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September 2001

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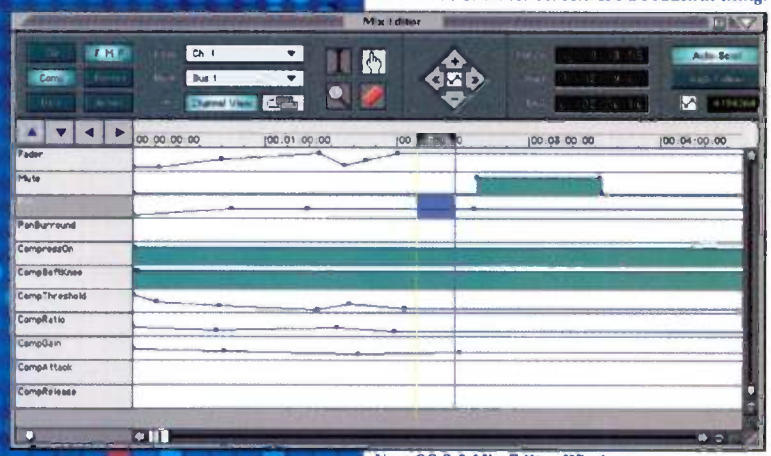
OS 3.0 Fat Channel Screen. It's a beautiful thing.



New OS 3.0 Mix Editor Window

New OS 3.0 24-Channel Overview Screen

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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 IVL Vocal Studio require addition of D8B UFX card.*

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

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

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

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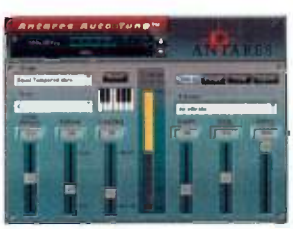
IVL Vocal Studio

Automate between pan points in the 5.1 sound field



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KARMA Features:

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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
6/21/01
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I N S I

FEATURES

COVER STORY

Cover illustration by David Ball

DEPARTMENTS

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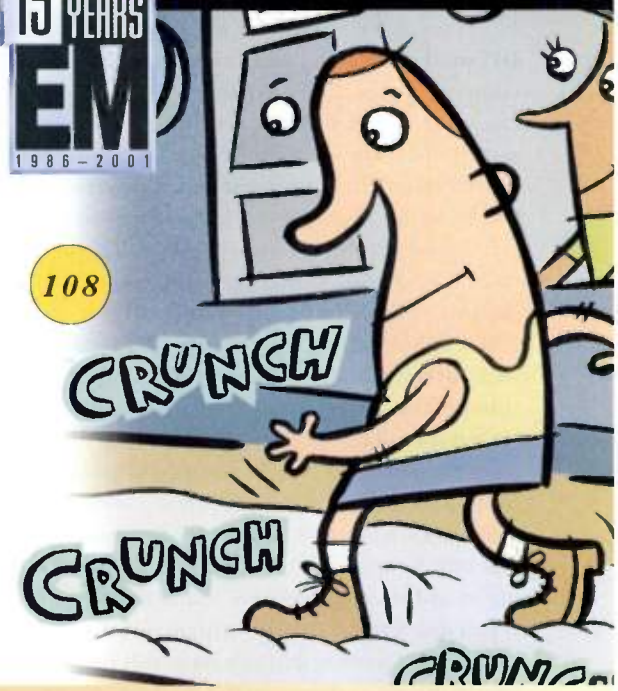
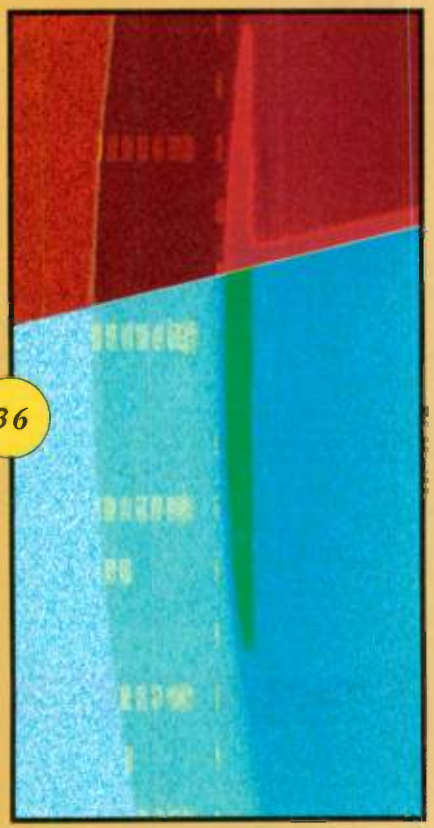
15 YEARS EM 1986–2001

COLUMNS





REVIEWS

Weaving Home

ANTHONY PIDGEON

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!

We welcome your feedback. E-mail us at emeditorial@primediabusiness.com.

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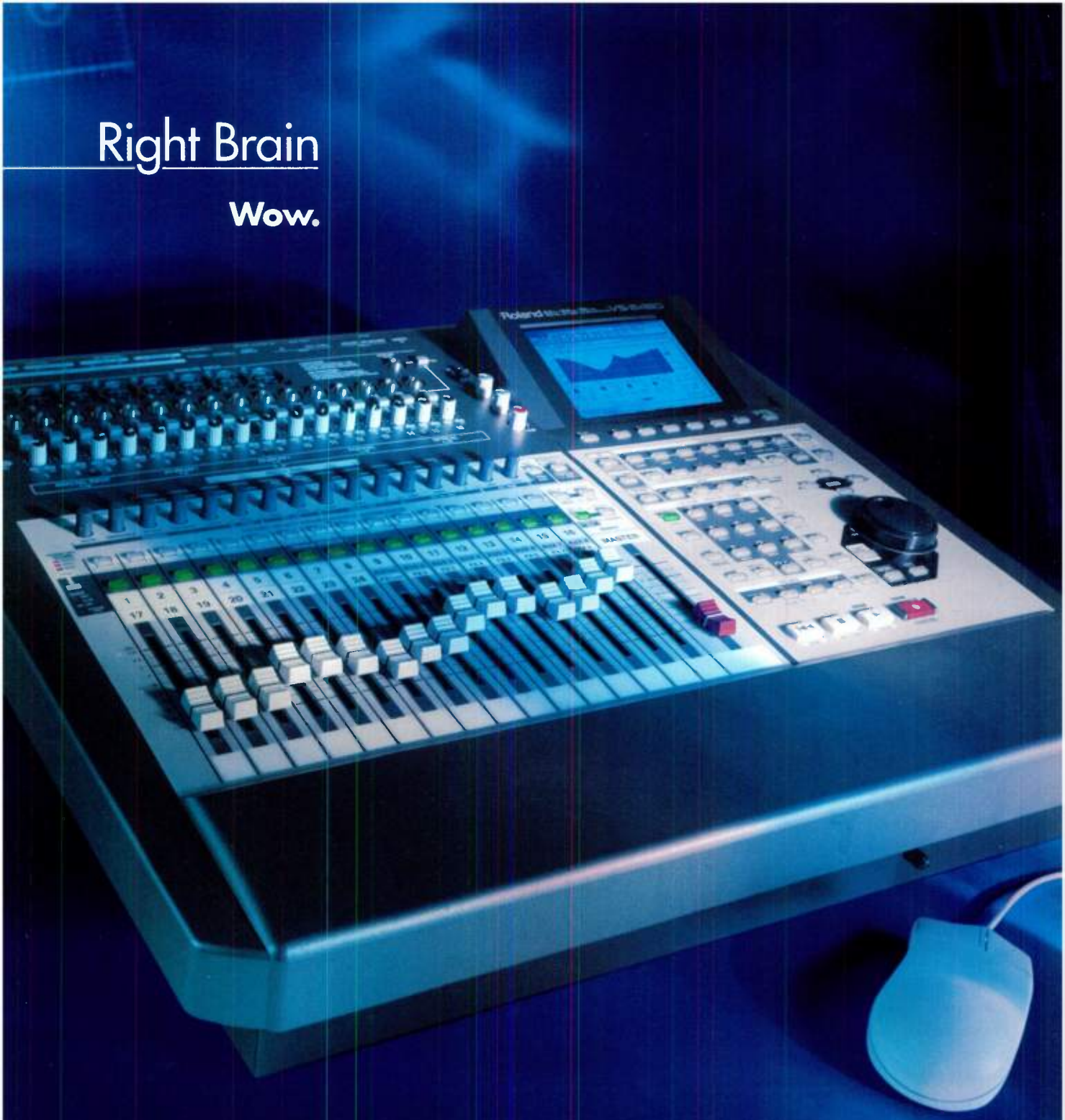
VS-2480 back panel

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

Right Brain

Wow.



What were we thinking when we created the new VS-2480? It's pretty obvious. Only the best of the best workstations ever. With 24 tracks to give you all the room you need to take your music anywhere it wants to go, without having to build a studio to get it. And drag-and-drop mouse editing on the LCD to make operation easy and intuitive. Check it out for yourself. Because once you get your hands on it, you'll only have one thing on your mind.

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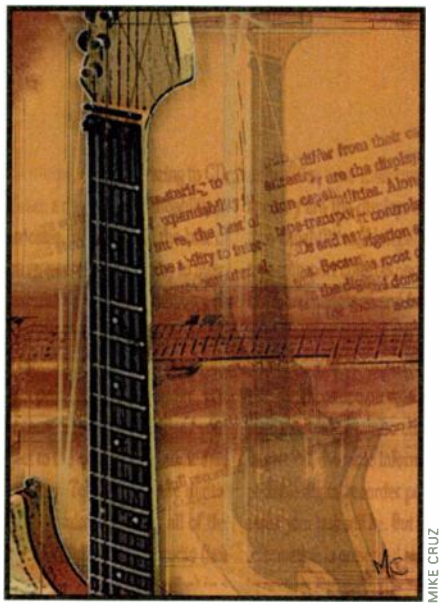


MIKE CRUZ

OUT OF CONTROL

Thanks 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 pickup. 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

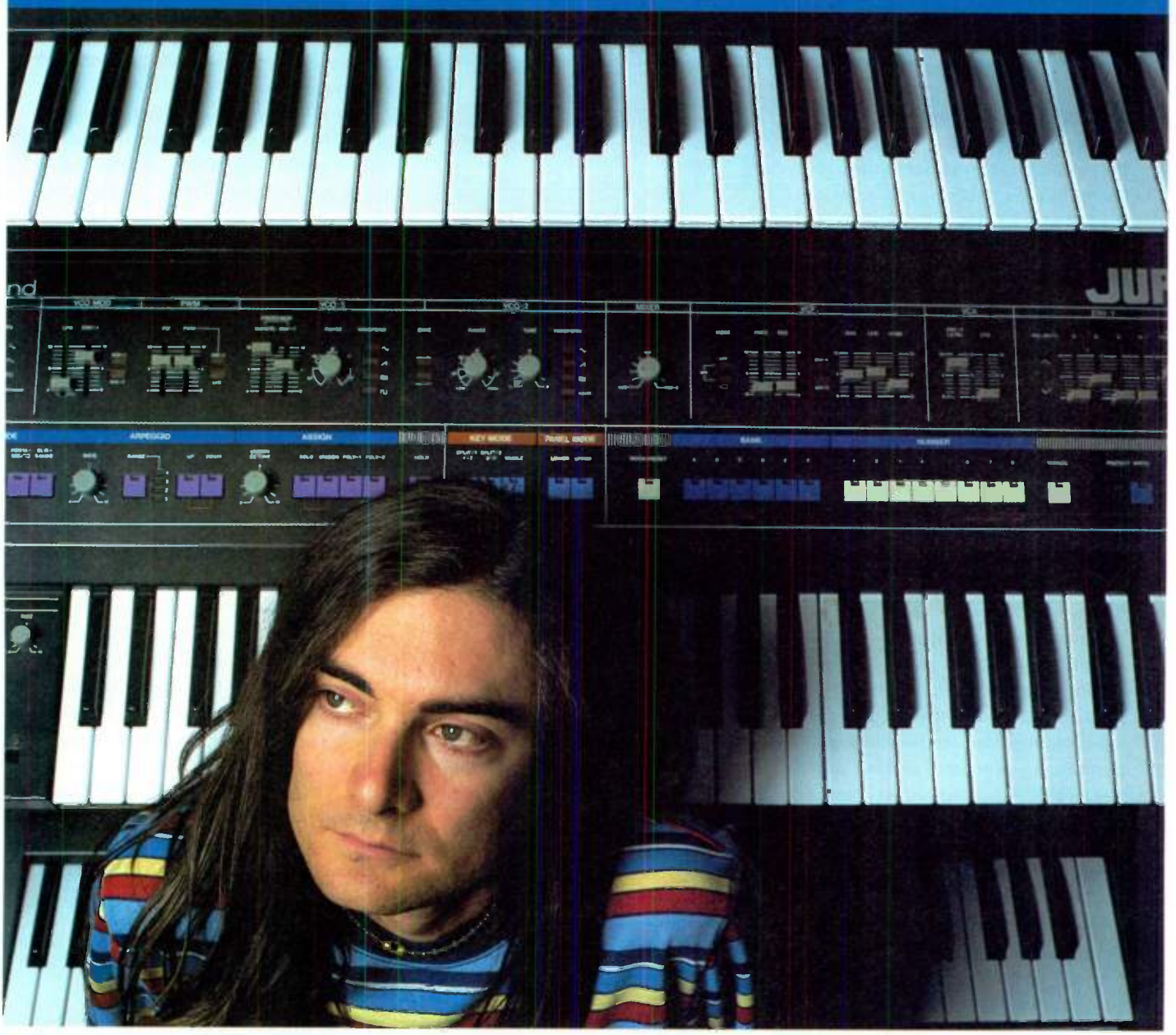
POWER TO THE PEOPLE

Larry 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.

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FIFTEEN YEARS AGO IN EM

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

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

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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 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. Published letters may be edited for space and clarity.*

Get The MX-2424 Advantage!

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.

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>
> *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

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Media	Cost of Drive	Media/10 Projects	Total Cost
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TASCAM DVD-RAM	$599	1 Drive + 20 Disks	$1739
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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*.

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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.

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WHAT'S NEW

By Marty Cutler

SEK'D PRODIF 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; Web 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 ¼-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; Web 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 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 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; Web www.steinberg.net.

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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; Web 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 collections 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; Web 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; Web 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. 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; Web 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; Web www.dssoundware.com.

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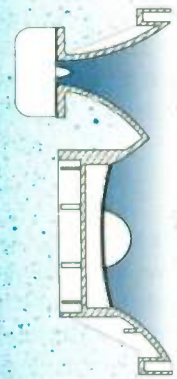

Our asymmetrical Optimized Wavefront™ horn integrates the output of the HF compression driver with the 6-inch midrange driver (whose cone is shaped to become part of the main horn). Treble and midrange arrive at the audience's ears properly blended.

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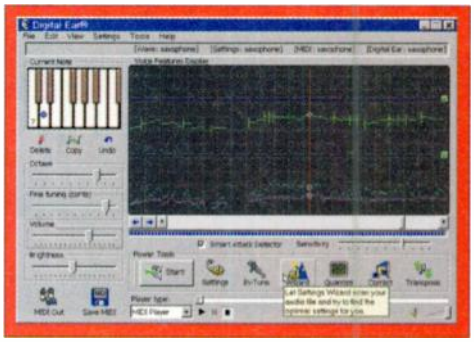
KEY CHANGES

BitHeadz 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) . . . . **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.

▶ EPINOISIS SOFTWARE DIGITAL EAR



Converting 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. Epinoisis 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.

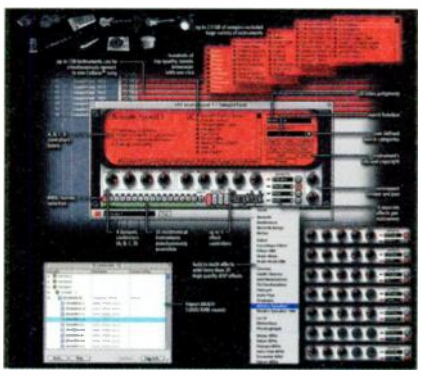
To further ensure that a MIDI file follows the expressiveness of the audio performance, *Digital Ear* can capture the amplitude envelope of the audio file, converting the information into MIDI Volume messages. Dynamic control of timbre is analyzed and can be changed into MIDI Control Change messages 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. Epinoisis Software; e-mail info@digitalear.com; Web www.digital-ear.com.

▼ IK MULTIMEDIA SAMPLETANK

IK 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; Web www.ikmultimedia.com, www.groovemaker.com, or www.t-racks.com.

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Ethno Techno

NEW

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!
Awarded Key Buy!

ILIO

Groove CONTROL ACTIVATED

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

CD-ROM multi-disc set (with Groove Control) $299
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.

Groove CONTROL ACTIVATED

★★★★★ *"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." – SOUND ON 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

Analog Meltdown

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

NEW

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

Hot Steel Blues

NEW

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.

Guitars include vintage Gibsons, Fenders, Martin, Lap and Upright Slides. Great playing, recorded to ILIO spec! Put the sauce of real guitar in your remixes and tracks!

CD-Audio $99

CD-ROM $199 (includes Audio CD)
Akai/Emu, Roland, 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 Basses 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
Akai, Roland, SampleCell, Kurzweil, Emu EOS

Interactive Drum Kits

SONIC REALITY

All Acoustic Drum Kits with a mega multi-sampling of kicks, snares, toms, hats and cymbals, from old Ludwig®, and Gretch® 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

SPECTRASONICS

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, Cavaquiñho, 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

CD-Audio (*without* Groove Control™) $99

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

Call about our special Upgrade price!

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... infectiously musical... a fantastically wide range of drum sounds... amazingly tight and powerful...'must sample' sound quality. . one of the best!"* – SOUND ON 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

Symphony of Voices

A massive FOUR CD-ROM SET, which includes a variety of multisamples, phrases & fx from some of the world's most prestigious singers.

- **The London Chorale.** 80 voice choir with multisamples and fx
- **English Boys' Choir.** solo and ensemble multisamples and phrases
- **Classical Soloists** Operatic tenor and soprano phrases and expressive multisamples of each soloist
- **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

CD-ROM $499 4-disc set
Roland, Akai/Emu, Kurzweil, SampleCell

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" acapella, 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 ¼-inch inputs; a pair each of RCA tape inputs; and two unbalanced ¼-inch aux inputs. Each channel also has separate balanced ¼-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 ¼-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 ¼-inch stereo master outputs for accommodating near-field and main monitors; a pair of unbalanced ¼-inch outputs for talk back; and a pair of ¼-inch stereo headphone jacks on the front panel with independent level controls. A ¼-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; Web 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 ¼-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; Web www.emu.com.

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WEB PAGE

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) 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 rackspaces 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) 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) 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). 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

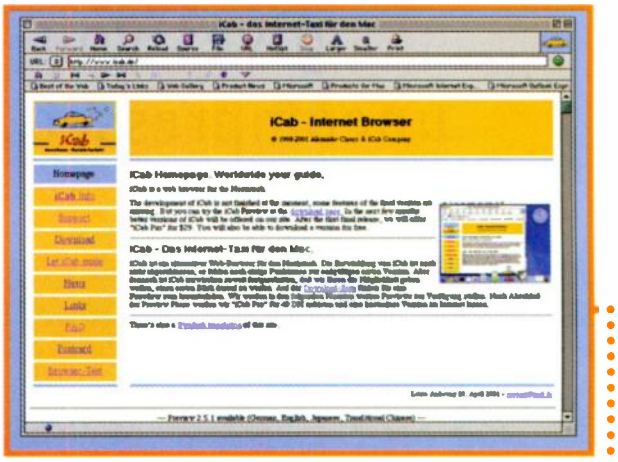
used them first). . . . Online comparison shopping for gear is the impetus behind **Gearbeat** (www.gearbeat.com). You can browse the site by manufacturer or instrument to find the best prices for the item you want. Gearbeat gives you results from four of the biggest online retailers: Mars Music, Music123, 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).

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), 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.

Our new hard disk recorder gives you 44 hours of uncompressed recording time.

Good luck.

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.

Bonding experience: Working with the MRS-1044 feels like working with tape. But each of its ten tracks is supported by ten virtual tracks. Auto punch and "easy bounce" allow you to combine and comp tracks with no generation loss. Then there's the familiar scrub control that lets you locate precise edit points with your ears. Scene memory and point markers make it even easier to get around.

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*.

Personal effects: Process and sweeten the mix with legendary Zoom 24-bit digital effects, including EQ, Compression, Reverb, Chorus and even VAMS guitar amp modeling. There's also dedicated EQ on every channel.

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.

ZOOM®
CATCH US IF YOU CAN

The Zoom MRS-1044 MultiTrak Recording Studio

For more about Zoom, click to www.samsontech.com or email sales@samsontech.com •

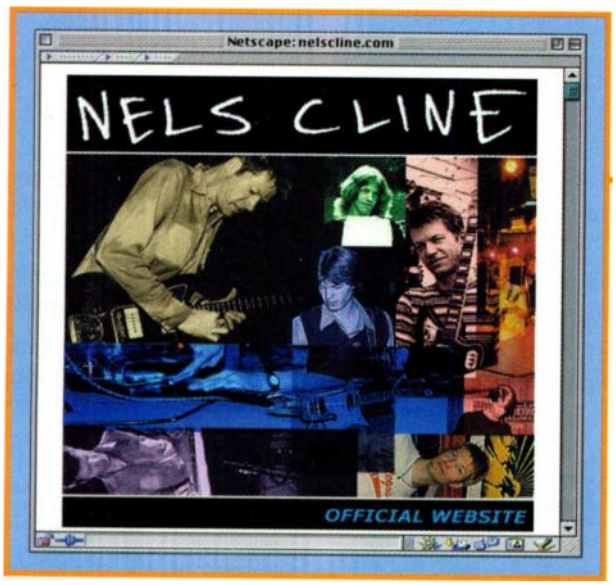
The current beta version of *iCab* is free, though it times out in October 2001. However, that should give you enough time to explore its various features, particularly by checking out the heartiness of your own Web pages. When the finished browser is made available, it will have two versions: *iCab 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) 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 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) 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 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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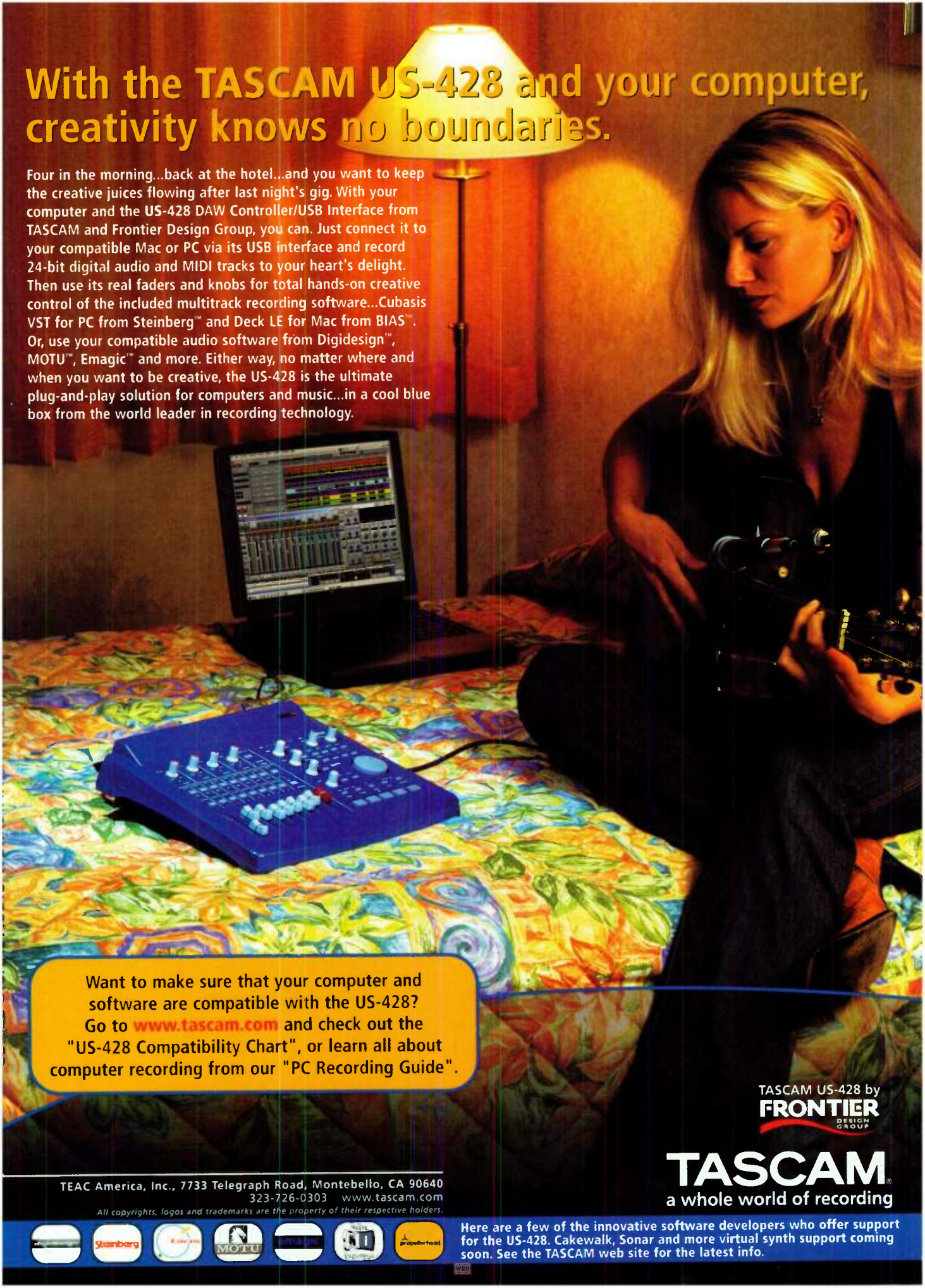
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Here are a few of the innovative software developers who offer support for the US-428. Cakewalk, Sonar and more virtual synth support coming soon. See the TASCAM web site for the latest info.

PLAYS WELL WITH OTHERS

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.

By Myles Boisen

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.

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.

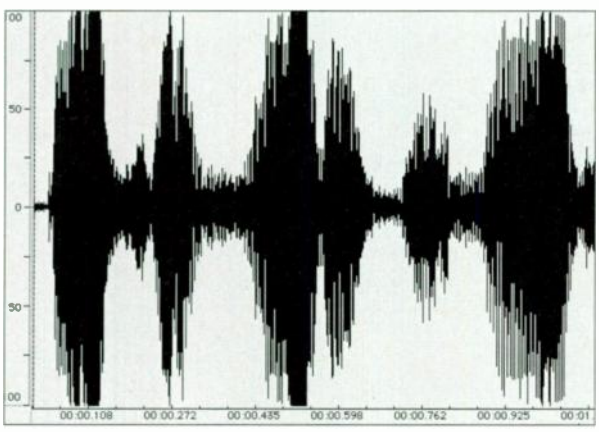

FIG. 1: At any point in the signal path, too much gain can result in clipping. Once it's recorded, there's no way to eliminate distortion.

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, 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.

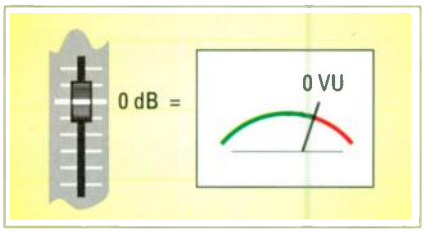

FIG. 2: If everything is properly calibrated, a 0 dB setting on your mixer's fader should result in an average signal level of 0 dB or 0 VU all the way through your signal chain.

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.

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Staying out of the Red

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

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), 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.

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

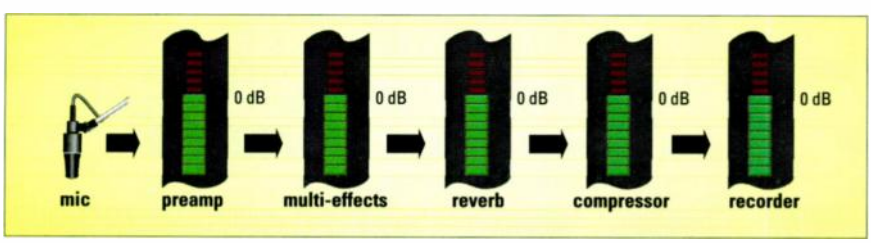
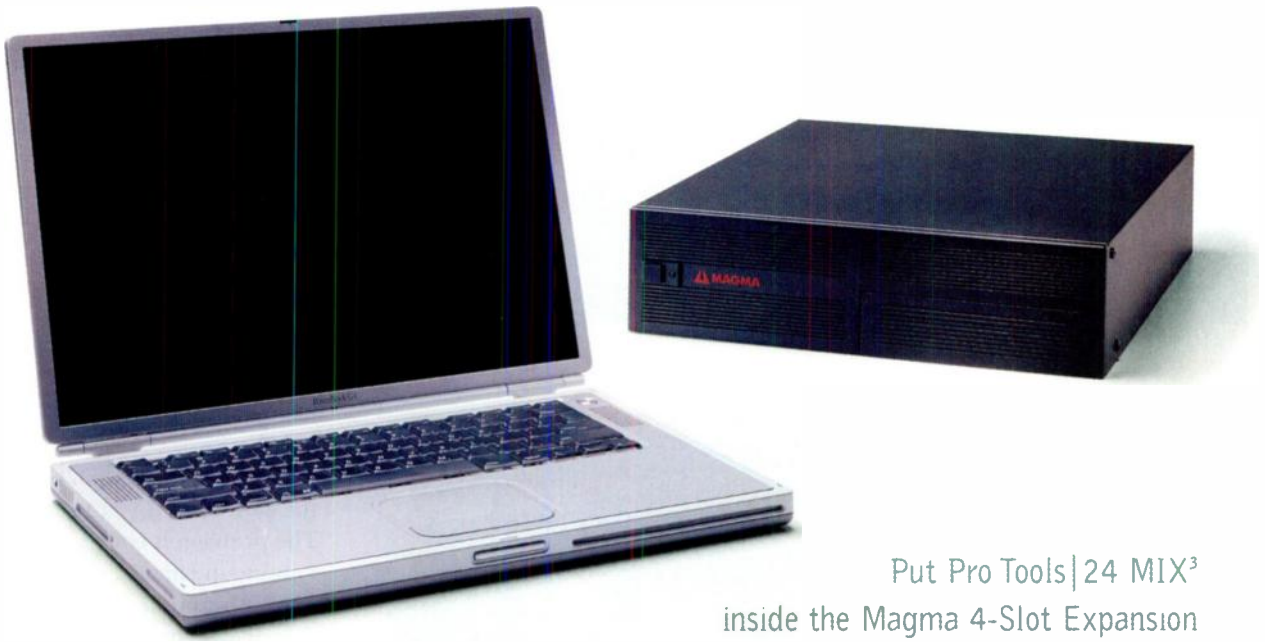


FIG. 3: Ideally, a 0 dB signal level at the signal chain's first stage equals a 0 dB signal in each device through the last stage.

For Here | or To Go



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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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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

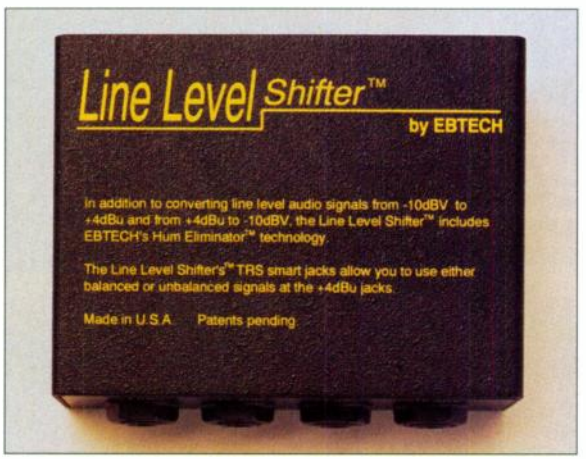

FIG. 5: The Ebtech Line Level Shifter changes the signal levels of eight outputs from –10 dBV to +4 dBu and vice versa. It also automatically converts from balanced to unbalanced (and back again), depending on whether you use a TRS or TS plug.

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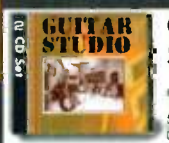

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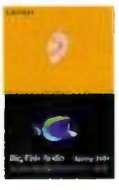

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master level. Once the submix is set, all faders should ideally be within ±10 dB of zero. If not, adjust the input gain/trim to bring the channel fader into the recommended range and maintain an optimal signal-to-noise ratio.

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 control 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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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 outputs 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 ±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.

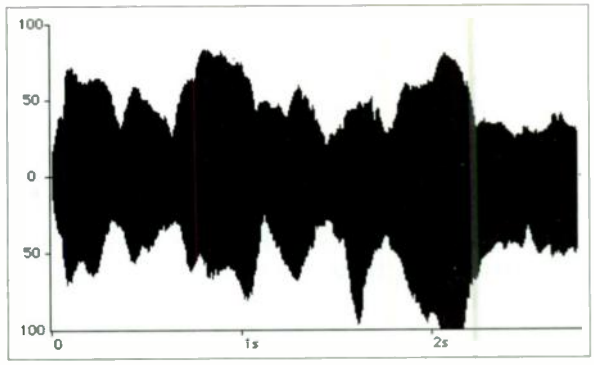

FIG. 6: Certain instruments and vocalists produce waveforms with greater negative than positive voltage. Some peak meters don't register a signal's negative voltage component, possibly resulting in audible distortion when you trust the meter's accuracy instead of your ears.

TIME TO REVIEW, SUE

The best mindset for proper analog gain staging is to be aware of the potential 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) 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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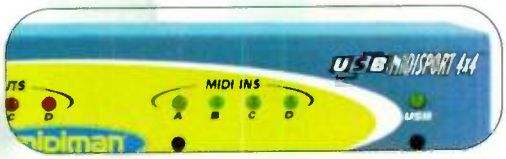

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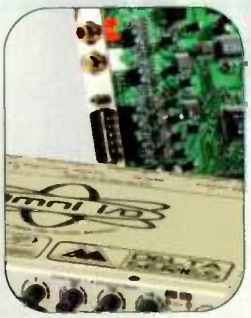

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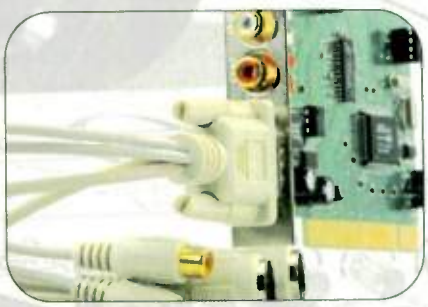

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WEB MUSIC LAUNCHPAD

ILLUSTRATION BY DAVID BALL

Grab 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.

BY DAVID BATTINO

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.


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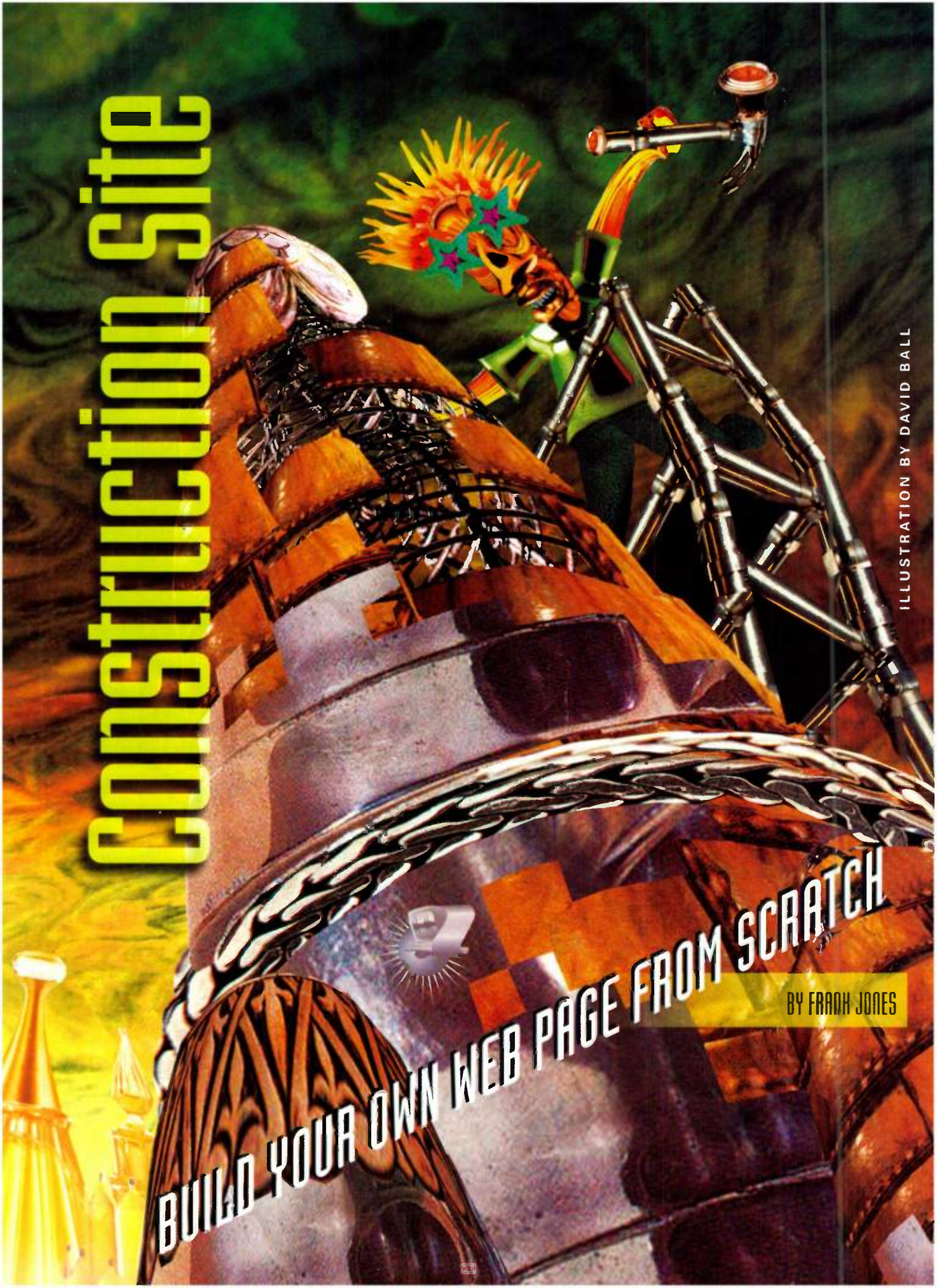
Construction Site
BUILD YOUR OWN WEB PAGE FROM SCRATCH
BY FRANK JONES
ILLUSTRATION BY DAVID BALL

Showcasing 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 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) or AT&T (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) 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, 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), 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 or CNET's 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. 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 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 and Webmonkey.

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.

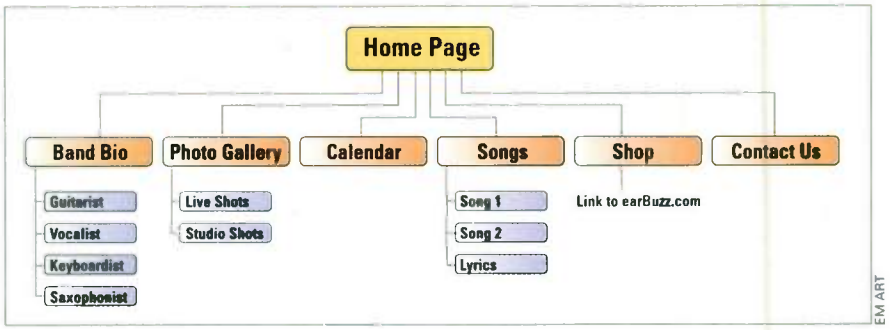

FIG. 1: Sketching a site map before creating your Web site can help ensure that no page is too many clicks away from any other.

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 environments, 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;

$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* 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. *Lview 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

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.

—David Battino

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 English 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.

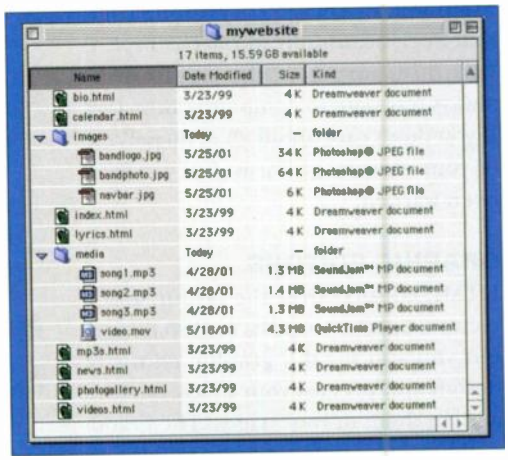

FIG. 2: Taking some time to plan the directories in which your site's files will reside will make the site easier to update and maintain.

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 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

Tube Preamp Channel Strip w/ Digital Out

376

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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.

HOW BEZAR

"First gratify, then mystify," advises Emily Bezar (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."

CHRISTINA SHOOK

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."

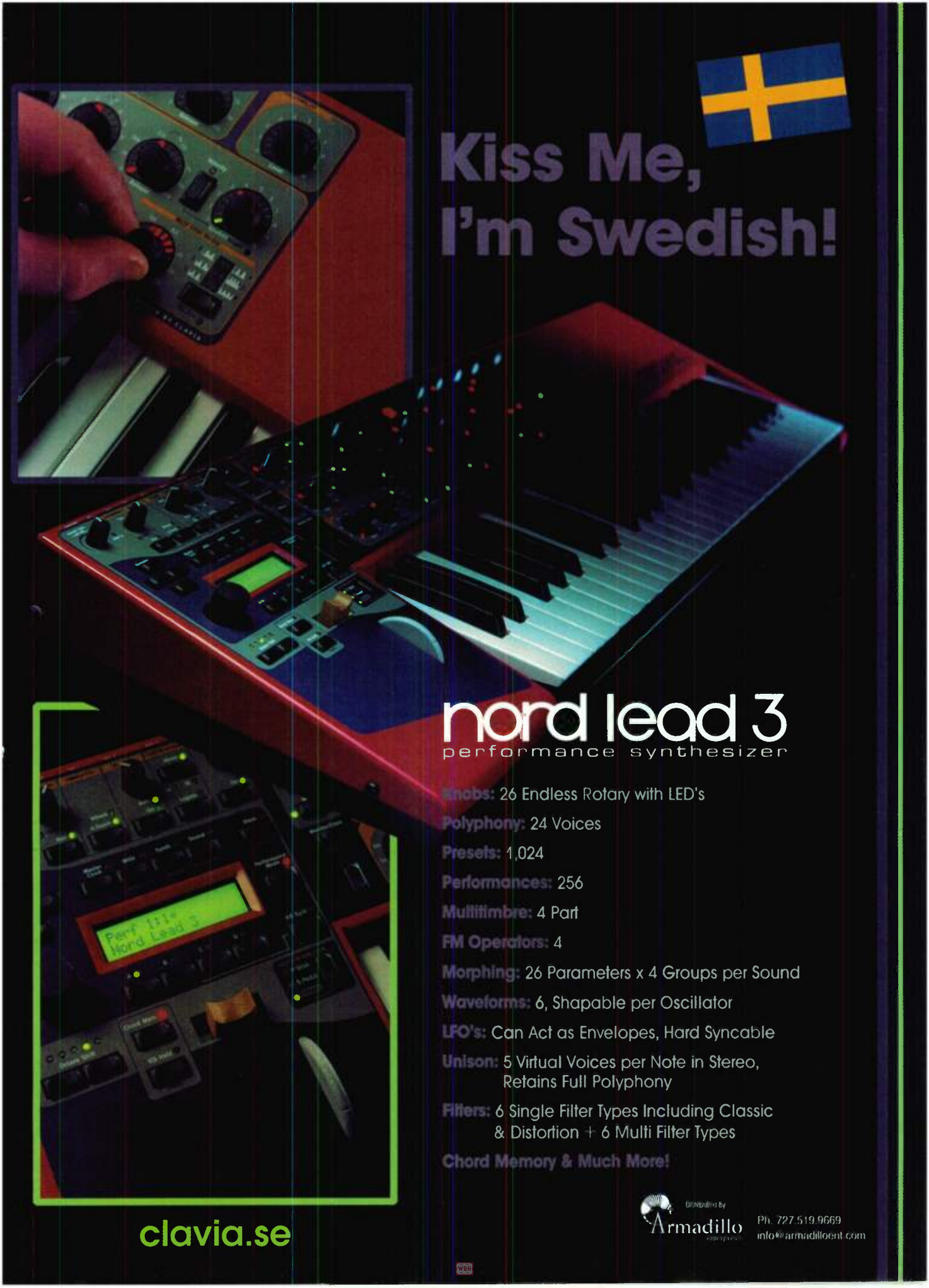
—David Battino

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


Kiss Me,
I'm Swedish!
nord lead 3
performance synthesizer
Knobs: 26 Endless Rotary with LED's
Polyphony: 24 Voices
Presets: 1,024
Performances: 256
Multitimbre: 4 Part
FM Operators: 4
Morphing: 26 Parameters x 4 Groups per Sound
Waveforms: 6, Shapable per Oscillator
LFO's: Can Act as Envelopes, Hard Syncable
Unison: 5 Virtual Voices per Note in Stereo,
Retains Full Polyphony
Filters: 6 Single Filter Types Including Classic
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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 (www.yourband.com) instead of the more unwieldy 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.

FIG. 3: Kissinger is an Austin, Texas, band with a terrific Web site (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.

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, /krispykatwhack, /davidmicrowave, and /31clm. The latter is an acronym for 31st Century Lounge Music, his cheerful foray into experimental electronica.


TINA ESPOSITO

Javelosa with son, Luca

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 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, 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

FLASH WOUNDS


GEORGE SHEPARD

"I hate those oh-so-clever Flash intros, and I even do music for them!" says BJ Leiderman (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. "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

A RIVER RUNS THROUGH IT


AARON MARKS

"New artists selling music through their Web sites might want to consider programs like Amazon.com Advantage," says Jon Holland (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.

```
<head>
<title>The Screaming Cats' Homepage</title>
<meta name="description" content="The
Screaming Cats are the #1 dance band in
Austin, Texas.">
<meta name="keywords" content="screaming
cats, house, deep house, Austin, dance,
club, music, beats, disco, Chicago house,
Detroit techno, electronic">
</head>
```

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

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 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 640×480 pixels.

Although 800×600 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 640×480 and review 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 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.

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*

ALONG CAME A SNYDER


D. M. FRATINI

Musician, producer, and novelist Keith Snyder (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), 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

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.

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

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 is 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 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.

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
Domain-name search www.domainsurfer.com
Low-cost registration tips http://larrysworld.com/articles/sjm_yourdomain.htm

ISP SEARCH

Boardwatch www.boardwatch.com
Geocities http://geocities.yahoo.com
GKG www.gkg.net

DEVELOPMENT AND DESIGN

Builder www.builder.com
Vischeck www.vischeck.com
Webmonkey www.webmonkey.com
Web Page Design for Designers www.wpdfd.com
Web Pages That Suck www.webpagesthatsuck.com

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CafePress.com www.cafepress.com
EarBuzz.com www.earbuzz.com
MP3.com www.mp3.com
Yahoo Store http://store.yahoo.com

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Composer www.netscape.com
Cool Page www.coolpage.com
CorelDraw, PhotoPaint www.corel.com
Dreamweaver, Fireworks, Flash www.macromedia.com
GifBuilder http://homepage.mac.com/piguet/gif.html
GoLive, LiveMotion, Photoshop www.adobe.com
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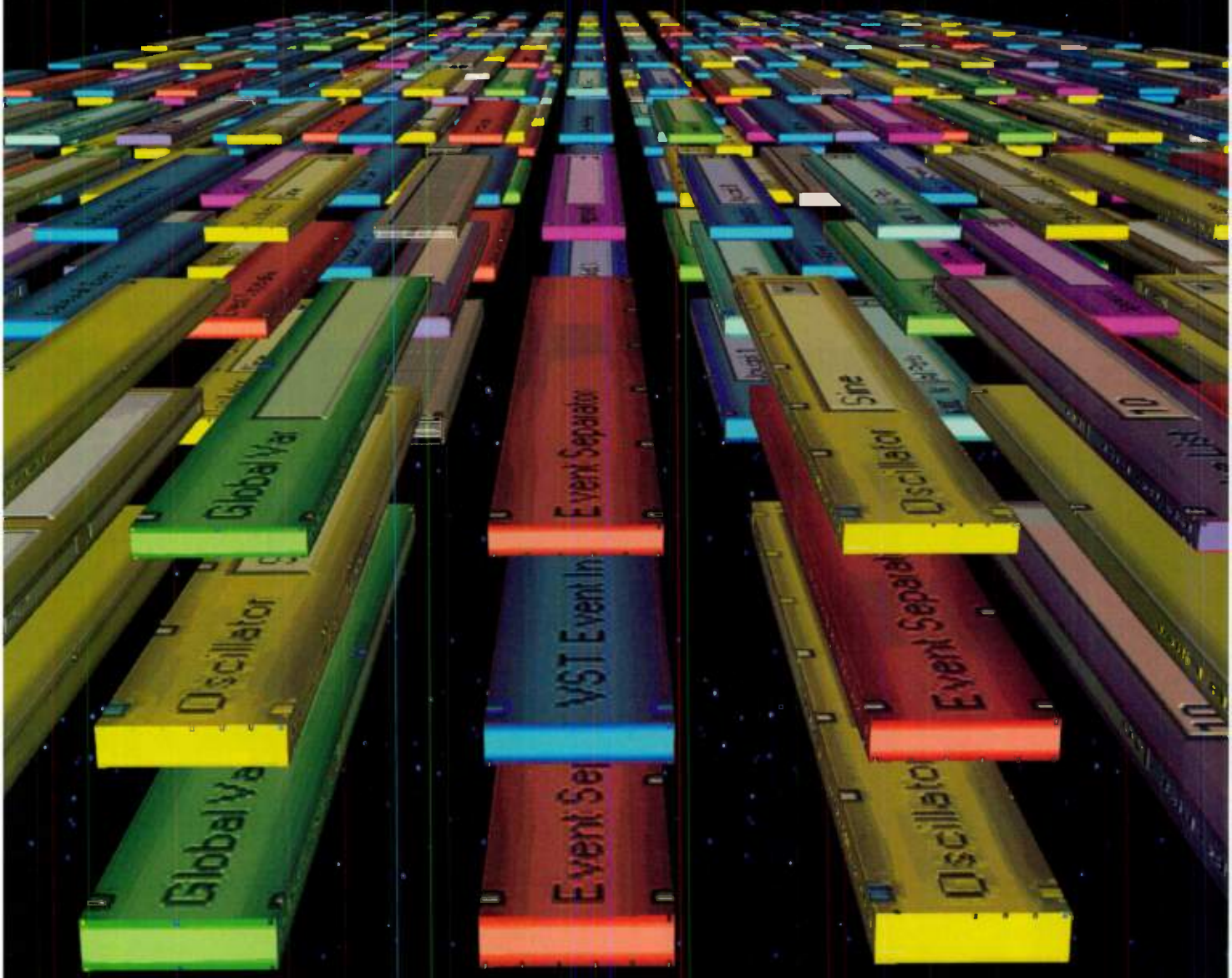

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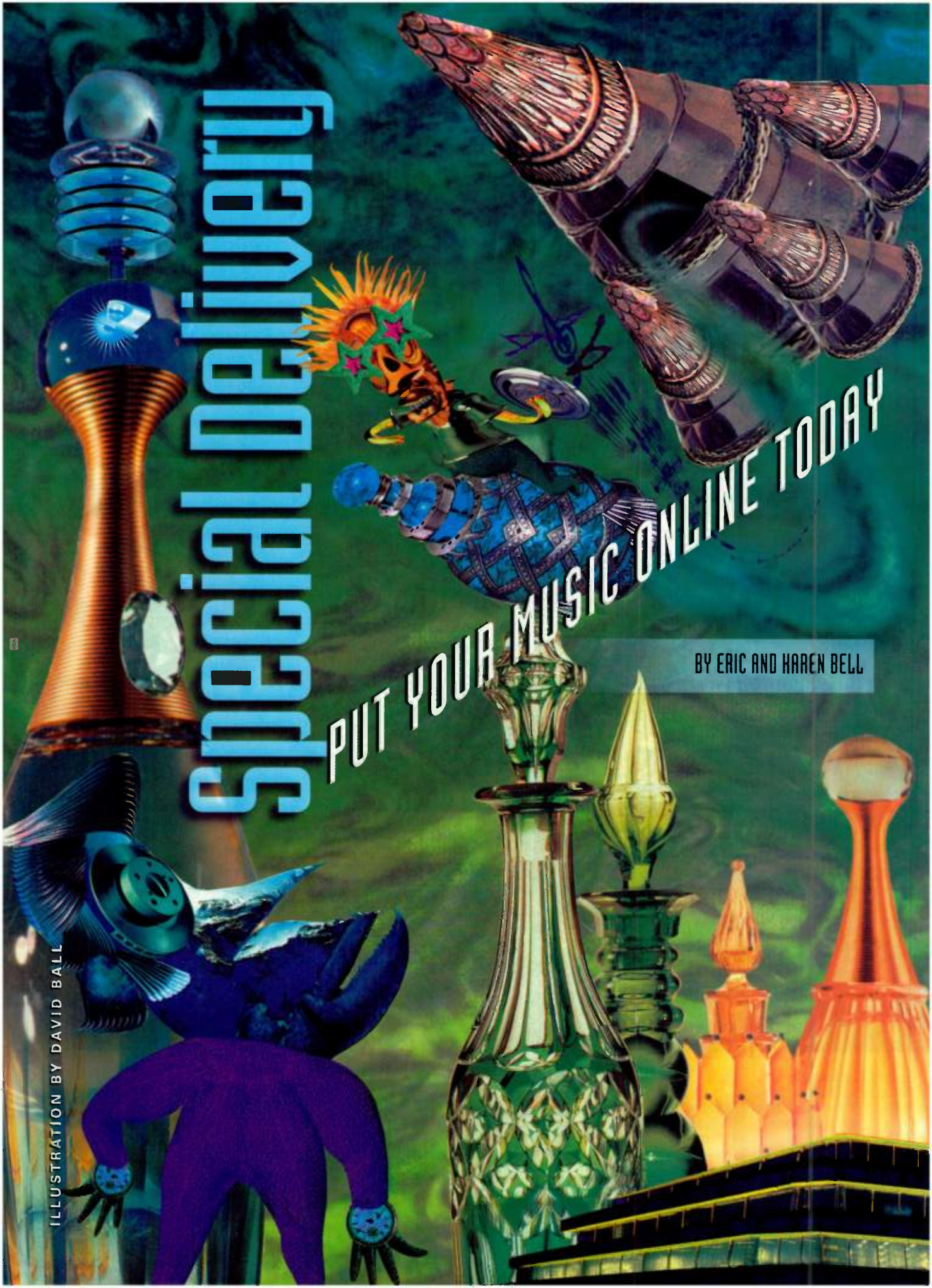
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ILLUSTRATION BY DAVID BALL

Your 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 and 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) 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 Internet 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) owns the technology, and it's licensed through the French manufacturer Thomson (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.

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 encoder, 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 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 MusicMatch *Jukebox* (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 metafile, 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.

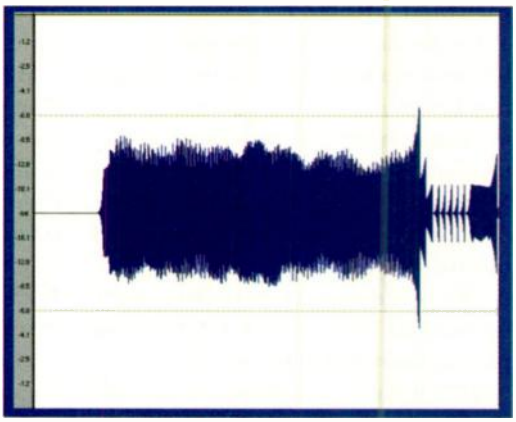

FIG. 1: Streaming-audio players often stutter when they first receive a stream. Adding digital silence to an audio file's beginning can help the player lock in before it gets to the downbeat.

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.

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)
URL	www.mpeg.org	www.quicktime.com	www.realnetworks.com/devzone	www.windowsmedia.com
Encoder Pricing	varies from free to expensive	$29.95 for QuickTime Pro; often included in audio editors	*RealSystem Producer Basic* (free); *RealSystem Producer Plus* ($149.95); often included in audio editors	free; often included in audio editors
Player Installation Difficulty	varies	easy; preinstalled on Macs	varies from easy to frustratingly difficult	built into new Windows; easy if added on
Pros	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
Cons	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
Cool Features	ability to embed a graphic in the ID3 tag	supports looping multiple tracks, video, flexible embedding, and much more	*RealPlayer* 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

"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 and in the June 2001 Issue of MIX magazine.

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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, 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.

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.

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 *RealSystem 8 Production Guide* (available at 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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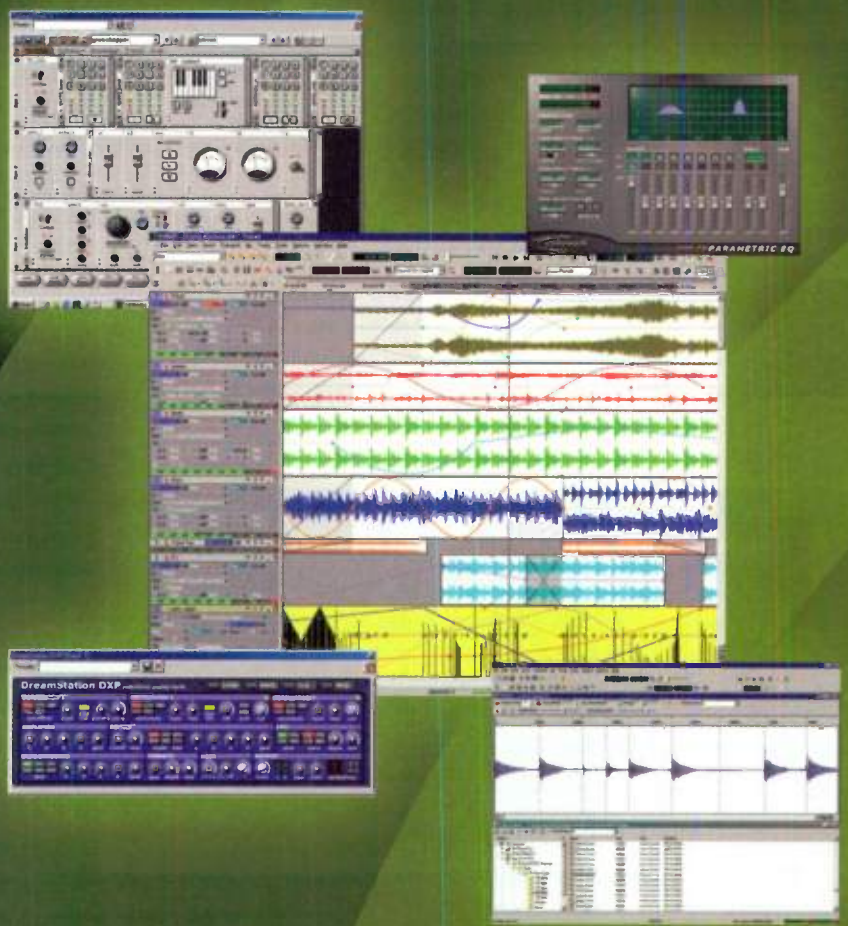

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–SOUND ON SOUND MAGAZINE

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"If you want the ultimate combination of audio looping, a full-blown MIDI sequencer with integrated software synths, and excellent mixing, nothing on the market today can touch SONAR."
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For a list of soft synth developers supporting the new DXi plug-in standard, visit www.cakewalk.com/dxi

For more information, visit 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 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

STREAMING MP3s FOR FREE

AUDREY GOODMAN

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. Click the 16 kbps link and see what you think.

—David Battino

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SPECIAL DELIVERY

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 latter 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

HAVE MERCY

AUDREY GOODMAN

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), 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 RealAudio, 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

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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.

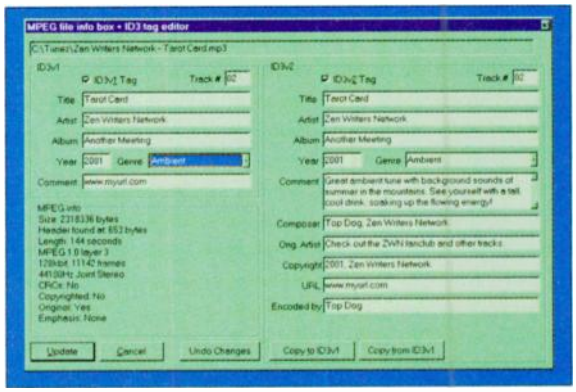

FIG. 3: ID3 tags, which store text information (and even graphics) inside an MP3 file, are an excellent way to communicate with your listeners. Take the time to set them up in detail.

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 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 withstand 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; $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) and Coda Music (www.codamusic.com) have excellent information about creating Web pages to display your music in their respective score formats.

—Peter Hamlin

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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...***

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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 freeware and shareware candidates are available. As an alternative, your Web host may provide a Web-based interface for uploading files.

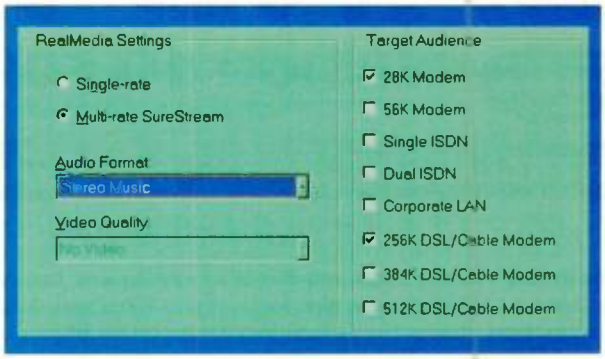

FIG. 4: If your delivery solution doesn't support multiple bit rates in one file (as *RealProducer* does when used with *RealServer*), consider creating lo- and hi-fi versions.

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 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.

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)—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

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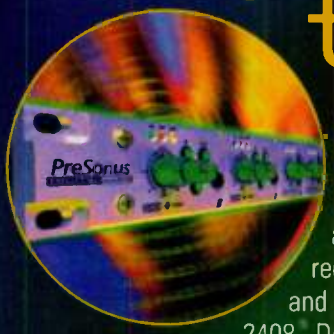

Combine eight channels of award winning, pristine mic preamplification, limiting and EQ Enhancement with 24bit digital and analog output and the Digimax seamlessly fits into any digital recording situation. The Digimax is the perfect front-end for DAW's and adding mic-pre's to digital mixers and sound 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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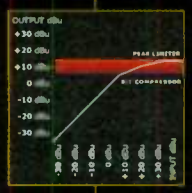
- **ADAT Lightpipe Output, AES/EBU or S/PDIF**
- **All 24 outputs, (analog and digital) operate simultaneously**
- **Word Clock In and Out via BNC connectors**



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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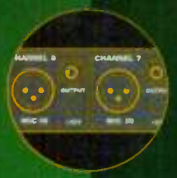

The Digimax interfaces with more gear than any mic-pre on the planet! Need balanced analog outputs? How about 24 bit ADAT outputs? What about 24 bit AES/EBU or S/PDIF? The Digimax gives you all of these outputs and up to 24 channels *simultaneously!* So you'll never have a problem sending your audio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

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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). "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), 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

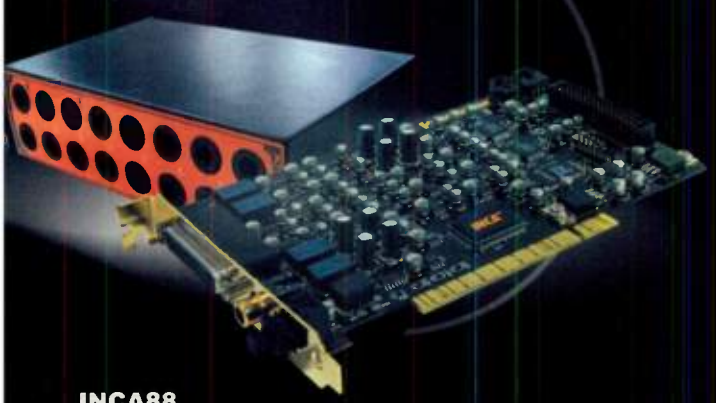
Armed for the Future.

INCA88

The INCA88's EWDM driver is capable of Mulit - 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 sythesizers.
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.

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www.audiotrak.net

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Fax:1-310.322.4700

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you created from right inside *RealProducer*. 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. 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, download 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.*

We welcome your feedback. E-mail us at emeditorial@primediabusiness.com.

PRIMACOUSTIC

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.

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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 tighens up bass and brings balance back into your room.

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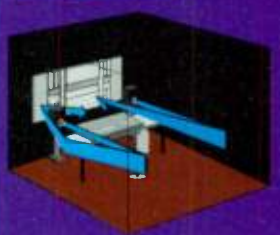
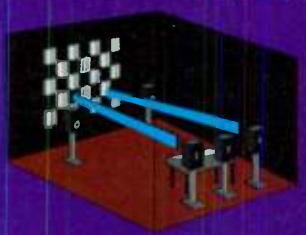
For more information call Primacoustic and ask for a brochure, visit our web site, or go to your local pro audio shop.

Tell 'em you want to Take Control

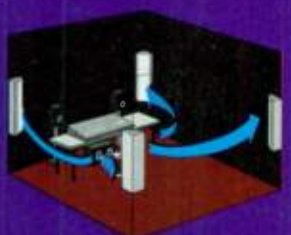


1 Europa Flutter Wall
Reduces 'front to back' echo, standing waves and monitor fold back. Over 28 creative patterns to choose from. Prices start at $150*.



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*.

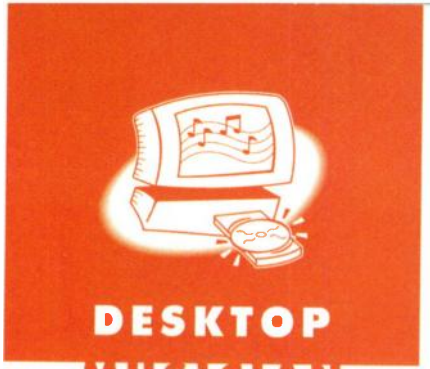


4 Australis Bass Trap
Effective down to 45Hz, tightens up bass and reduces smear. Can be used in corners or on walls. Priced at $100* each.

*Suggested US retail price

Primacoustic is a division of JP CableTek Electronics Ltd. #114-1585 Broadway, Port Coquitlam, BC, CANADA
Tel (604) 942-1001 Fax (604) 942-1010

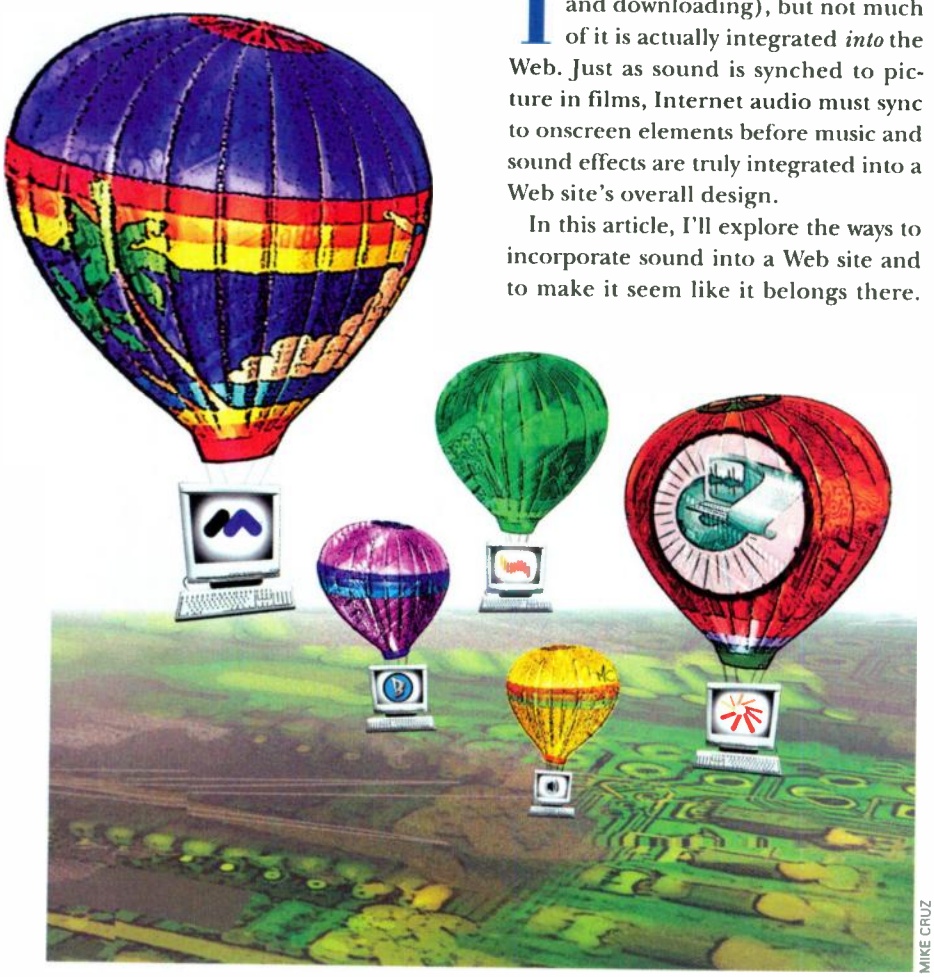
www.primacoustic.com



Web Audio Action

Make your Web site come alive with interactive audio.

By Spencer Critchley



MIKE CRUZ

There 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, you can try that as well as

(continued on p. 102)

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- 48v phantom power for microphones
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EDIROL

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- Discreet guitar and microphone inputs with level control
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- Convenient merge function
- 2 USB ports, one front - one rear
- Utility (Preview, Cable Check, MIDI Event Filter)
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- 902 tones plus 26 drum sets
- Reverb, chorus and delay effects
- MIDI to .WAV/.AIFF file conversion
- Includes over 100 royalty-free MIDI files
- WIN/MAC compatible

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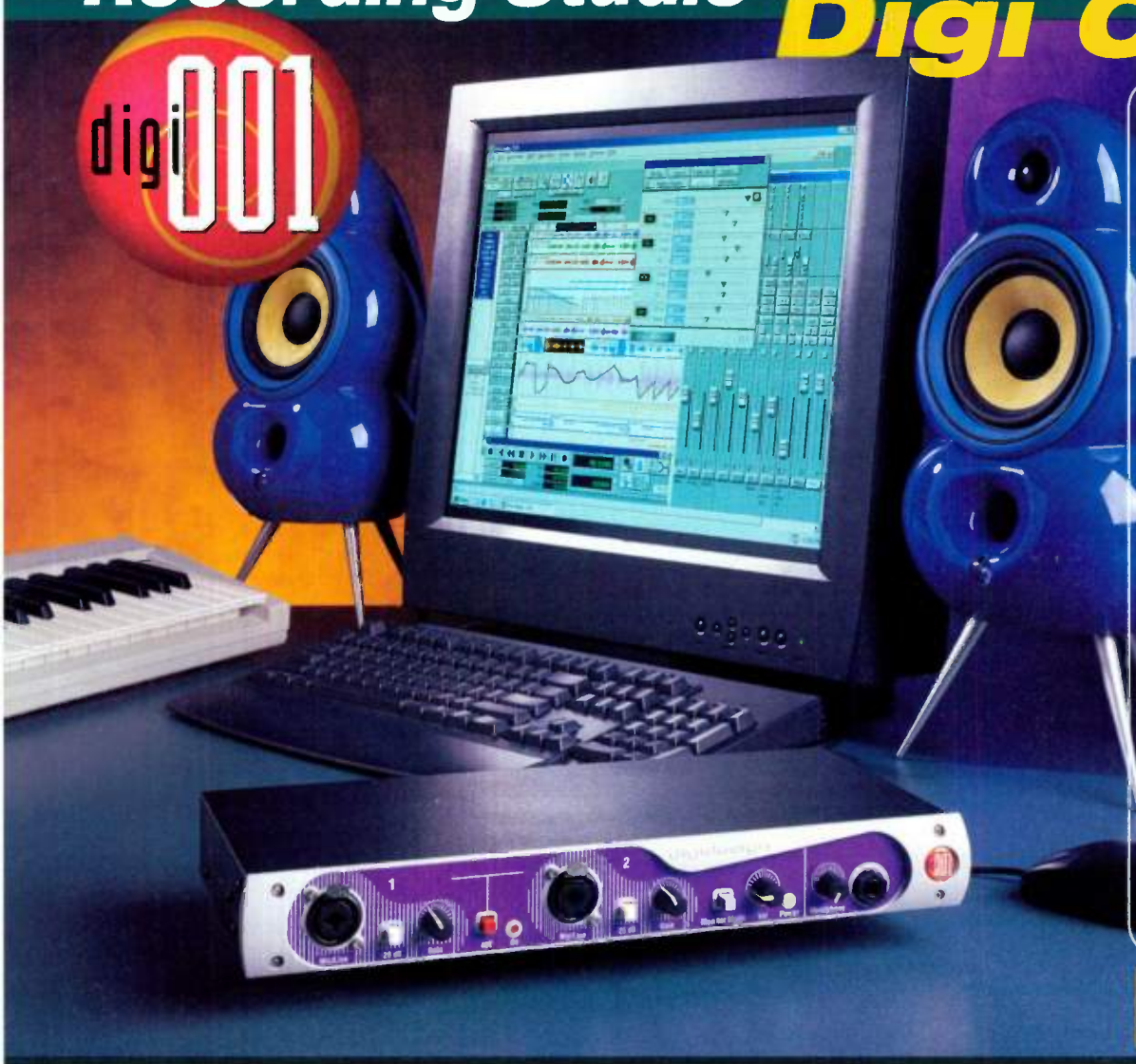

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PRO TOOLS | M Macintosh OS | W Windows 98

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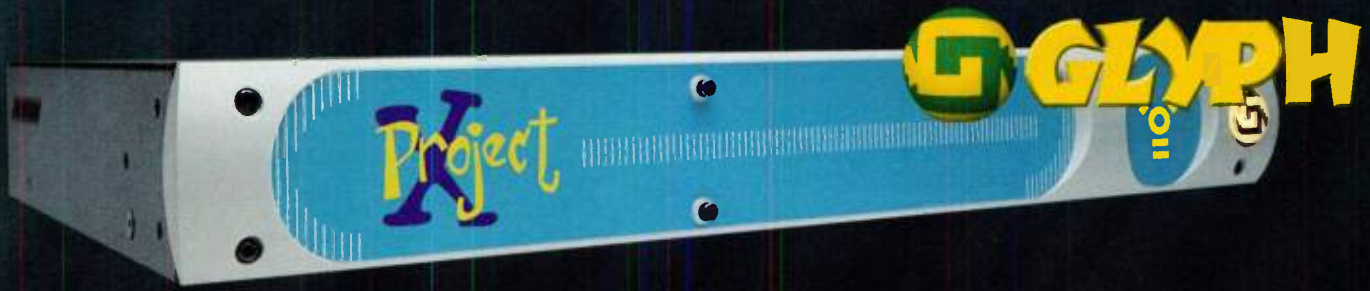
Essential Hardware

For Your Digital Audio Workstation



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You deserve a hard drive with the reliability and performance to match your Digi 001 system. Unleash your system with an X-Project from Glyph and enjoy the performance and support that professionals do... everyday. With the X-Project you get a drive optimized for superior performance in handling digital audio files, overnight advance replacement should your drive fail, and Herculean service and crushing tech support all from people that live and breathe digital A/V production. X-Project works on your tabletop or you can rack mount it. And with firewire you don't need to buy a host bus adapter card. Where else can you find that?

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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, embedding 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.

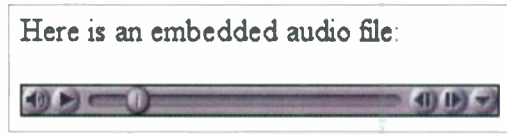

FIG. 1: This example illustrates a typical controller interface for an embedded audio file.

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 μ-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 compression 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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Rugged steel chassis, sealed rotary controls and fiberglass circuit boards resist the radically rude rigors of the road.

Extra stereo bus! Pressing Mute routes the channel output to the **ALT 3-4 bus**. Use it direct from its ¼" outputs or route it through the Ctl Room/Phones matrix.

Control Room/Phones source matrix lets you create monitor mixes or remote feeds with any combination of the main mix, ALT 3-4 stereo bus or tape inputs routed to separate stereo outputs (or submixes to mains).

Inside: **VLZ® design** minimizes thermal noise at key points in the circuitry. **Negative gain mix amp architecture** prevents overload when feeding all channels with hot inputs.

Easy level setting. Maximize headroom and minimize noise quickly via Channel solo and Trim control. Up to 60dB of gain for boosting timid vocalists. −10dB "virtual pad" for toning down drummers.

EFX to Monitor lets performers on stage hear a different level of effects than is in the main PA mix.

Balanced/unbalanced TS outputs plus **balanced XLR outs** with +4dB or -10dB level switch. RCA-type tape inputs and outputs, too.

1604-VLZ® PRO

16 total chs.• 4-bus configuration • 16 XDR™ premium mic preamps • 16 mono mic/line channels • 3-band EQ with swept mid, 75Hz low cut filters and inserts on all chs. • 6 aux sends per ch. • 4 stereo aux returns with EFX to Monitor and bus routing options • Control Room/ Phones source matrix • 60mm log-taper faders • 3-way rotatable I/O pod for rack or table use

1642-VLZ® PRO

16 total chs.• 4-bus w/double-bussed outputs • 10 XDR™ mic preamps • 8 mono mic/line level channels • 2 hybrid mono mic and mono/stereo line level channels • 2 mono/stereo line level chs.• 3-band EQ w/swept mid on mono channels & 4-band EQ on stereo channels• 75Hz low cut filters on mono chs. • 4 aux sends per ch. • 4 stereo aux returns with EFX to Monitor • Ctl Rm/ Phones matrix w/level controls • 60mm log-taper faders

1402-VLZ® PRO

14 total channels • 6 XDR™ premium mic preamps • 6 mono mic/line level chs. • 4 mono/stereo line level chs. • Extra ALT 3-4 stereo bus • 3-band EQ • 75Hz low cut filters on mono chs. • 2 aux sends per ch. • 2 master stereo aux returns with EFX to Monitor • Ctl Rm/Phones source matrix • 60mm log-taper faders • Switchable AFL/PFL

1202-VLZ® PRO

12 total channels • 4 XDR™ premium mic preamps • 4 mono mic/line level chs. • 4 mono/stereo line level chs. • Extra ALT 3-4 stereo bus • 3-band equalization • 75Hz low cut filters on mono chs.• 2 aux sends per ch. • 2 master stereo aux returns with EFX to Monitor • Ctl Rm/Phones source matrix • Rotary gain controls • Built-in power supply

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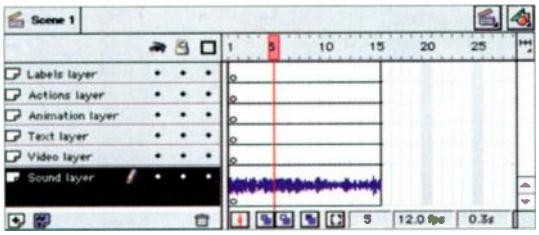


FIG. 2: This partial view of the *Flash* authoring environment includes several layers (left), the playback head, and the timeline.

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 software 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 process. Some content tools, such as *RealSystem 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 attributes 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

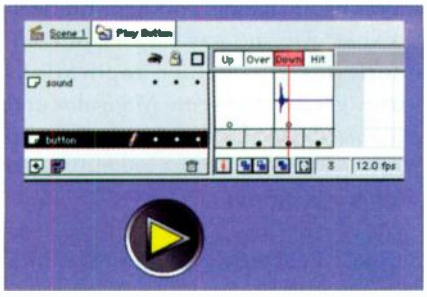


FIG. 3: *Flash* lets you trigger a sound by clicking on a button or another object.

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 online 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

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
This is the source for Apple's *QuickTime Player* and for *QuickTime Player Pro*, which adds important content-creation features.

www.beatnik.com
Founded by musician Thomas Dolby, Beatnik, Inc. provides the *Beatnik Player*, content tools, and the MusicObject JavaScript library.

www.builder.com
Replete with information on a variety of topics, this CNET site offers "solutions for site builders."

www.macromedia.com
Macromedia offers a variety of content tools and players and is the home of Flash and Shockwave.

www.real.com
RealNetworks makes *RealPlayer* and the associated content tools, including *RealSystem Producer*.

www.sseyo.com
This is the home of the Koan format used by Brian Eno and others to create generative music.

www.webmonkey.com
Webmonkey: The Web Developer's Resource provides Web-authoring tools for beginners, builders, and masters.

www.webreference.com
This site is an excellent place to find information and tutorials about all aspects of Web authoring.

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
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 *FlashSound* 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 *FlashSound* 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 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.)

▼

Take into account each format's audio quality at various bandwidths.

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.*

We welcome your feedback. E-mail us at emeditorial@primediabusiness.com.

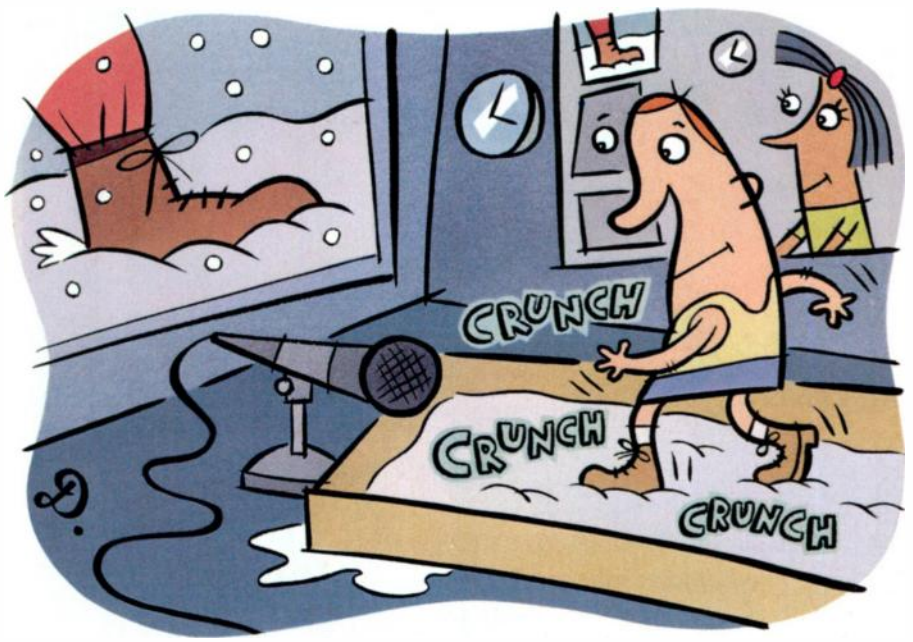
RECORDING MUSICIAN

Sounds in the Key of Life

Tips and techniques for recording Foley effects.

By Karen Stackpole

With 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.



JACK DESROCHER

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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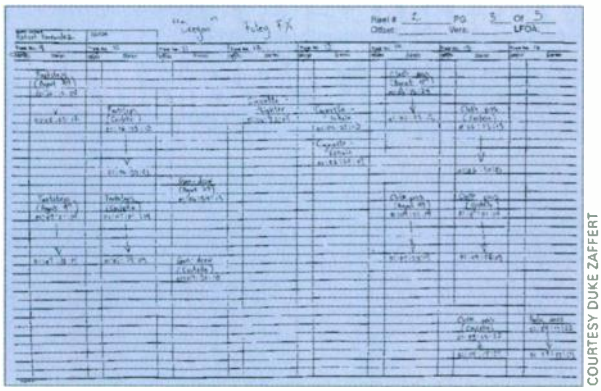
* When converted to 16 bit linear format



COURTESY DUKE ZAFFERT

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 conspicuous 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.

LAYING IT DOWN

Basic recording considerations for Foley are the same as for most studio music recording. 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. 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.

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.

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 multipattern 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

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 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.

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.

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.

BRIAN KNAVE

FIG. 3: The author snaps stalks of celery to simulate the sound of a victim's neck breaking.

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, 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.*

We welcome your feedback. E-mail us at emeditorial@primediabusiness.com.

Keep It on the Download

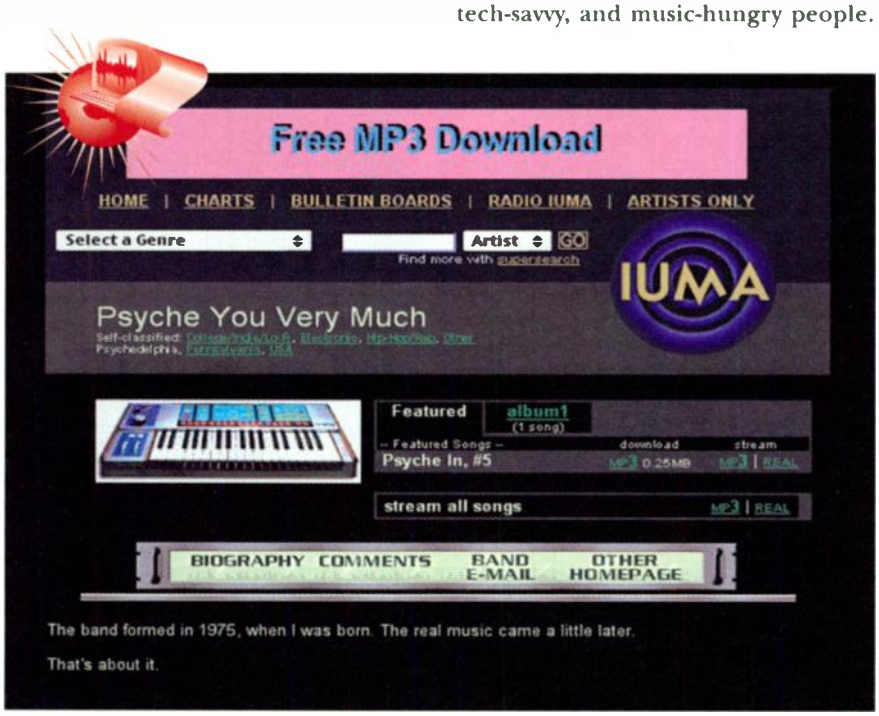
Make third-party music Web sites your secret publicity weapon.

By Markkus Rovito

The 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



The IUMA artists' pages are simple yet elegant.

"We Had A #1 Hit Because We Joined TAXI"

If you told me that one day I'd co-write the #1 Country song in America, I probably wouldn't have believed you.

My name is Erik Hickenlooper. My writing partner, Jim Funk and I wrote the Kenny Rogers hit, 'Buy Me A Rose.'

We aren't professional songwriters with a string of hits under our belts. Just a couple of ordinary guys who love to write and record our own songs. We live in small towns in Utah, and we both have day jobs.

But, even though we write Country songs, we've never been to Nashville.

'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 mooed or a plane flew over, we had to stop the tape. Not very high-tech, but it worked.

Jim and I didn't have any music industry connections, so we joined TAXI. It seemed like the smart way to go. Our instincts proved to be right on the money -- literally.

We landed our first publishing deal through TAXI. That resulted in 'Buy Me A Rose' being cut by Kenny Rogers.

Over the next few months, we watched our song climb the charts until that wonderful week when it hit #1 on all three Country Music charts, including Billboard.

Can TAXI do that for you? Maybe. It depends how good your music is.

TAXI proved to us that if your music is great, they really *can* get it to all the right people.

And TAXI's not just for songwriters. They also work with bands and artists, and can get your music in TV shows and films, too.

But TAXI is much more than a way to connect with the music industry. The written feedback you'll get on your material is like having a team of music industry veterans as your personal coaches.

You'll also get TAXI's great monthly newsletter, and a FREE pass to TAXI's private convention, "The Road Rally." This exclusive convention is phenomenal, and worth far more than what your TAXI membership costs.

So, don't let your music sit on a shelf collecting dust. Call right now for TAXI's FREE info kit. We did, and we got a #1 Hit!

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a personally maintained Web site, most third-party music sites are free and have regular users who might otherwise never visit your site.

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 Archive (IUMA; 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, IUMA sent a detailed e-mail offering suggestions about improving the page to attract repeat visitors. No other Web site responded that way.

Vitaminic takes a functional approach to its artist page design.

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) 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

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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) 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.

While your radio station streams on Live365.com, a playlist window appears with track information.

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), 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 offsite. 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) 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;

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) 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) 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), 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,

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
Image Hosting	yes	yes	yes	no	yes	yes	yes	yes
Customizable Pages	yes	no	yes	no	yes	no	no	no
Streaming Audio	yes	yes	yes	yes	yes	yes	yes	yes
Gig Listings	yes	no	yes	no	yes	no	yes	yes
Daily Statistics	no	yes	yes	no	yes	yes	yes	yes
Listener Comments	yes	no	yes	no	yes	yes	yes	no
CD Sales	no	yes	yes	yes	yes	yes	no	yes
Individual Song Sales	no	no	no	no	no	no	no	yes
Radio	yes	no	yes	yes	yes	yes	no	no
Personal URL	yes	yes	yes	no	yes	no	yes	yes
Fee-based Premium Services	yes	no	no	no	yes	no	no	no
Ease of Use	9	7	9	7	8	5	9	8
Pay Structure	n/a	9	8	n/a	7	6	n/a	9
Search Function	9	9	9	8	7	7	6	10
Best Feature	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 *Rolling Stone* editor	can create your own page for 9 European countries
Weakest Link	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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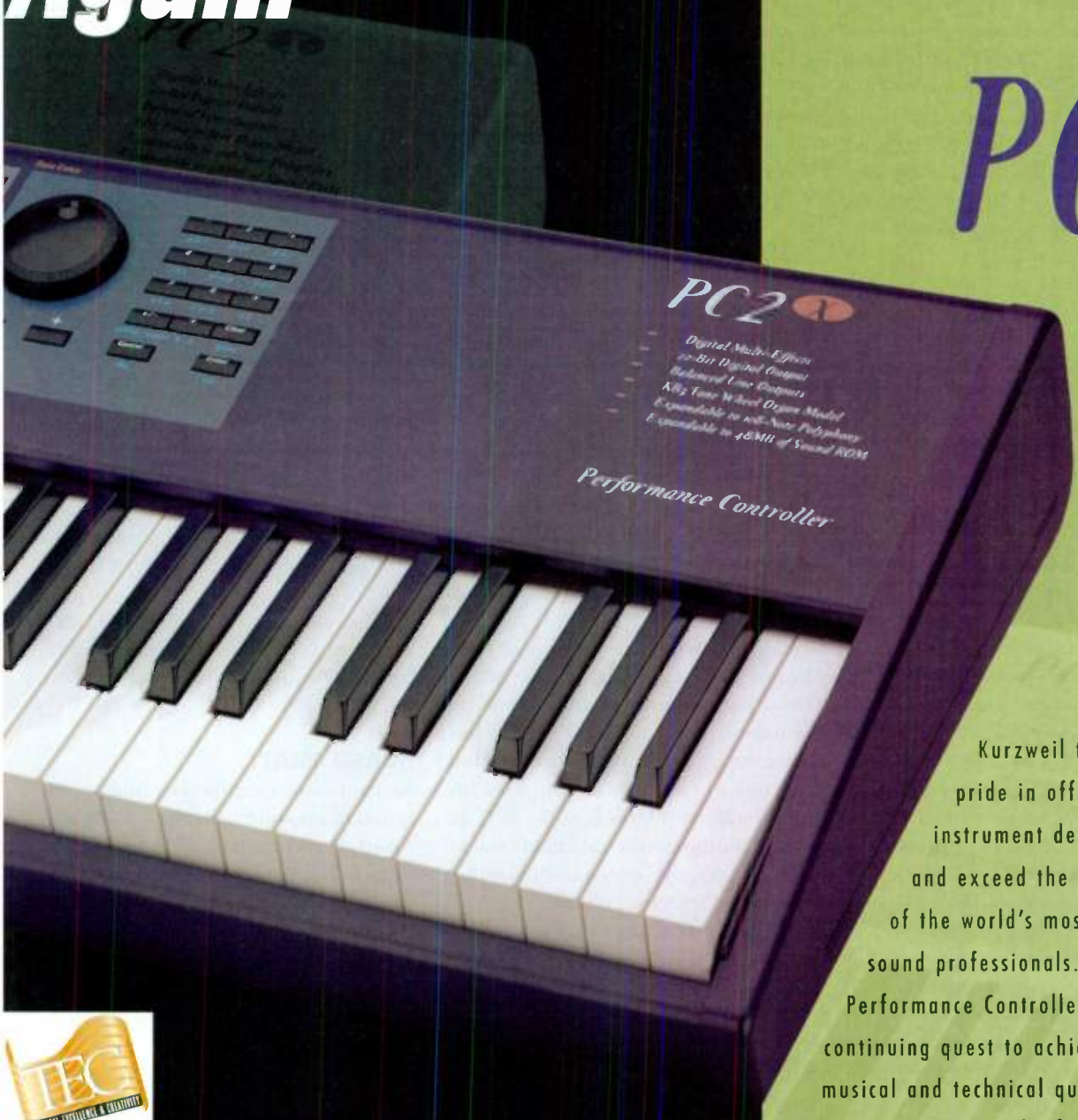

Kurzweil takes great pride in offering an instrument designed to meet and exceed the expectations of the world's most demanding sound professionals. The PC2 Performance Controller represents a continuing quest to achieve the highest musical and technical quality possible. Stunning new sounds, fantastic effects, precise control, and superior audio quality, are only a few of the features that make the PC2 the finest instrument of its kind.

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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 independent 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 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.

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

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

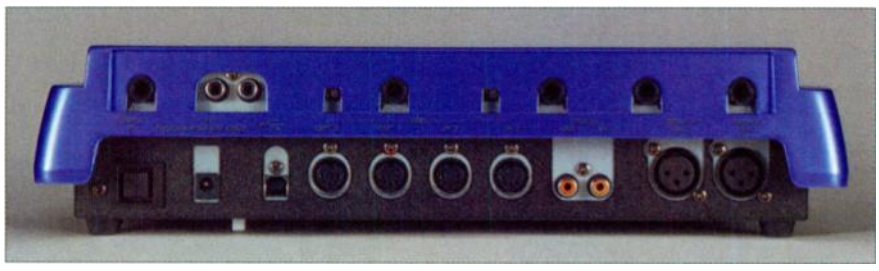

FIG. 2: The US-428's back panel features plenty of audio and MIDI connectivity, including mic-level, balanced and unbalanced line-level, and high-impedance analog inputs along with a headphone output, S/PDIF I/O, and 32 MIDI channels.

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 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.

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 ¼-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 automate 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

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.

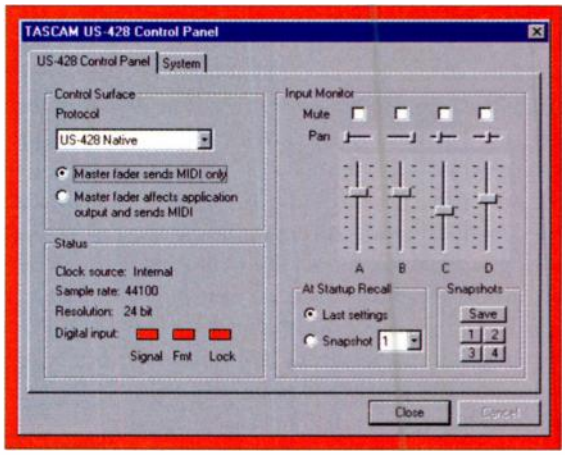

FIG. 3: The US-428 Control Panel applet allows you to select alternate control modes, such as the JLCooper CS-10 emulation or the Native Instruments *B4* setup. It also allows you to create snapshots for the input monitor mix and adjust buffer settings.

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

Analog Inputs	(2) balanced XLR mic-level; (2) balanced ¼" line-level (+4 dBu); (2) unbalanced ¼" switchable between line-level and high impedance (–10 dBV)
Analog Outputs	(2) unbalanced RCA (–10 dBV); (1) ¼" stereo headphone
Digital I/O	(1) S/PDIF coaxial RCA stereo in; (1) S/PDIF coaxial RCA stereo out
Resolution	16-bit; 24-bit
Sampling Rates	44.1, 48 kHz
Frequency Response	20 Hz–20 kHz (+0.5, –0.3 dB)
Total Harmonic Distortion	<0.07% @ 1 kHz (mic A/B to line out)
Noise Level	Better than –88 dBu A weighted
MIDI I/O	(2) In; (2) Out
Dimensions	11.5" (W) × 14" (H) × 3.25" (D)
Weight	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 JLCooper 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
tel. (323) 726-0303
e-mail custser@tascam.com
Web www.tascam.com

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 *Sorceror* 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 prepatched configuration behind the scenes. The first synth I owned was an ARP Odyssey, an analog monosynth with 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.

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@analoguesystems.co.uk
Web www.analogu 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.

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

Unity DS-1 Sound Storm

The promise of incredible polyphony is here. The tales of awesome sound quality are true. The reality of an integrated music production system on a computer has arrived. These are the perfect conditions for a Sound Storm. This collection of expressive, dynamic libraries was crafted to spark creativity during torrential deadlines. Each instrument takes advantage of Unity 's digital synthesis architecture. After all, what use is a lightning fast computer without a little thunder?

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Bittleadz Pop Drums
supercharges your songs with pop rhythms from funk to shuffle. Features Unity's OscillatorStretch for real-time tempo changes.

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Tubes, Tines, & Transistors
are vintage keyboards that have rocked the last quarter century. Hammond tubes, Rhodes tines, and Moog transistors set the tone for this eclectic electric storm.

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can OscillatorStretch these Break-Beats and take the house by storm. Bionic bass lines are included for one high-voltage rhythm section.

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http://www.bitheadz.com (401) 886-7045

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.

DOUGLAS WAGNER

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.

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 ¼-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 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.

DOUGLAS WAGNER

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.

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

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 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-oscillate, generating a sine wave that can serve as a pitched audio source.

The Sorcerer's overall construction is reassuringly solid.

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,