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December 1999

## 29 Great Gift Ideas!

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to mix in 5.1

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Focusrite ComPounder,  
Rode NTV, and  
Steinberg ReCycle

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12 >



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**NEW!**

## 1202-VLZ PRO

**12x2x1 • 4 XDR™ preamps** • 4 mono & 4 stereo chs.  
 • 3-band EQ @ 12kHz, 2.5kHz & 80Hz • 18dB/oct. @ 75Hz low cut filter • 2 aux sends per ch. • Constant Loudness pan controls  
 • 2 aux returns • RCA tape inputs & outputs • 4 channel inserts  
 • XLR & TRS balanced outputs • switchable +4/mic level output  
 • ALT 3-4 stereo bus • Control Room matrix with Assign to Main Mix & separate outputs • Ctl Rm/Phone level control • 12-LED metering plus RUDE Solo light • Aux 1 Pre/Post • EFX to Monitor  
 • sealed rotary controls • built-in power supply • steel chassis



**NEW!**

## 1402-VLZ PRO

**14x2x1 • 6 XDR™ preamps** • 60mm faders • 6 mono & 4 stereo chs.  
 • 3-band EQ @ 12kHz, 2.5kHz & 80Hz • 18dB/oct. @ 75Hz low cut • 2 aux sends per ch. • Constant Loudness pan controls • 2 aux returns • RCA tape inputs & outputs • 6 channel inserts • XLR & TRS balanced outputs • switchable +4/mic level output • ALT 3-4 stereo bus • Switchable AFL/PFL Solo • Control Room matrix with Assign to Main Mix & separate outputs • Ctl Rm/Phone level control • 12-LED metering plus Level Set LED & RUDE Solo light • Aux 1 Pre/Post • EFX to Monitor • sealed rotary controls • built-in power supply • steel chassis

**NEW!**

## 1604-VLZ PRO

**16x4x2 • 16 XDR™ preamps** • 60mm faders • 16 mono chs.  
 • 4 sub buses + main L/R • 3-band EQ with sweepable midrange (12kHz & 80Hz shelving, 100Hz-8kHz mid) • 18dB/oct. @ 75Hz low cut • 6 aux sends per ch. • Constant Loudness pan controls • 4 aux returns • RCA tape inputs & outputs • 16 channel inserts • 8 direct outs • TRS balanced outputs • Switchable AFL/PFL Solo • Control Room matrix with Assign to Main Mix & separate outputs • Ctl Rm/Phone level control • 12-LED metering plus Level Set LED & RUDE Solo light • Aux 1 & 2 Pre/Post • Aux Send master section w/level controls • Solo buttons with LEDs • Stereo Aux Return assign section with EFX to Monitor & Main/Submix assign • built-in power supply • steel chassis • BNC lamp socket • Rotatable I/O pod allows 5 physical configurations



# NEW MIDSIZE

## Introducing the 1642-VLZ PRO... 4 submix buses, 4 aux sends per

**WARM, DETAILED SOUND**  
**0.0007% THD**  
**NEAR DC-TO-LIGHT BANDWIDTH**



**OVER 130dB DYNAMIC RANGE FOR 24-BIT, 192kHz SAMPLING RATE INPUTS**  
**ULTRA-LOW IM DISTORTION & E.I.N. AT NORMAL OPERATING LEVELS**  
**IMPEDANCE INDEPENDENT**  
**BEST RF REJECTION OF ANY MIXER AVAILABLE**

No matter how much you spend on a microphone, its ultimate performance depends on how it interacts with the preamp it's plugged into. For years, high-end outboard mic preamps have provided fidelity that just hasn't been possible with the "stock" mic preamps built into mixing consoles. Until now. Introducing Xtended Dynamic Range discrete mic preamplifiers.

The first in-mixer preamps that can effortlessly amplify the most subtle of sonic nuances, creating an aural panorama that's breathtakingly realistic, excitingly vivid and

**10 XDR™ mic preamplifiers** with the finest sound quality (and specifications) ever on a mixer of any size. 0dB to 60dB gain range.

**10 mono mic inputs** (Chs. 1-10) and **8 mono line inputs** (Chs. 1-8), with +15dB to -45dB gain range.

**Inserts** on the first eight 1642-VLZ™ PRO channels.

**75Hz low cut filters** on all 10 mono channels. Sharp 18dB/oct., phase accurate circuitry cuts infrasonics caused by room and stage rumble, wind noise, mic clunks, P-pops and other crud.



**NEW!**

**Sweepable midrange EQ** on Chs. 1-8. Incredibly wide 100Hz-8kHz sweep range lets you use this control as a second HF or LF control, too! Fixed shelving HF EQ at 12kHz. Shelving LF at 80Hz.

**Overload** and ultra-sensitive, hyper-twitchy -20dB **Signal Present LEDs** on every channel.

**4 aux sends per channel.** 15dB of gain above Unity to drive wimpy effects processors. Auxes 1 & 2 are pre/post switchable; Auxes 3&4 are fixed post-fader.

**60mm logarithmic taper faders** with ultra-long-life resistance elements provide linear volume change from full-on to ∞.

truly 3-dimensional in scope. The first built-in mic preamps that are impedance independent and designed with full protection from hot-patching and dead shorts. The first compact mixer with mic preamps that really do sound like \$500 to \$2000-per-channel esoteric preamps.

It took us two years and a quarter of a million dollars. And you probably won't believe it until you actually audition the XDR™ circuitry with a high qual-

ity condenser mic. But it's true: Verifiable with your ears. Verifiable on the lab bench.

XDR's Controlled Interface Input Impedance system accepts an enormous range of impedances without compromising frequency response. Whether the mic/cable load is 50 ohms, 150 ohms or 600 ohms, XDR™ mic preamp frequency response is down less than one tenth of a dB at 20Hz and 20kHz!

Many mixers that tout low E.I.N. specs can't deliver that

# LUXURY VLZ PRO MIXER!

10 XDR mic preamp channels and 4 stereo line channels, channel, sweepable mid EQ and more for just \$999\*



4 stereo line inputs (on Chs. 9-16) with +15dB to -45dB gain range.

Dual headphone outputs. RCA inputs and outputs with tape input level control.

On the back: Direct outs (Chs. 1-8, bal./unbal.), TRS mono main output with level control, XLR stereo main outputs with recessed mic/+4 line level switch.

Effects to Monitor controls on Aux Returns 1 & 2 let you fold EFX back into stage monitor mixes independent of main PA.

Aux Return 3 can be assigned to Main Mix or Subs 1 & 2 or 3 & 4.

Aux Return 4 can be assigned to Control Room/Phones only.

Master Aux Return Solo switch.

Tape Input Level.

Tape to Main Mix switch.

Level-set LED + channel strip in-place stereo solo buttons make initial level setting fast and accurate.

RUDE solo LED in bright ecologically-correct green.

4-band EQ on Chs. 9-16. With 12kHz HF, 3K Hi-Mid, 800Hz Low-Mid and 80HZ LF.

True 4-bus configuration with bus assigns on every channel and master LR assign switches. Bus outputs are duplicated (double-bussed) so you can hook up all 8 channels of a digital recorder without constant re-patching.

Control Room/Phones Section with separate headphone and control room level controls. Source Matrix selects any combination of Main Mix, Subs 1 & 2, Subs 3 & 4 or Tape. In studio applications, the matrix gives you exceptional monitoring flexibility. During live mixing, it lets you create a third stage monitor mix or separate feed.

\* \$999 suggested U.S. retail price does not include extra toppings or optional thick Sicilian crust. Your price may vary. No user-serviceable parts in this footnote.

performance at normal +20 to +30dB gain settings. Our XDR™ design maintains lower noise levels in this “real world” operating range than even mega-expensive outboard designs.

The more sensitive a preamp is, the more likely it is to also pick up radio frequency interference (RFI). XDR™ incorporates bifilar wound DC pulse transformers with high permeability cores that reject RFI without cutting audible high

frequency response. Plus we direct-coupled the circuit from input to output and used pole-zero-cancellation constant current biasing. Bottom line for the non-technical: Our VLZ™ PRO Series has the best RFI rejection of any mixing consoles in the world. Period.

Hearing is believing. Visit a Mackie Dealer and audition XDR™ mic preamps with a really high quality condenser mic. Then get a 1604-VLZ™ PRO. Think of it as ten expensive esoteric stereo mic preamps... with a really excellent compact mixer attached.

You asked. We listened. The ultimate studio mixer value for tracking with a single 8-track digital recorder.

The new 1642-VLZ™ PRO gives you the finest mic preamps ever offered on a compact mixer. And it's configured to make recording incredibly easy. Two dedicated channels for tracking. Eight for monitoring. And two stereo channels for effects. Plus “double-bussed” submix outputs so you can feed all 8 channels of your recorder without having to re-patch.



The 1642-VLZ™ PRO is packed with goodies including sweepable midrange EQ, 75Hz low cut filters to cut room rumble and drum vibrations, Control Room/Phones switching matrix with individual level controls, four aux sends per channel, constant loudness pan control and in-place stereo solo.

Plus it has a whole ‘nother set of extra features just case you also use your mixer for live performances.

Call toll-free or visit our web site for complete information on the new midsize luxury 1642-VLZ™ PRO. Learn why it's the best compact studio mixer value on the planet.



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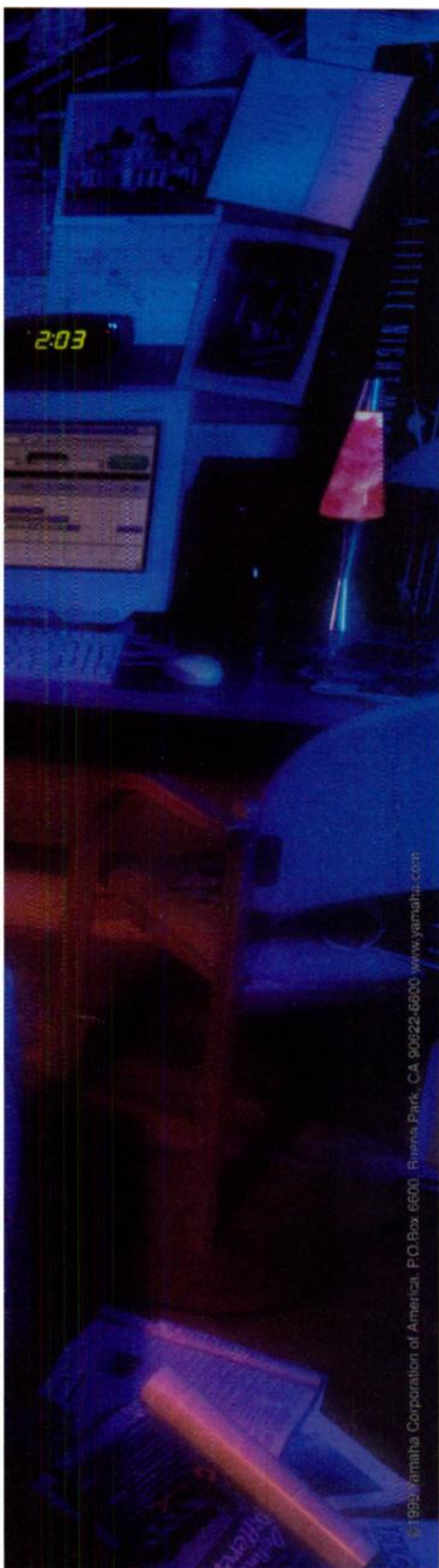


CD-ROM with XGWorks 3.0 Lite software • Pitch-bend, modulation wheels • Effects: 12 reverb, 23 chorus, 93 insertion • Sounds: 364 AWM2 voices, 128 performances

• Modular Synthesis Plug-In System • PLG boards add complete synthesizers, polyphony, effects and multitimbral capacity

MIDI control • 4 Assignable data sliders, 5 assignable knobs • Quick Access key: easily, instantly select your favorite voices

• 4 Programmable keyboard zones • Channel aftertouch • 128 memory locations • A/D input jack • Effects applicable to external audio • Direct computer interface



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88-Note weighted action MIDI master controller keyboard with aftertouch, 4 assignable sliders, 5 assignable knobs, 3 pedal and 1 breath controller inputs

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2 Modular Synthesis plug-in expansion slots to add polyphony, effects and new synthesis technologies (VL, VH, DX, AN, XG, PF)

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To-host computer connection, SMF playback directly from SmartMedia, A/D input, XG Works 3.0 Lite sequencer/editing software

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# S80



# YAMAHA

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not just sounds • Two PLG expansion slots • Ultra-thin, high-capacity SmartMedia™ cards store voice and performance setups

# I N S I

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*By Brian Knave*

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*By Mary Cosola with the **EM** staff*

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*By David Rubin*



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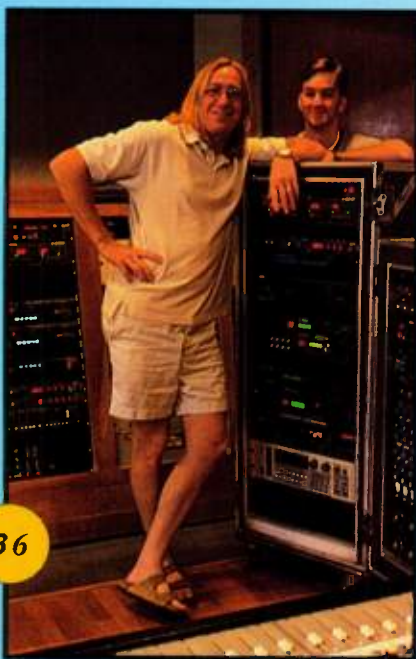
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## Future Shock

It seems to me that the age of physical delivery media is slowly fading. We are witnessing the dawn of the age of Internet delivery, and not just of MP3 files and other low-quality media. Broadband Internet "pipelines" are being constructed, the commercialization of the Internet is underway, and we will soon have huge amounts of data-storage capacity in our electronic entertainment devices as well as our computers.

Before long, we will be able to quickly and easily download large quantities of digital audio that is either uncompressed or is compressed with algorithms so good that the difference will be virtually imperceptible. We will be able to load this data directly into small consumer devices. At that point, selling audio and video on a physical medium such as a disc will seem cumbersome and costly by comparison.

I can foresee the day when brick-and-mortar record stores could be as rare as drive-in movie theaters are today. It won't happen overnight, but I think it will evolve gradually over the next decade.

This movement will affect the basic structure of the record industry significantly. Executives of certain Big Five major record labels, such as EMI, claim that they understand what the Internet means to their business. But I think that the major labels are in for a big shock. Once broadband Internet delivery to home-based performance systems becomes a reality, the record-label business model may have to be reinvented, and not because of piracy.

You think that's too bold a statement? Consider this: in the past, the big labels supplied deep-pocket banking services, distribution, and marketing services. Traditionally, they also offered recording services, but this part of their empire is already suffering from the onslaught of lower-budget personal studios.

If you can bypass the conventional record store and distribute via the Net, you don't need major-label connections for distribution; independent Web labels can distribute for you. You don't need to finance a huge distribution effort or stock physical product, because your product will be a (hopefully secure) data download. Selling music could be much like selling software on the Web in that sense (see "Working Musician: Moving Units Online" on p. 102). Furthermore, with the growth of Webcasting, a handful of radio and TV outlets will no longer determine which acts get heard; anyone can Webcast his or her music.

The major labels will still control their superb back catalogs, of course. And if you want to compete at a big-league level, you'll need high-powered promotion and marketing, whether you use the Web or attempt a multifaceted media blitz. So the major labels could essentially become specialized marketing firms, losing the distribution and banking roles they have enjoyed in the past.

As with the current business model, if you want to be successful in a small niche market, working with an independent label that has a smart, well-focused self-promotion effort could do the trick. If not, you might still need professional marketing help to be heard above the noise floor of thousands of acts.

Either way, we are not talking about traditional record-label models anymore. And that is what the Big Five do not seem to understand.



ANTHONY PIDGEON

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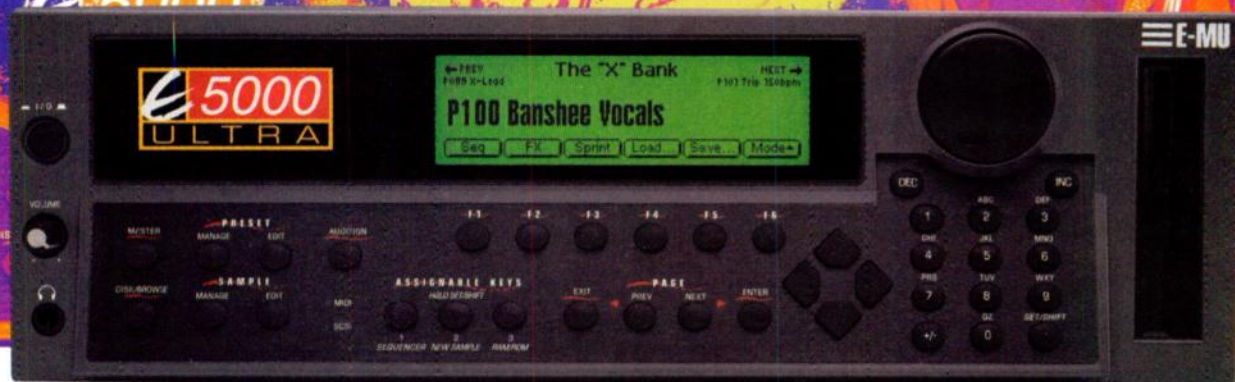
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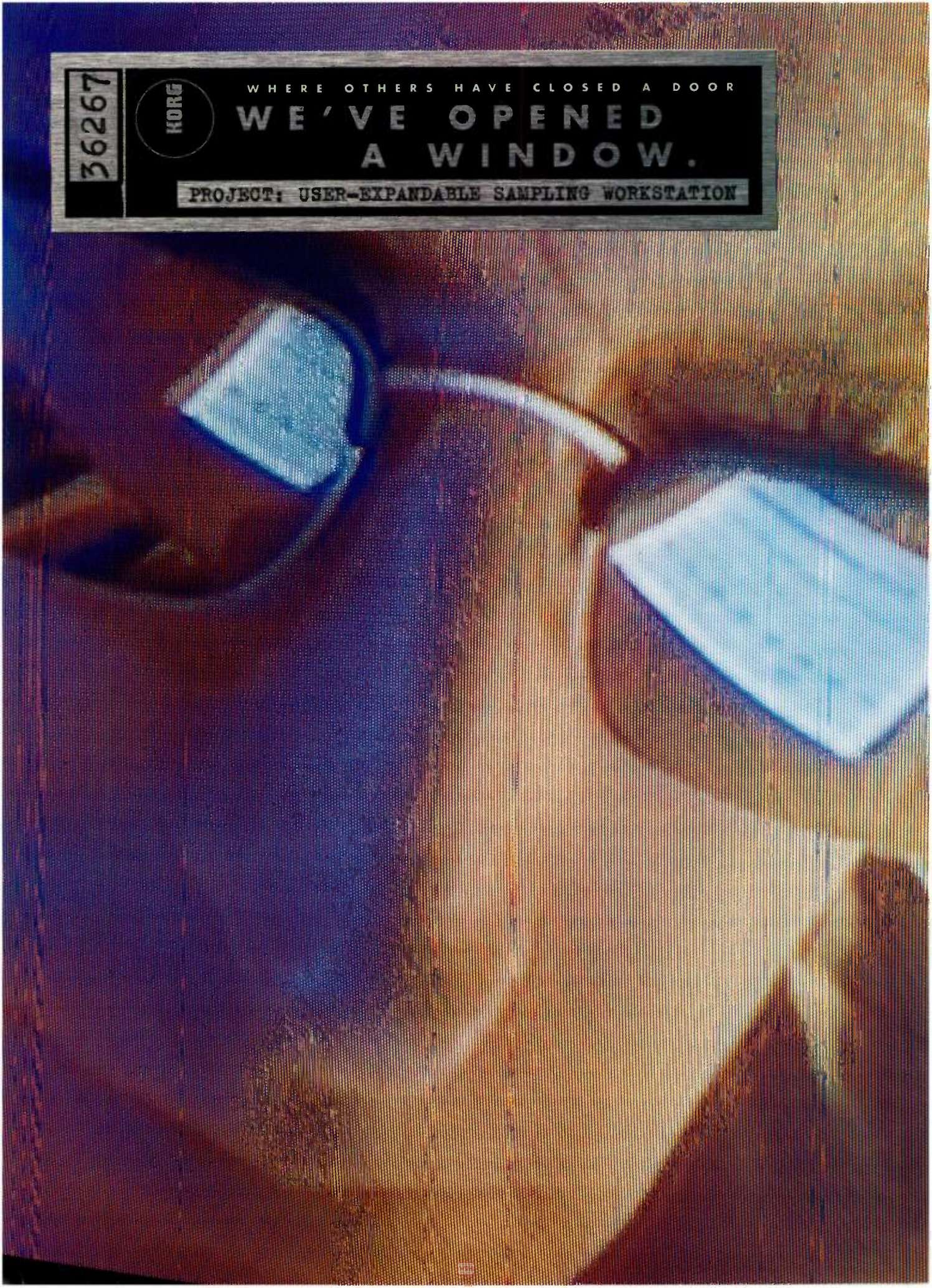
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## MATH LESSON

Your article on fractal music-generation programs was quite interesting ("Square One: Fractals and Music," October 1999). I plan to download a program or two to use as in-class demos, but as a mathematics instructor, I must note an inaccuracy. Mr. Diaz-Jerez claims that the equation  $X^2-1=0$  is a linear equation, when in fact it is not. Linear equations do not contain exponents. An example of a linear equation (in slope-intercept form) would be  $Y=3X+4$ . Otherwise, an excellent article.

**Kevin G. Crothers**  
Mathematics Department  
Wando High School  
Mt. Pleasant, SC

## SPANKED ON SPAM

I was horrified to read in "Working Musician: Ocean of Promotion" (October 1999) authors Lygia Ferra and Erik Hawkins advising musicians to use "acquired" e-mail lists to send unsolicited e-mail to unsuspecting netizens. This, as I would have thought you would have known, is

called spamming and is near the top of the list of most noxious violations of net-etiquette, or "netiquette." Not only is it almost always unproductive, it is one of the fastest ways of being removed from your Internet service or Web site provider. Under certain circumstances and in some jurisdictions it is also illegal. Your readers—as well as the innocent denizens of the Internet—deserve much better.

*name withheld by request*

## SAX EDUCATION

First of all—great magazine. I refer to it for reviews and articles almost exclusively. I have just one thing to say about the "Equal Time" article in the October 1999 issue: *Please* don't tell engineers to boost midrange on saxophones.

I have been a sax player for 42 years and am a studio musician in L.A. The sound that I work so hard in achieving has been "messed up" by engineers adding midrange to the recorded tracks. The best way I have found to reproduce the sound of the sax is to "minus" the high frequency (10 kHz) about 2.5 dB and leave the rest flat.

The article is a nice starting point for someone learning about EQ, but it

shouldn't be taken as the Holy Grail. Sometimes less or none is better.

**Pat Zicari**  
Music, MIDI & Madness  
via e-mail

## PICTURE PERFECT THANKS

I thoroughly enjoyed Gene Takahashi's primer on audio to picture synchronization ("Square One: Picture Perfect Sound," September 1999). I'm eager to get into providing music for video projects, so I'd definitely like to see a continuing series on this subject, perhaps primers on SMPTE, MPEG, and so forth.

Thanks for publishing an outstanding magazine. I have a passion for making music, and **EM** educates me with the tips, tricks, and technology for maximizing my productivity.

**Randall K. Harp**  
via e-mail

## WHEN IS PRO NOT PRO?

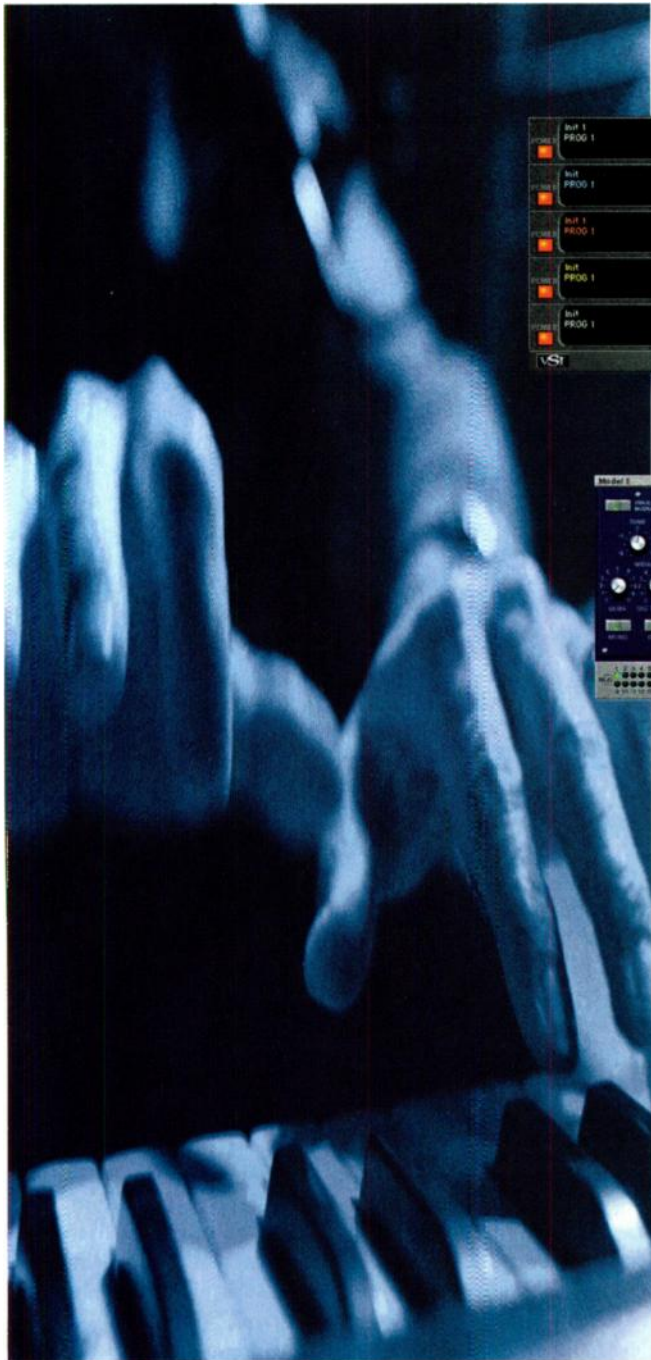
I don't quite understand why Jeff Casey wrote in "A Perfect Ten" (August 1999) that while the Spirit 328 digital console had only two assignable dynamic processors, it was not a major concern because users could use onboard compressors or limiters. As far as I could gather from the article, the 328 has no insert on the tape returns, so how can you insert any dynamics processor into the signal chain?

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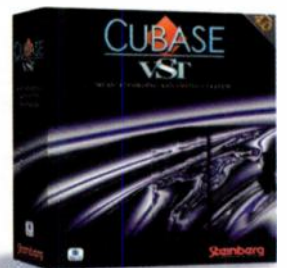
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And it's all quick and easy, so you can go back to what's important: making and recording music!

I have been considering upgrading to a digital mixer, in particular the Spirit 328, but that was before I read this article. I think this is a very serious limitation, and Soundcraft does not mention this in any of its product literature. So thank you very much for pointing this out in the review.

In my opinion, a digital mixer without a dynamic processor on an individual channel cannot be graded as a professional mixer at all.

**Henry Lai**  
via e-mail

*Henry—The 328's lack of inserts and relative paucity of onboard compressors might indeed be a concern when tracking with mics (say, recording a vocal) because you might want to insert a favorite compressor after the internal mic preamp and before the converter. But you do get two assignable onboard compressors; how many compressors do you need to use simultaneously during tracking—or for that matter, during mixdown? Furthermore, the 328's onboard compressors are very good, especially when compared with the digital compressors in competing digital mixers.*

*At mixdown, you have the option of wiring an analog compressor inline between the tape deck's analog track output and the mixer's tape return. As with many studio wiring tasks, a patch bay can make this simple. True, you have to go through the deck's DAC and the mixer's ADC, which is not ideal, but that's not necessarily a disaster if the converters are good. That's what Jeff Casey was talking about.*

*Finally, what can and cannot be graded as a "professional" console is a matter of perspective, unless you want to consider extreme examples. To a high-end engineer, many of the products we home-studio owners use are considered to be semipro ("musical instrument") gear, sold in music stores*

*rather than pro audio shops. Yet a lot of professional-quality work is produced with them.—Steve O.*

### OPEN SOURCE OF JOY

Regarding R Pickett's article titled "The Penguin's Song" (June 1999), I just wanted to let you know how grateful I am that someone had the foresight to help all the rest of us rebels out here by writing such a helpful and insightful article.

So few magazines have the guts to investigate anything but the accepted standards because it's not "in" or it just doesn't sell. For years, I have been trying out alternate operating systems to use for hard disk recording, and finally someone comes along and lets me know that the new Linux OS (which is a lot cheaper than anything else out there) I just bought has promise in this area.

I've never read your magazine before, but after picking up this back issue at my local pro shop I will buy every issue of EM I can afford. (Of course, I'm a starving musician, so it'll be a struggle every month.) Tell Mr. Pickett that we're proud of him out here in penguin land and that he should keep it coming. Proud to see you in a brave (and open source) new world!

**Alan "Doc" Pride**  
Decatur, IL

### CHOMPING AT THE BIT

For eight years I've owned a successful commercial project facility. Before that, I worked for IBM. I feel if anyone should understand bit-depth and how it translates to audio advantage, I should. But I am confused.

Manufacturers' ads talk about "24 bit" constantly, but I have been told by several people I trust that 24 bit is not 24 bit is not 24 bit. I understand that some products truncate the extra bit resolution. One person told me that a good implementation of a 20-bit converter is far superior sonically than most of the current 24-bit designs (with Apogee being one of the exceptions).

A manufacturer rep told me that the noise of the necessary electronic circuits that surround the 24-bit A-D converters actually erase most of the advantage of the expanded resolution. He went so far as to say that it is cost-prohibitive to build the circuits necessary to implement true, fully improved 24-bit resolution.

If companies think that throwing around "24-bit, 96 kHz" is going to get me to buy, they've missed the mark completely. I am less apt to make a decision now than ever before. Can you help me (and I hope other readers) by spending some real time on this subject?

**Bill Dodd, Owner**  
Mud-Hut Studios  
via e-mail

*Bill—We are planning to address this topic in an upcoming "Square One."—Mary C.*

### SO, LONGER IS BETTER

I'm a fairly new subscriber to your magazine, and I'd like to say I'm very pleased with the caliber and scope of the articles. I have learned so much in the few short months that I've been a reader. I especially like the fact that the articles tend to be longer and more in-depth than your average "scratch the surface and then go buy whatever products we're advertising" articles. Please keep up the great work.

**Mike Giblin**  
via e-mail

### WE WELCOME YOUR FEEDBACK.

Address correspondence and e-mail to "Letters," Electronic Musician, 6400 Hollis Street, Suite 12, Emeryville, CA 94608 or to [emeditorial@intertec.com](mailto:emeditorial@intertec.com). Published letters may be edited for space and clarity.

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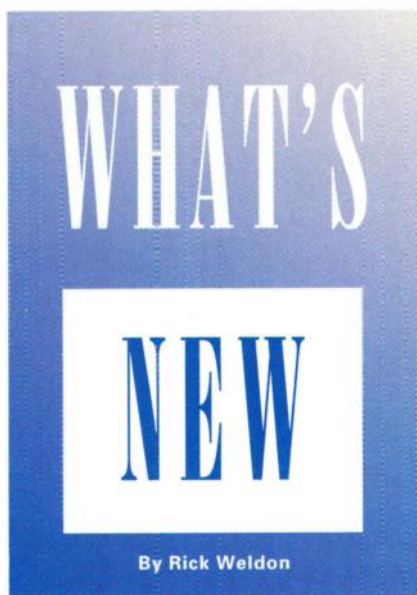
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### ▲ AUDIX CX-211

The CX-211 (\$649) from Audix is a cardioid condenser microphone with a 1-inch, gold-vapor-coated diaphragm; a 6 dB/octave bass rolloff switch centered at 125 Hz; and a 10 dB pad. The mic, designed for live, studio, and broadcast applications, is made with a brass body and steel-mesh grille. The CX-211 requires 48V phantom power.

The CX-211 uses a diaphragm similar to the CX-111's. Unlike the CX-111, however, it is a front-address mic. It also has a different pickup pattern, allowing for additional rejection of ambient stage noise.

The mic ships with a foam wind-screen, flight case, and mic-stand bracket (shown). Optional accessories include the APS-2 2-channel phantom-power supply (\$119). Audix rates the microphone's frequency response at 20 Hz to 20 kHz ( $\pm 3$  dB), dynamic range at 109 dB, maximum SPL at 145 dB (with the 10 dB pad in use), and self-noise at 17 dB (A weighted). Audix USA; tel. (800) 966-8261 or (503) 682-6933; fax (503) 682-7114; e-mail [info@audixusa.com](mailto:info@audixusa.com); Web [www.audixusa.com](http://www.audixusa.com).

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### ▶ E-MU E5000 ULTRA

The E5000 Ultra (\$1,695) from E-mu features much of the same hardware and software used in the company's E4 Ultra line of samplers, including the Emulator Operating System, processor, and sounds. The new 3U rack-mount sampler is offered at a lower price and ships with 4 analog outputs (expandable to 12), 64-note polyphony, and 16-channel MIDI capability (upgradable to 32 channels).

The sampler features E-mu's proprietary Beat Munging loop-editing tool, which automatically determines bpm and sets loop points, among other functions. The E5000 Ultra also includes 21 of the company's Z-Plane morphing filters. To control the E5000 Ultra from your computer, you can purchase the Mac- and Windows-compatible *EOS Link* software (\$40).

The E5000 has 20-bit A/D and D/A converters, and 24-bit internal processing.



Audio sample rates of 44.1 and 48 kHz are supported. Input is on two balanced 1/4-inch connectors, and output is on four balanced 1/4-inch connectors. You can install eight more balanced 1/4-inch connectors using an expander kit (\$795).

Other installation options include an 8-in, 16-out ADAT I/O kit (\$549), a D-WAM digital I/O daughter card (\$395), a multi-channel effects processor chip, and several memory expansion kits.

E-mu rates the E5000 Ultra's frequency response at 20 Hz to 20 kHz ( $\pm 1$  dB), S/N ratio at 105 dB, and THD+N at 0.44%. E-mu—Ensoniq; tel. (831) 438-1921; fax (831) 438-8612; e-mail [info@emu.com](mailto:info@emu.com); Web [www.emu.com](http://www.emu.com).

Circle #402 on Reader Service Card

### ▼ MEEPMEEP MBOOM

From Belgian software company MeepMeep comes *Mboom* (\$150), a MIDI sequencer with an integrated WAV-file audio sampler. The program is designed for intuitive music making, whether you are step sequencing or making changes on the fly. It can import



any MIDI or WAV file; supports VST plug-ins; and allows panning, gain, and mix automation. *Mboom* has a maximum storage capacity of 128 tracks, and each channel of the 16-track mixer can hold up to four VST plug-ins.

*Mboom* features a loop editor, a song editor, and the Playroom, which ties the two editors together for arranging songs on the fly. In addition, *Mboom* includes a mono WAV-file sample editor; a piano-roll-style MIDI editor; a graphic editor for velocity and control change messages; an event editor; and the Vintage editor, an analog-style step sequencer that allows you to modify key, velocity, and note length. You can save your own sequences as "grooves," or choose from the 17 groove templates, which are preset rhythm sequences. You can also create drum maps and morph and layer sounds.

*Mboom* detects any MIDI equipment attached to the computer during startup. The program requires a Pentium 100 with 32 MB RAM running Windows 95, 98, or NT. MeepMeep; tel. 32-2-241-5382; e-mail [meepmeep@mboom.com](mailto:meepmeep@mboom.com); Web [www.mboom.com](http://www.mboom.com).

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- ▶ 1/4" Jacks - Dual I/O
- ▶ 24 bit internal processing

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▶ **FASOFT N-TRACK STUDIO 2.0**

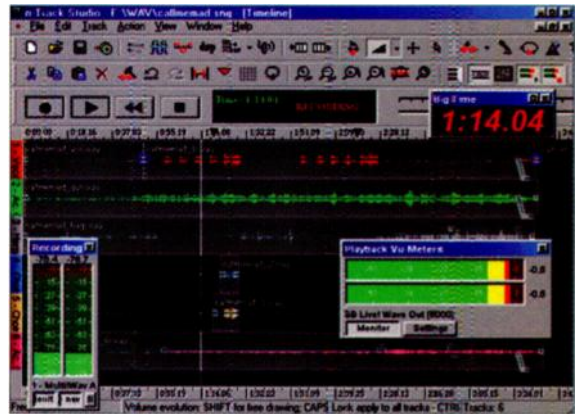
**F**ASoft's *n-Track Studio 2.0* (Win; \$35) is a digital audio sequencer that lets you record, mix, and edit audio and MIDI tracks; apply real-time effects; play AVI, MPEG, and QuickTime videos in sync with your tracks; and sync to other programs or devices as either a master or slave via SMPTE, MTC, or MIDI Clock. Any combination of 16-, 24-, and 32-bit mono or stereo WAV files can be used within a song or a track.

You can mix songs down to a stereo WAV file and encode them as an MP3 file within the program. *N-Track Studio* lets you automate volume levels, pan positions, and routing of sends and returns of up to 32 aux channels. In addition, you can create your own crossfades or

choose from several crossfade presets.

The software supports DirectX plug-ins and ships with its own native DirectX real-time effects, including a reverb, a delay, and a stereo chorus/flanger. A fourth *n-Track Studio* native plug-in, AutoVol, offers phase shifting and an effect called "aliased pitch shifting" that resembles ring modulation. The resolution of the effects processing is 32-bit.

The program is compatible with any 16- or 24-bit sound card, and it can use multiple sound cards simultaneously. *N-Track Studio* requires a Pentium 75



with 16 MB RAM running Windows 95, 98, or NT. FASoft; tel. and fax 39-6-5235-4431; e-mail info@fasoft.com; Web www.fasoft.com.

Circle #404 on Reader Service Card

▼ **MICROBOARDS STARTREC**

**S**tartREC, from MicroBoards Technology, is a 6U rack-mount multiple CD-R burning system designed to give the user complete control over the replication process. StartREC comes in a number of configurations ranging from the ST-2000 model (\$3,195), which includes two Panasonic 7503 CD re-

orders, to the ST-3000P (\$4,495), which includes three Plextor Plexwriter CD-R burners. Both the Panasonic and Plextor recorders burn CDs at 8x, 4x, and 2x speeds. Each configuration features the same analog and digital I/O, editing software, 6.3 GB internal IDE hard drive, and CD-ROM drive for making duplicates of existing CDs.

Digital-audio I/O includes S/PDIF optical and S/PDIF coaxial, as well as an AES/EBU input via an XLR connector. Stereo analog I/O is available on both balanced XLR and unbalanced RCA connectors. Analog input levels are monitored using the front-panel LCD

level meter and adjusted with the trim knob. StartREC also includes a front-panel 1/4-inch stereo headphone jack.

StartREC comes with software that allows you to cut, copy, and paste audio tracks; combine two mono tracks into a stereo file; split stereo into mono; apply index markers; and perform fade-ins and fade-outs. The unit automatically detects and converts 32 and 48 kHz signals to 44.1 kHz and can produce SCMS copy-protected discs if desired.

Microboards rates the StartREC's frequency response at 20 Hz to 20 kHz, and signal-to-noise ratio at 94 dB. MicroBoards Technology; tel. (800) 646-8881 or (612) 556-1600; fax (612) 566-1620; Web www.microboards.com.

Circle #405 on Reader Service Card



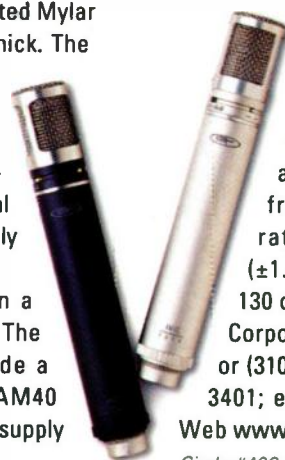
▶ **GT ELECTRONICS AM SERIES**

**G**T Electronics has added three new condenser mics to its AM series: the AM11 (\$399), AM30 (\$499), and AM40 (\$799). Each of the three mics has a 12 dB/octave low-frequency rolloff filter fixed at 80 Hz. The AM11 has a 10 dB attenuation pad; the AM30 and AM40 have 15 dB pads.

The fixed-cardioid AM11 features Class A FET electronics throughout. It has a 1-inch, gold-evaporated Mylar diaphragm 6 microns thick on a brass backplate capsule. The vacuum-tube AM40 and its Class A FET counterpart, the AM30, each

feature a 3/4-inch, gold-evaporated Mylar diaphragm that is 3 microns thick. The AM40 and AM30 have interchangeable capsules. The AMC1 cardioid capsule comes standard; the AMC2 supercardioid and AMC3 omnidirectional capsules are available separately for \$129 each.

Each microphone ships in a case with a mic-stand mount. The AM30 and AM40 also include a foam windscreen, and the AM40 comes with an external power supply and a 25-foot, 6-pin cable.



GT Electronics rates the frequency response of the AM11 and AM30 at 20 Hz to 18 kHz ( $\pm 1.5$  dB), and maximum SPL at 140 dB. The AM40's frequency response is rated at 20 Hz to 20 kHz ( $\pm 1.5$  dB), maximum SPL at 130 dB. GT Electronics/Alesis Corporation; tel. (800) 525-3747 or (310) 255-3400; fax (310) 255-3401; e-mail info@alesis.com; Web www.alesis.com.

Circle #406 on Reader Service Card

# D-TWO FOR THE SHOW

D-TWO MULTITAP RHYTHM DELAY  
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- ▶ FILTER - Increase filtering as repeats decay

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- ▶ Up to 10 seconds of Delay
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PEAK 7

PEAK 8

DIGITAL

PAN

PAN

PAN

PAN

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PAN

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PAN

STATUS

1

2

3

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# PLUG-IN BONANZA ▲▲▲▲



## ▲ SERATO

**P**itch 'n Time (Mac; \$799), from the New Zealand-based company Serato, is an AudioSuite plug-in that provides pitch-shifting and time compression and expansion. Whereas the time-manipulation algorithms of many similar programs work by duplicating or deleting blocks of samples from a length of digital audio, *Pitch 'n Time* uses a proprietary algorithm. According to the manufacturer, this eliminates the audio artifacts that have, up to now, been common to the process.

*Pitch 'n Time* can pitch-shift a track up or down by percentage or semitones (up to 12) and stretch or compress an audio track 50 to 200 percent of its original length. Time compression is done in a number of ways: by adjusting tempo or change in length by percentage, or by defining a new target length.

These processes can be performed simultaneously and on any kind of audio, from a monophonic synth to a full mix. Stereo tracks can be processed without phasing, and Dolby matrix-encoded tracks can undergo treatment without loss of surround information.

*Pitch 'n Time* requires an AudioSuite-compatible host application. A 200 MHz PowerPC is needed for

real-time preview of mono tracks, and a 400 MHz PowerPC for real-time preview of stereo tracks. Final processing is done offline, so your CPU speed affects only the total processing time. Serato; tel. 64-9-377-4723; fax 64-9-377-4724; e-mail info@serato.com; Web www.serato.com.

Circle #407 on Reader Service Card

## ▼ BOMB FACTORY

**A** number of fascinating plug-ins are available from Bomb Factory that run under either the Real-Time AudioSuite or TDM format on Macintosh and Windows systems. The company worked with the makers of several cool pieces of gear to release plug-ins modeled on them. These include the *Voce Spin and Chorus/Vibrato* (\$399), *Classic Compressors* (\$599), *SansAmp PSA-1* (\$599), and *Moogerfooger Lowpass Filter and Ring Modulator* (\$399). The interface for each plug-in centers around a photorealistic image of the device, complete with moving shadows and the occasional scratch or ding.

*Voce Spin and Chorus/Vibrato* provides a simulation of a rotating speaker and lets you choose a speaker cabinet, control the mic placement, change the speakers' crossover, and adjust motor speeds and pulley lengths. This plug-in also delivers a Hammond B3-style vibrato. *Classic Compressors* models

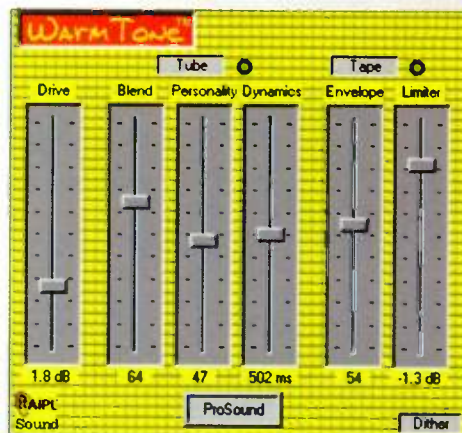
Universal Audio's LA-2A compressor and the Urei 1176 limiting amplifier, but it adds features not available on the original units, such as a sidechain input and stereo imaging. The *SansAmp PSA-1* and *Moogerfooger Lowpass Filter and Ring Modulator* similarly mimic their namesakes.

Each of the Bomb Factory plug-ins requires *Pro Tools* 4.0 or later. The Real-Time AudioSuite version requires *Pro Tools* 5.0 LE. Bomb Factory; tel. (818) 558-6662; fax (818) 558-1611; e-mail info@bombfactory.com; Web www.bombfactory.com.

Circle #408 on Reader Service Card

## ▼ AIPL

**T**wo DirectX plug-ins are available from AIPL that use processes based on psychoacoustic principles.



*WarmTone* (Win; Standard \$39, Pro \$79) is designed to add to your digital audio tracks the richness traditionally gained by using analog equipment. The plug-in has controls for simulating tube saturation and analog tape compression, as well as sliders for adjusting drive, blend, dynamics, envelope, and limiting. A Personality slider changes the quality of the simulated tube.

*SpinCycle* (Win; \$59 Standard, \$99 Pro) uses a proprietary, patent-pending algorithm that digitally simulates a mechanical rotating-speaker system. It has sliders that control the speed and



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## PLUG-IN BONANZA ▲▲▲▲

size of the rotating bass and treble horns, as well as the amount of ventilation, or aperture of the holes in the virtual speaker cabinet. The two horns can function on their own or locked together. Other sliders offer control over input gain and speaker crossover frequency. You can also control mic placement for each horn: *SpinCycle* lets you set the horizontal and vertical positions of the mics in front of the cabinet. The AutoRhythm function automates the on/off pedal, including simulation of the rotating speaker's acceleration/deceleration, according to the audio's rhythm.

The Standard and Pro versions of the plug-ins are available as downloads from the AIPL Web site. The Standard versions let you use 24-bit audio files; the Pro versions add a ProSound button, which removes digital artifacts for an even cleaner sound.

The plug-ins require a Pentium 120 with 16 MB RAM running Windows 95, 98, or NT (on NT systems, 32 MB RAM is required). Acoustic Information Processing Lab (AIPL); tel. (509) 427-5374; fax (509) 427-7101; e-mail [levy@aipl.com](mailto:levy@aipl.com); Web [www.aipl.com](http://www.aipl.com).

Circle #409 on Reader Service Card

### ▼ AUDIO EASE

Several playful software products from Audio Ease are available bundled as Rocket Science (Mac; \$199). The plug-ins, written for the MOTU Audio System format, are



*Roger, Follo, and Orbit.* *Roger* applies filters to your audio that reproduce pronounced vowel sounds. You select the filter sound from a bank at the bottom of the interface; the choices are *oo, ah, ee, uh*, and six others. You can filter with "Roger," a filter that mimics an adult male; "Patty," an adult woman; or "Cindy," a young girl. You control the speed between vowel filters using the Portamento control, and the amount of vowel effect using the Bandwidth control. A Tempo control (in bpm) applies filter sounds rhythmically. *Roger* can also be controlled by MIDI.

The *Follo* plug-in is a resonant bandpass filter that adjusts itself according to the amplitude of the incoming audio. You set the width of the filter using the Bandwidth knob, and filter peaks for low and high amplitudes using onscreen sliders. A virtual ball that moves between these sliders shows the filter peak's current frequency. The Analysis and Release knobs offer more control over how the filter peak changes. *Follo* can operate on mono or stereo files.

The *Orbit* plug-in simulates how your audio would sound if it came from a moving source in a large room. You can adjust the size of the room, the amount of sound absorption caused by the walls, and the time it takes for early reflections to come back to you. You can also adjust the speed of the moving source and its flight path around the room.

The plug-ins require a Power Mac running MOTU *Digital Performer* 2.11 or higher, *AudioDesk*, or *Performer* 6.0. Mark of the Unicorn, Inc. (MOTU); tel. (617) 576-2760; fax (617) 576-3609;

e-mail [info@motu.com](mailto:info@motu.com); Web [www.motu.com](http://www.motu.com) or [www.audioease.com](http://www.audioease.com).

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### ▼ ANTARES

Antares's *Microphone Modeler* (Mac/Win) is a plug-in that allows any microphone with a decent frequency response to sound like virtually any other microphone. Engineers at



Antares have used the company's patented Spectral Shaping Tools to create digital models of a wide variety of microphones, from vintage German tube mics to modern large-diaphragm condensers. You can download new mic models from the Antares Web site as they become available.

To use the plug-in, you designate the microphone you are using and the mic to be modeled. *Microphone Modeler* then references its models of the source and target mics and processes the input signal. You can adjust polar patterns and use attenuation pads and low-cut filters, if the modeled mic has these options. You can also model close and far mic placement and add tube-style saturation.

*Microphone Modeler* is available in TDM (\$599), MAS (\$399), VST (Mac only; \$399), and DirectX (\$299) formats, and requires a PowerPC running MacOS 7.0 or later, or a Pentium running Windows 95, 98, or NT. Antares Audio Technologies; tel. (888) 332-2636 or (408) 399-0008; fax (408) 399-0036; e-mail [info@antarestech.com](mailto:info@antarestech.com); Web [www.antarestech.com](http://www.antarestech.com).

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# KEY CHANGES

**Kind of Loud Technologies** will now distribute **Gallery's** Axis joystick and accompanying software (\$795 for a black model and \$895 for a chrome model) in the U.S. and Canada. The joystick, which can be used to control pan positions in Kind of Loud's *SmartPan Pro* surround-sound software, is compatible with Mac G3s (USB and beige models alike). The Axis software can be purchased separately for \$299 and supports other control devices including Gallery's Mission Control panner, JLCoooper's MCS panner, Wacom tablets, and MIDI controllers...**BitHeadz's** *Osmosis* sample-conversion software is now able to read Roland-format CD-ROMs and convert them into Unity DS-1 and SampleCell formats. The company has also announced that its *Unity DS-1* and *Retro AS-1* software supports **Digidesign's** DirectConnect technology, allowing you to route the programs' audio and MIDI directly into Pro Tools. Bitheadz has implemented this support for its *Voodoo* and *Black & Whites* products, as well...**Emagic Logic Audio** enthusiasts will find a like-minded online community at several specialized Web sites, including [www.onelist.com/community/logic-users](http://www.onelist.com/community/logic-users), [www.onelist.com/community/logic-tdm](http://www.onelist.com/community/logic-tdm), and [www.onelist.com/community/sounddiverusers](http://www.onelist.com/community/sounddiverusers)... Since **Event Electronics** stopped production on the Layla, Gina, and Darla, the manufacturer has formed a partnership with **Hyperactive Audio**. The two companies will work together to create a new digital audio recording system that uses Hyperactive Audio's proprietary DSP chips...**MH20**, located on the Web at [www.mh20.com](http://www.mh20.com), offers audio samples and other resources for making music, streaming-audio files and downloadable MP3 files, and online copyright services. All these are offered to members for \$2.99 per month, or \$19.99 for a yearlong membership.

—Rick Weldon

## ▼ LEXICON MPX 500

**L**exicon's MPX 500 (\$599) is a dual-channel digital effects processor that uses the company's proprietary Lexichip DSP chip and 24-bit A/D and D/A converters. The unit has 240 presets and 30 user-programmable locations; presets include room and plate reverbs, echo chambers, and reverse reverbs, as well as tremolo, rotary-speaker simulators, chorus, flange, pitch-shifting, detuning, and up to 5.5 seconds of delay.

You can lock in a delay time by using a tap-tempo button, a footswitch, an external MIDI controller, or an audio input. You can also sync a delay to MIDI Clock or control it using a Program Change message. All of the front-panel controls can be adjusted via MIDI. The MPX 500's dis-

play lets you monitor input level, preset number, and current delay tempo in bpm.

Analog stereo input and output on the MPX 500 are each on two balanced 1/4-inch and two balanced XLR connectors. The MPX 500 supports sample rates of 44.1 and 48 kHz using 24-bit A/D and D/A converters. On the rear panel is coaxial S/PDIF digital I/O, as well as the MIDI In and Out/Thru connectors. The Out/Thru connector's function is software selectable. Lexicon rates the unit's analog-output frequency response at 20 Hz to 20 kHz (±1 dB), dynamic range at 101 dB, and crosstalk at -96 dB (at 1 kHz). Lexicon, Inc.; tel. (781) 280-0300; fax (781) 280-0490; e-mail [info@lexicon.com](mailto:info@lexicon.com); Web [www.lexicon.com](http://www.lexicon.com).

Circle #412 on Reader Service Card



## ▼ KORG OASYS

**T**he Oasys PCI (\$2,200) from Korg combines 24-bit analog and digital I/O with software synthesis and DSP effects on a single PCI card. The synthesizers and effects, included on a CD-ROM, are in the form of software plugins. This allow you to take advantage of future upgrades through downloads from the Korg Web site.

The synthesizers model a variety of analog and FM synths, as well as a number of acoustic instruments (for example, brass, woodwinds, vocals, and percussion). The effects range from common (reverbs, flangers, and amplifier simulations) to specialized types (random filters, a stepped phaser, and a Doppler shifter), and are culled from both the Korg Trinity and a set of new algorithms (including tempo-synched LFOs and delays and analog-style EQ). You can use effects for real-time processing and apply them to synthesizers and hard-disk audio tracks simultaneously.

Five Motorola 56300-series DSP chips provide card-based DSP processing to minimize your CPU's workload. A built-in submixer lets you chain together up to four effects, in any order, as inserts on as many as 12 channels, 4 sends, and 6

stereo output buses. And nearly every parameter of the synths, effects, and mixer is MIDI controllable.

The Oasys PCI card has 24-bit A/D/A converters and supports sample rates of 44.1 and 48 kHz. It includes a breakout cable with stereo analog I/O on balanced 1/4-inch connectors (operating at +4 dBu), BNC word-clock I/O, 2-channel S/PDIF digital I/O on coaxial (RCA) connectors, and ADAT time-code input. The card itself houses ADAT optical input and output connectors. All I/O can be used simultaneously.



Software drivers include ASIO, OMS, and FreeMIDI for the Mac; Windows drivers will be available early next year. Korg USA, Inc.; tel. (516) 333-9100; fax (516) 333-9108; e-mail [product\\_support@korgusa.com](mailto:product_support@korgusa.com); Web [www.korg.com](http://www.korg.com).

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**SYSTEM:** Type: Modular, active near/mid/field monitor. Configuration: 2-way acoustic suspension. Woofer: 6.5" treated paper. Tweeter: 1" metal dome. Magnetic Shielding: Partial. Monitor Dimensions/Wgt: 14" h x 7.5" w x 11.9" d, 17 lbs. Monitor Enclosure Materials: 3/4" mdf w/HP laminate. FEATURES/CONTROLS: Connectors: Input: XLR, TRS. Output: XLR. Controls: Input sensitivity: -10, -3, +4, +11,  $\infty$  dBu. Listening proximity: 5 position (near/mid/far). Boundary proximity: 5 position (0, 1, 2)

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▶ **STEINBERG NUENDO**

Steinberg's *Nuendo* media production system (Win; \$1,295) is a software product designed for audio, multimedia, and sound-for-picture applications with an emphasis on surround sound. *Nuendo* lets you record and mix up to 128 audio tracks and an unlimited number of MIDI tracks. It can also accept VST and DirectX plug-ins and can play and sync audio to AVI files. The program is scalable and can use more than one CPU at a time for additional plug-in power.

*Nuendo's* mixer lets you apply up to four EQs and four plug-in insert effects on any audio track, and up to eight plug-ins globally. Plug-ins can be controlled by MIDI events within the program. Also



available are eight aux sends and complete automation of fader levels, EQ, pan, surround-sound placement, and effects parameters. Using the program's speaker-placement editor and surround-panning plug-ins, you can work in a number of surround-sound formats and change formats during a project.

Features such as nondestructive drag-and-drop crossfades are designed to make processes easily customizable. Unlimited undo and redo on all edits are also available. In *Nuendo*, these changes can be performed selectively; you scroll through an edit list and choose which edits to remove or reapply.

Multiple *Nuendo* systems can be used together on an Ethernet network, with one computer acting as a server. Any of the linked computers can use data stored on the server without making a copy.

*Nuendo* requires a Pentium 233 running BeOS or Windows 95, 98, or NT. Steinberg North America; tel. (818) 678-5100; fax (818) 678-5199; e-mail [info@steinberg-na.com](mailto:info@steinberg-na.com); Web [www.us.steinberg.net](http://www.us.steinberg.net).

Circle #414 on Reader Service Card

▶ **TASCAM MX-2424**

Tascam has released a hard-disk recording system, codeveloped with TimeLine Vista, called the MX-2424 (\$3,999). It has 24-bit A/D and D/A converters and plays back up to 24 tracks of 24-bit, 44.1 or 48 kHz audio, or 12 tracks of 24-bit, 96 kHz audio. The MX-2424 can read AIFF files, and it can read and write WAV and SDII files. It can record via analog and digital inputs simultaneously and work with files of different bit depths within a single project.

The unit uses TimeLine's Open Track List, an open format that allows other companies to make their own OpenTL format products compatible with the

MX-2424. The *ViewNet MX* software and built-in Fast Ethernet port let you control the unit from a Mac or PC.

The MX-2424 ships with a 9 GB SCSI hard drive and an extra drive bay. There is also an Ultra Wide SCSI connector. The unit has internally routable AES/EBU and S/PDIF digital I/O.

Several user-installable modules are available that fit into the rear of the unit, which accommodates an analog module and any one of several digital I/O modules. The analog module features 24 channels of balanced 1/4-inch connectors (\$1,499); the digital module can have 24 channels of TDIF (\$499), ADAT Optical (\$499), or AES/EBU (\$999) I/O.

You can sync the MX-2424 as a master or slave using SMPTE, LTC, word clock, MMC, MTC, or video sync. The TL-Bus provides a standard clock signal when using multiple units; up to 32 can be



linked with sample-accurate sync. Tascam; tel. (323) 726-0303; fax (323) 727-7635; faxback (800) 827-2268; Web [www.tascam.com](http://www.tascam.com).

Circle #415 on Reader Service Card

▼ **TC ELECTRONIC M-ONE AND D-TWO**

TC Electronic has released two single-rack-space stereo processors designed to provide TC algorithms at more affordable prices. The M-One (\$699) is a stereo dual-effects processor; the D-Two (\$699) is a digital multitap delay. Each of the units features 24-bit A/D/A converters, 24-bit internal processing, and a front-panel LED display.

The M-One lets you run two effects simultaneously. Twenty effects algorithms, including reverb, chorus, tremolo, pitch-

shifting, delay, and compression, are combined to create 128 preset effects. In addition, there are 128 user programs.

Using algorithms based on TC Electronic's 2290 delay, the D-Two provides 50 preset and 128 user programs. You can dial in up to 10 seconds of delay, and the unit's Rhythm Tap feature gives you the ability not only to tap in a tempo, but to tap the rhythm of the delays, as well. You can also trigger delays from MIDI and control the number of repeats. Other features include delay with stereo-field

expansion; ping-pong panning; reverse delay; chorus and filtering; and Dynamic, which lets you set a release time and threshold to allow the signal's input level to control the delay.

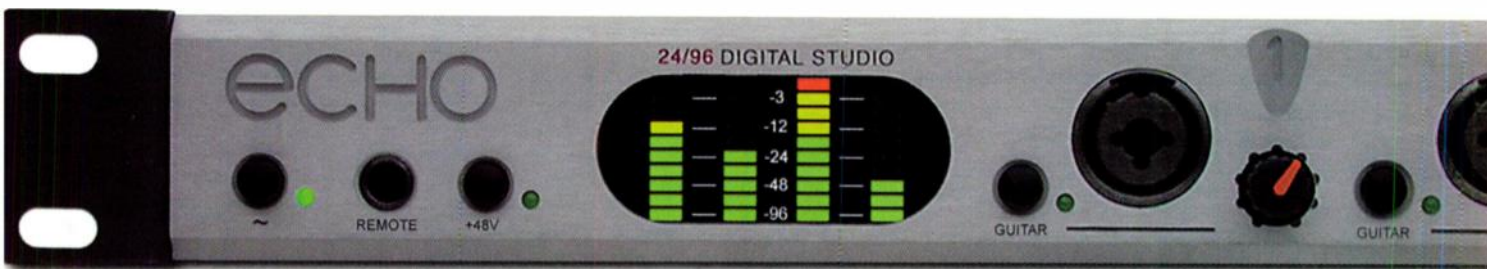
The M-One and D-Two feature stereo analog I/O on balanced 1/4-inch connectors. Digital I/O is on S/PDIF connectors. MIDI In, Out, and Thru are located on the rear panel as well. TC Electronic rates the frequency response for each unit at 20 Hz to 20 kHz (+0/-5 dB) and dynamic range at >101 dB (20 Hz to 20 kHz). TC Electronic; tel. (805) 373-1828; fax (805) 379-2648; e-mail [tcus@tcelectronic.com](mailto:tcus@tcelectronic.com); Web [www.tcelectronic.com](http://www.tcelectronic.com).

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- Compatible with all popular recording/editing software



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## File Under "Heavy"

**K**ris Bones knows a bit about sampling. He makes sample-based music under the Genaside II moniker, and his pieces have been sampled by Prodigy and the Chemical Brothers. His body of work is part of a grand cycle of exchanged beats and melodic ideas. On his album *Ad Finite*, released on Tricky's Durban Poison label, Bones drops a surly dose of beat-laden noise that is equal parts jungle, opera, and "paranoid thugism" (to quote one of the track titles).

Bones's home studio includes two Yamaha 03Ds, a 300 MHz Macintosh G3 running *Logic Audio*, two E-mu 6400 samplers, and CD-ROMs galore. "All the *Peter Siedlaczek's Advanced Orchestra* CD-ROMs from Best Service, that's where we got most of the classical-sounding strings," says Bones. "We use the individual sounds, putting the violas, violins, basses, and cellos all in separately in fours, and we put them in at different volumes. Then we reverse a few bits and pieces to get an approximation of string and bow movements." Bones built many of the orchestral pieces on *Ad Finite* from scratch with friend and fellow engineer Marcus Brown "as if we had an orchestra in the house."

For the opening track, "The Genaside Will Not Be Televised," Bones reworked the theme of Gil-Scott Heron's famous spoken-word piece. He inserted a backing melody lifted from the *Cape Fear* soundtrack, building the instrumentation from scratch with *Advanced Orchestra*.

The free-verse monologue is an update of the original, recontextualized for working-class London. It is feverishly delivered by Bones's friend Maureen Tivit, an actress in the London area. "She did the song as if it were an acting job," says Bones. "She took it and learned the lyrics as if they were lines to a film. By the time we went to record, she'd

*Genaside II heralds the end of the millennium.*



Kris Bones

memorized it. Because of that, I could get her to act it out as if she were on stage talking to an auditorium of people, trying to get a message across."

The vocals for this track, along with those recorded with Genaside mates Scotty and MC Killerman Archer, were recorded in Bones's flat. "What Killerman Archer does sounds like raw, live stuff anyway, so we do it at home. Besides, he has a tendency to just muck about in the house making lyrics, and he'd probably forget them by the time we got into a proper studio, so we take what we can get right then and there."

But apart from recording vocals and the occasional live bass or drum track, Genaside creates the bulk of its material with samplers and keyboards. "Marcus and I normally sit down and work on a melody. Then we'll spit it out as notation and work on it some more. We'll write for an orchestra, asking ourselves, 'Which notes

would which instrument play?'" Once an arrangement has been finalized, the strings are individually recorded as audio tracks. "The songs with all the classical stuff, when we're running 30 to 40 strings on separate tracks, put the most strain on the computer. Sometimes you could actually hear *Logic* crying. We also had a few days of 'file movement.' The computer would move tracks back and forth in time, and it all started to get really mixed up."

And how did they manage to get around it? "We turned it off and went out for a couple of days. When we came back it was all right. We'd been working solid 12-hour days for six weeks in a row, and I think it just decided it needed a holiday."

For further information, contact *Never Records Group*: te' (212) 675-4268; e-mail [info@n.vprop.com](mailto:info@n.vprop.com); Web [www.neverrecords.com](http://www.neverrecords.com) or [www.trickyonline.com](http://www.trickyonline.com).





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## Auld Lang Syne

Over the past seven years, I've covered a lot of cool new technologies in "Tech Page" that could have interesting musical applications in the future. I thought it might be fun to use the last "Tech Page" of the second millennium to look back at some of these technologies and see, with the benefit of hindsight, how they have fared since I first wrote about them. (Of course, the new millennium doesn't officially start until January 1, 2001, but try telling that to the billions of people who will be celebrating a year early.)

I've always maintained that any computer technology is fair game for "Tech Page"; we use general-purpose computers for musical applications, and modern electronic-music devices are nothing more than computers dedicated to making or recording music. Processing speed, storage capacity, and transmission bandwidth have a direct impact on music technology, and all three are increasing more or less along the lines of Moore's Law, doubling every 18 months or so at a given price point.

Moore's Law was originally applied to the number of transistor elements within integrated circuits, but these elements can't continue to shrink forever; at some point, they will approach the size of molecules and atoms. When this happens, possibly within 20 years or so, we will enter the realm of nanocomputing (discussed in the June 1996 "Tech Page"), biomolecular computing (covered in the July 1995 column), and quantum computing (September 1997). Research into these possibilities is still in its infancy, and it's difficult to see any significant progress since I wrote about them.

In addition to these rather far-out ideas, I have also presented some processing technologies with more immediate potential in "Tech Page." For example, the PowerPC (covered in the March 1994 column) has become the heart of all current Macintoshes, and gigahertz microprocessors (May 1998) should become available by the end of next year. Digital signal processing (DSP) chips have also become increasingly powerful and pervasive, including the Motorola DSP56000 series (Janu-

### Reflections

### on the fate

### of new

### technologies.

ary 1993) and Analog Devices' SHARC (February 1997).

My very first "Tech Page" (November 1992) looked at two competing digital audio media: Sony's MiniDisc and Philips's Digital Compact Cassette. Although DCC was backward-compatible with standard analog cassettes, and some argued that it sounded better than MD, it quickly disappeared, whereas MD is now a viable consumer format.

The use of short-wavelength blue lasers (January 1994) and multiple layers within an optical disc (August 1994; see Fig. 1) led directly to the development of DVD

(July 1998), which promises to become one of the most successful distribution media ever, with a storage capacity of 4.7 to 17 GB. Originally intended for video material, DVDs can also be used to store multichannel digital audio at higher sampling rates and resolutions than standard CDs allow.

In terms of transmission bandwidth, it looked like Apple's FireWire (July 1996) and other implementations of IEEE 1394 (such as Sony's i.Link and Yamaha's mLAN) might sweep through the computer industry to become the new interconnection standard for all sorts of data-intensive devices. With a current bandwidth of 100 to 400 Mbps, it's much faster than RS232/422, SCSI, USB, and Ethernet. Furthermore, 800 Mbps systems will be here soon, and 1,600 Mbps FireWire is under development. Although it has been slow to appear in the marketplace for various marketing and economic reasons, FireWire still has tremendous promise, especially for digital video and audio applications. On the other hand, digital subscriber lines (March 1997) have become a very popular high-bandwidth connection to the Internet in just a couple of years.

It's been said that the defining technologies of the 20th century were already being developed in the 1890s, so it makes sense to look at the emerging technologies of today for an idea of what life may be like in the next century. For electronic musicians, we can count on increasing processor speed, storage capacity, and bandwidth to convey our music to a world hungry for the gifts it can bestow. Happy New Millennium! ☺

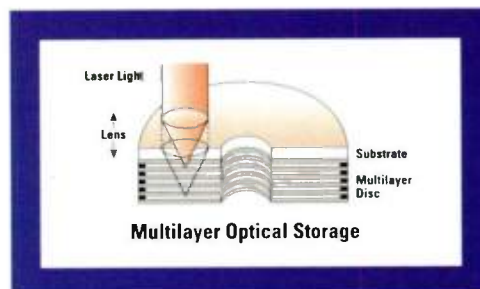


FIG. 1: In IBM's experimental multilayer optical disc, the laser is focused on different layers to access the data they hold. (Courtesy IBM Corporation, Research Division, Almaden Research Center)

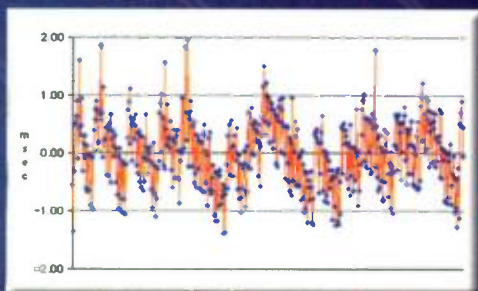


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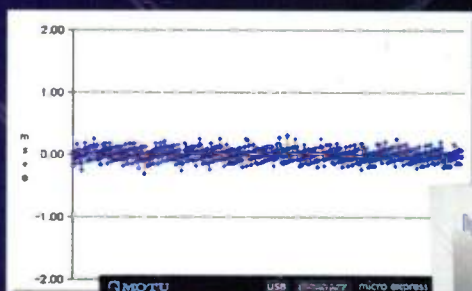
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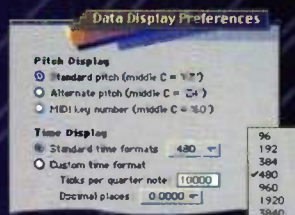
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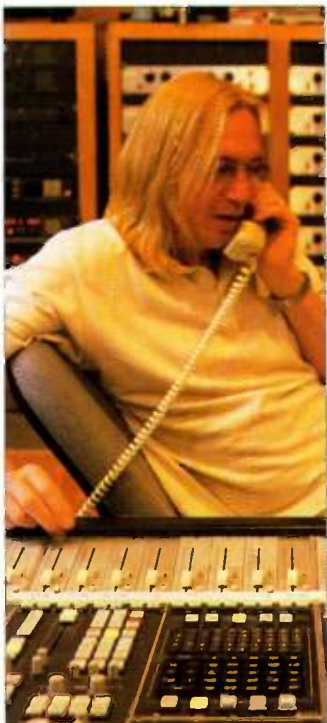
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A  
DAY  
IN  
THE  
LIFE

# MIX MAGIC

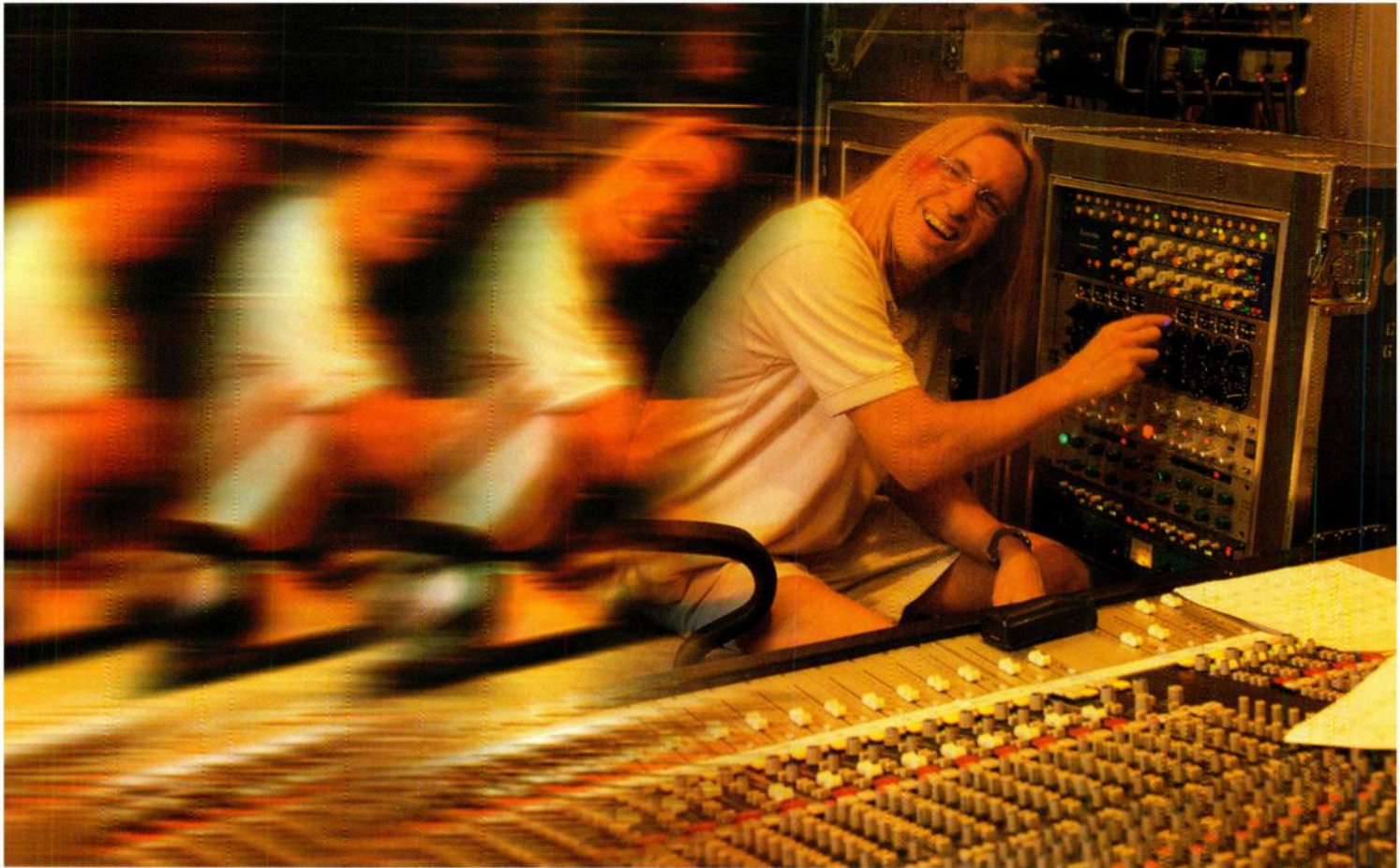
## on Music

### Row



One of the best ways to learn the finer points of an art is to observe a master of the art in action. I recently had the good fortune to do just that: while in Nashville for the NAMM show, I got to sit in on a mix session with award-winning recording engineer Chuck Ainlay. He was mixing a ballad for the latest Toby Keith record, *How Do You Like Me Now?!* (DreamWorks Records, 1999).

Talk about getting the goods! In a career spanning 20 years, Ainlay has worked with many of the world's top musicians and producers. He has engineered well over 100 albums, including several Grammy-award winners. He also won the Nashville Music Recording Engineer Award for two years in a row (1996–97) and *Music Row Magazine's* 1998 Engineer of the Year award (which is given to the engineer with the most top ten country records). Ainlay was a Grammy nominee himself in 1994 in the Best Engineered Recording Non-Classical (Rhythm, Country, and Blues) category, and this year he was nominated for a TEC Recording/Mixing Engineer award.



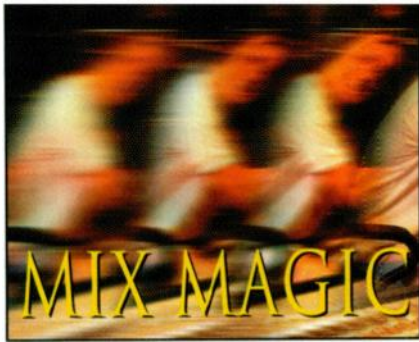
PHOTOS BY TOBY HORTON

**Renowned  
engineer  
Chuck Ainlay  
shares his  
thoughts and  
techniques  
on mixing  
country  
music.**

**By Brian  
Knave**

Ainlay has long been recognized for his proficiency in cutting-edge technology. He conducted the first all-digital recordings in Nashville, was Music City's first master of the SSL console, and is currently leading the pack in surround-sound mixing with five releases in 5.1 this year. Recently Ainlay has worked with George Strait, Vince Gill, Trisha Yearwood, Martina McBride, Olivia Newton-John, the Mavericks, and the Dixie Chicks. He also produced Mark Knopfler's solo album *Golden Heart*, as well as movie scores for *Wag the Dog* and *Metroland*.

So if you ever wanted to be a fly on the wall during a mix by an industry giant, here's your chance (virtually, at least). Although this article details the mix for one song only—"Bottom of My Heart," a ballad penned by Keith—a close analysis of how Ainlay shaped the song's raw tracks into their final form should prove instructive. It will be especially valuable to those readers who mix country and rock songs and are seeking to improve their understanding of what goes into a fully professional mix. True, most of us don't have access to the premium gear Ainlay uses on a daily basis, and even our best use of what we *do* have probably won't yield equivalent results. But just the same, careful readers can extrapolate from Ainlay's example and adapt some of his insights and techniques to their own mixes.



## NASHVILLE PACE

The mix of "Bottom of My Heart" took place at Loud Studio in the UA Tower on Music Square West. The producer, James Stroud, was out of town for several of the Toby Keith mix sessions, a somewhat unusual situation. But it presented no problem—after completing a mix, Ainlay simply burned Stroud a CD and FedExed it to him overnight for comments. If any changes were in order, Ainlay would recall the mix the following morning and make the necessary tweaks before moving on to the next tune.

Loud Studio's mix room is outfitted with an SSL 4000 E Series console and numerous racks of premium gear, much of which is vintage (see Fig. 1). Ainlay brought in his own KRK E8 monitors, which are active, mid-field units. "I like the E8s," he says, "because the mixes I do on them translate well to other speakers. They sound a lot like Yamaha NS-10s, but with more bottom." To my surprise, Ainlay used the E8s exclusively, never once firing up the studio's main monitors.

In addition to carting around his favorite monitors, Ainlay also brings along three large racks of his own gear. These hold an impressive array of processing tools, including select vintage goodies, premium recent-model EQs, and some units often found in home studios (for example, an Alesis D4, Akai S1000, and Ensoniq DP/2). (For a complete list of Ainlay's gear, see the sidebar "Tools of the Trade").

Unlike some acclaimed engineers who keep an air of secrecy about the tools and techniques they use to shape audio, Ainlay was remarkably forthcoming. "There's nothing I do that's all that special," he says. "Either I stole it from someone else or it's something everyone already knows about." In this generous spirit, Ainlay fielded my questions and revealed the signal paths for each instrument, as well as the parameters he dialed in on each piece of gear used in the mix. I also got invaluable help from Ainlay's assistant engineer, Mark Ralston, who also answered countless questions and provided photocopies of track and gear sheets.

## PICTURE THIS

Ainlay describes his approach to mixing as being "pictorial" based. "First I pull up all

the tracks and just listen to the song," he explains. "That puts an image in my head. From there, I just keep working on the mix until I reach the image. I also listen closely to the lyric and what that asks of me, while keeping in mind what the musical genre calls for."

*Organic* is the word that came to mind as I watched Ainlay mix. I was impressed by how little time he spent soloing and tweaking individual instruments. "Generally, I try to mix across the board," he says. "I will spend time working on individual things, but not all that much. It becomes obvious to me sooner or later that, say, the bass drum needs some top or bottom added, some middle pulled out, or whatever. But I try not to get too caught up on any one instrument for too long."

Even when Ainlay soloed instruments to EQ them, he heard what needed to be done first, while all the tracks were up. "I see the whole picture," he explains. "For example, with the acoustic guitar, I could tell right away that it was too boomy and not really cutting through. I went into solo just to hear what I was doing, but I knew in



FIG. 1: The equipment racks at Loud Studio are well appointed with premium vintage gear. Note the Fairchild Limiter (the giant, dual-channel box) and eight Pultec EQP-1A3 program equalizers.

my mind beforehand what I had to achieve. And, once the track was back in the mix, I still grabbed the EQ and played with it some more."

Interestingly, Ainlay had the television on, tuned to the sports channel, throughout the day (with the sound off, of course). "You need distractions," he states, "so you don't get too caught up in the mix." Ainlay also stressed the importance of not working too long on a mix. "I find if I work too long, I get too *inside* the mix and everything starts sounding more and more wadded together. I'll stop and call somebody, take a break—anything to get some distance and fresh per-

spective. Besides, if the tracks are recorded halfway decently, it shouldn't take all that long to mix a song. If it takes more than six hours, there are problems with the tracks—or there are 96 tracks!"

Despite the range of gear at his disposal, Ainlay generally favors a less-is-more approach. "When I first started mixing," he recounts, "I thought I had to patch in every piece of gear I owned and turn all the knobs to get a good mix. But later I realized that's not how it's done. If the song is recorded well, you shouldn't have to mess with it that much. For example, for the George Strait album I recorded, we mixed the songs in two or three hours each. The tracks went onto tape sounding great, so afterwards there wasn't all that much we had to do to them."

Ainlay shows similar restraint behind the behemoth consoles he works on. "Once I've found where all the levels sit, I'll go through and do mutes and any obvious level changes," he says. "But in general, I only use automation when it's necessary. Depending on the song, I may decide to ride the vocals, just to get more out of the track.

But I don't get fancy with the technology just because it's there."

## COUNTRY SPREAD

Ainlay describes the country songs coming out of Nashville these days as being mixed like rock songs from 15 years ago. "We're finally moving into the '80s!" he laughs. "Which is good, because everything you do on the SSL 4000 has that sound."

Ainlay's approach to panning instruments in a country mix derives from seat-of-the-pants experience—that is, based on folks sitting in their vehicles. "I think most people

listen to country music while driving around in a car or truck," he explains. "When I'm sitting in the driver's seat, the thing I want farthest away from me is the steel guitar. Traditionally, the steel has a lot of reverb on it—kind of a wash—so I like to hear it from farthest away, panned far right. I definitely don't want it beside me, on the left."

To balance that, Ainlay usually puts the electric guitar "pretty far left, because we don't want it right up next to us in the pickup truck, either." Placement of acoustic guitars depends on how many are in the song. If there are two acoustics doubling a part,

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Ainlay tends to spread them wide, left and right. But if there's only one, he will usually put it closer to center, panned slightly left of the lead vocal.

For drums, Ainlay generally generally goes for the perspective of looking at the performance. Assuming that the drummer is right-handed, the hats are to the right of the kick and snare (which are panned dead center), at about 1 or 2 o'clock. The piano tracks (stereo) are panned hard left and right. "This puts the piano player's right hand on the right," explains Ainlay, "near the hi-hat, where it seems to go nicely." (See Fig. 2 for complete instrument pans to "Bottom of My Heart.")

## ALL THINGS BEING EQUAL

Ainlay's approach to equalization is best described as musical rather than clinical. "I think of EQ more like tone controls," he says, "rather than like, 'Yeah, let's go in there and EQ this frequency and that frequency and surgically fix things.' If the track is well recorded, you shouldn't have to do that. Instead, I usually just brighten things, add a little presence, maybe pull out some low mids if something sounds 'swarmy' from close miking."

I observed that contemporary country mixes seem, on the whole, brighter and less bass-driven than mixes from decades past, and Ainlay agreed. "You're right," he says. "Country music has become very bright. I think that's partly because the vocal needs to be right up there. So you're trying to get a lot of musical activity yet not interfere with the voice. If you start making the track really big-sounding, with a lot of bottom, you run the risk of making the voice sound small."

## BOTTOM OF THE MIX

Now that we've heard Ainlay's general views on mixing, let's get down to the nitty-gritty. The track sheets for "Bottom of My Heart" indicated 36 recorded tracks, including a vocal scratch track, four final vocal takes, one vocal comp (composite), a tuned vocal comp ("Pretty much all vocals in Nashville are comped and tuned these days," says Ainlay), and a click track. Obviously, of the seven lead vocal tracks, only one (the tuned comp) was used for the final mix. Also, Ainlay opted not to use two of the drum tracks (from a stereo pair of room mics on the kit). With the click removed, the final number of tracks was 27 (see Fig. 2).

Typically, after listening to a song with all the tracks up (to get his image), Ainlay starts in on the drums. He then proceeds to bass guitar, piano, acoustic guitars, and

electric guitars, in roughly that order, and focuses on vocals last. But again, Ainlay is apt to mix "across the board," going wherever the muse dictates, so the following sections are not to be taken as an exact account of what he worked on first, second, and so on.

## YOU SEND ME

To understand the signal processing on "Bottom of My Heart," it helps to know how Ainlay routed signals from the console to the processors. The SSL 4000 E offers a wealth of routing options, but as with most mixers, the three most readily available signal-processing paths are aux sends, group outs, and channel inserts. We'll start with the auxes, which typically are used for the primary reverbs and delays.

The 4000 E has five dedicated aux sends:

## TOOLS OF THE TRADE

Professional mix engineers have access to premium gear, but most bring in their own gear as well. Shown are the three racks of equipment Chuck Ainlay carts to sessions; the units in each rack are listed beneath. For Toby Keith's "Bottom of My Heart," Ainlay employed about three-fourths of his gear.



### Rack 1 (left), top to bottom:

Furman PL-8 power conditioner  
TC Electronic 2290 delay  
Lexicon PCM 42 digital delay  
Lexicon PCM 70 digital effects processor  
Lexicon 300 digital effects processor  
Ensoniq DP/2 parallel effects processor  
Ensoniq DP/4 quad effects processor  
Roland SRV-330 dimensional space reverb (2)  
Yamaha SPX900 multi-effects processor  
Russian Dragon RD-T  
Opcode Studio 64X MIDI interface/patch bay  
Alesis D4 drum machine  
Akai S1000 sampler

### Rack 2 (middle), top to bottom:

GML transformerless mic preamp  
Millennia Twin Topology NSEQ-2  
GML Model 8900 dynamic gain control  
Tube-Tech CL 1A mono tube compressor  
Neve channel strips: 1081 (2); 1083 (2); 1073 (4)  
Urei 1176LN peak limiter (2)

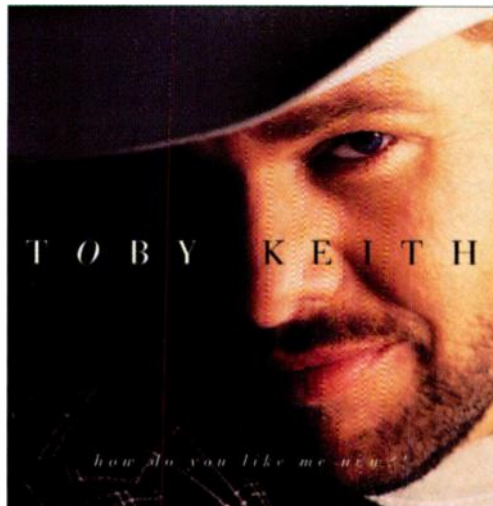
### Rack 3 (right), top to bottom:

Focusrite ISA 115HD equalizer  
Focusrite ISA 215 dual-mono mic preamp and equalizer  
Manley Massive Passive stereo EQ  
Avalon Design AD2055 pure Class A equalizer  
Crane Song LTD STC-8 discrete Class A stereo compressor/peak limiter  
Calrec RQD 6400 twin stereo compressor/limiter  
Joemeek SC3 compressor  
Joemeek SC2 ("Classic") compressor  
Joemeek SC4 compressor  
Drawmer 1960 tube compressor  
Drawmer DS 201 dual gate



one stereo and four mono. Ainlay used all five. He routed the stereo send to his Ensoniq DP/4, a quad processor that he runs essentially as two stereo units. "That way, I can put a delay followed by a chorus, a chorus followed by a reverb, or whatever," he explains. "In this case, I've got a phase delay followed by an eight-voice chorus—just a big smear, really—on one side and a chamber setting on the other. I absolutely love the Ensoniq DP/4 and DP/2. They've got all the basic building blocks and I can modify them really quickly. They're my main smearing boxes."

Send 1 was routed to the Lexicon PCM 70 multi-effects processor, which was set to a brass plate. Send 2 was routed to Loud Studio's Lexicon 224XL, a popular reverb that is controlled from a LARC (Lexicon Alphanumeric Remote Control). The 224 was set to a bright hall with 110 milliseconds of predelay. Send 3 went to Ainlay's Lexicon 300 multi-effects processor, which was set to a snare plate. And send 4 was routed to the studio's EMT 250 reverb, one of those huge old units that stand upright on



The song "Bottom of My Heart" appears on this latest release from Toby Keith.

the floor and look like steam radiators with four big, R2D2-style levers on top.

"The EMT has the weirdest sound," says Ainlay. "It kind of sounds like a live room—there's a hint of real space going on—yet it has the impact of a plate, that *gggzzzhhhhh*. But at the same time, it's sort of dark and rumble like a chamber. It sounds great on

electric guitars, snare drums, and hi-hats. Most reverbs, when you put them on hats, kind of go *ssssssss*, like hiss going on in the background. But the EMT doesn't do that. It has a real distinct sound that just lays nicely on lots of things and really works."

As much as Ainlay likes the sound of the EMT 250, however, he describes it as "pretty boring by itself, and definitely not very modern-sounding." (The EMT 250, which debuted in 1979, was the first digital reverb.) His solution is to layer a brighter reverb or delay on top of it—in this case, the Lexicon 224XL's bright hall—to "disguise" the sound of the EMT. "This song is sort of a big, bashy ballad, and I'm using the Lexicon hall primarily to bring things into the same space. The Lexicon gives it that *shhhh* sound while the EMT is the warmer sound that fills out the *shhhh*." Reverb time on the EMT 250 was set at 2 seconds and predelay at 40 milliseconds.

#### ALTERNATE BUS ROUTE

Ainlay configured additional sends—three stereo and three mono—through nine of the 32 buses available from the SSL's small faders. Buses 1 and 2 were patched to Loud Studio's AMS dmx 15-80S digital delay, a

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“plus/minus harmonizer,” as Ainlay calls it. “The AMS is awesome,” he says. “It’s an older technology, so the frequency response is somewhat limited, which I like. Also, just going through its converters causes quite a lot of delay—about 30 millisc-

onds, I believe. I’ve added 8 milliseconds more, so it’s more like 38 total.” For “Bottom of My Heart,” Ainlay pitch-shifted the left channel of the AMS down to 0.996 and the right channel up to 1.004.

Buses 3 and 4 were patched to Ainlay’s Ensoniq DP/2, which was set to a delay on one side and a flanger on the other. Bus 5 was sent to Ainlay’s Lexicon PCM 42, one of the early Lexicon digital delays. “I really like the 42 on vocals because it has a somewhat limited bandwidth. Also, it has a nice limiter that not only stops you from overloading it, but also gives it sort of that

tape saturation sound of a tape delay.” The PCM 42 was set with 330 milliseconds of delay, a figure that Ainlay arrived at using his bpm chart. “I always try to get my delays to work with the tempo of the song,” he explains. “On this song, the tempo is 91 bpm, and 330 is the eighth note on 91.”

Buses 7 and 8 were patched to Loud’s TC Electronic M2000, which was set to a gated room. Buses 31 and 32 were patched to the left and right channels of Ainlay’s Joemeek SC3 stereo compressor, which he typically uses on drum submixes. Ainlay used channel inserts to feed 13 other outboard units, which I’ll cover individually for the instruments on which they were used.

### FIRST THINGS FIRST

The first thing Ainlay zoomed in on after listening to the tracks was the main acoustic guitar, which sounded a bit boomy. “You can hear some off-axis coloration going on as well,” remarks Ainlay. “But the main problem is that it’s just too muddy sounding.”

Ainlay routed the two acoustic guitars—the main guitar and the high-strung, each mono—through the left and right channels of his Millennia NSEQ. Both channels of the unit, which offers independent solid-state and tube paths, were set to the solid-state mode, the more transparent of the two.

While soloing the two guitars, Ainlay discovered a part where the high-strung was momentarily out of tune—due, evidently, to fumbled fretting. Fortunately, the out-of-tune part was fleeting, and not too egregious. “If it were any worse,” says Ainlay, “I’d put it on another track and tune it. But in this case, you probably won’t be able to hear it in the final mix.” (This proved to be true.)

Ainlay dialed in both low and high shelving filters on the main acoustic: a 3 dB shelving cut at 50 Hz and a 6 dB shelving boost at 16 kHz. Using the NSEQ’s high-mid control, he also boosted 4 dB around 4.5 kHz using approximately a half-octave Q (bandwidth). On the high-strung guitar, Ainlay employed another 6 dB shelving boost at 16 kHz and positioned the low-frequency shelf (also with a 3 dB cut) at 34 Hz. Ainlay dialed in roughly the same high mids on the high-strung, but with a broader Q, close to an octave wide. (Note: These were the final EQ settings. Ainlay decided on them after returning to the acoustic guitars a number of times during the session, each time refining his tweaks according to the rest of the mix.)

Ainlay also compressed and limited the two acoustic-guitar tracks using his Calrec

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RQD 6400 twin stereo compressor/limiter. The main acoustic was compressed at a ratio slightly higher than 2:1 with a 0 dBu threshold and 4 or 5 dB of makeup gain. Attack and release times were both in auto mode. Threshold on the limiter was set at +11 dBm with a 0.2-second release. On the high-strung, the compression ratio was closer to 3:1, threshold was set at -5 dBu, attack and release were on auto, and makeup gain was again around 5 dB. The limiter threshold was set at +8 dBm with a 75 millisecond release.

To create a stereo spread for the main acoustic, which was panned left of center, Ainlay sent the signal to the Ensoniq DP/2 (delay/flanger) and panned the returns to the right of center. "I put a really wide flanger on the DP/2," says Ainlay, "so there's a lot of regeneration." The main acoustic was also sent to the Lexicon PCM 70 (brass plate), Lexicon 300 (snare plate), and EMT 250 (reverb). Ainlay sent the high-strung to the AMS delay and fed some of the signal to the Lexicon 300 (snare plate) as well.

### FLIP, GROUP, AND SQUASH

Turning his attention to the drums, Ainlay first checked the phase relationships of the various tracks, particularly of the overheads in relation to the kick and snare. "The distance of the overhead mics from the drums can cause close to a 180-degree phase shift," he explains, "so I always check to see whether flipping the phase helps or hurts. In my experience, it usually sounds better with the overheads flipped. Basically,

I want the sound to be as full as possible. My assumption is that if you get all the leakages to sound their biggest and fattest, then you're probably more in phase than if they sound thin. So if the snare drum sounds kind of hollow and the low end of the bass drum goes away when I'm *not* flipping the phase, then I'll flip it and go with the fuller sound."

Ainlay also checks to make sure that reversing the phase on the overheads doesn't degrade the sound of the toms. "Often, when I flip phase on the overheads, some of the sustain of the toms goes away, which means there's some cancellation going on. But the kick and snare are hitting a lot more in the song, so they're more important. Besides, you might even be wanting the toms to thin out a bit, especially if they're roaring."

All nine channels of drums were sub-mixed to the Joemeek SC3 compressor and brought up on a stereo return. The controls on Joemeek compressors are pretty arbitrary—they don't really correspond to controls on other units—but just in case you have one, here are the settings Ainlay dialed in: input gain at 6, slope at 4, compression (threshold) at 3, attack at 9 (slow), release at around 250 milliseconds, and no makeup gain.

Ainlay also compressed the kick and snare drums individually through his Urei 1176LN peak limiters. "I was one of the first guys to always drag out the Akai sampler," says Ainlay. "I wouldn't necessarily replace things, but I would always put a sample in with the original instrument. But samples just get to be really boring. I'm way over it. I prefer the performance aspect of a real drum over a sample. The drummer is going to hit the drums dif-



Chuck Ainlay rides a vocal at the helm of Loud Studio's SSL 4000 E Series console. Note the television and telephone—both favorable distractions that help Ainlay avoid getting "too caught up in the mix."

ferently throughout the song, perhaps even intentionally, and there's just no way a sample is going to have that intimacy. These compressors allow me to use the real thing and still get bass and snare drums as hot in a mix as you could using a sample."

Ainlay used similar settings on both units. "Usually, I set as fast a release and as slow an attack as possible—the 1176s aren't very fast to begin with. I squash the kick and snare until I get a nice snap out of them. The snare should have that sort of *kooosh* sound, like a basketball being dribbled in a gymnasium, but not too much body. On the kick drum, the compressor should give you a whole lot of slap from the head." The secret of the 1176, says Ainlay, is in how you set the four ratio buttons, which are labeled 4, 8, 12, and 20. "By pushing in more than one button at a time, you get this cool over-compression thing. If I want a really smashed sound, I push in the 4 and the 8 on the bass drum and the 4, 8, and 12 on the snare."

Returning the compressed kick and snare signals on separate channels allowed Ainlay to gate them without affecting the original signal. "Gating the compressed signal helps eliminate some of the leakage from the hi-hat and other drums," he explains, "and it helps deal with some of the increased leakage you get from the extra compression. At the same time, I retain some of the quick transient response from the original signal, because it isn't gated."

Generally, Ainlay puts his equalizers after the compressors so that EQ changes won't affect the compression. He EQ'd the kick and snare with his two Neve 1081 channel strips, the overheads with his two Neve

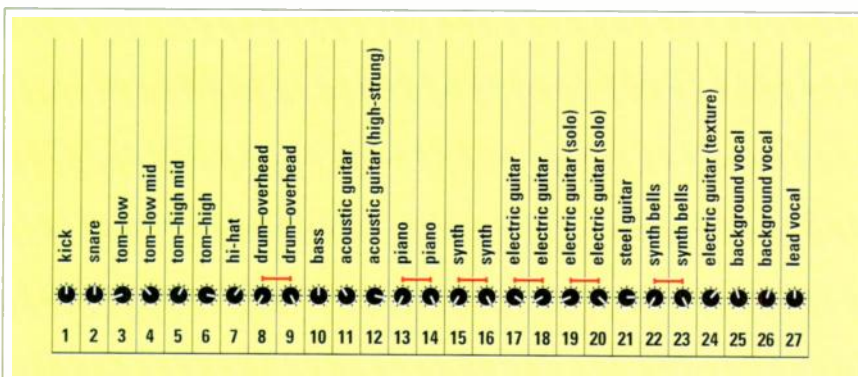
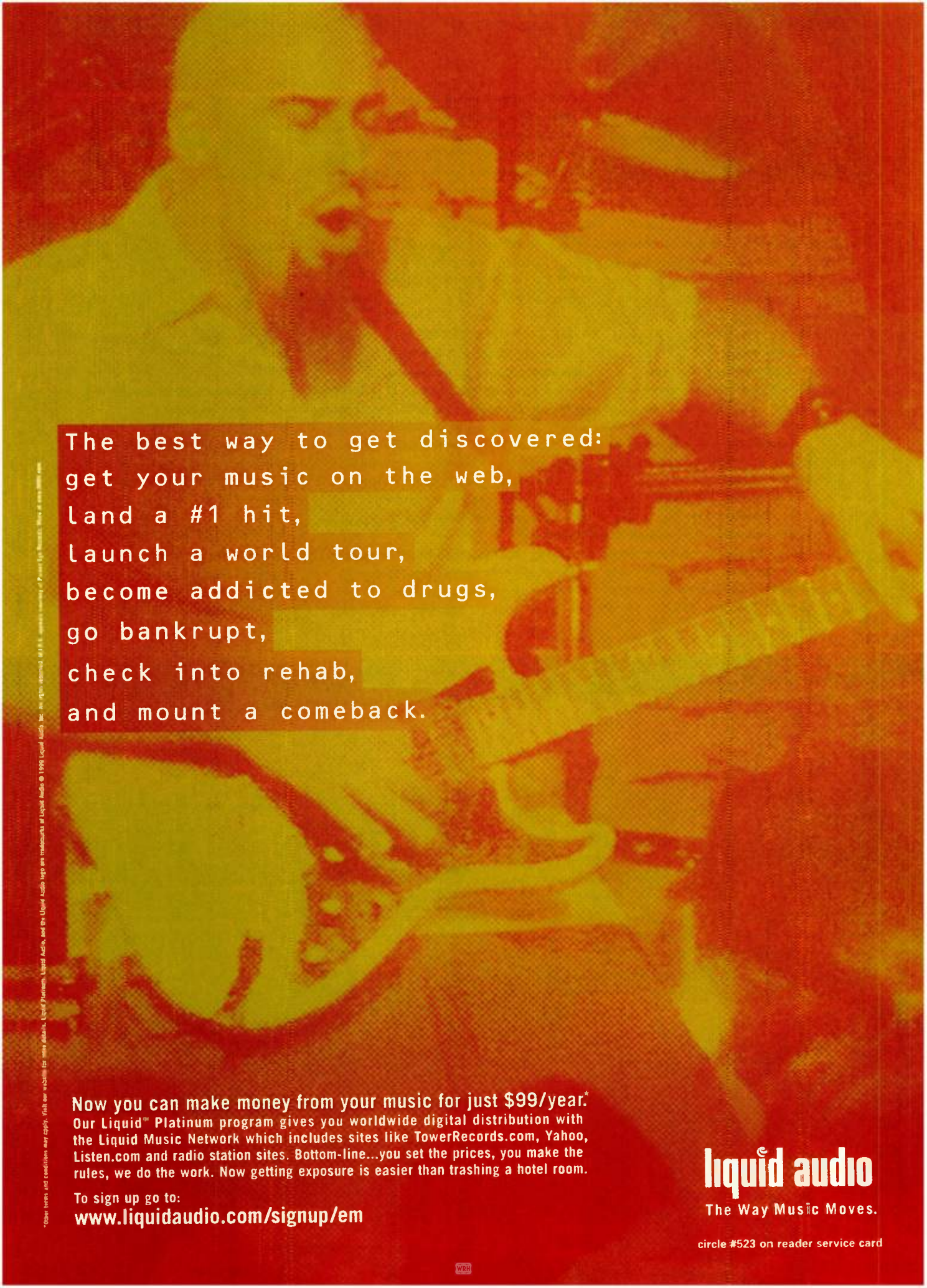


FIG. 2: The 27 tracks used in the song "Bottom of My Heart" and how each was panned.



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1083s, and the hi-hat with his Focusrite ISA 115HD. "On kick drum, I usually boost a little at 60 Hz, cut a little at 450 Hz, boost somewhere around 4.5 kHz, and boost a bit at 10 kHz for some air. Snare drum gets a big boost of 10 kHz shelving, a whole lot of 5.6 kHz, and a little 100 Hz. I usually don't cut much out of a snare drum."

On the overheads, Ainlay boosted a few dB at 10 kHz on both channels. He cut a bit at 56 and 390 Hz on one side, and at 100 and 400 Hz on the other. On the hi-hat, he engaged a low-cut filter at 105 Hz and boosted a little at 12 kHz.

Ainlay used console EQ on the toms. He boosted at 4.5 and 5 kHz on the high and high-mid toms, respectively, added a touch of 10 kHz to each, and cut a few dB at 700 Hz on each. The low-mid tom got boosts at 4.5 and 9 kHz and a cut at 700 Hz, and the low tom received a boost

at 4.3 kHz and a cut at 500 Hz.

For effects, Ainlay sent plenty of signal from the snare and toms to three units: the PCM 70 (brass plate), Lexicon 300 (snare plate), and EMT 250. A touch of bass-drum signal was sent to both the Lexicon 300 and the EMT, and a moderate amount of signal from the overheads was sent to the PCM 70, Lexicon 224XL (bright hall), and EMT.

### ONE-TRACK WONDER

"Bottom of My Heart" had a DI bass track only. Ainlay treated the track with compression and EQ only—no effects. For compression duties, he selected his Joemeek SC2 "Classic." Again, the settings won't mean much unless you own the same compressor, but here they are just in case: input gain at 7, slope at 1, compression (threshold) at 6, attack at 5 (medium fast), and release at 3 (faster).

To EQ the bass, Ainlay patched in the right channel of his Manley Massive Passive stereo equalizer. He chose a bell filter centered at 2.2 kHz (with a broad Q)

and a shelving filter at 8.2 kHz (with a slightly narrower Q). He boosted the bell filter about 2 dB, and the shelving filter 7 or 8 dB.

### KEYS TO THE HIGHWAY

Ainlay used similar boxes to process the stereo piano tracks: a Joemeek compressor followed by an outboard EQ. The stereo compressor was his Joemeek SC4 with input



Ainlay and assistant engineer Mark Ralston pause for a photo during the mix of "Bottom of My Heart."

POWER  
PUSH ON/OFF

BOSS

VF-1 24-BIT MULTIPLE EFFECT  
PROCESSOR

MIDI

EFFECTS: *in*

CATEGORY: *OFF*

B32

DELAY: *RSS*

DELAY: *RSS*

COSM

GUITAR (Hi-Z)



gain at 6, slope at 1, compression (threshold) at 3, a moderate attack time, and a medium-fast release.

Ainlay EQ'd the piano with his Avalon Design AD2055 pure Class A equalizer, first cutting a few dBs at 25 Hz on both sides. On the left channel (the pianist's left hand) he boosted around 1.8 kHz (with a broad Q), and added a few dB of 10 kHz as well. On the right channel, he boosted at 1 kHz (also with a broad Q), and again added a touch of 10 kHz.

For piano effects, he sent moderate amounts of the tracks to the Lexicon 224XL (bright hall) and the EMT 250. He also bussed a bit of the signal to the AMS dmx harmonizer.

### SYNTHS YOU FELL FOR ME

Not surprisingly, the stereo pad and stereo synth bells received minimal processing. Ainlay EQ'd the synth pad at the console, boosting 5 and 8 kHz by about 2 dB and cutting 2.5 kHz by 2 dB. For effects, he sent the signals to both the Lexicon 224XL (bright hall) and the EMT 250.

The synth bells received neither EQ nor compression. They were sent to four processors: the Ensoniq DP/4 (phase delay

chorus/chamber), Lexicon PCM 70 (brass plate), Lexicon 300 (snare plate), and EMT 250.

### STEEL YOURSELF

The mono steel guitar track also received minimal treatment—just a bit of EQ, some effects, and no dynamics processing. Using console EQ, Ainlay boosted 3.5 kHz by a few dBs. He sent a bit of the signal to the Lexicon 224XL (bright hall), a bit more to the DP/4 and EMT 250, and the biggest portion to the Lexicon 300 (snare plate), the return of which was panned left to complement the right-panned main signal.

### GUIT' IN THE TRUCK!

The five electric guitar tracks all received similar treatment in the mix. Ainlay didn't use dynamics processing on any of them, and he handled all EQ at the console.

The mono texture track received slight boosts at 6 and 8 kHz. The biggest part of the signal was sent to the Ensoniq DP/2 (delay/flanger) and DP/4 (phase delay-chorus/chamber)—“for that big swirl,” says Ainlay—but a fair amount was also sent to the EMT 250 and PCM 70 (brass plate).

The stereo solo tracks were sent to those same processors, as well as to the Lexicon 300 (snare plate), with most of the effect coming from the 300 and the EMT. Ainlay bolstered the tracks with a 3 dB boost at 8 kHz, a 6 dB boost at 2 kHz, and a 1 dB boost at 2.4 kHz.

The stereo rhythm tracks were sent to the DP/4, PCM 70, Lexicon 300, and EMT 250, with most of the signal going to the DP/4 and Lexicon 300. They received no EQ.

### BACK ON UP

Ainlay imposed 70 Hz low-cut filters on the background vocal tracks at the console. He then patched them through his Focusrite ISA 215 dual-mono mic preamp/equalizer (for the EQ only), and from there into his Crane Song LTD STC-8 discrete Class A stereo compressor/peak limiter. On the Focusrite 215, he boosted at 10 kHz and around 4.5 kHz on both tracks. He also cut a bit of 300 Hz from one of the tracks.

The Crane Song STC-8 is a unique compressor/limiter with several parameters that don't translate to other dynamics processors. Ainlay used the unit in KI mode, which adds second-order harmonic distortion to warm up the sound. The STC-8 offers



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presets, but Ainlay chose the variable mode. This allowed him to dial in his own attack and release times (medium attack, medium-slow release), as well as gentle curve and slope on one channel and aggressive curve and slope on the other.

For effects, Ainlay sent the background vocals to the Lexicon 300 (snare plate) and EMT 250. He also bussed a bit of the signals to the AMS dmx delay/harmonizer and the Lexicon PCM 42 delay.

### MAIN ATTRACTION

For Keith's lead vocal track, which he worked on last, Ainlay reserved a channel of the Manley Massive Passive EQ and his GML (George Massenburg Labs) 8900 Dynamic Gain Control (Series III) compressor. For EQ, he employed a medium-wide bell filter on the low end, cutting 3 dB at

68 Hz, and a low-cut shelving filter set at 22 Hz. Ainlay set a second shelving filter at 4.7 kHz, which he boosted 2 dB, and a third shelving filter at 12 kHz, which he boosted 4 dB.

The GML 8900 is another unique box with certain parameters (for example, Crest Factor) that don't translate to other units. In simple terms, Ainlay operated the unit in soft-knee mode with a medium ratio and medium "timing" (simultaneous attack and release times).

Ainlay used the same effects on the lead vocal that he used on the background vocals: a mix of Lexicon 300 and PCM 42, some EMT 250, and a touch of AMS dmx delay. His concluding move for the mix was riding the lead vocal track manually—"to get more out of the track"—while the SSL 4000 E "memorized" his moves.

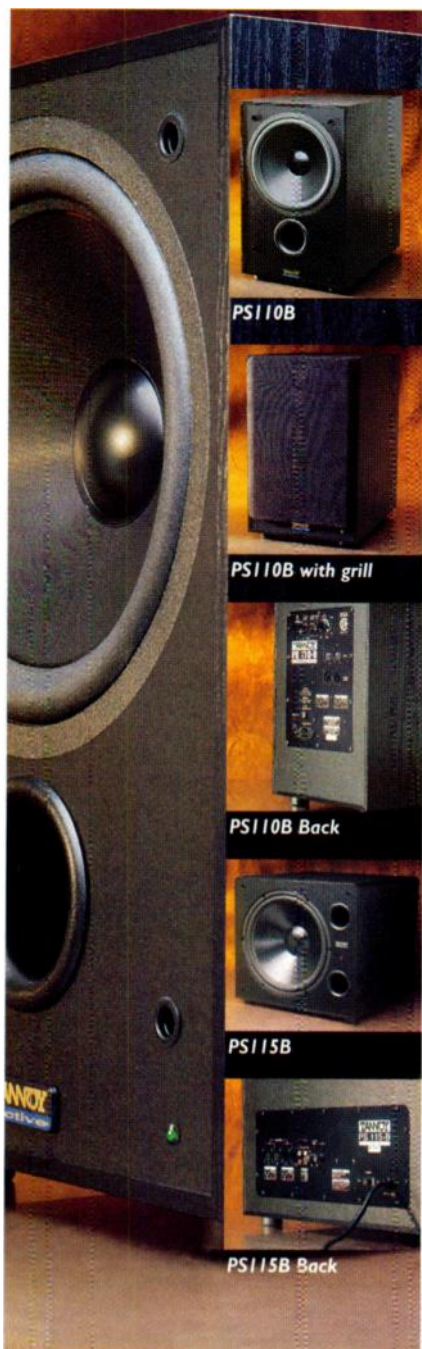
### GET A CLUE

Hopefully, this session account has provided a helpful glimpse into Ainlay's thoughts on mixing and deepened your understanding of the various elements that go into a professional mix. However, I do want to issue this warning: Do not take the various EQ and processor settings given here as recommendations on how you should process your own tracks. Those settings are pertinent to "Bottom of My Heart" only, and are based on Ainlay's extensive mixing experience and familiarity with his gear. Certainly, you can't expect to go plugging them into your own productions and have them work!

On the other hand, you may well benefit from *thinking critically about* the gear and settings Ainlay chose and why he chose them. Moreover, some of the settings (for example, EQ on the bass drum) may prove a good jumping-off point in your own mix efforts. Just make sure that your ears and musical sensibility have the final say.

To get the most from this piece, you might also want to pick up a copy of *How Do You Like Me Now?!*, and give "Bottom of My Heart" a careful listen. Just learning to identify the different elements of the mix—where the instruments and effects are coming from in the stereo field, which elements are more or less compressed, which brighter or darker, which louder or softer, and so on—will do much to sharpen your sense of how to mix a song.

**Brian Knave** is an associate editor at **EM**. A warm thanks to Robbie Clyne, Chuck Ainlay, Mark Ralston, James Stroud, Loud Studio, George Petersen, Fletcher, and everyone else who helped make this piece possible.



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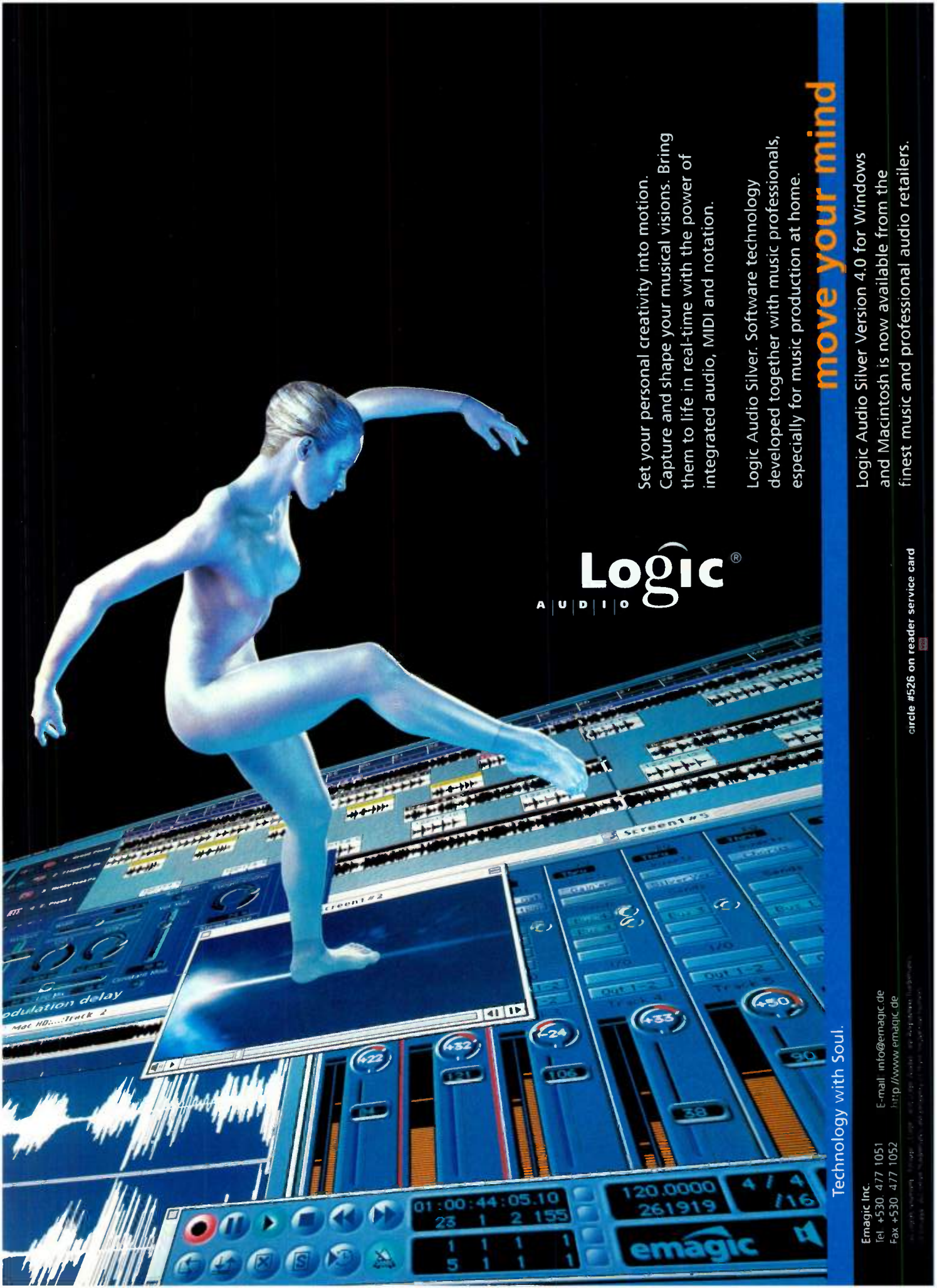
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# All Gadgets Great & Small

Our annual gift story is more than just an

*EM's suggestions for holiday  
gift giving, from the  
extravagant to the sublime.*

*i call it Mini Me*

**T**hese miniature guitar amps are small in stature but big on personality. I set them up on my desk, but they attracted such a large audience that I had to hide them away in order to get any work done.

**1** The highest fun-factor rating goes to **Smokey Amps**. The company's mini amp (\$29.95) comes in two varieties: a translucent polycarbonate box and (get this) a recycled cigarette box that has been reinforced from the inside for durability. The polycarbonate style is available in purple, orange, green, blue, or clear, and the cigarette box amp comes in a variety of brands. These little amps are more than mere playthings: Smokey amps were used on recent CDs by Korn, the Offspring, the Verve Pipe, and Sepultura.

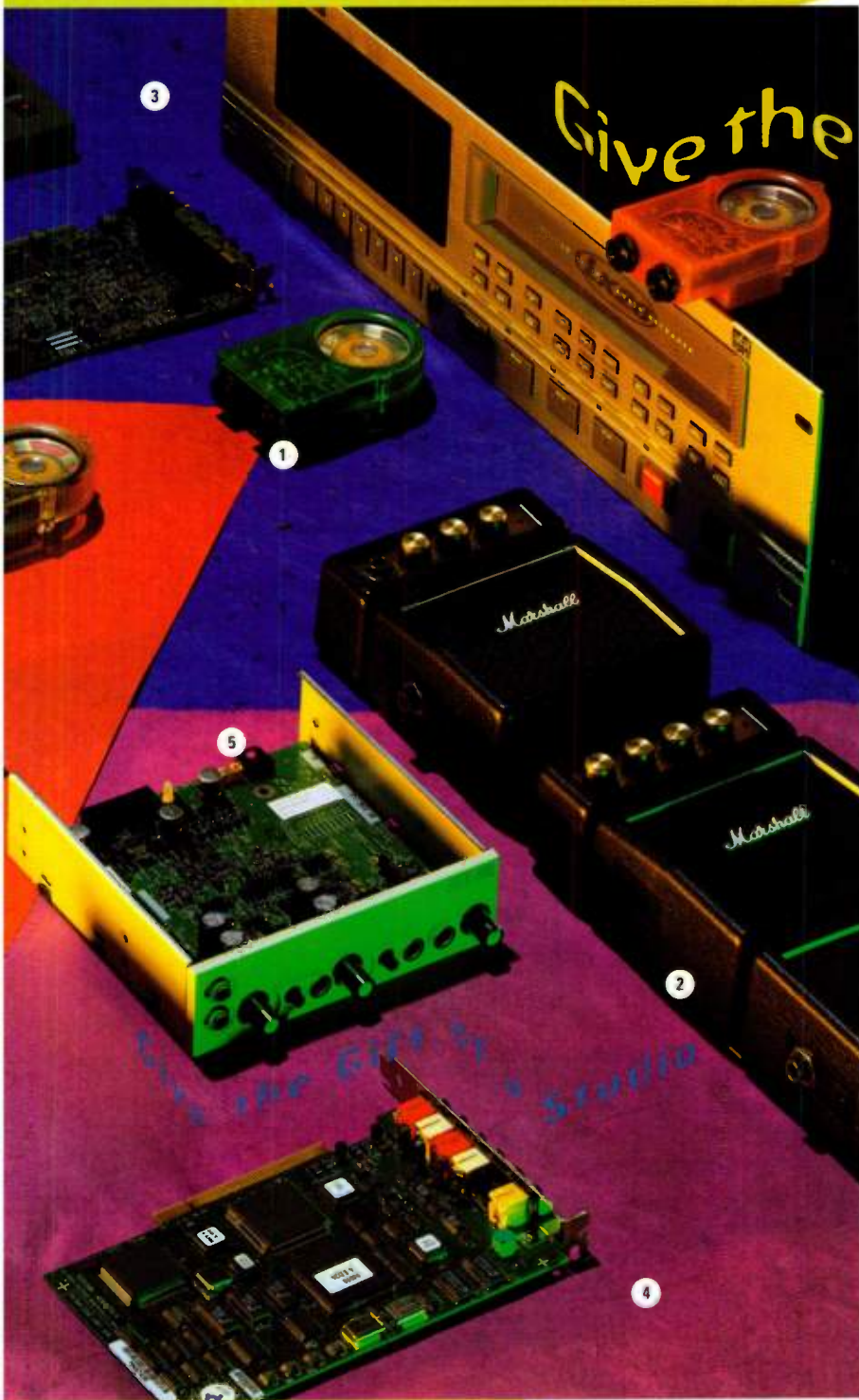
**2** The Marshall **MS-4** micro stack and the **MS-2** micro guitar amp (Korg USA; \$70 and \$49, respectively) are great for playing out your rock-and-roll fantasies. Both of these dynamos are scaled down but fully functional Marshall amps, with gain, volume, and tone controls. Both run on a 9-volt battery or an external 9-volt DC power supply.



*By Mary Cosola with the EM Staff*

opportunity to dress up some gadgets and parade them around in all their holiday finery: it's a chance to highlight some items that our staff is particularly fond of. On the following pages, you'll see some great items from the usual suspects—Alesis, Digidesign, and Sonic Foundry, for example—but you'll also be introduced to some highly unusual gear and instruments. An amp made out of a cigarette box? A theremin that looks like a psychedelic crystal ball? We got 'em here, plus a lot more. If you want to pick up something for a musician friend or loved one, or you're looking to add a few items to your personal wish list, read on for a slew of intriguing possibilities.

# Give the Gift of a Studio



The next three items fall into the "I've been extremely good this year" category.

**3** First up is the Alesis **ADAT StudioPack** (\$2,999), which comes with almost everything you need to get your studio up and running: an ADAT LX20, a Studio 24 console, NanoVerb digital effects processor, NanoCompressor stereo compressor/limiter, instructional video on setting up and using the equipment, and all the cables and snakes you need to hook it all together. Add instruments and monitors, mix well, and you're cookin'.

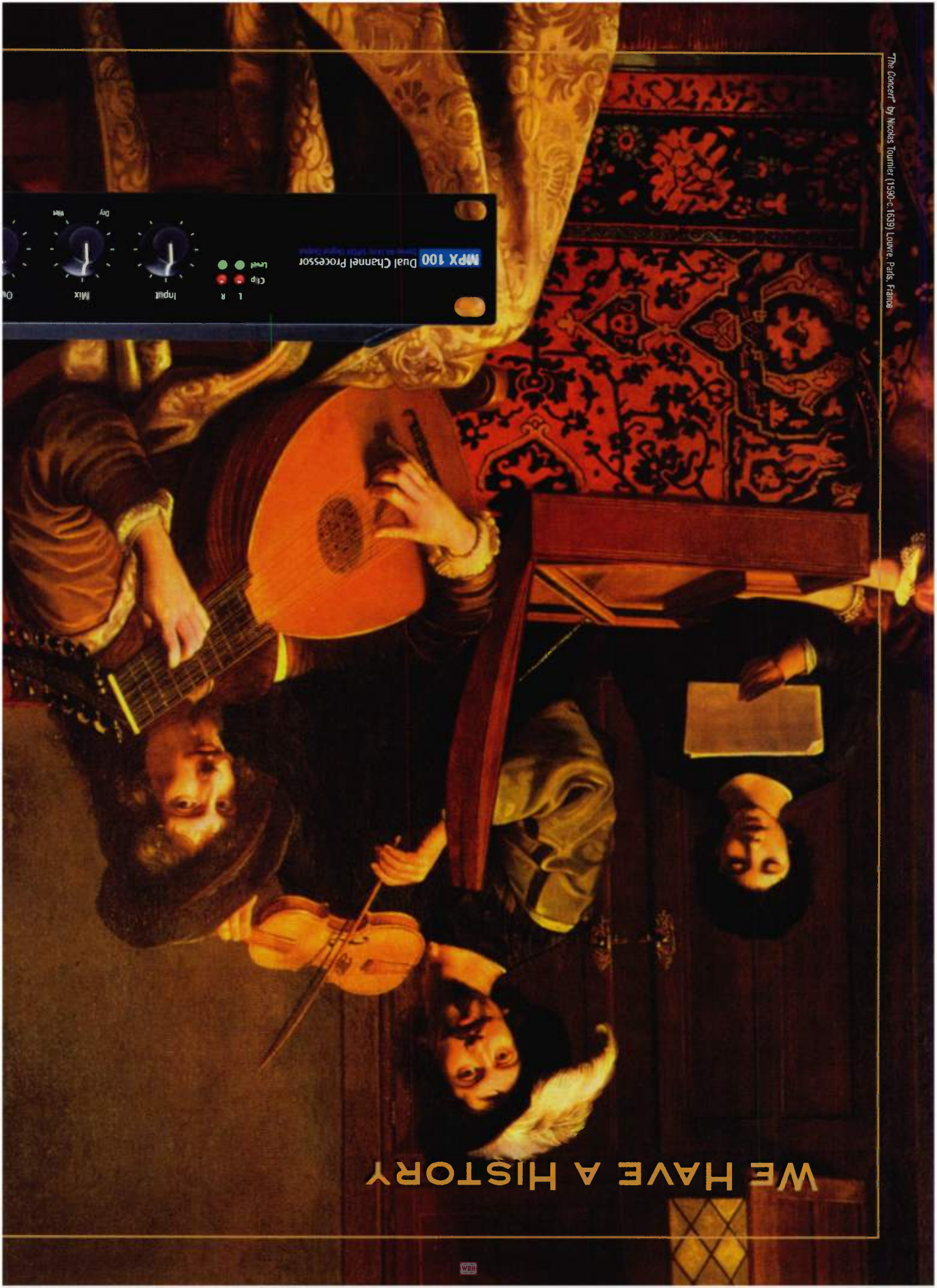
**4** For the desktop audio-inclined, there's Digidesign's cross-platform **ToolBox XP** (Mac/Win; \$545). For the Mac, ToolBox XP includes the Audio Media III PCI card and *Pro Tools LE* software, which incorporates MIDI sequencing and Real-Time AudioSuite effects processing, among many other features. For Windows, ToolBox XP currently ships with Sonic Foundry's *Sound Forge XP* and *Acid Rock* instead of *Pro Tools LE*. Digidesign says *Pro Tools LE* will be Windows 98-compatible in early 2000. (Registered Windows 98 customers will get a free upgrade.)

**5** E-mu's **Audio Production Studio (APS)** offers Windows users a complete desktop music environment at an affordable price (\$699), including audio and MIDI sequencing software, real-time DSP effects, 64-voice software sampler/synthesizer (not CPU dependent), digital mixer, CPU-mounted I/O module, and a full-duplex digital audio recording system with support for eight sample rates between 8 and 48 kHz. And it's easy to install and use. Stay home for the holidays, glued to your computer screen!

All Photography by David Gaz with Daniel Furon

WE HAVE A HISTORY

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Dual Channel Processor  
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reverb available at all times.

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5899 List



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5.7 second Delay and Echo. Dual-channel processing gives you completely independent effects on the left and right channels.

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be controlled by audio input, the front panel Tap button, dual footswitch, external MIDI controller or MIDI Program Change.

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# Play Around

**1** If you thought musical spoons were no more intriguing than...well...silverware, guess again. **Catpaws** (S20) from Catania Folk Instruments (distributed by Elderly Instruments) are fun to play and nice to look at. They are hand carved from Pennsylvania cherry wood, and the package has illustrated instructions on playing the spoons.

**2** Another hand-carved beauty is the **E.mbir**, from Lucinda Ellison Musical Instruments. There are four base models, which start at \$250. Because Ellison handcrafts each of these electric mbiras in her Tennessee studio, they can be ordered with various design options and wood choices. The prices, of course, vary accordingly.

**3** If beautiful hardwood is too "last week" for your modern sensibilities, perhaps the Suzuki **QChord** (S199) is more your speed. This sleek, built-for-the-millennium synth is a big winner when it comes to immediate gratification. Children and seasoned vets alike can just turn on this space-age MIDI Autoharp and rock out.





4 4

Any theremin lover can get behind the groovy, hand-painted, crystal ball theremin from **Theremaniacs** (\$139.95). It works just like a traditional theremin: a knob controls how close your hand has to be before it starts to make sound, and the antenna is an

adhesive metallic disc under the top of the dome. Also available from Theremaniacs is a more traditional black-box-style theremin that mounts on a microphone stand (\$139.95). Or you can purchase the circuit board only (\$79.95) if you want to fashion your own theremin.



5 5 For you control(ler) freaks, there's the **I-Cube System** (\$615) from Infusion Systems.

The unit has six sensors: two respond to illumination, and the remaining four respond to contact pressure, temperature, close proximity, and rotation angle. In short, the I-Cube lets you use just about anything you can think of as a MIDI controller.

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1 1

If you're shopping for good studio mics, the GT Electronics AM mic series is worth checking out. The affordable AM11 (\$399) is a large-diaphragm condenser mic with a fixed-cardioid pattern and Class-A FET preamp.

# Microphone Merriness



2 2

The drummer on your list would love the Audio-Technica drum microphone KitPak (\$259). This is a complete drum-miking kit: four cardioid dynamic drum mics, heavy duty carrying case, and drum-miking instructions.





Microphone  
Merriness

**3 3** The Blueberry (\$1,295) from BLUE is a top-notch large-diaphragm condenser mic that works especially well for vocals and percussion. Don't let the cute name fool you; this is one handsome and solidly built mic.

# Gear Fab

1 1

The **Cyclodon** (\$265) from Technosaurus is a fascinating and compact 16-step analog sequencer. Roughly the size of a VHS tape, this little cutie has 16 potentiometers for tweaking to your heart's content.

2

2 2

Fold, spindle, and mutilate your music well into the new year with the **Moogerfooger MF-102** ring modulator (\$299) from Big Briar. Add the EP-1 expression pedal (\$40), and you're in for some hands-free fun.

3 3

Also from Technosaurus is the **Micron** (\$265), a mono analog synth with one resonant filter and one CV/gate input. It's about the same size as the Cyclodon, which makes it "the smallest analog synth available," according to the company.

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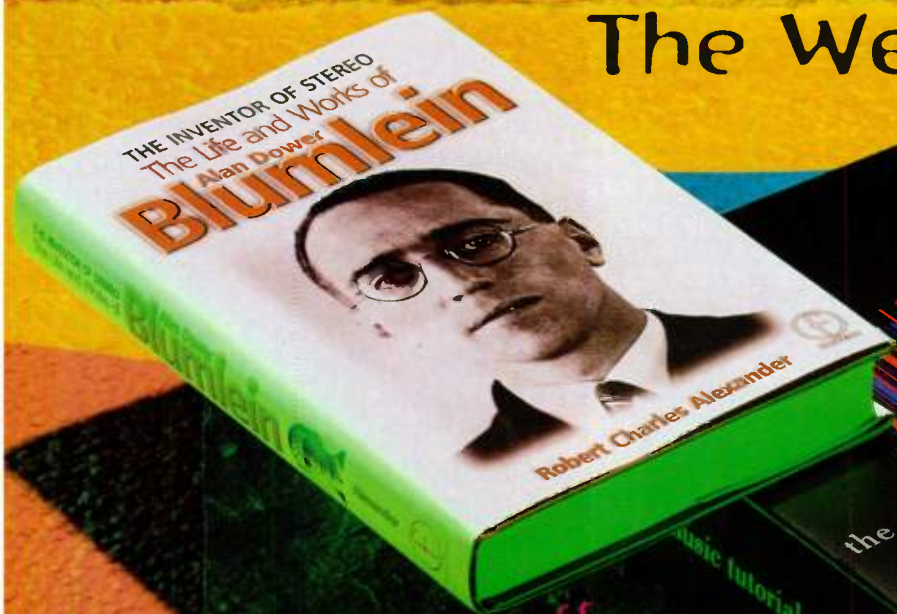
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**The Inventor of Stereo: The Life and Works of Alan Dower Blumlein**, by Robert Charles Alexander (Focal Press, \$56.95) is a fascinating read. Don't mistake this as some dry textbook about arcane microphone facts. Rather, it reads at times like a spy novel about top-secret radar development during WWII, with Blumlein (who patented binaural recording in 1931 at age 28) as one of the main characters. Engaging and enlightening, and not the least bit nerdy.

## The Well-Read Gift



The Well-Read Gift



**Magic Music from the Telharmonium**, by Reynold Weidenaar (Scarecrow Press, \$62.50), is the first comprehensive look at one of the world's earliest electronic music instruments. Thaddeus Cahill's Telharmonium was a 200-ton mass of gears and wires that allowed residents on the East Coast in 1906 to hear music over telephone wires.



**The Computer Music Tutorial**, by Curtis Rhodes (MIT Press, \$58), is the definitive text on any and all subjects related to electronic and computer music. It's all here: the evolution of musical instruments, all aspects of MIDI hardware and software, and everything you ever wanted to know about digital audio and modern synthesis methods. Despite its forboding appearance (1,200 pages on computer music!), it's very readable with numerous informational graphics. A must for the desktop musician in your life.

The Well-Read Gift



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# Gizmos Galore

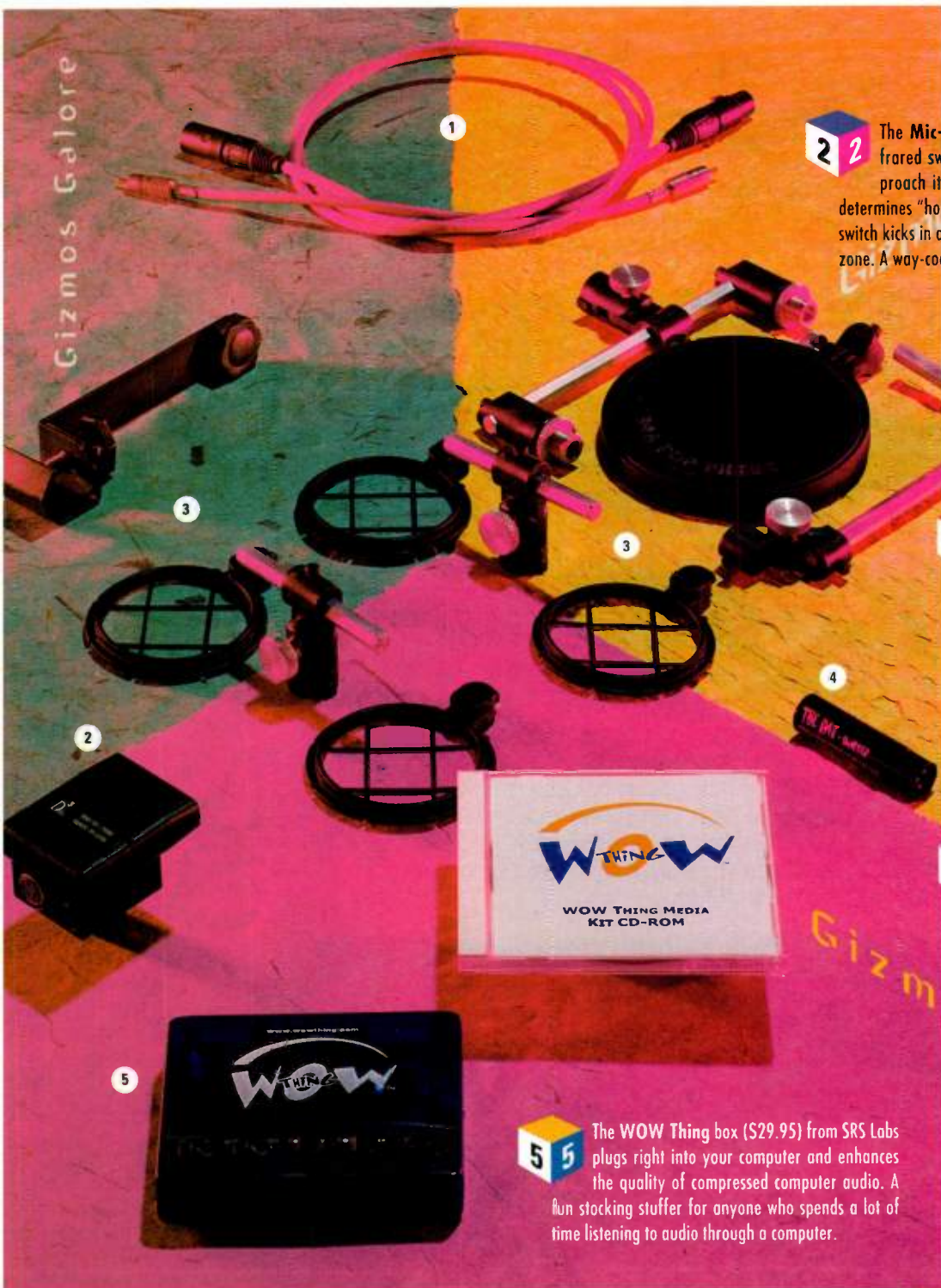
**1 1** Everyone could use a set of good cables, such as the Wyde Eye A/D cable from Apogee Electronics. These durable cables are designed to minimize noise and are great for both analog and digital applications. Prices start at \$37.95 (for a 0.5-meter cable) and go up to \$89.90 (for a 10-meter cable).

**2 2** The **Mic-Mute** (\$249) from PureSound is an infrared switch that turns the mic on when you approach it and off when you walk away. The user determines "hot zone" parameters—at what distance the switch kicks in and how long it stays on after you leave the zone. A way-cool gift for the musician onstage!

**3 3** The **SPK Universal Noise Suppression System** (\$129) from Sabra Som is ideal for the recording musician. It includes the SSM-1 shock-mount, the ST-2 double support bar, and the SPF pop filter. These Brazilian-made accessories fit almost any mic and mic stand and are very affordable. Each item in the package is also for sale individually.

**4 4** The interestingly named **Rat Sniffer** (\$24.95) from Audio-Control Industrial is a handy phantom-powered inline cable tester. The company also has a battery-powered tester called the **Rat Sender** (\$24.95). The two testers are offered together as the **Rat Pack** (\$45.95).

**5 5** The **WOW Thing box** (\$29.95) from SRS Labs plugs right into your computer and enhances the quality of compressed computer audio. A fun stocking stuffer for anyone who spends a lot of time listening to audio through a computer.



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# The Soft Sell

**1 1** Perhaps the hottest music software on the market is Sonic Foundry's *Acid* family of products (*Acid Pro*, *Acid Music*, and *Acid Style*). The company has a ton of loop libraries and the selection is growing all the time, so you're sure to find styles that will please the *Acid* heads on your gift list. Check out such loop offerings as *Methods of Mayhem*, *Bill Laswell Sampler*, *Classic Country*, and *Syntonic Generator* (\$59.95 each).

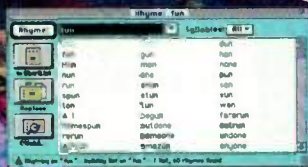
**2 2** The songwriters on your list would most certainly appreciate receiving *A Zillion Kajillion Rhymes* (Mac/Win; \$64.90) from Eccentric Software. It's very easy to use: load it on a computer from the floppy disk, boot it up, type in a word, and let the rhyming begin. Eccentric is now packaging *A Zillion Kajillion Cliches with Rhymes*. The *Cliche* program functions much like *Rhymes*: type in a word and the program lists cliches that use that word.

**3 3** Yamaha's *XGWorks 3.0* (Win; \$99) is a versatile and inexpensive digital audio sequencer. In addition to its sequencing functions, it offers pitch-to-MIDI conversion and functions as an editor for Yamaha's XG synths.

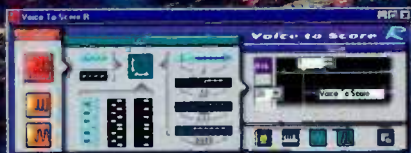
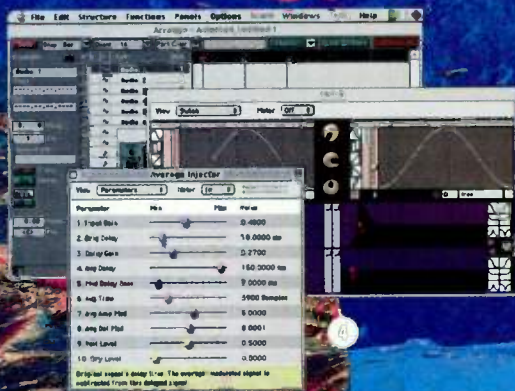
**4 4** If someone on your gift list is a devotee of Cycling '74's *MSP*, consider fueling that software desire with Cycling's *Pluggo* (Mac; \$74). This package of 74 VST-format plug-ins is a good deal in itself. But wait, there's more! The exciting feature is that you can use *Pluggo* to create your own VST plug-ins. Talk about a gift that keeps on giving!



1



2



3

## And to All a Good Night

Because the entire EM staff was solicited for gift selections, the ideas kept pouring in. In fact, as this issue went to press, suggestions were still crossing my desk. (Pssst...guys...enough already!) Here are a few general ideas that merit mention: SMF libraries, synth patches, downloadable shareware (create a nice collection for a desktop-musician friend), time at a mastering or recording studio, and MP3 rippers that allow you to easily create MP3 files from a CD. (Many rippers are available online for download; check the MP3 site for links at [www.MP3.com](http://www.MP3.com).) If nothing else, this collection of goodies should fuel more than a few ideas of your own. Happy hunting and happy holidays to all!

*Managing Editor Mary Cosola is a veteran shopper and is considered the office shopping consultant. Special thanks to Editorial Assistant Matt Gallagher for his dogged pursuit of the products that appear in this guide.*

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Illustration by Michael Aveto

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LARRY  
THE O

**S**uppose you've just transferred your 48 kHz ADAT files into your workstation and mixed them, and now you need to convert the mixes to 44.1 kHz audio for a CD project. Or perhaps you want to make 16 takes of a guitar part sound punchier, and you also need to process a bunch of scraping-metal sound effects. Or add 4,500 lines of dialog that must be maximized, brightened, and downsampled for a Web site or video game. There's no way you're gonna do all this stuff file by file. Life's a batch, man.

♪ Scenarios like these are why batch sound-file processors were created. The idea of setting up a step-by-step process that runs automatically on a group of computer files has been around for a long time, but it was fewer than ten years ago—when computers exploded onto the audio- and music-production scene—that the idea began to catch on with editors, musicians, and music-software developers. Batch sound-file processors (or *batch processors*) started out exclusively for file-format conversion, but many of today's programs offer a much wider range of options for shaping sound en masse.

📁 In essence, batch processors work like this: you point the program at a group of source files, define one or more processes you want applied to those files, designate a destination (and a few other target details), then click Go. The batch processor might take anywhere from 15 seconds to 15 or more hours to complete the job, depending on the specifics involved.

♪ Once you're clear on the concept, variations on the theme become more understandable. You can start by separating batch processors into two categories: stand-alone programs and those that are part of a more comprehensive "host" program. Airworks Media's *S-Link* 2.1, Audio Ease's *BarbaBatch* 3.0, Gallery Software's *TurboMorph* 1.81, and Waves' *WaveConvert Pro* 2.3 are examples of stand-alone programs, whereas the batch processors found in BIAS's *Peak* 2.04, Dissidents' *SampleWrench* 24/96 5.0, Sonic Foundry's *Sound Forge* 4.5, Steinberg's *WaveLab* 2.02, and TC Works' *Spark* 1.01 represent hosted processors. Gallery's *SampleSearch* 2.2 is neither fish nor fowl but a utility program with batch-processing capabilities.

Haul a truckload of  
files through one of  
these programs and  
convert your sounds into  
a whole new cargo.

## BATCH PROCESSOR SPECIFICATIONS

Although all batch processors have the same basic objective, their varying features are astonishingly broad, confusing, and difficult to classify. For instance, the floating-point method is a more compact way of representing data than is the most common method, integer. Does that make floating point a compression scheme? Or is it more accurate to list it as a numerical representation?

The chart below gives a starting point for evaluating the programs, but remember that not all combinations of the parameters are available: for example, not all compression schemes are available for all kinds of file formats. To choose the right batch processor, first determine which formats and combinations you need, and then find out if the product you're looking at has those combinations.

SOFTWARE	VERSION	TYPE	INPUT FORMATS	OUTPUT FORMATS	BIT DEPTHS
<b>Airworks Media S-Link</b> (Mac/Win; \$100)	2.1	stand-alone	AIFC, AIFF, Akai sampler, Amiga IFF/8SVX, CD-A, CD-ROM, DAWN, Fostex Foundation, Lightworks, Mac SND 1 and 2, MOD, Next/Sun, OMFI, QT, QT for Windows, raw, SDI and SDII, Sonic AIFF, SoundCap, SoundEdit, Synclavier/PostPro, VOC, WAV	AIFC, AIFF, Akai sampler, Amiga IFF/8SVX, CD-ROM, DAWN, Fostex Foundation, Lightworks, Mac SND 1 and 2, MOD, Next/Sun, OMFI, QT, QT for Windows, raw, SDI and SDII, Sonic AIFF, SoundCap, SoundEdit, Synclavier/PostPro, VOC, WAV	8 linear
<b>Audio Ease BarbaBatch</b> (Mac; \$395)	3.0	stand-alone	AIFC, AIFF, Amiga IFF/8SVX, Audio CD, AVR, DAWN, Dialogic Vox, Dyaxis, Next/Sun, Paris, QT, SDI and SDII, System 7 SND, VOC, WAV	AIFC, AIFF, Amiga IFF/8SVX, AVR, DAWN AIFF, Dialogic Vox, Dyaxis MacMix, Next/Sun, Paris, QT, RealAudio, RealSystem G2, SDI and SDII, System 7 SND, VOC 16-bit, WAV	64, 32 floating point; 32, 24, 16, 8 linear
<b>BIAS Peak</b> (Mac; \$299; TDM edition, \$499)	2.04	hosted	AIFF, Jam image, Next/Sun, Paris, Pro Tools dual mono, QT, raw, SDII, Shockwave, Sonic AIFF, System 7 SND, WAV	AIFF, Jam image, Next/Sun, Paris, Pro Tools dual mono, QT, raw, RealAudio, SDII, Shockwave, Sonic AIFF, System 7 SND, WAV	64, 32 floating point; 32, 24 integer; 32, 24, 16, 8 linear
<b>Dissidents SampleWrench 24/96</b> (Win; \$259)	5.0	hosted	AIFF, Amiga IFF/8SVX, Next/Sun, raw, RealAudio, SDI, SND, Studio 16, VOC, WAV	AIFF, Amiga IFF/8SVX, Next/Sun, raw, RealAudio, SDI, SND, Studio 16, VOC, WAV	32, 24, 16, 8 linear
<b>Gallery Software SampleSearch</b> (Mac; \$399)	2.2	hosted	AIFF, DAWN AIFF, Gefen, QT, raw, SDI and SDII, WAV	AIFF, QT, SDII, SMP, SND, WAV	24, 16, 8 linear
<b>Gallery Software TurboMorph</b> (Mac; \$249)	1.81	stand-alone	AIFC, AIFF, DAWN AIFF, DV, DVI, GSM, LPC, SDII, WAV	AIFC, AIFF, Intel raw, QT, SDII, WAV	64, 32 floating point; 32, 24, 16 integer; 16, 8 linear
<b>Sonic Foundry Sound Forge</b> (Win; \$499)	4.5	hosted	Ad Lib, Amiga IFF/8SVX, Covox V8, Creative Labs VOC, Gravis Patch, InterVoice, Mac AIFF, Mac SND resource, MIDI SDS, Next/Sun (Java), raw, SampleVision, SDI, Sonic Foundry, Sounder/Sound Tool, Video for Windows (AVI), WAV	Ad Lib Sample, Advanced Streaming Format, AIFF, Amiga IFF/8SVX, AVI, CCITT a-law, CCITT $\mu$ -law, Covox V8, Dialogic VOC ADPCM, DSP Group TrueSpeech, Gravis Patch, GSM 6.10, InterVoice, Lernout & Houspie CELP 4.8 kbps, Lernout & Houspie SBC 8 kbps, MIDI SDS, Next/Sun, raw, RealSystem G2, SampleVision, SDI, Sonic Foundry, Sounder/Sound Tool, VOC, WAV, WMA	16, 8 linear
<b>Steinberg WaveLab</b> (Win; \$499)	2.02	hosted	AIFF, Next/Sun, Paris, raw, WAV	AIFF, Next/Sun, Paris, raw, WAV	32 floating point; 24, 20, 16, 12, 8 linear
<b>TC Works Spark</b> (Mac; \$499)	1.01	hosted	AIFF, SDII, WAV	AIFF, SDII, WAV	24, 16, 8 linear
<b>Waves WaveConvert Pro</b> (Mac; \$300)	2.3	stand-alone	AIFF, QT, raw, SDII, SND, WAV	AIFF, QT, raw, SDII, SND, WAV	16, 8 linear



SAMPLING RATES (kHz)	COMPRESSION FORMATS	PLUG-IN FORMATS	FEATURES/NOTES	SCRIPTING	RENAMING
50, 48, 44.1, 33, 24, 16, 11.025, 8, 5	a-law, IMA 4:1, MACE 3:1, MACE 6:1, $\mu$ -law	none	Can handle Big Endian/Little Endian. Has waveform display for selecting portions of a file. Also converts sequence files from DAWN, OMFI, Pro Tools, and Synclavier. Can output files as binary offset or two's complement.	none	none
1-100, with presets for common settings	ADPCM, a-law, Dialogic ADPCM, IMA ADPCM 4:1, MACE 3:1, MACE 6:1, MP3 (optional), MPEG-1 Layer 1 and 2, MS ADPCM, QDesign Music, Qualcomm PureVoice, $\mu$ -law	none	Supports nested directories. Dialog allows file type and creator to be defined for all major sound-file types. Excellent handling of interleaved/split stereo files. Region munging. MP3 support, \$99.	AppleScript	Adds/replaces file name extensions. More extensive renaming with included utility program.
48, 47.952, 44.1, 44.056, 37.8, 22.254, 22.05, 18.9, 11.025, 5.5125, custom	a-law, IMA 4:1, MACE 3:1, MACE 6:1, MP3, QDesign Music, Qualcomm PureVoice, $\mu$ -law	Premiere; AudioSuite; TDM (with appropriate hardware)	Can handle Little Endian/Big Endian. Supports nested directories. Flexible and powerful onboard processing. Premiere plug-ins. Saves and reloads scripts. Region munging.	batch, AppleEvents	none
48, 44.1, 32, 22.05, 11.025, custom	a-law, $\mu$ -law	none	Enable language supports customized processing, renaming, nested directories, and esoteric manipulations. Requires code programming.	Enable (Visual Basic variant)	none
No SR conversion, SR hard reset is available, however.	IMA 4:1, IMA ADPCM, MACE 3:1, MACE 6:1, MP3, QDesign, Qualcomm PureVoice, $\mu$ -law 2:1	680X0 Premiere (PowerPC version also supports PowerPC plug-ins)	Powerful utility functions unavailable in other batch processors. Has SDII waveform overview calculation, supports nested directories, extracts channels from multichannel AIFF files. Region munging and export to files. Is neither an editor nor a batch processor; has unusual limitations and unique capabilities.	AppleScript	assortment of renaming options
48, 44.1, 22.254, 22.05, 11.127, 11.025, custom	ADPCM, IMA 4:1, MACE 3:1, MACE 6:1, MP3, QDesign, Qualcomm PureVoice, $\mu$ -law 2:1	Premiere	Watches folders and processes dropped files. Auditions have set parameters. Replicates nested directories. Plug-ins available through "process chaining." Transcodes already compressed audio files. Outputs files as binary offset or two's complement.	AppleScript	file name extensions
2-96	Dialogic VOC ADPCM, IMA ADPCM, MP3 (with optional plug-in), MS ACM, MS ADPCM	DirectX	Can watch a folder and process files dropped there. Drag-and-drop. Runs multiple scripts on a set of files. Supports nested directories. Region munging. Very powerful, flexible, and fast.	batch	none
96, 88.2, 64, 48, 44.1, 32, 22.05, custom	MS ACM	DirectX, VST, WaveLab	Will run multiple batch scripts, can load from and replicate nested directory structures, can create backups of files before overwrite, flexible output options.	batch	prefixes, file name extensions
48, 44.1	none	none	Normalize. DC offset remove.	none	none
48, 44.1, 44.056, 32, 22.255, 22.05, 16, 11.127, 11.025, 8, 5.564, custom	IMA 4:1, MS ADPCM, Waves IMA 4:1, Waves MS ADPCM, Waves NoLoss	Waves	Windows version also available. Previewing available. Not being actively developed.	batch	file name extensions



Because 24-bit files have only recently come into wide use, some batch processors are unable to handle them. However, the fact that a program can handle 24-bit files doesn't necessarily mean that its plug-ins can. Most manufacturers who haven't made their plug-ins 24-bit capable either plan to or are already working on it. Nonetheless, you may have to do some legwork to make sure the plug-ins you need provide support for high-resolution audio files.

Some batch processors—such as *Sound Forge* and *WaveConvert Pro*—let you generate file-conversion previews, which let you hear and compare various settings. *BarbaBatch*, *TurboMorph*, and *Sound Forge* let you designate that a batch process be executed whenever files are dropped into a designated folder. Should you need documentation, some batch processors, like *Peak's*, can generate a text document logging batch execution.

One utility covered only lightly by existing batch processors is file renaming. Most batch processors can be set to add or change three-letter Windows (née DOS) file name extensions. Only *SampleSearch* has the built-in ability to rename files from a text list of names, although *BarbaBatch* comes with several utility programs that do the job. Free-ware and shareware programs such as *Drop/Rename* are also handy for this sort of function.

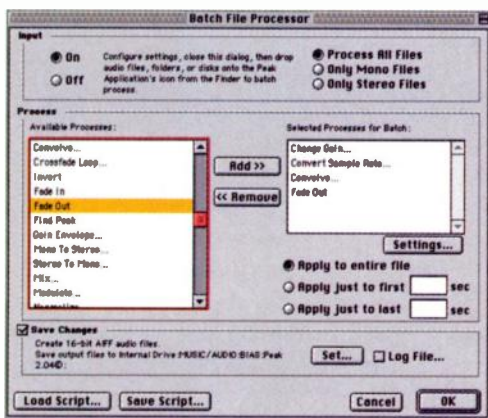


FIG. 2: Most of *Peak's* audio-processing capabilities are also available in its powerful batch-processing section.

Each program additionally offers its own "extras." *WaveLab* lets you set up a number of batch processes working on different file sets, all strung into a single list that gets executed in one gesture. *BarbaBatch* can assemble a group of files as regions in a single file, then split them again after processing (region munging).

Not all differences between programs are desirable ones. Some programs convert one type of marker into another type; for example, they may change loop markers into text markers. If markers are important to your files, run tests to ensure that the program you choose won't ruin your project when you next run a large batch of files containing markers.

### BY THE SCRIPT

Because the whole idea behind batch processors is automation, scripting is an important feature. Scripting can mean either the ability to string menu commands and plug-in operations into a sequence of actions or the ability to control the program's operation through some scripting language. Where neither of these is available, the capability to store the current settings as a preset file is often provided.

*Peak*, *WaveLab*, and *Sound Forge* allow commands and plug-ins to be listed one after another, and then the whole script can be saved for later recall. *Peak's* batch processor allows the parameters of any step to be edited, and lets you specify that any step be applied only to a segment at the beginning or end of the file. All of that information then gets saved with the script.

When it comes to scripting languages, the clear winner is *SampleWrench*, which includes Enable, a customized variant on Visual Basic. Using a programming language is a double-edged sword, however. It means that you can create far more sophisticated processes, but it also requires you to write an Enable program to do the simplest batch process.

*BarbaBatch* boasts a rich AppleScript implementation, while *Peak* and *SampleSearch* are capable of responding to some custom AppleEvents.

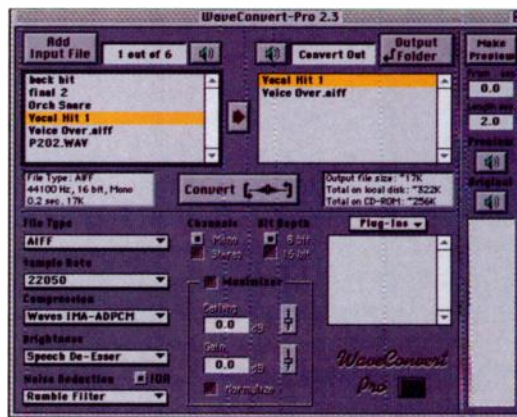


FIG. 3: *WaveConvert Pro* offers a wide selection of onboard processing options, including EQ, gating, and filtering.

Writing AppleScript or Enable scripts represents much more work than a simple list-based interface but offers the two great advantages of allowing extensive customization and integration with other applications. For example, a multimedia production environment could be built around a *FileMaker Pro* database of files with built-in AppleScripts for controlling *BarbaBatch*.

Of course, the "poor man's batch processor" would be a powerful macro program like *QuicKeys* or *KeyQuencer* used with your favorite audio program. Unfortunately, the heavily graphic user interfaces found on digital audio workstations do not always lend themselves to macro control, therefore complicating this method.

### PERFORMANCE PRACTICE

Features may be important, but for many users, performance is paramount. The idea is to crank out lots of work as quickly as possible without problems. Speed is often the major concern, and rightly so. The speed of any batch will always vary with the sophistication of the process, the number of files involved, and the capabilities of the computer's CPU, but there are still big differences in basic performance levels. *BarbaBatch* and *TurboMorph* are the fastest batch processors I've encountered, while *Peak* is the slowest.

But speed isn't everything. I was surprised by the stability problems I found in many of the batch processors I tested for this article. This brings me back to the need for testing in your own environment. If you can't try out a copy of a program before buying it, run tests as soon as possible. If you're unhappy with a product's performance and haven't

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had it long, many dealers will take it back. One stability question is how well a batch processor handles large quantities of files. In multimedia and Website development, batches can contain thousands of them. Some programs bear up this burden; others choke.

Finally, don't forget about what many people consider a make-or-break characteristic: fidelity. In the world of sampling-rate conversion and DSP, all algorithms are not created equal. A corner may have been cut during manufacture to speed things up, or one programmer may have known tricks that another didn't. Sampling-rate and bit-depth conversions, especially, require critical listening. Even the program's method of using dither in bit-depth reduction can make an audible difference.

## DIRECTORY ASSISTANCE

Because batch processors are a load-'em-up-and-spit-'em-out kind of tool, the key is how easily files can be loaded in and processing can be specified. Although most batch processors offer drag-and-drop support for files, fewer allow you to drop nested directories. In multimedia work, especially, files are often organized into directories containing files in one or more layers of subdirectories. Keeping this structure intact can be vital to the production process, particularly when many files are involved. Some programs, like *BarbaBatch*, *Peak*, and *TurboMorph*, allow you to drop nested structures right onto the program, which then replicates them for the output files. *WaveLab* won't let you drop a directory structure on it, but a button lets you search and load from such a structure.

If you have files in a directory structure but the batch processor can't go through the structure to load all the files, you have two choices: either navigate the entire structure in a dialog—loading as you go—or move all the files out of the structure into a single, huge bin. This clearly adds more work.

## FILE OUT

Batch processing is tailor-made for people who have lots of files to modify and convert, but the applications can go much further. If you're creating Web audio or multimedia of any kind and aren't into batch processing, well, get with it. For those writing and recording music, too, there are many benefits. Mellow out all the vocal tracks in a song with a tube-preamp-emulator plug-in, or run a mess of samples through some sonic cement-mixer. Though many people associate batch processors with sampling-rate and bit-depth conversion, the most creative applications have nothing to do with either.

The current crop is powerful enough to do some wonderful things, though there are still rough edges to be smoothed. Still, it's a great feeling to grab a bunch of files, toss them into a batch processor, and do something amazing, or even useful, to all of them in a single pass. It can get to be a habit.

*Larry the O provides music and audio services under the name Toys in the Attic. He has used batch processors extensively in his work as a sound designer at LucasArts Entertainment.*

# IMAGINE THE POSSIBILITIES



A



B



C



D



E



F

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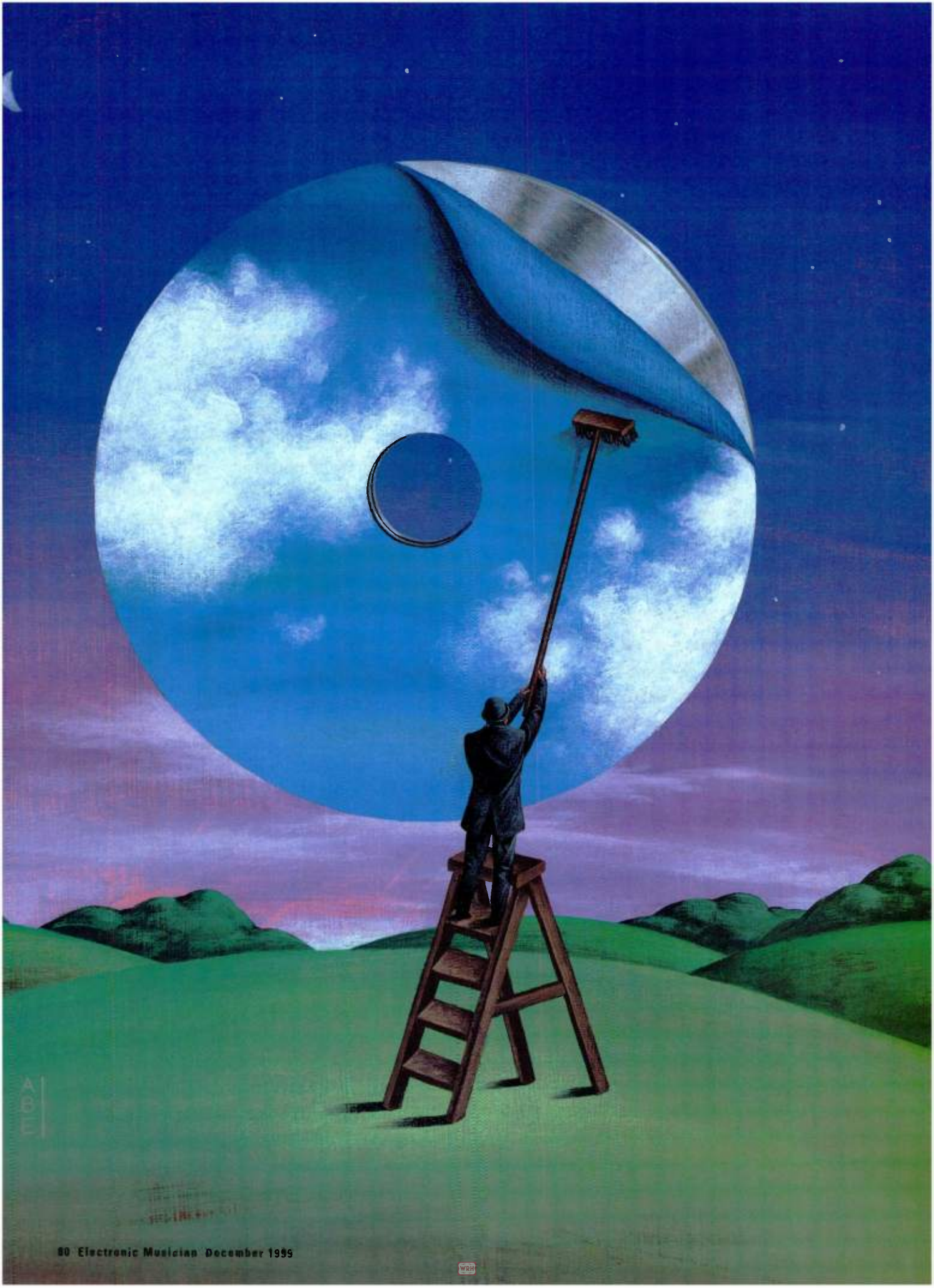
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ABE

By David Rubin

# Ready, Willing, *and* Label

**When you send your CD demo out on the town, make sure it's dressed for action.**

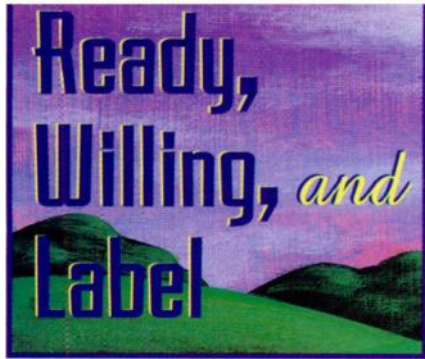
*It* doesn't take a rocket scientist to realize that the compact disc has become the undisputed hard-copy distribution medium for music. Just look at your favorite music store: rows and rows of CDs bristle from gleaming bins, while the cassette tapes languish in a corner. So why are you still sending out your demos on cassette tapes? With the prices of CD-R drives dropping like June bugs in a frost, the time is ripe to join the "big boys" and make the transition to compact disc.

CDs have many advantages over cassette tapes, but one important advantage is often underestimated: people perceive CDs as classier and more valuable than cassettes, so CDs offer the opportunity to make a great first impression when you present your demo.

It's important to avoid shooting yourself in the foot, however, by sending out a great-sounding demo that looks like a remnant from an industrial accident. No matter how good your music is, you won't make the best impression if your CD arrives in a cardboard sleeve with program notes written on a scrap of paper and the disc labeled with an old laundry marker. Fortunately, professional-looking CD packaging is no longer reserved for corporate music distributors and large-scale CD replicators. If you have a computer and a color printer, you have all the tools you need to upgrade your image with professional-level CD packaging.

To give you an idea of the tools that are available, we'll look at four popular CD-labeling kits: the CD Stomper Pro (Mac/Win; \$39.99), Memorex CD LabelMaker (Mac/Win; \$29.95), Neato 2000 (Mac/Win; \$29.95), and SureThing CD Labeler (Win; \$39.95). We'll also explore several issues regarding CD labeling and packaging. But let's start with the basics.

ILLUSTRATION BY GEORGE ABE



## HERE, THERE, EVERYWHERE

To achieve a fully professional look, you'll need to add labels to three areas of your CD package. The top surface of the disc takes a self-stick label for artwork and text. The bottom and spines of the plastic "jewel" case usually hold a *tray card* made of lightweight cardboard or heavy paper. The front cover of the jewel case holds an insert of the same material or a booklet with lyrics or other information.

The front-cover insert/booklet or the tray card should always include a list of the CD's tracks along with their corresponding track numbers. Giving the timings for each track adds a nice touch, as well. Be sure to include your phone number (or other contact information, such as your e-mail or Website address) on the disc label and on at least one of the jewel-case inserts. Remember to add a copyright notice where appropriate.

Some blank CD-Rs come with a label area imprinted on their top surface, and you might be tempted to label them using a marker pen to save time and effort. Don't: No matter how neat your penmanship, marker-labeled discs have an unprofessional and careless appearance. Even more important, many marker-pen inks contain solvents that might damage some brands of compact discs. If you still choose to use a marker

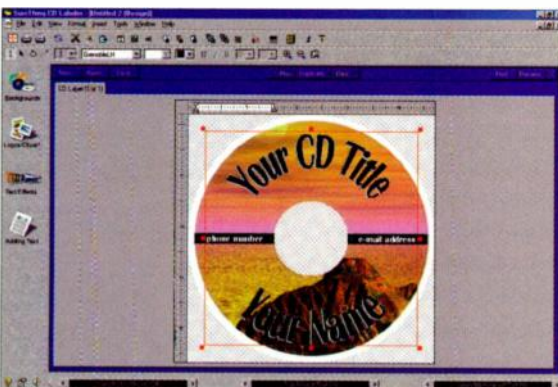
(for archive or other nondistribution discs, for example), consider using a special CD-marking pen such as the TDK CD Writer, which contains a permanent marking ink that is safe for all compact discs.

Some people are reluctant to use paper labels on CDs because they fear that the labels will unbalance the disc and adversely affect playback. That might be a problem if you stick a large return-address-style label on your disc. CD labeling kits, however, use labels that uniformly cover the disc surface and (thanks to some clever alignment gizmos) are perfectly centered. In his article for *E-Media Professional*, Brad Thompson described some experiments that he performed to test the effects of unbalanced labels on CD-ROM discs. He discovered that using only half of a disc label caused some slight imbalance problems, but even then, playback accuracy was not noticeably affected. Proper application of an entire disc label did not appear to cause any problems.

According to a spokesperson from Stomp, Inc., accelerated aging tests performed on several brands of labels have revealed a problem with disc labels failing to adhere properly to some Maxell CD-Rs. Maxell uses a special coating on its CDs that makes it difficult for the labels to get a long-term grip on the discs. This problem did not occur with other brands of CDs.

## PICTURE PERFECT

Aside from conveying important text-based information, CD labels and jewel-case inserts offer an opportunity to project a personal or musical image through the use of photos, clip art, and other graphic elements. If you're well versed in a graphics program—such as Adobe *Photoshop*, Adobe *Illustrator*, *CorelDraw*, *QuarkXPress*, or Adobe *PageMaker*—you can use it to design and print your labels and inserts. Although these programs can cost a lot and take time to master, they offer the highest degree of control over the final product and



**FIG. 1:** MicroVision's *SureThing CD Labeler* software offers hundreds of great designs for creating professional-looking labels quickly.



**FIG. 2:** *CD Stomper Pro's* label-designing software for the Mac stresses quick-and-easy design with a simplified user interface.

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Fortunately, most labeling kits include an assortment of ready-to-use layout templates for creating labels and inserts in popular graphics applications. The templates let you work in your favorite program and print out the results (with proper alignment) on the proprietary label stock supplied with each kit. (Each company sells its own replacement label and card stock.) The labels usually come on standard 8.5 × 11-inch sheets, but some kits also include templates for the metric A4 format. Disc labels typically come two or three to a sheet and may be accompanied by some smaller ancillary labels for miscellaneous uses.

The list of supported programs varies from product to product, and that might steer you toward one kit over another if you must use a particular program. The only labeling kit in this group that provides no assortment of templates for third-party applications is *SureThing*; it's intended as a stand-alone (and full-featured) one-stop label-making program and includes its own dedicated collection of design templates (see Fig. 1).

The Memorex kit represents the other extreme, offering only third-party templates for the Macintosh. (The package supplies PC users with label-making software.) As if to compensate, the Memorex CD-ROM provides the largest collection of Mac (and PC) templates in this group, including layouts for Microsoft *Word* and *ClarisWorks*.



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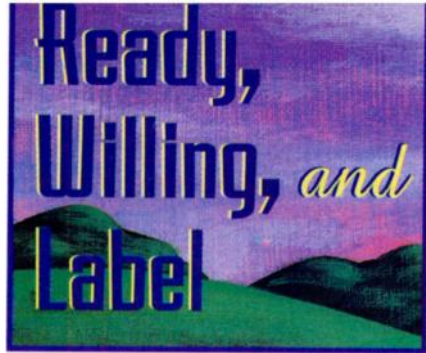
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CD Stomper Pro and Neato 2000 set a middle course by offering easy-to-use label-making software along with an assortment of third-party templates. CD Stomper's PC software, an earlier (and modified) version of MicroVision's *SureThing CD Labeler* program, provides a nice balance between power and user-friendliness. The Mac software is completely different and comes from another developer; its interface stresses quick-and-easy label design but with less versatility than the PC software (see Fig. 2). The Neato kit's *MediaFace* software, now in Mac and PC versions, offers a good set of standard label-designing tools in a familiar graphics/layout environment.

In case you don't have your own collection of digitized art, all of the labeling kits include an assortment of background art—photos, abstract designs, textures, drawings, and so forth—to use for disc labels and inserts. Most of the images are not ideally suited to musical CDs (the images are intended for a variety of applications, including CD-ROMs, multimedia, corporate presentations, and archiving),

but you'll probably still find plenty of artwork to fill your needs. SureThing, Memorex, and CD Stomper Pro supply hundreds of images—photos, drawings, and patterns—and SureThing includes 8,000 clip-art images—far more than the other kits. Neato provides 66 backgrounds (and one "compact disc" logo) in 72- and 150-dpi versions.

SureThing is unique in offering more than 50 fonts with its kit, so you can expand your collection of type styles to jazz up your labels. The other programs rely on the fonts you already have installed. Of course, you can always import graphics from other sources and add new fonts at any time with any of the programs. Keep in mind, however, that different graphics programs handle fonts in different ways; some programs treat blocks of text as bitmapped images, so the final appearance might not be as smooth or clean-looking as possible.

### LABEL LIBERATION

All the labeling kits in this group include some kind of ingenious contraption for sticking the CD label onto the disc. Neato (originally MicroPatent) got the ball rolling a few years ago with its two-part plastic device that worked somewhat like an automotive clutch-alignment tool. Neato, however, has now joined both Memorex and CD Stomper in offering a one-piece unit that employs a spring-loaded, pistonlike plunger mounted in the center of a smooth circular platform.

Although they all look different, the devices work in essentially the same manner: after printing the label, you peel it off the backing sheet and place it sticky-side-up over the large piston on the circular platform. You then place the disc data-side-up on the piston where it rests on a short spindle, suspended over the label. To apply the label, you press the disc down until it makes contact. Bingo! You have a perfectly

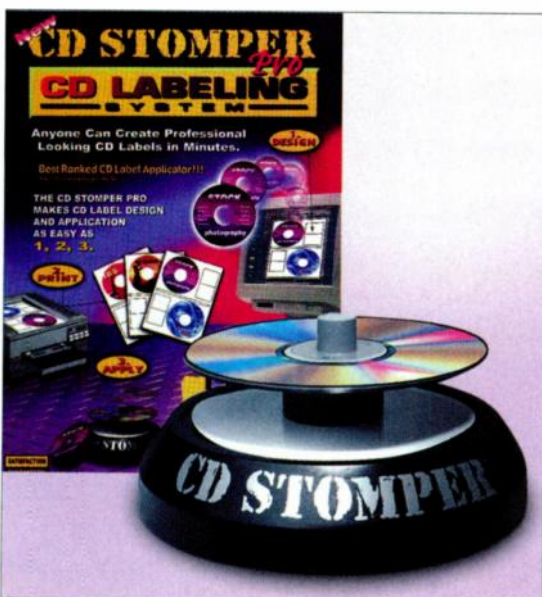


FIG. 3: With its broad base, solid construction, and padded bottom, the CD Stomper Pro applicator makes a fine choice.



FIG. 4: The clear-plastic Memorex applicator employs a large spring and a tall plunger to deliver a solid, positive feel.

centered and smoothly applied CD label. These applicators might seem a bit medieval in design, but don't let their low-tech appearance fool you; they work remarkably well, and they can all label a great many discs without a mishap.

CD Stomper is one of my favorites (see Fig. 3). It has a solid feel, a wide base with a low center of gravity, and a nonskid rubber pad covering the bottom, all of which contribute to a good sense of stability. The 1-inch-tall piston holds the disc high enough to avoid accidental contact with the label, and the spring feels smooth with the right amount of resistance. And you can lock the piston down for easier storage.

I also like the Memorex applicator (see Fig. 4). It's taller than the CD Stomper and has a smaller footprint, but the construction feels solid, and the nonskid buttons on the bottom prevent the device from moving during use. The 1.5-inch-tall piston keeps the disc well away from the label, and the extrastrong, extralong plunger spring offers very good resistance and a solid, positive feel. I'd prefer a label platform that was  $\frac{1}{4}$ -inch wider in diameter to better support the edges of the labels, but I have to admit that I encountered no problems when I used it.

The Neato 2000 applicator is much like the CD Stomper Pro, except that it's smaller, flatter, lighter, and lacks the rubber bottom pad (see Fig. 5). Its  $\frac{3}{8}$ -inch-tall piston puts the disc uncomfortably close to the label during use,

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# Ready, Willing, and Label

which could cause a problem if the label suddenly curls. Unlike the CD Stomper and Memorex devices, the Neato 2000 doesn't use a metal spring; instead, it relies on a piece of foam sponge to provide resistance when you press down.

The SureThing kit takes a different approach. Its applicator is built into a CD jewel case and doesn't use springs. You open the case, place the label on one side and the disc on the other, then close the case. The disc and label meet in proper alignment. Although SureThing's device is cleverly designed and the applicator is easy to store, I found it more troublesome to use than the other three. It also provided a less positive feel and its construction was clearly not as sturdy as the others. (According to a MicroVision spokesperson, a newer, sturdier, molded-plastic version of the applicator will be available by the time this issue reaches the newsstands. It's



**FIG. 5:** Unlike its predecessor, the lightweight Neato 2000 applicator uses a one-piece design with a short plunger.

about the same size as the current model and works in a similar fashion. The company plans to offer an upgrade path for current owners.)

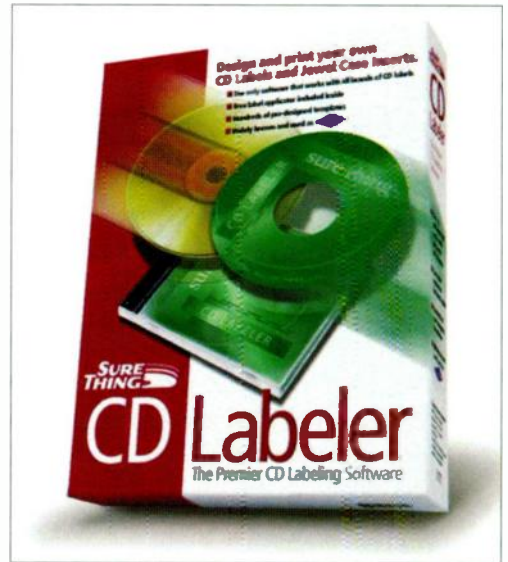
## STICK 'EM UP

In most cases, you can't use the labels from one manufacturer with the label-design software from another, because the positions of the labels on the sheets vary from company to company. After printing your labels, however, you can use most brands of CD labels with any of the applicators in this group. I got excellent results with several different combinations of labels and applicators. Keep in mind that the plunger diameters vary by a very small amount (several thousandths of an inch), so try one or two labels before committing to a large run of discs. If you want to play it absolutely safe, use the same brand applicator and labels.

If you need to have compatibility between your design software and different brands of label stock, consider purchasing the SureThing CD Labeler (see Fig. 6). It's the only kit with software that supports nearly all other brands of tray cards and disc labels currently on the market. In addition to Neato, CD Stomper, and Memorex labels, SureThing works with stock from label giant Avery and others. You can switch from one brand of label stock to another without redesigning your label; the program makes the necessary adjustments automatically.

The most common type of CD label uses a nonglare white paper, but you can also get disc labels in a wide assortment of papers and colors, including glossy white, gold, silver, and transparent. The standard white labels usually cost the least and are often the easiest to work with because they dry quickly.

Printing on precolored labels affects the final color balance of your design, so you'll need to experiment a little. For example, white text or empty spaces take on the color of the background, and light colors blend with darker backgrounds. In many cases, you'll get clearer and brighter results by printing the same colors on a white label instead. On the other hand, colored labels provide users who have noncolor printers the option of adding



**FIG. 6:** The SureThing CD Labeler kit works with label stock from most manufacturers.

a colored background to their discs.

Glossy-white labels add a photo-quality finish to a label, but they're more expensive, and they might take a bit more time to dry. Transparent labels also add a professional touch to a CD, but you might have to wait an hour or more for them to dry before applying them. Of course, you can't use a transparent label on a CD-R with a brand name and label area already printed on the top surface of the disc. Another drawback to consider: it's difficult to peel a transparent label from the backing sheet without getting fingerprints on the back (sticky side) of the label. Unless the label is heavily printed, those fingerprints could be visible after you apply the label, so you need to handle transparent labels with extra care.

Now that we've covered the basics of CD labeling, let's take a closer look at the strengths and weaknesses of each kit.

## CD STOMPER PRO

With a price tag of less than \$40, CD Stomper Pro from Stomp, Inc. is quite a bargain. The CD-ROM that comes in the kit includes label-designing software for the Mac and PC along with more than 1,200 images (backgrounds and clip art). Although the PC software (by MicroVision) offers more versatility than the Mac's, the Mac software is a breeze to use, compensating for its other limitations. Expediency is the name of the game with the Mac program: you simply choose a template, select from hundreds of backgrounds,

type in some text, and you're done.

The PC software sports a clean and intuitive interface: you can design your label from scratch, or you can start by choosing one of several preset layouts and then one of several variations with different colors and shading. You can import graphics, add or change text, and manipulate the elements in a variety of ways, such as rotating objects or curving and angling text. For more sophisticated productions, Mac and PC artists can use one of CD Stomper's graphics templates in *Photoshop*, *Illustrator*, *QuarkXPress*, *PageMaker*, *Corel-Draw*, and EPS formats.

Moreover, the CD Stomper Pro applicator is one of the best in this group with its wide, stable base and smooth plunger action. The well-designed platform is solid and totally flat, providing an even surface for pressing the label against the disc. The CD Stomper Pro kit also comes with a generous assortment of labels (far more than any other kit) to get you started, including 50 matte-white CD labels and 10 front-cover and tray-card inserts. Replacements cost \$24.99 for 100 standard

white CD labels, \$29.99 for 40 glossy-white labels, and \$19.99 for 50 jewel-case inserts (front and back).

### MEMOREX CD LABELMAKER

The Memorex kit is one of the least expensive kits in this group, although it offers one of the best applicators. Unfortunately, it doesn't include a label-designing program for Mac users. Windows users, however, can take advantage of CD LabelMaker's *exPressIT* software (see Fig. 7) for designing and printing CD labels and jewel case inserts (as well as labels for MiniDisc, Zip, Jaz, floppy disk, audiotape, and videotape).

The design software provides all the basic features for CD-label production, along with several cool tools for altering text and graphics by stretching, flipping, rotating, and deforming selected objects. The software includes hundreds of images, but it of-

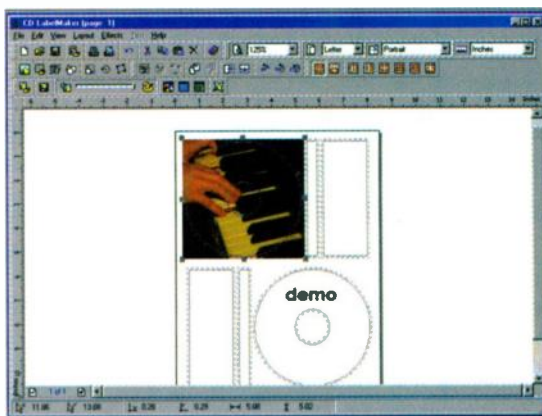



FIG. 7: Memorex's *exPressIT* software for the PC provides basic label-designing features along with several tools for manipulating objects.


fers little in the way of documentation.

The Memorex kit provides the largest number of third-party templates for working with high-end graphics programs on the Mac and PC, and it's the only product in this group that offers CD label templates for Microsoft *Word* (Mac and PC versions) and *ClarisWorks* (Mac). Memorex CD labels come in a variety of solid colors and in clear. The



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label designs. What's more, you can design and print a terrific-looking label in a matter of minutes.

SureThing's secret lies in its use of interactive SmartDesigns templates. With its professional designs and layouts, the SmartDesigns feature lets you browse through hundreds of backgrounds and combine them with myriad text styles and arrangements. When you find a layout that suits you, simply replace the generic placeholder text with your own, and you're finished. (The CD Stomper software offers a similar feature, but with fewer options.)

The kit includes 50 fonts and thousands of clip-art images to further enhance your label designs. A Text Effects feature lets you create curved, angled,

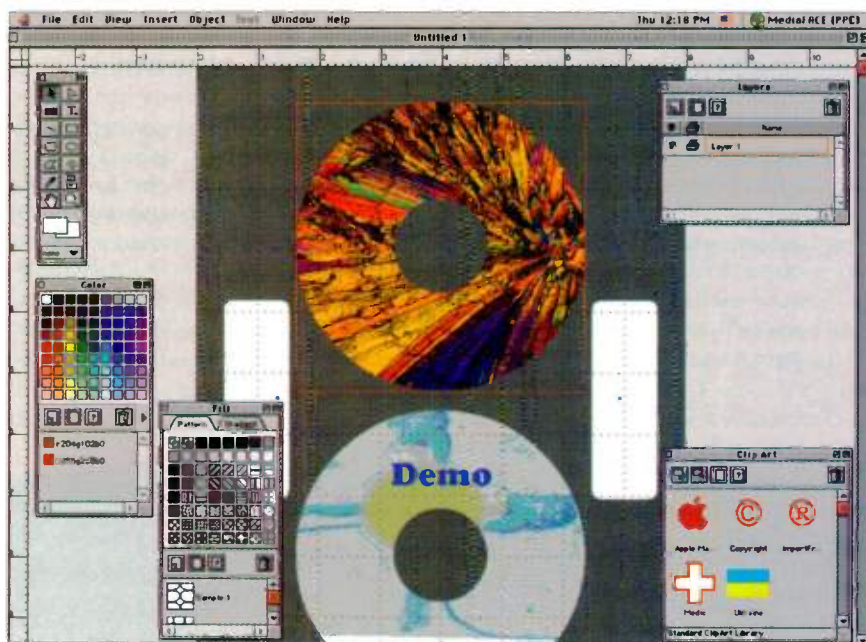


FIG. 8: Neato's *MediaFace* software provides 66 backgrounds and a set of graphics tools for designing labels.

arched, or drop-shadowed text, and the program provides enough flexibility in other areas to customize your designs in a number of ways.

Although the SureThing CD-ROM has no third-party templates for graphics programs, the label-designing software is unique in offering support for

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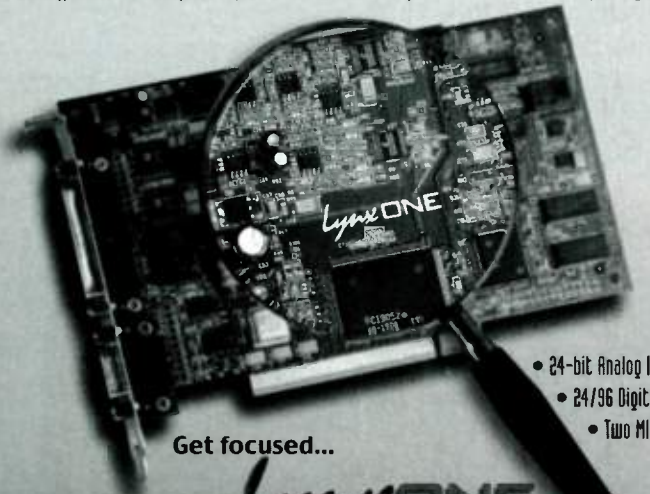
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# Ready, Willing, and Label

most brands of label stock, so you can use it with labels from other companies or with MicroVision's own labels. On the negative side, the kit includes only ten glossy CD labels (no inserts) to get you started. However, the SureThing kit deserves praise as the only product in this group to include a printed and bound user guide (34 pages).

The SureThing label applicator is arguably the weakest part of the package. Designed around a CD jewel case, it's awkward to use and susceptible to damage. Although it should work fine for an occasional label application, I wouldn't use it for a run of 50 or 100 discs. Clearly, the SureThing software is the main reason that someone would buy this kit. It's an attractive option if you already have a label applicator and simply need better design software.

Replacements cost \$17.95 for 100 matte-white CD labels, \$24.95 for 50 glossy-white labels, and \$19.95 for 50 matte-white jewel-case inserts. MicroVision also markets clear, colored, and metallic labels as well as labels for several other disc, tape, and cartridge formats.

### END CUT

An old Hollywood axiom states, "It's not how you play the game that counts, but how you look while you're playing." This little adage is typically offered with a tinge of sarcasm, but beneath the surface lies a grain of truth—at least when it comes to CD packaging. After all, getting your demo noticed (in the right way, of course) is half the battle.

The labeling kits we've examined here provide the essential tools for developing and printing artfully designed, eye-catching CD labels and jewel-case inserts. As we've seen, some do it better than others, and each kit has its strengths and weaknesses. But, regardless of which labeling kit you use, it's nice to know that desktop musicians can now join the CD party and not feel underdressed.

Associate Editor David Rubin lives and works in the Los Angeles area.



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**RANE**

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# Surrounded by Sound

***5.1-channel sound ushers in a new age of audio reproduction.***

By Vance Galloway  
and Scott Wilkinson

When the world of audio reproduction went from monaural to stereo, a new sonic vista was revealed. Individual sound sources (instruments, voices, and so on) could be localized within the left-to-right stereo sound field, presenting a much more interesting and involving sonic image to the listener.

In an attempt to improve the front-to-back imaging and general sense of envelopment, quadraphonic recording and playback was introduced in the 1970s. In this system, four channels of audio were directed to four speakers,

which were generally placed in the corners of a room. However, quad never achieved widespread popularity for various technical and marketing reasons.

Despite quad's failure, the merits of multichannel audio (often called *surround sound*) are quite clear. This is demonstrated every day in commercial cinemas around the world. Modern movie soundtracks are routinely mixed to several channels, and speakers are placed around the theater. The sources of the apparent various sounds in the movie are appropriate to what's happening on the screen, heightening the audience's sense of being "in the action."

Now surround-sound playback systems are proliferating in "home theaters," and multichannel music-only recordings are becoming more common as well. So it's important for musicians, engineers, and producers to be familiar with the concepts and technology of surround sound.

## WHAT IT IS

The most common type of surround-sound system uses six discrete channels of audio: five full-range channels and one channel that is limited to the low frequencies (typically below 120 Hz or so). As a result, the system is called *5.1*.

The speakers that correspond to the five main channels are placed around the room (see Fig. 1). Two are placed just like a stereo pair, in front and to

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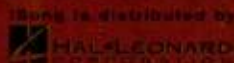
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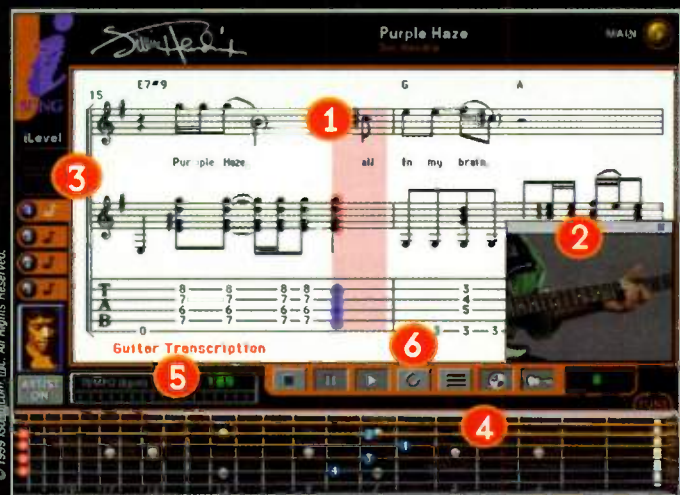
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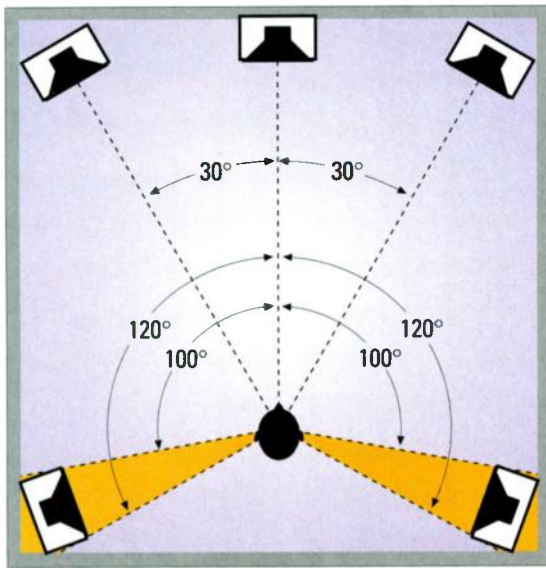
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**FIG. 1:** In a 5.1 surround-sound system, the front left and right speakers form a 60° angle with the listener at the apex, and the center-channel speaker is directly in front of the listener. Direct-radiating surround speakers are often placed at an angle between 100° and 120° from the front-center line.

the left and right of the listener. The third speaker, called the *center-channel speaker*, is directly in front of the listener. The two remaining speakers are behind or to the sides of the listener; these are called the *surround speakers*.

The three front speakers are generally standard, direct-radiating designs. The surround speakers can also be direct radiators, but they are often of a different type called *bipolar*. In bipolar design, two sets of drivers are mounted into a cabinet, one set facing toward the front of the room and one set facing toward the rear. This means that such speakers should be placed to the sides of the listener. Most commonly, these drivers are angled into the room slightly. Bipolar speakers produce a greater sense of envelopment than direct radiators, and they make it more difficult to pinpoint the location of individual sound sources, which is desirable in most movie soundtracks.

The remaining channel is often called the *low-frequency effects (LFE) channel*, and it requires a specialized type of speaker called a *subwoofer*. Because low frequencies are relatively nondirectional, the subwoofer can be placed almost anywhere in the room; typically, it is in the front between the center and either the left or right speaker. Sometimes it is placed in a corner in order to reinforce the low frequencies.

Of course, each speaker needs a channel of amplification. Most modern receivers include five or six amplifier channels. (Many subwoofers have their own internal amp, so they don't need external amplification.) More sophisticated playback systems include separate power amplifiers. A lot of home-theater amps provide five or six channels; alternatively, you could use three stereo amps or five or six monaural amps (often called *monoblocks*). Of course, you can also use powered speakers all around.

The next step back along the signal path is the *surround processor*. This device takes a digital signal from the source (for example, a CD or DVD player), decodes it into discrete, analog channels, and sends them to the amplifiers. (Receivers have built-in surround processors in addition to amplifiers.)

This brings us to the source, which is typically a CD or DVD. (Other digital sources, such as laserdiscs and digital satellite feeds, can also carry 5.1 surround-sound signals.) How are 5.1 channels encoded on these media? And what surround-sound standards have been established to encourage

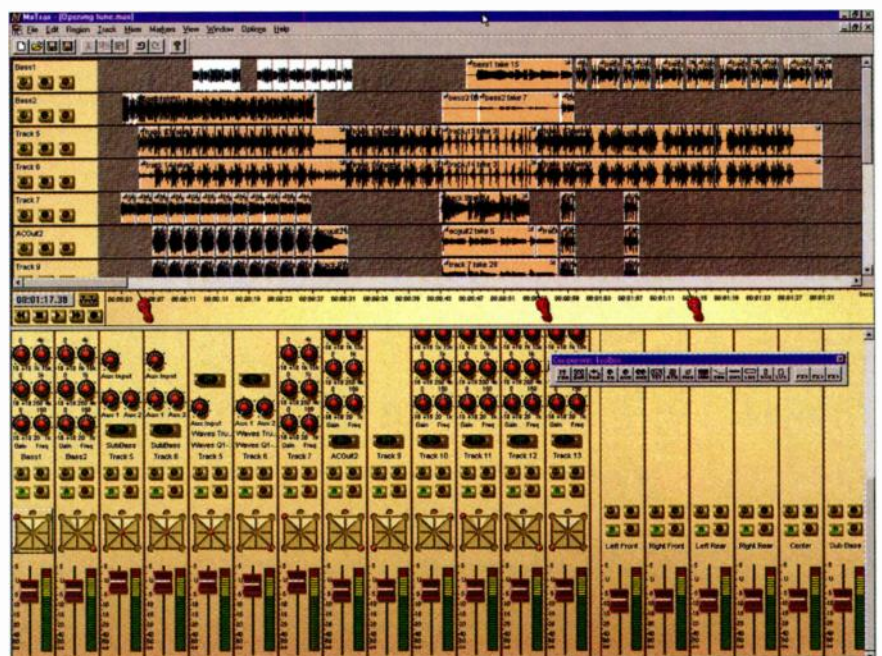
the widespread acceptance of multi-channel sound?

**SECRET DECODER RING**

Over the past few years, two standards have been vying for dominance in the surround-sound market. By far the most successful is Dolby Digital, which has been adopted as the standard surround-sound format for DVD-Video discs and the new digital-television (DTV) system.

Uncompressed audio at 44.1 kHz with 16-bit resolution requires a bandwidth of about 700 kilobits per second (kbps) for each channel, so six channels need a total of 4.2 Mbps. In order to conserve bandwidth, Dolby Digital uses a lossy data-compression and encoding algorithm called AC-3 to reduce the required bit rate to roughly 400 kbps. Because it uses this algorithm, Dolby Digital is sometimes mistakenly called AC-3.

The other contender is called DTS, from Digital Theater Systems. Derived from the company's commercial-cinema surround-sound system of the same name, this format has been slow to reach the market. DTS also uses lossy data compression to bring its bandwidth requirements down to about 1.4 Mbps, which is less severe compression than in Dolby Digital, but still substantial. Whether this decreased compression improves the sound quality is hotly debated within the home-theater industry.



**FIG. 2:** Minnetonka Software's *Mx51* is a PC-based DAW with the ability to do 5.1 panning.

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Both formats require a player that can output the appropriate data stream from the disc and a processor that can decode it. Virtually all DVD players can output Dolby Digital, and most can now output DTS as well. Similarly, all modern receivers and surround processors can decode Dolby Digital, and most can handle DTS.

In addition to Dolby Digital and DTS, there are a couple of other formats you should be familiar with. A new DVD format called DVD-Audio will soon be available (see "Tech Page: CD? No, DVD!" in the July 1998 issue of *EM*). Unlike DVD-Video, the new format is designed primarily to store audio-only data on standard DVD discs (although it can include a limited amount of graphics, such as album covers, lyrics, and artist bio information).

Because a DVD disc has such a large storage capacity (4.7 GB and up), uncompressed, multichannel audio is easily accommodated. As a result, DVD-Audio allows multiple channels of audio at several bit resolutions and sampling rates from 16/44.1 to 24/192 (although 24/192 is limited to two channels).

In addition, different rates and resolutions can be used on different channels within a single mix. Even so, it is likely that lossless compression will be used to reduce bandwidth requirements by a factor of two. In fact, a scheme called Meridian Lossless Pack-

ing (MLP) has recently been adopted as the standard compression for DVD-Audio. DVD-Audio players should become available by the end of the year.

Another new type of audio disc is the Super Audio CD (SACD) from Sony and Philips (see "Tech Page: CD—The Next Generation" in the March 1998 issue of *EM*). This type of CD stores multichannel audio using a very high sampling rate (2.8 MHz) and



**Two well-known  
mixing engineers  
claim they've been  
driven to tears of  
joy while  
mixing in 5.1.**

1-bit resolution, as well as a proprietary encoding algorithm called Direct Stream Digital (DSD). In addition, an SACD can include two layers: one with multichannel DSD data and one with standard stereo CD data, which means that such hybrid discs are fully compatible with current CD players. However, Sony's first commercial SACD player is stereo only.

**WHY 5.1?**

Most engineers, producers, composers, and musicians have been working in stereo for their entire careers, but they are becoming 5.1 converts in droves. Why? Because of the effect it has on the listener. The sense of realism, the apparent acoustic space, the impression of "being there" can be overwhelming to ears accustomed to stereo. Two well-known mixing engineers actually claim they've been driven to tears of joy while mixing in 5.1 because of the format's impact.

Others who are a little more restrained simply point out that humans are able to localize sounds that originate from any direction, and 5.1 is much more capable of stimulating this ability than stereo. Musicians and composers are particularly attracted to 5.1 because of the artistic possibilities it offers.

However, there is some disagreement about how 5.1 should be used. Most of these arguments revolve around aesthetic decisions that the producer, engineer, or composer must make. Some want to use the extra speakers to experiment with radical spatial placement of sounds. Others abhor this approach, and prefer to use 5.1 to heighten the listener's sense of being in an acoustic space. Debates of a more technical nature, such as which elements of the mix should be routed to the LFE channel, also abound.

**Web Resources**

For more information on multichannel audio, check out some of these Web sites.

<a href="http://Personal.riverusers.com/~manderso">Personal.riverusers.com/~manderso</a>	Provides listings of some surround recordings in 5.1 and other channel formats.
<a href="http://www.disctronics.co.uk/dvd">www.disctronics.co.uk/dvd</a>	Disctronics is a CD/DVD manufacturing company. Its site has very clear and concise information about both DVD and SACD.
<a href="http://www.dtstech.com">www.dtstech.com</a>	Gives information about DTS commercial cinema systems, consumer products, and 5.1 music recordings. Provides links to related sites.
<a href="http://www.dvdinsider.com/links.html">www.dvdinsider.com/links.html</a>	Is a source of a large number of links to Web sites on all topics related to DVD.
<a href="http://www.dvdresource.com">www.dvdresource.com</a>	Provides general information about DVD and has frequent postings of DVD reviews and new developments.
<a href="http://www.interfacers.com/CurrentEvents/HDTV/Advocate.shtml">www.interfacers.com/CurrentEvents/HDTV/Advocate.shtml</a>	Supplies information about high-definition television, which is part of the new digital television (DTV) system. Includes links to related sites.
<a href="http://www.kgw.tu-berlin.de/~y2371/SIGMA_1">www.kgw.tu-berlin.de/~y2371/SIGMA_1</a>	Has information about the $\Sigma$ -1 Multi Format Surround Tool for Pro Tools.
<a href="http://www.meridian.co.uk">www.meridian.co.uk</a>	Gives information about Meridian Lossless Packing data compression, which is used on DVD-Audio discs.
<a href="http://www.seneschal.net/dvd-a.htm">www.seneschal.net/dvd-a.htm</a>	Provides an excellent article about the DVD-Audio format by new-media expert Oliver Masciarotte.
<a href="http://www.surroundassociates.com/ssfaq.html">www.surroundassociates.com/ssfaq.html</a>	Gives informative answers to general surround-sound FAQs.
<a href="http://www.tmhlabs.com">www.tmhlabs.com</a>	TMH Labs was founded by Tomlinson Holman, the man behind THX. Site offers products and services to assure quality of audio systems and rooms.

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## ● SQUARE ONE

It should be noted that 5.1 has its own technical limitations. This is not the ultimate be-all and end-all of channel formats. For example, experts agree that the surround-sound effect can be greatly enhanced by adding even more channels and speakers. Dolby is experimenting with a 6.1 format for commercial cinemas called Dolby Digital EX, in which a center speaker is placed in the rear. In addition, several surround processors synthesize 7.1 channels of sound from 5.1 material. Systems with 12 or more channels are being tested for use in theaters and other specialty locations. However, the advantages of adding more channels must be weighed against the immense difficulty of transmitting, storing, and reproducing an increased amount of audio data.

### GETTING IN THE GAME

There are several pieces of gear that are unique to 5.1 mixing, but owners of modern project studios probably already have some of the items that are required to get started in 5.1.

First of all, you need to have enough speakers and amplification to reproduce five full-bandwidth channels and one low-frequency channel. Several companies, including Event, Genelec, Tannoy, Dynaudio, JBL, and Bag End, offer speaker packages specifically for 5.1 studio monitoring. Many of these packages include five matched speakers for the main channels and a subwoofer for the LFE channel. However, some engineers prefer to use smaller speakers for the surround channels, imitating the configuration common to many households.

Next, you need a way to pan sounds among 5.1 channels. Many newer mixing boards targeted toward the project-studio market are capable of mixing in 5.1. The Yamaha 02R and 03D, Mackie D8B, Tascam TMD-8000, Panasonic DA7, and the Roland VM series of digital mixers all provide this capability. It is possible to create 5.1 mixes with boards that do not include surround-panning features, but it is quite difficult, and the impressive cost/performance ratio of the new mixers makes them very attractive.

Several digital audio workstations now include 5.1 panning in their core software or allow the use of plug-ins that perform this function. Minnetonka Software recently introduced

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For manufacturer information, please see Contact Sheet, p. 179.



*Mx51*, a PC-based DAW with the ability to do 5.1 panning with the Digital Audio Labs V8 card or the Yamaha DSP Factory card as its audio hardware (see Fig. 2). Sonic Solutions' new Sonic Studio HDSP workstation includes surround panning as a standard feature.

Pro Tools owners can use the *Smart-Pan Pro* plug-in by Kind of Loud Technologies to perform 5.1 or even 7.1 panning on Pro Tools 24/Mix or Mix-Plus systems. SonicEngineering has introduced the *Panhandler* plug-in for DirectX hosts. Innovative Quality Software's *SAW*, Adobe *Premiere*, and Syntrillium's *Cool Edit Pro*. The 5.3 version of SEK'D's *Samplitude 2496* includes extensive surround mixing, and Steinberg's forthcoming *Nuendo* audio production software will also offer surround support. Rest assured that many more 5.1-capable DAWs, plug-ins, and mixers will appear in the near future.

What sort of device should you use to record your 5.1 mix? Any machine that lets you record six full-bandwidth audio channels will do. At present, the most commonly chosen option is multitrack tape. The nearly ubiquitous DA-88 and ADAT formats are excellent choices because of their popularity and their ability to record a 5.1 and stereo version of the same mix on the same tape. Mixing to a DAW is a great choice, especially if it lets you achieve better-than-CD audio quality, such as 24/96.

Depending on the delivery format you are mixing for, you might need to encode your 5.1 mix using a data-compression method such as Dolby Digital. This requires an appropriate encoder. Hardware encoders are expensive and sometimes available only by leasing, so the best option is usually a software encoder. Sonic Foundry offers *SoftEncode*, a PC-based application that allows six audio files to be encoded into 5.1 Dolby Digital. Astarte has announced the imminent release of *A.Pack*, which performs the same feat on the Mac and PC. Sonic Solutions offers a Dolby Digital encoder for its Mac-based workstations that provides real-time encoding.

#### FINAL THOUGHTS

The new 5.1-channel format provides audiences with a greatly enhanced listening experience, and it provides

artists and engineers with an expanded palette of creative possibilities. In addition, it produces these impressive results while remaining within the limits of the existing and emerging technologies that are (or soon will be) in the hands of the public. Enthusiastic acceptance by audiences and leading audio professionals indicates that 5.1's future is fairly well assured.

Of course, the 5.1 format does have its limitations, and debates about its "proper" use will simmer for quite some time. It is important to remem-

ber that this is typical for a new format.

Nevertheless, 5.1 is an amazing advance beyond stereo, and the equipment to produce it and play it back is commonly available and relatively affordable. All of these ingredients add up to one conclusion: It is high time to take a closer look at 5.1.

*Vance Galloway is a San Francisco-based experimental musician and new-media consultant. Scott Wilkinson is a contributing editor for EM and a journalist in the home-theater industry.*

## Meet Moe,

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The new Rolls HM60 Headphone Monitor System, along with the HM58 and HM59 Monitor Remotes are the ultimate in monitor mixing and headphone distribution. It mixes a main stereo signal with up to four mono sub-mixes, and has compression and eq for total headphone sound control.



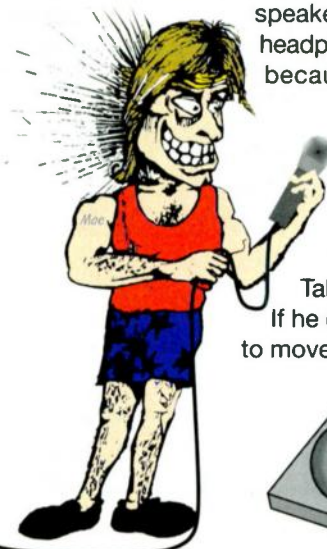
The PM50s and PM50sOB mix a stereo monitor signal with a balanced mic signal. Moe can plug his microphone into the PM50 - the signal passes through the unit without signal loss, and goes into the mixer. His monitor send comes from the mixer and goes into the Monitor input. Now Moe can adjust the monitor level and his own mic level himself.

The PM52 is the simplest of the bunch, it acts like a monitor speaker. It goes in-line and you plug headphones into it. It requires no power because it's using a speaker level signal.



Rolls also has headphone amplifiers like the HA43 Four Channel, RA53 Five Channel, and the RA62 Six Channel Headphone amplifiers.

Take Moe with you to the nearest Rolls dealer. If he complains that he still wants his arm-hairs to move, well, get him a fan.



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# Moving Units Online

*Selling your music through Internet music retail sites.*

By Lygia Ferra and Erik Hawkins

**P**roof of the Internet's potential to revolutionize the music industry is evident: Web-savvy musicians are madly setting up sites to promote and sell their material, and major labels are scrambling to keep up with the changing times. The Internet has the power to disseminate music worldwide without the hassle of going through traditional brick-and-mortar distribution channels (that is, major labels). But figuring out how to develop the infrastructure necessary to get your music

to consumers and generate profit (or at least break even) through the Internet is not a simple matter.

Selling product online is not as easy as it might sound, especially if you, like most independent musicians, are on a shoestring budget. Business banking, credit card processing, and setting up a merchant account require time and money. Getting enough people to visit your site on a regular basis and buy directly from you is another ordeal altogether. Major labels have the advertising dollars to lure potential customers and the budget to build business structures such as collections departments for bounced checks, secured credit transactions systems, order-fulfillment houses, and so on. Very few independent musicians have access to those kinds of resources.

Nevertheless, an indie can make an online impact similar in scope to that of a major. To do so, you need to understand the workings of online business, specifically of Internet music retailers.

## RETAIL LOCATIONS NEAR YOU

Think of an Internet music retailer as a neighborhood record store with the whole world as its neighborhood. There are big virtual record stores, small mom-and-pop sites, and a variety of permutations (see the sidebar "On the Retail Trail"). With new music retail sites popping up almost every

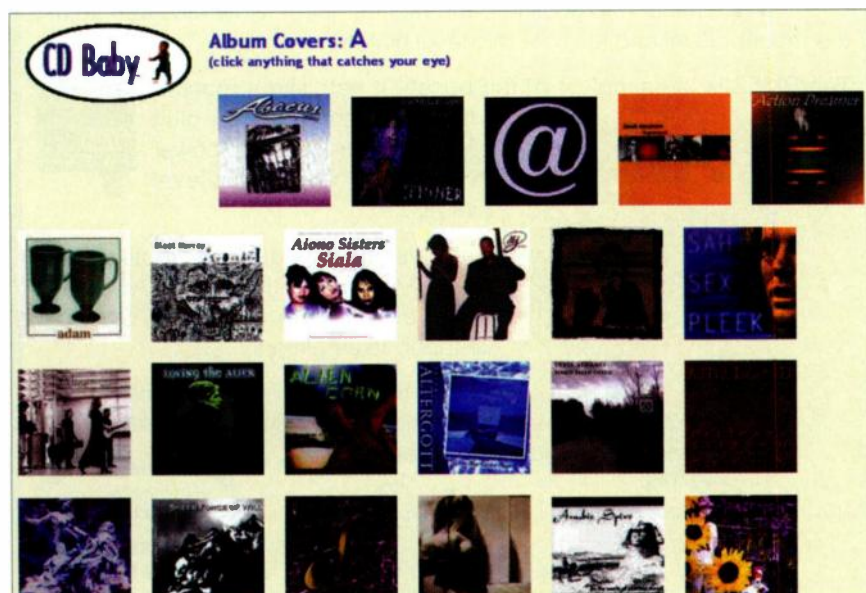


FIG. 1: CD Baby's cover-art pages are online virtual record bins. You can browse through titles in much the same way you would in a real-world music store.



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88 Note Graded Hammer action • 64 Note polyphony  
• Stereo piano voices plus EPs, strings, organ and bass • Single, dual and split voices • Reverb  
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**P80** • 88 Note Graded Hammer action • 64 Note polyphony • Stereo piano voices plus EPs, strings, organ and bass • Single, dual and split voices • Reverb and modulation effects • 10,000 Note, 2-track sequencer • Portable 37 lb. design • **\$1295 MSRP**

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**FIG. 2:** Fisher lists on her Web site the Internet retail locations where her CD is available. Clicking on a retailer's icon transports you to her page on their site, where you can buy the CD.

day, it's impossible to cover all of them. We'll profile the ones we've had experience with and others that have a good reputation. Before you give your product to any Internet retailer, be sure to check its reputation and find out how long it has been in business. If the company makes you uncomfortable, seems to have too much red tape, or wants you to sign contracts, move on. All the companies we discuss here are nonexclusive.

Amazon.com is a major online retailer with a great reputation. It carries independent releases right alongside major-label releases and reports having 10.7 million customers in 160 countries. The company has a program called Amazon.com Advantage ([www.amazon.com/advantage/music](http://www.amazon.com/advantage/music)), which is specifically geared toward independent artists. The program is completely free: it has no listening fees, CD storage fees, or anything. You can have a description of your music, any reviews you've received, along with your cover art, liner notes, bio, and three 30-second sound clips posted on the Amazon site. The only prerequisite is that you have a UPC bar code, which is standard for all the big online retailers.

The company takes 55 percent of every sale, so if your CD lists for \$12.99, your net is \$5.85. Although you set your price (in dollar increments from \$8.99 to \$22.99), Amazon reserves the right to discount it. However, even if Amazon does choose to discount your CD, you will still receive a 45 percent cut of its original list price. Amazon mails out checks once a month. Members of the Amazon.com Advantage program have access to password-protected

reports that detail how their titles are selling and how much money they have made. Also, sales rankings for all of Amazon's titles are posted on the site.

Amazon recently implemented its New Music Spotlight, which appears in the Free Digital Downloads area of the site. The New Music Spotlight features full-length MP3 files by independent artists. Amazon's editorial staff chooses the songs that are featured, and new

artists are added frequently. "Our Free Digital Downloads area was launched in June, but until now it has focused mainly on big-name artists from major labels," says Amazon's product manager for music, Greg Hart. "Now, with the New Music Spotlight, music fans can also discover independent artists they would normally never come across. It's a great way for customers to check out new music."

CD Baby is a relative newcomer but is already highly regarded ([www.cdbaby.com](http://www.cdbaby.com)). A mom-and-pop site, it was started almost two years ago by Derek Silvers and caters exclusively to independents. The site currently has about 700 artists and adds about 30 new artists every week. "CD Baby is the kind of store that's a musician's dream, the kind of place I wished existed when I released my first CD," says Silvers. Pay a one-time setup fee of \$35, and Silvers will scan your artwork, digitize your music, and create a CD Baby Web page for you. The fee covers up to four

tracks; additional tracks cost \$10. Your cover art will also appear in the virtual record bins for those folks who are just browsing (see Fig. 1). CD Baby has no prerequisites for joining; you don't need a bar code or even shrink-wrapped CDs. The company takes a flat fee of \$4 from every sale and never sells advertising space on its site. You set your own price (most CDs on the site are priced at around \$10), and when a CD sells, you receive an e-mail message with the customer's contact information. This feature is invaluable for compiling your band's mailing list. Silvers is also always on top of his catalog, and will recommend appropriate artists to film and TV music directors when they call.

An alternative to the more traditional retail structures is CD Street ([www.cdstreet.com](http://www.cdstreet.com)). This company is essentially a fulfillment house, providing a merchant account and a secure credit transaction system. An icon on your Web site links customers to CD Street's transaction page. Once an order has been placed, the company processes it and ships the CD. (If you prefer, you can ship the CD yourself.) The customer is billed for shipping and any applicable taxes. CD Street has no setup fees or other prerequisites for its service. The company takes 15 percent of every CD sale. Its commission is low, which translates to more net profit per CD for the musician, but it is not a retail store and does nothing to generate traffic, so your CD won't be automatically exposed to the music-buying public as it would be on an actual retail site.

Another alternative to regular retail sites is the MP3 site ([www.mp3.com](http://www.mp3.com)). It lets you sell your music via a DAM CD,

## ON THE RETAIL TRAIL

Listed below are some of the Internet retail sites we have discussed here, and some that are not mentioned but are certainly worth checking out.

### Major Retail Sites

[www.amazon.com/advantage/music](http://www.amazon.com/advantage/music)  
[www.theorchard.com](http://www.theorchard.com)  
[www.cdnw.com](http://www.cdnw.com)

### Mom-and-Pop Sites

[www.cdbaby.com](http://www.cdbaby.com)  
[www.lama.com](http://www.lama.com)  
[www.tweekitten.com](http://www.tweekitten.com)

### Just for the Ladies

[www.rahul.net/hrmusic](http://www.rahul.net/hrmusic)  
[www.ladyslipper.org](http://www.ladyslipper.org)

### None of the Above

[www.mp3.com](http://www.mp3.com)  
[www.amp3.com](http://www.amp3.com)  
[www.cdstreet.com](http://www.cdstreet.com)

Your computer

Your mixer

## Introducing WaveCenter/PCI

OK, you see what's happening: digital mixers are looking pretty cool. After all, they've got incredible sonics, built-in effects, and the automation capabilities you could only dream about before. But if you hook that puppy up to the NoiseRacket analog soundcard that came with your computer, you're right back in \*\*\*\*ville. (Rhymes with "Snapville.")

Here's a better idea: keep it digital with our new WaveCenter/PCI card. It has all the connections you need to integrate your digital mixer into your computer-based studio. Transfer up to 10 channels of digital audio simultaneously using ADAT lightpipe and S/PDIF, with 24-bit resolution on all channels. Use one of the built-in MIDI ports for mixer automation, and the other to connect your synthesizers.

Built from the same technological foundation that's made our Dakota card the leading digital I/O and MIDI solution for the PC, WaveCenter/PCI provides all the connections you need to integrate your PC or Mac with your digital mixer.

Your card

### The perfect partner for your digital mixer

- 8 channels of ADAT optical I/O
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which is a CD-R with tracks in MP3 and audio file formats. Listeners pop the CD-R into their computers to listen to the MP3 files, transfer them to their portable MP3 player, or listen to the audio files on their compact disc player. For every DAM CD you sell, MP3.com splits the revenue 50/50. This commission may seem high, but consider the fact that you don't pay for anything else. It's free to join, and all you have to do is send your audio tracks; MP3.com burns and mails the CD-R. You can set your own price (\$4.99 to \$9.99) and choose the genre from hundreds of categories. Furthermore, on the MP3 site you get a page dedicated to your songs, which you can link to your own Web site. The top ten selling DAM CDs are listed weekly, as are the most downloaded singles. Because the MP3 site gets thousands of hits every day, involving yourself with this company is a great way to increase your exposure.

Haven't manufactured a CD yet? Not a problem—you can still sell your material on MP3. Convert your songs to the MP3 format and upload them to the site. (Visit the MP3 site for information on how to do this.)

An important point to note is that if you want to sell DAM CDs through MP3, the company requires you to post at least one free MP3 track on its site. Don't worry—giving up a track won't eat into your sales. First of all, MP3 files aren't CD-quality audio. Second, you don't have to give away tracks that are on your actual CD. In fact, many artists use the DAM CDs as a platform for remixes, live performances, songs that didn't make it onto their retail CD, and sometimes even demos (great for die-hard fans). It's a good idea to offer at least three free MP3 tracks. Rotate them by replacing the oldest song with a new one every month. This way, folks can download several tracks and get a real feel for your music. If listeners like what they hear, they might link to your site to purchase your CD. Or if they don't buy the retail CD, they still might buy the DAM CD on the MP3 site. Either way, you can't lose: another set of ears has heard your tunes.

**THE BIG SETUP**

The three keys to online sales are options, links, and hits. If you have these elements in place, old fans will find you, new fans will discover you, and

with a little luck, you should see some national and international sales.

With e-commerce still so new, customers need to have the option of buying goods through the channels they feel most comfortable using, so you should give them a choice of where to purchase your CD. Provide links on your Web site to more than one retail location (see Fig. 2). Customers might not feel at ease sending you a check or ordering through the mom-and-pop site where they found you, so make sure at least one of the major music retailers carries your product. Having a variety of purchase points increases the odds of making a sale and being seen.

It's been said before, but it bears repeating: links are crucial for generating traffic. The more links you have out there, the better. Make sure that the retail locations you work with provide links to your site. That way, no matter where somebody discovers your CD, that person always has a way to get to your site for more information and other ways to buy product. Hook up with other independents and trade links. If you align yourself with artists or organizations working in similar genres, chances are good that folks visiting those sites will also visit yours. Links have a cumulative effect, so keep pursuing them. Well-placed links help people distinguish you from all the other musicians on the Net by associating you with sites that people already know and like.

Hits are only as good as the sales they generate. Even though big retailers get a lot of hits, these hits do not guarantee sales. People need to hear your music, be assured that the CD isn't a lemon (something consumers are especially wary of with independents), and get excited about the music before they make the purchase. Real Audio lets people hear your tracks almost instantaneously, but its sound quality is less than astounding. One solution to this problem is to give some tracks away as MP3 files at the MP3 site (see Fig. 3), as we mentioned earlier.



**FIG. 3: Scott Meldrum offers three free MP3 tracks from his debut CD on his MP3 page. He regularly rotates these tracks with others from his album to keep people coming back for more.**

This lets folks hear your music with much better sonic clarity and listen to it at their leisure.

**HIGH RISK, HIGH REWARD**

So far, online sales figures for independents have been very modest. Don't expect to sell thousands of units right away. Silvers says that CD Baby averages about 350 sales per week. That means only about half of the 700 artists in the company's catalog are selling their CDs. One explanation is that purchasing music on the Net is still in its infancy, but the prevailing reason is that, more often than not, people just don't know about new independent releases. This topic is too vast to discuss here, but as Silvers points out, "The top sellers at CD Baby sell a lot largely because they play out live." The connection between people who see an act in concert and people who buy the act's CD online is strong, so don't ignore it.

An example of a CD that is selling quite well online is *One* from Fisher (www.digitalsound.net). Ron Wasserman, who produced and cowrote the songs on *One*, explains that they are aggressively marketing online using links, banners, reviews, MP3, and anything else they can think of. He was kind enough to give us a sales breakdown for a two-week period in May. Out of 363 CDs sold, 170 were sold through Internet music retailers (40 through CD Street, 30 through CD Baby, and 100 through Amazon), 40 via word of mouth, 30 at local "real-world" retail stores, and 123 by check or money order. (Mailing a check is still a popular way of buying goods despite improved security of online



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## WORKING MUSICIAN

credit card transactions.) These are great figures for an indie; most report far less.

Halley DeVestern's release, *Sugar Free* ([www.tnom.com/halley](http://www.tnom.com/halley)), is being offered on MP3, CD Baby, Amazon, and Harmony Ridge (a site exclusively for indie female artists). DeVestern says she is excited about being part of sites such as MP3 and Harmony Ridge, but she stresses the importance of being with a major retailer as well. "Being on a site like Amazon makes you look legit," she explains. "People will go with the safety and name recognition it has rather than buy from a site they've never heard of." Offering a free single on MP3, she reveals, "is great because I can see exactly how many downloads I've had." Scott Meldrum ([www.crushwerx.com](http://www.crushwerx.com)), another MP3 artist, concurs. MP3 singles from his debut CD, *Crush*, have seen more than 30,159 downloads. His sales figures for the second quarter of this year, with more than 145 DAM CDs and 502 retail CDs sold, prove that offering free MP3 files works.

## UP IN VIRTUAL ARMS

The Internet now allows indies to stand toe to toe with major labels. However, independents must understand how to use and develop the distribution channels that are evolving in order to have a fighting chance of survival, let alone success. They have to be proactive and aggressive in their involvement with online music retailers, customers, and new audio formats to show that they can produce quality product and sizable revenues. This is the only way to grab a big enough piece of the market to stay on a par with the majors, because the majors will soon come thundering on the scene, waving their fat wallets and proprietary technologies (like digital copy protection and music tracking systems). If indies can create online support systems and business structures, they won't be so easily brushed aside.

*Lygia Ferra is a songwriter/producer whose first independent release as a solo artist is in its final stages. The album, Strange Peculiar, is slated to hit retail stores before the end of the year. For more information, visit her Web site, [www.lygiaferra.com](http://www.lygiaferra.com). Erik Hawkins is a musician/producer working in Los Angeles County and the San Francisco Bay Area. You can check out his fledgling indie label at [www.muzicali.com](http://www.muzicali.com).*



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# Taming the Elements with MIDI

*The remarkable sound sculpture of Trimpin.*

By Tim Perkis

Imagine using your keyboard to control the rhythm of water drops. Or using your sequencer to play organ pipes with fire. In a career spanning nearly 30 years, Seattle-based sculptor/musician Trimpin has built an astonishing array of experimental musical instruments, machines, and sculptures that do both of these things and more.

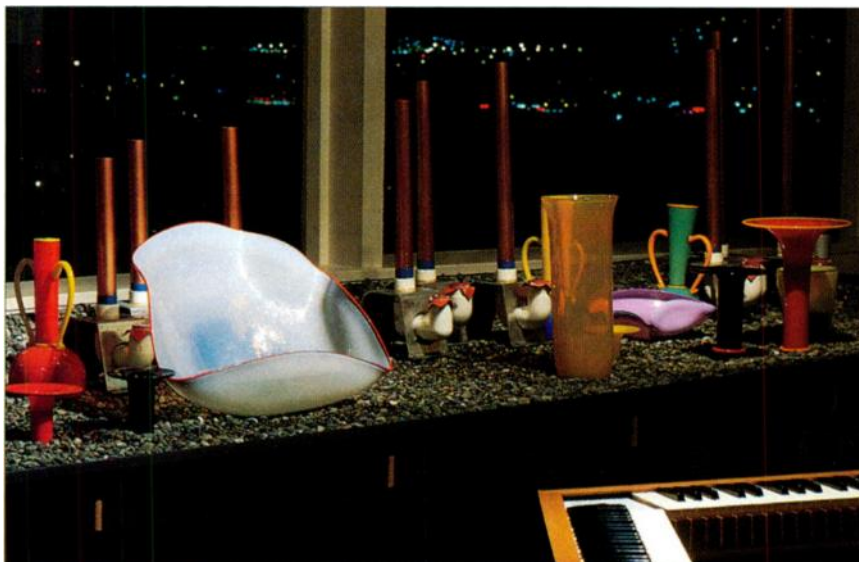
Trimpin's specialty is computer-controlled mechanical instruments. He often designs and builds every piece of the instrument, from the special-

purpose computers that hold the scores to the finely crafted mechanical devices that make the sounds. In one sense, Trimpin's work is old-fashioned: he never uses loudspeakers or synthesized sound, and the sound always comes from the mechanical action of real objects. In another sense, his work is contemporary: the mechanical instruments are usually controlled by computers using MIDI.

Trimpin often creates robotic extensions for conventional musical instruments such as pianos, organs, violins, and trumpets. But other works are much more fanciful and unusual; Trimpin is continually finding ways to harness elemental forces—fire, air, and water—for musical use. His works are in galleries and museums throughout the world, where they either play pre-programmed compositions or are played by the visitors.

## META PIANO

*Contraption IPP* (Instant Prepared Piano) 71512, for example, consists of a mechanical superstructure that sits over a grand piano and plays the strings directly using a host of mechanized objects (see Fig. 1). *Contraption* has four tracks, each with its own set of performance tools. The timbral range of the piano is greatly extended as *Contraption* bows, plucks, and dampens the strings with the different shapes and materials. The piano can also be played



JAKE SENUK

For his work *Liquid Percussion*, Trimpin designed and built a system that regulates water dripping into vessels created by glass artists in Seattle. A custom-built keyboard is used to "play" the drips.



Neil Karsh is the Vice President of Audio Services for New York Media Group. Recently, Karsh selected LSR monitoring systems for two of his Manhattan facilities, *Lower East Side* and *East Side Audio*.

“We’ve installed the first of our LSR 5.1 surround systems at East Side Audio and it’s a great addition. The sound is extremely clear and is enjoyed by our mixers and our clients. Everyone is very pleased with the result.”

New York

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David Kershenbaum is a Grammy Award winner who has been on the cutting-edge of music production for decades. His discography is a remarkable ‘who’s who’ of popular recording.

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Los Angeles

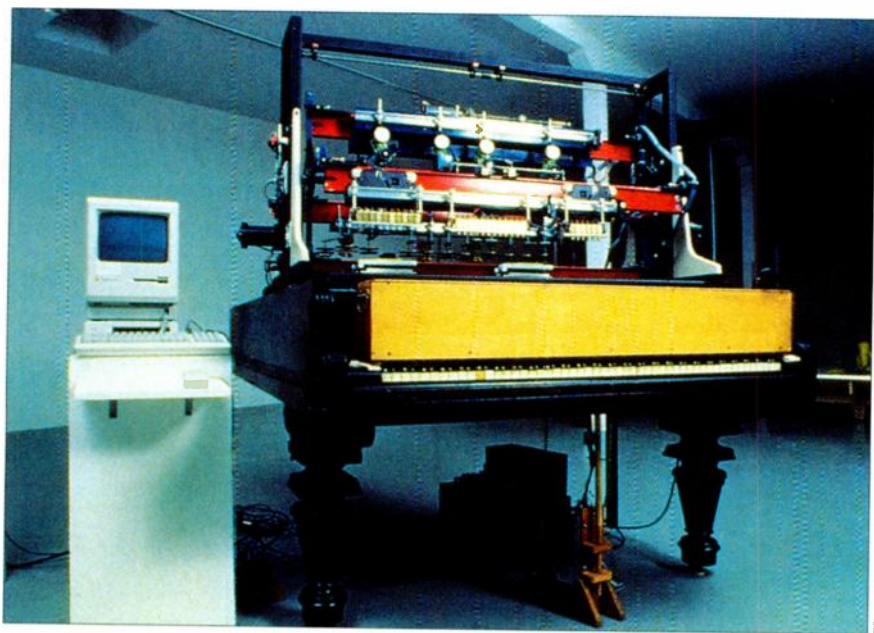


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**FIG. 1:** *Contraption IPP 71512* uses a large, remote-controlled device to pluck, bow, dampen, and prepare the strings inside a grand piano.

from the keyboard, either by hand, or by using remote control to direct mechanical pistons that push down the individual keys. For this piece, Trimpin uses a Macintosh Classic running Opcode's *Max* MIDI software.

Trimplin has been especially inspired by the work of expatriate American composer Conlon Nancarrow. In his Mexico City studio, Nancarrow composed and punched piano rolls to create amazing player-piano works, many of which are impossible for human beings to play.

Trimplin's interest in the work of Nancarrow led him to build a device that optically reads Nancarrow's rolls and records the data on a computer for transcription into MIDI song files. Then he built a device that mechanically depresses the piano keys, in order to play Nancarrow's pieces and other demanding compositions. (According to Trimplin, this device is still the only way to play Nancarrow's pieces on a real piano under MIDI control. Commercially available MIDI pianos, such as the Yamaha Disklavier, cannot play pieces as dense and complex as Nancarrow's.)

Nancarrow's work also plays a part in one of Trimplin's more recent creations. *Conloninpurple* is a set of 84 wooden marimba bars, each coupled with an electromechanical striker and an anodized, purple, trumpetlike resonator. The bars, which hang from the

ceiling, are distributed throughout the performance space. Because they are placed throughout a large area, the music seems to move quickly around the space during the course of a piece. *Conloninpurple* is designed to play not only Nancarrow's pieces, but other works from MIDI files as well.

#### BACK AT THE LAB

During my visit to his Seattle studio, Trimplin expressed his frustration with using commercially available MIDI devices for his work. The Nancarrow scores, for example, are very demanding because they often require dozens of notes to be played simultaneously. The transmission speed of standard MIDI is not the limiting factor. Trimplin has found that disk-based MIDI sequencers are not able to keep up with the speed and density in Nancarrow's works without disrupting the timing of events.

As a consequence, Trimplin applies the same careful craftsmanship to the control electronics that he puts into his mechanical assemblies. "You say to yourself, 'Why not use commercial equipment, because it exists? It's already designed, engineered, and it's inexpensive.' But then you realize it doesn't really work," he notes. "I have some installations in museums that need to run every day for years. As soon as you have a moving part—such as a disk-drive motor—it wears out. I'm now

working to design a flash-memory MIDI sequencer that has no moving parts."

#### ALL THINGS COMBUSTIBLE

A new version of Trimplin's *FireOrgan* was also under development in his studio. While his studio assistant, Troy Swanson, machined parts in the background, Trimplin demonstrated the operation of a *FireOrgan* pipe. A normal organ pipe functions by forcing air through a pipe of a particular length, with the length of the pipe determining the pitch. *FireOrgan* works in a similar way, but the flow of air through the pipe is induced by a flame, just like the airflow through a normal chimney.

Two small pilot lights glow at the bottom of each Pyrex glass pipe. A MIDI-controlled valve turns up the gas on one of the flames, causing air to flow and the pipe to sound. The result is a beautiful, slow onset of each tone. The dancing of the blue and yellow flames is also beautiful, especially at night. As with many of Trimplin's installations, the instrument operates in two modes: one in which visitors can play the organ with a keyboard, and one in which it is controlled by prerecorded MIDI sequences.

#### ELEMENTAL MUSIC

Complementing the *FlameOrgan* are works in air and water. *PHFFFT* (1992) consists of nearly 200 air-activated instruments: accordion reeds bleeping through tuba bells; duck calls honking through bass clarinet bells, whistles, and flutes. *Hydraulis* (1994), created in collaboration with Clark Wiegman, is an interactive water wall. The movements of passersby trigger the fall of water; different movements result in different water patterns. The falling droplets strike tuned surfaces, producing correlated visual and sonic effects.

Trimplin's workshop is filled with scavenged surplus metal parts, as well as new, expensive anodized items. He used to work with wood and scavenged metals exclusively, but his success in recent years has allowed him to use more expensive materials. For example, *FlameOrgan* is made of beautiful materials: clear Pyrex tubes; red, anodized-aluminum collars; and precisely machined brass fittings. "The wood period is over," says Trimplin. "With wood, I can use hand tools to do everything I want to do. With metal I need much more machinery, and when

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I didn't have much of a budget, I used the cheaper materials. But slowly throughout the years, as the budgets have gotten better, I can demand more."

### BLACK FOREST PRODIGY

Trimpin's interest in mechanical tinkering dates back to his childhood. "Working with music and mechanics was a fascination of mine as a kid, because I grew up in the Black Forest [Germany] with all the barrel organs, band organs, and automatic clocks," he explains. "When I was a kid, I made my own kind of music machines. When I was around ten years old, I collected 12 or so old-fashioned tube radios, took the wooden cases off, and stacked them up. Then I connected the dials for changing the stations with one pulley, so when you turned one dial it would change all the stations on all the radios. I would work for days on this pulley system, so that they would all be moving at the same time, on completely differ-

ent stations. This was almost like rap music."

While many of his later works involve mechanized percussion or string instruments, Trimpin says that early on he was interested only in devices that involved breath and provided simulations of what the human body could do directly. Some of his earliest works were mechanical trumpet players that were actually able to play melodies on brass instruments using rubber lips and compressed air. He rarely shows these works now, on account of their temperamental and fragile nature.

Although Trimpin started out playing brass instruments, he had trouble with his lips and eventually became a percussionist. An encounter with modern percussion music led to another driving obsession in his work: the distribution of synchronized sounds in space.

"There was a percussion group in Strasbourg [France], not far from where I grew up, that performed mostly contemporary work," notes Trimpin. "And I remember hearing a Xenakis piece that used the spatial location of the different percussionists. Each group of instruments was in a different part of the performance space. But as soon as a certain sequence was starting to sound in the round, it was lacking synchronization. From this moment on I was fascinated with spatial sounds. In fact, this goes back to my childhood, when I was with my father in the forest playing duets—I've always had a fascination with acoustic environments."

Mechanical means, and eventually MIDI, have proven to be perfect solutions to the problems Trimpin encountered when he tried to precisely synchronize instruments distributed throughout a space. "My main interest," he says, "was always in using the space as a medium. But then

you need some kind of automation. That's why I began using mechanical means to operate the instruments. Then of course when MIDI came out, this was the perfect way to adapt all my hardware and software. MIDI is like a player-piano roll: it doesn't store any sound—it stores information—and it doesn't matter if you hook up a synthesizer or a motor or any kind of mechanical means, because MIDI is still doing the same thing. It's just information about what you want to do, and this was the perfect kind of serial communication I needed to perform all of these tasks with instruments that were placed in different locations."

### MIAMI TRIKES

Perhaps the ultimate expression of freely spatialized and tightly synchronized music is Trimpin's *Miami Klangflotte* project (see Fig. 2). For this work, Trimpin created a fleet of six, customized tricycle rickshaws, each equipped with automatically operated musical instruments. Each rickshaw represents a particular group of instruments, such as drums, horns, or xylophones. Wireless MIDI receivers on each rickshaw allow the whole fleet to be played in sync.

One special rickshaw transmits the information to the other five, and the driver of this rickshaw also serves as conductor, transmitting instructions via walkie-talkie to coordinate the movements of the other drivers. "When the



SHERYL BALL

FIG. 2: Trimpin built six customized tricycle rickshaws equipped with automatically operated musical instruments for his *Miami Klangflotte*. Each tricycle receives messages via a wireless MIDI system, allowing the entire group to play in sync.



ARMANDO LINDNER

FIG. 3: For his work *D.R.A.M.A. ohno*, Trimpin designed special costumes that are outfitted with a variety of reed and flute instruments (including armpit accordions and shoe flutes), so that every movement of the body makes a sound. The costumes were built by Mariane Koimanns.



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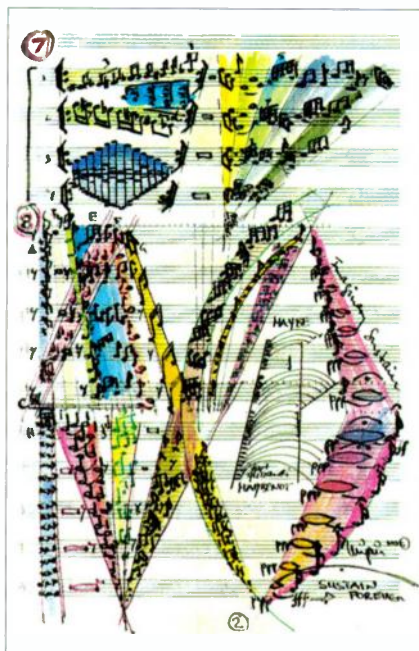
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Pluggo works with Macintosh audio software that supports the VST, VST 2.0, and MAS (MOTU Audio System) plug-in formats.

## ● PERFORMING MUSICIAN



An excerpt from Trimpin's visual score for *Conloninpurple*. This work incorporates 84 marimba bars, each coupled to an electro-mechanical striker and purple resonator. *Conloninpurple* will be at the Holter Museum of Art in Helena, Montana, until January 2, 2000.

bikes are traveling in a clockwise direction around the audience, the automated instruments might be playing sequentially counterclockwise," Trimpin explains. "The audience will experience how sound is moving in many different directions simultaneously."

### HIGH-DENSITY SCORING

For score preparation, Trimpin uses either Opcode's *Vision* or Mark of the Unicorn's *Performer* software, depending on his needs. He prefers working graphically and finds *Performer*'s piano-roll notation easiest to use for his purposes. "MIDI is still perfect for what I'm doing; I don't need any more upgrades. Of course today everybody works with audio signals, such as direct synthesis, but I never use any audio amplification, synthesis, or loudspeakers of any kind."

Trimpin's interest in spatialization accounts in part for his complete dedication to using acoustic sound sources, without relying on loudspeakers. "As soon as there are loudspeakers involved, the sound is not the same anymore, because space is the essential resonating chamber, and not this tiny loudspeaker which tries to recreate the environment it was in before. I've never

been satisfied with any kind of recorded sounds; for me it's a big distortion when I listen to any kind of recording. For this reason it's not my interest to put any recordings out; my philosophy is that everyone should record this in their brain, and that's the only recording that exists at this moment in this space at this time. These kind of mental recordings shouldn't be destroyed."

### THEATRICAL WORKS

Besides his prodigious output of mechanical installation pieces, Trimpin has also worked in the medium of musical theater and performance. His work *D.R.A.M.A. ohno* (1993) intentionally seeks to create in the listener confusion about the source of the sounds they are hearing during the performance. "The audience is confronted with concurrent sound effects which are synchronized with other performance elements in such a way that one is never quite sure what is actually the source," Trimpin explains.

The sound sources include drums played by MIDI-controlled water drops. As the water falls, a strobe light flashes on the drops, creating a visual analog of the sounds. In addition, the dancers in the performance wear specially designed costumes with built-in instruments, including shoes fitted with air pumps and flutes, and armpit accordions. In this way, the movements of each dancer generate specific sounds (see Fig. 3).

### (R)EVOLUTION

Trimpin's work continues to evolve as he explores new sonic and technological frontiers. Upcoming projects include a theatrical collaboration with composer Robert Ashley, involving *Fire-Organ* and visual projections on steam clouds (MIDI controlled, of course, by regulated dripping of water drops onto heated plates).

Because Trimpin's works are not recorded for commercial release, the only way to experience them is to catch them in person. This is getting easier to do, as his growing popularity is inspiring more museums and festivals in North America and Europe to commission him.

Tim Perkis is a musician, writer, and engineer living in the San Francisco Bay Area. His home page is at [www.artifact.com/perkis](http://www.artifact.com/perkis).



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The more LF transducer cone area a speaker has, the more bass it can produce. But a huge low frequency transducer isn't an option on a compact near field monitor.

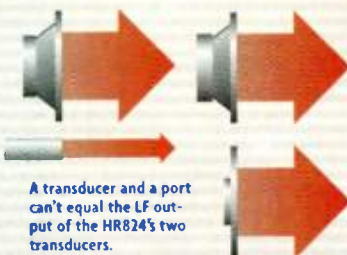
Last fall we won the pro audio industry's coveted TEC Award for best near field monitor. Modesty prevents us from listing the impressive field of competitors but you'll probably encounter their ads in this very magazine.



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To augment primary bass output, other monitors resort to using ducted ports that can convert cone movement into extra low frequency air movement. But for optimal output, a ducted port needs to have the same area as the low frequency transducer — an 8-inch near field monitor would need an 8-inch vent. Needless to say, you haven't seen any vents this big on other near field monitors. When vent size is reduced, bass output is compromised. And, forcing a lot of energy out of small ports can create audible wheezing and whooshing.

Instead, the HR824 adds a large passive transducer with the cone area of another 8-inch woofer. This ultra-rigid, honeycomb laminate piston tightly couples with the HR824's active bass transducer. With a combined cone area greater than a single 12-inch woofer, you get exceptionally extended bass without port noise complaint.



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Punching out crisp bass requires a lotta watts. The FR Series™ high-current bass amplifier module inside the HR824 delivers a solid 150 watts of power with peak output in excess of 250 watts (plus another 100 watts for mid and treble). That's significantly more than any other 8-inch active monitor. Moreover, the HR824's servo coupling and ultra-short signal path put that power to work far more effectively than a passive monitor and a 250-watt stereo amp could.

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# REVIEWS

Y A M A H A

FS1R

*FM and so much  
more for the new  
millennium.*

By Julian Colbeck

The sounds are vastly complex and produced, and the unit's humanistic formant-shaping-synthesis technology is fascinating and different. Dig beneath the presets, and you'll find yourself in an extremely dense and complicated operating system, immersed in operators and algorithms. This is territory that will be simultaneously familiar yet unfamiliar to all the players around the planet who bought the world's second-best-selling synth back in the 1980s. Let me present to you the DX7 2000 in a box, aka the Yamaha FS1r.

If you still have an old FM synth but curse its now rather lo-fi output and plain-jane patches, you will find that

the FS1r is to die for. You can transfer DX patches into the FS1r and give them a fresh coat of paint by applying new filters and effects. That will put you several years ahead of most FS1r owners, who will definitely spend their first year with the instrument playing presets and steering well clear of the edit buttons.

#### ON THE CASE

Yamaha has not gone overboard with the hardware. The FS1r is a standard 1U rack-mount unit that offers 4 free-flowing control knobs, 15 teeny mode/access buttons, and a good-size (3- x 1-inch) backlit LCD. The power switch, headphone socket, and master

118	Yamaha FS1r
126	Steinberg ReCycle 1.7 (Mac/Win)
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172	Quick Picks: Ego Systems Dr. D; Steinberg FreeFilter (Mac/Win); Arboretum Systems Restoration-NR 1.1.0 (Win); Keyfax Guitar Grooves (Mac/Win); Carl Martin Compressor/Limiter



The Yamaha FS1r stands in the long tradition of FM tone modules but adds significant new resources. Among the most important additions is formant synthesis, which is particularly adept at modeling human vocal sounds.

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Keyboard Magazine, November '99 Issue

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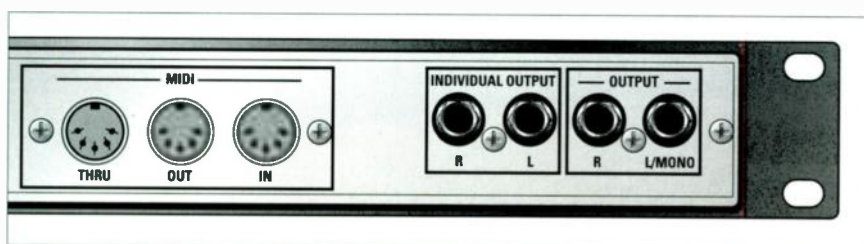


FIG. 1: The rear panel of the FS1r sports the traditional MIDI ports and two sets of audio outputs.

volume are also front-mounted. At the back are the main L/R outputs, a set of audio outputs (Part/Voice), and MIDI In/Out/Thru (see Fig. 1).

The four control knobs have three separate functions. When you press the upper of the two LED buttons, they serve as global tweakers of Attack, Release, Formant, and FM. Press the lower button, and the knobs become four assignable controllers. In Utility mode, they provide direct access to Part/Op, Group, Cursor, and Value.

I'm grateful for any immediate, real-time control over sounds within a rack module, but to some extent, the knobs' power is restricted by the almost unfathomable number of options available. If you leave well enough alone and allow each Performance to be controlled by whatever assignments the Yamaha programmers decided would be cool, fine. But start tweaking, and the complexity of choosing options soon discourages you from investigating them. You might also encounter some anomalies that I'll detail later on.

In general, I found the user interface pretty grueling; it's reminiscent of Korg's Wavestation SR. Luckily, as with the Wavestation, the preset sounds and available features are such that you can learn a little, forgive a lot, and move on.

### THE MAIN DEAL

This is a turbocharged, 32-note polyphonic FM tone generator. With a maximum multitimbrality of four parts, it's clearly not designed as an all-things-to-all-people module. GM it's not, though it does seem to respond to Yamaha's XG format in terms of NRPN control.

The FS1r sounds different. It sounds new. It includes some devastating natural-instrument sounds, particularly in the electric-piano and bass class, but it also ventures into the uncharted waters of formant sequencing and real-time control over timbral content. The response is

superfast, which makes it a perfectly acceptable solution for a gigging player who admires the classic nature of FM pianos but wants to use them in a cooler, more modern environment. And there's enough under the hood to keep even the most ardent programmer merrily tied up in knots for years.

You can edit from the front panel, but Yamaha also has a Mac-only editor available for downloading on its British Web site ([www.yamaha.co.uk/synth](http://www.yamaha.co.uk/synth)). Frankly, neither approach is remotely friendly. Documentation for the instrument itself will make no sense to 99 percent of the buying public, and documentation for the editor software is nonexistent.

As I said: DX7 2000, welcome back!

### BASIC THEORY

The FS1r sells itself on FS (formant shaping) synthesis, which, as Yamaha admits, is closely related to the company's groundbreaking FM (frequency modulation) synthesis in the DX

series. If you understand FM, you will understand the principles here, even though the range of parameters, operators, algorithms, and processing options has been increased substantially. (For an overview of FM synthesis, see "Square One: FM Basic Training" in the April 1999 issue of *EM*.)

If you don't understand FM, you will be joining the 199,900 DX7 owners (out of 200,000) who had no clue how to program the DX7 from an initialized patch. It's the same with the FS1r, thanks to the fiddly user interface, tiny panel buttons, and a zillion levels to each page. Adding to the problem is the fact that this is a rack-mount module, and as with most such modules, it's almost impossible to view the screen from a comfortable angle. A centralized Value knob would have been helpful.

The word *formant* in *formant-shaping synthesis* refers to the defining timbral characteristics of vocal sounds. Certain fixed frequencies are amplified by the vocal tract, whereas others are attenuated; the amplified frequencies are called formants. With the FS1r, these timbral characteristics can be applied to other types of sounds as well.

Rather than using a conventional system of filtered oscillators and noise generators to imitate consonants and the various subtle changes that make up complex vowels (ai, ee, ow, and so on), Yamaha turned to its trusty FM synthesis system. In a slight twist on

## FS1r Specifications

<b>Synthesis Engine</b>	formant synthesis, frequency modulation
<b>Polyphony</b>	32 notes
<b>Multitimbral Parts</b>	4
<b>ROM Performances</b>	384 (3 banks × 128)
<b>ROM Voices</b>	1,408 (11 banks × 128)
<b>User Performances</b>	128
<b>User Voices</b>	128
<b>Operators</b>	8 voiced, 8 unvoiced
<b>Algorithms</b>	88
<b>Real-Time Controls</b>	4 knobs (multifunction)
<b>Effects Types</b>	reverb, variation, insertion, EQ (1 bank each)
<b>External Storage</b>	SysEx only
<b>Audio Outputs</b>	(2) unbalanced 1/4" master L/R; (2) unbalanced 1/4" aux; (1) 1/4" stereo headphone
<b>Other Ports</b>	MIDI In, Out, Thru
<b>Display</b>	3- × 1-inch backlit LCD
<b>Special Features</b>	Formant Sequences, DX patch loading
<b>Dimensions</b>	19" (W) × 1.75" (H) × 9.2" (D)
<b>Weight</b>	6 lbs.

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the old system, both pitched and un-pitched operators (each of which includes an oscillator and filter in one building block) can be ordered in a variety of ways within 88 different algorithms (see Fig. 2).

As in FM of old, the operators can be either carriers or modulators, but unlike old FM, FS operators can be either voiced or unvoiced. A voiced operator is capable of producing one of eight waveforms: sine, broadband with all harmonics, narrowband with all harmonics, broadband with odd harmonics only, narrowband with odd harmonics only, resonant broadband, resonant narrowband, and formant. The first seven of these waveforms can vary in pitch as different notes are played, or they can remain at a fixed frequency; the formant waveform can only be a fixed frequency. In addition, the user can specify the bandwidth of these waveforms. Unvoiced operators are primarily for noise generation.

Add to the mix an elaborate matrix of envelope generators, separate filters, and LFOs, and an intriguing time-based feature called Formant Sequences (FSeqs), and you have yourself a hefty bag of programming tools.

But how do they all manifest themselves? Let's take a look.

## PERFORMANCE ANIMAL

When you power up the FS1r, the unit defaults to Performance mode. Flip through its 512 Performances (384 preset and 128 user-definable), and you'll go from classic DX7-type pianos (on steroids) to swirly pads, gnarly organs, and basses to radical vocalized patches that actually seem to speak to you.

You can play these sounds or tweak the four front-panel knobs to make slight changes. Just about all you want to see is on the main screen: patch number, pan position, volume, reverb and effects levels, and key transposition. Although you'll face rather more error than trial when accessing these day-to-day parameters, you'll be very happy.

The FS1r's highest level of operation is a Performance, which is made up of a maximum of four Parts (hence, the four-part multitimbrality maximum). Each Part can operate on its own MIDI channel, and it has its own Voice and control assignments, such as filter, EGs, pitch, portamento, and note range.

A Voice is the kernel of the sound,

where you assign the algorithm for the operators. Rounding out the Voice parameters are filtering, LFO, and envelope-generator modulation. You can save some 1,500 Voices in memory (most of them will be preset Voices in ROM, but you can save 128 of your own Voices in RAM). Effects and EQ, you ask? They're applied at the Performance level.

You might well decide that this is simply too many layers of control. Where is filter resonance applied? Within the Part? At the Voice level? Within a particular algorithm? Often, it's not easy to figure out.

Knowing the FS1r's FM heritage, you can't help but dive straight into its collection of electric pianos. "EP Wide" is as creamy a digital Rhodes as you're going to find, with a beautiful Velocity response. It's got depth but plenty of cut; it's rounded, but it has a natural attack. The patch just plays itself.

The FS1r also has a superb accordion; a majestic church organ that'll have you on your knees in seconds; plenty of speaker-rattling, sine wave, drum 'n' bass-type basses; enough funky vamping patches to keep gigging keyboard players afloat for the next couple of years; and a seemingly endless array of, well, weirdness.

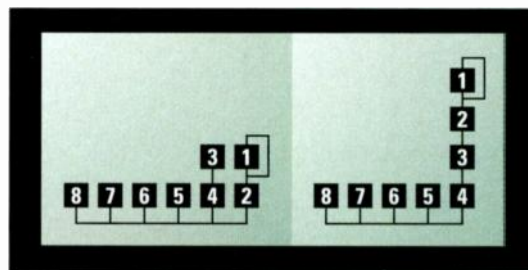
As all sensible manufacturers do these days, Yamaha provides a little on-board search engine so you can scroll through sounds by category. This is available for Performances and Voices, and you can add your own creations to the lists.

In summary, even if you don't tweak a darned thing, the FS1r is a sonic monster.

## SO TO TWEAK

Armed with four substantial front-panel knobs, even the greatest preset hound will soon fancy a tweak. The first two knobs, Attack and Release, globally alter the envelopes in the whole sound (that is, all the Parts and Voices within a Performance). But what of the Formant and FM knobs?

Well, the documentation on these knobs is nothing short of a travesty. Essentially, the manual says that increasing the level of the formant increases the level of the formant, and the same



**FIG. 2:** Eighty-eight algorithms determine the way the FS1r's eight operators interact. On the left, operators 1 and 3 modulate operators 2 and 4, respectively, and the final output is added to the outputs of the remaining operators. On the right, operators 1 through 4 run in series. In both of these algorithms, operator 1 includes a feedback loop, with the amount of feedback adjustable by the user.


for FM. Great, but what does that mean? In practice, these knobs add harmonics, boost resonance, and lend weirdness to the sounds. Within each Voice, you can set up five operators for formant and FM control, each with its own range of values and destination. The complexities of FM being what they are, results can be very unpredictable. When you consider that a Performance can use several Voices at once, you begin to see why the authors of the FS1r manual left so much to the imagination.

Perhaps it would be best to describe the knobs' effect on a specific patch. With the EP Wide patch, the FM knob thins and sharpens the sound to the point where it's like a pedal steel (especially if you soften the attack as well). The Formant knob adds an intriguing burble, most notably with increased Velocity. Soften the attack a lot and add a touch of release, and you have one of those dreamy, ghostly piano things you can play all day.

Real-time tweaking is one thing, but what about recording front-panel changes into your sequence? The menus within the unit imply that this is perfectly possible, but I was unable to do it. Fortunately, the FS1r does respond to NRPNs and CCs, which I sent from my PhatBoy MIDI performance controller. Using knobs on the PhatBoy (in XG/GS mode), I recorded lots of filter, envelope, and LFO manipulation into *Cubase* and everything was recorded and played back just fine.

## FORMANT SEQUENCES

Formant Sequences (FSeqs) are great fun, but you can't edit them directly on the FS1r (or, I suspect, by any



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other means). Somewhat similar to Ensoniq's Transwaves and Korg's wave sequences, FSeqs are sequences of formant structures, streams of complex multistage envelope data that can be applied to sounds in order to make them speak. The FS1r has about 90 FSeqs that you can apply to Parts within a Performance. The sequences can be triggered once by the first note played after silence, or repeatedly by all notes (though this option gets too messy for most purposes).

You can set a loop within each FSeq and speed it up or slow it down. For instance, with the ShoobyDoWap preset, *ShoobyDoWap* can become the sequence *ShoobyDoWap, byDoWap, byDoWap, by-DoWap* or *ShoobyDoWap, DoWap, DoWap, DoWap*, and so on, all at various speeds, directions, offsets, and delays.

A slightly more useful application is to put an FSeq under Mod Wheel control so that you can access different syllables or sections of the FSeq at any rate in real time. Apply this to a Clavinet-type patch and you'll say "Dead funky!" though in fact, it's very much alive.

The list of FSeq presets includes such memorable epithets as Oiyai, ChowaUu, Thankyou, YaYeYiYo, and CanYouGi, but it's a shame you can't create your own FSeqs directly on the unit. I suspect many would want to train their FS1r to order coffee or say "P— off" when the engineer comes into the studio.

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**CONS:** Highly complex editing. Unhelpful owner's manual. Curious implementation of real-time controllers.

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## EFFECTS

The FS1r has four separate levels of effects processing: reverb, variation, insertion, and EQ. As you'd expect from Yamaha, the reverbs (halls, rooms, plate, tunnel, canyon, and so on) are ultrahigh-quality, with not so much as a glitch or ping in sight. You can pan the reverb and make microscopic edits to densities, sizes, and amounts.

Variation effects include chorusing, flanging, phasing, gates, compression, and delays—in other words, a full range of multi-effects. Again, all are minutely editable in terms of speeds, amounts, and other salient parameters.

Insertion effects are inserted directly into the signal flow, as opposed to the send/return arrangement used for the FS1r's reverbs and variation effects. They overlap the variation effects, particularly in the chorus, flanger, and



**The complexity of choosing options soon discourages you from investigating them.**

delay areas. But they also include distortion, overdrive, rotary speaker, and more, for a total of 41 effects in all.

A final coat of sophisticated 3-band EQ can be applied at the end of the signal chain. This is a very powerful selection of processing tools, all the more heart stopping when you consider the size of the sonic palette available before you even think about effects.

As seductive as they are, effects can be dangerous, and they can clutter up the final sound. So I was pleased to see main-page access to the reverb, variation, and insertion effects from within a Performance.

## VOICE EDIT

Detailed programming, be it from scratch or simply from informed preset tweaking, is a daunting task using just the FS1r. I hope that someone produces a better software editor, or at least some route maps into the editor that Yamaha already offers.

As I've said, prior knowledge of FM will obviously help, but the FS1r goes a

lot deeper than that. It offers not only eight voiced and eight unvoiced operators (in contrast with the DX7's six voiced operators), but also many more waveform options, resonant filtering as a separate programming layer, pinpoint-accurate pitch envelopes, two LFOs, and a wealth of modulation sources and destinations. Until Yamaha (or someone else) comes up with an editor that's presented and documented so that the parameters are readily accessible, the FS1r is effectively a tweakable, rather than editable, unit.

Does this matter? Not really. During the time that I spent with the unit, I definitely got \$999 worth of song-inspiring patches, cool new tricks and treats, and just the sheer pleasure of with it all.

*Julian Colbeck reviewed the very first DX7 back in the early 1980s, direct from David Paitch's studio in Los Angeles. Few instruments have avoided his balllike ears since then, though today he is more at home producing instruments for Keyfax Software & Hardware than examining them.*

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# STEINBERG

## RECYCLE 1.7 (MAC/WIN)

*Slice, dice, shave,  
and shred your way to  
great loops.*

By Erik Hawkins

First introduced in 1994, Steinberg's *ReCycle* software has been on the sampling-and-looping scene for some time. Touted as "the ultimate tool for sampled grooves," its innovative strategies for changing tempos and manipulating beats have made it a favorite among sample-heads in all genres. For version 1.7, *ReCycle* received a major face-lift. A redesigned user interface and a host of new features make it more user-friendly and flexible than ever.

*ReCycle* 1.7 works on Macs and PCs and looks and acts pretty much the same on both. Differing key commands and the need to install OMS on the Mac (to access some samplers via MIDI) are the most conspicuous differences. *ReCycle*'s output can be heard through the Mac's audio outputs, but PC users will need a 16-bit sound card.

A single CD-ROM and a manual provide installation and instructions for both systems. One product, in one box, for both platforms—very cool. This lets you perform multiple installations on different platforms without buying another piece of software.

### THE UNINITIATED

Not familiar with *ReCycle*? Here's a quick overview. The program chops up a sampled groove into its component beats. These discrete samples, called *slices*, can then be exported to a sampler or a computer-based digital audio workstation (DAW). *ReCycle* also generates an associated MIDI file that contains the note and timing data needed to reconstruct the original groove. This allows you to, among other things, change the speed of the groove without altering its pitch. Just change the tempo of the file playing back the slices and alter the groove at will.

The slice strategy also permits easy manipulation of sounds within the loop. With the beats broken into individual samples, it's easy to swap one sound for another, or even rearrange the order of the beats themselves. Before *ReCycle*, music producers used to chop up and resequence their loops manually, a time-consuming and tedious practice.

Don't confuse *ReCycle*'s operation with the time-stretching feature in your

audio editor. Time stretching destructively stretches or compresses the audio data to change the loop's tempo without altering its pitch. It also leaves the loop intact, making it very difficult to change individual sounds or rearrange beats. Unlike time stretching, *ReCycle*'s slicing involves no destructive audio processing. Therefore, the original sound is not colored or changed; it's simply broken up.

*ReCycle* does have a function called Stretch, but it's not related to time stretching and has nothing to do with beats per minute (bpm). I'll explain what Stretch is in a minute and why the function should have been named Tails.

### UP AND RUNNING

Installing *ReCycle* is a simple matter, and if you follow the instructions and enter the product serial number when prompted, everything should run smoothly. When you boot up the software for the first time, the CD has to be in the computer, but after that, you can tuck the disc away.

The CD-ROM offers a gaggle of great loops that you can audition and start fidgeting with right off the bat. The samples are from several libraries, including Amg, eLab, Sounds Good, and Wizoo. On the main menu bar, an item entitled Contacts connects you to the Propellerhead home page, where there are additional free loops for downloading. (Propellerhead is the company in Sweden that makes *ReCycle*; Steinberg distributes it and provides product support.)

### THE LOOK AND FEEL

If you have used an earlier version of *ReCycle*, the new user interface will seem familiar. Each sample still gets its own discrete window, and you can open as many samples as memory allows. In each window, you see the waveform, an overview of the waveform, and a Command section with tools and transport controls.

When lots of sample windows are open, the screen can get rather cluttered. A pull-down menu entitled Windows helps organize the jumble. Windows displays a list of all the samples currently open. Scroll to a sample's name, and it is brought to the front. This lets you navigate easily among samples no matter how many you have open. A tiling option is also available in the PC version, but not in

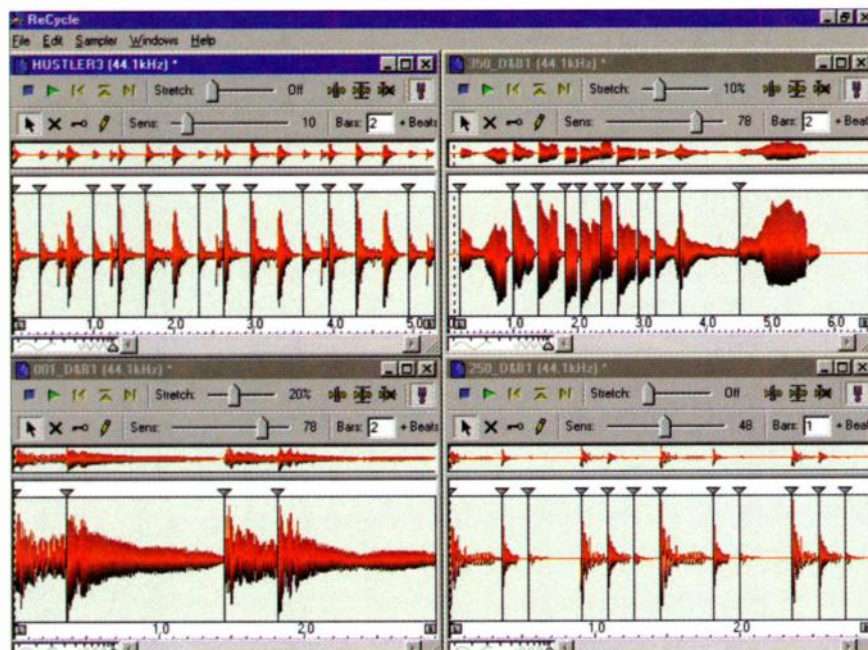


FIG. 1: You can tile *ReCycle*'s windows automatically on the PC. Extensive customization of the user interface elements (for example, screen colors and textures) is possible on both platforms.

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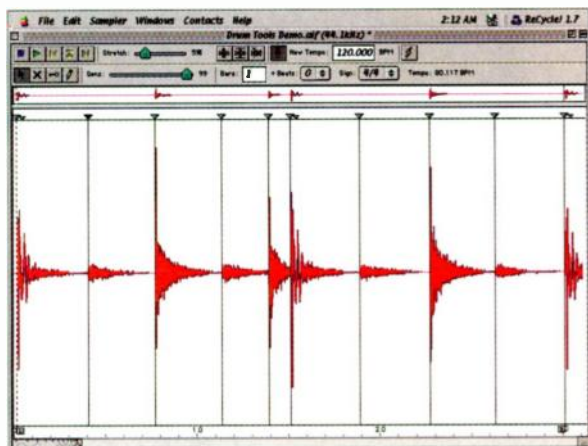
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the Mac version (see Fig. 1). Automatic tiling is the best way to view all your samples at the same time, short of manually resizing and moving each window so that they all sit side by side.

As in previous versions, waveforms can be displayed in a variety of mind-bending colors. Red, purple, blue, chartreuse, it's your choice. But now you can choose a texture (Plain, Shaded, or 3D) as well. Plain is the texture used in the original program and is certainly the easiest to view. Shaded gives the waveform a lighting effect. The "light" shines down on the waveform from above, shading its underside and making its top a little overexposed and difficult to see. 3D is a topographical effect that is easy to look at and definitely cool. A contrast control lets you adjust the relationship between the waveform and its background. Higher contrast settings make the waveform darker and the background lighter.

The zoom in/out control at the lower left of the waveform enables you to zoom in on the waveform for detailed viewing. The control has been improved from older versions and now has greater resolution. You can zoom in much closer than previously, which makes finding zero-point crossings much simpler. A waveform overview remains above the actual waveform. In the overview, the section being viewed in the main waveform window is shown bookended by two black lines. Magnifying options include Magnify to Fit for viewing the entire waveform, and Magnify to Fit Loop for viewing the looped section.



**FIG. 2:** Slice markers are placed wherever *ReCycle* identifies a hit or beat in your loop. Markers can be disabled with the Hide tool, as shown by the smaller triangles above the waveform.

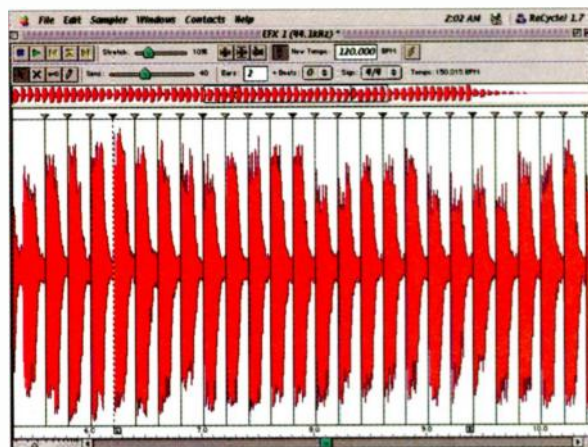
## SLICING IT UP

Slicing a sampled groove into easily digestible pieces is simple: load a loop and move the Sensitivity control (now positioned horizontally above the waveform) to the right until slice markers appear (see Fig. 2). Each slice marker indicates a piece of the loop that will be exported. The higher the Sensitivity control is set, the more sliced up the sample is. The goal is to adjust the Sensitivity setting so that each slice represents a beat or hit in the groove.

Some loops translate really well; others don't. The more defined the beats are—the deeper the valleys and the higher the amplitude peaks—the better the Sensitivity function is at catching everything. Loops with droning sounds, sustained bass notes, or lots of cymbals with long decays are difficult to deal with. Simple drum loops with plenty of transients and percussive hits or individual instruments with clearly outlined notes and chords work great. However, I found that even with the most ideal samples, there are times when the Sensitivity function lays down too many markers or too few.

A newly expanded Transport feature lets you audition each slice to determine whether it needs to be lengthened or shortened before exporting. Transport offers the standard Play and

Stop controls as well as Play Next Slice, Play Previous Slice, and Play Current Slice. (Keyboard shortcuts are available for the Transport functions.) You can use these functions to preview each slice one at a time. Hitting Current plays the current slice (the one that the Playbar is resting on); hitting Next plays the current slice and advances the Playbar to the next slice; and hitting Previous plays the slice right before the Playbar. Pressing Stop



**FIG. 3:** In *ReCycle*, loop start and end points are represented by small boxes placed just beneath the waveform. These boxes typically snap to the nearest slice point when you move them.

once stops playback, and pressing it again takes you to the top of the loop. These new controls are invaluable in the quest for obtaining the perfectly dissected loop.

Once you've listened to the slices, you'll probably need to make a few changes. There are four tools to work with, which are the same as the tools in past versions. The default tool is a typical-looking arrow-shaped selector. Click on a marker's head (the triangle at its top) to select it. If Sensitivity has generated too many markers (for example, markers in the wrong places or markers in the middle of beats), use the Hide tool to render them invisible. This doesn't delete the markers; it just turns them off.

Draw in markers with the Pencil tool. When you know the beat is there but Sensitivity doesn't recognize it, just locate the beginning of the beat, zoom in on the waveform, find a zero-point crossing, and draw a marker with the Pencil.

## A LOOPING MACHINE

*ReCycle* doesn't claim to be a looping program, but it does an excellent job of making looping effortless. Every sample that is loaded receives loop start and end points automatically. These points are, by default, at the very beginning and end of the sample (unless different loop points have been previously saved to the sample via another program). Of course, not every sample loops perfectly; maybe there are a few extra beats at the end of the loop. Or perhaps all you want to do is loop the second bar of a long

# COOL FRONT. SERIOUS BACK.



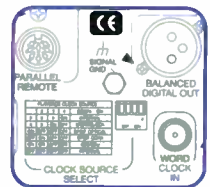
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phrase. That's when it's time for you to put *ReCycle* to work.

Once Sensitivity has placed a bunch of slice markers, it's usually easy to find perfect loop points. As the file plays back, watch the Playbar. You can see which markers delineate your loop as the Playbar crosses over them. Grab the loop pointers, wherever they are (you can usually find them at the extreme ends of the sample), and drag them to the markers you want them to align with. Drop the pointers on or near the markers, and they snap to those exact beats. That's it. Ninety percent of the time, this produces a beautifully in-time loop. (If it doesn't, you'll need to use the Pencil tool for manual marking.)

Once your loop is working, type in the number of bars and beats you want; the exact tempo of your loop (up to three decimal places) is then registered. I love this feature because it's a quick way of figuring out the precise bpm of a loop. To generate and export a MIDI file, you must fill in the Bars and Beats fields. If you forget to enter values, when you try to export the file, the program will prompt you.

## FILES AWAY

Without a doubt, version 1.7's most impressive feature is its ability to export two new file formats, REX and TRK. The REX format is a *ReCycle* file that Steinberg's *Cubase* (version 3.7 for Windows and version 4.0 for the Mac)

can read. Though a REX file is actually an audio file, when you load it into *Cubase*, you can treat it much like a MIDI file. For example, you can change its tempo without altering its pitch, rearrange individual beats as needed, or process it through VST EQ and effects. (For some hints about using drum loops as REX files, see the Steinberg *Cubase VST* section of "Sequencing Secrets" in the November 1998 issue of *EM*.)

With *Cubase*, REX files, and a powerful enough computer, you'll never have to download a loop to an external sampler again. Now you can do all your complicated loop arrangements right on the computer—a great way to work. You can get started with the numerous CD-ROMs containing REX files available via the Steinberg Web site.

The TRK format is similar to the REX format but is intended specifically for *Mixman*, the live sample-remix program from Mixman Technologies. (For a review of *Mixman Studio Pro*, see the November 1999 issue of *EM*.) Rather than using off-the-shelf TRK files (not that what's available is bad), you can now create and customize your own TRK loops with complete tempo and pitch control. This opens a whole new realm of possibilities.

*ReCycle* also can export the SoundFont format, but I didn't have enough time to play with any SoundFont files. On the PC, SoundFonts can be used by a number of RAM-based sound cards, such as the Creative Labs Sound Blaster series, and by various software synthesizers, such as Seer Systems' *Reality*. On the Mac, software by BitHeadz and others also supports the format. As with the REX and TRK formats, *ReCycle* exports both the SoundFont and a MIDI file to trigger the samples.

Along with the new file formats, *ReCycle* still writes standard AIFF, WAV, and SDII files. It can also save a file in Digidesign's SampleCell format.

Readable files include AIFF, WAV, and SDII: *ReCycle* doesn't recognize REX, TRK, or SoundFont files. In day-to-day use this isn't a problem, but in several scenarios it could tie you up. For example, what if you just spent a long time beat-mapping an AIFF file, saved it as a REX, and then realized you should have exported it to your sampler? Sure, you could open up the original file and re-create the beat map, but who wants to do that?

## ReCycle

### Minimum System Requirements

Mac: Power Mac; 16 MB RAM; Mac OS 8  
PC: Pentium 90; 16 MB RAM; Windows 95, 98, or NT 4.0; 16-bit sound card

Or perhaps you have TRK or REX files on CD-ROM that you want to send to your sampler. (Though CD-ROMs from Mixman and other manufacturers come with duplicate WAV-format files, those files are not beat-mapped.) The only way to pass them through *ReCycle* is to open them in *Cubase* and mix them down to disk in a readable format. Of course, in the process, you reintegrate all the individual beats and lose all of your slices. In short, count on spending some time converting and remapping if you plan to load REX, TRK, or SoundFont files into your sampler.

## STEREO BITES

*ReCycle* still cannot open stereo files. It sees them, but only opens them as monophonic files. You have the option of opening the left side, the right side, or a mix of both sides. If you must retain stereo, I suggest opening each side independently, slicing, exporting, and then panning each sample hard left and hard right. This takes up two tracks in your playback software but saves the loop's stereo imaging.

The program also only opens 16-bit files. When it encounters something other than 16-bit, the program usually responds with, "*ReCycle* only supports 16-bit audio files." Sometimes, however, this warning is strangely absent; the file is seen, but it won't open and you can't audition it.

## SAMPLER SAGACITY

A supplement to the manual is included on the CD-ROM. The document, in PDF format, covers working with hardware samplers and contains a list of supported samplers.

For the PC, several samplers are no longer supported via SMDI (that is, SCSI) transfer. The Roland S760 and several Akai samplers ranging from the S1000 series to the CD 3000 are incompatible with Windows 95 and 98. They are still MIDI Sample Dump compatible, but this method is dreadfully

**STEINBERG**  
ReCycle 1.7 loop editor (Mac/Win)  
\$199

**FEATURES** ■■■■

**EASE OF USE** ■■■■

**AUDIO QUALITY** ■■■■

**VALUE** ■■■■  
1 2 3 4 5

**PROS:** Important new features in updated version. REX, TRK, and SoundFont file format creation now supported. Improved transport controls.

**CONS:** Can't read REX, TRK, or SoundFont files. Only supports 16-bit files. Can't read stereo files.

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**Miroslav Vitous**  
*Symphonic Orchestra*  
*Samples*

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slow. Be sure to use SMDI if your equipment supports it.

*ReCycle* automatically scans for samplers when it is launched, and looks for both MIDI and SCSI connections. It creates instruments in the Export menu for the samplers that it finds. I tested *ReCycle* with an Ensoniq ASR-10, but because the program doesn't automatically identify the ASR-10 (as stated in the supplement), I had to create an instrument manually and assign it to the sampler. This was not a big deal and took only a few seconds.

When exporting samples, you can choose from several processing options. Sampling rates can be converted during transfer to rates ranging from 48 kHz down to 6.25 kHz. Because many loops are pulled from CD at 44.1 kHz, being able to convert them to lower rates during transfer is a great way to save time (and memory). Individual sample slices can be normalized on export, though that could have an unwanted effect on your loop's overall dynamics. (In certain cases, I'm sure it would be a cool effect.) The Silence feature lets you mute beats, creating a

silent space in the loop without messing up the groove. I prefer to mute beats using MIDI, because once you silence a slice, it's permanently altered.

The Stretch feature I mentioned earlier adds a tail to each sample slice. A slider adjusts the percentage of "stretch," with values from 0 to 100 percent. The tail sounds a lot like reverb but doesn't make the whole sample wet. Only the reverb's tail hangs off the beat's end. Stretch usually sounds fine under 30 percent, but over that, the added audio portion starts sounding rather odd.

If you export a *ReCycle*'d groove and want to play it back at a tempo dramatically lower than its original bpm, there are things to consider. For example, taking a loop at 120 bpm and playing it back at 60 bpm could, depending on the loop, create large, audible gaps between the sample slices. There are two solutions: pitch-shift the sample down so that the slices become longer in duration, or stretch just the ends of the slices to fill in the holes. You might also try adding a bit of reverb to the loop. *ReCycle* will automatically pitch-shift your loop to a new

bpm. Just type in a new bpm and export the file, and the program does the calculations for you. No more fidgeting with your sampler's tuning parameter to make a groove fit a tempo!

## RECYCLE OR DIE

With a \$199 sticker price, *ReCycle* hardly puts a dent in the piggy bank. The software is a solid value, standing alone in performance and originality. But it isn't for everybody. You'll need to run an additional program that reads its file formats or use an external sampler to take advantage of what it offers.

Version 1.7 upholds *ReCycle*'s unique groove-slicing traditions while ushering in a new age of crosscompatibility. If you've used the software before and are thinking about updating, you won't be disappointed. If you have never worked with the program but use *Cubase* or *Mixman* and love working with loops, do check it out. *ReCycle*'s ability to take any loop and export it in a format that gives you complete control of tempo and individually sampled beats is nothing short of amazing. ☺

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# R Ø D E

NTV

*An affordable tube condenser mic with attitude to spare.*

By Rob Shrock

**T**here's no mistaking the sound of a good tube microphone. Though typically not as accurate or transparent sounding as solid-state models, tube mics tend to have one thing going for them that their transistor-based cousins don't: character.

The new Røde NTV tube condenser microphone is modeled after a vintage tube-mic design that connects the lead wire to the edge of the capsule rather than to its center, an approach said to improve both transient and low-frequency responses. I used the NTV to record a variety of instruments during a two-month test period and was quite impressed. Here's the scoop.



The Røde NTV has an aggressive, detailed sound with loads of tube attitude—and the harder you hit it, the more aggressive the sound becomes.

## STUDIO READY

The NTV is a true condenser mic with a fixed cardioid polar pattern, making it a good candidate for vocals, acoustic guitars, and other close-miked sources. The mic provides no filters or attenuation pads. The only embellishment on its stainless-steel body is a brass dot beneath the grille to indicate the front of the capsule. The NTV contains a hand-selected ECC81 twin-triode tube and, as a result, runs slightly warm to the touch. Solidly built and quite hefty, this mic warrants use of your beefiest mic stand.

The accompanying power supply is beefy, too. It connects to the NTV via a 30-foot multipin cable (described as "double-shielded, oxygen-free copper, multicore cable") that screws into the base of the mic chassis. The multipin jack, XLR output jack, and IEC power-cord jack are all on the rear panel of the power supply, which also provides a ground-lift switch and a compartment for the fuse. A cool-looking blue LED that slowly lights up as the tube rises to full voltage distinguishes the front of the power supply.

The mic, power supply, and accessories come in a quality aluminum flight case that is well padded with foam and provides a fitted compartment for each component. Accessories include a standard mic clip and a bird-cage-style shock-mount. The shock-mount, which suspends the NTV from the power connector rather than from the mic body, works beautifully. This is an exceptionally nice package for the money.

## CHARACTER WITNESS

The NTV features an aggressive sound with a distinctly vintage vibe. It imparted some attitude—in the positive sense—to just about everything I miked with it. It's a quiet mic, too, and capable of handling fairly high SPLs (130 dB max), so it readily accommodates parts that range from a whisper to a roar.

One interesting quality: the NTV's timbre changes slightly as the source gets louder—not unlike the way a guitar preamp works. The tone is milder at low levels and acquires a more aggressive coloration with added SPL. I loved this personality trait.

The NTV proved especially well suited to recording vocals, thanks both to the aforementioned qualities and to a very detailed sound that picks up all

sorts of nuances in a voice. It's not a "pure" sound by any means, but practically every vocalist I had use the NTV sounded good with it.

Positioned directly on-axis to the source, the NTV exhibits a huge bottom end and a silky top end. However, this position tends to exaggerate sibilance on vocalists. I got the best results by angling the mic 25 degrees off-axis to the singer's mouth, which provided a milder tone better suited to pop applications. (A pop screen positioned to keep the singer back from the mic also helped.) On the other hand, the sibilance doesn't sound harsh, and for certain tracks—say, an aggressive rock mix—the extra presence helps the voice cut through without the aid of equalization.

## BACKFIELD IN MOTION

For a cardioid mic, the NTV's rear rejection performs less effectively than several cardioid condensers in my collection. I first noticed this when cutting a rough vocal with playback in the control room over close-field monitors. The singer was standing about eight feet from the monitors (which were pushing about 70 dB) and off to one side, directly facing the speakers. I've tracked roughs this way quite a bit with other mics and have never experienced the amount of bleed I got with the NTV.

Of course, this isn't necessarily a bad thing, depending on the application. In this case, I actually liked hearing more of the room than usual because it added some life to the dance track I was working on. The openness of this mic's polar pattern would probably make the NTV a great choice for a compressed room mic on drums in lieu of having a good omnidirectional microphone.

## NEXT IN LINE

Any mic will sound different when used with different preamps. The NTV, however, seems particularly chameleon-like in this regard. It fares quite well with moderately priced solid-state units, providing plenty of meat and sauce to make up for the blandness of generic preamps. The NTV can even make inexpensive mixer preamps sound pretty good.

When coupled with high-end solid-state preamps—for example, Neve or API—the NTV sounds absolutely spectacular. It also becomes more sensitive to mic placement.

## NTV Specifications

<b>Acoustic Operating Principle</b>	pressure-gradient transducer
<b>Diaphragm</b>	1" edge connected, gold sputtered
<b>Tube</b>	selected twin-triode ECC81
<b>Output Transformer</b>	custom Jensen
<b>Polar Pattern</b>	cardioid
<b>Frequency Response</b>	20 Hz–5 kHz(±2 dB) with +6 dB @ 10 kHz
<b>Dynamic Range</b>	113 dB
<b>Signal-to-Noise Ratio</b>	75 dB @ 94 dB SPL
<b>Self-Noise</b>	19 dB (A weighted)
<b>Sensitivity</b>	15 mV/Pa
<b>Maximum SPL</b>	130 dB
<b>Dimensions</b>	8.25" (L) x 2.15" (D)
<b>Weight</b>	1.5 lbs.

I also auditioned the NTV through a tube preamp: the En-Voice MindPrint tube-based preamp/EQ/compressor, which I was reviewing at the time. The MindPrint is a wonderful box capable of adding its own special sauce to a signal. However, the combination of the NTV and the MindPrint proved a bit over-the-top in terms of tube coloration. Specifically, it created a fuzziness in the top end and a dip in the midrange that just didn't work for my tastes. Hey, sometimes more is just too much.

### LOS OTROS

On acoustic guitar, the NTV once again imparted a characteristically aggressive sound. Using a Mackie console preamp and an Empirical Labs EL8 Distressor (a compressor and tape-saturation emulator), I got a killer fat tone that

would be great for rock or pop. In fact, it sounded kind of Beatles-y. I actually wrote myself a note to remember that particular setup for the future.

I also created a great electric-guitar tone by using the NTV to mic a close-field monitor playing back a track recorded earlier from the direct output of a Boss GT-5 (employing the internal amp/cabinet simulator and an external guitar preamp). I thought I liked the guitar tone before, but miking the speaker gave it some air, which the NTV is more than capable of capturing with style. The in-your-face nature of the NTV made the guitar track roar. Sometimes more really is more.

### CASE CLOSED

If you're looking for accuracy and transparency alone, the Røde NTV is not the mic for the job. But if you want character and attitude, the aggressive personality of the NTV delivers them in spades. I love the way the sound gets more aggressive as the source gets louder.

Despite its signature sound, the NTV is extremely versatile, proving useful in a variety of applications. As long as you don't mind auditioning the NTV to make sure it's appropriate for the task at hand, you won't be disappointed having it in your collection. And you can't complain about the price, either, especially given the wealth of accessories.

*Producer and songwriter Rob Shrock is musical director for Burt Bacharach. He has recorded and performed with Elvis Costello, Dionne Warwick, LeAnn Rimes, Mikaila, Wynonna, David Foster, George Duke, Cyndi Lauper, and a host of other artists.*

RØDE

NTV tube microphone  
\$1,199

AUDIO QUALITY ■■■■■

VALUE ■■■■■

1 2 3 4 5

**PROS:** Detailed, with personality. Full-bodied, aggressive sound, especially well suited for dynamic vocals. Makes most generic preamps sound better. Well built and quiet.

**CONS:** Doesn't sound as good with certain tube preamps and/or tube compressors because of excess of tube sound.

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# MINNETONKA

MXTRAX 2.4.4 (WIN)

*Harness your  
DSP Factory horsepower.*

By Bill Boggs

When Yamaha announced its DSP Factory last year, it sent more than a few ripples across the pro-audio pond. Advertised as an 02R mixer and digital audio recorder on a card, the DS2416 promised to put a studio inside your computer. A stampede of software vendors pledged support for the DSP Factory, and the race was on to exploit Yamaha's new creation to its fullest potential. Now that the dust has settled, only a handful of serious contenders has emerged.

One industrial-strength option for DSP Factory support is *MxTrax* 2.4.4 from Minnetonka Audio Software. *MxTrax* was previously introduced for the Digital Audio Labs V8 system, but the version I reviewed was created specifically for Yamaha's DSP Factory products, which include the SW1000XG expansion card, AX44 analog I/O expansion box, and AX16-AT ADAT-interface card. (For a comparison of the

two versions, see the sidebar "DSP Factory vs. V8.")

For this review, I installed *MxTrax* on a Celeron processor-based PC overclocked to 450 MHz with 128 MB of RAM. The test system used two 7,200 rpm IDE hard drives, one for program data and one for audio. Installing *MxTrax* from the CD was a simple task and took only minutes. The supplied copy-protection dongle attaches to the PC's parallel port.

## VIEW FROM THE TOP

If you have some experience with tape-based studios, *MxTrax* should look and feel quite familiar. The program's interface is based on two main windows: the Track window and the Mixer window. The Track window is where you view and edit sound files from disk; each channel of audio appears as a track. The Mixer window is where you mix tracks from disk and external inputs. It looks very much like a traditional mixing console, with channel strips, faders, and other controls. The two windows normally appear in a split screen with the Track window on top and the Mixer window on the bottom (see Fig. 1). Separating the two windows is a small horizontal area that contains the transport controls.

The overall appearance of the program is pleasing, and the earth-tone color scheme is easy on the eyes. In addition to the standard Windows menu

**MxTrax for the Yamaha DSP Factory  
Minimum System Requirements**  
200 MHz Pentium CPU; 64 MB RAM; Windows 95/98; Yamaha DSP Factory card; video card with 16-bit or greater color

bar across the top, Minnetonka has graciously provided hot keys for nearly every menu function. For example, a press of the F2 key instantly puts you in full Mixer view, F3 in full Track view, and F4 in split-window view. Many of the *MxTrax* screen items also offer right-click menus.

*MxTrax* saves your work as a project, which consists of tracks, mixer design, automation, and edits. I like the simplicity of saving and retrieving everything under a single name. In addition, you can save several mixes of the same source material as different projects.

The program comes attractively packaged and includes a well-written (though unindexed) manual with plenty of screen shots and diagrams. Online help is available within the program, as well. Several multitrack tutorial projects are included to demonstrate the program's features.

## KEEPING TRACK

The Track window displays a graphic representation of your digital audio files. To the left of each track is a Track Control area with Solo, Mute, and Record-Enable buttons. You can set a track's display size to Normal (the default), Full (for more detail), or Mini (for the smallest possible display). The Mini size is especially useful with a small monitor.

To add a track, select Add from the Track menu. You can also add WAV files from other programs to your project. As tracks are added, a scroll bar lets you move tracks into view. *MxTrax* supports 16-bit or 32-bit audio files. For 32-bit resolution, however, you must use version 1.003 or later of the DSP Factory driver.

You can mix tracks with different resolutions; the program converts them to the project default. However, you may lose precision in the audio data by using 32-bit audio files in a 16-bit project. Also, keep in mind that 32-bit projects—and any projects that require conversion—consume extra CPU resources.



FIG. 1: The main workspace in *MxTrax* provides a split-screen view, with multiple waveform displays on top and a customizable mixer section below.



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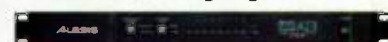


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While there is no limit to the number of tracks in a project, only 16 disk tracks at a time can be connected to the mixer. Most of my projects use more than 16 tracks, so I find this a bit limiting. Of course, adding a second DSP Factory card would allow 32 connected disk tracks. (Each card also offers 8 live inputs, for a total of 24 input channels per card.)

## DO IT YOURSELF

This is my favorite part: in *MxTrax*, you build your own mixer! With a unique feature called the Component Toolbox, *MxTrax* provides a drag-and-drop scheme that lets you build your mixer exactly as you want it. You can create a custom mixer for each project or build a generic default mixer as a starting point and then customize it further as necessary. The Component Toolbox includes the following drag-and-drop objects: input channels, output channels, pan controls, EQ, aux sends, text labels, buttons (Solo, Mute, Record-Enable, and Automation), dynamics, attenuator, phase, delay, and effects returns.

*MxTrax* supports the DSP Factory EQ, dynamics processing, and DSP effects. For those with two DSP Factory cards installed, the program works right out of the box, providing an impressive 48 input channels with full DSP EQ, dynamics processing, and effects.

The current version of the program doesn't support DirectX plug-ins, but DirectX support is slated for a future update.

Building a mixer is easy. To add an input channel, simply click on the Input Channel icon in the Component Toolbox and drag it into the Mixer window. A single channel strip, complete with a fader and LED-style VU meter, drops into place. To add a pan control, just click the appropriate icon in the

**FIG. 2:** You configure each mixer module in *MxTrax* with only the controls you need. Just drag icons from the Component Toolbox and drop them onto the channel strip.



## DSP FACTORY VS. V8

Although this review covers *MxTrax* for the Yamaha DSP Factory, an earlier version of the program for the Digital Audio Labs V8 is also available. The differences between the two versions are primarily the result of differences in the hardware.

With the DSP Factory, the mixer you build must conform to the architecture of a Yamaha 02R digital mixer. Within that framework, you can build any mixer up to and including a full 02R. The V8, on the other hand, has no predefined mixer, and anything can be connected to anything until you've used up all of your mixer resources.

The DSP Factory has 4-band EQ, dynamics processing, and other

features available on all channels. It also lets you choose 2 of 40 mono-in, stereo-out effects. The V8 comes with no hardware effects but does allow any number of third-party effects, which can be connected anywhere in the mixer, up to the DSP horsepower limit of your system.

The V8 has optional ADAT and DA-88 interfaces, both with transport control and sync. The DSP Factory has an optional ADAT interface without sync. Furthermore, the V8 has an optional SMPTE sync interface. The DSP Factory does not have sync hardware, but *MxTrax* can generate MIDI Time Code, and a soon-to-be-released version will be able to slave to MIDI Time Code.

Component Toolbox, and drag and drop it onto the channel strip. Need a 4-band EQ? Click, drag, and drop! The components all snap to a neat vertical arrangement down the channel strip (see Fig. 2).

Another particularly nice feature allows a single channel strip to be saved and loaded into other projects. You can also copy channel strips and paste them multiple times into the Mixer window. The Channel Copy command

Stage, you click the FX icon in the Component Toolbox and drag the effect into the Mixer window. To connect audio to the input of the DSP effect, you click on the effect name and drag it to the desired input channel. The cursor changes during the drag to indicate an effects-to-aux connection. When you release the mouse button, a postfader aux-send knob appears on the input channel. You can change the aux send to pre-fader by clicking the Pre/Post button. With the Component Toolbox, you can build a software "mixing surface" that suits each project perfectly.

## SMOOTH MOVES

Because of the program's tight integration with the DSP Factory hardware, mixer components in *MxTrax* work in real time, even when all 16 tracks are playing. There is no visible or audible latency between a movement and the expected result. Using the mouse, you can "turn" the rotary knobs for EQ, dynamics processing, and aux sends, but you can also place the cursor in a knob's value field and drag it, which allows finer control. The volume faders, which can be grouped, move precisely, and the changes are instantaneous.

The mixer components are comfortable and easy to manipulate with the mouse, but if you enjoy a more tactile mixing experience, *MxTrax* supports

▼  
***MxTrax* takes the  
rocket science  
out of DSP  
Factory busing.**

is very helpful when you need to quickly create a big mixer. Depending on the project, a custom mixer can become quite large and complex, so I recommend setting your screen resolution to 1,024 × 768 or greater. As with any multitrack program, a large monitor is always an advantage.

Output channels and effects channels are also built up from drag-and-drop components. For example, to add the DSP Factory effect called Reverb

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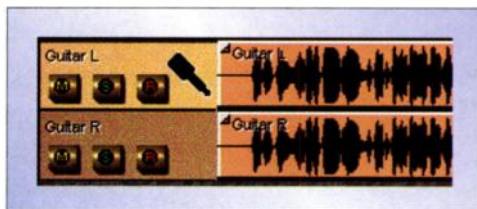


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MXTRAX



**FIG. 3:** *MxTrax* provides a phone-plug-style cursor for quickly and easily assigning tracks to input channels.

MIDI hardware control surfaces from CM Automation (MotorMix), Mackie (HUI), and Peavey (PC 1600x). Support for hardware controllers is selected from a drop-down box in the Preferences screen; no other program settings are required. *MxTrax* even provides built-in support for the Yamaha 01V as an automated front end. Although it's a full-blown console, I found that the 01V serves great double duty when used to command *MxTrax*.

### AUTOPILOT

*MxTrax* supports automation of the mixer controls on a per-channel basis via the Automation buttons. Parameters in the DSP effects can also be automated. There are three basic modes: Write, Update, and Playback. The background color of the Automation button indicates the mode. Red is for Write mode, split green and red is for Update mode, and green is for Playback mode.

In Write mode, all of the controls for the selected channel record automation data, whether or not a control is moved. In Update mode, the mixer plays previously written automation data until you move a mixer control. The control then enters Write mode until it is released, at which point it returns to Playback mode. In Playback mode, the mixer plays previously written automation data, and new automation data cannot be recorded. I found the Automation features in *MxTrax* to be straightforward and simple to use.

### MAKING THE CONNECTION

For those of us who are musicians more than we are engineers, the topic of DSP Factory busing can evoke blank stares and glazed eyes. Although I'm somewhat "schematically challenged," I found signal routing in *MxTrax* to be foolproof because the engineers at Minnetonka have implemented a routing system that does not require an in-

depth understanding of DSP Factory busing.

A right-click on the box at the bottom of each channel strip opens a list of options for connecting that input channel. You can connect an input channel to disk tracks or to physical inputs (I/O cards) such as the optional AX44 unit or the SW1000XG card. The Tracks option opens a

submenu that lists the current project's audio tracks; selecting a track places its name in the Track Input box. It's especially convenient that you don't have to retype track names into each channel strip.

Selecting I/O Cards provides a submenu of the available external inputs, such as DS2416 In L, DS2416 In R, AX44 In 1 through 4, and SW1000XG In 1 through 6. Once selected, the input name appears in the Track Input box.

*MxTrax* also has a drag-and-drop quick-connect feature. If you place the cursor in the leftmost track area and hold down the left mouse button, the cursor changes to a silhouette of a phone plug (see Fig. 3). By dragging the phone plug to the fader area on the input channel, you can assign the track and have the track name appear at the bottom of the input channel. Happily, *MxTrax* takes the rocket science out of DSP Factory busing and gets the job done behind the scenes.

### EASY EDITS

Audio editing takes place in the Track window, where *MxTrax* features non-destructive editing of audio *Regions*. A *Region* is a set of start and end points in any audio track. An unedited audio track consists of a single *Region* from start to end. During editing, you can split that *Region* into multiple *Regions*, move it horizontally to a different time location on the track, and adjust its size to include more or less of the original audio track.

In fact, you can perform more than 50 editing operations on *Regions*, including loop, nudge, normalize, cross-fade, insert time, delete time, gain change, and automation scrubbing. I found the Gain Change command particularly useful for adding a fraction of a decibel to boost softer passages. You can group *Regions* with the Group/Ungroup function and manipulate them together. That feature is handy when two or more *Regions* must stay locked in time.

For manufacturer information, please see Contact Sheet, p. 179.



Working with Regions is easy and intuitive. In each Region display, there are five locations where the mouse is used: the left and right Region edges, the lower-middle Region section, the upper-middle Region section, the upper-left and -right Region corners, and the edit-cursor position. For example, to trim the beginning of a Region, you position the pointer at the Region beginning. The pointer then changes to a graphic cursor with left and right arrows. Pressing the left mouse button and moving the mouse to the right trims the Region. By adjusting the Region's ends in this way, you can make a Region as small as a single audio sample or as long as the entire audio track. Performing a track fade is just as painless: simply grab the fade handles in the upper-right or -left corner of a Region and drag horizontally. Fading in or out couldn't be easier.

Crossfades are performed in *MxTrax* by selecting two Regions on the same track and right-clicking on one of them to open a pop-up menu. After selecting Crossfade, you simply grab one Region and move it horizontally until it overlaps the other Region. A crossfade is formed in the overlapping area.

*MxTrax* also provides a user-definable number of Undo levels. The default number is 100, which I found to be more than adequate.

**LIGHT AND BRIGHT**

In today's audio-software market, where form often comes at the expense of function, *MxTrax* shines brightly. Although the reviewed version lacked support for DirectX plug-ins, I found it to be a rock-solid DAW component worth serious consideration.

Anyone who has ever worked at a console will understand *MxTrax* right away, and the program requires no special PC optimization or tweaking, although it would be nice to have a built-in indicator to monitor CPU and disk usage.

During the review process, I didn't experience any dropouts, skipping, or latency, as I have with some "big name" multitrack audio programs running an equal number of tracks. The thoughtfully engineered user interface, ease of signal routing, custom mixer creation, and support for several hardware controllers put *MxTrax* at the head of the class for DSP Factory support.

*Bill Boggs is a PC-network specialist in Tustin, California. He has been involved with pro-audio recording since the '70s.*

**MINNETONKA**  
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FEATURES

EASE OF USE

DOCUMENTATION


VALUE

1 2 3 4 5

**PROS:** Simple, elegant interface. Easy to learn and use. Custom mixer creation. Rock-solid, real-time performance. Quick and simple DSP Factory signal routing.

**CONS:** No support for DirectX effects. Maximum of 16 track inputs per DSP Factory card. Manual needs an index.

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# NHTPRO

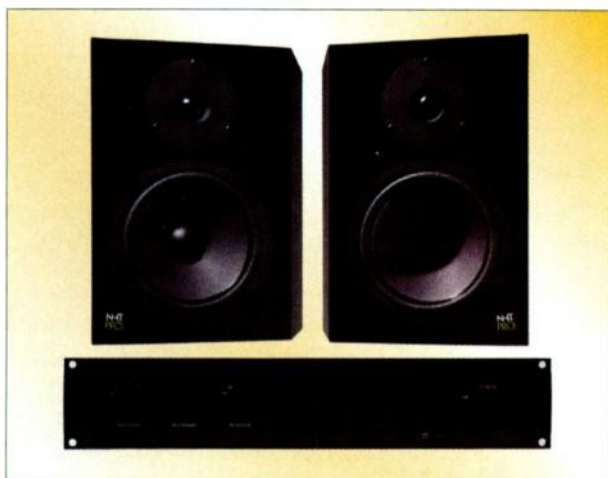
A-10

*A unique design in  
powered monitors for the  
personal studio.*

By Rob Shrock

**N**HT, well known for its audiophile home speakers, has expanded into the pro-audio market as NHTPro with a line of active reference monitors. Formed in 1998 by Vergence Technology (the same company that started NHT in 1986), NHTPro offers three models: the small (4.5-inch woofer), self-contained M-00 (\$375); the top-of-the-line A-20 (\$2,000); and the midline A-10 (\$1,250), which is reviewed here.

Whereas most active monitors house the power amplifiers and crossover units in the back of one or both cabinets (or in the subwoofer enclosure), the A-10 and A-20 employ external 2U rack-mount amp/crossover units. This approach lets NHTPro provide the benefits of self-powered monitors while sidestepping potential problems caused by having the power amps so close to the speakers. Both the A-10 and A-20 are self-contained monitoring systems, meaning that you cannot use the separate components with other systems.



Active monitors with a separate power supply? That's just one of the unique design features of NHTPro's A-10 monitoring system. Though lean in low-bass response, these trapezoidal units have a tight, accurate sound.

## CONTROL ISSUES

The A-10 control amplifier accepts both balanced and unbalanced inputs on either XLR or 1/4-inch TRS connectors. Although these inputs are wired in parallel, the manufacturer recommends connecting only one type at a time.

The system comes with red, 20-foot XLR cables for connecting the amplifier and speakers. These cables have a lower impedance than standard microphone cables; regular mic cables will fit, but using them would likely impair system performance.

The front panel of the A-10 amp provides three knobs for tailoring the sound to the listening environment. The first, labeled Sensitivity, has five settings—Mute and +11, +4, -3, and -10 dB—to enable gain-matching with a wide variety of equipment.



**In this case, the lack of  
very low frequencies  
feels appropriate.**

The second knob, labeled Boundary, allows you to tailor the bass response when the speakers are placed close to walls or other reflective surfaces that can cause bass buildup. There are two settings: the 0 setting is flat, and the 1 setting attenuates 50 Hz by 3 dB, affecting frequencies up to around 150 Hz.

Last, the Position knob has two settings, NF (near-field) and MF (mid-field). NF, which attenuates 20 kHz by 2.5 dB with no effect on frequencies below 3 kHz, is recommended for listening positions less than one meter from the speakers. MF, designed for positions more than one meter away, is flat.

## ODD COUPLE

The A-10 speaker cabinets have a unique, asymmetrical shape with dedicated left and right units. The shape simplifies orientation of the speak-

ers for optimal monitoring: when the backs of the cabinets are perpendicular to the listener (that is, parallel to the rear wall), the speakers are angled in properly toward the listener (when he or she is sitting in the sweet spot). A green LED indicates that the control amplifier is turned on and—a nice touch—that the system is correctly wired.

Even though the power amp is separate from the cabinets, the A-10s are still quite heavy—comparable, in fact, to powered monitors that contain their amplifiers. Evidently, the designers, free of the constraint of having to fit everything into the cabinets, were able to focus on optimizing the sound quality of the speaker housings. As a result, the cabinets seem tighter and more durable overall than many self-contained active monitors. This is reflected in the sound quality of the A-10s—although they employ only 6.5-inch woofers, they sound like much larger monitors. And, of course, there is no worrying about stray magnetism or heat from the amp causing sonic or operational artifacts—a problem in some integrated active monitors.

## TIGHT SOUND

The adjective that best describes my lasting impression of the A-10s is *tight*—not in a pinched way, but in the sense of being solid and reliable. Although a tad on the bright side, the A-10 speakers are not harsh at all. I used them extensively for a two-month period and never found listening through them fatiguing. Indeed, the brightness might better be described as clarity. At any rate, I quickly came to rely upon the A-10s, whether arranging, sequencing, recording, or mixing.

The frequency response of the A-10s is balanced from 20 kHz down to approximately 75 Hz, with a 2 dB dip down around 55 Hz. Rather than attempting to trick your ears into hearing frequencies lower than is physically possible with a woofer and cabinet of this size, as some monitors do, the A-10s provide a natural-sounding balance of frequencies within the range allowed by physics. (For those of you who need more low-end extension, NHTPro is soon to release a subwoofer to augment the A-10 and A-20 monitor systems.)

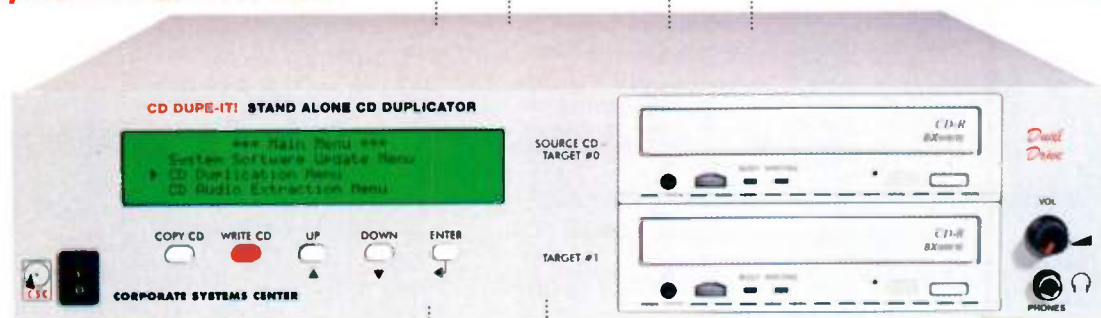
Interestingly, at lower monitoring levels, the A-10s evidence a slight lack of presence in the upper mids, between about 1 and 3.5 kHz. However, when

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## A-10 Specifications

### AUDIO

Frequency Response	55 Hz–20 kHz (±2 dB)
Peak Output	116 dB SPL
Total Harmonic Distortion (@ 90 dB SPL)	0.8% (100 Hz–10 kHz @ 1 meter)

### AMPLIFIER

Power Rating	150W continuous, 300W peak
Signal-to-Noise Ratio	>100 dB
Residual Hum/Noise	<10 dB (A weighted @ 1 meter)
Input Impedance	22 kΩ
Amplifier Sensitivity Control	5-position knob: Mute, +11 dB, +4 dB, -3 dB, or -10 dB
Amplifier Boundary Control	2-position knob: 0 (flat) or 1 (-3 dB @ 50 Hz)
Amplifier Position Control	2-position knob: NF (-2.5 dB @ 20 kHz) or MF (flat)
LF Cutoff	6 dB @ 50 Hz
Input Connectors	(2) balanced XLR; (2) balanced/unbalanced ¼"

### SPEAKERS

High-Frequency Driver	1" soft dome
Low-Frequency Driver	6.5" treated paper

### CROSSOVER

Crossover Frequency	2.1 kHz
Crossover Slope	12 dB per octave (woofer)/6 dB per octave (tweeter)

### ENCLOSURE

Material (monitors)	¾" MDF with high-pressure laminate
Dimensions	monitors 7.5" (W) × 11.9" (H) × 10.7" (D); amplifier 19" (W) × 3.5" (H) × 13.25" (D)
Weight	monitors 14 lbs. each; amplifier 29 lbs.

you turn them up to moderate or loud levels, the mid range blossoms and balance is restored.

Given their size, the A-10s present a solid soundscape. However, compared with certain larger powered monitors, they sound a bit small. If you consider the analogy of changing pixel resolutions on your computer monitor—everything is there and in the same relationship, only the size is changed—you will get an idea of what I mean. But in this case, the lack of very low frequencies feels appropriate. Were the low lows provided "artificially" (by porting or other design maneuvers), the A-10s' frequency balance and solid imaging might be disrupted. That said, I still would like to hear the A-10s with the proposed subwoofer.

### NATURAL SETTINGS

Be sure to experiment with the Position knob on the A-10 control amplifier. Unless you are more than five or six feet away from the speakers, I recommend using the NF setting, which sounds less bright than the MF setting. The MF setting could trick you into thinking there are more

high frequencies present than there actually are, resulting in mixes that sound dull when played back on other systems. Based on the sonic characteristics of my studio and on my tastes, I ran the amp with the Position knob set to NF (high-frequency reduction)

### NHTPRO

A-10 active monitoring system  
\$1,250

AUDIO QUALITY ■■■■

VALUE ■■■■

1 2 3 4 5

**PROS:** Tight, balanced, great sound. Open top end. Cabinet shape makes ideal placement easy. Separate amplifier housing allows for more solid cabinet design. No heat or magnetic sonic artifacts induced from amplifier being close to speakers.

**CONS:** Subwoofer needed for very low frequencies. Separate control amplifier makes transport cumbersome.

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and the Boundary knob set to 0 (maximum bass).

Here's a trick I discovered: if you set up the control amp within reach of your listening position, you can use the Sensitivity knob to switch monitoring levels without disturbing your original control-room setting. This is unorthodox, of course, and technically speaking, it could create distortion or other artifacts. But it did not pose a discernible problem to my ears, and I dug the ease it provided. I ran the input at the +4 dB setting, which allowed me to check the mix at a low level simply by turning the Sensitivity knob to the +11 dB setting. To really crank it up, I



**The adjective that best describes my lasting impression is tight.**

switched to the -3 dB setting, and then I could return to my exact original level by switching back to the +4 dB setting. This "feature" would be helpful to anyone who needs to monitor at precise, consistent levels.

### LEAN ON ME

The more monitors I work with, the better I appreciate the value of monitoring on several systems throughout the tracking and mixing process. When you get a mix to sound great on a variety of monitors, you know you've nailed it. The A-10s seemed to provide an intangible characteristic missing from my array of monitors, and I thoroughly enjoyed working with them.

Would I rely on the A-10s alone for critical work? You bet. Any criticisms of their sound expressed in this review are, in the larger picture, minuscule and ultimately a matter of personal taste. I would have no problem relying on the A-10s for tracking and mixing professional projects.

The only functional drawback of the system is the separate control amplifier, which makes the A-10s perhaps not the best choice for folks whose work requires them to tote their monitors from studio to studio. But if you are staying in one spot, the A-10s may just rock your world. ☺

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# FOCUSRITE

## PLATINUM COMPOUNDER

*A new standard in affordable 2-channel dynamics processors.*

By Myles Boisen

Focusrite has long been known for its top-drawer (and top-dollar) studio and mastering gear. Over the past few years, the company's affordably priced Green and Platinum products have brought world-class sounds within the budget of the personal studio. Although the Platinum VoiceMaster and ToneFactory were only politely received by personal-studio pundits, Focusrite's newest contender, the Platinum ComPounder, will likely get a hero's welcome—not only in the personal studio but also in pro facilities and from live-sound engineers and DJs.

Starting with the familiar configuration of a 2-channel gate/compressor/limiter, the ComPounder adds a ground-breaking low-boosting EQ to the package and offers supercharged sonics with Class A circuitry for maximum warmth and fidelity throughout the signal path.

### FRONT AND CENTER

With the exception of the power switch on the far right, the ComPounder's dense front panel is laid out symmetrically. With 25 buttons and 18 knobs in one rack unit of space, there is not much room to spare. The signal path is the same for both channels; the noise gate is followed by the compressor, bass expander, and limiter. However, Focusrite placed the gate controls for the right channel *after* the compressor on the front panel, resulting in a slightly confusing layout.

The compressor and limiter sections have separate stereo-link switches located in the center of the front panel. These, along with all In and Out buttons, are lit with a small red LED when engaged. When linked, the controls on the left side of the unit govern both sides of the stereo signal, overriding the settings on the right half of the panel.

The noise gates use optical sensors instead of voltage-controlled amplifiers and have only two continuously adjustable controls. However, the gates, which cannot be linked for stereo operation, are enhanced significantly by the addition of four push-button switches: Fast Attack includes settings for signals with slow initial transients (such as trumpet) or rapid ones (such as drums); Full Range selects either -20 or -80 dB of gating attenuation; Expand toggles between a classic noise-gate mode with a rapid cutoff and an expander/gate function (with a 2:1 ratio) that fades the signal with a tapered decay (adjustable between 100 milliseconds and 4 seconds using the Release/Hold knob); and Hold can be adjusted (also using the Release/Hold knob) to keep the gate open for as long as 4 seconds. Although this last option is useful for keeping sustained sounds from "flickering" as they approach the threshold, it also has potential as a creative effect.

A key-gating switch (which allows the gate to be triggered by an external audio signal), a bypass switch, and a four-position attenuation meter in green LEDs fill out the gate section.

Except for the bass expander, which distinguishes the ComPounder from other dynamics processors on the market, the VCA compressor controls are straightforward. Multicolored LED arrays provide useful metering for input level and gain reduction, with input peak (at +20 dB, 2 dB before clipping), compression overload levels, and limiting status indicated by red LEDs. Push-button switches include the compressor bypass, soft or hard knee set-

tings, autorelease (a program-adaptive circuit designed to vary release times automatically), the bass expander's Huge function, and a bypass for the limiter.

Rotary pots govern a full complement of conventional compressor settings: Threshold (from -24 to +12 dB), Ratio (1.3:1 to "overcompression"), Attack (100 microseconds to 100 milliseconds), and Release (100 milliseconds to 4 seconds). Continuing to the right, the bass expander knob is next, followed by the make-up gain knob.

The limiter is the final circuit in the compressor section. Like the noise gate, the limiter is optical rather than VCA, which keeps coloration and distortion to a minimum. The limiter's appearance in the circuit after the make-up gain guarantees foolproof operation, but this arrangement could be a blessing or a curse, depending on how you prefer to employ output limiting.

The ComPounder's rear-panel inputs include line-level XLR (pin 2 hot) and 1/4-inch jacks, with selectable levels (-10 dBV or +4 dBu) on each channel using a rear-panel button (see Fig. 1). The XLR input is automatically disconnected when the 1/4-inch input is used. The key-gating input accepts a balanced or unbalanced 1/4-inch plug. The line output levels are +4 dBu at the XLR jack and -10 dBV at the 1/4-inch unbalanced jack. Both outputs can be accessed simultaneously, a real boon in semipro and personal studios.

One thing to keep in mind is that the rear-panel and side vents are definitely not just for show. To protect the internal Class A components, the ComPounder needs to be well ventilated in an equipment rack, as it runs hotter than some tube gear.

Another important feature is the ComPounder's manual. It provides an informative and comprehensive breakdown of each control function, along with diagrams and common practical settings that go a long way toward unraveling the mysteries of compression.



Focusrite's Platinum ComPounder combines a VCA compressor and a photo-optical limiter and gate with Class A components to yield a pro-sounding dynamics processor at a personal-studio price.



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**FIG. 1:** Besides letting you select the input level for each channel independently, the Platinum ComPounder lets you use the XLR and 1/4-inch outputs of each channel simultaneously.

**THANK THE INDUCTOR**

The ComPounder's bass expander feature might be dismissed by some as a trendy gimmick, except that it works great and sounds amazing. Based on an old-fashioned wire-wound inductor—a component found in classic Rupert Neve designs—the bass expander gives you as much clean, transparent low end as you could want. In fact, the dial ranges from Flat to Fat! The Fat setting (fully clockwise) adds 7 dB of boosting below 50 Hz, and with Huge engaged, a similar boost occurs with a corner frequency of 100 Hz.

Of course, any equalizer can add bass. But the way the ComPounder's inductor generates deep, musical lows without sacrificing clarity must be heard to be appreciated. I found that it added substantially to electric bass and kick drum, increasing the fundamental

power of isolated tracks as well as mixes, without ever getting muddy or taxing my woofers.

**DYNAMIC TESTS**

The ComPounder's expander/gate worked well on rack toms, but only after a bewildering initial workout involving almost every possible switch and knob combination. I didn't like it as well as the gate I usually use for toms, although the ComPounder's sensitivity and fast release time should be ideal for taming tracks where noise or bleed is a problem. And once I got the hang of it, I realized that this gate is versatile and precise enough for almost any task.

The ComPounder's compressor worked like a charm on kick drum; with a 3:1 ratio, and attack and release settings at 10 o'clock, it provided up

to 6 dB of gain reduction without distortion or pumping. This particular track didn't need any low-end help, but dialing in a little bass expander does wonders for any thin-sounding kick-drum tracks. As a single-channel compressor, the unit also handled muted trumpet, voice, harmonica, and sax effortlessly and musically, once I learned to start with slower settings.

Using the compressor on bass, I noted some distortion on fast attack and release settings, as happens with many such units. The manual is matter-of-fact on this point, noting that "distortion during gain reduction is determined by the attack and release times set." Electric bass is often the ultimate test of a compressor/limiter, and not even the best designs are foolproof in preventing distortion. But an adjustment toward slower settings sidestepped this problem and worked to tame an unruly direct-bass part. In this application, and with a number of other sources, I found that setting the attack and release midway (at around 11 to 1 o'clock) yielded adequate, conservative compression without undue side effects.

**ON THE BUS**

With the ComPounder stereo-linked as a +4 dBu insert on the mix bus, I tested the unit for coloration and gain changes on a full mix. With the compression circuit engaged and the threshold fully clockwise to +12, I noted a very slight increase in gain, as well as a mild but noticeable bass boost, which sounded like a residual effect of the bass expander. More listening revealed a very slight increase of high-end edginess, but the lack of coloration was still commendable—and a rarity—for a compressor costing less than \$1,000. When used as a channel insert at -10 dBV, the ComPounder did cause a drop in level; I easily compensated for this by applying a small amount of make-up gain, with no noise or signal degradation being added.

As with most fast VCA compressors, the ComPounder did exhibit pumping on kick-drum beats in a stereo mix

**Platinum ComPounder Specifications**

<b>Inputs</b>	(2) XLR; (2) balanced/unbalanced 1/4"
<b>Outputs</b>	(2) XLR; (2) unbalanced 1/4"
<b>Other Inputs</b>	(2) balanced/unbalanced 1/4" key inputs
<b>Frequency Response</b>	5 Hz–200 kHz (+0/–2 dB)
<b>Signal-to-Noise Ratio</b>	–100 dB; –87 dB with compressor in
<b>Total Harmonic Distortion</b>	<0.006% @ +6 dB
<b>Compressor</b>	
<b>Type</b>	VCA
<b>Threshold</b>	–24 to +12 dB
<b>Ratio</b>	1.3:1 to ∞:1 and "over"
<b>Attack Time</b>	0.1–100 ms
<b>Release Time</b>	100 ms–4 sec
<b>Make-Up Gain</b>	0 to +20 dB
<b>Amplifier</b>	Class A
<b> Limiter</b>	
<b>Type</b>	Photo-optical
<b>Threshold</b>	12–26 dBu
<b>Attack</b>	Fast
<b> Expander/Gate</b>	
<b>Type</b>	Photo-optical
<b>Threshold</b>	–40 to +10 dB
<b>Expander Ratio</b>	1:2
<b>Release/Hold Time</b>	100 ms–4 sec
<b>Gate Range</b>	–20 dB; –80 dB with Full Range engaged
<b>Dimensions</b>	1U x 10.2" (D)
<b>Weight</b>	9.4 lbs.

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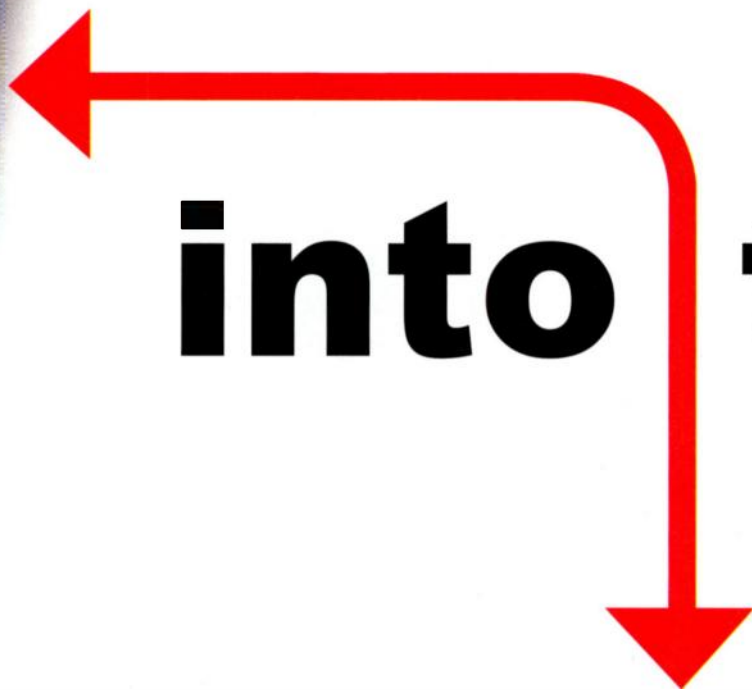
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(hard knee setting) unless very conservative threshold, attack, and release settings were used. Switching to a soft knee made the results more palatable, and setting a 2:1 ratio with moderate attack and release times allowed me to use between 3 and 6 dB of compression without much audible pumping on low-frequency information.

For this mastering-style application, tweaking the bass expander and make-up gain produced a dramatic augmentation of the entire mix, although I still wasn't happy with how it squeezed the otherwise uncompressed rock-style kick drum. Lest we forget, this is not a \$4,000 mastering compressor. Yet with some careful listening and adjustment it has the potential to be an acceptable stereo-bus compressor for a variety of styles. And the bass expander was a lifesaver in this case, artfully compensating for the momentary low-end ducking that occurred when the ComPounder clamped down on a full mix.

In addition, I'm happy to report that the limiter worked with uncommon smoothness on mono tracks and stereo

mixes, especially when used in moderation. The autorelease option is also handy for fast-transient sources like drums, percussion, and acoustic guitar.

**TWO THUMBS UP!**

So what's not to like? Other than the wobbly and cheap-feeling plastic buttons (which remind me of loose teeth), the look, sound, and performance of the ComPounder is surprisingly close to that of its classy, high-priced siblings. With the exception of the powerful (and addictive) bass expander, there

is nothing new about this kind of stereo gate/compressor/limiter. But when a company like Focusrite takes such a project-studio staple to a professional level—with a pristine signal path and fully functional processing blocks—that's a major event.

*Myles Boisen is a guitarist, producer, composer, and head engineer/instructor at Guerrilla Recording and the Headless Buddha Mastering Lab in Oakland, California. He may be contacted by e-mail at mylesboise@aol.com.*

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**CONS:** Symmetrical front-panel layout doesn't follow signal path. Wobbly and cheap-feeling plastic buttons. Some pumping and distortion when using fast attack and release times on low-frequency sources.

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# ALGORITHMIX

SOUND LAUNDRY 2.1B (WIN)

*Real-time audio  
restoration plug-in bundle.*

By Scott R. Garrigus

**S**ound Laundry from Algorithmix is a bundle of real-time audio restoration plug-ins that runs on the Windows platform. Included in the package are the Analyzer, DC-Removal Filter, De-Noiser, De-Scratcher, and High-Lowpass Filter tools. You also get the AlgoTest tool, which lets you determine the residual noise level of your sound card, and the AlgoRec tool, for recording WAV files with built-in proprietary lossless audio compression. The bundle touts high-quality 80-bit internal signal processing, coupled with speedy performance, low CPU load, and an easy-to-use interface.

Unfortunately, in its quest for simplicity, Algorithmix has made *Sound Laundry* more difficult to work with. The incomplete interface and proprietary plug-in format greatly reduce productivity. I tested the product on a 300 MHz Pentium II, with 64 MB of RAM, and all the while I was wishing that these were DirectX plug-ins. That would have allowed me to use them from within my favorite digital audio-editing software.

## MINOR SETUP PROBLEM

To begin with, I had a problem authorizing the program. I went through the

installation process, during which I had to type in a required CD-key number. The number was accepted, but the plug-ins still ran as unregistered copies. After a few attempts I contacted Algorithmix, and the company's response was quick and helpful.

It turns out that the setup procedure has a small bug: authorization won't work unless you elect to add icons to your desktop for each of the plug-ins. I had unchecked that option each time I tried installing the program because I don't like desktop clutter. Allowing Setup to add the icons solved the problem. Algorithmix says it will fix the bug in the next version.

## THE PLUG-IN STATION

Because of their proprietary format, the *Sound Laundry* plug-ins can be run only via the included PlugIn Station (see Fig. 1), the command center where you input, process, and output audio. The PlugIn Station provides three methods of processing: Live, Real-Time, and Off-Line. Live Processing lets you take an audio signal from your sound card's input, process it with the *Sound Laundry* plug-ins, and hear the results through your sound card's output without generating an intermediate WAV file. This method lets you use your computer as a live signal processor.

I experienced a slight delay between the input signal and the processed output signal, but this is to be expected. All sound cards exhibit some amount of latency, so this is not the fault of *Sound Laundry*. As a matter of fact, the program allows you to adjust the number of device buffers as well as their size in samples, so you can find the right balance of least latency without signal dropouts.

Another problem I encountered was a slight echo of the

input signal introduced into the output signal. The echo had a very low amplitude, but it was still audible when the input signal ceased and the delayed output signal sounded. Whether *Sound Laundry* caused this, I can't be sure.

Real-Time Processing is similar to Live Processing except that the input is derived from a preexisting WAV file rather than a live signal. When you use Real-Time Processing, you're prompted to select an input file. Then any processing you do is applied to the file in real time as it plays. Any parameter changes that you make are also reflected in playback. This allows you to make fine adjustments and hear the results instantly. You can bypass any processing during playback to hear an unaltered signal, or you can use the Difference feature to listen to the disturbances being removed instead of to the signal that's being processed.

When you've found the right settings, you can switch to Off-Line Processing. Here you must select an input file and an output file. Then all plug-in parameters are disabled so that changes cannot be made, and the file is processed. In addition to WAV files, *Sound Laundry* accepts MP3 files and files created by its own AlgoRec tool, although it can output only to WAV format.

After you've chosen a processing method, the PlugIn Station lets you select which plug-ins you want to apply to the signal. You can chain up to four plug-ins in any order by selecting them from the drop-down plug-in menus. Why a fifth menu wasn't included puzzles me. After all, there are five plug-ins, and most users have the available computer power to use them all. In

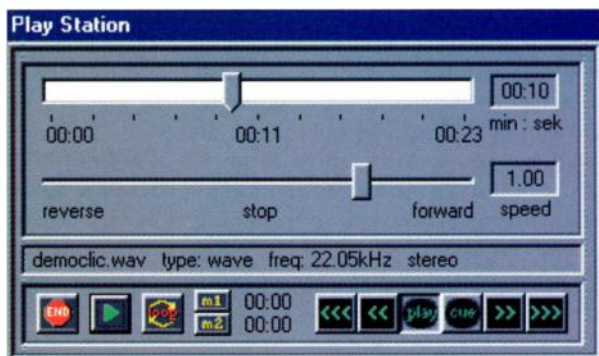


FIG. 2: The Play Station lets you control audio playback of your input file.



FIG. 1: The PlugIn Station is the command center where you choose what type of processing to use and define the plug-in chain.

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**Sound Laundry**  
**Minimum System Requirements**  
 Pentium 133; 16 MB RAM; Windows  
 95/98/NT 4.0; 16-bit Windows-compatible  
 sound card

fact, I was able to process a stereo file with all four plug-in menus selected without exceeding a CPU load of 48 percent.

*Sound Laundry* has no preset functions. (This will change with the newly announced v. 2.5.) You can't save individual plug-in parameters or the settings in the drop-down plug-in menus. You must start from scratch every time you launch the program, although the last settings used and the last window positions are saved when you exit.

#### THE PLAY STATION

If you choose the Real-Time Processing method, the PlugIn Station opens a companion window called the Play

Station (see Fig. 2). This part of the program lets you control audio playback of your input file. I found the Play Station confusing at first. It has a row of buttons at the bottom that, from left to right, seem to indicate stop, play, loop, markers 1 and 2, rewind to beginning, rewind to marker, play, cue, fast-forward to marker, and fast-forward to end. But in fact, the End button ends the current session, and the button marked with a green triangle acts as both a stop and play button.

The loop and marker buttons are as they seem, but the remaining buttons select either Play or Cue mode. In Cue mode, what look like rewind and fast-forward buttons are actually high-speed playback buttons. Instead of instantly moving to a point within the file, they



**You can monitor the overall click and crackle level via the Scratch Level meter.**

just play the file backward or forward at 4x or 16x speed. I have no idea why they are included.

The Speed lever, however, lets you adjust playback speed and make rudimentary corrections to pitch. Finally, the Current Position lever lets you move to any point within the file, but playback always starts at the beginning unless you place markers and activate Loop mode.

#### THE DE-SCRATCHER

The De-Scratcher plug-in is really three tools in one (see Fig. 3). It provides de-clicking, which removes large spikes in the audio signal; de-crackling, which removes crackles and smaller clicks that are left behind after the de-clicking process; and de-plopping, which removes low-frequency disturbances in the signal due to mechanical resonances and can be turned on or off. De-clicking and de-crackling can be adjusted via sliders that range from 0 (no processing) to 100.

As your audio is processed, you can monitor the overall click and crackle level on the Scratch Level meter. The more clicks and crackles detected,

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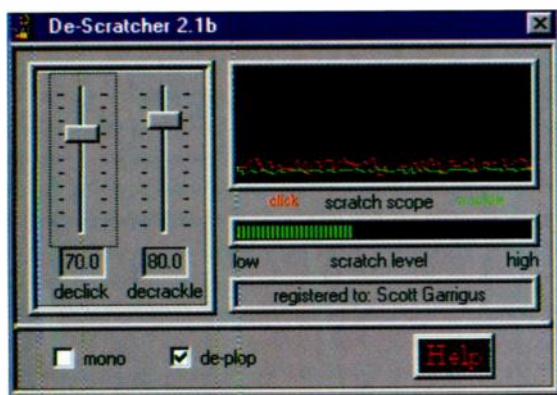


FIG. 3: The De-Scratcher plug-in includes de-clicking, de-crackling, and de-plopping tools.

the higher the Scratch level will be. You can also monitor the separate click and crackle levels, which are graphically displayed on the Scratch Scope as red and green lines, respectively. The Scope displays the last 12 seconds of signal. The higher each line appears from the bottom of the Scope, the higher the click or crackle level.

I found the De-Scratcher very effective. *Sound Laundry* includes a demo WAV file, which contains a number of disturbances. Using De-Scratcher I was able to remove most of the clicks and crackle from the "dirty" file without any adverse effects on the audio.

### THE DE-NOISER

The De-Noiser, on the other hand, requires the user to expend a fair amount of effort in order to achieve good results (see Fig. 4). This plug-in provides adjustable Threshold and Noise Reduction Amount parameters for removing continuous background noises such as hiss. It also has a Noise Level Meter and a Noise Scope, which function similarly to the De-Scratcher's Scratch Level Meter and Scratch Scope. The De-Noiser uses the popular noise-print method for processing and provides two preset prints—white noise and pink noise—which enable you to quickly remove background hiss. You can also capture a user print from your audio file for more accurate processing, but herein lies the problem.

To capture a noise print, you have to hunt and peck your way through your file to find a good piece of "silence" that contains only a fragment of the noise that you're trying to re-

move. Locating a sample of noise with the Play Station is cumbersome, because it gives you no way to graphically view and select a portion of the file. If there is enough silence at the beginning or the end of the file, you may get lucky. But even then, you have to capture on the fly and hit the Stop button in time so you don't include any of the actual audio in the print.

Furthermore, if you succeed at capturing a good print, you have no way to graphically edit the noise print itself. I've worked with many noise-reduction products, and those that use the noise-print method have always included a way to edit the noise print. These issues are major oversights in *Sound Laundry*. (The new version of the software includes a waveform editor, which should make finding a noise print much easier. Other improvements in the new release, such as noise-print smoothing and editing, will also help considerably.)

With a good noise print, however, De-Noiser gave me some decent results. I tried it with a vocal track that contained some air-conditioner noise in the background. After a bit of a struggle, I obtained a good noise print, and the plug-in removed all the noise with only a slight coloration of the audio material. But getting a good sound still takes a lot of trial and error. Luckily, you can adjust the fast Fourier transform block size and FFT overlap, which are parameters that aren't adjustable on many products. I was also able to clean up the included demo file very nicely after finding the right combination of FFT, Threshold, and Noise Reduction Amount settings.

### THE OTHER PLUG-INS

*Sound Laundry* gives you three more plug-ins, which are nice to have but less necessary than the De-Scratcher and De-Noiser. The DC-Removal Filter simply removes DC offset from the

input signal. Left and right meters show the level of DC offset in each channel, and a reset button lets you reset the meters. I have no complaints about this plug-in except that most Windows audio editors already provide a DC-offset removal function. (Algorithmix has recently announced a DirectX version of the De-Scratcher and the De-Noiser, which will enable you to use the technology directly within many host audio applications.)

Because the Noise Scope provides only a basic display of the De-Noiser's levels, the Analyzer is included for showing a more accurate frequency spectrum. You can set it to display the input and output of the De-Noiser as well as the High-Lowpass Filter. You can also use it to display your captured noise print superimposed over the other signals. (You still can't edit the noise print, though.) Adjustable frequency and amplitude scales allow you to zoom in or out for a more or less detailed display. You can switch the amplitude scale between logarithmic or linear, and a Decay parameter controls the fallback time of the display.



FIG. 4: Using the noise-print method, the De-Noiser plug-in lets you remove continuous background noises such as hiss.

The High-Lowpass Filter—the most useful of the three additional plug-ins—acts as a highpass and lowpass filter, with adjustable parameters for each. What makes this plug-in special is its use of linear-phase filters, both of which have continuously adjustable slopes from 0 to 24 dB per octave. This gives you some nice high-end filtering possibilities. The highpass filter has an adjustable cutoff frequency of 20 to 180 Hz, and the low-pass filter can be adjusted from 2 to 20 kHz. The plug-in provides a graphical display of the filter, and you can adjust the parameters

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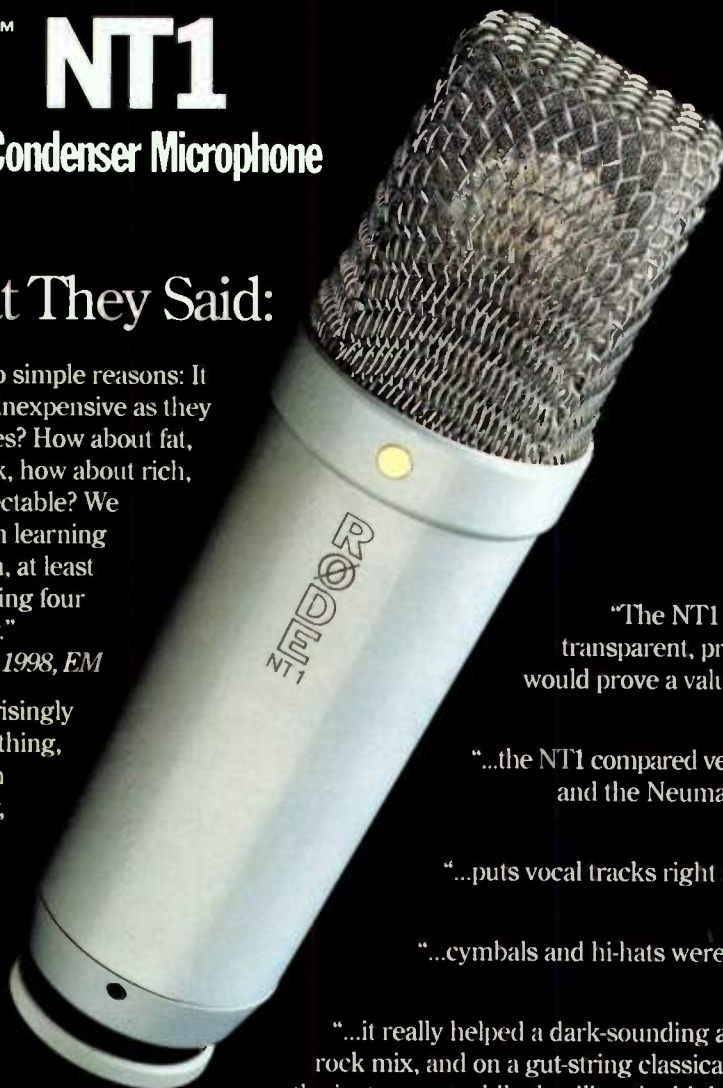
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**CONS:** No DirectX support. No presets. Cumbersome playback and file navigation. No graphical selection or editing of noise print.

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by dragging the appropriate filter point with the mouse. At the same time, the corresponding numerical values are shown below the graph, although you can't adjust these numbers using the computer keyboard.

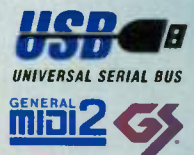
### THE END

With some effort, you can use *Sound Laundry* to remove a number of anomalies from your audio signals. But the product is more difficult to use than its documentation claims. Although the program comes with no printed documentation, the online Help files explain the functions of each part of the program quite well. And the CD includes a comprehensive PDF manual, which explains in detail how to use the plug-ins.

*Sound Laundry's* main problem is its lack of DirectX support. With DirectX, users could simply run the plug-ins through their favorite Windows audio-editing application rather than having to deal with the cumbersome Play Station. Algorithmix should also add graphical noise-print selection and editing to the De-Noiser plug-in. Without those features, however, capturing an accurate print is very difficult.

Otherwise, *Sound Laundry* provides some good processing power. If the new release is all that Algorithmix says, then the program will compare well with the other professional solutions on the market. ☹

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# A P O G E E

## PSX-100 AND ROSETTA

### *Raising the bar for digital converters.*

By Gino Robair

We often take many parts of our digital audio arsenal for granted, including our converters; most of us simply use whatever comes standard on our equipment. However, just like with the preamps on your mixer, you can achieve a noticeable improvement in sound over your built-in converters by using dedicated outboard ADCs and DACs. A 2-channel digital converter with a variety of input and output options is especially handy—you can use it with your DAT, ADAT, CD-R, and hard-disk recorder.

Apogee Electronics offers a pair of 2-channel converters that you can customize to a number of specific studio applications while using digital converters similar to those in Apogee's flagship 8-channel converter, the AD-8000.

The Rosetta is a 24-bit, 2-channel A/D converter that comes in two "speeds": one that records at the common sampling rates of 44.1 and 48 kHz, and a high-speed "96" version that adds 88.2 and 96 kHz to the list. (An upgrade to the 96 kHz version costs \$795.) The PSX-100 is a 2-channel A/D and D/A converter. Each converter has its own clock so that they can be used independently.

Although the Rosetta and PSX-100 are meant for slightly different applica-

tions, they share a number of handy features that make them stand out from other outboard converters.

### DYNAMIC CONTROL

For music with a dangerously wide dynamic range, the Rosetta and PSX-100 include Apogee's proprietary Soft Limit. This acts as a subtle, yet transparent, compressor/limiter. Soft Limit kicks in as the source material approaches the digital ceiling of 0 dBFS, avoiding overs to let you tape a hotter signal. I found Soft Limit to be useful for mixing and mastering as well as for going direct to DAT in the field (where I used it most). If you're recording instruments with an extreme dynamic range (in my case, it was the organ at St. Mary's Cathedral in San Francisco), Soft Limit is invaluable.

Speaking of levels, I found the Rosetta's horizontal level meters to be quite helpful, and I actually preferred them to the shorter, vertical ones on the PSX-100. The Rosetta meters seemed to give a better visual indication of what I was hearing.

### WHITHER GOEST DITHER

Both units begin by converting the analog signal to a 24-bit word length. To get an output of a shorter word length, you have two options: select 16- or 20-bit with UV22 using the Output Res button, or leave the unit in 24-bit mode and allow the recording device to truncate the word by dropping the least significant bits.

UV22 is Apogee's answer to using dither and noise shaping in the reduction of word lengths. UV22 places a high-frequency (22 kHz) "clump of energy" that acts as a bias taking the noise floor down to the theoretical 16-bit level. The result is the ability to hear

sounds disappear smoothly as their levels go below the noise floor—similar to how quiet sounds move into the noise floor on analog tape.

UV22 is transparent and gives a remarkable clarity to 16-bit recordings at 44.1 or 48 kHz. (You cannot use UV22 on the faster sampling rates of 88.2 or 96 kHz.)

You may be wondering, then, why anyone would want to record without it. Because UV22 is centered around 22 kHz, any music destined for downward pitch changing risks exposing this added sonic energy. For sources destined for downward pitch shifting, or extreme data-compression schemes, Apogee warns against using UV22.

### APOGEE BIT SPLITTING

In order to get 24-bit word lengths and 88.2 or 96 kHz sampling rates to work on a modular digital multitrack machine, the Rosetta and PSX-100 use Apogee Bit Splitting (ABS 96), which spreads the 2-channel, high-resolution signal across all eight tracks of the MDM. To listen back to a recording done with ABS 96, you will need the D/A of the PSX-100 for decoding. Because the Rosetta is an A/D converter only, you will not be able to monitor ABS 96 with the same high resolution you are recording with.

You can, however, use the S/PDIF outputs (coaxial and optical) for monitoring purposes. These outputs send every other sample to the D/A, which translates to 44.1 kHz at the 88.2 kHz rate, and 48 kHz at the 96 kHz rate. But without the proper filters, the resulting audio will not be suitable for recording because of possible aliasing and other audio artifacts. On the PSX-100, you get similar results when you monitor from the aux output.



FIG. 1: The front (a) and back (b) panels of the Rosetta.



FIG. 2: The front (a) and back (b) panels of the PSX-100.

There are two possible ways to use the AES/EBU outputs for ABS 96: double-wide and double-fast. The one that you choose will depend on your recording device. Double-wide, which is the standard setup in the Rosetta and PSX-100, sends half of the high-resolution signal through AES/EBU output 1, and the other half through AES/EBU output 2.

Double-fast requires only one of the AES/EBU outputs because it sends the data twice as fast. Originally, Apogee didn't support double-fast on the Rosetta and PSX-100, but now it does, via an upgrade (prices to be announced).

**EVERYBODY OUT**

The PSX-100 and Rosetta allow you to send digital signals to multiple devices at once; on both units, all of the digital outputs are on at the same time. If you're recording at 44.1 or 48 kHz on the Rosetta, for example, this gives you two AES/EBU outputs, an optical output (selectable between ADAT or S/PDIF), TDIF, and a coaxial S/PDIF output.

On the PSX-100, things get a bit more interesting. It not only acts as a format converter, but it can also give you outputs at two different resolutions at the same time, because a 24-bit signal is always available from the AES/EBU aux output. This allowed me to send a 24-bit, 44.1 kHz signal to the DA-45HR (Tascam's 24-bit DAT machine) while simultaneously making a 16-bit, 44.1 kHz backup on a Panasonic SV-3700.

**DON'T FORGET THE DIP**

Back-panel DIP switches on both devices allow you to customize each unit for specific applications. The switches are designed more for a "set it and forget it" situation, thus freeing the

user from unnecessary menu levels.

For instance, switch 1 on the Rosetta sets the input to run at either -10 or +4 dBu. On the PSX-100 you can set the input and output separately to operate at -10 or +4 dBu. The DIP switches also allow you, among other things, to determine the number of consecutive full-scale samples (selectable from 1 to 4) it takes to make the level meters indicate an over.

Aside from these shared features, the Rosetta and the PSX-100 differ greatly in their feature depth and implementation.

**DECIPHERING THE ROSETTA**

As a 24-bit A/D converter running at 44.1 or 48 kHz, the Rosetta couldn't be more user-friendly. Simply plug in your analog inputs, connect your digital recorder to the appropriate Rosetta outputs, choose your sampling rate, pick the bit resolution you need, and you're ready to roll. It doesn't get any easier than this.

The only other thing to consider is whether you want S/PDIF or ADAT

information sent to the optical output. Once you've decided this point, you're ready to record with increased resolution, even to a 16-bit recorder such as DAT or CD-R.

The Rosetta is a little trickier to figure out when you want to use the higher sampling rates of 88.2 and 96 kHz on an ADAT. Although the information is clearly laid out for the Tascam DA series recorders, it took a bit of sleuthing in the manual to get all the information I needed for using the ADAT. But once I got it up and running at 96 kHz, everything worked reliably.

The Rosetta's front panel is easy to navigate (see Fig. 1a). From left to right, there are only six buttons. Next to the power switch, which is nice to have on the front panel, is the Sample Rate selector (44.1 through 96 kHz). Next is the Resolution selector for choosing the bit depth (16- and 20-bit with UV22, or 24-bit), followed by the Optical Out selector, which you can use to determine whether S/PDIF or ADAT protocol is sent over the optical cable. The last two buttons are

PSX-100 Specifications	
Analog Inputs	(2) XLR
Analog Outputs	(2) XLR
Digital Inputs	(2) AES/EBU; (1) coaxial; (1) optical; (1) TDIF
Digital Outputs	(3) AES/EBU; (1) coaxial; (1) optical; (1) TDIF
Word-Clock Ports	In, Out
Input Resolution	24-bit
Output Resolution	24-bit; 16- and 20-bit with UV22
Sampling Rates	44.1, 48, 88.2, 96 kHz
Frequency Response	10 Hz-20 kHz (±0.025 dB)
THD+N	-112 dB (A weighted)
Dynamic Range	119 dB (A weighted)
Dimensions	1U x 14.25" (D)
Weight	12.5 lbs.

the Soft Limit selector and the Meter Clear button, which clears the red "over" LEDs. The Soft Limit button also does double duty: hold it down for two seconds and it puts the unit into calibration mode.

There is also an LED bar graph and overload light for each channel, as well as adjustable trim controls for setting the level going to the A/D converter.

The back panel is also fairly straightforward (see Fig. 1b). A pair of XLR connectors that can accept either +4 dBu or -10 dBV serve as the analog

inputs. Digital outputs include jacks for a 25-pin TDIF cable, coaxial and optical jacks, and a pair of AES/EBU connectors. There is also a BNC jack for word-clock output. A set of DIP switches and the connector for the IEC power cable complete the scene.

#### INSIDE THE PSX-100

Although the PSX-100 has many more features than the Rosetta, the overall implementation is just as logical. Like the Rosetta, the PSX-100 includes buttons for output resolution, Soft Limit,

and optical output format (see Fig. 2a). Additional buttons include A/D Sync for selecting the sync source, individual mute switches for each channel, buttons to select ABS and Digital Copy mode, an A/D or D/A metering selector, and the MDM Input selector for choosing which tracks of the MDM you wish to monitor.

Most of the buttons on the PSX-100 serve double duty. Press them quickly to get the results printed on the front panel; press and hold a button for two seconds to get to another layer of parameters. For example, to return the unit to its default settings (DIP switches excluded), press and hold the Output Res button during power-up; to go into Fast mode for operation at 88.2 and 96 kHz, press and hold the A/D Sync button. Memorizing which buttons had the press-and-hold features that I needed was easy.

The PSX-100 can cover a wide range of applications, and is easy to use once you set it up for your own studio situation. Once everything is plugged into it and the DIP switches are configured (see Fig. 2b), the PSX-100 becomes almost invisible during your work.

For example, you can send an analog signal into the A/D converter and send the results from a digital output to a recorder, while at the same time converting a digital input to an analog signal through the D/A output.

#### THREE OPERATING MODES

The PSX-100 has three modes that determine how A/D and D/A converters interact with each other: Confidence Monitor, Analog Monitor, and Digital Copy. In Confidence Monitor mode, the A/D does not go directly to the D/A converter. Rather, the A/D and D/A converter act independently of one another, with each using its own low-jitter clock. Besides being able to use the PSX-100 as if it were two separate converters (you can even run them at different sampling rates if you like), you can do what Apogee calls *confidence monitoring*: taking the digital output of the device you're recording to and running it through the PSX-100's D/A converter. This lets you hear exactly what's being recorded.

In Analog Monitor mode, the A/D converter sends a signal directly to the D/A output, while also feeding each of the digital outputs. This means you

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are monitoring what is going to the A/D converter rather than what the recording device has recorded.

In Digital Copy mode, a signal received in one of the digital inputs is routed to all of the digital outputs as well as the analog output. This allows you to do digital format conversions, such as sending an optical S/PDIF to AES/EBU and coaxial S/PDIF simultaneously. I have to admit that I didn't think I would use the PSX-100 much as a format converter. But in the time I've had the unit, converting formats has been one of the primary uses of the device in my studio.

### A NEW RESOLUTION

Features and convenience aside, the sound quality of recordings made with the PSX-100 or Rosetta at the front end was astounding. In every case, they proved to be a vast improvement over the internal converters on each recorder that I used.

Both the Rosetta and the PSX-100 recorded a 24-bit, 96 kHz signal on an ADAT XT with startling results. Immediately, I noticed the extended dynamic range the high-resolution recording promises, not to mention a high end that is clear and true, with greater detail in the low-level information.

Using the PSX-100 with the Tascam DA-45HR, 24-bit DAT machine was equally revealing. The 16-bit, UV22 recordings made with the Rosetta had

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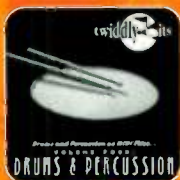
VALUE ■■■■■

1 2 3 4 5

**PROS:** Logical layout of features. Soft Limit and UV22 are fairly transparent but yield superb results. Format flexibility. A/D and D/A can operate independently. Quiet.  
**CONS:** Manual is slightly confusing with some of the advanced, high-resolution applications.

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**In a perfect world** Bill Bruford, or Gavin Harrison, or Paul Kodish descends on your studio in person to lay down some rhythm tracks. You sit sipping non-fat lattés and discussing the finer points of the material while a crew of smiling but monosyllabic assistants assemble the drums. The session is a blast: the tempos perfect, the feels peerless. You can use everything.

But then Bill/Gavin/Paul slips you an envelope. S\*\*\*, the invoice: You open it with trembling fingers to read the words 'No Charge,' and you look up into Bill/Gavin/Paul's smiling eyes and waving finger as he says "But next time, man, you're gonna play on my record, OK? Deal?"

You both laugh, knowingly, as only fellow and equal artists can do. And then sushi arrives.

**In an imperfect world** you've just spent another lousy hundred bucks on another sample CD. It's got some loops you can use but, heck, you've heard a lot of these a zillion times on the radio. When did this come out? 1997. You curse the clerk at BigBucks Megastore.

But by lunchtime you've got a groove loaded and found a workaround to incompatibility issues between your sequencer and digital audio package. The tempos are kind of limp, which you can fudge. Still you wish you could change the sound of the snare. You wish you could program decent drums yourself. At the end of a hard day you fill in some sample clearance forms and toss a pizza into the microwave.

**In a smart world** you reach up for the Jewel-Case marked Twiddly•Bits Vol 8 MIDI BreakBeats and flip open the lid. You insert the disk into your PC (or Mac), open Cubase (or Cakewalk, or Performer..), and load a file. You Solo one of a dozen tracks containing exuberant 2-bar drum 'n' bass loops, and hit play. Geez! Are those sounds coming out of *my* gear? Still in shock, you loop the groove over 16 bars and snip out the final bar, substituting it for a death-defying fill currently residing on Track 14. You switch to an ambient drum kit. Yea! the groove becomes even more intoxicating, especially when you hit the gas and effortlessly take the tempo up to 155. The track already has life, energy, and your own slant on things. You wonder how many grooves are on this disk. You look. About 700. For how much? \$39 bucks? Why haven't I bought any of these before? Food comes in and you don't even notice.



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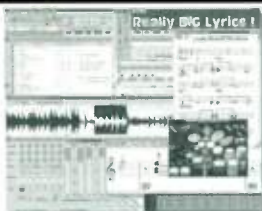
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The Jazz Soloist is a music program with professional jazz quartet arrangements of over 50 songs (per volume). Each song features a great jazz solo played by top jazz musicians, as well as piano comping, bass and drums. Includes a standalone "Jazz Soloist" program with MIDI files (files also included in Band-in-a-Box format). Vol. 1: Swing (50 pieces); Vol. 2: Swing (50 pieces); Vol. 3: Latin/blues/waltzes (60 pieces)



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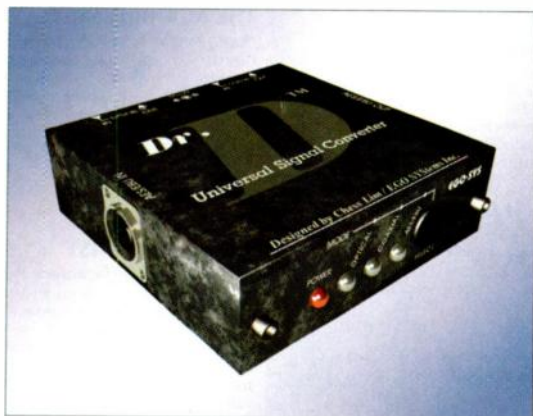
# QUICK PICKS

## EGO SYSTEMS

Dr. D

By Gino Robair

The Dr. D universal signal converter (\$120), from Ego Systems, routes S/PDIF signals between digital devices with different types of connectors: optical (Toslink), coaxial



The Dr. D allows you to route S/PDIF signals between various types of digital connectors, including coaxial (RCA), optical (Toslink), and XLR. The Dr. D is rugged, inexpensive, and easy to use, and it has a small footprint.

(RCA), and XLR. The term *universal signal converter* is misleading because the Dr. D is merely an S/PDIF interface converter that changes the impedance and voltage of the signal so that it will pass through the different connector types, including XLR. The Dr. D does not change the channel status bits that differentiate AES/EBU from S/PDIF—which is what the term *universal signal converter* leads one to believe.

### The Little Things That Count

The S/PDIF (a consumer format known officially as IEC 958 Type II) and AES/EBU formats differ in peak-to-peak voltage (0.5 to 1 volt and 2 to 7 volts, respectively) as well as cable impedance (75 ohms and 110 ohms, respectively). The formats are otherwise very similar, so most machines require only a change in voltage and impedance and can overlook

the difference in subcode information.

However, certain digital recorders—typically older models—are in fact very particular about the information in the subcode. Little did I know that the two DAT machines I own, both of which are Panasonic SV-3700s, were among those picky machines. Apparently, the SV-3700 is not “reasonably flexible and tolerant of slight foos in the signal,” as the Dr. D manual so quaintly puts it; consequently, some routings didn’t work. The main reason is that the SV-3700 must receive a complete AES/EBU signal over the digital XLR jack and a complete S/PDIF signal over the coaxial jack.

On the other hand, the Dr. D worked well with a number of newer recorders by Fostex, Panasonic, Sony, and Tascam, as well as with the Apogee PSX-100 digital converter; the signals passed from one connector type to the other with no problems. In some cases, I had to set the AES/EBU XLR connector of the receiving unit to receive an S/PDIF signal, a procedure that is not possible with an SV-3700.

In addition to its low price, the Dr. D has a small footprint (it’s a little smaller than the average stompbox), is well built, and is easy to set up and use. The idea is that you simply leave your digital devices plugged into the Dr. D and use its selector button to determine how it will route the signals.

### Jacks on the Box

For each type of jack (XLR, coaxial, and optical) you get an

input and an output. The XLR jacks are on the unit’s sides, whereas the other jacks reside on the rear panel. The front panel has a selector button that lets you cycle between the seven routing possibilities.

Three of the four lights on the front panel, one devoted to each connector type, indicate routing status. The fourth light is the power indicator. The Dr. D has no power switch; the moment you plug in the wall-wart connector, the unit is on.

The Dr. D is flexible. Take, for example, these three typical routings: optical input to optical, coaxial, and XLR output; optical to and from XLR, and from coaxial to coaxial; and optical to optical, coaxial to coaxial, and XLR to XLR. Each input and output can accommodate a different

device, meaning you can send up to three separate simultaneous signals—from three players—to three recorders.

### Nice Device

In my own studio, I found the device handy for connecting my CD player (using the Dr. D’s optical input) to a DAT machine (using the XLR digital output), the Apogee PSX-100 converter (using the optical output), and a sound card (using the coaxial output). Again, the CD player’s IEC 958 Type II signal can go to any or all of the outputs simultaneously. I also have the option of hooking up another two digital devices to the remaining open inputs, in this case coaxial and XLR. The Dr. D has a lot of potential.

Overall EM Rating (1 through 5): 3

CIRCLE #446 ON READER SERVICE CARD

## STEINBERG

FreeFilter (Mac/Win)

By Phil Darg

Steinberg’s *FreeFilter* (\$199) is a one-third-octave equalizer plug-in that delivers precise, high-quality equalization for digital audio—and more. It also offers a unique EQ spectral analysis function that can “learn” the EQ signature of an existing sound file and apply it to a destination file.

*FreeFilter* is a 30-band ( $\pm 15$  dB per band) equalizer that can work in both real-time and passive editing modes. It uses a variety of drawing tools to create EQ peaks, notches, and roll-offs. It has two EQ displays: linear



FIG. 1: Steinberg’s *FreeFilter* can provide you with a detailed spectral analysis. The logarithmic display shown here is especially useful when tweaking the high end of the spectrum.



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and logarithmic. The linear display concentrates on the more audible end of the spectrum, detailing the 16 Hz to 12 kHz range. The logarithmic display extends the spectrum upward, allowing for more detailed shaping in the upper end (see Fig. 1).

**Free as a Filter?**

Steinberg designed *FreeFilter* to run as a VST plug-in, and this is the only available option on the Mac. On a Windows system, *FreeFilter* can also be used by any Microsoft DirectX host application. As with most DirectX plug-ins, its performance on your

system will depend on many factors, particularly the manner in which your software implements DirectX support. There's no way to predict how *FreeFilter* will perform on your system, but during my own tests, it performed better under Steinberg's *WaveLab* and *Cubase* (which use the native VST plug-in format) than under any of the DirectX software I tried.

But what about the promise of EQ morphing? Does it really imprint the sound of a professionally equalized mix onto an amateur recording? The answer is yes and no. *FreeFilter* can learn the EQ signature of one

sound file and apply it to another. This process will alter the destination file's EQ sound, but it won't improve a lack of clarity or change the tonal color of a poorly executed mix. So if you think *FreeFilter* will make a sludgy recording sound like Led Zeppelin, I'm afraid you'll be disappointed.

You can have *FreeFilter* learn an EQ curve used on a human voice and apply that curve to your own vocal material. This works especially well if you set *FreeFilter*'s Morph feature to around 70 or 75 percent and make sure that the source and destination files are in the same key. I used this technique with a brief vocal passage from "Maybe I'm Amazed," in an attempt to morph my voice into Paul McCartney's. The result was interesting, but I didn't sound any more like Paul than I did before.

**Analyze This**

One of the greatest unadvertised strengths of *FreeFilter* is its usefulness as a diagnostic tool. Because it can analyze audio, it can display frequency spikes in a track or mix. I made quite a few discoveries using *FreeFilter* this way, which helped me improve the overall sound of my music. In fact, *FreeFilter* enabled me to design the most precise vocal-EQ setting that I have ever developed.

Overall, Steinberg's *FreeFilter* is a powerful EQ and spectral diagnostic tool. *FreeFilter*'s EQ quality in passive editing mode was excellent, surpassing the quality of the other traditional parametric EQs I've used by a wide margin. The results I attained were crisp and clear. *FreeFilter* is worth buying simply to guarantee a higher quality of equalization in digital post-production. However, there's no guarantee that you'll get acceptable real-time performance when using it as a non-VST application. Its EQ-learning function produced interesting but not always desirable results, and is not really a magical mystery morph.

**Overall EM Rating (1 through 5): 4**  
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**ARBORETUM SYSTEMS**

Restoration-NR 1.1.0 (Win)  
 By Scott R. Garrigus

If you've ever done any acoustic recording, then you've dealt with background noise. Most noise-reduction products are



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**Restoration-NR** (shown here within *Sound Forge*) employs hardwarelike knobs for setting Threshold, Attenuation, Hi CutOff, and Hi Boost parameters.

rather difficult to use, and even with precise settings they can have a negative effect on the timbre of the original sound. *Restoration-NR* (\$299), from Arboretum Systems, claims to eliminate more hiss—with less coloration and loss of the original signal—than any other noise-reduction software.

*Restoration-NR* is a DirectX plug-in, which means that it works with any DirectX-compatible application, such as Sonic Foundry's *Sound Forge* and Cake-walk's *Pro Audio*. The software's mode of operation, however, depends on the host

application. For example, in *Sound Forge*, *Restoration-NR* acts as an offline processor, but in *Pro Audio* it can be used as a real-time effect. The Bypass, Mute, and Preset functions also depend on the host. Other functions work the same way no matter how *Restoration-NR* is run.

### Prints Charming

Like most noise-reduction software, *Restoration-NR* relies on a noise print to process the audio. Its Guess and Learn functions each provide a different method of analysis. Guess assumes that the signal you're analyzing contains both noise and original sound, and makes an "educated guess" as to how much noise is present. Learn, on the other hand, requires that you first select a portion of your audio file that contains only noise. As you might expect, I found Learn to be much more accurate than Guess. However, the Guess feature might come in handy if every

section of your recording includes both noise and original sound. *Restoration-NR* also lets you save and load noise prints for future use.

*Restoration-NR's* sound quality is quite good, especially when you consider that the program works with audio files that have resolutions of up to 24 bits and 96 kHz. But the program's results don't always support its claim of being the best. I found *Restoration-NR* to be comparable to other noise-reduction software but not necessarily better. *Restoration-NR* requires a fair amount of fine tuning to get the right balance between signal and noise, and even then, anomalies can sometimes be heard.

### Control Room

Controls are provided for Threshold (a  $\pm 36$  dB offset from a value the program calculates automatically) and Attenuation (0 to  $-36$  dB). The Hi CutOff and Hi Boost controls let you deal with the high-frequency loss that can occur; Hi Boost lets you boost the signal up to 12 dB—a nice addition. You also get output-level faders (which can be grouped) and meters, as well as Hi Res mode, which determines

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if *Restoration-NR* uses 512 or 4,096 bands of gated EQ during processing. Hi Res mode gives you better sound quality but requires more CPU-processing time.

My only gripe is with the interface: it mimics hardware knobs for the parameters, and the knobs have to be adjusted with the mouse. This arrangement can be a bit awkward at times. It's too bad that *Restoration-NR* doesn't let you type in the settings.

In summary, *Restoration-NR* provides powerful, high-quality sound processing that is comparable to that of other noise-reduction products, in spite of its slightly awkward user interface.

**Overall EM Rating (1 through 5): 3.5**

CIRCLE #448 ON READER SERVICE CARD

## KEYFAX

Guitar Grooves (Mac/Win)

By Jeff Obee

Keyfax Software's *Guitar Grooves* (\$39.95 in Standard MIDI File format on floppy disk; \$49.95 for SMFs and WAV and AIFF files on CD) is a tidy little product aimed primarily at songwriters and producers. It offers strums, picked runs, jazz comping, and more in a variety of styles, tempos, and keys.

### Basics

The guitar parts were performed by J. J. Belle, who has played with Elton John, Madonna, the Pet Shop Boys, and many

other big names. He used an Axon MIDI guitar controller, one of the best MIDI guitar controllers on the market. It translates every nuance of Belle's guitar playing—the slight bends in pitch, vibrato, slides, and so on—beautifully.

*Guitar Grooves* is intended for General MIDI users, but it is viable with any guitar samples. Control Change data such as Program Changes is written into each file and will automatically call up the appropriate patches on your GM/GS/XG synth. Each file comes with a setup track containing the GM data, a drum groove on track 2, and the guitar files in track 3 onward. Each guitar phrase is two bars long (except for the "Skank" parts, which are four bars each). The Axon MIDI guitar controller can send MIDI data on each of the six strings; Keyfax recommends using six MIDI channels for most of the files to capture all of the nuances of a real guitar. However, you can assign a full part to one MIDI channel and still achieve excellent results.

### Real World

I don't own a GM-specific module, so I was unable to ascertain how the CC data works with that type of synth. However, my past experience with Keyfax products assures me that you'll have no problems there. Instead, I used the GM bank on a Kurzweil K2000RS and Sweetwater's *Ultimate Guitars* samples, and found that certain issues arise when using these tracks with non-GM synths. For instance, you'd need to load whatever drum and guitar sounds you have, assign them to the correct MIDI channel manually, and delete the unnecessary Program Change data or mute the setup track. You could also edit the Program Change data in your sequencer and tweak your synth or sampler to call up the GM patches. Just be aware that drums must be GM-mapped to play back correctly.

I had to transpose all the guitar parts up; this may not be required when using a GM module. In general, the parts sounded good when transposed from about five semitones to an octave up, making it easy to adjust to the key of a given song. Tempos are designated in the file name, but there is no information specifying any keys or meters (all grooves are in 4/4); I would like

to see the documentation go a bit further here. It can be a painstaking process to fit a part into a tune after the fact, making *Guitar Grooves* best used as the foundation of a song.

### Verdict

*Guitar Grooves* can be a worthwhile songwriting tool and a good resource for getting authentic guitar parts into your music. It won't cover a wide range of songwriting situations, and in all fairness, it's not intended to—in fact, Keyfax described it to me as "a night in J. J.'s living room." It most definitely warrants a listen.

**Overall EM Rating (1 through 5): 3**

CIRCLE #449 ON READER SERVICE CARD

## CARL MARTIN

Compressor/Limiter

By Barry Cleveland

One of the Holy Grails of vintage effects pedals is the TC Electronic Parametric EQ/Sustainer. It features studio-quality EQ and compression circuitry packed into a stompbox and originally sold for several times more than the competition. To buy a used one today, you'll have to spend some serious coin. Fortunately, Carl Martin has produced a new line of pedals that, much like the old TC pedals, are handmade in Denmark, come housed in rugged metal casings, and sport high-performance components.

### The Mettle of the Pedal

The Carl Martin Compressor/Limiter (\$249.95) can produce some of the same sounds as the old TC Parametric EQ/Sustainer (less the EQ, of course), but it has far more parameter control and sonic flexibility. In fact, it has more features than any dynamics pedal I am aware of, and it sounds better than many rack-mount processors, at least when used with guitars and basses.

The unit features most of the parameter controls you would expect to find on a rack unit: threshold, compression ratio, response (which simultaneously controls attack and release times), and makeup gain. What's more, it has an LED that functions as a gain-reduction meter. This clever circuit causes the Busy LED to glow brighter as compression is increased, and even indicates potential gain reduction while the pedal is in bypass mode. Because the Compressor/Limiter has the same controls



The SMFs featured on Keyfax Software's *Guitar Grooves* capture every nuance of session ace J. J. Belle's guitar playing.

as a pro unit, you'll achieve better and faster results if you know something about how compressors operate. If you do, you'll be able to dial in a good basic sound almost immediately and quickly get a feel for the wide range of options that each control offers.

After using the Compressor/Limiter for a month, I came to appreciate just how flexible and sophisticated it actually is. For starters, the amount of compression is continually variable between 1:1 (no compression) and brick-wall limiting. Similarly, the threshold is continuously variable over a range of 60 dB, enabling you to add just a touch of limiting on the peaks, or squash a signal into total submission. The controls are highly interactive, though finding your way back to a particular setting can sometimes be difficult because there is no display to indicate precise values (it *is* a pedal, after all). Nonetheless, the controls are also fairly intuitive, and once you get used to them it is relatively easy to find a suitable setting by ear.

#### A Few Applications

Adjusting the Compressor/Limiter to produce just a few decibels of gain reduction, with a moderately slow attack, made my guitar sound so good I was tempted to leave it on all the time. I also used it to produce lots of other useful effects, such as altering the attack envelope of lightly picked single notes, squashing overly dynamic rhythm parts, brightening up dull acoustic guitars, and adding lots of sustain to both clean and distorted tones. Speaking of distorted tones, the unit has

more than enough bite to control even the most over-the-top distortion devices, and when placed between a good distortion pedal and a decent amp or mixer, it produces a fat, creamy sustain for days. The pedal also sounded great with electric bass, and even worked well on fat synth bass sounds.

Typical compressor artifacts such as pumping and breathing were practically nonexistent. However, at extreme settings, the Compressor/Limiter did boost high frequencies and produce a somewhat metallic sound. It was also a little

noisy on some settings, though overall the unit is exceptionally quiet, particularly when compared with other dynamics pedals.

Although the Carl Martin Compressor/Limiter is not exactly inexpensive, you definitely get what you pay for. I've tried lots of dynamics pedals (including the TC Parametric EQ/Sustainer), and nothing rivals this one in sound and versatility. This box rocks! ☺

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

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The Carl Martin Compressor/Limiter has more features than most dynamics pedals and sounds better than many rack-mount processors.

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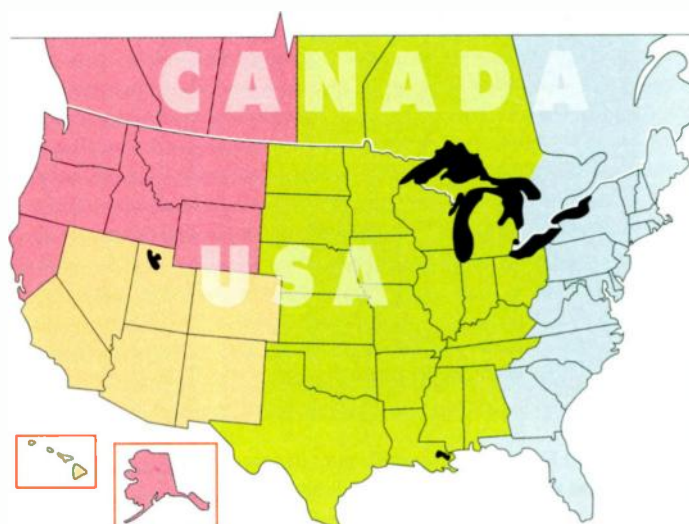
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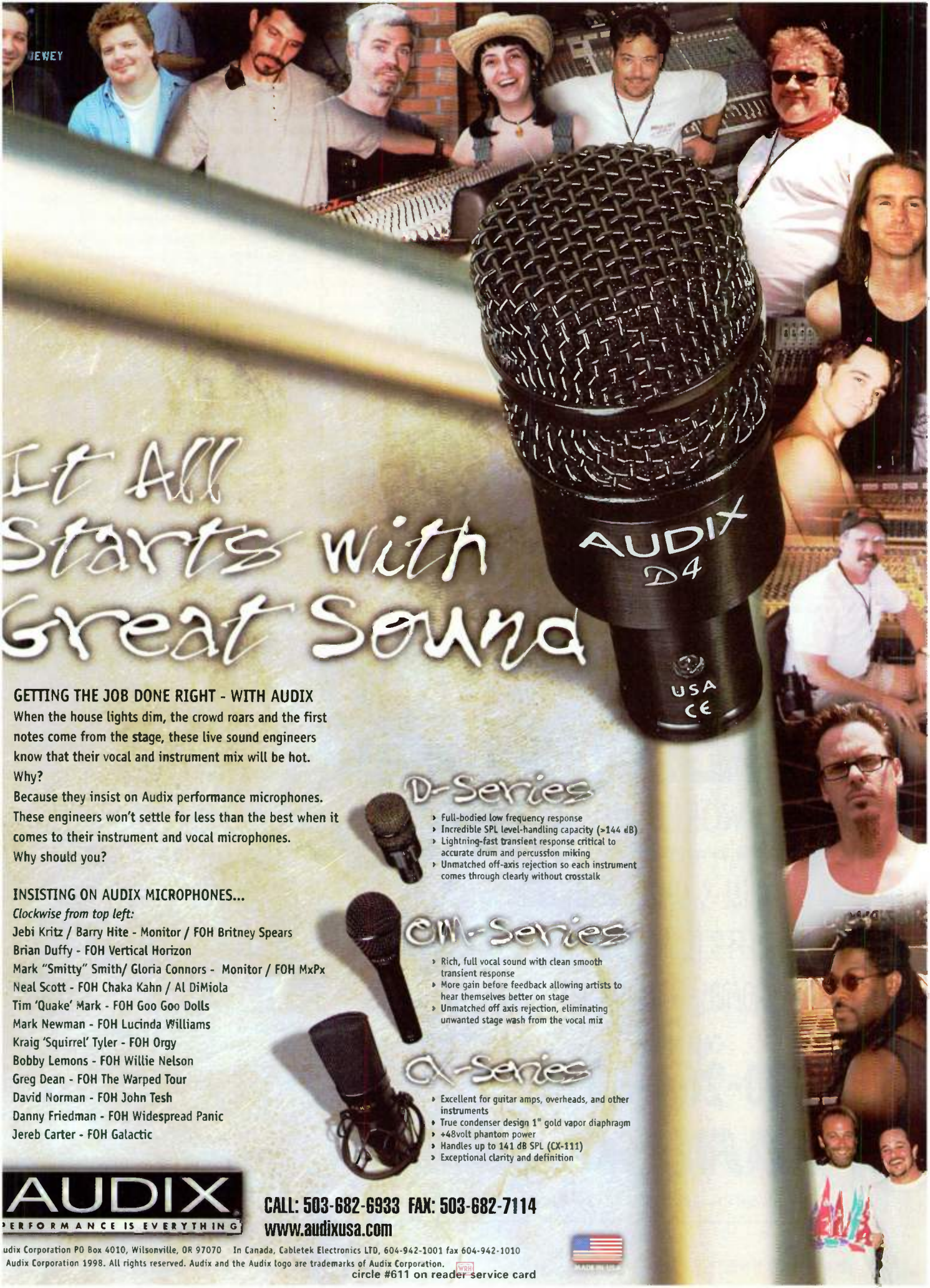
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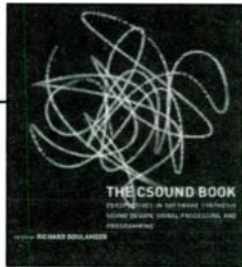
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Expanding on their industry standard line of DTRS multitracks, Tascam has just unveiled their latest DTRS recorder, the true 24-bit DA78HR, at the most recent AES show in NYC. Not only is the DA78HR the first true 24-bit MDM it also has a host of standard features that make make this DTRS not only cutting edge but cost effective. These standard features include SMPTE and MIDI Timecode as well as a built-in digital mixer and S/PDIF digital I/O that will allow you to do a quick mix right to DAT or CD or for doing track bouncing. The DA-78HR is also compatible to all of the other DTRS machines in the DTRS sync line.

- Selectable 16 bit or 24 bit High Resolution audio
- 24 bit A/D and D/A converters
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- 20kHz - 20kHz frequency response  $\pm 5$ dB
- 1 hr. 48 min. recording time on a single 120 tape
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- On-Board support for MIDI Machine Control
- Internal digital mixer with level and pan for internal bouncing, or for quick mixes
- Track slip from 20C to +7200 samples
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- Word Sync In/Out/Thru
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The ADAT Studio Pack has everything you need to get you up and running with tape based digital multitrack recording. The Studio Pack is based around the LX-20 8-track digital multitrack tape recorder that uses Alesis' renowned ADAT type II tape format, offering true 20-bit recording and playback using inexpensive and readily available S-VHS video cassettes. Also included in the Studio Pack is the S24 24 channel inline mixer as well as the NanoVerb effects processor and NanoCompressor dynamics processor.

### ADAT STUDIO PACK CONTENTS--

- LX20 20-Bit digital audio recorder
- Studio 24 recording console with inline monitor
- NanoVerb digital effects processor featuring 16 programs (halls, rooms, plates, chorus, flange, delay multieffects and rotary speaker simulation)
- NanoCompressor stereo compressor/limiter w/ threshold, compression, attack, release and level controls
- Two 8-channel phono (RCA) cable snakes (for ADAT to Studio 24 connection)
- Two dual 1/4 in. stereo 1/4 in. cables for NanoVerb
- Two 1/4 in. insert cables for NanoCompressor

## CD RECORDERS & DUPLICATORS

# MICROBOARDS

## StartREC Digital Audio Editing/ CD Duplication System

The Microboards StartREC is the first digital audio editing system combined with a multitrack 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 StartRECs 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 S/PDIF 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) 6x writers



## CD-R 850 CD Recorder

The new HHB CDR850 is one of the most comprehensive CD-R, CD-RW recorders available today. It delivers the outstanding sound quality that HHB is known at a lower price than previous models.



Equipped with a complete range of analog and digital I/O and easy to use one touch recording modes make the CDR850 suitable for any audio environment no matter how sophisticated or demanding.

- CD-R, CD-RW compatible
- All functions accessible from front panel menu
- 4 one touch recording modes: 2 manual, 2 automatic
- Sample rate converter accepts any digital signal from 32kHz to 48kHz including varispeed

- Copies all CD, DAT, MD, DVD and DCC track starts
- Complete user control over SCMS
- Balanced XLR analog I/O, Unbalanced (RCA) phono analog I/O, AES/EBU digital input, coaxial & optical S/PDIF digital I/O

# TASCAM CD-RW5000 CD Recorder

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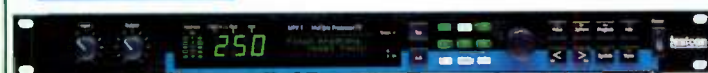
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The MPX-1 is truly an outstanding multi-effects device. Using Lexicon's Lexchip, it offers outstanding reverb or ambience as well as a separate processor for effects for awesome power in the studio or on the road.

### FEATURES--

- Intuitive user interface for easy editing, built-in help
- Balanced Analog I/O (1/4" & XLR)
- 56 effect algorithms
- Digital Inputs & Outputs (S/PDIF @ 44.1KHz)
- 18 Bit A/D, 20 Bit D/A Conversion, 32-bit processing
- >90dB of Dynamic Range
- Intelligent Sorting by Name, Number, Application, etc.
- Parameter Morphing
- Dynamic MIDI@ patching & MIDI automation

# t.c. electronic

## M3000 Professional Reverb



Incorporating TC Electronic's new VSS-3 technology, the M3000 is a great sounding, versatile reverb that is easy to use. Combining ultimate control of early reflections with a transparent reverb tail, the art of reverberation is brought to a new level. Whether it's a phone booth, cave or concert hall, the M3000 delivers high-quality ambience.

### FEATURES--

- VSS-3, VSS-3 Gate, G.O.R.E. & REV-3 reverbs as well as Delay, Pitch, EQ, Chorus, Flanger, Tremolo, Phaser, Expander/Gate, Compressor and De-Esser
- 300 high-grade factory presets including Halls, Rooms, Plates, Ambience, Gated Reverbs, and more
- Up to 300 user presets in internal RAM and 300 more using an optional PCMCIA card.
- Dual engine configuration featuring 24-bit A/D/D/A's
- Connections include AES/EBU, Coaxial S/PDIF, Optical Tos-Link/ADAT & analog XLR I/O's, MIDI I/IN/OUT/THRU, Clock Sync and External Control.

## ATR-1

### Intonation Processor

"Perfect Pitch in a Box"



By comparing the incoming signal of a vocal or solo instrument with a target pitch defined by a preset or user defined scale, the ATR-1 miraculously corrects out of tune pitch, in real time, without unwanted distortion or artifacts. Balanced I/O, 20-bit A to D conversion and 56-bit processing ensures that the nuance and expression of the original performance is preserved. Additional parameters such as adjusting the speed at which pitch correction takes place, tailor the response or the ATR-1 to match the characteristics of a specific performance or musical style. Ideal for use in the studio or live!

### FEATURES--

- Corrects the pitch of a vocal or solo instrument, in real time, without distortion or artifacts
- 20-bit data path, 56-bit internal processing
- Balanced I/O
- Factory Programs for chromatic and standard diatonic scales or customize your own scales
- Individual Scale notes can be bypassed. Bypassed notes will not be pitch corrected.
- Scales can be specified in real time via a MIDI keyboard or sequencer. Specify an exact melody via MIDI
- Completely controllable via SysX
- Processing delay is no greater than 4 milliseconds



## QUANTUM Digital Mastering Processor



24-bit/96kHz mastering processor with a 48-bit digital signal path and the dbx TYPE IV Conversion System that retains the warmth and body of your signal while adding punch and depth. The intuitive user interface puts several high-end mastering tools at your fingertips including Tape Saturation Emulation (TSE), compression, EQ and more.

### FEATURES--

- 96 kHz, 24 bit A/D/A, and Digital I/O on AES/EBU or S/PDIF • 48 bit internal signal path for increased head room and low level resolution • Type IV A/D Conversion system with TSE • 4 band stereo compressor, gate, limiter • 5 band EQ Hi and Lo shelves, 3 band fully parametric • Normalizer • Stereo adjust controls
- Sync I/O using dbx's own proprietary clock chips for extremely low jitter sync • Dither outputs to 16, 20, or 24 bits • Sample rate conversion • Software updateable via Internet and MIDI • 4 band crossover with variable slopes

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## MICROPHONES & PREAMPS



### 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 mixing 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

## JOE MEEK

### TRAKPAK TP-47 JM-47 MIC/ VC-3 MIC PRE KIT

The new Joemeek TP47 TrakPak is an ideal front end to go between you and your digital multitrack. It includes the VC3 mic-pre, compressor, and enhancer, and the new Joemeek JM-47 "Meekrophone" (microphone). This all in one system is all you need to get the warm and punchy vintage sounds of the 60's on your digital recordings.

#### JM-47 MEEKROPHONE FEATURES-

- 1" Gold 6 micron hand assembled true condenser capsule
- FET pre amplifier with transformer output
- Low noise, minimalist electronics
- 10dB Pad, switchable
- High pass 100Hz filter
- Quality shockmount
- Classic and full bodied sound
- Frequency response: substantially flat 20Hz to 20kHz
- Output impedance: 200ohms balanced, earth free floating
- Power supply: 48V phantom

#### VC-3 FEATURES-

- Superlative Mic input with ultra low noise and vast headroom.
- Input gain control with 60dB range on mic and 30dB range on line.
- Phantom power (switched on/off) with LED indicator.



got meek?

- Compression attack speed switch high/low.
- Compression depth control with LED indicator.
- Compression release speed control.
- Compression in/out switch.
- Enhancer drive control with LED indicator.
- Enhancer depth control.
- Enhancer resonance control (Q).
- An accurate peak reading meter.
- Output volume control
- XLR type microphone input, standard jack line input.
- Standard jack insert point after the mic amp and pre compressor.
- Standard jack additional mix input port pre compressor.
- Dual line level outputs.
- Compact half of 1U size.

#### ALSO INCLUDES-

- Heavy duty road case • 5m Meekrophone cable



### 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 AT8449SV shockmount
- Also includes a limited edition tweed flight case while supplies last!



### AM-52 Class A FET

The GT Electronics AM52 uses a super-clean Class A FET circuit. It amazingly sensitive large diaphragm is capable of handling extremely high sound pressure levels and offers a choice of three polar patterns, for unsurpassed versatility. A perfect choice for virtually any recording application...from vocals to acoustic and amplified instruments.

- Class A FET preamp for extremely transparent, low-noise performance
- Cardioid, Omni and Figure 8 polar patterns
- Large-diameter, super-thin 3 micron gold evaporated Mylar diaphragm
- Switchable -10dB attenuation pad and 80Hz low frequency roll-off filter
- High SPL handling for very loud sources
- Includes hard-shell case and hard mount
- Frequency response 20Hz - 20kHz



### AM-61 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-51 cardioid class A FET condenser mic
- ALSO AVAILABLE AM-62 multipattern tube condenser mic

## ART

APPLIED RESEARCH AND TECHNOLOGY

The Art Pro Channel is an all-in-one mic/line channel strip featuring a tube mic preamp, compressor and four band parametric EQ. The compression section utilizes the coveted variable mu design found in vintage broadcast limiters that is distinctively fat sounding with a fast aggressive attack. Like all other ART products, the Pro Channel is also affordable. Ideal for professional recording channels for professional recording, project and home studios as a DI box for Instruments, as a front end for Digital Audio Workstations & Computer-based Recording as well as Voice-Over, Broadcast, and Edit Suites.

- Professional Tube-Based Microphone/Line Recording Channel featuring a tube mic pre, switchable optical/variable mu compressor, and tube
- Dynamic Range >100dB (20-20kHz)
- Frequency Response 10Hz to 20kHz (± .5dB)
- Low-Cut Filter: Variable: -30dB@10Hz to 250Hz
- XLR balanced & 1/4" unbalanced Inputs and Outputs
- 1/4" unbalanced Insert Connections Between Preamp and Compressor, and Compressor and EQ

### Pro Channel Tube Mic Pre/ Compressor/ EQ



- Phantom Power +48V DC (switchable)
- Three Hand-Selected Vacuum Tubes
- Optical/variable mu Tube based compressor with variable threshold, compression ratio, attack and release controls
- Four-band parametric equalizer with selectable Q for the two sweepable mid-bands
- Selectable VU Metering (mic pre out, compressor out, or Main Out)
- Five-Year Warranty

## STUDIO MONITORS

### Hafler TRM-6

#### Bi-Amplified 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 and mastering. Supported by Hafler's legendary amplifier technology providing a more accurate sound field, in width, height and also depth.

#### FEATURES-

- 33 Watt HF & 50 Watt LF amplification
- 1" soft dome tweeter & 6.5" polypropylene woofer
- 45Hz - 21kHz Response
- Magnetically Shielded
- Electronically and Acoustically Matched



### KRK V-6

#### Bi-Amplified Studio Monitors

These bi-amped studio monitors from KRK supply 90 watts of clean power. Their 6" woofer & 1" silk dome tweeter ensure consistency from top to bottom with crystal clear highs; and a solid bass response.

#### FEATURES-

- 58Hz - 20kHz frequency response
- 1" silk dome tweeter and 6" long stroke, polyvinyl woofer
- Magnetically shielded
- 30 Watt HF & 50 Watt LF amplification
- Variable system gain -6dB -30dB
- Neutrik XLR - 1/4" TRS combo connector



### MACKIE HR824

#### Bi-Amplified Studio Monitors

These close field monitors from Mackie have a wide deep response with exceptional detail. Each pair of these bi-amplified speakers has been clinically matched to ensure optimum performance.

#### FEATURES-

- 8.75" polypropylene woofer, 1" aluminum dome tweeter
- 150W HF & 100W HF amps
- Full space, half space and quarter space placement compensation • 1/4" and XLR inputs
- Hi frequency adjustment, low frequency roll-off switch
- Frequency Response 39Hz to 22kHz, ±1dB



### ALESIS M1 Active

#### Bi-Amped Ref. Monitor

The new M1 Actives feature custom designed dual amplifiers and an internal active crossover: for accurate response. The specs are outstanding with a 1" silk dome tweeter, a 6.5" woofer and 8th order high and low pass electronic crossover filters, perfect for both project and pro recording applications.

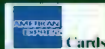
#### FEATURES-

- 75 watt LF and 25 watt HF amps.
- 1500Hz crossover point for low midrange coloration.
- Dual front mounted ports • Magnetically shielded
- Combination XLR/1/4" connectors with input level control.



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## 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 TDFIF 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 FEATURES--

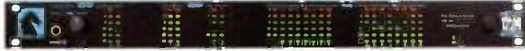
- 7 banks of 8 channel I/O, 1 bank of analog, 3 banks of ADAT optical, 3 banks of Tascam TDF, plus stereo S/PDIF
- Custom VLSI chip for amazing I/O capabilities
- Format conversion between ADAT and DA-88
- 24-bit internal data bus for full 24-bit recording via digital inputs



- 20-bit A/D and D/A converters on analog ins & outs
- 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 (TRC), <math>\pm 4</math> dB audio
- Stereo AES/EBU digital I/O
- 24-bit balanced <math>\pm 4</math> XLR main outputs • 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 • Word Clock I/O
- Front panel headphone output with level control



- Connect up to three 24i rack I/Os to a PCI-324 audio card for a total of 72 inputs and six outs

Also available with MOTU's award-winning Digital Performer audio sequencer software package

## Lexicon

### CORE 2 Recording System

High quality, true 24-bit computer based audio system at an affordable price. Easy to use interface offers 4 analog inputs and 8 outs as well as coaxial S/PDIF and 8 channels of ADAT optical digital I/O. Dedicated hardware takes on the burden of CPU intensive tasks putting less strain on the computer's processor.

#### FEATURES--

- Ultra wide-range 24-bit A/D and D/A converters
- Four channels of analog in, eight channels of analog out
- Eight channels of ADAT™ digital I/O and a stereo S/PDIF pair
- Selectable dbx Type IV™ soft-knee limiting on every input channel to simulate tape compression and provide 4dB of improved headroom.
- Ships with Lexicon Drivers and Control Panel for Win 95/98

- Includes Syntrillium's Cool EditPro SE, providing as many as 64 mixing tracks.
- An optional MP-100 daughter-board will be available soon and will include all of the effects found in the Lexicon MPX 100 Dual Channel Effects Processor: Chorus, Flange, Pitch, Detune, Delay, Echo, Rotary, Tremolo and Lexicon Reverb and Ambience



**NEW LOWER PRICE**

## SONORUS STUDIO/O 24-bit Audio Card

The Sonorus STUDIO/O is a 16-channel plug-n-play digital audio card for Mac and PC. It's based around two ADAT compatible Toslink connectors that support 24-bit audio at 44.1 and 48kHz sample rates. The Toslink connectors are software switchable between ADAT lightpipe and standard optical S/PDIF I/O. The hardware specs are enhanced further by the ease at which this card is configurable as well as its compatibility to today's leading Mac and Windows software.

#### FEATURES--

- Two optical inputs and outputs ("lightpipe" connectors) software selectable between ADAT(8-channel) & S/PDIF
- 18-bit 1/4" headphone/monitor output
- 16-channels, phase-locked and in sync. No ground loops, no noise
- 24 bit audio is supported- ready for the latest generation of digital audio hardware
- Software configurable so there's no jumpers to mess with
- Comes with its own Control Panel software that makes setup simple and allows you to customize & save your settings
- PCI Plug-n-Play Cross-platform compatibility
- Full Windows audio drivers for PC and Cubase VST and Logic Audio (PC & Mac) • Onboard sample rate converter



## SOFTWARE



### Digital Performer MIDI/AUDIO Software for Mac

Their second major update this year, with a relentless stream of new advanced features, like sample-accurate editing, sample-accurate sync and MOTU's innovative RAM-based loop recording tool called POLAR, DP is packed full of features you won't find anywhere else.

#### FEATURES--

- Includes over 50 real-time MIDI & audio effects plug-ins
- POLAR window - Interactive audio loop recording the way it should be
- 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
- Advanced waveform editor
- Sample-accurate - the most reliable editing and tightest sync you can get

- OMF export - transfer your entire session, crossfades and all, into Pro Tools
- 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, and much more • Compatible with Pro Tools24, the MOTU 2408 and today's other popular systems
- Digital Performer is an entire recording studio inside your computer



## SONIC



### Vegas

#### Multi-track Recording Software

From the company that brought you Sound Forge and Acid Pro comes Vegas Pro, the non-linear multitrack recording and editing software, for Windows. Whether you need better than CD quality 24-bit/96kHz file support for tracking your next album project or are authoring content for streaming audio on the internet, Vegas Pro's got you covered.

#### FEATURES--

- 24-bit/96kHz file support • Unlimited Tracks (dependent on CPU speed and RAM) • Non-destructive Editing
- Supports multiple file formats and sample rates on a single track • DirectX plug-in support with 32 assignable FX sends • 26 Aux outputs • Unlimited Undo/Redo

- Multiple I/O support • Dual monitor support
- MIDI Timecode support
- 4-band EQ and compressor inserts on every channel
- Audio/Video Scrub
- Direct internet streaming file authoring 9Windows Media Technologies and Real Networks G2)



## TC | WORKS

### SPARK

#### 2-Track Editing For Mac

Intuitive, easy to use 2-track editing software for the Power Macintosh. 24 and 32-bit file support is ideal for music mastering. SMPTE synchronization and quicktime movie import capabilities for editing audio for film and video. A host of compression algorithms such as DDesign make editing audio for the web a snap. Most major professional samplers are also supported and the Loop Tuner helps create perfect loops every time.

#### FEATURES--

- 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, SoundDesigner, 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 raw file



### 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 two 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 chorus/doubling, parallel harmonies, excellent vocal slap/spread effects, and much more



### Unity DS-1 Digital Sampler

Turn your computer into a full featured digital sampler with the Unity DS-1 from BitHeadz. Recreate the sounds of acoustic instruments or any other audio source. All of the features of dedicated hardware samplers are here- 16 part multi-tilrality, 64 voice polyphony, a complete synth engine and the ability to create layers and splits all with full MIDI control. Compatible with Akai, SampleCell, WAV and AIFF and CD audio files that can all be edited using the integrated audio editor.

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Other qualifications considered essential for success in this position include:

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- Familiarity with both Yamaha and major competitors' products
- College graduate, with marketing or recording major

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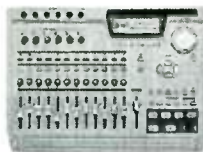
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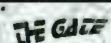
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## Plans that Come to Naught

*...or Merely Half a Page of Scribbled Lines*

**P**ink Floyd has long influenced me. The band's 1972 album *Dark Side of the Moon* (from which this month's title was culled) was a landmark accomplishment. I imagine making that album must have taken some serious doing, but somehow it was completed and went on to become one of the most popular albums of all time.

Many projects turn out to be more difficult to finish than their creators initially anticipated. I believe that a primary reason for this is the fantastic rate at which AmericanTechnoSociety.com moves today. In any case, it's always sobering for me to consider all the ideas I've had that only got as far as some jotted-down notes or maybe a demo, and never came to fruition. Occasionally, it seems as though hanging on in quiet desperation is the American way, as well.

Completion brings me fulfillment. In my line of work, it also results in an aesthetic statement and/or a work that can be distributed or sold. To finish a project is a Very Good Thing, and I've certainly finished a good many in my time, in spite of all those that have never gotten done.

What is the difference between a project that gets done and one that doesn't? The ever-present multitude of circumstantial factors doesn't fully account for it.

I think it often comes down to attitude: the determination to complete the project. In some cases, the "good, fast, cheap" law I discussed in the November 1999 "Final Mix" comes into play. You just might need to compromise to accommodate "the slings and arrows of outrageous fortune" and bring the bacon home. Other times, relentlessly sticking to your vision against all odds is the way to get something finished. Sheer cussedness prevails on occasion.



Clearly, the key skill is the ability to figure out which approach to take in a given case. Furthermore, circumstances change over the course of a project, so your strategy must be dynamic. Additionally, you must often be willing to face unpleasant realities in order to see what is really happening and steer the project through to completion. None of this is easy.

The starkest fact is that only those with the simplest desires have any hope of doing everything they would like to do. The rest of us must ponder how to choose which

inspirations are worth the dedication necessary to see things through.

My ongoing inspiration for divining which ideas to pursue is derived from Tea Bag Wisdom. Years ago, when I attended the Berklee College of Music, I spent my first semester living in the dorms. Every morning, I'd troop down to the cafeteria to pry my eyes open with a cup of Tetley tea. (The coffee was too hideous to even consider.) On the back of the tea bag tags were homilies, most of them corny and hackneyed, like Hallmark fortune cookies.

One morning, as I sipped my Go Juice, I turned over the tag to see: "One is not old until he stops having dreams and begins having regrets." Something about this penetrated the haze enough to make me put the tag in my pocket. Later, I pulled it out, reread it, and decided there was genuine profundity in it. Words to live by, indeed.

Since that time, I have let my gut feeling about how badly I would regret not finishing a particular project motivate my energies and guide my decisions. My choices certainly aren't always right, but I usually end up feeling that my dreams haven't been overtaken by my regrets. ☹

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