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September 2001

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AUDIO FILES**

● **CHOOSING A THIRD-  
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**MINIMUM PAIN**

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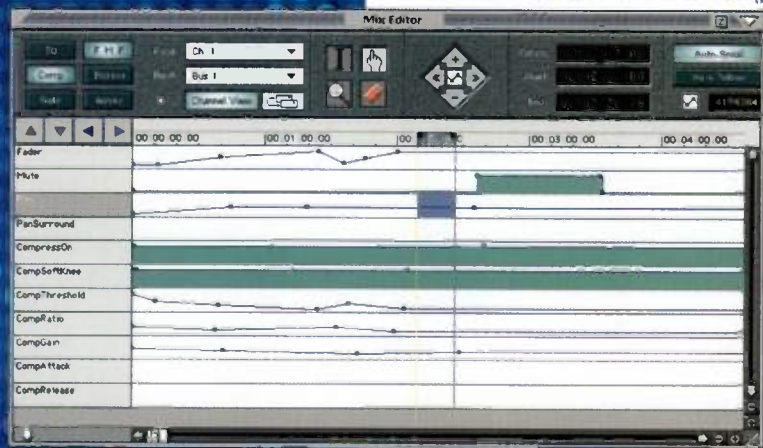
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# WE'VE ADDED SO MANY NEW FEATURES YOU SHOULD PROBABLY CALL IT THE



OS 3.0 Fat Channel Screen. It's a beautiful thing.



New OS 3.0 Mix Editor Window



New OS 3.0 24-Channel Overview Screen

Other digital consoles get old. The D8B gets better and better.

We just added over 50 significant enhancements with our new Mackie Real Time OS 3.0 upgrade including...

- 3rd-party plug-ins
- Enhanced dynamics
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- 200 levels of undo
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- 24-bit Alt I/O
- An advanced Mix Editor with view sizing arrows, Auto-Loop SMPTE time code boxes for Loop In/Loop Out and cursor location and cue markers in the time bar
- Event Automation Track – recall a plug-in, channel EQ, channel dynamics, a whole channel strip or an entire mix
- Enhanced Surround Sound mix environment with Depth of Center and LF Gain Control for each channel, surround-corrected bus and track assignment, front-to-rear pan via D8B control surface or MIDI and a 72-channel Overview window that instantly shows you where everything is
- Enhanced, flexible MIDI I/O mapping for all channel strip and master section parameters
- 24-bit plug-in inserts across the main L/R buses

We could go on and on. But the main point is that if you buy a Mackie



Acuma Labs TimePak



Drawmer Dynamics

- All plug-ins except IXL Vocal Studio require addition of D8B UFX card.



# URES AND FUNCTIONS THAT WE DIGITAL 8•BUS MK. 3.0.

Digital 8•Bus now, you're not just getting a superb, productivity-boosting creative tool. You're buying the only digital console with an open architecture that provides for future enhancements, too. Mackie Real Time OS 3.0 is dramatic proof. And we're hard at work on even more cool stuff for future upgrades.



**72-channel Panning Overview Window** shows you the relative position of each channel within the 5.1 or 7.1 sound field.

## Intuitive & easy to use.

One of the things we hear over and over from satisfied Digital 8•Bus owners is that this console is as simple to operate as their old analog board — there are real buttons and knobs instead of a lot of scrolling menus. Things are in logical places and work the way you expect.

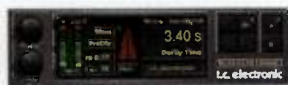
Moreover, they tell us that the digital aspects of the D8B — automation, DSP,



**IVL Vocal Studio**



**Antares AutoTune**



**TC Electronic Level 1 Reverb**



**Massenberg Stereo Parametric Equalizer**



*At right: New Mackie Real Time OS 3.0 48-ch. Overview screen.*



event editing, surround mixing, file management and the like are *equally* easy to use. Productivity goes up. The manual goes in a drawer.

## A growing track record.

Right now, Mackie Digital 8•Bus consoles are working hard for some of the world's top engineers and recording artists. D8B's have mixed major motion pictures, top-rated TV shows and turned out a growing list of albums and hit singles. For an impressively long and growing list of Famous Users, log onto our web site.



*Automate between pan points in the 5.1 sound field*

## It just keeps getting better and better.

We weren't kidding about the advantages of Digital 8•Bus' open architecture. F'rinstance... We're working on new software to tie the D8B seamlessly to our HDR24/96 hard disk recorder creating an integrated digital audio workstation. Recording, editing and mixing — with plug-in's and a hardware control surface — for under \$15,000. Common time code base. One software. One Graphical User

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# ...INSPIRATION

## Technical Specifications:

- 61-key synth action keyboard with velocity and aftertouch sensitivity
- 62-note polyphony
- 32 Mbyte wave ROM, expandable to 64 Mbytes with 2 EXB-PCM expansion boards
- 640 Programs (including GM Level 2)/384 Combis – expandable to 896 Programs/640 Combis
- Support for EXB-MOSS (adds 128 new Programs/64 new Combis)
- 102 Insert/90 Master effects (up to 5 Insert, 2 Master effects plus 3-band EQ)
- 16-track 200,000 note sequencer, 200 Songs, 20 Cue Lists, 100 patterns per Song, 150 preset drum patterns, 72 RPPR patterns per Song, 16 preset/16 user Template Songs
- Joystick, 4 assignable knobs, 2 assignable switches and 1 assignable slider

## KARMA Features:

- 1190 Generated Effects (1 GE per Program, 4 GEs per Combi or Song). A GE contains over 400 parameters to generate notes, control synth and effects parameters, and provide randomization of these events
- 8 knobs, 2 switches and 2 scene memories, plus joystick, slider and pedals for real-time control over GE parameters
- 4 programmable Chord Memory buttons for triggering chord voicings easily

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Korg USA  
316 South Service Road  
Melville, NY 11747

Dear Korg,

Korg products have always been terrific, but my new Karma Music Workstation is simply amazing. I continue to be blown away every time I play it. I already own a Triton, so I'm familiar with the sounds, effects and sequencer, which are great, and I like that it's compatible with all my Triton sounds.

What makes this instrument truly revolutionary is KARMA. It's brilliant! This technology is versatile, innovative and always inspires me to come up with new ideas. I'm amazed by the control that it gives me and the way I can turn a few knobs to create a completely new part. KARMA certainly is the most unique system I've seen in a long time. I produce a lot of dance music, and this keyboard continues to breathe new life into my tracks. Plus, it saves me tons of time! But I'm afraid to bring it to a live gig because someone might figure out my tricks. (ha ha)

Karma is truly the most inspiring workstation I've ever played. Thank you for creating such an outstanding instrument.

Sincerely,

*Chuck Johns*  
Chuck Johns





# STORY #23

Chuck Johns Queens, NY



GOOD KARMA. WICKED SOUND. **KORG**



For a free copy of the Karma Video Intro, write to: Korg USA, Attn: Karma Video, 316 South Service Road, Melville, NY 11747. Or visit [www.korg.com/karma](http://www.korg.com/karma) and e-mail us your request. ©2001 Korg USA. For the Korg dealer nearest you: (800) 335-0800. For more info via faxback: (631) 393-8530, Doc #3607. KARMA™ (Kay Algorithmic Realtime Music Architecture) is a trademark and patented technology licensed from Stephen Kay, Karma Lab LLC, [www.karma-lab.com](http://www.karma-lab.com)



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*By Myles Boisen*

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*By Eric and Karen Bell*



Cover illustration by David Ball

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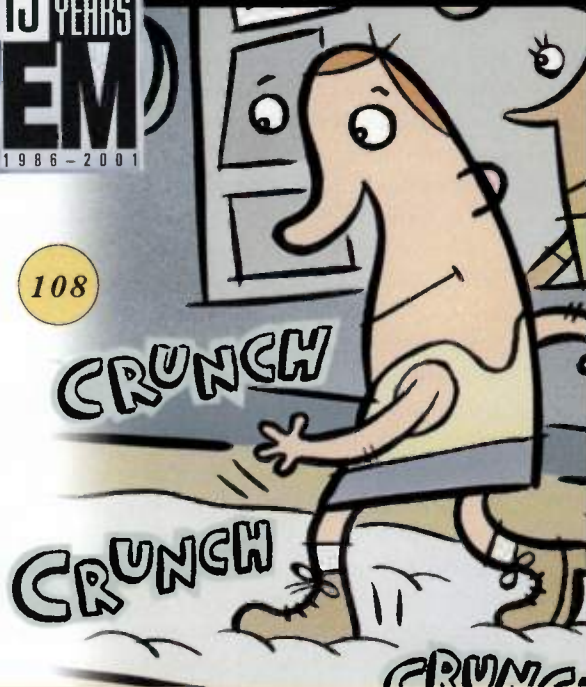
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## Weaving Home

In this era of independent artists and DIY marketing and distribution, the Web site has become a key tool. If you know what you're doing, you can create a site that not only presents your band's music and image but also sets those elements in an environment that communicates the feel of what you're trying to do—if you know what you're doing.

It seems like everyone is a Web designer these days. If your band broke up or you recently left your day job, you might be designing sites.

You would think, then, that the Web would abound with lovely, practical, full-featured, and properly functioning sites. It doesn't. Although you'll find many cool sites, you'll also suffer with even more poorly designed sites that are a pain to navigate or that fail to deliver key information. Having a good guitar doesn't make you a good guitarist; similarly, having good Web-authoring tools does not necessarily result in carefully planned and well-implemented sites.

Some Web authors lack an eye for design and a sense of what makes a site user-friendly. Some don't completely grasp what Web tools can do. Once you start trying to add streaming media, you're in danger of getting lost in a tangle of problems. If you don't think things through, even a simple home page can turn into a mess.

The good news is that this issue will help you cut through the tangle and fire off your music into cyberspace the right way. Our cover feature, "Web Music Launchpad," is an overview that leads to six stories in this special Web-focused issue. "Construction Site" teaches you the basics of site authoring and gives tips many veteran Web authors overlook. "Special Delivery" gets you started creating streaming audio and downloadable audio files. "Desktop Musician: Web Audio Action" provides more advanced information about getting sound files to stream or download properly.

To learn about third-party music sites where you can promote and deliver your tunes, read "Working Musician: Keep It on the Download." Our monthly "Web Page" column introduces Standard Music Description Language (SMDL).

By the time you've completed those stories, you'll be well prepared to start exploring your authoring software. Before long, you will be able to roll up your sleeves and author a practical, useful Web site for your band and other musical productions.

Conceiving and executing an attractive and user-friendly site involves more than understanding the technology. You need to spend a lot of time browsing the Web, seeing what others have done well and what they have done poorly.

To some extent, what constitutes "good" design is subjective. You'll probably need to go through a lot of trial-and-error tweaking, especially in your first efforts. As with music, get opinions from a lot of people, but follow your own judgment in the end—unless you're working for someone else, in which case the customer is the boss, whether you think he or she is right.

So enjoy the issue and relax: Web authoring and creating streaming audio aren't easy, and the process gets tangled at times, but it's nowhere near as thorny as you might think. Happy Web weaving!



ANTHONY PIDGION

We welcome your feedback. E-mail us at [emeditorial@primediabusiness.com](mailto:emeditorial@primediabusiness.com).

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VS-2480 back panel

The AKG C3000B: the perfect input source for the VS-2480's COSM Mic Modeling effect.






# Right Brain

## Wow.



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MIKE CRUZ

## OUT OF CONTROL

**T**hanks for the excellent article about MIDI winds ("In Control," May 2001). However, I take issue with the review of the Akai EWI3020. Akai may have worked extensively on the EWI in the past, but it has done nothing to it in at least five years. Furthermore, the module is unnecessarily huge—a full-depth 2U rackmount unit, which makes it unwieldy for road use.

Perhaps Akai bought too many large rackmount cases about six years ago and needs to recoup its investment. On the other hand, the new MIDI EVI, custom-built by Nyle Steiner, offers significant improvements to Akai's product line, namely better MIDI compatibility and more features. In addition to being MIDI compatible, the MIDI EVI has a control voltage (CV) output (a much more sensitive response than MIDI).

Many EWI owners are waiting to get their hands on an improved MIDI EWI, if only Nyle Steiner would build one.

**Ernie Mansfield**  
via e-mail

*Ernie—I agree that the EWI sound modules are large and unwieldy. I also agree that the Steiner MIDI EVI is a big improvement to the Akai EWI in terms of features and MIDI capabilities, and it does have a*

*CV output. However, not many synths are available that can take advantage of that feature, and it's difficult to access because it's carried on an unused conductor within the MIDI cable. To access it, you need to build a box that routes that conductor to a CV output. On the other hand, the Akai sound modules can process external analog signals through their filters and amp sections, which the EWI controls. That capability is not available on any other MIDI wind controller.—Scott Wilkinson*

## STARR SEARCH

**I**'ve been reading **EM** for almost 15 years. I've always looked to it for information about what's happening in the MIDI, synth, and recording worlds, and usually I have been satisfied with the articles.

However, I noticed that the article about alternative MIDI controllers ("In Control," May 2001) didn't mention Starr Labs' Ztar line of alternative controllers. I own a Ztar Z2, with the ingenious Ztar synth controller neck, and an electric guitar with a hex MIDI pick-up. I've been following guitar synthesis trends since the mid-'80s and have never encountered an interface like the Ztar's. It not only brings guitarists a fairly straightforward way to trigger synth sounds but also works within MIDI's limitations as a keyboard interface protocol.

The Ztar deserves way more attention than it has received. Please include it in the next relevant article about MIDI controllers or, better yet, dedicate an article to exploring it.

**Michael LaMeyer**  
via e-mail

*Michael—I agree that Starr Lab's controllers offer an outstanding degree of control and MIDI implementation that is difficult, if not impossible, to achieve with mainstream*

*MIDI guitars. Nonetheless, the focus of my article was on mainstream controllers. Starr's instruments, however closely they resemble guitars, are not mainstream controllers.*

Associate editor Gino Robair and I covered several Starr controllers in the August 2000 cover story, "The Outer Limits"; "What's New" in the July 2001 issue has a write-up of the Starr Z6 and Z6-S; and a review of the Starr Z1 and Z1-S is in progress.—Marty Cutler

## POWER TO THE PEOPLE

**L**arry the O's comments in "Final Mix: Stuck in the Middle" (June 2001) are right on the money.

I am the broadcast and recording engineer for Atlantic Records' Internet department, and I own a commercial studio in New York City. At Atlantic, I use a Digidesign Pro Tools/24 system (hardware and software), a Yamaha O2R digital mixer, and a pair of Genelec monitors. At my studio, I use a Mark of the Unicorn (MOTU) 2408mkII system (hardware and software); a Mackie 32-8 analog mixer; Mackie HR824 monitors; Event 20/20 monitors; and a consumer monitoring setup, which consists of an Onkyo M-501 power amp, a pair of Allison bookshelf speakers, and a Panasonic boom box, all for A/B comparisons. Both studios use Mac G3s. I have a clear understanding of what Larry the O is talking about.

For the high-profile Atlantic recordings, the tracking gets done on the Pro Tools system, recorded in 24-bit, 48 kHz format. I then transfer the tracks to a FireWire hard drive and bring them to my studio for post-production work. There was a time when that would have been impossible without having an expensive setup to handle the critical applications of truly professional work—but not anymore. Although Atlantic's pro system is great, you can't beat the modern midrange audio systems. No



# ROGER MANNING KNOWS.



## Great ideas come from great sounds.

As a studio ace and the keyboardist behind Beck, Jellyfish, and many others, he has to stay on top of the technology that matters.

Roger uses GigaStudio and the Delta 1010. GigaStudio has revolutionized the studio environment by providing the benefits of samplers without the burden of expensive hardware. GigaStudio provides access to the most prized sound libraries available, a palette so vivid and complex that it exposes the shortcomings of even the best soundcards.

**Enter the Delta 1010.** The critically acclaimed Delta 1010 has earned the honor of being the industry standard soundcard for GigaStudio. How? By providing pro features and performance, low latency, and clearly superior fidelity. The 1010 and GigaStudio together form a system that challenges everything your ears know.

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To learn more about GigaStudio, visit [www.nemesysmusic.com](http://www.nemesysmusic.com)  
To learn more about the Delta 1010, visit [www.m-audio.com](http://www.m-audio.com)

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John Diliberto must have felt satisfaction approaching ecstasy when he wrote the cover story for our September 1986 issue. In a wide-ranging discussion, Diliberto and Frank Zappa conversed about Zappa's use of his \$200,000 New England Digital Synclavier composition and synthesis system. As one would expect, Zappa had plenty to say, and Diliberto did a fine job writing the article.

The September issue's main focus was very different from the ideas Zappa and Diliberto considered: we presented four features on telecommunications. Steve Sagman gave us "Telecommunications for Musicians," which discussed transferring data between two computers. Sagman started out with using a null modem and RS-232 port to transfer data directly between two local computers; he then got into transfers via terminal-emulation programs. He also explained how to use a bulletin-board system—the BBS was a precursor of today's FTP sites, chat rooms, and newsgroups—and defined a few basic terms.

Next, a variety of authors delved into specific telecom services and networks for musicians. Richard Elen discussed Esi, Jules Delgado explained MusicNet, Perry Leopold promoted the Performing Arts Network (PAN), Bryan Bell discussed his SynthBank synth-patch service, and Gary Rottger gave us the skinny on SynthNet and MIDI-Connection. Jack Orman provided a quick overview of contemporary BBSs, and Craig Anderton offered advice for choosing and using the services.

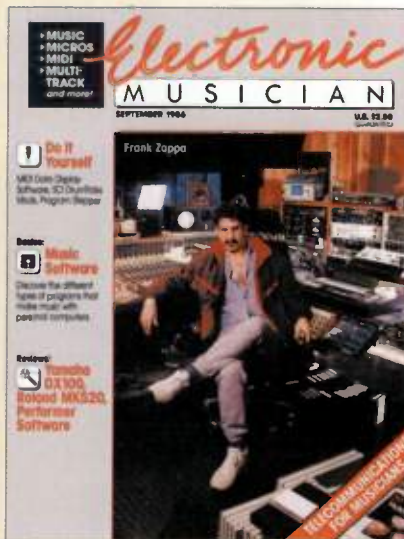
"Telecommunications in the Real World" featured short stories by industry pros about how they used online technology. Authors included synthesist Larry Fast, singer Graham Nash, Farmyard Studio manager Graham Hutcheon, bass wizard Tony Levin, Roxy Music electronic guitarist Phil Manzanera, audio engineer David Scheirman, and studio owner and consultant Bobby Nathan.

Longtime contributor Alan Gary Campbell completed our telecommunications special with a story on low-cost modems, including plans for modifying them.

In September 1986, we were still deep in the era of DIY electronics. Michael Dosa showed how to build an external sound module for the MXR Drum Computer; Eric Barbour provided several modifications for the Sequential Drum Traks drum machine; and Mark M. Williams gave us the Program Stepper, a footswitch that let you change programs on Korg's classic Poly 800 analog synth without using MIDI. We also had a DIY computer program, Jim Johnson's *MIDIPrint*, which let you view and analyze MIDI data on a Commodore 64.

Those stories and part two of Craig Anderton's overview of music-computer basics left space for only three reviews. Two were of fairly popular synths, Yamaha's DX100 FM and Roland's MKS-20 digital piano module. The third review was, in my opinion, much more significant: our first look at Mark of the Unicorn's *Performer* MIDI sequencer for the Mac, which quickly established itself as one of the finest sequencing programs on the planet. Just days before I wrote this column, the company released *Digital Performer* 3.0, yet another major upgrade.

—Steve Oppenheimer



## ● LETTERS

matter what audio sequencing software you use, the 2408's I/O can compete with the big dogs.

The power has been brought back to the people by the outstanding efforts of companies such as MOTU, Echo, and so many others. Larry the O is right when he says that rough times are ahead with new operating systems, protocols, and software. If you can ride out the storm, it's only going to get better.

A. J. Tissian  
via e-mail

## STOP IT—WE'RE BLUSHING

As I have been considering the purchase of a new computer for audio, I sent an e-mail inquiring about Windows ME versus 2000. Thanks to the magazine and associate editor Dennis Miller for the timely and immensely helpful response and for the pleasant surprise of seeing my letter in the June 2001 issue.

EM is the highly valued center of my music-reference library. As a reader for more than ten years, I have many issues to revisit, all of which contain good, trustworthy advice. My projects continue to improve not only with practice but also from reading each issue.

Thanks to the entire staff, which consistently does an excellent job. You should sleep well knowing that you help many people pursue their passion with confidence and satisfaction. You really do make a difference.

Brian Strines  
via e-mail

## IT'S A MYTH-TERY

Dan Phillips's article ("Debunking Digital-Audio Myths," May 2001) covered many interesting points. I found it frustrating, however, when he failed to provide at least basic definitions for topics such as fixed- versus floating-point calculations. I know that's an important topic because I've heard of it so many times in descriptions of computer-music gear. However, Phillips basically said that there is a distinction between the two—they result in different calculations by the



# VOICE MODELING THE IMPOSSIBLE

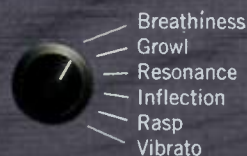
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Voice Modeling technology allows realtime vocal resynthesis. It can be applied to both live and recorded vocals, with amazing results.

The world's most beautiful instrument now has crafting tools that were previously only available to instrumentalists.

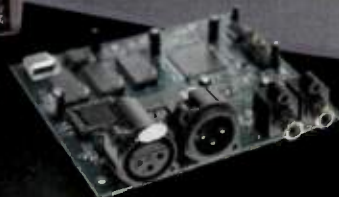
The VoicePrismPlus with built-in VoiceCraft Modeling card gives you direct, editable control over your lead voice.

Imagine adding:



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## VoicePrismPlus

HUMAN VOICE MODELING | FORMANT PROCESSOR

The most advanced vocal channel available anywhere, VoicePrismPlus is both a lead-voice and harmony processor under preset control. It includes, lead-voice modeling, four fully adjustable harmony voices, TC Electronic Compression, EQ, Delay, Chorus, Flange and Reverbs. AES/EBU and S/PDIF I/Os are included.

The human voice is our passion and it shows!  
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Take your vocals further!

Included in the VoicePrismPlus, the VoiceCraft Voice Modeling card is also available to upgrade your VoicePrism. Whatever the vocal, you can craft its style and attributes easily and quickly.



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computer—but gave no explanation of what they are. I still don't know whether one is better than the other.

Likewise, he wasn't clear about how plug-in compressors and limiters have certain "frequency-related issues." What does he mean by saying compressors and limiters "work by modulating one audio-rate signal with another audio-rate signal"? Does *audio rate* refer to the sampling rate? That section, which I really needed to understand, wasn't written in clear terms—unless you're a total tech head.

I'm making the same observation that a reader ("Letters," May 2001) recently made. Please have nontechnical editors edit the articles to make sure at least basic definitions are provided for the lexicon used in more technical sections. Take a look at the articles in your sister publication *Remix*, in which almost everything is explained clearly.

**Michael Arana**  
New York

*Michael—The question of fixed point versus floating point was mentioned as a side point, so I could spare only a few paragraphs. It's a highly technical subject, and a complete discussion could easily fill an entire article.*

*The two formats have varying ways of approaching the possible range of values. For audio, think of the difference between silence and full-scale signal. Floating point has finer resolution near zero than at larger values, resulting in greater dynamic range; fixed point has constant resolution throughout its range, culminating in finer resolution for larger values.*

*Bit resolution is often not the same when comparing fixed- and floating-point hardware, which makes apples-to-apples comparisons difficult. Some tasks may be easier or more processor-efficient, depending on the choice of fixed or floating point; even chips capable of both may have fairly contrasting capabilities when doing one or the other.*

*As for which calculation is better, I don't have an easy answer. Highly regarded digital signal processing programmers have differences of opinion on the matter. Some point out disparities in ease of programming; others point to algorithms that seem to work better in one case or the other. Because*

## CAN'T GET ENOUGH OF EM?

ONLINE THIS MONTH:

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- Free reader service! Our reader-service card is now online. Get the product information you need directly from manufacturers. It's quick and easy—no more mailing and waiting.
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*the experts disagree, it's safe to say that you don't need to worry about it.*

*My point was not that one is better but simply that, in some cases, they may not produce identical results, and if a developer implements the same synth or effect on floating-point and fixed-point systems, the two may sound slightly dissimilar.*

*Regarding compressors and audio-rate signals, audio rate means a signal with its frequency in the audio range, approximately 20 Hz to 20 kHz. A compressor's gain control may respond to incoming audio so quickly that it produces signals within that range.*

*With 1 ms attack and release times, for instance, a compressor can act like a 500 Hz oscillator. That may produce frequencies significantly higher than 500 Hz, depending on the waveform shape created by the attack and release characteristics.*

*The frequency produced by the gain control interacts with the frequency of the signal being processed and produces aliasing noise if the combined frequencies exceed half the sampling rate (the Nyquist frequency). To diminish aliasing, use slower attack and release times and, if possible, use processors or plug-ins with higher internal sampling rates.—Dan Phillips*

*Michael—We do indeed have nontechnical copy editors working on the stories. However, EM has never been an entry-level magazine*

*with respect to the articles' technical level. We constantly do a balancing act. On one hand, we don't want to lose readers who lack an extensive technical background, so we try to explain the underlying technical issues when we can. On the other hand, if we never assume a certain level of technical knowledge, we can't discuss more advanced issues that are of interest to our many technically savvy readers.*

*Fixed- versus floating-point calculation is a good example of a highly technical issue about which we had to assume readers already had some knowledge.—Steve O*

## ERROR LOG

August 2001, "Making a Joyful Noise," p. 48: Three out of the four graphics (Figs. A–D) appear in the wrong sequence and do not match the captions. The Fig. A graphic should be Fig. B; the Fig. B graphic should be Fig. D; Fig. C is correct; and the Fig. D graphic should be Fig. A.

## WE WELCOME YOUR FEEDBACK.

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



# Get The MX-2424 Advantage!

“ The ‘Golden Ears’ all found the TASCAM performed extremely well, nearly beating out a unit priced four times higher. The listening tests confirmed what I already knew: the MX-2424 is a solid performer at a great price. ”

— Glen O'Hara,  
Pro Audio Review Magazine

“ ...the MX-2424 puts high resolution sound quality and professional recording features at your fingertips. ”

— Electronic Musician Magazine,  
2001 Editor's Choice Award



“ ...the TASCAM MX-2424 is a rock-solid, excellent studio recorder that performs well, sounds great and is priced right. ”

— George Petersen,  
Mix Magazine

“ The machine alone is impressive enough to warrant close attention, but the implications inherent in the control and networking capabilities make it potentially astounding. ”

— Rob James,  
Studio Sound Magazine

## Ph.D. in Nuclear Physics Not Required

If you've ever recorded before, you'll find the MX-2424 as easy to use as any multitrack recorder. Since TASCAM has been the world leader in multitrack recording for over 25 years, we know how to create gear that's powerful and sophisticated without making the learning curve too steep.

## Edit How You Like: MX-View™ Waveform Graphic Interface and Extensive Front Panel Editing

Running in native Mac and PC versions, the upcoming MX-View is a powerful graphic editing interface that offers sophisticated, sample-level editing on par with full-featured digital audio workstations. You can drag and drop on the fly, get onscreen metering for up to six MX-2424s, set up custom configurable keyboard shortcuts, manage virtual tracks and much more. Plus, the MX-2424's extensive built-in front panel editing tools let you edit in the field without lugging around a keyboard, monitor and mouse.

## True Recording Power: Take the Punch-In Challenge

The MX-2424's hard disk engine is so strong that it allows for seamless, gapless punches across 24 tracks, with up to 72 tracks of throughput to accomplish this considerable task. If you're brave, try arming 24 tracks on any other standalone

The **TASCAM MX-2424** is the most popular 24-track recorder ever made. Whether you're making the transition from analog and tape-based digital recorders or just getting into recording, here's some info to help you truly understand the MX-2424 advantage.

24-track hard disk recorder and quickly punching in and out. It's just one example of the MX-2424's awesome dual-processor recording power, which includes both TapeMode and Non Destructive recording, up to 999 virtual tracks per project with 100 locate points, 100 levels of Undo and much more.

## Sound Designer II & Broadcast Wave Audio Files and SCSI Drives for Ultra Flexible Compatibility

Since the MX-2424 writes Sound Designer II™ audio files to Mac-formatted disks and Broadcast Wave audio files to PC disks, it's easy to move sound back and forth between your computer and the MX-2424. With these standard time-stamped file types and professional SCSI drives, you're ensured of sample accurate compatibility with Pro Tools™, Nuendo™, Digital Performer™ and more. With compatibility being so important to MX-2424 owners, it's no surprise that its 24-channel interfaces are ready to interface with just about any console, digital or analog. Or that its analog, TDIF and AES/EBU interfaces are 96kHz ready.

## Back Up Your Tracks: As Low As A Buck Per Song

Media	Cost of Drive	Media/10 Projects	Total Cost
90 Minute IDE Drive	\$299	10 Drives	\$2990
Orb Drive	\$299	1 Drive + 86 Disks	\$2879
TASCAM DVD-RAM	\$599	1 Drive + 20 Disks	\$1739
Offline CD-R Backup*	\$749	1 Drive + 290 Disks	\$959

If you're forced to use cheap disk drives to backup, you'll pay in the long run. DVD-RAM drives may be connected to the MX-2424's front panel or rear SCSI port, and offline CD-R backup via Ethernet transfer to your computer is the most cost-effective backup method available on any HD recorder by far...as low as one dollar for an average pop tune\*.

## Get the Advantage of the Most Powerful and Most Affordable 24-Track Hard Disk Recorder Available Today

There's much more to the MX-2424 than what fits on this page. So if you're getting into the hard disk revolution, you might as well take advantage of the recorder with all the advantages. Just go to [www.mx2424.com](http://www.mx2424.com) for the complete MX-2424 story, or check out the MX-2424 for yourself at any TASCAM dealer.

### MX-2424 24 TRACK 24 BIT HARD DISK RECORDER/EDITOR

\* based on an average 3 1/2 minute song of 24 tracks at 24-bit/48kHz. Your mileage may vary.

† Offline CD-R backup is possible with an Ethernet-equipped computer.

The \$749 (USD) reference is based on TASCAM's CDR-Pro Bundle.

TEAC America, Inc., 7733 Telegraph Road, Montebello, CA 90640  
323-726-0303 [www.tascam.com](http://www.tascam.com)

**TASCAM**



## It does more than burn. It sizzles.

Introducing the new Korg D1600 Digital Recording Studio, the most complete and affordable solution for home and project recording. This 16-track digital recorder packs recording, mixing and final CD mastering into a professional quality all-in-one unit. With even more features and capabilities, the D1600 has everything for your music-making needs.

The D1600 comes with a massive 20 GB hard drive for more recording time and less worry about running out of time or space. And thanks to its unique user-swappable design you can easily change drives from session to session using standard IDE mechanisms. The D1600 supports the largest drives possible, so say goodbye to making backups and clearing your drive for the next project. Simply swap it!

When it comes time to master or backup a project to CD you'll appreciate the D1600's internal CD-RW drive bay. (The Korg model CDRW-2 and many ATAPI-compatible devices can be used.) No cables. No additional power supplies. You can even record audio directly from the internal CD-RW drive. Try doing that with an external unit!

The effects power of the D1600 really shines when recording and mixing. Have up to eight Insert effects configured any way you like, plus two Master and one Final effect. It's like having a professional rack of high-quality effects processors with everything from reverbs and delays to compressors, limiters and EQs. Plus, our special REMS™ models of mics, guitar amps and speaker cabinets.

With its user-friendly TouchView graphic display and intuitive operating system, the D1600 is just begging to be touched. Lay your hands on it and let your creativity take over. Once you heat things up, there's no telling what you'll be able to burn.

# KORG

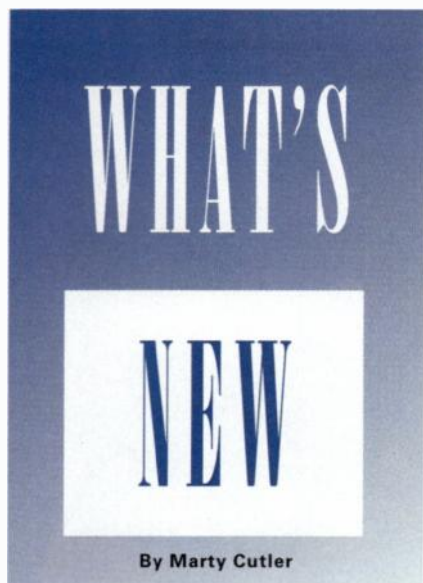


# D1600



- Recording Format: 24-bit/16-bit uncompressed, 44.1 kHz • 24-bit A/D, D/A conversion
- 8 track recording/16 track playback @16-bit mode • 4 track recording/8 track playback @ 24-bit mode
- Total of 128 tracks (8 virtual tracks per track) • 100 scenes/4 locate points per song
- 24 channel, 8 bus digital mixer with scene memory and MIDI automation • 3-band EQ per channel
- Four XLR inputs w/phantom power • 106 effects algorithms • Built-in tuner
- 215 PCM drum rhythms • 24-bit optical S/PDIF I/O





## ▼ SEK'D PRODIG T 2496 PRO

The 2496 Pro (\$599) is a digital-audio interface for Windows computers. The interface includes a breakout cable, two TDIF interfaces, transport controls, and a synchronization port for TDIF-equipped recorders. The card can record and play back 16 channels of digital audio, and you can combine as many as four cards in one for 64 channels of digital audio.

The card supports sampling rates from 44.1 through 96 kHz and resolutions of 16, 20, and 24 bits. The DTRS connector allows full remote control of transport and recording functions with the provided software. The application supports locate points as well as in, out, and preroll settings. The interface supports frame-accurate transfer of tracks between TDIF-compatible recorders and the computer. Sek'd America; tel. (800) 330-7753 or (707) 578-2023; fax (707) 578-2025; e-mail [info@sekd.com](mailto:info@sekd.com); Web [www.sekd.com](http://www.sekd.com).



## ▶ ZOOM MRS-1044

The MRS-1044 (\$1,199.99) is Zoom's new portable digital studio. The recorder provides 10 tracks of uncompressed 24-bit, 44.1 kHz audio, a fully programmable stereo drum machine, as well as a bass track. Each track is accompanied by ten virtual tracks.

The unit houses a 15 GB hard disk, offering as many as 44 track hours of recording. Optionally, you can add a USB or SCSI expansion card for storage and recording.

The built-in mixer offers 24-bit internal processing and effects. Digital signal processing includes reverb, chorus, delay, modulation, compression, effects tailored for mastering, and algorithms drawn from Zoom's guitar processors. You can use six effects simultaneously. Each of the ten audio channels has a dedicated fader and 2-band EQ.

Unlike other portable digital studios, the MRS-1044 offers a full-fledged drum



machine. You get eight velocity-sensitive pads that access three banks of drum sounds for a total of 24 drum sounds per kit. You can also use the pads to sequence a wide range of bass sounds, with 250 user and 400 preset patterns available.

The MRS-1044 offers two phantom-powered XLR and two unbalanced 1/4-inch inputs, one pair of stereo RCA outputs, S/PDIF optical output, and MIDI In and Out. Samson Technologies Corp. (distributor); tel. (800) 328-2882 or (516) 364-2244; e-mail [sales@samsontech.com](mailto:sales@samsontech.com); Web [www.samsontech.com](http://www.samsontech.com).

## ▼ STEINBERG HALION

Steinberg's *Halion* (\$399; Mac/Win) is a software sampler for VST-compatible host programs. The sampler supports 32-bit sampling and features a built-in sample editor.

You get as many as 256 notes of polyphony and 16-MIDI-channel multitimbral

envelope generators are provided, each with a maximum of eight stages.

*Halion* is compatible with WAV, AIFF, Akai, and E-mu sample formats, with additional formats in development. *Halion's* sample editor lets you drag and drop samples to key assignments, and you can easily set layers, velocity switching, and velocity crossfading by moving Key Zones. The editor searches automatically for zero crossings and performs nondestructive crossfades for smoother looping.

To get you started, *Halion* ships with four Wizoo sample CD-ROMs, including grand piano, basses, and drum kits. Running *Halion* requires a Pentium II/266 MHz computer with 128 MB RAM, Windows 95/98/NT, an approved MME- or ASIO-compliant sound card, and a VST-compatible host application. For the Mac, you will need a PPC 603e/266 MHz processor, 128 MB RAM, OS 9.1, an approved ASIO-compliant sound card, and a VST host program. Steinberg North America; tel. (818) 678-5100; e-mail [info@steinberg.net](mailto:info@steinberg.net); Web [www.steinberg.net](http://www.steinberg.net).



capability. You can assign a different multimode filter to each sample or deploy filters globally. Filters include notch, highpass, lowpass, and bandpass, with 12 dB and 24 dB slopes. Filters offer a Fatness function to beef up sounds. Two



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## SOUND ADVICE ▲▲▲▲



### ▲ CAKEWALK

A new series of loop discs has been released by Cakewalk in support of its *Sonar* digital-audio sequencer. From well-known remix producer X-Mix comes *X-Mix Studio Loops* (\$89). Subtitled *X-Treme Dance and Hip-Hop*, the collection contains the same samples used in tracks by Puff Daddy, Janet Jackson, New Order, and others.

*Smart Loops: Rockit Fuel* (\$89) is a compilation of pop, rock, and funk loops. The CD offers drum, percussion, bass, and guitar loops.

*Power FX: In Your Face FX* (\$89) contains special effects targeted at radio, television, and film projects. The sounds are recorded, processed, and mastered digitally. Sounds include sci-fi effects, machine noises, DJ effects, atmospheric pads, and more.

The series is compatible with any software supporting *Acid* loops. Cakewalk; tel. (888) CAKEWALK or (617) 423-9004; e-mail [sales@cakewalk.com](mailto:sales@cakewalk.com); Web [www.cakewalk.com](http://www.cakewalk.com).

### PRIMESOUNDS

PrimeSounds is an online subscription club (\$10 monthly for one-year membership) that provides a huge library of samples for downloading. Sound developers for the company produced sample CD titles such as *Methods of Mayhem*, *On the Jazz Tip*, and *X-Static Goldmine*; samples from those collec-

tions are available at the Web site. The service offers a searchable sample database. Once you locate something of interest, you can audition sounds with *RealPlayer*. As a member, you can download as many samples as you need with no charge other than the subscription fee. All samples are royalty-free and original, so there are no clearance issues. PrimeSounds; tel. 46-823-5316; e-mail [info@primesounds.com](mailto:info@primesounds.com); Web [www.primesounds.com](http://www.primesounds.com).

### ▼ SONIC FOUNDRY

David Torn is no stranger to fans of adventurous guitar; sounds that issue from his instruments are as intriguing as any found in the latest synthesizers. *Textures for Electronica and Film Music* (\$59.95) contains warped



guitar sounds inspired by his *Splattercell* recording project. The collection is designed for Sonic Foundry's *Acid* and *Acid*-compatible programs.

*Textures for Electronica and Film Music* provides a grab bag of cinematic textures and sound beds, unusual solo instruments, sound effects, ambient and experimental sounds, sounds suited for techno and hip-hop music, and lots more. Sonic Foundry; tel. (800) 577-6642 or (608) 256-3133; e-mail [customerservice@sonicfoundry.com](mailto:customerservice@sonicfoundry.com); Web [www.sonicfoundry.com](http://www.sonicfoundry.com).

### ACCESS

Users of the *Virus TDM* software synthesizer will be happy to know that *Virus TDM Bonus Sound*, vol. 3, is available for free download at [www.access-music.de](http://www.access-music.de). The file offers about 300 additional patches. Owners of hardware *Virus* synthesizers have not been left out of the picture: also available at Access's site is Matt Picone's *Rock and Fusion Signature Set No. 2*, which offers 256 free patches. Digidesign (distributor); tel. (800) 333-2137 or (650) 842-7900; e-mail [prodinfo@digidesign.com](mailto:prodinfo@digidesign.com); Web [www.access-music.de](http://www.access-music.de).

### ▼ DS SOUNDWARE

*Ultimate Marimba and Vibes* (\$199) is a two-disc library for NemeSys's *GigaSampler* and *GigaStudio* software samplers. The collection provides samples from a Marimba One five-octave rosewood marimba and a Musser Gold Century vibraphone.

The producer sampled each instrument over its entire range and used four sets of mallets. Among the patches are four-velocity strikes, rolls, muted strikes, and strikes with a rattan handle. Marimba patches offer resonator strikes, glissandi, and idiomatic runs. You also get bowed vibes, strikes with pedals up, and other special effects. DS Soundware; e-mail [donnie@dssoundware.com](mailto:donnie@dssoundware.com); Web [www.dssoundware.com](http://www.dssoundware.com).





# LOUD IS GOOD.

(Preferably so loud that you can stun small animals and peel paint.)

# Accurate is better.

(...assuming you've practiced a lot and are reasonably in tune.)

# THE SRI530 IS BOTH.



The SR1530 just looks like an SR speaker. Actually it has a three-way electronic crossover, three FR Series™ power amps with 500 total watts RMS delivered to the transducers, three parametric equalizers and an electronic time corrector...built into an astonishing SR speaker.

In terms of technical advancement, the active SRI530 resembles a conventional SR speaker about as much as a jet fighter resembles a hang-glider.

The SRI530 is a 3-way design with a separate 6-inch midrange transducer, so vocals and instruments are rendered with extraordinary detail and clarity.

Each transducer is driven to its maximum output by an individual, custom-designed high-current power amplifier. You get higher SPLs, tighter bass and better dynamic response ...and don't have to lug around a rack of outboard amps and an electronic crossover.

Built-in electronic equalization smooths each transducer's response curve; time and phase compensation circuits coordinate each driver's output for pin-point imaging.

The RCF Precision™ HF compression driver and midrange transducer are integrated into a single Optimized Wavefront™ horn for flatter response and wider dispersion. The cast-frame 15-inch LF transducer features our exclusive Inside/Outside voice coil for maximum heat resistance.

We could go on and on. But to become a believer, all you have to do visit your nearest Mackie Dealer and hear the loud, accurate SRI530.



Our asymmetrical Optimized Wavefront™ horn integrates the output of the HF compression driver with the 6-inch midrange driver (whose cone is shaped to become part of the main horn). Treble and midrange arrive at the audience's ears properly blended.



1-inch exit diameter compression driver with integrated phase plug

Optimized Wavefront™ Horn properly blends HF and mids

6-inch midrange transducer with integrated phase plug

16-ply Baltic Birch trapezoidal enclosure with rugged resin end caps

Weight-balanced side handles plus top and bottom handles

15-inch cast-frame LF transducer with heat-resistant Inside/Outside voice coil and high-flux magnetic circuit

Inside: 3 separate FR Series™ amplifiers with 500 total watts RMS delivered to the transducers

Inside: Phase-accurate electronic crossover, electronic parametric equalization, time correction and phase alignment circuitry

## PERFECT MATCH: THE SR24-4-VLZ® PRO MIXER

- 4-bus design • 20 premium XDR™ microphone preamps • 24 total channels with 20 mono line level/mic chs. & 2 stereo line level chs.
- 6 aux sends per ch. • Inserts on mono chs. • 3-band EQ with swept mid & low cut filter (mono chs.) • EFX to Monitor • Separate talkback section with extra mic preamp • RCA tape inputs & outputs • 60mm long-wear log-taper faders • Solid steel chassis & mucho mondo more



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## KEY CHANGES

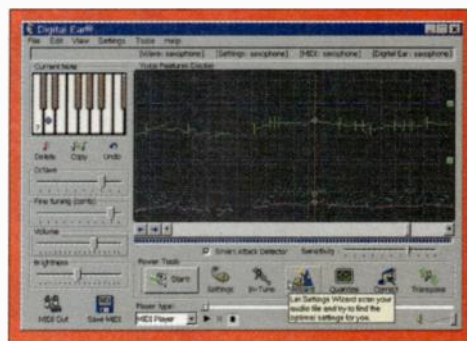
**B**itHeadz has entered into a partnership agreement with online sound distributor **Sonomic**. Under the terms of the agreement, Sonomic will be the exclusive provider of downloadable samples for BitHeadz's *Unity DS-1* software sampler. . . . **E-mu** has released *EOS 4.6* for E4 Ultra samplers. Included in the release's new features is the ability to import Ensoniq ASR samples from floppy-disk or SCSI drives. . . . **Gvox** announced that *Encore*, *MusicTime Deluxe*, and *Master Tracks Pro* are available for purchase and download at its Web site ([www.gvox.com](http://www.gvox.com)) . . . **Steinberg's** *Cubase VST 5.04* for Windows now supports *ReWire 2*. **Propellerhead's** *Reason* can now plug directly into *Cubase VST's* Instrument Racks. . . . **Riot Act** has announced a distribution agreement with **Sound-Effects-Library.com**. Samples from Riot Act's *Slow Death by Vise* collection are available for audition and download in several industry-standard formats, including WAV and AIFF. . . . **Waves** announced that it will support **Digidesign's** Real Time AudioSuite (RTAS) system for plug-ins. RTAS compliance will be implemented with version 3.1 of Waves plug-in CD bundles. . . . **NemeSys** and **Alien Connections** have announced an agreement that allows NemeSys to distribute *ReValver* amplifier-modeling plug-ins. Alien Connections will produce plug-ins that are compatible with NemeSys software, taking advantage of NemeSys zero-timing latency. . . . **Seasound, LLC**, manufacturer of digital-audio interfaces, has gone out of business. A technical support FAQ and a user forum will remain available at [www.seasound.com](http://www.seasound.com).

## ▶ EPINOISIS SOFTWARE DIGITAL EAR

**C**onverting digital-audio data to MIDI can be a thorny undertaking; the ability to capture a performance accurately depends on dynamics and articulation, and many audio-to-MIDI software programs fall short in that regard. Epinois Software's *Digital Ear* (\$79.95; Win) boasts a number of features that enable accurate conversion of monophonic audio files to MIDI data.

The program translates the audio file's vibrato into Pitch Bend data to one-cent accuracy. The software's Pitch Quantize can resolve MIDI events to the nearest semitone, or use Soft Quantization for a less rigid but more in-tune performance. An In-Tune Wizard can automatically tune performances that are below or above standard tuning.

To further ensure that a MIDI file follows the expressiveness of the audio performance, *Digital Ear* can capture the amplitude envelope of the audio file, converting the information into MIDI Volume messages. Dynamic control of timbre is



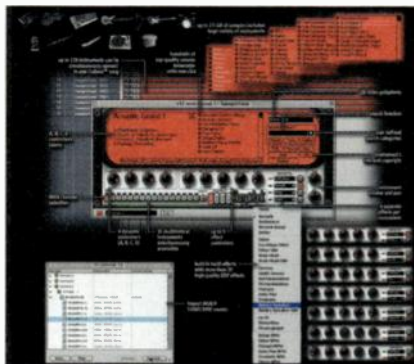
analyzed and can be changed into MIDI Control Change messages for managing filter cutoff. You can edit the resulting pitch, volume, and brightness contours of the MIDI performance using an on-screen keyboard, chart, and sliders.

*Digital Ear* supports General MIDI- and XG-compatible synthesizers, but you can remap MIDI controller messages to support synths that don't comply with those standards. *Digital Ear* requires at least a 100 MHz Pentium with 32 MB RAM and Windows 95/98/ME/2000. Epinois Software; e-mail [info@digitalear.com](mailto:info@digitalear.com); Web [www.digital-ear.com](http://www.digital-ear.com).

## ▼ IK MULTIMEDIA SAMPLETANK

**I**K Multimedia's *Sampletank* (\$499; Mac/Win) is a VST sample-based software synthesizer. The package includes a CD-ROM collection offering 450 banks of multisampled instruments. If that isn't enough, you can import WAV, AIFF, and Akai S1000/3000-format samples.

*Sampletank* offers 128 notes of polyphony, and its proprietary compression algorithm doubles the number of instruments available in RAM. You can also load sounds without compression.



*Sampletank's* synthesis architecture provides two oscillators, two envelope generators, and a multimode filter to better simulate acoustic sounds and instrument damping. *Sampletank* also offers two multimode LFOs and a waveshaper section.

The software has four stereo outputs, which can be configured as eight mono outputs in the *Cubase VST* mixer. Effects include reverb, compression, delay, filter, wah-wah, AM and FM modulation, and bit reduction. Control Change messages can be mapped to effects and other synth parameters. A control panel lets you make quick, coarse adjustments to an instrument's settings, including brightness, touch sensitivity, and EQ.

Macintosh users will need a 200 MHz PPC/604 running OS 8.5 with 64 MB RAM. The Windows version needs a Pentium II 200 MHz MMX computer running Windows 95/ME/2000/NT 4.0 with 64 MB RAM. IK Multimedia Production; tel. (866) 243-1718; e-mail [info@sampletank.com](mailto:info@sampletank.com); Web [www.ikmultimedia.com](http://www.ikmultimedia.com), [www.groovemaker.com](http://www.groovemaker.com), or [www.t-racks.com](http://www.t-racks.com).



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## Miroslav Vitous Symphonic Orchestra

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## Ethno Techno

Presenting a **Groove Masterpiece** from world famous drummer/percussionist **Bashiri Johnson** and producer

**Eric Persing.** Ethno Techno is a new kind of groove library, with sounds that are organic, metallic, deep and glassy. The grooves were created using a mixture of radical, hand-welded instruments, some "junk" percussion, and more traditional skins and sticks. The instruments were played live by Bashiri and friends (including a member of STOMP) with an emphasis on modern dance/pop and urban styles. Persing then used these raw materials to create the remixes, flowing with spacious ambience, round impacts, and laid-back to aggressive feels. Mixes, Elements and Remixes, all **Groove Control** activated.

"...straight out of some futuristic drum circle, where handmade instruments, traditional drums, electronic drums, and effects processors collide to create a hybrid wash of rhythm... The grooves, the sounds, the creative blend of traditional and non-traditional instruments: This collection is nothing but first class... I can't think of a single area where Ethno Techno delivers anything less than perfection. The samples sound great and have plenty of vibe, and there's enough variety to serve a wide range of music styles... It really doesn't get any better than this..." —KEYBOARD Unprecedented Four 10s!

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CD-Audio 2-disc set (without Groove Control) \$129

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Includes sampler CD-ROMs and Data CD  
Roland, Akai/Emu, Kurzweil



## Skippy's Big Bad Beats

From producer/programmer **John "Skippy" Lehmkuhl**, one of the true gurus of groove, comes an explosion of unique, hi-fi, funkified drum loops. Skippy uses his wacky imagination to create **hip hop**, **trip hop**, and **dance** grooves that come in a variety of flavors, including smaller mixes, no-kick, no-snare, and even breakdown versions! Plus, this library is entirely **Groove Control** activated, meaning you can load any of these grooves into your sampler and

have completely **Independent control** over **tempo**, **pitch**, and even the **feel** of the grooves, using just your sequencer and sampler.

★★★★★ "If you're looking for some very 'now' sounding loops... Big Bad Beats will not only deliver, but might even represent the future of the sample CD." — SOUNDOUN SOUND

CD-Audio (without Groove Control) \$99

CD-ROM (with Groove Control) \$199  
Includes sampler CD-ROM and Audio/Data CD  
Roland, Akai/Emu, Kurzweil



## Hot Steel Blues

From the producer of **Fingerstyles** comes a hot new library, full of sizzling electric and acoustic guitar riffs. You'll find over 800 phrases divided into Patterns, Melodies and Endings and arranged into Construction Kits that can be assembled and mixed to create complete, seamless tracks. Both "plugged" and "unplugged" styles traverse the entire Blues genre, from Waters to Clapton.

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## Analog Meltdown

Classic synths, tricked out and turned up! Introducing a new slant on synth sounds.

Produced and programmed by synth sound design veteran, **Kevin Wakefield**, Analog Meltdown is a radioactive, protoplasmic adventure through unearthly terrain and solid-state high jinks. Don't expect a preponderance of presets. Every sound is handcrafted to sound totally fresh, with unique stacks, evolving waveforms and unusual element combinations. Sounds run the gamut

from high impact to ambient, plucky attacks to swirling FX! All will inspire a raving dance mix or a high-tech soundtrack.

"Analog Meltdown not only captures the integrity of Analog synthesis but also the magic of the technology. This disc gives you all the analog sounds you remember, plus a grand assortment of amazing material that would have never been possible until now." —JORDAN RUDESS

CD-ROM \$199  
Akai/Emu, Kurzweil



## Virtuoso Strings

The Virtuoso Series Strings by Kirk Hunter has already become a classic. Recorded in LA by top musicians, it offers a variety of articulations previously unavailable, like **grace-note slides** and **repeated notes**. Plus various **vibrato** styles, a true **Sordini**, **hard and soft attacks**, **half** and **whole step trills** and much more! It features Violins with 24, 8, 2 players, and solo, Violas with 16 players, Cellos with 10, 6, 2 players or solo, and Bases with 5 players. A whole new category of string library!

"These are the smoothest and most ambient sampled strings I've ever heard! The programming is really creative. I can now finally get some really expressive performances from a string sample library!" — David Newman, Academy Award Nominated Composer

CD-ROM Multi-Disc Set \$995  
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## Interactive Drum Kits

All Acoustic Drum Kits with a mega multi-sampling of kicks, snares, toms, hats and cymbals, from old Ludwig®, and Gretsch® sets to new top of the line Pearl®, and Drum Workshop® kits. All hits (no loops). These are extremely realistic drums that you can whack from your keyboard or with your drum pad/triggers. The vintage and custom kits were performed by some of the world's top session drummers. Interchangeable snare programs feature 20 to 50 hits per snare for realism from center, to edge, to rim!

"This is my new favorite drum sample collection...frighteningly realistic..." — KEYBOARD  
**Awarded Key Buy!**

CD-ROM \$199  
Akai, Roland, Emu EOS, Kurzweil, SampleCell



## Concert Grand Pianos

Brilliant renditions of the essential Yamaha piano sound. Features a Yamaha C7 recorded in-studio and a CFIII nine foot grand recorded in a concert hall, both with several dynamics. We've even included pedal down notes with resonating harp. These pianos respond beautifully to 88 note weighted controllers. Each dynamic is in stereo or mono and can be loaded together or individually for maximum flexibility with your setup. You get a slew of programming options for loud or soft music and a useful variety of memory sizes ranging from 8 megs to over 90 megs.

CD-ROM \$199  
Akai, Roland, Emu EOS, Kurzweil, SampleCell





## Hans Zimmer Guitars Volume 2

This brilliant follow-up to Volume 1 raises the bar in recording, sampling and programming techniques, perfected by veteran sound designer, Bob Daspit. These instruments feature velocity switching for both up and down slides, and an intuitive new method for controlling vibrato with dynamics. It's beautifully

programmed and a thrill to play. Volume 2 features Jazz Hollowbody Guitar, Lap Steel Slide Guitar, Electric Baritone, Flamenco Nylon, and a killer new Steel String Acoustic. Plus, check out the rare Middle Eastern, South American and other world instruments like the Charango, Mandolin, Cavaquinho, Cuatro, Oud, Saz, Electric Sitar, Cumbus, and Yayli Tambur. All are amazingly captured in this stunning new release!

\*\*\*\*\* "... a must-have disc for anyone needing first-class plucked instrument sounds... this collection deserves all five stars."  
—SOUND ON SOUND

CD-Audio \$ 99  
CD-ROM \$299  
Roland, Akai/Emu, Kurzweil, SampleCell

## Distorted Reality 2 "Darkness & Light"

The completely new adventure in sonic dementia from producer

**Eric Persing is here at last!** DR2 was created with the very latest in sonic sculpturing technology. Spinning metallic textures, singing oceans, vast amounts of unique loops (50-480 BPM!), impacts, pads, subsonic low-end and the many joys of feedback only begin to describe the wonderful noises in this collection. If you are a fan of volume 1, your sonic arsenal is simply incomplete without "Darkness & Light."

"Spectrasonics had a lot to live up to with DR2, and they didn't disappoint!"  
—KEYBOARD **Awarded Key Buy!**

\*\*\*\*\* —SOUND ON SOUND

CD-Audio \$99  
CD-ROM \$199  
Roland, Akai/Emu, SampleCell, Kurzweil

## Bizarre Guitar

Sound designer Eric Persing and guitarist Peter Maunu blaze a new trail of sound design via guitar. It features the extreme contrasts of breathtakingly beautiful ambience beds and searing harmonic slashes, bowed guitar, strange funk and unsettling washes. Created with tape loop techniques, e-bow, the Roland VG-8, and cutting edge signal

processing tricks, you won't believe your ears. The CD-ROM version includes selected Groove Control™ loops.

"...The range of sonic ideas is vast...brings to mind the dreamlike soundscapes of Fripp and Eno...an aural addict's dream come true."  
—KEYBOARD

"...meticulous attention to detail... perfectly suited to ambient and film music...Bizarre Guitar will appeal to those who like Distorted Reality, providing a wealth of strange and beautiful sounds."  
—SOUND ON SOUND

CD-Audio \$99  
CD-ROM \$199  
Includes sampler CD-ROM and Audio/Data CD  
Roland, Akai/Emu, Kurzweil, SampleCell

## Metamorphosis

21st Century Grooves! Acclaimed producer **Eric Persing's** newest creation features an entire library of his trademark, cutting-edge loop manipulations. Each one of the hundreds of amazing remix grooves is truly unique in texture and feel. From floating, atmospheric Trip Hop pulsations, to experimental Euro-club beats, and all the way to intense, Drum 'N Bass fury, this is an extremely versatile library. If you're a fan of Persing's highly-creative groove processing, prepare yourself to be knocked out!

For the first time ever, each groove is presented three different ways: Standard loops, Groove Menus and in Groove Control™ versions!

"Amazing, description-defying sounds on this bases-loaded, outta-the-park home run of a sample CD-ROM, Groove Control renders the grooves elastic to a startling degree... scandalously creative sound design..."  
—KEYBOARD

"NAMM Top 20" Products Award

CD-Audio (loops only) \$99  
CD-ROM multi-disc set (with Groove Control) \$199  
Akai/Emu, Giga, Roland  
Includes Data Disc, Soundfinder, Groove Menus & WAVE files!

## Bass Legends

Marcus Miller, John Patitucci & Abraham Laboriel present

their coveted electric and acoustic basses & grooves on this critically-acclaimed 650 meg collection.

**TRIPLE \*\*\*\*\* review**  
"...a truckload of great multisampled basses... Definitely put this one on your list of must-haves!"  
—KEYBOARD

"... superb... well organized, exquisitely recorded, and brilliantly performed."  
—ELECTRONIC MUSICIAN

CD-Audio \$99 (grooves only)  
CD-ROM \$299 (basses and grooves)  
Roland, Akai/Emu, SampleCell, Kurzweil

## Liquid Grooves

Now, more "liquid" than ever! The unique and inspiring grooves from the timeless library "Liquid Grooves" are now available in a Groove Control™ version. This revolutionary new method allows you to mix and match grooves in any tempo, and will follow tempo changes from your sequencer! Groove Control also allows you to change the pattern, feel and pitch of the rhythms to your music. Imagine being able to tune the

Wavedrum™ grooves to the key of your song in real-time, without changing the rhythm! Program your own original patterns and fills with the same sounds and mixes from this library!

\*\*\*\*\* "The standard of the sounds and their rhythmic content can't be praised enough, and making all this available in the Groove Control format has extended their usefulness enormously."  
—SOUND ON SOUND

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CD-ROM (with Groove Control) \$199  
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Roland, Akai/Emu, Kurzweil

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## Retro Funk

Spectrasonics takes Retro into the future! Producer **Eric Persing** has created a collection of Classic live drumming with serious feel, vintage sonics and a huge variety of original drum grooves and fills from four incredible drummers! These authentic sounding loops are ultra-flexible, bringing that magic "vibe" to any modern track. And with

Groove Control, the grooves are at your command, effortlessly blending their timing and human feel to match your music.

Intros, Fills, Breakdowns and Variations are provided along with separate Claps, Cymbals and funky live Percussion loops too!

\*\*\*\*\* "... amazingly useful... infectious musical... a fantastically wide range of drum sounds... amazingly tight and powerful... must sample sound quality... one of the best!"  
—SOUND ON SOUND

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CD-ROM (with Groove Control) \$199  
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• English Boys' Choir.  
solo and ensemble

multisamples and phrases  
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• Gregorian Men's Choir  
Multisamples and ancient Chants  
• Lush Multitracked Pop Stacks  
"Enya-esque" pads

"... simply stunning... without a doubt the ultimate library of choral samples."  
—KEYBOARD 10 of 10 rating. **Awarded Key Buy.**

\*\*\*\*\* "... the definitive vocal sampling work."  
—SOUND ON SOUND

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## Vocal Planet

Spectrasonics is proud to announce that the eagerly anticipated follow-up to Symphony of Voices is now available! Vocal Planet is an epic Five Disc CD-ROM library produced by Eric Persing, that features both multisamples and phrases, an awesome variety of over 12,000 samples of authentic male and female singers. These are incredible one-of-a-kind sounds. Best of all, the samples have all been pre-cleared for your musical use without any additional licensing fees!

The main categories include Gospel with choir multisamples, shouts, hums, praises and phrases plus soloists - Jazz/Blues with Take-6 style vocal ensembles, scat singers and Delta Blues men - World with Tuvan throat singers, Colombian, Peruvian, Brazilian, Native American, Rasta, Indian, Serbian, Mid-East, Nordic, Balkan, Celtic, much more - R&B/Dance with Chromazone background licks, soulful phrases, dance hooks and shouts, "street corner" acappella, human synths, thousands of vocal percussion hits and **Groove Control loops!**

More than EIGHT HOURS of wall to wall vocals. Vocal Planet is the ultimate way to "humanize" your tracks!

\*\*\*\*\* "This has to be the Encyclopedia Britannica of vocal samples!"  
—SOUND ON SOUND

CD-ROM \$399 5-disc set  
Akai/Emu, Roland, Kurzweil  
Complete library Includes Data CD with Soundfinder system

CD-Audio \$149 3-disc set  
Selected phrases



## ▶ AKAI DPS24

Akai's latest entry into the portable-digital-studio market is its 24-track, 24-bit recorder, the DPS24 (\$4,995). It supports 16-, 20-, and 24-bit recording resolutions and 32, 44.1, 48, 88.2, and 96 kHz sampling rates. The recorder comes with a 30 GB IDE hard drive and provides a drive bay for another drive or CD-RW.

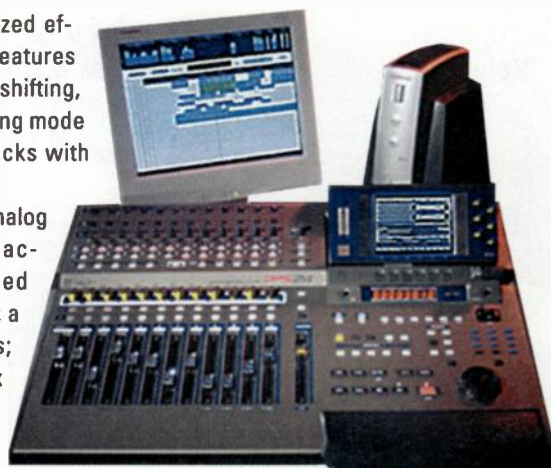
Thirteen 100 mm motorized, touch-sensitive faders (12 channels and 1 master) control five fader banks. The DPS24 provides scene and dynamic automation. Akai's Q-Link navigation lets you input mix, effects, and EQ parameter changes in real time using dedicated front-panel knobs and the new Q-channel strip. A built-in USB port lets you connect the DPS24 to a computer so you can control it using the *ak.Sys* software.

The mixer offers 12 input channels that you can use simultaneously. Each channel includes level, pan, dynamics processing, 3-band EQ with a sweepable mid and variable Q, solo, and four pre- or posteffects sends. The DPS24 features a 4-bus effects processor with a real-time pitch corrector, reverb, chorus, delay, phase shifter, flange, and multiband compressor. An effects

library lets you store customized effects settings. Track-editing features include time stretching, pitch shifting, and bpm matching. Track Editing mode provides a view of stereo tracks with stereo waveform viewing.

The 20-bus mixer offers 28 analog inputs: 24 combo jacks that accommodate XLR and balanced and unbalanced 1/4-inch inputs; a pair each of RCA tape inputs; and two unbalanced 1/4-inch aux inputs. Each channel also has separate balanced 1/4-inch inputs; the first four provide balanced inserts, which can connect external mic preamps directly to the A/D converter, bypassing the gain stage. You get an additional unbalanced 1/4-inch high-impedance input for guitar and bass. A pair of optical connectors that support stereo S/PDIF or eight channels of ADAT Lightpipe I/O, and jacks for Word Clock I/O and MIDI In, Out, and Thru are also included. The DPS24 supports MIDI Clock and MTC as well as Control Change messages for dynamic automation.

Analog outputs are two pairs of balanced 1/4-inch stereo master outputs for



accommodating near-field and main monitors; a pair of unbalanced 1/4-inch outputs for talk back; and a pair of 1/4-inch stereo headphone jacks on the front panel with independent level controls. A 1/4-inch jack accommodates a footswitch or an ADAT LRC remote control. The DPS24 offers a built-in talk-back mic. A jack for an ASCII keyboard lets you name tracks and projects. Akai Musical Instrument Corporation; tel. (800) 433-5627 or (817) 831-9203; e-mail [info@akaipro.com](mailto:info@akaipro.com); Web [www.akaipro.com](http://www.akaipro.com).

## ▼ E-MU XL-7 AND MP-7

The XL-7 and MP-7 (\$1,695) offer sound sets (based on samples from E-mu's Extreme Lead and Mo'Phatt modules, respectively) in tabletop units with built-in sequencers, arpeggiators, and real-time controllers. You can also rackmount the instruments. What's more, the knobs and buttons can serve as controllers for external MIDI gear.

The synthesis architecture is identical to that of the Proteus 2000. Both units feature 128-note polyphony and 16-part multitimbral capabilities. You get 32 MB of sounds with more than 1,000 sampled waveforms in ROM; if you need more, you can fill the Command Station's ROM expansion slots for as many as 96 MB of additional samples. Eleven ROM cards are available, ranging in price from \$249 to \$395. You can burn your own ROM cards from an E-mu E4 Ultra sampler.

Sounds can be shaped using any of 50 types of 6th- and 12th-order filters. In keeping with the unit's groovebox orientation, you get more than 100 synthesis



parameters to sync to bpm or external MIDI Clock.

The built-in sequencer lets you record in real time, step time, or with classic beatbox-style grid recording. Songs are constructed by linking patterns in a cue list, and Mute and Select buttons allow

you to play back or remove patterns on the fly. Pattern-editing tools include copy, cut, paste, quantize, and swing.

You get more than 40 knobs and buttons and a touch strip for real-time control; you can freely assign each of those to a different MIDI channel and Control Change message. The units support 32 MIDI channels, so you can control built-in sounds and external devices simultaneously. You can store different controller configurations in any of 64 memory

locations. The units feature 13 polyphonic, velocity- and pressure-sensitive pads; pressure sensitivity can be mapped to any MIDI control messages. You can also input MIDI data with an external MIDI controller. Analog outputs are on six balanced 1/4-inch jacks. The XL-7 and MP-7 also come with a coaxial S/PDIF output. E-mu/Ensoniq; tel. (831) 438-1921; e-mail [info@emu.com](mailto:info@emu.com); Web [www.emu.com](http://www.emu.com). ●



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**AKAI YAMAHA MACKIE. UBE MOTU BOSS PRS**





By Gino Robair



## WEB SITE OF THE MONTH

Assembling an analog modular synthesizer requires careful planning. You don't just have to determine which modules you want and can afford; you must also design a layout that meets your ergonomic and structural needs. One challenge you'll likely face is modules that vary in width—determining the position of the modules in a 19-inch rackspace can be difficult. Andrew Parker's wonderful Modular Planner ([www.modular-planner.com](http://www.modular-planner.com)) provides the perfect solution.

Using a modified version of code originally written by Mike Perkowitz for a Doepfer A-100 planner, the Modular Planner calculates rackspace requirements and the price of your proposed system. Five synthesizer companies are represented: Analog Systems, Doepfer, Serge/Sound Transform Systems (STS), Synthesis Technology, and Synthesizers.com. Planners for Analog Solutions and Modcan are in the works.

For each manufacturer, the Modular Planner presents a concise list of modules and prices on one page, making it easy to plan your instrument. That is especially important for anyone interested in a Serge/STS system, because there are no online resources for Serge/STS's products.

Modular Planner lets you assemble as many as three rows of modules. Once you have chosen how many rack-

spaces you want to fill, which modules you want, and their order in the racks, the Modular Planner calculates how much space your planned system requires compared with the amount of space available. The planner shows you the layout and gives you the cost (based on the manufacturer's list price). If your proposed layout doesn't meet the rack requirements, simply reorder the modules and recalculate until your system fits.

If you're unfamiliar with any company covered in the Modular Planner, spend some time building a fantasy system with their modules. When the layout is calculated, you will be shown JPEGs of the modules. You can print the layout for reference or just marvel at the sea of knobs and switches.



## DOTDOTDOT.COM

The Rhodes Super Site ([www.fenderrhodes.org](http://www.fenderrhodes.org)) is an online resource for information about the ubiquitous electric piano the Rhodes (also known as the Fender Rhodes). Invented by Harold Rhodes (1910–2000), the instrument became known as the Fender Rhodes in 1959 when Leo Fender bought the company and released the Piano Bass, made famous by Ray Manzarek of the Doors. The Fender Rhodes has appeared on countless records and for years was the instrument of choice for artists such as Chick Corea, George Duke, Herbie Hancock, Stevie Wonder, and Pink Floyd's Rick Wright. The Rhodes Super Site contains the Rhodes service manual, the Stage preamp schematic, a variety of technical notes (such as those for repairs and modifications), a list of technicians worldwide, and sources for parts. . . . The sound of England's inexpensive electronic musical toy, the Dubreq Stylophone, has been re-created on the Web. The Virtual Stylophone V1.01 ([www.reelsounds.com/styloflash.html](http://www.reelsounds.com/styloflash.html)) is a Flash-based interface that lets you play all 20 notes of the Stylophone keyboard. Although the Virtual Stylophone doesn't let you switch on the Organ or Vibrato effects, it does let you experience this popular, though somewhat cheesy-sounding, item firsthand. . . . Finding a name for a band or record label is one the most difficult chores musicians face. For online inspiration, visit WordLab ([www.johncage.com](http://www.johncage.com)). You can search the WordLab database by category (acronyms, cars, rock bands, romance novels) or by keyword. The results are word combinations that are sometimes strange, silly, rude, or completely cryptic. However, the results can be used free of charge (though there is no guarantee that someone else hasn't





used them first). . . . Online comparison shopping for gear is the impetus behind **Gearbeat** ([www.gearbeat.com](http://www.gearbeat.com)). You can browse the site by manufacturer or instrument to find the best prices for the item you want. Gearbeat gives you results from four of the biggest online retailers: Mars Music, Music123, Musician's Friend, and Sam Ash. The site also includes links to reviews and lets you create a wish list and store it on the site.

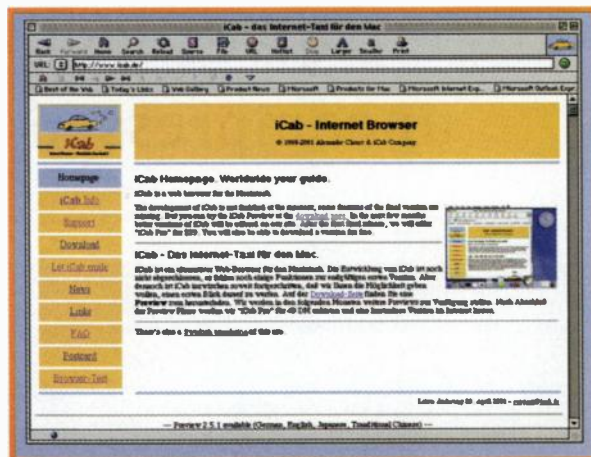


## WEBCAST

The Internet has a huge amount of information, yet it often seems like few sites offer quality listening and viewing content. Nevertheless, a wealth of independently produced underground and noncommercial content, often focusing on the bizarre and obscure, can be found at Supersphere ([www.supersphere.com](http://www.supersphere.com)).

Supersphere's site is divided neatly into seven sections: Clubtronic provides concert footage in a number of genres, including avant-rock, country, jazz, international, and hip-hop; Spherevision is a source for film and video footage; Radiomatica features DJs spinning their wares; Zinetropa has information about magazines and books; Spherepolitic carries political content; Europe covers events across the Atlantic Ocean; and Mediamix offers film and music reviews. The content at each destination is decidedly unusual, but the information presented is unique and sometimes controversial.

For example, Spherevision's list of hard-to-find low-budget films includes John Heyn and Jeff Krulik's classic documentary about Judas Priest fans, *Heavy Metal Parking Lot*. Imagine using your home-video camera to informally interview concertgoers in the parking lot before a local rock show.



The result is more disturbing than you can imagine, but it is required viewing for anyone interested in 20th-century sociology. To strike a balance, Spherevision also includes Krulik's follow-up, *Neil Diamond Parking Lot*.

Other notable tidbits on the site include an interview with filmmaker Penelope Spheeris (*The Decline of Western Civilization*, parts I–III); concert footage of English saxophonist John Butcher, American power-instrumentalist Don Caballero; Dutch avant-punk band the Ex; and just about everything in Spherepolitic. Some will find Supersphere seditious and dangerous—you be the judge.



## DOWNLOAD OF THE MONTH

Tired of dealing with the limitations and instability of your Web browser? The German company iCab has an alternative. *iCab* 2.5.1 ([www.icab.de](http://www.icab.de)), short for Internet taxicab, is a Mac-only browser that is compact (it takes up 1.2 MB of storage space and needs only 4 MB of RAM), stable, and simple to use. It offers image and cookie filtering as well as the ability to bookmark frames.

Created by Alexander Clauss to run on an Atari computer, *iCab* uses Mac OS Runtime for Java (MRJ), Apple's implementation of Java Virtual Machine. That gives *iCab* greater stability than its competitors when it comes to running Java applets and showing Web pages. To prove its point, *iCab* has a browser test on its Web site to determine whether your browser can accurately display what *iCab* thinks are the most important aspects of HTML 4.0.

*iCab*'s designers have ensured that the HTML support is rigorous. In fact, *iCab* lets you check whether a Web page meets HTML 4.0 requirements. For example, the browser includes a face in the upper-right corner: if the face is smiling, the page you are viewing conforms completely to the HTML 4.0 specifications; if a sad face appears, click on it to get a pop-up Error Report detailing each nonconforming aspect of the page.



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Take a good look at the MRS-1044. Its power and simplicity bring the spontaneity back to digital recording. While you may not be able to see many of the dozens of features that make it so incredible, its greatest asset is the way they all fit together. It's the Zoom of desktop recorders.



**No manual required:** The MRS-1044's logical control surface makes it simple to record, edit and mix your songs. Large, logical controls and clear displays make it quick to get around with no learning curve. But just in case, the owner's manual it ships with is brilliant.

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**It's a bridge:** We're talking full MIDI capabilities together with digital audio. There are programmable stereo drums and bass on their own tracks. Their sound — *real*.

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**It's well connected:** The MRS-1044's open design provides enough ins and outs to satisfy any session. Phantom powered XLR balanced, 1/4 inch unbalanced inputs, stereo RCA analog outs, S/PDIF Optical out, MIDI and a slot for add-in SCSI and USB! No kidding.

**Zoom audio quality:** The MRS-1044 gives you Zoom's legendary audio quality with remarkably smooth, clean 24-bit A/D and D/A converters and 44.1 kHz bit resolution.

**More questions?** Obviously there's more than we're telling you here but we think we've already got your attention. With the MRS-1044 all you'll need is inspiration. Good luck.

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The current beta version of *iCab* is free, though it times out in October 2001. However, that should give you enough time to explore its various features, particularly by checking out the heartiness of your own Web pages. When the finished browser is made available, it will have two versions: *iCab Pro* will cost \$29 to download, and the lite version is expected to be available for free.



## BAND ON THE WEB

Even as dime-a-dozen rock-guitar heroes come and go with amazing speed, Nels Cline ([www.nelscline.com](http://www.nelscline.com)) remains one of the most innovative guitarists in the United States. Cline is as at home playing jazz as he is playing rock, and he is as likely to play his instrument with a toy ray gun as he is to play it with a pick.

His formidable technique and unique playing style have led to numerous important collaborations. For example, Cline has recorded with Thurston Moore of Sonic Youth, trumpeter Wadada Leo Smith, Minutemen bassist Mike Watt, and saxophonists Julius Hemphill and Tim Berne. His own projects garner unanimous praise from reviewers.

Although [nelscline.com](http://nelscline.com) has the usual pages found in a well-designed Web site (News, Calendar, Links, Discography, Gallery), the content allows Cline's personality to shine through, which is something surprisingly few band Web sites can boast. In his Tech Talk page, Cline explains the development of his current performance setup and gives advice about creating your own sound. On his Lists page, he notes 200 guitarists he admires (in no particular order) and offers examples of his eclectic listening tastes. Cline names as influences England's Derek Bailey, studio legend Glen Campbell, blues master John Lee Hooker, Indian slide-guitarist Brij Bhushan Kabra, and post-blues-and-funk genius James "Blood" Ulmer,

among many others. On his Praise page, Cline offers a tribute to the influential American guitarist John Fahey (who has an interesting site created in his honor at [www.johnfahey.com](http://www.johnfahey.com)) and links to the pages of several living artists he admires.

Cline's Web site is designed and maintained by bassist Devin Sarno, Webmaster for Thievery. Although it lacks listening examples of Cline at work, [nelscline.com](http://nelscline.com) serves as a fine example of a meaningful and enjoyable site. It's easy to navigate; the pages load quickly; and Cline's irresistible, no-nonsense personality comes through.



## WEB APP

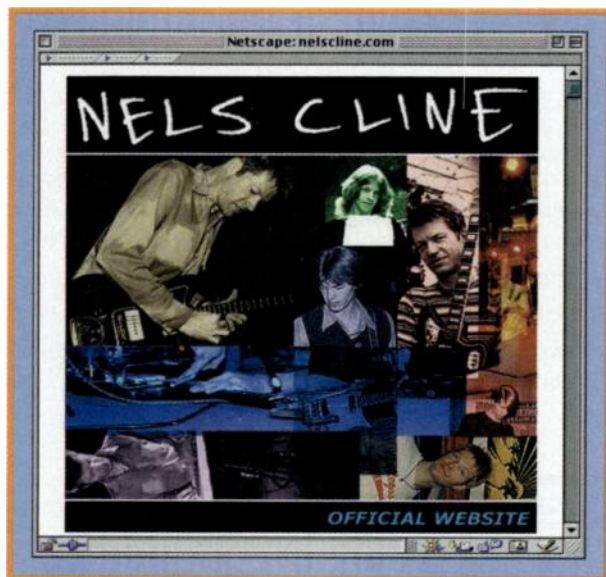
A number of Internet-related music-notation projects are in development, and the Standard Music Description Language (SMDL) is one of the most intriguing. Driving its maturation is the desire for score-related Internet resources that include more than just the notes on a page.

SMDL is built on the Standard Generalized Markup Language (SGML) and the Hypermedia Time-based Structuring Language (HyTime), a pair of text-based markup languages that let you create a hierarchy of logical elements to describe a document. That also allows SMDL to store musical content independently from layout information.

For example, an SMDL document includes not only the usual elements found in printed sheet music but also bibliographic and discographic content that is useful for cataloging purposes. SMDL, however, is still in the works: a number of elements having to do with the description of articulations, dynamics, and tempo must be determined before SMDL is finished and can become an internationally recognized standard.

The most recent version of the SMDL draft divides musical works into four conceptual domains: logical, gestural, visual, and analytical. The logical domain includes structural elements such as pitch, note groupings, and duration. The gestural domain describes how the elements in the logical domain should be expressed in performance. The visual domain includes typographic details of the score, and the analytical domain includes commentary about and analysis of information in the other domains.

To get an idea of how powerful SMDL can be, consider that it lets you define the pitch of a note in more than one way: you can define it in terms of frequency, choose it from a predetermined gamut of pitches, or specify a particular interval from a reference pitch. That kind of flexibility is well suited for Just Intonation and other microtonal uses. In practice, SMDL is being used by the Thesaurus Musicarum Italicarum project to mark up the scores found in Italian Renaissance music treatises into an electronic form for distribution on the Web and on CD-ROM. 🎵

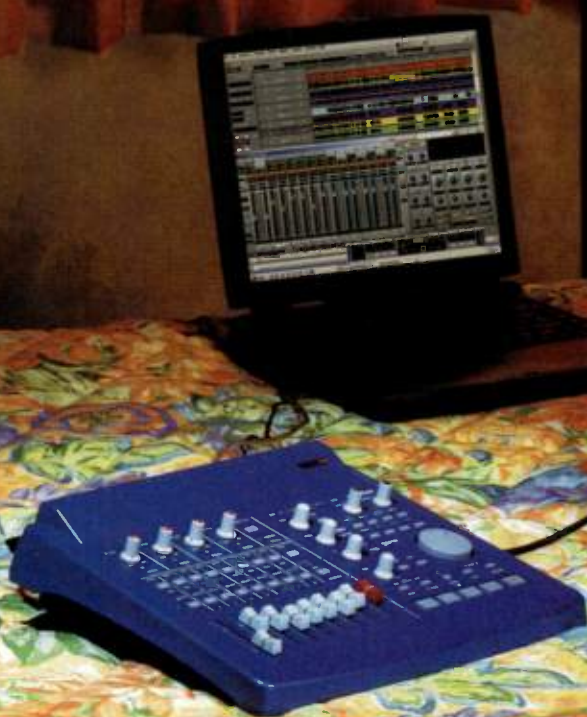


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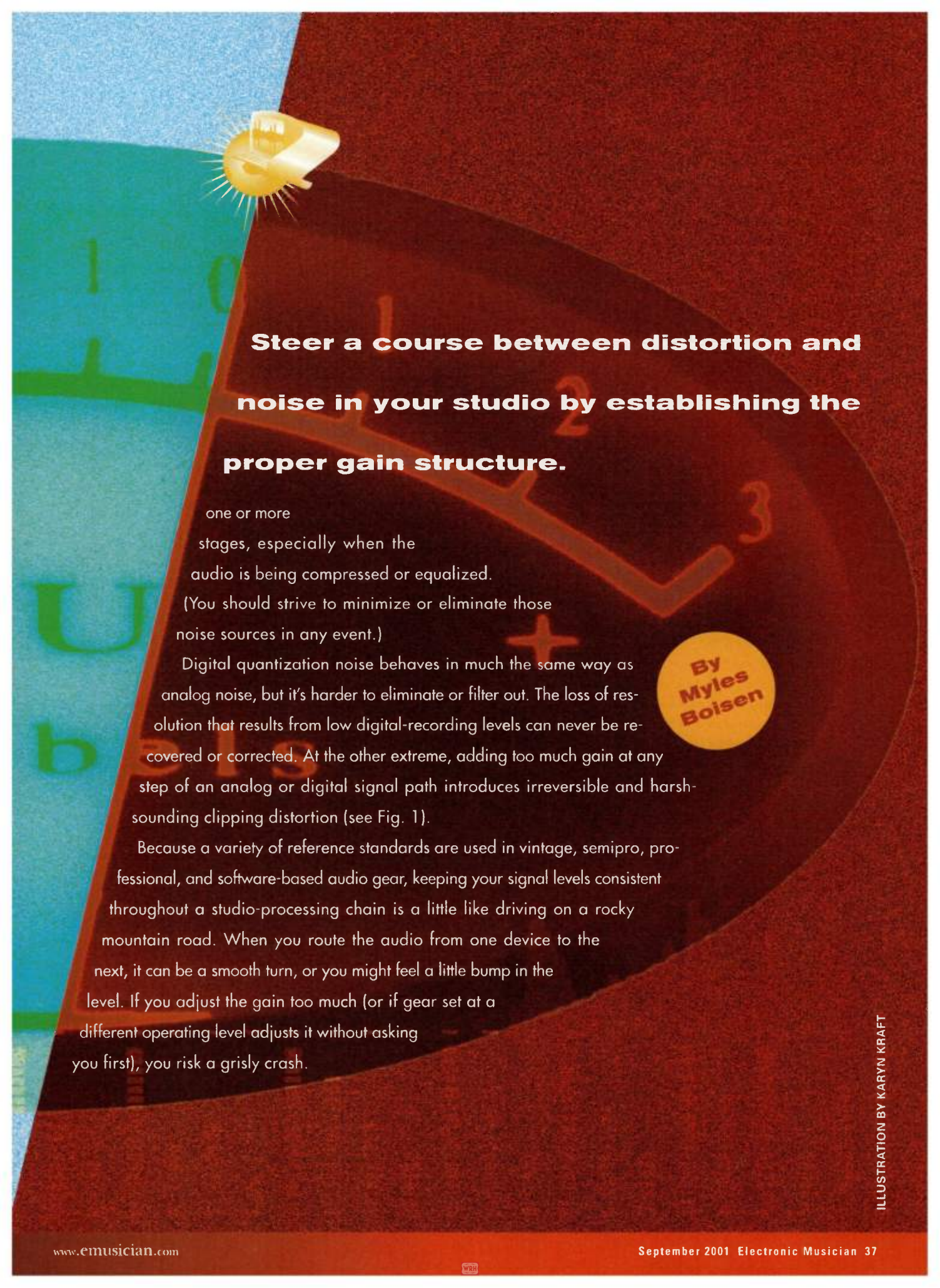
Here are a few of the innovative software developers who offer support for the US-428. Cakewalk, Sonar and more virtual synth support coming soon. See the TASCAM web site for the latest info.



# Staying out of the **Red**

In a perfect world, every device in your studio racks would integrate seamlessly with its neighbors, your levels would always be hot without a hint of distortion, and routing signals would be like driving down a smooth road on a sunny day. If that ever happened to me, I'd know for sure that I was about to awaken and find myself facedown on the mixer, drooling into the faders. At my studio, I have collected some of the least expensive and most incompatible audio gear ever made. Connecting that equipment is just the beginning of a never-ending set of challenges. Once the signals start flowing through those rackmounted mongrels, it can be a long, bumpy ride down the treacherous road of gain staging. In any integrated recording and mixing studio, including uncomplicated cassette 4-tracks and self-contained digital-audio workstations (DAWs), maintaining optimal gain at each stage of the signal chain is crucial to the ultimate goal of clean, undistorted recordings. (Any point in the chain at which the signal level can be changed is called a gain stage.) If your signal dips too low at any stage, noise becomes part of the audio. In the analog domain, that noise—whether it's high-end hiss, radio-frequency interference (RFI), 60 Hz ground-loop buzz, or some combination of the three—is often amplified at





## **Steer a course between distortion and noise in your studio by establishing the proper gain structure.**

one or more stages, especially when the audio is being compressed or equalized. (You should strive to minimize or eliminate those noise sources in any event.)

Digital quantization noise behaves in much the same way as analog noise, but it's harder to eliminate or filter out. The loss of resolution that results from low digital-recording levels can never be recovered or corrected. At the other extreme, adding too much gain at any step of an analog or digital signal path introduces irreversible and harsh-sounding clipping distortion (see Fig. 1).

Because a variety of reference standards are used in vintage, semipro, professional, and software-based audio gear, keeping your signal levels consistent throughout a studio-processing chain is a little like driving on a rocky mountain road. When you route the audio from one device to the next, it can be a smooth turn, or you might feel a little bump in the level. If you adjust the gain too much (or if gear set at a different operating level adjusts it without asking you first), you risk a grisly crash.

**By  
Myles  
Boisen**

ILLUSTRATION BY KARYN KRAFT



# Staying out of the Red

## ON THE LEVEL, NEVILLE

Fortunately, that motoring scenario includes a centerline designed to keep you from running into a mountain or careening off the side. Within the analog domain, where most audio signals originate, look for a zero mark—either 0 VU on a VU meter or 0 dB on an LED meter, fader, or knob (see Fig. 2). If you steer the level toward zero (allowing for normal fluctuations in dynamic level), your signal will have a safe ride to its final destination.

The zero calibration of a device is referenced to its internal operating level. A sine-wave signal that produces a zero-level reading on a compressor's output might show up as a different level on the meter of a multitrack tape machine to which it is routed. Patch that signal from tape to a DAW, and you'll get yet another meter reading.

Theoretically, a zero reading on a device's meter indicates a specific AC voltage within a unit, calibrated to one of two prevailing audio standards. The professional audio standard is +4 dBu. An analog device calibrated to that level references its 0 dB meter reading to an input/output voltage of 1.23 VRMS, and the connection is generally balanced. Stereo equipment, and some home-recording gear, is referenced to the consumer-level standard known as -10 dBV, in which a 0 dB meter reading

indicates an input/output voltage of 0.316 VRMS and the connection is typically unbalanced. (See "Square One: Decibels Demystified, Part 2" in the August 2001 issue for more about those standards.) When interfacing both kinds of equipment, it's important to know there is an 11.8 dB voltage discrepancy between -10 dBV and +4 dBu reference levels.

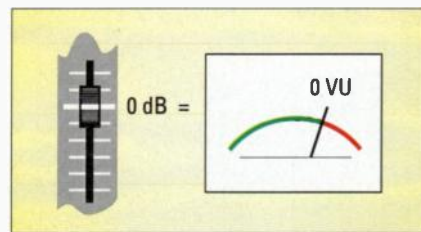
Tape-machine inputs are referenced to -10 dBV or +4 dBu (some include inputs for both), but their meters are commonly adjusted so that 0 VU actually indicates a level that is 3, 6, or even 8 dB higher than the reference level. That convention lets engineers print maximum levels on tape without continually pegging the meter. Film, video, and broadcast equipment, especially older types, may also have unique reference level requirements and other quirks.

If the devices in your studio are the same type (-10 dBV or +4 dBu) and each one is properly adjusted and performing no gain changes, a 0 dB test tone applied to the first unit's input should appear at the final stage as a 0 dB level (see Fig. 3). But remember, I'm speaking in theory. In the real world, components age or aren't precisely calibrated to begin with, and somewhere in your chain is probably a box of the other type that you can't do without.

## GO WITH THE FLOW, JOE

The initial source device, which is the first and most important gain stage, also has the greatest impact on the overall signal-to-noise ratio. A careful level adjustment there—well above the noise floor yet conservatively below clipping—will result in a clean, healthy signal throughout the rest of the chain as long as you intelligently use devices with different levels and observe the principle of unity gain.

Unity gain is a simple concept. When the input and output levels in a device are equal,



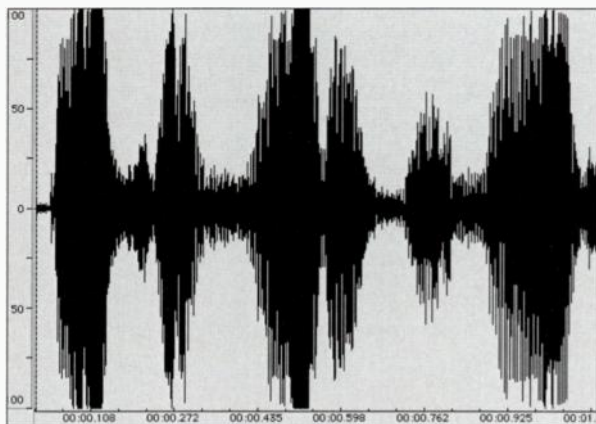
**FIG. 2:** If everything is properly calibrated, a 0 dB setting on your mixer's fader should result in an average signal level of 0 dB or 0 VU all the way through your signal chain.

resulting in no net gain or loss (technically, a gain ratio of one), that unit is operating at unity gain. The zero mark on a mixer's fader indicates unity gain between the corresponding circuit's input and output. Running gear at or near unity gain preserves the optimal signal-to-noise ratio of the source and downstream devices.

If your studio is set up and calibrated for one operating level (-10 dBV or +4 dBu) and you follow the principle of unity gain (even with heavy-duty processing devices such as compressors and equalizers), you'll have few problems establishing proper gain staging. However, the reality is that most personal studios, and some world-class facilities as well, use a combination of -10 dBV and +4 dBu equipment. That mismatch is where most analog gain-staging woes arise.

ADAT, DTRS (the Tascam DA-88 and its siblings), and DAT machines usually offer -10 dBV and +4 dBu input options with dedicated connectors to eliminate confusion (see Fig. 4). Connector types aren't strictly standardized, but RCA jacks typically carry unbalanced -10 dBV analog signals, and 3-pin XLRs or proprietary multipin connectors commonly carry balanced +4 dBu signals. Quarter-inch connectors (TS or TRS) are often used in the shadowy nether region, where mixed levels with balanced or unbalanced lines coexist. Unlike their analog cousins, no level differences exist between the two common digital connections: S/PDIF (RCA jack) and AES/EBU (XLR connector).

In my experience as a mixed-level signal herder, it's easiest (though not essential) to keep signals consistent at -10 dBV or +4 dBu throughout a chain.



**FIG. 1:** At any point in the signal path, too much gain can result in clipping. Once it's recorded, there's no way to eliminate distortion.



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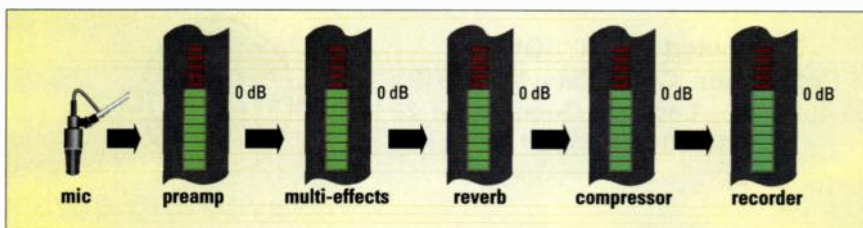
# Staying out of the Red

My main multitrack recorder—a Tascam MS-16, 16-track analog tape deck—offers –10 dBV and +4 dBu ins and outs. My mixing board, a Soundcraft Spirit, is set up to run at –10 dBV, with mix bus outputs referenced to +4 dBu. (The deck that I use for mixdown or mastering has +4 dBu inputs.) Accordingly, my tape returns, board, and reverbs normally run at –10 dBV. The mixer's channel inserts are also –10 dBV, and consequently, a lot of the rack gear usually used for mixing operates at –10 dBV.

However, I also have many mic preamps and compressors that I like to run at +4 dBu directly into the tape machine, bypassing the board and any extraneous connections. In situations like that, gear with switchable –10 dBV or +4 dBu levels is obviously a godsend, and I will gladly take a trip to the back of my rack to change input or output level switches when necessary. Nonetheless, combining mixed-level gear in a chain is certainly not out of the question and can still result in pristine audio quality. One particularly handy device in that regard is the Ebtech Line Level Shifter ([www.cymation.com](http://www.cymation.com)), which converts –10 dBV to +4 dBu and vice versa (see Fig. 5).

## STEP UP THE GAIN, JANE

I rarely worry about decreasing a signal from a +4 dBu output to a –10 dBV input. Remember that zero on a –10 dBV unit is about 12 dB less than zero on +4 dBu equipment. If that arrangement produces a distorted signal, attenuate the output level of the +4 dBu device by 10 or 12 dB; that should solve the problem with minimal impact on the audio quality.



**FIG. 3:** Ideally, a 0 dB signal level at the signal chain's first stage equals a 0 dB signal in each device through the last stage.



**FIG. 4:** Some equipment, such as the Focusrite Platinum Compounder, offers maximum flexibility by letting you switch between –10 dBV and +4 dBu inputs.

However, I'm less carefree about stepping up signals from –10 dBV devices to those operating at +4 dBu. When that gain change is unavoidable (for instance, from a –10 dBV keyboard to a +4 dBu compressor, or mastering from a consumer-level recorder to a pro deck), I step up the signal in one of two ways: boosting the internal amplifier of the source device or patching in another unit just for amplification.

Boosting the internal amp of a –10 dBV device by 12 dB is generally not the best way to go; it can substantially raise the noise level and the signal. In addition, the device may not have enough internal amplification to reach the required level. Finally, overdriving the –10 dBV device's output amplifier beyond its available headroom results in clipping. When that happens, a meter on the downstream +4 dBu unit's input stage will read at or below zero and still sound distorted because the –10 dBV unit doesn't have enough output voltage to drive it at an optimal level. The far better approach is to use an external amplifier to boost the level of the –10 dBV device by 12 dB.

Returning to my Soundcraft board for a moment, inquiring minds might ask, "If the board has –10 dBV inputs, inserts, and effects sends and +4 dBu mix outputs, isn't there a step up involved?" Yes, but in that case, the console's high-quality amplifiers provide a gain boost with little extra noise. Another factor is that the signals coming

from my tape machine, referenced to –10 dBV, can easily have peak values from 10 to 20 dB above zero. That brings the general signal level at the faders within range of 0 VU at +4 dBu.

Once you become adept at analog gain setting, cautiously raise levels through your system to take advantage of the various devices' headroom. When you're ready to do that, though, remember that the weakest gain link in the chain (invariably a –10 dBV device) will limit the system's headroom. When you advance to that point, you will think of zero calibration as a guideline, but never an absolute or universal value.

## WATCH THE METER, PETER

Setting the level controls of all the devices in a signal chain is a balancing act; for example, if you increase the level at one point in the chain, you must decrease the level somewhere downstream to maintain a constant average signal level throughout the chain. (The opposite is also true: if you decrease the level at one point, you must increase the level somewhere downstream to maintain a given signal level.)

In general, try to avoid setting any input or output-level control to its maximum value, which causes the circuit to operate at the extreme of its range and invites distortion and increased noise levels. Keep most gain controls somewhere in the middle of their range, which lets the circuits operate in their most linear region, minimizing the potential for clipping distortion and maximizing the signal-to-noise ratio. (That rule has some exceptions.)

Typically, the first gain stage in the chain is a mic preamp or an electronic source, such as a synth, sampler, or CD player. Most electronic musical instruments don't offer output metering, nor do some mic preamps (even fully professional ones), which makes it difficult





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## Staying out of the **Red**

to set their average output levels to 0 dB. In that case, follow the signal flow to the next downstream device—typically a compressor, recorder, or mixer—and set the initial gain according to what those meters tell you.

If you route the output of the source device directly to a tape deck that has been calibrated to accurately reflect signal levels on its meters, simply use those meters to set the output level of the source. It's important to match the reference levels of both devices (that is, -10 dBV to -10 dBV or +4 dBu to +4 dBu). If the reference level of the source does not match that of the deck, take steps to correct the mismatch.

On the other hand, if you send the output from the source into another device with the capability to change the level, such as a compressor or mixer, that device's meter might not give you a clear picture of what's going on. For example, if the input level of the downstream device is set very low, its meter might show a level well below zero, even if you crank the output level of the source to its maximum, which increases the potential for clipping and noise. The problem is compounded if you try to bring the meter reading up by boosting the output level of the downstream device to its maximum.

That is especially important in a mixer, where there are several gain stages before the signal reaches the output meters (input gain/trim, input fader, subgroup output, main output). If the mixer includes a meter bridge with input-level meters, you still have to think about the effect of the input gain/trim and fader on the meter reading.

Most +4 dBu devices have ample headroom to handle signal peaks above +20 dBu, but you can often hear clipping distortion at lower levels. The most common reason for audible clipping at levels that appear acceptable is inaccurate metering. VU meters are particularly slow to react to transients, which makes them unreliable for gauging fast-rising peak-voltage levels. Peak





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## Staying out of the Red

LED meters are more reliable in that regard, and they can be calibrated to indicate clipping, levels above clipping, or a "safety zone" from 3 to 6 dB below the onset of clipping. If a manufacturer's specifications don't address that issue (and even in the rare cases when they do), setting the levels according to peak-level meter readings involves trial and error.

Another factor that complicates level setting by the meters is asymmetrical waveforms. Speakers, drums, and other common acoustic sound sources tend to move equally far in both directions as they vibrate, generating electrical waveforms that have equivalent positive and negative voltage values. Those waveforms look symmetrical when viewed on an oscilloscope or DAW screen.

However, some vocalists and most brass instruments and saxophones generate waveforms that are decidedly asymmetrical with far greater negative voltages when viewed onscreen (see Fig. 6). Older peak meters designed to read only positive voltage may not accurately reflect the level of those signals, letting the wave's negative voltage component (which may be double the indicated voltage) clip and produce audible distortion. Some signals, such as

drum transients, mask some distortion, whereas the identical amount of distortion is easily audible in a piano or nylon-string guitar note.

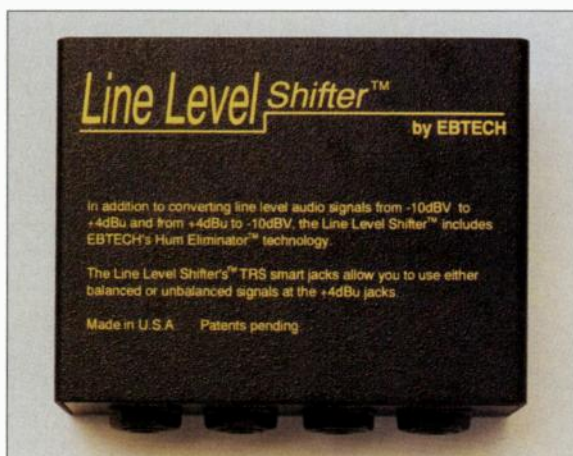
### DOWN AND DIRTY, GERTIE

When routing a microphone signal through a mixer, it is standard practice to set the channel fader at 0 dB and send the signal from the direct or subgroup outputs to the destination recorder. The direct signal path is simple, and the input gain/trim control is the only gain stage that needs to be adjusted.

In that scenario, gain through the mixer channel is commonly monitored by engaging the channel's prefader level (PFL) or solo button, which routes the selected channel to the monitor bus and displays the level on the main stereo meters. On most mixers, it is also possible to route an individual channel to a subgroup for level-setting purposes, even if that signal is sent out of the board through the direct output. Many modern studio mixers include signal-present or peak-overload indicator lights on each channel to aid the gain-setting process. In addition to using those indicators, check the level at the recorder for any track being recorded.

When you're mixing one or more channels to a subgroup output, gain-staging procedures become more complicated. First, it's important to establish the gain through each input channel by setting the channel fader at 0 dB and adjusting the input gain/trim control to maintain a usable signal level as indicated by the board's meters. Once that's done, assign the channels to the appropriate subgroups; their faders should be set to 0 dB.

To create a mix of two or more channels in a subgroup, simply adjust the channel faders and perhaps bring the overall subgroup level up or down. Use the meters on the subgroup and the destination recorder to determine the subgroup



**FIG. 5:** The Ebtech Line Level Shifter changes the signal levels of eight outputs from -10 dBV to +4 dBu and vice versa. It also automatically converts from balanced to unbalanced (and back again), depending on whether you use a TRS or TS plug.



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master level. Once the submix is set, all faders should ideally be within  $\pm 10$  dB of zero. If not, adjust the input gain/trim to bring the channel fader into the recommended range and maintain an optimal signal-to-noise ratio.

Within a mixer are several other gain stages related to the auxiliary effects buses. Those controls are typically rotary pots that may have a central or unity-gain setting flanked by numerical plus and minus values, or they might use a simple one-to-ten numbering scheme. In addition to aux-send controls in each input channel, each aux

bus should also have a master-send control and an after-fader level (AFL) or solo button that lets you check the output signal to make sure it's within a usable range (that is, an average level near 0 dB).

Most engineers maximize the headroom within outboard reverb units by setting input and output controls to their full 100 percent levels. In most instances, they also set the mix controls (which adjust the ratio of dry to processed sound) to full or 100 percent "wet." Most digital effects processors have their own metering with clear peak-level indication. For best audio quality, send the hottest possible signal to the units but avoid peaking and listen carefully for distortion.

The final gain stage in the aux-effects chain is the effects return at the board. That control can be a rotary pot or fader, and it adjusts how much effected signal is added to the stereo mix bus. In most cases, that effected signal is far less than a 0 dB level. Effects-return levels must be adjusted by ear rather than by metering. Solo or AFL switches at the effects return let you determine if the processed signal is undistorted and at a usable level. Comparing the effects-send signal to the return signal can also supply valuable insight into the character of an effects program. In addition, such a comparison can indicate overall gain changes through the unit, which may be due to reference-level mismatches or extreme regeneration in delay effects.

Compressors also present unique gain-setting challenges. As a general rule, you should compensate for the amount of gain reduction indicated on a compressor's meter by setting an equivalent boost at the makeup gain control. For example, if the compressor regularly cuts a signal by  $-4$  dB, a makeup gain boost of  $+4$  dB keeps the peaks at roughly the same level through the unit. The signal will sound louder because the dynamic range is reduced and low-level signals are boosted. But in terms of peak metering, the maximum signal levels should be the same from input to output and more consistent as well. At extreme compression settings, that method may not be so predictable, and you should watch the meters in a downstream device after the compressor.

### FIDGETY DIGITS, BRIDGET

When it comes to setting digital levels, 0 dBFS (decibels full scale) is an absolute ceiling value that should never be reached until the final stage of mastering. At that level, the highest peaks of the waveform are represented by binary numbers consisting of all ones. Think of 0 dBFS as the guardrail on your digital gain-staging road; it's always there to guide you, but you sure don't want to risk running up against it!

There are various philosophies about what levels should be maintained when

### ANOTHER APPROACH

Another approach to gain staging also works well in the studio. The goal is to minimize the audible noise level while maximizing the signal level at each gain stage. The procedure yields a wonderfully quiet sound system with plenty of signal level.

The idea is to work backward from the control-room amp to the mixer and aux effects and, finally, to the sources. EQ should be completely flat as you work through these steps.

1. Connect everything.
2. Set volume controls to minimum.
3. Power up all devices in order: instruments and preamps, effects, mixer, amplifier.
4. Raise mixer control-room volume to maximum; back off until noise disappears.
5. Raise amp level to maximum; back off until noise disappears.
6. Raise mixer master level to maximum; back off until noise disappears (hopefully, unity gain).
7. Raise each mixer subgroup fader to maximum; back off until noise disappears (hopefully, unity gain).

For each aux effect bus:

8. Raise effects mix or wet/dry con-

trol to 100 percent or full wet.

9. Raise effects input and output levels to 100 percent.
10. Raise mixer effects-return level to maximum; back off until noise disappears.
11. Raise mixer master send level to maximum; back off until noise disappears.
12. Raise each channel aux-send level to maximum; back off until noise disappears.

Adjust as needed for each channel during mix but try not to exceed that level.

For each mixer input:

13. Raise the mixer input fader to maximum.
14. Raise level of instrument or mic preamp to maximum.
15. Raise mixer input gain/trim to maximum; back off until noise disappears.
16. Lower input fader to unity gain.
17. Lower instrument or preamp level to minimum before playing.
18. Slowly raise instrument or preamp level to desired level while playing, as indicated on mixer or tape-deck meters.

—Scott Wilkinson



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# Staying out of the Red

mixing from analog to digital or recording from an analog board into a modular digital multitrack (MDM) or DAW. Like the producers of analog gear, manufacturers of digital equipment use various digital-reference standards meant to keep engineers from maxing out their dBFS levels when making analog-to-digital transfers.

The conventional wisdom is that 12 dB of headroom is generally acceptable in a digital-audio recording system. That means an average meter reading of 0 dB on an analog mixer's outputs should equate to about -12 dBFS on a digital meter (assuming that the mixer's out-

puts and the MDM's analog inputs are at the same reference level). I say "about," because no established reference-level standard exists within the industry for the crucial operation of converting analog audio voltage into digital ones and zeros.

Many equipment manufacturers reference 0 dB to -18 dBFS, whereas others set their standards from -12 to -24 dBFS. To keep overzealous recordists from pegging the meters (as they did in the old days of analog), some companies also include a safety margin—a few decibels of "hidden" headroom—between the 0 dBFS peak indication and the point of digital clipping. That lets you scoot along the mythical guardrail without scraping up your paint job.

Many MDMs offer -10 dBV and +4 dBu

inputs, and the smoothest ride is always on the road where your reference levels match. In many studios, outboard mic preamps referenced to +4 dBu run straight into digital recorder inputs, following the philosophy of a minimal signal path. That routing presents few gain-staging problems as long as you remember that such a mic preamp needs to provide roughly 12 dB less output when driving a -10 dBV input.

On rare occasions, I've found that a +4 dBu preamp running at its lowest output still provided too much level for a -10 dBV ADAT input, and it was not feasible to use the multipin +4 dBu Elco snake. In those circumstances, it is easiest to engage the pad switch (if one is provided on the mic or preamp) or physically move the microphone farther from

## INITIAL GAIN CALIBRATION

When setting up a studio system, start with the sources—in most cases, synths or samplers with -10 dBV outputs and one or more microphones connected to mic preamps with +4 dBu outputs. To ensure that the synths have adequate gain, connect their outputs to direct injection (DI) boxes and connect the DI boxes to mic preamps. (For mics and synths with DI boxes, it's best if the preamps have output-level meters.) If DI boxes are not available, connect the synths' outputs to the -10 dBV inputs on the mixer.

In that procedure, you will use one of the sources as a signal generator to set the levels throughout the rest of the signal chain. A test-tone generator with a known output level is more reliable for that purpose, but it's not pleasant to listen to for an extended period of time. A sustained keyboard chord is fine, as is a microphone in front of a radio or other compressed music source.

If you use a phantom-powered condenser mic, connect it to the preamp and apply phantom power first. Then, connect and power up all studio devices except for the final power amp or powered monitors. Set the gain on outboard devices to unity. Start with all mixer controls at minimum or detented settings; EQs should be flat or bypassed.

If you use an outboard preamp as the source, raise the gain so the preamp meter reads 0 dB. (If you connected a synth to the preamp, set the synth's output to the highest level that does not overload the preamp's input.) Connect the preamp directly to each outboard compressor, setting the controls for unity gain, no gain reduction, and 0 dB on the output meter. Any other outboard insert devices used in tracking (gates, equalizers, and so on) should also be calibrated in that manner.

Once it's been calibrated, the final device in the chain can be routed to one channel of the multitrack recorder to check its meter reading. The preamp's 0 dB level might not read zero on a digital or analog recorder's meter. For calibration or adjustment of the deck's input level, consult a qualified technician.

Next, route the preamp's output to an appropriate line input (not mic input) on the mixer. Set the mixer's channel, subgroup, and master faders to zero or unity; engage the channel's PFL or solo switch; and raise the channel's gain/trim control until the meter reads 0 dB. (Repeat for all other input channels.) At that point, the subgroups and master buses should read zero as well. If you're not using an outboard preamp, connect the mic or synth to an appropriate input on the mixer and follow the same procedure.

Connect the channel-direct outputs or subgroup outs to the multitrack recorder and check the levels on the multitrack meters. (As before, the mixer's 0 dB level might not read zero on the recorder's meters. For calibration or adjustment of the recorder's input level, consult a qualified technician.) Connect the recorder's outputs to the mixer's tape returns, engage the deck's monitor function, and adjust the mixer's tape-return levels so that they indicate zero on the mixer's meters after pressing the appropriate PFL or solo switch.

Connect the channel inserts to devices used for tracking or mixing. Generally, those devices are compressors, gates, equalizers, digital delays, and other single-channel effects not connected to an aux bus. Make sure the reference levels of those units match the mixer insert's operating level. Check for unity gain on the PFL or solo meters or by



the source. If that doesn't do the trick, the remaining options are to choose another mic or preamp with lower output level or to insert a compressor or other gain-reducing device between the preamp and recorder.

There is also the possibility that a -10 dBV unit, such as a keyboard or CD player, may be called upon to drive a +4 dBu input on a digital device. An intermediate line amplifier, such as the Ebtech Line Level Shifter or the internal amp in a +4 dBu mixer, is the best way to avoid step-up problems. The increase in resolution attained by keeping the signal as hot as possible generally outweighs the potential increase in noise you may get by boosting levels in that manner, especially in a 16-bit digital-recording format.

## FIX IT IN THE MIX, TRIX

Stereo mixdown to a digital medium such as DAT is another common procedure. When mixing from an analog console, remember that a signal reading 0 dB on the mixer's meter typically measures between -12 and -18 dBFS on the digital recorder's meter, depending on the analog-to-digital converter's calibration. If your program material has a wide dynamic range, set an average signal level of 0 dB at the mixer's master faders (once you've established proper gain staging throughout the rest of the board) and then play the selection from beginning to end, noting the highest peak level (not merely the average level) registered on the digital recorder. The peak-hold function on many digital meters is particularly

helpful for logging maximum levels.

After the level-checking pass, you may want to adjust the DAT's input level, keeping in mind that it's always good practice to keep peak signal levels 2 to 3 dB below 0 dBFS to retain the best resolution. If you find that one transient peak in your piece hits -2 dBFS and the rest of the program sits around -8 dBFS, consider compressing or manually fading the track with the offending transient. That lets you boost the entire mix level by 6 dB and utilize more available bits.

On average, a highly compressed rock mix might have only 4 to 8 dB of dynamic range. Transferring such a mix at 0 dB equal to -12 dBFS is a waste of perfectly good bits. For example, if the dynamic range of the mix is 8 dB, set

monitoring the channel level by ear while physically engaging and disengaging the insert connector from the mixer.

Set the inputs and outputs of all aux effects units at maximum and set the mix control at 0 percent (completely dry, noneffected signal). On the active mixer channel, set the individual aux-send levels at a repeatable midway point (for example, unity, 5 o'clock, or 12 o'clock). Raise the master aux-send control until the effects unit indicates a 0 dB level.

If a PFL or AFL meter is available to indicate the level at the mixer's master effects return, check it to make sure that a usable signal (that is, near 0 dB) is coming back into the board with the master effects-return control set between the midway and maximum points. Then, monitor those levels with the effects unit's mix control set to 100 percent. Various effects units will probably calibrate somewhat differently through those steps, but as long as levels are in the usable range (near 0 dB) without distortion, that should not be cause for alarm. Note the positions of all effects-send and -return masters so they can be preset before a mix.

Next, route the active channel to the 2-track mixdown recorder (DAT, CD, hard disk, or analog) and adjust its input levels so the deck's meters read zero when the mixer's stereo output bus reads zero. (An outboard sampler can be calibrated the same way.) To establish unity gain through the mixdown deck, connect the deck's outputs to the mixer's 2-track inputs (or other inputs if it has no dedicated inputs), record the calibration signal you're using, and then play it back and adjust the deck's output until the mixer's meters read 0. Make sure the reference level of the 2-track or sampler matches the mixer's output and 2-track input reference level (-10 dBV or +4 dBu).

During those procedures, it is possible (though not necessary) to monitor the audio signal with headphones, which can also be used to check the gain in any headphone mix buses following the procedures outlined for the aux buses. In addition, adjust and note comfortable levels through headphone distribution amps. Bear in mind that different headphones have widely varying efficiency ratings, and one brand or model may be much louder than another.

For the final stage, make sure your mixer's stereo master and control-room output faders are all the way down. Then, power up your main monitor amplifier(s). If the amp has gain controls, set them at 100 percent. Raise the mixer's main faders to zero and slowly increase the control-room level until a comfortable listening level is established. If a sound pressure level (SPL) meter is available, set the listening level between 80 and 90 dB. Clearly mark the position of the control-room master for future reference as a safe setting.

If the safe control-room setting seems low (say, below three on a pot marked from one to ten) or the monitors are noticeably noisy, you might want to attenuate the amp gain. If you do that, turn down both sides of a stereo amplifier by the same amount and test for audible stereo balance using a high-frequency mono source panned to center. In addition, be aware that trimming a power amp's gain lowers its headroom, which may interfere with transient response. Clipping distortion may also occur if the mixer has to overdrive the amp's input to achieve the desired listening level. For those reasons, most professionals run their amps at 100 percent and take care to keep the control-room pot at a conservative setting.



# Staying out of the Red

the DAT's input level so that 0 dB (the average level of the mix) corresponds to -6 dBFS, which lets the dynamic range vary by  $\pm 4$  dB while leaving 2 dB of headroom below 0 dBFS.

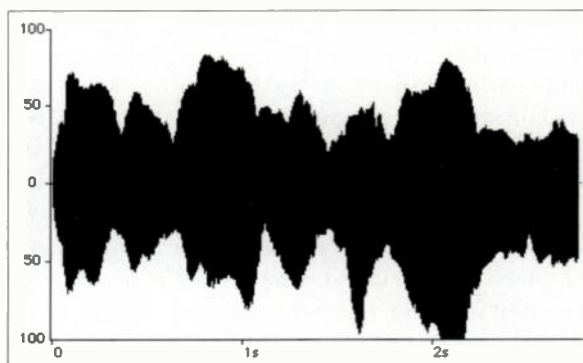
Whatever kind of mix you have, do not be afraid to nudge the level so that you have a strong average digital level and no peak goes higher than -2 or -3 dBFS. Don't forget to use your ears on the final product. Some digital meters are a bit slow; they can let a distorted transient slip by undetected if every sample of the incoming audio is not measured.

In an all-digital mix—whether from a digital mixer or within a self-contained recording and mixing DAW such as Pro Tools—pay special attention to digital headroom. In a 16-bit system, it's advisable to keep peak levels between -2

and -3 dBFS. Higher-resolution systems can reproduce a greater dynamic range, and peaks near -6 dBFS are acceptable in that case. The internal processing of a digital mixer might allow for extra headroom and longer word lengths, but its signal must ultimately pass through a digital-to-analog converter to be heard. Also, the ultimate destination is usually a 16-bit CD. Those facts often mandate a gain reduction at the output faders to keep the final level below the 0 dBFS ceiling, especially with dense multitrack mixes.

## TIME TO REVIEW, SUE

The best mindset for proper analog gain staging is to be aware of the po-



**FIG. 6:** Certain instruments and vocalists produce waveforms with greater negative than positive voltage. Some peak meters don't register a signal's negative voltage component, possibly resulting in audible distortion when you trust the meter's accuracy instead of your ears.

tential consequences of stepping the gain up or down in professional and consumer-level gear. Even if the analog portion of your studio is set up and precisely calibrated for only one reference level, you should still take the time to maintain and periodically check zero levels wherever possible in the processing chain, following the signal flow's direction.

Within the digital domain, it's equally important to maximize your levels, but keep the peaks at -2 to -3 dBFS at all stages before final mastering. It is also crucial to listen for distortion and noise at the end of an analog or digital signal chain, regardless of what the meters tell you.

To avoid nasty potholes and detours on the gain-staging road, steer your signals toward zero, keep your eyes on the gauges, and drive with your ears. Armed with the knowledge thus acquired, your signal-routing trip can indeed be like driving down a smooth, level road on a sunny day.

**Myles Boisen** ([mylesaudio@aol.com](mailto:mylesaudio@aol.com)) is a guitarist, producer, composer, and head engineer and instructor at *Guerrilla Recording and the Headless Buddha Mastering Lab* in Oakland, California. Thanks to Karen Stackpole, Bob Smith of BS Studios, and Lawrence Fellows-Mannion of Rance Electronics.

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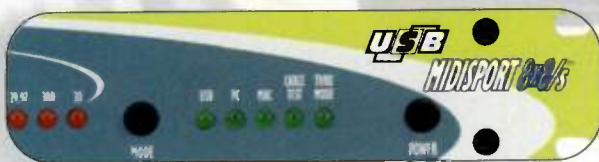
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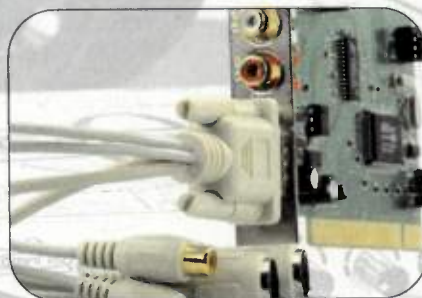


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\* Music Trades Magazine



# WEB MUSIC LAUNCHPAD

**G**rab your rocket pack. Nearly every month for the past few years, **EM** has featured articles on getting, putting, buying, selling, viewing, hearing, or making music online. By now, you probably have an inkling of the enormous benefits of showcasing your music on the Internet, but if you're like many musicians, you still haven't taken that next step and actually done it. Or maybe you've uploaded some tunes, but you aren't completely satisfied with the quality or response. Or perhaps you're looking to journey into the new frontier of interactive music.

Good news: whatever your interest in boosting your audio presence on the Web, this issue is designed to help. From "Construction Site," which explains the absolute basics of how sound moves around the Net, to "Special Delivery," a step-by-step recipe for building your own music site, this section strives to cover the topic from all sides. In the two-wrongs-don't-make-a-site category, you'll find the articles peppered with tips from other artists on what to do (and what to avoid) if you want to attract and keep fans online.

## IF THE BENEFITS, WEAR IT

The advantages of having your music on a global jukebox are undeniable. You'll enjoy low-cost promotion and distribution, a more direct connection with listeners, and a "demo tape" that's always cued up. Think of how many times you've met someone who wants or needs to hear your music—isn't it always when you've just run out of CDs? In those situations, it's frequently too awkward and time consuming to ask the person for a mailing address, but it's easy to jot down your URL. The savings in time, postage, and plastic coasters make the online approach even sweeter.

To take another example, people are leery of buying things they can't try out. If you're selling an original CD, posting previews of it on a Web site is an effective way to put potential buyers at ease. You may also find that the skills you pick up by building a site can easily turn into a significant source of side income. (Handy for the gear junkie in everyone!)

Finally, having a site shows that you're serious about your music, and it also can be fun. Upload a few grooves from your songs and let visitors rearrange them or suggest new directions for you. After all, the Internet has always been about accelerating the flow of ideas.

Although putting your music online may seem like a giant leap, it really just involves a series of small steps. So pick the topic that interests you, flip to the appropriate page, and get ready to blast off.

BY DAVID BATTINO

ILLUSTRATION BY DAVID BALL



A stylized illustration of a rocket ship launching into space. The rocket is depicted with a metallic, segmented body and a large, ornate fin. Bright orange and yellow flames are visible at the base of the rocket, indicating a powerful launch. The background is a deep green space filled with numerous small, glowing blue and purple star-like patterns. A large, bright orange planet is visible in the upper left corner. The text "BLAST YOUR MUSIC ONTO THE INTERNET!" is written in a bold, white, sans-serif font, slanted diagonally across the image from the bottom left towards the top right.

www.emusician.com



# construction site



ILLUSTRATION BY DAVID BALL

BUILD YOUR OWN WEB PAGE FROM SCRATCH

BY FRANK JONES



Showing your music online has never been so easy. Numerous services generate finished Web pages from your raw images, text, and sound files—often for free. (See “Working Musician: Keep It on the Download” on p. 116 for examples.) But if you’re like most musicians, you’ve invested too much effort in perfecting your recordings to be completely satisfied with a generic Web page. Fortunately, building your own custom Web site is easier (and cheaper) than ever. In this article, I’ll explain what you need to know to design a professional-looking and easy-to-use site that presents your music to the world.

## SEIZE YOUR DOMAIN

The first step is to register a *domain* that reflects your band or project’s name; the domain is the text between the “www.” and the “.com.” Registering is easy if your band has a unique moniker such as the Screaming Cats, but it is somewhat daunting if you’re called Business or Furniture. Don’t get frustrated if your band’s name is already taken. There are many ways to get around that, such as adding underscores or hyphens between each word or appending “music,” “online,” “site,” and so on to the end of the name. (Come to think of it, [www.furnituremusic.com](http://www.furnituremusic.com) has a nice ring to it. Too bad it’s already taken.) Perseverance and creativity are key, so get started immediately.

Several sites let you search for and register any “.com” name in one step. The Internet Corporation for Assigned Names and Numbers (ICANN) site has a complete list of accredited domain name registrars. Check that site first to avoid any fly-by-night scams (see the sidebar “Online Resources”).

## FIND A HOST

Once you have your domain name registered, you need to find an Internet service provider (ISP) to host the files that will make up your site. The ISP will store your files on a *server*, a computer dedicated to delivering Web pages to the Internet.

You might want to go with an established ISP such as Earthlink ([www.earthlink.net](http://www.earthlink.net)) or AT&T ([www.att.com](http://www.att.com)).

Both offer domain and site-hosting services for less than \$50 a month. AT&T even has a starter plan that includes domain hosting, ten e-mail accounts, and 100 MB of storage for \$25 a month. That is a great value, but local ISPs may offer even more competitive pricing. ISP World ([www.boardwatch.com](http://www.boardwatch.com)) is the definitive resource for finding the right ISP, local or otherwise. Note that some ISPs prohibit MP3 files or e-commerce, so check the conditions for each plan up front.

If you want to offer online music or video, plan to get at least 50 MB of server space. A 44.1 kHz, 4-minute MP3 file takes up about 3.6 MB at the standard 128 kbps compression setting; video files are even larger. (See “Special Delivery” on p. 74 for information about data compression.)

The Web also has quite a few free options for hosting your site, such as Yahoo’s Geocities.com. If you don’t care about having a URL like [www.geocities.com/screamingcats](http://www.geocities.com/screamingcats), you’ll be fine. The catch—and free stuff always has a catch—is that Geocities will display a pop-up ad anytime someone surfs by your site. That is definitely annoying, but free lunches are growing increasingly elusive. A sneaky compromise is to register your domain with an inexpensive service, such as GKG ([www.gkg.net](http://www.gkg.net)), that throws in a single-page site you can use to direct visitors to another site, such as your free Geocities site, automatically. One GKG package costs just \$9.95 a year.

## A SITE FOR MORE BUYS

You have quite a few options for selling your band’s CDs and other paraphernalia online. The easiest approach is simply to post your e-mail address and to conduct transactions informally. If you’re just starting out, chances are you won’t have huge numbers of visitors, so that approach may suit your needs. On the other hand, some visitors won’t be comfortable sending checks or credit card information to unknown sites. Start with e-mail and see how sales go and then expand if necessary. Implementing an automated

e-commerce system is difficult if you don’t have programming experience. If you’re up to the challenge, however, head over to *Wired’s* [Webmonkey.com](http://Webmonkey.com) or CNET’s [Builder.com](http://Builder.com) to brush up on your CGI skills.

A simpler option is to redirect visitors to a third-party site to buy your Screaming Cats sweatshirts and commuter cups. Yahoo has a supereasy plan called Yahoo Store; for \$100 a month, it takes care of everything for as many as 50 products. The look of the “store” is completely customizable, so it can be seamlessly integrated into your site. For the ultimate in hands-off retail, try [CafePress.com](http://CafePress.com). Its service prints and ships all items on demand, collects the payments, and takes a share of the profits. For those who just want to sell CDs, numerous sites such as Amazon and [earbuzz.com](http://earbuzz.com) are waiting to help.

If you want to go the all-digital route and avoid the expense of pressing CDs, consider MP3.com’s Payback for Playback proposition. If you sign up for a Premium Artist Service membership (\$19.99 per month) and post your songs to MP3.com, the site will pay you royalties based on how often the songs are downloaded. Popular artists can make \$5,000 to \$10,000 per month (check the MP3.com charts if you don’t believe it), so if your tracks are really hot, that could be the way to go.

## TOOLS YOU NEED

The primary code that underlies Web pages is called Hypertext Markup Language (HTML). Although quite a few graphic HTML editors are available, you’ll get the best results and be ahead of the pack if you take the time to understand the basics of how HTML and the Web really work. HTML is surprisingly easy to grasp. If it weren’t, the Web wouldn’t have caught on so quickly as a mass-communication medium. So don’t be afraid to try coding basic Web pages without the aid of a software-based editor. I’ve seen brilliant sites created with nothing more than Windows’ *NotePad* or Mac’s *SimpleText*.

Before you buy an expensive HTML book, check out a few Web-developer sites like [Builder.com](http://Builder.com) and [Webmonkey.com](http://Webmonkey.com).



## CONSTRUCTION SITE

Such resources offer vast amounts of wisdom on Web development using easy-to-understand tutorials. One last tip: use your browser's View Source function to take a look at the innards of your favorite Web pages. That is a great way to see how the pros build their sites.

### HTML EDITORS

As mentioned, you don't need to wrap your brain around code. Thanks to the enormous growth of the Web, a plethora of top-of-the-line professional tools are available for page building, led by Adobe's *GoLive* (\$284; Mac/Win) and Macromedia's *Dreamweaver* (\$299; Mac/Win). Both applications are almost as deep as today's sequencing environ-

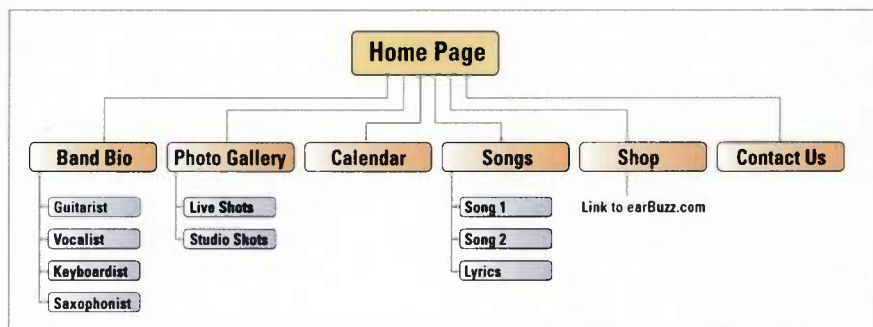


FIG. 1: Sketching a site map before creating your Web site can help ensure that no page is too many clicks away from any other.

ments, so be prepared to crack a manual and spend some time getting past the initial learning curve. Luckily, the documentation (especially *Dreamweaver's*) is gloriously detailed. Another excellent tool is SoftQuad's *HoTMetal Pro* (Win; \$129), which began as a souped-up coder's assistant and is now a fairly advanced WYSIWYG (what-you-see-is-what-you-get) editor. All three are excellent tools, but *GoLive* will probably

appeal most to beginners because of its integrated set of basic graphics and QuickTime editors.

Designers with more modest objectives may be able to get by with Netscape's freeware *Composer* tool (included with the full download of *Communicator*), 3Dize's shareware *Cool Page Pro* (Win; \$49), or CoffeeCup software's *HTML Editor* (Win; \$49).

Although Microsoft's *FrontPage* (Win;

## True blue.



### S.com plus Stereo Compressor/Limiter

It combines a feature-rich Compressor/Limiter, Expander/Gate and Enhancer offering precise control. And its logical front panel layout with extensive metering makes it easy to use. The *plus* is for its useful De-Esser that removes sibilance from vocals and reduces overly bright audio. Most importantly, S.com plus's audio path employs super low-noise VCAs with vast headroom and imperceptible distortion for transparency and sonic integrity.

And it carries S Class's assurance for intelligent design, superior functionality and unparalleled performance.

**AEG**  
Auto Envelope  
GENERATOR

**SKD**  
Smart Kn...  
DETECTOR

**EFR**  
Enhanced  
Frequency  
RECOVERY



\$149) will do a fair job of creating pages that work beautifully in *Internet Explorer* (surprise, surprise), the results don't always translate to competing browsers. If you don't care about 25 to 30 percent of your viewers, go for it. But you have been warned.

## GRAPHIC EDITORS

HTML editors cover the layout, architecture, and text aspects of Web design, but you still need a graphic editor to design and process your images before adding them to your pages. The granddaddy of all graphics tools is Adobe's *Photoshop* (Mac/Win; \$609), which is about as advanced as it gets for creating world-class graphics for print and the Web. Corel's *CorelDraw* and *PhotoPaint* (Mac/Win; \$549 for the set) are also solid tools and slightly less expensive.

However, Macromedia's *Fireworks* (Mac/Win; \$299) is quickly becoming the Web designer's tool of choice. It costs less than half the price of *Photoshop*

## JOIN THE RING

If your music falls into a category that other people might share, consider joining or even starting a Webring. Rings are maintained by users (called RingMasters) and provide a link for like-minded individuals to find others of their ilk. You can find a list of many current rings at <http://dir.webring.yahoo.com/rw?d=Music> and get information about starting your own at [http://edit.webring.yahoo.com/h/create\\_ring.html](http://edit.webring.yahoo.com/h/create_ring.html).

—David Battino



and includes tons of Web-specific features, such as the ability to create animation and mouse-over effects for ultrawhizzy interface design. If you shop around, you may even come across discounted bundles. I found a terrific special containing *Dreamweaver* and *Fireworks* for less than \$300 at Macmall.com.

Even without plunking down a few hundred bucks, you can still get the tools you need to handle basic image

editing. *Liveview Pro* (\$49) and Jasc's *PaintShop Pro* (\$99) are two excellent graphics apps for Windows. Mac users should check out *Graphic Converter* (\$35), if only for its ability to import, edit, and export nearly every graphic format ever created.

## PLAN YOUR SITE

All too often, bands decide that they want a Web site without giving much

# Different shades of blue.



## S·phone Four Channel Headphone Amplifier

It's simply the most versatile and flexible four-channel headphone amplifier you can own. Each channel incorporates independent Level control, Two-Band EQ and a Stereo Aux Input. Listeners can also mix in more of their own signal for "More Me." Plus, the amplifier will power all *twelve* headphone outs.

The S·phone, like the entire Samson S Class range, represents a new perspective on audio processing tools.

# SAMSON

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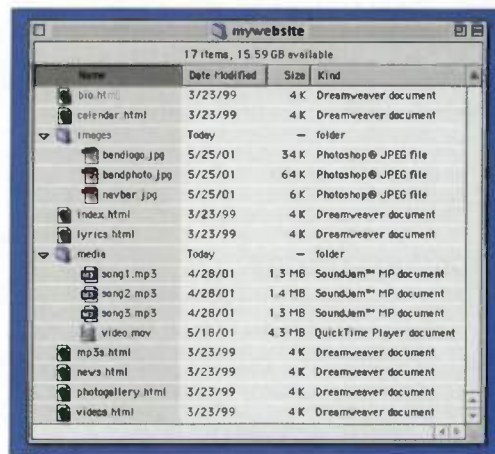
thought to what information they want to communicate to their visitors. Some good questions to consider before beginning are: Who is your audience? Is this site for fans, record labels, or both? Will you sell your music online? Will you provide information about upcoming gigs? Who will write the site's content? Once those questions are answered, you'll be in a better position to develop the material that will drive repeat visits from fans or interested companies.

**Assign or hire a writer.** Nothing says "amateur" like bad grammar and lousy spelling. If you're serious about looking professional, get someone who really understands your band—and the Eng-

lish language—to write your content. At a minimum, you'll need someone to write the band bio (if you don't already have one) and instructions about getting the most from each page of your Web site.

If you or your band members don't feel up to the task, consider asking friends, parents, spouses, or even fans. A devoted fan who understands how to communicate your message effectively could be just the ticket. If money is an issue, compensate him or her with complimentary passes, a copy of your CD, a free T-shirt, or even the opportunity to watch you jam during rehearsals.

**Make it "sticky."** You want your visitors to keep coming back for more, don't you? Give them a reason. Web designers refer to a site's ability to attract repeat visitors and keep them interested as *stickiness* (think flypaper). A band bio



**FIG. 2:** Taking some time to plan the directories in which your site's files will reside will make the site easier to update and maintain.

and some pictures of live gigs just aren't enough. One easy way to engage your audience is to provide a calendar for upcoming gigs. Calendars are a breeze to implement, simple to maintain, and have the added benefit of improving

**WHAT'S NEW ABOUT THE SHERMAN FILTERBANK 2 :**

There are 5 NEW 3-way switches, and 2 LEDs, and on the back panel there's one pedal / footswitch input jack. A reworked front-panel lay-out and the grey metal colour.

- \* the pedal input (we will deliver footpedal separately) allows foot control of filter 1 and bypass/effect switching. This footpedal will also be especially designed by Sherman and will be released later this year
- \* A 5mm green LED indicates 'Effect on' on the FB 2
- \* A 3-way switch on the input stage allows Hi boost as well as Hi cut (both boosting high frequencies at input)
- \* Another 3-way switch allows 'Sensitrig' (which makes the triggering twice as sensitive for e.g. clean string pass filtering) and 'Link', which leaves the filters more 'breathing room' for self-oscillation if the input stage is extremely overdriven
- \* A 3-way switch has 2 general transpose functions: -1 Octave and +1 Octave
- \* A 3-way switch provides monophonic signals with harmonic enrichment
- \* A 3-way switch for the really powerful and quite revolutionary 'Tracking' function – a monophonic pitch follower that tunes filter 2 to the incoming pitch, and makes filter 1 slave of filter 2 via the harmonics switch. E.g. in position 2, filter 1 will be pitched one octave higher than filter 2, but still following the pitch. This extra switch activates the 'tracking' in a normal or deep 'track low' position, with stunning basses as result. The unique aspect of this function is that never before any similar system enhances 'on the spot' harmonics and creates new harmonics with fat analog circuits.
- \* A white LED indicates when the tracking system is 'locked on'.
- \* At last there is an 3-way switch in the LFO section, allowing sawtooth wave shape or AR retrigger; this forces an LFO restart from the AR trig with pumping grooves as unavoidable result.

**Sherman**

Find our list of USA dealers at:  
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## Tube Preamp Channel Strip w/ Digital Out

# 376

## It's Time to Change the Channel...

In the digital world, you're only as good as your weakest link or channel. So, why settle for any less than the warmth and integrity offered by the new **dbx® 376 Tube Preamp Channel Strip with 96k Digital Outs?** For more than 25 years dbx has been setting the standard, and the 376 is the culmination of those years of innovative success.

With a feature list that includes a vacuum tube preamp section, three-band parametric EQ, compressor and the *real* kickers: built-in De-Essing and AES/EBU and S/PDIF digital outputs, make the 376 an all inclusive Channel Strip toolbox that's just as much at home in a conventional analog mixer application as it is in a state-of-the-art digital workstation. With the 376 you can bypass the mixer all together, while producing warm and rich tube mic preamp tones in the digital domain by using dbx's proprietary Type IV™ A/D conversion system. Stop by your local authorized dbx® dealer and tune into all that is available on the next channel.

- Tube microphone pre-amp
- De-Esser
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- AES/EBU and S/PDIF digital outputs
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Unit is 19" wide and will not fit in a mixing console.

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## CONSTRUCTION SITE

attendance at your shows. If you give your fans easy access to a list of upcoming gigs, they will check back more often. Other tried-and-true approaches for improving your hit count include frequently updated song lyrics (post 'em as you write 'em), tablature (play along at home!), MP3s, live video, and band interviews.

### DON'T SELL THE COW

The Napster phenomenon demonstrated conclusively that people love to download free music. However, if you are planning to make money selling your CDs or tapes online, refrain from posting all of your songs as MP3s. Consider posting only one or two strong

tracks (but not singles) from the CD.

You might also want to post live versions of your music. The next time you play a gig, record a DAT of the performance and upload a few of the best tracks as MP3s. That is a great way to capture the excitement of a live performance without cutting into your

record sales. If you update the MP3s every few months, you'll give your fans a reason to visit the site more often. Alternately, you might want to post excerpts of your songs (one verse and a chorus is fine). If visitors dig the hooks, they might buy the whole track.

*Streaming media* is an alternative worth

### HOW BEZAR

"First gratify, then mystify," advises Emily Bezar ([www.emilybezar.com](http://www.emilybezar.com)), a singer and keyboardist who has released three haunting albums of jazzy, electric songs on her own label, DemiVox. "Remember that for people without fast connections, the Web is like an encyclopedia with leaden pages. Don't make them hunt through three levels of Flash animation for your music. Have an obvious link to your sound files on the home page."

To maintain a sense of mystery, Bezar recommends not playing all of your cards—with sound or with visuals. "One or two pictures of you is enough to intrigue," she says. "Don't give away your favorite composition."



CHRISTINA SHOOK

—David Battino

# The Dawning of a New Sound

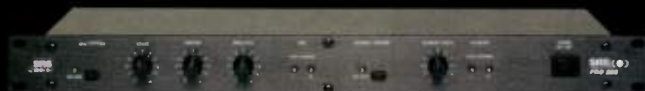
## SRS Pro 220 Sound Retrieval System

SRS (Sound Retrieval System) is an award-winning patented technology that retrieves the spatial information from any stereo recording and restores the original three-dimensional sound field.

Also, use the SRS Pro 220 to convert mono to 3D stereo.

### SRS PRO 220 APPLICATIONS

- Recording
- DJ Systems
- Audio Post Production
- Live Performance



*"Not only does the audio enhancement of the SRS processor complement any program material, it reveals subtleties and detail that I have not heard before. Bravo — it is truly a remarkable device."*

Edward Greene, independent audio contractor

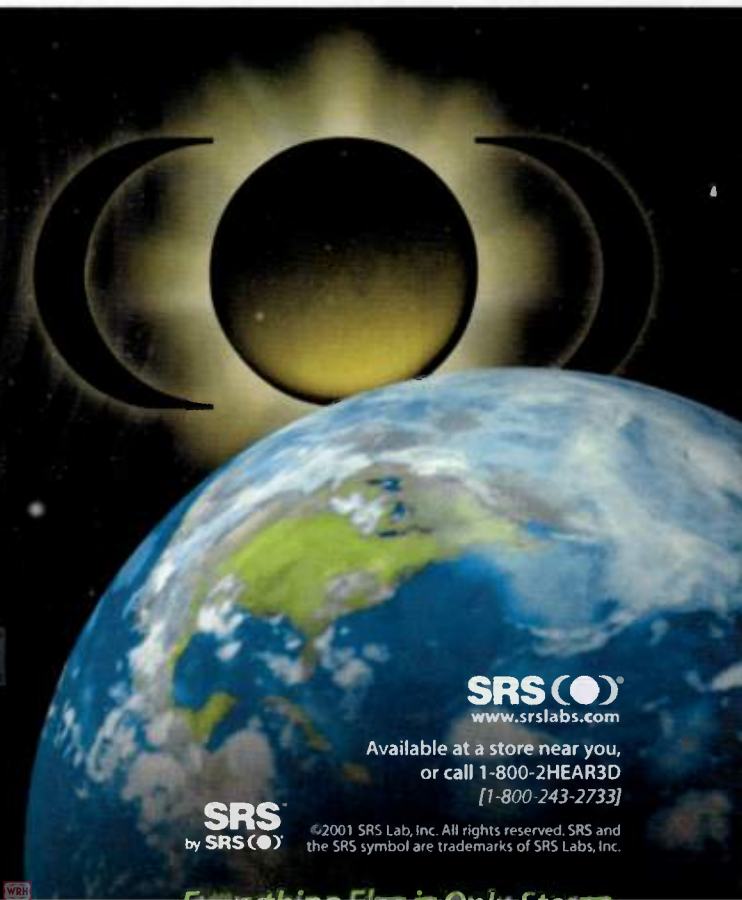
*"SRS creates width and depth in my recordings that were next to impossible to create before."*

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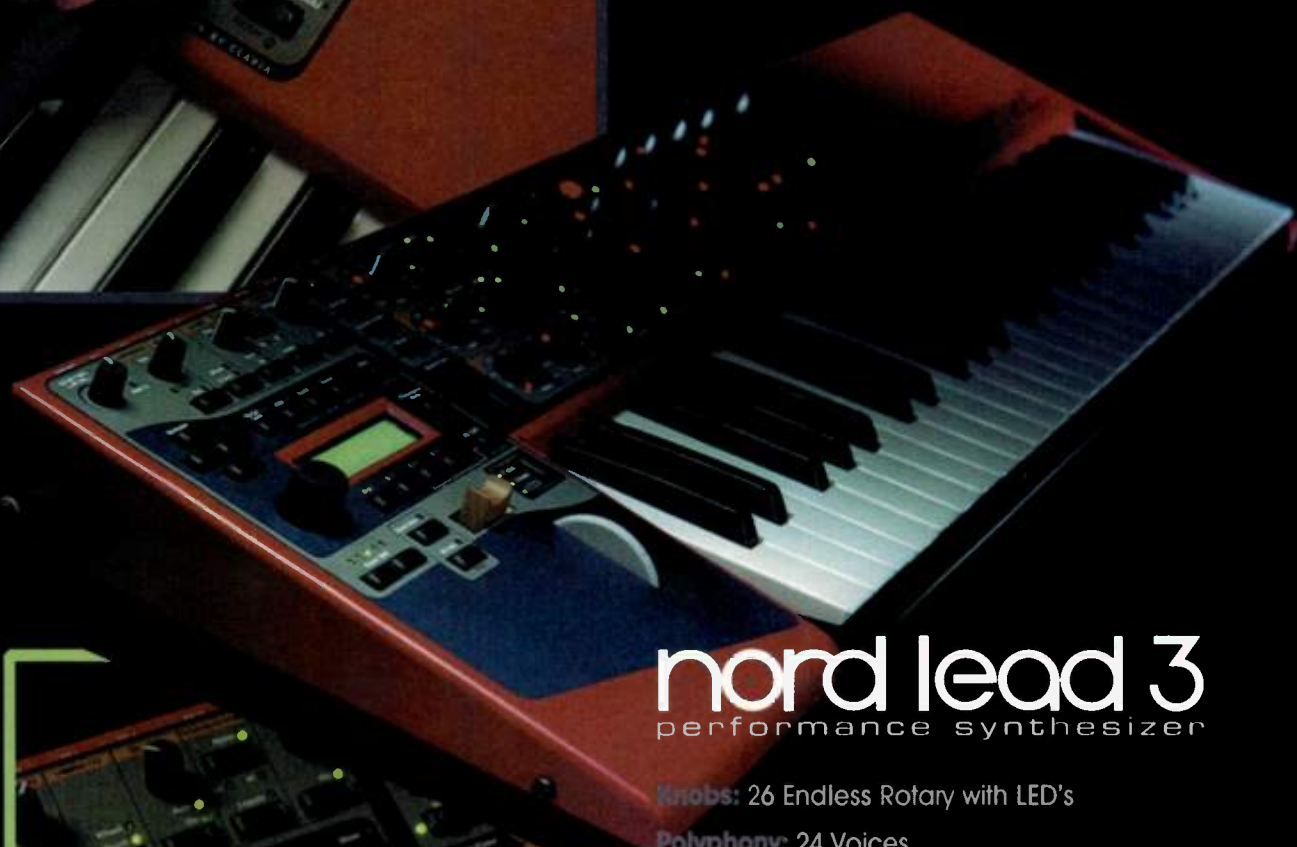
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& Distortion + 6 Multi Filter Types

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considering. Unlike MP3 files, the content remains on your server and is not easily downloaded or traded; it's more like an on-demand radio broadcast than an online record store. Visitors can start to hear the music within seconds, without enduring lengthy downloads. What's more, streaming media can encompass video, text, and graphics as well as audio, so it's possible to create a rich experience for the listener.

## PREPARING TO BUILD

Web design is referred to as "architecture" for a good reason. Designing a good site is like building a house—you begin with a foundation; build a framework; and then put up walls, windows, doors, and so on. Once that's completed, you can begin decorating and furnishing your home.

**Site map.** The foundation and framework for any Web site begins with a *site map*, which can be created on paper or in a basic drawing program. It should

contain a top-down view of all the pages and files your site will include. A basic site map consists of your home page at the top with subpages containing each linked page (see Fig. 1). Once you determine the content you'll post, you can begin crafting a site map that will inform your overall architecture and navigation.

**Directory structures.** When your site map is complete, create a *directory structure*. That is extremely important, because it dictates how your site will grow. In serverland, order is everything. If your directories are a mess, updating your Web site is a tedious and frustrating process. First, create a main folder; it will contain your entire site. Within the main folder, create a folder titled images; another called media; and finally, an HTML (text) file named index.html, index.htm, or default.htm (see Fig. 2).

Those folders will contain the components used to create your site, and the HTML file will serve as your home page. Use the HTML file name so that users can simply type the domain name



**FIG. 3:** Kissinger is an Austin, Texas, band with a terrific Web site ([www.kissingertheband.com](http://www.kissingertheband.com)). The fun and informative home page incorporates the band's logo, top and left-hand navigation, and a lot of content in an easy-to-digest format.

([www.yourband.com](http://www.yourband.com)) instead of the more unwieldy [www.yourband.com/homepage.html](http://www.yourband.com/homepage.html). The directory names are fairly self-explanatory. Even if you don't use all of the directories immediately, it's good to have them available for the future.

## DESIGN ELEMENTS

Your site's overall design will be the main factor in communicating your musical identity. Think of the site's look and feel as you would a CD cover or gig flyer. Everything has to make sense in context. Other bands' sites are always a good source of inspiration, but it's also worthwhile to grab a copy of *Billboard*, *Spin*, or *Rolling Stone* and look at the ads. Go through your CD collection and pick your favorite covers and liner notes. Examine the design carefully. Is it bright? Is it clean? Is it organic or geometrically oriented? Those elements dictate how your visitors react to your band's image, so take the time to consider your options.

**Color palette.** Color is the most visceral of all design elements. Coded into our primal awareness, color is universal and crosses all language boundaries. Generally speaking, bright colors signify intensity and energy, whereas dark colors signify coolness and mystery. If

## THE MORE THE MERRIER

Composer David Javelosa is currently professor of interactive media at Santa Monica College, but he has done everything from fronting the new-wave band Los Microwaves to running the audio department at Sega. Not surprisingly, his musical styles cover the map—and so do his Web sites. "If you're doing multiple project demos, create multiple sites," he says. "It's less confusing and more focused." Javelosa has four subsites on MP3.com: [www.mp3.com/javelosa](http://www.mp3.com/javelosa), [/krispykatwhack](http://www.mp3.com/krispykatwhack), [/davidmicrowave](http://www.mp3.com/davidmicrowave), and [/31clm](http://www.mp3.com/31clm). The latter is an acronym for 31st Century Lounge Music, his cheerful foray into experimental electronica.



Javelosa with son, Luca

TINA ESPOSITO

Another benefit of the multiple-site approach is that it lets you emphasize different songs. "Always put the tune that you want people to hear first, first," Javelosa says. "Don't get into the trap of sequencing it like a CD or a live set. On the Net, time is tight and bandwidth is narrow. People want to hear what you're about without thinking or digging. If they want more, they'll scroll down."

—David Battino



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your sound has a tropical or upbeat feel, consider oranges, reds, yellows, and greens. On the other hand, if your music has a hyperhip serious sound, think about muted or dark colors with splashes of brightness for contrast.

After selecting your overall palette, pick three or four colors that communicate your style. Unless you're a design pro, do not use more than four colors; doing so will give your site a busy, garish look.

If you are in the dark about color schemes, go to the nearest art-supply store and pick up a color wheel. After a few hours of fiddling around with one, you should have a better idea of what works and what doesn't. (Check out [www.makart.com/resources/artclass/cschemes.html](http://www.makart.com/resources/artclass/cschemes.html) for insight about using a color wheel.)

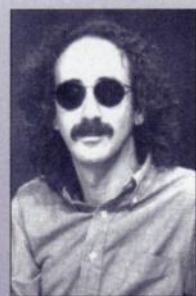
**Color tips.** If you are still not quite sure where to start, choose a simple background color such as black, white,

## FLASH WOUNDS

"I hate those oh-so-clever Flash intros, and I even do music for them!" says BJ Leiderman ([www.bjleiderman.com](http://www.bjleiderman.com)), the award-winning composer of themes for National Public Radio's *Morning Edition*, *Weekend Edition*, and *Marketplace*. "All they do is put more time between you and the information you want. Before you animate your splash screen, ask yourself exactly how it will enhance your site; if it's necessary; and most important, are you doing it because all of the other sites are doing it? That's a great reason to opt out, in my opinion."

"If you must Flash," Leiderman continues, "have mercy on visitors without a broadband connection and keep the file size down." When asked to name a good Flash site, Leiderman mentions [www.stratum.net/espresso/flash.html](http://www.stratum.net/espresso/flash.html). "I like it because it syncs so well with the animation and lends an air of importance to the site," he says. "Effective Flash music adds something to the animation; it isn't simply something to listen to while the animation is going on. That's what radio is for."

—David Battino



or gray. As a rule, stick with saturated tones or pastels. Solid primary colors are a no-no when it comes to Web-page backgrounds, because they tend to fatigue the eye. Always use the *Web216* color palette (nearly every HTML editor lets you choose from that palette). That will ensure that your colors display uniformly on most, if not all, platforms.

Once you select a background, choose your text color and link colors. For the main text, use black if the background is light and white if the background is dark. Colored text on a colored background often can be difficult to read, so sticking with the basics is always safe. Link colors should complement the background and remain legible at all times; never use blue (or any dark, cool color) on black backgrounds: it's impossible to read.

**Background images.** Once you have the hang of what background colors work in your design, consider using background images. They give Web sites a more polished look and, in conjunction with tables, can really make a site design pop. Always use backgrounds in GIF or JPEG format (browsers cannot render BMP, TIFF, or other image formats) and use the image to complement and unify the overall design of your site. Again, the overriding concern is to ensure that your text remains legible at all times. Stay away from wild, repeating patterns; they will give your site a cheap, gaudy look. They look cool only for the first five minutes, after which your visitors will grab the ibuprofen and click away to another site.

**Fonts.** Unlike print media, browsers have only three fonts that are completely cross-platform: Times, Arial, and

## A RIVER RUNS THROUGH IT

"New artists selling music through their Web sites might want to consider programs like Amazon.com Advantage," says Jon Holland ([www.jonholland.com](http://www.jonholland.com)), composer of numerous video-game scores, including *Ms. Pac-Man Maze Madness* (Dreamcast/N64/PlayStation) and *Vectorman* (Sega Genesis). "You can place a link to your Amazon.com page on your personal site's ordering page, allowing customers to purchase your CD through Amazon for peace of mind."

Selling through Amazon also lets you tap into that mammoth site's powerful referral engine, which directs visitors to your music when they browse similar albums. Better, you're paid 45 percent of the retail price you set, even though Amazon sells your CD for a "discount" price.

Holland expects to finish his debut album later this year but has already had success promoting it. MP3.com visitors have played demos from the disc more than 59,000 times, and scarcely a week goes by without a fan writing to ask when the album will be available. In the meantime, MP3.com's Payback for Playback program sends Holland money every time one of his songs is clicked on.

—David Battino





Verdana. Times is a *serif* font, which means that each character has curlicues at the edges, like the text you're reading now. Arial and Verdana are *sans serif* fonts and are cleaner and blockier, like the **EM** logo.

Unless your design has an antiquated, old-time feel, avoid Times, because it is slightly less legible than Arial or Verdana. I prefer Verdana because it is easy to read at all resolutions. As for font sizes, stay away from very small or very large ones. A good guideline is not to use anything smaller than the standard HTML font size 2 or larger than 4, as it will be illegible or look heavy-handed.

**Layout.** After you select fonts and colors, begin creating your page layouts. Most basic sites utilize two distinct layout structures—one for the home page and another for the content pages within the site. Sure, it's possible to create additional layouts, but sticking with two to three basic templates provides consistency and makes the site easier to

develop, maintain, and navigate.

Have some fun with your home-page layout. Be splashy. Be fun. Focus on a few highlights for the site. If you have some good photos of recent gigs or high-quality band photos, tell the world. If you have a free preview track from your upcoming CD, make it known.

The home page is where you make your first impression, so be creative.

Interior pages, however, should be clean, concise, and to the point. Your band's photo gallery should be well organized and easy to browse. The calendar should include all relevant information: date, ticket price, venue, start time, opening act, and maybe even a link to MapQuest.com so that visitors can find the gig with a minimum of fuss.

The best way to achieve a clean layout

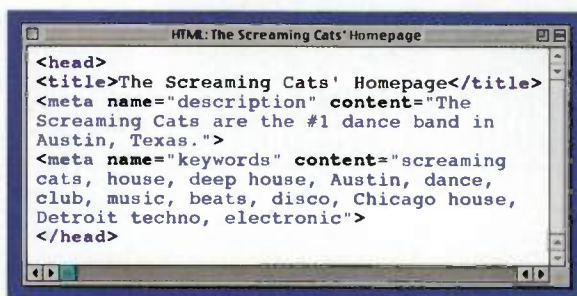


FIG. 4: Meta tags are often overlooked by novices but are crucial for helping search engines find and describe your site.

is through the use of tables. Frames, which give you windows within the main window, are another way to create interesting layout designs. However, frames can be tricky, and they come with their own set of usability constraints. Once again, Webmonkey and Builder.com provide detailed tutorials on the minutiae of tables and frames.

One final note about layout: be sure that your pages render correctly at a screen resolution of 640x480 pixels.

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Although 800x600 monitor resolution is fairly standard, you ensure maximum compatibility by coding to the lowest common denominator. One of the most annoying things on the Web is having to scroll horizontally because the designer created the site on a high-res monitor. If in doubt, change your screen resolution to 640x480 and re-view your site. If you find any anomalies, readjust your layout accordingly.

**Navigation.** Unless you're redesigning BowieNet or MadonnaMusic, chances are you'll deal with only 10 to 15 pages on your site. That should make the normally arduous chore of designing sensible navigation a breeze. Basically, your navigation elements should be omnipresent but relatively unintrusive. Unless you go with fully Flash-based navigation, your work should be relatively painless.

The two customary places for site navigation are the top of the page and the

## ALONG CAME A SNYDER

Musician, producer, and novelist Keith Snyder ([www.mp3.com/keithsnyder](http://www.mp3.com/keithsnyder)) has helped a variety of artists get online. He offers this advice: "Tap into a hardcore genre audience. My opera artist, Kathleen Haaversen ([www.mp3.com/haaversen](http://www.mp3.com/haaversen)), gets more downloads than all of my more experimental and pop-oriented artists combined. The listens are much steadier, too—no volatile flash-in-the-pan download patterns."

Snyder also recommends doing theme events that you can promote to e-mail lists outside your music one. "My two most successful MP3.com projects have been *A Criminal Record* [music and voice collaborations with mystery writers] and *The Ship That Lies at the Bottom* [spoken-word pieces about an old ship in New York City]," he says. Although it would have been inappropriate to ask subscribers to a literature list to check out his music, it was perfectly fine to entice them to his MP3.com page to hear recordings of dramatic readings. Once there, they couldn't help but notice the music tracks.

—David Battino



left sidebar. Generally, it's best to place your global navigation (the primary areas of your site) at the top of the page and, if needed, add additional navigation on the left side of the page, with the content in the center or on the right.

Navigation calls for solid graphic-

design chops. At a minimum, your top navigation should include your band's logo, the five to seven most important areas of your site, and an e-mail link so your audience can get in touch with you easily. Fig. 3 shows a good example.

## 12 STEPS TO BUILDING A KILLER WEB SITE

1. Create and register a unique domain name for your site.
2. Engage an ISP that offers the right balance of service, price, and storage for your needs.
3. Identify your target audience and determine what it most wants to know about you and your music.
4. Choose an HTML editor and graphic-design program that meets your needs and budget.
5. Create a site map and directory structure that allows for growth yet is easy to maintain.
6. Enlist the services of a talented writer.
7. Choose a color scheme, graphic design, and page layout that is easy on the eyes and accessible to a variety of visitors.
8. Integrate uncluttered and easy-to-use navigational tools on every page.
9. Make sure that each page loads quickly on a 56 kbps modem and that alt tags are used to identify graphic content.
10. Use rich media (MP3s, video, streaming audio) to make your site engaging and interesting.
11. Test your site on a wide variety of users. Include as many browsers and platforms as possible in your tests to ensure compatibility.
12. Promote your site using search engines, newsgroups, opt-in e-mail, link exchanges, fans, flyers, stickers, and announcements at gigs.

## GIF VERSUS JPEG

As you design your site's graphics, it's extremely important to understand the distinction between the GIF and JPEG file formats. GIF (Graphics Interchange Format) is excellent for logos and navigation elements because it provides excellent data compression for images that contain only a few colors. However, GIF limits your color palette's size. Although a GIF image can contain any colors, the total number of colors cannot exceed 256. In fact, if your logo and site design are predominantly black and white, you may even be able to get away with a 16- or 32-color palette, which will reduce your file size (and visitors' download times) considerably.

Despite their limitations, GIFs have two advantages. Selected colors can be transparent, which lets the image blend more smoothly into pages with sophisticated backgrounds. GIFs can also be animated so that they can "dance" or display moving content. Most Web graphic apps like Macromedia's *Fireworks*



have tools for animating GIFs, and the classic freeware applet *GIFbuilder* (Mac) creates animations in a snap.

The JPEG (Joint Photographers Expert Group) format is optimized for photographs and complex graphics, also known as *continuous tone* images, that have subtle variations in shading. JPEG compression is considered a lossy format, like MP3 in that once a file is compressed and the irrelevant data discarded, it can never be regained. JPEG compression can work wonders on large photographic image files, reducing them in size by orders of magnitude, but it will not provide the same level of compression for solid blocks of color as GIF. As a rule, use GIF for your logos, navigation, design elements, and animations, and use JPEG for photographs and images with a lot of detail.

#### ALT FOR ONE

The *image tag* (the code that specifies which graphic to load into a spot on a

page) includes an important attribute called *alt*. This is a space for you to enter information about the image's content. For instance, if you post a picture of your band playing live at Madison Square Garden, you should include the alt text, "The Screaming Cats playing live at Madison Square Garden on April 4, 2001."

That text is displayed on three occasions: when a visitor places his or her cursor over the image for more than a few seconds; when a visitor has images turned off (pages load much faster with images off, for obvious reasons); and while the page is actually downloading. Adding the alt attribute greatly enhances navigation. Most important, the alt attribute is often the only way for visually impaired visitors to gain information about the type of images, including *navigational* images, on a page, because text-to-speech tools can read the data aloud. Use the attribute wherever possible.

#### META TAGS

Often overlooked by novices, the *meta tag* is used to convey information about a Web page to search engines. That information includes which keywords will trigger a positive correlation in a search. For example, if your music is heavily influenced by deep house and soul, you'll probably want to include keywords such as *deep house* in your meta tag along with *screaming cats* (see Fig. 4).

Other uses for the meta tag include creating your own description of the contents for each page in your site. That way, when users come across your site using search engines, they'll know exactly what the site is about.

#### JAVASCRIPT

Not to be confused with Java, which is a true programming language, JavaScript is an adjunct to HTML that allows for nifty tricks such as changing link colors or images as your mouse passes over

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them, creating slide shows and menus, and opening up smaller browser windows for displaying video content.

Whereas getting the most from JavaScript requires learning the language's details, a good number of professional HTML and graphic editors include WYSIWYG tools for creating basic interactive animations. Web sites such as <http://javascript.internet.com> also offer free cut-and-paste code.

### MAKE A FLASH

Macromedia's Flash format enables designers to create amazing pages with complex interactivity, multimedia, animation, and even games. Learning to use Flash creation tools such as Macromedia's *Flash* (\$399; Mac/Win) and Adobe's *LiveMotion* (\$299; Mac/Win) can be a daunting task, but the reward is a truly immersing site. The caveat is that the more complex and detailed the Flash component, the larger the file size and download times, so keep that in mind as you explore your options. Additionally, your visitors will need to download the *Flash* plug-in to see anything.

If you use *Flash*, consider making two versions of your site. JavaScript programming tricks exist that let browsers automatically redirect users to the appropriate version of your site, but those scripts may not be compatible with every browser. It's also worth noting that many basic functions *Flash* provides can be duplicated with JavaScript and HTML; it may be best to stick with the basics for your initial site designs so you're not overwhelmed (and potentially disappointed).

### VIDEO STAR

If you gig regularly, give some serious thought to posting live videos of your band on your site. That is a terrific way to engage users and could give interested labels a way to see your showcase

from the comfort of their ultraplush offices. In this era of inexpensive digital video cameras, you probably know someone who can shoot the video for you. Just be sure to get the cleanest sound possible—a direct feed from the board to the camera is ideal.

You may even be able to edit the video yourself. Several consumer PCs and all currently shipping Macs come with some sort of video-editing software. Apple's *iMovie* is ridiculously easy to use and delivers great results with titles, effects, and professional-looking

### 10 SITE-BUILDING TIPS

1. Create templates for your primary page designs. Include navigation and layout details in each template so that all you need to do is add the content (writing, links, images, video) and link the page to the rest of the site.
2. If you create a photo gallery of your band, make an index page that includes thumbnails (smaller versions of each image) that link to the full-size images. That speeds download times and lets visitors browse your selection, enlarging only the photos that interest them.
3. Never resize images using HTML size tags. Doing so degrades the image quality and cheapens the look of your site. Even though the image is smaller, it will still have the same file size as the original image, causing a needlessly long download. If you need a smaller image, resize it in your graphic editor before adding it to your page.
4. If your site relies on plug-ins for displaying content, include direct links to the relevant plug-in download pages. Otherwise, your visitors may be forced to hunt for the needed plug-ins on their own—or will simply give up.
5. Minimize the use of dancing baloney on your site. One or two animations that make sense in context are fine, but gratuitous use of blinking, gyrating images is best left to the Web's red-light districts.
6. Regardless of the tools you used to design your site, test every page in Netscape Navigator 4.x and Microsoft Internet Explorer. Whereas Dreamweaver and other professional tools let you do that with one click and report incompatibilities, they can't catch visual inconsistencies in the manner that browsers render page elements. Netscape has only about 25 percent market share, and a surprising number of users refuse (or don't know how) to switch to another browser. If possible, check your site on Mac and PC. That will help to ensure a truly democratic experience for all visitors.
7. Try to keep all pages in your site no more than three clicks from any other page. With careful planning, that is fairly easy to accomplish, and it will make it easy for visitors to move quickly between areas that interest them.
8. Don't overload your pages with images. Refrain from placing text (other than primary navigation) within images just to get the typeface you're after. Images take time to download and most popular browsers can handle a maximum of eight download streams simultaneously. Stick with Times, Arial, and Verdana fonts until a true font standard arrives.
9. Always keep a complete backup of your site in a safe place. If you put it on a CD, you can even hand out your site as a business card. Update your backup when you update your site. If your ISP loses the data or your hard drive crashes irrecoverably, you'll be really glad you did.
10. Less is more. If you take the time to examine the competition, you will find that the best sites make sensible use of space and do not cram pages full of information. Keep the design simple and elegant, and you'll be ahead of the pack when it comes to return visitors. You might even win an award or two!

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transitions. *IMovie* and several other consumer video editors include built-in compression tools, so exporting the results in a Web-ready format and file size is a piece of cake.

## THE NEXT LEVEL

Few things on the Web are more frustrating than waiting for a page to download. As you design your site, keep track of the file sizes of each of the components that make up your pages: images, HTML, Flash, everything. Generally, the total file size for the entire page and all graphics should be less than 50 KB—70 KB at the most.

Possible exceptions to that rule are photo galleries with thumbnails, which should max out at 100 KB, but only if necessary. If you're making extensive use of Flash in your site design, your download times will be negatively impacted. So plan to massage your Flash components separately if needed.

Another tool for advanced designers, or friends of advanced designers, is CGI (Common Gateway Interface) scripting. CGI enables the collection and manipulation of text and offers a few other nifty server-oriented functions. Like JavaScript, CGI is a place where design meets programming, and it's not for the faint of heart. Common uses for CGI include ordering forms, e-mail submission, simple search engines, and hit counters. Many ISPs charge additional fees for the use of CGI, because processing takes place on the servers, which adds to the overall load.

Chances are your site won't require that type of programming, because you can easily create e-mail links for soliciting input from your visitors using the `mailto: command`. But as your site grows in popularity, you may wish to explore the options that CGI offers. As always, tutorials are available at Webmonkey and Builder.com.

## TESTING

Before you launch your site, test it thoroughly with as many users as possible. Recruit family, friends, anyone with a computer and a browser to go through your site and make comments. If possible, have them view the site on your computer first so they know what it's supposed to look like. It's also instructive to watch others try to navigate your site. You'll see pretty quickly what you need to make it more clear. If doing that isn't possible, post or e-mail screen shots for reference. If anyone encounters problems, ask them to capture screen shots and e-mail them to you to examine.

Some areas to check: Does the site look essentially the same on all browsers and platforms? Are any links broken? Are all graphics loading correctly? Do navigation tricks such as mouse-over animations work the same way for everyone? For that matter, is the navigation itself obvious, or do you feel compelled to grab the mouse and explain how to get to a certain feature? Are the audio and video streaming or downloading the right way?

Beware of people who say, "It looks wonderful! Don't change a thing!" You're actively seeking criticism so that you can make your site the best it can be. Look for faults and problems first and then fix them. After that, you can get on with basking in the glory.

## PUBLICIZING

If you followed the foregoing instructions, did your research, and designed and tested your site, you should be more than ready to tell the world about it. Where do you begin?

**Search engines.** Search engines are the core of

the Web. Almost every public Web site is cataloged and indexed through those marvels of utility. One search engine is even devoted exclusively to band Web sites: [www.ubl.com](http://www.ubl.com).

The top five general-purpose search engines and indices are (in alphabetical order) AltaVista, Google, HotBot, Lycos, and Yahoo. Each one accepts submissions: look for the link that reads "Add your site" or "Submit your site."

The process is painless. However, search engines receive thousands of submissions a day; it can take two weeks for your site to be added to their database, so be patient. Don't forget to make sure your meta tags are in place before submitting.

**E-mail and newsgroups.** Savvy bands probably already have a contact list of their fans, complete with e-mail and

## ONLINE RESOURCES

### DOMAIN NAME REGISTRATION

**Accredited registrars** [www.icann.org/registrars/accredited-list.html](http://www.icann.org/registrars/accredited-list.html)

**Domain-name search** [www.domainsurfer.com](http://www.domainsurfer.com)

### Low-cost registration tips

[http://larrysworld.com/articles/sjm\\_yourdomain.htm](http://larrysworld.com/articles/sjm_yourdomain.htm)

### ISP SEARCH

**Boardwatch** [www.boardwatch.com](http://www.boardwatch.com)

**Geocities** <http://geocities.yahoo.com>

**GKG** [www.gkg.net](http://www.gkg.net)

### DEVELOPMENT AND DESIGN

**Builder** [www.builder.com](http://www.builder.com)

**Vischeck** [www.vischeck.com](http://www.vischeck.com)

**Webmonkey** [www.webmonkey.com](http://www.webmonkey.com)

**Web Page Design for Designers** [www.wpdtd.com](http://www.wpdtd.com)

**Web Pages That Suck** [www.webpagesthatsuck.com](http://www.webpagesthatsuck.com)

### THIRD-PARTY E-COMMERCE SERVICES

**Amazon.com** [www.amazon.com](http://www.amazon.com)

**CafePress.com** [www.cafepress.com](http://www.cafepress.com)

**EarBuzz.com** [www.earbuzz.com](http://www.earbuzz.com)

**MP3.com** [www.mp3.com](http://www.mp3.com)

**Yahoo Store** <http://store.yahoo.com>

### DESIGN AND DEVELOPMENT TOOLS

**Composer** [www.netscape.com](http://www.netscape.com)

**Cool Page** [www.coolpage.com](http://www.coolpage.com)

**CorelDraw, PhotoPaint** [www.corel.com](http://www.corel.com)

**Dreamweaver, Fireworks, Flash** [www.macromedia.com](http://www.macromedia.com)

**GifBuilder** <http://homepage.mac.com/piguet/gif.html>

**GoLive, LiveMotion, Photoshop** [www.adobe.com](http://www.adobe.com)

**HoTMetaL Pro** [www.softquad.com](http://www.softquad.com)

**HTML Editor** [www.coffeecup.com](http://www.coffeecup.com)



2001: THE YEAR WE MADE CONTACT

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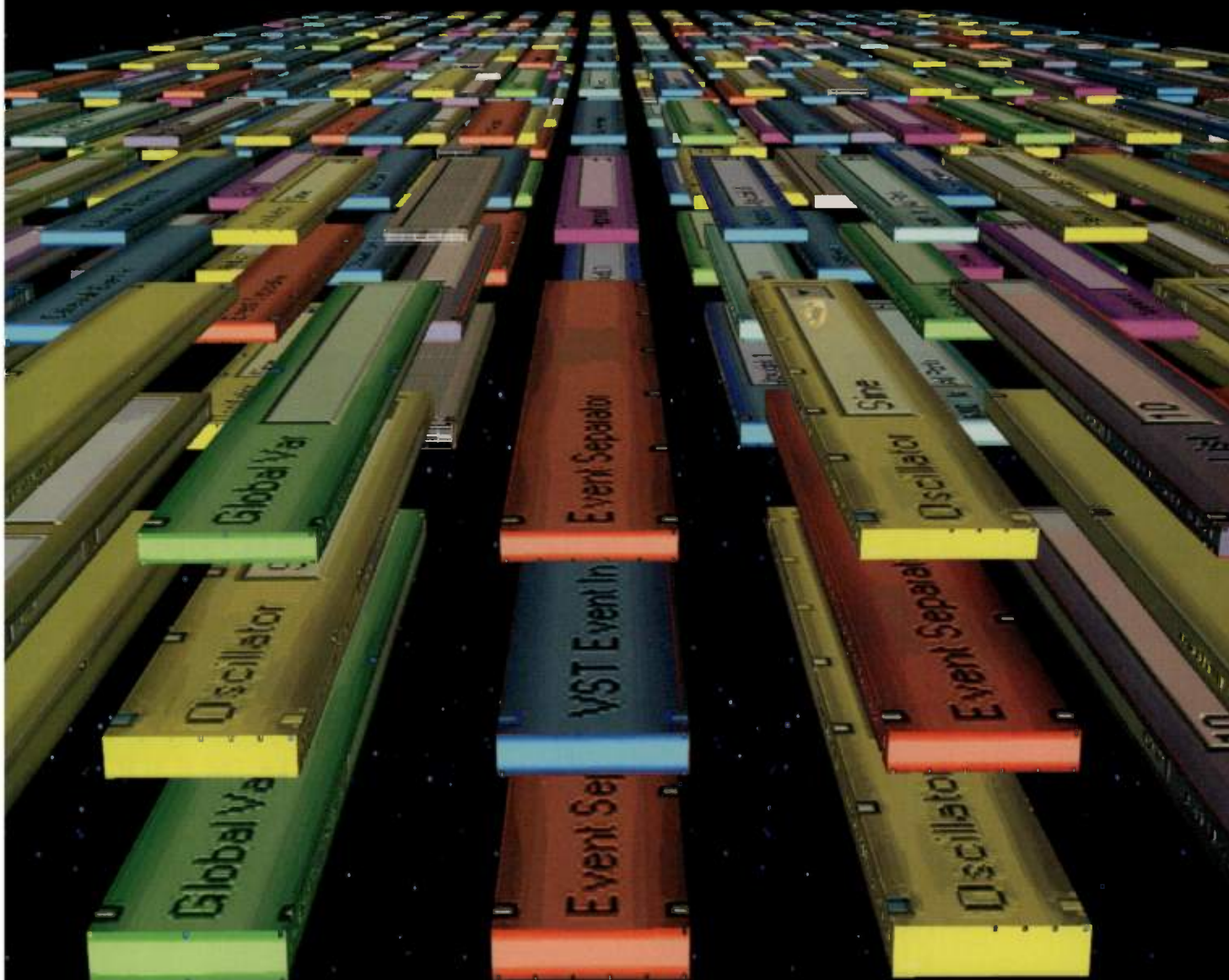
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postal addresses, phone numbers, and so on. If your fans gave you that information, they probably won't mind receiving one e-mail to notify them of your site's arrival. Word the e-mail carefully to allow the recipients to respond if they no longer wish to receive notices from you. Always be polite. Fans are your lifeline, so treat them with respect. Never send a promotional e-mail of any type to an individual who has not already expressed interest in your band. Spam sucks, and you'll be remembered for it.

You may be tempted to post your announcement to newsgroups and online bulletin boards. That is a tricky proposition because many newsgroups ban

such spammed announcements. If you do decide to use that approach, target your newsgroups carefully. For an industrial band, alt.fan.shania-twain is probably not the best forum for a site announcement.

The best and most subtle way to get word out to acquaintances and newsgroups is to simply add your site's URL to your e-mail signature, right below your name. It's downright powerful, too, as everything you send electronically will contain the link without drawing undue attention to its promotional value. Sneaky, huh?

**Other methods.** Be sure your URL is included on every gig flyer you post, all your CD releases, business cards, letterhead, buttons, T-shirts, and the like. If there's room for your band name, chances are there's room for the URL too. You might also want to see if you can swap links with other independent bands, either locally or within your genre. Most bands will be happy to add

a link to you in exchange for a reciprocal link, if you're polite about it.

## NO END IN SITE

It's said that musicians make excellent programmers, but the point of this article is not to get you to wallow in code. Rather, I hope now you're much closer to being able to put your music online than you might have thought. (For a quick road map, see the sidebar "12 Steps to Building a Killer Web Site.")

The Web is so new that even the best designers out there have probably been building sites for far less time than you've been playing music. There's a lot to absorb, but the benefits of having an online presence are enormous, so dive on in—before somebody else takes your domain name!

*Frank Jones is a keyboardist, recording engineer, and user-experience designer from Buffalo, New York. Thanks to 8legged.com's Dave O'Neal for his tip.*



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- >> Stand-alone patchbay operation without computer
- >> AMT (Active MIDI Transmission) for superb MIDI timing precision on the borders of perception
- >> Uncluttered front panel with status indicators, plus Unitor8 Control software, for exceptional ease of use
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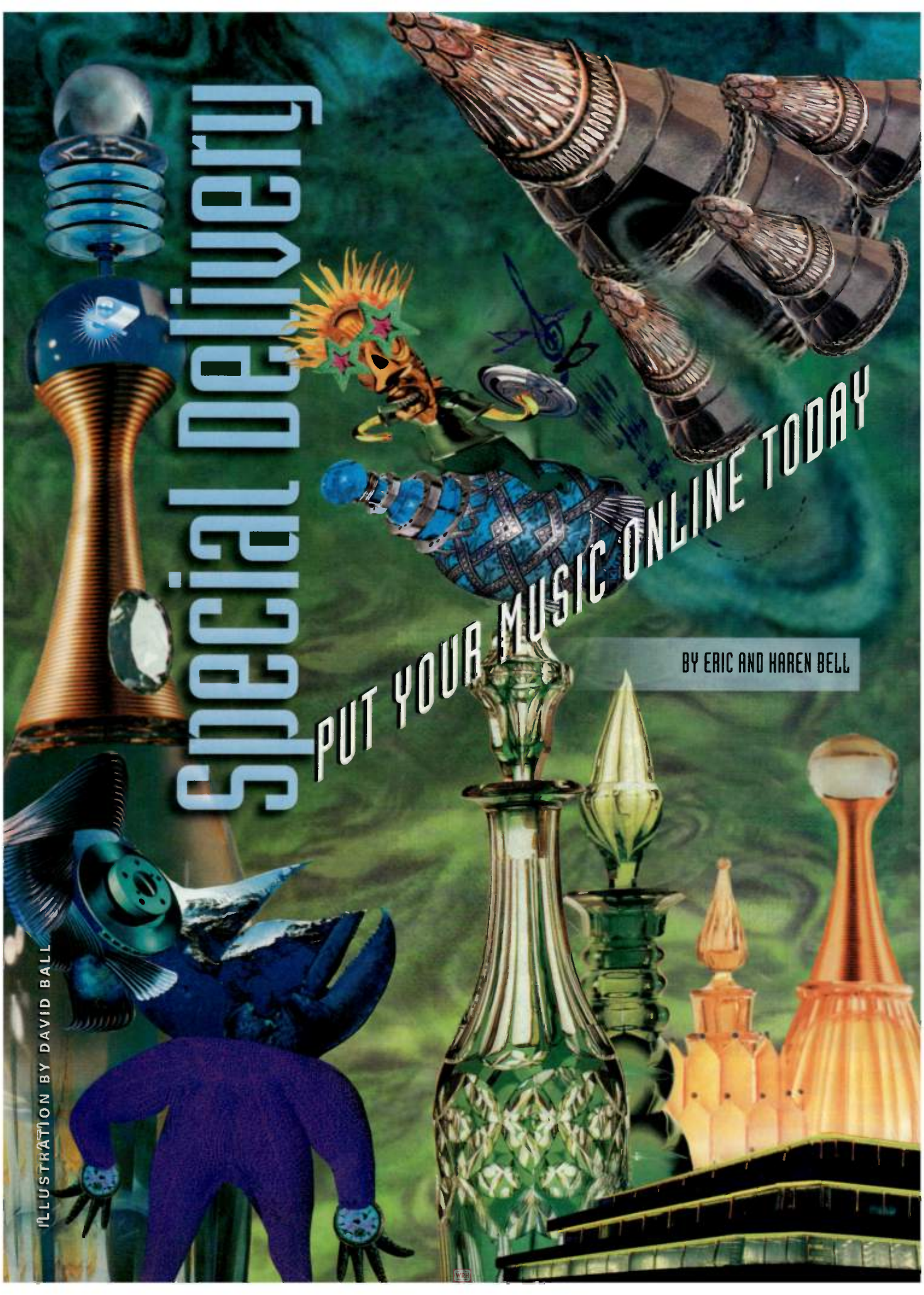


# Special Delivery

PUT YOUR MUSIC ONLINE TODAY

BY ERIC AND HAREN BELL

ILLUSTRATION BY DAVID BALL





**Y**our music isn't much use to anyone if it just sits on your desktop. It's time to deliver it to that huge online audience you know is out there. This piece will cover the nuts and bolts of premastering your tracks so they'll sparkle no matter which online delivery format you choose. We'll guide you through the process of choosing a format and putting the new audio files onto your Web site. Don't have a site yet? Read this month's "Working Musician" for pointers on commercial services that will host your encoded audio files; see "Construction Site" for tips about building a site.

## WEB AUDIO PREPRODUCTION

The two primary ways to present audio online are as downloadable files or as streaming files. The basics of how these two methods work, along with the benefits and drawbacks of each, are covered in the sidebar "Web Audio Basics." For now, suffice it to say that streaming files are similar to radio broadcasts: the listener hears the sound as it downloads; then it's gone. Downloadable files must be transferred to the listener's hard drive before they can be played.

If you have a Web site and are (or have access to) a competent Webmaster, downloadable and streaming delivery are options. If you have limited HTML prowess, downloadable formats are your best choice. In that case, you will be distributing your music files through e-mail or newsgroups, or perhaps providing them to others to make available.

## COMPRESS FOR SUCCESS

The average CD takes more than a day to download over a standard modem, so online music must be subjected to heavy data compression to be accessible to the widest range of listeners. Standard lossless data-compression tools, such as *WinZip* and *StuffIt* ([www.winzip.com](http://www.winzip.com) and [www.stuffit.com](http://www.stuffit.com), respectively), yield at best about a 20 percent size reduction on audio files. Even specialized audio-data compressors such as *DaxAif* ([www.dakx.com](http://www.dakx.com)) manage only 50 percent. The greater-than-90 percent reduction rates yielded by formats

such as MP3 are achieved with a lossy compression technique called *perceptual coding*; the end result is close, but not identical, to the original.

Perceptual coding analyzes the source material using a psychoacoustic model and removes parts of the signal that the ears and brain do not perceive. A simplified example of that is the *masking effect*. For instance, a listener might not perceive a quiet guitar part at the moment a loud cymbal crash occurs, so the guitar frequencies can be removed from the file at that point. In essence, the encoder breaks down the file into small chunks called *frames* and determines on a frame-by-frame basis how to allocate bits across the frequency spectrum to describe a sound.

All audio-encoding schemes feature various levels of compression quality. One common variable is the bit rate, which is roughly analogous to the sampling rate in noncompressed audio. In both cases, reducing the rate produces a smaller—and lower-quality—file. Whereas lowering the sampling rate simply removes high frequencies, lowering the bit rate alters the character of the sound throughout its frequency range.

What exactly is lost in perceptual coding is tricky to pin down—listeners describe encoded sound as squishy, metallic, smeared, or lacking in clarity and spaciousness. There's clearly some loss of extreme frequencies and of dynamic range. To get a sense of the difference, play around with an encoder and listen to its highest compression rates so you'll know what types of artifacts to listen for. (The table "Encoder/Format Comparison" contains additional information.)

Music destined for the Web should be prepared in three steps: first, create a clean premaster file in uncompressed, 16-bit, 44.1 kHz stereo WAV or AIFF format. Second, create a tweaked master with appropriate EQ, sampling-rate, mono-stereo, and dynamics adjustments to compensate for the sonic degradation caused by the encoder. Finally, create the encoded file for distribution. This approach is especially helpful if you will be encoding the same music

into a variety of formats, because it provides a common starting point for your processing.

The premaster file should be tightly cropped and as noise-free as possible. Use your editing software to remove any *DC offset*, a vertical shift in the waveform typically caused by poor grounding during recording. A file with DC offset will be centered on a value other than 0V, which leads to distortion when it's processed.

If you're preparing an excerpt rather than a full track, add an appropriate fade-in and fade-out or cut the file on the beat. It's often effective to start the excerpt on the downbeat of a measure and then fade out over the course of one or two measures. Sometimes extending the fade for an additional beat (adding the downbeat of the following measure) adds a feeling of closure.

## TWEAK AND YE SHALL FIND

As noted earlier, encoding audio for the Web reduces its sonic quality, in some cases only a little, but with high compression, a lot. Here are some tips for tweaking your premaster file to help your music survive the encoding process with maximum fidelity.

**EQ.** Consider lightening the encoder's load by rolling off very low and high frequencies with a shelving filter. For example, if you're fairly sure the typical playback system will be inexpensive multimedia speakers competing with a whining computer fan, remove frequencies below 60 Hz and above 12 kHz. An MP3 at the standard 128 kbps bit rate doesn't contain much information above 15 kHz, so it's safe to remove frequencies above that. For streaming files, you can start the high-frequency rolloff as low as 6 kHz, depending on the target bit rate.

You may want to boost some frequencies to compensate for encoder losses. For example, try boosting at 2.5 kHz to enhance presence and at 200 Hz to aid the bass. Trial and error is the key here, but if certain frequency bands are important to particular tunes, then your EQ settings should reflect that.





**Stereo enhancement.** Although encoders frequently reduce spaciousness, applying stereo-enhancement effects to compensate can lead to the presence of swishy artifacts. It may be more effective to add reverb or stereo echo; again, trial and error will tell. In fact, mixing your stereo file to mono may prove to be the best compromise, because doing so will reduce the file size by as much as half or allow the encoder to create a smoother sound at the same

file size or bit rate. (Some encoders automatically discard information that's common to the left and right channels.)

**Padding.** If you're planning to encode a streaming file, you may want to add a second or two of digital silence to the beginning of the premaster (see Fig. 1). That helps to compensate for the dropouts that listeners may experience while a streaming player loads a file. Some streaming servers also truncate the end of a file, so you might want to pad that as well.

**Dynamic compression.** Limiting dynamic range by using a little compression can improve the quality of your encoded file. Try a 2:1 compression ratio with a threshold of -6 dB to

-10 dB to start; you may need to go as high as 4:1.

**Sampling rate.** If the encoder outputs a file at a reduced sampling rate, such as 22.05 kHz, you will often get better results by feeding it a file that's already at that rate. The sampling-rate conversion algorithm in your audio editor may be superior to the encoder's.

**Normalization.** As a last step, normalize your tweaked masters to provide consistency in playback levels from file to file and to improve encoding results. Leave a little headroom to avoid introducing distortion at the encoding stage. In Sonic Foundry *Sound Forge*, we use Peak Level normalization at 95 percent (see Fig. 2).

## WEB AUDIO BASICS

Posting sounds on your Web site involves three easy steps. First, create the sound file in an appropriate format. Next, transfer that file to your Web site's server. (Your Internet service provider has information about how to do that.) Finally, put a link on your Web page that visitors will click on to hear the sound. The link is a simple matter—all you need is an HTML statement on your page such as this:

```
<A HREF="demo.aiff"> Here's a  
sound demo ... </A>
```

The anchor tag, <A>, is an easy way to create a link to a sound file. It gives information about the file's name and location, and it includes the link text that will appear on the page. Using the HTML code mentioned previously will result in the appearance of the following line on the Web page:

[Here's a sound demo ...](#)

When a visitor clicks on the link you've created, the server sends the file (in this case, demo.aiff) across the In-

ternet to the visitor's browser. If the user's browser isn't set up to interpret that file type, the browser offers the option of choosing an application that can play the file or of downloading it. If the user has installed a browser plug-in or another application as a sound player for that file type, the application automatically downloads and plays the sound.

### RAW SOUND: BIG AND BAD

The simplest sound format is an uncompressed digital sound file. The most popular types are WAV files, common on PCs, and Audio Interchange File Format (AIFF) files, common on Macs. There are many other types of sound-file formats, but their contents are much the same: a long string of numbers that represents the waveform of the sound. At the beginning of the file, a header provides information such as the sampling rate and whether the sound is in stereo or mono. A sound-player application uses that information to interpret the data.

Formats such as WAV and AIFF are so common that they can be used by many applications, but they have one main drawback: size. The WAV file

of a 10-second stereo sound with a 44.1 kHz sampling rate and 16-bit resolution, for example, is 1.68 MB. Even short sounds will try the patience of many Web surfers. WAV and AIFF files are great to work with in your studio when you're creating and mixing audio, but their sizes make them ill-suited for Web use.

### SMALL IS BEAUTIFUL

An easy solution to the problem of file size is file compression, for which the MP3 file format is popular. MP3 files are usually much smaller than standard uncompressed sound files, but their sound quality remains good. For example, the 1.68 MB WAV file can be reduced to 156K—less than one-tenth the size of the original—when converted to MP3. (You can use different amounts of compression when creating MP3 files, and the files are larger or smaller accordingly.)

Posting an MP3 file is like posting a WAV file: create the file, transfer it to your site's Web server, and create a link to it in HTML. When users reach your site, they'll need an MP3 player to hear the file. You could include a link to an MP3 player, but



## FORMAT FRENZY

There are many Web-audio formats, but because you want to reach the greatest number of listeners with the least hassle, we'll concentrate here on the most popular ones: MP3, RealAudio, Windows Media Audio (WMA), and QuickTime. All four formats support streaming and downloading. At the moment, RealAudio is the most popular streaming format and MP3 is the top format for playing downloadable files.

**MP3.** If there's a no-brainer format in the bunch, it's stereo MP3 at 128 kbps. The sound quality is good, and the compression rates are high. The format is broadly supported with tools and playback software on virtually all computer platforms, not to mention an

array of dedicated external playback units such as the SonicBlue Rio.

MP3 technology is not open-source. The German agency Fraunhofer IIS ([www.fraunhofer.de](http://www.fraunhofer.de)) owns the technology, and it's licensed through the French manufacturer Thomson ([www.thomson-multimedia.com](http://www.thomson-multimedia.com)). If you don't charge for music distributed in MP3 format, that isn't a problem. But if you do charge, be prepared to fork over some royalties. The details are at [www.mp3licensing.com](http://www.mp3licensing.com).

Most MP3 encoders use one of three algorithms: Fraunhofer, LAME, or BladEnc. Many people believe that the Fraunhofer codec (compression algorithm) gives the best results; others swear by the open-source LAME en-

coder, which is used in a surprising number of freeware and commercial products. (Thomson recently unveiled a new version of MP3 called MP3Pro. Files in MP3Pro format are about half the size of equivalent-sounding MP3 files, but the licensing fee charged to encoder manufacturers is 50 percent higher, so the format may be slow to roll out. MP3Pro files will play on older players, but there will be no quality boost. See [www.codingtechnologies.com](http://www.codingtechnologies.com) for details.)

Your audio-editing software may have a built-in MP3 encoder, which is convenient. Here's a description of the encoding process using Music-Match *Jukebox* ([www.musicmatch.com](http://www.musicmatch.com); other programs have similar options).

MP3 is such a popular format that many Web surfers are already set up for it. Visit <http://software.MP3.com/> software to find MP3 players, encoders, and other MP3 software.

My favorite Windows MP3 player is *Winamp*, partly because it supports beautiful graphic displays that accompany the music as it plays. Many *Winamp skins* (software facades to fit your taste) are available. *Winamp* also plays WAV and MIDI files, making it a handy tool to have.

## LIFE IS BUT A STREAM

Compression is a big help, but even compressed files can take considerable time to download. After all, some users are still connected to the Web through older modems or busy networks. Another solution for delivering audio is streaming. Streaming is simple and powerful: instead of downloading the whole file before you can play it, your browser starts playing it right away. The popular streaming format RealAudio is a good choice because many computer users own *RealPlayer* and use it to play back streaming audio. If they don't already have *RealPlayer*, it's easy to add. (*RealPlayer Basic* is free,

and *RealPlayer Plus* costs \$29.99; both are available at <http://real.com>.)

To create RealAudio files, you will need an encoder. RealNetworks offers several encoders, including the free *RealProducer Basic*. (Go to <http://realnetworks.com> and follow the link to Products.) *RealProducer Basic* converts WAV files to RealMedia (RM) files. My 10-second demo WAV file, which started out at 1.68 MB and then diminished to 156K when compressed to MP3, has now shrunk to 46K—almost one-fortieth of its original size—when converted to RM. Even better, the file starts playing immediately, so listeners don't have to wait for it to download completely. Each compression stage further degrades the sound quality, however.

You need to know one more detail about posting RealAudio on the Web. Let's say the original sound is *demo.wav*, and the RM file created using *RealProducer* is *demo.rm*. You also need to create a *demo.ram* file, which is a text file to which your Web page should link. The file does nothing more than point to the RM file. Assuming your RM file resides in the same directory as the *demo.ram* file,

the contents of the RAM file would be: `file://demo.rm`.

The RAM file is called a meta-file, and it is required for streaming. If you just linked directly to the RM file, it won't stream; like any nonstreaming file, it will download completely before playing.

You can follow all the steps to create, preview, and publish your Web materials, but if you prefer not to do everything from scratch, *RealProducer* has tools that guide you through the process.

## MAKE IT EASY

As you can see, there are numerous possibilities for getting sound on your Web site. Think about your needs, decide when you can make compromises, and explore each format's strengths and weaknesses. Consider issues such as sound quality, file size, and how common a given format is and determine which factors will be most important to your site visitors. Pick one format and use it consistently; that way, you know that if site visitors can hear one of your sounds, they can hear all of them.

—Peter Hamlin





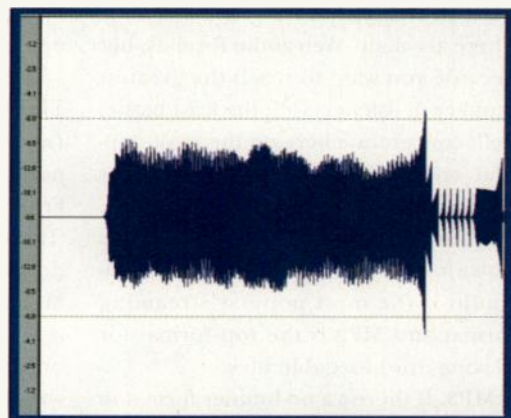
Select the Convert command from the File menu to open the encoding dialog. When creating a constant bit-rate MP3, you must specify the rate. Think of 96 kbps as a “budget” rate with easily discernible artifacts; 128 kbps is a standard, high-quality rate with just a few audible changes from CD quality; and 160 kbps (and higher) can be considered to be a “premium” rate with very high quality but a larger file size. (A Fraunhofer representative says that at 192 kbps, few listeners can differentiate between the MP3 and the original WAV.) If file size is at an absolute premium, you can encode at 8 kbps. We shrank a song that was 4 MB at 128 kbps to 270 KB at 8 kbps, and it sounded awful.

To maximize the trade-off between size and quality, try selecting variable bit-rate (VBR) encoding. With VBR, the bit rate is adjusted on the fly to meet the needs of the source material. The

theory is that some material isn’t as demanding as other material. In MusicMatch *Jukebox*, you can choose a rate from 1 to 100 percent to express how much material to leave at a constant rate. The 1 percent setting renders a file that is less than half the size of the file encoded at 100 percent.

Another way to save space is to select joint stereo if your encoder supports it. That scheme saves space by combining information that’s common to both channels. Try it to see if the space savings are worth the sonic results; sometimes stereo imaging suffers.

Don’t forget to tag your MP3 file with track information and your Web site’s URL (see Fig. 3). The most widely supported standard is ID3v1, but ID3v2 offers more space for information, more preset music-genre tags, and even the ability to hold a small graphic. It’s less confusing to input the tag information before you encode the MP3; however, many MP3 players (*Winamp*, for example) let you edit the tags after encoding the file.



**FIG. 1:** Streaming-audio players often stutter when they first receive a stream. Adding digital silence to an audio file’s beginning can help the player lock in before it gets to the downbeat.

**RealAudio.** RealAudio is RealNetworks’ streaming-audio format. Although the company’s tools and players focus more on multimedia streaming, RealAudio remains one of the strongest choices for audio streaming because of the large installed base of RealAudio-enabled players (200 million according to RealNetworks) and a good selection of flexible encoding tools.

Before digging into producing RealAudio files, investigate your options

## Encoder/Format Comparison

	MP3	QuickTime	RealAudio	Windows Media Audio (WMA)
<b>URL</b>	<a href="http://www.mpeg.org">www.mpeg.org</a>	<a href="http://www.quicktime.com">www.quicktime.com</a>	<a href="http://www.realnetworks.com/devzone">www.realnetworks.com/devzone</a>	<a href="http://www.windowsmedia.com">www.windowsmedia.com</a>
<b>Encoder Pricing</b>	varies from free to expensive	\$29.95 for QuickTime Pro; often included in audio editors	<i>RealSystem Producer Basic</i> (free); <i>RealSystem Producer Plus</i> (\$149.95); often included in audio editors	free; often included in audio editors
<b>Player Installation Difficulty</b>	varies	easy; preinstalled on Macs	varies from easy to frustratingly difficult	built into new Windows; easy if added on
<b>Pros</b>	more free tools available than any other format; wide support on portable players	server source code availability for four major platforms bodes well for future viability	flexible, free tools for encoding and streaming; good, expensive tools for commercial distribution	high-quality sound with lower file size; heavyweight corporate support
<b>Cons</b>	sell your music, pay Fraunhofer; poorer sound than other formats’ at low bit rates	smallest installed base of players	proprietary player nags users to upgrade to paid version	confusing encoder interface
<b>Cool Features</b>	ability to embed a graphic in the ID3 tag	supports looping multiple tracks, video, flexible embedding, and much more	<i>RealPlayer</i> clients slated for Sony’s PlayStation 2 and Nokia’s Media Station	supports encryption



# RAVE REVIEWS

*The Røde NT1000 Launches With Rave Reviews*



"...the lowest noise floor you can get."

"These microphones are standard-setters that the entire industry would do well to study."

- Bruce Richardson

Bruce Richardson - ProRec Recording Magazine  
The complete review is available at [www.prorec.com](http://www.prorec.com)

"The U87i was woolier, the NT1000 clearer and slightly brighter. Over time, I became bothered by the self-noise of the U87i, because it veiled the low-level detail that was audible with the NT1000 and NTK."

"In every situation, both the NT1000 and NTK had lower self noise than either U87."

- Ty Ford

Ty Ford - Mix Magazine  
The complete test report is available at [www.mixonline.com](http://www.mixonline.com)  
and in the June 2001 Issue of MIX magazine.

**RØDE**  
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for serving them to your fans. If you have control of your Web server, you will be able to use the *RealSystem Server* software to deliver the streams. The free version supports 25 simultaneous

streams. If your site is hosted, chances are good that *RealServer* is already installed; you'll have to negotiate terms for use, however, and encode your files to match the host's setup. If *RealServer* is not available, don't worry. Another distribution option, HTTP streaming, doesn't require a dedicated RealAudio server.

Like most streaming companies, RealNetworks has a free encoder—*RealProducer Basic* for Windows, Mac,



**FIG. 2:** The file in the lower window of Sonic Foundry's *SoundForge* was processed with a dynamic compressor and normalized. Note how much more signal is available than in the top window.

Unix, and Solaris platforms. For more options, you can shell out \$149.95 for *RealSystem Producer Plus*. Many audio editors now include RealAudio encoders as well.

*RealProducer Basic* has both Wizard and DIY modes. The Wizard walks you through the selection process for choosing the file or audio device from which to encode, the destination, and the type of codec. The main encoding screen lets you enter information to identify your music in the listener's player. That is a good place to include your Web site's URL.

When choosing a codec, carefully consider the number of simultaneous streams you want to support and the total bandwidth available on your server (and the bandwidth therefore available to each audio stream); then, select the codec to match. Also consider the type of connection your listeners are likely to have. A 28.8 kbps modem can support a 20 kbps RealAudio stream in stereo (see Fig. 4). Faster connections will support higher bit rates. The *Real-System 8 Production Guide* (available at [www.realnetworks.com/devzone](http://www.realnetworks.com/devzone)) provides the information you need to choose your codec wisely.

If you're streaming files with the *RealSystem Server*, you don't need to choose just one bit rate. *RealProducer's*

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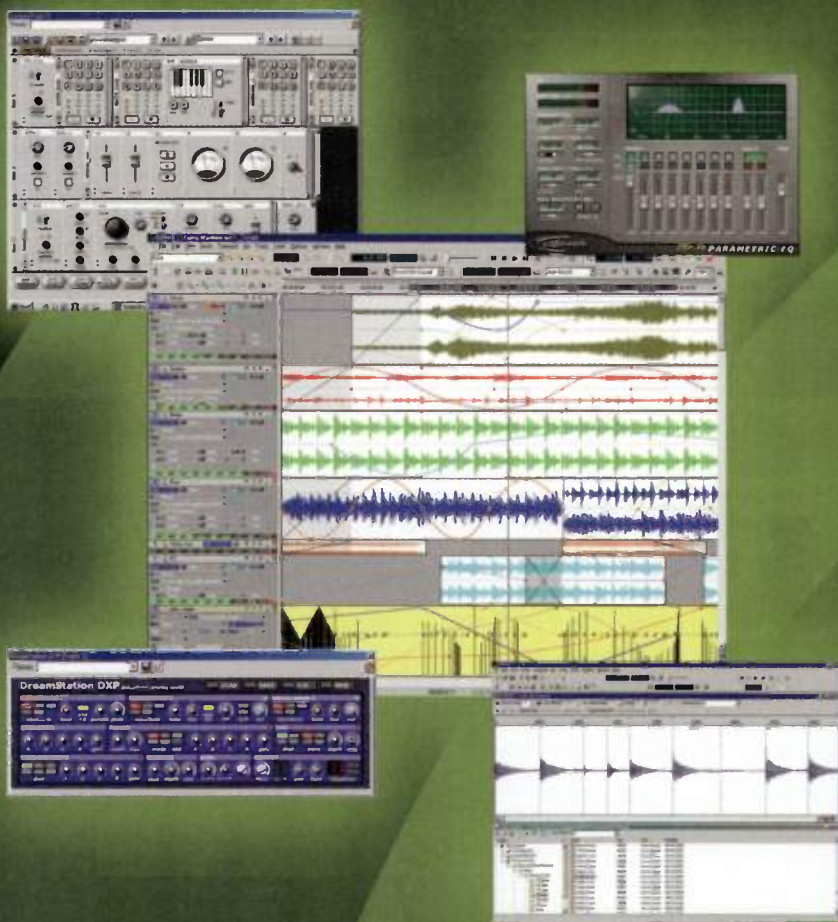
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For a list of soft synth developers supporting the new DXi plug-in standard, visit [www.cakewalk.com/dxi](http://www.cakewalk.com/dxi)

For more information, visit [www.cakewalk.com/sonar](http://www.cakewalk.com/sonar) or call 888-CAKEWALK (617-423-9004 outside U.S.)

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## SPECIAL DELIVERY

SureStream option creates a single file containing audio encoded at as many as eight rates. The listener's connection speed determines which version is streamed. (The freebie *RealProducer Basic* encoder lets you choose only two of the eight rates. If you want to use more, you'll have to purchase the *Plus* version.) If you use HTTP streaming, you won't be able to detect the listener's connection speed automatically, so it's wise to make two or more versions available and allow the listener to choose.

**Windows Media Audio.** The main competition to RealAudio is Windows Media Audio (WMA). When something becomes popular, like Web-distributed

## STREAMING MP3s FOR FREE

Emmy-nominated sound editor Skip Adams runs Global Graffiti, a production-music service for TV, film, and radio. "Most people don't realize that they can stream MP3 files from their own Web site just like MP3.com does," Adams says. "What's more, you don't need a special server or software."

By using heavy data compression, Adams creates MP3s that stream reliably over 28.8 kbps modems. He encodes the files at 16 kbps, 11 kHz mono. "In terms of sound quality, you won't notice a huge difference between these files and their somewhat larger cousins," he says. "Better to stream than dream." As a service to *EM* readers, Adams has put a streaming MP3 tutorial on a secret page of his site, [www.globalgraffiti.com/demo.htm](http://www.globalgraffiti.com/demo.htm). Click the 16 kbps link and see what you think.

—David Battino



AUDREY GOODMAN

music, Microsoft usually muddies the waters by jumping in and releasing a competing, proprietary standard that it touts as better. But if file size is your

main consideration, Windows Media Audio 8 deserves a look: a WMA file at 96 kbps is said to be comparable to MP3 at 128 kbps. In our tests, we found

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the 96 kbps quality to be high—a good choice for online distribution.

WMA is getting increasingly wide support because the *Windows Media Player* is included with Windows. In fact, WMA support will be an integral part of the upcoming Windows XP. A Macintosh version of the player is also available.

If you want to create downloadable WMA files, version 7.1 of the player is all you need. Unfortunately, that player isn't available on all key platforms—missing are versions for Windows 95 and NT. (Version 7.0 is available for Mac.) You can also encode WMA files with *Windows Media Encoder 7.1* or *Windows Media 8 Encoding Utility*. The lat-

## HAVE MERCY

Vocalist and composer Amy X Neuburg heads the "electronic avant-cabaret" ensemble Amy X Neuburg and Men. When designing her site ([www.isproductions.com/amy](http://www.isproductions.com/amy)), she tried to think like a potential fan. "Even with DSL, I don't have the patience to download entire MP3 songs just to get a taste of what someone is up to," she says, "so I suggest offering quicker options. On my page, I only include short segments in Real-Audio, with links to my MP3 songs at MP3 service sites. That saves time for the surfer and gets the point across. I'm assuming most people won't necessarily want to hear all five minutes of a song just to get an idea of what my music is like; my site is basically for promo. So I pick my favorite 30 seconds or minute and post just that. That also allows me to use my allotted server space more efficiently. I can post lots of short segments instead of just a few long ones."

—David Battino



AUDREY GOODMAN

ter offers more flexibility, including batch processing; both are free downloads. Several audio editors support

WMA export as well. For streaming, download *Windows Media Services 4.1* from Microsoft's site. It's supported on

## Hear What The Hype Is All About

"The C-3 is THE HIP new guitar mic. It gives your Marshalls that phat-gut-punch we all crave. I'll never cut another record without one."

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**Ted Perlman** - Producer/Arranger/Composer  
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One of the best vocal mics in the world is the \$300 Studio Projects C1. You can spend way more for "one of those" mics from Germany if your ego demands it, but the C1 is certainly the sonic equivalent.

**Pete Leoni** - Producer Engineer, Tech writer and reviewer



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NT Server 4.0 and built into Windows 2000 Server.

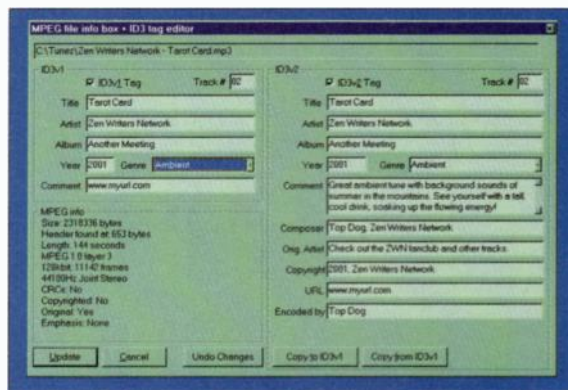
The free *Windows Media Encoder* isn't as user-friendly as some encoders; in fact, many of the options are downright confusing. We therefore recommend using its New Session Wizard. Select "Audio"; choose the input and output files; and finally, choose the codec. The 96 kbps codec provides excellent compression—about 95 percent—with few artifacts.

Microsoft has done some work toward maintaining content security. After all, if you want to receive compensation at some point, it will be difficult with all those digital copies floating around. You can use *Windows Media Rights Manager* to lock digital copies of your music. A license, specific to an individual's computer, unlocks the file and makes it

playable. That isn't a technology you can likely implement on your own; you'll have to go through one of the third-party companies listed on Microsoft's site. That said, be warned that hackers have broken most audio encryption and watermarking schemes to date.

**QuickTime.** The new QuickTime 5 is the latest iteration of Apple's popular multimedia authoring format; *QuickTime Player* supports MP3 streaming directly at last. (Version 4 required listeners to copy and paste the MP3's URL into the player.) Needless to say, QuickTime is supported well on the Macintosh, but the player and plug-in are also easy to install on Windows.

Like products from Real Networks, QuickTime is primarily aimed at video (the file extension is MOV), but audio-only movies are a viable distribution method for your music. QuickTime is



**FIG. 3:** ID3 tags, which store text information (and even graphics) inside an MP3 file, are an excellent way to communicate with your listeners. Take the time to set them up in detail.

really a container format; it supports a large number of codecs, including MP3 and numerous video codecs. However, its ace in the hole is the QDesign Music codec, which offers good quality at high compression rates. To encode QuickTime files, you need the \$29.95 *QuickTime Pro* or an audio editor such as TC Works' *Spark* that features built-in QuickTime encoding. If you want your QuickTime

## WHAT ABOUT MIDI?

MIDI is another important option for posting music files on your Web page. MIDI files contain no sounds, just control information. Although the files can be quite small, you have little control of what sound your MIDI file produces when it reaches the surfer's sound card. The visitor to your site may not have a synthesizer that supports the General MIDI (GM) sound set (some computers still contain low-quality FM synthesizers). Even if a GM synth is on hand, not all GM synths are created equal.

MIDI has its place on the Internet, but be aware of its limitations. If you have a carefully crafted MIDI file that is intended to play back on a Kurzweil K2600, you probably don't want to post it on your site. However, if you have a piece that uses traditional sounds from the GM sound set and you think your music can with-

stand a range of realizations, MIDI is certainly an option to consider.

Another Web format worth mentioning is Beatnik's Rich Music Format (RMF). The *Beatnik Player* plug-in is easy to obtain and install. RMF files can combine MIDI and audio, and they support compression and streaming. You can customize the appearance of *Beatnik Player* on your Web page. To create RMF files, you need *Beatnik Editor* (available at [www.beatnik.com](http://www.beatnik.com); \$129.95).

Ideally suited to making your site interactive, Beatnik can be adapted to a range of situations. The Beatnik Web site has excellent tutorials and documentation. For more details, see "Desktop Musician: The Beatnik Player," in the December 2000 issue.

Another great thing about *Beatnik Player* is that you don't necessarily have to use RMF files. Although the RMF format is optimized for use on the

Web, audio and Standard MIDI Files also work. *Beatnik Player* includes its own software synthesizer, so if you use MIDI, you'll know exactly how your files will sound when they're played back.

One final MIDI option is to post your music in the form of a notated score. Some notation programs, such as Sibelius Software's *Sibelius* and Coda Music's *Finale*, have plug-ins that let you do just that. Visitors to your site can view the notation, play it back, and even transpose the music to another key. *Scorch* is the Sibelius plug-in, and Coda's product is *Finale MusicViewer* (Windows only). Both plug-ins are free and easy to install. Sibelius Software ([www.sibelius.com](http://www.sibelius.com)) and Coda Music ([www.codamusic.com](http://www.codamusic.com)) have excellent information about creating Web pages to display your music in their respective score formats.

—Peter Hamlin



# BAND-IN-A-BOX®

Program for  
Windows® &  
Macintosh®

## VERSION 10 FOR WINDOWS® IS HERE!

\* NOTE: Band-in-a-Box for Macintosh® is currently available at version 8.0

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The Live Harmonies feature has been enhanced, so that when the program is stopped you can play harmonies that follow the chords you play. There's also a Chord Preview Builder. This feature allows you to hear how a chord sounds before you select it from the popular chord types offered. You'll also want to check out the new "Ear Training Window" which will provide you with endless hours of chord and interval recognition exercises.

The Digital Audio Recording feature has been enhanced; now you can harness the power of the popular DirectX audio plug-in format with DirectX support. There's also an Audio Edit Window to allow you to make easy edits and overdubs of your audio track, and when you're ready to let others hear your composition, you can "burn" it directly to an Audio-CD with your CD-R or CD-RW drive. You can even save your composition in Windows

Media Format, leaving you with a file all ready to be uploaded to your web site and played over the Internet with great fidelity over a wide selection of streaming rates.

Band-in-a-Box Version 10 also includes notation printout enhancements such as Print-Preview, Print-to-JPG (viewable on your Web site) and a Print Chords-only fakebook-style leadsheet. *And much more...*

"...one of the few music products  
that sits in the 'must-have' category."  
Sound On Sound, July 2000

#### MORE FEATURES IN VERSION 10...

**OVER 150 STYLES INCLUDED:** Jazz, Latin, Waltzes, Pop/Rock, Classical, Country, Folk, Ethnic, Euro-Tek, Fusion, Blues, Unplugged, Praise and Worship, and more!

**AUTOMATIC SOLOING.** Simply select the soloist you'd like to hear and play with (from over 100 available) and Band-in-a-Box will create & play a solo in that style, along to any song! This is hot!

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**STANDARD MUSIC NOTATION** and leadsheet printout of chords, melody and lyrics. Enter your songs in standard notation & print out a standard lead sheet of chords, melody and lyrics.

**AUDIO TRACK.** Add vocals or any instrument to your Band-in-a-Box song.

**NEW IMPROVED GUITAR SUPPORT.** Animated Guitar Fretboard Window – displays any track; Guitar tablature – on-screen or print out notation complete with Guitar TAB.

**BIG LYRICS WINDOW.** Great for singalongs and Karaoke!

**BUILT-IN SEQUENCER ALLOWS YOU TO RECORD OR EDIT MELODIES.**

**BUILT-IN STYLEMAKER™.** You can create your own 5 instrument styles using the StyleMaker section of the program.

**AUTOMATIC HARMONIZATION.** You can select from over 100 harmonies to harmonize the melody track, or harmonize what you play along in real time. Play along in "SuperSax" harmony, or harmonize the melody with "Shearing Quintet". Create your own harmonies or edit our harmonies.

#### Burn your own Audio-CD!

Now you can convert ("burn") your Band-in-a-Box composition directly to an Audio-CD. The resulting CD will play in any standard Audio-CD player.

NOTE: this feature requires a CD-R or CD-RW drive.



"Guitar Tutor" shows you real guitar chords on the guitar fretboard!

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The MegaPAK contains "the works" – version 10 PLUS Styles Disks (1-26), all Soloist Disks (1-9), Melodists (1,2), The MIDI Fakebook & PowerGuide Instructional CD-ROM and bonus software **SlowBlast!** (Windows® version only)

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Includes Band-in-a-Box version 10 upgrade PLUS Styles Disk 24

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✓ **NEW! Styles Disk 26 – Classic Country**

✓ **MORE STYLES DISKS:** Styles Disk 23 – Contemporary Country • Styles Disk 22

– 60's British Invasion • Styles Disk 21 – Top 40 • Styles Disk 20 – Southern

Gospel • Styles Disk 19 – Requested • #18 – Praise & Worship • #17 – Unplugged

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files to stream, check the Prepare for Internet Streaming and Fast Start-Compressed Header options when you decode files.

You can snag a free program called *MakeRefMovie* from the QuickTime Tools section of Apple's developer site (go to <http://developer.apple.com/quicktime>). That 156 KB gem enables you to create a reference movie (actually just a minuscule pointer file) that automatically selects the appropriate QuickTime file based on the listener's connection speed. You simply upload the reference movie along with QuickTime files optimized for different connection speeds, and then you link to the reference movie on your Web page.

## LINK AND GROW RICH

Once you've squashed your audio files, upload them to your Web server and create a Web page containing links to them. You'll probably need an FTP program to do the upload; plenty of free-ware and shareware candidates are available. As an alternative, your Web host may provide a Web-based interface for uploading files.

Here is the complete but simple HTML code for a Web page that links to a downloadable MP3 file:

```
<html>
<body>
<a href="mysong.mp3"> Click to download my
song.</a>
</body>
</html>
```

Unfortunately, the action triggered by clicking on the link depends on

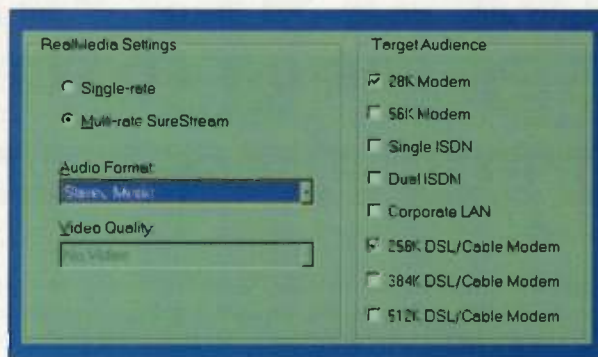


FIG. 4: If your delivery solution doesn't support multiple bit rates in one file (as *RealProducer* does when used with *RealServer*), consider creating lo- and hi-fi versions.

how the listener's browser is configured to handle the file type. The file may be downloaded; played by a plug-in, opening pop-up transport controls; spawn a dialog box asking how the visitor wants to handle it; or even spew meaningless text in a new window. To ensure that the file downloads, you can provide instructions for Macintosh users to Option-click and Windows users to right-click on the link and then choose the Save to Disk option from the resulting dialog box.

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## ANIMATE YOUR MUSIC

Posting audio files on the Web is a great start, but why not give your visitors something to look at as well? Dave O'Neal—composer, sound designer, and animator for 8Legged Entertainment's *Deep Fried, Live!* ([www.8legged.com](http://www.8legged.com))—did just that and found the process synergistic. He composed the music in the animation program Macromedia *Flash*.

"In our 'King Prawn' episode, there were several segments that called for a spacey, sci-fi soundtrack that musically highlighted events in the show," O'Neal says. "So I recorded some creepy ambience; string swells; abrupt piano chords; and eerie, wandering piano lines. Then, I imported them into *Flash*. As I built the scene graphically, I used the musical elements to articulate actions on screen, such as the confused expressions of the octopus chef or the surprise arrival of a gigantic radioactive shrimp. All the sounds were set to stream, so *Flash* mixed them to a single audio track as the movie was published. The result was a creepy soundtrack nicely integrated into the scene."



—David Battino



# the purest path to digital

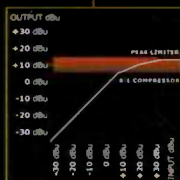
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Combine eight channels of award winning, pristine mic preamplification, limiting and EQ Enhancement with 24bit digital and analog output and the Digimax seamlessly fits into any digital recording situation. The Digimax is the perfect front-end for DAW's and adding mic-pre's to digital mixers and sound cards. What do MOTU™ 2408, Digi001, Mackie™ HDR, Tascam™ MX2424, Ensoniq™ Paris, Yamaha™ AW4416, have in common? They are all compatible with the Digimax!

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- Eight Dual Servo Mic Preamps with 48v phantom, 2 Instrument Inputs
- Class A / Discrete Input Buffers, Ultra Low Noise
- Eight Dual Domain Limiters
- Eight EQ Enhancers
- 32kHz, 44.1kHz or 48kHz, 24 Bit A/D Converters
- Eight Balanced Analog TRS Outputs
- ADAT Lightpipe Output, AES/EBU or S/PDIF
- All 24 outputs, (analog and digital) operate simultaneously
- Word Clock In and Out via BNC connectors

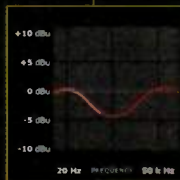


## What Makes a Limiter Musical?

Most limiters use only Peak Detection. Most compressors use only RMS detection. The Digimax uses both RMS and Peak detection simultaneously to give you the benefit of maximum gain before clipping while maintaining the musical transparency of a compressor. The end result? A fast, musical, natural limiter with the ability to catch anything you throw at it.

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The Digimax interfaces with more gear than any mic-pre on the planet! Need balanced analog outputs? How about 24 bit ADAT outputs? What about 24 bit AES/EBU or S/PDIF? The Digimax gives you all of these outputs and up to 24 channels *simultaneously*! So you'll never have a problem sending your audio across multiple platforms, both digital and analog.



## Add Some "Crystal" To Match Your Mic or Instrument!

Each channel of the Digimax features EQ Enhancement which provides a pre-set EQ curve. EQ Enhancement helps to tame excessive midrange and accentuate presence for any audio source that may possess a characteristic midrange rise. This unique feature adds sheen and punch to any signal.

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## EMBED TOGETHER

If you want to be a little slicker, explore the HTML Embed command. That command lets you assign a sound to a Web page or to a link in a Web page. The parameters for the command determine the size and behavior of the playback controller.

The following example embeds a QuickTime audio-only movie file, displaying a transport control that is 120 pixels wide by 16 pixels tall:

```
<embed src="feelings.mov"
autoplay="false"
width="120" height="16">
```

Setting autoplay to "true" would have caused the sound to start playing as soon as it was loaded. In the next example, additional parameters specify volume, back-and-forth looping, and a page that opens if the visitor doesn't have the required plug-in:



FIG. 5: Mousejam.com uses QuickTime in innovative ways. Click on the controller bars to play sound effects, or "scratch" the audio by Control-clicking (Alt-clicking on a PC) between the Fast Forward and Rewind buttons.

```
<embed src="creepingvapor.mov" autoplay =
"true" volume="100" width="160" height="16"
loop="palindrome" pluginspage=
"http://www.apple.com/quicktime/download/">
```

For creative and well-documented QuickTime-embedding examples, visit

## FILE PREPARATION

"To reduce bandwidth, some sites automatically convert your music to mono when you submit it," says Kevin Hammer, Webmaster for the Music Technology Learning Center ([www.mtlc.net](http://www.mtlc.net)). "So after you've finished your mix, listen to it once again in mono to check for phase cancellation or other problems."

Hammer, who's in the band Infinity Minus One ([www.infinityminusone.com](http://www.infinityminusone.com)), also recommends being less subtle with your mixes when mastering for the Web. "Some subtleties that might sound great on a CD or a high bit-rate MP3 either get lost or just sound bad when converted to a streaming format," he says. "For example, sounds in the very upper and lower registers will often disappear. Don't spend a lot of time creating very delicate textures in these regions, because they probably won't be heard by the listener."

Hammer also recommends being conservative with effects when mixing. "Some sound cards add reverb to audio playback by default," he says, "so if your song has a lot of reverb on it already, this might put it over the top."

—Dennis Miller



# Armed for the Future.

## INCA88

The INCA88's EWDM driver is capable of Multitask - Client and Multi-Streaming

functions that allow you to use different applications at the same time - even on the same output ports. The INCA88 features low latency at 3ms (ASIO driver) and 1.5ms (in Sonar), making it ideal for sequencing/recording software and virtual synthesizers. The INCA88 comes complete with 2 headphone outputs and an AC3 Digital Output for surround sound and DVD entertainment.

Offering 5.1 channel surround sound, the INCA88 is a multifunctional system designed for desktop music production.

With the INCA88, 8 analog inputs and outputs give you a multitude of choices. All 8 outputs of the INCA88 can be set for a 5.1 channel surround sound system, which will allow you to produce your own 5.1 mixes with audio software supporting surround sound mixing.

MSRP \$ 279



### INCA88

- 8 In / 8 Analog Outs with digital S/PDIF Output
- 5.1 Channel DVD Surround Sound
- 2 Mic Ins / 2 Headphone Outs
- 3ms latency (ASIO) or 1.5ms (with Sonar)
- Mic Preamp with Phantom Power supply
- Individually Shielded Cable for breakout box
- Active Filtering for extensive dynamic range
- 6 Layer PCB for interference reduction
- Optical/Coaxial Digital Output with AC3
- Windows 98SE/ME/2000 compatible
- Windows XP Ready

## MAYA44

AUDIOTRAK introduces the MAYA44; a classic audio card featuring superb

compatibility with recording software and virtual synthesizers.

It provides all the functions you need from a conventional soundcard plus what you require for a serious music production environment.

The MAYA44 provides 4 In/ 4 Out analog ports, an S/PDIF optical digital output, a MIC Input with Phantom Power, and even a Headphone output. As music production becomes more popular and affordable, MAYA44 is the perfect solution with support for ASIO 2.0, DirectSound, and MME drivers. It is also compatible with Cakewalk's new sequencing/recording application, Sonar. Featuring ultra low latency at 3ms (ASIO driver) and 1.5ms (in Sonar) with AUDIOTRAK's proprietary EWDM driver, the MAYA44 and the INCA88 may be the the fastest cards available in their market, making them ideal for sequencing/recording software and virtual synthesizers. For more information, contact your local dealer or AUDIOTRAK today.

MSRP \$ 119



### MAYA44

- 4 In / 4 Analog Outs with digital S/PDIF Output
- 1 Mic In / 1 Headphone Out
- 3ms latency (ASIO) or 1.5ms (with Sonar)
- Mic Preamp with Phantom Power supply
- Active Filtering for extensive dynamic range
- Optical/Coaxial Digital Output with AC3
- Windows 98SE/ME/2000 compatible
- Windows XP Ready



## Miditrak 2120

The Miditrak 2 In/2 Out Optional MIDI Interface can be connected to both the MAYA44 and the INCA88 internally without consuming additional IRQ's.





www.mousejam.com (see Fig. 5). For examples geared to other audio formats, enter "embed html" into your favorite search engine. (See "Desktop Musician: Web Audio Action" on p. 96 for more details.)

## STREAMING ALL OVER

Making files stream involves a little trick: you link to a text file that points to the audio file, not directly to the audio file itself. You can create this pointer file (or *metafile*) in a text editor such as *Notepad* or *SimpleText*. It should contain just the URL of your target audio file. For example, if you title your encoded RealAudio file *mysong.rm* and stored in your site's

Audio directory, the contents of the metafile would be:

<http://www.mywebsite.com/audio/mysong.rm>

You would then save the metafile as *mysong.rm* and put the following link on your page:

[Click here to play my song.](mysong.rm)

When your visitors click on the link, the RealAudio player will launch and play *mysong.rm*. You can put pointers to more than one song in a metafile, which will cause the songs to play sequentially. Just add a return between each URL in the metafile.

To have the stream played by the RealAudio plug-in instead of the player, substitute the RPM extension for the RAM extension in the metafile and the link; then, use an embed tag to call the metafile:

```
<embed src=
"http://www.mywebsite.com/mysong.rpm"
width=375 height=100 controls=all>
```

Up to this point, we've been describing HTTP streaming; the syntax is slightly different for *RealServer* streaming. HTTP streaming has several drawbacks. For example, you can't seek through the song with the playback-position slider, live broadcast isn't supported, and dropouts are more common. But the price sure is right.

You don't even have to get your hands dirty with HTML. *RealProducer Basic* can automatically create a Web page to link to your newly created RealAudio file; just select Create Web Page from the Tools menu and fill in the blanks. You can even publish the page

## SELF-PLAYING MP3s

As the Napster (www.napster.com) debacle showed, MP3 files are impossible to control once they're out there. An interesting shareware program for Windows called

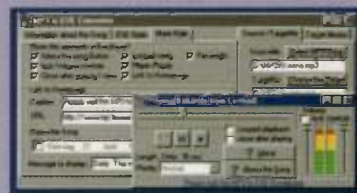


FIG. A: You can turn MP3s into standalone programs *MP3 to EXE*. The foreground window shows what listeners see when they open the file.

*MP3 to Exe* (www.mp3toexe.com) addresses that issue by letting you convert an MP3 file to a standalone player program. When the listener downloads and double-clicks on the file, it opens a window with transport controls, meters, and a clickable link to your Web site (see Fig. A). You can also specify an expiration date after which the song will no longer play, so there's an added modicum of security to this distribution method.

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# Powered Plug-Ins

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## No Compromises

Think about it. Ever had to trade quality for quantity in plug-in effects? With Powered Plug-Ins, create the project of your dreams without those painful trade-offs. Ever wondered if plug-in companies make compromises too? They do. We don't. With our single super-computer DSP chip we avoid the inherent limitations of multi-chip DSP cards. The result: ultimate plug-in power.

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No workstation on the market — at any price — matches the UAD-1. Take the most popular (and expensive) DAW available today. Multiply its power by three. Now you're close (for a whole lot less!). Imagine a project with 8 RealVerb Pros or 32 EQs, 16 compressors and 3 RealVerb Pros running simultaneously — all of a quality previously limited to pricey high-performance workstations. With no hit to your CPU, you've got tons of overhead for more tracks, automation and native effects. This is serious stuff.

## Best of Both Worlds

Powered Plug-Ins combine the value of native systems with the power of dedicated DSP. And because they're from the Analog Ears and Digital Minds of Universal Audio, you get the best of the analog and digital worlds, with obsessively exact digital emulations of our very own 1176LN™ and LA-2A™ Vintage Compressors™.

## Are Your Plug-Ins Powered?

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> RealVerb Pro™



> Vintage Compressors™  
(1176LN and LA-2A)



> UAD CS-1  
Channel Strip™







you created from right inside *Real-Producer*. Click on Publish Web Page, also in the Tools menu, and fill in the FTP coordinates and passwords for your Web site. Within less than a minute, the music we encoded was linked to a Web page and ready to go.

### MP3 STREAMING

The metafile trick works with MP3s, too. In that case, you just use the extension M3U. (For a tutorial, see the link in the "Streaming MP3s for Free" sidebar.) You also have a number of commercial choices for Webcasting music in MP3 format. The simplest is Shoutcast, which lets you use your local Shoutcast-compatible MP3 player—

including *Sonique* and *Winamp* for Windows, *Audion* for the Mac, and *XMMS* for Linux—along with additional drivers to link into the Shoutcast network and provide your streaming music to the world.

It's free and easy to install. Instructions and the software components are available at [www.shoutcast.com](http://www.shoutcast.com). You can even attach a microphone to your computer and mix voice-overs into the broadcast. When you're up and running, you can get listed on the Shoutcast directory so listeners can find you.

Another option for streaming is Icecast, a free, open-source streaming technology. Packages are available for Windows and Linux. The source code is also available for programmers.

Live365.com has almost 40,000 stations running as of this writing, and you could become one of them, spinning your tracks. It supplies the tools, bandwidth, and 365 MB of storage space. All you do is go to the site, register, down-

load and install the software, and you're ready. Playback quality varies depending on the broadcaster's connection speed. Broadcasts can be received by Live365's *Player365*, *RealPlayer8*, *Winamp*, *Sonique*, *MusicMatch*, or *Windows Media Player*. Listen.com provides a similar service.

### GO, STREAM, GO!

There are many ways to get heard online. This is just the beginning of a new era of music distribution. If music is your passion, there's never been a better time to share it. So build a Web site, encode some files, and give your musical gifts to the world.

*Eric Bell is a writer, programmer, and musician; Karen Bell is a technical writer and artist. They live in Canada, where the streams are clear.*

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## Take Control of Your Room!

### London-14 Studio



- 1 Europa Flutter Wall
- 2 Scandia Scatter Blocks
- 3 Orientique Washboard
- 4 Australis Bass Trap

Face it. Most project studios and post-production rooms are built in typical rectangular rooms. You spend thousands of dollars on gear only to battle standing waves, flutter echo, and all the hash that makes it difficult to get a good mix. Battle no more.

Introducing Primacoustic. A new concept in broadband acoustical treatment that is easy to install, affordable, and has the look and performance of an architecturally designed studio.

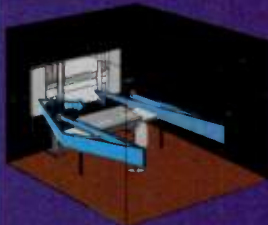
Primacoustic is based on a modular concept whereby precision-cut acoustical absorbers are combined to resolve the four main problems common to all square rooms: The Europa Flutter Wall controls 'front to back' flutter and works with the Scandia Scatter Blocks to reduce standing waves. The Orientique Washboards reduce side wash and powerful primary reflections. The Australis Bass Trap is a corner wedge that tightens up bass and brings balance back into your room.

### Calling London for Under \$600\*

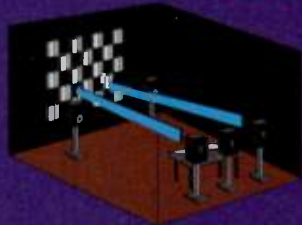
The London-14 is one of the more than dozen studio packages available. London combines all four acoustical systems into one affordable package (London Studios start at \$450\*). Other packages include the New York Voice Over Booths, Rio Video Suites and Montreal Studios. With complete rooms starting at \$200\* - no other acoustical treatment is as affordable or so effective! We even include the glue.

For more information call Primacoustic and ask for a brochure, visit our web site, or go to your local pro audio shop.

### Tell 'em you want to Take Control



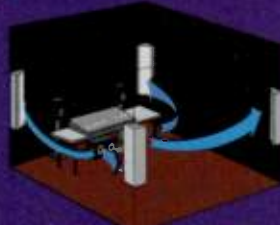
- 1 **Europa Flutter Wall**  
Reduces 'front to back' echo, standing waves and monitor fold back. Over 28 creative patterns to choose from. Prices start at \$150\*.



- 2 **Scandia Scatter Blocks**  
Affordable alternative to diffusion. Keeps room live and reduces standing waves. Over 12 creative patterns to choose from. Prices start at \$100\*.



- 3 **Orientique Washboard**  
Absorbs primary reflections and side-to-side flutter. Six creative patterns to choose from. Prices start at \$80\*.



- 4 **Australis Bass Trap**  
Effective down to 45Hz, tightens up bass and reduces smear. Can be used in corners or on walls. Priced at \$100\* each.

\*Suggested US retail price.





# Web Audio Action

***Make your Web site come alive with interactive audio.***

By Spencer Critchley

**T**here may be lots of audio activity on the Web (such as streaming and downloading), but not much of it is actually integrated *into* the Web. Just as sound is synched to picture in films, Internet audio must sync to onscreen elements before music and sound effects are truly integrated into a Web site's overall design.

In this article, I'll explore the ways to incorporate sound into a Web site and to make it seem like it belongs there.

That means going past the limitations of HTML, which by nature is page oriented, to understand the role of helper applications, scripting, and programming.

## PLAYING THE LINKS

Playing audio from a Web page depends on an audio-player helper application, such as a Netscape *Navigator* plug-in or an ActiveX control added to Microsoft *Internet Explorer*. The helper application might be the browser's default audio player or one of several third-party players, including *RealPlayer*, *QuickTime Player*, or *Windows Media Player*. The most basic way to play an audio file is through a simple hyperlink, such as this bit of HTML:

```
<html>
<head></head>
<body>
```

Here is a link to an audio file:

```
<a href="myAudioFile.au"> Click here for
a sound.</a>
</body>
</html>
```

At [www.spencercritchley.com/em/webaudio](http://www.spencercritchley.com/em/webaudio), you can try that as well as  
**(continued on p. 102)**

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### DA-2496 8x8 Multi-track Digital Audio Recording Interface



- 24-bit/96 kHz AD/DA converter
- 8 input - 8 output
- 1U-rack mount type break-out box & PCI interface card
- 48v phantom power for microphones
- Direct input for guitar (Hi-Z)
- MIDI in/out
- ASIO2.0 (WIN/MAC) MME (WIN), Sound Manager (MAC)

## ==EDIROL==

### UA-5 USB Digital Audio Capture Interface

- 24-bit/96 kHz AD/DA converter
- 2 input - 2 output
- RCA plus optical/coaxial S/P DIF input and output jacks, 2 XLR plus 2 1/4" inputs, 1 stereo input, 1 stereo output
- 48v phantom power for microphones
- ASIO2.0 (WIN/MAC), MME (WIN), Sound Manager (MAC)



## ==EDIROL==

### UA-3 USB Digital Audio Capture Interface

- 2 input - 2 output
- Discreet guitar and microphone inputs with level control
- 1 RCA stereo input and 1 RCA stereo output plus optical S/P DIF input and output jacks
- USB bus-powered, adapter-free
- MME (WIN), Sound Manager (MAC)



## ==EDIROL==

### UA-1D USB Digital Audio Capture Interface

- 16-bit/44.1 kHz AD/DA converter
- 1 stereo input - 1 stereo output optical/coaxial S/P DIF
- USB bus-powered, adapter-free
- MME (WIN), Sound Manager (MAC)



## ==EDIROL==

### UA-1A USB Analog Audio Capture Interface

- 16-bit/44.1 kHz AD/DA converter
- 1 stereo input - 1 stereo output RCA analog connections
- USB bus-powered, adapter-free
- MME (WIN), Sound Manager (MAC)



## ==EDIROL==

### MA-10D Amplified Digital Micro-Monitor

- 20w stereo amplifier powers both monitors
- 24-bit/96 kHz AD/DA converter
- RCA plus optical/coaxial S/P DIF input jacks,
- 2 way bass-reflex enclosure
- Wood grained cabinet finish
- Headphone jack



## ==EDIROL==

### SD-90 Complete USB Digital Audio Studio System



- 24-bit/44.1, 48 kHz AD/DA converters
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- MIDI with 1,024 instruments, 36 drum sets (64 polyphony, 32 multi-timbral)
- GM2/6S compatible rich sound source selections
- Guitar, vocal, ambience and mastering effects for audio
- ASIO2.0 (WIN/MAC), MME (WIN), Sound Manager (MAC)

## ==EDIROL==

### UM-880 8x8 USB MIDI Interface



- 8 input - 8 output MIDI connections
- Zero latency Hardware Direct MIDI Routing (HDMR) with Fast Processing Technology of MIDI (FPT)
- Convenient merge function
- 2 USB ports, one front - one rear
- Utility (Preview, Cable Check, MIDI Event Filter)
- MME (WIN), Sound Manager (MAC)

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## ==EDIROL==

### MA-10A Amplified Analog Micro-Monitor

- 20w stereo amplifier powers both monitors
- 2 way bass-reflex enclosure
- RCA input connections
- Wood grained cabinet finish
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**Reaktor** is a complete sound design studio that can be used as a synth, a sampler, an effects processor, a groovebox, and much, much more!

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The Retro **AS-1** is extremely powerful software that delivers classic analog synth sounds, mind-warping effects, wicked filters and up to 32 notes of polyphony. **Voodoo** rhythm software turns your computer into a programmable beat box that plays samples and standard MIDI files. You can trigger real-time samples and drum patterns from your computer keyboard, MIDI controller, or MIDI application running on the same CPU.

## **KOBLO**

The **Studio9000** is a cutting edge, host-based package with four powerful tools for your creative muse. In this one bundle you get two monophonic, top-shelf analog-modeling synths, an excellent polyphonic sampler, and a kickin' multi-timbral drum machine.



## **DirectConnect**

Now, with Digidesign's DirectConnect plug-in you can stream the output of your favorite software synthesizer or sampler and mix and process them directly into Pro Tools!



Koblo





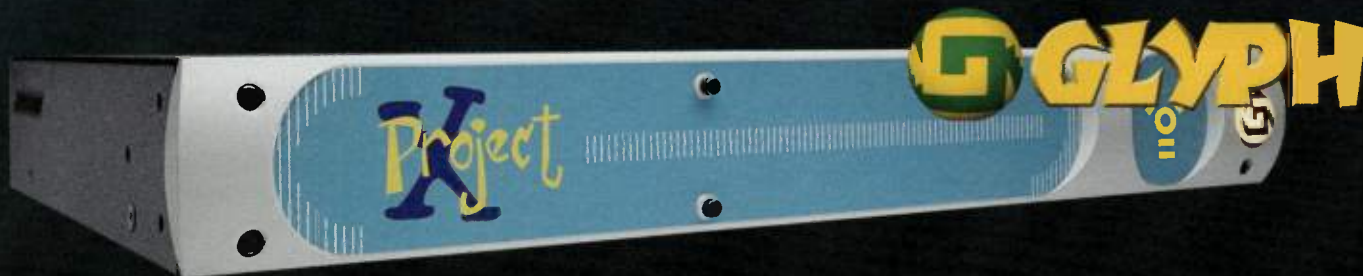
**CM  
Labs**

### **Motor Mix: Real motorized faders for your DAW!**

The convenience and power of your digital audio workstation meets the intuitive "feel" of a hardware mixing board! The Motor Mix brings you the best of both worlds, letting you seamlessly integrate with your DAW for the ultimate in efficient, intuitive operation. 8 Motorized 100mm motorized faders give you just the right amount of tension, while control banks give you fast, easy access to all your channels – why scroll and click through a series of windows when all you need to do is press a button?

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(continued from p. 96)

the other examples. As you will see, when you click on a link such as that, the helper application is supposed to launch and play the file; see example 1 on my Web site for more information. The behavior of the audio file when it is played varies widely depending on which helper application is installed, though. From a design point of view, that behavior is not very integrated, because you don't have a lot of control over what happens on the user's machine.

## EMBEDDING AUDIO

The first step beyond just linking from a page to an audio file is *embedding* the audio in the page. Actually, what you're embedding is an *instance* of a helper application, which plays the audio. (An instance of an application is created whenever an application is launched and loaded into memory. Frequently, you can have more than one instance of the same application running.)

From an interactivity standpoint, em-

Here is an embedded audio file:



FIG. 1: This example illustrates a typical controller interface for an embedded audio file.

bedding has several advantages. The audio can reside within the page along with the text and images. Typically, the audio file and the rest of the page are loaded into memory so that once the page has finished loading, the audio is ready for playback without a noticeable delay. That responsiveness is crucial for successful interactive design. Depending on the helper application, you could also have a fair amount of control over what kind of playback interface, if any, is presented to the user.

Fig. 1 shows how an embedded audio file might appear on a Web page (see online example 2). Any browser installed or updated in the past few years (*Navigator* 3.0 and later or *Internet Explorer* 4.0 and later) should be able to play an embedded audio file if the audio is in a standard format (see the sidebar "Web Audio Formats").

Embedding can also have some shortcomings. Because the file is typically loaded into memory, embedding is not a good choice if you work with large audio files or many small ones. Transferring a lot of audio data across the Internet slows down the page load and may take up more memory than is available on the user's computer. Loading the entire file isn't always necessary; many embeddable players allow streaming, so the audio file plays as it arrives from the Web server.

Without the effort of extra scripting, interactive control is typically limited to playing, stopping, cueing, and setting the volume. Managing layers of audio without extra scripting is also difficult. You can embed multiple audio files, but any attempts to synchronize them or control their volumes will likely end in frustration.

## FORMAT FINESSE

Your audio format choice should be based on several factors, including its

## WEB AUDIO FORMATS

Standard Web-audio formats include AU, MP3, MIDI, WAV, and AIFF. Popular proprietary formats include Flash, RealAudio, QuickTime, Windows Media, and Shockwave. Proprietary player applications can often play several standard formats, and in some cases, they can play proprietary formats from other companies.

The AU file extension refers to the Sun Microsystems audio format, which is the original Internet-audio format and therefore the most widely compatible. Because the format is limited to 8-bit samples, it's not the best sounding, though  $\mu$ -Law or a-Law data compression improves its performance.

WAV and AIFF are also widely compatible and capable of the highest quality, but there's little reason to use them on the Web anymore because compressed formats such as MP3 sound good and are much smaller. MIDI files are tiny, but unless you're using a MIDI-enabled player such as *QuickTime Player* or *Beatnik Player*, MIDI files are played with whatever MIDI sound set is installed on the user's computer, with widely varying results. (For more about QuickTime's MIDI capabilities, see "Desktop Musician: Customizing QuickTime MIDI" in the May 2001 issue.)

**Less-standard formats.** Liquid Audio matches high-quality data com-

pression with flexible security and is oriented more toward distribution than interactivity. Ogg Vorbis is an open-source, free-license alternative to MP3. Beatnik's Rich Music Format (RMF) is a hybrid of MIDI data and sample-based sound sets. (The QuickTime Musical Instruments set is a branch of the same family tree.) RMF yields very small files and high interactivity. (For more about Beatnik's capabilities, see "Desktop Musician: The Beatnik Player" in the December 2000 issue.) Sseyo's Koan also yields small, highly interactive files, though it's geared more toward generative composition.

RMF and Koan are examples of structured formats, in which descriptive information about the data remains visible to outside applications that can act on the data in real time. The difference between structured and unstructured formats (such as WAV and MP3) is like the difference between a fax and an e-mail. A fax is fixed on the page; you can't do much to change it beyond physically cutting up the paper. An e-mail remains infinitely editable. Some formats, such as QuickTime, can incorporate unstructured data and some structured data such as MIDI and animation sprites. Generally, structure is the trend. MPEG-4 aims to be the ultraformat, offering a structured approach to every form of media, all in the same file.



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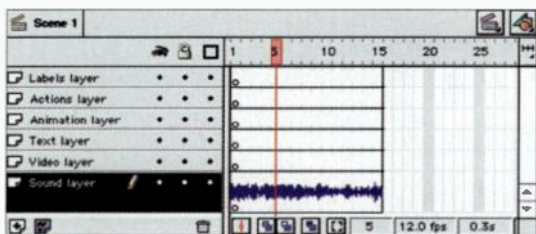


FIG. 2: This partial view of the *Flash* authoring environment includes several layers (left), the playback head, and the timeline.

compatibility with various browser versions. The most widely adopted helper-application formats are Windows Media, RealAudio, QuickTime, Shockwave, and Flash.

Take into account each format's audio quality at various bandwidths; some formats do better than others at certain bandwidths. The type of playback interface and the depth of interactivity you want are also important considerations.

For many formats, encoding doesn't cost anything. Your audio-editing soft-

ware might support Web encoding, or the Web site of the company that makes your player software may offer a free, downloadable content-creation tool (see the sidebar "Useful Resources"). The encoding process is usually well explained in each company's documentation, and wizards are often available to guide you through the pro-

cess. Some content tools, such as *Real-System Producer*, convert the audio and generate the HTML to embed the file in a Web page.

### IN THE CODE

The next example shows the HTML for embedding an audio file; go to online example 2 for more information. I use QuickTime because its code is relatively straightforward; you can do the same kind of thing with the other helper applications. The `<embed>` tag's attrib-

utes vary among individual players and between *Navigator* and *Internet Explorer*. The base attributes, observed by nearly everybody, are `<src>`, `<width>`, `<height>`, `<align>`, `<name>`, and `<hidden>`.

```
<p><embed src = "myAudioFile.mov"
height = "16"
width = "240"
pluginspage="http://www.apple.com/
quicktime">
</embed>
```

I used the `<height>` and `<width>` attributes of the `<embed>` tag to create a minimal audio-style interface that is 16 pixels high and 240 pixels wide. The `<pluginspage>` attribute directs the browser to the helper application if it isn't already installed. In my examples, I use `<embed>`, which is supported by *Navigator* 2.0 and later and *Internet Explorer* 3.0 and later. *Internet Explorer* also uses the `<object>` tag, and for strict compatibility, you may want to use both tags in the same page. A good HTML guide can help if you need more details.

The interface can have different dimensions as appropriate, or you can make it invisible, which might be an option for background music, spoken greetings, or ambient sound effects. You might also want the audio to start playing automatically. For QuickTime, that code looks like the following example (see online example 3).

```
<p><embed src = "myAudioFile.mov"
height = "2" width = "2"
hidden = "True" autoplay = "True"
pluginspage="http://www.apple.com/
quicktime"></embed>
```

The `<height>` and `<width>` attributes are each set to 2, not 0, because some browsers can't display an object with dimensions of 0. With some players, you may also be able to set a color attribute, which you could match with the background color of your page to prevent the user from seeing a 2-by-2-pixel dot.

Keep in mind that, from a design standpoint, it's risky to start audio automatically without giving the user a way to stop it or control its volume. You

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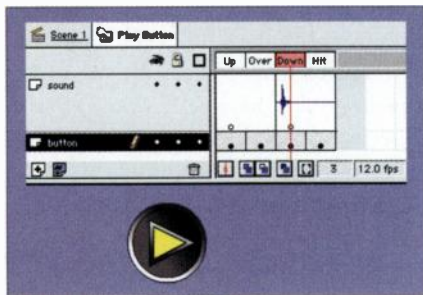


FIG. 3: *Flash* lets you trigger a sound by clicking on a button or another object.

might therefore want to seriously consider making the interface visible and think carefully before using <autoplay>.

If you do not want to write code by hand, visual Web-authoring tools such as Macromedia *Dreamweaver* can often write it for you. *Dreamweaver* makes it easy to embed Flash and Shockwave files, because they are Macromedia formats. With free extensions, downloadable from the Macromedia Exchange, *Dreamweaver* can automatically embed RealAudio, QuickTime, Beatnik, and other formats. Other Web-authoring programs, such as Adobe *GoLive*, offer similar capabilities.

### SYNC ME

It's surprisingly tricky to synchronize events on a Web page, because browsers load and display page elements as they become available and do so at varying rates depending on the momentary state of the connection. Embedded helper applications make achieving sync possible, at least within a file if not across the page. Many player formats handle various media, so they can play sound and pictures together. For example, in most video-editing or animation programs, such as Macromedia *Flash* and Adobe *LiveMotion*, you can add a linear soundtrack; you can encode and embed the resulting file in an appropriate Web format. Online example 4 has a musical sting synched to a splash-screen animation.

In many cases, linear sync is not enough. True interactivity means responding to user gestures, such as rollovers and clicks. To achieve that kind of interactivity, you can go further with helper applications by one of two

routes: from the outside in or the inside out. *Outside in* means controlling the behavior of a helper application with a scripting language, which can be a code-heavy approach. *Inside out* means using the extensive capabilities already built into the helper applications.

### INSIDE OUT

Some helper applications are powerful enough that you can use them to create complete multimedia Web sites. In on-

line example 5, I reproduced my home page using *Flash*, and I added rollover sounds to the menu.

For interactive audio purposes, *Flash* is the best mainstream choice because of its combination of good audio interactivity and near-universal adoption. That doesn't mean you should ignore the other formats; several have fascinating capabilities and may be better choices for individual projects. However, the *Flash* player has emerged as

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the VHS of interactive formats. I'll point out the highlights of using Flash with audio; study the manual for the details, because *Flash* is quite deep.

*Flash* takes a timeline approach to content creation. A virtual playback head progresses along a series of frames, playing any images, text, video, sounds, and actions (scripting instructions) it encounters (see Fig. 2). In a *Flash* movie, the location of the playback head (and the execution of actions) can be controlled by onscreen buttons to provide interactivity.

The simplest way to incorporate audio in *Flash* is by importing one or more audio files and specifying at which frames you want them to start playing. You can also adjust volume, fade in or out, set looping behavior, and add simple effects. When you export a *Flash* movie, you can specify the type and quality of audio-data compression (typically MP3). *Flash* also generates the HTML needed to embed the movie in a Web page.

The next step might be to associate sounds with buttons. A button can look like an actual button, or it can be any object on the screen that you define as a

button; a tree might produce the sound of leaves rustling, for example. The button can be activated by a rollover or a click. In Fig. 3, I added a sound to a button that is triggered by a click.

Next, try importing short audio snippets that can be placed on multiple layers and played in different orders. In that way, it's possible to create evolving ambient sound environments or remix music in response to user actions. If you want to keep going, you can learn to program complex behaviors using ActionScript, *Flash*'s scripting language, which is similar to JavaScript.

## OUTSIDE IN

It's also possible to control helper applications from the outside in, using a scripting language, usually JavaScript. JavaScript integrates closely with HTML, and because it can control the browser and the helper application, it allows the addition of detailed interactivity to a Web page.

Becoming expert in JavaScript takes a lot of effort, especially if you don't have much programming experience. In the past, that effort was seldom worth the trouble for an audio person

unless he or she was working with Beatnik, because the way JavaScript communicates with helper applications varies greatly between *Navigator* and *Internet Explorer*. Consequently, Web pages have to be authored and tested for both browsers.

Except in the case of Beatnik, JavaScript isn't able to communicate with multimedia helper applications under *Internet Explorer* on a Macintosh because Microsoft has not implemented the capability on that platform. Beatnik's work-around for the problem is its MusicObject JavaScript library, which hides browser differences and enables deep interactivity. In addition, Beatnik has an Actionset extension for *Dreamweaver*, which makes JavaScript sonification of Web pages easy.

Unfortunately, Beatnik doesn't have a *Flash*-size installed base. However, some clever people with expertise in *Flash*, JavaScript, and audio figured out how to leverage *Flash* to provide some of the power of Beatnik's approach while keeping the benefit of the huge *Flash* user population. Working through the interactive-audio community, Sonify.org developer Hayden Porter has released

## USEFUL RESOURCES

### WEB SITES

<http://java.sun.com/products/java-media/sound>

This site offers information about the Java Sound API (application programming interface) for programming freestanding audio applications.

<http://sonify.org>

This nonprofit community site focuses on interactive audio for the Web. It provides many links to other sites.

[www.apple.com/quicktime](http://www.apple.com/quicktime)

This is the source for Apple's *QuickTime Player* and for *QuickTime Player Pro*, which adds important content-creation features.

[www.beatnik.com](http://www.beatnik.com)

Founded by musician Thomas Dolby, Beatnik, Inc. provides the *Beatnik Player*, content tools, and the MusicObject JavaScript library.

[www.builder.com](http://www.builder.com)

Replete with information on a variety of topics,

this CNET site offers "solutions for site builders."

[www.macromedia.com](http://www.macromedia.com)

Macromedia offers a variety of content tools and players and is the home of *Flash* and *Shockwave*.

[www.real.com](http://www.real.com)

RealNetworks makes *RealPlayer* and the associated content tools, including *RealSystem Producer*.

[www.sseyo.com](http://www.sseyo.com)

This is the home of the Koan format used by Brian Eno and others to create generative music.

[www.webmonkey.com](http://www.webmonkey.com)

Webmonkey: The Web Developer's Resource provides Web-authoring tools for beginners, builders, and masters.

[www.webreference.com](http://www.webreference.com)

This site is an excellent place to find information and tutorials about all aspects of Web authoring.

[www.windowsmedia.com](http://www.windowsmedia.com)

The home of Microsoft's *Windows Media Player*, this site includes many links, downloads, content-creation tools, and information.

[www.xiph.org/ogg/vorbis](http://www.xiph.org/ogg/vorbis)

This site features the license-free, open-source Ogg Vorbis MP3 alternative.

### BOOKS

*Designing Web Audio*

By Josh Beggs and Dylan Thede

This book concentrates on RealAudio, *Flash*, *Shockwave*, MP3, and Beatnik. It also looks at a few other formats.

*Digital Audio with Java*

By Craig A. Lindley

This book explains the digital signal processing (DSP) theory behind audio effects and shows how to build two sample applications: a phrase sampler and a guitar-and-bass tuner. It assumes familiarity with Java.



the free *FlashSound* JavaScript library. Using it still requires knowledge of *Flash* and JavaScript, but it's a great solution if you're willing to invest the effort. It doesn't always make sense to author entirely in *Flash*, and *Flash-Sound* lets you build a sonified site based on HTML. What's more, users who don't have Flash installed see the same site; it's just silent. I used *Flash-Sound* for the menu rollovers in online example 6.

### PROGRAMMING POTENTIAL

As I said, scripting languages such as JavaScript allow the control of other applications, and programming languages enable the development of applications themselves. Java (similar to JavaScript in name only) is a programming language that has good Web-audio functionality. One advantage of working with Java is that it lets you deliver interactive audio that doesn't require plug-ins. A small Java applet can be embedded in a Web

page, providing its own user interface and any set of behaviors the programmer decides to provide.

On the other hand, Java has until recently been limited to the 8-bit AU file format, so sound quality has not been great. That changed with the recent

▼  
**Take into account  
each format's audio  
quality at various  
bandwidths.**

Java 2, which uses a version of the more flexible Beatnik Audio Engine, though most browsers have not yet implemented it. (For more about working with Java, see "Java Jive" in the November 2000 issue.)

Shockwave is a format that bridges

scripting and programming. Using the Lingo scripting language in Macromedia's authoring program *Director*, you can create deeply interactive Shockwave applications, including games that incorporate several kinds of audio.

I covered a lot of information here, and if you haven't already created some Web content, the number of new concepts, techniques, and tools involved might intimidate you. I won't pretend that this stuff is always easy, but if you have experience with MIDI or digital audio, you're probably up to the challenge. As you know from those more familiar fields, the way to learn is step-by-step. Good luck!

---

*Spencer Critchley provides creative consulting and production services for BeVocal and other companies. He's the cofounder, with Tony DeYoung, of Sonify.org.*

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# Sounds in the Key of Life

***Tips and techniques for recording Foley effects.***

By Karen Stackpole

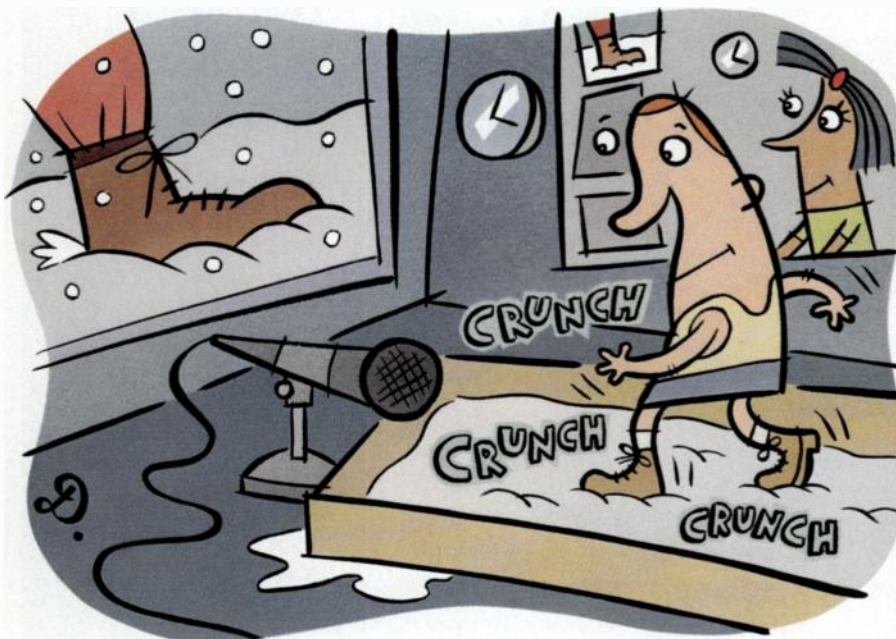
**W**ith music production an increasingly digital affair and countless imaginative choices a simple mouse-click away, it is reassuring to know that one stage of the game, recording, still offers room for true think-it-up-as-you-go creativity. Perhaps in no recording endeavor is that more true than Foley, a delightfully hands-on, shoot-from-the-hip art that thrives in the high-tech jungle of commercial audio.

Named after Jack Foley, who worked at Universal Studios for 40 years as a sound engineer, Foley is the art of creating sound effects for film, video, and other visual formats. One of Foley's more remarkable achievements was his aural enhancement of Stanley Kubrick's film *Spartacus*. To simulate the sound of 10,000 Roman soldiers marching to battle, Foley recorded the sound of large loaded key rings rhythmically jingling—a much easier solution than trying to record 10,000 men walking in unison on packed earth.

Although Foley is most commonly associated with motion-picture sound, its origins date back to the heyday of radio. Today, the art of Foley encompasses sound effects not only for radio, video, and film (including animation) but also for television shows and commercials, computer games, and audio CDs.

In general, Foley sounds accompany movements, typically character interactions with the environment: footsteps, fistfights, a door creaking open, and so on. Usually, an artist performs the movements on a Foley stage, utilizing props and various floor surfaces, while an engineer records the sound direct to picture (while the film is running).

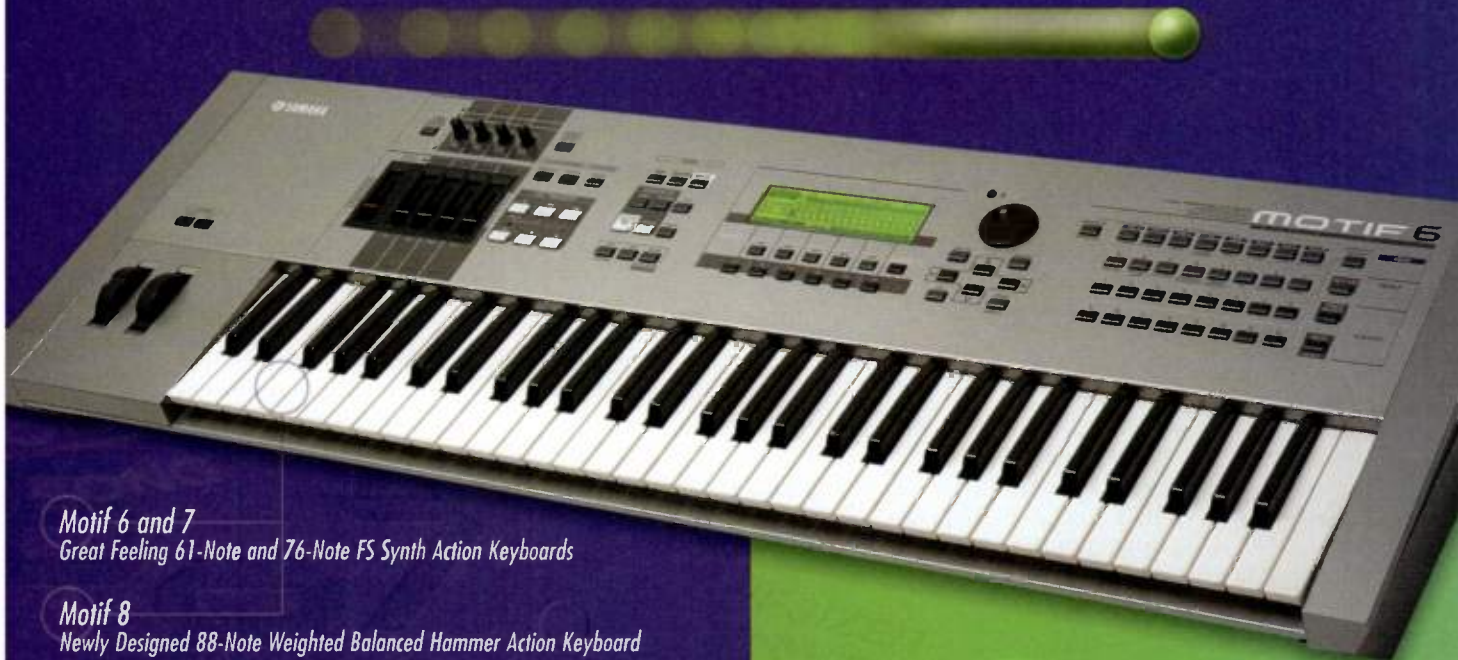
This column will cover technical and creative considerations for recording



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\* When converted to 16-bit linear format



The image shows a handwritten Foley cue sheet for the movie 'The Untouchables'. It is a complex table with multiple columns for different types of sounds and effects. The title 'Foley FX' is written at the top. The table includes columns for 'Scene', 'Time', 'Sound', 'Take', and 'Time Code'. Various sound effects are listed, such as 'Footsteps', 'Door Closes', 'Chair Scratches', and 'Glass Clatters'. Each entry is accompanied by a specific time code and a take number. The handwriting is in blue ink on a white background.

COURTESY DUKE ZAFFERTY

FIG. 1: A Foley cue sheet helps keep track of sounds, props, surfaces, takes, and time-code information.

Foley in the personal studio and provide tips about capturing commonly used sounds. Half of the fun of Foley is in challenging your imagination in addition to your technical expertise. A well-conceived, well-executed Foley track adds immeasurably to the visual medium and also can be gratifying to the recordist. Imagine tromping in a box full of dirt, rattling and pummeling junk, or doing whatever it takes to create the aural illusions required for the production.

## THE BIG FAKE OUT

Foley sounds fall loosely within two categories: *analogue* (not to be confused with analog) and *simulated*. The analogue sounds are created by the same means as the movement depicted. For example, to create a Foley effect for a film scene that shows a door opening, it makes sense to record the sound of an actual door opening. (For realism, it probably should be the same type of door.) Although less demanding imaginatively than simulated sound, analogue Foley is equally essential to the finished product.

A simulated sound is one that must be fabricated because it is not feasible to record an analogue event—Jack Foley's jangling key rings instead of an army, for example. The goal is to make the audience think it hears one thing (a Roman army) when in fact it hears another (jangling keys).

Most Foley effects mimic background sounds—those typically on the periphery of consciousness. Such sounds are con-

spicuous in their absence but must be subtle and convincing to go unnoticed when present. A Foley effect helps complete the visual and anchor it to reality, but it must not draw attention to itself.

First, make sure the signal going to the recording medium is sufficiently hot. Second, record the sound as cleanly as possible, without effects. You can manipulate levels later during mixdown and add effects if necessary. The idea is to create clean, solid, consistent tracks so you can give the mixer as much flexibility as possible. Mono recordings are generally preferable because spatial cues inherent in stereo tracks can present problems during mixdown.

It's also helpful, especially for ambience (room) recordings, to record a longer section than is necessary for the scene, leaving a *handle* on the beginning and end of the take. That's because edits may change or the mixer may choose to do fades between scenes.

## THIS IS THE PITS

You can construct a Foley pit from plywood and two-by-fours. A practical size is three by four feet with a depth of about one foot to accommodate adequate fill. A rubber mat or piece of foam rubber under the pit helps block unwanted sympathetic vibrations. Also, make sure your pit rests on a solid surface, such as concrete. If it's on a wooden floor or some other suspended base, the microphone may pick up a hollow resonance from beneath footsteps, which could foil your attempts at realism.

You can partition the pit so it is able to accommodate various surfaces

simultaneously. Common pit materials include sand, rock, gravel, dirt, tile, linoleum, concrete, and marble. Other handy items include a wooden pallet (to suggest the sound of a stage, dock, wooden stairs, and so forth), a metal grate (to indicate a catwalk, a ship's boiler room, or a spaceship), and a length of chain-link fence.

Always keep the final mix in mind while recording; that way, you can give the mix engineer options and make his or her job as straightforward as possible.

Recording formats commonly used on professional Foley stages include Tascam DTRS (DA-88, DA-98, and DA-78, as well as comparable Sony models) and Digidesign Pro Tools. That is good to know if you expect to interact with major recording facilities. But no matter what format you record to, synchronization is essential and almost always utilizes SMPTE time code. (For more information about SMPTE and synchronization, see "Desktop Musician: Synchronicity" in the July 2000 issue, "Square One: Picture Perfect Sound" in the September 1999 issue, and "That Synching Feeling" in the October 1996 issue.)

## CHAIN OF EVENTS

To ensure clean recordings, keep the signal chain between the sound source and recorder to a minimum: a microphone and mic preamp are usually sufficient. Both are critical to the success of Foley recordings.

There are three main criteria for selecting a microphone for Foley use. The first is transparency. A mic that sounds great for kick drum because of its huge low end and forward highs is certainly less than ideal for Foley.

Foley props provide the real fun. Give free reign to your inner pack rat. Items you've been hoarding may have unexpected sonic value, and so will many things available at junkyards, garage sales, and hardware stores.



Choose instead a mic with a flat, extended frequency response and as little coloration as possible.

The second criterium is the ability to pick up detail. Detail is crucial to providing the realism that is fundamental to Foley. For that reason, a condenser microphone is almost always the best choice.

Last but not least is low self-noise. Although certain loud sounds—trains, explosions, or waterfalls—may not require a quiet mic, often the Foley artist is recording ambient and other low-level sounds. Such sounds may require as much as 60 dB of preamp gain to get a sufficient level to the recording medium—enough to make a noisy mic audible in the mix.

Most professional Foley engineers prefer high-end microphones—for example, models made by Schoepps, DPA (formerly Brüel and Kjær), and Neumann (the U 87 is especially popular). Engineer Dave Nelson, of Outpost Film Center in San Francisco, favors the

small-diaphragm Sennheiser MKH 40 for his Foley needs. Larry the O of Lucas Digital is a fan of the Earthworks SR77 for the projects he works on at his personal studio, Toys in the Attic. Although that mic is not as quiet as some models, it is reasonably priced and, according to Larry the O, remarkably flat, transparent, and detailed.

The mic preamp should also be quiet, transparent, and detailed, with gain and headroom to spare. Because you will use lots of gain to capture low-level sounds, the preamp must remain quiet even under high-gain conditions. A preamp that sounds quiet at 40 dB of gain when recording a ukulele may not sound so quiet when cranked up to 60 dB to capture the sound of a drip from a water faucet.

Headroom is important, because Foley tracks tend to be extremely dynamic. You need a preamp that can handle a wide dynamic range in one pass, from the tinkle of a wind chime to the slam of

a door, without muddling the quiet sounds or clipping on the loud ones.

## STUCK IN A PATTERN

Because the Foley recordist may be called upon to record any number and type of sounds, it's nice to have a range of microphones at hand. However, if you can afford only one good mic, a multi-pattern condenser is the way to go. If you can afford only a single-pattern mic, opt for one with a cardioid pattern.

A cardioid pattern is usually best for recording Foley tracks because it helps the mic focus on the object or event being recorded. If room noise is a problem, try a tighter pattern such as supercardioid or hypercardioid, assuming the sound source is stationary. If the source is moving, you may need a wide cardioid or even omnidirectional pickup pattern to avoid unwanted off-axis coloration.

An omni pattern is also useful if you need to position the mic close to the sound source but want to avoid bass

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boosting from the proximity effect. Just make sure the room is sufficiently quiet so that you don't pick up extraneous noise, and sufficiently dead (acoustically) so that you don't capture unwanted ambience.

## QUEST FOR QUIET

Ideally, your Foley room should be soundproof and acoustically dead. Although a large reverberant space could work to your advantage occasionally, a quiet, nonreverberant space is easier to work with and more versatile.

In your quest for quiet, make every attempt to minimize superfluous noise that could interfere with the recording. That includes unwanted breathing; stomach gurgling; clothes rustling; shoelaces flapping; and keys, jewelry, or pocket change jangling. The best solution is to get rid of the noisemaker—by emptying pockets or changing noisy clothing, for example. Sounds that cannot readily be removed should be minimized through careful mic positioning and judicious use of pickup patterns.

Be vigilant, too, about headphone bleed, especially when the preamp gain is cranked high to capture low-level sounds. Also, take care not to make noise with the headphone cable as you move around. You may even need to hold your breath or breathe quietly during a cut or make it a point not to move your body beyond what is required to create the effect.

## THAT'S LEFT, RIGHT?

Typically, Foley effects are recorded with a single strategically placed microphone. Stereo-miking would be called for if a scene requires spatial cues, but that is rare. Again, the idea is to grant maximum flexibility to the mix engineer. As I mentioned previously, stereo tracks, no matter how great they sound, can end up creating problems for the mixer; moreover, an intentional mono recording almost always sounds better than an incidental one derived from using only one of two stereo tracks.

Because realism is usually critical to Foley, it would make sense to position the mic approximately the same distance from the sound source as the camera is from the source in the film. In reality, though, that doesn't always work; often, the source, especially a very quiet one, must be recorded at close range and then mixed at a lower level so it sounds as though it is the correct distance away.

The question of realism is generally more of an issue with ambient sounds than with particular sounds (for example, a slap to the face). It's easier to mix a dry recording of a face slap into a large-room ambient track and treat it with effects so that it sounds as though it



BRIAN KNAVE

**FIG. 2:** This Foley pit at Ex'pression Center for New Media in Emeryville, California, provides a concrete surface, two grades of sand, three types of gravel, and a pile of loose analog tape. Here, the author records footsteps for a desert scene.

actually happened in that space than it is to create a realistic-sounding large room from an ambient track that was recorded in a small space. To capture more room sound for a hospital fight scene in the film *Dream with the Fishes*, Dave Nelson chose to pull the mic back from the Foley artists (as opposed to close-miking them). That made the fight sound more as though it happened in the room depicted on the screen.

For some scenes, Nelson suggests using multiple mics to increase mix options. For example, if the actor is walking on a dock, try using a room mic and a boundary-layer mic positioned beneath the walking surface. That gives the mix engineer the option of using either track separately or of blending them together, depending on what best suits the scene.

## PLAYING IT SAFE

Take necessary safety precautions when creating sounds with frangible items. For example, wear safety goggles when breaking glass or other materials that could fly into your eyes. When working with powdery materials—dirt, cornstarch,

## Sound Advice

Here are recommended source materials for creating Foley sound effects.

SOUND	MATERIALS	INSTRUCTIONS
Body Hits	phone books, vinyl-covered cushions, leather-wrapped cloth	pound as needed
Breaking Bones	celery stalks, carrots	break to suit action
Footsteps on Leaves, Grass	houseplants, loose analog tape	spread and walk on as needed
Footsteps on Snow	cornstarch, table salt	place on sheet over dirt in pit and walk on as needed
Space Suit	rubber tubing	rub, twist, or crunch as needed
Viscera	paper towels soaked in raw eggs, tuna salad, beef joints	do whatever it takes



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plants with excessive pollen, and the like—a dust mask is essential.

But don't stop at just protecting yourself; you also have the mic to consider. A quality windscreen and pop filter can help guard against smoke, dust, water, bursts of air, flying debris, and other sources of potential harm to delicate mic elements.

## THE DRAWING BOARD

Always do a spotting session before you start recording. In a spotting session, you figure out what sounds you need and where they go based on the scene layout and time-code information. Make a comprehensive list or cue sheet of sounds you need to cover and figure out what surfaces, props, and other items are needed to create those sounds. The cue sheet should also include take numbers, time-code information, and any other notes that might help at mixdown (see Fig. 1).

The spotting session is also a good time to decide whether to work sequentially (scene to scene), from one character to the next, or from material to material (for example, recording all the breaking glass for different scenes at one time).

A Foley artist must examine every inch of a scene, accounting for each movement that might produce an audible sound. Attention to detail is everything. Remember that you are creating an aural illusion intended to keep the viewer immersed in the action and convinced of its authenticity; any oversight on your part could break the viewer's suspension of disbelief.

Strive to become one with the characters. Study how they move and feel what they feel so you can convincingly simulate the sounds of their actions. Are the characters depressed and treading heavily? Or are they happy and walking energetically? Becoming a good Foley artist requires not only technical and auditory skills but also sensitivity and a keen imagination.

## WILEY TRICKS

The following are tips and techniques for capturing some common Foley sounds. It's up to you to determine

what objects to use and to develop good timing.

**Walk this way.** More often than not, walking is done in place and is later panned in the mix to simulate movement across the soundstage. To help make the gait sound natural, watch the shoulder movements of the character you're mimicking.

Have several types of shoes on hand: leather sole, rubber sole, lug sole, and so on. Foley artist Dian Langlois, of Outpost Film Center in San Francisco, says you can get different sounds from a pair of shoes by covering the soles with gaffer's tape. (You can also tape on false soles.) Langlois also recommends using tape to secure flapping shoelaces, jingling buckles or snaps, and anything else that creates unwanted noise, to avoid random aural contamination that can spoil a take. Also, watch out for squeaks in shoes—unless you want the character's shoes to squeak.

The walking surface you select is clearly critical to your success. If at all possible, use the same material that the person in the scene is walking on. Start with the mic two or three feet away, aimed at the feet (see Fig. 2). If the shot is a close-up, move the mic closer. If the scene takes place in a big room, add a room mic to pick up ambience. If the walking is seen from a distance, the close mic will probably sound unnatural, and the room mic alone may suffice. (See the sidebar, "This Is the Pits," for ideas on building a Foley pit.)

**Of the cloth.** Clothing rustles every time a character moves, assuming the person is clothed. But even if a character is naked—in bed, for example—his or her body makes sounds rubbing against the sheets.

To get a good recording of cloth sound, start with the mic 6 to 12 inches away. Close-miking helps minimize ambience; however, at such close range, you may encounter proximity effect and problematic fluctuations in dynamic range. Also, watch out for bursts of air if a motion is large or sudden,

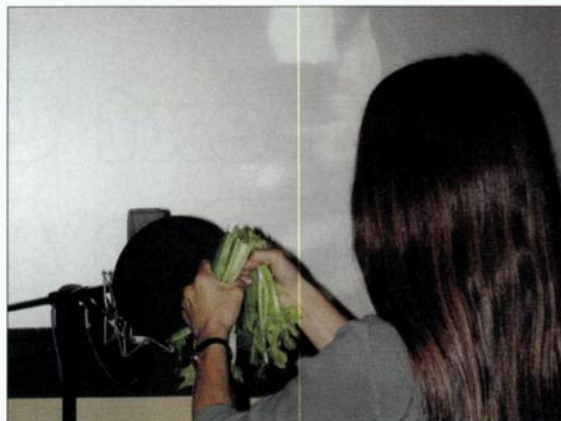


FIG. 3: The author snaps stalks of celery to simulate the sound of a victim's neck breaking.

and if necessary, use a windscreen or pop filter to quell them.

To create a natural-sounding distinction between characters, try using a different piece of cloth for each actor. Another approach is to equalize each character's clothing sound differently during mixdown.

**Up in smoke.** Exercise caution when creating fire sound effects. The roar of a conflagration, such as a forest fire, is probably best taken from a sound-effects library. If you must record the sound of a huge destructive fire at close range, opt for a cheap sacrificial microphone. You don't want to lose an expensive condenser mic if you suddenly have to tuck tail and run.

Smaller effects, such as the sound of someone smoking or striking a match, are much easier to capture. For a match strike, position the mic about 6 to 12 inches back and shield it with a pop filter to protect it from flying particles. That sound requires considerable gain, so use your quietest preamp and mic.

**Street rumble.** Creating fight sounds can be lots of fun. Langlois's main fight-scene prop consists of cloth wrapped in leather. She balls up bunches of cloth, wraps them in a leather jacket, and then hits that with whatever the scene calls for. Similarly, to create fight sounds for a computer game, I wailed on vinyl- and cloth-covered cushions with a metal pipe. Hitting thick phone books can also be effective.

Position the mic about 18 inches from the source and adjust the gain so



that the loudest hits don't overload the recorder. Fierce poundings are typically loud and may require limiting if you're recording to a digital medium.

**Sticks and stones.** Celery sticks are frequently used to simulate the sound of bones breaking, and the results can be wincingly realistic (see Fig. 3). Larry the O recalls doing a Foley session for a courtroom scene in which a lawyer brandished a severed arm as evidence. Larry the O obtained some juicy beef joints from the local butcher, laid a tarpaulin sheet in the studio, and set up the mic with a protective pop filter about two feet from the joints. "Someone rotated the joints, making the cartilage snap and break," he says. "We cranked up the gain so you could hear all the disgusting gristle and slimy stuff slipping around, and it worked very effectively for the scene." (For more on Foley materials, see the table, "Sound Advice.")

▼  
**A Foley effect  
helps complete the  
visual and  
anchor it to reality.**

EM associate editor Brian Knave once simulated the sound of a cat being thrown into a well for a Mephistophelian remake of the children's song "The Cat Came Back." "We couldn't very well throw a real cat down a well," says Knave. Instead, he and his music partner, Norm Milstein, created the effect from scratch. For the splash, they recorded the sound of a wet, tightly wrapped towel being thrown into a bathtub filled with water. For the impact, they recorded the same wet towel being flung hard against drywall. Mixed together, those two tracks simulated the sound of the cat hitting the water. For the fall, Knave added cavernous reverb to a mournful cat yowl from a sound-effects library. Although no animal was harmed in the making of the song, it sure sounds as though one was.

In a similar vein, Langlois suggests blending hard effects (those taken from, say, a sound-effects library) with real-time Foley effects to personalize the sound and make it work better for the scene. "Sound-effects libraries typically have doors opening and closing," says Langlois. "But usually, those can be enhanced, depending on the scene. For example, you can add the sound of the character's hand turning the doorknob. For extra realism, don't forget the sound

of the hand coming off the knob—hand on, knob turn, then hand off."

**Karen Stackpole**, a closet Foley artist, teaches sound arts at Ex'pression Center for New Media in Emeryville, California. Special thanks to Dian Langlois and Dave Nelson at Outpost Film Center, Larry the O, Duke Zafferty, and Brian Knave.

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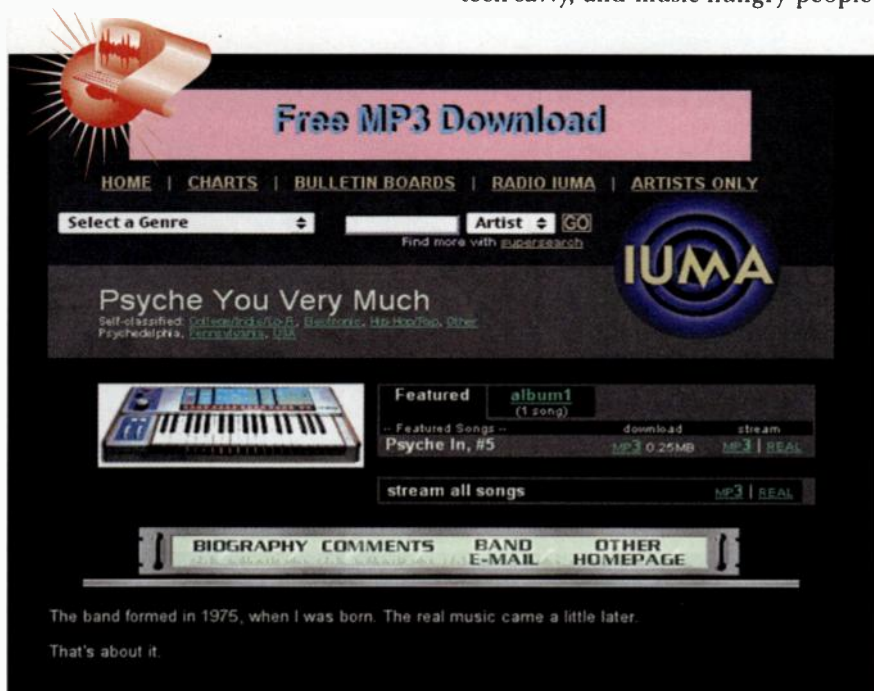
By Markkus Rovito

**T**he Internet hasn't crashed. What has crashed is the notion of a gold rush in which any half-baked Internet startup with a sketchy business model can secure millions in venture capital and sit back to wait for a monumental IPO. Never mind profitability; the Internet's popularity is as high as ever, especially among young, tech-savvy, and music-hungry people.

What's more, the Internet is on the verge of expanding its user base as it migrates to devices less expensive than the PC, such as TVs and game consoles.

That's encouraging for those who want to promote their music online. The Internet provides simple and cost-effective ways of getting your music heard, promoting gigs, and keeping in touch with fans, as well as finding new ones. However, just as a mediocre business model and a Web site do not equal fast wealth and early retirement, a few demo MP3s and a band photo online won't start a label bidding war. Successful music promotion on the Internet takes hard work; a little luck; and, above all, your best music.

In the heady cyberspace daydreams of the late 1990s, the Internet was supposed to function as the great equalizer so unsigned bands could snatch a piece of the rock-star pie away from corporate-approved icons. A small army of Web sites cropped up to help facilitate the power shift by hosting unsigned artists' MP3 files for download. Most sites offer each act a home page and a concise URL with MP3 downloads, streaming audio, images, biographies, gig listings, and CD sales. Although any of that can be accomplished—with a greater amount of customization—on



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'Buy Me A Rose' was recorded on an 8-track in the back bedroom of an old farm house. We only had one microphone. And every time a cow moored or a plane flew over, we had to stop the tape. Not very high-tech, but it worked.

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Although a smattering of the thousands of artists who patronize those sites have gone on to sign record deals, compose music for film and TV, or somehow make a living in music, the dream of knocking the major labels from their pedestals remains unfulfilled. The majors may be wobbling a bit from their inability to stifle or control online music distribution, but the Internet cash crunch has taken its toll on the third-party sites as well. Recently, some players in downloadable music have either choked (Riffage.com) or faltered (IUMA.com disappeared only to be revived by Vitaminic). Whether the survivors will succeed in playing Robin Hood to the arrogant major-label powers that be or starve from the profitlessness of their goodwill remains to be seen. In the meantime, the amount of fertile breeding ground for your music online is too good to pass up. I checked out eight third-party music sites to see what they have to offer musicians and how they stack up against each other (see the table, "The Site Scene.")

## LOCK AND LOAD

Uploading music was surprisingly simple with almost all of the third-party sites that I tested. Depending on the speed of your Internet connection and

on the lengths you go to to describe your band and music, you can complete the registration and uploading process for some sites in a matter of minutes. Nevertheless, your page will not appear for two to ten days.

After filling out the requisite personal information, you will most likely be presented with a lengthy contract. Not to worry. They are not deals with the devil that give away the rights to your music. The long-winded contracts say what you want and need them to say: you agree to have your music posted online, you retain ownership and copyright of your music, and so on. In addition, all agreements are nonexclusive, meaning you have the right to put your songs on as many Web sites as you like, and you can take them offline whenever you choose. Also, most sites prohibit the uploading of cover songs, though RollingStone.com allows it as long as you attribute the song to the original artist. A few sites offer DAM (digital automatic music) CDs. On those sites, artists can create DAM CDs from MP3s of their songs. When an order is placed for the DAM CD, the site presses and mails out the disc, keeping a portion of the sale and giving the rest to the artist. That is a nice way around having to maintain an inventory of CDs, and you can create and update your DAM CDs as you add tracks to your repertoire.

**IUMA.** Making its first appearance in 1993, the Internet Underground Music

IUMA sent a detailed e-mail offering suggestions about improving the page to attract repeat visitors. No other Web site responded that way.

IUMA shut down briefly earlier this year only to be acquired and revived by fellow third-party Web site Vitaminic. At press time, IUMA had not yet reinstated its artist CD sales but was planning to do so shortly. Artists who press their CDs can send them to IUMA to be sold from the site. IUMA then takes care of billing and fulfillment of CD sales and keeps a \$5 consignment fee from the artist-determined CD price. IUMA pays artists their portion of CD revenue quarterly, and users can check their sales, page views, downloads, and streaming-audio statistics daily. Artists' IUMA pages are also highly customizable; available options include a large selection of background colors, font colors, button graphics, and rotating JPEG images. Users can also list their music in as many as four of the 40 available musical genres.

Ad-revenue sharing as a way of paying artists dropped after the relaunch, but IUMA users may benefit from the increased exposure to European listeners that Vitaminic brings.

**Vitaminic.** With sites for nine European countries and one for the United States, Vitaminic ([www.vitaminic.com](http://www.vitaminic.com)) claims to be the most popular site in Europe for downloadable music. Although it's still vying for mass recognition stateside, Vitaminic offers some nice, unique features for unsigned artists. First, you can create a band page for any European Vitaminic site, but the company does not offer translation services. You may also choose to sell downloads of MP3 tracks. The minimum price per MP3 is 99 cents, and Vitaminic keeps 50 percent of song sales. It also keeps 50 percent of sales of DAM CDs that it creates using your album art. The company pays artists quarterly as long as the amount due is \$50 or more.

Listeners can use streaming audio to hear your uploaded songs at no cost, but beyond that, you designate whether the MP3 download is free, for sale, or for fans only. Potential listeners must register to your e-mail list to download fan-only



Vitaminic takes a functional approach to its artist page design.

Archive (IUMA; [www.iuma.com](http://www.iuma.com)) was one of the first third-party sites. Originality usually garners respect in the music world, which is one reason IUMA holds a reputation as an innovator. Statements from IUMA such as "IUMA is the one place to post your music where actual musicians are watching out for you—not weasels watching the numbers" also lend the site a musician-friendly vibe. It's not just talk, either; two days after I posted a phony band page sloppily thrown together for this column,



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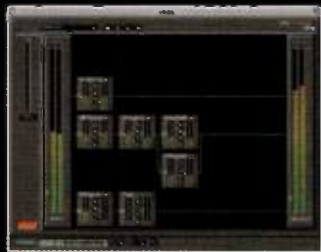


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songs. That basically creates a fan club, and Vitaminic lets you send mass e-mails to everyone on your list. Vitaminic hosts pages for signed established acts as well, which drives site traffic.

**MP3.com.** The most famous of the third-party sites—for all its high-profile legal battles—MP3.com ([www.mp3.com](http://www.mp3.com)) is also becoming the most infamous for being the first to charge artists monthly fees and to sell perks. Basic services are still free, but \$19.99 a month buys Premium Artist Services, which include eligibility for the Payback for Playback (P4P) program, priority placement in search results, and more control of your page. The total dollar amount MP3.com pays artists in P4P money is capped at \$1 million a month, which, unfortunately, means that the more artists who join Premium Services, the more each artist's share per download decreases.

The most suspect of MP3.com's practices are the auctioning off of payola songs that receive special placement on search pages and the selling of other perks to the highest bidder. The fact that bids in some auctions reach many hundreds of dollars must mean that exposure on MP3.com is effective, and the site can't be blamed for taking advantage of its online real estate. Still, the auctions give MP3.com an air of impenetrability for the starving musicians trying to level the promotional playing field, and there's the sense that maybe some of the music industry's corporate slime is oozing from the major labels into cyberspace.

However, MP3.com's free services are more than adequate, and it's hard to argue against the site's brand recognition and 10 million unique visitors a month. The company also manufactures DAM CDs of artists' uploaded songs, which they can sell from their pages. Musicians set the CD prices and can sell as many different albums as they want. They receive 50 percent of the proceeds after MP3.com takes a \$3.99 fee for production and order-fulfillment costs. The company also sells netCDs, which consist of the same songs as MP3 downloads. The price of netCDs is the same as the cost of the DAM CDs minus the \$3.99 production cost, and again, the artist receives 50 percent of the sale.

**PeopleSound.** Although the Web site claiming to be Great Britain's most popular music download page is an attractive and useful tool ([www.peoplesound.com](http://www.peoplesound.com)), musicians from the United States could likely be put off by PeopleSound's mail-in registration page that must be printed and sent to London along with hard copies of photos to be scanned for the site. Despite that absurdity, PeopleSound has advantages. Owned by EMI, PeopleSound's A&R team works to find deals for member artists, including licensing tracks for film, TV, and other media. Popular British media outlets such as *New Music Express* (NME) and *Music Week* publish PeopleSound's weekly charts from the site's 80 genres. The site offers many help and advice sections, and members receive a 25 percent discount off Beatnik sample CDs. PeopleSound

also produces DAM CDs for musicians to sell off-site. Artists receive 50 percent of each CD sale minus British sales tax and a £2 production cost.

**RollingStone.com.** RollingStone.com's third-party music site ([www.rollingstone.com](http://www.rollingstone.com)) is light on special features, offering just the basics: multiple MP3 hosting, a band JPEG, biography, announcements, listener ratings, and so on. It offers no direct CD sales;



While your radio station streams on Live365.com, a playlist window appears with track information.

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# Internet Audio



instead, you may link to another Web site that sells your CDs. A big selling point for RollingStone.com is that a *Rolling Stone* editor reviews one MP3 per day. The competition is fierce, however, so don't put all your eggs in that basket.

**EarBuzz.** This wild-card site ([www.earbuzz.com](http://www.earbuzz.com)) takes a slightly different approach to the third-party music-site scheme. It is primarily for artists who have CDs to sell online but who want a third-party service to take care of the billing and fulfillment. Users pay a \$45 annual fee and send CDs to earBuzz. The artist then gets a page on earBuzz.com with images, info, one full MP3 track from the CD, and several clips from other tracks. The artist sets the price for each CD and keeps the proceeds, minus a 3 percent credit card fee. The company also does unique promotions for its artists, such as regional shows featuring earBuzz member bands.

**Live365.** More of an Internet radio portal than a third-party music site, Live365 ([www.live365.com](http://www.live365.com)) is home to more than 37,000 online radio stations. Musicians can start a personal radio station on which they can loop as many as three hours of their MP3 songs 24/7. As the songs play, a player window that provides track information pops up in the listener's browser. The player window can also provide Buy buttons that link to sites from which the music can be purchased.

**Broadjam.** The newest service on the block, Broadjam ([www.broadjam.com](http://www.broadjam.com)), has a unique set of services and features intended to help artists gain exposure quickly. Broadjam has three levels of membership. The first two levels, Quick 10 and Club 10, are free. The Quick 10 lets listeners review and rate tracks. Listener feedback is sent directly to artists, who are automatically notified when someone reviews their songs. Artists also receive notice if one of their tracks makes it onto a top ten list. Club 10 is the basic level tailored for musicians. It offers a page on the site and room for three songs. One of the requirements is that artists must review three other songs on the site for every song they post.

The highest service level, Musicians of Broadjam (MOB), is available for an annual fee of \$50. For the MOB price,

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## THE SITE SCENE

Here is an overview of the services offered by the eight third-party music sites covered in this story. Ratings are given for each site's ease of use, pay structure, and search function on a scale of 0 to 10, with 10 being the highest rating.

	Broadjam	earBuzz	IUMA	Live365	MP3	PeopleSound	RollingStone	Vitaminic
<b>Image Hosting</b>	yes	yes	yes	no	yes	yes	yes	yes
<b>Customizable Pages</b>	yes	no	yes	no	yes	no	no	no
<b>Streaming Audio</b>	yes	yes	yes	yes	yes	yes	yes	yes
<b>Gig Listings</b>	yes	no	yes	no	yes	no	yes	yes
<b>Daily Statistics</b>	no	yes	yes	no	yes	yes	yes	yes
<b>Listener Comments</b>	yes	no	yes	no	yes	yes	yes	no
<b>CD Sales</b>	no	yes	yes	yes	yes	yes	no	yes
<b>Individual Song Sales</b>	no	no	no	no	no	no	no	yes
<b>Radio</b>	yes	no	yes	yes	yes	yes	no	no
<b>Personal URL</b>	yes	yes	yes	no	yes	no	yes	yes
<b>Fee-based Premium Services</b>	yes	no	no	no	yes	no	no	no
<b>Ease of Use</b>	9	7	9	7	8	5	9	8
<b>Pay Structure</b>	n/a	9	8	n/a	7	6	n/a	9
<b>Search Function</b>	9	9	9	8	7	7	6	10
<b>Best Feature</b>	distributes songs to other music sites	highest recoupment from CD sales	indie cred	creates your own personal Internet radio station	most recognizable name	weekly charts published in top media outlets	possible review by <i>Rolling Stone</i> editor	can create your own page for 9 European countries
<b>Weakest Link</b>	unproven track record	little name recognition	rocky past and uncertain future	top MP3 quality is 56 Kbps	sells prime placement of music to the highest bidder	mail-in sign up form	is the lottery ticket of online promotion	bland artist pages

Broadjam registers eight of the artist's songs on its site, provides a Broadjam e-mail account and e-mail distribution service for press releases and fan lists, and disseminates five songs to other music sites. Broadjam distributes to the most active sites on the Web, and the list is updated frequently as new sites gain prominence and old sites disappear.

### OUT OF SITE

As nice as it would be to recommend one third-party music site that is best suited to hosting your MP3 music, most sites have at least one unique feature. Considering

that the investment of time and money required to establish a presence on most sites is negligible, take a blanket approach to promoting your music on third-party Web sites. Cover all the bases that make sense. If you don't have CDs pressed, bypass earBuzz in favor of MP3.com, Vitaminic, or another site that produces CDs. If you don't have enough material to justify creating a radio station, check out IUMA or another site on which your tunes may end up on the company's Internet radio stations.

Getting your music online through third-party Web sites is so easy that if

you're not doing it, you may as well be singing out of key into a paper-cup microphone. Do yourself a couple of favors: get a high-speed Internet connection and start filling servers with your music today.

**Markkus Rovito** *vaguely remembers life before DSL. He is a senior editor for E-Gear, a bedroom musician, and a contributor to Remix, an EM sister publication. E-mail him at mrovito@earthlink.net.*

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# REVIEWS

## TASCAM

US-428 (MAC/WIN)

*The portastudio meets  
the computer.*

By Brian Smithers

In spite of USB's lukewarm reception in some quarters, innovative developers continue to do amazing things with the beleaguered protocol. Tascam's US-428 digital-audio workstation (DAW) controller, which was developed in partnership with Frontier Design Group, manages to squeeze six 24-bit audio streams, 32 MIDI channels, and a sizable amount of control information through the USB pipeline. The unit not only fulfills USB's promises of cross-platform compatibility, hot-swappability, notebook and desktop interchangeability, and easy configuration but also exceeds the bus's charter as a pathway for low-bandwidth devices (see Fig. 1).

The US-428 is a good choice for someone building a home studio around a desktop or notebook computer. Its combination of audio interface, MIDI interface, sequencing software, and control surface provides a complete package at an affordable price.

The unit's A and B inputs consist of two balanced XLR mic connections and



FIG. 1: The Tascam US-428 includes a full complement of faders, buttons, and knobs designed to give you tactile control over your music-software mix functions.

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Tascam US-428 (Mac/Win)

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Analogue Systems Sorcerer

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Adept Nightingale 4.0 (Mac)

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Peavey TMP-1

146

Minnetonka SurCode CD Professional 1.0.2 (Win)

148

Audio-Technica AT835ST

154

Quick Picks: Rising Software Auralia 2.1 (Win) ear-training software; Soundforest Voice Fusions sample CD; Contempo sas Virtual Sound book



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a separate set of two balanced ¼-inch TRS line connections (see Fig. 2). You could actually use both sets at the same time, though Tascam doesn't recommend doing that because the signals are summed in each channel, which may cause distortion. The C and D inputs are unbalanced ¼-inch connections that are switchable between line-level and high-impedance settings. The digital input uses an S/PDIF coaxial connection, which takes the place of the C and D analog inputs when selected by a front-panel button.

That complement of input connections lets you record various sources—such as keyboards, guitars, mics, and DAT recorders—without much fuss. The only caveat is that if you want to use a condenser mic, you need an outboard phantom power supply.

A front-panel trim-control knob is provided for each input channel; input-level LEDs indicate signal presence and overload. The Signal LED lights up when input exceeds -42 dBFS, and the Overload LED warns of anything more than -2.5 dBFS. When digital input is selected, the trim controls on inputs C and D are bypassed.

Only one pair of audio output channels is available, but it's available at three stereo connections: a headphone jack, analog RCA jacks, and a coaxial S/PDIF jack. All three outputs carry the same signal simultaneously, so you can split the signal to different destinations. For example, you could easily have the RCA outputs connected to your control-room monitors while recording the digital output to a DAT deck. Separate line out and headphone volume controls effectively give you in-

dependent level control over the three outputs, because the level of the digital output is determined by the application's master output level.

Four MIDI ports (two In, two Out) round out the US-428's back panel, providing 32 independent MIDI I/O channels. The US-428 uses MIDI for its control protocol, but the signal is carried by the USB connection, leaving the MIDI ports free for keyboards and other devices.

## TOUCH ME

The US-428's control surface is a model of efficient design. Everything is close enough to everything else that you can operate it with one hand while your other hand is on your computer keyboard or mouse. That was my preferred mode of operation, because although the US-428 provides a great deal of control, it still falls short of completely replacing the traditional keyboard-and-mouse interface.

At your fingertips are eight channel faders and one Master fader. Each channel fader has an associated Mute button and Select button. The Master fader has two buttons that control the behavior of the channel faders' buttons: the Solo button switches the Mute buttons to function as Solo buttons, and the Record button works with the Select buttons to record-enable tracks. The unit provides only one Pan knob; it affects the selected channel.

Standard transport controls are located within easy reach of the faders. Raised markings on the buttons make it possible to operate the transport without looking. Buttons above the transport controls let you set locate points

## Minimum System Requirements

### US-428

**MAC:** PPC; 64 MB RAM (128 MB recommended); OS 8.6.1 or later (no OS X support); USB port

**PC:** Pentium/200 (Pentium II/300 recommended); 64 MB RAM (128 MB recommended); Windows 98 SE/ME/2000; USB port

and jump forward or backward to them. Bank increment and decrement buttons move the focus of the faders left or right to any set of eight adjacent on-screen MIDI or audio channels. Above the Bank buttons, a Jog wheel doubles as a data-entry wheel.

The US-428's EQ section provides quick access to useful tone-shaping functions. Buttons let you select among four frequency bands; three rotary knobs are dedicated to gain, frequency, and Q (bandwidth) for the selected band. To the right of the EQ controls are four Aux buttons, three assignable Function keys, and the Assign button that determines which other buttons are active.

## HEARD THAT

As a notebook-recording enthusiast, my initial fascination with the US-428 was based on its merits as a USB audio interface. Getting four channels of 24-bit audio into my laptop while monitoring two 24-bit output channels sounded like a dream come true. The dream faded a bit, though, when I learned that I would have to upgrade my operating system to use the device.

Initial publicity for the US-428 (as well as the box and manual I received with the review unit) claimed compatibility with Windows 98. However, Microsoft's implementation of the USB protocol didn't deliver acceptable results with the first edition of Windows 98, so when Tascam added Windows ME and Windows 2000 support to version 2.0 of the US-428 drivers, it stopped supporting anything prior to Windows 98 SE. Tascam's Web site now makes that clear.

I therefore plugged the US-428 into my desktop computer running Windows



**FIG. 2:** The US-428's back panel features plenty of audio and MIDI connectivity, including mic-level, balanced and unbalanced line-level, and high-impedance analog inputs along with a headphone output, S/PDIF I/O, and 32 MIDI channels.



98 SE. The US-428 driver showed up in my audio and MIDI programs and worked perfectly as an audio and MIDI interface, even in programs that don't yet support its mixing and transport controls.

Like most current audio interfaces, the US-428 features direct-input monitoring to avoid the latency of monitoring an input signal after it has been digitized and squeezed through the CPU. When you press the Input Monitor button, the unit's first four faders control the direct-output level of the four inputs, letting you set up a monitor mix quickly and easily. Those settings are reflected in the US-428's Control Panel applet (see Fig. 3). The Control Panel applet also lets you save as many as four snapshots of

mate fader and knob adjustments (to the extent that your software supports them), though the US-428's faders aren't motorized and therefore won't track previously written automation.

Nevertheless, just controlling Start, Stop, Record, and Locate functions from traditional transport controls is much better than clicking on onscreen graphic representations. Using keyboard hotkeys for transport functions has become second nature to me, but I

still find the US-428's transport controls more comfortable.

That liberating experience didn't come without a price, though. After my initial successful installation of the US-428, I suddenly discovered that the controls no longer affected the software. The audio interface worked, MIDI communication was fine, and the software seemed to behave properly if I used the mouse and keyboard.

The Tascam tech support people



**As an audio interface,  
the US-428 doesn't  
disappoint.**

input-monitor level, pan, and mute settings and load any of those or your last-used settings on startup. Unfortunately, the snapshots are available only through the Control Panel software and not directly from the US-428 control surface.

As an audio interface, the US-428 doesn't disappoint. Its preamps and converters have a nice neutral sound comparable to other similarly priced audio interfaces. To start coloring the sound, use a tube preamp connected to the US-428's balanced 1/4-inch line inputs. In the unlikely event that you decide the unit's A/D converters are the weak link in your recording chain, use the S/PDIF jack to input signals from a standalone converter.

#### TAKING CONTROL

Mixing with the US-428 is a cool experience for anyone who has ever cursed the impracticality of mixing with a mouse. Eight channels are within your control at a time, and the next eight channels are only a button press away. You can auto-



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were helpful and attentive, but at first, they were at a loss to identify the problem. In the full version of Steinberg *Cubase VST*, you select the US-428 as a VST Remote device, but I was using the bundled version of *Cubasis VST* (a special version called *Cubasis VST US-428*), which, according to the manual, "will automatically recognize the US-428 as a remote controller unit." It did recognize it for the first day or two, but then it developed amnesia (a software, not a hardware, problem). At any rate, no setting was available to cause *Cubasis* to recognize the control surface.

The telltale clue came when, in frustration, I reopened the *Cubasis* demo song and discovered that the remote controls worked properly. I deleted the data from that song, saved it as a *Cubasis* default template, and the problem was solved. *Cubasis* starts from a template called DEF.ALL, and the automatic recognition of the US-428's control features is built into the template that ships with the bundled version. My DEF.ALL file must have become corrupted. After I reverse-engineered a new one, however, everything worked properly.

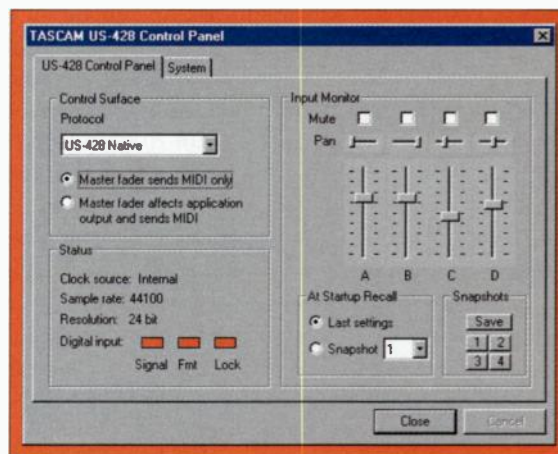
Because *Cubasis VST US-428* is installed from a single archive file, you can't simply go to the CD and retrieve a fresh DEF.ALL file if you run into problems. You will have to back up your DEF.ALL file as soon as you complete

the software installation; then, you can restore the file easily.

### ALL MIXED UP

Without motorized faders, updating mix automation can be difficult. The moment you move a fader, it starts writing its current value, and the odds of that value matching the current written value can be pretty slim. To solve that problem, the US-428 lets you match the faders with existing automation. The Fader Null button "disconnects" the faders, so you can adjust them to the currently written value. In that mode, the Record and Select LEDs serve as up and down indicators, letting you know which way to adjust. When you match the current value, both LEDs light. That is also handy when you switch from one bank of faders to another.

Using the EQ and effects controls was a bit less convenient than using the faders and the transport controls. One reason is that the controls don't work exactly as described in the documentation. Another is that the sequence of keys that you must press is a bit strange until you get used to it.



**FIG. 3:** The US-428 Control Panel applet allows you to select alternate control modes, such as the JLCopper CS-10 emulation or the Native Instruments B4 setup. It also allows you to create snapshots for the input monitor mix and adjust buffer settings.

To adjust an EQ setting, press the desired channel's Select button, followed by the Assign button, and then the button for the desired EQ band. *Cubasis VST* supplies just two EQ bands, though the US-428 has four dedicated EQ-band buttons. (High-end programs such as *Cubase VST* make use of all four bands.) To enable an EQ band, press Assign again, followed by the High or Low band button. With so many button presses, setting the EQ can be cumbersome, and important details about using the buttons are frustratingly absent from the documentation.

The aux sends work similarly; you use the Aux 1 or Aux 2 buttons to enable them (four buttons are available, but *Cubasis VST* supports only two sends). The Jog/Data wheel controls the send level when an aux send is active, or you can use the mouse to adjust the send level. Unfortunately, no control for channel-insert effects is available, nor is there any way to select a plug-in or control its parameters from the US-428 under *Cubasis VST*.

### WIDE WORLD OF SUPPORT

My beefs about the US-428 are pretty minor and are mainly aimed at the bundled *Cubasis VST* application. If you use the US-428 with more sophisticated software, your experience may be significantly different.

Tascam deserves accolades for trying

## US-428 Specifications

<b>Analog Inputs</b>	(2) balanced XLR mic-level; (2) balanced 1/4" line-level (+4 dBu); (2) unbalanced 1/4" switchable between line-level and high impedance (-10 dBV)
<b>Analog Outputs</b>	(2) unbalanced RCA (-10 dBV); (1) 1/4" stereo headphone
<b>Digital I/O</b>	(1) S/PDIF coaxial RCA stereo in; (1) S/PDIF coaxial RCA stereo out
<b>Resolution</b>	16-bit; 24-bit
<b>Sampling Rates</b>	44.1, 48 kHz
<b>Frequency Response</b>	20 Hz–20 kHz (+0.5, -0.3 dB)
<b>Total Harmonic Distortion</b>	<0.07% @ 1 kHz (mic A/B to line out)
<b>Noise Level</b>	Better than -88 dBu A weighted
<b>MIDI I/O</b>	(2) In; (2) Out
<b>Dimensions</b>	11.5" (W) × 14" (H) × 3.25" (D)
<b>Weight</b>	4.5 lbs.



to generate widespread support for the US-428. Its control protocol uses MIDI controller and SysEx messages similar to those used by the JCooper CS-10, offering developers a familiar foundation from which to work. Tascam's Web site lists the support status for popular applications and offers documentation and support files necessary for using the US-428 with those programs.

Mark of the Unicorn's *Digital Performer* and Digidesign's *Pro Tools* use the US-428 in ways that go beyond the basic functions that *Cubasis VST* implements. They use the available buttons in combinations that activate zoom controls, data-selection controls, and plug-in-parameter controls. With those programs, the US-428 really starts to earn the name DAW controller.

Unfortunately for PC users, Cakewalk's *Sonar* is limited to a user-developed StudioWare panel. Although much credit is due to the user who developed the panel, it has some bothersome quirks. For example, it delivers sluggish response and needs to be jump-started by a sequence of button presses each

time it's opened. (According to Tascam, Cakewalk has promised a greater level of support in the near future.)

One appealing application is the pairing of the US-428 with Native Instruments' *B4* virtual tonewheel organ. By selecting the *B4* protocol in the US-428 Control Panel applet, you can use the channel faders to control the organ's drawbars. Various buttons and knobs control vibrato on and off, motor speed, percussion, and amp settings.

### PACKAGE POTENTIAL

A year ago, I would have considered buying the US-428 for its audio interface alone, but the competition has heated. My enthusiasm for the US-428 as a home-studio starter kit is dampened by the choice of *Cubasis VST* as the bundled software. In addition to points already mentioned, *Cubasis VST* lets only one stereo or mono audio track record at a time, wasting the US-428's four-input capability.

Even though the US-428 has been on the market since September 2000, the

promised Mac version of *Cubasis VST* is not available as of this writing; Tascam provides Mac users with *BIAS Deck LE* instead. In fairness, though, those bundled entry-level programs are intended to offer users an introduction to computer-based recording and perhaps whet their appetites for more powerful software that can take greater advantage of the hardware.

As a hard-disk recording interface, the US-428 manages to pack a good deal of functionality into a unit with a reasonable price tag. The versatile audio I/O options and excellent audio quality are big assets, and the control surface is generally well designed. If it works well with the software you like to use, you'll be delighted to reduce your mouse dependency. As support for the US-428 grows, it should become even more tempting.

Brian Smithers is associate course director of MIDI at Full Sail Real World Education in Winter Park, Florida. Contact him through his Web site, <http://members.aol.com/notebooks1>.

### PRODUCT SUMMARY

#### Tascam

US-428

digital-audio interface/control surface

\$625

FEATURES	3.5
AUDIO QUALITY	4.0
EASE OF USE	4.0
VALUE	4.0

#### RATING PRODUCTS FROM 1 TO 5

**PROS:** Sounds good. Simple USB connection. Automated mixing capability. Great laptop audio solution. Flexible audio inputs. Control protocol open to third-party developers.

**CONS:** Bundled PC application doesn't record four simultaneous inputs. Setting EQ and aux sends is cumbersome. Documentation is incomplete and sometimes inaccurate.

#### Manufacturer

Tascam

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# ANALOGUE SYSTEMS

## SORCERER

*Modular analog synthesis  
is alive and well  
in the 21st century.*

By Julian Colbeck

There was a time when a synthesizer was a collection of modules filled with dozens of knobs, jacks, and a few blinking LEDs, without a programmable preset in sight. The sound-generating and sound-controlling devices were separate units connected by patch cords. Assembling a modular synth system and a sound required considerable knowledge and cash. Consequently, thirty-odd years ago, synthesis was an undertaking with limited appeal.

A modular-synthesizer manufacturer based in the United Kingdom (hence the spellings of *analogue* and *synthesiser* in the company name and products), Analogue Systems produces a variety of modules in the Integrator line, ranging from oscillators and filters to controllers, effects, and signal converters. The Sorcerer (spelled *Sorcerer* on the back of the keyboard case) is the company's chassis-and-keyboard combination,

which you can fill with modules of your choice (see Fig. 1).

### ANALOG HEAVEN OR HELL?

Modular synths are in vogue, but they still require technical chops and sizable chunks of change. Radiohead's Jonny Greenwood, for example, uses an Analogue Systems RS8000 system and RS200 sequencer that costs \$4,000. Even at that price, it plays only one note at a time.

The modular-synth market remains highly specialized for good reasons. Never mind the prospect of building your own sound, which may be terrifying to a generation of musicians that has grown up on the preset, polyphonic, instant-gratification fast track: using an Analogue Systems synth requires that you build an instrument from factory-assembled components.

The Sorcerer performs in glorious mono, and the only available memory, quite literally, is yours. To replicate a sound in the future, you have two options: remember how you created it or write down every patch connection and parameter setting.

I am not a modular-synth fanatic, nor have I ever owned such an instrument. Nonetheless, I have played most modular synth models ever made. I grew up using semimodulars (such as the Korg MS20) which have some sort of pre-patched configuration behind the scenes. The first synth I owned was an ARP Odyssey, an analog monosynth with

**PRODUCT SUMMARY**

**Analogue Systems**  
Sorcerer  
analog modular synthesizer  
\$1,395 (without modules)

FEATURES	4.0
EASE OF USE	3.0
AUDIO QUALITY	4.0
VALUE	4.0

RATING PRODUCTS FROM 1 TO 5

**PROS:** Flexible design. High-quality construction. Excellent audio specifications. Superb owner's manual. Capacity to mix and match modules from other manufacturers.

**CONS:** Minimal MIDI support. Less-than-reliable minijacks, including the audio output. Awkward to play when patch cords trail over the keyboard.

**Manufacturer**  
Analogue Systems/Enport (distributor)  
tel. (402) 398-0198  
e-mail enquiries@  
analaguesystems.co.uk  
Web [www.analogue.esystems.co.uk](http://www.analogue.esystems.co.uk)



STEVE JENNINGS

FIG. 1: With its classic good looks, the monophonic Sorcerer provides a foundation for constructing a modular system from a large selection of synth modules.

no patch memory. Still, something is undeniably exciting about creating a sound that's probably unique. The Sorcerer is a grown-up's toy, to be sure, but if you have the money and the inclination, you're in for a real treat.

### IN THE BEGINNING

The Sorcerer's substantial chassis is made of American walnut. It can house modules with a width of 168 horizontal pitch (HP). (One HP is 5.08 mm, or 0.2 inches, wide; the average Analogue Systems module is 12 HP.) The Sorcerer features a 49-note monophonic keyboard with a controller module, power supply, x-y joystick module, and MIDI I/O (see Fig. 2).

The RS220 self-centering, spring-loaded joystick operates smoothly and has separate range controls for the x- and y-axes (see Fig. 3). Each axis has two output jacks, letting you set up a range of real-time-controllable modulation routings.

The RS330 controller module determines how the keyboard routes control



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signals to modules. Five control-voltage (CV) outputs are the Sorcerer's main links, in addition to two Trigger outputs and two Gate outputs. A three-position toggle switch transposes pitch through two octaves. Portamento controls include a Fast/Slow knob and a toggle switch for Off, On, and S-shot (single-triggering).

The Sorcerer's chassis design places the modules at an almost-45-degree angle for comfortable viewing and patching. It has a flat 4-inch top and a 3-inch ledge between the modules' base and the keyboard. The instrument's nature necessitates many loose cords dangling about, and the ledge doesn't quite take up all the slack. I found it rather unnerving to play the Sorcerer with my hands in a cat's cradle of patch chords half the time; when it comes to performing on a modular synth, perhaps that's indicative of the lack of emphasis on playing the keyboard.

Understandably, then, the keyboard has a light action, though the Sorcerer's overall construction is reassuringly solid. That's good, because at this point, you're already in for almost \$1,400, and you have yet to add oscillators, filters, envelope generators, amplifiers, or signal processors.

Not only does Analogue Systems produce more than 30 modules, but you can mix and match with Doepfer's giant collection of A-100 modules and modules from Analogue Solutions. The expansion potential is a major bonus for consumers who might otherwise feel trapped buying from just one manufacturer. The unit supplied for review came

with ten Analogue Systems modules that represent the complete product line. However, even with the modules in place, you're still confronted by a totally dumb piece of hardware until you start creating a sound by linking modules with the patch cords.

## A MULTITUDE OF MODULES

Analogue Systems' RS-series modules appear more academic than exciting. Mounted on brushed aluminum panels, the knobs are smooth and solid. Patch cords are plugged into 1/8-inch minijacks; they make good connections most, but not all, of the time.

Each module is slotted into the custom Sorcerer rack, fastened with four Phillips screws, and internally connected by a simple 16-pin ribbon cable. Even if you're more musically than technically oriented, installing modules is easy.

The Sorcerer comes with a rat's nest of patch cords of varying lengths. The color-coded cords—blue for frequencies and clocking controls; gray for DC CV and control functions; green for wave shapes; white for audio signals; yellow for resonance, slew rates, and pans; and red for envelopes—correspond to the knobs' color coding, which is a smart move. However, that is only a suggested usage: any cable can be used in any jack.

**Oscillator.** The oscillator lies at the heart of any analog synthesizer, defining its sound and operation style. The RS90 (\$129) is Analogue Systems' primary sound source; two were supplied in my instrument. I want three things from an oscillator—stability, timbral richness, and flexibility—and the RS90 didn't disappoint.

The RS90 generates variable sawtooth and pulse waveforms. Using the dedicated rotary control, you can adjust the sawtooth from ramp-down sawtooth to triangle wave to ramp-up sawtooth. The pulse wave's control knob takes the signal from 0 percent narrow (which Analogue Systems calls *leading pulse*) to 0 percent wide (*trailing pulse*), with a square wave in the



FIG. 3: The RS220 (left) features a joystick with separate CV outputs for the x- and y-axes. The RS330 module (right) routes control signals from the keyboard to the other modules.

center position. Around the sawtooth knob's central triangle position is a wide band that doesn't change the sound much. Also, a sizable dead area is at both ends of the pulse-wave knob's spectrum, making the range of basic tones not quite as vast as I first thought.

The shapes of the sawtooth and pulse waveforms are voltage controllable, which is a cool feature. With a Sync In jack providing a means to hard-sync one audio oscillator to another, and highly sophisticated filtering available further down the line, the Sorcerer is full of potential for timbral richness and character.

You can tune oscillator frequency in three ranges (Wide, Normal, or -2 Octave) using a tiny three-position toggle switch and the frequency-control knob. Wide is unbelievably wide, providing a theoretical range of 0.3 Hz to 17 kHz (the low end is way below earshot, so you can use the RS90 as an LFO). Normal range varies pitch by an interval of approximately a fifth, and -2 Octave transposes the pitch down as much as two octaves.

The Sorcerer uses the 1V-per-octave standard used by Moog, Sequential Circuits, and other analog-synth manufacturers; consequently, connecting the few instruments that use the hertz-to-voltage system (such as the older Korg and Yamaha mono synths) doesn't produce conventional musical scales.

Although I can't find fault with the RS90 on a technical level, for the average musician, its approach is more purist than practical. The RS90 lacks



FIG. 2: The back panel has three MIDI ports, an AC connector, a power switch, and a rotary selector for changing MIDI channels. You will need to add the RS250 Trunk Line module (\$44) to get back-panel audio outputs.



LEDs to indicate whether a signal is incoming (or outgoing), and the tuning controls aren't especially helpful for making exact calibrations. It also has no broad- and fine-tuning knobs. On a positive note, the pitch stability is rock-solid.

But if the Sorcerer is used by people who know their way around a modular system and aren't looking for instant, lock-tight results, the RS90 offers a professional and reliable range of oscillator power and potential. For just \$10 more, the RS95 module offers most of the same features but with the addition of a sine-wave output.

**Filters.** The exceptionally good RS110 multimode filter module (\$119) is the system's best component. It has two audio inputs with individual level controls. You can route the inputs to four parallel resonant filters: lowpass, highpass, bandpass, and notch. You don't have to select among the four filter types, though, because four outputs

make them simultaneously available; that approach is extremely clear and direct. A shared frequency-cutoff control is the only limit to this flexible and practical arrangement.

Resonance has its own control input and output. In addition to simply

oscillate, generating a sine wave that can serve as a pitched audio source.

Best of all, the filters sound superb. They're sharp (with 24 dB-per-octave slopes on lowpass and highpass settings), fat, and Moog-like. The RS110 provides interesting options, from the unusual insert point in the resonance loop to variable CV control of filter tracking.

For deviant filter effects, the RS120 Comb Filter (\$119) might be what you need. Based on an analog delay, the comb filter's fundamental frequency is regulated by varying the delay time, usually by voltage control. The RS120 has two audio-signal inputs and a single Delay Time that ranges from 2.5 to 25 ms, resulting in a cutoff frequency from 40 to 4,000 Hz. Two CV inputs with Level controls are provided to vary Delay Time. You can turn up the Resonance control to make the filter self-oscillate.

The RS120 sounds cheap, but in the nicest sort of way. It can produce ringing,

▼

**The Sorcerer's overall  
construction is  
reassuringly solid.**

applying resonance, you can divert its normal path through another module (voltage-controlled amplifier [VCA], delay, and so on). That unusual and perhaps unique feature opens the door to all manner of resonance effects. Fully in the clockwise position, the resonance knob can make the filter self-

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slightly ghostly, and fuzzy effects, and it's great for lo-fi sounds.

**LFO.** Although the RS90 oscillator module can function as an LFO, you will probably want a dedicated LFO. The Analogue Systems RS80 VC-LFO (\$119) operates from very low frequencies (the spec says one cycle every 50 seconds) to growl-producing, rapid-modulation speeds. In addition to the RS80's manual Frequency control, you can control its rate by sending a CV into the linear-CV input jack. Surprisingly, unlike the system's audio-oscillator module, the CV input adheres to the unusual hertz-to-voltage system noted previously.

The RS80 can generate four waveforms simultaneously: sine, triangle, square, and rising or falling sawtooth. Each has an output-level control, except the sine wave, which outputs a  $\pm 5V$  signal at the LFO frequency.

A Reset In jack lets you reinitialize the LFO waveform by applying a second waveform to its input. If the signal is a mid- or high-frequency periodic waveform from a voltage-controlled oscillator (VCO), it acts as a sync input. A status LED indicates LFO frequency.

**Amplifiers and envelopes.** Although a VCA is essential for hearing the results of your labors, VCAs are hardly the stuff of dreams. The RS180 (\$87) offers two audio inputs, two CV inputs (logarithmic and linear inputs are included), and a single audio output, all with separate level controls. Transparency is the key to a usable amplifier, and the RS180

attenuates and amplifies the signal without altering its character.

Envelope generators (EGs) are much more complex than amplifiers because they govern the shape and variety of sounds. The RS60 (\$119) is a classic four-stage ADSR EG that offers nine mode combinations. It has two toggle switches for changing modes—one for switching between Hold and One Shot and the other for Auto Repeat and Gated Repeat options—that work in tandem.

The RS60's flexible nature makes it possible to create a variety of rhythmic effects that form the basis of much current trance, dance, and techno music. Although I didn't figure out exactly why each effect occurred, I had enormous fun switching among the modes and clipping or inverting the signal with the Attack and Decay knobs. The envelope's attack time ranges from a minimum of 0.5 ms (very fast) to a maximum of 10 seconds (quite ample). The decay and release times range from 2.5 ms to 20 seconds, so creating extremely long sweeps is a breeze.

**Additional modules.** Analogue Systems produces an impressive range of modules (for more information, check out the Analogue Systems Web site). The review instrument included the RS160 4-input-by-1-output Mixer (\$68); the RS40 Noise/S&H Oscillator (\$119), which generates white noise (unless you apply filtering to change its color) and features a sample-and-hold circuit with a square-wave LFO; and the RS170 Dual 5-Way Multiple (\$44), for sending

one signal to several destinations simultaneously. Unfortunately, the RS200 (\$600) three-by-eight-step analog sequencer module wasn't provided with the review unit.

## MIDI IN ACTION

Even to an instrument that conjures a different time and space the way that the Sorcerer does, MIDI is a fact of life. The Sorcerer converts MIDI data into control voltages—Aftertouch, Velocity, and Control Change 1 (Modulation), 11 (Expression), and 12 (Effect 1)—which are sent from the keyboard's controller module to the sound-producing modules. The active MIDI channel is selected by an unusual back-panel switch that requires a screwdriver.

When I triggered the Sorcerer from an external MIDI keyboard, I noticed some slackness in the response compared with playing the Sorcerer keyboard. If you were to control the Sorcerer with a MIDI sequencer, you could offset the sequencer track to compensate for the Sorcerer's sluggish response.

## TAKING THE PLUNGE

If you're in the market for a modular synthesizer, the Sorcerer is cost-effective compared with a vintage instrument and much more reliable. If you've wet your feet with modular synthesis and want to dive in headfirst, the Sorcerer is a great way to immerse yourself, especially given its open-minded approach to adding modules from other manufacturers. If you're a more typical synth user and feel the urge to acquire a modular instrument, think long and hard before making the hefty investment of time and money that such instruments require.

The Sorcerer certainly sounds cool, and its flexibility is astounding. However, the restraints of using a monophonic synth with limited MIDI capabilities and no programmable memory make modular synthesis a sport for a musical minority—just as it has always been.

*Julian Colbeck used to be a musician, but he's better now. As head of Keyfax Software, he prefers to enjoy music rather than infest the world's stages as he did for 25 years.*

## Sorcerer Specifications

<b>Sound Engine</b>	analog subtractive synthesis
<b>Keyboard</b>	49-note, unweighted; transmits neither Velocity nor Pressure
<b>Polyphony</b>	1-note
<b>ROM/RAM Programs</b>	0/0
<b>Analog Audio Output</b>	(1) 1/4" minijack (with RS180 VCA)
<b>MIDI Ports</b>	In; Out; Thru
<b>Optional Sequencer</b>	3 × 8-step (RS200)
<b>Optional Effects</b>	reverb/chorus (RS310); spring reverb (RS320); Bode-style frequency shifter (RS240)
<b>Dimensions</b>	35" (L) × 9" (H) × 16" (D)
<b>Weight</b>	38 lbs.





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# A D E P T

## NIGHTINGALE 4.0 (MAC)

### *A visionary notation program makes a solid comeback.*

By Thomas Wells

Which music-notation program to use is a question musicians frequently ask. The answer varies from what it was five or six years ago. Differences in the quality of printed scores and user interfaces have generally leveled out among the big contenders, and questions of design philosophy are not the hot-button issues they once were.

When programmer Don Byrd released *Nightingale* for the Macintosh in 1993, the major notation-software players included Coda's *Finale*, Mark of the Unicorn's (MOTU's) *Professional Composer*, and Passport's *Encore*. Then, *Nightingale* was a visionary program that excelled in areas in which others came up short. Later, it even pioneered important developments such as OCR and Web publishing.

*Nightingale* has since developed at a

slow pace, and the benchmark for notation software has moved ever higher. Nevertheless, *Nightingale* is still a formidable program; it even won an EM Editors' Choice award in 1997. The August 2000 release of *Nightingale* 4.0 (also known as *Nightingale* 2000) in native PPC and 680x0 versions signals a new chapter in the program's development.

*Nightingale*, now owned and developed by Adept Music Notation Solutions, is an incredibly feature-laden program that cannot be fully described in this review. All software has an attitude—a personality, style, design philosophy, and look that distinguish it—and *Nightingale*'s is an intriguing one. It's chock-full of features but isn't gimmicky. Gracious and useful, *Nightingale* is deep yet easy to learn.

#### LET'S NOTATE

Notation-program users have varying work habits and preferences; none are more important than those involving note entry. *Nightingale* lets you do things your way by offering numerous methods to input music: a mouse, step-time note entry through MIDI, and real-time transcription through MIDI. In addition, you can import Type 1 Standard MIDI Files (SMFs), *Finale* Enigma Transportable Format (ETF) files, and files created by the OCR program *Note-Scan*. You can also use *Nightingale* to import and export text files in Notelist format, an ASCII-based music-input language favored by some typographers.

Note entry with the mouse is easy and unproblematic, following a procedure that is familiar to the majority of readers. Note values are selected from the Tool Palette, and the note is then inserted on the staff by a mouse-click (see Fig. 1).

Alternatively, you can use alphanumeric keys to select note values. Rather than using numbers to represent note

#### Minimum System Requirements

##### Nightingale 4.0

PPC: Power Mac 6100/60, 8 MB RAM, OS 7.5

680x0: Mac II, 5 MB RAM; OS 7

values as some other programs do, *Nightingale* uses alphabetic abbreviations such as *q* for quarter note, *Q* for quarter rest, and *h* for half note. Although the Tool Palette's tools have default keyboard assignments, users can reassign them using an external application called *NightCustomizer*. If you don't like the arrangement of symbols on the Tool Palette, hold down the Option key and drag a symbol to a new location, and the symbols exchange positions.

Step-time entry with a MIDI keyboard works as it does in many notation programs: select a duration using the computer keyboard and then play notes on a MIDI controller. The notes you play appear in a box on the staff that shows only the previous three notes or chords you entered, which makes it difficult to spot mistakes. When you finish entering notes, click the mouse; the notes you entered will be displayed on the staff, and you'll be back in normal note-entry mode.

Importing SMFs and ETF files (from *Finale* versions 3.0 through 3.5 only) worked as well in *Nightingale* as in any notation program I've used. The import process requires some cleanup and editing—adding slurs, correcting quantization errors, and so on—to make the notation acceptable. When transcribing MIDI files, *Nightingale* handles beam placement nicely with its Guess Beams by Beat option, and it transcribes triplets accurately.

Real-time MIDI transcription with *Nightingale* is a two-step process. First, record the passage using the Record Insert command; then, use the Transcribe Recording command to notate the raw durations. Unfortunately, *Nightingale* doesn't interpret well the passages recorded in real time. I recorded many passages with alternating triplets and 16th notes, and the program consistently had trouble with transcription.

I especially liked *Nightingale*'s Chord

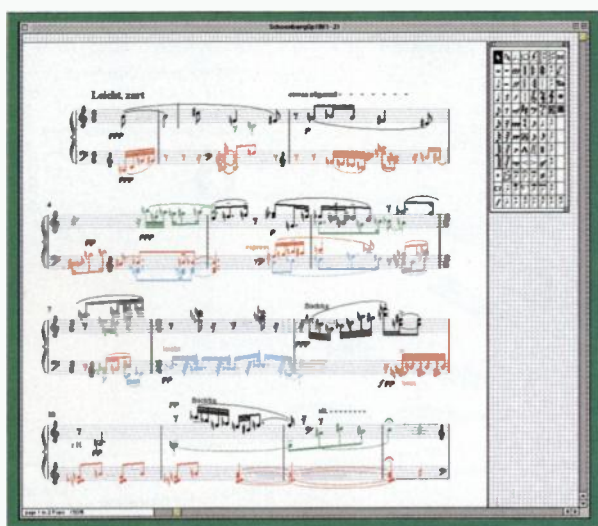
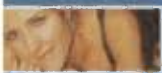


FIG. 1: *Nightingale* provides a wide range of notation symbols in its Score and Tool Palette (upper right). The main Score page can show each Voice in a different color.



# broadjam



**Artist:** Katrina Carlson  
**Genre:** Pop

**Song:** I Know You By Heart

LO-FI MP3

HI-FI MP3

REAL AUDIO



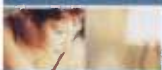
**Artist:** Kodac Harrison  
**Genre:** Blues

**Song:** Love Turned On The Light

LO-FI MP3

HI-FI MP3

REAL AUDIO



**Artist:** Faye  
**Genre:** Alternative

**Song:** What's Right

LO-FI MP3

HI-FI MP3

REAL AUDIO



**Artist:** Bill Epps  
**Genre:** R & B

**Song:** Sign On In

LO-FI MP3

HI-FI MP3

REAL AUDIO



**Artist:** Derrick Procell  
**Genre:** Country

**Song:** Same Plan

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Symbol tool for its simplicity of use and flexibility. The Chord Symbol tool makes it possible to notate any variation of standard chord symbols or even to make up new ones. Fig. 2 shows the Chord Symbol tool with entries for an A-flat minor (11/13b/9b/5b) chord and the resulting chord symbol. *Nightingale* gives you the option to select chord names, qualities, and alterations from the tool's pop-up menus or to type any text you choose directly into the text boxes.

## FAIR FONTS

*Nightingale* operates with only two fonts: Adobe Sonata and BlueNotz, a jazz font developed by Thomas Williams that is similar in appearance to handwriting (\$60; available at [www.ngale.com/index\\_02.html](http://www.ngale.com/index_02.html)). *Nightingale* ships with the screen-font version of Sonata, but users who want to print from a laser printer and don't already own PostScript Sonata will have to purchase it from

Adobe for about \$26.

Print quality on my laser printer was excellent. Fig. 3 shows examples of the PostScript Adobe Sonata font output and the BlueNotz font output scanned at 600 dpi.

Changing music fonts requires that you use the *NightCustomizer* out-board application, which is included in the *Nightingale* distribution bundle. You can use *NightCustomizer* to specify hundreds of *Nightingale* global preferences, such as MIDI Velocity tables for playback of dynamics and MIDI driver options. It also provides access to dozens of PostScript settings down to the smallest detail, such as Size of Colons Between Tuplet Numerals.

With so many great music fonts available, including a lot that approach the look of classic engraved editions from great publishing houses, a wider font selection would be a welcome addition to the program. The developer says *Nightingale* will have that capability in a future release.

## SONG OF THE NIGHTINGALE

Lyrics are entered using the Flow in Text/Lyrics tool, and the process is simple and straightforward. First, type or paste your text into a box using the appropriate hyphens for syllabification and underscores for melismatic passages; then, click on notes to assign the words and syllables.

You can also add lyrics by attaching them directly to notes one at a time, as you would any piece of text. Any font can be designated a "lyric" style, which affects the spacing of notes on a preset or single-use basis. Once you enter the lyrics, you can move them easily using the Dragging tool.

You can also use the QuickChange tool to make global alterations, such as changing the position of highlighted text. Although the review version does not allow entry of multiple text lines (for example, for different stanzas), the next release of *Nightingale* should have that feature.

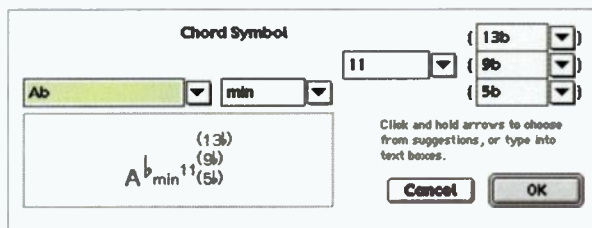


FIG. 2: The Chord Symbol tool uses a dedicated window for building chord symbols. You can choose from many existing chord types or create your own by typing text directly into the window.

## EDITING ALTERNATIVES

*Nightingale* offers a large number of editing features. Notes, rests, and symbols can be selected with the arrow cursor and deleted by pressing the Delete key. Notes move up, down, right, and left with the Dragging tool, but using that sometimes causes symbols, especially graphics and text, to disappear while being moved. The symbol usually reappears on release of the mouse button. If not, it will show up after a forced screen redraw.

You can manipulate notes and other symbols one at a time by invoking the Get Info command (Control + I, as in the Mac OS) on a selected score event. That brings up a window with a number of text boxes in which you can specify a note or symbol's position in quarters of a point or change MIDI-playback information, for example. Get Info complements the QuickChange command by letting you make numerous changes on a single event at the same time.

You can navigate smoothly from one score page to another using the thumbwheel at the bottom or side of the window. *Nightingale* directly associates symbols with notes or rests, ensuring that hairpins, articulations, and dynamic marks won't wander about when you extract parts.

One of *Nightingale*'s highlights is the QuickChange command, which concentrates a large number of editing possibilities in one place. QuickChange lets you edit groups of symbols belonging to the same type. Editable symbols include notes, rests, slurs, ties, tempo marks, chord symbols, and articulations as well as other note modifiers, bar lines, dynamics, and tuplets. You can change the shape of note-head groups,

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align the baselines or alter the text style, and modify the shape of slurs.

To change the shape of the note heads of every other note in a string of eight eighth notes, highlight the entries using Command-click or the Threader tool. Then, implement the QuickChange command by typing Command + H. A dialog box with three pull-down menus will appear. Select Note/Rest, Appearance, and x-shape (see Fig. 4). Each symbol type has menu options appropriate for its attributes.

The QuickChange command is one of the most useful, flexible, and innovative tools I've encountered in a music notation program. It's indicative of *Nightingale's* creative design and understanding of notation ergonomics.

Have you ever started to enter notes while working in your notation software, only to find that you selected the wrong tool? Another *Nightingale* innovation, called Mouse Shaking, helps you avoid that scenario. A few quick twitches of the wrist, mouse in hand,

and you're back in note-entry mode from anywhere you happened to be. In MIDI step-entry mode, when the hand is usually not on the mouse, Mouse Shaking is less helpful; in other situations, it can help reduce editing mistakes. Mouse Shaking also works fine with a trackball.

You will also appreciate the Threader tool, which lets you select a series or "thread" of notes or events by clicking on and dragging over symbols. Holding down the Command key and using the Threader tool allows you to select threads at will from different parts of the score.

I especially like *Nightingale's* Show Duration Problems tool, which finds duration problems and displays them with crosshatching over the affected area. It worked so nicely for real duration problems that I forgave its nagging habit of considering incomplete upbeat measures as mistakes. Unfortunately, *Nightingale* offers no multiple Undo or Redo commands.

#### PRODUCT SUMMARY

### Adept Music Notation Solutions

Nightingale 4.0 (Mac)

music-notation software

\$159 (academic, student, and upgrade pricing also available)

FEATURES	4.0
EASE OF USE	3.5
DOCUMENTATION	4.5
VALUE	5.0

#### RATING PRODUCTS FROM 1 TO 5

**PROS:** Simple, customizable user interface. Unique features. Runs on a variety of Macs. Excellent micro- and macro-editing features. Thorough and well-organized documentation.

**CONS:** Limited MIDI implementation. Work-arounds needed for several basic tasks, such as guitar tablature and nested tuplets.

#### Manufacturer

Adept Music Notation Solutions, Inc.  
tel. (215) 736-8237  
e-mail info@ngale.com  
Web www.ngale.com

#### BUILDING THE NEST

*Nightingale's* Master Page tool is used to set up basic system and page formatting for the score. Although it doesn't look like much, the Master Page tool is powerful.

In Master Page mode, *Nightingale's* Play/Rec menu is replaced by a Master Page menu that contains options to add or delete parts, split staves, set staff size, specify margins, define instrument assignments for staves, and designate groupings by placing bar lines through groups, for example. Fig. 5 shows a closeup of the Master Page tool used to specify MIDI channels and patches for a woodwind-quintet layout.

*Nightingale* organizes scores into Parts, staves, and Voices. Parts can consist of single or multiple staves, and each staff can contain 31 Voices. A score can have a maximum of 100 Voices, and a Voice can spread across any of a Part's staves. Voice entry and editing is simple, and the handy Look at One Voice tool shows a selected voice at normal brightness while dimming others. Voices can also be assigned colors for easy identification.

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## CUE THE NIGHTINGALE

*Nightingale's* MIDI scoring options are not as robust as they could be. Although it's easy to assign channels and Program Changes to staves using the Master Page setup or, less conveniently, the Instrument MIDI Settings, it's impossible to insert channel and Program Changes at arbitrary points in the score. Consequently, you can't change an arco patch to pizzicato, for example, or route a software synth to a different MIDI port as a score plays back. For most MIDI orchestrators, that's a major shortcoming.

In general, MIDI playback is simple and reliable. Just hit Command + 1 to start playback and Command + period to stop; clicking the mouse also stops playback. For playing back part of a score, you have to choose a separate Play Selection command (Command + 4). You can toggle page turns during MIDI playback, but MIDI data is occasionally interrupted when you enable that feature.

Starting playback from any point other than the beginning requires two steps: first, click on the point in the score at which you want playback to begin; then, select Continue Play from the Play/Rec menu or use its shortcut, Control + 2. Continue Play is also useful for resuming playback from the point at which it was halted by a mouse-click. A Transport window with punch-in and punch-out windows as well as a consol-

idation of some Play commands would be valuable additions to the program.

*Nightingale* does a fair job of playing dynamics, and you can easily make your own dynamic marking-to-MIDI Velocity assignments. *Nightingale* doesn't play crescendos, decrescendos, ornaments, or articulations. Work-arounds to some limitations, however, are described in the *Users Guide*. For example, to accurately play back a group of notes marked staccato, select them and use the Set Durations command to shorten their duration. Such a work-around may be possible, but it is not always practical—I can't imagine doing that for a 20-minute orchestra score.

*Nightingale* uses the Open Music System (OMS) to handle MIDI. Adept plans to add the option of using MOTU's FreeMIDI in a future release.

## GUIDE ME

The *Nightingale* user guide, implemented as a Help file, is one of the most complete help systems I have seen in any notation program. Each topic is organized into three parts: the Actions section, which carefully walks the user through the workings of each feature; the See

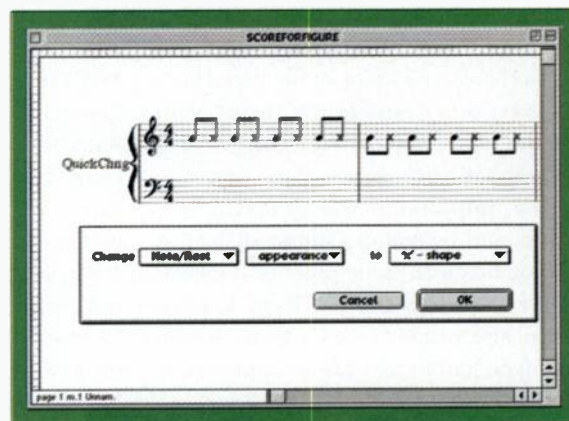


FIG. 4: *Nightingale's* QuickChange dialog offers an easy way to change multiple notes or other symbols simultaneously. The attributes in the dialog at the bottom of this figure convert the note heads of every other note to an x.

Also section, which provides links to related topics; and the More Information section, which offers more references to the main topic. When I looked up the Flow in Text/Lyrics tool in the user guide, for example, the More Information section provided 31 references. The manufacturer plans to offer the *Nightingale* user guide in HTML format in a future release.

The *Nightingale* Tutorial, presented in Adobe Acrobat, is similarly well organized, nicely illustrated, and user-friendly, though it has no links. The lessons take the user from Mac basics through most of *Nightingale's* functions. It even has a tutorial about how to use the *Users Guide*.

Hippo Birdy; Two Ewes.

Molto grazioso.

**a**

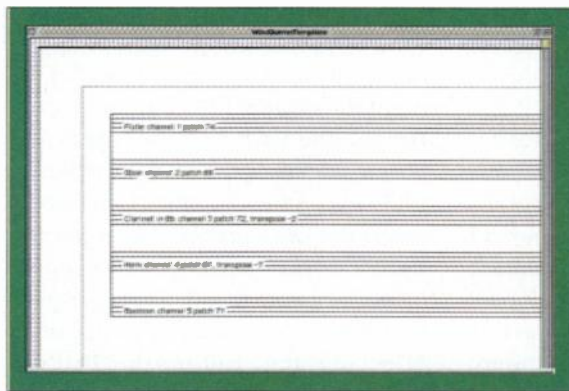
Hippo Birdy; Two Ewes.

Molto grazioso.

**b**

FIG. 3: *Nightingale's* native font is Adobe Sonata, shown here in a 600 dpi scan of a laser printout (a). The program also supports the BlueNotz font, also shown at 600 dpi (b).





**FIG. 5:** Use the Master Page window to configure score and formatting options and set MIDI parameters for staves. The interface is basic yet functional.

## NIGHTTIME

Unlike other music-notation programs, *Nightingale* doesn't make decisions for you. It doesn't have "wizards" waiting to assist you or get in your way. *Nightingale's* basic philosophy is that the user is in charge and needs no automatic intervention from the program.

For example, you can put seven quarter notes in a 4/4 measure if you like, and *Nightingale* will not complain unless you ask it to do so.

There's little the program can't do with music notation. However, the work-arounds to accomplish certain tasks are sometimes a bit awkward and time consuming. I am unable to recommend *Nightingale* for guitar tablature, for example, and nested triplets are also

quite problematic.

*Nightingale* is fast. Page-redraw speed, global changes, and part extraction are amazingly quick, even running the 680x0 version on an old 68030 PowerBook Duo. My main test setup for this review was a Mac blue and white G3 with 128 MB RAM. On the G3, speed of

part extraction was so fast, I doubted the program had done its job until I checked the part files.

The program's micro- and macro-editing capabilities are among the best that I have seen in any notation software. The supply of templates is ample, and the documentation is superb. PostScript print quality is excellent. The user interface is simple, elegant, and highly configurable, and the program runs efficiently on Power Macs and 680x0 Macs.

*Nightingale* is one of the biggest bargains in music-notation software. For those wanting a test drive, a limited version known as *NightLight* is available for download from the Adept Web site. A 14-day trial of the full version should also be on the site by the time you read this article.

**Thomas Wells** has been involved with audio and computer music for more than 25 years. He teaches at Ohio State University.

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# PEAVEY

## TMP-1

### *An affordable, easy-to-use Class A tube mic preamp.*

By Karen Stackpole

Peavey's previous foray into tube microphone preamp design yielded the critically acclaimed VMP-2, a great-sounding and affordable dual-channel Class A unit. Now, the Mississippi-based manufacturer has added an even more affordable unit to its pro-recording line: the single-channel TMP-1 Class A tube mic preamp. Because I often use and really like the VMP-2, I jumped at the chance to check out the TMP-1.

Like the VMP-2, the TMP-1 boasts Class A tube design throughout its signal path. It has fewer features than its predecessor, however, which is no surprise given the preamp's remarkably low price.

#### REAL ESTATE

The TMP-1 is a 1U rackmount box with a modern, no-frills look. The faceplate has a silk-screened blue-to-black fade, a depiction of two tubes, and large white lettering. From left, the front panel provides an 80 Hz low-cut switch, an input-level knob, a five-step LED input meter (–6 dB, 0 dB, +6 dB, +12 dB, and Clip), a 24V Phantom Power switch, a power-indicator LED, and a power On/Off button. The TMP-1 lacks an attenuation pad, a polarity-reversal switch, and an EQ (aside from the highpass filter).

The highpass filter, which is designed to eliminate low-end rumble, has a steep 12 dB-per-octave slope starting at 80 Hz (despite the incorrect mention in the manual of a 40 Hz highpass filter with a 6 dB-per-octave slope). The unit's Gain knob is marked 0 to 10, like a guitar amp's, rather than marked with decibel calibrations. The LED is a helpful addition and more than many preamps

offer. According to Peavey, you can achieve the best signal-to-noise ratio by keeping the signal between the meter's +6 dB and +12 dB range.

One thing that irks me is the TMP-1's 24V phantom power. Peavey confirmed that the lower, nonstandard voltage helped cut costs, but phantom power is not the place to skimp on a preamp designed for professional use. Although most condenser mics work with as little as 9V phantom power, many microphones require 48V to operate at optimum level. Moreover, the TMP-1 does not provide an LED to indicate that phantom power is on. That is a concern because the Phantom Power button is easy to push, yet it's difficult to tell at a glance whether it's engaged.

#### OUT THE BACK, JACK

The TMP-1's rear panel is as simple as they come. A combination input jack allows for balanced XLR and unbalanced 1/4-inch connections. The XLR input (recipient of the phantom power) is transformer balanced. My only beef with the jack design is that it doesn't provide a locking mechanism for securing the mic cable.

The unit has two discrete output jacks: a transformer-balanced XLR and an unbalanced 1/4-inch. Also located on the rear panel is the receptacle for the included IEC power cable, which is detachable.

#### RACKED AND READY

Like the VMP-2, the TMP-1 employs readily obtainable tubes: a 12AX7 at the input stage and a 12AT7 at the output. Despite the VMP-2's better specs and bigger feature set, I thought it worthwhile to conduct a comparison test between the two preamps. I also put the TMP-1 head-to-head against a couple of more-expensive, solid-state preamps that I'm well acquainted with, just to draw a better bead on the TMP-1's sound quality.

I tested the TMP-1 in the controlled environment of Guerrilla Recording in Oakland, California, and on location recording gigs. I used Monster Cables and recorded direct to a Panasonic SV3800 DAT. In the studio, I routed signals through a Soundcraft Spirit Studio console; on location, I used a Mackie 1202-VLZ.

I used a variety of microphones to test the TMP-1, including Baltic Latvian Universal Electronics (BLUE) Dragonfly and AKG C 3000 B large-diaphragm condensers, an Oktava MK 012 small-diaphragm condenser, and a Shure SM57 dynamic mic. Sources included female and male vocals, acoustic guitar, dumbek, and key chimes.

I also tested the unit as a direct injection (DI) box for recording bass guitar—an application curiously absent from the manual, considering that the unit offers

#### TMP-1 Specifications

<b>Input Connectors</b>	(1) Neutrik Combo (transformer-balanced XLR; unbalanced 1/4")
<b>Output Connectors</b>	(1) transformer-balanced XLR; (1) unbalanced 1/4"
<b>Maximum Gain</b>	55 dB (mic); 40 dB (line)
<b>Maximum Input Level</b>	+55 dBu (mic); +40 dBu (line)
<b>Maximum Output Level</b>	+18 dBm
<b>Frequency Response</b>	20 Hz–20 kHz (+0, –3 dB)
<b>Dynamic Range</b>	120 dB
<b>Equivalent Input Noise</b>	–106 dBV
<b>Total Harmonic Distortion</b>	<0.2% @ maximum gain (40 Hz–40 kHz)
<b>Hum and Noise</b>	66 dBV @ 40 dB gain (unweighted)
<b>Signal-to-Noise Ratio</b>	>66 dBV @ 40 dB gain
<b>Phantom Power</b>	24 VDC
<b>Tubes</b>	12AX7 (input); 12AT7 (output)
<b>Filter</b>	80 Hz highpass
<b>Metering</b>	5-step LED (input)
<b>Power Supply</b>	internal (IEC jack)
<b>Dimensions</b>	1U × 9.875" (D)
<b>Weight</b>	8.4 lbs.





The Peavey TMP-1 is an economical, no-frills, single-channel Class A tube microphone preamp with an all-tube signal path. A combo input jack allows for XLR input and instrument DI service.

an unbalanced 1/4-inch instrument-level input. Interestingly, the DI box was my favorite use for the TMP-1. The tone, albeit a bit on the bright side, was smooth, clear, and present, not boomy or indistinct. The TMP-1 may well prove a winner as a preamp for bass rigs.

### IN THE CONTROL ROOM

When plugged in and turned on, the TMP-1's transformer put out a troubling 60-cycle hum. That was a moderate distraction in the control room, though, fortunately, the monitoring levels in the room effectively overrode the hum during recording, making it less of an issue.

Another curious thing happened: after the unit had been on for half an hour or so, the -6 dB and 0 dB LEDs lit up, despite no signal being present. Thinking the unit defective, I obtained a second TMP-1 from Peavey. With that unit, only the -6 dB LED lit up (though the 0 dB LED flickered occasionally). Fortunately, the LED gremlins didn't seem to affect the unit's sound.

The TMP-1's self-noise level is fairly prominent. The noise wasn't a problem when recording loud sources that provided a fairly hot input (strummed steel-string guitar and dumbek, for example). However, it was appreciable when recording quieter sources that required greater amplification, such as soft vocals and light, sparse percussion. Moreover, using the TMP-1 with a somewhat noisy mic compounded the noise.

### SIBLING RIVALRY

Although the TMP-1's overall tone is fairly close to the VMP-2's, the TMP-1 doesn't quite measure up sonically. For one thing, the TMP-1 is about 7 dB higher in self-noise than the VMP-2, and it produces a noticeable high-end hiss. Because of that, the TMP-1 would not be my first pick for recording quiet sources.

Depending on which mic I used, the differences in tone between the two

preamps changed, particularly in the highs. Overall, the TMP-1 sounded brighter than the VMP-2 (especially with the Dragonfly). I was impressed, though, by how good both preamps

the TMP-1 is noisier. Keep in mind, however, that those preamps cost two to three times as much per channel, so that's not exactly an apples-to-apples comparison. (The comparison helped

made the SM57 sound.

In comparison with the more expensive preamps, the TMP-1 sounds somewhat harsher, more sibilant, and not quite as warm and detailed; again,

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me to get a better idea of the TMP-1's tonal qualities.)

Because the TMP-1's overall sound is somewhat thin, I preferred not to engage the unit's highpass filter for most applications. Nonetheless, the filter is a welcome feature in case of severe rumble, and it could also prove to be helpful when recording particularly boomy sources.

When powering the Dragonfly, the TMP-1's 24V of phantom power reduced

the mic's output by about 6 to 8 dB (as compared with the VMP-2, which provides the standard 48V phantom power). If I had not been doing a direct comparison, the deficiency might not have been so noticeable. Decreasing the phantom-power voltage reduces the mic's sensitivity, however, and additional gain is required to make up for the loss; if the preamp is noisy to begin with, the noise level is only going to increase.



# PERSONAL STUDIO 2002 BUYER'S GUIDE™

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**PUBLICATION DATE: JULY 2001**

## PRODUCT SUMMARY

### Peavey

TMP-1

tube mic preamp

\$289.99

FEATURES	2.5
EASE OF USE	5.0
AUDIO QUALITY	2.5
VALUE	3.0

#### RATING PRODUCTS FROM 1 TO 5

**PROS:** Affordable. Transformer-balanced I/O. Great as bass DI box. Provides ¼-inch input, five-step LED input meter, and 80 Hz highpass filter.

**CONS:** Noisy. Provides only 24V phantom power. No indicator LED for phantom power. No attenuation pad, polarity reversal, or locking mechanism on XLR input jack. Somewhat thin sounding and lacking in warmth and low end. Skimpy manual. Mysterious LED-meter malfunction.

#### Manufacturer

Peavey Electronics Corp.  
tel. (800) 821-2279 or (601) 483-5365  
e-mail [peavey@peavey.com](mailto:peavey@peavey.com)  
Web [www.peavey.com](http://www.peavey.com)

## STRAIGHT UP

The TMP-1 is an affordable, single-channel Class A tube mic preamp with a tube signal path from input to output and a simple, uncluttered design. Although it lacks the tone warmth typically attributed to tube gear, the TMP-1 provides a sonic personality different from those of standard solid-state board preamps. If you have a few extra dollars and want to increase your studio's palette of sounds, give the TMP-1 a listen.

I have a couple of concerns. One, it's noisy enough to be problematic when recording quiet sources (or when used in tandem with a noisy mic). It also provides only 24V rather than standard 48V phantom power—a cost-cutting maneuver that reduces the unit's appeal and usefulness for professional recording.

If you're a bass player, check out the TMP-1 as a DI box and as a preamp for your rig. It could prove your most affordable route to a clear and present bass sound. ☺



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# MINNETONKA

**SURCODE CD PROFESSIONAL  
1.0.2 (WIN)**

*Affordable surround-sound  
production for the  
project studio.*

By Thomas Wells

**D**olby Digital and Digital Theater System (DTS) are the top contenders in the surround-sound arena, and they represent impressive technical achievements. Dolby Digital software offers a reasonably priced option for producing surround mixes, but if you want to distribute your music on commercial CDs, you are out of luck if it's all you have. That's because DTS owns the exclusive licensing rights to put compressed surround data on audio CDs. In fact, if you wanted to produce DTS-encoded material in the past, you had to send your music to DTS to have it encoded. Fortunately for desktop musicians and personal-studio owners, that is no longer the case.

Minnesota-based Minnetonka has just released its new *SurCode CD Professional* DTS-encoding software, which lets you produce DTS surround mixes simply and reliably. Moreover, purchasing *SurCode*

*CD Professional* gives you the right to publish and sell surround-mix CDs.

*SurCode CD Professional* uses lossy compression to encode six audio channels with a playback streaming rate of 1,234 kbps. The sophisticated compression scheme lets you fit as many minutes of DTS-encoded audio on a CD as you get with a normal stereo CD. (For a brief overview of surround technologies, see the sidebar, "Surround About.")

## SPATIAL NEEDS

To realize your surround-sound ideas, you need a 5.1 decoder or 5.1 receiver, a set of speakers, and 5.1-mixing software such as Digidesign's *Pro Tools*, Steinberg's *Nuendo*, or Minnetonka's *Mx51* surround mixer.

Before you can use *SurCode CD Professional*, you must click on its Options menu and select the sound-card outputs for monitoring. The program is easy to use and centers on a single window that presents the necessary parameter settings at a glance (see Fig. 1).

Because Windows audio devices are allocated in stereo pairs, it's necessary to assign three MME drivers for the six outputs in your 5.1 mix: left-front, right-front, center, subbass LFE, left-rear, and right-rear. If you assign fewer than three pairs of drivers, the source files are mixed to the available devices. Besides assigning the three pairs of drivers for the six channels, you can assign a driver through which you can send the encoded mix to a decoder for preburn auditioning.

Once the hardware assignments are set, it's a simple matter to select sound files for encoding. *SurCode CD Professional* accepts WAV and AIFF files at 44.1 kHz. You choose the files by clicking on the buttons of the six channels and selecting from a standard Windows browse menu. The name of the selected sound file for a given channel then appears in the window next to the correspon-

## Minimum System Requirements

### SurCode CD Professional

Pentium II; Windows 95/98/2000/NT;  
32 MB RAM

ding button. Each channel has Mute and Solo buttons as well as a Clear button to remove the selected file if you change your mind or make a mistake.

The next step is to pick a destination for the encoded file using the Destination button at the top of the window. The encoded file is written as a WAV file, which you can easily burn onto a CD with several popular programs such as Roxio's *Easy CD Creator*. A session with all of its input sound files and its destination sound file can be archived or reopened with the Save or Open commands, respectively.

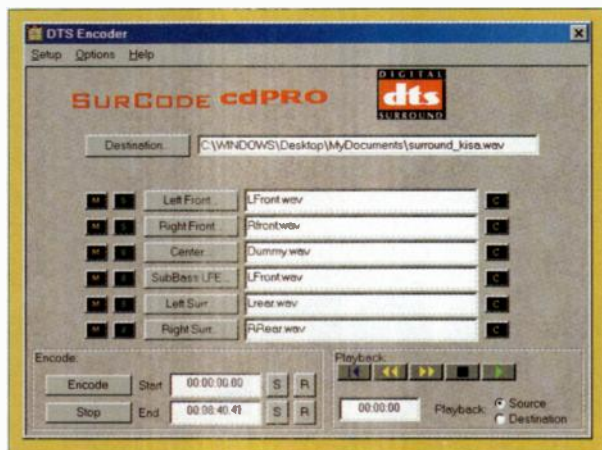
You don't have to select all six channels to encode. For one mix, I selected a computer-music piece and encoded it in four channels: left-front, right-front, left-rear, and right-rear.

Two sections labeled Encode and Playback appear at the bottom of the window. Clicking on the Encode button in the lower-left corner starts the encoding process. The Start and End displays mark the locations in the source files where encoding begins and ends.

A five-button transport in the Playback section lets you play and navigate the source files or the encoded WAV file. A time display beneath the transport buttons serves only as an indicator of elapsed time for the source files or the encoded file; it doesn't accept typed-in values for setting the playback point.

You enter start and stop points for encoding by typing numbers into the Encode section's Start and End displays before you hit the Encode button. Start and stop points can also be set by playing the music with the transport controls: after locating the appropriate point in the music and stopping playback, hit the S (Set) button in the Encode section to transfer the current time to the Start or End display. The R (Reset) button returns the display to its default setting.

If you have a sound card with at least six analog outputs or an ADAT Optical



**FIG. 1:** Minnetonka's *SurCode CD Professional* employs a single window from which you set all encoding parameters.



port, *SurCode CD Professional* lets you monitor your pre-encoded mix by clicking on the Source radio button beneath the transport controls. To do a preburn audition of the DTS-encoded WAV file, click on the Destination radio button and send the mix through your sound card's S/PDIF outputs to the decoder. Be aware, however, that many sound-card drivers include a software volume control, which corrupts the data on its way to the decoder. If it can't be bypassed (as is the case with Creative Labs' Sound Blaster Live, for example) your audio output will end up sounding like static or white noise. If your sound card has a driver designed for streaming encoded files (such as the Sound Blaster Platinum or the Digital Audio Labs CardDeluxe), you should have no problem.

The 16-page *SurCode CD Professional* user manual is a hard-copy version of the online document distributed with the software. It is attractive, well laid out, and designed to get you up and encoding quickly. However, it left me wanting more, especially in the sections about how DTS works and where you can obtain further information. Also,

specific hints about using the encoder with particular sound cards to test a DTS encoding prior to burning would have made a nice addition.

### TESTING, TESTING

For this review, I used *Nuendo* to prepare examples for testing. The mixes were from various sources: contemporary classical chamber works, jazz, and 4-channel computer music. I auditioned the mixes on an Infinity Prelude MTS surround speaker system driven by a Sony model STR DE-935 consumer 5.1 receiver along with a Hsu subwoofer.

I was impressed with how good the DTS algorithm sounded. Most of my musician and recording-engineer colleagues couldn't tell the difference between a 6-channel ADAT classical-music recording and its DTS-encoded counterpart. Some preferred the DTS-encoded mixes to a Dolby Digital-encoded version that I also prepared.

You can experience for yourself how *SurCode CD Professional* sounds by downloading from Minnetonka's Web site two free sound files that were produced with the software. All you have to do is

### PRODUCT SUMMARY

#### Minnetonka

SurCode CD Professional 1.0.2 (Win)  
surround-sound encoding software  
\$499

FEATURES	4.0
EASE OF USE	4.5
DOCUMENTATION	3.5
VALUE	4.0

RATING PRODUCTS FROM 1 TO 5

**PROS:** Simple, easy-to-use interface. Excellent sound quality.

**CONS:** Documentation a bit sparse. Can't directly enter playback start time.

#### Manufacturer

Minnetonka Audio Software, Inc.  
tel. (952) 449-6481  
e-mail info@minnetonkaaudio.com  
Web www.minnetonkaaudio.com

burn the WAV files onto a CD and play them through a DTS decoder.

If you want to hear more 5.1 mixes, DTS ([www.dtsonline.com](http://www.dtsonline.com)) markets a large number of surround-audio CDs featuring artists and composers from Steely Dan to Messiaen. The DTS mixes I have heard from that collection are quite impressive and are clearly the work of talented recording engineers.

### DTS DESTINY

About 60 companies are licensed to manufacture DTS-compatible surround equipment, such as A/V receivers, discrete decoders, and DVD players with built-in decoders. Most units are built for video home entertainment but will play DTS surround-audio CDs just fine.

The fact that more DVD movies are being released with Dolby Digital and DTS audio tracks speaks to DTS's acceptance and viability. In addition, the large installed base of DTS theater systems (about 19,000 compared with about 25,000 for Dolby Digital) says something positive for the future of DTS.

If you want an entrée into surround sound and wish to release multichannel mixes on audio CDs, I can't think of a better solution than Minnetonka's easy-to-use *SurCode CD Professional*. ☉

### SURROUND ABOUT

Multichannel sound production has been around a long time and has gone through many incarnations, including the pioneering multichannel soundtrack of Disney's *Fantasia* in the 1940s, multichannel electroacoustic compositions from the '50s, the interest in quad sound on LP and 4-channel tape in the late '60s and '70s, and Dolby ProLogic in the '80s and '90s. Now the two biggest surround-sound contenders are Dolby Digital and DTS. (Although Sony Dynamic Digital Sound [SDDS] is an important system in wide use, no SDDS software encoders are available.)

The question of which digital surround format—Dolby Digital or DTS—is superior remains a hot-button issue in audio circles. Both surround systems are certainly impressive. Of the two competing for-

mats, Dolby took the lead in 1992 with the release of *Batman Returns*; DTS followed the next year with the release of *Jurassic Park*.

Until now, if you wanted to get involved in making your own surround mixes, Dolby Digital software encoding was the only reasonably priced game in town. However, making surround CDs with a Dolby Digital software encoder can be fairly dicey. (For more about the process of creating surround-sound mixes, see "You're Surrounded" in the October 2000 issue and "Mixing in the Round" in the May 2001 issue.)

If you plan to release your surround-sound music on commercial CDs, you'll have to use DTS encoding. DTS has the exclusive rights to surround-encoded audio for commercial CD distribution.

# AUDIO-TECHNICA

AT835ST

*This affordable stereo  
shotgun mic puts distant  
sounds within reach.*

By Rudy Trubitt

In the comfortable confines of a studio, you can position microphones as you please. Want more detail? Just move the mic closer to the source. In the rough-and-tumble world of field recording, however, it's often impossible to position a microphone as close to the source as you'd like. Imagine, for example, trying to record the sound of a squirrel eating a walnut. It would be great if you could position the mic inches from the rodent's maw, but what wild creature is going to allow that?

A common solution for that type of challenge is to record with a shotgun microphone, a key item in the field recordist's handbag. Shotgun mics (also called *interference tube* or *line cardioid* microphones) use a highly focused polar pattern—tighter than hypercardioid—to capture distant sounds. They are especially useful in noisy or reverberant environments because of their ability to accurately home in on a particular sound while rejecting surrounding sounds.

Audio-Technica's AT835ST is not only

a shotgun microphone but also a stereo mic. *Single-point* stereo mics (one microphone housing two capsules) are commonly used for field recording and for video- and film-production sound work. Single-point stereo mics usually have better mono compatibility than a spaced pair of microphones, and they also minimize the size and weight of the rig—important concerns in the field. (For more about shotgun mics, see the sidebar "I Said Shotgun.")

## WHERE IT'S AT

The build quality of the AT835ST inspires confidence. A little more than nine inches long, the microphone is made of sturdy yet lightweight metal with a gray-bronze finish and subtle black dapples (see Fig. 1). The connector end provides a balanced stereo output on a 5-pin XLR connector. The electret condenser capsules are near the connector and visible through the slots cut into the tube. (When mounting or holding the mic, don't obstruct that area, or performance will suffer.)

The mic has two switches recessed deep into the body and movable only with a narrow tool. The first provides access to a highpass filter at 80 Hz; the second is a three-position switch that allows control of the stereo image width. The first setting, marked MS, disables the mic's built-in M-S decoder, permitting variable-width processing (see the sidebar "Shotgun Wedding"). The other two positions, LR-W and LR-N, engage the decoding circuitry to create wide or narrow stereo images, respectively.

I rarely used the normal position; during mixdown, you can easily reduce a wide image to a narrower one, or even to mono, by simply panning the signal's left and right halves toward the center. In addition, collapsing the signal to mono won't create phase problems, as often occurs when using other stereo-miking techniques; rather, the side signals cancel out, and you're left with a recording of what the mid capsule alone heard.

The AT835ST comes in a well-padded snap-shut storage box



**FIG. 1:** Although designed mainly for electronic news gathering, the AT835ST (shown with the AT815ST, left) will appeal to sound designers and field recordists thanks to its affordability, lightness, and small size.

## PRODUCT SUMMARY

### Audio-Technica

AT835ST

stereo shotgun microphone  
\$899

FEATURES	4.0
AUDIO QUALITY	3.5
EASE OF USE	3.5
VALUE	4.0

## RATING PRODUCTS FROM 1 TO 5

**PROS:** Lightweight. Good sound quality. Good value. Comes in storage box with cable, windscreen, and clipmount.

**CONS:** Somewhat noisy. No internal battery option (requires phantom power). Requires balanced-line transformers for connecting to unbalanced inputs.

## Manufacturer

Audio-Technica U.S., Inc.  
tel. (330) 686-2600  
e-mail [pro@atus.com](mailto:pro@atus.com)  
Web [www.audio-technica.com](http://www.audio-technica.com)

(made of vinyl-covered cardboard), complete with a rigid mic clip, light-duty foam windscreen, and short stereo cable (5-pin female to dual 3-pin male). One small annoyance: the AT835ST's storage box is significantly larger than necessary. (That is because Audio-Technica uses the same box to accommodate its longer stereo shotgun mic, the AT815ST.)

## JUDGMENT DAY

I look at a number of characteristics when judging a mic's suitability for field recording. Sound quality is obviously critical, but there are other important factors to consider, such as electronic self-noise, size and weight, and handling noise. For a stereo mic, stereo-imaging quality is also important.

The AT835ST sounds good. On the provided spec sheet, the mic shows a broad boost in the highs between 2 and 10 kHz with a 4 to 5 dB bump around 7.5 kHz. That extra high end enhances dialog intelligibility and can help clarify distant sounds; however, it can also impart an edgy character to some sources. On the low end, the AT835ST dips about 4 dB at 80 Hz.



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The main purpose of a shotgun mic is to accurately capture the target sound while minimizing off-axis noise. To that end, the AT835ST is a target-specific instrument. Note that the Narrow and Wide modes do not have an effect on the directionality of the shotgun capsule; instead, they raise the relative level of the figure-8 side mic. When using the AT835ST in Wide mode, therefore, you hear a fair amount of stereo ambience along with the sound at which you're aiming. Collapse the image to mono after the fact (or record in undecoded M-S mode), though, and you'll be impressed by the amount of rejected ambience and off-axis sound. (If you need even greater directionality, check out the aforementioned AT815ST, a physically longer and more focused version of essentially the same instrument.)

### QUIET ON THE SET

Because field recordists may be called on to record very quiet sounds—for example, the murmur of a creek, leaves rustling across a lawn, or a clock ticking in a quiet house—mic self-noise is an important consideration. The mic pre-amp you use can contribute significantly to noise, so I tested the AT835ST using an outstanding and very quiet mic pre: a Grace Designs Lunatec V2.

The AT835ST uses electret condenser capsules—capsules that tend to be noisier than a true condenser (that is, one with an externally polarized capacitor). The AT835ST performed about as I expected for its reasonable price: it was somewhat noisy. Therefore, it would not be my first pick for recording really quiet sources; for louder applications, however, it is sufficiently quiet.

The first AT835ST I tested suffered from a tiny but noticeable sputtering sound coming from the figure-8 capsule. It turned out that the mic was defective, so Audio-Technica sent a replacement. Thankfully, the second microphone did not exhibit the sputtering noise.

The AT835ST showed typical amounts of handling and infrasonic noise. Also, though adequate on calm days, the slipover foam windscreen that comes with the AT835ST is insufficient in moderate or stiff winds. The solution to both problems is to budget for a combined shockmount and windscreen, such as those manufactured by Rycote ([www.rycote.com](http://www.rycote.com)).

Audio-Technica supplied a top-of-the-line Rycote Windshield and Windjam-



ROBIN BOYCE-TRUBITT

**FIG. 2:** Rudy Trubitt uses the AT835ST (placed inside a Rycote windscreen) to capture the sound of a chunk of melting ice on the shores of a glacial lake in New Zealand.

mer. The Windshield comprises a tube made of flexible plastic netting with an adjustable suspension mount inside and a pistol-grip handle. The Windjammer is a faux-fur sock that slips over the Windshield. I did my outdoor testing using the Windshield and Windjammer combination, and it worked beautifully. Even on the open observation coach of a speeding passenger train, wind noise remained under control. Rycotes aren't cheap, but they do the job well.

### SLIM AND TRIM

Size and weight are obvious considerations for microphones meant for use in the field. The AT835ST is relatively compact and very lightweight. It's also

## SHOTGUN WEDDING

Shotgun stereo mics typically employ a mid-side (M-S) stereo-pickup design with the requisite two capsules contained in a single compact housing. That is a much more elegant solution than, say, grafting together two interference tube mics to create an XY stereo pickup pattern (not to mention an unwieldy V-shaped monstrosity). In a dedicated M-S mic, the mid capsule (directional or omnidirectional) points straight at the sound source, and the "side" capsule (bi-directional or figure-8) is positioned directly behind the first cap, with its two diaphragms aimed to either side. By means of an M-S decoding circuit, the mid and side mics' signals combine to form a stereo image.

Typically, dedicated M-S mics have the necessary stereo-decoding circuitry built-in. On the AT835ST, you can also disable the decoder and record the shotgun signal on one channel and the figure-8 on the other. During post-production, that lets you create a variable-width stereo image by running the signals through a software- or

hardware-based M-S decoder. A variable-width image offers creative advantages over a fixed-stereo image. For example, if you were mixing sound for video, you could widen the stereo image as the camera pulled back from a close-up, increasing ambience to match the broadening picture.

The quality of stereo imaging provided by an M-S microphone depends in large part on the directionality of the middle mic (or capsule). Whereas the omni or cardioid microphone typically used in an M-S setup provides natural imaging, the highly directional mid capsule of a shotgun mic makes for a noticeable compromise. Specifically, the resulting stereo image is weighted toward the center and sides with areas between those points difficult to pin down precisely. In addition, an M-S shotgun's mid mic leads to some left-right ambiguity when sounds move behind the mic. For example, a car approaching from your left and passing behind and to your right will generate some signal in the left as well as the right channel.



## AT835ST Specifications

Element	fixed-charge backplate, permanently polarized condenser (electret)
Diaphragm	½" gold-sputtered Mylar
Polar Patterns	line cardioid; figure-8 (for M-S)
Frequency Response	40 Hz–20 kHz
Dynamic Range	101 dB (mid); 101 dB (side); 102 dB (L/R stereo)
Sensitivity (@1 kHz)	mV/Pa 31.6 (mid); 19.9 (side); 15.8 (L/R stereo)
Signal-to-Noise Ratio (@ 1 kHz)	72 dB (mid); 68 dB (side); 70 dB (L/R stereo)
Self-Noise	22 dBA (mid); 26 dBA (side); 24 dBA (L/R stereo)
Maximum SPL (for 1% THD)	123 dB (mid); 127 dB (side); 126 dB (L/R stereo)
Highpass Filter	80 Hz (12 dB/octave)
Stereo Settings (switchable)	M-S; L/R stereo-wide; L/R stereo-narrow
Power	11–52 VDC phantom power
Dimensions	9.29" (L) × 0.83" (D)
Weight	0.23 lbs.

comfortable to use for extended periods, either when handheld in a shock-mounted pistol grip or cradled at the end of a boom pole.

Power requirements for condenser mics are another important consideration for the field recordist. The AT835ST requires external phantom power (11 to 52 VDC); internal battery power is not an option. In the past, I have been willing to suffer the higher self-noise of an electret condenser mic because the internal battery provided easy interfacing with ultraportable consumer DAT and Mini-Disc (MD) recorders (which rarely provide phantom power). The AT835ST offers no such trade-off. In addition, balanced line transformers are required when connecting the mic to an unbalanced mic input—a potentially cumbersome requirement in the field.

If your field recorder provides XLR mic inputs and phantom power, neither concern is an issue. As Audio-Technica points out, XLR jacks and phantom power have become commonplace on "prosumer" sound and video gear. However, given the AT835ST's competitive price, it will also appeal to many sound recordists using consumer-grade gear. If you're in that group, be aware that interfacing the mic to your rig will not be a trivial task.

## STEREO LAB

Though the AT835ST delivers pleasant ambience, its stereo imaging reflects a

compromise inherent to such directional microphones: it images strongly to the center and sides, with somewhat vague transitions in between. In addition, I encountered occasional left-right ambiguity with moving sound sources. That is no surprise, because the microphone is primarily designed with directionality rather than stereo imaging as its main goal.

What it comes down to is choosing the right tool for the job. If your primary goal is to capture realistic stereo environments, for instance, a non-shotgun stereo mic is a better choice. (I have had good success with the less-expensive Audio-Technica AT825 and my primary single-point stereo mic, the slightly pricier Shure VP88.)

## AT PLAY IN THE FIELD

I took the AT835ST to New Zealand and returned with some memorable sounds. In a forest at the edge of a coastal marsh on the South Island, I was attempting to capture the sound of a bellbird in a high tree when a large gull-shaped bird flew overhead. Luckily for me, I was recording. The AT835ST captured the sound of the bird grunting with each flap of its wings as it swooped over the forest canopy. The sound would be right at home in the pod-racer sequence from *Star Wars, Episode I: The Phantom Menace*; it was that weird.

On the barren banks of a glacial lake at the foot of Mount Cook, I came upon

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## I SAID SHOTGUN

A shotgun mic's pinpoint accuracy is achieved largely by physical design. The capsule is housed in a long tube with slots cut along its length. Those slots add acoustical delays to off-axis sounds. Sounds coming straight down the barrel combine with the time-delayed off-axis signals, resulting in acoustical phase cancellation at the microphone's diaphragm. The result is an extremely directional pickup—of higher frequencies, at least; the pattern naturally widens at lower frequencies.

Although some instances call for shotgun mics to be mounted on microphone stands, they're often handheld, mounted on the end of a boom pole, or clamped onto a video camera. In the last three cases, handling noise is an

important concern. If the microphone is accidentally bumped or rubbed, some mechanical shock will reach the capsule and end up on the recording. The amount of that noise depends on the quality of the microphone's internal shockmounting.

Another type of handling noise is infrasonic noise, a powerful low-frequency shudder that happens when a mic is moved quickly, sometimes even when a shockmount is used. You can partially combat both types of handling noise and wind noise with a low-cut filter (assuming one is available). That approach is used at the expense of low frequencies in the recording. A better solution is to use a windscreen with an integrated suspension mount.

a chunk of ice drifting 20 feet offshore. By positioning the mic at the water's edge, I captured the glassy lapping of the windblown lake against the distant melting ice block, all the while keeping my feet warm and dry (see Fig. 2).

Later that afternoon, I encountered a

small rocky stream and "fished" for voices in the bubbling water. Although I was working at close range, the AT835ST's directionality was still helpful; it let me target minute areas of the stream's soundscape. As I moved the mic from rock to rock, listening for a good loca-

tion, inspiration struck. I took the recorder out of pause and, holding the microphone, began a series of slow, sweeping gestures over the stream. My goal was to create a short piece in which the fades and transitions were created live at the microphone rather than by editing and crossfading back in the studio. It worked. A good tool should inspire new ways of working, and the AT835ST came through on that count.

## BALANCING ACT

The Audio-Technica AT835ST stereo shotgun microphone strikes a good balance between sound, features, and price. In fact, no other stereo shotgun mic comes even close to the low price of the AT835ST.

I recommend the AT835ST, but with a couple of caveats. The first relates to its self-noise. Although the mic is not loud enough to be a concern if you are recording a soccer match, for example, you may wish it were a bit quieter as you crouch behind a bush, trying to capture a distant birdcall. My other warning is relevant only to users of semipro gear, and that's simply to be aware that you need phantom power and balanced transformers to hook up the AT835ST to a portable DAT or MD recorder.

*Rudy Trubitt is a writer and recordist from Oakland, California. His books Mackie Compact Mixers and Live Sound for Musicians are available through his Web site, [www.trubitt.com](http://www.trubitt.com).*

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WRH

# Quick Picks

## RISING SOFTWARE

Auralia 2.1 (Win)

By Thomas Wells

Australian-based Rising Software has entered the field of ear-training software with *Auralia* (\$149). *Auralia* provides an interactive environment for learning ear-training skills and allows students to sing and perform rhythms that the software grades and evaluates.

*Auralia*'s straightforward layout is easy to navigate. Twenty-six lessons are distributed among four main topics: Intervals and Scales, Chords, Rhythm, and Pitch and Melody. You access topics using the large buttons located below the Menu and Toolbar. *Auralia* calls those buttons *topic groups*; clicking on them reveals their respective lessons.

For example, select the Chords topic button, and nine lessons appear: Cadences, Chord Progressions, Jazz Chords, Chord Recognition, Advanced Chord Progressions, Jazz Chord Singing, Chord Singing, Cluster Chords, and Jazz Chord Progres-

sions. Click on one of the lessons, and the drill begins. The toolbar controls volume and tempo, changes exercise difficulty level, and provides a score for the drill.

### Teach Me

A quick tour through one of the lessons gives an idea of what being an *Auralia* student is like. I began with the topic group Intervals and Scales and then selected Interval Singing, one of the group's seven lessons. Selecting a lesson brings up a level-selection menu (the number of levels varies). Interval Singing has seven levels and a Custom-level option that lets users create a custom set of intervals for testing. The level-selection menu also provides a brief description of the lesson and how to use it.

I selected Level 7. *Auralia* immediately played a note with a piano-like timbre and prompted me to sing a tritone above it. (You can change the sound *Auralia* uses in the Administration screen.) I sang the correct note and was rewarded with a jaunty little fanfare accompanied by a window displaying the message "Correct!" and a cute red eighth-note caricature bearing a toothy grin. From that window, I could choose to hear the interval played back on the synthesizer, go to the next level of difficulty, continue with the current level, or quit. The pitch-detection software worked well for the most part; only occasionally did I have to repeat an exercise when the program didn't "hear" me.

I sang some incorrect responses to test the program's diagnostic Help function. After responding with a whistling, falling-bomb-and-explosion sound and the message "Incorrect," I was given the option to play the question again or exit.

I chose Continue, and *Auralia* took me back to the beginning of the lesson. When I sang the wrong response again, the program displayed its "Incorrect" message. That time, however, it showed the incorrect interval I sang and didn't let me try again. Fortunately, when you configure

custom tests, you can change the number of retries allowed.

*Auralia* provides substantial onboard help. Each lesson includes some theoretical background and interactive instruction about the lesson topic, as well as a Help feature that explains the lesson's structure.

### Testing, Testing

*Auralia* provides ample customization options for the instructor. Although you can't add new topics, it's possible to add new chord types, edit existing chord types, and change certain terminology.

Making up tests with *Auralia* is easy. The Tests entry in the Administration menu lets you name a test, decide which topics and levels it will cover, and determine the number of questions and the number of replays. When students log in, the program informs them that tests are available and lets them choose which test they want to take. It will also tell them their status on each test.

The Professor feature, a kind of virtual teaching associate, is also a nice touch. It can suggest that students are ready to move on to more- or less-advanced work when their percentage of correct answers attains or fails to meet a level set by the administrator.

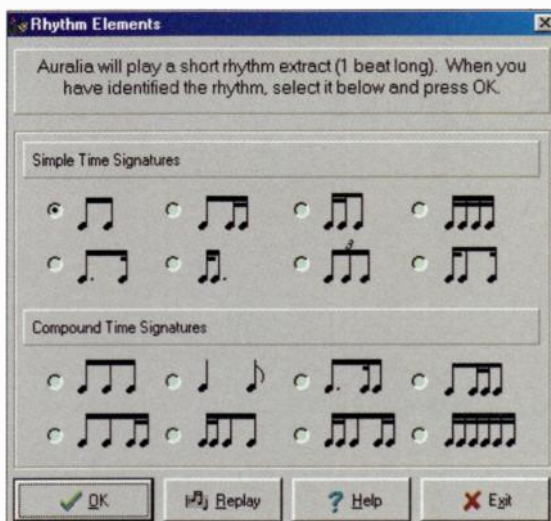
Record keeping, examining test results, and creating and deleting users are simple to do with *Auralia*'s administrator tools. Networking *Auralia* in a lab environment is similarly straightforward and doesn't require a systems guru. The manufacturer's Web site provides pricing for lab packs and unlimited desktop use of *Auralia*.

### The Score

An effective drill-based ear-training program, *Auralia* is suitable for instruction at a number of levels. Although you can customize the program's content, some users might wish for the ability to add lesson topics. The inclusion of jazz-theory topics gives the program a broad appeal, and *Auralia*'s Pitch-detection feature adds a fun and musical dimension to working with the program.

### Overall EM Rating (1 through 5): 4.5

Rising Software; tel. (888) 667-7839 or 61-3-9894-4788; e-mail sales@risingsoftware.com; Web www.risingsoftware.com



Rising Software's *Auralia* offers exercises grouped by topic in many areas of musicianship. The exercises can be replayed as often as desired, and help is available for each topic. Shown here is an upper-level drill in rhythm identification.



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 Polar Pattern: cardioid  
 Sensitivity: >16m V/Pa  
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 THD: <0.5% at 120 dB SPL  
 Power: external regulated 115/220 P.S



## SE1

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 Frequency Response: 30Hz to 18kHz  
 Polar Pattern: cardioid  
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## SE1000

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Type: large diaphragm condenser  
 Frequency Response: 30Hz to 20kHz  
 Polar Pattern: cardioid  
 Sensitivity: >18m V/Pa  
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 Output Noise: <17dB typical, A weighted  
 THD: <0.5% at 120 dB SPL  
 Power: +48V phantom power



## SE2000

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Type: large diaphragm condenser  
 -10db Pad - lo-cut filter  
 Frequency Response: 30Hz to 20kHz  
 Polar Pattern: cardioid  
 Sensitivity: >18m V/Pa  
 Output Impedance: <200 ohm  
 Output Noise: <17dB typical, A weighted  
 THD: <0.5% at 120 dB SPL  
 Power: +48V phantom power



## SE2500

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Type: large diaphragm condenser  
 Frequency Response: 30Hz to 18kHz  
 Polar Pattern: cardioid  
 Sensitivity: >16m V/Pa  
 Output Impedance: <200 ohm  
 Output Noise: <17dB typical, A weighted  
 THD: <0.5% at 120 dB SPL  
 Power: +48V phantom power



## SE3000

**Sale \$179.00**

Type: 1.07" twin diaphragm condenser  
 Frequency Response: 20Hz to 20kHz  
 Polar Pattern: cardioid, figure 8, omni  
 Sensitivity: >18m V/Pa  
 Output Impedance: <200 ohm  
 Output Noise: <17dB typical, A weighted  
 THD: <0.5% at 120 dB SPL  
 Power: +48V phantom power



## SE3500

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Type: 1.07" large diaphragm condenser  
 Frequency Response: 20Hz to 20kHz  
 Polar Pattern: cardioid  
 Sensitivity: >20m V/Pa  
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## Quick Picks

### SOUNDFOREST

Voice Fusions

By Jeff Obee

The human voice can have a dramatic emotional impact. Unfortunately, too many voice-based sample CDs are mired in clichés and fail to reach for broader creative possibilities. *Voice Fusions* (\$99.95, audio CD), from the fledgling Soundforest company, makes that risky reach with distinctive results.

#### Speaking of Which

The self-described "explorations with voice" travel a diverse aural landscape, often pulling off on the sonic back roads to see what's there. Lurking in the two-CD set's 190 tracks is everything from spoken phrases to complex sound-design transformations; hundreds of sounds provide a lot of bang for your buck.

Producer Michael Kelsey created the sounds from three basic stylistic ideas: voice synthesis (using the human voice as waveforms for an E-mu E-Synth and Kurzweil K2600); language as music (metaphorical or unusual, thought-provoking phrases); and voice explorations (the suggestive nature of the sample itself inspiring new phrases or rhythms).

Kelsey then organized the sounds into 31 categories according to "a predominate impressionistic quality," with titles such as Dream Deliriums, Poetry, Voice Rhythms, Shaman Signs, Rubber Springs, Granulation, and Alien Worlds. Samples run from one second to more than two minutes and are arranged from shortest to longest on each track.

#### Fuse Box

The material is oriented to the spoken word, vocal effects, and vocal improvisation as opposed to traditional singing. Vocalists were chosen for their ability to project their personalities rather than those of the microphones (Rode NT1s, a Shure SM57, and a Radio Shack PZM) and for their ability to enunciate, accent, and inflect. Kelsey kept an ear open for happy accidents. I have a hunch that there were happy accidents aplenty.

The typical "ooh," "ahh," and "oh, baby, do it again" samples are absent, though *Voice Fusions* does include shorter statements that

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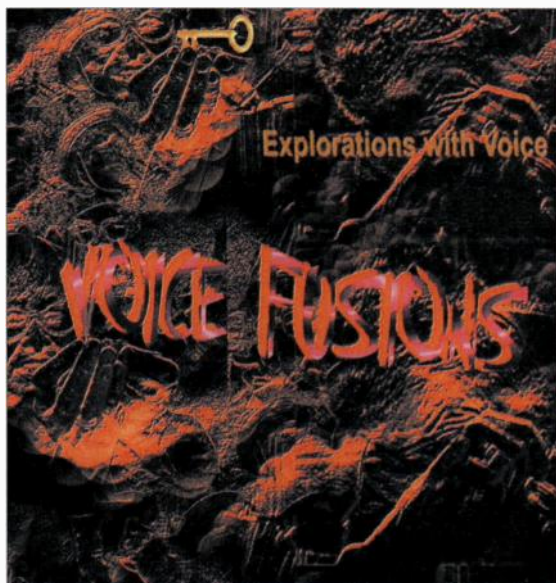
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Soundforest's *Voice Fusions* sample CD is an adventurous and unique collection of vocal sounds.

could work in a dance-music context. Instead, you'll find surreal, abstract phrases such as "a clock surrenders to the filaments of light surrounding it," and "I am not unhappy, only wet with darkness, soaked to the bone with primitive memories." Many phrases were excerpted from poetry written by Kelsey; some are stream of consciousness musings.

Kelsey took a no-holds-barred approach to the processing, using Steinberg's *Wave-Lab*, Sonic Foundry's *Acid*, Waves' Gold Native Bundle plug-ins, and hardware units such as the Ensoniq DP/4. You can hear standard effects such as delay, panning, vocoding, pitch shifting, and reverb in the collection. However, at least half of the material has an intuitive, improvised quality thanks to digital signal processing that follows the flow of the sound, completely altering or enhancing it. Many samples use multi-effects processing. Although some sounds are composites of two or more samples, most additional textures and artifacts are a result of the processing.

### Intriguing Utterances

I discovered numerous gems in addition to the poetic and stream of consciousness musings. The eight samples in the Old Time category create an antique radio atmosphere; in fact, the sample Tonyboy was created from family recordings dating from the 1940s and 1950s. Monkschant and

Mountainchant are lengthy, evolving sounds, each evoking the aura of their names in oblique, dreamlike ways.

The Voice Rhythms and Beatland sections contain rhythmic material that you can loop. Clips such as the entrancing Velvetmorn and Enigbeat are just the thing for trance music; the Chicken-meeting samples are edgy with spiked rhythms that are suitable for a more industrial setting. Zeiglig2, from the Syllable Play category, has no bpm reference but is an enigmatic and cool rhythmic bit.

The samples seem to flow from shorter, more intelligible sounds at the beginning to more intensely processed and

experimental things. The Humangeese sounds on disc 2 are superbly designed abstractions, as are Forcesalittle, Indecision, and Alcoholcontent from the Scitter-Scat section.

The last few categories offer the longest and most bizarre designs: deep, powerful, primitive growling; shimmering, doppleresque atonal singing; twittering ambiences; futuristic space rides; and on and on. Walkaround2 in the Transformations category is a wash of cacophonous noises featuring a discernable spoken voice that emerges occasionally. Itsaknow evolves over a period of 38 seconds in a style reminiscent of Steve Reich's "It's Gonna Rain." It's hard to believe that Sounddeepcrystal, an evocative two-minute drone, is of vocal origin.

### Voicing My Opinion

A unique, sometimes strange, and often inspiring collection, *Voice Fusions* is an admirable initial offering full of wonderful surprises. The human voice can indeed be dramatic, but so can an adventurous approach and attitude to recording and processing.

Kelsey suggests using the collection in contexts that include mainstream music, experimental music, electronica, choreography, film, theater, and performance art. The sky is the limit, though. One rewarding approach is to arbitrarily cut and paste a

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## Quick Picks

few phrases together as though they were refrigerator poetry magnets.

The documentation covers the essentials, though the indexing system has a few errors in the length of the samples. You can download a more comprehensive, sortable database that includes bpm and byte-size listings from Soundforest's Web site. Those who appreciate truly artistic sound design must give *Voice Fusions* a listen.

### Overall EM Rating (1 through 5): 4.5

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## CONTEMPO SAS

*Virtual Sound*

By Thomas Wells

.....  
**V**irtual Sound (\$45), by Riccardo Bianchini and Alessandro Cipriani, is a tutorial on the Csound programming language. Written in a gentle and historically informative style, the book is easy to read and follow thanks to the efforts of the authors and the Italian-to-English translator, Agostino di Scipio. Bianchini and Cipriani have extensive backgrounds in computer music and impressive academic credentials.

### Tome Poem

*Virtual Sound* is organized in two sections: a 17-chapter, 330-page Csound tutorial; and a 200-page collection of appendices, useful charts and tables, and selected articles about Csound-related topics. Chapter topics reflect a tried-and-true pedagogical approach, starting with a general introduction to Csound, moving to various synthesis methods, and then gradually integrating more Csound-specific topics such as table opcodes, using Csound with MIDI, and Csound as a programming language.

Bianchini and Cipriani provide a thorough grounding in the basics and do an admirable job of explaining Csound's potential be-

yond note-by-note generation. The text describes how to build orchestras that can serve as rich compositional resources, even to the point of generating multiple musical ideas.

It's clear from the presentation, flow of materials, and general tone of *Virtual Sound* that the authors are experienced composers of electroacoustic music as well as effective teachers. The pervading attitude in the book is that computer-generated music is expressive and evocative. That is one of the Csound tome's most attractive features.

### By Extension

As an example of the authors' effective pedagogy, many chapters in the book are followed by sections called Extensions that provide technical—and in some cases, historical—enrichment. For example, in the subtractive synthesis chapter, the authors refer to Stockhausen's *Gesang der Jünglinge* and *Kontakte* as examples of works in which subtractive synthesis was used. However, they don't go into specifics, such as how Stockhausen made the wonderful resonant-filter sounds in *Kontakte* and how to reproduce them with a Csound instrument.

The articles in *Virtual Sound's* Appendices and Readings portion are noteworthy.

Riccardo Bianchini · Alessandro Cipriani

## Virtual Sound

Sound Synthesis and Signal Processing - Theory and Practice with Csound



**Virtual Sound**, by Riccardo Bianchini and Alessandro Cipriani, explores the synthesis and signal-processing operations that Csound provides. A CD-ROM includes the example files discussed in the book.



First is an introduction to *WCShell*, a front end for Csound written by Bianchini. That section also includes articles about Csound and Linux, granular synthesis, algorithmic composition, additive synthesis, and interactive control of real-time Csound. For the most part, the Appendices and Readings portion builds on topics discussed earlier in the text and shows the reader how to elaborate those ideas to form practical and versatile production tools.

#### Added Value

The dual-platform (Mac/Win) CD-ROM included with the book contains several versions of Csound and a suite of freeware Csound utilities. The Windows offerings are more interesting and include *WCShell* and a graphic Csound-orchestra builder called *Spaghetti* (also by Bianchini). Also included are Gabriel Maldonado's *DirectCsound*, a real-time PC version of Csound, and *VMCI*, a virtual MIDI interface. The example orchestra and scores in the text are on the CD-ROM. However, the examples are not organized by chapter or by synthesis algorithm, and the book gives no specific directions for their use.

I would prefer the inclusion of audio or multimedia examples that illustrate chapter concepts and integrate more thoroughly with the printed material. Although it is convenient to have the free programs together on the disc, most of the CD-ROM's content can be downloaded easily from the Web.

#### Csound Resource

Some locations use *Virtual Sound* as a textbook, and it can also serve as a valuable reference. Its skimpy index leaves a lot to be desired, however, and the bibliography is somewhat dated. I also wish for a general discography of pieces that employ the techniques covered in the book. Despite those shortcomings, I felt as I read that I was in the hands of master teachers whose love of their subject and musicianship comes across on every page. ☺

#### Overall EM Rating (1 through 5): 4

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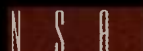
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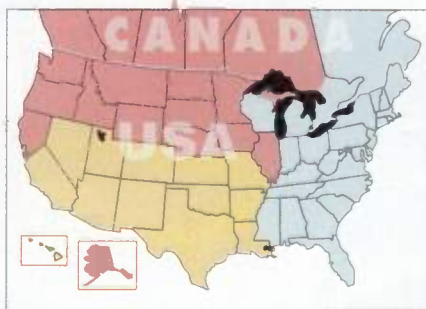
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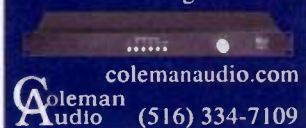


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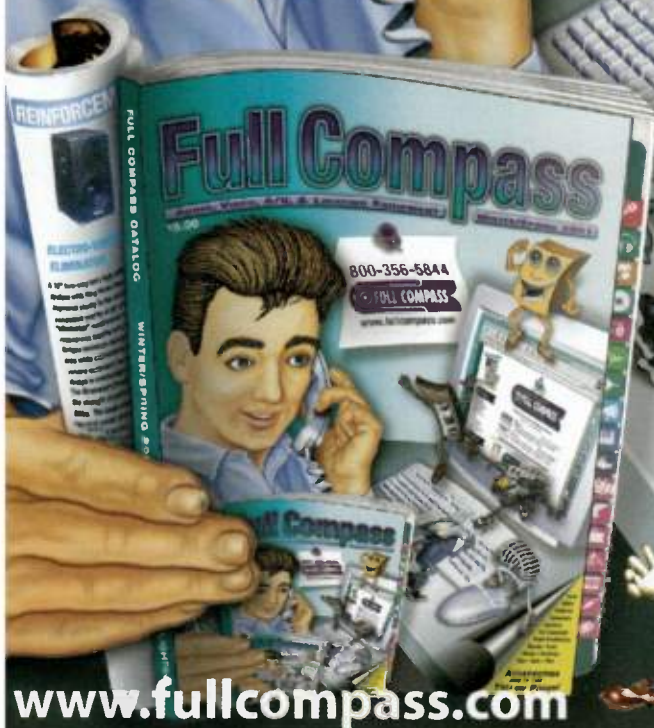
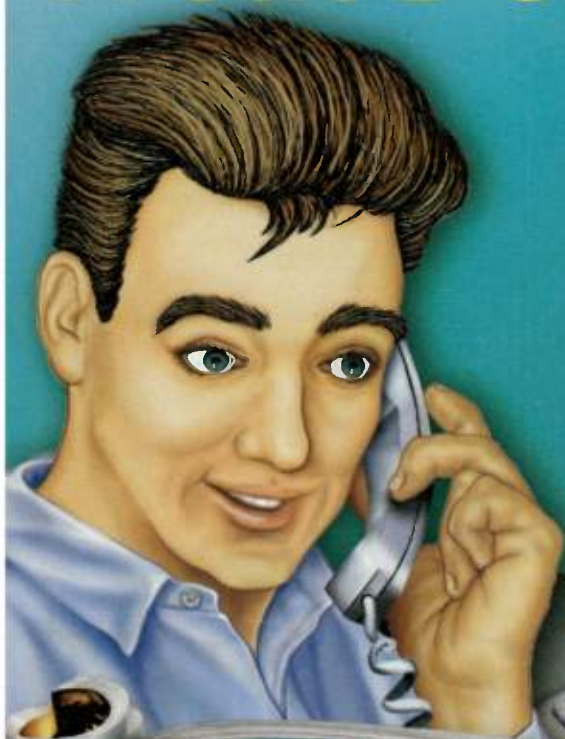
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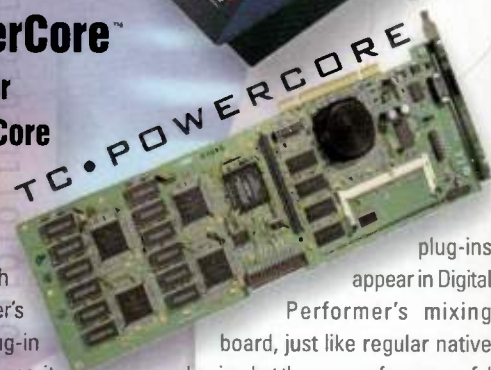


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## Together

There are laws against military officers engaging in personal relationships with soldiers under their command, corporate regulations that forbid supervisors to have romantic involvement with employees, and prohibitions at universities that ban teachers from dating students in their classes. Power issues aside, people clearly feel that there is danger in, as a rather coarse but concise colloquialism puts it, "getting your meat where you get your bread." Yet it happens all the time. Why do people insist on doing something they know they shouldn't? (Insert uproarious laughter here.)

The obvious answer is that people become involved with workmates because those are the people with whom they spend much of their time and whom they get to know well. The military, corporate, and university worlds often have the advantage of being communities with at least a little room for separation if something goes wrong. When the environment is much smaller, as in a performing group, production studio, or small company, another level of intensity comes into play. With only a few people around, a couple is in a fishbowl, with every disagreement clearly visible to all. That creates tension and polarization that infects the entire group. If you've ever been in a band with a couple, you've probably experienced the Silence That Crowds Everyone or the misery of the couple exploding, taking the whole effort down with it.

Performing groups in particular carry the most loaded element of all: emotional involvement. Performers try to express themselves, and artistic expression without emotional involvement is pointless. With emotional involvement—and the natural disagreements that come with it—a given, the additional energy of a personal relationship with a problem is like adding dynamite to the fire. *Ker-blam!*

If you don't have the idea by now, dating someone in your band, at your studio, in your dance troupe, or even in your office is a really bad idea. Don't do it. Do as I say, not as I do.

Oops.



Did I say that in my "outside voice"? (Heh-heh.) Okay, I admit I was involved with a singer in one of my bands. Well, okay, and with a violinist in another band. Jeez, if you're going to push me, yes, most women I've been involved with have been band- or workmates. There: it's said. Are you happy? Well, I have been.

Even though I'm not still dating those women (wonderful as they are), we were fortunate enough—and, I think, professional enough—to get away with doing it without creating major trauma in the work environment. I'm not trying to brag; I'm just saying that the situation is risky but not impossible.

We employed several techniques, mostly consciously, to minimize the impact when we had problems. First, we tried to simply leave personal problems at the door. That's much more easily said than done, but if the work is absorbing, it draws your attention, and you can go a long way by letting it do so.

Failing that, the next tactic is just to keep your mouth shut. That doesn't mean maintaining an uncomfortable silence, but rather letting something your partner (or ex) says or does go by without comment. The work issue at hand often can be revisited later when tensions aren't so high. If the rest of the group is absorbed in what it's doing, the whole thing might blow past unnoticed. Do the work now; discuss it with your partner later.

The last and frequently most constructive tack is to direct your emotional energies into the work. Kept within acceptable bounds of performance, that sometimes produces incredible results.

Make no mistake: I am not suggesting everyone pursue relationships in work situations. It takes maturity, effort, and discipline. But sharing the joys and hardships of work can add richness and depth to a relationship when it works right. If it doesn't, though, be prepared to deal with the consequences. ☹

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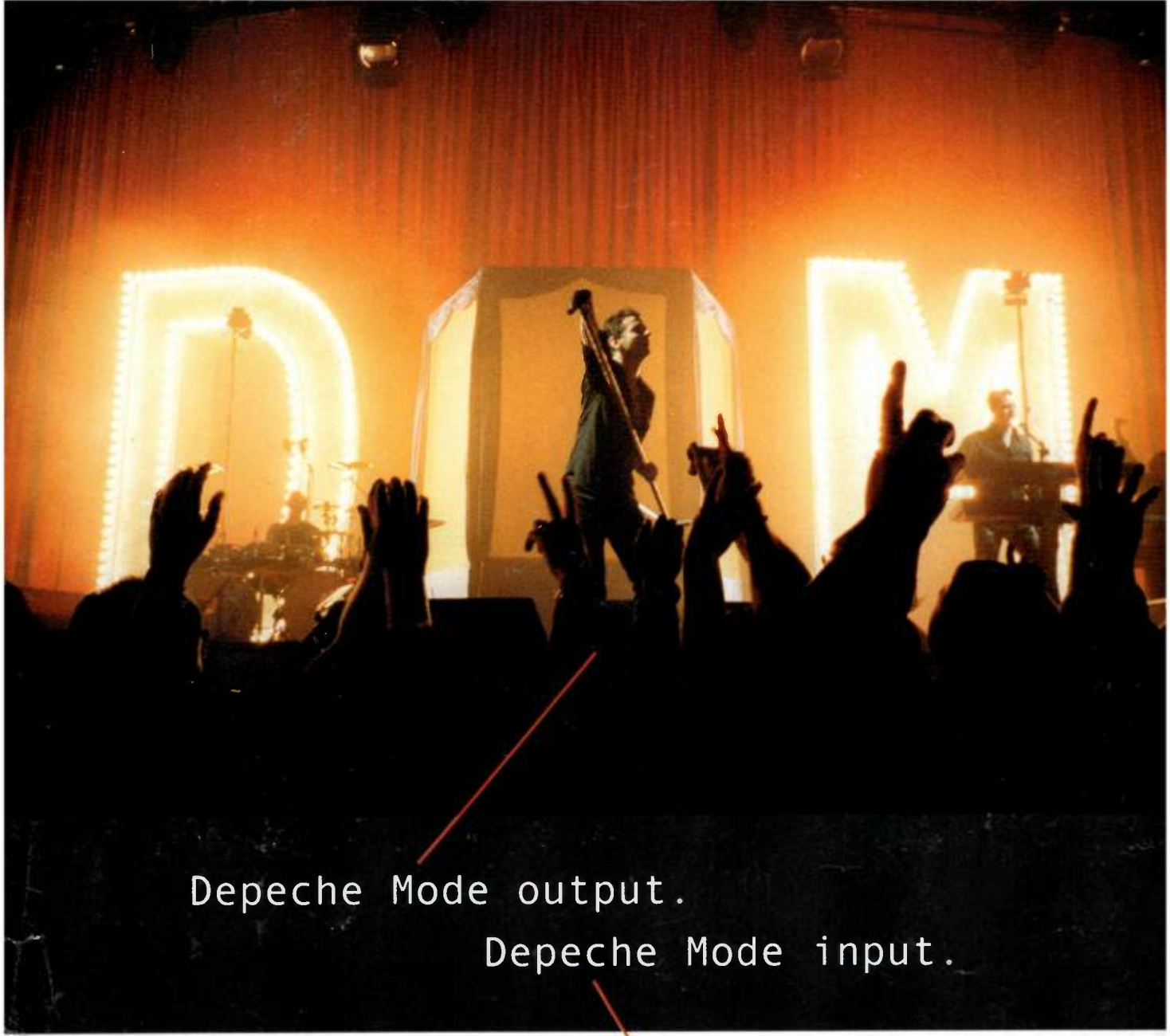


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