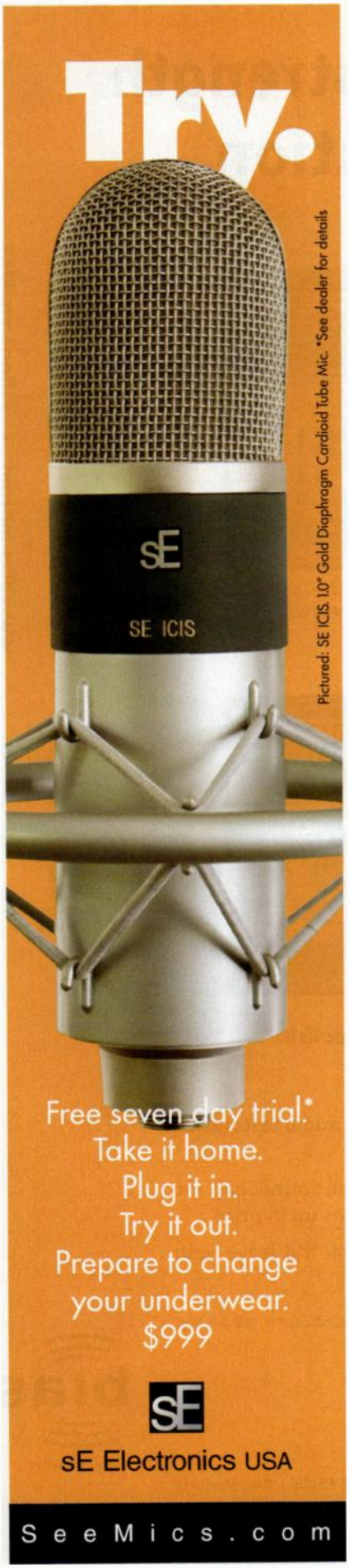


ST8

ST8 Specifications

Audio	
Frequency Response	52Hz–20 kHz (±2 dB)
Input Impedance	8Ω
Power Handling	120W
Total Harmonic Distortion	<1% at 1W
Peak Output	90 dB at 1m/1W
Speakers	
High-Frequency Driver	1" silk dome
Low-Frequency Driver	8" double-layer anodized aluminum
Input Connectors	standard binding posts
Crossover	
Crossover Slope	2.25 kHz, second order
Enclosure	
Material	0.875" MDF
Dimensions	9.75" (W) × 15.00" (H) × 10.50" (D)
Weight	26 lb.

the burn-in process was completed, the ST8s sounded much better.

The overall tonality of the speaker hadn't changed—it was still a bit constricted on the top end. (This is reflected in the published frequency response plot.) However, the deficient qualities were reduced from their pre-burn-in levels.

Even in its improved state, the imaging of the speaker never really opened up for me, and that made it difficult to set levels for reverberant effects and balances between microphones. The speakers also sounded a little bit slow, as though the leading-edge transients were rounded off. I suspect that the rolled-off high-end had something to do with this phenomenon.

The balance of the ST8 is quite good, and the rolled-off high-end may encourage users to add a little bit of top-end sparkle to their mixes. I found that I usually added brightness to compensate for the roll-off, and my ST8 mixes tended to be slightly wetter, because reverb was a bit difficult to get a handle on. Nonetheless, my ST8 mixes held up well when evaluated on other systems.

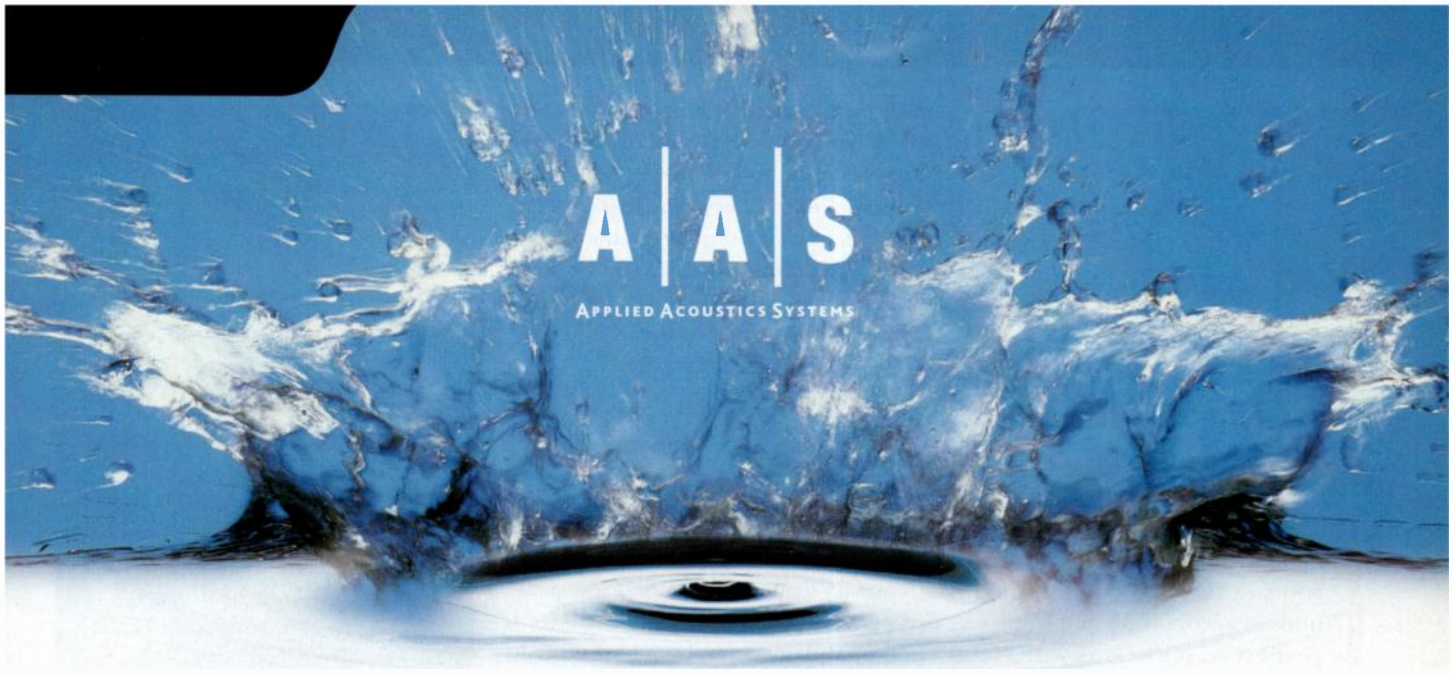
In a way, the ST8 reminded me of the venerable Yamaha NS10, which had a definite sonic signature but still enabled users to produce good mixes that would accurately translate to other systems. General-use speakers have greatly improved, especially in their low-end response. I think that the ST8 reflects this change. The low-end response of the ST8 exceeds the standard set by the NS10 (and you won't need toilet paper to tame the ST8's tweeters).

Another attribute is that the ST8 can handle loud volumes and keep its composure. I credit this both to its excellent cabinet (which seemed to introduce few resonant artifacts, if any, to the sound) and the stiff aluminum cone of the woofer.

A GOOD CHOICE

The KRK ST8s are a great value. Their cabinets are extremely well constructed and have many of the sonic attributes of the more costly offerings in KRK's product line. While the ST8s are not the last word in transparency and imaging, they are a significant step beyond other monitors in their price range. Once you learn to adjust your mixes to compensate for the speaker's minor anomalies (something that is necessary with all monitors), the KRK ST8s are fully capable of providing a trusted sonic reference.

Richard Alan Salz *is a producer and engineer in southern Vermont. His Web site is www.vtaudio.com.*



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TAPCO

S-5

A good sounding active monitor at a budget price.

By Rusty Cutchin

The news last year that Mackie was reviving the Tapco line brought nods of recognition and some eagerness to musicians with long memories. After all, before Greg Mackie helped kick off the home-recording revolution with his CR1604 small-format mixer, his first company, Tapco, made a similar impact with small, well-built, and reasonably priced mixers that were embraced by bands for use with their P.A. systems.

The new incarnation of Tapco, a company called Tapco by Mackie, aims to bring some of Mackie's know-how and considerable success with pro-studio monitors to budget-minded users who have been courted with inexpensive powered monitors by Alesis, Behringer, M-Audio, and others. The first product from the new company is the S-5 Active Studio Monitor, and a full workout reveals it to be a serious contender among speakers in its price range.

The Tapco S-5 powered monitor provides versatility and accurate sound at a bargain price.

BACK TO BASICS

The S-5 is a compact powered monitor that houses a 5.25-inch polypropylene cone woofer and a 1-inch silk dome tweeter mounted in a wave guide. Dual 60W amps drive the high- and low-frequency sections. A recessed rear panel protects the electronic components from potential damage and enables units to be packed tightly for transport. The S-5 is smart in appearance, with antique silver panels accenting the black, rounded-corner, seamless MDF cabinet on which the orange Tapco logo stands in bold relief. Chrome hex nuts secure the tweeter panel and woofer rim to the cabinet.

Below the recessed heat sink, the rear panel is divided into sections for Inputs, Settings (EQ switches and Input Level), and the power section, which includes the cable receptacle, the power switch, and an AC Select switch. The default voltage-selector setting is one clue that these monitors are manufactured in China. A bigger hint comes from the bright yellow crime-scene-style caution tape across the rear of the unit that lets you know your first job is to switch the S-5's voltage from 230 to 110. Though the country of the monitor's manufacture is clearly stated on the rear panel, users are reminded in true Mackie fashion that the S-5 is "brought to you by the groovy folks in Woodinville, Washington."

And several elements of the S-5 are indeed groovy. Power and clipping indicators are on the front where they should be. The monitor is easy to set up and move around. Handling each 17-pound unit (they're sold in pairs), you get the sense that Mackie gave the S-5, though part of a "bargain" line, the right amount of heft while keeping it easily transportable. (Some other similarly sized and priced powered monitors I've examined in the last year made me wonder if I should pop the cover and see if there was really an amp inside.)

Tapco has also made the analog-only S-5 user friendly by including all three common input connectors: balanced XLR, balanced TRS, and unbalanced RCA. Unused inputs can be daisy-chained to additional monitors. The different connectors make the S-5 easy to hook up to devices ranging from a large-format mixing console to a modest computer sound card. If you're shopping for your first set of powered monitors, be aware that connection options vary from model to model, especially if a compatible subwoofer is part of the system. For example, some small powered monitors ship with XLR inputs only—high quality but not desktop friendly. Tapco deserves points for providing this flexibility.

ON THE DOWN LOW

Speaking of matched subwoofers, Tapco has not announced a model designed to mate with the S-5. According to its specs, the S-5's frequency response bottoms out around 65 Hz. Clearly these boxes are not designed to reproduce

PRODUCT SUMMARY

Tapco
S-5
active close-field monitor
$499 per pair

FEATURES	3.5
EASE OF USE	4.0
AUDIO QUALITY	3.0
VALUE	4.0

RATING PRODUCTS FROM 1 TO 5

PROS: Compact and portable. Versatile input connections. Front panel power indicators. Bargain priced.

CONS: Highs sound slightly compressed. No matching subwoofer. Input-level pot difficult to grasp.

Manufacturer
Tapco
tel. (877) 827-2669
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S-5 Specifications

Audio	
Frequency Response	64 Hz–20 kHz (±3 dB)
High-Frequency Equalization	±2 dB shelving at 5 kHz
Low-Frequency Equalization	+2 dB; +4 dB peaking at 65 Hz
Peak Output	113 dB
Amplifiers	
Power Rating	60W (HF amplifier); 60W (LF amplifier) rated with 4Ω load, 100W peak
Signal-to-Noise Ratio (HF amplifier)	>93 dB unweighted
Signal-to-Noise Ration (LF amplifier)	>101 dB unweighted
Total Harmonic Distortion	<0.01%
Power Consumption	20W (idle); 80W (full program)
Speakers	
High-Frequency Driver	wave-guide loaded 1" silk dome
Low-Frequency Driver	5.25" polypropylene cone
Input Connectors	XLR, ¼" TRS, RCA
Crossover	
Crossover Slope	24 dB/octave at 4 kHz, active
Enclosure	
Material	0.625" MDF with 0.750" MDF front panel
Dimensions	7.6" (W) × 11.3" (H) × 9.1" (D)
Weight	17 lb.

the extreme club environment in your bedroom studio. Modern powered monitors with 5-inch drivers and a 65 Hz low-end limit should have compatible subwoofers in the same box, or at least clearly in sight on the showroom floor.

Having stated that, I must also point out that the first thing I noticed when I began pumping CDs through the S-5s was the bass response. Though no one would mistake them for the heart of an underground hip-hop system, the S-5s do a fine job with most low-end material, owing in part to a well functioning slotted rear port below the power-cable connector and switch. The onboard Low Frequency Filter switch boosts bass response by 2 dB or 4 dB at 65 Hz. These choices make for a subtle but noticeable improvement without significantly increasing the threat of creating mixes that are bass deficient when played on other systems.

Placement, however, is of primary concern with the S-5s. This monitor will probably wind up in smaller control rooms and on desktops, so in my initial setup I positioned the monitors close to a corner of an almost acoustically dead room, which compounded my initially favorable impression of the S-5's bass response. Moving the monitors to a position three feet away from the walls gave me a more reasonable assessment of their low-end capability: the S-5s do a fair job with bass for their size and cost. (Tapco has also just released the S-8, which, with its 8-inch drivers, promises an extended low-frequency response for those who can spend a little extra cash.)

The S-5's High Frequency Filter switch creates a ±2 dB shelf at 5 kHz. However, I didn't have to adjust this switch; the S-5's high-end performance was already generally satisfactory for every placement and type of music I pumped into it.

LISTENING IN

I popped in several well-known commercial CDs with which I was familiar for quick comparisons while setting up one of my mixes. My initial impression on material like Nelly's "Hot In Herre" and Pink's "Don't Let Me Get Me" was

that the monitor's power handling was excellent. Even with the input control set to its center detent position, the monitors were slamming when fed a stereo signal through my MOTU 2408mkII. But tonally, the S-5s seemed to flatten high-end transients and compress highly compressed pop music even further, besides missing the ultra-low end that I wanted to feel and hear on dance and hip-hop.

Yet I was surprised when I inserted more conventionally mixed material like Norah Jones's *Come Away with Me* and Jay Graydon's retro-modern jazz *Bebop*. The S-5s exhibited an impressive evenness and clarity across the full frequency range. I detected no obvious flaws in the stereo image, and the response was surprisingly even as much as 30 degrees or so off axis. Just when I thought the S-5s wouldn't be very satisfying over the long haul, they came up with new ways to make me appreciate them.

On my own mix of a heavily arranged R&B-jazz theme composed for a video tutorial, the results were consistent with what I heard from the CDs. Upper-midrange material in the horn arrangements was strong and prominent without being overbearing, and there were no obnoxious peaks in the low mids. However, the ride cymbal loop lacked the brightness I'd come to expect from mixing the track on my usual monitors, and the driving quarter-note bass part from a Korg Triton was missing the deep bottom I had purposely built into the sound, as was the 808-style kick. The dual-harmonized lead guitars generated with the Crunch preset on a Pod Pro, however, were spot on.

While remixing the track, I quickly got used to what I was missing in low-end frequency response and was glad the S-5s were making up for it in gain. In fact, I began to think seriously about how killer the S-5s could be in a 5.1 system with the right sub. For a studio primarily booking rock sessions, the S-5s would, well, rock, and with the right bass management, I wouldn't be surprised if they made some of the best satellites available.

BOTTOM LINE

For me, the S-5s are not the right choice for a 2.0 monitoring system. I can see using them in a small writing room away from my main studio, and I can certainly see them forming the mid-to-high-frequency components of an exceptional 2.1 or 5.1 system, assuming Mackie comes up with the right sub or I can find a compatible one.

For a traditional stereo monitoring system, I'm looking forward to checking out the Tapco S-8, which should offer a little more oomph in the low end. Still, on many projects, the efficient, low-cost, solid performance of an S-5 pair will make it a great choice for users who don't need extended bass frequencies.

Rusty Cutchin *is an associate editor of* **EM.**

ALESIS

PROACTIVE 5.1

A complete low-cost surround system with controller.

By Rudy Trubitt

When a salesperson showed me the Alesis ProActive 5.1 surround speaker system, I was intrigued. I used to have a surround setup in my living room, but a roaming toddler and tipsy speaker stands were a risky combination, so I was seeking a worthy replacement. The ProActive speakers are small enough for easy wall mounting, and the fully integrated controller meant I didn't need to buy a new receiver. I figured I could leave my existing stereo music system intact and use the ProActive system just for surround.

This Alesis-branded product is actually an OEM (original equipment manufacturer) version of the Z-680 system designed and manufactured by Logitech. Logitech sells their $399 list version through computer stores and other consumer outlets. Alesis's version is available at musical instrument and pro-audio stores. For the extra cash, Alesis throws in heavier gauge speaker wire and a free subscription to a surround magazine.

The ProActive 5.1 system includes a subwoofer cabinet containing amplifiers for all six speakers: the sub, three front satellite cabinets, and two rear satellites. An AC cord and hefty heat sink occupy the subwoofer's rear panel. The side of the subwoofer has a bass port.

The brains of the system is a controller tethered to the subwoofer with a nonextendable 4-foot multipin cable. A small infrared remote lets you adjust most settings from across the room. Alesis provides a 6-channel analog audio cable (RCA-to-⅛-inch stereo miniplug) as well as six RCA-to-¼-inch adapters.

MASTER CONTROL

The master controller sports a large knob that adjusts overall volume or the currently selected parameter (Input Select, Level, Effect, Settings, and Mute). Parameters are cycled by repeatedly pressing front-panel buttons.

Coaxial and optical digital inputs and six analog line inputs (using three stereo ⅛-inch minijacks) are supplied on the controller's rear panel. The front panel has a stereo ⅛-inch aux input and an ⅛-inch headphone output. You choose the source by pressing the Input button. Anything connected to the front-panel input jack is mixed into the front left and right channels along with the direct 6-channel analog source. You can use the front-panel inputs for a karaoke input or to overlay system alert beeps from a computer. However, all inbound analog signals are muted when either digital input is selected.

Once you've chosen the input source, several playback options are available. The Effects button actually selects one of many decoders: Dolby Digital, DTS, MPEG, Dolby Pro Logic II Music, Pro-Logic II Movie, 6-channel analog input, Stereo ×2, or Stereo.

Dolby Digital and DTS will come in handy for watching DVDs or monitoring surround mixes that are encoded into either of these formats. Pro Logic II is the current version of Dolby's 2-channel surround playback system. You feed Pro Logic II a stereo mix, and the decoder derives center and surround information automatically. The center-channel speaker is used in Pro Logic II Movie mode; in Music mode, it is not. (Music mode also includes a number of surround processing parameters not available in other modes.) Stereo ×2 simply puts the same stereo mix in both front and rear speakers, and Stereo is plain old stereo. It's a long list of options, but happily, the system makes the correct choice automatically when it sees a digital input signal.

BALANCE ISSUES

Each of the satellite cabinets holds a single 2.75-inch speaker. This driver starts working at about 150 Hz; by about 200 Hz you're fully out of the subwoofer and into the satellite. Performance is crisp in the midrange, aiding dialog intelligibility, but not especially detailed in the top octave. No polar plots of the speakers are provided, but I believe that the high-frequency pattern narrows considerably at upper frequencies.

Although the center-channel cabinet is larger than the other four, it also houses a single driver. If you stick your face up to the center-channel speaker, you can hear a low-level hiss while the system is idling, but I never noticed this while playing program material.

The 8-inch subwoofer can put out a clearly audible 40 Hz signal and has

The Alesis ProActive 5.1 system features a desktop controller that handles inputs, decoding, and signal processing for audio routed to a subwoofer and five satellites.

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plenty of thump. Unfortunately, I was never able to get a completely satisfactory balance between the subwoofer and the satellites; the adjustments you can make to the sub's level are too coarse. In two completely different acoustical environments, I had to set the sub to its lowest possible volume. One more click down, and the sub turns off entirely! Also lacking in any parameter adjustments are useful measurement units such as decibels or milliseconds.

Aside from the sub/satellite balance problem, bass management is handled appropriately and transparently. For example, when operating in direct 6-channel input mode, all low frequencies directed to the five satellites end up in the subwoofer output along with the signal sent to the sub channel. Automatic low-frequency signal routing is an advantage of an integrated 5.1 system such as the ProActive.

The documentation is adequate, although light on placement and calibration details. I created a test CD with band-limited pink noise (500 Hz to 2 kHz) at a level of –20 dBFS RMS, as described in Tomlinson Holman's book, *5.1 Surround Sound: Up and Running*. I then calibrated the system levels using that source to video reference (78 dB) and later to film levels (83 dB SPL, C weighted at the listening position). Playback was loud and clear in both cases.

The system is THX certified as a multimedia device (for use, it's suggested, with a computer at a distance of 28 inches). Details of THX's measurement criteria are proprietary and, unfortunately, not available to customers or members of the press. However, I believe that the multimedia criteria is a less demanding spec than the more rigorous THX pm3 certification met by systems such as Mackie's HR824 loudspeakers. In other words, the THX label is reassuring, but I wouldn't read too much into it.

SCREEN SOUNDS

Most of my surround work involves the creation of natural and other soundscapes rather than music. I reviewed some of my DVD-A multichannel projects through the ProActive's analog inputs, and the soundtracks translated fairly well. I also listened to some of my recent raw field recordings and generally found the midrange accurate, but felt a gap between the low mids and the boomy, high bass of the sub. One advantage of this extra low end is that if you test your mix on the ProActive 5.1 you probably won't overlook any unintended low-end rumble. If it's there, you'll hear it loud and clear.

A few minutes of DVD playback from the extended version of *Lord of the Rings: The Fellowship of the Ring* illustrates the system's strengths and weaknesses. Starting at Disc 2, Chapter 4, as the fellowship marches from Rivendell, we hear a fully orchestrated version of the "Fellowship Theme," culminating with a rich brass climax. Through the ProActive, the track exhibits plenty of midrange clarity, but a lack of airiness. The low end of Gandalf's following voice-over ("We will march 40 days . . .") feels a little truncated, indicating a bit of a disconnect between sub and center channel through the crossover range. But moments later, the system shines. While Gimli the dwarf dismisses an approaching flock of birds as just a wisp of clouds, the score signals otherwise. The muted strokes of an orchestral bass drum are delivered with ominous authority by the ProActive sub. Then, as the evil birds swoop in from the rear-right, the listener is enveloped in wing beats and squawking—a wonderful sequence well served by the loudspeaker system.

I had a couple of hardware problems following my purchase. (Skimming the Web, I found a handful of users with similar complaints.) After my initial setup, the system began blowing fuses, so my dealer provided a replacement system. However, the new sub developed a mechanical internal rattle around 110 Hz. Both issues were resolved. The popping fuses seem to be attributable to an early version of the master controller, and have since

ProActive 5.1 Specifications

Audio	
Frequency Response (system)	35 Hz–20 kHz
Peak Output	114 dB
Amplifiers	
Power Rating	62W (satellites); 69W (center channel); 188W (subwoofer) at 100 Hz and 1 kHz
Signal-to-Noise Ratio	100 dBA
Input Impedance	10 kΩ
Total Harmonic Distortion	<0.01%
Power Consumption	600W (full program)
Speakers	
High-Frequency Driver	3" butyl rubber suspension with aluminum phase plug
Low-Frequency Driver	8" high-excursion, low-throw woofer
Input Connectors	coaxial; optical; 6-channel direct (three stereo miniplugs); analog stereo mini
Crossover	
Crossover Frequency	200 Hz
Enclosure	
Material	satellites and center: ABS plastic; subwoofer: MDF
Dimensions	satellites 4.0" (W) × 5.0" (H) × 3.5" (D); center 8.5" (W) × 4.0" (H) × 3.0" (D); subwoofer 12.0" (W) × 12.0" (H) × 14.0" (D)
Weight	51 lb. total

PRODUCT SUMMARY

Alesis
ProActive 5.1
surround speaker system
$499

FEATURES	4.0
EASE OF USE	3.0
QUALITY OF SOUND	2.5
VALUE	4.5

RATING PRODUCTS FROM 1 TO 5

PROS: Good value. Fun for home theater.

CONS: Poor sonic integration between sub and satellite speakers. Coarse parameter adjustments.

Manufacturer
Alesis
tel. (312) 821-5000
e-mail info@alesis.com
Web www.alesis.com

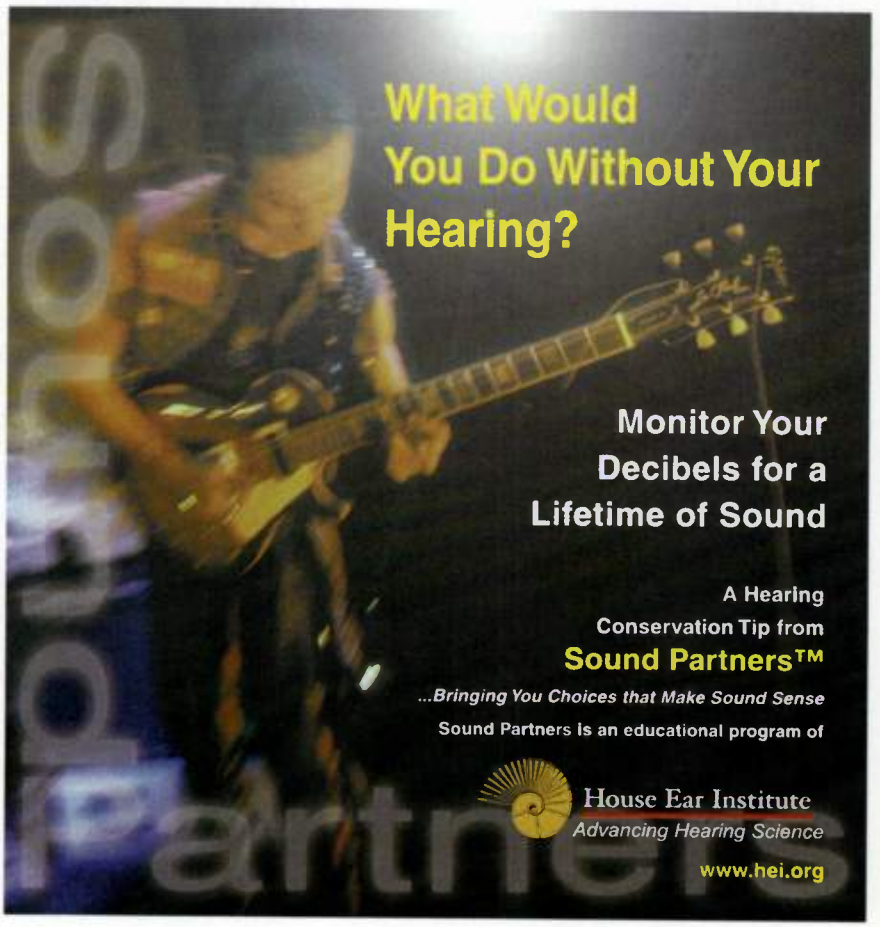
been fixed. Alesis will repair any rattling subs, but before you call tech support, be sure that the noise you hear isn't coming from objects on, near, or even across the room from your sub.

FINAL CUT

After living with the ProActive 5.1 for a few months, I'm pleased with the purchase. The system is an excellent value, easy to set up and operate, and great for listening to soundtracks of DVD movies—I'm still surprised at how much I enjoy these speakers as part of a home-theater setup. Music playback is somewhat less satisfying, so my original 2-channel playback system is still in place.

The ProActive 5.1 system is a good, low-cost way to get started with surround sound. The monitors can be used as a real-world reference—like having a surround system of Auratones. While I wouldn't rely on them as my primary monitors for production work, they're loads of fun as a playback system.

Rudy Trubitt *is a freelance audio producer in the San Francisco Bay Area. Visit him on the Web at www.trubitt.com.*



Quick Picks

KORG TONEWORKS

Ampworks

By Mike Levine

From Korg's ToneWorks division, which makes the tiny but powerful Pandora effects units, comes the Ampworks ($179), a guitar-effects processor that delivers a big bang in a small package. A little less than six inches wide and three inches deep (and weighing just under half a pound), the Ampworks is small enough to throw into the pocket of your guitar case. It's powered by two AA batteries, which, according to Korg, yield about 10 hours of continuous life. An optional AC adapter, the KA 193 ($9.50), is also available.

Control knobs for Gain, Treble, Middle, Bass, Volume, and Effect Depth reside at the top of the Ampworks' front panel. Below them are detented model-selector knobs for Amp Type, Cabinet Type, and Effect. The names of the various models are printed on the knobs, which makes it easy to set up a patch. Dial in the desired amp, cabinet, and effect; set the preamp settings and effect level; and off you go.

The rear panel has a ¼-inch TS input and a ¼-inch TRS stereo output that doubles as a headphone out. A Line/Amp switch lets you use the unit as a DI box or as an amp front end. The footswitch jack accepts Korg's optional PS-100 ($19.99) footswitch, which can be used to switch between the two user presets and Manual Mode or one user program and Bypass.

The Ampworks modeling processor is less than six inches wide and weighs less than half a pound.

Program Limits

The Ampworks is fairly stripped down in the features department. It offers 11 factory preset sounds and just 2 memory locations for user-edited patches. ToneWorks' decidedly low-tech solution to this memory shortage is a piece of paper called the "programmer's chart," a template that shows all the front-panel knobs, on which you jot down the knob positions so you can replicate your settings later.

The Prog/Manu button allows you to toggle between Manual mode and the two user presets, Program 1 and Program 2. In Manual mode, the unit is governed by the current knob settings. When it's set to Program 1 or 2 or to one of the factory presets—which you access by pressing the Preset button and turning the Amp Type knob—the settings jump to their saved state (regardless of knob position) and the knobs must be moved to become active.

The manual for the Ampworks is more pamphlet than book, but it contains useful information about the unit's functions, including a handy list that describes the available amp models and gives cabinet recommendations for them.

The Works

The Ampworks' models, which use Korg's REMS technology, are the strength of the unit. You get emulations of a Blackface Fender Twin, several Marshalls, a Mesa/Boogie, a Dumble, a pair of Voxes, and a vintage fuzz box. The models do a nice job of capturing the flavor of the amps that they're based on, and they produce a variety of usable tones (see **Web Clips 1** through **4**).

The distorted sounds are crunchy and fat and run the gamut from overdriven Tweed to classic British distortion to aggressive modern-rock buzz. Impressively, the clean tones sound realistic, which is often not the case with amp modelers. Also available are 11 cabinet models. They range from a 1×8 Tweed to a 2×12 combo to three varieties of 4×12.

Nine effects are offered; many are stereo. Only one can be used at a time, but two dual effects pair chorus with delay and reverb. The manual doesn't specify which pedals were modeled for the effects, but the quality is good. Besides the Effects Depth knob, the only parameter control for the effects comes from the Tap button, which can be used to control delay and reverb time and the speed of the modulation effects.

Although the Ampworks lacks the bells and whistles of many of the more expensive modelers on the market, it sounds good and is an excellent value for direct recording or practice applications.

Overall EM Rating (1 through 5): 4

Korg USA, Inc.; tel. (516) 333-9100; Web www.korg.com

SOUNDTOYS

FilterFreak (Mac)

By Nick Peck

SoundToys (formerly Wave Mechanics) has released FilterFreak ($249), an analog-style multimode filtering plug-in for Mac-based Pro Tools systems. It features one or two bands of filtering, a master section, and an extensive modulation section. Its architecture is clear and consistent, and its suitably high-tech retro graphics provide a snappy oscilloscope-like display. FilterFreak's capabilities are quite deep, but you can easily produce interesting musical results within minutes. Hundreds of factory patches show off the plug-in's varied capabilities and make good starting points for experimentation.

FilterFreak ships with RTAS, AudioSuite, and HTDM versions for Mac OS 9 and OS X, and it requires an iLok hardware key for copy protection. The plug-in is host based, running on the CPU even on TDM systems. It can be processor intensive, particularly when analog-saturation modeling is switched on. I tested FilterFreak using a dual-processor Mac G4/867 MHz, Pro Tools TDM 6.2.2 software, and Pro Tools|HD 3 Accel hardware. The plug-in was stable; however, I encountered some

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MUSICIANS FIRST

SoundToys FilterFreak is an RTAS/AudioSuite/HTDM plug-in for Mac-based Pro Tools systems that emulates the character of vintage analog resonant filters.

graphical anomalies when Pro Tools automation was engaged.

Section Selection

FilterFreak's two filter bands can be routed in parallel or in series at the click of a switch. When you engage the Link switch, the second filter tracks any movements you make on the first filter's knobs. Each band has a Shape knob for choosing whether its filter type is lowpass, bandpass, highpass, or band-reject. The Poles knob selects the slope of the filter curve, from a gradual 2-pole to a razor-sharp 8-pole configuration. The Frequency knob specifies the center point or cutoff frequency, depending on the filter type. The Gain knob allows 24 dB of boost or of cut, and the Resonance knob adjusts the boost at the filter frequency. With the resonance turned up, FilterFreak's filters sound appropriately fat and rich. High resonance settings drive them into self-oscillation that sounds authentically analog.

The master section contains knobs for wet/dry mix, modulation amount, and input and output gain. You can overdrive the signal before or after filtering (or both) by adjusting the Input and Output knobs. Clicking on the Analog Mode saturation-modeling switch reveals a variety of distortion and compression settings: Clean, Fat, Squash, Dirt, Crunch, Shred, and Pump. As their names imply, they range from warm and friendly to hard and nasty. Although saturation modeling adds considerably to the processor load, it is responsible for much of FilterFreak's character.

FilterFreak's well-designed modulation section offers six modulation modes that modify filter frequency, resonance, output level, or any two of those in combination. Switching modes changes the controls that appear in this section. In most modes, the LFOs can lock to MIDI Clock or tap tempo.

In addition to providing standard LFO shapes, LFO mode allows you to draw your own shapes and save them as presets. Rhythm mode plays a series of complex filter-modulation patterns that you create using the Rhythm Editor, which displays a drum-machine-style metrical grid. Envelope mode produces a classic amplitude-triggered envelope-follower effect. Sample-and-Hold mode generates random modulation levels that can sync to your session's tempo. Random Step mode combines Sample-and-Hold with Envelope mode to create a triggered random-level generator. And ADSR mode generates a synthlike filter envelope that can be triggered by threshold level, by MIDI notes, or by pressing the plug-in's trigger button. With so many modulation choices, you'll probably be finding new uses for FilterFreak for some time to come.

Fashionably Freak

I was quite impressed with FilterFreak's sound quality and versatility. The plug-in imparted a variety of interesting effects to whatever I threw at it. I spiced up an analog-synth drone by modulating a lowpass filter with sample and hold. A pair of LFO-modulated bandpass filters created a new take on the telephone-EQ vocal effect heard frequently in electronic music. But my favorite effect was mangling drum tracks by processing them through heavy saturation and a filter pattern I drew in the Rhythm Editor. The flexibility of FilterFreak's filters surpasses anything I've heard on a hardware-based synthesizer.

FilterFreak is a gem. Its selection of filter effects, its clear and simple user interface, and its extensive modulation capabilities combine to make a plug-in that sounds great and is fun to play with. If you are a Mac-based Pro Tools user looking for a solid new tool for your arsenal of effects, FilterFreak is worth a good listen. You can download a demo at the SoundToys Web site.

Overall EM Rating (1 through 5): 4.5

SoundToys Inc.; tel. (802) 951-9700; e-mail sales@soundtoys.com; www.soundtoys.com

EASTWEST

PMI Grandioso Bösendorfer 290

By Rob Shrock

Acoustic piano is one of the hardest instruments to sample realistically. From the thunderous 97-note Bösendorfer 290 piano, sampling master Michiel Post has created an excellent virtual instrument especially suited to classical styles. Post Musical Instruments (PMI) Grandioso Bösendorfer 290 ($199.95) is available as a 24-bit plug-in and standalone program, as 16-bit sample libraries for EXS24 and GigaStudio, and as 16- and 24-bit sample libraries for Kontakt and HALion. Light Edition (LE) versions ($95) are also available in both Wet and Dry varieties for those four sampler formats.

Details, Details

The PMI Grandioso Bösendorfer 290 comes on a DVD that also includes the popular Native Instruments Kompakt Instrument player, so a separate sampler is unnecessary. The software supports operating systems from Windows 98 and Mac OS 9.2 through Windows XP and Mac OS X. In addition to VST, DX, RTAS (not for Mac OS 9), and Audio Units formats, it supports ASIO, MME, DirectSound, and Sound Manager, so hardly anyone should feel left out.

Two mic positions (close and ambient) were sampled in a European concert hall, and certain programs let you blend them with the mod wheel. If your CPU is robust enough, you can play patches that have 16 Velocity layers; more modest systems can

PMI Grandioso Bösendorfer 290, from EastWest, goes a long way toward reproducing the sound and the feel of a fine concert grand piano. The plug-in version, shown here, is based on NI's Kompakt Instrument.

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use the 8- or 4-layer versions. (When I played the 16-layer patches on a dual-processor Mac G4/800 MHz, disk streaming had problems keeping up.) Several programs use true-release samples that greatly enhance the piano sound's authenticity and ambience. All programs supply pedal-up and pedal-down samples, creating a lush, three-dimensional sound when the pedal is depressed. Some patches take advantage of Kompakt Instrument's onboard reverb, chorus, delay, and filtering capabilities. The FX programs have a collection of sounds that would be great for film scores, and the Wet and Dark patches sound especially good in orchestral settings. For a single piano, these patches cover a lot of territory.

The Sound Resounds

Post has done an excellent job of sampling this beast of a piano; I was particularly impressed by the instrument's expressiveness. Like many piano players, I have a hard time finding any sampled piano that responds well to Velocity and feels good to play; this one definitely feels better than most. The switching between samples from very soft to very loud is quite smooth and mostly undetectable. That kind of responsiveness makes for a piano that is very playable, and on playback, very satisfying to listen to.

In general, the Bösendorfer 290 has a dark, ambient tone, even on the close-miked samples. Don't expect these samples to produce a bright, in-your-face sound that's as suitable for pop or jazz as a Yamaha C7. The B290 Dry Bright patch comes close, but the Bösendorfer's overall tone is rounder than the Yamaha's, and the samples always give you a sense of the room. That's not necessarily a bad thing; I just wouldn't choose this particular piano-and-room combination for every project. I recommend that you listen to make sure it suits your style of music, because you are, in essence, considering a particular instrument. (You can hear audio demos at http://www.soundsonline.com/sophtml/details.phtml?sku=EW-157.)

That said, the piano and environment represented here have been faithfully recreated in a well-programmed, very musical software instrument. PMI Grandioso Bösendorfer 290 sets a new standard for sampling the grand piano.

Overall EM Rating (1 through 5): 4

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FXPANSION

BFD 1.07 (Mac/Win)

By Marty Cutler

EM ★★★★★ hot pick

Coaxing great drum tracks out of your DAW often requires the skills of a drummer and a recording engineer combined. FXpansion's drum module, BFD (Mac/Win, $299), answers both needs, with 24-bit, 44.1 kHz samples and MIDI grooves recorded by a top-notch drummer.

BFD comes with seven drum kits and assorted individual instruments, which you can mix and match to create new sets (see **Web Clip 1**). The module gives you control

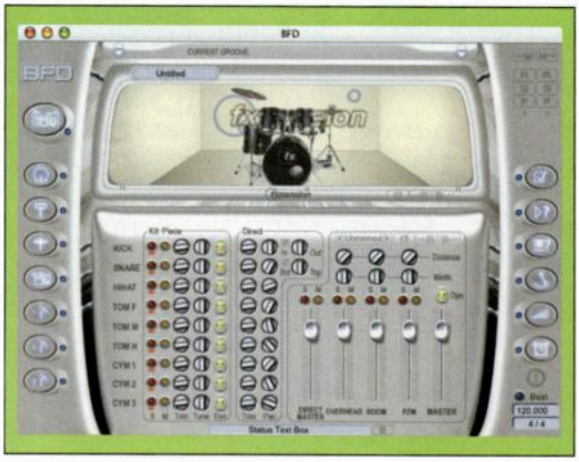
of the balance between the direct mics and three sets of room mics.

BFD can be used as a standalone or plug-in instrument (RTAS, VST, DX, and Audio Units) and offers ReWire compatibility. The minimum system requirements on the PC are a Pentium III or Athlon/1 GHz and Windows 2000 or XP. On the Mac side, you'll need a G4/733 MHz and OS X 10.2. You'll also need at least 512 MB of RAM and a DVD drive for installation. I tested the instrument on a dual-processor G4/1.42 GHz with OS X 10.2.8 and 2 GB of RAM.

Sui Generous

The samples in the BFD kits are fairly large, which ensures subtle and realistic transitions between dynamic levels. For example, the 1920s Ludwig 4 × 14-inch snare uses 45 velocity layers, and that doesn't include multilayered flams, rim shots, and rolls. In addition, you can hear the snare's strainers fade in as you increase the Velocity on some of the toms. You can also choose between a kick drum at B0, in which increased Velocities introduce sympathetic snare vibrations, and C1, a kick drum with no snare interaction.

The instruments were sampled with their full natural decay. That means you won't hear the kind of artifacts you get from looped cymbals, which often have unnatural, wobbly-sounding tails. Because each complete drum kit is larger than 1 GB, BFD streams samples from disk rather than loading them into RAM.



FXpansion's BFD features beautifully recorded drum kits, with the ability to swap instruments within each kit. You can use the program as a drum module or trigger the provided grooves.

Balancing Act

Most of the instruments have a direct mic and controls for Trim, Tuning, Dynamics, and Pan. The two exceptions are the snare drum, which has a mic on the top and bottom, and the bass drum, which has a mic inside and a mic outside. An additional control for each of these drums lets you set the balance between the two mics.

BFD's three types of stereo distance miking—overheads, room ambience, and PZM—are available simultaneously. You can alter the level and stereo spread of each pair and change their distance from

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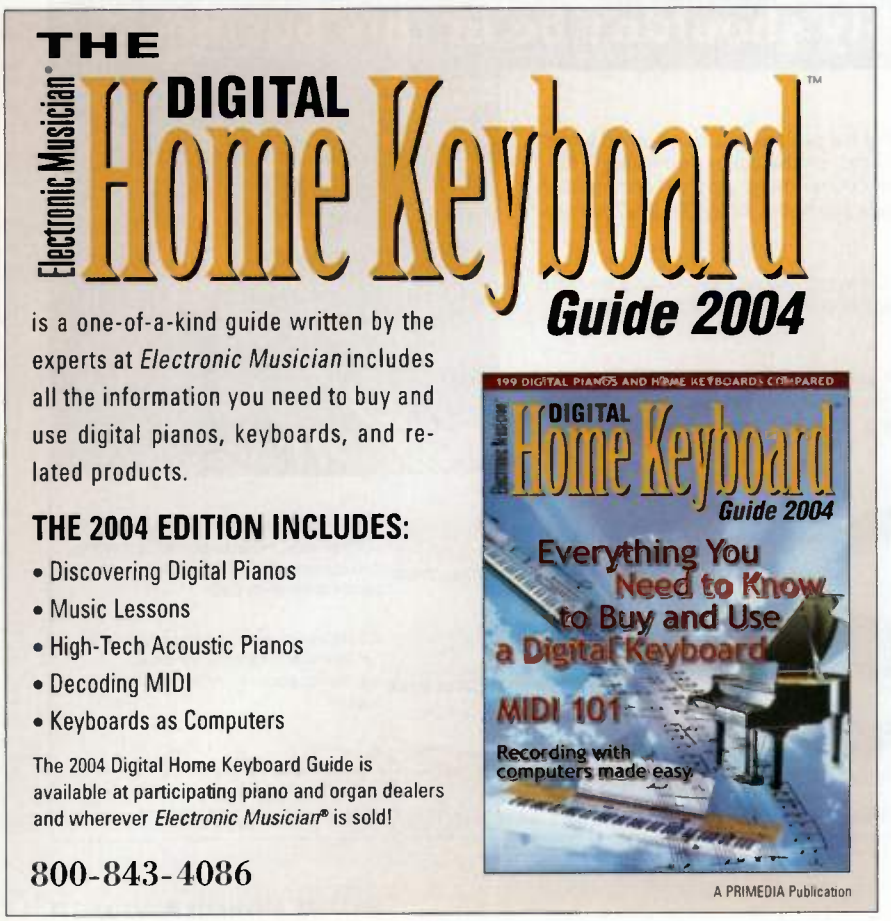

the drums. Although this kind of flexibility leaves little need for additional spatial enhancement, BFD offers 17 outputs, so you can process each microphone separately.

The default drum maps loosely conform to the General MIDI standard, but you can configure your own mapping or use preset maps for devices such as the Alesis DM Pro, Roland TD-10, and the Yamaha DTXtreme.

BFD comes with MIDI-file grooves that take advantage of the full dynamic range of each instrument. The grooves can be triggered with MIDI Note numbers, and you can customize playback in a variety of ways, including overlaying additional instrument hits. The playing is creative, human, and supple, and there are plenty of real-time tools to let you change the feel and dynamics. The most amusing controller resides in the quantization window: as you move the slider from hard quantization to swing, a colorful robot image morphs into a beret-wearing, goateed hipster.

It's difficult choosing a favorite from the assortment of vintage and contemporary drums: I love them all. If I had to single out just one, it would be the Slingerland kit, which features a vintage Ludwig snare, a resonant Radio King floor tom, and a kick with a nice, long decay.

In all cases, Velocity controls layering. However, on some cymbals and rim shots, Velocity is used to switch between strike locations rather than loud and soft samples. I'd prefer to use Modulation (CC 1) to change where an instrument is struck: Velocity is harder to control if you want to move from the edge of the ride cymbal to the bell.

Beat It

BFD offers nearly all the tools you need to create realistic, high-quality drum performances. According to FXpansion, more drum kits are in the works, so hopefully we'll soon see a few brushed kits and hand-percussion setups. With all that BFD provides—great-sounding and expressive drums and a wealth of customization and mixing options—I doubt that my drum machines and samplers will ever see the light of day again.

Overall EM Rating (1 through 5): 5

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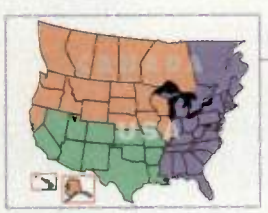

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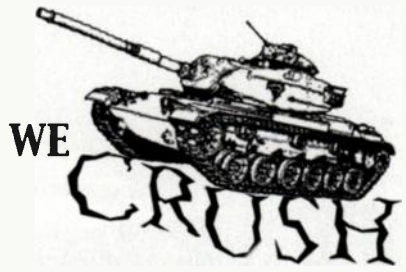

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Charlie delivers famous electric organ sounds to your Digital Performer desktop studio via a 3 GB sound library that captures the real sound quality of genuine organs recorded with the vintage equipment favored by purists. Charlie is powered by the UVI Engine™, allowing you to play complex parts with unlimited polyphony. A gorgeous, clearly-designed, feature-rich synth interface, including amazing filters and mono/legato modes, lets you customize the sounds, or completely mangle them. Most patches are available with slow and fast rotary speaker effects. Use real-time MIDI control of every parameter to enhance expression and live use. Included instruments cover the gamut of vintage, classic American and European organs. Enjoy unsurpassed realism for your DP4 organ tracks.

Native instruments Pro-53™

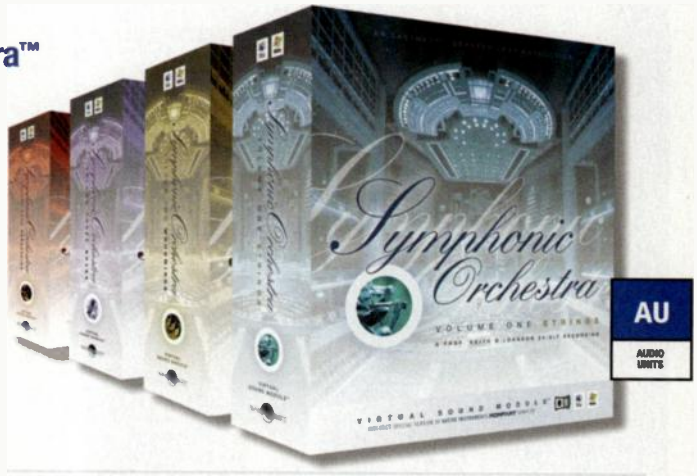
The second coming of a virtual synth legend

The PRO-53 carries on the tradition of the legendary days of vintage cult synthesizers. Fashioned after the unique original Prophet Five, the PRO-53 casts in software those qualities which have been a major influence on popular music in the past twenty years: brilliance, power, warmth and beauty. Through Native Instruments' creative development philosophy, these timeless aesthetics have now reached the next step in their evolution. The result is the manifest re-definition of an original that was regarded as unrivalled until now. Call Sweetwater and add Pro-53 to your DP4 studio today.

East West / Quantum Leap Symphonic Orchestra™

World class strings / woodwinds / brass / percussion

This stunning new 24-bit orchestra sample library was recorded in a state of the art concert hall by GRAMMY award-winning classical recording engineer Keith O. Johnson with custom-designed recording equipment. And now it can be at your fingertips in DP4. Just open the included Kompakt™ sample player and then mix together any combination of three recorded mic positions (close, stage and hall) to alter the tone and ambience of any instrument or section. For example, you could use the stage mics for that big Hollywood sound, boost certain instruments with a hint of the close mics, and bring in a touch of the hall mics for reverb or even surround mixing. This library was produced by Doug Rogers and Nick Pheonix, recipients of over 30 international awards.



Arturia CS-80V™

Reproduction of the legendary Yamaha® CS-80 polysynth

In 1976, Yamaha introduced the CS-80. The price tag ($6,900) put it out of reach of most musicians... But the qualities of the CS-80, considered as Japan's first great synthesizer, made it immediately famous in the music industry. Popularized in the late 70's and early 80's by artists and groups like Toto, Jean-Michel Jarre, Keith Emerson, Stevie Wonder and Vangelis, the CS-80 soon became myth. The Arturia CS-80V offers all the features of the original synth, plus a new generation of innovative features. Does CS-80V really sound like the original? We humbly say a resounding "yes!", thanks to Arturia's TAE®, the proprietary technology developed by Arturia, and already successfully used in the Moog Modular V.

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Universal Audio UAD-1 Studio and Project Pak™

PCI DSP Card and Powered Plug-ins for Digital Performer

Give your MOTU studio more plug-in power with the UAD-1 plug-in DSP card from Universal Audio. UA's plug-in line features acclaimed classic compressors and vintage EQ's as well as professional reverbs and modulation/guitar FX. Both the flagship Studio Pak (which features 20 plug-ins) and the low-priced Project Pak (with just the studio essentials) give your Mac a break, improve your mixes and deliver the ultimate upgrade for your DP4 system. For a limited time, the new Pultec Pro plug-in ($79 value) is free to new Project Pak buyers, so call Sweetwater today!

Metric Halo ChannelStrip™ X

Console-style, integrated EQ and dynamics processing for DP4

Metric Halo's ChannelStrip is the recognized leader in console-style channel strip audio processing for Digital Performer. As the first plug-in to offer the combination of exceptional audio quality, incredible DSP efficiency and a comprehensive user interface, ChannelStrip lets DP4 users work as efficiently and interactively as they would with a dedicated, world-class mixing console. ChannelStrip comes with more than 100 presets included to help you get your mix started. Use the presets to compress your drums, EQ your vocals, get your sessions ready for mastering and much more. With ChannelStrip for DP4, you get an unparalleled EQ, Gate, and Compressor, all in one easy to use interface. ChannelStrip is the critical mixing tool for thousands of top engineers and producers world-wide

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MOTU AUDIO SYSTEM

RØDE NT2000™

The World's first fully variable control microphone

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PreSonus Central Station™

A Console Master Section Without the Console!

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 eliminating 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

Mackie Control Universal™

Automated hands-on control for the DP4 studio

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

Mackie HR-series Active Studio Monitors

Nearfield monitors for your MOTU studio

Mackie's 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.

Sweetwater SweetCare™

Your personal MOTU studio expert advisor

When setting up and maintaining a MOTU desktop studio, there are many considerations to factor in to your decision making. Both the hardware and software landscape are constantly changing, and it's hard to keep up with all of the advancements. That's where Sweetwater comes in. Your personal Sweetwater sales engineer offers much, much more than just a great price. They do the research, day in and day out, to ensure that you'll fine-tune your MOTU system to fit your exact needs.

Call now for your MOTU studio personal consultation: 800-222-4700

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FINAL MIX

By Larry the O

What's in a Word?

Semantics are fascinating. There are times when they really aren't relevant, and it is only the basic message that counts; at other times, the choice of wording is critical. I often find it useful to bend language to my own nefarious ends, in which instance semantics are an important tool. A prime example of that is illustrating conceptual contrasts through creative semantic differentiation. This works best when I don't adhere to what is in the dictionary but apply my own nuances to definitions. Of course, that only succeeds when those nuances are elucidated.

So leave your dictionaries on the shelf (no Web sites, either), and remember that the definitions expressed here are those of "Final Mix" and not necessarily those of *Electronic Musician, Funk & Wagnall's,* or your high school English teacher.

For a start, consider the difference between "concern" and "worry." To me, the difference lies essentially in whether there's anything to be done in the situation. Say, for example, that your band gets booked to play on a popular, nationally syndicated radio show. It's an important gig, and you are really concerned about doing well. This qualifies as concern, because the band can rehearse like demons to address it.

Now consider a different scenario, in which you are a studio owner. A band booked to play a radio show has decided that if the show goes well, there will be enough response to justify spending the money to come into your studio and record. But if they don't do well or don't get the response they're hoping for, they won't book studio time. Times are tight, and you're worried about whether the booking will come through. This constitutes worry, because there's nothing you can do to influence the outcome.

Worry, on the whole, is not very valuable in my view, and I try to avoid it. I don't always succeed, but that is how I see it.

Another interesting difference is between "competent" and "good." This one is a little trickier. Basically, I view the words as different levels on a scale of excellence. Most of the time, competence is a component of goodness. It is not uncommon, however, to experience something that is competent but not good. There are always performers whose technique is impressive but who, somehow, just don't have anything interesting to say. I refer to this syndrome as "CBU": Competent but Uninspired. A good performer elicits a desired response from the audience, usually through competence combined with inspiration.

One of the most fascinating semantic differences, however, occurs between "reason" and "excuse." Here's a reason: a band member phones you saying, "I'm not going to make the rehearsal tonight because I have the flu, and I've had a fever of 102 all day and haven't left the bathroom in five hours." There's an explanation and a justification. The situation is beyond the person's control and clearly renders him or her unable to attend and perform as needed.

Then you get another phone call from a different band member (this is apparently not a good night) who says, "I'm not going to make the rehearsal tonight because an old friend showed up out of the blue, and we drank and took narcotics all afternoon, and now I'm totally hung over and haven't left the bathroom for an hour." Well, the person is clearly rendered unable to attend and perform as needed, but that's due to a reckless choice to deliberately surrender control. There's certainly a reason, but no justification in it. Excuses include reasons, but reasons are not always excuses.

Even the word "control" poses a semantic issue for me, as I think it is a misnomer when applied to people's lives. As another one of my famous (in some circles) "O-grown" proverbs says, "a person has control over nothing in his life; he just has varying degrees of influence."

I find this sort of semantic game useful beyond helping to devise appropriate turns of phrase. I play it more as an analytical tool for gaining insight into situations and attitudes. Drawing semantic distinctions can simplify things a bit, though simplification carries its own dangers. Alas, I am out of space and must wait for another time to discuss the difference between "simple" and "simplistic."

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