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November 2000

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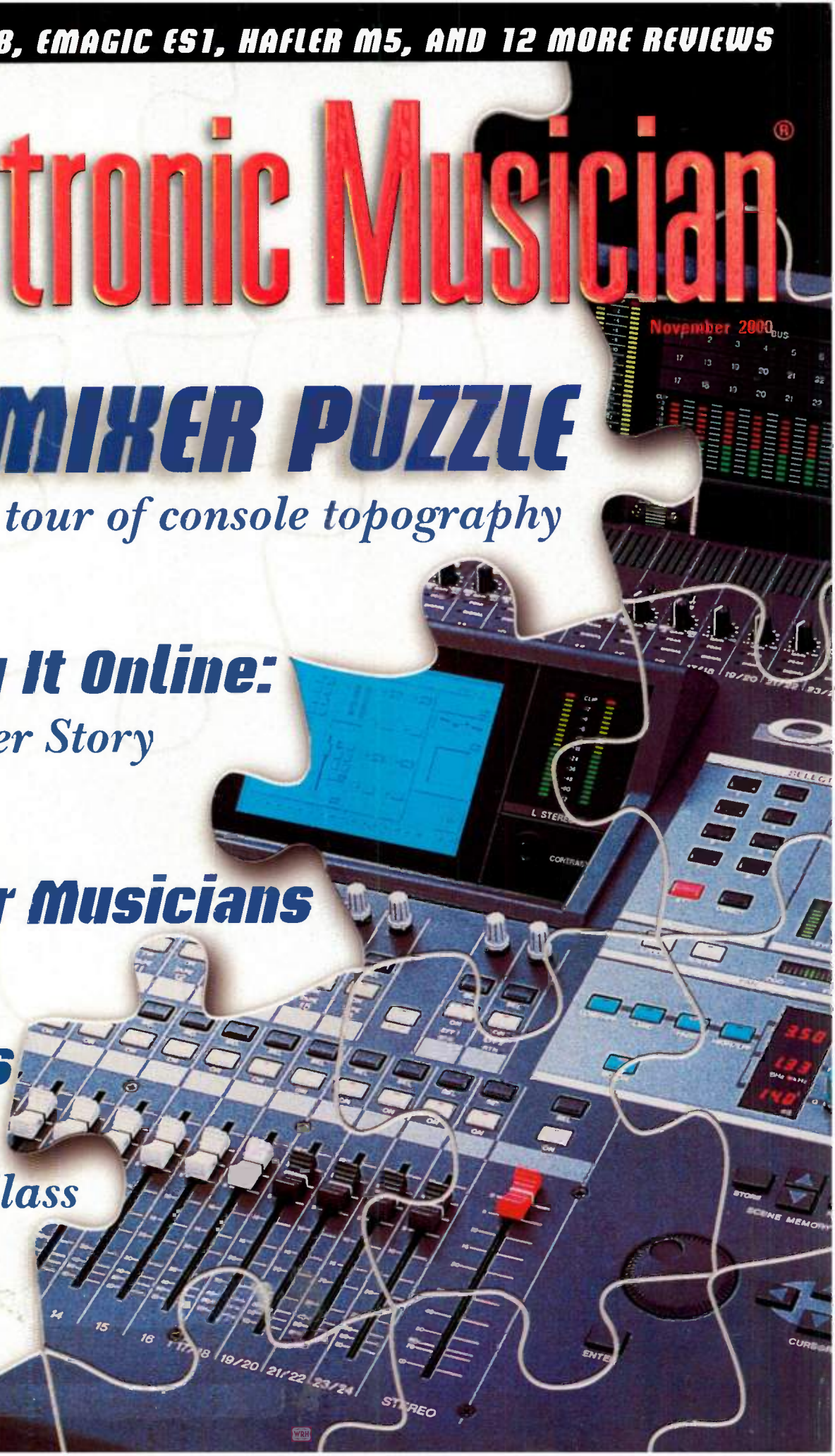

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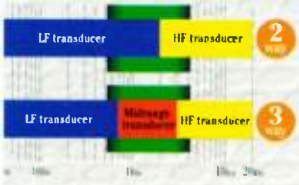
The story behind (and in front of) Mackie's new SR1530 Active 15-inch 3-way speaker system.

The potential of a 3-way system.

A properly-designed 3-way system is capable of reproducing vocals and instrumentals more accurately because it has a separate midrange transducer.



The transition range (crossover point) between transducers in a 2-way system falls in the middle of the critical midrange area (green area above). This part of the sound spectrum is being handled by the extreme high range of the LF transducer and the extreme low range of the HF transducer (where neither is most capable).

In a 3-way system, the HF and LF need only contribute in their more optimal frequency ranges. The key is melding the output of the three transducers.

The **SR1530** realizes the potential of the 3-way design by integrating:

- ***Optimized Wavefront™ horns***
- ***Electronic time compensation, equalization and crossover design***
- ***Tri-amplification***

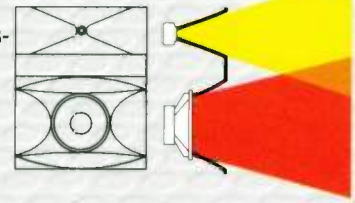
Optimized Wavefront™ Horns.

To achieve 40° dispersion, conventional systems use a high frequency horn with 20° of angle "on top" and 20° of angle "on the bottom." That beams high frequencies straight ahead, which means mids and high are actually aiming at different spots in the audience.

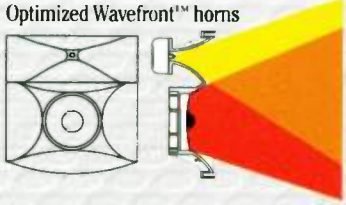
The **SR1530** is the first speaker in its class to feature a one-piece, 90° x 40° horn that includes both mid and high frequency sections. The 6-inch midrange's basket assembly is designed as part of the horn assembly and is also designed to function as an optimized compression chamber for better efficiency.

Both high and midrange sections of the SR1530's Optimized Wavefront™ horn have asymmetrical shapes with 10° angle "on top" and 30° angle below. High frequencies are directed down into the mid- range's dispersion pattern. This allows midrange and treble reach the audience as a focused, single wavefront with extreme accuracy and pin-point detail.

Brand X symmetrical horns



Optimized Wavefront™ horns



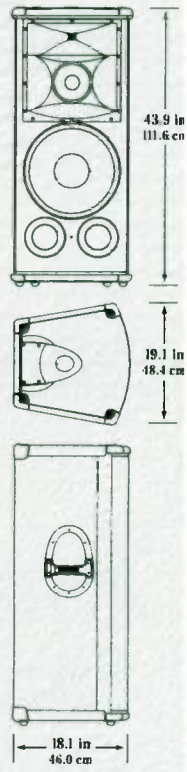
Active electronics.

If we stopped there we'd have a better passive system. But we didn't. Because the **SR1530** is an *active* system, we could employ a sophisticated, phase-accurate electronic crossover (instead of a crude passive one), time correction (to ensure that all three transducers' outputs arrive at the same time) and equalization to optimize each drivers' response to the enclosure as a system.

Individual FR Series™ amps.

The best way to power a transducer is to use a dedicated amplifier that's specially suited to its frequency range and power handling. Until now, that meant three separate amplifiers, a rack full of electronic crossovers and delay units, triple speaker wiring — great for huge touring systems, but very expensive and impractical for smaller applications.

The **SR1530** gives you the benefits of multi-amping without the cost and complication. Separate FR Series modules are directly coupled to LF, Mid and HF transducers, allowing maximum output with protection from distortion and burn-out.



Get the full SR1530 technical story.

These two pages are just a short introduction to the technology we've packed into the **SR1530**. Details like why the inside/outside low frequency transducer voice coil can handle intense amounts of power without damage and how solid and well-balanced the SR1530 enclosure is are covered in our free 80-page SR products brochure.

Call toll-free or log onto our web site and then sound good on stage with affordable 3-way active accuracy:

The new **SR1530** from Mackie Designs. ■

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The new **SR1530** features...

- Electronic equalization, time correction/phase alignment plus complete electronic and component protection circuitry
- Active circuitry makes the FR Series™ high-current tri-amplification more efficient than passive speakers because passive speakers have inefficient crossovers which cause significant power loss. Because of this, the on-board SR1530 amplifiers, with 500 total watts, can drive the speaker system to 126dB peak SPL.
- RCF Precision components...
- Wide-dispersion, high-output HF/mid-horn design with phase plug
- High-output, low-distortion 6-inch horn-loaded midrange transducer
- High-precision 1-inch exit, high-frequency driver
- 15-inch, high-efficiency, cast-frame woofer with heat dispersing Inside/Outside voice-coil technology
- Correctly weight-balanced with two comfortable side handles for easy carrying and set-up plus top and bottom handles for easier positioning on stage
- Weather-resistant steel grille

Sound quality that's only possible with a true active system.

Though just 44 inches tall, **SR1530**s generate the sound output of much bigger systems... and are far more accurate to boot. Our active design achieves near-perfect interaction between transducers and internal amplifiers. Together, you get transparent and precise, high-resolution audio performance... only at PA output levels, which is the beauty of properly engineered, high-end 3-way systems

SR1530 rear panel with amp heat exchanger female XLR input and male XLR full-range through.

Optimized Wavefront™ system "marries" high frequency and midrange.

In typical 3-way designs, mid- and high-frequency horns have symmetrical cross sections which physically force their output to different parallel locations in front of the box, causing uneven frequency response across the audience.

Optimized Wavefront™ horn system

The **SR1530**'s Optimized Wavefront™ horns have asymmetrical shapes with the high-frequency horn firing down into the six-inch midrange's dispersion pattern. Combined with built-in electronic time and phase correction, this creates a unified, wavefront with excellent phase and power response characteristics: Everybody in your audience hears the same thing.

You gotta hear it to believe it.

Yes, you can log onto our web site for more info or call toll-free for an excruciatingly complete brochure. But the real amazement won't kick in until you hear a pair of **SR1530**s at a Mackie dealer.

If you're looking for the smooth frequency response and articulated midrange inherent in a 3-way system, there's only one Active way to go. The new **SR1530** from Mackie. ■

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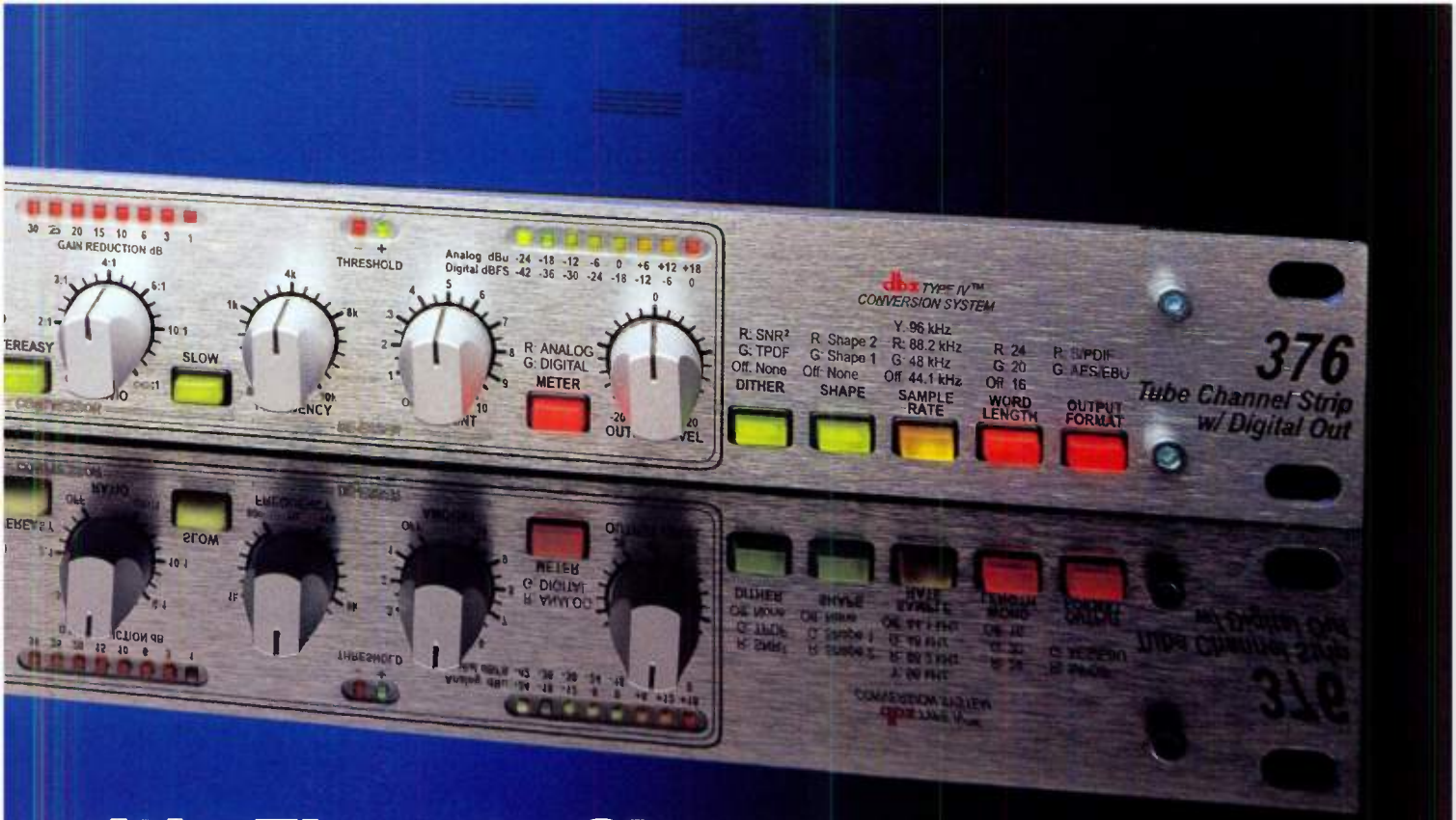

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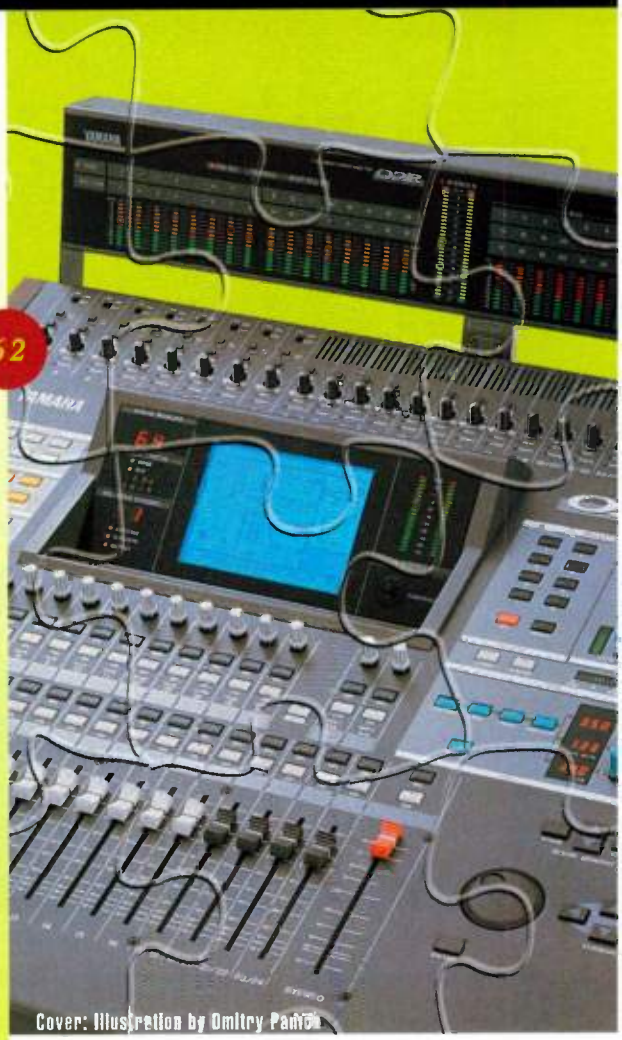

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DEPARTMENTS

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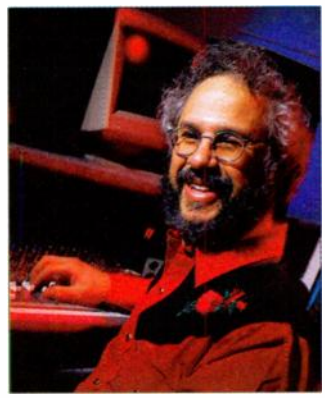
COLUMNS

REVIEWS

Back to Basics


ANTHONY PIDGEON

In any endeavor—even in our personal lives—there's no substitute for a firm grasp on the fundamentals. Often, the longer one is involved in an art, craft, sport, or business, the easier it is to take the basics for granted—and get sloppy.

Superior musicians understand this and periodically go back to basics in their practice routines. This could mean practicing arpeggios and scales, working on hand position, checking posture, playing etudes and instrument-specific exercises, and reviewing simple tunes that allow you to focus on technique and basic musicianship. Smart bands employ a similar approach during rehearsal, breaking down arrangements, going over each part slowly, with ears tuned to each note and nuance. If you fail to periodically return to fundamentals, you run the risk of developing bad habits and delivering a second-rate product.

It's instructive to watch great athletes go through their warm-up routines. They work slowly at first, releasing tension and ensuring that every move is smooth and properly stretches their bodies. If they do it wrong, they could fall short of their high performance standards, and even be injured.

Most instrumentalists and vocalists are athletes of a sort. We rely on mental sharpness and physical coordination to create art. Therefore, we should develop fundamentally sound technique through good practice routines, slow and precise rehearsal, with plenty of repetition and careful attention to smooth, correct, relaxed movement.

In some ways, the principles are similar for the producer and engineer, though the process may be more mental than physical. In the excitement of production, we sometimes fail to consider basic facts about how our gear works. Even fundamental principles of audio can fade from the mind if we don't review them.

That's why our cover story on mixer topography and signal flow (see "Mixed Signals," p. 62) is important reading for veteran personal-studio owners and less experienced musicians. Being fundamentally sound in the studio includes periodically reviewing your studio's signal flow, to make sure you use your board—the heart of most studios—to its best advantage.

Even author Barry Cleveland, with his extensive studio experience, learned new tricks when researching this story. Cleveland takes you through the ins and outs of recording consoles slowly, smoothly, and in a relaxed fashion to ensure you get it right. It's like a simple etude to build good recording technique.

Similarly, our "Square One" column this month (p. 108) sets the record straight regarding phase and polarity. Many experienced recording musicians don't have a clear understanding of these fundamental aspects of audio. Do you have them straight? Better read the story and make sure.

When you finish your review of the basics, read "Final Mix" (p. 226), in which Larry the O tackles another fundamental issue: the role of fine art in a deadline-driven production environment. When the pressure is on, how do you make deadline and still allow time for creativity? You could zip through that column, but if creativity under pressure is an issue for you, read it carefully. It's a mental etude for those who produce not only music but other goods and services—including magazines.

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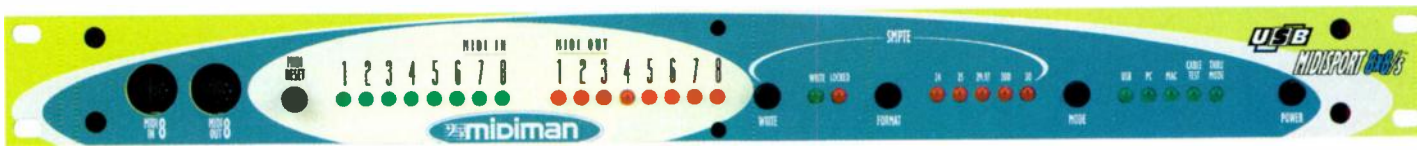

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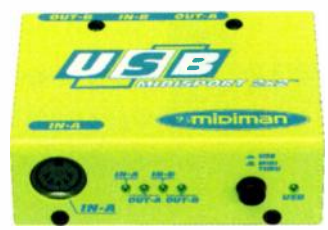

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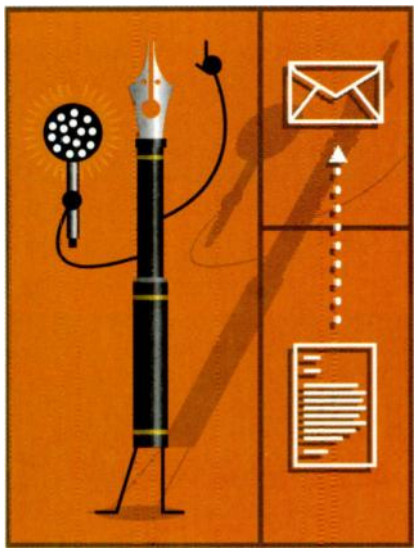

BALLET FANTASTIQUE

I am a professional composer and arranger at Bush Gardens, Tampa Bay. Your article "Rediscovering the Ballet Mécanique" [see the August 2000 issue of **EM**] was extremely interesting, to say the least. Every day I deal with sequencing, SMPTE, and other MIDI-related issues. Hats off to you for an excellent job. I can't wait to hear it. I'm sure George Antheil would greatly approve.

Bill Norman
via e-mail

BALLET HORRIFIQUE

Almost all the professional musicians I know have a memory that makes them wince, cringe, or feel a little nauseated. For me, that memory is my *Ballet Mécanique* experience.

I was a 22-year-old grad student in orchestral conducting at the University of Missouri–Kansas City Conservatory of Music. The percussion ensemble was in rehearsals for an upcoming performance of *Ballet Mécanique* when the director, Larry Kaptain, asked me to be "cover conductor" for the concert. I agreed, thinking that I would never have to conduct the piece. Larry didn't even give me an advance copy of the score to study.

When I arrived to watch the performance from backstage, one of my friends in the group informed me, "You're conducting tonight. Dr. Kaptain's wife just went into labor about 45 minutes ago." I hadn't even known she was pregnant. Imagine my surprise as I looked at this extremely complicated score while the opening pieces of the concert were being performed!

In a vain attempt to relax, I told myself, "It's just a percussion-ensemble concert. No one will be here." Little did I know. I was stunned to walk out onstage and see the place packed to the rafters! Pass the Pepto, please!

Nonetheless, the concert was a triumph, although I am sure that night turned my hair a little grayer. No matter what professional situation I encounter, I can always think, "This isn't as frightening as *Ballet Mécanique*."

Brian St. John
via e-mail

UNJUSTLY ACCUSED

I take exception to your shortsighted opinion that I am a thief because I share songs on Napster. [See "The Front Page: Giving It All Away," in the September 2000 issue of **EM**.] Not everybody on Napster is downloading Britney Spears, Korn, or Metallica.

Thousands of Napster users would gladly purchase old or hard-to-find music, but the record companies, in order to maximize profits and minimize distribution costs, don't make many of the albums available. Unless a particular '70s or '80s title was a huge seller, the CD is probably long out of print, especially if the artist had only one hit. A lot of material is not on the record companies' compilation CDs. Sometimes you can get lucky at the used-CD store, but I often end up buying original '80s CDs on eBay for three, four, or five times the store price. And most of the pop remixes and dance mixes of the '80s and early '90s are gone. You can get them only on Napster and from the guy in Europe selling a copy on eBay for $50.

So until record companies open up their music vaults and market the music they've hoarded for years, Napster will serve a wonderful purpose.

Greg Purkey
via e-mail

Greg—I can understand your frustration, and I would like to see those vaults opened, too. Furthermore, I am no fan of the major labels because they've often acted like a pack of thieves themselves in the way they have bilked artists. Nevertheless, as a matter of general principle, if you don't own something, and those who legally own it don't give you permission to use it, you cannot use it. Of course, any sane society will take steps against hoarding things that affect the public's health and safety (food, medicine, fuel, and so on), but music hardly qualifies as that.

Furthermore, we are talking about large-scale, organized copyright infringement, not simply a few people listening to a few tunes. (The latter would still be wrong, but nobody would care.)

If the companies who own the music you like choose to keep it off the market, that's a drag, but it's up to them. You can protest loudly and publicly, you can boycott the companies' other products and encourage others to do so, and you might find other legitimate ways to put the pressure on. But if you simply take the music, sorry, but that is stealing.—Steve O.

CONFLICTED

I'm an amateur composer and professional software developer. I continue to be baffled by the contradictory positions people take with respect to music and software. I'm referring to "The Front Page: Giving It All Away" in **EM**'s September 2000 issue.

On one hand, you argue that users should not copy music or otherwise get

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it free because that harms the creators of that music. On the other hand, I hear arguments all the time that source code should be freely available to everyone.

I'm at a total loss as to how to reconcile these contrary positions.

David Jameson
via e-mail

David—I don't think anybody owes it to you to give you access to free source code or free music. Sometimes it's smart to open the source code because it advances other aspects of development and furthers the developer's long-term goals, but you have no right to the code unless it is voluntarily offered. To my knowledge, the only time anyone suggested forcing a company to open its code was in the Microsoft lawsuit, where the Federal court sought to put an end to illegal, monopolistic business practices. That solution was not chosen.

Similarly, I don't think anyone should be forced to give away their music. Again, giving away a few songs might be smart if it helps promote your musical career in the long run. Also, as I noted in my column, your objective in creating the music or software might not be to sell it; you might choose to give your music away because you want people to enjoy it. But the choice belongs to the copyright holder.—Steve O.

DISAPPEARING ACT

In his "Download of the Month," Roger Maycock says to go to www.recordlab.com to download *Internet TapeDeck* [see "Web Page" in the August 2000 issue of **EM**]. This site does not seem to be happening. Please help.

Claudio Urbani
via e-mail

Claudio—We were as surprised and frustrated as you are. As soon as we began getting reader letters about the situation, we tried contacting both recordLab.com and its parent company, Midisoft, by phone, fax, and e-mail. However, despite repeated attempts, we've come up with nothing. All we found was a page on the company's Web site that reads, "We're sorry. The store is closed for repair."

Rest assured that the items we list exist at the time of writing. Roger Maycock, who researches and writes "Web Page," spoke to recordLab.com when he fact-checked the article, and he received no indication that the site would soon go down. But as we all know, life in cyberspace moves faster than life in meatspace. The publication process demands that we prepare each issue three months before it's published, and unfortunately, some information is bound to change between the time it's written and when it hits the newsstand.

We will keep an eye out for any changes to the Internet TapeDeck *and recordLab.com Web sites.—Gino Robair*

MONEY MATTERS

When I got involved in MIDI, back in '92, **EM** helped me build a very nice studio. But the vast majority of **EM**'s articles today are aimed at professionals with a lot more money than I have.

With my analog 4-track recorder (analog, God forbid!), several very nice Roland sound modules, and a sequencer, I am able to produce a MiniDisc master that I can successfully make into a CD. No, the recording doesn't sound as though it cost a million bucks, but the people who listen to my music can't tell the difference. Using good recording techniques (a lot of which I picked up in **EM**), I generate songs that make people wonder how I do it without the professional equipment I read about. I am not criticizing the new product reviews, but I could use articles that teach musicians like me—who don't have tons of bucks for all the latest and greatest equipment—how to get better-sounding recordings from the equipment we already have.

The last straw was "Cartoon Cutups: Music Editing for TV Animation" [see the June 2000 issue of **EM**]. Interesting article. My problem is the sidebar about the "modest" equipment used to create the music. The word *modest* is used again in the article. I know enough about equipment to realize that most of the components listed are not modest. Does a musician have to have a million bucks' worth of equipment to get respect? I think it is more impressive to see what can be done with less-than-ideal equipment.

David Fox
via e-mail

David—Okay, let's take a look at that June issue. It had a lot of full-length software reviews, including Steinberg LM-4 *($99), SSEYO* Koan Pro *($199.95), and Sounds Logical* WaveWarp *($199) and* WaveWarp Lite *($99). Koblo* Studio9000 *lists for $595, but as we noted, the company's* Vibra1000 *is a free download. We also reviewed the Technosaurus Microcon and Cyclodon synths ($329). That's aside from the Quick Pick reviews. Many of the products you would need to follow our recommendations in the cover story, "Mission Control," cost less than $500, and some are much less. Most of the sample CD libraries suggested in "Desktop Flamenco" cost less than $100. Is that downright cheap? Maybe not, but those prices sound pretty modest to me.—Steve O.*

FORWARDING ADDRESS

Your article "Musical PCs" [see "Desktop Musician" in the August 2000 issue of **EM**] refers to a company called FAQ Systems. Unfortunately, the company's phone has been disconnected, and its URL, www.faqsys.com, states, "Thanks for stopping by, we regret to announce that we are no longer in business. Please visit our friends at Wave Digital or Alexander Publishing." Thought you'd want to know.

Len
Norcross, GA

ERROR LOG

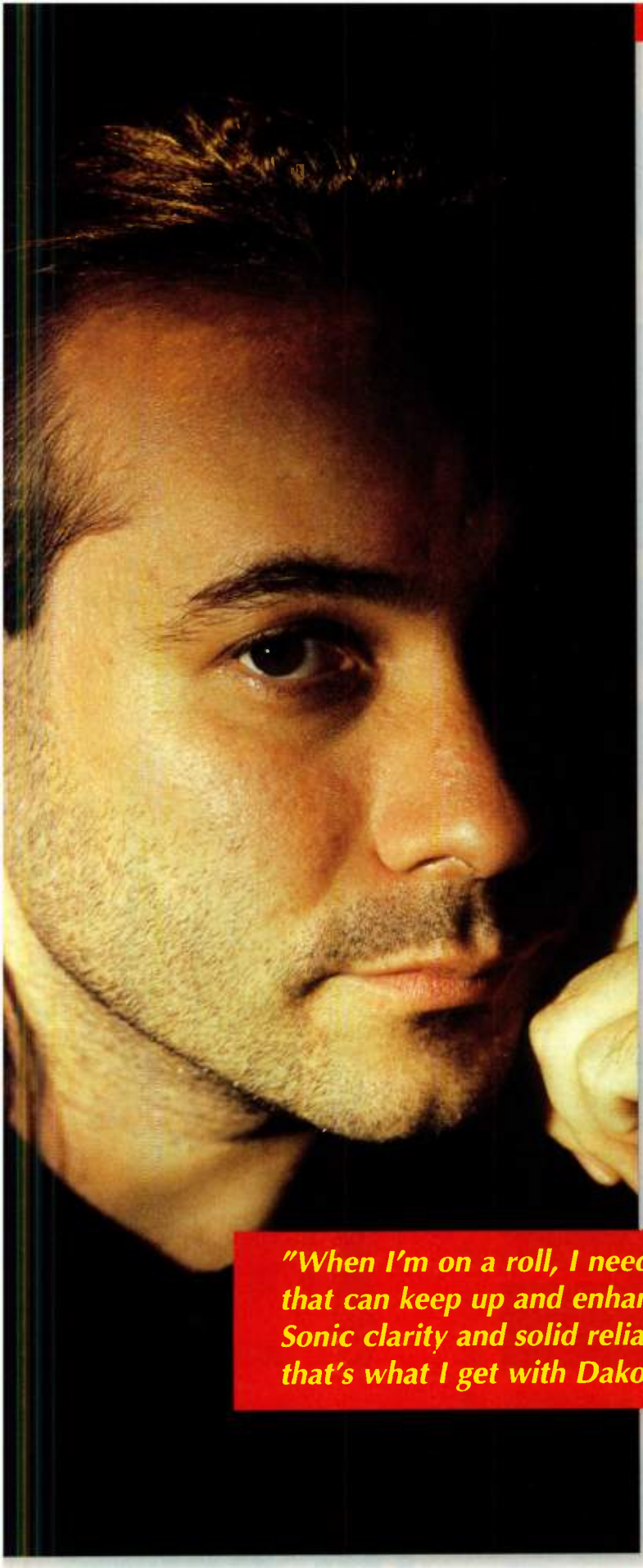
July 2000, FXpansion Series One review, p. 180: Jamie O'Connell, not Propellerhead Software, is the creator of MIDI Yoke.

September 2000, "What's New," p. 20: In the United States, the AKG C 2000 B condenser microphone ships with the SA41 stand adapter, not the H 100 shock-mount.

September 2000, "Building a Microphone Cabinet on Any Budget," p. 60: Craig Stuart Garfinkle was a contributing songwriter for Disney's *Little Mermaid* series—not the movie.

September 2000, "Building a Microphone Cabinet on Any Budget," p. 74: The pictured Electro-Voice RE20 is a large-diaphragm dynamic mic, not a cardioid condenser.

WE WELCOME YOUR FEEDBACK.
Address correspondence and e-mail to "Letters," Electronic Musician, *6400 Hollis St., Suite 12, Emeryville, CA 94608 or to emeditorial@intertec.com. Published letters may be edited for space and clarity.*



Artist Profile:

Shawn Clement

Profession:

Music Composer for TV and Film

Location:

Clemistry Ranch, Southern California
(a recent emigré from Beverly Hills)

Credits:

Buffy the Vampire Slayer, feature films, network TV and a long list of reality shows including *World's Most Amazing Videos*, and our favorite: *When Good Pets Go Bad*

Recent Honor:

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Most Performed Composer on TV in 1999

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WHAT'S NEW

By Marty Cutler

▲ A.R.T. TUBE MP STUDIO

Applied Research & Technology's Tube MP Studio ($159) is a redesigned version of its original Tube MP mic preamp. The Tube MP Studio adds a VU meter for visual feedback on the output level and has a brickwall peak limiter. The VU meter reflects the limiter's effect on the signal; for example, if the signal is in the red on the VU meter, engaging the limiter will bring the signal out of the red. A.R.T. claims the Tube MP Studio will provide more than 70 dB of gain.

You can also use the unit as a DI box for line-level signals. It uses a 12AX7 tube and offers variable input- and output-gain knobs. The preamp has a phase-reverse switch and provides defeatable 48V phantom power via the XLR input. Inputs and outputs are on both unbalanced ¼-inch and balanced XLR jacks. A.R.T. (Applied Research & Technology); tel. (716) 436-2720; fax (716) 436-3942; e-mail art@artroch.com; Web www.artroch.com.

▶ ELECTRIX REPEATER

The Repeater ($749) from Electrix is a loop-based digital "performance sampler" that can capture 16-bit, 44.1 kHz (uncompressed) loops. Internal processing is 24-bit. The number of loops you can record is limited only by the capacity of your CompactFlash card. Data is stored as WAV files and can be offloaded to a computer via a CompactFlash card reader for further editing.

Loops can be bounced and resampled. You get four tracks per loop, and tracks are stereo linkable. You can also use sound-on-sound overdubbing to create layered tracks.

Once a loop is recorded, the Loop Assist feature can use tempo-detection schemes and the sample's transients to automatically find good loop points. You can change the track's tempo, shift its pitch and its location in time, and apply stereo panning. If you want to sync loops recorded at different pitches and tempos, the Repeater allows you to do so in real time, with the twist of a knob. It can use MIDI Clock, its Advanced Tempo Detection feature, or a rotary encoder to set the bpm. Loops can be selected with MIDI Program Change messages. Electrix; tel. (250) 544-4091; fax (250) 544-4102; e-mail support@electrixpro.com; Web www.electrixpro.com.

▼ TC WORKS MERCURY-1

TC Works' *Mercury-1* ($199) is a multitimbral analog-modeling software synthesizer that provides up to four independent monophonic voices at once.

A single *Mercury-1* voice has dual oscillators, a noise generator (oscillator 1 only), and an additional suboscillator. The oscillator section offers a choice of sine, sawtooth, triangle, square, or pulse waveforms with pulse-width modulation. You can use oscillator sync or add ring modulation, both of which can be modulated by the LFO and the envelope generator. Many additional parameters, including Pulse-Width Modulation, Wave Selection, Sync, Mix, Filter Cutoff Frequency, and Oscillator Detuning, can be modulated with assignable MIDI commands.

The single LFO offers a choice of sine, sawtooth, square, and sample-and-hold waveforms, and you can modulate LFO frequency with MIDI Clock as well as define the number of LFO cycles per beat. When the LFO is synchronized to MIDI Clock, the LFO Rate parameter automatically displays the tempo base.

The 24 dB-per-octave resonant lowpass filter has a programmable LFO amount, and you can modulate the filter's cutoff frequency by keyboard position. (Modulation amount is scalable.) Either of the two envelope generators is assignable to the filter, and you can invert the filter's envelope.

You have a choice of triggering the amp section with an envelope generator or with a simple gate. If gating is used, the second envelope generator is free to modulate another parameter. The amp's Drive parameter engages TC Works' SoftSat algorithm for simulated analog distortion effects.

Mac users need at least a G3, 64 MB of RAM (128 MB with Mac OS 9.0), and Mac OS 8.6. Windows users can use a Pentium II or better with 64 MB of RAM and Windows 95/98 or NT 4. VST-compatible sequencing software is required for both platforms. TC Works/TC Electronic (distributor); tel. (805) 373-1828; fax (805) 379-2648; e-mail us@tcworks.de; Web www.tcworks.de.

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CRUISERWEIGHT

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GOLDEN GLOVES

VINTAGE ARCHIVES

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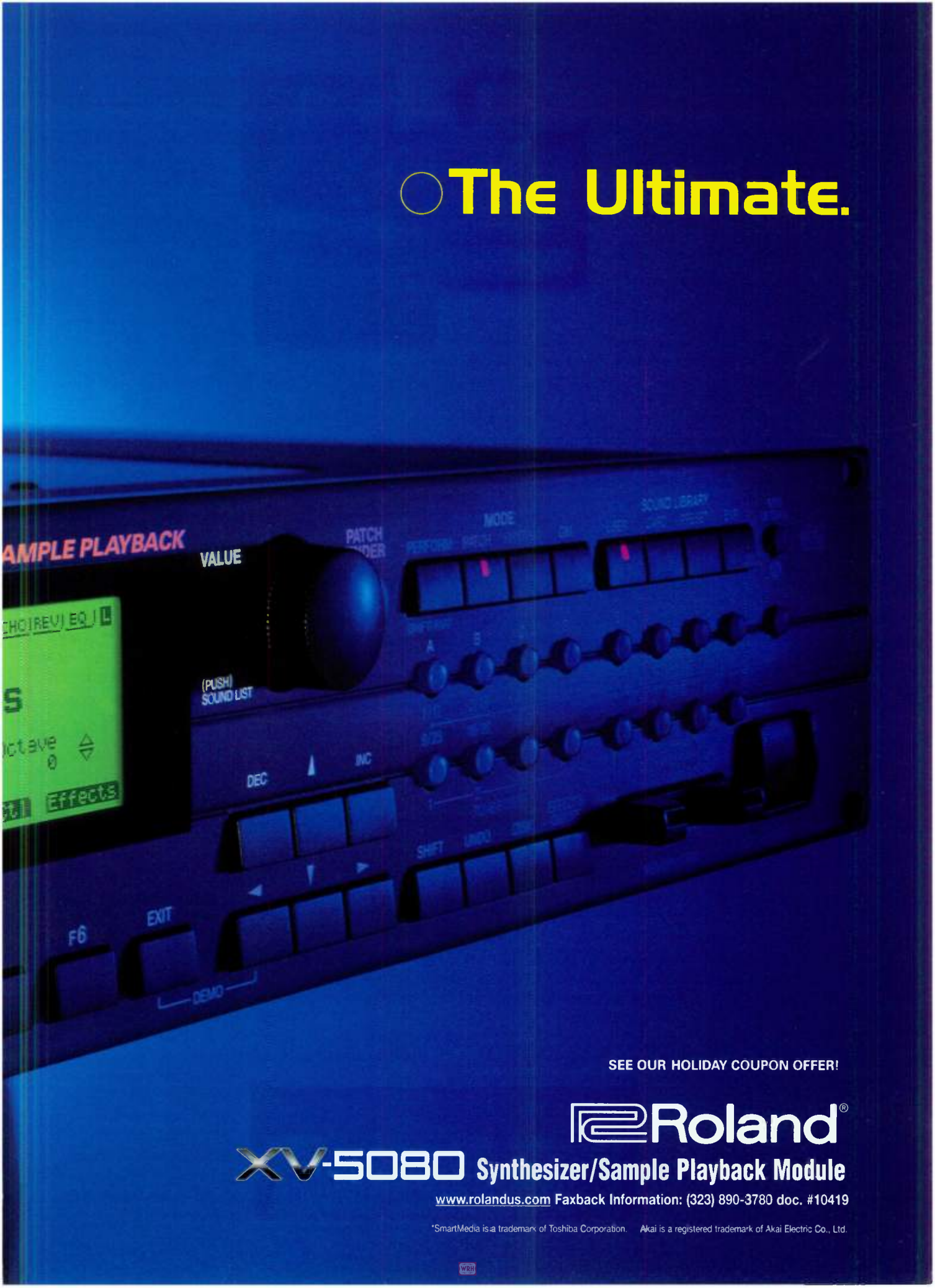
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▶ AUDIO EASE NAUTILUS BUNDLE

Audio Ease's *Nautilus Bundle* plug-ins for MAS ($299) are a real-time granular synthesizer, a 24-notch phaser, a 32-band equalizer, and a spectroscope. Both the granular synth and the phaser can be synchronized to tempo for time-based variations.

Riverrun is probably the most dramatic of the three plug-ins: it breaks up your audio tracks into tiny, user-definable grains. The grains can then go through a number of sound-mangling processes. For example, you can reorder them, feed them to an envelope generator, play them as chords, and lock them to the tempo of MOTU's *Digital Performer*.

A Grain Glass display is your window to the portion of grains that you are processing. A Walk slider controls the speed at which the grains are scanned. Scanning can move forward and backward and can even be frozen.

You can load Sound Designer II files and save them to disk. *Riverrun* automatically saves its input in this format when you close the song or quit *Digital Performer*.

The Texture Panel offers two modes: Flowing mode creates dense, continuous sounds (useful for pads), and Rhythmic mode builds beat-oriented patterns that can be locked to *Digital Performer*'s tempo. The Grain Speed slider controls grain density, and the Grain Length slider sets grain size. A Shape window allows you to apply a variety of envelopes to your input, and the Transposition Panel determines the pitch of each grain.

Periscope is an AltiVec-aware, 32-band equalizer. If you're using it on a Power Macintosh G4, the plug-in will take advantage of Apple's Velocity Engine for a 400-percent boost in processing speed over G3 computers. The 32 bands may be distributed at any frequency in the audio spectrum for surgically precise EQ. For example, you can use all 32 bands within a low-frequency range between 0 Hz and 400 Hz, or remove a 10 Hz band at 3 kHz.

Several control modes allow you to shape your EQ curves in different ways. For instance, Free Draw mode lets you define faders that snap to your mouse position, and Magnetic mode lets you create a smooth or drastic bump or dip in the curve by dragging an onscreen fader up or down.

The phaser, *Deep Phase Nine*, offers 24 notches per channel that you can sweep with a versatile assortment of LFO shapes: sine, triangle, sample-and-hold, one-shot sine, and one-shot triangle. One-shot LFOs allow you to define a place in the LFO's cycle where it will halt. Peaks and notches can be driven to self-oscillation. As with *Riverrun*, *Deep Phase Nine* can lock to tempo.

Because *Nautilus Bundle* is an MAS-only suite, you will need either *Digital Performer* 2.7 or *Audio Desk* 1.01. You'll also need a 233 MHz G3 with Mac OS 8.5.1, and a minimum of 4 MB of free RAM. Audio Ease/Mark of the Unicorn (distributor); tel. (617) 576-2760; fax (617) 576-3609; e-mail info@motu.com; Web www.motu.com.

▼ KORG CX-3

Tone-wheel modeling technology powers the sounds of Korg's redesigned and reissued CX-3 ($2,600). The 61-note combo organ offers 128 programs covering a wide range of organ sounds for pop, rock, jazz, and other applications. The CX-3 offers vintage and clean tone-wheel sounds, with the specialty of the house being modeled Hammond organ. The organ even gives you control over many of the modeled mechanical artifacts of analog organs. For example, you can add leakage and key click (up and down) and adjust tone-wheel overtone levels.

The new CX-3's drawbars (unlike the original's) send and respond to MIDI Control Change messages, and you can use CC messages to operate every switch, including those for percussion and vibrato. You can also control the CX-3 with an expression pedal or the two assignable pedal/footswitch inputs. The drawbars and the vibrato/chorus and percussion switches are in the same location as on the Hammond C-series organs.

The two sets of nine drawbars emulate foldback settings and individual harmonic distortion. In EX mode, you can link all 18 drawbars for 13 tonal harmonics and as many as 5 percussion harmonics at once. Percussion is fully programmable, with control over volume, decay, and second- and third-harmonic settings.

Korg's REMS modeling technology provides rotary speaker and spatial effects. You get two types of amp simulators: a traditional Leslie speaker and a Leslie/guitar amp combination. These can be bypassed, which is useful for connecting the CX-3 to an external rotary speaker and amplifier. Each simulation features a dynamic overdrive effect; as the volume increases, the sound gets dirtier. You can control the rotor-adjustment time when switching rotor or horn speeds, or you can stop the rotation. You can also adjust the placement of virtual microphones, add vibrato and chorus settings, and choose one of three types of reverb.

In Split mode, each set of drawbars can be assigned to upper or lower sounds. If connected to another MIDI keyboard, the CX-3 can serve as a dual-manual organ, with 61-note polyphony available for the two keyboards. Korg USA; tel. (516) 333-9100; fax (516) 333-9108; Web www.korg.com.

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▲ ILIO ENTERTAINMENTS

A common issue with prepackaged sampled grooves is that they are often limited to a few feels, tempos, and musical styles, forcing the composer to fit the music to the groove, instead of the other way around. *Skippy's Big Bad Beats* from Ilio (audio CD, $99; CD-ROM with Groove Control, $199) offers a solution to the dilemma with a customizable library of high-fidelity dance, hip-hop, and pop grooves.

Ilio enlisted John "Skippy" Lehmkuhl, a noted programmer and sound designer, to create the grooves. Instead of limiting you to repetitive 2- and 4-bar patterns, the disc lets you rearrange varied mixes of the patterns and use them at different points in the song. For example, you can create a mix without the snare or other elements, and play a full-tilt version later in the song to build intensity.

The collection consists of more than 300 loops that were processed with Groove Control, a feature that offers variations of the original loop's feel, swing, tempo, and dynamics—without altering the original stereo sounds. Using your sequencer, you can independently change tempo, pitch, and feel, either subtly or to extremes, to make countless permutations of the groove. A couple of the loops are even intensified with live acoustic drums. Ilio Entertainments; tel. (800) 747-4546 or (818) 707-7222; fax (818) 707-8552; e-mail ilioinfo@ilio.com; Web www.ilio.com.

SYBARIS LABS

The Legend ($155 plus shipping) from Sybaris Labs offers eight new Hammond B-3–type sounds and a Fender Rhodes sound on a PCM card for the Korg 01 series, X series, 03R, and Wavestation SR synthesizers. The sounds were created with a combination of modeling (70 percent) and sampling (30 percent). All sounds are multisampled, and loops are longer than the 01-series factory samples. Plug the card into your synth's PCM card slot, and you have access to the card's new sounds.

A floppy disk provides 100 new Programs based on the card's samples. The waveforms include B3-Pure, a clean, bright Hammond B-3–type sound sampled without effects; B3-PureDST, a cheesy organ sound with slight distortion; and B3-Leslie, with sampled Leslie. There are several variants of the waveforms, with and without effects and distortion. You also get a Fender Rhodes multisample. Sybaris Labs/Albedo Ltd.; tel. 90-216-418-8546; fax 90-216-418-8547; Web www.sybarislabs.com.

▼ SERAFINE STUDIOS

Four years of work and a number of unorthodox recording techniques went into the making of *SFX: The Serafine Collection* ($1,395), a 16-disk collection of sounds from Hollywood-based sound designer Frank Serafine. Serafine has created sounds for films such as *The Hunt for Red October, Star Trek III: The Search for Spock, and Brainstorm.* The collection includes

Serafine's sounds from major motion pictures.

The sound categories in this collection range from the exotic (Science Fiction, Electronic, Magic/Surreal) to the more earthbound (Human/Animal, Foley, and Doors). Serafine employed a combination of real-world sounds, electronic musical instruments, and unusual miking techniques (including microphones placed in 35 mm film cans filled with motor oil) to create the sounds. Serafine Studios; tel. (310) 399-9279; fax (310) 396-0314; e-mail fserafine@earthlink.net; Web www.frankserafine.com.

▲ KORG

Analog synthesizer and drum machine sounds abound in Korg's EXB-PCM05 Vintage Archives expansion board ($200) for the Triton and Triton-Rack. The user-installable PCM expansion board provides 16 MB of new sampled waveforms, and it comes with a floppy disk containing 128 Programs and 128 Combinations contributed by British, American, and Japanese analog synthesizer manufacturers.

The 158 multisamples include vintage synths, vocoders, tape-based keyboards, and rhythm machines. Instruments include the Korg mini-Korg 700Os, Poly 6, Delta, and MS-20. Programs and Combinations include both emulations of vintage gear and many new sounds oriented toward dance music. Korg USA; tel. (516) 333-9100; fax (516) 333-9108; Web www.korg.com.

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2 AUDIO/1 WAV

Complete Celt

Complete Celt: Ballads, Airs & Laments. Some of the finest Celtic musicians in the British Isles, including Riverdance's Luke Daniels, bring you a triple CD set of authentic, specially recorded licks and performances to add a Celtic influence to your tracks. Celtic Fiddle, Uillean Pipes, Mandolin, Bagpipes, Voice, Bodhran, Mandocello, Accordian etc. AMG (ID#1089)

3 AUDIO CD SET

Rhythmic Journey

Awarded Keyboard's KEY BUY AWARD, the review said - "As you'd expect, Steve's drumming is perfect - and the recording quality is among the best I've heard. In summary, this collection is first class. From start to finish, Steve's timing and feel are rock solid. 10/10" 2 CD collection from ex-Journey drummer STEVE SMITH. Demo at soundsonline.com (ID#1076)

AUDIO/WAV-AKAI

NY Cutz Off Da Hook

Another exciting release from Zero-G. NY Cutz - Off Da Hook is the long awaited, eagerly anticipated follow up to the hugely successful NY Cutz (which was awarded Keyboard Magazine's [illegible]). It's huge slabs of fat cut street ready vibes and juicy grooves, are waiting for you to get your teeth into! So good, Zero-G named it twice! (ID#1093)

2 AUDIO/1 WAV

King Tone Grooves

King Tone Grooves provides the meanest and most varied collection of stylised breaks ever brought to you on one CD. From Killer 70's Funk loops to Slammin' Hardcore Dance Cuts, from huge Bonhamesque Beats to Deep Soul Grooves all played live on the finest quality kits with the biggest fattest sounds imaginable. Hot off the press, Check it out! AMG (ID#1091)

AUDIO

DM Hip Hop 2

1000 hot new stereo drumloops (70-120 bpm) + 300 hip hop & funk sounds: Guitars & licks, synthesizers, hits, brass, pianos, rhodes, basses etc. All loops are sorted into bpm groups. The CD-ROM includes all sounds from the Audio-CD. Volumes and programs have a max. of 8 megs. Filter and envelope parameters are already set, program #s are preassigned. (ID#1077)

AUDIO/AKAI/EMU

Total Funk

The historic Zero-G funk collection, and one of the latest releases in their critically acclaimed 'Total' series. Total Funk features over 1700 pure funk tools for the serious funkster... It's tight, it's cheeky, it's fruity, it's funky, and it's available right now in a 3 CD package to add plenty of funk to your production... It could only be Total Funk! (ID#1094)

2 AUDIO/1 WAV

Phil Gould On Drums

Just awarded Keyboard Mag's prestigious [illegible], this massive collection of fresh beats includes a vast range of feels and styles from recordings made as far back as 1984 right up to the present day. This collection has a similar feel to Geta Yashiki's CD, excellent performances, loose, funky and creatively produced, plus a selection of hits. AMG (ID#1088)

AUDIO/WAV

ExtremeRockFunkRage

ExtremeRockFunkRage features powerful rock grooves, riffs and loops. This is red hot with an extreme attitude. Cranking guitars, throbbing basses, slamming drums and raging vocals with a fresh funk/rock hip flavor. Complete with construction kits and grab a riff and vocal loops with variations and hits. Power UP and Rock ON. Dude, it rocks! (ID#2000)

AUDIO

Planet of the Breaks 2

"In short, this is a 21st-century sample CD that probably says more about the future of creative drumming than most other releases put together. Shawn Lee's follow-up to the hugely successful Planet Of The Breaks takes us on a further voyage through his own brand of cool, twisted & sickeningly infectious funk drumming." ★★★★★ Sound On Sound, UK (ID#1091)

2 AUDIO CD SET

Slam On the Breaks

A huge collection of specially produced live and programmed dance loops, plus a bonus collection of bongo loops. Leading UK drummer Danny Ward and engineer Danny Evans have produced a hugely diverse collection of original loops recorded in a wide range of studios that gives this collection a variety of unique and distinct sounds. Superb! AMG (ID#1087)

AUDIO/WAV

da nu RnB hip hop

A unique variety of new RnB Hip Hop styles. 2 CDS packed with a whole bunch of flippin' stuff from da East Coast. Twistin' construction kits, supa lastin' beats, for all ya people out dere who dig da flava of Missy & Busta ... Dis one's a killa! All of the material is also excellent for commercials. Over 2 hours of content including extended song arrangements. (ID#[illegible])

2 AUDIO CDS

Total Drum'n'Bass

Everything you need for serious Drum'n'Bass tracks. Breakbeats, transformations, sub basses, real bass, perc, and so much more! The package includes 2 CDs and 1 WAV CD-ROM, bursting with top notch samples, tempo matched and edited to perfection! You'll never need another Drum'n'Bass CD... This is it... Total Coverage! ★★★★★ SOS-UK (ID#1071)

2 AUDIO/1 WAV

The Vinyl Frontier

"When drum-loop sample CDs are this good and presented with this much thought, it makes you glad you own a sampler. A class act all the way." ★★★★★ (Sound On Sound, UK). This collection has a gritty vinyl feel and includes long grooves with variations that are followed by all the hits used to create them so users can create their own edits. AMG (ID#1086)

2 CD AUDIO

Brit Horns

Top UK horn section Pete Thoms, Gary Barnacle & Stuart Brooks, (George Michael, Tina Turner, Paul McCartney, Marvin Gaye) bring you specially recorded brass licks, including funk, disco, pop and latin styles. Trumpet, Sax, Trombone & Flute are all included. As well as full sections in different keys, there are screaming sax solos and flute licks. AMG (ID#1090)

AUDIO/WAV

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Re Loop 2

NEW

AIFFWAV CD-ROM

Re Loop 2 includes 1000 drum loops plus easy-to-use loop remixer software for PC and MAC. The software has been designed to enable manipulation of the included drumloops (you can even distort them) and you can construct countless new variations and combinations of the loops. After just a few mouse clicks you'll be surprised by the creative possibilities (ID#1096)

Ethno World

NEW

4 AKAI CD-ROMS/3 EMU 6IGA

Ethno World contains more than 70 rare and ethnic instrumental and percussion sounds from around the world on multiple CD-ROMs. Hear the squeaking and scraping of strings, the breathing of woodwinds, hands on drum skins, and the moods of other countries. Instruments are multi-layered and feature many styles, loop variations and high quality sounds. (ID#1095)

Percussive Adventures

NEW

2 CD AUDIO/4 CD-ROM

"With so much soundware available to the discriminating producer, it's getting harder for any one CD package to stand out. Percussive Adventures definitely stands out, which is why we gave it our KEY BUY AWARD. Both the sheer amount of material and the freshness of the performance mark it as a must-have for composers." Keyboard Review (ID#1045)

Adv/Orch Compact

NEW

AKAI/EXS24/PULSAR/YAM

The ever-growing need for high-quality orchestral samples and the continuing success of the "Advanced Orchestra" series has created demand for this affordable "compact" version of this critically acclaimed library. The Compact Edition contains the most useful samples from the "big" library which need much less memory than the "big" samples do. (ID#1097)

Dance Mega Drums 2

HOT!

AUDIO/AKAI

Dance Mega Drums 2 includes over 4000 Drum, Bass, and Drum machine samples, plus of drum kits for Drum'n'Bass, Hip Hop, Disco, House. 1332 Drum-kit samples. 473 Bass drums, 551 Snare drums, 246 Claps, Snaps and Rim-Shots, 367 HiHats, 70 Cymbals, 396 Perc and FX. 12 ultra rare drum machines. All sorted and categorized. CD 2 is Akai/Emu CD-ROM. (ID#1012)

Spiritual Voices

NEW

AUDIO

The magic, authentic ethno vocal collection! No instruments, just voices recorded in their original settings. This unique collection contains single voices, choirs, mouth percussion, shouts and processed effect voices. Spiritual voices offers quality samples of ethnic voices for use in film, commercial or musical productions. Over 72 minutes of unique vocal performances. (ID#1098)

Ill Jointz

HOT!

2 CD AUDIO

ILL JOINTZ is 2 CDs of Hip-hop and R'n'B loops - the cutting edge of street flava all here for your sampling pleasure! Over 21/2 hours of construction kit style loops, with all loops broken down into their basic elements! All loops are at least 4 bars long so you can feel the flow, cut them up and combine them. All the ingredients to produce a chart-topping record. (ID#1004)

Drumskills

NEW!

AUDIO

If you're into real live drums, you can't do without Drumskills. This collection features extra long takes in various styles- Drum n Bass, RnB, Jazz, Easy Style, Latin, Jazz Brushes, Swing Jazz, Funk, Disco, Special, Breaks, Cymbals! Give your tracks a fresh live human feel. Just load these loops into your sampler or hard disk recorder and start producing. (ID#1099)

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ONLINE AUDIO DEMOS

Listen to online demos of these CDs at www.soundsonline.com. Insert the 4-digit ID# listed at the end of each product in the online home page search window.

TASCAM 788

Tascam's 788 Digital Portastudio ($1,149) gives you eight tracks of uncompressed 24-bit, 44.1 kHz audio recording. You can record up to six simultaneous tracks via the ¼-inch balanced TRS inputs, which accept line- or mic-level signals. Input D is designed to accommodate direct electric guitar or bass input. The 788 has stereo outputs on RCA jacks for mixdown, and a stereo pair of RCA jacks for monitors. You also get two auxiliary outputs.

The 788 boasts a variety of multieffects algorithms, including reverbs, distortion, flange, phase, and pitch-shifting. It also offers dynamics processing, de-essing, and EQ. Its SCSI port can be used for mastering to CD-R and for archiving data to external media, including Zip, Jaz, and fixed drives. You can record a maximum of 4 GB of digital audio directly to an external SCSI hard drive; if the drive is larger, the 788 will divide the drive into 4 GB partitions. An optical S/PDIF output allows you to transfer tracks digitally to an external device.

The MIDI In and Out ports let you use the 788 as a master or slave with MTC. The 788 also sends MIDI Clock and receives MIDI Machine Control. Although the 788 does not transmit fader and panning moves, any sequencer or device that can map Control Change messages can be used to automate mix parameters.

The unit offers an extensive list of editing features. Dedicated In, Out, and To controls let you select editing ranges, and 999 locate points help you keep track of edit regions.

The waveform display gives you visual feedback on your edits. If you change your mind and decide to revert to earlier stages of editing, you can take advantage of the unit's 999 levels of undo. Tascam; tel. (323) 726-0303; fax (323) 727-7635; Web www.tascam.com.

PSP AUDIO MIXSATURATOR

PSP Audio's *MixSaturator* VST plug-in ($30) replicates saturation effects common in tube circuits and analog tape recorders. The plug-in features three algorithms with a wide range of variation.

The Analog Saturation Simulator includes a selection of seven types of nonlinear saturation curves. Frequency-dependent processing is also available: the bass algorithm adds low-end harmonics; the treble algorithm simulates tape saturation of the upper frequencies, but without an increase in distortion or aliasing.

Windows users need a PC with at least a Pentium II/200 MHz processor, 32 MB of RAM, and Windows 95. Macintosh users require a 300 MHz G3 with 64 MB of RAM and Mac OS 8.5. PSP Audio; tel. and fax 48-60-196-3173; e-mail contact@psp-audioware.com; Web www.psp-audioware.com.

ENCORE ELECTRONICS KNOBBY

MIDI faders are fine for controlling parameters such as volume in a sequencer, synth, or DAW, but sometimes a knob is the tactile tool you want. Encore Electronics' Knobby MIDI controller ($249) lets you access a synth's parameters and can also be used to control other MIDI software and hardware.

The Knobby offers eight knobs, four Group buttons, and a Scene button, giving you up to 120 programmable controls. It can send any MIDI Control Change message (including RPNs and NRPNs), as well as System Exclusive messages up to 55 bytes in length. You can also program a delay time for MIDI messages, which is useful when you're sending messages to older devices that need time to respond to message packets. Should your old keyboard choke on the Knobby's output, the Scene switch doubles as a Panic button.

You need a computer to program the Knobby. Encore Electronics bundles the hardware with *KnobbyEd* (Win), which lets you set up the knobs by dragging and dropping control-parameter icons onto the knob icons. A Macintosh version should be available by the time you read this. Once you are done, the unit holds your settings in nonvolatile memory.

The software includes a library manager and a collection of profiles for a number of synthesizers, both ancient and contemporary. If your synth is not supported, you can create your own profile using SysEx messages. Encore Electronics; tel. and fax (925) 229-8875; e-mail sales@encoreelectronics.com; Web www.encoreelectronics.com.

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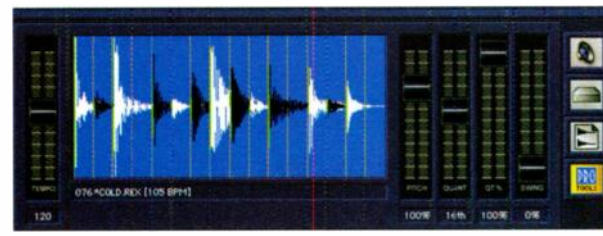
▶ AUDIO GENETICS ALKALI

One of the problems with digital audio is that it is not as pliable as MIDI data with respect to tempo and pitch. Most software solutions result in compromised audio that contains artifacts of the pitch-shifting or time-stretching process. Audio Genetics' *Alkali* ($299) offers a different approach to the process.



Alkali slices your audio loops into discrete components. When tempos change, it moves the components farther apart or closer together, as the tempo requires, rather than stretching the entire audio event. In this way, loop components can be quantized, individual elements can be pitch-shifted, and you can even get a straight feel to swing.

A Tempo slider at the left of the screen lets you "varispeed" the loop to taste, while additional sliders let you adjust the pitch without changing tempo, quantize, adjust quantization percentage, and add swing.

The program supports DirectConnect and appears as a plug-in in *Pro Tools* 5.0. When you find the settings you like, the file is spotted directly in a *Pro Tools* track. Because *Alkali* can render grooves as Sound Designer II files, you can use your *Alkali*-created grooves in other digital audio sequencers.

Alkali supports REX, Sound Designer II, and AIFF file formats. The program is bundled with a library of REX files on CD-ROM. You will need a PPC 603 and Mac OS 8.61. Audio Genetics; tel. 44-207-431-6260; fax 44-870-130-5336; e-mail sales@audio-genetics.com; Web www.audio-genetics.com.

▶ BITHEADZ TUBES, TINES & TRANSISTORS

More than 300 MB of vintage organs, analog synths, Mellotrons, and electric pianos are gathered for your delectation in BitHeadz's *Tubes, Tines & Transistors* sample-playback software synth ($199) for the Macintosh.

You get 116 banks with more than 3,500 programs of keyboard and synthesizer sounds. The samples cover a wide range of vintage instruments: Hammond B-3, Korg CX-3, Vox, and Farfisa organs; Mellotron, ARP 2600, Oberheim SEM, and Moog synths; and more. *Tubes, Tines & Transistors* uses BitHeadz's *Unity DS-1* engine to voice and play the sounds, providing a wide range of filter settings, modulation routings, and built-in effects.

The synth supports OMS, FreeMIDI, ASIO, Direct Sound, Direct I/O, DirectConnect, ReWire, and Sound Manager. It is optimized for the G4 processor, but it can use a PPC 604e/200 MHz with 64 MB of RAM and Mac OS 7.61. Windows users need a Pentium II/200 MHz, Windows 95 or 98, and a Direct Sound– or ASIO-compatible sound card. BitHeadz; tel. (831) 465-9898; fax (831) 465-9899; e-mail info@bitheadz.com; Web www.bitheadz.com.

▼ ZETA MUSIC SYSTEMS SYNTHONY II

Zeta Music Systems' Synthony II MIDI processor ($2,495) is a pitch-to-MIDI converter designed specifically for use with a Zeta MIDI-capable violin, viola, cello, or bass. You can adjust the converter's tracking to taste, and Zeta claims that tracking is nearly instantaneous.

The Synthony II features an XG-compatible tone generator with 480 sounds. Each sound can be edited and stored in one of the 256 user locations. A built-in effects processor dishes up 11 different reverbs, 11 types of chorus, and 42 variation effects, including delay, flange, rotary, tremolo, and distortion. Up to three effects can be applied to a sound.

The single-rackspace unit has a built-in arpeggiator and a drum sequencer with a 32-note capacity. You get a total of 32 sequences for self-accompaniment. You can loop, change the sequence's tempo, and quantize. The Synthony II can also be used as a multitimbral sound source with an external sequencer.

The synthesizer outputs are on a pair of unbalanced ¼-inch jacks. You get two expression-pedal inputs, two footswitch jacks, and MIDI In, Out, and Thru. The unit has a footswitch, an 18-foot audio cable with a proprietary connector, and a power supply. Zeta Music Systems; tel. (510) 261-1702 or (800) 622-6434; fax (510) 261-1708; e-mail info@zetamusic.com; Web www.zetamusic.com. ●

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By Roger Maycock

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WEB SITE OF THE MONTH

Whether you require legal assistance, a repair shop, or an equipment rental service in your area, you will probably find what you need in the i-Music Production Guide (www.1212.com). Touting itself as "the largest database of music industry–related Web information in more than 50 countries," this site helps you locate session players, voice-over talent, engineers, sound designers, and gigs in a large number of geographical locations.

Site navigation is easy—simply choose the category you want, then select the country. You'll find the names, addresses, and other contact information of the people, facilities, or organizations that meet your criteria.

The site is updated daily and is quite comprehensive. For example, when I searched through the Recording Studios section, I found established names such as Nashville's Sound Kitchen and New York City's Electric Lady Studios, and the Studio Design link included the Russ Berger Design Group and Studio Bau ton.

NoteHeads AB (www.noteheads .com) recently introduced *Igor Engraver* 1.0, a freeware music-notation program developed by composer/programmer Peter Bengston. Available for Mac OS and Windows operating systems, the application proves well suited for a wide variety of compositional styles, including popular, chamber, orchestral, and opera. *Igor Engraver* reads and writes MIDI files, supports multilanguage instrument names, context-sensitive slurs, and both traditional and modern notation of accidentals. A companion freeware application, *NoteHeads Reader,* allows you to play or print your files without running *Igor Engraver* . . . **DreamWorks Digital A&R** (www.dreamworksdigital.com) recently launched a Web site that allows unsigned artists in the United States to submit music directly to DreamWorks Records. The company hopes to connect with the vast amount of music that exists outside the more traditional distribution channels, an approach DreamWorks believes will help level the playing field between unknown artists and those who have cultivated professional contacts. Artists are allowed to submit one song in MP3 format within any three-month period . . . You can now get assistance with your efforts to market your music at the **RainMusic .com** site (www.rainmusic.com). RainMusic's many offerings include a Music Business/Music Promotion bookstore, a Music Promotion Academy, a database of free sheet music, and the Pianist's Guide to the Internet. RainMusic also sells a variety of other materials that provide the names and addresses of record-industry contacts, give you advice on the successful way to market your music, and keep you informed about other related music topics.

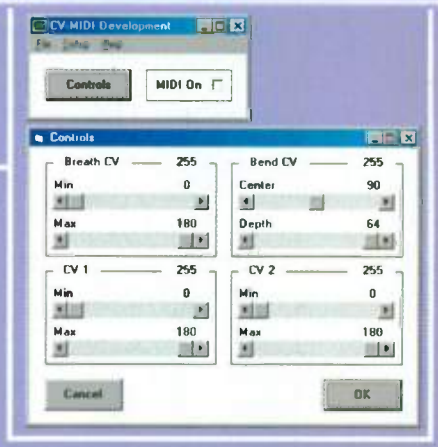
DOWNLOAD OF THE MONTH

For musicians with a hankering for DIY projects, Windworks Design (http://windworksdesign.com) has introduced the CV-MIDI Development Tool, a software/hardware system for converting control voltages to MIDI. The application and its source code are useful for musicians interested in integrating their analog synthesizer equipment with their desktop systems.

Originally created for use with wind controllers, the software employs terms familiar to wind players (for example, Breath CV and Bend CV). The program is coded in Visual Basic, with additional software for MIDI I/O and MIDI data generation.

When you first launch the application, a MIDI Setup screen is displayed. Once you define a MIDI Out Device and a MIDI Out Channel, you then proceed to the main operating window, CV-MIDI Development.

Included in the download is a PDF file containing the schematics and parts list for the printed circuit board (PCB) that provides the A/D interface between the control voltages and your computer. You'll need 14 parts to assemble the PCB, which attaches to your computer's parallel printer port.



The CV-MIDI Development Tool is available as freeware and is designed for Windows 3.1/95/98. You'll need *PKZIP*, *WinZip*, or a similar utility to uncompress the archive.

WEBCAST

Of all the Webcasts on the Internet, radio broadcasts are among my favorites because they let me "tune in" to stations located just about anywhere. If your musical preferences include the genres urban, blues, gospel, Caribbean, or jazz, don't miss Bay Drum (www.baydrum.com).

Based in Northern California, Bay Drum is a content-rich online information network that serves the African-American community. It includes sections on career opportunities, community information, and financial news; links to other African-American sites; an educational resource center; and much more.

As with many Webcasts, Bay Drum's musical channels come in RealAudio or Windows Media format. Unfortunately, you can't determine in advance which format a particular radio station will broadcast. While this isn't likely to be an issue for PC/Windows users, Mac enthusiasts won't be able to access those channels broadcasting via Windows Media.

Be sure to check out the jazz stations KKSF (San Francisco) and WJZF (Atlanta): jazz just doesn't get much smoother than this. From musical perspective to audio quality, Bay Drum is first-rate all around.

WEB APP

Microsoft Windows Media Technologies 7

If you have spent time surfing for Webcasts, you've probably noticed that the overwhelming majority of streaming content is available in either RealAudio or Windows Media format. RealAudio has a commanding lead in acceptance and product recognition, but Windows Media has developed a strong following by offering a highly competitive set of tools for encoding, digital rights management, and playback of content. With the introduction of *Windows Media Technologies* 7 (www.microsoft.com/windows/windowsmedia/en/wm7/default.asp), Microsoft improves upon an alreacy popular format.

Available for Windows 98/98SE/2000/Millennium Edition, *Windows Media Player* 7 (*WMP7*) provides a new look, playlists for jukebox applications, and the ability to rip and encode for the creation of custom audio CDs. There is also support for portable audio players, an Internet radio tuner, a media guide, enhanced media librarian facilities, skins (custom faceplates), and a 10-band equalizer. In addition to Windows Media files, *WMP7* also handles WAV, AVI, MIDI, MPEG, VOD, AIFF, RMI, and MP3 files.

Windows Media Encoder 7 (*WME7*), which is still in beta as of this writing, represents Microsoft's latest encoding tool. *WME7* uses Wizards (predefined settings that match content type and bit rate with suitable audio and video codecs) to guide you through the encoding process. The templates included—AM, FM, FM stereo, Near CD Quality—can be edited and saved, letting you determine playback quality. *WME7* provides multiple-source support and source-switching for broadcasting live events, which lets content creators alternate between live and prerecorded input sources.

Musicians concerned about the security of their intellectual properties will appreciate the digital rights management (DRM) capability of *Windows Media Technologies* 7. With *Windows Media Rights Manager*, you can encrypt your data, after which the file is locked with a "key." The owner's key, which is also encrypted, is distributed separately. The protected file is saved in Windows Media Audio format (.wma) or Windows Media Video format (.wmv). These files can also include scripting information, such as captions and meta tags with embedded URLs that can, for example, instruct a browser to "jump" to your band's home page.

After encoding your media file, you choose a server/clearinghouse that stores the protected file and the terms of its license. The clearinghouse confirms the consumer's request for a license, which takes effect when an attempt is made to download the file or upon first-time playback. *Rights Manager* then sends the consumer to a registration page to acquire information and, if required, process payment. In order to play the file, the consumer needs a media player that supports *Rights Manager*. The file can then be played according to the terms of the license. Licenses can define criteria such as start times, duration, and counted operations.

BAND ON THE WEB

Larry Steen

With his debut album, *First Move* (LMS, 1997), Los Angeles–based composer and bassist Larry Steen (http://LarrySteen.iuma.com) has catapulted himself into the limelight as one of the most promising jazz artists to come along in years. Recognized by the late jazz critic Leonard Feather as "a giant of the not-too-distant future," Steen has generated an enthusiastic response from audiences as far away as Brazil and Hong Kong. The Internet has played a significant role in developing his following.

Steen first established himself in the Los Angeles music scene as a capable electric and acoustic bassist. A winner of the International Society of Bass Players' jazz competition, Steen studied at the University of Miami, the Berklee College of Music, and the California Institute of the Arts. He has also worked with numerous artists such as Melissa Manchester, Mel Torme, Stevie Wonder, and Louis Bellson.

On *First Move*, Steen weaves a fascinating sonic tapestry by combining West African, Brazilian, Caribbean, and Middle Eastern rhythms and grooves with intricate harmonic progressions, creating what he refers to as "world jazz." Though structurally complex, Steen's unique music contains memorable phrases that grab the listener like the hook of a popular song. "Though the harmony is intricate at times," says Steen, "the music is still very melodic."

First Move consists of 11 tracks, 9 of them composed, arranged, and produced by Steen. Well-known jazz artists Dave Weckl, Ernie Watts, Bill Cunliffe, and Jeff Beal contributed to the album.

Like many other artists seeking to broaden their exposure and sell their music outside the traditional distribution channels, Steen has turned his efforts toward the Internet. He has a presence on a variety of Web sites, including the Internet Underground Music Archive (www.iuma.com), Riffage.com (www.riffage.com), and MP3.com (www.mp3.com).

"People from all over the world have contacted me to express interest in my music," says Steen, who won ASCAP's Special Award four years in a row. "I anticipate that sales will increase dramatically in the near future as more people get online and feel secure about making credit-card transactions." Although the fiscal rewards for Steen's efforts are still in the offing, the steady exposure provided by the Internet is proving invaluable for the bassist's career.

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VINTAGE PAGE

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Produced: 1984–1986
Made in: Japan
Number produced: 40,000
Synthesis system: analog, subtractive
Price new: $1,095
Today's prices: like new=$600; okay for its age=$450; like hell=$300

In the early '70s, the Minimoog captured the hearts, minds, and ears of musicians, from progressive-rock stalwarts like Keith Emerson and Rick Wakeman to jazzers such as Herbie Hancock and Chick Corea. It's a great testament to the Minimoog's design that music ranging from screaming rock to subtle jazz can be extracted from its modest circuitry. Indeed, today you can add techno, funk, and hip-hop to the list of Minimoog-friendly genres.

The monophonic Minimoog became the blueprint for "performance" synthesizers, with its logical placement of knobs following the actual flow of electricity from oscillator to filter to amplifier. The unit's envelope generators use control voltages to modulate the audio signal. The knobs and switches are all sufficiently large and well spaced so that the player can tweak and play at the same time.

The Minimoog's two oscillators can produce square, rectangle, sine, or sawtooth waveforms in 32'-to-2' pitch ranges. Oscillator 2 can be tuned apart (up to a sixth) with respect to oscillator 1. Oscillator 3, which also functions as an audio generator, can serve as a control signal for LFO modulation. Noise (white or pink) is available as a sound source, and you can even patch in an external signal for processing using the Minimoog filter and amplifier circuits.

The filter itself is a powerful 24 dB-per-octave, lowpass type with Emphasis (resonance) control, and it can be shaped using a dedicated attack, decay, and sustain (ADS) envelope generator. Set the resonance to full (10), and the filter produces a pure, self-oscillating sine wave, effectively providing another sound source, albeit one hairy to control in terms of tuning. A separate ADS envelope generator governs the amplifier, and glide is also available.

Armed with numerous sound sources whose blend is controlled by a dedicated mixer panel, razor-sharp filtering, and a superfast envelope generator, you can produce a range of sounds and effects that has been endlessly copied and approximated but, frankly, never outpaced.

Indeed, the oscillators' myriad permutations and regenerating aspects combine to produce as modern an array of sounds as any synth currently on the market can. It's quite remarkable.

For more traditional music, bass has always been a Minimoog specialty. Simply put, a real, live Minimoog delivers an edge you just can't get using samples—or for that matter, using any modern MIDI synth. The depth and grit generated by the genuine analog circuitry provide all-important textural substance. Minimoog bass is synth bass you can almost touch.

MIDI is understandably an issue for many people. The Lintronics MIDI Converter (LMC) is a well-designed kit that enables MIDI control of loudness, modulation amount, LFO rate and depth, glide (portamento), and decay. Bob Moog's own Big Briar handles sales and installation of the LMC upgrade. In the United Kingdom, Moog Music Ltd. (which has nothing to do with Bob Moog) constructs new "Minimoogs" that, with one or two added features, re-create the workings of an original Minimoog in a modern MIDI setting—complete with oscillator tuning stability.

The Minimoog is a classic and will always remain so; prices have remained steady for a number of years. Despite "new" Minimoogs, rack-mount "MIDIMoogs," software emulations (such as Steinberg's *Model E*), and even the possibility of Big Briar itself producing a performance instrument along the lines of a Minimoog, there will never be more than the 13,000 real McCoys produced between 1971 and 1982.

Julian Colbeck *has toured everywhere from Tokyo to São Paulo with artists as varied as ABWH/Yes, Steve Hackett, John Miles, and Charlie.*

The legendary Moog Music Minimoog is the archetype of today's performance synthesizers and remains one of the most popular synths on the second-hand market.

For manufacturer information, please see Contact Sheet, p. 205.

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Whether you're making tracks with your computer or doing a solo gig, a little EQ can go a long way toward giving your sound a pro edge. Each EZbus channel gives you super responsive, totally musical EQ—four bands worth, with high and low shelving plus two fully-parametric bands. Of course, you can go overboard if you like, but be warned—the EZbus's exclusive AudioAlert™ system will let you know if you exceed maximum digital levels and point you to the offending channels. (Hey, you don't have to correct the problem—it's your right to make offensive sounds—so long as you don't still live at home.)

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Real-time dynamics processing on every channel means never having to worry about clipping that perfect vocal take. Make your synths breathe with the Expander. Tame your, ahem, vintage (okay . . . old) gear with the Noise Gate. And since the full complement of dynamics processing is also available on the Main Mix bus, you can give your final masters a smooth, polished sound.

What could be easier than hot-plugging the EZbus into your computer's USB port and getting your musical ideas recorded *fast*? No PCI cards to install. No IRQs to configure. No DMA channels to mess with. Just plug it in and go. (Sorry, you still have to provide the creativity. But we'll make sure that when inspiration does strike, the hardware won't get in the way.)

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EZ Because it lets you do amazingly sophisticated audio processing with zero hassle.

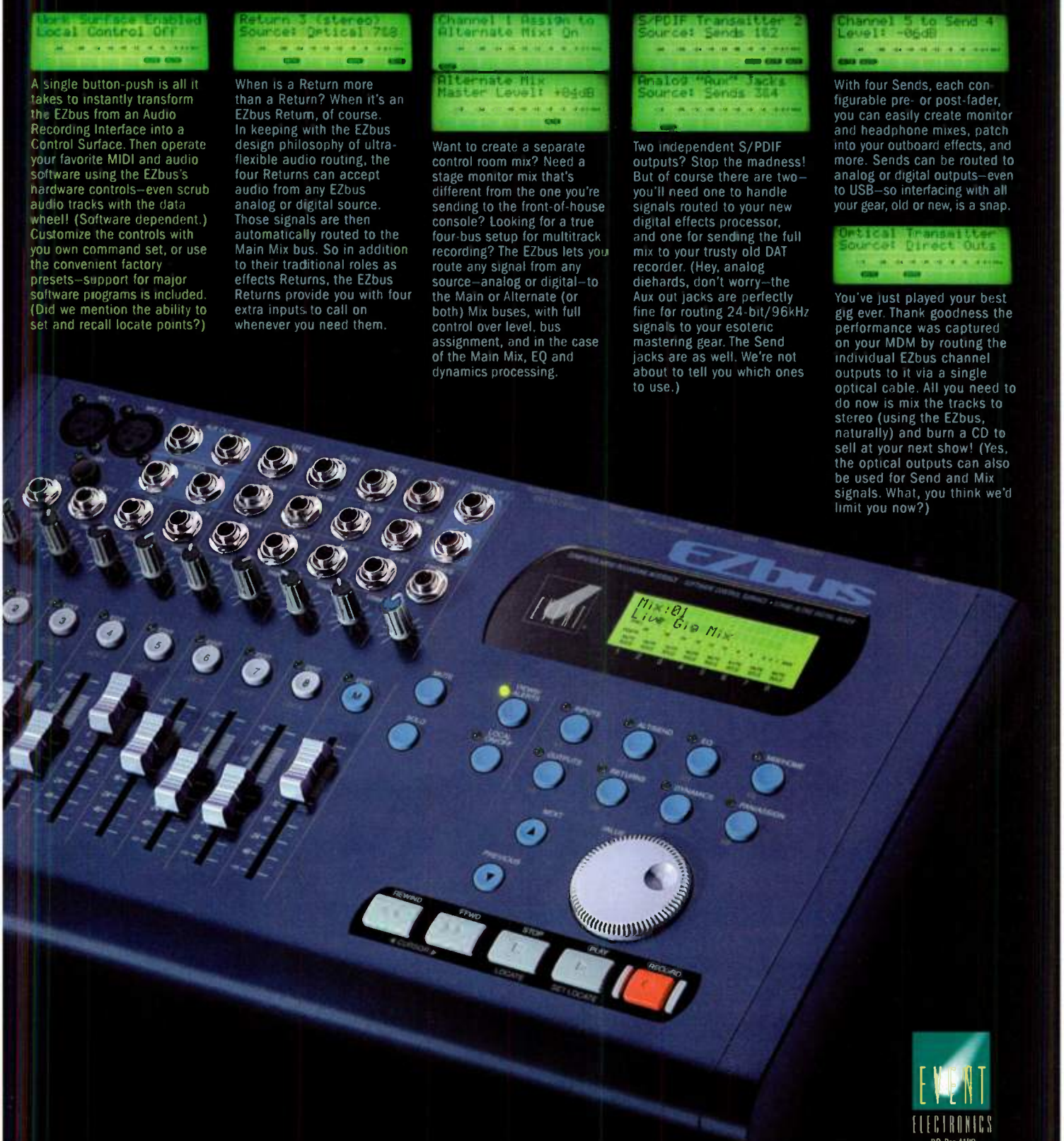
EZ Because it's got a ton of gozintas and gozoutas, and you've gotta ton of things that need gettininta and gettinouta.

bus Because once upon a time we took a Greyhound to see our Aunt in Cleveland. She was pretty far ahead of her time, having predicted the breakup of the Beatles, the birth (and death) of disco, and hanging onto her vinyl collection because she had a feeling that "some day people will use records and turntables differently than the way we do today."

bus Because an audio path is a bus, and the EZbus has a ton of 'em. Fully programmable ones, at that.

EVENT ELECTRONICS.

Specifications subject to change without notice.



A single button-push is all it takes to instantly transform the EZbus from an Audio Recording Interface into a Control Surface. Then operate your favorite MIDI and audio software using the EZbus's hardware controls—even scrub audio tracks with the data wheel! (Software dependent.) Customize the controls with you own command set, or use the convenient factory presets—support for major software programs is included. (Did we mention the ability to set and recall locate points?)

When is a Return more than a Return? When it's an EZbus Return, of course. In keeping with the EZbus design philosophy of ultra-flexible audio routing, the four Returns can accept audio from any EZbus analog or digital source. Those signals are then automatically routed to the Main Mix bus. So in addition to their traditional roles as effects Returns, the EZbus Returns provide you with four extra inputs to call on whenever you need them.

Want to create a separate control room mix? Need a stage monitor mix that's different from the one you're sending to the front-of-house console? Looking for a true four-bus setup for multitrack recording? The EZbus lets you route any signal from any source—analog or digital—to the Main or Alternate (or both) Mix buses, with full control over level, bus assignment, and in the case of the Main Mix, EQ and dynamics processing.

Two independent S/PDIF outputs? Stop the madness! But of course there are two—you'll need one to handle signals routed to your new digital effects processor, and one for sending the full mix to your trusty old DAT recorder. (Hey, analog diehards, don't worry—the Aux out jacks are perfectly fine for routing 24-bit/96kHz signals to your esoteric mastering gear. The Send jacks are as well. We're not about to tell you which ones to use.)

With four Sends, each configurable pre- or post-fader, you can easily create monitor and headphone mixes, patch into your outboard effects, and more. Sends can be routed to analog or digital outputs—even to USB—so interfacing with all your gear, old or new, is a snap.

You've just played your best gig ever. Thank goodness the performance was captured on your MDM by routing the individual EZbus channel outputs to it via a single optical cable. All you need to do now is mix the tracks to stereo (using the EZbus, naturally) and burn a CD to sell at your next show! (Yes, the optical outputs can also be used for Send and Mix signals. What, you think we'd limit you now?)

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PRO FILE

By Rick Weldon

Orso Changes Its Tune

The ambient hillbilly twang of Chicago's Orso first emerged from the musical backwoods in 1999, when multi-instrumentalist Phil Spirito, a former member of the indie group Rex, emigrated from New York at the behest of friends in the Midwest. Spirito joined Ben Massarella of Perishable Records, engineer Brian Deck, and a broad supporting cast of musician friends—all of whom play a hefty list of instruments—to form Orso's original lineup.

Orso released its self-titled debut album on Perishable in 1999. Following its first release, the band gained a fourth core member, multi-instrumentalist Gillian Lisee. Orso completed *Long Time By*, its second album, on Perishable this year. Although both records were created by essentially the same set of folks, the processes involved in producing each of them differed drastically.

Time between albums makes for a world of difference.

Spirito recalls the prevailing spirit of the first Orso record: "With Rex records, people thought, 'Wow, you did this on a 4-track?' It wasn't that we were out to make our records on a 4-track; we always worked with whatever gear we could afford, or whatever we already had around. With the first Orso record it was the same: we borrowed a ¼-inch reel-to-reel machine and some other gear from friends out here, and then drove all of it out to Ben's house in Indiana, about an hour away.

"So we started to record out there at Ben's," says Spirito, "and most of the basic tracks were done when the tape we were using started to fall apart. We watched as pieces of the tape fell off the reel. So we immediately took the machine to a studio here in town and transferred the tracks to ADAT. We rented an ADAT to finish the record; it was kind of thrown together. Still, Brian was able to take tons of different kinds of gear, old and new, and spit out that record, which I think has a pretty unique sound."

During the interim between the first and second Orso albums, Deck and Massarella worked to finish the renovation of a space that they leased together on the first floor of a Chicago apartment building. It was a multicar garage that would eventually house Perishable Records' headquarters and Deck's Clava recording studio.

Recording *Long Time By* at Clava required that the band abandon the "elementary school" style of recording that they had developed for the first record. Instead, they recorded 16-track basics onto 2-inch tape and used Deck's Digidesign Pro Tools/24 Mixplus system. "It was heaven," says Spirito, "but it was also different. Instead of taking a more hands-on approach, such as running a signal through an effects box, Brian would change a sound by using a plug-in in Pro Tools. I wondered for a while if the recording would sound too clean, but I'm really happy with how the album turned out."

One thing about the band's recording process that did not change was the final stage in which all of the elements were balanced. "Brian tends to go into overdrive while we're mixing," says Spirito. "He changes his focus from getting the sounds to record well to actually taking the music and transforming it into a finished product. And with Pro Tools this time out, we were able to go further with the electronic end of Orso."

For more information, you can e-mail Perishable Records at phil@onshore.com or go to www.perishablerecords.com.

***Long Time By*/Orso**

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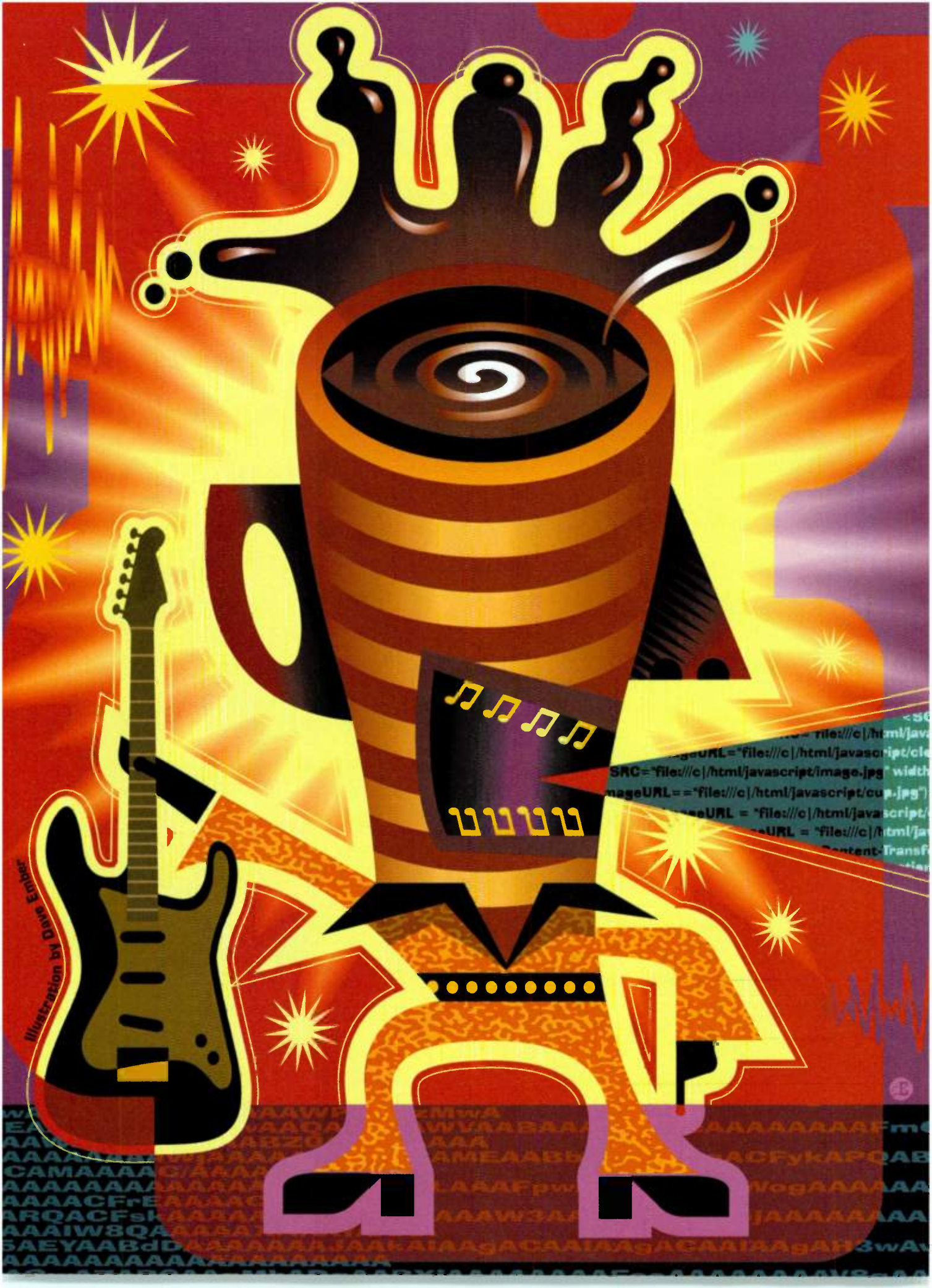
Illustration by Dave Ember

JAVA Jive

Anybody who has been around computers for the past few years has probably heard about Java. This isn't the kind of java that keeps musicians and producers awake during late-night recording or composing sessions. This Java is a computer language. So why is another computer language important, especially for those of us who long ago traded in music paper for computer screens?

IS JAVA THE ELECTRONIC MUSICIAN'S CUP OF TEA?

By Peter Hamlin

The reason for all the buzz is that the same Java program can run on any platform: Windows, Mac, and even a Linux or Solaris system. Moreover, you can embed special Java programs called *applets* in a Web page, and visitors can run them over the Internet using almost any browser. The frustrations of hardware and software incompatibility are, at least in theory, not an issue for Java programs.

What makes Java especially interesting for musicians is that it includes support for both MIDI and digital audio. What's more, Java 1.3, the latest version at this writing, supports impressive features for recording, playing, and processing sound. It also comes packaged with an excellent software synthesizer. All this means that more Java applications and applets rich in multimedia content should be appearing on our desktops.

To give you a feel for what Java can do, I'm going to present several examples. In the process, you'll see the interactivity and multimedia features that Java offers. You'll also learn how to set up your computer to run Java applets and applications easily and efficiently.

JAVA APPLETS

First, let's look at three Java applets: an interactive "graphic" synthesizer, a tool for developing musical skills, and a demonstration of the physics of sound. If you can browse the Web as you're reading, you'll be able to see all the features I describe. Otherwise, just read along, then check out the examples later. If you have trouble running any of these applets, have a look at the sidebar "Setting Up Your Computer to Run Java Programs."

The vOICe. *The vOICe* (http://ourworld.compuserve.com/homepages/Peter_Meijer/javoice.htm) was created by Peter B. L. Meijer. The first thing you'll notice when you access this page is that Java applets often take longer to load than typical Web pages. Find the applet display—a large grid filled with a digitized photograph of a car—just below the top of the page (see **Fig. 1a**). Click on the display with your mouse, and the screen goes blank. Then click-drag your mouse over the screen, and you'll see tiny pixels form in response to your mouse movements. Each pixel immediately triggers a short sound (shades of *MetaSynth*!).

On the graph, the *x* axis represents time and the *y* axis represents pitch, and the drawing you make "loops" repeatedly. Everything updates in real time; add a continuous tone by adding a straight line from left to right or a burst of sound by drawing a circular blob of pixels. Single pixels placed at random points around the screen result in sparkles of sound, and small, curvy lines create wispy melodic riffs. You can also choose shades of gray for your drawing: the brighter the color, the louder the sound.

▼

This isn't the kind of java that keeps musicians and producers awake.

By clicking on the Load From button, you'll hear how the digitized photograph sounds when the light and dark pixels are translated into pitches. If you click on the Reset button, you get a screen full of options that enables you to change the applet's settings. For example, you can change the number of columns (time slots) to create a longer musical segment. The Clear button lets you erase the screen and start over, and the Mute button instantly mutes the sound. Finally, clicking on the Wave button shows you a picture of the sound wave you've created (see **Fig. 1b**).

The vOICe also supports animation. You can create several frames of pictures and cycle through them for a visual as well as an audio show. Farther down the page is a discussion of how you can use *The vOICe* to demonstrate auditory effects. And there's one more nice trick: you can load a WAV file and work in reverse, creating a sonogram (a pictorial representation of that sound) on the computer screen. You'll also find links to some interesting Web sites on which *The vOICe* has been used.

If you can think of an interesting use for *The vOICe* on your Web site, the applet's creator offers a free site license for personal, noncommercial use. You might find that this or another applet is perfect for sprucing up your site (see the sidebar "Adding Applets to Web Sites"). If you'd rather just experiment with the program, *The vOICe* is available as a standalone application for your computer.

Scale Building. Java's interactivity and multimedia support are ideally suited for creating musical skill–training exercises that run on the Internet. The Hamilton College Software Project has produced a large number of Java applets that are good examples of this approach. The applets were written by

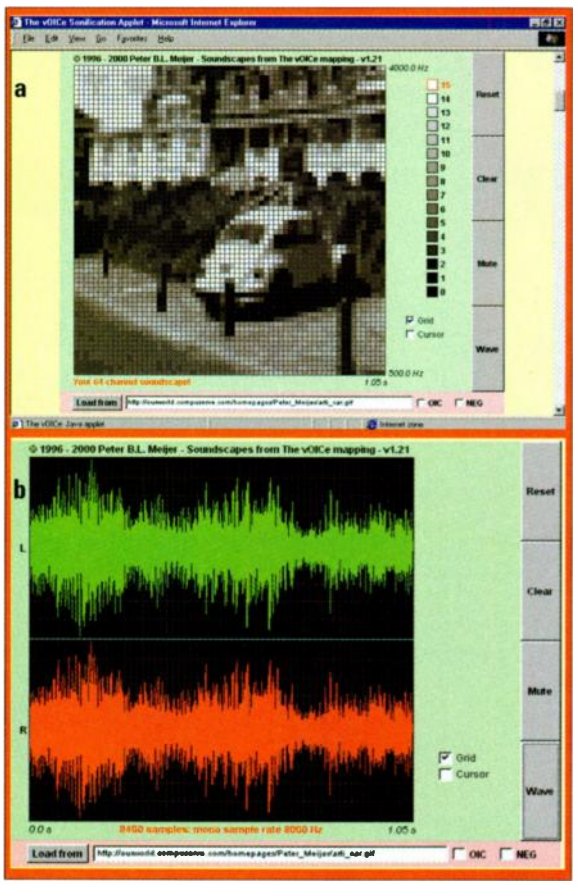

FIG. 1: Peter B. L. Meijer's *vOICe* is a Java applet that converts images into sound. In this example, a car image (a) was used to create a waveform (b). Users can also draw their own pictures.

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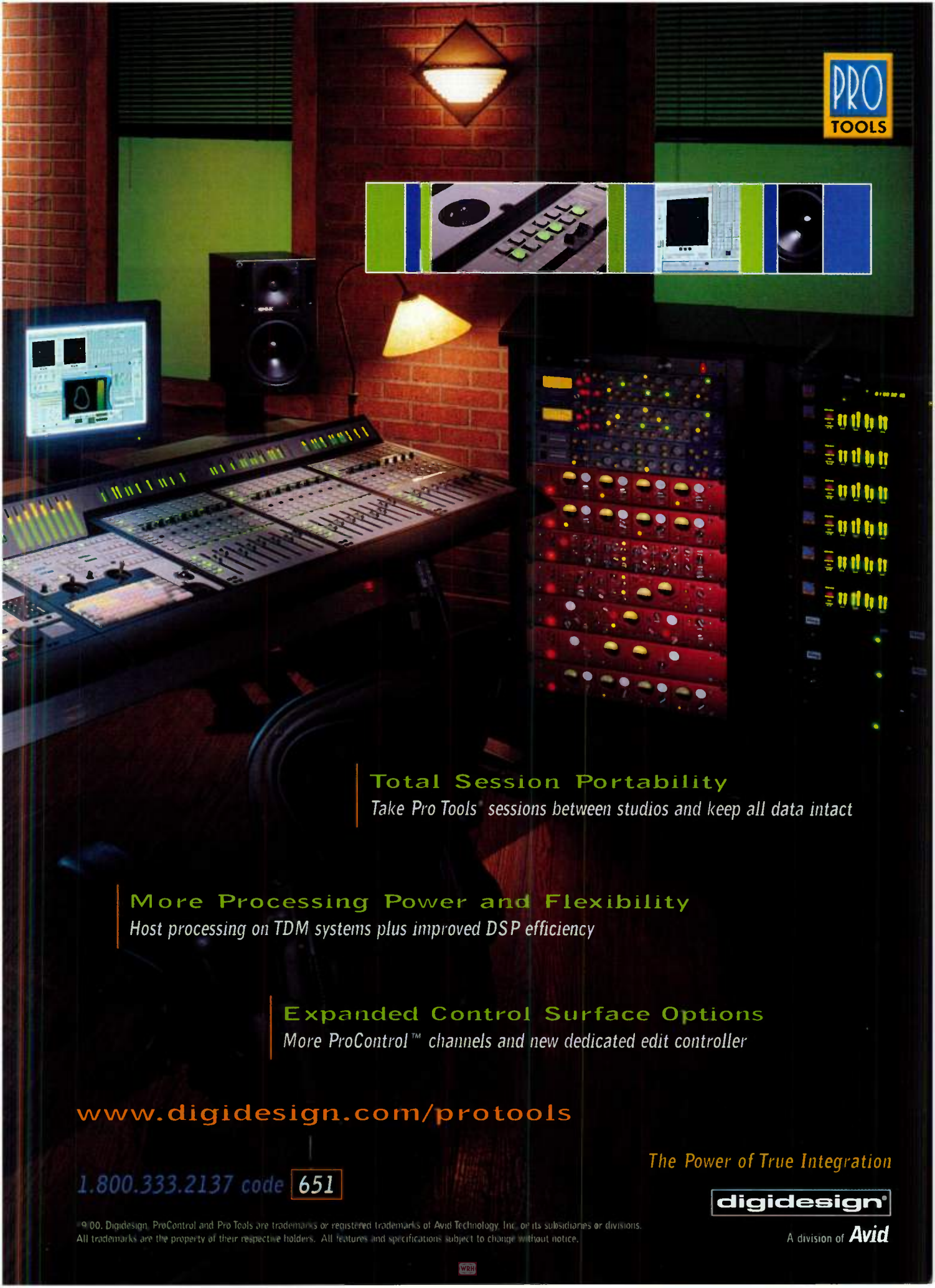

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Rob Whelan and are based on designs by Samuel Pellman and G. Roberts Kolb. We'll look at the *Scale Building* applet (http://academics.hamilton.edu/music/spellman/JavaMusic/ScaleBuilding.html), which lets you practice constructing different kinds of scales.

This applet takes a while to start, and then you need to wait a bit more for the sound files to load. When all is ready, click on the Options button. (On my laptop, the screen is compressed and unreadable, so I need to make the application window larger before using it.) Select which scales you want to practice; you can make the drills easier or harder by including more scale types to work with. Notice that there are two drop-down option windows: the one labeled "Shortcuts" lets you quickly select or deselect all scales or choose scales by category, and the other window lets you choose the starting pitches from which the scales are built.

When you've selected all your desired options, click on Done to return to the applet. Next press Start, and you are presented with a starting note and the name of a scale (see **Fig. 2**). You need to build the scale by choosing the correct notes from a palette and clicking them into the correct position on the musical staff. While you're working, you can audition the scale you're trying to build. (A great way to test your knowledge is to try singing the scale first, then listen to it to see if it's correct.) As you build the scale, mistakes are indicated by an obnoxious "oogah" horn, a good incentive to improve your scale-building skills as quickly as possible.

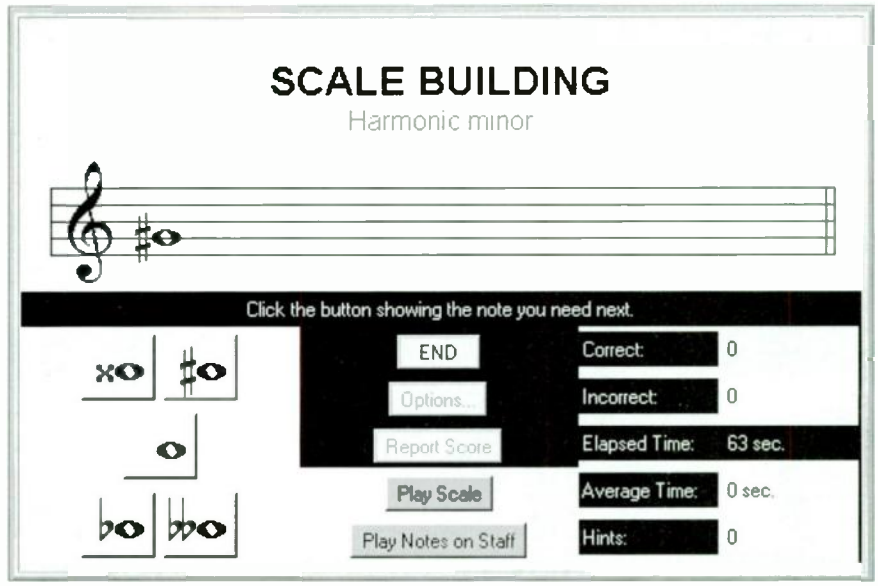

FIG. 2: Java applets are especially good for interactive instruction. In Rob Whelan's *Scale Building* applet, you can practice creating many different types of traditional and nontraditional scales.

An interactive applet is ideal for this kind of exercise. You can work at your own pace, you receive constant feedback about how you're doing, you get to relate the notation to the musical sound, the level of difficulty is up to you, and you can customize the drills to focus on areas you need to work on. Because it's a Java applet, it's already been "distributed" to everyone who has an Internet connection and a browser that supports Java, no matter what kind of computer they have. The Java Music Theory Web site has many other good examples of interactive applets, and no doubt you'll find

SETTING UP YOUR COMPUTER TO RUN JAVA PROGRAMS

Java programs run on a Java Virtual Machine (JVM), software that acts as an intermediary between the program code and whatever hardware and OS you're using. The JVM is part of the Java Runtime Environment (JRE), which must be installed on your computer before you can run Java programs.

To install version 1.3 of the Windows JRE, head to http://java.sun.com/j2se/1.3/jre/download-windows.html. This is the site of Sun Microsystems, Java's creator. Look for the heading, "Downloading the Java 2 Runtime Environment, v 1.3.0." The download is only about 5 MB, and it's free. When downloading is complete, double-click on the file to run the installer. If you need help, the Sun Web site has a link to installation instructions, and it offers troubleshooting help if things don't work properly. Many excellent books on the market also provide installation assistance and more information about Java. My favorite is *Core Java, vol. I: Fundamentals* by Cay Horstmann and Gary Cornell (Prentice Hall, 1998). It is a clear, practical, and thorough introduction that serves as an excellent reference.

Many Java applets will run in a standard browser, although you should have at least version 4 of Netscape's *Navigator* or Microsoft's *Internet Explorer* for optimal support. If you find applets that won't run in your browser, the solution is *Java Plug-in.* It tells the browser not to run its own built-in version of Java, but instead to use the JRE on your computer. If you've installed a current JRE, the plug-in is automatically added to the Windows Control Panel. (Anyone with earlier versions of Java will notice that the process is a lot simpler than it used to be.)

Information about Java downloads for the Mac can be found at http://developer.apple.com/Java/text/download.html, and you can look for Solaris and Linux support at Sun's main Java-products page (http://Java.sun.com/products). If you want to write your own Java programs, you need the Sun Developer's Kit (SDK), a download of about 30 MB, plus 20 MB more for documentation. The SDK is available at Sun's site, and it's also free.

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something of interest. You can reach them from the Web site's main page: http://academics.hamilton.edu/music/spellman/JavaMusic.

Other music-theory and ear-training applets can be found all over the Web. For example, the Teoría Web site (www.teoria.com/java/eng/java.htm) has excellent skill-building applets by José Rodríguez Alvira. These applets use notation only (no sound), but they are still very effective teaching tools. If you want to try a little of the hard stuff, visit Matthew H. Fields's *Twelve Tone Toy Box* at the University of Michigan's Web site (www.personal.umich.edu/~fields/TTTB). This applet is musically interesting and has some great-looking animated graphics to go with it.

Fourier Synthesis. Java's combination of sound, graphics (including animation), and interactivity also makes it an excellent tool for teaching acoustics. For example, Fu-Kwun Hwang's *Fourier Synthesis* (www.phy.ntnu.edu.tw/java/sound/sound.html) demonstrates the technique of the same name, which is the process of creating a complex sound by combining sine waves.

When *Fourier Synthesis* is loaded, you see two rows of faders on the left, a picture of a waveform on the right, and some settings at the top (see **Fig. 3**). A single sine wave is initially drawn at the fundamental frequency of 220 Hz (press Play to hear it), and you add harmonics by moving the faders. For example, move the top-row fader marked "2f" (twice the fundamental frequency) and listen to how this harmonic affects the sound. The bottom-row faders let you add cosine components (that is, phase-shifted sine waves). As you move the faders, the waveform display immediately updates to reflect the sound's spectrum.

The *Fourier Synthesis* Java applet is effective because it provides immediate feedback to your input. The way it lets you see the waveform and constantly hear the effects of the changes you make is, again, a good example of the use of interactive and multimedia content on the Web, a particular strength of Java applets. For other interesting online demonstrations of acoustics, direct your Web browser to www.phy.duke.edu/%7Edtl/36linka.html. Also check out the sidebar "Outta Sites" for even more applets.

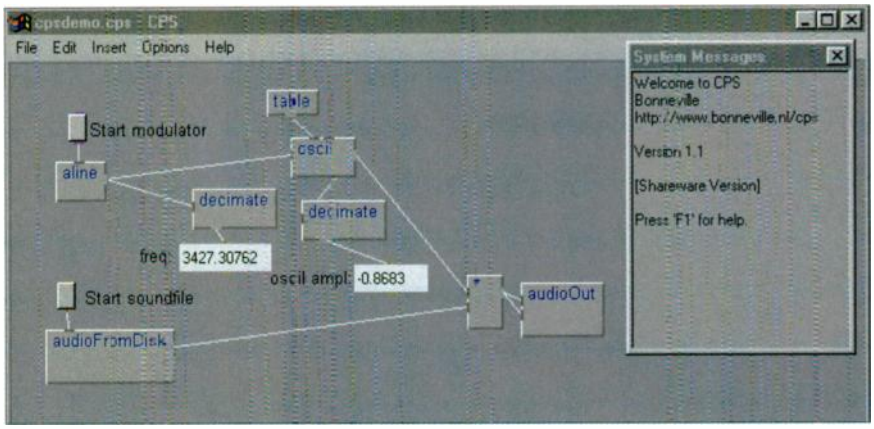

FIG. 4: *CPS* is a powerful, real-time synthesis and sound-processing application that runs on the desktop under Java. The program, created by Niels Gorisse, uses an extensive toolkit of digital audio and MIDI modules that you can interconnect for a wide range of musical results.

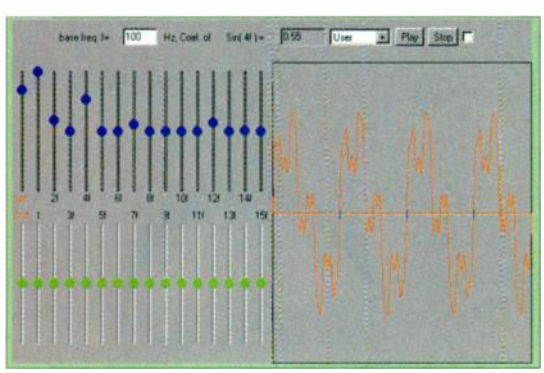

FIG. 3: Building complex sounds from simple sine-wave building blocks is the function of Fu-Kwun Hwang's *Fourier Synthesis* applet. As you move the faders (left), the graph updates to show the waveform (right) that is constructed.

GREAT APPS!

The creators of Java applications are attracted to its cross-platform nature and programming power. As a result, a number of standalone applications written in Java are starting to appear. Intended to run on the desktop, these programs require that you have Java configured on your computer (see the sidebar, "Setting Up Your Computer to Run Java Programs").

CPS. Written by Niels Gorisse, *CPS* (www.bonneville.nl/cps) is a real-time, programmable sound environment that can control and process digital audio and MIDI signals. Some of its modules bring sound into the program, others process sound in various ways, and still others output audio or MIDI or write files to disk.

Java applications such as *CPS* run on what is called a Java Virtual Machine (JVM), the software that interprets the Java code for a given platform. The JVM is part of the Java Runtime Environment (JRE). The sidebar "Setting Up Your Computer to Run Java Programs" provides instructions on how to install Sun Microsystems' JRE, but *CPS* works under Windows with a JVM from Microsoft. If you install *CPS* and find it doesn't run, you should install the Microsoft JVM (it's free) by following the link on the *CPS* home page. If the program runs but acts strangely (for example, if the main window closes at unexpected times), then you have an out-of-date JVM and need to download the current version.

You launch *CPS* by double-clicking on the file CPS.exe in the Program directory, which was created when you installed the program. Two windows appear: an empty window that serves as a work space and a small console for system messages. The Insert menu provides a list of 20 categories of objects that you can place in the work space. (You can also right-click anywhere on the work space to insert objects from a floating pop-up menu.) In addition to audio and MIDI input and output objects, the program has objects for display, data conversion, oscillators, filters, amplifiers, noise, envelopes, and much more.

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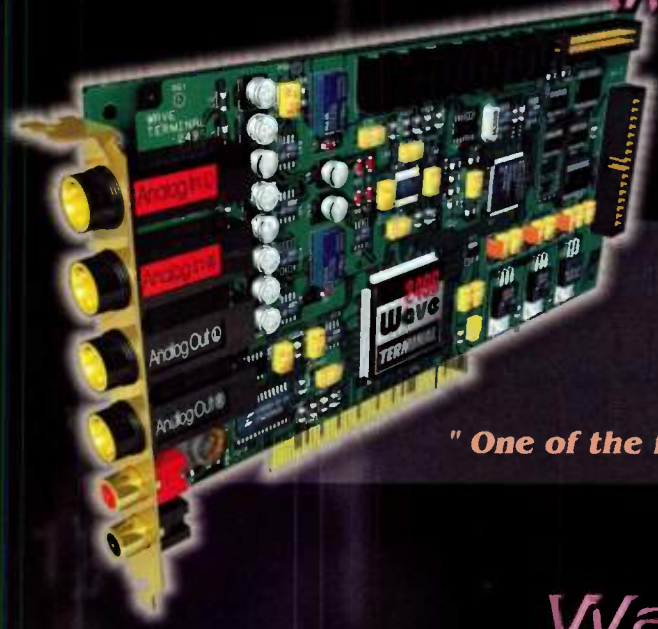

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When you insert an object, it appears on the screen as a rectangle (see **Fig. 4**). Control inputs and outputs appear at the top and bottom of an object, and audio inputs and outputs are found on an object's left and right sides. (Of course, not all objects have all types of ins and outs.) A lot of contextual help is available, and it's easy to move, delete, and interconnect the objects to create a "patch" that generates the sounds and processes you're after.

When you start working with *CPS*, you will notice many similarities to Csound, the powerful sound-synthesis programming language created at MIT and used widely by electronic-music composers (see "Master Class: Building Blocks" in the October 2000 issue of **EM**). *CPS* is actually based on an audio standard called MPEG-4, which is based on Csound. (To find out more about MPEG-4, visit http://sound.media.mit.edu/mpeg4.) But unlike Csound, *CPS* is a live, interactive visual environment. *CPS* lets you add and rewire the elements while they're playing, offering a spontaneity that is not available with Csound.

▼

Java programs can run on any platform.

Fig. 4 shows a *CPS* patch that multiplies a sound file's output with a variable-pitch sine oscillator; in other words, it's a ring modulator. The frequency of the oscil object is derived from the envelope-generator object, called aline. The oscil's waveshape is programmed in the table object; double-clicking on the table object brings up a table editor in which you can create whatever waveform you desire. The audioFromDisc object produces audio output that is multiplied by the output of the oscillator (shown by the * object), and the resulting signal is sent to the audioOut object, where the sound is heard.

Notice that the display objects freq and oscil ampl show the oscillator's instantaneous frequency and amplitude. The decimate objects are also needed for the display: they read in values at the audio sample rate and display them at a much slower rate so you can read them. The System Messages window is available for error messages and other information.

Another interesting component of *CPS* is CPSChat, which lets you communicate with other users over the Internet and even send musical signals to them. It is easy to imagine *CPS* as the basis for interactive Internet improvisation. The creator of *CPS* has also written a program called *MidiChat* that allows people connected to the Internet to jam together with MIDI signals that they send and receive in real time.

At the time of this writing, *CPS* was available only for Windows. (Java itself works across platforms, but *CPS* handles MIDI and audio using high-performance, Windows-only libraries that aren't written in Java.) However, the author is developing versions for other platforms. The program costs $125, but you can try the shareware version before you purchase.

HPKComposer. *HPKComposer* (hplank.inetpc.com/hpkcomposer.html) was created by Didier Debril and Jean-Pierre Lemoine of the French research group HplanK, and like *CPS*, it is related to Csound. The Csound language generates music using an orchestra file, which describes the virtual instruments or "patches," and a score file, which indicates exactly when each instrument sounds, its duration, its amplitude, and any number of other programmable parameters.

HPKComposer provides a variety of sophisticated visual and mathematical tools for creating Csound orchestra and score files. You must have Csound on your computer to generate sound files from the score and orchestra files created by *HPKComposer*. You can download Csound from www.csound.org, where you'll also

ADDING JAVA APPLETS TO WEB SITES

Many applets are available for free, and others are available for purchase. Even if you're not a programmer, you can download an applet and add it to your Web site (assuming, of course, that the applet is cleared for public use). And depending on how the applet is constructed, you might even be able to customize it. So once you have an applet, how do you add it to your Web site?

Hypertext Markup Language (HTML), the standard language used for displaying Web pages, includes an <applet> tag. Let's say you have an applet called test.class that requires a 300-by-300-pixel display area on the screen. Assuming that the test.class file is in the same directory as your Web page, insert the applet into the page with the following HTML code:

```
<APPLET CODE="test.class"
 WIDTH=300
 HEIGHT=300>
</APPLET>
```

(Depending on the applet, you might need to include other parameters.) Place the <applet> tag in the page on which you'd like the applet to appear.

The <applet> tag works with a browser's built-in Java support, but if you want the user to run the applet with *Java Plug-in*, you must use <embed> tags for *Navigator* browsers and <object> tags for *Internet Explorer* browsers. (Unfortunately, each browser uses the plug-in differently.) Java's creator, Sun Microsystems, makes a tool that simplifies this process. You can create the page with <applet> tags and run it through a free HTML converter, and the page will automatically be rewritten with both <embed> and <object> tags. If either *Navigator* or *Internet Explorer* finds your site, it will view the applet correctly. Sun posts the HTML converter at http://Java.sun.com/products/plugin/converter.html.

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Yamaha makes a lot of great products. So when you think of Yamaha, maybe you think of pianos, digital mixers, or even motorcycles. But over the last few years, Yamaha has quietly developed the broadest line of professional sampling products on the market, from desktop phrase samplers targeted to the DJ/Remix market (the SU200 and SU700) to the critically acclaimed A-series rack mounts and all the way to the least expensive sampling keyboards and modules (the CS6X and CS6R). Check out some of their great features at www.yamahasynth.com or your local Yamaha dealer. Then think of what you could do with this whole new set of power tools.

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All Yamaha samplers have phat resonant filters and tons of killer effects (what else would expect from the world leader in synths and digital mixers?)

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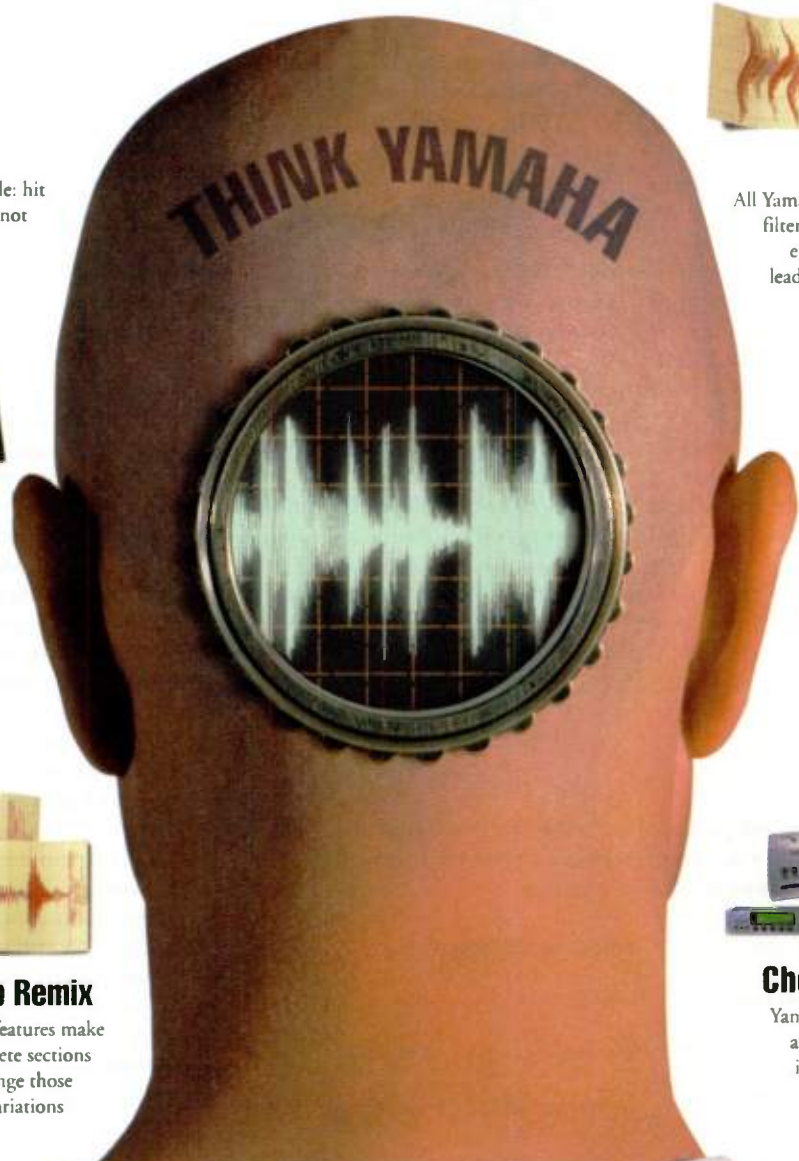

Resampling is a Snap

Once you've finished warping a sample with Yamaha's cool tools, you can resample it and save it. Then you can start the creative process all over again!

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find information about installing the program. *HPKComposer* uses the Sun Microsystems JRE (see the sidebar "Setting Up Your Computer to Run Java Programs").

Another feature of the program is support for Virtual Reality Markup Language (VRML), a three-dimensional interactive scripting language. (A scripting language uses a text script to describe the scene to be produced.) *HPKComposer* can be set up to create VRML scenes that respond to elements of a Csound score. It's refreshing to see a music application that also creates visual art to go along with the sounds it produces. To view VRML scenes, you need to install a VRML plug-in for your Web browser. I use the Cosmo VRML player (www.cai.com/cosmo) with Microsoft's *Internet Explorer*.

HPKComposer has an idiosyncratic user interface that was confusing at first, but I quickly adjusted to it and came to like it. It's certainly beautiful to look at (see **Fig. 5**). The program has three basic work areas: the Score Editor, which generates Csound score files; the Soft Synthesizer, where you create Csound orchestra files; and the VRML 3D Builder, which can create three-dimensional graphics to go with your music.

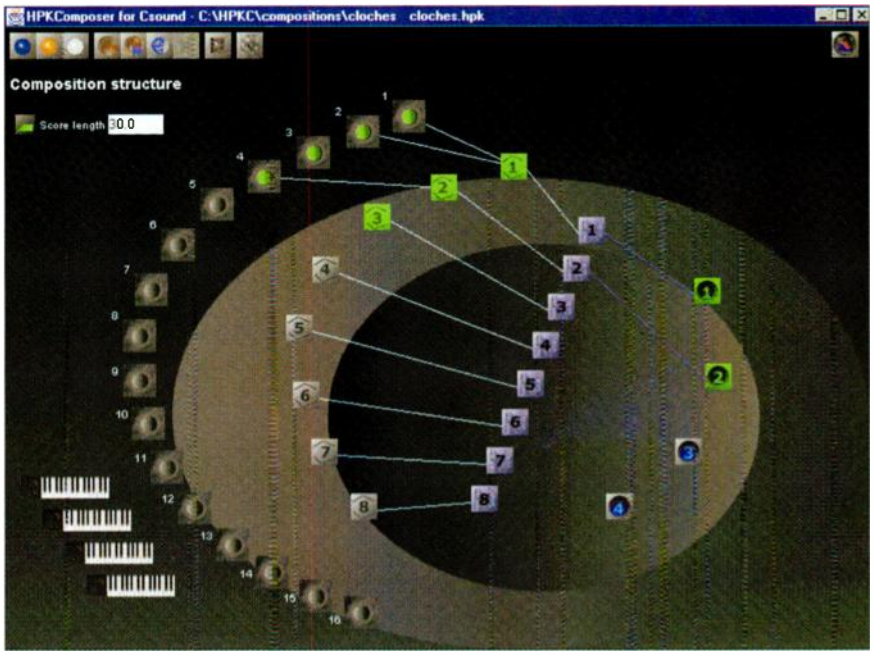


FIG. 5: Didier Debril and Jean-Pierre Lemoine's *HPKComposer* serves as a front end for the Csound programming language. The application has numerous tools for defining sound parameters algorithmically and also offers significant resources for creating VRML scripts.

HPK Composer's Score Editor enables you to specify the time at which each note sounds, its duration, its pitch (single notes or chords), its amplitude, and any controllers you wish to define (more in a moment). You can type in a value for any of a sound's parameters, or you can use various functions, such as probability curves or fractal functions, to specify values. Another possibility is to use the Composer, a sophisticated tool for creating sound clusters, chord morphings, and note patterns.

The Soft Synthesizer is an onscreen representation of a classic modular synthesizer that provides access to Csound's sound-generating and sound-processing functions. You can create up to eight virtual instruments, each containing up to four sound sources. The sound sources can be drawn from any one of 18 selectable sound generators. The outputs of these sound sources can be processed with pitch and amplitude modulation, filters, a ring modulator, a morpher, a panner, and a multi-effects unit. Any parameter—such as amplitude modulation, panning, or "wetness" of effects—can be set by controller data specified in the score. This controller data can be as simple as a constant value, or it can change over time in very complex ways.

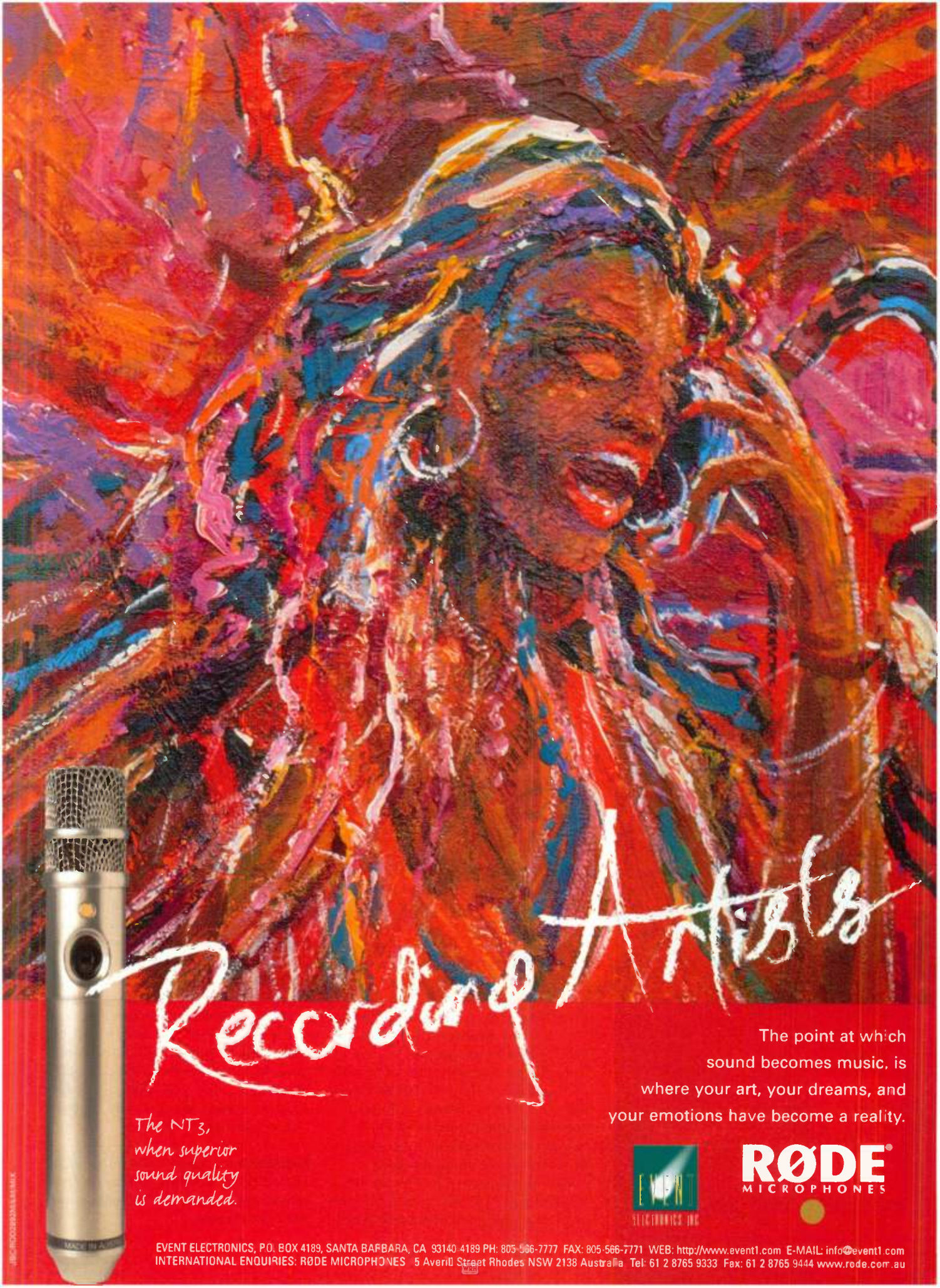
After you've set up the Score Editor and Soft Synthesizer, click on a button that generates the Csound score and orchestra files, then launch Csound to create the sound file. I use Csound under Windows, and I have a

OUTTA SITES

We've looked at a few good Java applets, but a vast number of other applets are available online. Here are some starting points for finding additional examples, perhaps to use on your own Web site.

Gamelan	http://gamelan.earthweb.com
Jars.com (a Java review service)	www.jars.com
Java Boutique	http://Javaboutique.internet.com
Java Music Projects	http://music.calarts.edu/~tre/JavaMusic.html
Sun Microsystems	http://Java.sun.com/applets/index.html

Most of these sites are general, but they typically have one or more categories of multimedia applets. Java Music Projects, created by Tom Erbe at the CalArts School of Music, is especially interesting for musicians. To find other sites, try running a search engine. Add the words *java* and *applet* to the keywords representing your interest.



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shortcut defined on the task bar at the bottom of my screen, so launching Csound is just a click away. You can also configure *HPKComposer* so that you can load Csound from within the program.

HPKComposer runs on Sun's JVM and is platform independent by nature. Because Csound has been ported to just about every platform, *HPKComposer* can run nearly anywhere as well. When you run *HPKComposer* (by double-clicking on the file HPKComposer.bat), you will notice a few things that are characteristic of Java. First, you click on a batch file to start the program. This is necessary because you're actually running the JVM, and the batch file tells it which Java elements it has to load. Once things are loaded, there's little evidence that you're not using your favorite desktop audio software.

FAST-FORWARD

Java offers a lot of promise as a way to create multiplatform, multimedia applications and Web sites. But what is the future of Java for electronic musicians? Is it worth taking the time to master the language or even configure it on your computer?

Java is a strong addition to the multimedia field. Its inherent power, platform independence, and music support and the fact that it is available for free are all significant assets. But it also exhibits a few frustrating limitations in practice. The average Web surfer won't spend 30 minutes downloading a plug-in, which is how long it took me to get the core Java components via my modem connection. The need to install the JVM in your system before you can run applications might also be a deterrent to some users. And although the language is universally compatible in theory, you will definitely notice problems in some circumstances (for example, when you're using certain versions on certain browsers on certain platforms).

Web developers face yet another frustrating trade-off: if you use the impressive music features found only in the most recent versions of Java, fewer people will be able to use your applets. (This is not an issue with standalone Java applications, because all required files can be distributed with the application itself.) On the other hand, if you are creating applets for a network, such as a school, college, or business intranet, for which you have fast network connections and control over browser versions and user setups, Java is an ideal tool.

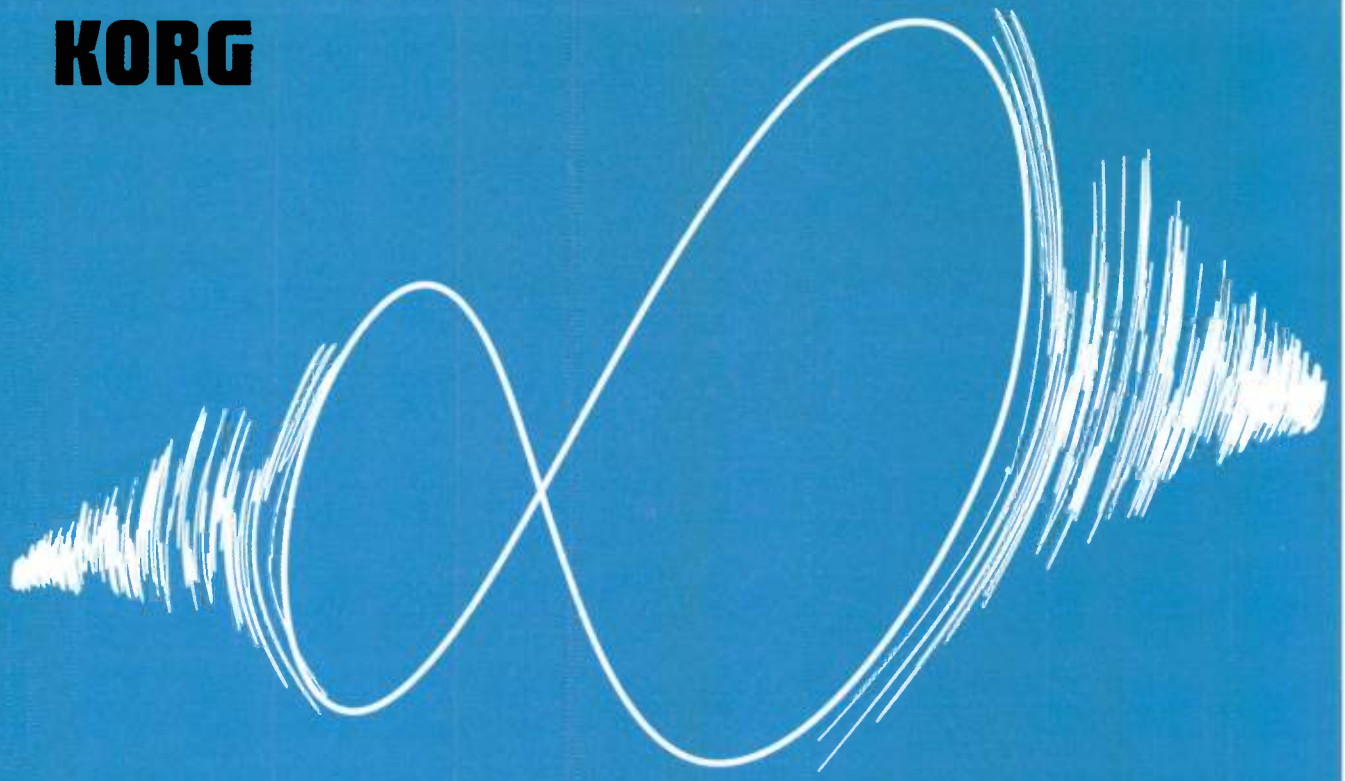
Java's performance can be noticeably slower than optimized platform-specific programs. Add to this the bandwidth limitations of the Internet when it's running Java applets, and you'll understand my anxiety when I see the words "loading Java applet." Fortunately, JVMs are getting much faster and more powerful, and the dramatic speed increases of computer hardware should reduce Java's performance disadvantages. And of course, increases in online speed as more people move to broadband connections will also be a big help.

It will be interesting to see if and how major software developers use Java. Programs that demand the most of a computer's resources—such as sophisticated notation programs and sequencers—will probably not be candidates for Java in the foreseeable future. It seems more likely that ambitious and creative programmers, such as the creators of *CPS*, *HPKComposer*, and the applets we have examined, will use Java to do interesting and inventive things on the Internet. It's exciting to think about all the Java teaching tools—from ear-training exercises to acoustics demonstrations to interactive creative projects—that could be created. The possibilities for interactivity and communication will make Java on the Internet an important new creative-performance medium for computer musicians.

I expect Java to be a significant player in the coming years. Because of its extensive support for sound, it will be especially important for electronic musicians. No one can predict exactly how big a role it will play down the road, but Java will certainly be part of most musicians' futures.

Peter Hamlin *is a composer who teaches at St. Olaf College in Northfield, Minnesota. He is also a member of the live electronic-music band Data Stream.*

KORG



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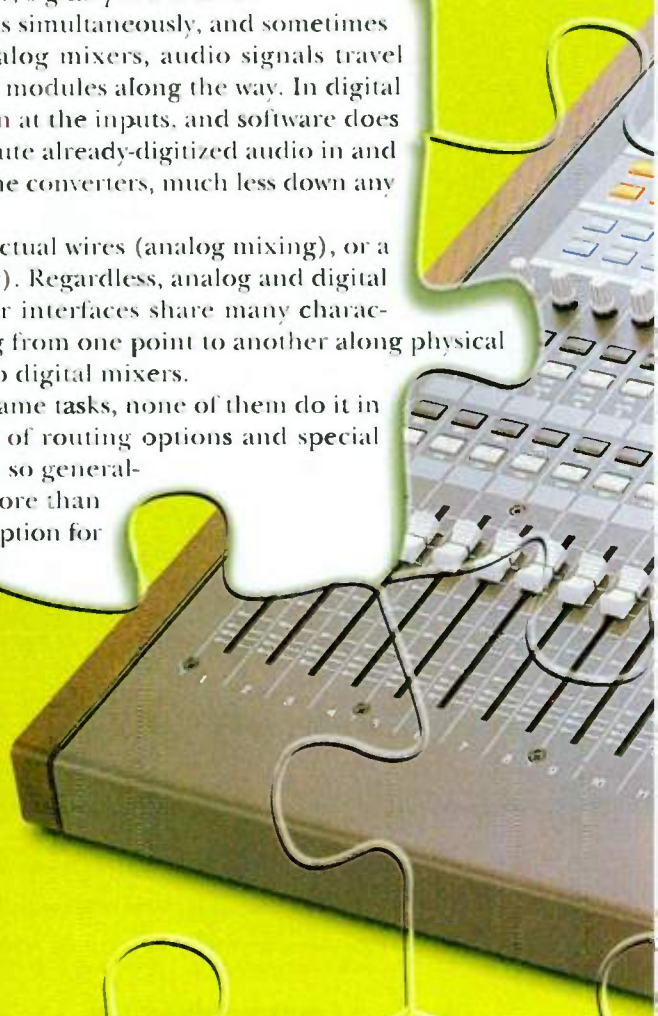
Our guided tour of mixer topography

Mixers are about signal flow. A good recording mixer lets you route a variety of input signals wherever you'd like and combine them into a stereo, mono, or even surround mix.

Audio travels through a mixer on a signal path. However, signal *paths* is more accurate because a signal is often sent to multiple destinations simultaneously, and sometimes a signal leaves the mixer and comes back in again. In analog mixers, audio signals travel through wires and circuits and are routed to various physical modules along the way. In digital mixers, the audio signals are converted to digital information at the inputs, and software does all of the routing and processing. (Of course, you can also route already-digitized audio in and out of most digital mixers.) Audio signals never make it past the converters, much less down any wires (see the sidebar "Digital Differences").

Signals can flow in and out of physical components via actual wires (analog mixing), or a CPU can process a stream of zeroes and ones (digital mixing). Regardless, analog and digital mixers perform many of the same functions, and their user interfaces share many characteristics. For clarity I'll speak mostly of analog signals moving from one point to another along physical paths. Just bear in mind that the basic concepts also apply to digital mixers.

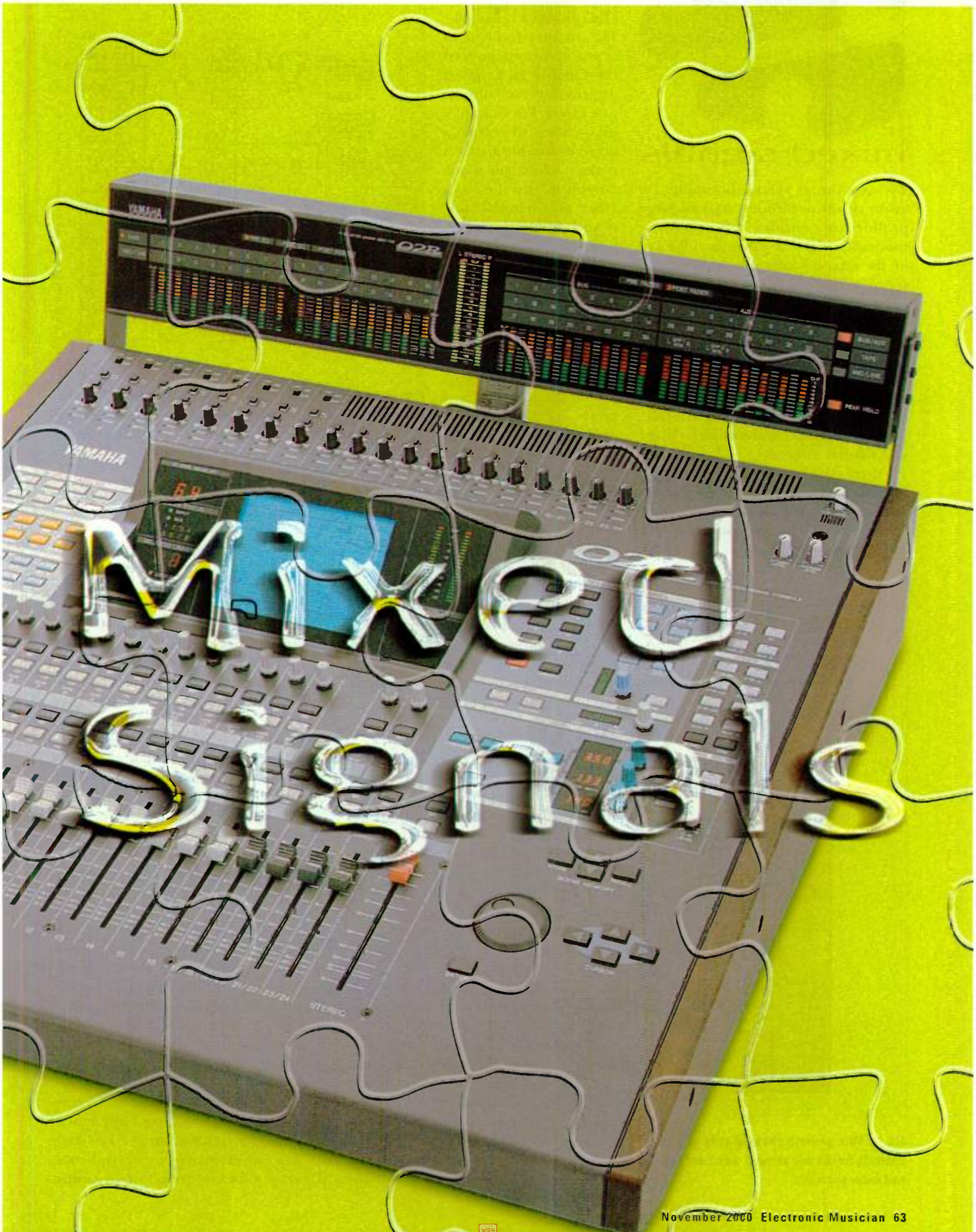
Although all recording mixers handle more or less the same tasks, none of them do it in exactly the same way. Manufacturers offer a variety of routing options and special features, and they even name controls differently, so generalizing is sometimes difficult. There will always be more than one way to accomplish the simplest task—a prescription for confusion. I'll look at the most common paths that signals take through mixers and briefly mention appropriate alternatives.



By Barry Cleveland

ILLUSTRATION BY DMITRY PANICH

helps you go with the signal flow.



mixed signals

To keep things relatively simple, I'll avoid issues pertaining only to large production consoles costing tens of thousands of dollars. Instead, I'll focus on the mixers commonly found in personal studios. Though I won't talk about any mixer in detail, I'll use the Mackie 24/8 8-bus analog mixer and the Yamaha 02R digital mixer as examples. As two of the most widely used mixers on the market, they arguably represent the upper end of personal-studio mixers. That said, most of the principles I'll discuss also apply to larger and smaller mixers.

I'll take you along the signal path from one end of a hypothetical mixer to the other, stopping at major destinations along the way. But first, let's talk channels and buses.

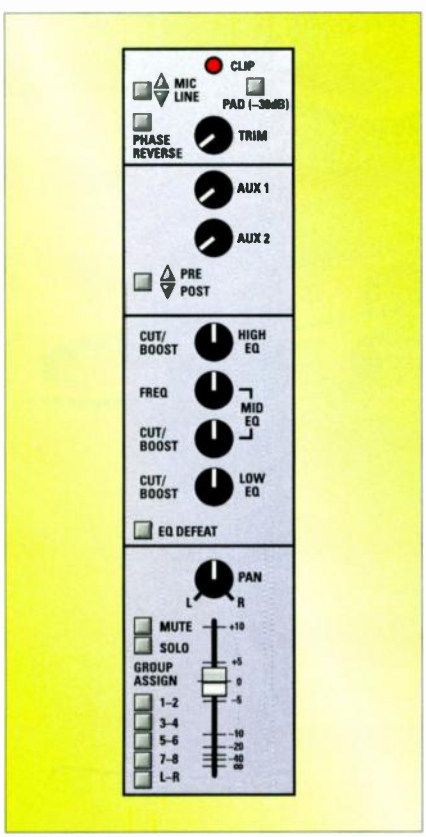


FIG. 1: This generic channel strip shows the controls for the mic preamp, auxiliary bus, EQ, and fader sections.

GOING THROUGH CHANNELS

The number and type of input channels govern the number and type of devices that can connect to a mixer. For example, if you want to record a large ensemble using a dozen microphones simultaneously, you'll need a mixer with at least 12 mic inputs. Similarly, if you have a 16-track recorder, and you want to hear all the tracks played back at once, you need 16 inputs capable of handling the type of signals output by your recorder.

If you are intimidated by the sheer number of knobs, buttons, switches, and faders on larger mixers, take comfort in the fact that most of them are channel controls. If you know how one channel works, you understand them all. Typically arranged in vertical "strips," mixer channels have controls for modifying and routing input signals. The controls are organized in a manner that more or less follows the signal's path through the channel. This path varies from mixer to mixer, but there are more similarities than differences, so we'll refer to a generic "channel" (see **Figs. 1** and **2**).

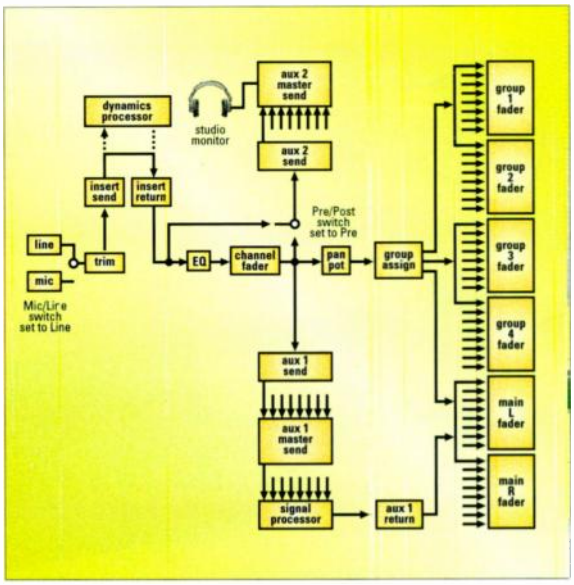


FIG. 2: This simple block diagram illustrates the signal path through one channel of a typical analog mixer. The blocks with extra arrows represent the aux send, group, and main buses fed by all mixer channels.

THE IN CROWD

All sorts of things can be connected to a mixer's inputs, from cheesy high-impedance microphones to state-of-the-art samplers. But if a device has analog outputs, it usually falls into one of two groups: line-level sources and microphone-level sources. Channel strips typically have inputs for both types, usually accompanied by a mic/line selector switch. In many mixers that lack a mic/line switch, plugging a device into the line input automatically disables the mic input. However, some mixers allow you to use both types of inputs at once.

Line-level inputs are high impedance (see the sidebar "Impeding Progress") and typically employ ¼-inch phone jacks or RCA phono connectors. Keyboards, samplers, drum machines, the outputs from most recording decks, effects processors, and instrument preamps can all connect to line-level inputs. For the most part, you use mic inputs only for microphones and direct boxes.

Because many line-level sources have stereo outputs, it is increasingly common for mixers to have one or more stereo input channels—that is, a single channel strip that handles two input signals. The two inputs in a stereo channel are most often treated as a single source—with one fader, one EQ section, and so on—making it unnecessary to dial in duplicate settings for the left and right signals. Stereo input channels sometimes have fewer features than regular channels because they are most often used for modern synths and samplers that have onboard effects, EQ, and level controls. The idea is to get the instrument's sound into the mixer and route it with little or no processing.

An additional type of line-level input is the *tape return*. This term originated when all recordings were made to tape, but it now designates inputs that route playback signals from any type of multitrack recorder back into the mixer. I'll deal with how signals get routed to and from multitrack recorders shortly.

Microphone-level inputs are low impedance and typically employ female XLR connectors. Because mixers operate at line level, low-impedance microphone signals must be boosted to line level using a microphone preamp. Channel-strip mic preamps

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FIG. 4: The Yamaha 02R's rear panel sports six aux sends, studio and control-room monitor outputs, main stereo outputs on RCA and XLR connectors, 2-track analog inputs on ¼-inch TRS and RCA jacks, and 24 analog inputs. S/PDIF and AES/EBU digital I/O are provided. Other connections include word clock I/O, SMPTE and MIDI Time Code inputs, and MIDI In, Out, and Thru. You also get a meter-bridge port, a Mac (To Host) interface, and four I/O card slots.

generally include a trim (or gain) pot that adjusts the input sensitivity, a pad (or attenuation) switch for reducing very hot signals (typically by 10, 20, or 30 dB) to the range covered by the trim pot, and a clip (or overload) LED that lights as the signal approaches the upper limit of the input circuit's capacity, usually around –3 dB.

While these characteristics are the same for the majority of mixers used in professional applications, some confusing exceptions exist. First, microphones can be high impedance, and these must be patched to high-impedance inputs, usually on ¼-inch phone jacks. Second, some older mixers and compact newer models use ¼-inch jacks for low-impedance mic connections because ¼-inch connectors are smaller and less expensive than XLRs. Some mixers use ¼-inch, switchable mic/line inputs on certain channels; these mic/line channels include mic preamps that are in the circuit only when the input is set for mic-level operation.

If your mixer offers only ¼-inch mic inputs, check the manual to determine their impedance and mic/line status. This is important, as low-impedance microphones function improperly when connected to high-impedance inputs, and vice versa. You can circumvent this problem by using "step-up" and "step-down" transformers. Besides altering the level, they also function as adapters, converting one type of connector into another. However, they can also affect the sound.

HIDDEN POWER

Many mixers deliver phantom power to condenser microphones. Condenser mics require a small amount of DC voltage to operate, and although many of them can be powered using batteries, powering them from the mixer is more economical and consistent. The voltage (usually 48 VDC, but it can be as high as 52 and as low as 12V) travels along one of the audio conductors in the microphone cable. Active direct boxes can also be phantom powered.

Mixers may offer individual phantom-power switches for each input, switches for groups of inputs, or simply a global switch that routes phantom power to all the inputs, regardless of whether it is required by more than one microphone. A global switch might complicate things if you plan to use condenser mics at the same time as other types of microphones; however, inadvertently routing phantom power to noncondenser mics usually produces no noticeable effects.

BUS TOUR

Before I discuss the rest of the channel strip, let's look ahead to routing the signals to external devices.

Signals enter a mixer through inputs and leave on buses. A bus is simply an independent route out of a mixer. The most common example is the master stereo bus, corresponding to the main left and right stereo outputs. Like a tour bus that picks up band members from various locations and drops them off at a gig, a mixer bus accepts signals from all channels assigned to it and takes them to a specific place, usually an output.

A very simple mixer might have just eight input channels, mixing down to a single stereo bus and its stereo outputs. This is fine if you just want to mix eight signals directly to a stereo recorder, but what if you have an 8-track recorder, and you want to simultaneously record each input signal to a different track?

You can accomplish this in a few ways, depending on your mixer. Some mixers have dedicated direct outputs (sometimes called tape outputs) on each channel. Simply patch each channel's direct output to the appropriate recorder input, and you're wired.

FIG. 3: The Mackie 24/8's main jack field includes insert points for the eight group and stereo master buses, six aux sends with stereo returns, and various stereo inputs and outputs, including headphone jacks. Also shown are mic and line inputs, direct outs, and insert points for channels 15 and 16.

DIGITAL DIFFERENCES

Although digital mixers perform nearly all of the same functions as analog units, they do so differently. They also offer many features not found on analog mixers. It's far beyond this article's scope to give a complete account of signal routing in specific digital mixers, but I'll point out a few essentials using the Yamaha 02R (see Fig. A) as an example.

Analog audio signals don't flow through digital mixers. Analog signals entering a digital mixer are converted to digital information in a data stream, and they stay that way until converted back to analog signals. If you track to a digital multitrack machine, using digital buses and mixing to a digital recorder, the only reason to convert the digital signals back to analog is for monitoring. (Monitor speakers must be analog.)

Digital consoles have no analog circuits between the A/D converters and the DACs. When you push up a digital fader, you're simply moving a vertical data encoder assigned to adjust amplitude. You can reassign this fader to adjust some other value—such as monitor-send level—and most digital mixers exploit this capability with several different fader assignments levels. For example, level 1 might assign faders 1 through 16 to channels 1 through 16, while at level 2 the same faders control channels 17 through 32, and at level 3 they act as master sends for the aux and recording buses.

Many digital mixers feature software-based effects. For example, the 02R has two complete onboard multi-effects processors and enough 4-band parametric EQs, dynamics processors, and delays to patch one of each across nearly every input and output on the mixer—all without plugging in a single cable. Yet most digital mixers have few, if any, analog insert points. Adding inserts (and direct outs) means more D/A converters. If you normally patch in your favorite vintage compressors on mixdown, you may not be a happy camper. This point is a deal-breaker for many people.

Because digital-mixer settings are information stored in memory, they are perfect for "snapshot" and dynamic automation. Once you set the mix parameters, you can take a snapshot of them and name and store them as a file. In most cases, you can back up these settings to a computer for safekeeping. You could return to the mix years later, press a few buttons, and shazam! Your settings load, and the mixer is ready. The same goes for dynamic automation, in which you usually store the fader, EQ, pan, and mute moves in memory (or in a MIDI sequencer, if the mixer has MIDI automation).

Like analog mixers, digital mixers have analog mic and line inputs, but they usually offer additional channels accessible only through various I/O cards. If you want to use a digital mixer with an analog multitrack deck, you need analog I/O cards. You'll probably connect the mixer to digital recorders, so you'll need the appropriate interface: ADAT, TDIF, AES/EBU, or S/PDIF. A few digital mixers boast lots of digital inputs, but most need optional I/O cards.

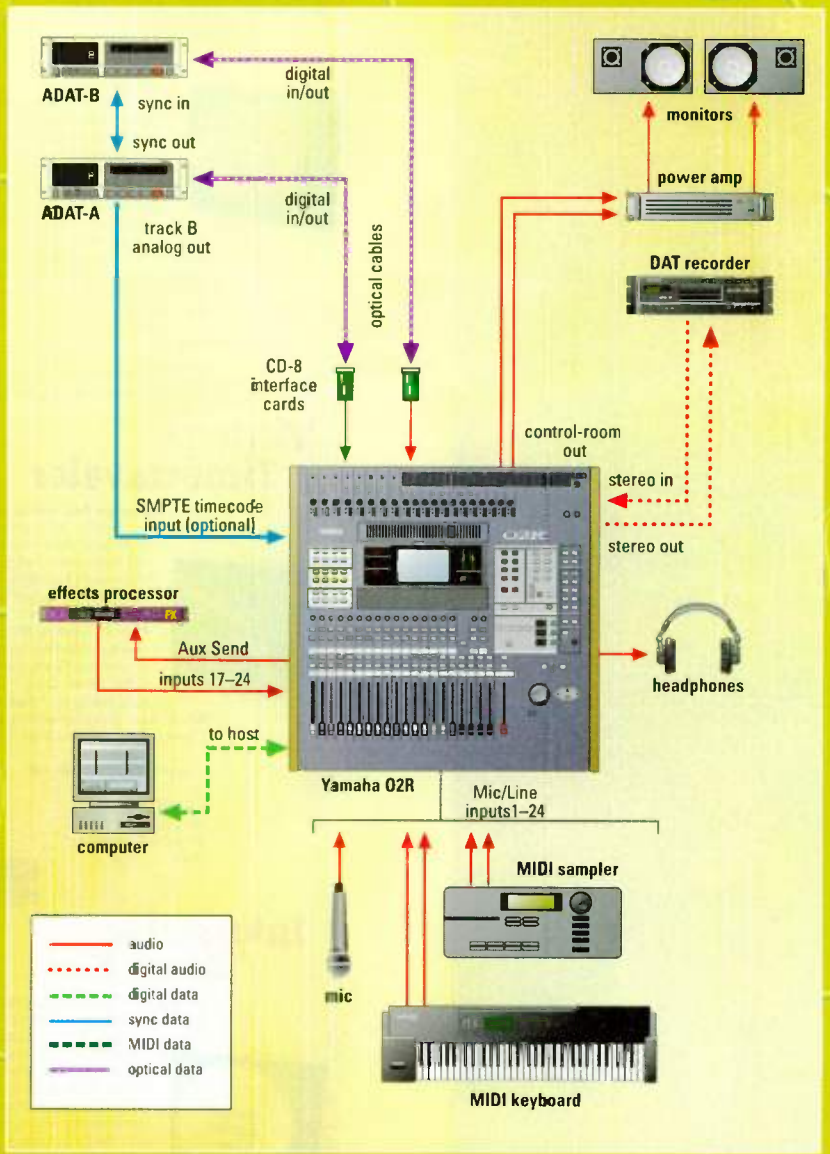

FIG. A: This Yamaha 02R digital mixer s configured for use with two ADATs, which are synched using SMPTE time code printed to track 8 of one recorder. Also shown are the connections to an aux send, a computer, headphones, control-room monitors, and various input sources.

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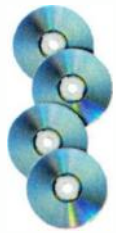

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mixed signals

In addition to the main stereo bus, most mixers designed to work with multitrack recorders have four or more recording, or "group," buses. You can assign signals from one or more channel inputs to a single group bus and route them through that bus's output to a track input on the recorder (or anywhere else for that matter). The more buses you have, the more tracks you can record at the same time.

One common method of classifying mixers is by the number of channel inputs, group buses, and outputs they offer. If your mixer has 24 channel inputs, 8 recording buses, and a pair of stereo outputs, it is classified as a 24 by 8 by 2 mixer. The Mackie 24/8 (see **Fig. 3**) and the Yamaha 02R (see **Fig. 4**) are examples of this configuration, but you can give the 02R up to 16 additional analog or digital inputs using optional I/O cards.

The number of buses that you'll need depends on how many tracks you wish to record at the same time. For example, if you have a 24-track recorder and you want to record different signals on all the tracks at the same time, you'll need a 24-bus mixer. In practice, though, you probably wouldn't need to record 24 tracks at once, and most 24-track studios get by with an 8- or 12-bus mixer. You can also take some signals from the channel direct outputs and others from the subgroups, if your mixer offers both. Alternatively, you can work around the limitation by using DI boxes, stand-alone mic preamps, or other devices to route signals directly to the recorder inputs, bypassing the mixer altogether.

On the other hand, some mixers can send the same subgrouped signal to several different parallel outputs, letting you record the group to several decks at once. On the Mackie 24/8 mixer, for instance, you get 24 triple-bused submaster/tape outputs, which are actually three sets of outputs for the eight subgroups (aka "submasters"). This means the signal from subgroup 8 is routed to outputs 8, 16, and 24, allowing you to record to three 8-track decks simultaneously.

INSERT HERE

After the mic preamp, the signal path's next stop is the channel insert point. An insert point comprises an output (send) and an input (return). It commonly routes a signal from a channel to an external device such as an EQ or compressor and then returns the processed signal back into the channel's signal path. This lets you process just the signal on that channel. For instance, you could patch in a compressor to even out a lead vocal's level during tracking to make up for the singer's uneven mic technique. On some mixers, the insert point comes after the fader. However, digital mixers' insert points—when provided at all—come between the mic preamp and the A/D converter.

Insert points are implemented in one of three ways, but in almost all cases, when you plug into the insert's send, the signal is removed from the channel path. To send the signal on its merry way through the channel, you have to patch it back in via the insert's return. Sometimes there are separate jacks (usually unbalanced ¼-inch) for the send and return signals. As with a patch bay, the send and return jacks are connected together, or *normaled*, unless you insert a plug. A variation on this arrangement uses individual jacks (usually RCA). These aren't connected internally; instead a jumper or dummy plug connects the send jack to the receive jack when no external devices are connected.

The third and most common method employs a single ¼-inch TRS jack and requires the use of a special insert, or Y-cable. Insert cables have a ¼-inch TRS stereo plug on one end and two mono ¼-inch plugs on the other. Instead of carrying a stereo signal, the cable carries two mono signals, one from the mixer's insert send to the external device's input, and the other from the external device's output back to the mixer's insert return. Note that some mixer inserts are wired with the send signal going to the tip and the return going to the ring, while others are wired in the opposite way. In both cases, the ground signal is wired to the sleeve. Check the user manual to see your mixer's wiring scheme.

Another use for the TRS-type insert point—assuming it's postfader—is as a direct out. There are two common approaches to this use. The easiest is to insert a mono ¼-inch plug halfway into the insert point, thus engaging the

Yamaha's 02R digital mixer began the digital-mixing revolution in personal studios.

For manufacturer information, please see Contact Sheet, p. 205.

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Sammy Peralta loves music. That pure and simple fact comes through strikingly clear as he sits at his keyboard tinkering with half-written tunes. Sammy's background includes work with talents including Tito Puente and Willie Bermudez. "I have to be careful because I can get so lost in the music, I sometimes forget I have a family that would like a little of my attention too".

One last point: Sammy Peralta's new CD ***On the One*** featuring Lenny White was mixed entirely with LSR monitors.

LSR.

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mixed signals

send part of the jack but not the return. This allows the channel signal to be sent to a recorder without returning to complete the circuit. However, it is not a great solution because a half-inserted plug often makes a relatively poor connection.

Instead, use a Y-cable to connect both the channel insert send and the return to a normaled patch bay. The trick here is that you patch the send to the top rear and the return to the bottom rear of the same patch-bay channel. When nothing is plugged into the front of the patch bay, the signals flow through it and back to the channel, as if the insert points were not in use. But when you patch the insert send from the top front of the patch bay to your recorder, the normal is broken, and the signal flows to the recorder. As a bonus, if you want to temporarily patch something new into the mixer's channel input, you can patch it to the insert return on the patch bay; that interrupts the channel and inserts the new signal in place of the signal at the channel input. Unlike plugging partway into the insert point, there's nothing half-patched about this approach.

In addition to individual channel inserts, insert points are commonly provided for certain buses, particularly the subgroups and the main and monitor output buses. This allows you to process an entire submix, monitor mix, or main stereo mix.

EQUAL OPPORTUNITIES

When people refer to the sound of a mixer, they often mean the sound of its EQ section. Equalization serves two purposes: to cut undesirable frequencies and to boost ones that need enhancement. Like any gain-affecting circuit in the signal path, EQ can disturb the overall balance of sounds and add distortion, so use great care when using it.

Channel EQ designs vary a lot with regard to number of bands, whether they are fully parametric, and so on. (For more on the types and uses of EQ, see "Equal Time" in the October 1999 issue of **EM**.) But in terms of signal flow, there are only a few considerations.

The EQ section often has a switch to insert it into or remove it from the channel's signal path, and sometimes (as with the Mackie 24/8) you'll find a switch for splitting the section and assigning bands to various functions. The 24/8 lets you assign the high and low shelving bands to the Mix B channel, leaving the sweepable mid bands assigned to the main channel signal.

YOU SEND ME

Next come the auxiliary-send buses. Although the basic function of aux sends is fairly straightforward—they route varying amounts of individual channel signals to a single bus—implementation and occasional labeling inconsistencies can lead to confusion.

Three types of aux sends exist: prefader, postfader, and those with a pre/post switch or internal jumper for configuring them either way. Prefader aux sends tap the signal before it reaches the channel fader (and usually before the EQ, though some aux sends also have pre/post EQ switches). Putting the aux-send control before the fader lets you set the send levels independently of the overall channel level. Postfader aux sends tap the signal after the channel fader and are therefore affected by the fader position. If an aux send is not labeled pre- or postfader and doesn't have a switch, it's probably postfader.

Two of the most common uses for aux sends are creating separate monitor mixes and routing signals to external effects processors. Here's where the situation can get confusing. Some mixers label sends "monitor" or "effect" rather than aux, meaning that they are configured for a particular application. Let's take a closer look.

Monitor sends route varying amounts of signal from individual channels to a monitor bus, where the signals combine to create a monitor mix. Because the monitor mix must be independent of the main mix, you must tap the individual channel signals before they reach the main channel faders (prefader). Assume that a send labeled "monitor" with no pre/post switch is prefader.

Monitor mixes usually provide a custom balance of sounds for a particular musician. For example, a drummer will likely want to hear less drum signal in the headphone mix, as the drum set's acoustic sound will already be quite loud. Therefore, some mixers have several monitor sends, each of which can be used to create a separate monitor mix. The Mix B bus on the Mackie 24/8 can create a stereo monitor mix, because each channel has a pan pot in addition to a level control.

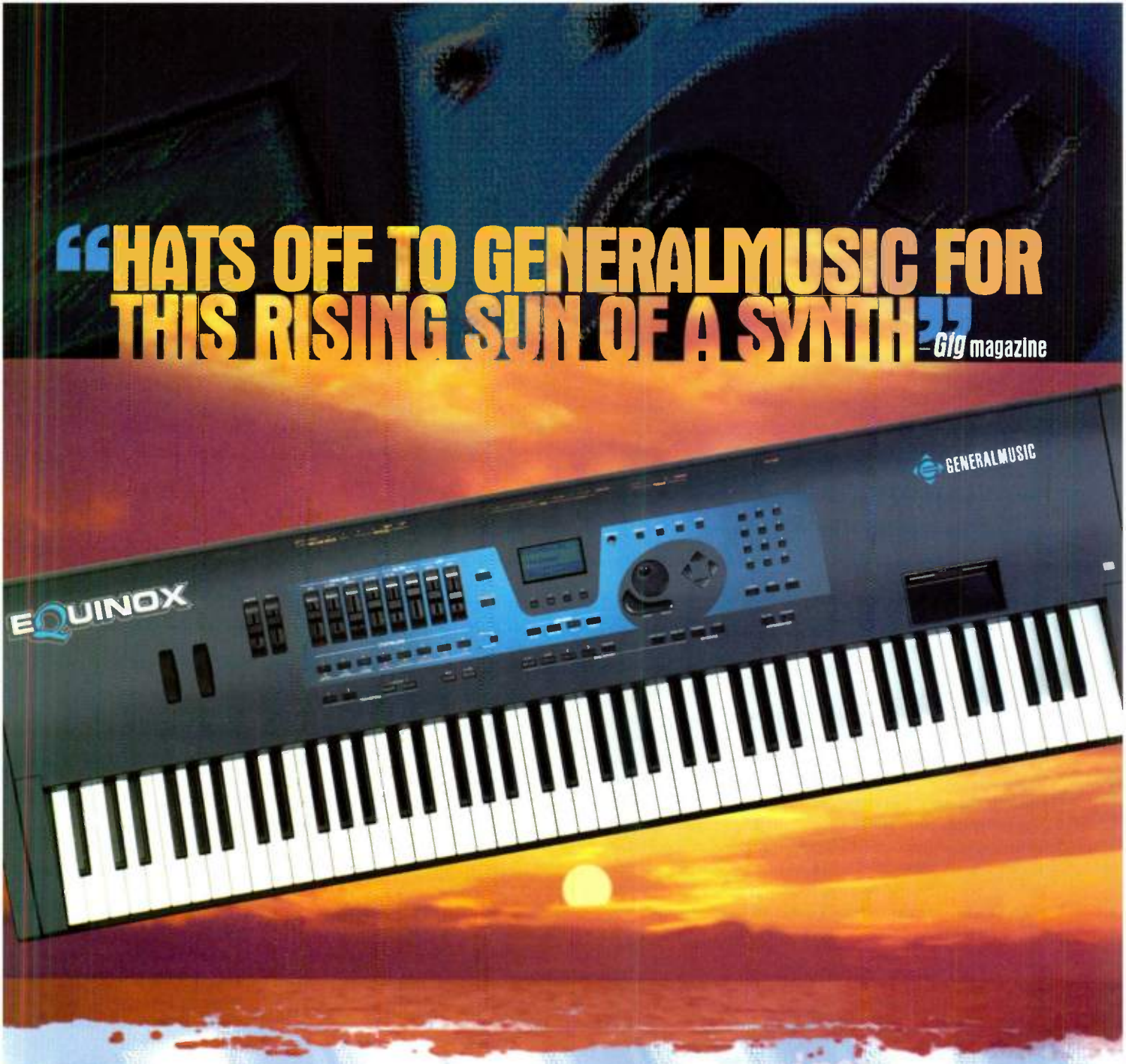
Effects sends route signals from mixer channels to the inputs of outboard processors. For example, if you have a reverb processor connected to an aux send, increasing the aux send level for a particular channel sends more of that channel's sound to the

IMPEDING PROGRESS

Impedance is a measure of a circuit's opposition (the sum of a DC resistance and the circuit's reactance) to a signal or current attempting to pass through. The practical difference between impedance and resistance is that impedance is the opposition to alternating current (AC), whereas resistance is the opposition to direct current (DC), and impedance changes as a function of frequency. Impedance is symbolized in equations by the letter *Z*, and its values are measured in ohms, represented by the Greek letter omega (Ω).

High-impedance signals are generally held to be in the 10 kΩ to 20 kΩ range, while signals in the 150Ω to 1 kΩ range are considered low impedance. If you plug a high-impedance source into a low-impedance input, you're likely to overdrive it into distortion; do the opposite, and not enough signal gets through for a satisfactory level. A line-matching transformer, usually in the form of a direct-injection box (more commonly called a "direct box" or "DI"), is often used to match signal levels and impedances. Direct boxes can employ either active or passive circuitry.

—Steve O. and Barry Cleveland



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reverb's input. (A master aux-send control determines the overall send level to the processor's input.) Some mixers, including the Mackie 24/8, offer stereo effects sends for feeding processors with stereo inputs.

Normally an effects send is postfader, which means changing the overall channel level also changes the amount sent to the effects bus. But if you have the option of using a prefader send to feed an outboard signal processor, you can create some interesting special effects. For example, if you are sending to a reverb processor, you can pull the main fader down and hear just the reverb returns, creating an eerie effect. If a send is labeled "effects" and has no pre/post switch, you can assume that it is postfader.

Most mixers have dedicated effects-return jacks in their main mix section (not in the channel strip). From there, signals from the effects unit's outputs return to the mixer and blend with the main stereo output mix, forming an effects loop. Some mixers let you assign effects returns to buses other than the main stereo output bus, such as recording buses. If your mixer does not have dedicated effects returns—and many digital mixers, including the Yamaha 02R, do not—you'll need channel inputs.

Conventional wisdom dictates that compressors, EQs, and other processors inserted into a channel or master bus should not connect to an effects send and return because 100 percent of the signal is supposed to pass through them. However, it is sometimes desirable to have some of the original signal combined with the processed signal to achieve particular effects. Famed producer Eddie Kramer routinely uses this technique.

An aux send with a pre/post switch can be used for any purpose that requires summing output signals from individual channels and routing them to a single bus. For example, it can pinch hit as an additional recording bus. It is also worth noting that auxiliary sends and monitor sends are usually balanced, while effects sends may be either balanced or unbalanced.

MUTED COMMENTS

Channel mutes remove individual channels from the main signal chain, allowing you to turn off a channel without pulling its fader down. Some manufacturers call the channel mute an "on" button, reversing the concept, but the same function is performed. (Note: you can also mute a channel by disengaging the L/R bus assignment switch.)

On the more sophisticated analog mixers and most digital mixers, channel mutes can be organized into groups. Pushing the mute button for one channel in the group engages all mutes in the group. Mute groups are useful whenever you need to turn several channels on or off simultaneously, such as when bringing a group of instruments into a mix. Say you need to record a horn section with six mics, with each mic on its own track and mixer channel. The horns play only on the bridge, and during the rest of the song there's nothing but extraneous noise on the tracks. Instead of pressing six mute buttons before the horns enter and again after they finish, you simply press one button.

The Mackie 24/8 analog 8-bus mixer is one of the most popular and widely used recording boards in the world.

FLYING SOLO

The solo button is in some ways the opposite of the mute button; it turns off everything except the desired channel or channels. Solo comes in three styles: PFL (Pre-Fader Listen, sometimes called *cue*), Solo-In-Place, and mono. PFL allows you to monitor the sound before the signal reaches the channel fader—and thus before fader level, panning, EQ, effects, and other settings affect it. Of necessity, PFL comes after the mic preamp, because an unboosted mic-level signal would be too weak to monitor. The PFL signal is usually routed to the headphone bus and is useful for setting the preamp input level or for any other task for which it is advantageous to hear the signal before it's altered.

Solo-In-Place also allows you to hear an individual channel, but it taps the signal chain after the fader, panner, and EQ, and it retains the stereo imaging. Most useful in mixing, this type of solo tells you exactly what the processed signal sounds like and where it will appear in the stereo field. Mono is identical to Solo-In-Place, but without the stereo placement.

PANNING YOUR MUSIC

The panoramic control, or pan pot, serves two functions. ("Pot" is short for "potentiometer," the type of variable resistor used for panning in analog mixers. Digital mixers use rotary digital encoders, but these are still conventionally referred to as "pan pots.")

You commonly use the pan control to position a signal on an individual channel within the 180-degree stereo spectrum. You accomplish this by adjusting the relative volumes of the signals being routed to the stereo bus's right and left sides. For example, when you increase the right side's volume and decrease the left side's volume, the sound "moves" to the right. Sounds placed entirely on one side are said to be panned "hard" right or left. When the pan pot is in the 12 o'clock position, the channel sends equal amounts of the signal to both sides of the stereo bus, which means you are essentially listening to a monaural signal.

In some mixers, pan pots also assign a signal to a particular group bus.

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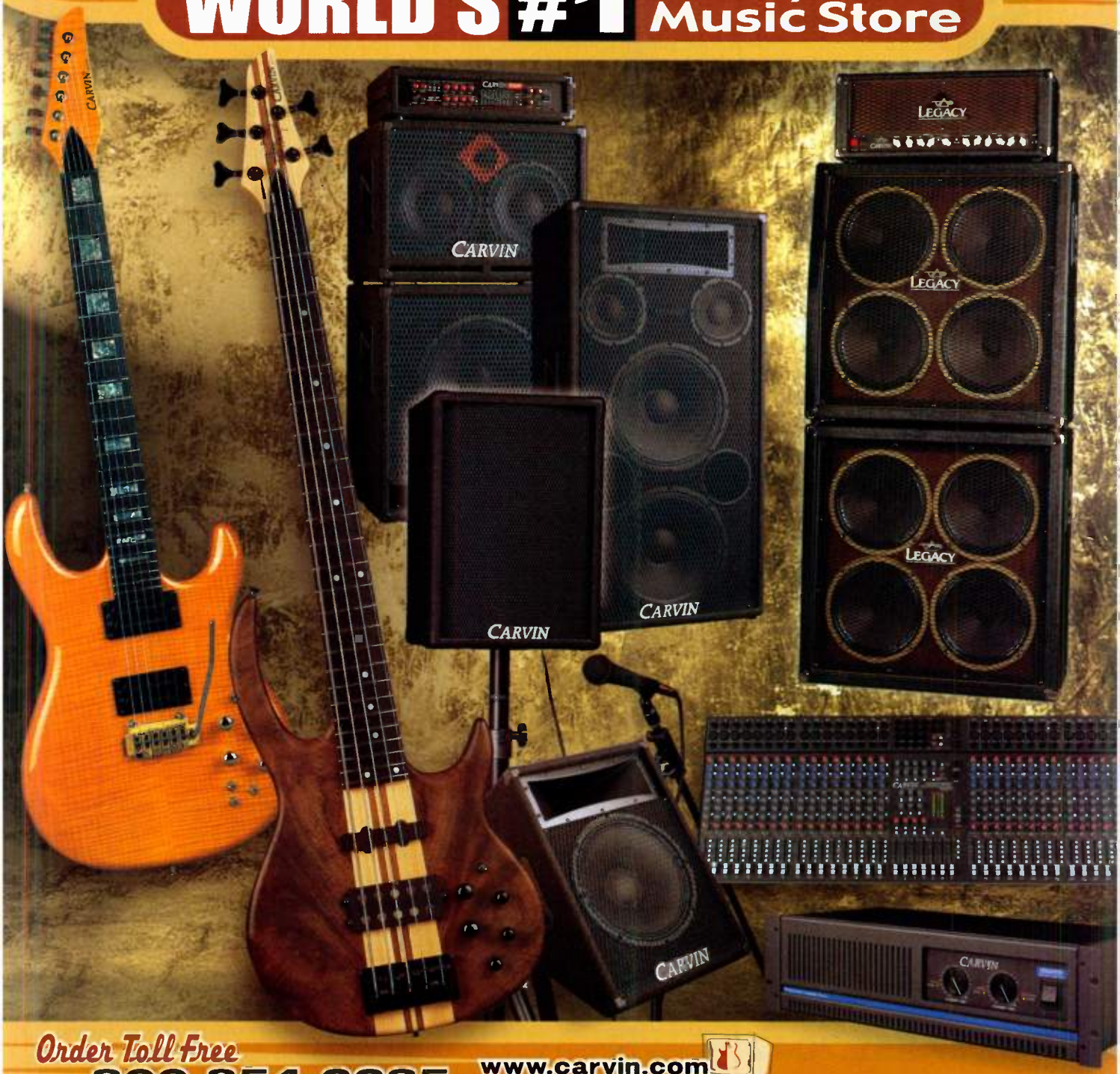

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Group buses are organized in pairs (for example, 1 and 2, 3 and 4, 5 and 6, and 7 and 8), with a single switch assigning a channel to a pair. The pan pot sends more or less signal to either bus in the pair, or sends it to only one of the buses (when the pot is turned to one side).

NOT FADE AWAY

Channel faders serve different purposes when you're tracking and when you're mixing. During tracking, the fader interacts with all the buses to which it is routed, particularly the group bus that feeds the record channel. If the recorder is fed by a direct out or tape out, the channel fader determines the record level. During mixing, the faders determine the level of each channel in a mix. In either case, the faders' relative positions supply a visual reference.

Also, in some mixers, faders can be grouped to operate as a single control. Once they're locked together as a fader group, moving one up or down moves all of them, and they maintain their level relationships. That is important because fader values taper logarithmically, not linearly. That means a greater volume increase occurs when you move a fader at the lower end of its range than when you move it at the higher end. To get a uniform group fade, the actual level relationships between channels—not the faders' visible relationships—must be maintained. If you group the first two channels, and channel 1's level goes up by 2 dB, channel 2's level will also go up by 2 dB, even though the physical positions of the faders may be quite different.

In some boards, especially digital consoles, you get a choice of level relationships in a fader group. You can maintain either the relative levels or the linear relationships, even though choosing the latter means that the levels will not increase identically in all the grouped channels. You also might be able to move one fader in the group without affecting the others until the first fader exceeds a certain threshold level, at which point the other faders start moving with the first.

ON DECK

If you record and mix using a multitrack recorder, you need to get signals from your mixer to the individual recorder tracks. You then must send them back to your mixer for stereo mixdown. When recording overdubs, you need to hear the previously recorded tracks while adding new ones. Mixers handle these tasks in different ways, and in almost all cases there are workarounds for any problem or limitation.

As you have seen, channel signals can be sent to recorder tracks in two primary ways: through recording buses and via individual channels' direct outputs. Each approach has its limitations. Recording buses allow you to sum signals from several channels to the same bus and then route the summed signal to a single recorder track. Dedicated direct outputs route signals from only a single channel.

Say you have an 8-bus mixer, and you want to use four mics to record four-part backing vocals to two tracks. At the same time, you will record individual instruments on six tracks and a stereo

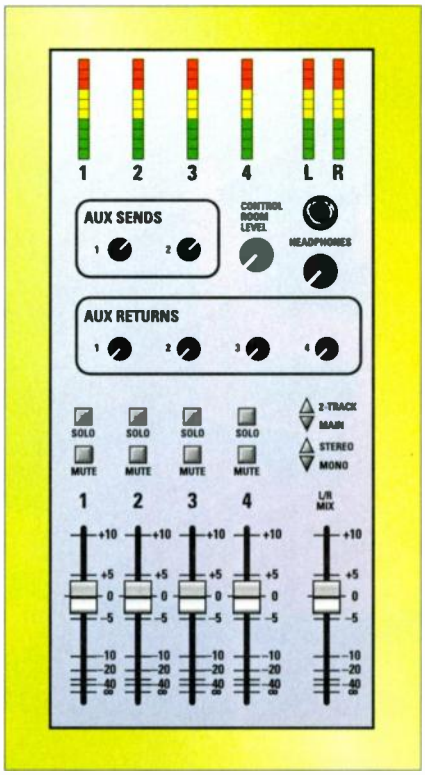
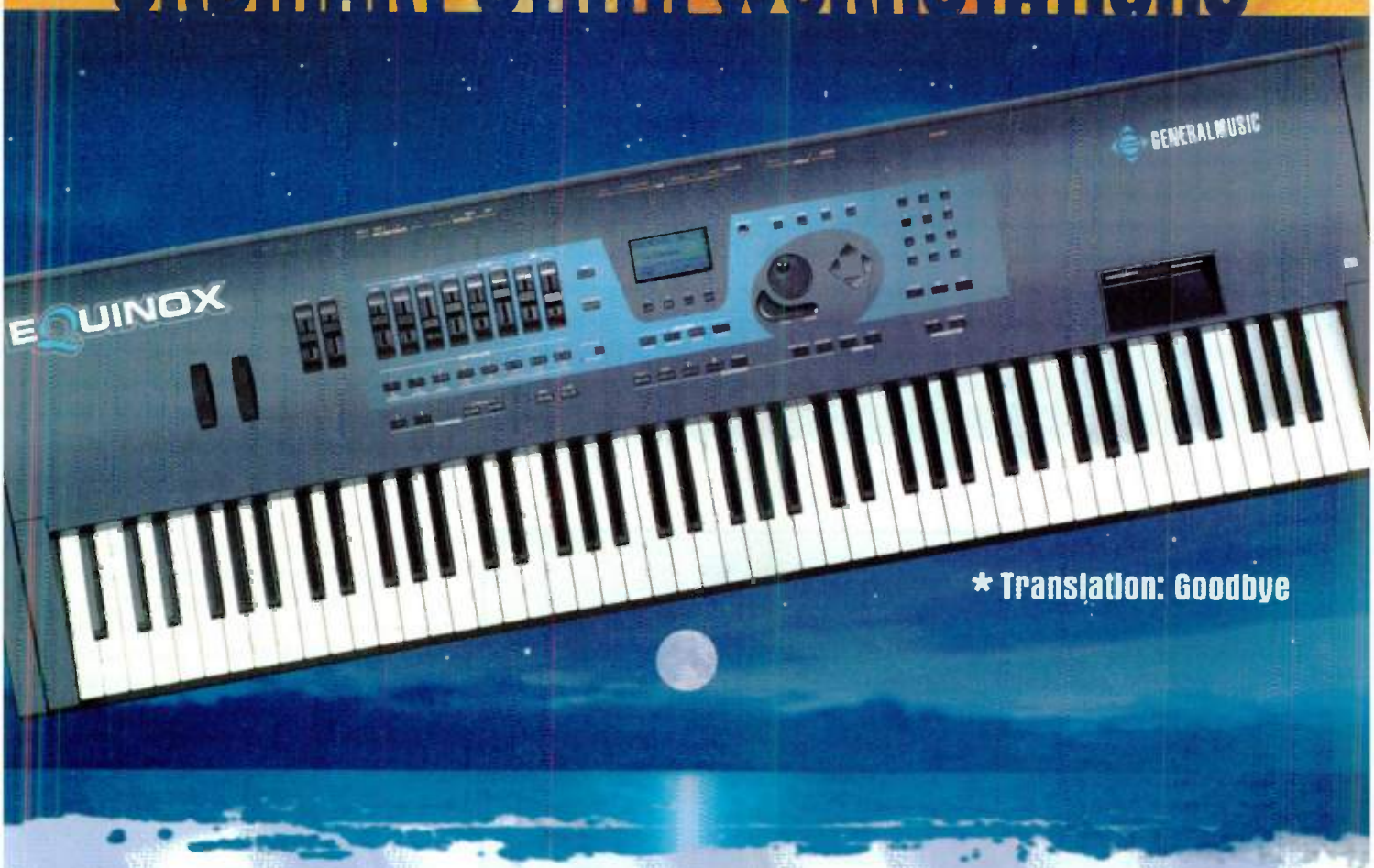


FIG. 5: The master section of this hypothetical analog mixer illustrates the metering section and master auxiliary, master group bus, and main output fader controls.

IT'S TIME TO SAY SAYONARA* TO ORDINARY SYNTH WORKSTATIONS



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lead vocal on two tracks. You could assign the four backing-vocal mics to group buses 1 and 2 and the stereo lead vocal to group buses 3 and 4, using group buses 5 through 8 for four of the instruments and two channel direct outs for the other two instruments. That way you utilize the mixer's ability to combine channels using the group buses while circumventing the eight-group limitation.

How you get signals from the multitrack back into the mixer depends on your mixer. If it has dedicated tape returns, and they connect to a separate mixing section with its own inputs, faders, and other controls—usually located to the right of the master faders—you have a split mixer. If your mixer has tape returns on the regular input channels, you have an in-line mixer.

With an in-line mixer, each channel does double duty by accepting signals from both the channel input and the tape input. The tape input generally has its own path (called the *monitor path*), complete with separate volume and pan controls. In many cases, you can split the channel EQ section, with the high and low bands assigned to the monitor path and the two center bands assigned to the channel path. Considerably more limited than the channel path, the monitor path cannot be assigned to any buses other than the main stereo L/R bus. That means signals arriving at the tape input can't be fed to external effects processors, included in discrete monitor mixes, routed to group buses, or processed with the entire channel equalizer.

However, many in-line mixers have a Flip button, which swaps the two signal paths, reversing the situation. This lets you use all of the board's channel-routing features with your outboard processors while mixing recorded tracks. The more limited signal path can then be used for virtual tracks from synths or samplers, which usually have onboard effects and EQ anyway.

mixed signals

(The Mix B bus on the Mackie 24/8 can be configured for this purpose.)

WE HEAR YOU, MASTER

All paths lead to the master section. On the hypothetical mixer in **Fig. 5**, this section contains the master faders and meters for the group buses, along with their mute and solo switches; the master aux-send and aux-return level controls; the master stereo output fader; the control-room volume pot; and the headphone jack and level control. It also has buttons for collapsing the stereo mix to mono and for switching the monitor section between the main stereo output bus and the 2-track input so you can hear your recorded mixes. Some mixers also allow you to assign the aux returns to group buses.

Sounds travel from the mixer to your ears via the headphones and the studio monitors. The mixer's control-room monitor outputs (which generally use either XLR or balanced ¼-inch TRS jacks) feed powered monitors or a power amplifier and passive monitors.

The 2-track mixdown machine (say, a DAT deck) connects to either the main (XLR) outputs or the dedicated recording outputs (XLR, ¼-inch TRS, or RCA). Its output is patched to the 2-track recorder inputs (usually RCA, but sometimes XLR or ¼-inch TRS).

HAPPY TRAILS

I've traced the basic signal paths commonly found in personal-studio mixers, but space does not permit me to address the host of routing options, esoteric functions, and applications.

The best way to really understand your mixer's capabilities—and learn what does and doesn't work—is to experiment. Happy mixing!

Barry Cleveland *is an associate editor for* **EM** *and* Onstage *and an independent engineer and producer. He's also writing a book on British producer Joe Meek, to be published in early 2001 by MixBooks (www.mixbooks.com).*

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MS2000

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PROTEUS POWER

Master CLASS

An insider's tips on maximizing this monster module.

By Clark Salisbury

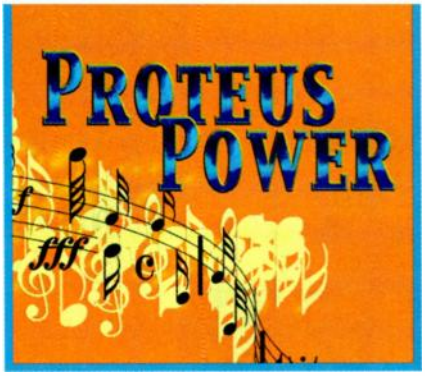
In recent years, sample-playback modules have acquired a reputation for being relatively boring devices, capable of producing little beyond the usual meat-and-potatoes piano, string, and brass sounds. So it hardly seems fair to categorize E-mu's Proteus 2000 as a sample-playback unit. True, its sounds are based on samples stored in ROM, but that's where its similarity to most playback appliances ends.

The synthesis capabilities of the Proteus 2000 easily overshadow those of lesser devices and offer the synthesis aficionado a huge bag of tricks for seriously warping sounds. I'm going to touch on a few of my favorite tips and tricks, but this article is by no means an exhaustive survey of what this powerful machine can do—it's really just a start.

CONSTRUCTION KIT

Apart from the Instrument kit GM Dance, the Proteus 2000 does not provide a standard General MIDI drum kit. This might force you to edit some GM sequences if you wish to play them with anything other than the decidedly electronic textures of the GM Dance Instrument. You can, however, do a pretty good job of creating a variety of GM-compatible kits with the Proteus 2000's extensive layering and linking capabilities. By using all four Layers in each of three linked programs, you can create a preset with 12 separate Layers, each of which can contain a chunk of your customized GM drum kit.

Here's an example: Select preset 079 (Acoustic 2) in CMPSR bank 3. As you play up the keyboard, starting on MIDI note 35 (B0), you'll discover that the kit corresponds to the GM layout for only four notes. I'm not going to worry about assigning the notes below note 35; they aren't used very often. (If you need them, you can extrapolate from the rest of this exercise to determine how to assign them the way you want.)



When you hit note 39 (D#1), you'll find a snare sound where handclaps would be in a GM-compatible kit. To correct this, simply add a new Layer beginning at note 39. In Edit mode, set Layer 1 (which is providing the first group of percussion samples) to sound only from note B0 to D1:

```
L1 KEY: LO   FADE   HIGH   FADE
        B0   000    D1     000
```

Now select Layer 2, and assign it to sound only on D#1:

```
L2 KEY: LO   FADE   HIGH   FADE
        D#1  000    D#1    000
```

While Layer 2 is still selected, scroll to the Instrument page and change the assignment to one of the handclap sounds, such as Claps 2:

```
L2  INSTRUMENT      ROM:CMPSR
0620          PRC Claps 2
```

This Layer has been transposed down 24 semitones, so you'll probably want to change that:

```
L2  TRANSPOSE
+0  semitones
```

Because the claps are now in a separate Layer, you have the freedom to tune, pan, mix, and process them separately from the other sounds in this kit—things you normally wouldn't be able to do with a drum kit that uses a preset multisample. For example, using Send2 for the claps allows you to splash more reverb on them than you would use for the rest of the kit. You can assign Send2 to Layer 2 on the Mix Output page:

```
L2  MIX OUTPUT
Send2  ->   main
```

After adding more Layers to this preset, you can adjust the reverb amounts for each Layer (up to four Layers per preset) from the FXA Send Amounts page:

```
FXA SEND AMOUNTS    1: 3%
2: 15%     3: 8%    4: 10%
```

To complete the GM drum kit, continue assigning Instruments to the appropriately split Layers. For example, you can assign Instrument 0630 to Layer 3:

```
L3  INSTRUMENT      ROM: CMPSR
0630          kit:Acoustic 1&2
```

This Instrument corresponds to the GM standard all the way to note 51 (D#2), so we'll split it like this:

```
L3 KEY: LO   FADE   HIGH   FADE
        E1   000    D#2    000
```

For the fourth Layer, we can use the GM Dance Instrument, which provides relatively generic-sounding percussion instruments in a GM-compatible map up to A#3:

```
L4  INSTRUMENT      ROM:CMPSR
0650          kit:GM Dance

L4 KEY: LO   FADE   HIGH   FADE
        E2   000    A#3    000
```

This example illustrates the basic approach, but you can certainly take the idea much further. If you need additional Layers, simply link another preset (or two) to this one. Each additional preset provides four more Layers to mess around with. You might want to use the additional Layers to cover areas of the keyboard above and below the ranges I've dealt with here. Also, having specific percussion sounds assigned to individual Layers can provide some flexibility in tailoring the drum kit to a specific situation. For example, if you assign a cymbal to its own Layer, you can adjust its decay time, reverb amount, and panning without affecting other sounds in the kit.

TUNE-UP MASTER

I'm also fond of employing the user tuning tables to control the pitch of individual drums in a Layer. This lets you tune the toms, for example, to get additional pitches that aren't preset in the stock drum map. To try this technique, set the Instrument's keyboard tuning to the User 1 tuning table:

```
KEYBOARD TUNING
User 1
```

Then hit the Master button and scroll to the tuning-table definition page:

```
USER  KEY TUNING    Table:1
Key:  A1  Crs:045   Fine:00
```

Underline the key number and play the low tom (F1) on the keyboard. Underline the Crs value and set it to 038. This tunes the low tom several semitones lower.

```
USER  KEY TUNING    Table:1
Key:  F1  Crs:038   Fine:00
```

You can repeat this procedure for any drum sound you'd like to tune.

BENDY-BOY

The idiomatic "dive-bomb" sound associated with electric guitar can be difficult to reproduce on most synths. That's because most synths let you set only a single value for the Pitch Bend range. In other words, if you want to set the bender to drop a fifth, you end up with the Pitch Bend range going up a fifth as well. That can make it hard to perform the guitar's characteristic half- and whole-step upward bends. Fortunately, you can set the bender in the Proteus 2000 so it bends down by a different amount than it bends up.

The trick is to use a Proteus modulation processor called the Diode, which passes only positive input values. By

E-mu's Proteus 2000 is far more than a sample-playback module. Its powerful processing, filtering, editing, and modulation capabilities provide many opportunities for creative sound designing.

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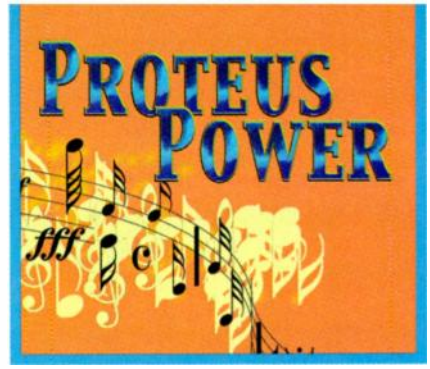

routing the Pitch Wheel through the Diode and then to the Pitch parameter, you can add a greater modulation amount to the Pitch Bend range, but in one direction only.

The following patch requires two PatchCords (modulation connections). From the Edit menu, route one PatchCord from the Pitch Wheel to the Diode.

```
L1 PATCHCORDS      #01
PitchWhl -> Diode  -100
```

Then connect the Diode to the Pitch parameter.

```
L1 PATCHCORDS      #02
Diode -> Pitch     -010
```

Set the modulation amount according to the effect you want. For example, if you set it to –010, and the Pitchbend Range for the patch is set at ±2, the bender will bend notes up a second and down a fourth. If you set the modulation amount to –016, the bend down will be a fifth. To use the Diode output to control the upward bend range, set the first PatchCord to +100:

```
L1 PATCHCORDS      #01
PitchWhl -> Diode  +100
```

WAVE OPS

To paraphrase a well-known maxim, you can never be too rich or too thin, or have too many waveforms. Even though the Proteus 2000 has nearly 1,200 different waves, there may still be times when you want something that isn't in the instrument's ROM. Luckily, there are a couple of easy ways to produce new instrument sounds for your custom presets.

One of the easiest methods is to experiment with a sound's start time. Setting the start-time number to something greater than 0 starts the playback of the sample at a later point in the waveform. This technique may not make much of a difference when applied to a synth-based waveform, but if you apply it to an

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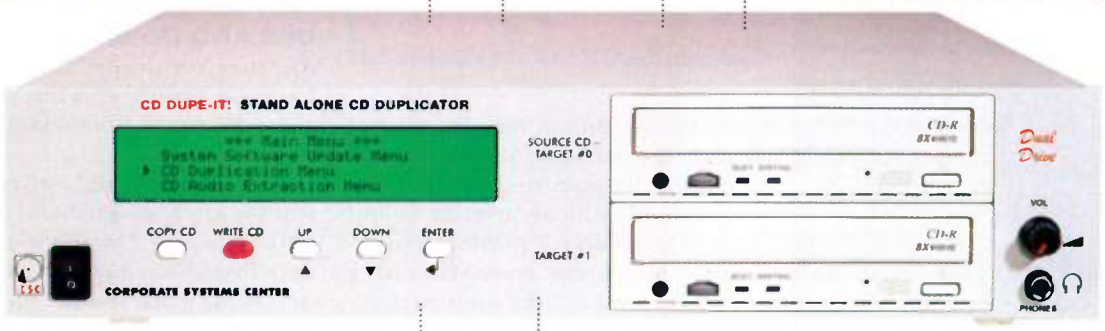

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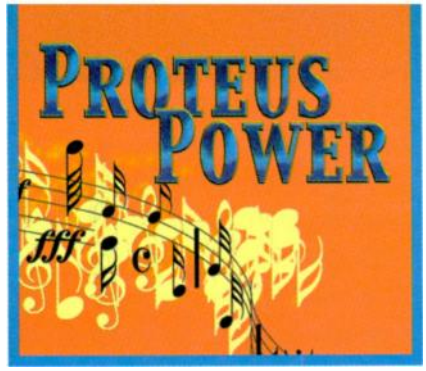

acoustic-instrument sample, you can lop off the attack of the sound and leave just the sustaining portion. Because we identify an acoustic sound largely by its attack portion, removing the attack can leave you with a waveform that retains some acoustical characteristics but isn't readily identifiable.

For example, select the str:Solo Quartet patch (089) in CMPSR bank 7. Hit the Edit button, scroll to the Sound Start menu, and set Start to 127:

```
L1 SOUND    START  DELAY
            127    0
```

This setting chops the gritty bowed attack off the front of the sound. Now, to further mangle the waveform, I'll apply the second trick: sample stretching.

The Proteus 2000 provides two ways to change a sample's pitch: transposing and tuning. Transposing the sample works by shifting the keyboard position of the waveform, which preserves the key range assigned for each waveform in a multisampled Instrument. Tuning shifts the pitch of the multisamples, pushing them outside their predetermined key range. By combining the two approaches, you can keep a preset in pitch while forcing its individual samples outside of their range.

For example, set the transposition for Layer 1 up an octave:

```
L1 TRANSPOSE
+12      SEMITONES
```

And set its tuning down an octave:

```
L1 TUNING
COARSE: -12   FINE: +0
```

Try increasing the release time a bit and dialing up an appropriate filter—perhaps one of the Vow (vowel) filters—and you'll have a fairly sick-sounding vocal group.

UPS AND DOWNS

Another technique is triggering a Layer on key-up. This lets you create a mandolin-style tremolo with a guitar sound.

Start with a straight-ahead guitar sound, such as gtr:Steel (048) in CMPSR bank 7. Use the transposition trick that I just explained to make the steel-string guitar sound a bit more like a mandolin. Transpose the Instrument up 7 semitones, and then tune it down 7 semitones to get that slightly thunky mandolin texture. Now set up the gate to control sample retriggering:

```
L1 PATCHCORDS        #19
GATE -> SRETRIG      +001
```

(Note that any number greater than 0 will suffice for the PatchCord amount.)

This setup causes the Layer to retrigger when the key is released. The effect will be pretty subtle, because the envelope cuts off the sound of the Layer when the key is released, but this is easily remedied. Scroll to the Volume envelope page and make sure the Mode is set to time-based (or tempo-based, if you want to time the envelope to a particular tempo). Set the values for Attack1, Attack2, and Decay1 to a rate of 0 and a level of 100 percent. Set Decay2 to a rate of approximately 76 and a level of 0 percent. Set Release1 to a rate of 0 and a level of 100 percent (so the envelope jumps to full volume when the key is released), and set Release2 to a rate of approximately 54 and a level of 0 percent (so the note ultimately decays to silence).

If you want to get fancy, use the PatchCords to scale the decay and release times to keyboard position, so that higher notes produce quicker decays and releases, as with a real mandolin:

```
L1 PATCHCORDS              #20
KEY+- ->      VENVDCY      +060
```

PROTEUS 2000 PATCHES ON EMUSICIAN.COM

Several of the Proteus 2000 patches described in this article are available as free System Exclusive SMFs. You can download them at www.emusician.com.

For manufacturer information, please see Contact Sheet, p. 205.

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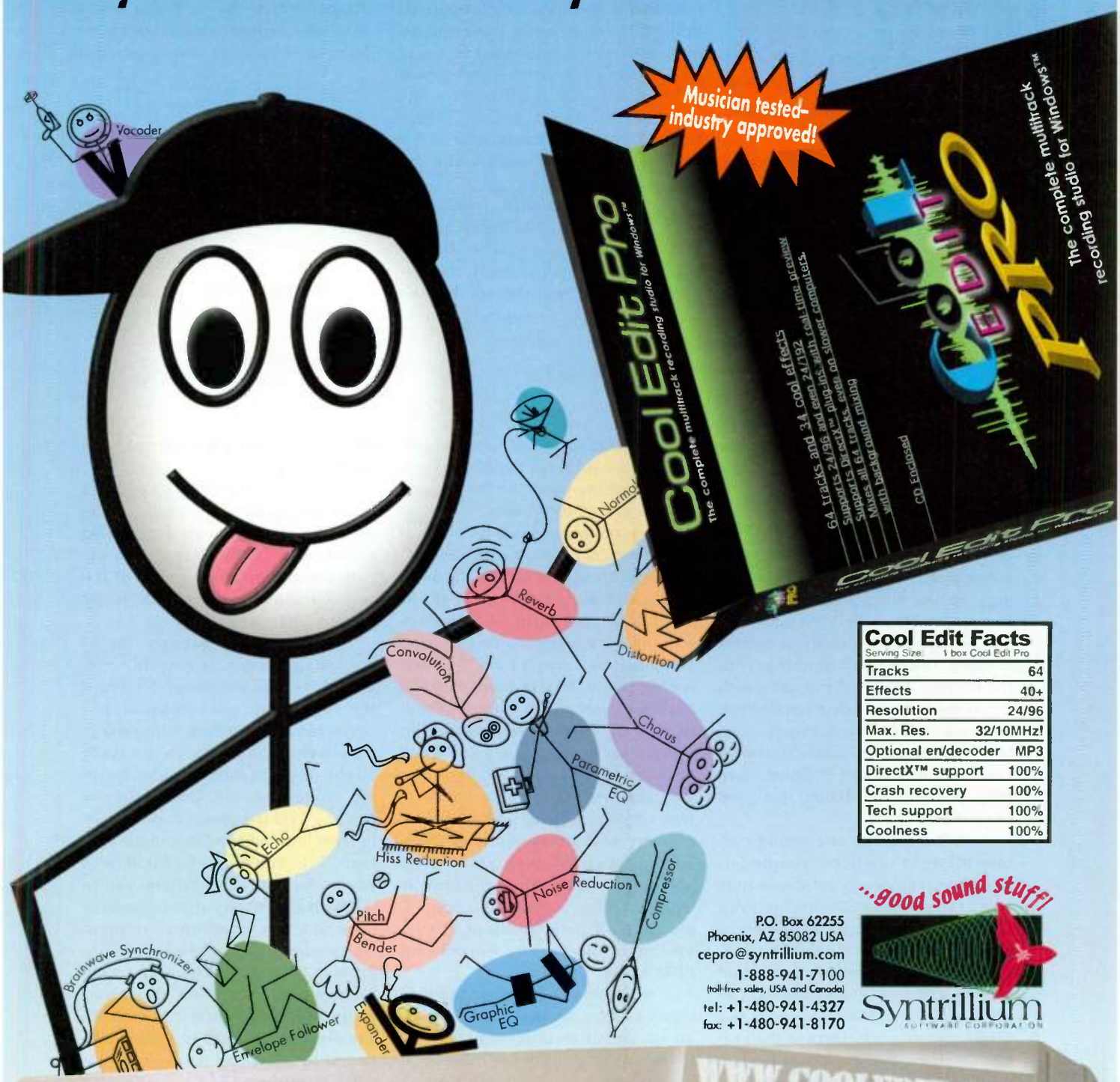

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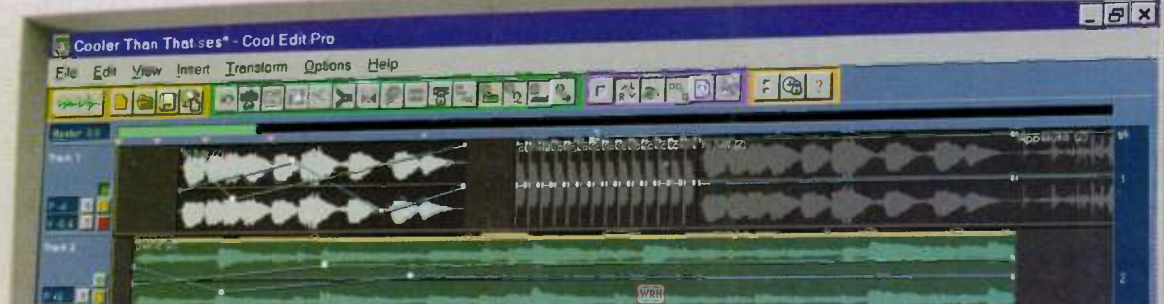

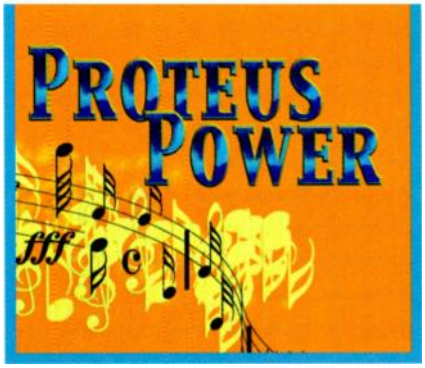


```
L1 PATCHCORDS          #21
Key+-   ->   VEnvRls   +020
```

To complete the mandolin effect, turn on the Chorus parameter. Choose a setting that's not too heavy—perhaps around 12 percent with the width left at 0 percent.

SAXX GRUZZ

A saxophone growl can be a handy sound to have in your collection. Although there is more than one approach to creating this kind of sound, an easy way to get a reasonably good result is to use the Auxiliary Envelope to create the characteristic "buzz." You can then use a controller, such as Aftertouch or the mod wheel, to bring in the effect.

To create this sound, first locate wnd:Grouch (042) in CMPSR bank 0. This provides an aggressive saxophone sound as a starting point. For the basic growl, you can set the Auxiliary Envelope to repeat, and set each segment to travel a small distance at a fast rate. Begin with all the attack and decay segments set to a rate of 1, and alternate between a level of +1 percent and –1 percent:

```
L1 AUX ENV    RATE    LEVEL
Attack1       1       +1%

L1 AUX ENV    RATE    LEVEL
Attack2       1       -1%

L1 AUX ENV    RATE    LEVEL
Decay1        1       +1%

L1 AUX ENV    RATE    LEVEL
Decay2        1       -1%
```

AUTHOR! AUTHOR!

I've often wished that I could have my own custom sound bank available in ROM, providing instant access to the sounds I use the most. With the Proteus 2000's support for sounds burned into nonvolatile Flash ROM, that wish is now a reality. That's great news for gigging musicians who want to use custom samples in their act but prefer the convenience of a sample-playback module. You can also do things with the Proteus 2000 that you can't with other modules, such as apply the amazing z-plane filters to your custom drum loops, or create your own custom drum kits with samples, mapping, panning, and tuning designed to your own specs.

The process of creating custom ROMs is relatively simple (although you'll have to get your hands on an Ultra-series EOS sampler if you don't already have one). Simply pop a Flash-ROM SIMM into the EOS Ultra, put together the bank of sounds that you want to author, save the bank to the Flash-ROM SIMM, transfer the SIMM from the EOS Ultra to the Proteus 2000, create presets based on the new ROM, and save the presets (as a bank) to the Flash ROM.

The procedure will go smoothly if you take a little time to plan your project before starting. The main thing to keep in mind is that you have a limited amount of memory. Flash-ROM SIMMs currently come in only one size: 16 MB, although 32 MB SIMMs may be available in the future. The Proteus 2000 has a total of four slots that can accept Flash SIMMs, but one slot is already used for the Proteus 2000's factory ROM banks. (You can, however, remove the factory ROM and fill all four slots with your own ROMs.)

With 16 MB SIMMs in three slots, you have a maximum of 48 MB to play around with. Remember, however, that an Instrument must be contained in a single bank. In other words, if you want to store a 20 MB multisampled piano patch in Flash ROM, you must do something a bit tricky, such as creating the lower half of the piano in one 16 MB bank and the upper half in another 16 MB bank. (you can always fill any leftover Flash memory with other sounds.) Then, when you've installed your newly authored Flash SIMMs in the Proteus 2000, you can re-create the original piano patch by layering or linking the instruments from the two different ROM banks.

Cramming a wealth of sounds into a relatively small space is truly an art, and attempting to put 16 MB to their most efficient use makes you admire the E-mu sound designers who stuffed hundreds of samples into the 32 MB of sample ROM that ships with the Proteus 2000. Nonetheless, anyone familiar with sampling shouldn't have too much trouble understanding the basics of efficient memory usage: never use two samples when one will suffice, do not use higher sampling rates than necessary, and keep the samples as short as possible.

The Proteus 2000's synthesis resources are quite extensive, so you might not need to sample a completed sound. You may be able to get away with sampling a component of the sound and processing it later in the Proteus 2000.

Consider, for example, the re-creation of some of your favorite synthesizer pad and sweep sounds. If the sound you want to capture is characterized by a long filter sweep, try opening the filters on the synth all the way and sampling the resulting unfiltered sound. Then see if you can re-create the sound using the extensive filtering available in the Proteus 2000. You might find that once you've turned off the filters, you're left with a relatively straightforward layer of synth waveforms—some of which may already be available in Proteus 2000 ROM. You might even be able to re-create the sound you want without making any custom samples at all, which is a great way to get to a deeper level—not just with the Proteus 2000, but with your other synths, too.

Finally, as you're putting together your banks in the EOS Ultra, keep in mind that nothing is forever. You may wish to revisit those banks to make changes at some later date, so it's a good idea to back up your original EOS banks. That way you can easily retrieve them if you need to.

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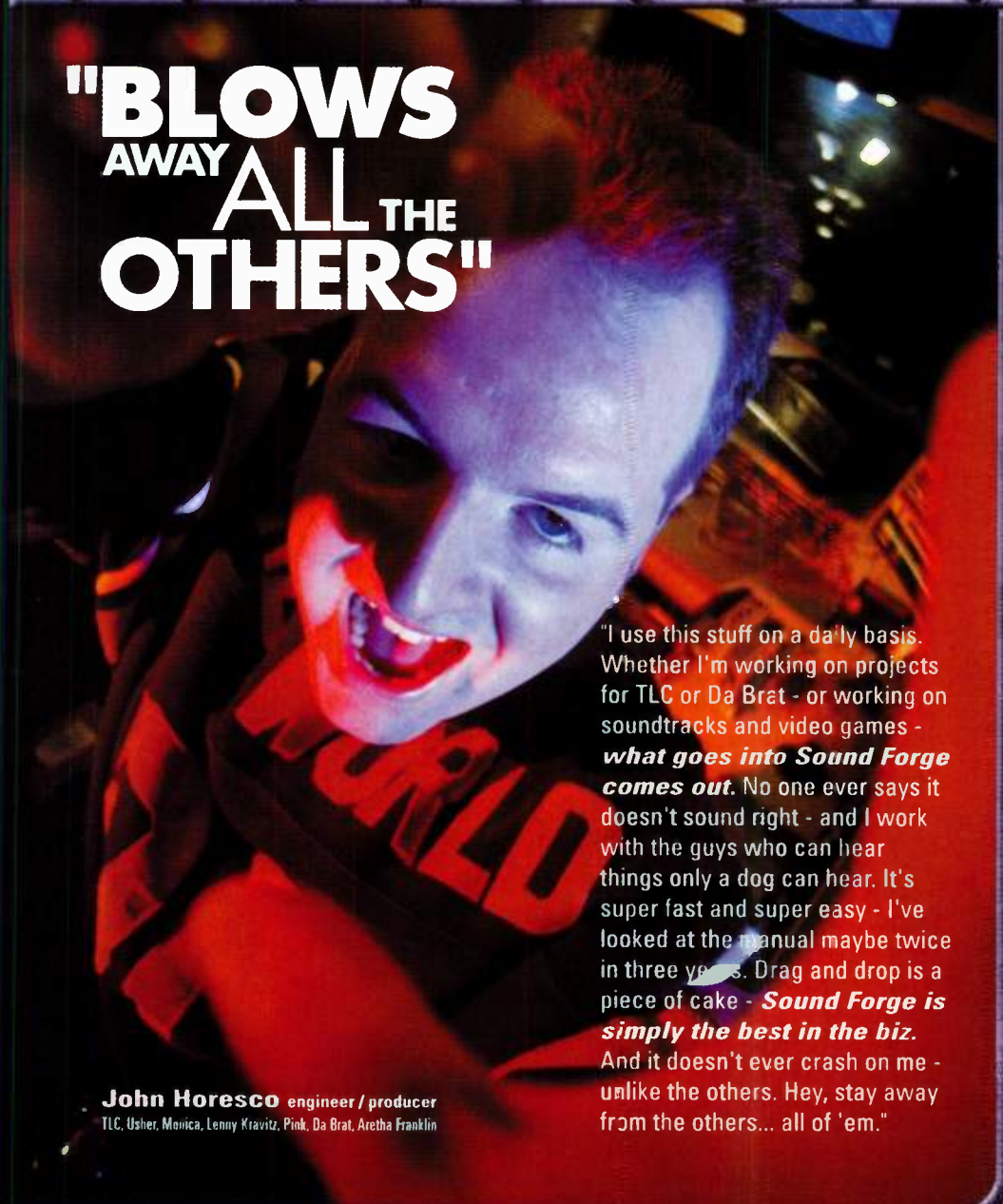

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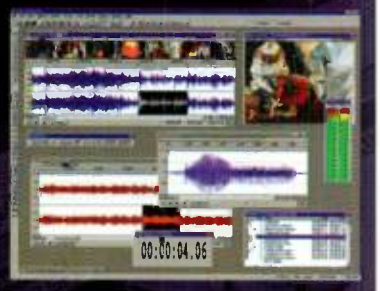
John Horesco engineer / producer
TLC, Usher, Monica, Lenny Kravitz, Pink, Da Brat, Aretha Franklin



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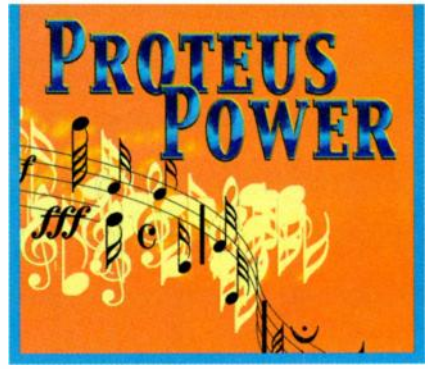

Note that I've used positive and negative levels in equal increments. That way, the pitch modulates around 0 and doesn't get pushed sharp or flat as the depth of the effect increases. Also, the release times won't matter unless the sound you're working with continues to decay after key-up. If it does, be sure to set the level for Release1 and Release2 to +0 percent, or your note may drift off pitch when released.

Once the Auxiliary Envelope has been set, use the PatchCords to route it to a likely destination. I've found that routing it to the Pitch parameter works well, but routing it to the filter or amplifier can also produce useful results. Whatever the destination, though, you'll probably want to hook up a controller to fade the effect in and out. To accomplish this, use another PatchCord to route the controller (I'll use the mod wheel for this example) to control another PatchCord amount. Let's hook up the Aux Envelope to control Pitch, but with a depth of 0:

```
L1 PATCHCORDS          #08
AuxEnv+   ->   Pitch   +000
```

Then hook up another PatchCord routing mod wheel to the Amount control:

```
L1 PATCHCORDS          #24
ModWhl ->   CORAmt     +028
```

Finally, if you want to get tricky, use at least two Layers for this patch, with a crossfade controlled by the Mod wheel, breath controller, or some other controller. This allows you to set up fades between mellow, smooth sax sounds and the grittier, buzzy sound you just created.

RANDOM RAMBLINGS

Without going into too much detail, I've set down a few ideas that might get you started in some new directions:

1. Route one of the squared-up LFO shapes—one of the Pat: shapes, for example—to control SRetrig on a percussion Instrument. You will have hours of fun as you experiment with new drum grooves based on the LFO rate.

2. Use the Sub outs for the dry sounds, and the Main outs for the wet (effects) signal. This lets you control the overall effects mix from a couple of faders on your mixer—handy for live performances.

3. Several of the Proteus 2000 filters can be made to distort, but the BassOMatic filter produces a warm, tubelike distortion. Adjust the Q parameter to control the amount of distortion, or use Velocity or another controller to crossfade between distorted and clean Layers. This is a nice effect for electric pianos and organs, among other things.

4. For sweeping pads, try using one of the vocal filters on a Layer, modulated by a slow LFO for some extra animation.

5. You can achieve some of the most interesting effects by modulating modulators. In other words, try modulating an LFO's rate and/or depth from another LFO, which might itself be modulated by an envelope or even the first LFO. Some very interesting cascading patterns can be created by routing the results of these "monster mods" to several destinations, such as Pitch, Filter, Pan, and so on. You can keep everything in time by basing LFO rates and envelope times on bpms, or you can let things run free to produce sounds that constantly change and shift.

6. Finally, don't forget to read your Proteus 2000 owner's manual, especially the programming tutorial. It's an excellent source of small exercises that can turn into big ideas. Also check out back issues of **EM**; the Proteus 2000 was reviewed in the September 1999 issue.

A number of helpful Proteus 2000 links are online, including E-mu's own Web site (www.emu.com). An active Proteus 2000 user group is at www.egroups.com/group/p2k, and Jeff Donnici runs an excellent Web site at www.donnici.com/p2k/p2k_main.asp, where you can find tons of information and links.

Clark Salisbury *maintains a loosely quantized life in the United States, just to the left of Idaho.* *Special thanks to Jeff Alviani (keyboardist with the Terry Evans Band) and Derk Hagedorn and Sean Wilhelmsen of E-mu/Ensoniq for their invaluable help.*

Fisher proves you can nab a record deal on the Internet.

Getting Signed Online

PRODUCTION VALUES

Without a doubt, the Internet is an incredibly powerful promotional tool. Used wisely, this inexpensive platform can help unsigned artists distribute and promote their music globally. Enterprising musicians have tapped into the Web to increase album sales, climb to impressive rankings on popular Internet music charts, and make money from song downloads and online plays. Yet despite all the hype surrounding online music, the dream of scoring a record deal by way of the Web still seems as elusive as ever. The hope that online notoriety will catch the attention of major labels and lead to big-money record contracts just hasn't panned out on a large scale.

But don't write off the Internet too quickly as a vehicle for landing a major contract. Earlier this year, a band named Fisher finally hooked that groundbreaking record deal, proving that the idea of getting signed as a result of a strong Web presence isn't so far-fetched. This article isn't an overnight-success story, nor is it a record-industry fairy tale that could never come true for an average musician. Fisher's record deal came only after the band spent more than a year in the top ten on several popular Web music charts, chalked up millions (yes, millions) of MP3 downloads, released an indie CD, and put in a lot of old-fashioned hard work. The group's experience demonstrates that Internet presence alone isn't enough to snag a record deal. It is only a part—albeit an important one—of a multifaceted, comprehensive marketing and promotional plan.

By Erik Hawkins

Design by Laura Williams

SULA MILLER

Wasserman and Fisher sit at the piano that they used for several tracks on *True North*.

BACKGROUND CHECK

Fisher's core members are Ron Wasserman (production, songwriting, and keyboards) and Kathy Fisher (vocals and songwriting). Wasserman describes the band's sound as "artistic pop—Sarah McLachlan meets Pink Floyd in the year 2000." After more than six years of playing and writing music together, Fisher has seen its share of ups and downs, from the high of having a song placed in a national television commercial (for Hyundai) to the low of being promised a record deal if they would only sound more like the band Garbage. Through it all, Fisher made a point of taking advantage of every opportunity that crossed its path, including playing MP3.com-sponsored gigs at the House of Blues in Hollywood and paying for its own touring expenses on the Lilith Fair tour.

Fisher recorded and mixed its first independent release, *One,* in Wasserman's home studio, operating on a shoestring budget. The CD sold about 6,000 units—not a lot by major-label standards, but a very respectable amount for a small grassroots indie effort. *True North,* Fisher's major-label debut with FarmClub/Interscope Records, is essentially a remake of *One* featuring improved production (a live band replaces many of the virtual MIDI tracks on the original album) and four new songs. At press time, *True North* was scheduled for release in October 2000.

FIRST BREAKS

Fisher's biggest break came a few years ago, when a friend of the group managed to get the song "Breakable" to Darren Higman, vice president of Atlantic Records' soundtracks division. Atlantic wanted one more song for the *Great Expectations* movie soundtrack, and Fisher's track turned out to be a perfect fit. The attorneys were called in to negotiate contracts, and the soundtrack was released in February 1998.

The movie was no blockbuster, but the soundtrack was well received by audiences and critics alike and went gold. Fisher's track was slated to be the sixth single released from the soundtrack, but unfortunately the label stopped with the fifth one. To make matters worse, Fisher had spent the previous year experimenting with a different, "edgier" sound at the request of a well-known record executive who was considering the band for a recording contract. That meant that Fisher didn't have enough material like "Breakable" to persuade Atlantic to offer an album deal.

Nevertheless, the soundtrack provided invaluable exposure for the group. The record company set up a *Great Expectations* Web site, where visitors could check out the album's selections. The soundtrack boasted several big-name artists, including Tori Amos, Iggy Pop, and the Grateful Dead. Fisher was the only unsigned band in the bunch, and its members were wise enough to use that exposure to their advantage.

INDEPENDENCE DAY

Unable to ink a record deal, Fisher thought about recording an independent album. To do that, though, Wasserman had to overcome his negative preconceptions about indie releases. "I thought that if you do your own CD, you're a loser," Wasserman says. "Which at the time really was the case. If you weren't good enough to be on a major label, you did an indie CD." He began to rethink this premise as he considered the power of the Internet. "When I saw what was about to happen with indie music online, I realized that doing your

FISHER'S TACKLE BOX

Ron Wasserman recorded and mixed Fisher's first album, the independent release *One,* in his home studio. Here's the gear he used to make that album:

E-mu Darwin 8-track hard disk recorder
Macintosh G3/266 MHz
Mark of the Unicorn *Digital Performer* 2.5 digital audio workstation
Digidesign Audio Media III digital audio card
Mark of the Unicorn MIDI Timepiece II MIDI interface
Kurzweil K2000 and two Roland JV-1080 synthesizers
Neumann U87 (rented) and Røde NT2 microphones
Amek System 9098 preamp

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own CD is actually really smart," he says. So the band formed Raw Fish Records, put up a modest two-page site for Fisher, and linked it to the *Great Expectations* site. The e-mail messages started to come in from folks looking to buy a Fisher album.

The decision to record *One* was simply a logical response to the ever-growing online fan base mustered by the *Great Expectations* soundtrack. "The Internet is how we initially started getting feedback from fans," says Fisher. Interestingly, Tori Amos fans in particular seemed to appreciate Fisher's sound. As it turned out, the *Great Expectations* site was linked to the hottest Tori Amos site on the Web, which was extremely helpful in pulling in new people. The demand for Fisher material existed, and it was time to make an album—with or without a major label's backing—or risk missing the wave of interest generated by the soundtrack.

TAKE ONE

The home studio where Wasserman recorded and mixed *One* is centered on an E-mu Darwin 8-track hard disk recorder and a Mac G3/266 MHz desktop computer. He used Mark of the Unicorn's *Digital Performer* 2.5, with a Digidesign Audio Media III card handling the input and output duties. (For a complete list of the equipment used to record *One*, see the sidebar "Fisher's Tackle Box.") Wasserman started the production process for most of the tracks by laying down some drum loops and virtual tracks (bass, pads, and so on). Next he created a stereo submix of these tracks on the Darwin. The submixed tracks were then used as reference tracks against which all of Kathy Fisher's vocals and any other instruments (such as guitars and strings) were recorded. Wasserman says that he recorded to Darwin directly rather than into *Digital Performer* because, at the time, the external stand-alone hard drive recorder was more dependable than the computer-based DAW.

FAVE RAVES ONLINE

Here are Kathy Fisher's and Ron Wasserman's favorite music sites, for musicians and listeners alike.

Amazon	www.amazon.com
Amp3	www.amp3.com
Audio Highway	www.audiohighway.com
CD Baby	www.cdbaby.com
CD Street	www.cdstreet.com
MP3	www.mp3.com
Music Choice	www.musicchoice.com

Kathy Fisher's vocals were recorded with a Røde NT2, which Wasserman says sounds great for an inexpensive microphone. The mic was run through an Amek System 9098 single-rackspace preamp. "It was Rupert Neve's last analog mic pre," says Wasserman. "And for how much it cost, it wasn't that impressive sounding." For additional acoustic tracks, such as drums and strings, the band rented a Neumann U87 mic from Audio Effects, a music-equipment rental company in Los Angeles.

After the vocals and overdubs were tracked on Darwin, Wasserman transferred them to the computer two tracks at a time via S/PDIF. Kathy Fisher's vocal takes were edited together in *Digital Performer* to create the final takes. Any other instrument overdubs that required editing received the same treatment. Wasserman usually added a song's final production elements, such as additional keyboard sounds, effects, and extra loops or samples, after editing the vocal and acoustic tracks.

In spite of the limits of his CPU, Wasserman managed to mix the entire album in *Digital Performer*. "Even though the system didn't have any separate TDM cards for extra processing power," he explains, "I still managed to roll off 32 tracks and a couple of effects." He found *Digital Performer*'s native MAS reverbs and delays "pretty decent sounding" and particularly useful during mixing.

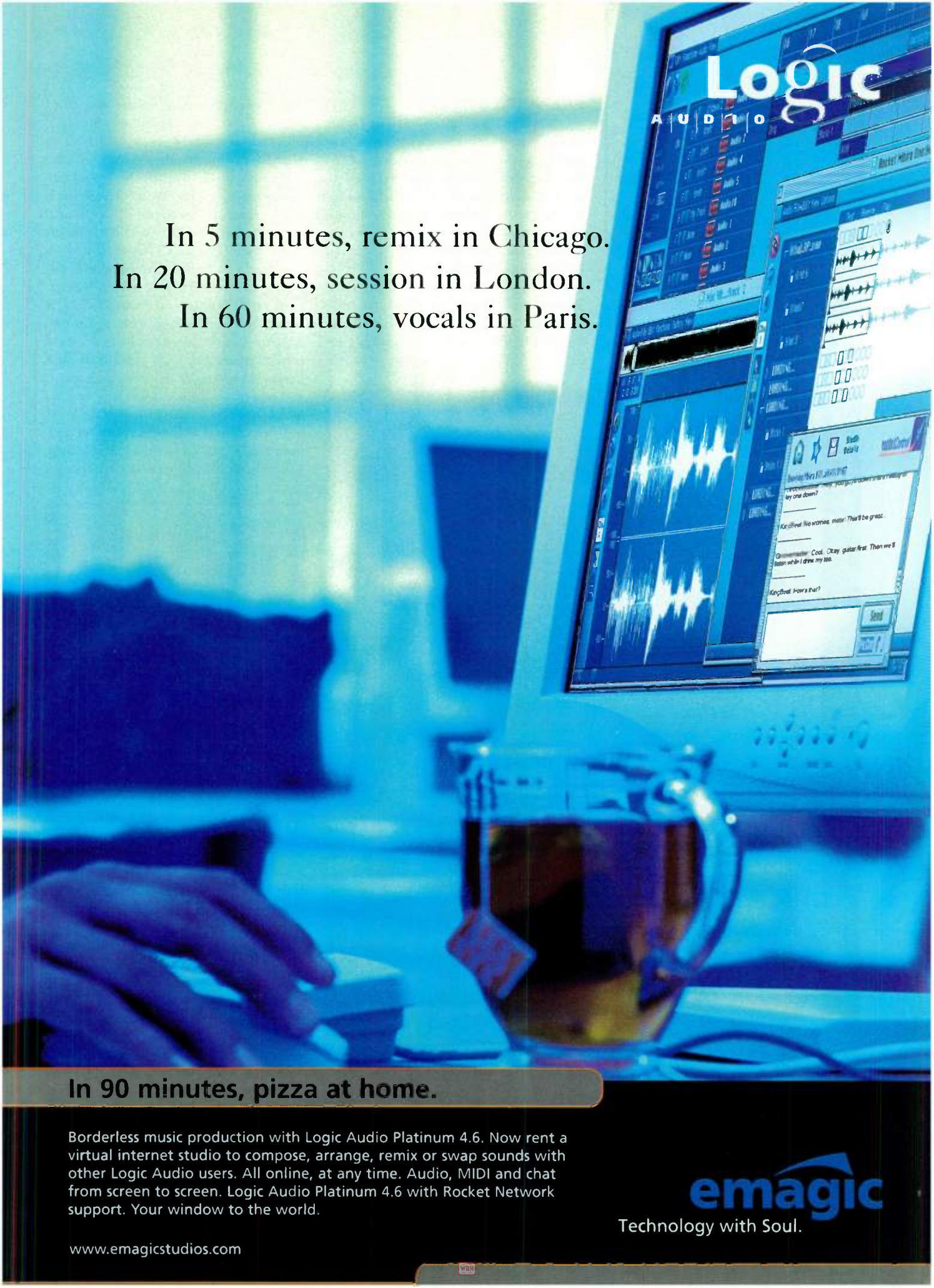
CHOOSING SITES

In early May 1999, right about the time Wasserman was putting the final touches on *One*, MP3.com started to generate a buzz. Wasserman checked out the site and a host of other music-oriented pages. "Because people initially found us through the Internet, that was the logical way to start marketing *One*," Fisher says. The band decided to focus its promotional efforts online using the RealAudio and MP3 file formats.

Wasserman and Kathy Fisher were very picky about where they uploaded their music, adamantly refusing to associate their songs with sites that had slow load times and bad layouts, both of which might have deterred fans from listening to Fisher's music and downloading song files. "We have a thing called 'the Evelyn test,'" says Kathy Fisher. "Evelyn is Ron's mother. She's 80 years old and likes to surf the Web, but she gets easily overwhelmed by sites that are poorly designed." The two show Evelyn a site and see if she can navigate it without getting confused and frustrated. If she can, then the site is deemed suitable for upload. (For a list of the band's favorite music sites, see the sidebar "Fave Raves Online.")

In another smart online marketing move, Wasserman uploaded Fisher songs to several smaller, mom-and-pop sites. "These sites are more likely to do write-ups and reviews," says Wasserman. It was those articles and CD reviews that continued to build the interest in Fisher's music. The ultimate result was enough online listens and downloads to put the group at the top of some of the most popular Internet music charts (for example, the MP3.com Top 40 and Pop Rock charts). Once Fisher reached that point, people checking out the top songs would become interested in the band. "Our position has pretty much become self-perpetuating," says Kathy Fisher.

Wasserman adds, "There are also sites like Rhino.com that go to popular MP3 sites and pick out their favorite tracks. They pirate the MP3 files over to their own sites and highlight these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songs as the top picks you should listen to." Consequently, Fisher's music is featured on more sites than just the ones the band posted uploads on.

PREPARE TO POST

The objective was to sell CDs, so Fisher didn't want to give all its songs away as free files—just enough to entice fans to buy the album. The band decided to post four songs online as MP3 downloads. Three of the songs were chosen because they always seemed to get extremely positive feedback from fans, and one song was a wild card.

The first MP3-authoring software Wasserman tried was Microsoft's *WinAmp*. "When I originally started creating MP3 files," he says, "I couldn't get things to encode right on the Mac. But I had a PC, so I transferred my Mac AIFF files to it and then I converted them to MP3 files using *WinAmp*. I then put the MP3 files back into the Mac and uploaded them to the Web." These days, Wasserman prefers to use BIAS *Peak* 2.0 software, because "the quality is much better than *WinAmp*'s." It also eliminates the need to transfer files between platforms, as *Peak* 2.0 is Mac-based. Wasserman's only complaint about *Peak* 2.0 is that it takes an incredibly long time to encode a file. "It takes about 25 minutes compared to what previously took maybe 35 seconds," Wasserman says.

Wasserman didn't make any special tweaks to optimize the tunes for the Web, but the CD was mastered by Chris Bellman of Bernie Grundman Mastering. Even though Fisher recorded *One* on an extremely tight budget, using little more than Wasserman's modest home-studio equipment, the band didn't skimp on the mastering process. Bernie Grundman's mastering services cost between $300 and $400 an hour, and Wasserman says they went back several times to refine the final master. No matter how inferior an MP3 file sounds compared with the original mix, a solid mastering job helps your MP3 files stand out from the crowd.

CATCHING AN EAR

Eventually, Fisher's online popularity caught the attention of the traditional media. The band was written up in *Hits* magazine, a popular music-industry journal, as the next hot group to watch. That sort of coverage carries a lot of weight in A&R circles, and band members expected the phone to start ringing off the hook with offers. But the phone didn't ring. "We got maybe one call, and I'm sure it was the wrong number," Wasserman says. "We weren't even contacted by any small indie labels—nothing." Catching the ear of a major label was not so straightforward.

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But as it turned out, Tony Ferguson, vice president of A&R at Interscope Records, did have his eye on the group. Aware of Fisher's Internet buzz, Ferguson had also heard of the band through Taxi, an independent A&R organization that Fisher had become a member of as part of its ongoing promotional efforts. Taxi's president, Michael Laskow, and vice president, Doug Minnick, had both brought Fisher to Ferguson's attention. Consequently, Ferguson took Fisher's material to Andy Schuon, the president and CEO of FarmClub.com, and asked his opinion. (FarmClub.com is a Web site created by the founders of Interscope. Artists upload songs to the site, and the public rates them.) Schuon had heard Fisher's music while surfing MP3 sites in search of new talent, and he had been watching the group's progress. Schuon and Ferguson decided to bring Fisher onboard. The only thing needed was final approval from Doug Morris, chairman and CEO of Universal Music Group (the distributor for FarmClub/Interscope Records). Morris also happens to be a cofounder of FarmClub.com.

A few weeks later, with the Christmas holiday fast approaching, Schuon met with Morris in New York. Schuon played Fisher's CD for Morris, and according to Wasserman, "Morris went nuts. He called the Interscope offices and had them stay open into Christmas Eve in order to give us the first offer." At first the label didn't believe Fisher's MP3.com download numbers. "They actually thought we were faking the numbers, so I gave them my access codes to the MP3 stats to clear

things up," says Wasserman. After about six weeks of negotiations, Fisher had a deal. Best of all, Fisher negotiated to keep all its digital rights (for example, download royalties, MP3 dissemination, and so on), a sort of reward for the group's Internet enterprise. At the time, such a deal was unheard-of.

GEARING UP

With the recording contract, Fisher now had a real budget to use for *True North*. But instead of rushing into a major studio and burning through all the money in a matter of weeks, Wasserman decided to build up his home studio for tracking vocals and overdubs and use a professional studio only for recording the more difficult acoustic instruments (drums, strings, grand piano, and the like). Once Wasserman finished all the production and editing at home, the band would hire a top engineer to mix the album in a high-end mixing room.

Wasserman chose Digidesign's Pro Tools/24 Mixplus system as his DAW, and installed it on a Mac G3/400 MHz

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computer. His interface of choice was Digidesign's 882/20 (eight balanced ¼-inch TRS ins and outs and S/PDIF I/O). "I don't see any reason to buy a couple of 888/24s yet, because I'm just monitoring the stereo mix, and doing overdubs one track at a time," Wasserman says. The computer, interface, and other hard drives sit in a closet adjacent to his studio to cut down on equipment noise (see **Fig. 1**). The Pro Tools sessions are backed up to Castlewood 2.2 GB removable Orb disks.

Wasserman paid particular attention to assembling a superclean signal path into Pro Tools. "The overdubs and vocals go through an Avalon 737 preamp into Apogee's Rosetta A/D converter. We purchased a Neumann M 147 microphone for cutting vocals," Wasserman says. "The signal path is real simple, but it sounds excellent.


ERIK HAWKINS

FIG. 1: A closet adjacent to the studio acts as a machine room, keeping equipment noise to a minimum. A hole drilled into the closet wall lets cables through. The computer sits on the floor, and several interfaces are bolted flat to the wall.

The sound I got on Kathy's voice easily matched the sound we were getting at a professional studio running through a Neve console and a vintage Neumann U 67." Everything was recorded into Pro Tools at 24 bits via the 882/20's digital ins, direct from the Rosetta's digital outs. (Even though the 882/20 is only 20-bit, its S/PDIF connections recognize 24-bit word lengths.)

A makeshift vocal booth was constructed in the bedroom. It's a simple affair constructed of several 4-by-6-foot Sonex pads, which hang from the ceiling to create a sort of foam tent (see **Fig. 2**). The house is in an extremely quiet mountain neighborhood outside of Los Angeles proper, far away from air traffic and busy streets. So having a soundproof vocal booth wasn't a concern. "All we needed was a way to take out the room reflections, and the Sonex pads do a fine job," says Wasserman.


ERIK HAWKINS

FIG. 2: Kathy Fisher performs in the band's home-studio vocal booth. Wasserman hung Sonex pads from the ceiling of the bedroom to form the vocal booth and control room ambience.

TAKE TWO

"After pre-production rehearsals with the full band, we went to Mad Hatter Studios in Los Angeles and spent four days recording the basic rhythm tracks to 2-inch analog tape at 15 ips with Dolby SR," says Wasserman. This included all the drums, the grand piano, and some rhythm guitar tracks. "We used a little Sony MiniDisc recorder, which I always brought to rehearsals, to help us reference song tempos and remember ideas while we were recording in the big studio."

After all the tracks were completed, a Pro Tools/24 Mixplus system was locked to the analog tape machine, and the tracks were transferred to the digital domain through Digidesign 888/24 interfaces. "Then it was back to the home studio," says Wasserman. "Recording at home saved a substantial amount on studio costs and allowed us to capture performances when people were ready to play or sing, as opposed to always watching the clock. This really helped get the best possible performances out of everybody.

"After the overdubs were done, I started digging into each track to clean up things such as guitar buzzes, coughs, bad jokes, noise. I also did a lot of vocal comping. Pro Tools allowed me to do all this editing quickly and accurately," says Wasserman. "Cleaning up all the tracks before we went into the big studio to mix saved us a ton of time, because fewer mutes needed to be automated. We probably saved a good two days total, mixing 13 songs, because I did this work ahead of time."

PIANO MAN

When cutting synthesizer parts, Wasserman would often "trash the sounds" to get a dirtier, bigger-sounding track. Because of this, high fidelity wasn't an issue on these parts, so he usually recorded the synthesizers at 20 bits (directly into the 882/20). Wasserman's favorite synth right now is the Access Virus, which he describes as incredible. "I'm using it all over the new album," he says. "It's really great to have knobs that actually do what they say they're going to do." He also uses his old Roland JV-1080s, but says, "They sound a little muffled to me now, though I can still get some great sounds out of them. For example, I made a Mellotron sound out of a couple of flute samples from the orchestral card, and people thought I had rented an actual Mellotron.

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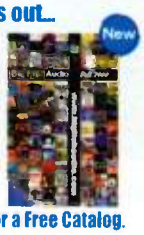

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"When we tracked the grand piano live in the big studio, we used the figure-8 pattern on a couple of AKG C 414s. We wanted that older, warmer sound. It sounded great, way better than any sampled piano. But I wasn't sure I had played the part that well. So when I got home I booted up the *GigaSampler* piano, thinking I was going to recut the track. The *GigaSampler* piano is great, but it just couldn't compare to the actual grand piano." Wasserman went with the imperfect performance. "Sometimes the hardest thing to do is to let go," he says.

However, Wasserman points out, "The new album isn't such a keyboard project, not like the first album. I really backed off." He jokes, "When this album goes on the road, I'm going to have a lot of breaks. *True North* sounds so much better than the first album because we have a real budget and can work with real musicians now—it's great."

THE FINAL MIX

With all the tracks cut and produced, Fisher was ready to mix. The renowned Don Smith (whose credits include songs by the Rolling Stones, Tom Petty, Stevie Nicks, and Cracker) was called in to do the honors. The mix sessions took place in June 2000 at Capitol Records' studio in Hollywood.

"For the mix, we rented a full 48-track Pro Tools system with six 888/24s that we plugged directly into the Neve console at Capitol," Wasserman says. Wasserman thought that Smith would want to transfer some of the tracks he'd recorded at home back to 2-inch tape to warm them up. However, by the end of the mix sessions not a single track had been transferred. Smith had never mixed an entire album exclusively from Pro Tools. "But apparently he thought everything sounded just fine," says Wasserman. "A great advantage of using Pro Tools to mix was having the ability to loop a little part and let Don really dig into the sound."

They didn't have to squander a lot of time cueing up the tape to make multiple passes over a particular part, either. "Working with Pro Tools has, again, saved us time and simultaneously given us the best possible mix results by letting us really focus on specific sections," says Wasserman. "Though Don does say he misses his 'rewind breaks.'"

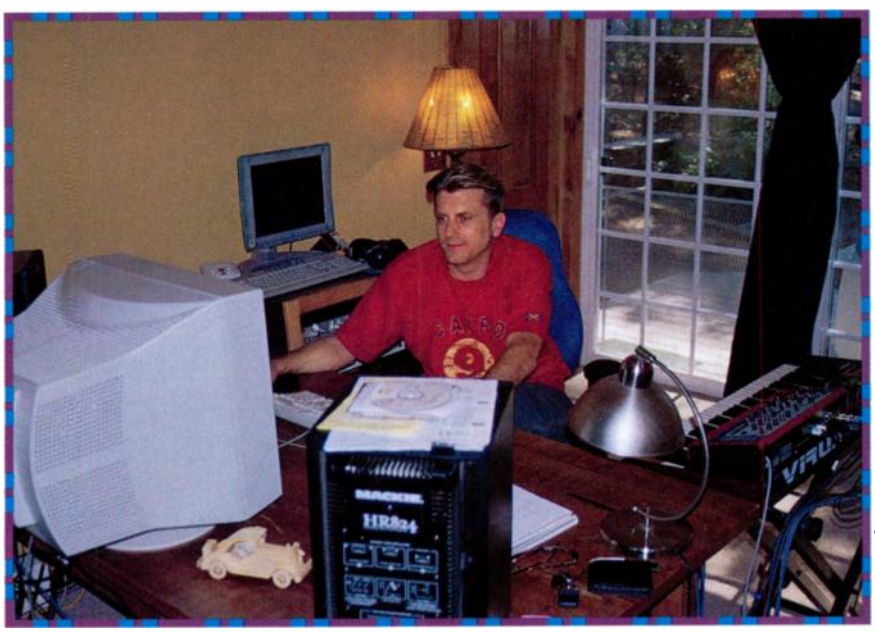
A popular plug-in during mixing was *Amp Farm* by Line 6. "On a lot of the guitars we used *Amp Farm*," Wasserman says. "The guitar players we work with actually prefer the sound of *Amp Farm* over miking a cabinet." Wasserman likes to record the guitars dry and then use the plug-in to beef them up in the mix. *Amp Farm* allowed complete flexibility with the sound of the guitar tracks, giving Wasserman anything from big distortion to subtle overdrive effects. "When Don wished a guitar sound were a little bigger, it was like, 'Hey Don, look what I can do—try this with those Rolling Stones tracks.'

But the biggest gift came from Pro Tools. "Its ability to nudge tracks using the QWERTY keyboard's arrow keys—that's the best thing," Wasserman says. "You can knock things off by a sample or a beat and have this incredible new part that works." But he warns, "The bottom line is to be careful about going overboard on tweaking. Truly great performances always include some degree of imperfection." Today's plug-ins make it extremely easy to over-perfect everything, and that can sap the life from your music.

ONLINE

Fisher landed a record contract not only because it has a solid act and great songs (essential ingredients for any artist), but also because people knew about the band—fans and A&R execs alike. The group intelligently used the Internet to capitalize on its first success (the *Great Expectations* soundtrack), a move that garnered additional attention, built a global fan base, and put the band at the top of the Internet music charts. After Fisher had spent months at the top of those charts, it was virtually impossible for A&R scouts to surf the Web and not run across the band's name.

It would be ludicrous to say that anyone can do what Fisher has done, because nobody can follow another band's path exactly. But Fisher's journey from being an unsigned group to making it as a major-label band serves as an interesting case study. It shows what talent, marketing smarts, technical know-how, Internet savvy, and steadfast determination can do for your career.



ERIK HAWKINS

Wasserman's home-studio setup is very streamlined. Here, he sits in front of his Pro Tools system, working on a vocal edit.

Erik Hawkins *is a musician/producer working in Los Angeles County and the San Francisco Bay Area. Visit him at www.erikhawkins.com for more equipment chitchat and tips on what's hot for the personal studio.*

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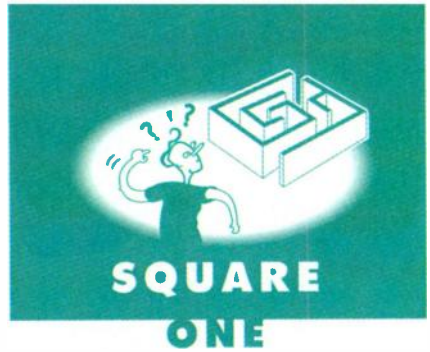

Phase One

Contrary to popular belief, phase and polarity are not the same thing.

By Jeff Baust

In the audio world, you often see the words *polarity* and *phase* used interchangeably, which might lead you to believe that they mean the same thing. However, these terms refer to two different concepts. I'll look at each concept, discuss how they relate to one another, and give you some examples that illustrate them in terms of music production.

JACK DESROCHER

POLAR REGIONS

Polarity refers to the positive and negative values of a signal voltage. Consider the sine wave in **Fig. 1a**. This waveform, like all analog audio signals, is an alternating-current (AC) signal, which means that the signal voltage repeatedly alternates from positive to negative. The voltage starts at 0V, goes positive, then negative, then back to 0. This completes 360 degrees of the waveform, or one cycle.

Now look at the sine wave in **Fig. 1b**, which is a copy of the first. The voltage starts at 0, goes negative, then positive, and ends up back at 0. This waveform is like a mirror image of the original, because its polarity is reversed, or inverted, with respect to the original. Whenever the first sine wave's voltage values are positive, the second wave's voltages are negative, and vice versa.

If you add these signals together, perhaps by summing them in a mixer, the two signals cancel each other out, as illustrated in **Fig. 1**. At every point in time, you are adding equivalent positive and negative voltages, and the result always equals 0V. If the signals have different amplitudes, they will only partially cancel each other. This makes sense, because at every point in time, you are subtracting the lesser voltage of one sine wave from the greater voltage of the other. The signal that remains is the difference in voltage between them.

The situation is the same with all signals, not just sine waves. For example, if you mix a trumpet recording with an inverted copy of itself, the two signals cancel out, just as with the sine waves.

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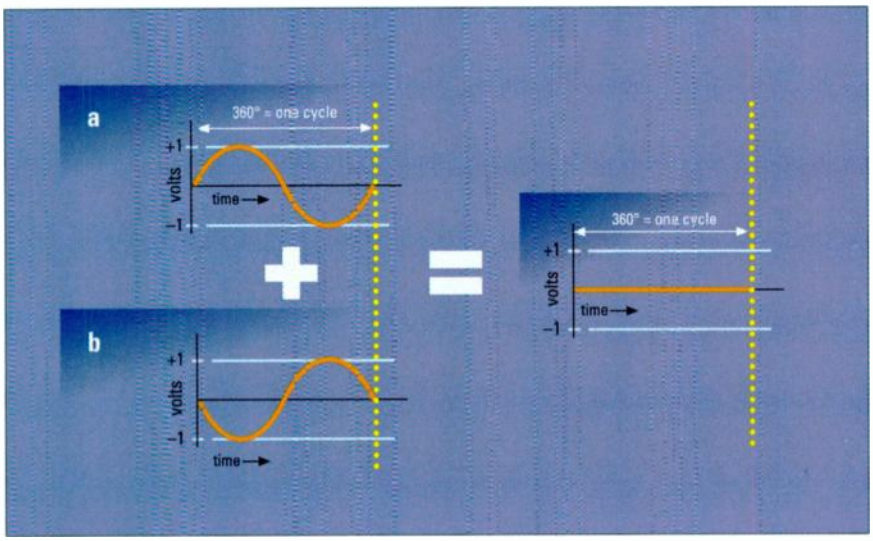

FIG. 1: Sine waves a and b have the same amplitude and frequency, but their polarities are reversed. When they are added together, they cancel each other out.

Again, at every point in time, equivalent positive and negative voltages are added together, regardless of the complexity of the signal. The result is always 0V.

Obviously, the result is different when you sum two different signals. If you are mixing a recording of a flute with a recording of a trumpet, inverting the polarity of the flute track might give the mix a slightly different timbre or tone. However, the signals are not identical, so they won't cancel each other out.

PHASE OUT

Whereas polarity refers to the values of a signal voltage, phase concerns the time relationship between identical signals. The sine waves in **Fig. 2a** and **Fig. 2b** are exactly alike, but the second signal begins a quarter of a cycle later than the first. Whenever two identical signals begin their cycles at different points in time, they're *out of phase*. The time difference between them is called the *phase shift*, and it is measured in degrees. In **Fig. 2**, the two signals are 90 degrees out of phase. If you add these signals together, they won't cancel each other out. Instead, the voltages add up at each point in time to create an output waveform with a greater amplitude than the original's.

Sine waves are great for illustrating these concepts, because they have only one frequency component: the fundamental. Musical tones are more complex and interesting, because they contain a fundamental frequency plus many overtones. These frequency components are called *partials*. Each partial is really a sine wave at a particular frequency, and the combination of the partials creates the timbre of the sound.

When you combine a complex signal, such as a trumpet recording, with a copy of it that has been shifted in phase, the partials add to and subtract from each other in several ways. Depending on the amount of phase shift, some partials cancel completely, some partials are only reduced a bit, and others reinforce each other and increase in amplitude. This phenomenon of cancellation and reinforcement at different frequencies is called *comb filtering*, because a graph of the areas of cancellation and reinforcement resembles a comb (see **Fig. 3**).

If the phase relationship between the two signals changes, the comb filtering changes as well. The comb filtering can change even more if the phase-shifted signal is reversed in polarity, changing all the cancellations and reinforcements accordingly. The comb filtering also changes if the phase-shifted signal is greater or lesser in amplitude than the original.

CROSS RELATIONS

Now I'll look at how phase and polarity are related. Go back to **Fig. 1** to see a sine wave and a polarity-reversed copy of it. Imagine that instead of being polarity-reversed, the copy was delayed by half a cycle, or 180 degrees. The result is unchanged. Because sine waves have only one partial, inverting the polarity of a sine wave produces the same result as shifting it 180 degrees out of phase.

This isn't true with complex signals, because they contain many partials at different frequencies. As a result, each partial's cycle has a different length, which means they can't all be shifted by half of a cycle at the same time. For example, **Fig. 4** shows the components of a complex tone with a fundamental frequency of 100 Hz and other partials at 200 Hz, 300 Hz, and 400 Hz. The partials have been graphed separately to illustrate the different cycle lengths.

Suppose you make a copy of this signal and shift the copy's phase by 180 degrees at the fundamental. The copied signal would be moved in time by one-half of the fundamental's cycle. If you then combine the original and the copy, the fundamentals

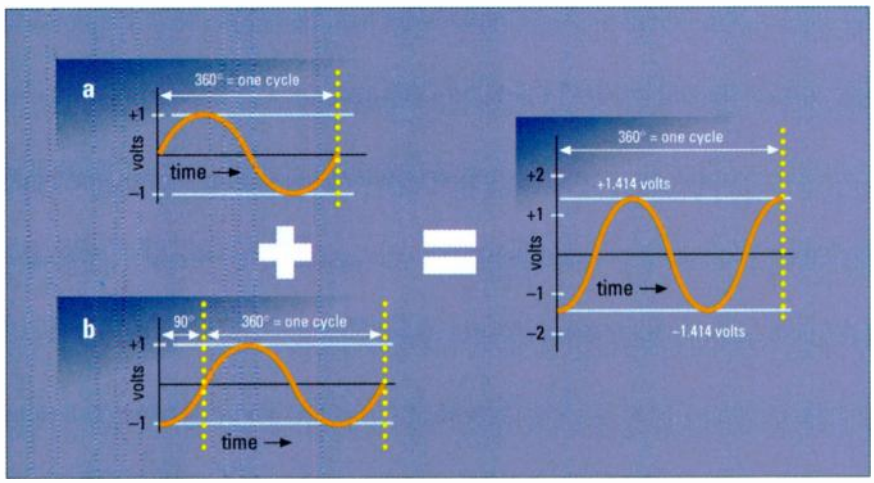

FIG. 2: Sine waves a and b have the same amplitude and frequency, but they are 90 degrees out of phase. When they are added together, a single sine wave with greater amplitude is created.

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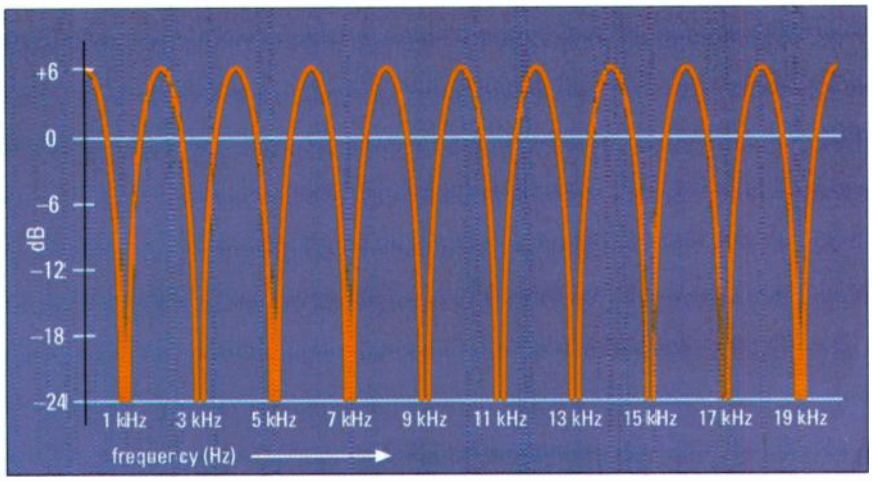

FIG. 3: When a complex signal is added to an out-of-phase copy of itself, comb filtering results. The term *comb filtering* stems from the appearance of the spectrum that is produced.

cancel each other out. Just as in **Fig. 1**, the voltages would always add up to 0V.

However, the next partial, 200 Hz, has a cycle that is only half as long as the fundamental's cycle. When the fundamental is shifted by 180 degrees, the second partial is shifted by one full cycle, or 360 degrees. Therefore, the second partial retains the same polarity in both signals (offset by one cycle), and its amplitude doubles instead of getting canceled out. The phase shift of the third partial is 540 degrees, or one cycle (360 degrees) plus 180 degrees more, so it's canceled out. At 400 Hz, there's 720 degrees of phase shift. Because 720 degrees is twice 360 degrees, or two complete cycles, the 400 Hz partial also doubles in amplitude. In this simple example, the odd-numbered partials are canceled out, and the even-numbered partials double in amplitude. The result is comb filtering.

The bottom line is this: applying a phase shift of 180 degrees to a complex signal is not the same thing as reversing its polarity, as it is with sine waves. Nevertheless, identical signals with opposite polarities are often referred to as being "out of phase." For example, on many mixing consoles, each input has a switch labeled "Phase," and the user manual might say that the switch "puts the signal 180 degrees out of phase." This switch doesn't really shift the signal in time; it simply inverts the signal's polarity.

Why the "Phase" label? Well, in the early days of electronics, the term *phase* was used to refer to the polarity of audio signals, and the word *polarity* was reserved for describing power signals. Technically, this terminology isn't correct for complex signals, but the industry still uses this convention.

FIX IT IN THE MIX

Proper handling of signal polarity and phase is an important part of audio production, because unintended comb filtering can ruin a project. However, we can apply these concepts in creative ways as well.

For example, critical analysis of music mixes is an excellent way to learn new ideas and techniques for your own work. Manipulation of signal polarity can be a useful tool in such analysis. Think of a stereo mix as having three basic components: sounds in the left channel (A), sounds in the right channel (B), and sounds common to both channels. We can often learn how music is mixed by listening to these components separately. One way to do this is to cancel out the sounds common to both channels and listen critically to the remaining sounds. This technique sometimes called *A-B listening*.

To analyze music through A/B listening, connect the outputs of your source, such as a CD player, to two channels of a mixer. Pan both channels to the center, and then reverse the polarity on one of the channels. Any sounds that are equal in both channels of the mix are canceled out, because their polarities in one channel are inverted with respect to the same sounds in the other channel. The mono signal that remains contains the sounds that were panned to the left or right channel, but not both. (Sounds that are more pronounced in one channel than in the other in the stereo mix are reduced in volume in this inverted mono mix, but they are not eliminated completely.) Comparing this signal with the stereo mix, as well as with the complete (noninverted) mono signal, helps you learn more about the reverbs, backing parts, stereo spreads, and other details that are often masked by the more prominent parts of the mix.

Manipulating signal polarity can help fix problems as well. For example, suppose you do a multitrack recording of a band, and you send each instrument

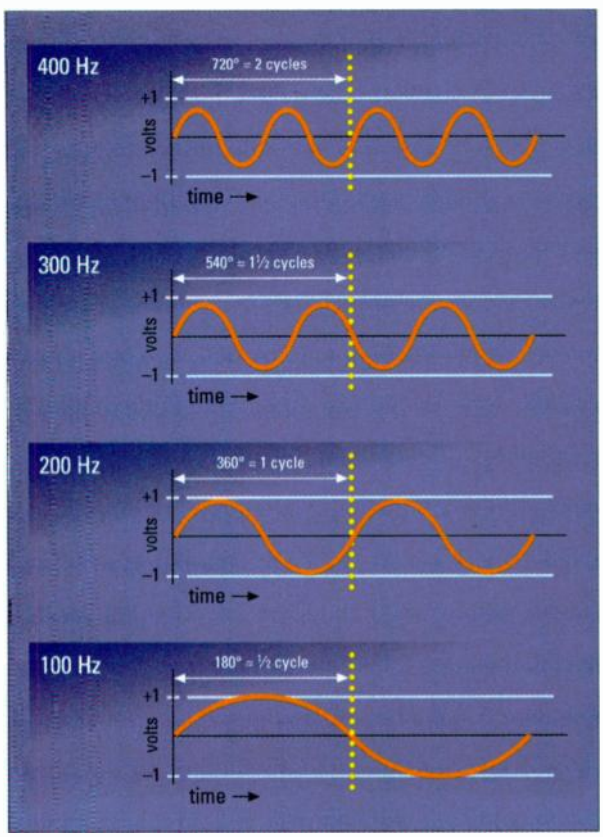

FIG. 4: Complex tones, such as musical sounds, contain many partials. Here, the first four partials of a simple musical tone are shown. You can see that each partial's cycle is a different length.

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to a separate track. Later, while listening to the playback, you discover that you mistakenly sent some of the guitar signal to the synth track.

You may be able to fix the synth track. First mute everything but the synth and guitar tracks. Reverse the polarity of the guitar track and mix it in with the synth track. Change the level of the inverted guitar track until you find one that removes most of the guitar sound, leaving just the synth part. Bounce the result to an open track, and the problem is solved! This technique doesn't work in all cases, but it might get you out of a tough situation now and then.

Creative use of phase shift is another powerful tool in music production. For example, a common technique for recording a guitar amp is to place one mic right up to the speaker cabinet and a second mic just a foot or so behind the first. The mics pick up the sound from the amp at different times, which means the signals are out of phase. When you mix these signals together, some frequencies cancel each other out, and some reinforce each other. The resulting comb filtering often creates a guitar timbre that a single mic can't capture. If you don't like the sound, move the second mic back and forth until you find just the right spot where the comb filtering creates an interesting and useful sound.

The same technique can also be employed in mixing. Suppose you are mixing a tune, and something isn't quite right about the bass track. The performance is great, but the tone just isn't cutting it. You've fiddled with EQ and compression, but the right sound eludes you. Split the track into another mixer input and insert a delay on it. Set a delay time of less than a millisecond, as low as 0.1 ms, with no feedback. By adding the two inputs together, you create a comb-filter effect for the bass track, again generating tones that might not be achievable with simple EQ.

On many mixing consoles, each input has a switch labeled "Phase."

By using different delay times and adjusting the balance between the original signal and the copy, you can create many different timbres. Don't forget that you can also reverse the polarity of the delayed signal, which gives you even more tonal variations. This approach works great for lots of sounds, particularly snares, kick drums, basses, and guitars.

FINAL CYCLE

Manipulating signal phase and polarity can be a powerful tool in audio production, in subtle and dramatic ways. Once you understand the difference between these concepts—and know what to expect—you will find other interesting techniques for your work. Just remember to check your mixes in mono!

Jeff Baust *is an engineer and freelance composer in Boston and New York City. He is also on the faculty of the Berklee College of Music.*

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Navigating the A&R Jungle

What record label execs want in a demo.

By Michael Kohn

By the mid-'90s, rap-rocker Kid Rock had been dropped by two record labels, yet he still regularly packed 1,200 fans into hometown bars, sold a lot of creatively designed merchandise, and tirelessly worked a network of interns to promote his music throughout the country.

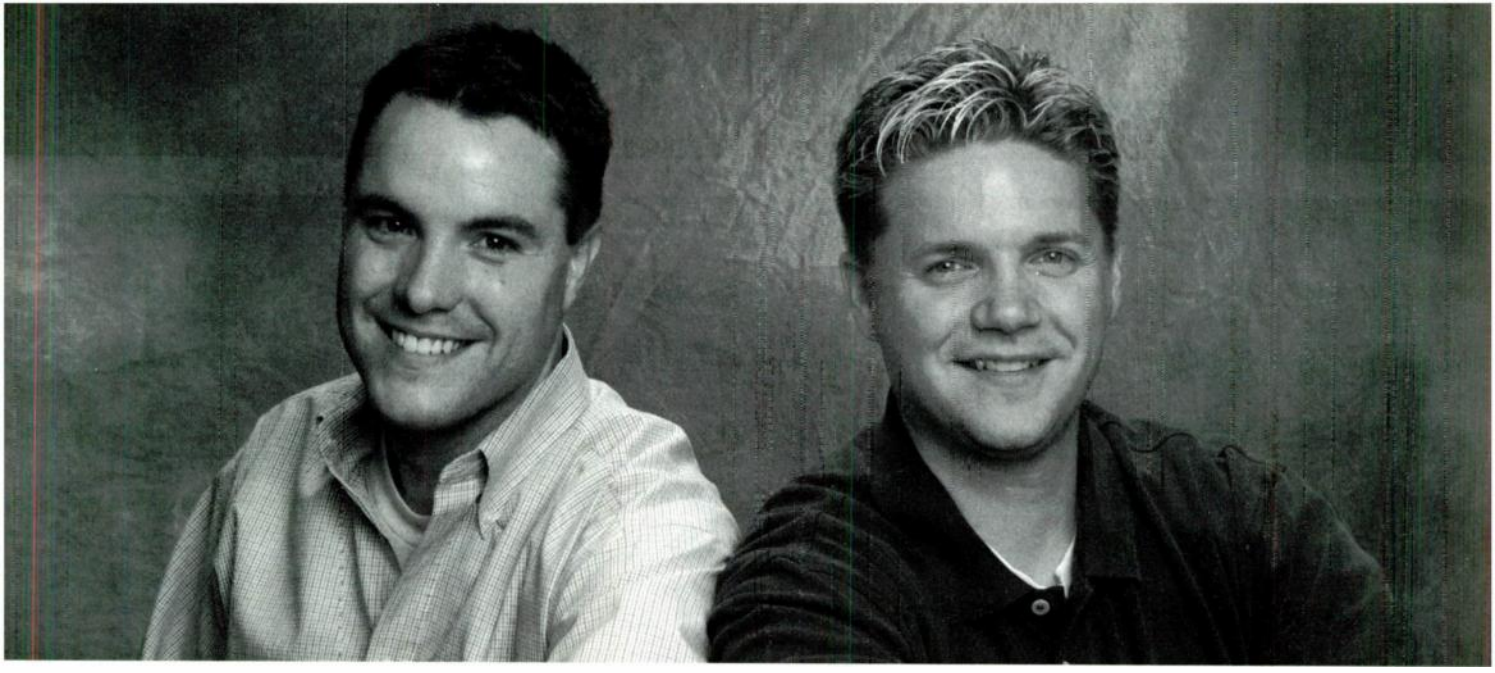
Temple of the Dog, Kid Rock's rudimentary basement studio in Detroit, featured two ADATs, a 16-channel Mackie mixing board, cheesy guitar stompboxes, a couple of turntables, and a massive collection of vinyl records. That basic gear spawned a cheap cassette demo, which led to another recording contract and the release of *Devil Without a Cause*, which has since sold more than 9 million copies.

CLAY PATRICK McBRIDE

Even after he was dropped by two labels, Kid Rock continued to promote his music and merchandise and worked to draw large audiences to his live shows. His efforts earned him a contract with Atlantic/Lava Records.

Andy Karp, Atlantic/Lava Records' A&R director, has seen a lot of fledgling groups in his ten years with the company. He calls Kid Rock's budding empire "a pretty impressive operation for a local musician." Kid Rock's tape and promotional efforts intrigued Karp so much that in December 1996 he flew to a Kid Rock show in Cleveland, where the performer crawled out of a coffin to perform for only 50 people. They inked a deal in October 1997, and Karp's nervous answering-machine message about the deal was later immortalized by Kid Rock on the track "Where You at Rock."

One of the mysteries of the music industry is how some bands get signed while others languish in obscurity. Most musicians know that they have to be talented and ambitious to make it big, but what exactly is it that grabs the attention of that crucial audience—the A&R executive? What do they want to hear when they pop a demo into their stereo system and press Play? As Kid Rock's road to success demonstrates, a combination of factors makes A&R execs sit up and



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take notice, but the crucial element in getting signed is a good demo.

WHAT THEY LISTEN FOR

Since the dawn of the record industry, the rule has been the same: a demo must first work on the most primitive level. It must grab the listener like a caveman and sock him or her over the head with a club of song, singer, and personality.

"Here is the secret rule: a melody, a lyric, and a performance, all with a rhythm track that makes you want to dance or have sex," says Dave Novik, RCA Records' senior vice president of international A&R. An A&R veteran with 26 years in the field, Novik has been with RCA for the past eight years. He is surrounded in his office by memorabilia of the artists he brought to the label, including gold and platinum discs of 'N Sync, Natalie Imbruglia, and Republica.

"A band needs to have a vision. They need to have an idea of who they are, where they're going, and what they want, because that's what we're buying into," Novik says. "We're buying into their whole package, who they are musically, intellectually, and visually."

Karp says energy, chemistry, attitude, and good songs are the key requirements for a successful demo. "If someone has star quality, it sticks out like a sore thumb," Karp says. (For an overview of A&R and its role in the music industry, see "Working Musician: A&R Primer" in the June 2000 issue of **EM**.)

THE PRODUCTION QUESTION

The importance of production in a demo, however, is in the ear of the beholder, as opinions vary among top professionals. Although most profess to be able to hear through any type of production to the underlying artistry, a song produced to sound like a hit record is certainly a big plus for those seeking the Holy Grail of the music business—a big-time record deal.

A demo must first work on the most primitive level.

The well-dressed demo. "I'm a producer myself, and I would be the first to admit there's no way to not be influenced in part by recording," says Bradley Kaplan, director of A&R for Warner Brothers Records. "When you hear a great singer who is recorded in a really cool way—which doesn't have to be high-tech or expensive—it definitely is more seductive. It makes our job easier."

Renowned guitarist, songwriter, and producer Nile Rodgers believes he owes the start of his recording career to a master-quality demo of his first number-one hit, Chic's 1977 disco classic, "Dance, Dance, Dance (Yowsah, Yowsah, Yowsah)." "The only reason I got a record deal was because I walked in with a record," Rodgers says. His career highlights include working with David Bowie, Madonna, and Duran Duran. Rodgers currently runs his own production company, Nile Rodgers

Productions, and distribution company, Sumthing Distribution.

According to Rodgers, an artist with a stripped-down, bare-bones demo doesn't have a chance in today's market. A polished track is "the most effective leveraging tool," he says. When he started in the business, most artists were limited by the cost of professional-studio time and could present only thumbnail examples of the music they envisioned. Now, tools once available only in world-class studios are just a mouse click away in a desktop studio, and Rodgers hasn't heard a stripped-down demo in a long time. "Have your vision as complete as possible. Try to make your record," Rodgers says. "Why should A&R people accept less when they can have more, when they routinely get finished products?"

The stripped-down demo. However, the days of the bare-bones, no-frills demo are not over. Singers with a less-is-more approach to production can still shine on a demo featuring only vocals with piano or acoustic-guitar accompaniment.

Sony/Epic/550 Music's Michael Caplan, senior vice president and A&R department head, signed artists such as Ginuwine, Living Colour, and G. Love and Special Sauce. "I've signed a lot of deals off live board tapes or people playing acoustically for me in the room," Caplan says. "I don't really require that people spend a lot of money."

Pete Ganbarg, senior director of A&R for Arista Records, also places less importance on production. "Production for a demo isn't really important as long as the strength of the artistry and music and songwriting comes across," Ganbarg says. "I'm much more interested in the substance than the style." Ganbarg knows his substance: he served as musical quarterback for Carlos Santana's *Supernatural*, which sold 13 million copies.

Renowned guitarist, songwriter, and producer Nile Rodgers advises musicians to put together the most polished and well-produced demo possible.

The overproduced demo. The experts agree that the quality of demos has dramatically improved as a result

of the personal-studio boom. The dark side of that boom is that a producer can create a Frankenstein's monster of a demo, in which overuse or inappropriate use of the technology overpowers the songwriter's vision.

"People tend to pad recordings with all kinds of effects just because they can, or think they should. You should work very hard to figure out the essence of the song first," says Karp. "If you can't fit everything in, then there's probably stuff that doesn't need to be there and is just getting in the way. Any reggae band will tell you that it's all about the space."

Glossy slickness is not even desirable in many forms of music, such as hip-hop, according to Public Enemy's Chuck D. "Cleaner doesn't necessarily mean better in all music," he says. "You still knew what a good song was when listening to AM radio. No matter what process you make it with, a bad song is just a bad song, based on how it's arranged and the vocals."

Sometimes bad material is treated to excellent production, but A&R people can see through it. Sean Roberts, TVT Records' director of A&R, who signed hard-rocking Sevendust, says that many of the demos that land on his desk received better production than they deserved. "You can't really polish a turd," he says. "I've heard some really horrible bands with really horrible material who sounded awesome."

DO'S AND DON'TS

When you're creating your demo, plan for maximum immediate impact, because listening time is precious among A&R people. They probably won't give your demo their full attention unless it grabs them and sucks them right in. Because A&R reps spend so much time on the phone, your CD may wind up as background music, aural wallpaper competing for attention with computers, MTV, and various other business interruptions.

"There's far less time to listen to music in A&R than you might think,"

Industry veteran Chuck D of Public Enemy doesn't believe that demos have to sound totally clean to win the attention of a major label.

GETTING NOTICED

The tried-and-true way to get A&R folks to listen to your demo is to create a buzz on a regional level. "The best thing that any band can do is to give us a reason to want to find them," Atlantic's Andy Karp says. "Bands are best served by having as much as possible going on around them when they sign their deal. It also helps them get a better one."

The Dave Matthews Band built its career for years, locking in solid touring, a manager, and promoters before sitting down at RCA Records' conference tables. "They did it all themselves, and that is probably the best time for a record company to be involved in a band, when much of the initial legwork has been done," RCA's Dave Novik says. "I don't want to hear a demo from you unless you have your stuff together." That means having a potential manager, attorney, and music publisher ready to go.

The discs that rise to the top of an A&R rep's demo pile are usually the ones submitted by respected industry contacts, which include agents, concert promoters, club bookers, and radio-station programmers. Novik prefers to hear from one of these professionals instead of the band members. He suggests building a career to the point at which the demand is so high that retailers must stock the record and radio stations have no choice but to play it.

"Kick butt locally and you have a better chance of kicking butt nationally, or even internationally," Arista's Pete Ganbarg says. "If you can prove in your own backyard that you have what it takes to succeed, then all the major label has to do is come in and do some polishing." This strategy might be easier in a smaller town than in an industry hotbed such as Manhattan or Los Angeles, because an artist can be the proverbial big fish in a small pond.

Ganbarg recently signed Shannon Curfman, a 14-year-old whose bluesy style has been compared to that of Bonnie Raitt and Melissa Etheridge. Curfman's self-released recording, *Loud Guitars, Big Suspicions,* was selling about 500 copies a week in her hometown of Minneapolis when she was signed. "If it's blowing up, we'll find out," Ganbarg says. "I would rather artists go out and start a buzz and I call them, instead of them calling me."

Live performance is still a crucial component in getting signed in rock or alternative music, but not necessarily in the urban or pop genres. In fact, most A&R people admit that they see bands in the clubs only when necessary, usually when they're already interested in an act.

The Internet has blossomed into another tool for A&R people, so developing a Web site can serve as an important step toward getting signed, as is getting your music on other music-related sites. Most industry insiders surf the Net in search of new talent. Michael Caplan of Sony/Epic/550 regularly searches cyberspace for MP3 files, and he actually signed moe. after seeing 500 kids in a chat room discussing the band.

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Karp says. A&R people receive an average of 50 demos per week, and some of them get more than twice that. Of all those acts, each executive signs only one to four acts a year.

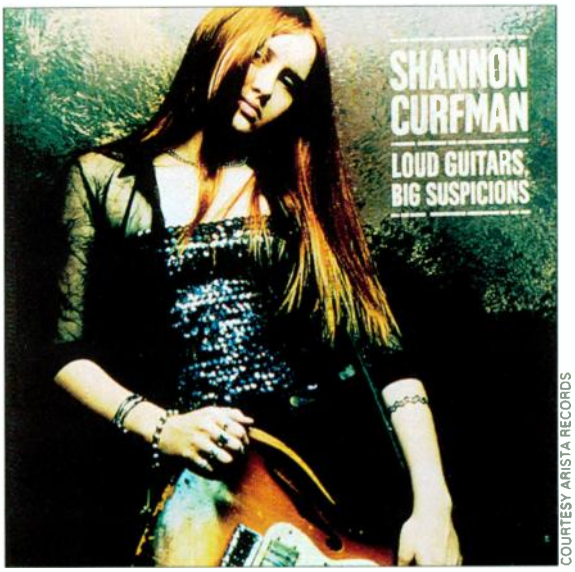
A horrible demo that hits way off the mark may get as few as 15 seconds of listening time, but most A&R execs say they that try to get through at least the verse and chorus of a few tunes. Many listen to everything they receive, usually taking at least a few weeks to do so, but they say they rarely find anything worthwhile in unsolicited material. (See the sidebar "Getting Noticed" for tips on getting the attention of A&R people.)

The songs. Ideally, a demo contains between three to four songs, none of which pass the four-minute mark. Carefully choose which material to include by gauging audience reaction at your live shows. Also, have more songs recorded for a follow-up in case you do pique a label's interest. If you send a full-length album instead of a short demo, identify the best tracks by highlighting their titles or listing them on a sticker on the cover.

Always put your best song first, as that may be your only chance to grab the listener's ear. Get to the chorus quickly, and keep the lead vocal up front in the mix, instead of burying it in reverb or other effects. Check your tapes and CDs before you send them to make sure your music was actually duplicated. Be certain to send your demo to a company that fits your musical style.

A successful demo must show focus and direction and not jump stylistically from one song to the next. "One of the biggest problems," Ganbarg says, "is trying to do too much and be too many things at once, stylistically and production-wise."

Caplan adds, "Unfortunately, diversity is now viewed as schizophrenia in the business. I love the Beatles' *White Album* because it's diverse, but now it would be viewed as being all over the place."



COURTESY ARISTA RECORDS

The success of 14-year-old blues dynamo Shannon Curfman is a good example of how hard work and self-promotion can pay off in a big way.

Packaging. Keep the demo package simple. Desktop publishing lets artists come up with more-elaborate packaging, which frequently results in excess garbage. Elaborate, expensive press kits are generally a waste of time and money; many A&R people never get to see them because their assistants separate them from the demo. Besides, A&R executives cannot be seduced by packaging. They're searching for good music, no matter how it's wrapped.

Do, however, be thorough when putting your package together. Make sure every item—especially the CD or tape—includes a current contact number, and an e-mail address and fax number if you have them. Label the spine of the CD with the band's name so it will be easier to find in the plastic mountain of jewel cases on an A&R person's desk. While a photo is not

EXTREME MUSICIANS

Musicians will sometimes go to extreme and occasionally frightening lengths to get their music heard. Demos arrive at record companies with huge packages of bows, balloons, flowers, candy, T-shirts, and even women's panties. Some A&R men admit that they listen to the packages that include photos of naked women, particularly if the women are part of the group.

One manager went one step further, sending strippers to Andy Karp's Lava/Atlantic office as a special bonus incentive. "I sort of felt guilty not listening to it, and I was really uncomfortable with the fact that the strippers were here. The guy went to the expense of sending them, so the least I could do was listen to his tape. It definitely got my attention," he says. But the ploy failed. The music received a big thumbs-down.

An unusual promotional video recently arrived at Maverick Records. It featured a husband and wife singing a song while having sex. "They were both, unfortunately, kind of scary, so that didn't work for me," says Michael Taylor, Maverick's New York A&R rep.

Sometimes the delusional even get violent. Nile Rodgers once had a gun pulled on him at a music-industry seminar. "I've had to call private detectives and the FBI more than a few times," Rodgers says.

The bottom of the barrel, the place an artist least wants to wind up, is the dreaded Wall of Shame. Some of the photos that arrive at record companies immediately sink to the bottom of the heap. Bulletin boards and walls behind doors display the worst of the worst, which range from inappropriate and freakish to the downright bizarre and surreal. What could the devil worshiper possibly have been thinking when he sent his naked picture to a major record label?

Because their jobs force them to listen to some pretty horrible music, some A&R people gleefully share their amusing—and sometimes horrifying—finds with their peers and visitors.

So before you act on your bright idea for grabbing the attention of that A&R person, remember the Wall of Shame—lest you join the legion of rejects.

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always necessary, it can be helpful, particularly if the band or its front person looks cool. A compact biography and some technical information about how the demo was recorded, are good additions. A compelling and simple live video can also be a big plus if your act is visually interesting.

Many musicians go way overboard with their demos in the mistaken belief that any attention is good attention. See the sidebar "Extreme Musicians" for a few hilarious examples of promotional attempts that went too far.

YES, MASTER

Thanks to the dramatic improvement in project-studio recording, more demos than ever before are being released as the final albums, usually after being remastered and tweaked with some re-recording or remixing. Although most pop records still require the slickness of the top professional studios, hip-hop and dance music are primarily the products of the personal studio.

"Demos are really a thing of the past with dance music," Roberts says. "When you're dealing with dance music, what's done in the home studio is generally just as good as anything done in a formal studio, depending on the artist's gear and talent and skills as a producer."

With big commercial studio rates running about $1,000 to $2,000 a day, "it's cheaper to buy studio stuff for your home and take your time with your record to make sure it sounds exactly how you want it to," Roberts says. For instance, TVT's Expansion Union and Supa DJ Dmitry (of Deelite fame) recorded their recent releases at home.

The majors have also released demos—after additional sweetening, mixing, and mastering. Albums that were recorded by Sony's Ginuwine, G. Love, and Arista's 14-year-old blues guitarist/vocalist Shannon Curfman are notable examples.

Choose your material by gauging audience reaction at your shows.

"THE CREAM RISES . . ."

The music business continues to redefine itself, and technology helps lead the way. But according to Rodgers, one thing has not changed in his two decades in the music business. "The cream rises to the top," Rodgers says. "It's never been more terrifying, and it's never been more exciting."

Although the dizzying array of recording gear can give a rock star wanna-be a competitive edge, the road to the top can still be paved cheaply with good old-fashioned talent and creativity. Kaplan sums it up best. "Writing is still free," he says. "The most valuable commodity in the entire business is the writing."

Michael Kohn *is New York-based drummer/songwriter/newspaper publisher/freelance journalist. His new band, SweetSpot, performs around New York, and he's currently working the band's demo through the A&R jungle. You can reach him at SweetSpotBand@aol.com.*

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REVIEWS

ROLAND

VG-88

Roland offers an entire guitar shop in a box.

By Jeff Burger

Several months ago, I set out in search of the perfect guitar—one that can handle everything from funk to metal, jazz to Texas rock. After thrashing through a zillion permutations (and people's opinions) of pickups, wood, electronics, craftsmanship, and other sonic signifiers, I ultimately came to the same conclusion that many guitarists do: serious players use multiple guitars for a reason.

Then I remembered Roland's Virtual Guitar modeling technology and its latest incarnation, the VG-88. Within a single device, I found most of the guitars I'd been looking for—and more.

SETTING THE STAGE

Modeling has become a technology to be reckoned with in terms of emulating existing instruments and gear. The general idea is that engineers analyze how these devices make sound under various circumstances and re-create those characteristics with digital signal processing (DSP). Guitarists are probably most familiar with modeling devices such as the Line 6 Pod and Tech 21 Sans Amp. These devices emulate classic amps, such as Fender Twin Reverbs, Marshall stacks, and Mesa Boogies, and they're no larger or more costly than a modest pedalboard. However, these devices model only the amp and effects, leaving you with the basic sound of your guitar.

One of the big buzzes at the 1995 Winter NAMM show was Roland's VG-8

The VG-88 hosts a guitar shop's worth of vintage guitars, pickups, amps, cabinets, and effects under one virtual roof.

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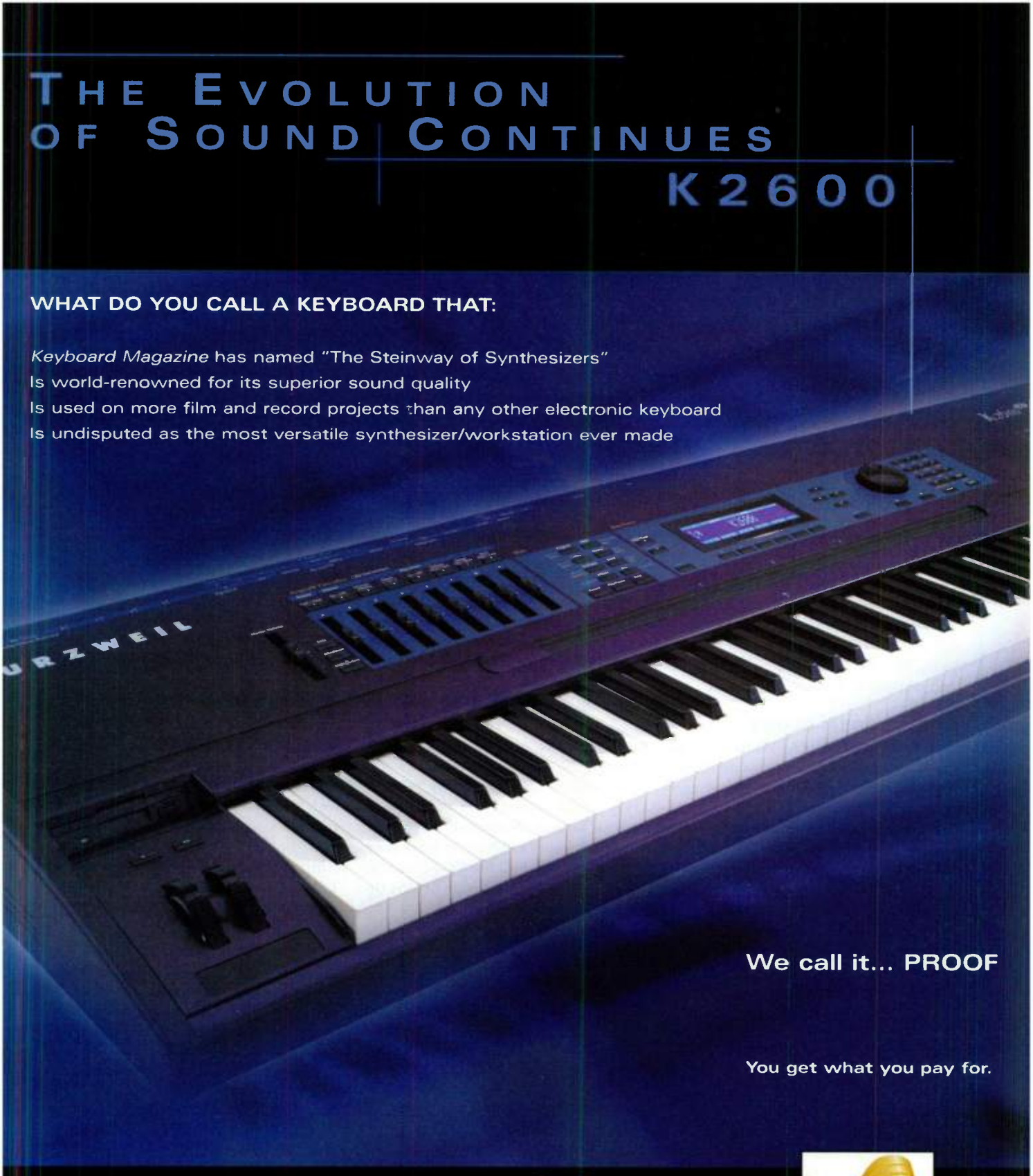

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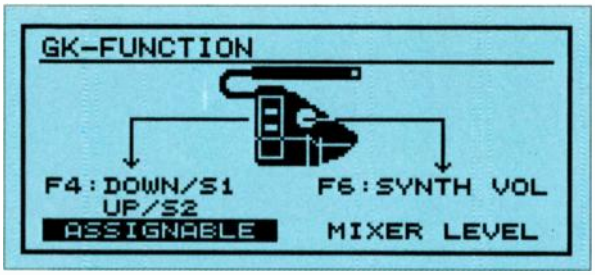

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FIG. 1: You can program the switches and controller knob on the GK-2A control box for different tasks, including toggling front and rear pickups.

guitar-modeling system. A Roland product specialist demonstrated an incredible variety of great guitar sounds using a guitar with no conventional pickups. At the same time, Jeff "Skunk" Baxter blew people away with guitar and amp emulations, as well as the system's expressive response to picking technique, harmonics, and the tremolo bar. I heard Hendrix, Page, and Clapton, all from a single guitar equipped with nothing more than a Roland GK-2A divided pickup and a VG-8. During the next few years, Roland added a few more bells and whistles to create the VG-8EX.

GUITAR COSM-OLOGY

The Roland pickup's sole mission in life is to filter each string's signal into a much less complex waveform and send it into the modeling system. Theoretically, it doesn't matter if the strings and pickup are mounted on a luxury guitar or a piece of plywood; however, the natural sustain of the hardware will affect the overall envelope of the sound.

The pickup's signal passes through a sophisticated set of DSP algorithms called Composite Object Sound Modeling (COSM). These algorithms combine electronic modeling (tubes and transistors), magnetic modeling (pickups, transformers, and speakers), and physical modeling (wood and metal) to emulate everything between the pick and the listener. The Harmonic Remodeling Synthesis (HRS) feature generates synthesizer-type sounds as well. Throw in polyphonic pitch shifting, and you can instantly retune to anything you want without touching a tuning peg!

With all this power and flexibility, why hasn't every guitarist immediately jumped on the bandwagon? For one thing, the concept was so foreign when it was introduced that some people simply assumed it was another typical MIDI guitar. Equally foreign was the idea of screwing an additional pickup onto a guitar. Moreover, playing an amplified electric guitar is a visceral and subjective analog experience, and digital technology doesn't suit everybody or every application. Finally, the $1,995 price tag for the VG-8EX was a bit steep.

Enter the VG-88. Its appearance resembles the previous generation's look and functionality, but with significantly redesigned technology. It offers better sound and a significantly lower price tag than the VG-8EX.

Roland avoids revealing the VG-8EX's digital audio specs, but it probably falls somewhere between 12- and 16-bit resolution with a 32 kHz sampling rate. However, the company proudly states these specs for the VG-88: 24-bit A/D and 20-bit D/A at 44.1 kHz. This means better tone quality, more effects, and improved dynamic response to touch. In addition, there's enough DSP power to process the output of your guitar through the effects and amp-modeling section while simultaneously generating a virtual guitar from the divided-pickup signal. However, VG-8 and VG-8EX owners will have to leave their old Patches behind; the VG-88's architecture differs considerably from the original units.

IT'S A SETUP

The biggest challenge with the VG-88 is having to attach a Roland GK-2A divided pickup to your acoustic steel-string or electric guitar. (Other compatible pickups include the Axon AX-101 and Yamaha G1D.) You can also use electric, acoustic steel-string, and nylon-string guitars with divided piezo bridges.

If you choose to install a divided pickup, you'll need enough space to put it about 5/16 of an inch from the guitar's bridge. They all come with double-sided tape for temporarily affixing the pickup to your guitar, which lets you test it before drilling holes into the instrument. You'll need the included screws and springs to permanently install and adjust the pickup. In theory, mere mortals can do this, but enlisting a technician might help your peace of mind.

The pickup connects to a control box with a 9-inch cable, and you must mount the control box on your guitar's face. Another short cable routes the guitar's native ¼-inch output to the controller as well. A three-way switch lets you select the output of the native pickups, the divided pickup, or both, and sends the signal to the VG-88 through a provided multipin cable. A volume control and two programmable switches can be used for functions such as incrementing and decrementing Patches (see **Fig. 1**).

If drilling holes in Old Faithful isn't your cup of tea, Godin and Fender make guitars with suitable built-in pickups and controls. I didn't have the opportunity to try one, but the Godins are beautiful instruments with a lot of handmade touches. For this review, I used the more affordable Roland-Ready Fender Standard Strat (with a built-in GK-2A.)

A 13-pin, 16-foot cable connects the control box to the rear of the VG-88. There's no need for a ¼-inch cable from the guitar. If you want to externally process the native guitar signal, you can use the Guitar Out jack on the back of the VG-88 to pass the unprocessed guitar signal. A Guitar In jack lets you run other guitars through the unit's effects and amp modeling (see **Fig. 2**). Stereo outputs pass the VG-88's signal. There's also a rear-panel headphone jack. MIDI In and Out jacks allow System Exclusive transfers, the sending and receiving of Continuous Controller messages, remote Patch

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FIG. 2: You can use the guitar input on the rear panel to send an additional guitar to the effects and amp-modeling section.

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changes, and reception of MIDI Clock (more on that in a moment). A ¼-inch jack lets you connect an additional expression pedal or up to two footswitches (with an insert cable).

The final setup stage uses the built-in calibration screen to adjust each string's pickup sensitivity. This is not difficult, and you only have to do this once unless you radically alter your guitar. The unit can store multiple setups so you can use more than one guitar in a set or session without needing to recalibrate.

PLAYTIME

Once you've set up the VG-88, getting started is no more difficult than it is with a multi-effects box. A dedicated front-panel switch lets you optimize the output signal for a guitar amp, headphones, or sound system by selecting whether to bypass the unit's amp and/or cabinet models. This lets you add the coloration of your external amp, or leave your it at home and play directly into the sound system, cutting down on your chiropractor bills. If you choose to play through a guitar amp, use a channel without overdrive or distortion engaged.

VG-88 Patches comprise models of a guitar body, pickups, effects, amp head, speaker cabinet, and mic placement. The unit offers a total of 260 Patch locations: 160 Presets and 100 user Patches. The VG-88 lacks the memory-card slot found on the VG-8, so it's good to know that the VG-88 sends and receives System Exclusive to ease off-line storage.

The Patches are organized into banks of four. Bank numbers appear in a large 2-character LED display, and Patch numbers and names (up to 8 characters) appear in a multipurpose backlit LCD.

▼

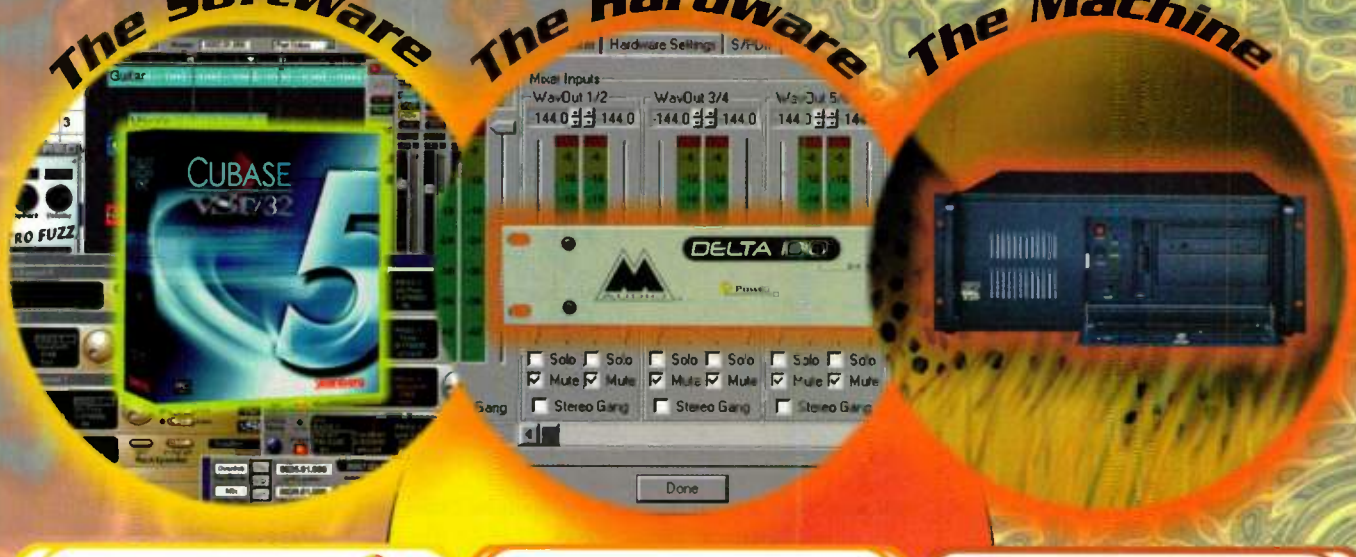
I heard Hendrix, Page, and Clapton from a single guitar.

Four footswitches along the top front of the unit select a Patch within the current bank. The two pedals that increment and decrement the bank number are mounted toward the center of the unit, making a balancing act necessary to engage them. A programmable footswitch engages various effects, and a programmable expression pedal on the far right controls parameters such as volume, wah, and pitch.

HENDRIX, BECK, AND SRV

The VG-88 has fewer signature-artist sounds than its predecessors, but there are still plenty of these sounds in the factory presets. ST Wing provides a clean, Hendrix-style Stratocaster, and JB Lead captures Jeff Beck's authoritative sound very nicely. Crunch TL conjures up a Tele reminiscent of early Pretenders, and Texas ST packs all the clear punch you'd expect from a Lone Star Strat through a Twin. OD Stack boasts incredible distortion and sustain while maintaining the clarity of the individual notes. It's great fun playing with alternate tunings, such as the Dobro-like Body E.

Considering the VG-88's depth of control, Roland made editing pretty straightforward. Dedicated buttons access the major functions, such as guitar modeling, amp modeling, and effects.



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Steinberg has once again raised the bar for the computer-based recording studio. Cubase VST/32 combines high resolution MIDI sequencing with audio recording in either 16, 24, or 32 bit "overload free" formats. Cubase VST/32 supports the world's largest range of add-on realtime audio effects as well as a growing list of Virtual Instrument plug-ins and sample accurate synthesizer plug-ins. New features include analogue sound TrueTape ™ recording technology and Apogee's famous UV22 ™ processing to achieve unprecedented warmth and character. VST/32 is the most complete music production system available and a "must have" for the serious recordist.

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M-Audio Delta 1010

An audio interface is the critical link that determines the sound quality of your recordings, allows the computer to integrate with other studio gear and largely determines what software applications can be run. The Delta 1010 has been thoughtfully designed and built to excel in all of these regards. With 24-bit 96kHz bandwidth and expansive flexibility, the DELTA 1010 boasts 8 balanced or unbalanced analog I/Os, S/PDIF I/O, Word Clock I/O, and MIDI I/O in an external rack-mountable chassis. With the most extensive set of drivers for Windows, Mac and Linux, you'll remain compatible with almost every audio application on the market.

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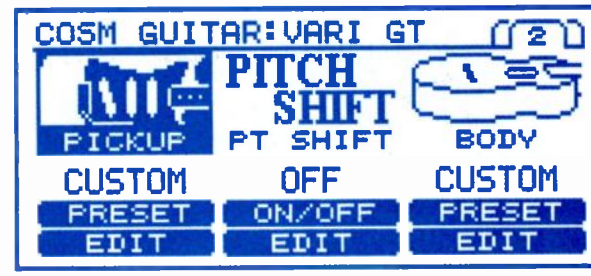

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FIG. 3: Vari Guitar is the unit's most complex algorithm, offering control of pickup, tuning, and body parameters.

Pressing the VG-88's EZ Edit button proves to be the fastest way to modify a sound. Simply select an algorithm type (such as Clean, Crunch, Drive, Lead, Wah, or Acoustic Guitar), then choose one of five simultaneously displayed parameters (Drive, Tone, Color, Mod, Delay) and dial in the desired setting. Store the Patch if you like, and you're done.

PICK A GUITAR, ANY GUITAR

The COSM Guitar section lets you build and edit instruments with great detail. A total of 19 algorithms model different types of instruments, and each one has several pages of parameters. The parameters available to each algorithm vary, but all include EQ, Pan, and Mixer sections. The EQ section offers fixed-frequency high and low boost/cut controls, and fully parametric low and high mids. In the Pan section, you can place each string in the stereo field for a very full sound. The Mixer controls the output level of the COSM sound and adjusts the balance and polarity relative to the guitar's native pickups.

A brief disclaimer: Roland and many other companies that model classic gear do not overtly refer to gear by name so as to avoid legal complications. Because I'm not selling anything, I'll sometimes make more direct references.

Of the 19 algorithms, the most complex is the Vari Guitar, where models of classic electric guitars reside (see **Fig. 3**). Most mimic vintage or reissue instruments, including Les Paul, Classic Strat (with passive electronics), Modern Strat (active electronics), Telecaster, P-90 (single-coil Soapbar pickups), Lipstick, PAF (vintage humbuckers), Rickenbacker, Chet Atkins (humbuckers on hollow-body), and a modern S-S-H (two single-coil pickups and a humbucker). Within these models, you can engage one or two pickups and specify individual volume and tone. The tone controls do offer a mellower sound, but they don't completely roll off the highs like real tone controls do.

LEX LUTHIER

There's also a complete roll-your-own pickup model available. You can choose front and rear pickup types, including Single, Double, Acoustic, Piezo, and Mic. You can also specify phase, position relative to the bridge (even partway up the neck), and angle for both front and rear. You can't emulate custom wiring (such as seven-way Strat switching), designer pickups, or hot-rod electronics. The Single and Double models sound convincing enough, and the Acoustic and Piezo models fare reasonably well.

The Vari Guitar algorithm also has a pitch-shift section that produces a second pitch for each string (±2 octaves). Each string has level controls for the direct sound and the additional pitch. Other controls depend on whether the pitch shifter is in Shift or Harmony mode. Shift mode provides coarse and fine tuning for the absolute pitch of each string. This combination of controls allows for capo, 12-string, otherwise impossible tunings, and even a combination of all three. Harmony mode lets you specify an interval from each string's native pitch and the overall key for the Patch. The VG-88 then generates the appropriate harmonies for the selected key while you play—very cool for certain applications, such as dual guitar leads from a single instrument.

As with most real-time pitch shifting, the best results stem from remaining close to the base pitch. Adjusting the tuning by a few steps works pretty well. An octave down passes for a nondescript bass, and an octave up works reasonably well for simulating a 12-string when blended with original string's pitch. However, I noticed that the

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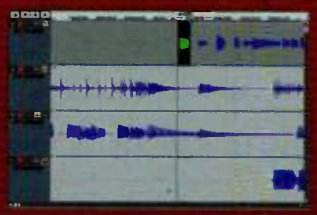

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tracking lags and glides and the sound becomes grainier when shifting the pitch by an octave or more.

The Vari Guitar algorithm also lets you specify the instrument body. Presets include Flat (a flattop acoustic), Round (with a round-bowl back), F Hole, Metal (metal-bodied resonator guitar), Banjo, and Solid. You control attack, balance between the straight and resonant sounds, low cut, size, resonance and low-frequency volume.

Other algorithms provide shortcuts to particular guitars. The Acoustic algorithm simulates an acoustic guitar with a choice of body controls as well as piezo pickup or mic. The Piezo setting emulates its namesake well, a sound that recently found popularity in the new-age-meets-light-jazz genre. On the other hand, the unconvincing Mic setting sounds more like a wimpy pickup.

The same holds true for the Nylon Strings algorithm. Despite the characteristic round punch and short decay, the sound is not truly acoustic—it resembles a nylon string guitar with a piezo pickup, at best. While useful, the 12-string algorithms lack the full jangle and twang of the real thing, a result of having only a global Detune control rather than individual fine tuning. Unfortunately, the Acoustic, Nylon, and 12-String algorithms do not offer user-definable alternate tunings.

The Open Tune algorithms provide easy access to commonly used tunings without bogging you down in all the settings of Vari Guitar. Changing between preprogrammed tunings at the drop of a hat is extremely cool; it's a godsend in live performance. However, these algorithms are not available for the Acoustic, Nylon, and 12-String models.

The Pedal Shift algorithm lets you bend notes with the expression pedal. You set a Master Shift interval, then select the strings it affects. It seems limiting to have a single pitch-shift range for all strings, but with the Pedal Assign parameters, you specify each string's pitch-shift range. It isn't exactly the formula for instant Buddy Emmons or Adrian Legg, but this algorithm certainly suggests these musical directions.

The VG-88 has four polyphonic algorithms in which each string is processed independently to avoid interstring modulation, with the general idea being that these provide greater clarity. For example, Poly Dist produces serious distortion while still retaining the character of the individual notes. Poly Comp provides independent compression for each string, letting you sustain single notes while preventing the volume from decreasing when you play chords. Poly Oct allows simultaneous blending of subharmonics one and two octaves down. The Bowed algorithm yields a volume fade-in effect.

BEYOND GUITARS

The remaining algorithms use a technology that Roland used to call Harmonic Restructure Modeling (HRM). Now, the company simply refers to the algorithms as additional instruments. The sounds include bowed strings, filter bass, pipe, pulse-width modulation, a crystalline bell, organ, and brass. The VG-88 lacks a few of the VG-8EX's HRM instruments, most notably the very rich and warm VIO-Guitar algorithm.

These instruments bring MIDI guitars and synthesizers to mind, but the

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technology and sounds remain significantly different. MIDI guitars analyze pitches and translate them into Note On and Off messages that trigger a MIDI sound generator. This process results in the tracking delays commonly associated with MIDI guitars. A real-time signal processor, the VG-88 has no tracking delays.

Best considered as by-products of the guitar-modeling process, the HRM instruments won't seriously contend for the guitar-synth crown. The various instruments have different sets of associated controls, but with extremely limited parameters. For example, these algorithms don't offer selectable waveforms, pitch, and other parameters normally associated with oscillators. Similarly, the envelopes are primarily those of the guitar string. Most of these instruments sound like pretty wimpy single-oscillator synths. For example, the new Brass algorithm has only Cutoff, Resonance, and Touch Sensitivity parameters. The Organ instrument offers volume control over 16-, 8-, and 4-foot stops, but there are no other parameters to speak of.

The VG-88's built-in effects section can certainly liven up these sounds, but there's only so far you can go. They might be novel for guitarists, but these synthlike instruments sound pretty plain by today's synthesizer standards. They can add to your overall sonic palette, but only as icing on the cake. If you're serious about guitar synthesis, look elsewhere. You can drive the VG-88 and an outboard MIDI guitar converter from the same pickup with Roland's optional US-20 Unit Selector ($195).

AMP CITY

The VG-88's amp algorithms are very respectable. Amp emulations include the Roland JC-120, Fender Twin, Matchless (drive), Vox AC-30, Mesa Boogie (lead), 1959 Marshall (input I, input II, or both in parallel), Marshall Combo, Marshall Bluesbreaker, Marshall Plexi, Soldano SLO100, and Peavey 5150, as well as nondescript crunch, blues, and acoustic-guitar preamp settings. The controls throughout are pretty much what you would find on the real thing.

You can also mix and match the heads and cabinets. In addition, you can place a modeled microphone in front of the cabinet at various distances,

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and you can position the mic vertically from the center of the cabinet down to the floor (lower positions reduce brightness). A balance control lets you mix the direct head signal with the speaker output.

I haven't tried all the real-world equivalents, but I was impressed with the range of tone quality this collection and their controls offer. Moreover, the sounds are fairly clean compared with other amp models, which yield a bit too much noise.

EFFECTIVE EFFECTS

The VG-88 has more built-in effects than its predecessor. They include a compressor/limiter, wah, EQ, delay, modulation, chorus, reverb, and noise suppression, all of which are available simultaneously. Primarily derived from the Boss GT line of effects, most have their own volume control, making it easier to adjust the composite results.

You can arrange the effects (along with the amp model and foot volume control) in just about any order. The native pickup's input always goes into the head of the chain, but you can input the signal from the GK pickup just about anywhere—a very flexible feature. Unfortunately, you can't process the native and GK pickup signals completely differently; for example, it's not possible to run native pickups through a crunchy, modeled amp while having a clean, modeled piezo.

The compressor/limiter is straightforward to use, and it's passable for most applications, but it gets rather noisy on long sustains. A separate noise-suppression section is designed specifically to reduce pickup hum. This works well; I haven't noticed any noise from the GK pickup. The EQ section has the same 4-stage setup found in the COSM guitar parameters, but it's nice to be able to insert it anywhere in the chain.

The wah section can be set for either pedal or automatic control. In Pedal mode, you can adjust the center frequency, but not the filter type or resonance amount. (It sounds like a lowpass filter, although this is not specified.) Auto mode yields an old Mutron-type effect or a continuously modulated wah. Parameters include lowpass/bandpass, sensitivity, frequency, peak width, rate, and depth.

An extensive modulation effect offers standards such as flanger, phaser, tremolo, autopanning, and vibrato. There are also some interesting pitch effects. Harmonist picks up where the Vari Guitar's pitch-shifter leaves off by generating up to two additional harmonies within a user-defined key. The P. Shifter effect generates one or more iterations of the performed pitches at successive intervals. For example, if you have it set for a fourth up and four iterations, you'll get a progression of four successive fourths. Harmonist and P. Shifter can even be combined with Vari Guitar's pitch-shifter for some fairly avant-garde sounds!

The modulation section also has a delay effect with up to 1,800 ms of delay time as well as feedback and high cut (which simulates older analog delays). You can get a two-tap delay effect by dialing in a percentage of the set delay time to be applied to one channel. This section also has a unique 2×2 Chorus effect that uses a crossover to divide the signal into two different frequency ranges with separate chorus settings.

Although it is not well-documented in the manual, the VG-88 recognizes (but does not send) MIDI Clock for locking

VG-88 Specifications

A/D Conversion	24-bit (direct guitar input); 20-bit (GK input)
D/A Conversion	20-bit, 128× oversampling
Program Memory	(160) preset, (100) user
Dynamic Range	100 dB (IHF-A)
Inputs	(1) GK (13-pin), (1) unbalanced ¼" guitar, (1) ¼" expression pedal/switch
Outputs	(1) unbalanced ¼" guitar, (2) unbalanced ¼" line level, (1) ¼" stereo headphone
MIDI I/O	MIDI In, Out
Weight	10 lbs., 13 oz.
Dimensions	19.88" (W) × 12" (D) × 4" (H)

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tempo-based effects to sequencers and other clock-driven devices. You can also use tap tempo.

Distinct from the modulation section is a dedicated, stereo chorus effect. As you might expect from Roland's history in the field, this chorus sounds great. There's also a reverb section, including Bright Room, Warm Room, Bright Hall, Warm Hall, and Plate. Controls include reverb times up to 10 seconds, predelay up to 100 ms, low cut, high cut, and density. The sound of the chorus and reverb are at least as good as you'll find in any other guitar effects, and it rivals some dedicated units. The VG-88's collection of effects provides just about everything you need, short of specialty items.

GROUND CONTROL

The VG-88 lets you control almost any of the unit's parameters in real time. The expression pedal, Ctrl switch, auxiliary pedal, and auxiliary switch provide lots of foot-based control, and you can program the guitar's GK volume knob and S1/S2 switches to affect most parameters, including switching between models for rhythm and lead. MIDI Control Changes 1 through 95 are also valid modulation sources, which lets you sequence parameter changes while performing or modulating external effect processors. Eight generic assignments let you modulate multiple parameters from a single controller, such as the expression pedal. You can also limit most of the parameters with minimum and maximum values.

You can set the switches to respond as momentary or toggles for some interesting performance effects. These performance options will have you exploring new possibilities for a long time.

The VG-88 also offers global settings for adjusting the lows, highs, noise-suppressor threshold, and reverb level across all Patches. This is great for tours where you are playing a series of rooms with different acoustic characteristics. The unit also sports a built-in tuner with auto mute.

Speaking of performance, the VG-88 offers no form of program chaining or direct jumping between programs in different banks. This means you must use the Exchange function to relocate Patches to certain banks so you can easily switch them within and between songs. However, the unit responds to Bank Select and Program Change messages sent from an external MIDI device, and the programmable real-time controls make it possible to change from a rhythm to a lead sound without changing Patches.

ONE WITH EVERYTHING

An amazing piece of technology, the Roland VG-88 provides an incredible amount of flexibility in a very intuitive manner. All I needed to do was refer to the manual to understand even the deepest editing parameters. More referential than instructional, however, the manual could be better organized and more thorough.

Let's be clear—the VG-88 won't suit everyone or every application. The guitarists I showed it to unanimously agreed that they would welcome the unit in the studio for its flexibility and recording ease. Beyond that, it comes down to how much of an analog purist you are and how attached you are to that piece of wood you've been playing for so many years. As a worst-case scenario, purists can simply think of it as another effect to expand their rig's sound palette.

I used the VG-88 on two songs with excellent results; on one song, I used it for three stereo tracks: a crunchy but distinguishable Strat-and-Soldano combination, a piezo 12-string, and a barking Tele with an AC30. I even used an octave-down Patch for the bass line. The results elicited pointed comments from players about how good the guitars sound.

This single unit can't possibly reproduce every custom or vintage axe and rig out there. On average, its emulations are probably about 80 percent realistic (some Patches more, some less) when compared directly with the real thing. However, the real thing involves $50,000 or more worth of vintage guitars, amps, effects, and microphones (not to mention the sonic space to crank it in and the physical means to store and haul it all). Having a damn good replica of most anything you could want—along with a slew of new possibilities for a street price of about $1,300 (including a GK-2A divided pickup)—is a real bargain in my book.

EM *contributing editor* **Jeff Burger** *is a producer and songwriter based in Sedona, Arizona.*

For manufacturer information, please see Contact Sheet, p. 205.

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SWISSONIC

USB STUDIO/D

A digital I/O device that doesn't make you play card games.

By Eric Bell

Now that the Universal Serial Bus (USB) is standard equipment on PCs and Macs, the race is on to exploit this versatile I/O channel. One innovative design is the Swissonic USB Studio/D, a 1U rack-mount mixer and digital interface that mixes audio signals from several types of analog inputs, converts them to digital format, and sends the data (in stereo) to the host computer over its USB cable. The Studio/D also accepts stereo digital audio from the computer or from its S/PDIF jacks and converts the data to an analog signal.

To route its wide variety of audio sources, the Studio/D incorporates two buses: monitor and record. Any of the audio inputs can be routed to either of the two buses, but the default input routing is to the monitor bus. The monitor bus signal is fed to the monitor line outputs as well as to the headphone jack, and the record bus signal is converted to digital format and then fed to the computer through the USB connection.

Of course, the Studio/D does much more than this simplified description implies. Thanks to its USB interface and some wise design choices, it offers several unique capabilities.

SET ME UP

The Studio/D is a sleek-looking device in a sturdy black steel case (see **Fig. 1**). Its front-panel, rocker-type power switch is conveniently located on the far right; the 15 rubberized knobs provide a weighty, confidence-inspiring feel with nice tactile feedback. The rather small buttons between the knobs, however, are difficult to operate because they don't protrude far enough from the front panel, and the panel labels are so tiny that they're difficult to read.

Initial setup was a breeze. With my PC already up and running Windows 98, I connected the Studio/D to the computer's USB port with the provided USB cable and switched on the unit. Within a couple of seconds, Windows detected the device and started to load the USB drivers needed to support it. (I keep the install files for Windows on my hard drive, which makes updating and reloading system files a snap.) Once the process was complete, new audio input and output drivers were available and ready to use. Installation was a joy compared with the configuration nightmares I've had with other products.

For my initial test of the Studio/D, I played a WAV file through the unit and experienced badly stuttering playback. I checked my BIOS settings and turned on Ultra DMA hard drive transfers. The situation improved, but the stuttering did not disappear completely. A quick check with Swissonic confirmed that the revamped USB drivers included with Windows 98 Second Edition are required to support streaming audio over USB, a fact not specified in the user manual. I updated the drivers using the Windows 98 service pack (available for free on Microsoft's Web site), and the stuttering stopped.

The Studio/D is compatible with both Windows and Macintosh USB implementations. ASIO drivers are available for Mac OS 9 and should be available for Windows by the time you read this.

The Studio/D user manual is a rather meager booklet with 14 pages of text, including a 1-page quick-start guide. The documentation for the device, though complete, is not expansive; more advice on how to use the Studio/D in various recording situations would be welcome.

BACK IN BLACK

The Studio/D's back panel (see **Fig. 2**) provides two balanced XLR microphone jacks with 48V phantom power, which is switched with buttons next to the jacks. When phantom power is engaged, a front-panel LED illuminates. Each mic input is also equipped with a TRS effects-insert jack and a polarity-invert button.

The mic-preamp trim and gain controls are combined into a single level control for each jack. This design keeps the unit compact and simplifies the adjustment of the mic input levels, but comes at the cost of flexibility in the adjustment of the mic-preamp trim levels. If you turn the level control hard left, it acts as a disengage switch, completely cutting the mic signal. No click or other tactile feedback, however, will confirm that this has happened.

When the Studio/D's mic signals are routed to the monitor bus, they are both centered in the monitor mix. When you route them to the record bus, mic 1 is panned hard left and mic 2 is panned hard right. This arrangement limits your flexibility somewhat, but keep in mind that this is a combo device rather than a full-fledged mixer. Some compromises have been made to save front-panel real estate and to reduce the number of controls and switches. With the number of inputs on the Studio/D, there just isn't room for pan pots.

The same panning scheme is employed on the Studio/D's two high-impedance TS mono instrument inputs. As with the mic controls, the preamp trim and gain controls are handled by a single level knob located on the front panel. These inputs are suitable for instruments using piezo or

FIG. 1: Swissonic's versatile USB Studio/D mixer provides an array of analog and digital I/O in a 1U device that connects to a computer through its USB port.

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Barry Rudolph, **Mix**, 4/00

"I used them on drums, vocals, acoustic and electric guitars, basses, percussion, and full mixes. In every case, I was pleased with the results. In fact, during the time I spent with the Classic Compressors, they became my first-call dynamics plug-ins."
Mitch Gallagher, **EQ**, 5/00

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magnetic pickups or for unbalanced microphones.

Next to the mono instrument inputs are two RCA jacks that serve double duty as line-level or phono inputs. (A banana-jack grounding terminal for a turntable is also provided.) A button switches the input between unbalanced line level and phono and engages the RIAA phono preamp.

The preamp's input capacitance can be set to better match your turntable's cartridge, but you have to remove the Studio/D's cover to get at the jumpers that control this adjustment. Unfortunately, no information about how to set the two jumpers is in the manual or on the circuit board itself. (According to Swissonic, the default input capacitance is 40 pF with both jumpers open and 250 pF with the jumpers shorted.)

To the left of the RCA jacks are four unbalanced stereo TRS input jacks, each with its own level control and bus-selection switch.

Next to these jacks are three RCA output pairs for the Studio/D's monitor and record buses. The line-out pair provides the signal from the monitor bus before the main monitor level control. The monitor out pair also takes its signal from the monitor bus, but after the level control and mute switch. The third output pair is fed from the record bus, before the main record level control. The Studio/D's digital I/O section, on the far left of the back panel, has jacks for coaxial and optical S/PDIF (more on this shortly).

The unit's voltage-selection switch allows you to choose between 115V and 230V, and the power connector features an easy-to-access integrated fuse holder. Thankfully, Swissonic put the power supply inside the unit, so you don't have to add an annoying wall wart to your collection.

POTS AND PANS

The Studio/D's front panel is logically laid out with a pair of controls for each input jack: a level knob and a Record Enable button. When the Record Enable button is out, the signal goes to the monitor bus; when it is pushed in, the signal is routed to the record bus.

The stereo channel arriving from the computer over the USB cable is always routed to the monitor bus, and it has a knob (labeled "Computer") for setting its level. The adjacent Rec Level knob sets the level of the stereo channel that is output to the computer over the USB cable. A pair of 8-segment, peak-level LED meters shows the output signal levels; the top LED lights up at 1 dB below clipping.

The overall level of the monitor bus as presented at the monitor outputs is controlled with its own knob, which is thoughtfully accompanied by a mute button. The monitor bus also feeds the headphone jack, which has its own level control.

Some applications can return a stereo audio stream through the USB connection for monitoring. However, your computer may not have enough CPU power to process the return stream with reasonably low latency. If that's the case, you can work around the problem by overriding the switching behavior for any audio input in the Studio/D, so that when you assign an input to the record bus, the signal remains present on the monitor bus as well. Then you can monitor your recording using the analog monitor or headphone outputs. You configure this option with jumpers inside the unit, and it's available for all inputs, both analog and digital. (You can also monitor the record bus directly through its pair of RCA jacks on the back panel.)

The Studio/D's front panel includes several status LEDs. For example, the monitor and record buses each have an overload indicator that lights up when less than 6 dB of headroom are

USB Studio/D Specifications

Analog Inputs	(4) unbalanced ¼" stereo line level; (2) balanced XLR mic (switchable phantom power with phase-invert switch); (2) ¼" mono instrument; (2) RCA line with switchable phono preamp
Analog Outputs	(2) RCA monitor bus; (2) RCA monitor bus (level controlled); (2) RCA record bus; (1) ¼" stereo headphone
Digital Inputs	(1) S/PDIF (RCA); (1) S/PDIF (Toslink)
Digital Outputs	(1) S/PDIF (RCA); (1) S/PDIF (Toslink)
Inserts	(2) ¼" TRS (on mic channels)
Sampling Rates	32, 44.1, and 48 kHz (digital I/O); 8 to 48 kHz (USB)
Resolution	20-bit (digital I/O); 16-bit (USB)
Dynamic Range	98 dBA (digital I/O); 92 dBA (USB)
THD	digital I/O: ADC 0.003% (–1 dBFS), DAC 0.003% (0 dBFS); USB: ADC 0.01% (–1 dBFS), DAC 0.005% (0 dBFS)
Frequency Response	20–20,000 Hz @ 0.1 dB (mic and line); 15–40,000 Hz @ –3 dB (instrument)
Dimensions	1U × 6.25" (D)
Weight	12 lbs.

FIG. 2: The USB Studio/D's rear panel is packed with inputs, outputs, and switches for routing the signals and configuring the jacks.

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left. And, of course, there is a power-on indicator.

The unit's Record Enable, Monitor Mute, and other switches, however, are small and hard to see. They would benefit greatly from a few more status LEDs, which would provide a better visual indication of their positions. That might have saved me from some frustrating moments when switches weren't set the way I thought they were. Also, a couple of the switches on my sample unit (Monitor Mute and the Phono/Line selector) were noisy, giving loud pops when I used them.

DIGITAL DOMAIN

The Studio/D uses an ADC with 20-bit resolution to convert the Record bus signal to digital for transmission to the computer. On the return trip (playback), the DAC converts the signal from the computer with 16-bit resolution. A separate converter in the Studio/D's digital section handles the S/PDIF ports. It offers 20-bit A/D/A resolution and features dynamic range and noise numbers that are slightly superior to those in the USB section.

For getting signals into and out of the digital section, the Studio/D supplies S/PDIF jacks in two formats: RCA (coaxial) and Toslink. A switch next to the jacks lets you select which of the two inputs is used. The digital outputs can be used simultaneously.

A knob on the front panel controls the level going to the S/PDIF outputs; a switch gives you the choice of a 44.1 or 48 kHz sample rate. For added flexibility, you get a second switch for determining whether the monitor or record bus is routed to the digital output. You can even use the Studio/D as a high-quality standalone A/D converter without engaging the USB connection at all. To help you keep the signal clean, an overload LED illuminates when the digital output is less than 6 dB below clipping.

The Studio/D controls the digital-input signal level through a dedicated Digital In knob; a Record Enable switch routes the signal to the record bus. Sample conversion is performed automatically if you use different rates in the S/PDIF and USB sections of the Studio/D. When the unit has locked on to a digital input stream, a Lock indicator lights up and the digital-output sample rate is set to match the input. For those who don't need the Studio/D's S/PDIF ports, Swissonic offers the USB Studio ($699), a nearly identical unit that lacks the digital inputs and outputs.

VINYL GROOVES

If you're looking for a simple way to transfer those warm (and sometimes scratchy) sounds from vinyl records to the computer, the Studio/D is a good choice. I did some vinyl-to-digital transfers, and the results were excellent. Any less-than-perfect highs in the source material were rendered faithfully, rather than made grainy or harsh, by the conversion.

The Studio/D also adeptly handled a wide assortment of audio signals. For example, it performed quite well when I plugged an electric guitar directly into one of the instrument inputs, especially when I routed the guitar signal through a SansAmp PSA-1 amp emulator first.

SWISSONIC
USB Studio/D audio interface
$849

FEATURES ■■■■
EASE OF USE ■■■
AUDIO QUALITY ■■■■
VALUE ■■■■
1 2 3 4 5

PROS: Versatile unit handles a wide variety of audio and digital inputs. Easy to set up. Useful configuration options add to flexibility. Clean sound. Good value.
CONS: Panel labels are hard to read. Buttons difficult to operate. Some design choices impose limits. Weak manual.

Microphone signals were also handled well. I got very good results when I miked a Fender tube amp with a self-powered condenser mic. The final recording exhibited all the singing highs, guts, and grit that the tube-distorted original did.

I can imagine the Studio/D playing a number of roles in a personal studio. The unit is not only sturdy, but quite portable. Combined with a USB-equipped laptop, it could be used successfully in all sorts of recording situations. Moreover, its wide variety of inputs and freedom from adapter cards make it suitable for a broad range of projects. It could also come in very handy for mixing signals or for serving as a stand-alone A/D converter when a computer isn't available.

Some users might bemoan the unit's lack of panning controls, but its TRS effects inserts, wide variety of ins and outs, and other features go a long way toward offsetting the deficiency.

Overall, Swissonic has delivered a fine digital-I/O unit that is versatile, sonically nonintrusive, and attractively priced. If you're looking for a device that brings digital audio into your computer with a minimum of muss and fuss, the Swissonic USB Studio/D is well worth considering.

Eric Bell *is a writer, programmer, and musician living in Canada.*

MICROTECH GEFELL

M930

Big, rich, detailed sound from a surprisingly small package.

By Elizabeth Papapetrou

Former East German microphone manufacturer Microtech Gefell earned distinction not only for building classy, ultramodern, great-sounding microphones, but also for turning out some of the more weird-looking—and wonderful-looking—mics on the market. The conical grille assembly on the company's M 900, for example, resembles a Mercury space capsule, and the sculptural UM 900 (Cher's new favorite) could pass for a Brancusi.

By comparison, the Microtech Gefell M 930 looks pretty standard. "Same old, same old," I thought, upon seeing the photo of the mic on the sales brochure. But what wasn't clear from the picture was the diminutive dimensions of the M 930. Opening the attractive tongue-and-groove hardwood storage box, I found to my surprise, nestled in form-fitted black foam, the tiniest large-diaphragm microphone I had ever encountered. There should have been a note attached to the mic that said "Eat me," for I certainly felt as if I were in a scene from *Alice's Adventures in Audioland*. I held the little thing up to the light to check the size of the diaphragm. Sure enough, there was the 1⅛-inch diaphragm, practically filling the compact wire-mesh grille head.

The M 930 is a side-address condenser mic with a fixed-cardioid polar pattern. Microtech also offers the identical-looking M 940, a supercardioid version. Both mics come in either a dark-bronze or satin-nickel finish, and both employ a new capsule design derived from the classic M7 (whose capsule was developed by Georg Neumann in 1932 and used in the CMV 4a, U 47, U 48, U 49, UM 57, and UM 70 microphones). The M 930's price and specifications suggest that it's slated to compete with the Neumann TLM 103, arguably the mic to beat in the personal-studio market. For that reason, I made sure to compare those two mics closely, in addition to the other tests I performed.

ATTENTION TO DETAIL

The dark-bronze finish on the M 930 I tested was gorgeous—deep, lustrous, and a testament to the mic's exceptional quality of manufacture. Though the M 930's lines are nothing spectacular, everything about its build points to painstaking attention to detail. Even the heft of the mic feels perfect.

The address side of the diaphragm is indicated by the silk-screened model number and polar-pattern symbol; the MG logo is silk-screened on the opposite side. Supplied with the M 930 is a sturdy, plastic-lined, slide-fit swivel-mount finished to match the mic. Easy to maneuver, the mount holds the mic securely at any angle and does a fair job of reducing shock and rumble. However, the mic did pick up some sound when I rattled the stand, so I recommend a shock-mount for critical applications. An optional rubber-lined, doughnut-style shock-mount is available for the whopping price of $150.

INNER SELF

The M 930 is opened, with some difficulty, by unscrewing a left-threaded hex nut that secures the grille assembly to the body. The internal components appear as sturdy and well finished as the exterior ones (see **Fig. 1**). The electronics are contained on a tiny circular circuit board attached to the underside of a hard-plastic diaphragm mount by means of a single screw. The whole assembly floats on a rubberized plastic ring—the internal shock-mount—which is the only part of the capsule attached to the mic body. Small alignment pegs ensure that the capsule-mounting system, body, and grille are reassembled correctly and that the diaphragm faces the right way.

According to Microtech, the new transformerless electronics created specifically for the M 930 and M 940 include special impedance-converter circuitry that reduces the mic's noise floor to 7 dBA—that's quiet with a sotto voce *q*—while increasing maximum output levels to around 17 or 18 dBu—loud with a capital *L*. Add a maximum SPL rating of 142 dB, and you have the specs profile of a modern, professional-quality, and very versatile condenser microphone.

The frequency-response chart for the M 930 shows that the mic's response is more or less flat up to around 6 kHz, above which it rises quite sharply, peaking by +4 dB at 11 or 12 kHz—a response that suggests sparkle in the highs and some edge in the high mids. In addition, the mic's polar-pattern responses show excellent rear rejection and outstanding side rejection across all frequency ranges. This is largely because the null arc extends about 60 degrees to each side of the rear of the mic, rather than the usual 45 degrees. Indeed, the M 930's side rejection is so good that the M 940 supercardioid beats it only at the highest frequencies.

Perhaps the smallest large-diaphragm condenser available, Microtech Gefell's M 930 is a premium and very versatile microphone. Its full lows, detailed highs, and overall flat response make it especially well suited for instrument recording—particularly for guitar cabinets and percussion.

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MICROTECH GEFELL
M 930 large-diaphragm condenser mic
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AUDIO QUALITY ■■■■
VALUE ■■■■■
1 2 3 4 5

PROS: Sturdy, high-quality construction. Tiny size. Great price. Very quiet, clean, and transparent. Good rear rejection and great side rejection. Okay for broadcast, good for general instruments, great for percussion, and wonderful for guitar cabinets. Nice wood storage box. Quality swivel-mount included.

CONS: High presence boost somewhat artificial sounding in some applications (particularly noticeable on vocals). Optional shock-mount expensive.

VOICE MY CONCERNS

I tried the M 930 first as a vocal mic, by recording my contralto and a friend's deep singing voice. We sang a variety of songs with a wide range of tonal demands. I ran the M 930 through a couple of different preamps, including an upgraded (by Audio Upgrades) dbx 760X and the new XDR preamps in a Mackie 1202-VLZ Pro mixer. The signals from the two preamps sounded similar, though the Audio Upgrades–enhanced dbx circuitry added a little warmth.

I wasn't too impressed by any of the recordings, and in particular I didn't like the way the higher frequencies in my voice were handled. Sure, the M 930 was ultraquiet, clean, and transparent, had plenty of output, and captured a reasonable amount of "air." But the flavor of the high-end boost and the general top-end "cut" of the mic sounded like a Shure SM57 on steroids. Then again, my taste in vocal mics runs flat and warm, like British beer. If you need to cut through a dense rock mix with a male voice that is less than piercing, the M 930 could be just the ticket. But overall, it didn't strike me as the first mic to reach for when tracking vocals.

To get a more pleasing vocal response from the M 930, I varied my singing distance and angle in relation to the mic. For example, I increased bass response (via proximity effect) by getting closer to the mic. The resulting sound, however, was too boomy and lacked definition. The off-axis vocal sound wasn't too promising, either: there was considerable attenuation of the highs, and the overall sound was nasal.

WHERE IT SHINES

Interestingly, the qualities that cause me to dislike a mic for vocals are often the same ones I appreciate in instrument mics. Therefore, I couldn't wait to try the M 930 in various instrument applications. Fortunately, an engineer friend, Tracy Collins, had an upcoming session at Mirror Image Studios with a Christian rock band called Crosscut. The session was booked in Studio B—the smaller of the two studios at Mirror Image—which is outfitted with a couple of ADAT XTs, Tannoy PBM 6.5 LM monitors, a Soundcraft Ghost 24/8/2 console, a Macintosh 7100/80 AV Power PC (loaded with umpteen sound applications), and lots of midquality outboard equipment. I felt comfortable with the gear and the general sound of the room.

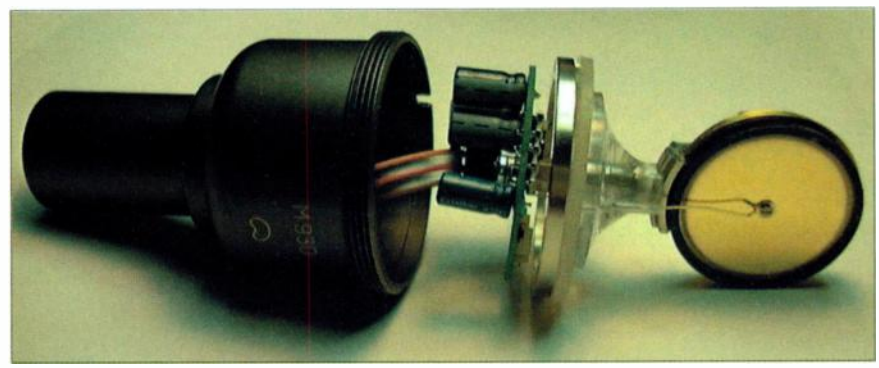
Crosscut needed to add several instruments to an already busy set of instrumental and vocal recordings that were grafted to a core of MIDI tracks on Collins's old but beloved OpCode *Vision*. We worked on a gospel song called "Life Is a Glorious Thing." Collins doesn't like to spend a lot of time messing around with complex miking setups—an aficionado of the Shure SM57 and Røde NT2, he knows what he wants and how to get it. This being his session, my involvement was minimal: I served as chief mic-stand adjuster, mic-placement consultant, and extra pair of ears.

The session producer, Frederick, decided to record himself playing tambourine first. He had an expensive, really fine-sounding tambourine, and he played it very well. We positioned the M 930 and Collins's Røde NT2 2 feet 6 inches apart in the middle of Studio B's small, semilive (we call it half-dead) room. We put Frederick about two feet from the mics and directed each signal to a separate track through the Ghost's built-in mic preamps.

It was immediately clear on playback that the M 930 captured the tambourine much better than the Røde NT2. There was better high-frequency definition, more depth, and more of a general sense of presence and air. The jingles sparkled and the sound of Frederick's hand striking the head was particularly solid—deep and drumlike—leading us all to wonder how the M 930 would sound on toms, congas, and other hand drums. Needless to say, we kept the M 930 track.

Next, we set up to record guitarist Richie Cash's Strat through a Line 6 AX2-212 guitar amp/cab—an application for which Collins would usually use an SM57. To compare, we set up three mics. We experimented first with the M 930, moving it around the cab, only to find that it wasn't too picky about positioning. The M 930's final position was about six inches out from the left speaker. We put the SM 57 in a similar position in relation to the right speaker, and then positioned the Røde NT2 near the control-room window as a room mic.

We recorded a separate track for each mic with minimal compression and no EQ. Whoa! This time everyone was surprised—the M 930 absolutely smoked the SM57. The M 930 track had cut and presence (qualities typically associated with SM57s) in spades, along with a



ELIZABETH PAPAPETROU

FIG. 1: Opening the M 930 reveals the microphone's capsule, tiny circuit board, and internal shock-mounting system.

For manufacturer information, please see Contact Sheet, p. 205.

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deep, beefy bottom end that gave Cash's guitar solo a richness and authority we loved. The M 930 would be worth keeping in a pro mic closet for this purpose alone—a condenser mic with all the benefits of an SM57, plus oomph.

After the Crosscut session, I went back to my studio and auditioned the M 930 on a big and sonorous bodhran. I played the instrument hard, to get as much rumbling low end as possible, about a foot in front of the mic with no compression. Whoa, again! The M 930 captured the bodhran beautifully, and it had no trouble with the SPL. I was especially impressed by how the mic captured the richness of the low-frequency resonance and the delightful harmonic ring from the beater hits. Considering its tiny size and particular response, I bet that the M 930 is a killer choice for close-miking toms.

BUT COMPARED WITH WHAT?

As mentioned previously, I thought it important to compare the M 930 with the Neumann TLM 103. Thankfully, Michael Mills of Erehwon Studios in New York City was kind enough to loan me one. The mic was in pristine condition, with only two or three sessions under its belt.

I focused on vocals for the first comparison, recording myself flat through the same preamps I had used in the initial test. I did separate passes with the two mics, routing the signals to separate tracks of my Innovative Quality Software *SAWPro* digital audio workstation. In addition to singing, I also did some voice-over-style talking.

The TLM 103 was much kinder to my singing voice, giving a general smoothness and depth to the low mids not found in the M 930 tracks. For dialogue, however, the M 930 provided greater clarity than the TLM 103.

To test for sibilance, I recorded over-the-top renditions of the line "Sister Suzy's sewing socks for silly sailors." Here, the two mics performed about equally, no matter how much I lisped the *esses*. This result, in conjunction with the M 930's very low noise floor, suggests that the mic might be useful in broadcast applications. (Then again, the lack of depth in the lower mids might put off some dialogue recordists.) I also sensed that the M 930 would be a fine choice for Foley (sound effects), thanks to its exceptional clarity.

DUELING ACOUSTICS

Next, I compared the two mics on acoustic guitar, again using the same signal path. I played a Goodall Grand Concert—finger style—with the mics aimed at the 12th fret from about two feet away in a live room. This time, the M 930 shone. The TLM 103 couldn't match the detail of the M 930, which also offered sweeter capture of the guitar's tone, better tonal balance across the strings, and, again, more level. Although the Goodall Grand Concert I played was not boomy (as dreadnoughts can be), I was left with the impression that the M 930 would handle boomy, problem guitars very well.

Clearly, the M 930 and TLM 103 have broadly similar responses. Each has a particularly low self-noise rating and a high SPL rating, their polar patterns

M 930 Specifications

Element	externally polarized (DC bias) capacitor ("true" condenser)
Diaphragm	1.18", 3-micron, gold vapor–deposited Mylar
Polar Pattern	cardioid
Frequency Range	40 Hz–18 kHz
Dynamic Range	135 dB
Sensitivity @ 1 kHz	21 mV/Pa
Signal-to-Noise Ratio	87 dBA
Self-Noise	7 dBA
Maximum SPL (for <0.5% THD)	142 dB
Finish	satin nickel or dark bronze
Dimensions	4.65" (H) × 1.81" (D)
Weight	7.4 oz.

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are similar, and both are notable for their clarity and transparency, at least up to the lower kilohertz. The differences become noticeable in the mics' handling of the higher frequencies: whereas the TLM 103's presence boost starts at around 4 to 5 kHz and drops off at approximately 17 kHz, the M 930's upper bump starts a little higher on the frequency chart and ends sooner. I must also add that the character of the M 930's presence peak sounds—in comparison—a tad artificial, suggesting that it might be a function of the electronics rather than the construction of the capsule. (That characteristic "Neumann airiness" is said to be due to the way Neumann attaches the diaphragm to its housing, as opposed to any electronic filtering.)

Although they sound similar, the M 930 and TLM 103 are certainly not interchangeable. For one thing, the M 930 has far more output than the TLM 103. More important, though, are the sonic differences. The TLM 103's presence boost is much more flattering to most singing voices. In comparison, the higher presence boost of the M 930 can sound tinny, particularly on female voices and male falsettos. On the other hand, that same boost provides more detail, which is usually preferable for instrument recording.

Another sonic difference is that the M 930, though very rich in the lowest frequencies, lacks the TLM 103's depth in the lower mids. But even that characteristic can be useful. In multitrack recording, for example, it's often necessary to cut the low mids to restore clarity to a mix. Using the M 930 on select instruments could eliminate the need to mess with the EQ later.

SELECT STUNNER

The M 930 is a well-built, versatile, and great-sounding mic, a worthy addition to the Microtech Gefell range of microphones. At only $795, it's one of the better values out there in the large-diaphragm condenser market—excluding the half dozen or more Chinese-made knockoffs of recent years. But the

▼

My taste in vocal mics runs flat and warm, like British beer.

M 930 is no knockoff: it's a true, hand-constructed German microphone, and the quality is first-rate.

Though not quite the all-singing, all-dancing, all-purpose microphone the manufacturer claims it is, the M 930 does sound stunning in many applications. This mic's ability to capture rich lows and detailed highs make it an ideal general instrument mic. I especially liked it on percussion, hand drums, acoustic guitars, and guitar cabinets. In addition, the M 930's diminutive size makes it easy to position in tight spaces—a real boon when miking drums. A viable option for many applications, the M 930 is a valuable addition to any mic cabinet.

Elizabeth Papapetrou *has been writing for music magazines and recording for 17 years. She loves microphones and specializes in recording solo and small-ensemble acoustic music.* *Special thanks to Michael Mills, Tracy Collins, and Mirror Image Studios.*

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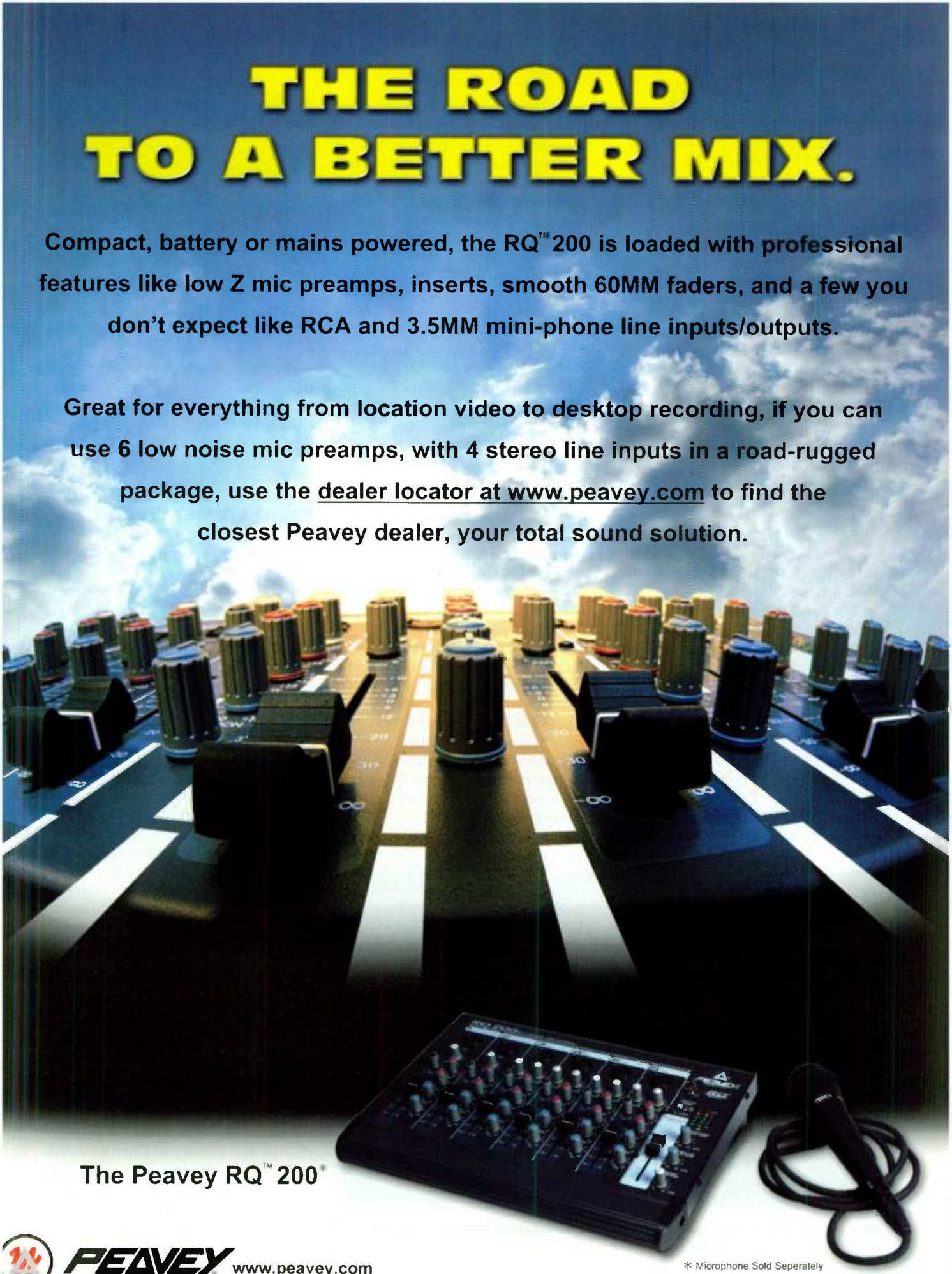

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E M A G I C

ES1 (MAC/WIN)

The Logic Audio environment gets its first plug-in synthesizer.

By Jeff Obee

Emagic recently expanded the role of plug-ins in the *Logic Audio* environment to include virtual instruments. *ES1*, which models a subtractive analog synthesizer, is the company's first plug-in to use the new Audio Instruments object category. This allows *ES1* to be accessed in the same way as other *Logic Audio* plug-ins.

ES1 requires *Logic Audio Platinum, Silver,* or *Gold,* or *MicroLogicAV* 4.1. If you're using 4.0, it automatically updates to 4.1 when you install the plug-in. The Mac and Windows versions of *ES1* come on the same CD-ROM and easily install into your *Logic Audio* folder. I used the Mac version for this review.

FROM THE TOP

ES1 doesn't take up much room on your hard drive. However, each individual synth you create requires about 2.5 MB of RAM. Although a minimum of 64 MB of RAM is recommended, you should add as much RAM as your computer will hold.

You can use up to 16 *ES1*s at a time, with each given a maximum of 16 voices. The more voices you allocate to a synth—and the more synths you use—the more you will tax your CPU.

You access the synth in the Environment audio layer, where a plug-in insert box is provided for *ES1*, as well as in the Track mixer. However, when you open a synth, the audio instrument's name isn't displayed in the window bar. Instead, the instrument number appears in a small window toward the top of the plug-in interface.

ES1 gives you a choice between a highly stylized graphic editor (see **Fig. 1**) and a simplified control screen (see **Fig. 2**). However, five important parameters appear only on the control screen: Master Tuning, Analog (which simulates the pitch drift of an analog VCO), Voices, Bend Range, and Output Level. Filter choices can be made only in the graphic editor, where you can select a 12 dB, 18 dB, 24 dB Classic (Moog-style emulation), or 24 dB Fat (Oberheim-like) lowpass filter, as well as adjust the cutoff and resonance.

The filter does an admirable job of emulating an analog filter. However, like many virtual synths, it sounds a tad too clean. With *ES1*, you can dirty it up with distortion, overdrive, bit reduction, and other plug-ins. *ES1*'s Drive function models the saturation characteristics of an overdriven filter, but it's a subtle effect even at the highest setting.

The Key feature lets you adjust the keyboard-dependent behavior of the filter envelope; at the lowest setting, the filter cutoff remains constant throughout the keyboard's range. When you increase the Key value, the filter progressively opens as you play up the keyboard.

ES1
Minimum System Requirements
Mac: PPC 604e; 64 MB RAM; Mac OS 8.5 (USB requires Mac OS 8.6); *Logic Audio Platinum, Silver,* or *Gold,* or *MicroLogic AV* 4.0; CD-ROM drive
PC: Pentium II/200; 64 MB RAM; Windows 98; *Logic Audio Platinum, Silver,* or *Gold,* or *MicroLogic AV* 4.0; multimedia-compatible sound card; CD-ROM drive

OSCILLATE METAL SONATAS

ES1 includes an oscillator, suboscillator, and LFO, each with a useful selection of waveforms. The oscillator has sawtooth, triangle, and square waves, and a variable pulse width. The suboscillator has a variety of square and pulse waves, as well as white noise. An octave switch to the oscillators' left lets you globally raise or lower their pitch in terms of organ-pipe lengths (2 to 32 feet). The Mix function sets the relative levels between the main and suboscillators.

LFO waveforms include triangle, ramp up, ramp down, square, sample and hold, and a lagged random wave. You specify the LFO's amount of synchronization with the control dial. Additionally, the LFO and the suboscillator have an External setting, so you can employ an audio track as a modulation source. This setting proves especially useful for processing drum loops and drones. Additionally, you can route external audio sources through *ES1*'s synth engine and filter.

The envelope generator has three modes: ADSR, AGateR, and GateR. AGateR bypasses the Decay and Sustain, so the level remains constant between the peak and the release. GateR functions similarly, but it sets the attack at 0. The ADSR via Velocity function sets the level of the envelope sent to the filter cutoff according to how hard you strike a key. The dual "slide rule" arrows adjust the positive and negative input values, letting you constrain the range and

FIG. 1: From the *ES1*'s graphic interface, you can choose one of four lowpass filter types: 12 dB, 18 dB, 24 dB Classic, or 24 dB Fat.

For manufacturer information, please see Contact Sheet, p. 205.

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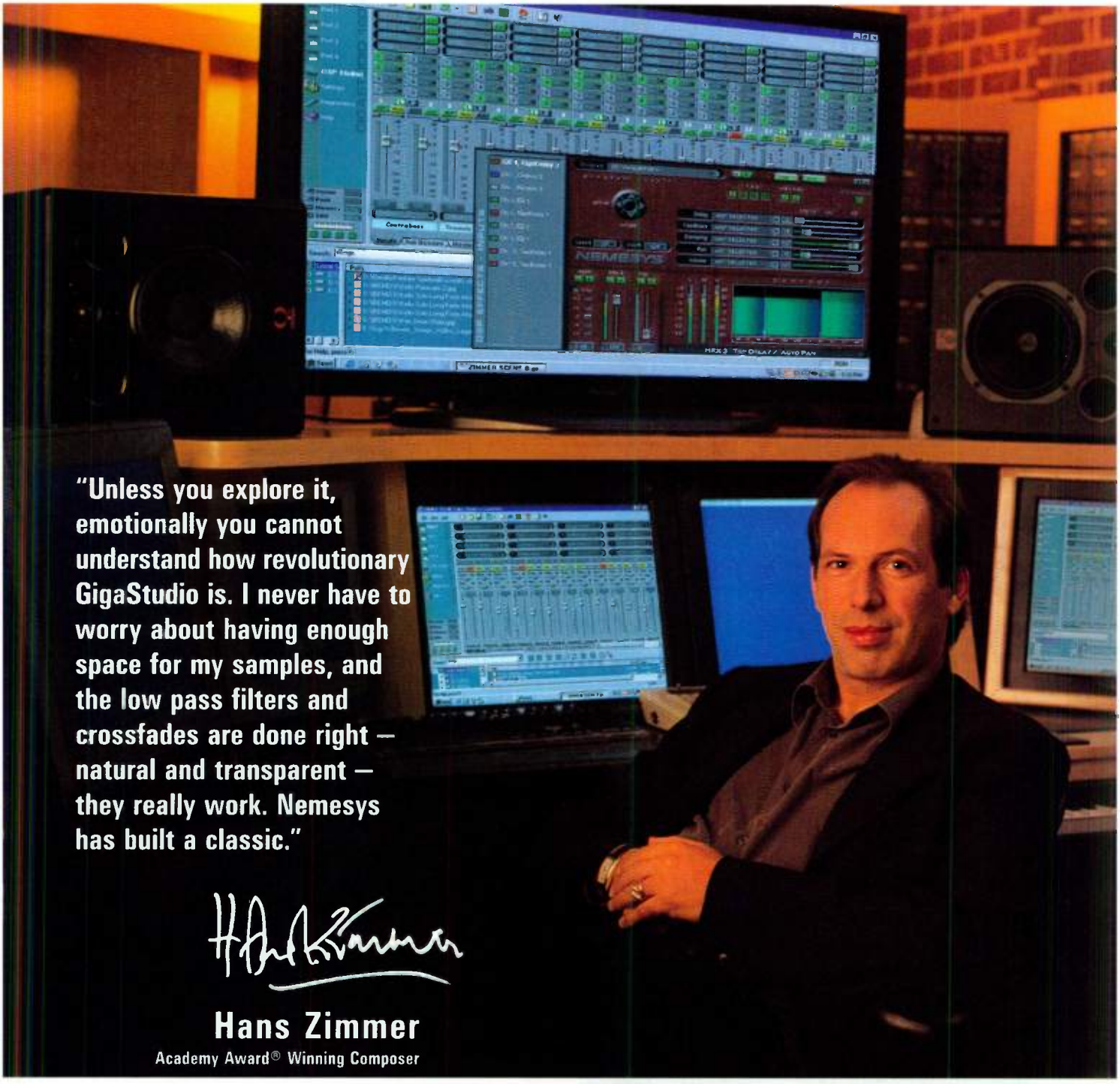

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You can limit basic LFO or Mod Envelope depth by using the lower arrow or with the two put together. Deployed separately, the arrows set upper and lower values for LFO Intensity via the Mod Wheel and Mod Envelope Intensity via Velocity.

The single-oscillator architecture of *ES1* doesn't make for the thickest pads, but mixing in the suboscillator with a dab of LFO—or opening a second synth with a slightly altered version of the same sound—gives you richer textures.

SYNTH DIY

ES1 comes with 127 presets, including basses, percussion, leads, pads, and sound effects. The presets are located in a folder accessible at the top of the instrument. The sounds appear as a list, and unfortunately, no hierarchical or subfolder system separates the different types of patches. All customized sounds are automatically saved in a Song; if you want to use them in a different piece, you must save them separately in the *ES1* folder.

ES1 has a number of solid presets that work in a variety of settings. However, I was more impressed with the overall sound quality of the synth, as well as with its speed and ease of use. Beginning with a preset, I quickly and easily created new patches to fit each composition I developed.

IN SITU

ES1's keyboard latency is very low. I recorded fast leads and punchy bass lines without the time lag that plagues some virtual synths. Kudos to the Emagic programmers.

Although Program changes are not supported by *ES1* (Emagic says it will add this function soon), you can manipulate and record all other parameters in real time from the graphic interface. That's right, all parameters. For example, you can change a sound's texture by choosing a different oscillator waveform while you're playing.

Unfortunately, the manual conspicuously lacks information about controller assignments. I gathered this information the hard way. After recording continuous controller data from the front panel, I opened the Event List to see each parameter's controller number.

ES 1 uses a new object category called Audio Instruments.

Logic Audio doesn't treat *ES1* as a MIDI object. As an audio object, *ES1* responds like one. When playing mono lines in legato mode, for example, the instrument sometimes took a second to "catch," resulting in an odd response. You can overcome this by adding a little preroll before you begin playing.

ES1 crashed a couple of times when I tweaked four synths (each with two or three effects plug-ins) at the same time. Things can become unstable under such strenuous CPU demands.

You also cannot cable *Logic Audio*'s arpeggiator to *ES1*, which is a frustrating situation when you're using a synth married to the *Logic Audio* environment. Emagic says that you can't cable an object to an audio instrument. Apparently this is a tough programming nut to crack, but the company says it's working on it.

FIG. 2: The easy-to-read control screen includes five parameters not found on the graphic interface: Analog, Bend Range, Master Tuning, Voices, and Output Level.

EMAGIC
ES1 (Mac/Win) synth plug-in
$99

FEATURES ■■■
EASE OF USE ■■■■
AUDIO QUALITY ■■■■
VALUE ■■■■
1 2 3 4 5

PROS: Low latency. Good sound. Easy to program. Can use effects plug-ins on synths. Up to eight *ES1*s can be used at once. External audio track can be used as modulation source.

CONS: Incomplete manual. External Continuous Control implementation is complicated. Doesn't respond to Program changes. Can't cable an arpeggiator to an audio instrument.

MAGIC SOUNDS

I enjoyed the sound and feel of *ES1* and the way it integrated into my system. Because it's a plug-in, I didn't need another memory-intensive application to get a quality synth. A big plus is the low latency, which is an important factor when you're using a keyboard.

ES1's manual leaves something to be desired. Although it contains interesting historical information about synthesis, it lacks many important features and issues.

The field of virtual synth plug-ins remains in its infancy, but Emagic has put a lot of power into *ES1*. It is an essential tool for any *Logic Audio* user.

Jeff Obee *is a fretless bassist/synthesist/composer making music in the San Francisco Bay Area. You can reach him by e-mail at obeej@dsp.com.*

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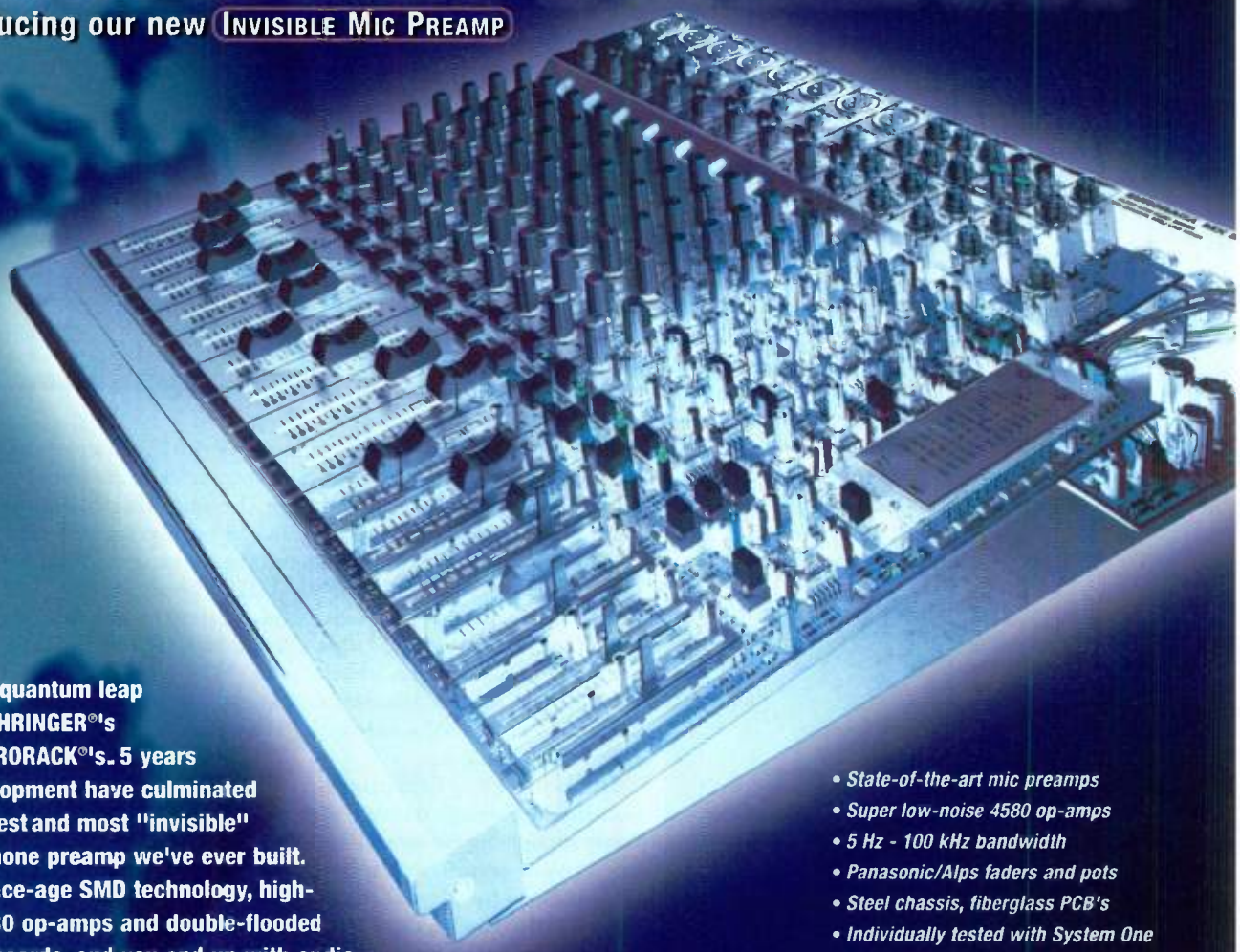

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HAFLER

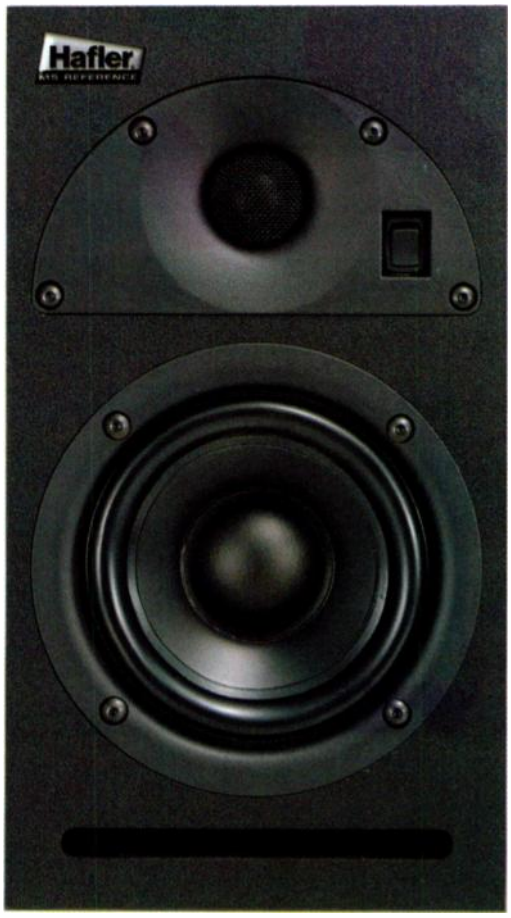
M5

Proof that good things come in small packages.

By Michael Cooper

It seems as though it was only yesterday that Hafler was known solely as a manufacturer of power amplifiers—and darn good ones, at that. The situation changed in 1998, however, when the company introduced its first studio-reference monitor, the TRM8. The first in a series of active Hafler monitors, the TRM8 won almost universal industry acclaim.

Hafler has broken ground again with its M5 reference monitors, which are passive rather than active (that is, they have no built-in amplifiers). The M5s are also quite small, making one wonder whether they can deliver true reference-quality sound. Well, there's no need to wonder—these babies deliver in spades.



Hafler's M5 passive, close-field monitors deliver excellent imaging, superior depth, and smooth sound in a compact package.

SUPERLATIVE DESIGN

The M5s look rather tiny next to Yamaha NS-10Ms, as they measure only about 7 inches wide, 7 inches deep, and 12 inches high. Weighing only 10 pounds each, the M5s are excellent for professional monitoring in tight spaces, and they can also be easily placed on a console bridge or workstation furniture.

Though the M5s' relatively low price may suggest that Hafler cut some corners, that is not the case. The quality of construction is professional throughout.

The M5 uses a 5¼-inch polypropylene woofer and a 1-inch silk-dome tweeter, with the latter set in an exponential (that is, curved) horn waveguide. Hafler maintains that the waveguide helps stabilize the close-field "phantom" center image. Whatever the reason, the M5s exhibit spectacular imaging.

The tweeter's optical-protection circuit prevents damage by slowly attenuating the signal level when power exceeds safe levels. In addition, a front-panel switch lets you reduce the tweeter's level by 3 dB. This feature could be helpful in a very live room where the highs are emphasized too much for your tastes. My control room features a dead front end (thanks to an Acoustic Sciences Corporation Attack Wall and floor carpeting), so I left the tweeter switch in the 0 dB (unattenuated) position. Interestingly, neither setting is indicated on the switch—a minor nuisance that you can easily remedy with a makeshift label.

Magnetically shielded, the woofer allows you to place the M5 next to computer monitors and televisions without distorting the image. The woofer also employs a nitrile rubber surround that prevents sound waves from reflecting back into the speaker cone and compromising the linearity of the frequency response. Furthermore, according to the manufacturer, the mineral-loaded cone's extra rigidity helps minimize intermodulation distortion (IMD). Listening for extended periods of time to speakers that produce a lot of IMD can be fatiguing, and the M5s are some of the least-fatiguing speakers I've ever heard. They were a pleasure to work on in long sessions.

The M5's internally braced cabinet is sturdily constructed of ¾-inch-thick medium-density fiberboard and covered in attractive, textured black vinyl. The slot-shaped bass port is in the front of the cabinet, where it belongs. (Some rear-firing designs sound a little mushy to my ears.) From an academic point of view, I wish that the M5's cabinet edges were rounded, because sharp, square edges tend to cause high-frequency diffraction, which scatters stereo imaging. However, as I noted earlier, the M5s exhibit outstanding imaging, even though they don't have rounded cabinet edges.

Gold-plated, five-way binding posts on the rear of the cabinet provide connections to your power amp. The M5s are conservatively rated to handle 100W RMS and 200W peak power—quite a load for such small monitors (and considerably more than the larger Yamaha NS-10Ms can handle). The only downside to the M5's small size is that, as one would expect, the speaker's bass-frequency response doesn't extend down very far. (Low-frequency response is rated at 70 Hz.)

HAFLER
M5 close-field reference monitors
$299 each

AUDIO QUALITY ■■■■■
VALUE ■■■■■
1 2 3 4 5

PROS: Excellent imaging and superior depth. Remarkably nonfatiguing. Magnetic shielding. Tweeter attenuator adjusts high-frequency response to complement your room's reverb-decay balance. Small footprint. Portable. Great price.
CONS: Weak low bass. Inefficient.

For manufacturer information, please see Contact Sheet, p. 205.

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The M5's peak acoustic output is rated at 110 dB at 1 meter—plenty loud for those who want to preserve their hearing and have a long career. Sensitivity is rated at 89 dB, which is a bit weak. In practice, I found the M5s' output to be noticeably quieter than that of the Yamaha NS-10Ms. This is not an issue unless you routinely use a superefficient second pair of monitors, in which case switching between them and the M5s could cause disconcerting monitor-level changes. It's a minor point, but one worth considering.

SOUNDING OFF

I tested the M5s using a Hafler P3000 Transnova power amp ($779), which Hafler kindly provided. My control-room setup is modeled after a LEDE (Live End Dead End) design, featuring the ASC Attack Wall at the front and RPG Skyline diffusors and an ASC Studio Soffit Poly-Trap on the rear wall. Optimal speaker placement for my room was rigorously devised using a combination of Metric Halo Labs' *SpectraFoo* and RPG's *Room Optimizer* software. The remaining low-bass room modes that resisted acoustic treatment were electronically equalized at the mix position for an even room response.

During the time I had the M5s, I used them to overdub vocals, flute, and Celtic harp tracks. I also used them to mix Celtic and modern country (including drum set) tracks. Mixes that sounded good on the M5s invariably translated well to other systems, as long as I used a subwoofer to reinforce lower bass frequencies (a point I'll come back to). In addition to tracking and mixing on the M5s, I used them to listen to a variety of commercially released rock, jazz, pop, R&B, techno, and new-age material, including some tracks that I had mixed previously.

Besides their outstanding stereo imaging, the M5s' incredible depth was immediately noticeable. For example, reverbs sounded dramatically clear and three-dimensional. From a timbral standpoint, the M5s sound warm, yet also clear and detailed. Upper mids in the vicinity of 2 kHz sounded very slightly understated, preventing vocals and guitars from being too forward or cutting. Yet the M5s have an uncanny ability to sort out loads of competing guitars and keyboards in a midrange-heavy mix. The spectral balance sounded quite good even outside the somewhat narrow sweet spot.

The M5s exhibit spectacular imaging.

As I mentioned earlier, the M5s' low-bass response is a bit weak. Alone, these monitors don't reproduce kick drum and low bass notes adequately enough. Were you to rely solely on the M5s for mixing, you might inadvertently add too much low end. (Of course, the same can be said about other small close-field monitors on the market.) For critical work, then, you'll want to either add a subwoofer or use the M5s as adjuncts to a larger pair of primary reference monitors.

It's worth noting that many of the M5s' positive attributes were severely compromised when the monitors were poorly positioned (for example, on

some workstation shelves). This demonstrates how important it is to do an acoustical analysis of your room to determine optimal speaker placement, and to effectively couple the monitors to their stands (another point that is true for all reference monitors). Though Hafler recommends that the M5s be placed in a vertical alignment, I found that they also performed extremely well horizontally.

M5 Specifications

Frequency Response	70 Hz–21 kHz (±3 dB)
Maximum Power Rating	200W
Peak Output	≥110 dB (per pair with music @ 1 m)
THD	<3% 70–150 Hz, <1% over 150 Hz (90 dB @ 1 m off axis)
High-Frequency Driver	1" silk dome
Low-Frequency Driver	5.25" polypropylene cone
Input Connectors	5-way gold binding posts
Input Sensitivity	>89 dB (with 2.83 vrms @ 1 m)
Nominal Impedance	6Ω
Treble Shelving Filter	–3 dB above crossover
Crossover Type	4th Order Linkwitz-Riley at 3.2 kHz
Enclosure Material	¾" medium-density fiberboard
Dimensions	6.75" (W) × 12.19" (H) × 7" (D)
Weight	10 lbs. each

NO HYPE

Some engineers (NS-10M fans come to mind) like their monitors to have hyped high mids so they can hear everything very clearly and won't be inclined to crank those frequencies to achieve clarity. It's a valid strategy meant to steer them toward a warmer mix. (For the record, I occasionally refer to my pair of NS-10Ms, but only for a few minutes at a time, as I find them quite fatiguing. In fact, I'm considering replacing them with the M5s.) For those folks, the M5s may not be the small monitor of choice.

However, if you're looking for revealing close-field monitors that owe their detail to superior execution of acoustical-design principles rather than hyped mids, look no further. The Hafler M5s' small size makes them a great choice for cramped control rooms and itinerant engineers. But size benefits aside, the M5s' rock-solid imaging, top-notch depth, and smooth spectral balance add up to a terrific value. I highly recommend that you check them out.

Michael Cooper *owns Michael Cooper Recording, located outside the resort town of Sisters, Oregon, at the base of the Oregon Cascades.*

AUDIO SIMULATION

DREAM STATION 1.0 (WIN)

Software synthesis, sample playback, sequencing, mixing, and effects all rolled into one.

By Scott R. Garrigus

Now that PCs are Pentium-powered, music-software developers are determined to squeeze as much real-time synthesis as possible from them. The German-Hungarian company Audio Simulation continues this trend and takes it one step further with *Dream Station* 1.0, an all-in-one synthesizer and music-production program that costs less than $100.

Dream Station offers software synthesis in the form of analog simulation and sample playback with up to 96 oscillators, 32 filters, and 32-note polyphony. Its physical modeling of analog circuits produces some great sounds, but that's only the beginning. *Dream Station* also includes a built-in step-time sequencer complete with automation, an 8-channel stereo mixer, and dual stereo effects processors. Combine these features and you have a versatile software-based production studio that can make many of your techno, acid, trance, house, rave, and pop composing dreams come true.

I tested *Dream Station* on a Pentium II/300 MHz with 64 MB of RAM, Windows 98SE, and a Diamond Multimedia Monster Sound MX300 sound card. It performed nicely, but as you might expect of a first-version release, there was still room for improvement.

SETUP TROUBLE

Normally during installation, you simply type in the supplied serial number to authorize the software. Unfortunately, I was not quite so lucky, because I use a multiport MIDI interface. According to *Dream Station*'s documentation, Windows doesn't allow more than ten MIDI drivers to be active at once, and the *Dream Station* installation program scans for this situation. If it doesn't find room for its own driver (which is needed to drive the synth from a sequencer on the same machine), *Dream Station* won't install the driver properly. So every time I ran the software, I received a MIDI-driver initialization error message. (If you select another MIDI port in the Preferences dialog box, you can still trigger the synth from an external MIDI controller.)

The documentation simply tells you that the installation probably didn't succeed, and suggests that you restart Windows and try again. But that does not work, because the archaic copy-protection scheme won't allow you to reinstall the program if it senses that a copy already exists on the machine. What's more, there's no easy way to uninstall the program in Windows 98. On my machine, *Dream Station* didn't even appear in Windows' Add/Remove Programs Properties dialog box.

▼

You can easily produce fat, full sounds.

Luckily, I was able to install the program on a second machine (with only one MIDI driver in use), and could then see how the *Dream Station* MIDI driver is implemented. After adding midi2=dsmidi.drv to the Drivers section of the System.ini file on the first machine, everything worked fine. But many users may not be so tech savvy. Hopefully, Audio Simulation will remedy this problem in a future version. Independently of copy protection, I should be able to easily uninstall and reinstall the software on the same machine if I am a legitimate user and have the original disc.

SKIMPY DOCS

Dream Station's very terse printed documentation poses another problem. All you get are 27 pages of short descriptions covering the program's features. That may be okay if you're an advanced user and already have experience with synthesis and sequencing, but beginners will most likely be overwhelmed by the software at first.

Furthermore, the documentation doesn't provide any step-by-step examples or tutorials. Some excellent demo files and a full bank of Programs (presets) show off the software quite nicely, but you have to spend some time getting to know this product before you can put it to good use. Unfortunately, the Help file doesn't provide much assistance either; it simply repeats the information the printed manual gives you.

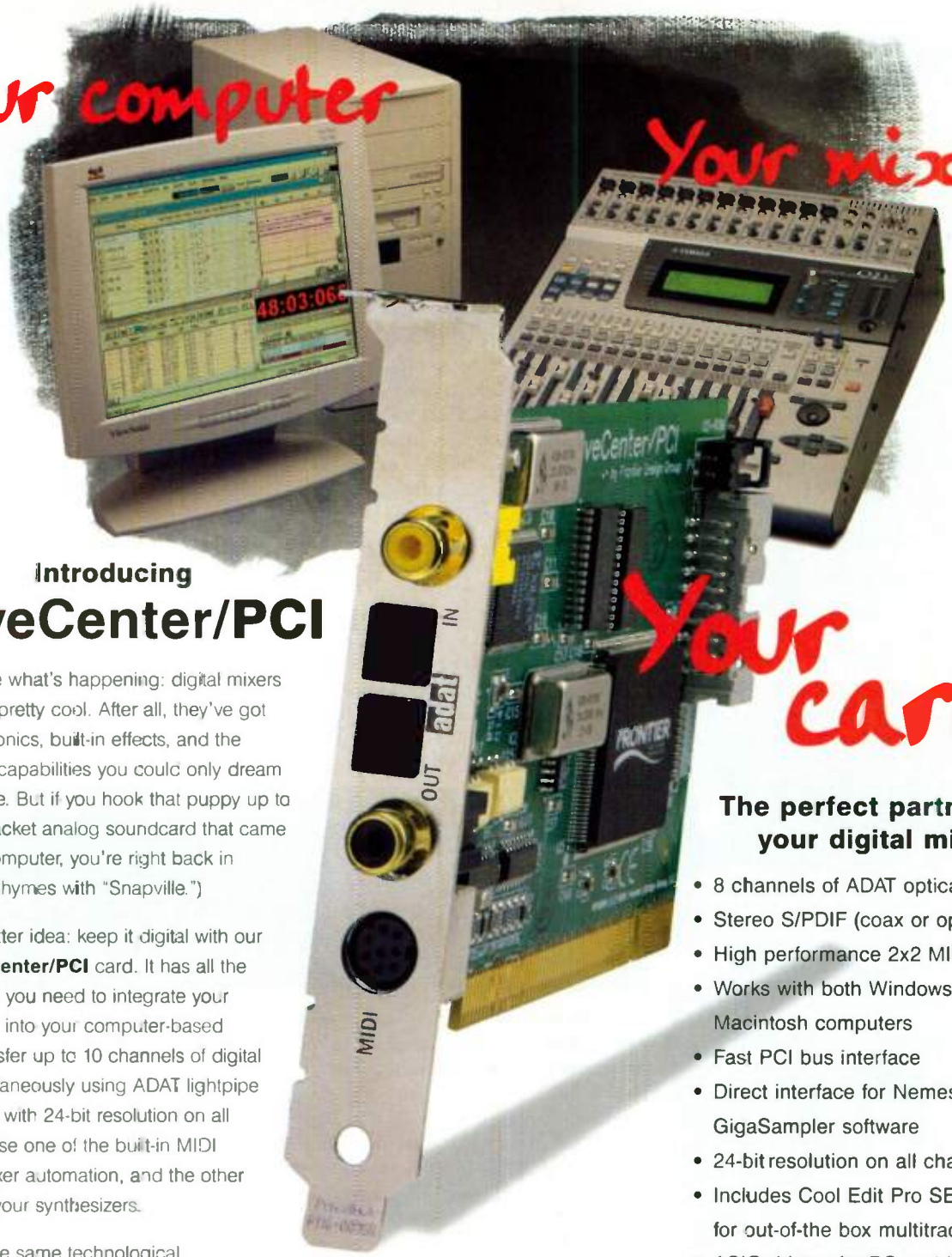
AWESOME ANALOG

Aside from its installation and documentation shortcomings, *Dream Station* is quite impressive, and its synthesis capabilities are very powerful. The program's 32 notes of maximum polyphony (depending on your CPU) are each constructed of up to three Oscillator modules and Amplifier, Filter, LFO, User Envelope, and Vibrato modules. Individual modules represent each of these features in the synthesizer section of *Dream Station* (see **Fig. 1**). The combination of these modules makes up a single Program. A basic Program consists of the combination of the Oscillator 1 and Amplifier modules, which are the only modules that are always active. The other modules can be turned on or off.

All three Oscillator modules can be set to a variety of waveforms including sine, triangle, sawtooth, noise, and pulse/square. Only Oscillator 1 has a pulse generator that can be adjusted with its Pwidth (Pulse Width) and PWM (Pulse Width Modulation) controls.

FIG. 1: Oscillator, Amplifier, Filter, LFO, User Envelope, Vibrato, and Program modules make up Dream Station's synthesis engine.

For manufacturer information, please see Contact Sheet, p. 205.



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Oscillators 2 and 3 provide nonadjustable square waves. All the Oscillator modules, however, have a PCM option that lets you use 16-bit mono samples in place of the traditional waveforms for a wider variety of synthesis options. (I'll talk more about this option later.)

All three oscillators can be tuned, with fine-tuning available in Oscillators 2 and 3. Keyboard tracking can be activated in Oscillators 1 and 2, but not in Oscillator 3. You can adjust the volume of Oscillators 2 and 3 only. Other options include hard synchronization and ring modulation between Oscillators 1 and 2. In addition, you can experiment with FM synthesis by adjusting Oscillator 2's FM Amount control, which sums the frequency of Oscillator 1 and the output signal (waveform) of 2.

The Filter module provides the usual cutoff-frequency and resonance controls as well as its own ADSR-envelope and gain controls. Keyboard tracking of the cutoff frequency is also available. The Filter can operate in one of five modes: 2-pole lowpass, 4-pole lowpass, 2-pole highpass, 2-pole bandpass, and 4-pole formant. The LFO module allows you to modulate the frequencies of Oscillators 1 and 2, the pulse width of Oscillator 1, or the cutoff frequency of the Filter. It provides the usual sine, sawtooth, pulse/square, and noise waveforms, which you can adjust with the Depth and Rate controls.

The User Envelope module is a stand-alone envelope generator that you can use to modulate the FM control of Oscillator 2, the pulse width of Oscillator 1, the frequencies of Oscillators 1 and 2, the volume of Oscillator 2, and the cutoff frequency of the Filter. It provides the usual ADSR and gain controls. The Vibrato module is "hardwired" to modulate the frequencies of all three Oscillators with a global set of Delay, Depth, and Rate controls. (A bit more flexibility here would be appreciated.) The Amplifier—the final module in the chain—has the usual ADSR-envelope and gain controls, which affect the overall volume of the Program.

The Program module provides some overall parameters for the current Program, such as settings for portamento speed, note release, legato, and distortion. The Program module is also where you assign a mixer output channel and where you can name your new Program and store it in any one of the 99 available user locations.

Dream Station
Minimum System Requirements
Pentium (Pentium II recommended)/200; 32 MB RAM (64 MB recommended); Windows 95/98; DirectX 5–compatible sound card; CD-ROM drive; 10 MB hard disk space; VGA monitor

FIG. 2: *Dream Station*'s sequencing capabilities are pattern based. You create patterns using the Pattern Editor and piece them together to compose songs. Note values and synth command codes are entered from your computer keyboard.

You can create truly amazing sounds with *Dream Station*, easily producing fat, full sounds that you'll swear come from a real analog synth. The software ships with 99 default sounds—in Dream Station Instrument (DSI) format—that show the program's capabilities quite well. You don't have to worry about overwriting these patches, because an included file contains all of the default Programs. A Randomize Sound feature randomly sets all the controls to produce some unique textures that can serve as great starting points for new sounds. One thing missing, however, is a good GM sound set, which would let you quickly begin using the software with your current compositions.

SIMPLE SAMPLES

Dream Station provides synthesis but has only 16-bit mono sample playback. You can get around the mono limitation by splitting a stereo sample into two separate files (representing the left and right channels) and assigning each file its own Program. Then you simply assign each Program to a different Mixer channel and pan one channel hard left and the other hard right. You might run into sync problems with long samples, and this approach may be a slight waste of resources, but at least it can be done.

Before you can assign samples to an Oscillator, you have to load them into memory using the Sample Organizer. This dialog box allows you to change which samples are currently stored in memory. Along with the file name of each sample (only WAV files are supported), the sample organizer lists size (sample size is unlimited), root key, and loopback point. Only the loopback point is adjustable here, and you can't audition the results immediately, so you're probably better off using a separate sample-editing application for creating loops.

An especially welcome feature in *Dream Station* is that you're not limited to only one sample per Program.

AUDIO SIMULATION

Dream Station 1.0 (Win) software synthesizer

$89

FEATURES ■■■■

EASE OF USE ■■■

DOCUMENTATION ■■

VALUE ■■■■

1 2 3 4 5

PROS: All-in-one synthesis, sample playback, sequencing, mixing, and effects. Excellent-sounding synthesis. Good synth-programming flexibility. Supports external sequencer. Automation via MIDI controllers. Good-sounding effects. A lot of power at a low price.

CONS: Archaic copy-protection scheme. Skimpy documentation. No stereo sample support. No window resizing. No Standard MIDI File support. No internal automation-data editing. No individual mixer channel outputs. No DirectX support.

FIG. 3: The Automation Controls box lets you assign up to ten different automation controls to be recorded. You can assign the controls to any of the knobs on *Dream Station*'s synth panel.

Using the Sample Split Editor, you can create sample splits to assign different samples to pitches across the entire MIDI note range. This is a great way to create drum kits. Samples can be assigned to individual notes or to a range of notes, and you can assign a transposition value to each sample in the list. The Sample Split Editor also lets you define up to 32 split presets (configurations). When assigning samples to Oscillators via the PCM option, you simply specify a split preset (1 to 32) instead of selecting a single sample. This feature works quite well. It would really be cool if you could change the split preset during sequencer playback, but unfortunately, that isn't possible.

CLASSIC SEQUENCING

Dream Station provides tracker-type sequencing capabilities like those from the old days of DOS. This means that you compose songs by piecing together patterns. You create patterns using the Pattern Editor (see **Fig. 2**); each pattern can contain up to 32 tracks and be up to 128 steps in length. Each track in the Pattern Editor contains three columns: two for commands and one for note values. The note values can be entered from your computer or MIDI keyboard, but only step entry is available.

The command values provide control over some of the various synth parameters; for example, you can select a Program for the current note, adjust the Filter cutoff frequency, or retrigger the LFO. Special codes for these and many other settings are outlined in the documentation. One annoying characteristic of the Pattern Editor is that it can display only seven tracks at a time. Its window isn't resizable, and that can make composing patterns a bit cumbersome.

After you have created your patterns, you piece them together with the Musicparts Editor. Each pattern is assigned a number, and you simply list these numbers in the order you want their corresponding patterns to play. After you've completed your list, you can play your song or save it as a proprietary *Dream Station* Sequence file, which stores all the sequence data and all the Program data together. Unfortunately, *Dream Station* lacks support for Standard MIDI Files, although you can export your song as a 16-bit, 44.1 kHz stereo WAV file.

▼

Samples can be assigned to individual notes or to a range of notes.

With the *Dream Station* MIDI driver, you can compose using your favorite sequencer. Just assign the MIDI output of your tracks to drive the *Dream Station* synth engine, and set up the appropriate MIDI channels using the MIDI Mapper. This allows you to run both the sequencer and *Dream Station* on the same PC, which shouldn't pose a problem with today's CPUs. I had no trouble running *Dream Station* and Cakewalk's *Pro Audio* on my Pentium II/300 MHz. Of course, you can also drive *Dream Station* using an external MIDI input. With either method, you can easily share your sequence data and still use *Dream Station*.

AUTOMATION STATION

For further flexibility, *Dream Station* provides internal automation with its Automation Controls box (see **Fig. 3**). You can assign up to ten different automation controls to be recorded, and you can assign these controls to any knob on *Dream Station*'s synth panel. Changes made to the specified controls are automatically recorded. Unfortunately, the automation data cannot be viewed or graphically edited. If you mess up, you have to record it all over again. You can copy and paste data to be used in multiple patterns, but that's about it.

Fortunately, *Dream Station*'s MIDI driver comes to the rescue. Instead of recording automation internally, you can do it using your favorite sequencer. Every knob, slider, toggle switch, and control in *Dream Station* has been assigned a MIDI controller number. By changing the values of these controllers, you can externally control every aspect of the program—a nice touch. You can also create a custom controller set, but it's limited to a modest set of functions.

MIXED REVIEW

When you're creating a synth Program, you have to assign it to one of the channels in *Dream Station*'s Mixer module (see **Fig. 4**). The Mixer provides eight channels routed to a stereo master bus. Each channel includes a volume fader, a pan control, and two effects sends.

Some other nice features are the level meters in each channel and the mute function, which you activate by simply clicking on the channel name. I was disappointed, however, to discover that you can't assign the output of each channel to its own sound-card output, a capability that Audio Simulation should add to the next version.

MINIMUM EFFECTS

Although *Dream Station*'s effects sound pretty good, they are, unfortunately, limited. For example, the program has

only two stereo effects processors, which means that all 32 synth voices have to share the same two types of effects. All you can vary is the amount of the effects applied with the Mixer module. In addition, only a limited number of effects types are available, although they do cover the basics: delay, phaser, flanger, chorus, and reverb. The number of choices you get within each type is rather slim. The program offers only three reverb selections, for instance, which isn't much to work with.

Finally, *Dream Station* doesn't support DirectX plug-ins, which would easily solve the problem of limited effects types. I do like the fact that the connection between the effects processors can be specified as parallel or serial. I also like that the second processor allows you to define two effects types, so in essence, you can have three types of effects going at once. But neither of these features makes up for *Dream Station*'s other limitations in this section.

DARE TO DREAM

As you can see, *Dream Station* has some room for improvement. The copy protection should be dropped or at least better implemented, and the documentation needs to be beefed up a bit. The program also needs stereo sample support, resizable windows, Standard MIDI File support, automation-data editing, individual mixer channel outputs, more effects processors and effects types, and DirectX support.

This may seem like a long list of complaints, but many are actually wish-list items. *Dream Station* delivers on its promise to provide an all-in-one production studio that lets you compose many types of music using a single piece of software. The limitations won't stop you from creating some awesome sounds and songs. With a price tag of only $89, this program is definitely worth the money, considering the very real power that it provides. If you are interested in checking out *Dream Station*, download the demo from the Audio Simulation Web site; I think you will be pleasantly surprised.

FIG. 4: The Mixer module is the last level of *Dream Station*'s internal architecture. Programs can be assigned to any of the eight Mixer channels. These channels are then combined into one final stereo mix, which is sent to your sound-card output.

Scott R. Garrigus *is the author of* Cakewalk Power *(Muska Lipman Books, 2000), the first professional guide to Cakewalk's* Pro Audio, Guitar Studio, *and* Home Studio *software. For more information, you can check out Garrigus's Web site at www.garrigus.com.*

METASONIX

TS-21 Hellfire Modulator

Redefining the word "distortion."

By Gino Robair

Sometimes the simplest devices yield the richest results. Such is the case with the TS-21 Hellfire Modulator, which Metasonix touts as "the world's most aggressive and complex distortion generator." The TS-21 is the first in the company's line of tube-based synth modules.

Metasonix has put its knowledge of tube circuitry to good use in the design of the TS-21. The unit is made up of three stages, each with its own tube: a preamp with a VCA, a pulse-width modulator (PWM), and an LFO-controlled waveshaper. Vacuum tubes are also used for the LFO and for powering additional circuits, giving you a total of five tubes in the device. Despite the tube count, however, the TS-21 has very low self-noise and gets only slightly warm to the touch.

Because of the type and configuration of the TS-21's five tubes, Metasonix states that the Hellfire Modulator works best with edgy signals, such as square and sawtooth waves from synthesizers. In fact, the company says that the device was created primarily for use with analog modular synthesizers. I accepted the challenge and mated the unit with my Buchla, Moog, Oberheim, and Technosaurus gear. In addition, I ran other sound sources through the TS-21, including electric guitar, theremin, drum loops, and a variety of samples.

GO WITH THE FLOW

The TS-21 is housed in a rugged 2U box that has the look and feel of military surplus gear. The front panel's symmetrical layout makes it easy to visualize the signal path through the unit. Because the I/O jacks are on the front panel, interfacing the unit with your modular-synth gear is a straightforward matter.

In the center of the front panel is a darkened, circular window through which you can view the dimly glowing tubes inside. To the left of the window is an unbalanced ¼-inch TS audio input, a ¼-inch CV input to the VCA, controls for input level and pulse-width shape (PWM/Manual), and switches marked PWM/Bypass and Range. On the right are the Beam Screen, L1, L2, and Speed knobs; a ¼-inch jack for the Beam/PWM CV input; and a ¼-inch TRS stereo jack for audio output. What I found handy is that both CV inputs gladly accept the output of an LFO and envelope generator, as well as control voltages.

From the input, the signal flows first to a pentode tube preamp, then through a PWM tube, and finally through a waveshaper circuit, allowing you to shape the sound at each of these stages. The CV VCA input affects only the input signal (though Metasonix will wire the VCA to the output by request); its effectiveness is controlled by the position of the PWM knob. Having a VCA at the input stage seemed a little strange to me at first, but I quickly discovered the potential of this configuration. For instance, modifying the loudness contour of the source material *before* it goes to the next stage in the system is very useful if you're looking for radical sound modification.

The next stage is the PWM circuit. When the PWM/Bypass switch is in the PWM position, the PWM/Manual knob controls the switch point of the circuit by changing the width of the pulses. The PWM circuit uses positive feedback, and you can easily set it into self-oscillation by turning the PWM knob past 9 o'clock.

The Range switch adds further unpredictability to the processing by sending the signal to different electrodes on the beam tube. However, the sonic results are dependent on the other front-panel settings. For example, sometimes the Range switch has no audible effect; at other times it pushes the signal to a new level of distortion. Occasionally it will cause the output level to drop a bit, although you can correct this by adjusting the L1 and L2 controls.

METASONIX
TS-21 Hellfire Modulator tube signal processor
$749

FEATURES ■■■■
EASE OF USE ■■■■■
SOUND QUALITY ■■■■
VALUE ■■■
1 2 3 4 5

PROS: Very low noise. High sound quality. Tube driven. Unpredictability in the circuits.
CONS: Expensive.

ON THE BEAM

The unit's Beam Screen knob controls the beam-modulator stage. Metasonix claims that the balanced modulator tube in this stage (6AR8/ME8/JH8) was intended to be a chroma detector in television sets, and that it has never been used in audio equipment before. When you hear how it treats an audio signal, you will understand why Metasonix chose to use it in the TS-21.

As the Beam Screen knob passes the 12 o'clock position, the gain increases, causing

The tube-based TS-21 Hellfire Modulator from Metasonix is a rugged 2U processor that can distort sounds in a number of fascinating ways.

For manufacturer information, please see Contact Sheet, p. 205.

"REASONS NOT TO BUY A MACKIE D8B...ZERO."

—Roger Nichols, EQ Magazine

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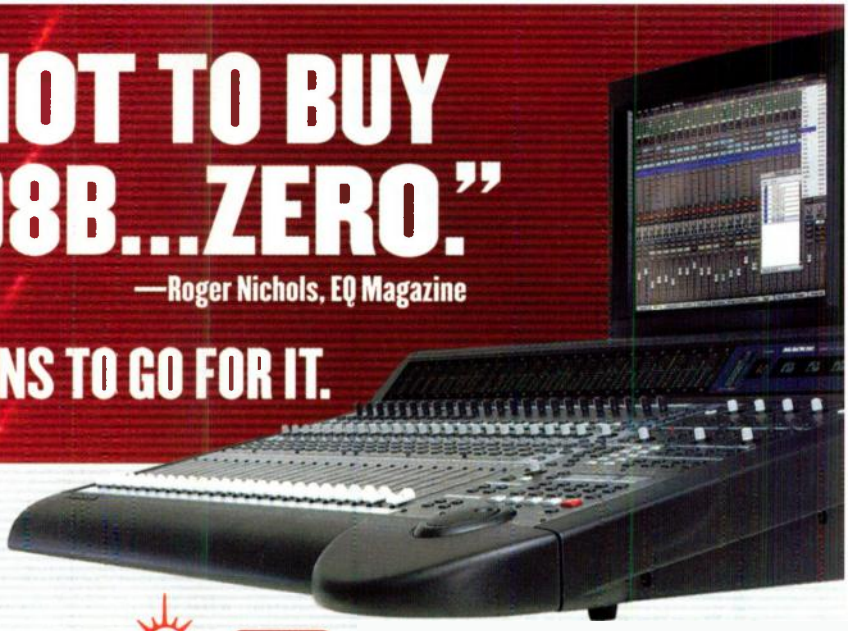

1 FREE UPGRADE! NEW OS 3.0 ADDS OVER 30 NEW FEATURES!

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- **Updated GUI** including 48-channel fader bank view screen.
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- **Multiple direct outs** per channel.
- **Optional level to tape** fader control.
- **Assignable, bidirectional MIDI control** of all parameters.
- **Cross patching** allows substitution of channels between various banks.

2 DSP PLUG-INS!

Antares' Auto-Tune for the D8B uses advanced DSP algorithms to detect the incoming pitch of a voice or solo instrument as it's being tracked and instantly pitch-correct it without introducing distortion or artifacts. Fully automatable.

Massenburg Parametric EQ. MDW 2x2 High-Resolution Parametric Equalizer plug-in from Grammy-winning engineer/producer George Massenburg. Mono/stereo EQ at 96kHz sample rate for unprecedented clarity and high frequency smoothness.

Drawmer offers two dynamics packages for the D8B: ADX100 includes their industry standard frequency conscious gating, plus compression and limiting; ADX200 adds variable "Peak Punch" and further Drawmer innovations.

IVL Technologies' VocalStudio provides real time vocal doubling, multi-part harmonies and pitch correction in an easy-to-use interface. A free demo is built-into the Digital 8•Bus. Just add a second MFX card to own this innovative plug-in from a world leader in vocal processing.

TC Electronic Reverb (bundled with the D8B UFX card) provides Reverb 1 and Reverb 2 algorithms from the renowned TC Electronic M2000 Studio Effects Processor. TC FX upgrade package contains an expanded set of M2000 reverbs plus Delay, Chorus, and Pitch. TC 2000 adds the TC M2000's Reverb 3, de-essing, tremolo, phasing, and panning.

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3 1999 TEC AWARD WINNER!

Normally we don't name competitors in our ads. But in this case, Mix Magazine published the other nominees for the 1999 TEC Award for Outstanding Technical Achievement in Small Format Consoles: Allen & Heath's GS-3000, Digidesign's ProControl, Panasonic's WR-DA7, Spirit's Digital 328 and Yamaha's 01V. Thanks to all who helped us win this prestigious award.

TS-21 Specifications

Analog Inputs	(1) unbalanced ¼" TS
Analog Outputs	(1) stereo ¼" TRS
Other Inputs	(2) ¼" CV
Frequency Response	20 Hz–40 kHz
Dynamic Range	30–50 dB, depending on settings
Dimensions	2U x 12" (D)
Weight	15 lbs.

the waveform to fold over on itself in unpredictable ways. Turning the knob clockwise as far as possible results in a hum, which further intensifies the output with some source material (particularly harmonic-rich synth signals). On source material (such as samples and loops), it merely sounds annoying.

At this point in the signal path, you can process your source material in ways that render it unrecognizable. But the fun doesn't stop here.

THE JOY OF PANNING

To go the extra distance, Metasonix wired an LFO to the beam modulator. In conjunction with the L1 and L2 knobs, the LFO controls how the beam switches between two anodes of the tube. The result is a panning effect when you use a TRS insert plug in the output jack.

The positions of L1 and L2 determine how evenly the panning occurs, while Speed controls the panning rate. You can set the TS-21 to pan in strange, limping rhythms that are unique to this device. Such rhythms can sometimes make the panning effect seem unstable, but in a musically interesting way. Additionally, the sound sent to each channel is noticeably different both in sound quality and volume, yet both channels share elements of the source material.

Finally, the Beam/PWM CV input affects the settings of both the Beam Screen and PWM/Manual controls. Again, you can use an LFO or high-gain audio signal to drive it.

The only unwanted noise I detected from the TS-21 was a quiet ticking from both outputs when the input was turned completely off. Metasonix says this is a result of the LFO. Newer TS-21 models have a switch that lets you turn the LFO (and the ticking sound) off.

GENTLE MANIPULATIONS

To get the most out of this device, you must take care in setting the controls, because the slightest adjustment can have a profound effect on the sound. Make a large move with one of the knobs, and you may pass over something amazing.

Occasionally, after working on a particular sound for a time, I found that the PWM was in self-oscillation and the source signal was no longer present at the output: the device itself had become the unintended source instrument. This is not necessarily a bad thing. The fact that the TS-21 can be used as an oscillator (in more ways than one) is another interesting feature.

▼

The slightest adjustment can have a profound effect on the sound.

ONE OF A KIND

Metasonix intended for the TS-21 to be used with modular synthesizers. However, I found myself treating the device itself as a voltage-controlled synth module. After I'd spent just a few moments with the TS-21, it seemed to take on a life of its own. Hours later, I gained an awareness and appreciation of its many subtleties.

Considering that the TS-21 is a single-channel processor, the biggest drawback for some will be its $749 list price. However, the TS-21 is unique in that it uses tubes to do the processing. The resulting sound quality speaks for itself, and serious synthesists and sound designers will appreciate this aspect of the unit. If the words *grainy, saturated,* and *mangled* appeal to you, or if you thought there were only a few ways to distort a sound, you're in for a treat with the TS-21.

Gino Robair *is an associate editor for* **EM.**

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LANGEVIN

DUAL VOCAL COMBO

This processor is the stuff legends are made of.

By Myles Boisen

Manley Laboratories is this country's biggest little manufacturer of modern, high-end tube gear. Manley products such as the Vox Box, Massive Passive equalizer, and Variable-Mu stereo compressor are glowing beacons of warmth in this digital age. They are also, sadly, too expensive for most **EM** readers, so they rarely appear in these pages. Thankfully, personal-studio owners can now reap the benefits of Manley's no-compromises approach to circuit design with a full range of solid-state boxes branded with the historic Langevin name.

The Langevin Company was founded in 1923 in New York. Throughout its 50-year history of manufacturing transformers and radio-broadcast equipment, the company went through a series of ownership and name changes. After moving around the country, Langevin relocated to Los Angeles in the early 1960s. Langevin mixing consoles found their way into a number of recording studios, and the company's AM16 mic-preamp modules remain a hot item on the vintage-pro-audio market today.

In 1992, Manley Laboratories acquired the rights to the Langevin name and designs and has since given the Langevin name to all of its solid-state processors. In addition, Manley made critical improvements to some of the original Langevin circuit designs. Though it's tempting to think of Langevin as Manley's budget line, the price and quality of the various models I've seen easily put them in the same ranks as the best contemporary Class A and solid-state units.

The most versatile and deluxe Langevin offering to date, the new Dual Vocal Combo combines the attributes of the Dual Mono Microphone Preamplifier with EQ and the Dual-Channel Electro-Optical Limiter (or El-Op). The Dual Vocal Combo also provides a direct input for each channel, making the unit a full-featured pair of "channel strip" processors that goes well beyond the limitations suggested by its name. Techies will appreciate that the microphone input uses a Manley Labs custom-wound transformer and is all-discrete Class A, with no integrated circuits or op amps in the signal path.

TOUR DE FRONT

The Dual Vocal Combo's uncluttered rose-red aluminum front panel sports a symmetrical layout of switches, knobs, and meters for each channel. The mic-preamp and EQ functions are organized across the top of the 2U front, and the DI jacks and limiter section occupy the bottom half of the panel face.

The AC power switch lies in the center of the top row, flanked by a fancy pair of locking phantom-power switches with yellow status lights. In the middle of each upper-panel half are the EQ sections, which contain two continuously variable low- and high-frequency shelving controls (–10 to +10 dB) with switchable 40/80 Hz and 8/12 kHz corner frequencies, as well as an EQ bypass for each channel. The EQ gain pots have no calibration markings (none of the pots have detents, zero-gain indications, or numerical gain values of any kind), but all of the rotary knobs on the Dual Vocal Combo are encircled by a white ring with ten equal divisions, five on each side of the center line. (In the case of the EQ knobs, these could be interpreted as 2 dB divisions.)

The preamp gain controls, labeled "Input Attenuate," are located on the outer edges of the mic-preamp sections. The name may seem rather obscure, but these controls are actually trim pots designed to keep the input from overdriving the preamp section. Despite the subtle nomenclature, the Input Attenuate knobs function just as conventional gain controls do: when they're turned as far as possible clockwise, the mic preamp operates at a factory-set rating of 45 dB, with both channels matched for identical maximum output.

Located directly beneath the Input Attenuate knobs are high-impedance (150 kΩ) direct-input jacks. When you insert a ¼-inch guitar cable into the DI jack, the microphone input is interrupted, and all the resources of the Dual Vocal Combo (including up to 25 dB gain) are available for shaping the sound of electric guitars, basses, keyboards, and so on.

LIMITING FACTORS

The remainder of the lower front panel is dedicated to the limiter block, which uses the unique response of a light-sensing Vactrol cell to control a fast-attack, slow-release, high-ratio compression circuit. In the center of the limiter section are two Sifam VU meters (which display either +4 dBm output level or the amount of gain reduction) separated by a switch labeled "Sep/Link." This switch lets the left and right channels operate either independently (for processing two different signals) or together (for stereo operation). For example, you would select Link to limit a stereo recording or mixdown. To enable smoother and more musical gain reduction, the Dual Vocal Combo limiting circuit, when linked, is controlled by a summed combination of the two channels rather than by only one channel, the more common (and less expensive) method of triggering gain reduction.

The limiter section, in keeping with the conventions of popular vintage limiters such as the UREI LA-3A, provides only two controls: makeup gain (labeled "Gain") and threshold (labeled "Reduction"). Clockwise movement of the Reduction knob lowers the compression threshold, which results in more peaks being limited and reduces the dynamic range of the signal. Due to the unique characteristics of the Vactrol sensing cell, the audible effect of the limiting circuit

With the Langevin Dual Vocal Combo, the esteemed Manley Laboratories finally addresses the needs—and budget restraints—of the personal-studio recordist seeking uncompromised audio.

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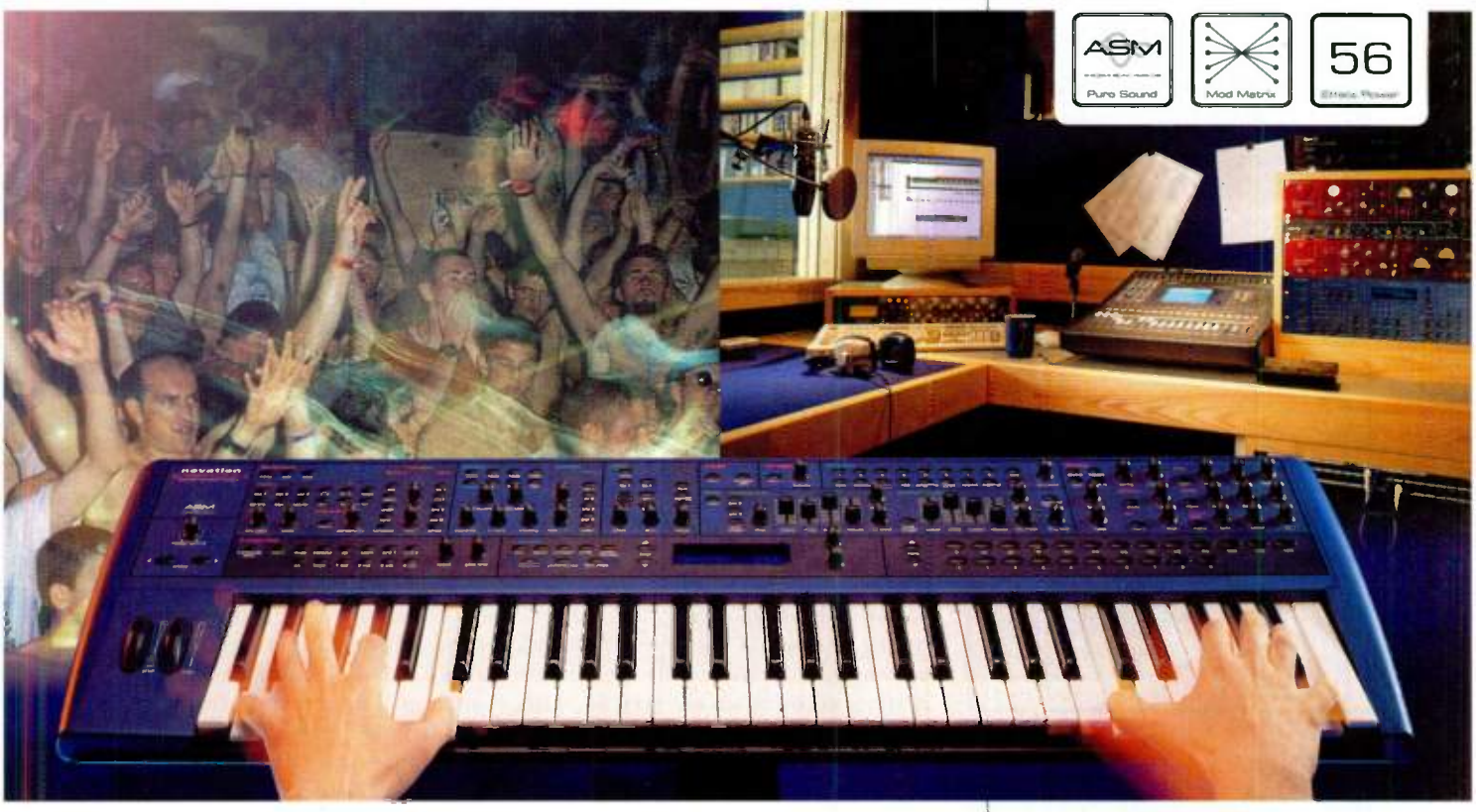

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changes subtly as the threshold is lowered and gain reduction increases. For most sources at minimal settings (up to 4 dB of gain reduction), the electro-optical limiter works more or less invisibly, with no ducking, transient squashing, or brickwall leveling in evidence. Used to compensate for the overall reduction in peak or RMS level, the makeup-gain control can also be used to add up to 15 dB of gain at the final output stage. This knob has no unity-gain or zero marking, which seemed a little strange. By trial and error I found the unity position near 1 o'clock on the rotary pot's outer ring, and I made a mental note to use this position as a starting point for future tests.

The last component in the section is the limiter Bypass switch. As the chatty yet highly informative manual wisely states, "This should be the most used control on your limiter." The Bypass switch allows you to precisely set makeup gain by ear, as well as make an A/B comparison of uncompressed and compressed signals to determine the desired amount of limiting.

A little 12 kHz boost was hard to resist, given the sweetness of the EQ.

AROUND BACK

On the rear panel is the usual complement of IEC power-cord connector and fuse holder, along with separate chassis- and circuit-ground terminals. These grounding points, which are normally jumpered together, can be accessed individually to reduce hum and ground loops. The microphone inputs and balanced +4 dBV outputs are gold-plated Neutrik XLR jacks. Two ¼-inch jacks are also provided: an unbalanced out at professional +4 dBV level (not consumer/semipro –10 dBu level, as is conventional for most unbalanced lines) and a TRS input jack for the limiter section.

Inserting a cable into the TRS jack enables a mechanical disconnect of the limiter, allowing the limiter section to be used essentially as a stand-alone unit—equivalent in every way to the $1,775 Langevin El-Op. My only wishes here are that the limiter input was on an XLR jack—or even on both kinds of jacks—and that there were consumer-level outputs so as to standardize connection with the mixture of gear in my racks.

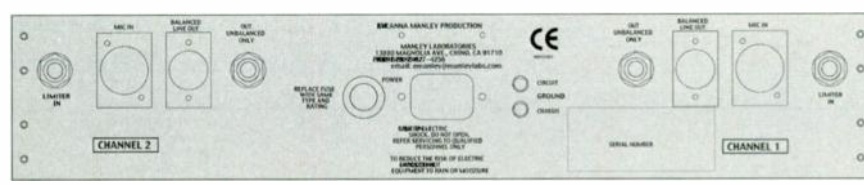
NO REVERSAL

The only other feature that I missed on the Dual Vocal Combo was a simple phase-reverse switch. In my perfect world, these switches (which can correct wiring anomalies and assist in checks for phase cancellation in multimic setups) are standard equipment on every mic preamp. This common feature is very handy, and certainly far more convenient than inserting a phase-reverse cable, especially when you're working with phantom-powered condenser mics.

SAX APPEAL

In my studio, the Dual Vocal Combo quickly became my favorite new toy. The biggest challenge it faced was recording a saxophone quartet, with all parts multitracked by arranger/player Jamison Reed of the popular Bay Area band Casino Royale. I'm known for being pretty picky about sax sounds (as is Reed, a veteran performer), and at the start of the session I vowed to abandon the Langevin the moment that it overcompressed, ran out of gain, or added unwanted coloration and harshness to this delicately balanced piece. As it turned out, my concerns were quickly allayed.

On the first track—the baritone-sax



The Dual Vocal Combo's rear panel provides balanced XLR mic inputs, balanced XLR and unbalanced ¼-inch outputs, and TRS input jacks for the limiter section (which can be used independently). The only unusual thing is that the unbalanced ¼-inch outputs are at +4 dBV rather than –10 dBu level.

For manufacturer information, please see Contact Sheet, p. 205.

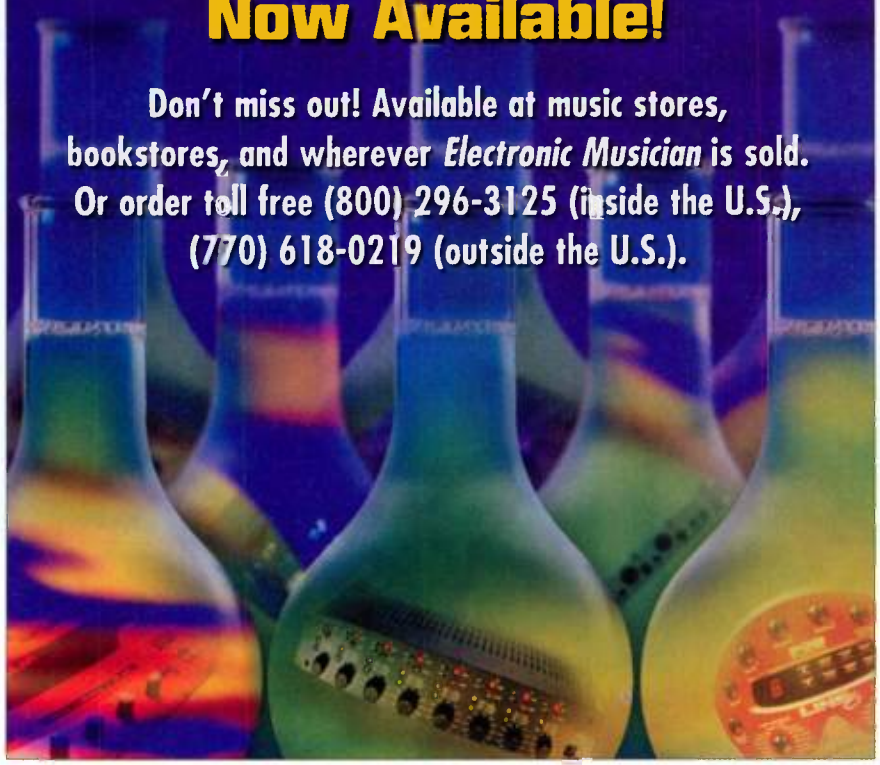
part—my Lawson L47MP tube microphone's tone sounded robust and clear, and the Langevin limiter kept the popping low notes of this dynamic horn in check with only 2 to 3 dB of gain reduction. There were no problems with the tenor sax, either, except for some uncharacteristic dullness of sound, which a touch of high-shelving EQ remedied nicely. Though I usually think of the high reeds as the most difficult to capture without fizziness or excessive upper midrange—especially when I'm using a solid-state preamp—the Langevin helped deliver what I'm proud to say are some of my best-recorded alto and soprano sax sounds.

Of course, the microphone and source are the key factors in a recording of this type, but it's up to the preamp to pass along every nuance and deliver the track with all its tonality and musicality intact. The Dual Vocal Combo gave me all the control I needed, with plenty of gain, ultralow noise, and effective, highly refined EQ and limiting. Judging by the cumulative timbre of this one-man sax quartet, I give the unit high marks for its tightly focused sound, useful features, and excellent tonal balance. The resulting sound was airy but never overly bright, even on piping soprano notes.

VOICE OF REASON

When recording vocals (as well as other lead instruments, such as saxophone), I need a preamp that provides not only accuracy and the ability to capture every utterance—no matter how quiet—but also some attitude. This puts the vocal track right up front in the mix. For this application, I typically default to a Focusrite Red 7, a single-channel preamp with compression that costs significantly more than the 2-channel Dual Vocal Combo.

Paired with the Lawson L47MP and the revealingly airy BLUE Bottle mic, the Langevin certainly held its own in warmth and nuance when used on the voices of two male singers (including the challenging falsetto of Martyn Jacques of London's infamous Tigerlilies). The



LANGEVIN
Dual Vocal Combo voice processor
$2,000

FEATURES ■■■■
AUDIO QUALITY ■■■■■
EASE OF USE ■■■■■
VALUE ■■■■■
1 2 3 4 5

PROS: Class A all-discrete microphone preamp, EQ, and optical limiting. DI on each channel. Useful for all types of vocal and instrumental recording. Tightly focused and highly detailed sound. Independent controls for each channel. Transparent, easy-to-use limiter can be accessed independently for stereo mixdowns. Summed channel linking for stereo limiting. Locking phantom-power switches.

CONS: No phase reverse. No –10 dBV inputs or outputs. No XLR input to limiter. No numerical markings on rotary controls. No indication of unity gain for limiter section. Direct inputs noisier than those on comparable units. Overall gain (though sufficient for most applications) may be low for recording with ribbon microphones or for doing distant, classical-style recording.

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Composer, Producer
Credits: ***Dawson's Creek*** Columbia/Tri-Star/Warner Brothers
Coming To America Paramount
Witness Paramount and many others

"The SeaSound SOLO EX gives me the quality and performance I need in working with digital audio. The convenient rack mount unit has features that are extremely accessible -Master, Control Room, and Headphone outputs. The mic preamps sound wonderful! The SeaSound SOLO EX is a great piece of gear."

Tom Size
Producer Mastering Engineer
Credits: ***Aerosmith, Steve, Miller, Mr. Big, Gregg Rolie,***
Paul Gilbert with Racer X

"The SeaSound Solo EX has proven to be a great tool in the studio. Not only to record performances directly in the computer but also to use it as an A to D on the output of an analog desk. The converters are some of the best I have worked with at any price, preserving every detail of the mix. The Solo EX is a must have for today's recording studios."

Kerry Livgren
Composer, Guitar, Keyboards for Kansas
Currently a solo artist on Numevox Records

"I'm doing most of my tracking these days with the Solo. The [built-in] mixer, preamps, and monitor system allow me to work without using a mixing console. And, having real controls on the box makes it much easier to use than software-controlled systems. The Solo is convenient and sounds great."

Steinberg ASIO emagic Performer cakewalk

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Dual Vocal Combo gave a very immediate, detailed sound that could be described as the proverbial "wire with gain," while the Focusrite Red 7 added a little of its own special sheen to the tracks. In the final assessment, I'd take either preamp to a desert island, and preferably I'd have room in my luggage for both.

As a 2-channel preamp for a matched pair of Schoeps 221b drum-overhead mics in XY configuration, the Langevin really floored me. On four diverse drummers (including EM's Gino Robair and Martin Huge of the Tigerlilies), the Dual Vocal Combo's minimalist circuitry yielded a level of transient detail, precision, and unclouded spaciousness that always perked up my ears. There was no harshness on cymbals, and I never felt that I had to add highs or cut lows to enhance definition of the kit. A little 12 kHz boost was hard to resist, however, given the sweet and utterly transparent nature of the Langevin EQ. Interestingly, I also found myself adding considerably less reverb than I would when using my standard solid-state Class A preamp. By passing the mic signals as cleanly and simply as possible, the Langevin gave a remarkable sense of "etched warmth" to these complex drum tracks.

OFF LIMITS

I also used the Dual Vocal Combo's limiter section on its own, primarily as a stereo-bus limiter following a tube compressor (the Manley Stereo Variable-Mu), for final mixdowns to both analog and digital formats. Again, when conservatively used, the electro-optical limiter worked wonders, taming drum and vocal peaks in my mixes without pumping or softening attacks on the drums. Though it is not my standard practice to chain a compressor and limiter on 2-track mixdowns, this arrangement was certainly an ear-opener, yielding screaming levels while retaining punch and dynamics on some heavy-rock tracks.

To get an additional opinion on the Dual Vocal Combo, I loaned the unit to remote-recording specialist Karen Stackpole for a vocal-tracking session. Following her first afternoon with the Langevin, I received a strange phone call: there was no opening "Hello," just a breathlessly urgent, "How much is it?" Stackpole found the unit simple to learn and use, and she noted that it was easy to hear minor adjustments in the limiter and EQ sections. On vocals—tracked to ADAT with the Lawson L47MP—she used up to 6 dB of limiting. Based on the results, Stackpole praised the unit for its smoothness and transparency. She

▼

I'd gladly take this unit to a desert island.

especially appreciated the unit's locking phantom-power switches, and she also rated the user manual highly. In short, she loved the Dual Vocal Combo, summing up its character as "warm sounding and not at all brittle."

BE DIRECT

I was pleasantly surprised to find that, when the Langevin was employed as a direct box with a Fender bass plugged into the DI jack, it sounded every bit as good as a Peavey VMP-2—my favorite American-made tube preamp with DI. Through the Dual Vocal Combo, the bass boasted thunderous lows, clear metallic highs, and marvelous sustain. But I was bothered by a relatively high background hiss in the unit, with some sputtering white noise evident in both channels.

To rule out my own error—and to make sure nothing had gone wrong with the unit since I last used it—I again compared the Dual Vocal Combo's mic preamps with some other mic preamps. But just as before, there was no significant noise problem in the unit's preamp-and-limiter chain. Next, using a jazz guitar with humbucking pickups, I double-checked the Langevin DI against three other level-matched DI/preamp boxes (both tube and solid-state), including a Manley Tube DI. Sure enough, the Dual Vocal Combo's DI channels—both of them, equally—were noisy in comparison with the others. Though the DI is nonetheless useful for a wide range of recording applications—the noise level is no

Dual Vocal Combo Specifications

Inputs	(2) XLR (mic); (2) unbalanced ¼" (DI); (2) TRS (limiter)
Outputs	(2) XLR; (2) unbalanced ¼"
Frequency Response (mic preamp)	20 Hz–20 kHz (±1 dB)
Frequency Response (limiter)	20 Hz–20 kHz (±0.5 dB)
THD + Noise (mic preamp)	0.075% (1 kHz @ +4 dBm)
THD + Noise (limiter)	0.06% (1 kHz @ +4 dBm)
Signal-to-Noise Ratio (limiter)	107 dB
Headroom (limiter)	26 dB (@ +4 dBV)
Maximum Output (limiter)	+30 dBV (75V)
Maximum Input (mic preamp)	70 mV
Maximum Input (direct input)	800 mV
Maximum Gain (mic preamp)	45 dB (factory setting), internally adjustable from 38 to 53 dB
Maximum Gain (direct input)	25 dB
Maximum Gain (limiter)	15 dB
Maximum Limiting	20 dB
Attack Time (fixed)	20 ms
Release Time (fixed)	500 ms
Input Impedance (mic preamp)	2,400Ω, transformer coupled (optimized for mics with 100–600Ω output impedance)
Input Impedance (direct input)	150 kΩ
Output Impedance (balanced)	11Ω
Output Impedance (unbalanced)	6Ω
Power Consumption	20W
Dimensions	2U × 10" (D)
Weight	12 lbs.

higher than that contributed by a typical guitar amplifier—I expected it to be quieter.

ALMOST A STEAL

In a personal-studio market flooded with "do-it-all" boxes, Manley Laboratories stands out from the crowd by having the class and foresight to do the job right with its Langevin Dual Vocal Combo. Almost every function on the unit is truly world-class, and its simple design and pristine sonics should appeal to all levels of the studio market, from project novices to audiophile purists. In addition to performing its intended function as a studio vocal processor, the Dual Vocal Combo is a tremendous all-around box for instrumental recording (especially for drums and other acoustic instruments) and stereo-mix limiting. It also has loads of potential as an all-in-one box for live stereo recording to DAT or CD.

Only a few things keep the Dual Vocal Combo from scoring a grand slam of all 5s in my **EM** ratings. The noise level of the direct inputs is the only shortcoming in terms of audio quality. It prompted me to knock down that rating by half a point—a disappointment, because otherwise the unit deserves the highest marks. As for features, the absence of phase-reverse switching is my main gripe, along with the lack of an XLR input to the limiter. (In the personal-studio environment, more input types—not to mention –10 dBu ins and outs—are always good.) Less damning are the missing numerical markings for the various rotary controls. The blank knobs could prove inconvenient when you're attempting to notate and apply repeat settings from one session to the next, but Manley has handled the situation well by providing a template page in the owner's manual. I own far more expensive preamps with no calibration marks at all, but this certainly doesn't keep me from using them.

In some situations (for example, recording with ribbon microphones and doing distant classical-style recording) the Dual Vocal Combo's maximum mic-preamp gain of only 45 dB could cause concern. Then again, tapping into the additional 15 dB of makeup gain available in the limiter section—or adjusting the internal mic-preamp trim to its upper limit of 53 dB—should eliminate any such worries. Besides, I confirmed in session use that the Dual Vocal Combo offers clean gain right up to the maximum, with ample headroom and no added noise or "crunchies" when the gain trims are cranked all the way up.

At $2,000, the Langevin Dual Vocal Combo is truly a great deal. Considering that the Langevin Dual-Channel Electro-Optical Limiter alone costs $1,775, it's almost a steal. Despite a self-imposed ban on adding new gear to my racks, I have to admit that I'm swayed by the Dual Vocal Combo's seductive sound and myriad features. This is one unit I don't think I can part with.

Myles Boisen *is a guitarist, a producer, a composer, and the head recording/mastering engineer at Guerrilla Recording and The Headless Buddha Mastering Lab in Oakland, California. He can be reached by e-mail at mylesaudio@aol.com.* *Thanks to Karen Stackpole and Portus Barlow for their assistance.*

MASTERBITS

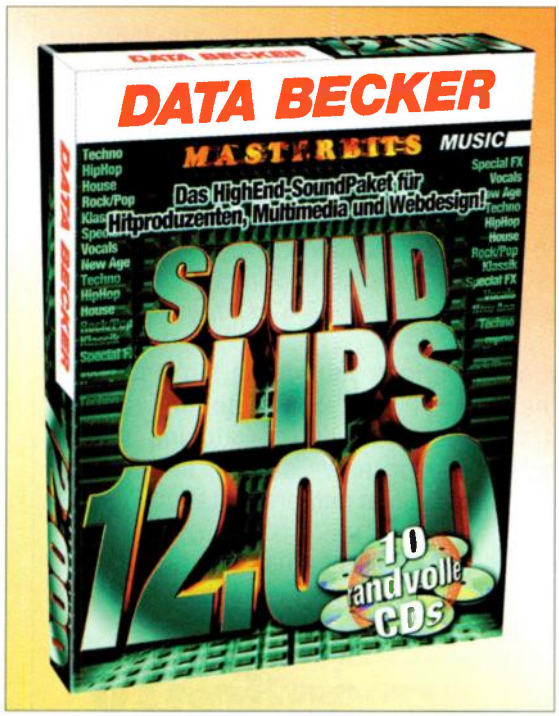
SOUND CLIPS 12,000 VOL. 1

A price-busting sample-CD collection.

By Jeff Obee

Building a library of sample CDs can be a costly proposition. It's not unusual to spend $100 or more for a single disc of sounds. But there is an alternative. Masterbits—a German company that has been producing sample CDs for a number of years—has released *Sound Clips 12,000,* vol. 1, a ten-disc CD-ROM library that offers a staggering 12,000 WAV files, yet retails for less than $50. Despite its bargain-basement price, this library is full of great-sounding 16-bit, 44.1 kHz samples, both loops and one-shots, in a variety of musical styles.

Each of the ten discs covers a different sound category or musical genre: techno, house, hip-hop, dance, rock/pop, classical, world/new age, vocals, effects, and multimedia. About three-quarters of the sounds were developed specifically for the collection; the remaining samples were culled from earlier Masterbits offerings.



***Sound Clips 12,000,* vol. 1, from the German manufacturer Masterbits, is a ten-disc collection of samples and loops. Less expensive than many single sample CDs, it offers both quantity and quality.**

GETTING AROUND

To help you navigate this massive array of sounds, Masterbits has thoughtfully bundled a software application called *Soundbrowser* (developed by another German company, Data Becker) with the discs (see **Fig. 1**). Although this software is fairly limited in functionality, it makes searching through and auditioning the numerous samples considerably easier.

Unfortunately, *Soundbrowser* is for Windows only. And although Mac users won't have a problem opening the WAV files, they'll have a hard time searching for samples on the discs, due in large part to the cryptic "8.3" file-naming convention (a remnant of DOS) that Masterbits has adopted for the individual files. The Code Index section of the Masterbits Web site (www.masterbits.com) shows you how to interpret the file names, but it's not a simple or intuitive process.

Soundbrowser is essentially an organizer that enables you to find and audition sound files. It's not limited to the sounds on the discs—it works with any WAV files on any drive in your system—but it's optimized for use with *Sound Clips 12,000.* Installing and uninstalling it is easy.

One of *Soundbrowser*'s handiest features is its search-engine function, which allows you to search through the library of sounds using three criteria: tempo, style, and instrument. When you find what you're looking for, you can copy it directly into a destination folder of your choice (referred to as a Target folder).

Dedicated Source and Target windows let you select samples from the discs and copy them to your system. For example, in the Source window you select the drive where *Sound Clips 12,000* is installed, then click through the hierarchy of folders until you find your desired category. The WAV files appear to the right, and you can drag them either to the Audio Engine for auditioning or to a Target folder for archiving. You could, for instance, set up specific Target folders for each project you work on, so that all the samples you used are together and easily accessible.

When you select a file in the Source or Target windows, the Info window shows the file's vital statistics. These include file length, file name, sample rate, tempo, style, instrument type, and whether it's mono or stereo. While this information is helpful, it isn't always detailed enough to allow you to really home in on a specific sound. For example, the collection has dozens of snare sounds, yet the Info window's Instrument category describes them all as simply "Snare." Additional descriptions, such as "Snare Rim" or "Snare Metallic," would be helpful.

If you want to audition a particular sample, the 4-track Audio Engine makes it really easy to listen to up to four sounds simultaneously. You can drag and drop files from Source or Target folders into tracks for immediate playback. The waveform is displayed in each track's Audio window, and you can start or stop all four tracks globally, mute and adjust the volume of individual tracks, and save or remove files.

The Audio Engine automatically loops any file you place in it (the loops in *Sound Clips 12,000* range from 1 to 4 measures). This is very convenient, except when you're dealing with one-shot samples, in which case it can be more of a hindrance than a help. For instance, if you place a snare hit into a track, it will repeat rapidly, making it difficult to get a sense of its sonic character. As a result, I found that using a conventional audio editor was more efficient for auditioning drum and percussion samples.

DANCE TO THE MUSIC

The first five discs are oriented toward contemporary, danceable rhythmic styles. They contain grooving, well-programmed drum patterns in various dance-music subgenres, as well as a wide assortment of one-shots. The

loops are well trimmed (as are all the collection's loops, which range in tempo from 60 to 170 bpm) and work nicely when imported into a digital audio sequencer. These drum loops are the real strength of *Sound Clips 12,000*'s first five discs.

The *Tekkno* disc has loads of cool-sounding samples, including percussion effects, vocoded and pitch-shifted vocal effects, arpeggiated "bubbles," and other ear candy for dressing a techno piece. The *Hip-Hop* CD offers numerous noises, scratches, slides, vinyl sounds, and funky processed Strat lines, in addition to some killer drum loops. The only drawback is that this disc has only 100 bpm loops.

As you might expect, the house and dance samples have a lot of stylistic similarities and feature pulsing synth bass loops, punchy synth chord progressions, and driving, energetic drum patterns. Again, the drum loops are the highlight; the *House* disc alone has 217.

ROCKIN' OUT

The *Rock/Pop* CD contains loops at 100, 120, and 140 bpm. I immediately liked the drum loops—they hit hard, sound great, and are appropriately processed with room reverb. They also make excellent groove templates for songwriters. They're practically worth the price of the entire collection. But this category contains much more, including synthesized brass lines and swells, percussion loops, electric guitar loops and one-shots, real sax lines, and some kickin' B-3 lines.

The *Vocals* disc, which is mostly for rap, soul, and R&B styles, features hundreds of male and female vocal samples for you to fly in or manipulate. Spoken-word, choir, ad-lib, and vocal-effects one-shots round out this disc; the effected vocals are the most intriguing.

The classical disc, *Classic*, has great-sounding samples, taken from *Peter Siedlaczek's Orchestra* library (also from Masterbits). This category can't be comprehensively covered on a single CD, but Masterbits has made a valiant effort. The disc contains one-shots of individual instruments, full orchestra, orchestral percussion, string ensemble, and operatic vocals, in addition to a liberal selection of orchestral loops. One weakness is the lack of pitch references for the instrument and orchestral one-shots.

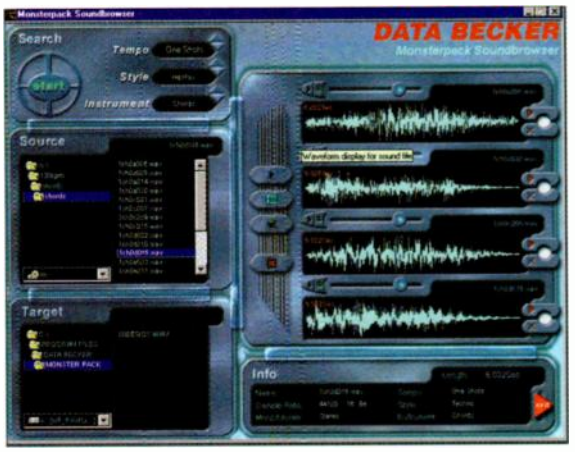


FIG. 1: The *Soundbrowser* organizer software (for Windows only) that comes with *Sound Clips 12,000* offers features for searching through, auditioning, and saving the vast collection of sounds.

One of *Soundbrowser's* handiest features is its search-engine function.

WE ARE THE WORLD

The *World/New Age* CD holds plenty of percussion, including both one-shot and looped phrases (specific tempos aren't listed for these loops) from Asia, Africa, Latin America, and the Far East. A folder of atmospheres has lots of rain and forest ambiences—cliché, yes, but plentiful and well recorded. Some 85 textures are here, many of them gorgeously rich and breathy. More vocals are on this CD, including African singsong, Moslem chant, and Latin spoken-word samples.

For me, the special-effects and multimedia discs were the most useful. Both are chock-full of effects samples. The *Special Sound FX* disc includes wonderful 3-D ambiences, outstanding guitar effects, and a good selection of machine samples that can function as rhythmic beds. The QSFX, SynthFX, and Textures folders contain even more cool ambiences and effect sounds.

The *Multimedia/Web* disc, also laden with sound effects, is organized into categories such as Animals, Traffic, Household, Office, and People. It also provides industrial zaps and hits, production music–style sound tracks, percussion hits, reversed bits, and incidental effects. There's plenty of material here to play with, including more than 200 single drum-sound elements that you can use to assemble kits of all types.

LAST BITS

Masterbits' *Sound Library 12,000*, vol. 1, offers an enormous selection of high-quality samples at an astoundingly low price. It's particularly strong for composing and producing dance music and electronica, but it covers plenty of other styles, too.

Is it a perfect product? No. It has some problems, such as confusing file names, lack of pitch references, and no Mac support for the software. But overall, these are minor quibbles when you remember that you're getting an entire library of samples and loops for only 50 bucks. So whether you're just starting your sound collection or looking to augment what you already have, *Sound Library 12,000*, vol. 1, offers both quantity and quality. ●

MASTERBITS
Sound Clips 12,000, volume 1
$49.99

QUALITY OF SAMPLES ■■■■
DOCUMENTATION ■■■
VALUE ■■■■
1 2 3 4 5

PROS: Inexpensive. Good audio quality. Thousands of diverse sounds to choose from. Excellent drum loops.

CONS: Cryptic file names. Searches are difficult. Browser software for Windows only. Some samples have no pitch references. Documentation for browser software only.

For manufacturer information, please see Contact Sheet, p. 205.

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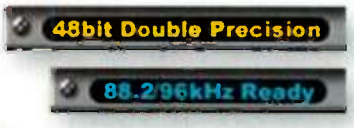

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PLG SERIES

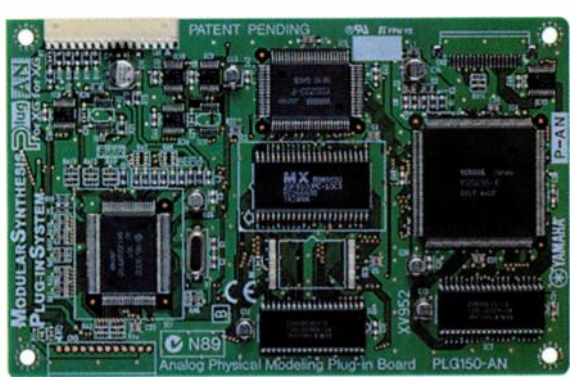
Upgrade with new (and old) synthesis technologies.

By Allan Metts

In past years, Yamaha has offered many ways to synthesize sound and music. In the '80s, it introduced FM synthesis to the masses with the DX family of products, and in the '90s, Yamaha unveiled expressive physical modeling of horns and strings with the VL1. Yamaha also gave us the analog-modeling AN1x, along with a host of sample-based devices.

All these technologies are now available on circuit boards not much larger than a 3-by-5-inch index card. Up to two of these modular-synthesis plug-in cards can be installed in the Yamaha CS6x, CS6R, and S80 synthesizers. Some work in the MU128 sound module and SW1000XG sound card, but they operate slightly differently in these older products. In this review, I'll cover the cards as they apply to the Yamaha CS6x.

Yamaha sent me five plug-in cards: the PLG150-AN provides analog-modeling synthesis, the PLG150-VL contains a virtual acoustic-synthesis engine, and the PLG150-DX offers the FM-based power of a Yamaha DX7 synth. The remaining two cards are sample based: the PLG150-PF is for piano sounds, and the PLG100-XG brings XG compatibility to the CS6x. (XG is Yamaha's superset of the General MIDI specification.)



With PLG series of plug-in cards from Yamaha, compatible synthesizers can play host to a variety of synthesis engines and new sounds.

PLUG IT IN

Although installing these cards in the CS6x is easy, removing them is hard. You remove eight screws from the bottom of the unit, plug in a wiring harness, and clip the board into place. In addition, the tiny locking tabs on the wiring harnesses make it very difficult to unplug the boards once they're installed. This arrangement doesn't allow quick and easy board swapping, so pick your two favorite boards and leave them there. Some sort of easily swapped cartridge system would be much better.

FIG. 1: *VL Visual Editor* provides an easy-to-use interface for the complex task of editing Virtual Acoustic Synthesis Voices. Edited Voices can be stored in the PLG150-VL's Custom bank.

Except for the PLG100-XG, all the boards are single-Part boards. (In Yamaha-speak, a Part plays a single program, or Voice, on one MIDI channel. A collection of Parts makes up a Performance.) In other words, these boards can play only one sound at a time. After installation, you can use the sounds on it from the PLG1 or PLG2's memory areas. Again, the XG board behaves differently, but I'll get to that later.

To play a single program from the first plug-in card, put the CS6x in Voice mode, select the PLG1 memory area, choose the program you want, and play away. The CS6x has dedicated real-time controller knobs for commonly used parameters such as panning, filter cutoff, and the strength of the amplitude envelope generator. All of these work as you'd expect on the plug-in Voices, provided the parameter is relevant to the card's underlying synthesis technology.

Editing the plug-in Voices is equally straightforward. You put the CS6x into Voice Edit mode and then change the settings just as you would for a Voice on the CS6x. Parameters not shared with the CS6x Voice architecture appear on separate plug-in pages within the Voice Edit screens. The CS6x has 128 memory locations for user-edited plug-in Voices (64 for each board). Yamaha calls these the Plug-In memory banks, and you can select these from the CS6x or with MIDI Bank Select messages (the same way you select from the banks of sounds built into the plug-in cards).

In Performance mode, one Voice from each plug-in can appear among the other CS6x Voices for multitimbral operation. The plug-in's volume, pan, and other Performance settings seamlessly integrate with those for the native CS6x Voices. If a plug-in board has system-level parameters (that is, parameters that apply to all the Voices on the board), these appear on separate pages among the CS6x Utility screens.

SOFT GOODS

Each plug-in board comes with Windows-based editing software that can be accessed from Yamaha's *XGWorks* or *XGWorks Lite* sequencers. (*XGWorks Lite* comes with the CS6x.) More extensive for some boards than for others, the software lets you make basic edits to a single Voice. You can also save the edited Voice data to disk or paste the System Exclusive data into an *XGWorks* sequence.

While a nice bonus, the editing software shouldn't come as *XGWorks* plug-ins. I already have a favorite sequencer, but I had to run *XGWorks* to edit plug-in Voices. The editors would be better if they were stand-alone programs.

Along with the cards, Yamaha provides Standard MIDI Files as System Exclusive dumps. You can use *XGWorks*

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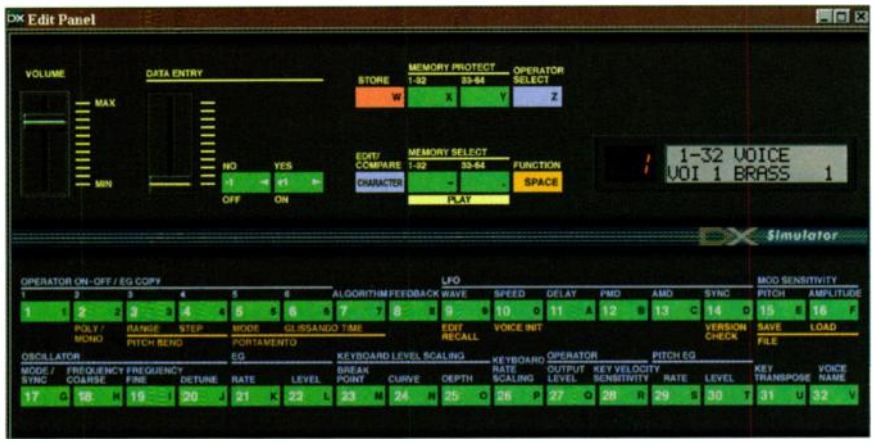

FIG. 4: *DX Simulator* lets you edit the Voices on the PLG150-DX using a virtual replica of the original DX7's programming panel.

create all sorts of sounds from the world of analog synthesizers. The card comes with 256 Voices, 5-note polyphony, an arpeggiator (which is completely separate from the one in the CS6x), a 16-note step sequencer, and a host of other goodies.

A complete description of this synthesis architecture would fill an entire review on its own. (In fact, it did; see the Yamaha AN1x review in the January 1998 issue of **EM**.) Suffice it to say that there is plenty of sound-making potential here. The four Free EGs (envelope generators) let you draw any envelope shape imaginable and apply it to nearly any synth parameter. A way-cool morphing feature also lets you use Aftertouch or MIDI Control Change messages (1 to 95) to gradually shift from the parameters of one Voice to the parameters of another.

The board includes a wide variety of synth programs. While running through the presets, I found mellow Moog sounds (think Emerson, Lake & Palmer's "Lucky Man"), punchy brass, and raunchy leads. There are plenty of synth basses, lots of great special effects, sequenced techno riffs, filter sweeps, strings, and pads. While the PLG150-AN sports analog percussion sounds, it's most useful for its lead sounds. Despite some nice pads, the 5-note polyphony is a little restrictive. (The AN1x has 10-note polyphony.)

You can edit a number of parameters using the CS6x Voice Edit screens, but for most Voice-editing tasks, you'll certainly want to fire up one of the two *XGWorks*-based editors that come with the card. *AN Expert Editor* (see **Fig. 3**) provides graphical access to all of the card's features, including the step sequencer and Free EG curves. Yamaha also bundles *AN Easy Editor*, which has keyboard shortcuts for most of the controls but offers fewer editing parameters than *Expert Editor*.

The electric grands are among my favorite sounds.

These editors can store your changes in the PLG150-AN's User bank. You lose your changes when you turn the power off, but you can save the User bank to a memory card on the synth, and both editors let you save sounds to disk. As with the PLG150-VL, you can make a memory card's sounds automatically load upon power-up.

DELIGHTFUL DX

The PLG150-DX is a 6-operator FM-synthesis engine with 16-note polyphony. In short, it's like having a DX7 on a card. The plug-in card contains 912 preset Voices and accepts additional voices over MIDI from other DX-series instruments or from your favorite DX editor. The card also has onboard EQ and filters. Even though the original FM synths didn't employ filters, you can route your FM Voice through a lowpass or highpass filter, which you can tweak on the fly with a CS6x knob or with Control Change messages. However, the filter is not a part of the synth architecture; you can't, for example, control filter cutoff frequency with an envelope generator.

The PLG150-DX board was one of the last boards I installed in the CS6x. I figured the DX board would be old news; after all, the original DX7 was shipping back in the early '80s (when MIDI itself was still a new idea). I must admit that I was pleasantly surprised by the card's sound; I had forgotten just how expressive FM can be. Even with today's sample-based wonders, nothing sounds exactly like a DX7 electric piano, a funky FM clav, or a punchy FM brass sound.

Like the PLG150-AN, the DX board ships with two editors that you can launch from *XGWorks*. *DX Simulator* (see **Fig. 4**) is a full-fledged Voice editor that provides the look and feel of an original DX7. If *DX Simulator* is more than you want, *DX Easy Editor* gives you access to the most commonly edited settings.

EXCELLENT XG

Rounding out our deck of plug-in cards is the PLG100-XG, which provides a full XG (and by extension, GM) sound set for the CS6x, S80, and CS6R. It contains 480 instrument Voices and 12 drum kits, all with 32-note polyphony.

YAMAHA

PLG Series plug-in synthesis cards

PLG100-XG $249.95
PLG150-AN $299.95
PLG150-DX $349.95
PLG150-PF $349.95
PLG150-VL $199.95

FEATURES ■■■■
AUDIO QUALITY ■■■■
EASE OF USE ■■■▮
VALUE ■■■■
1 2 3 4 5

PROS: Powerful synthesis capabilities. PC-based editors included. Excellent integration with host synthesizer.

CONS: Swapping cards is inconvenient. PC-based editors must operate from within *XGWorks*. Memory not retained after you turn the power off.

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FIG. 5: *XG Editor*, part of *XGWorks Lite*, offers a complete environment for tweaking the settings of an XG synth. I used it to include PLG100-XG parameter changes in my *XGWorks* sequence.

Unlike the single-Part cards described so far, this card offers 16-Part multitimbral operation. As a result, it behaves a little differently in the CS6x. In Voice mode, you see no new Voices available for use from the plug-in card.

Instead of providing Voices that you can use in the Parts of a Performance, this card simply adds 16 extra Parts to the CS6x. In Performance mode, you see Parts numbered 1 through 32. (The unexpanded CS6x offers Parts numbered 1 through 16.) Parts 17 through 32 belong to the PLG100-XG. You can choose Voices and edit these Parts, just as you would the native CS6x Parts. For more extensive editing, you can use *XG Editor* within *XGWorks Lite* (see **Fig. 5**).

SHUFFLE THE DECK

Each of these cards offers a powerful upgrade to your existing rig. Easy to install and use, the cards come with printed documentation that tells you all you need to know. (Documentation for the accompanying software is provided only in online-help format.)

Working with so many different synthesis technologies on a single host synthesizer was a joy. It's good to know that there is indeed life beyond sample-based synthesis. If you own a synth that accepts these cards, fill those empty slots!

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

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Take it from the top with Phrazer™, the new audio software from BitHeadz that takes loop composition to the next level.

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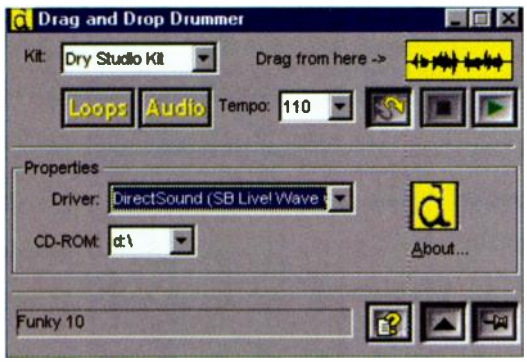
QUICK PICKS

DRAG AND DROP MUSICIAN

Drag and Drop Drummer (Win)

By Eric Bell

Conjuring up realistic-sounding drum tracks can be challenging for any desktop musician. Drag and Drop Musician has produced *Drag and Drop Drummer* (Win; $49) and a CD full of samples to make creating high-quality drum tracks easier.



Use *Drag and Drop Drummer* to audition and export drum loops from Drag and Drop Musician's *Dry Studio Kit* sample CD. The software will support additional loops CDs that have been announced by the company.

Drag and Drop Drummer is the software front end that lets you assemble drum tracks. It comes with the *Dry Studio Kit* audio- and MIDI-loop CD, the first of several loop CDs announced by the company (*Percussion Kit* and *R&B Hip-Hop* should be available by the time you read this). *Dry Studio Kit* contains professional-sounding audio drum loops, matching MIDI files, and SoundFonts containing the original samples. You can audition loops with the software and export them into an audio editor or digital audio sequencer. (Any program that supports dragging and dropping from Windows Explorer should work.)

Click, Drag, and Rock 'n' Roll

The drum loops on *Dry Studio Kit* are 16-bit, 44.1 kHz stereo WAV files. Each is provided at six tempos ranging from 95 to 120 bpm for most of the loops, and 70 to 90 bpm for two smaller sets. If none of the supplied tempos meet your needs, export the loops into an audio program and time stretch them as necessary. (However, stretching them more than a few percentage points can create artifacts, depending upon your audio editor.) You can also create your own loops by loading the SoundFonts into your favorite sound card and triggering them at any tempo with the included Standard MIDI Files.

The disc contains loops in a number of styles created from a dry studio drum kit. You can choose from 243 well-sequenced patterns. The three main categories are Fills, Beats, and Miscellaneous. You get tom patterns; disco beats and fills; straight-time, straight eighth-note, and 16th-note fills; funk grooves; funky ride-cymbal patterns; funk fills; triplet riffs; and hi-hat patterns. Generally, the loops sound quite good and are very musical. Because they were all recorded on the same drum set, mixing and matching them is easy, allowing you to build long, complex drum parts. Sample music tracks (available at www.dddrummer.com) demonstrate how well the loops work in larger arrangements.

Each drum loop boasts a matching MIDI file, which lets you recreate the patterns using any sound source you wish. You can create custom loops and fills with individual WAV files of the drum-set components as well as with the SoundFonts.

Bleeding Edge

One common loop problem is that cymbal crashes and sounds occurring at the end of a pattern are usually truncated because a loop must be accurately trimmed. This is not an issue with *Dry Studio Kit*. Because individual drum samples are available, you can add a single MIDI-triggered cymbal crash if needed.

Using the *Drag and Drop Drummer* interface is very simple: pick a category, select a loop, then set a tempo. Toggle the Audio/MIDI button to audition the WAV or MIDI version of the pattern. To export a loop, just drag it from the waveform display and drop it onto your audio program's main screen. You can keep the *Drag and Drop Drummer* window visible along with any other window, which is convenient if you're exporting multiple patterns.

My only complaint about the interface is that there are so many loops to choose from that the menu containing their names can often fill an entire screen. Perhaps the loops could be sorted into a few additional categories for a more manageable list.

Drag and Drop Drummer handily does the job it claims to do, and at a reasonable price. I look forward to hearing the company's forthcoming CD kits.

Overall EM Rating (1 through 5): 4

MIDIMAN

Midisport 2x2 USB (Mac/Win)

By Scott R. Garrigus

Musicians new to MIDI often ask me which MIDI interface they should purchase. One company I mention to them is Midiman, which enjoys a reputation for manufacturing quality products. The Midisport 2×2 USB ($129), one of Midiman's most recent offerings, lives up to this solid reputation.

Green Machine

Housed in a small, rugged box, the Midisport 2×2 USB is a lovely shade of lime green. It sports two independent MIDI input and output ports, which provide a combined total of 32 MIDI channels. The back of the box gives you access to both MIDI output jacks, the second MIDI input jack, and the USB connector. The front allows access to

The Midisport 2x2 USB includes front-panel LEDs and a MIDI Thru switch that allows you to use the device when your computer is off. On the rear panel is the USB connector, a second MIDI input, and two MIDI outputs.

For manufacturer information, please see Contact Sheet, p. 205.

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the first MIDI input jack and contains five green LED indicators, four of which correspond to the MIDI jacks. The last LED indicates whether the USB connection is working correctly.

The Midisport provides two extra features that give you a little more bang for your buck. One is a MIDI Thru switch that, when activated, routes data from each MIDI input to the corresponding MIDI output. This lets you continue to use your MIDI controllers and instruments when the computer is turned off. The second little extra is a CD-ROM containing drivers for both the PC and the Mac, so you can use the interface on multiple platforms. Very nice.

Sporty Performance

I tested the Midisport on my Pentium II/300 MHz PC running Windows 98. Installation was a cinch. I plugged the Midisport into a USB port, inserted the driver disc so that the drivers would automatically load, and that was it—simple and painless. I tested the interface with several software products, including Cakewalk's *Pro Audio* and Steinberg's *Cubase VST*. I had nary a problem, and the interface continues to perform without incident to this very day.

The Midisport 2×2 USB does the job and does it well. Moreover, its small size makes it ideal for laptop musicians. If you're looking for an inexpensive and reliable MIDI interface for your USB-equipped Mac or PC, you can't go wrong with this one.

Overall EM Rating (1 through 5): 4

ELECTRIX

Filter Queen

By Edo Castro

The Filter Queen ($299) is one of Electrix's modular signal processors. This remix tool is encased in a rugged steel housing and has small, unusual dimensions, measuring 3.5 by 10 inches. The unit's joiner plate can connect it to another Electrix Mod product in a 19-inch rack. The control surface slants so that the dials face you at an optimal angle. Two large, grooved rubber pads on the bottom of the unit minimize slippage and ensure stability.

The Hookup

All connections to the Filter Queen are on its rear panel. The input section has stereo RCA connectors (with a grounding post for

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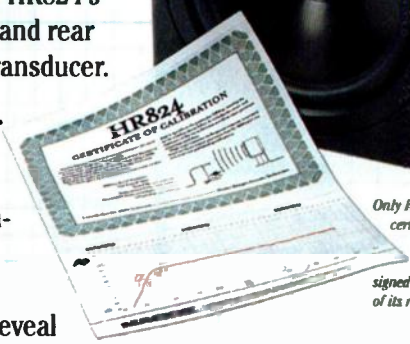

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Percent Paid and/or Requested Circulation	96.69%	95.64%

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John Pledger, Publisher

QUICK PICKS

your turntable) and two ¼-inch jacks for other instruments. A switch lets you select phono- or line-level inputs, with the line input optimized for a +4 dBu signal. When the switch is set to phono, the phono preamp accepts a range of cartridge output levels. You also get two ¼-inch inputs: one for a momentary footswitch and the other for an expression pedal.

The output section has two ¼-inch jacks and stereo RCA connectors. The output produces an unbalanced +4 dBu signal, and you can set the device for stereo or mono output.

The Electrix Filter Queen offers a flexible, hands-on approach to filter-based signal processing.

Warp Factor

The digitally controlled analog filters are modeled after the voltage-controlled filters found in traditional analog synthesizers. Simple and easy to read, the controls offer the tactile instant gratification of an analog synthesizer—grab a knob, change the sound. Front-panel controls include a Decay parameter for the envelope follower, and you can toggle the filter between highpass, midrange bandpass, lowpass, and allpass. As with any decent analog synth, you can adjust the filter frequency cutoff; the knob indicates frequency in hertz. Similarly, you can add a touch of resonance or crank it to self-oscillation with the dedicated Resonance knob.

The Filter Type button lets you choose between lowpass, highpass, bandpass, and notch filters. For hands-off filter modulation, the LFO offers a choice of square, triangle, sawtooth-up, sawtooth-down, and random waveforms. You also get knobs for LFO depth and speed. As you adjust LFO speed, an indicator light flashes at the same frequency. The signal flow for each group of knobs is silk-screened on the front panel, a thoughtful touch for novice tweakers. Each knob has a smooth feel with no play or looseness.

Fit for a Queen

The Filter Queen can serve as anything from a quacking, funky envelope filter to a silky, classic phase shifter. You can quickly set up the unit as a stereo 2-pole filter or mono 4-pole filter. Mono sums both channels before the 4-pole filter. The 2-pole setting is a 12-dB-per-octave filter, offering a smoother response. The 4-pole setting gives you a 24-dB-per-octave slope that results in a steeper filter response—my favorite configuration. When I plugged in my bass, the funky tones went on for days. The envelope follower transformed an audio CD of bass lines into jazzy Bootsy Collins impressions. I plugged in my Chapman stick and an expression pedal to produce some frighteningly funky wah tones. Running a slick, unctuous-sounding radio talk-show host through a lowpass filter—rapidly modulated by a square wave—gave his sales pitch a menacing growl.

You can also activate an effect with a footswitch and manually operate it with the Momentary and Engage buttons. Unfortunately, switching between the two buttons generated some noise—the Filter Queen's only drawback.

The Filter Queen has myriad setup configurations to meet your various needs. It adapts to any situation, live or in the studio.

Overall EM Rating (1 through 5): 4.5

NORTHSTAR PRODUCTIONS

Russian Masters

By David Rubin

You never know when you might be called upon to score the next *Doctor Zhivago*, write a dance piece for a Russian folk ensemble, or create background music for a documentary on the Ukraine. In fact, it's easy to see how ethnic Russian music might come in handy for a wide range of projects. Finding the instruments to create convincing music, however, is another story.

Fortunately, Northstar Productions can get you out of this quandary with *Russian Masters* ($249), the company's impressive sample collection of acoustic instruments from the former Soviet Union and parts of China. The collection is formatted for most E-mu samplers, including EIII, EIV, E64, and ESI. General categories include stringed instruments, ethnic winds,

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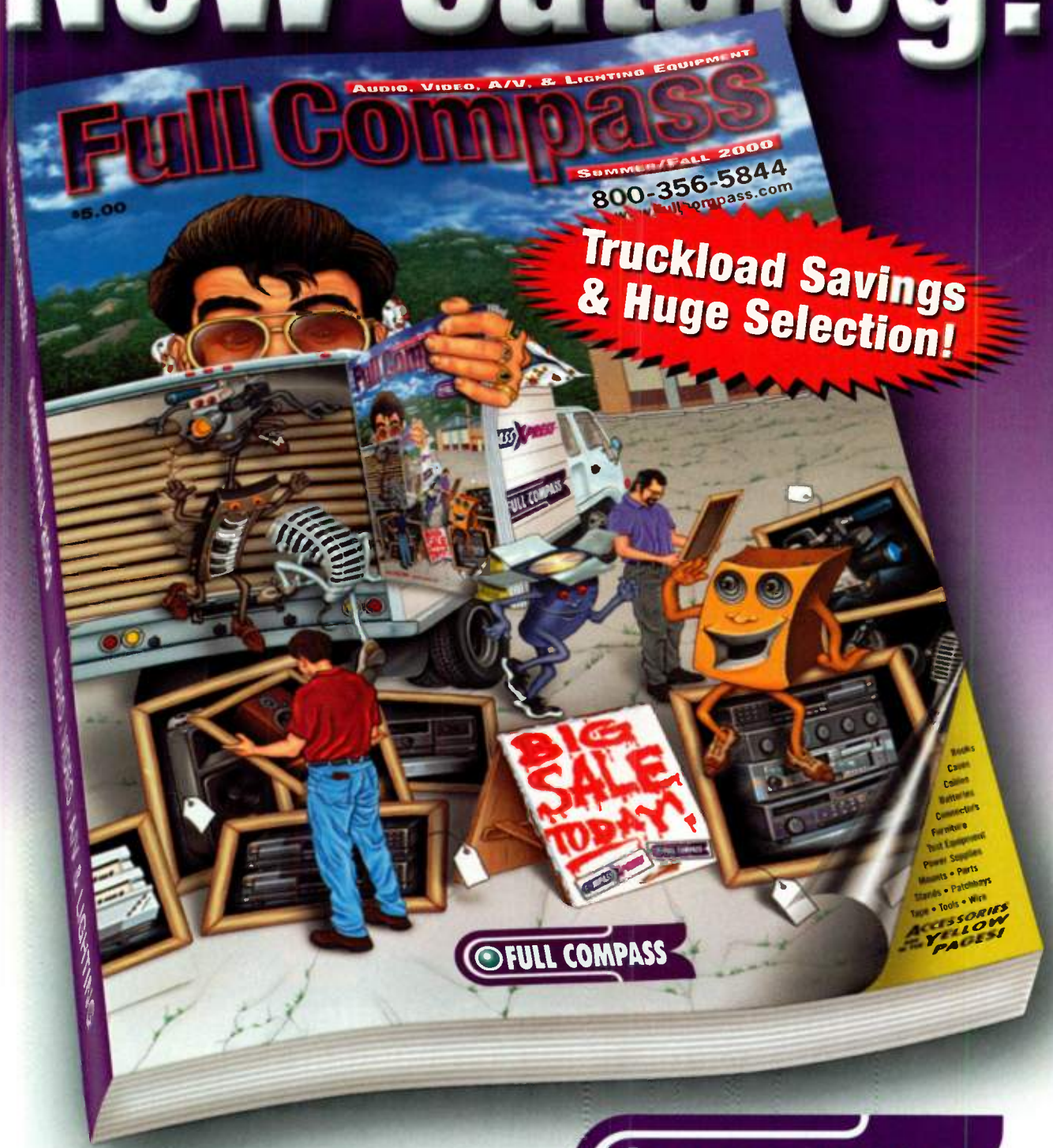

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percussion instruments, and ensembles. Jam-packed with individual notes, the disc also boasts numerous phrases, loops, and performance effects.

Birth of a Notion

British-Polish composer Martin Kiszko recorded the original samples in England to score the BBC series *Realms of the Russian Bear*. Kiszko composed and arranged the *balalaika* ensemble loops and other phrases, which were performed by the Feenist Balalaika Ensemble. Most of the remaining instrumental and vocal samples were performed by soloists from Moscow's Folklore Department of the Union of Composers.

Working from the original tapes, Northstar carefully processed and mastered the samples. Presets were then programmed in a number of different ways, including sample layering and Velocity switching between voices, filter settings, and attacks. The result is a versatile sample collection that makes good use of the EIII's and EIV's performance capabilities.

Sounds of Mother Russia

Russian Masters includes 80 banks that range in size from about 4 to 32 MB. Banks may contain as few as 11 presets or as many as 72, but most offer between 24 and 48 presets, some in stereo and some in mono. The first half of the Stringed Instruments section consists of a wide range of *balalaika* presets. Prima, alto, and contra *balalaikas* are well represented with individual plucked notes; looped and unlooped tremolos played by one, two, or three instruments; octaves; notes with glides; major and minor chords; and presets with various effects such as echo and chorus. Several of the presets with echo would lend themselves quite well to new-age compositions, and a filter-swell-with-delay preset offers a great atmospheric effect. I also like the presets that let you crossfade between octaves with the mod wheel.

The impressive *Russian Masters* sample collection from Northstar Productions offers a generous assortment of ethnic instruments from the former Soviet Union and parts of China.

My favorite presets in this group, however, are the scales, trills, phrases, and other unlooped musical fragments. The phrases with chord progressions are especially nice and a breeze to combine. Each phrase blends easily with the others, and if you throw in a few licks here and there, you can quickly create a full-length backing track with an unmistakably Russian flavor. Several banks of alto *domra* presets are also included, and the zitherlike *gusli* provides lots of metallic and harplike plucked sounds, chords, arpeggios, strums, and phrases.

Among my favorite banks are those devoted to the *dutar*, a long-necked, two-stringed instrument with a pear-shaped body. The *dutar* banks offer dozens of presets consisting of wonderful rhythmic dance phrases, chord progressions, fragments from improvisations, and short motifs. Playing with them and combining them in different ways is great fun. Other instruments in the Stringed Instruments section are the Chinese *pipa* and the plucked Armenian *tar* with its quarter-tone steps.

The Winds & Reeds section offers several standouts, including the *sopilka*, a Ukrainian end-blown flute with a breathy sound reminiscent of a bamboo flute. The large double-reed *duduk* is especially noteworthy; its plaintive, evocative phrases conjure up images of the Middle East. The CD also has a generous assortment of *bayan* (folk accordion) phrases.

The Percussion category includes numerous rhythm-section phrases (without bpm indications) played on a variety of exotic drums and tambourines. Also in the section are an excellent gong sound and two types of jaw harps that produce a variety of cartoonlike *twangs* and *boings*.

The final section is arguably the collection's crown jewel. It includes five banks of musical phrases extracted from performances by the Feenist Balalaika Ensemble. Many of the phrases are hauntingly beautiful and truly captivating with folklike modal chord progressions; others are more upbeat and dancelike in character.

Those interested in world music will find in the *Russian Masters* collection a wealth of fascinating and unusual instrumental sounds. The samples are well recorded and thoughtfully prepared, and the presets lend themselves to many applications. After spending a few minutes with this disc, you'll easily imagine yourself floating down the Volga with Russian folk music running through your head.

Overall EM Rating (1 through 5): 4.5

KELLAR BASS SYSTEMS

Jam Bass e28

By Geary Yelton

The guitarist seeking self-accompaniment on bass now has an alternative to the bass pedalboard. The Kellar Jam Bass e28 MIDI controller ($299) consists of a wafer-thin membrane switch panel that attaches to the back of a guitar neck and a small, black plastic Circuit Pack. The strip has two rows of 14 switches that duplicate the notes on the E and A strings of a bass guitar, allowing you to play bass parts with the thumb of your fretting hand. These switches should line up with the frets so you can play a chord's appropriate bass notes. The e28 model is designed for electric guitars, and the shorter a20 model ($299) is designed for acoustic guitars.

The strip is 1.5 inches wide and a bit more than 13.5 inches long. You can attach it to the guitar neck temporarily with masking tape, or permanently install it with the strip's adhesive backing. The strip is connected to the Circuit Pack by a 3-foot-long ribbon cable.

The optional SP1 sustain pedal ($39) is powered by a wall-wart adapter, or you can run the Jam Bass on a 9V battery in the Circuit Pack's battery compartment. The Circuit Pack has no power switch; you turn it on by plugging a guitar cord into the box. If you rely on battery power, bear in mind that you can drain the battery by leaving a guitar cord plugged in.

Bass-o-Matic

So why is the Jam Bass of interest to the electronic musician? The Jam Bass is actually a type of alternative MIDI controller with a built-in synthesizer. A MIDI Out port on the Circuit Pack lets you control any MIDI instrument and record anything you play into a MIDI sequencer. However, the Jam Bass has no MIDI In port, so a sequencer can't play its built-in sounds.

Though it's easy to play simple, sustained-note bass parts with your thumb, don't expect to play any bass solos on the Jam Bass. The switches serve other functions if you press them in a particular order. Instrument names, key functions, dynamic markings, and switch numbers are labeled on the switches in very small type. Pressing the Voice Select switch followed by any other note lets you choose from 18 preset sounds. Nine of these are bass sounds, and the rest are percussion and keyboard sounds.

You can also select any sound in the original General MIDI Instrument Map, but the procedure is a little complicated. First press the Shift switch, then MIDI Voice Group. Then select one of 16 voice groups from switches 1 through 16. To select any sound besides the first one in a voice group, hit Shift again, then MIDI Voice Number, then one of switches 1 through 8. When you turn the Jam Bass on, it defaults to the electric bass sound.

The quality of the sounds is marginal, at best. The default bass guitar sound is pretty versatile, but none of the other built-in sounds stand out as exceptional. Most of the General MIDI sounds are very disappointing.

Sporting a membrane switch panel that attaches to the back of a guitar's neck, the Jam Bass from Kellar Bass Systems lets guitarists accompany themselves using its built-in sounds or external MIDI devices.

All Thumbs

Your best option is to use the Jam Bass with an external sound module rather than the onboard sounds. Simply connect it to a synthesizer's MIDI In port, and you're ready to rock. Though it's impractical to play more than single notes with your thumb while playing chords with your fingers, it works well with sweeps, washes, and other electronic textures. You can't play percussion parts at the same time as guitar, but you can set up a series of drum patterns, each one triggered by a different MIDI note from the Jam Bass. Other possibilities include changing sequences to accompany your playing and switching scenes on a MIDI-controlled light board.

Changing programs in external instruments works just like changing internal programs. The Jam Bass can play polyphonically, but when I played more than two notes at a time, I continually experienced stuck notes. Because it's impossible to play polyphonically with just your thumb, this shouldn't be a problem in normal use.

Because the control strip is nothing more than a membrane switch panel, it looks rather flimsy and fragile, but it's made of durable, aerospace-industry materials. The ribbon-cable connector appears especially prone to damage, but the manufacturer says they've never had breakage problems. The user manual issues a warning about the importance of handling the Jam Bass's components with care.

Location, Location

In time, you may memorize the positions of all the function keys, but until then, be prepared to either play the default sound most of the time or stop playing long enough to flip your guitar over and squint at the tiny print. Once you've learned the buttons' locations, you need only associate their positions with the guitar frets. An instructional videotape is included to help you develop your playing technique.

The Jam Bass is more a unique toy than a serious musical instrument. It's unfortunate that Kellar Bass Systems can't manufacture it cheaply enough to sell it for $99.95. When I pay this much for a toy, I expect either more fun or more functionality than I found in the Jam Bass. If you're a guitarist who wants to provide your own bass accompaniment, however, you may want to give the Jam Bass a try. It might be useful—just don't take it too seriously. ❀

Overall EM Rating (1 through 5): 2

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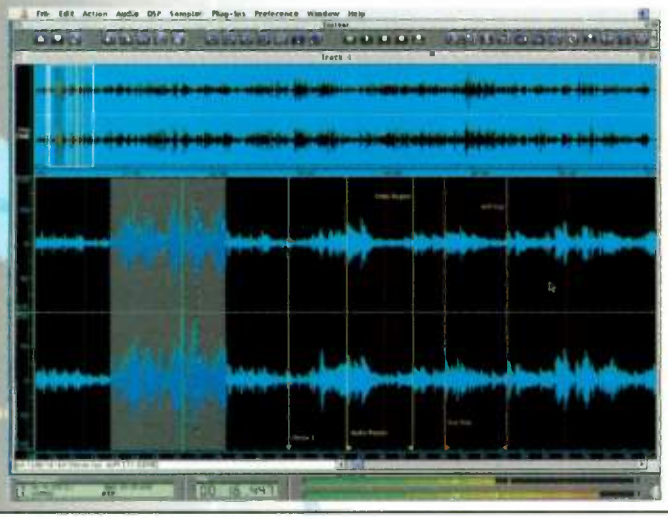

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ADVERTISER	INTERNET	PAGE
Aardvark #	www.aardvark-pro.com	107
Aardvark #	www.aardvark-pro.com	109
Aardvark #3	www.aardvark-pro.com	111
Aardvark #4	www.aardvark-pro.com	113
Aardvark #5	www.aardvark-pro.com	115
AKG (WMS 40)	www.akg-acoustics.com	29
AKG (C 3000B)	www.akg-acoustics.com	195
Alesis	www.alesis.com	43
Applied Research & Technology (A.R.T.)	www.artroch.com	187
Audio Computing	www.audiocomputing.com	76
Audix	www.audixusa.com	191
Axon/Music Industries	www.musicindustries.com	202
B & H Photo-Video	www.bhphotovideo.com	206–209
Bayview Pro Audio	www.bayviewproaudio.com	192
BBE Sound	www.bbesound.com	163
Behringer	www.behringer.com	159
Berklee Press	www.berkleepress.com	134
BIAS	www.bias-inc.com	203
Big Fish Audio	www.bigfishaudio.com	105
BitHeadz	www.bitheadz.com	193
The Bomb Factory	www.bombfactory.com	143
Cakewalk	www.cakewalk.com	161
Carvin	www.carvin.com	75
CMW	www.cmw.net	210
Coda Music Technology	www.codamusic.com	149
Conservatory of Recording Arts & Sciences	www.audiorecordingschool.com	152
Corporate Systems Center	www.dupeit.com	87
CreamWare	www.creamware.com	88
cSound.com	www.csounds.com	172
dbx Professional Products	www.dbxpro.com	4–5
digibid #1	www.digibid.com	140
digibid #2	www.digibid.com	162
digibid #3	www.digibid.com	227
Digidesign	www.digidesign.com	48–49
Digigram	www.digigram.com	114
Digital Media Online (DMO) #1	www.digitalmedianet.com	31
Digital Media Online (DMO) #2	www.digitalmedianet.com	85
Digital Media Online (DMO) #3	www.digitalmedianet.com	93
Disc Makers	www.discmakers.com	124
Earthworks	www.earthwks.com	146
Eastwest	www.soundsonline.com	26–27
Edirol	www.edirol.com	173
EGO•SYStems	www.egosys.net	54–55
Electrix IVL Technologies	www.electrixpro.com	39
Emagic	www.emagic.de	99
E-mu Systems (Planet Earth)	www.emu.com	9
E-mu Systems (Virtuoso)	www.emu.com	51
E-mu Systems (E4XT Ultra)	www.emu.com	145
Encore Electronics	www.encoreelectronics.com	167
Event Electronics	www.eventelectronics.com	40–41
Focusrite	www.focusrite.com	101
Fostex	www.fostex.com	25
Frontier Design Group #1	www.frontierdesign.com	15
Frontier Design Group #2	www.frontierdesign.com	165
Full Compass	www.fullcompass.com	199
Furman Sound	www.furmansound.com	169
Generalmusic (Equinox)	www.generalmusic.com	73
Generalmusic (Equinox)	www.generalmusic.com	77
Glyph Technologies	www.glyphtech.com	102
Grandma's Music & Sound	www.grandmas.com	152
iLIO Entertainments	www.ilio.com	68–69
Infusion Systems	www.infusionsystems.com	167
Interstate Music	www.interstatemusic.com	172
iZ technology	www.izcorp.com	32–33
JBL Professional	www.jblpro.com	71
JDSound	www.jdsound.com	136
Joemeek/PMI	www.joemeek.com	137
Korg (Tritons)	www.korg.com	16–17
Korg (Triton)	www.korg.com	19
Korg (OASYS)	www.korg.com	61
Korg (MS2000)	www.korg.com	81
Korg (D16)	www.korg.com	125
KRK Systems	www.krksys.com	79
Kurzweil	www.kurzweilmusicsystems.com	127
Leigh's Computers	www.leighs.com	198
Lexicon	www.lexicon.com	65
Lucid	www.lucidaudio.com	86
Mackie (SR1530)	www.mackie.com	2–3
Mackie (HDR24/96)	www.mackie.com	133
Mackie (D8B)	www.mackie.com	171
Mackie (HR824)	www.mackie.com	197
Mark of the Unicorn	www.motu.com	228
MARS	www.marsmusic.com	139
Media One	www.mediaonecompany.com	78
MicroBoards Technology	www.microboardsproaudio.com	196
Midiman	www.midiman.net	10–11
Mixman	www.mixman.com	177
Music123.com	www.music123.com	130
Musician's Friend	www.musiciansfriend.com	123
Native Instruments	www.native-instruments.com	189
NemeSys	www.nemesysmusic.com	157
Nord	www.clavia.se	141
Novation	www.novationusa.com	175
Peavey	www.peavey.com	155
PG Music	www.pgmusic.com	151
QCA	www.pol.com/qca	176
Quik Lok/Music Industries	www.quiklok.com	78
Rane	www.rane.com	86
Rode Microphones	www.event1.com	59
Roland (XV-5080)	www.rolandus.com	20–21
Roland (XP Rebate)	www.rolandus.com	37
Royer Labs	www.royerlabs.com	60
Sam Ash	www.samash.com	92
SeaSound	www.seasound.com	179
Serato	www.pitchntime.com	183
Sonic Foundry	www.sonicfoundry.com	91
Sony	www.sony.com/proaudio	121
Soundartist	www.soundartist.com	119
Sound Chaser	www.soundchaser.com	131
Sound Quest	www.squest.com	147
Speck Electronics	www.speck.com	176
Steinberg	www.steinberg.net	13
StudioLogic/Music Industries	www.musicindustries.com	80
StudioLogic/Music Industries	www.musicindustries.com	80
Sweetwater Sound #1	www.sweetwater.com	47
Sweetwater Sound #2	www.sweetwater.com	132
Sweetwater Sound #3	www.sweetwater.com	224–225
Syntrillium Software	www.syntrillium.com	89
Tannoy	www.tannoy.com	118
Tascam (MX-2424)	www.tascam.com	23
Tascam (US-428)	www.tascam.com	103
TC Electronic	www.tcelectronic.com	53
TC Works	www.tcworks.de	153
TerraTec	www.terratec-us.com	154
Testa	www.conventionTV.net	181
TransPerformance	www.selftuning.com	100
Taxi	www.taxi.com	117
Universal Audio	www.uaudio.com	135
Wave Digital	www.wavedigital.com	196
Waves (L2)	www.waves.com	129
Waves (Version 3)	www.waves.com	185
WD Coakley Sound Design	www.williamcoakley.com	138
Yamaha #1	www.yamaha.com	57
Yamaha #2	www.yamaha.com	97

ELECTRONIC MUSICIAN MARKETPLACE ADS

CD Labs	www.cdlabs.com	212
Crystal Clear Sound	www.crystalclearsound.com/cdtape	213
Drum Machine	www.drummachine.com	214
Doc's ProPlugs	www.proplugs.com	214
Earth Disc	www.earthdisc.com	211
Europadisk, Ltd.	www.europadisk.com	213
Funk Logic	www.funklogic.com	211
Gefen Systems	www.gefen.com	215
iNetbroadcasting.com	www.M-port.com	215
Lonely Records	www.lonelyrecords.com	211
Marathon Computer	www.marathoncomputer.com	213
Media Services	www.mediaomaha.com	212
Mercenary Audio	www.mercenary.com	215
Minimusic	www.5thwall.com/minimusic	211
Neato, LLC	www.neato.com	211
Recording Workshop	www.recordingworkshop.com	214
Reliable Music	www.reliablemusic.com	215
Shimad Corp.	www.shimad.com	213
Shreve Audio	www.shreveaudio.com	212
Topaz Enterprises	www.tpz.com	214
Universal Recording Supplies	www.universaltapes.com	215
WMG	www.worldmediagroup.com	214

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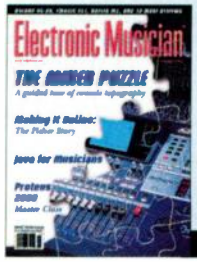

CONTACT SHEET

A GUIDE TO THE COMPANIES AND ORGANIZATIONS MENTIONED IN THIS ISSUE OF ELECTRONIC MUSICIAN

Vintage Page
p. 38

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Cover Story: Mixed Signals
pp. 62–80

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Master Class: Proteus Power
pp. 82–92

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Reviews
pp. 126–202

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DIGITAL MULTI-TRACK RECORDERS

TASCAM MX-2424 24-Bit 24-Track Hard Disk Recorder

Co-designed by TASCAM and TimeLine Inc., the MX-2424 is an affordable 24-bit, 24-track hard disk recorder that also has the editing power of a digital audio workstation. A 9GB internal hard drive comes standard as well as a SCSI Wide port that supports external LVD (Low Voltage Drives) hard drives from up to 40 feet away. An optional analog and several digital I/O cards are available so the MX-2424 can be configured to suit your work environment. SMPTE synchronization, Word Clock, MIDI Time Code and MIDI Machine Control are all built in for seamless integration into any studio.

- Records 24 tracks of 24-bit audio at 44.1 or 48 kHz, or 12 tracks at 88.2 or 96 kHz. Up to 24 tracks can be recorded simultaneously using any combination of digital and analog I/O.
- Supplied 9GB internal drive allows 45 minutes of audio across all 24 tracks
- Wide SCSI port on the back panel allows you to add multiple drives. A front 5-1/2" bay available for installing an additional drive, or an approved DVD-RAM drive for back-up.
- ViewNet MX, a Java-based software suite for Mac and PC offers DAW style editing of audio regions, dedicated system set-up screens that make set-up quicker and easier and track load screens that make virtual track management a snap. Connects to a computer via a standard Ethernet line.
- Can record to Mac (SDII) or PC (.WAV) formatted drives, allowing later export to the computer. The Open TL format allows compatible software to recognize virtual tracks without have to load, reposition and trim each digital file.

Transport Controls-

- Jog/scrub wheel
- MIDI In, Out, and Thru ports are built-in for MIDI Machine Control.

Editing-

- Built-in editing capabilities include cut, copy, paste, split and ripple or overwrite
- 100 levels of undo
- Supports destructive loop recording and non-destructive loop recording which continuously records new takes without erasing the previous version.

Build-In Synchronization-

- TMUS protocol can sample accurately lock 32 machines together for 384 tracks at 96kHz, or 768 tracks at 48kHz.
- Can generate or chase SMPTE timecode or MIDI Time Code.
- Word Clock In, Out, and Thru ports

I/O Options-

- Optional analog and digital cards all provide 24 channels of I/O. There is one slot for analog and one for digital.
- IF-TD24- T/DIF module
- IF-AD24- ADAT Lightpipe module
- IF-AE24- AES/EBU module
- IF- AN24- A-D, D-A I/O module with DB-25 connectors

Software Updates-

- System updates are made available through a front panel Smart Card slot or via computer directly from the TASCAM web site.

DA-78HR Modular Digital Multitrack

The DA-78HR is the first true 24-bit tape-based 8-track modular digital multitrack recorder. Based on the DTRS (Digital Tape Recording System) it provides up to 108 minutes of pristine 24-bit or 16-bit digital audio on a single 120 Hi-8 video tape. Designed for project and commercial recording studios as well as video post and field production, the DA-78HR offers a host of standard features including built-in SMPTE Time Code Reader/Generator, MIDI Time Code synchronization and a digital mixer with pan and level controls. A coaxial S/PDIF digital I/O allows pre-mixed digital bouncing within a single unit, or externally to another recorder or even a DAT or CD recorder. Up to 16 DTRS machines can be synchronized together for simultaneous, sample accurate control of 128 tracks of digital audio.

Features-

- Selectable 16 bit or 24 bit High Resolution audio
- 24 bit A/D and D/A converters
- >104dB Dynamic range
- 20Hz - 20kHz frequency response ±.5dB
- 1 hr. 48 min. recording time on a single 120 tape
- On-Board SMPTE synchronizer - chase or generate timecode
- On-Board support for MIDI Machine Control
- Internal digital mixer with level and pan for internal bouncing, or for quick mixes
- Track slip from -200 to +7200 samples
- Expandable up to 128 tracks (16 machines)
- Word Sync In/Out/Thru
- Analog output on DB25 balanced or RCA unbalanced
- Digital output on TDIF or 2 channels of S/PDIF

CD RECORDERS & DUPLICATORS

MICROBOARDS StartREC Digital Audio Editing/ CD Duplication System

The Microboards StartREC is the first digital audio editing system combined with a multidrive CD recordable duplication system for professionals. Audio is recorded to the internal 6.2 GB IDE hard drive using analog or digital inputs. Sample rate conversion is automatic. Tracks can be edited and sequenced using the StartREC's user friendly interface and up to 4 CDs can be recorded simultaneously. StartREC is the ideal solution for studio recording, mastering, post production or any pro audio environment requiring digital audio editing and short run CD-R duplication.

Features–

- 2X, 4X, or 8X recording speeds
- 6.2GB IDE hard drive
- Editing functions include move, divide, combine or delete audio tracks, add or drop any index or sub index and create track fade in or fade out
- Coaxial SP/DIF or AES/EBU digital input plus optical S/PDIF I/O
- XLR balanced and RCA Line inputs and outputs
- Automatic sample rate conversion from 32 and 48kHz
- Automatic CD Format Detection feature and user friendly interface provide one touch button operation
- Front panel trim pot and LCD display provide accurate input signal and time lapse metering
- SCMS (Serial Copy Management System) is supported, regardless of the source disc copy protection status
- **StartREC Models Include:** ST2000 (2) 8x writers, ST3000 (3) 8x writers and ST4000 (4) 8x writers

DIGITAL MIXERS

Roland VM Basic 72 Digital Mixing System

The all digital Roland V-Mixing System, when fully expanded, is capable of mixing up to 94 channels with 16 stereo (32 mono) onboard multi-effects including COSM Speaker Modeling. Utilizing a separate-component design, comprised of the VM-C7200 console and VM-7200 rackmount processor, allows the V-Mixing System to be configured to suit your needs. Navigation is made easy via a friendly user interface, FlexBus and EZ routing capabilities as well as a large informative LCD and ultra-fast short cut keys.

Features-

- 94 channels of digital automated mixing (fully expanded)
- Up to 48 channels of ADAT/Tascam T-DIF digital audio I/O with optional expansion boards and interfaces
- Separate console/processor design
- Quiet motorized faders, transport controls, total recall of all parameters including input gain, onboard mixer dynamic automation and scene memory
- 24 fader groups, dual-channel delays, 4-band parametric channel EQ + channel HPF
- FlexBus and "virtual patchbay" for unparalleled routing flexibility
- Up to 16 stereo (or 32 mono) multi-effects processors using optional VS8F-2 Effects Expansion Boards (2 stereo effects processors standard)
- COSM Speaker Modeling and Mic Simulation technology
- 5.1 Surround mixing capabilities
- EZ Routing allows mixer settings to be saved as templates
- Realtime Spectrum Analyzer checks room acoustics in conjunction with noise generator and oscillator
- Digital cables between processor and mixer can be up to 100 meters long- ideal for live sound reinforcement.

Options-

- **VS8F-2 Effects Expansion Board** -- Provides 2 stereo effects processors including COSM Speaker Modeling. Up to 3 additional boards can be user-installed into the VM-7200 processor, for 8 stereo or 16 mono effects per processor.
- **VM-24E I/O Expansion Board** -- Offers 3 R-Bus I/Os on a single board. Each R-Bus I/O provides 8-in/8-out 24-bit digital I/O, totalling 24 I/O per expansion board.
- **DIF-AT Interface Box for ADAT/Tascam** -- Converts signals between R-Bus (VM-24E expansion board required) and ADAT/Tascam T-DIF. Handles 8-in/8-out digital audio. 1/3 rackmount size.
- **VM-24C Cascade Kit** -- Connects two VM-Series processor units. Using two VM-7200 processors cascaded and fully expanded with R-Bus I/O, 94 channels of audio processing are available.

EFFECTS PROCESSING

Lexicon MPX-500 24-Bit Dual Channel Effects Processor

The MPX 500 is a true stereo 24-bit dual-channel processor and like the MPX100 is powered by Lexicon's proprietary Lexichip and offers dual-channel processing. However, the MPX 500 offers even greater control over effects parameters, has digital inputs and outputs as well as a large graphics display.

- 240 presets with classic, true stereo reverb programs as well as Tremolo, Rotary, Chorus, Flange, Pitch, Detune, 5.5 second Delay and Echo
- Balanced analog and S/PDIF digital I/O
- 4 dedicated front panel knobs allow adjustment of effect parameters. Easy Learn mode allows MIDI patching of front panel controls.
- Tempo-controlled delays lock to Tap or MIDI clock

t.c. electronic M-One Dual Effects Processor

The M-One allows two reverbs or other effects to be run simultaneously, without compromising sound quality. The intuitive yet sophisticated interface gives you instant control of all vital parameters and allows you to create awesome effects programs quickly and easily.

- 20 incredible TC effects including, Reverb, Chorus, Tremolo, Pitch, Delay and Dynamics
- Analog-style user interface
- 100 Factory/100 User presets
- Dual-Engine design
- 24 bit A/D-D/A converters
- S/PDIF digital I/O, 44.1-48kHz
- Balanced 1/4" Jacks - Dual I/O
- 24 bit internal processing

D-Two Multitap Rhythm Delay

Based on the Classic TC2290 Delay, the D-Two is the first unit that allows rhythm patterns to be tapped in directly or quantized to a specific tempo and subdivision.

- Multitap Rhythm Delay
- Absolute Repeat Control
- Up to 10 seconds of Delay
- 50 Factory/100 User presets
- 24 bit A/D-D/A converters
- S/PDIF digital I/O, 44.1-48kHz
- Balanced 1/4" Jacks - Dual I/O
- 24 bit internal processing

MICROPHONES

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RØDE NT-2 Condenser Mic

The RØDE NT2 is a large diaphragm true condenser studio mic that features both cardioid and omnidirectional polar patterns. The NT-2 offers superb sonic detail with a vintage flavor for vocal and instrument miking . Like all RØDE mics the NT-2 is hand-assembled in Australia and is available at a breakthrough price.

Features

- Dual pressure gradient transducer
- Large diaphragm (1") capsule with gold-sputtered membranes
- Low noise, transformerless circuitry
- Omni and cardioid polar patterns
- High pass filter switch
- -10dB pad switch
- 20Hz-20kHz frequency response
- 135dB Max SPL
- Gold plated output connector
- Gold plated internal head pins
- Shockmount, Flight Case, and Pop Filter included

SHURE KSM-32SL Cardioid Condenser Mic

The reviews are raving about Shure's new "classic" microphone. The KSM32 features Class A, transformerless preamplifier circuitry, low self-noise and increased dynamic range, all necessary for critical studio recording. It has a 15 dB attenuation switch for handling high SPLs, making it suitable for a variety of sound sources including vocals, acoustic instruments, ensembles and overhead miking of drums and percussion. For studios, the **KSM32/SL** has a light champagne finish and includes an aluminum carrying case, shock and swivel mounts and a velvet pouch. For live applications, the **KSM32/CG** has a charcoal grey finish and includes a swivel mount and padded zipper bag.

- **Frequency response 20Hz - 20kHz**

AKG C4000B Electret Condenser Mic

This new mic from AKG is a multi polar pattern condenser microphone using a unique electret dual large diaphragm transducer. It is based on the AKG Solid Tube design, except that the tube has been replaced by a transistorized impedance converter/ preamp.The transformerless output stage offers the C4000B exceptional low frequency response.

FEATURES-

- Electret Dual Large Diaphragm Transducer (1st of its kind)
- Cardioid, hypercardioid & omnidirectional polar patterns
- High Sensitivity
- Extremely low self-noise
- Bass cut filter & Pad switches
- Requires 12, 24 or 48 V phantom power
- Includes H-100 shockmount and wind/pop screen
- **Frequency response 20Hz to 20kHz**

GT Electronics AM-61 Cardioid Tube

The GT Electronics AM61 offers classic tube performance in a fixed cardioid, large diaphragm condenser mic. An outstanding addition to any project studio or large commercial recording facility seeking rich, warm tube sounds and unsurpassed value.

- Groove Tubes military-spec GT5840M vacuum tube preamplifier
- Large-diameter, super-thin 3 micron gold evaporated Mylar diaphragm
- Fixed cardioid polar pattern response
- Switchable -10dB attenuation pad and 80Hz low frequency roll-off filter
- Includes hard-shell case, shock mount, hard mount, 6-pin cable and external power supply
- **Frequency response 20Hz - 20kHz**

• **ALSO AVAILABLE** AM-62 multipattern tube condenser mic

audio-technica. AT4047SV Cardioid Condenser Mic

The AT4047 is the latest 40 Series large diaphragm condenser mic from Audio Technica. It has the low self noise, wide dynamic range and high sound pressure level capacity demanded by recording studios and sound reinforcement professionals.

- Side address cardioid condenser microphone for professional recording and critical applications in broadcast and live sound
- Low self noise, wide dynamic range and high SPL
- Switchable 80Hz Hi Pass Filter and 10dB pad
- **Includes AT8449/SV shockmount**
- **Also Includes a limited edition tweed flight case while supplies last!**

STUDIO MONITORS

VERGENCE A-20 Studio Reference Monitor System

Incorporating a pair of 2-way, acoustic suspension monitors and external, system-specific 250 watt per side control amplifier, the A-20 provides a precise, neutral studio reference monitoring system for project, commercial and post production studios. The A-20's control amplifier adapts to any production environment by offering control over monitoring depth (from near to far field), wall proximity and even input sensitivity while the speakers magnetic shielding allows seamless integration into today's computer based studios.

- Type Modular, self-powered near/mid/far-field monitor
- 48Hz - 20kHz frequency response @ 1M
- Peak Acoustic Output 117dB SPL (100ms pink noise at 1M).
- XLR outputs from power amp to speakers
- Matched impedance output cables included.
- -6dB LF Cutoff 40Hz
- 5 position wall proximity control
- 5 position listening proximity control between near, mid and far-field monitoring
- Power, Overload; SPL Output, Line VAC and Output device temperature display.

Amplifier

- Amplifier Power 250W (continuous rms/ch), 400W (100ms peak).
- XLR, TRS input connectors
- Headphone output
- 5-position input sensitivity switch with settings

Speakers

- 2-way acoustic suspension with a 6.5-inch treated paper woofer and a 1-inch aluminum dome tweeter
- Fully magnetically Shielded with an 18-inch recommended working distance

EVENT ELECTRONICS PS-5 Bi-Amplified Project Studio Monitors

The PS-5s are small format, full-range, non-fatiguing project studio monitors that give you the same precise, accurate sound as the highly acclaimed 20/20 series studio monitors. The use of custom driver components, complimentary crossover and bi-amplified power design provides a wide dynamic range with excellent transient response and low intermodulation distortion.

FEATURES-

- 5-1/4-inch magnetically shielded mineral-filled polypropylene cone with 1-inch diameter high-temperature voice coil and damped rubber surround LF Driver
- Magnetically shielded 25mm diameter ferrofluid-cooled natural silk dome neodymium HF Driver
- 70 watt continuous LF and 30 watt continuous HF amplification per side
- XLR-balanced and 1/4-inch (balanced or unbalanced) inputs
- 52Hz-19kHz frequency response ±3dB
- 2.6kHz, active second order crossover
- Built-in RF interference, output current limiting, over temperature, turn-on transient, subsonic filter, internal fuse protection
- Combination Power On/Clip LED indicator
- 5/8" vinyl-laminated MDF cabinet

KRK V-6 Bi-Amplified Near Field Studio Monitors

These bi-amped studio monitors from KRK supply 90 watts of clean power. Their 6-inch woofer & 1-inch silk dome tweeter ensure consistency from top to buttom with crystal clear highs and a solid bass response.

FEATURES-

- 58Hz - 22kHz frequency response
- 1-inch silk dome tweeter and 6-inch long stroke, polyvinyl woofer
- 30 Watt HF & 60 Watt LF amplification
- Magnetically shielded
- Variable system gain +6dB -30dB
- Neutrik XLR/1/4" TRS combo connector

Also Available- V-8

- 1-inch Silk Dome tweeter and 8-inch Woven Kevlar woofer
- 47Hz - 23kHz frequency response
- 60 Watt high frequency and 120 Watt low frequency amplification
- HF adjust +1dB, Flat, -1dB
- LF adjust -3dB at 45, 50 and 65 Hz

Hafler TRM-6 Bi-Amplified Near Field Studio Monitors

Offering honest, consistent sound from top to bottom, the TRM-6 bi-amplified studio monitors are the ideal reference monitors for any recording environment whether tracking, mixing or mastering. Supported by Hafler's legendary amplifier technology that provides a wide and accurate sound field, in width, height and also depth.

FEATURES-

- 33 Watt HF & 50 Watt LF amplification
- 1-inch soft dome tweeter and 6.5-inch polypropylene woofer
- 55Hz - 21kHz Response
- Magnetically Shielded
- Electronically and Acoustically Matched

Also Available- TRM-8

- 1-inch soft dome tweeter and 8-inch polypropylene woofer
- 45Hz - 21kHz frequency response ±2dB
- 75 Watt HF, 150 Watt LF amplification

COMPUTER BASED DIGITAL AUDIO SYSTEMS

MOTU AUDIO Hard Disk Recording Systems

The MOTU Audio System is a PCI based hard recording solution for the Mac and PC platforms. At the heart of the system is the PCI-324 PCI card that can connect up to three audio interfaces and allows up to 72 channels of simultaneous I/O. Audio interfaces are available with a wide range of I/O configurations including multiple analog I/O with the latest 24-bit A/D/A converters and/or multi channel digital I/O such as ADAT optical and TDIF I/O as well as standard S/PDIF and AES/EBU I/O. Each interface can be purchased separately or with a PCI-324 card allowing you to build a system to suit your needs. Includes drivers for all of today's hottest audio software and AudioDesk, multitrack recording and editing software for the Mac.

THEY ALL FEATURE– • Mac OS and Windows compatible • Includes software drivers for compatibility with all of today's popular audio software plus AudioDesk, MOTU's sample-accurate audio workstation software for Mac OS • Host computer determines the number of tracks that the software can record and play simultaneously, as well as the amount of real-time effects processing it can support • Front panels display metering for all inputs and outputs

• **AudioDesk Audio Workstation Software** for Mac OS features 24-bit recording, multi-channel waveform editing, automated virtual mixing, graphic editing of ramp automation, real-time effects plug-ins with 32-bit floating point processing, crossfades, support for third-party audio plug-ins (in the MOTU Audio System and Adobe Premiere formats), background processing of file-based operations, sample-accurate editing and placement of audio, and more

2408 mkII FEATURES– • 7 banks of 8 channel I/O: 1 bank of analog, 3 banks of ADAT optical, 3 banks of Tascam TDIF, plus stereo S/PDIF. • Custom VLSI chip for amazing I/O capabilities • • Format conversion between ADAT and DA-88

• 8x 24-bit 1/4" balanced analog I/Os • 24-bit internal data bus for full 24-bit recording via digital inputs • Standard S/PDIF I/O for digital plus an additional S/PDIF I/O for the main mix • Sample-accurate synchronization with ADATs and DA88s via an ADAT SYNC IN and RS422

1224 FEATURES– • 24-bit analog audio interface • State-of-the-art 24-bit A/D/A • Simultaneously record and play back 8 channels of balanced (TRS), +4 dB audio • 24-bit balanced +4 XLR main outputs • Stereo AES/EBU digital I/O • Word clock in/out • Dynamic range of 116 dB (A-weighted) • Front panel displays six-segment metering for all inputs and outputs • Headphone jack with volume knob

308 Features– • 8 channels of coaxial S/PDIF using 4 RCA input and 4 RCA output connectors • 8 channels of optical S/PDIF using 4 toslink input and 4 toslink output connectors • 8 channels of AES/EBU using 4 XLR male and 4 XLR female connectors • Word Clock I/O allows the 308 to synchronize with digital audio environments

24i Features– • 24 high quality, 24-bit analog inputs • Balanced 1/4" analog outputs • Optical and coaxial S/PDIF outputs • Front panel headphone output with level control • Word Clock I/O • Connect up to three 24i rack I/Os to a PCI-324 audio card for a total of 72 inputs and six outs

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DIGI001 Digital Audio Workstation For Mac And PC

A completely integrated digital recording, mixing and editing environment for the Mac and PC, the DIGI-001 offers a 24-bit multi I/O breakout interface along with Pro Tools LE software— based on Digidesign's world renowned ProTools software. The DIGI-001 interface features 18 simultaneous I/Os made up of 8 analog inputs and outputs— two of the inputs are full featured mic preamps with phantom power, and digital I/O including standard S/PDIF as well as an ADAT optical interface that can also be used as a S/PDIF I/O. ProTools LE supports 24 tracks of 16 or 24-bit audio and 128 MIDI tracks and also features RealTime AudioSuite (RTAS) effects plug-ins. For ease of use, MIDI and audio are editable within the same environment and all mixing parameters including effects processing can be fully automated.

FEATURES–

- 18 simultaneous, 24-bit ins and outs with support for 44.1 and 48 kHz sample rates
- 20Hz - 22kHz freq. response ± 0.5 dB
- 2 channel, XLR mic/1/4" line inputs with -26 dB pad, 48v phantom power, gain knob, and HP Filter at 60Hz
- 6 ch. line inputs (1/4") TRS balanced/ unbalanced w/ software controlled gain
- +4dB balanced 1/4-inch Main outputs
- Balanced 1/4" monitor outs with front panel gain knob
- 1/4-inch unbalanced line outputs channels 3-8
- Headphone output with independent gain control knob
- 2 channel S/PDIF coaxial digital I/O
- 8 channel ADAT optical I/O can also be used as 2 channel optical S/PDIF

Pro Tools LE

- Supports 24 tracks of 16 or 24-bit audio and 128 sequenced MIDI tracks
- Sample-accurate simultaneous editing of audio & MIDI
- Real-time digital mixing capabilities include recall of all mixing parameters, support for edit and mix groups and complete automation of all volume, panning, mutes and plug-ins.
- Route and mix outboard gear in realtime
- MP3 and RealAudio G2 file support (Mac)
- Two plug-in platforms offer multiple options for effects processing— Real-Time AudioSuite (RTAS) is a host based architecture that allows an effect to change and be dynamically automated in realtime as the audio plays back. —AudioSuite is a file-based format, that renders a new file with the processed sound.
- Bundled RTAS plug-ins include, 1 and 4-band EQ, Dynamics II- compressor, limiter, gate and expander/gate, Mod Delay - short, slap, medium, and long delays with modulation capabilities for chorus or flange effects and dither. AudioSuite plug-ins include Time Compression/Expansion, Pitch Shift, Normalize, Reverse.

MIDI Functions

- MIDI functions include graphic controller editing, piano roll display, up to 128 MIDI tracks and editing options like quantization, transpose, split notes, change velocity and change duration.
- MIDI data can be edited on the fly

SOFTWARE

Also available with MOTU's award-winning Digital Performer audio sequencer software package

Digital Performer 2.7 MIDI/AUDIO Software for Mac

Digital Performer is an integrated multitrack digital audio and MIDI sequencing program packed with advanced tools for a wide variety of audio applications. Sample accurate editing, loop based audio capture, realtime DSP effects and the best MIDI timing/resolution available insures unlimited creative potential.

FEATURES-

• Includes over 50 real-time MIDI and audio effects plug-ins • POLAR window - which provides Interactive audio loop recording • 24-bit recording and editing • 32-bit native effects processing - incredible sounding EQ and other FX • 64-bit MasterWorks Limiter and Multiband Compressor plug-ins included • Sample-accurate - the most reliable waveform editing and tightest sync you can get • Samplers window - drag & drop samples between your Mac and your Sampler • PureDSP stereo pitch-shifting and time-stretching • Unlimited audio tracks, real-time editing, full automation and remote control • QuickTime digital video support

NEW FEATURES-

- Full Plug-In FX automation and increased 3rd party Plug-in support
- Drum Editor
- **Adjustable Display Resolution** from 2 to 10,000 PPQ. Tick values up to four decimal places can be set allowing 1000 times greater editing resolution. For example, if you are used to editing MIDI data at 480 PPQ, you can set your edit resolution to 480,000 for 1000 times more precision.
- **MIDI Time Stamping** (MTS) which exists in MOTU's rack-mountable USB MIDI interfaces, delivers MIDI data from Digital Performer to MIDI devices as accurately as a third of a millisecond for every single MIDI event.

TC WORKS SPARK 1.5 2-Track Editing For Mac

ULTIMATE SOFTWARE MACHINES

Spark is professional 2-track audio editing software for the Power Macintosh that provides fast access to files and powerful processing tools. Supports files up to 24-bit/96kHz and has batch processing, VST plug-in support, as well as MP3 file export built-in. Audio can be extracted from a Quicktime movie, edited and then exported along with the video to a new file. Bundled with Adaptec's Toast so you can burn your audio directly to CD.

- Browser View- File database, audio editor and play list all in one easy to use display with movable border lines- Eliminates the need for surfing several windows to access and edit files.
- Wave Editor- Perform off-line editing, processing, and create markers and non-destructive regions
- Supports AIFF, Sound Designer, .WAV and QuickTime file formats.
- DSP Processing Includes- Normalize, Reverse, Fades, Crossfades, and Sample Rate conversion and **realtime Time Stretching**
- VST Plug-In compatible
- Supports file swapping with most major samplers and any sampler that supports SMDI • Batch Processing
- Bundled with Adaptec's Toast Pro you can burn your audio on CD
- Extract audio from a quicktime movie for editing and then export the audio along with the video into a new file
- **SPARK 1.5** supports MP3 audio authoring for the web directly from the file menu.

AMM-1 Microphone Modeler

ANTARES

The AMM-1 Microphone Modeler uses patented technology to create precise digital models of a wide variety of microphones, from historical classics to modern exotics and even industry-standard workhorses. Simply tell the Microphone Modeler what microphone you are actually using and what microphone you'd like it to sound like. It's as simple as that. Available as a plug-in for the TDM and MAS environments, with DirectX and Mac VST not far behind.

FEATURES–

• Proprietary DSP-based acoustic modeling allows any reasonable quality microphone to sound like any of a wide variety of high-end studio mics • Models reproduce the effects of windscreens, low-cut filters, pattern-dependent frequency response and proximity effects • Create hybrid mics that combine the bass response of one mic with the treble response of another • Add a model of classic tube saturation distortion • Use during mixdown to change the mic on an already recorded track • Incredibly simple to use - simply select the mic you're using and the mic you want it to sound like • Includes an extensive collection of digital models of historical classics, modern exotics, and industry-standard workhorses • Additional models can be downloaded from the Antares web site

WAVES Pro-FX Bundle Plug-ins For Mac or PC

The latest Bundle from Waves has some of the coolest sound design plug-ins available for the Mac and Windows platforms.

SuperTap - Six taps of mono or true stereo delay (up to Six seconds) • Global LFO modulation • 2 feedback modes • Q10-style filtering for each tap • rotation (stereo panning) • Delays are adjustable in milliseconds and note values • Tap out delay times or patterns using the Tap Pad

MetaFlanger - Vintage tape-flanging, phaser-emulation, and special effects • True dual-delay flanging sounds • Wet signal include filters so you can flange or phase just part of the signal • Factory presets of vintage emulations (Mutron, MXR, Itchycoo Park) and more.

MondoMod - AM, FM, and Rotation (stereo panning) modulators • Gentle wandering guitar solo panning or bizarre destructive effects • Single LFO drives all modulators with independent phase offsets between the modulator signals.

UltraPitch - Formant-corrected pitch shifter with 6-voices • Excellent gender-bending • Independent stereo panning and delay • Animator delay-randomizer. Set the pitchshift by musical intervals (with 5 cent resolution) • Manual formant mapping as well as presets that perfectly match instrumental formant responses • Creates huge and thick stereo chorusing, doubling, parallel harmonies, excellent vocal slap/spread effects, and much more

Enigma - Mysterious and innovative, Enigma combines a complex notch filter, short delay feedback loops and modulation to create distinctive sound design effects.

Doppler - Developed for post, film sound and game designers. Provides realtime doppler effects with auto and manual triggering modes, full control of air damping, panning pitch, path curve, gain, start/stop points and reverb tail.


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By Larry the O

Takin' My Time

I've spent a fair amount of time working in deadline-driven, high-volume production environments. In those situations, the right way to do things has a lot to do with which way is the fastest. This hones your abilities to set priorities and to evaluate and implement efficient tactics. It also forces you to be resourceful and productive and to create on demand.

Some people thrive under pressure, bless 'em, and they do their best work under those circumstances. But some fast-paced projects have left me feeling that the *right* way to approach a commercial project—that is, the most expeditious way—was not the best in terms of producing a quality product. Some things come out best on a quick "first take." Others take more development. Projects with heavy deadlines allow only one of these approaches; that is a simple fact of life.

Given all of this, it is easy to understand how one can develop the perspective that when there are two ways to do a job competently, the faster is the better. The faster may be the better way to get the job done on time, which is often the project's most important goal, but, even then, from a balanced perspective, it is clear that some good things cannot be accomplished when working quickly and that emphasis on speed alone compromises excellence. An approach in which every project is done pell-mell, with insufficient time to learn from mistakes and explore qualitative issues, can result in the same failures occurring time and again and limit the project's caliber.

Working quickly also discourages experimentation and promotes employing "tried and true" methods. In addition, the effect on individual and group mental health of a constant "hurry, hurry, hurry" refrain is not to be underestimated.

To project managers (indeed, to all involved), I say that expectations must match available resources: if you give 'em no time, you can't expect a highly polished product. However, if extra time can be eked out, even for just one key area, it can pay compelling dividends.

For the practitioner, it is a bit more complex. If you shine your brightest under pressure, this column has little to say to you besides, "Carry on and good cheer to you." For those like me—who can work quickly but neither work best that way nor, at the end of the day, find it wholly fulfilling—we, too, must accept the reality of time's tyranny.

On the one hand, this translates into letting go of artistic goals that take time to accomplish and going with the project's imperative of making the deadline. This is difficult because, put bluntly, it usually amounts to lowering one's standards. On the other hand is the personal need—and indeed, the need of society as a whole, if we are to enjoy and encourage quality—to achieve those artistic goals in areas outside of commercial projects. Those things a deadline-driven commercial project environment shuts out should find an outlet elsewhere, especially if that is how you do your best work. Take the time to make it shine.

Larry the O *provides a passle o' services for music and related technologies under the rubric of Toys In the Attic and plays MIDI mallets in Action Palace.*

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