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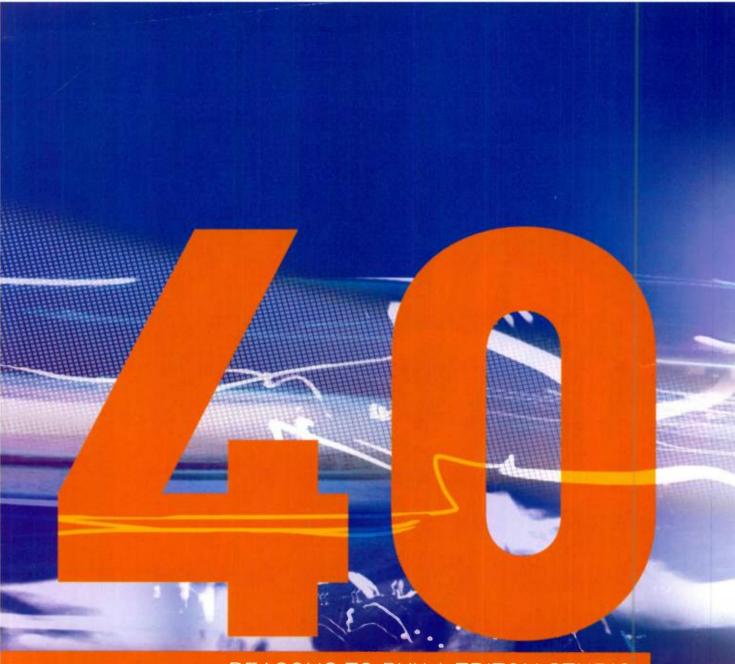
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An expert on loop-based music discusses the fine points of creating and editing killer audio loops and offers in-depth tips for making sliced loops with Ableton Live, Propellerhead ReCycle, and Sonic Foundry Acid. By Todd Souvignier

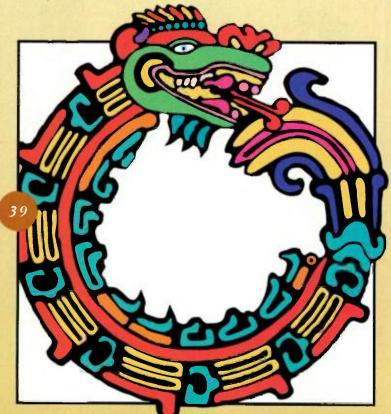
50 COVER STORY: GOING WILD

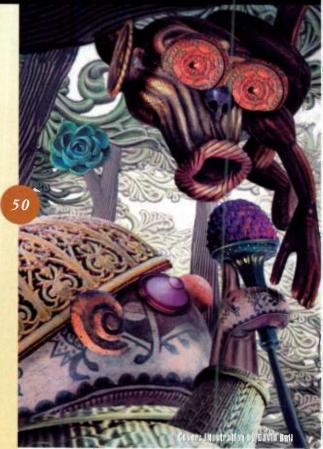
Mother Nature offers a world of sounds that, when accurately captured, can add truly fresh colors to your sonic palette. To get the best results, you need quiet clothing, a little time and patience, and the right equipment. EM asks the pros how they record these elusive sounds and bring them to life on CD. By Gino Robair

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Managing a large sound-effects collection can be a lot of work, but with the proper preparation and organization, you can save yourself time and aggravation. We'll show you how to get your house in order and create an efficient and manageable sound-effects library.

By Nick Peck





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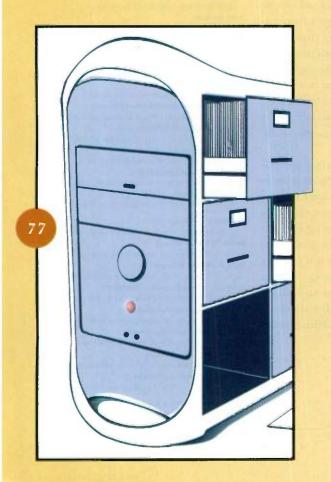
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FIRST TAKE

One More Thing to Sing the Blues About

s I write this in mid-February, the economy remains a mess, a lot of Americans are out of work, and too many are homeless. The U.S. government is determined to wage war on Iraq, al-Qaeda threatens to increase its terrorist attacks, and many of us have the uneasy feeling that we haven't seen the worst of it yet. Clearly, life is hard for a lot of people and probably will be much harder by the time you read this.



In hard times, artists of all types (not just musi-

cians) rise to new heights in an effort to express themselves. Whether debating social change (Dylan's "The Times They Are A-Changin'" versus Haggard's "Okie from Muskogee" in the '60s), inspiring patriotic fervor ("Over There" in World War I), admitting to desperation ("Brother, Can You Spare a Dime?" during the Great Depression), or describing the horrors of war (Picasso's Guernica in 1937), creative spirits somehow find ways to comment powerfully on the issues of the day.

But even in the most difficult times, the survivors love and lose, work and play, shop (perhaps cautiously), laugh and cry, pray and curse, marry, have children, and hopefully are able to grow old. We seek entertainment of many sorts: music, dance, visual art, reading, sports, theater, and much more. And we create art that is inspired by all of these things, not just about war and social change.

In such times, we need to step back more often and try to catch our breath. We're all stressed, many of us work too many hours and sleep too few (I speak from experience here), and an increasing number of us must spend many frustrating hours seeking work. It's easy to lose patience with each other and with ourselves.

Sometimes we just need to get away. Gino Robair's cover story "Going Wild" shows you ways that recording musicians are applying their skills to record the sounds of the wilderness, which also appears to be experiencing challenging times nowadays. Robair's story is a breath of fresh air in more ways than one. What the heck, let's pack a couple of mics and a recorder and go camping! Bears can be dangerous, but at least they don't throw bombs.

Creative artists of all sorts have a huge advantage in times like these. If we are feeling heavily pressed or depressed, the good news is that our muse probably is beckoning. My brother Larry the O and I have an admittedly tongue-in-cheek saying: "The worse things get, the better it gets because it's one more thing to sing the blues about." At least part of the answer for musicians is to put our emotions into music.

The song selection certainly matters if you have something specific to say lyrically. However, the most important goal is to express musically what you *feel*, not just what you think. Without passion, creative ideas have little power. Letting others hear your music may help them sort out their own feelings and ideas, which is wonderful; but even if you just make the music for yourself, remember that part of the creative artist's unique gift is the ability to make something good out of something bad. It's one more thing to sing the blues about.



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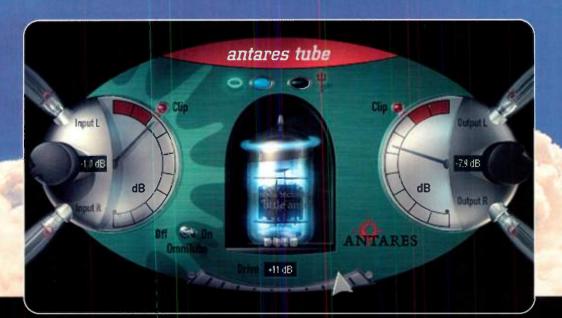
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LETTERS



SECOND OPINIONS

ve been using my Mobile I/O 2882 for more than a year. I found the text of Eli Crews's review (February 2003) to be fairly complete and insightful, but I'm confused by the meter ratings, which seem wildly inconsistent with the text.

For example, on p. 168, Crews writes, "When I compared the 2882's preamps to my Focusrite Green 1 Dual Mic Pre, they stacked up pretty nicely, especially considering that the Mobile I/O costs about a third as much per channel as the Focusrite." Then on p. 170, he states, "The Mobile I/O's analog output sounds great." Yet it receives a rating of only 3.0 out of 5.0 for audio quality? I don't get it.

On p. 170, Crews writes, "In combination with the MIO Console software, its flexibility and routing capabilities are extraordinary." Yet it receives a rating of 3.5 for Features and 3.0 for Ease of Use?

I can't quibble with the 2.0 Value rating given the problems with digital input and dropouts (which I've rarely experienced), but I expected the other three categories to score in the 4 to 5 range.

Darren Gibbs via e-mail

he EM review of the Metric Halo Mobile I/O 2882 audio interface seemed very off base. The reviewer, Eli Crews, had no clue that the Mobile I/O is being used by hundreds of people in all sorts of applications. Did he spend any time on the Metric Halo bulletin board that he mentions? Shouldn't a decent review contain information on a product's breadth and flexibility?

Crews provided no details about the Mobile I/O's converters. In our studio tests, we had major New York City engineers looking at their Apogees in tears. Metric Halo's converters sound better than converters that are five times more expensive. They sound incredible! The unit is worth their value alone. The other mindblower was that Crews performed all of his tests using Mac OS 9. This is outrageous! Shouldn't a reviewer be working with more up-to-date software?

It's amazing how you guys let the major companies slide and hold the smaller ones to a much higher standard. No, I don't work for Metric Halo, nor do I know anyone who does. However, I'd love an explanation, as would hundreds of other Metric Halo users out there.

Robert L. Lurie New York, NY

Author Eli Crews replies: Darren and Robert—I know that the editors at EM share my enthusiasm for giving credit where credit is due, whether it be to David or to Goliath. If my review contains any oversights or fallacies, it is wholly my fault, and not part of some bigger plot to keep the small company down.

I'm sorry that you found the breadth of my review too narrow. A review of this length can't possibly accommodate all the details of all the tests that I performed. I discussed the features that didn't work because potential buyers need to know about them. Unfortunately, the topic of conversion was pushed aside because of the limitations of space. I agree with you that the converters are a stellar attribute of the Mobile I/O.

You maintain that I should have tested the Mobile I/O in OS X as well as in OS 9. The Mobile I/O's OS X 10.2 driver was released on October 15, 2002, and my deadline for the review was October 25. Ten days is not enough time to comprehensively test a sophisticated piece of gear. I apologize if that wasn't made clear in the article. Also, keep in mind that most of the major DAWs (specifically Digital Performer, which I use) still aren't available for OS X even as I write this, three months after I wrote the review. I personally don't know of a single engineer who has switched over to OS X.

I do wish that the EM meter ratings were higher, reflecting the quality of the features that function properly. However, it would be a breach of duty to give higher marks to a product that is incomplete, that works spottily in some regards, and that is quite likely to fail in any number of ways during a session. Keep in mind also that a rating of 3.0 means that the unit is doing everything that it's supposed to do within the given category.

I do subscribe to the Metric Halo bulletin board. If people want to read testimonials about how great the unit sounds, they should visit the online forum. However, my job as the reviewer was to point out the Mobile I/O's drawbacks as well as its usefulness and flexibility. I feel that I gave ample attention to both aspects.

Metric Halo saw the review before it was published and agreed that it offered a fair assessment of the unit as it stood at the time. Had Metric Halo waited until everything was hammered out with the Mobile I/O before shipping the product, it would undoubtedly have received higher meter ratings.

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was amazed at how congenial the BitHeadz Unity Session 3.0.4 review (February 2003) was. It is a good

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product by and large because it can do an awful lot at a very low price. However, there is frustration among its user base due to the lack of product information offered by the manufacturer. I spent a good four weeks getting the bugs worked out.

No manual is provided with the product. Until I read your review, I was unaware that a manual is available for \$15. When you spend \$600 to \$700 on software, the manual should be there for you. Even when I e-mailed BitHeadz's tech support and asked about such a manual (prior to your article), I was not informed of the existence of this mythical treatise.

After owning the product prior to your review and being frustrated with the manufacturer's support, reading a good assessment in your magazine makes me question the depth of your journalism.

Rusty Smith via e-mail

Rusty—I'm sorry to hear that our Unity Session review didn't meet your expectations. However, I also feel that your questioning the depth of our journalism just because we didn't focus on the one aspect of the product that is most bothersome to you is unjustified.

For the record, the review spends several pages explaining in some detail how the

current version of Unity differs from past versions, how the underlying architecture has changed, what the different program modules do, what the system requirements are, and how the program integrates with other software. The review also points out the CPU demands that the program makes and raises other issues that are important for effectively using the various components. Of course, the reviewer also assesses the sampling, synthesis, audio processing, and editing capabilities of the program.

EM does not base its reviews on unknown sources in user groups even if they agree with each other. Our product reviews are always the result of first-hand analysis in a studio setting by an experienced writer and musician-producer or engineer. In this case, the reviewer received a printed manual with the review copy of the software, and during the editing process we discovered that printed documentation was not normally included in the package. As you point out, that fact was clearly stated in the review. (BitHeadz has confirmed that a printed manual is available, although the price is now \$25.)

Aside from his analysis of Unity Session, the reviewer points out several areas that caused him trouble during the review period, including sluggish screen redraws, authorization glitches, and miscellaneous bugs. I would hardly characterize those criticisms as being "congenial." By your own admission, Unity Session is "a good product by and large because it can do an awful lot at a very low price." We agree with you in that assessment, and we also agree that complex software should be accompanied by clearly written, detailed, printed documentation. Perhaps more software (and hardware) developers will realize over time that they are squandering the good will of the end users by not providing adequate documentation for their products.—David Rubin

YOU'RE THE INSPIRATION

've been reading your magazine for years. Early on, I read an article that said, "Gear does not replace an education. If you don't understand music, how can you record it?" I dropped everything and got an education in music. Once I graduated, I purchased a Korg 01/WFD and made a deal with myself: I could only buy new gear when the older gear paid for itself.

The 01/WFD paid for itself in a few months as I got a job writing new-age music. I later opened a recording studio with my earnings and got a job creating sound effects and original compositions for a computer-game company. EM has made the difference in succeeding at my dream. Keep it up, and so will I.

> John Glynn Leadmine Pond Productions

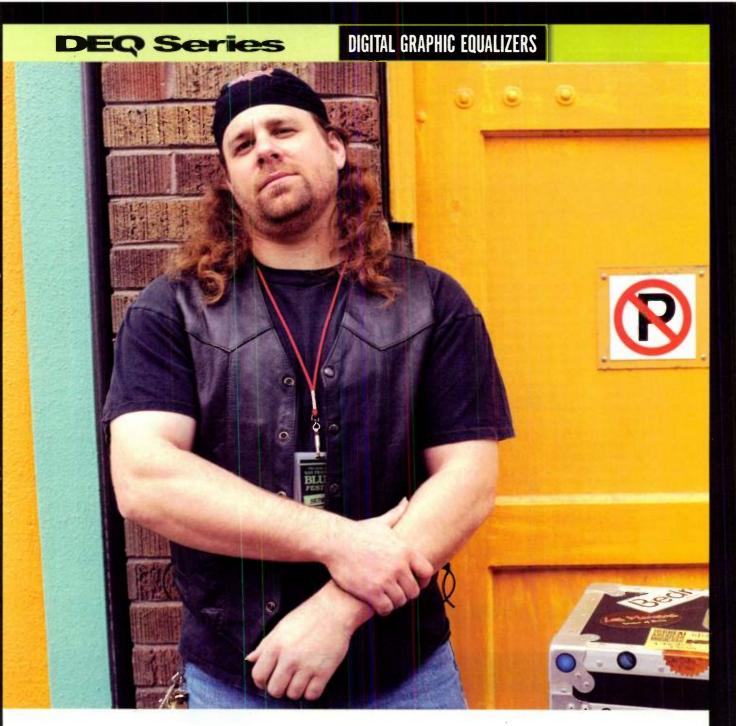
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March 2003, "Recording Musician: Maximum Conversion," p. 82. The graphics for Fig. 1 and Fig. 2 were transposed.

March 2003, "Review: Emagic Logic Platinum 5.5 (Mac/Win)," p 102. In the Product Summary sidebar, one of the Cons states that the program "can't display multiple plug-in windows simultaneously." In fact, by unchecking the Link icon, you can view as many plug-in windows as you would like.

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.



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FRONT PANEL

Download of the Month

By Len Sasso

Before you take off on your next transcontinental flight or bus ride with your laptop in hand, be sure to pick up Marcel Blum's Soundplant (Windows, \$20 shareware; Mac, freeware) to amaze and annoy your tripmates. Soundplant turns your computer into a full-featured sample player that you trigger from the computer's keyboard. The program supports audio files in AIFF, WAV, AU, and MP3 formats (shareware registration is required for MP3 support on the PC, but it's free on the Mac). You can load audio files of any length your computer can handle into RAM or



play them from your hard disk. RAM files are triggered with virtually no latency, and Soundplant can perform real-time processing on MP3 files without having to decompress the data. Pick up the latest release version for Windows as well as a beta version for the Mac at www .soundplant.org.

You can assign samples to any of 72 keys by dragging and drop-

ping them onto Soundplant's onscreen keyboard, and the resulting Keymaps can be saved to disk. Five triggering modes are available: Sustain (each key press layers a new copy), Restart (retriggers from start), Kill (toggles playback on and off), Mute (mutes and unmutes while the sample keeps running), and Pause (pauses and restarts playback). You can assign alternate triggering modes to lowercase and uppercase letters (that is, with or without pressing Shift). Controls are available for setting each sample's start and end points, loop points, pitch, volume, and pan position. You can assign a sample across several adjacent keys and have Soundplant automatically adjust the pitch or playback offset, which is a nice touch. For example, if you assign a sample to eight keys with automatic offset, each key will play a different eighth of the sample for instant beat slicing.

Aside from its novelty value, Soundplant has a number of practical uses. It offers an optional link to your sample editor for contextual sound design. Depending on the quality of your sound card, you can use it as a performance tool. You can record your performances into any audio recording program, provided that your sound card supports fullduplex operation (most do). When you grow tired of your favorite computer game, Soundplant offers a refreshing alternative.



Cool Tip of the Month

Sync Up Your Delays

The EM Cool Tip of the Month is presented courtesy of Cool Breeze Systems.

O nce you've achieved your basic blend in a mix, time-based effects such as a delay can help you further position the parts. If you aren't careful, though, overusing such effects can simply clutter up the soundstage. A great place to start is to base the timing of the effects on song tempo, because it lets you easily produce a delay that is in time with the song.

Almost all multitrack DAW programs provide some type of mono-to-stereo delay plug-in. In this example, I'll use Waves SuperTap delay, which is available as a third-party add-on for most audio programs. SuperTap has multitap capabilities, providing the option of playing several delayed signals along with the original. Here I'll apply a multitap mono-to-stereo delay on a lead vocal track.

1. First, insert a mono-to-stereo delay plug-in on the track to which you'd like to apply the effect.

2. Next, confirm the tempo of the song



and the duration of a quarter note in milliseconds. Modern DAWs offer many ways to determine timing data, from reading tempo maps to simply tapping the

Band on the Web

By Geary Yelton

GrooveLily is not your average rock 'n' roll power trio. Two out of three members have graduate degrees in music; the third graduated from Princeton with honors. Individually, they've performed with such varied artists as Cindy Lauper, Joe Jackson, John Patitucci, Clarence Clemons, and Ben Harper. Together since 1994, GrooveLily has built a loyal following and tours extensively, primarily on the East Coast. Their diverse music spans styles from power-pop rock to jazzy ballads and acoustic folk.

Like their music, GrooveLily's Web site is a group effort. Despite their busy performance schedule, the three band members take full responsibility for their jam-packed site. Valerie Vigoda (electric violin, vocals, songwriting) and Brendan Milburn (keyboards, vocals, songwriting) originally designed the site, with subsequent design and maintenance by Gene Lewin (drums). Lewin actively updates the site, changing it at least three times a week and sometimes daily.

When you log on to www.groovelily.com, Milburn's well-executed Flash intro does just what it should: plays briefly and moves on to the home page. From there, it's easy to navigate to pages devoted to GrooveLily's music, schedule, reviews, bios, photo gallery, journal en-



tries, discussion boards, and news updates. The sheer volume of favorable reviews is impressive. Journalists (and fans) can conveniently download online PDF press kits and high-res JPEGs of the band. You can order CDs, T-shirts, and hats from the merchandise page. Truly enthusiastic fans, called Petal Pushers, provide local promotion and man the merchandise table; in exchange, they're rewarded with free admissions, backstage passes, and exclusive downloads on their own Web pages.

Three of GrooveLily's five CDs are out of print, but you can hear every out-of-print song in its entirety on their site. Selections from their two most recent albums and from Vigoda's 1994 solo debut are also online, along with lyrics to every song on every album. Their most recent CD, Just the Three of Us, is a live concert recording, and their next studio album is tentatively titled Are We There Yet?

Key Changes

By Marty Cutler

he TC Group is combining TC Works and TC Electronic products under a single brand. Consequently, the company's PowerCore and future TC Works products will be branded as TC Electronic (www.tcelectronic.com). The TC Works company will continue to be responsible for technology and product development . . . Fender Musical Instruments (www.fender.com) announced its new manufacturing subsidiary, Jackson-Charvel Manufacturing, which has signed a deal to purchase certain assets of the Jackson-Charvel Guitar Company, a division of Akai Musical Instruments Corporation (AMIC). The acquisition includes all existing inventory of products and trademarks relating to Jackson and Charvel . . . An offshoot of Berklee College of Music, Berkleemusic.com offers online instruction in music theory, songwriting, career planning, and computer-based production. Courses range from 3 to 12 weeks in length and from \$295 to \$795 in cost . . . Digidesign has announced that it will add Rewire2 support to the entire Pro Tools product line. Rewire2 will be included for free in future Pro Tools software. It will allow the integration of MIDI, audio, and transport control in programs such as Ableton Live and Propellerhead Reason . . . Sonic Reality sample packages will offer UFO, a Mac and Windows application codeveloped by Sonic Reality (www.sonicreality.com) and Chicken Systems (www.chickensys .com). The application allows translation of samples across a broad base of sampler platforms, obviating the need for proprietary sample-format packages. As feature updates to samplers appear, UFO will be able to update and tweak sampler-specific patches.

tempo in the plug-in or identifying beats and viewing the length of a quarter note in milliseconds on the timeline. In this example, SuperTap includes a Tap Tempo button in its window. Play the song with SuperTap open and tap the button to confirm the tempo.

3. Now that you know the tempo in milliseconds, adjust the delay time to a multiple of that number. Dividing by two will produce an eighth-note delay; by four, a 16th-note delay; and so on. SuperTap makes the process very easy—its graphic interface lets you adjust multiple delay taps on a grid, and they can snap to an exact note duration. 4. Adjust the Feedback control to the number of repeats you desire.

5. Adjust the delay signal's gain so that its level is lower than the direct signal's.

Note that additional routing and plugins could delay the source signals and thus affect timing. Depending on your rig, you might need to shift tracks in time to compensate.

-Steve Albanese

Be sure to check out the streaming movie tutorial of this tip for an overview of SuperTap and to check out this procedure in action. Log on to www.emusician.com/cooltip to take part in this online adventure. Also, if you dare, take the quiz to review what you've learned!

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Rev Up

By Marty Cutler



Native Instruments

V irtual-instrument construction kit Reaktor 4 (Mac/Win, \$499), from Native Instruments, provides improved modules, graphical sample-management tools, and support for Mac OS X and Windows XP. Upgrading from earlier versions is a free download, but you can order hard-copy manuals and an upgrade CD with Reaktor Ensembles for \$79.

The new floating snapshot window lets you randomly seed or morph between two patches. Improved sample mapping now provides a listbased view or a graphical keymap view. The graphical editor is much like Kontakt's Mapper, albeit without overlapping zones or crossfades. Sample-mapping capabilities now allow Velocity splits. Reaktor 4 ups its sample-wordlength ante to allow 32-bit WAV, AIFF, and SDII samples. A new matrix list takes its design from the preset displays of the software instruments FM7 and Absynth.

VST support now allows unlimited instances of the program and VST automation. The updated sound modules feature analogmodeled oscillators derived from Native Instruments' soft

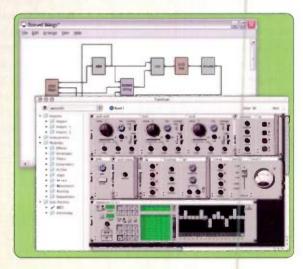
synth Pro-53, offering improved antialiasing.

The Grain-Cloud Delay provides freezing and real-time sampling. You can choose to control modules with an event or incoming audio. You also receive a new library of Reaktor instruments.

Reaktor serves as a standalone application with ASIO and Core Audio or as a plugin with VST 2.0, Audio Units (OS X), and DXi (Windows). On the Mac, Reaktor requires a G3/500 MHz with OS 9.1 or OS X 10.2 and 256 MB of RAM. For Windows, you need a Pentium III/500 MHz with Windows 98, 2000, ME, or XP and 256 MB of RAM. Native Instruments U.S.A.; tel. (866) 556-6487; e-mail info@native-instruments.com; Web www.native-instruments.com.

Applied Acoustics Systems

assman 3.0 (Mac/Win, \$449; upgrade, free) adds support for Mac OS X, MAS, and DirectConnect. A new Browser integrates the Builder and Player windows. Every element relevant to building and playing a synth appears in a simple tree-type directory within which you can drag and drop instruments,



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The Other Analog Tape

There are three types of tape—the sticky kind, not the stuff you record on—that I find indispensable in my studio. First is masking tape, which is handy primarily for laying out instrument assignation strips on the mixing console. I buy the kind watercolorists use (available at artist-supply stores) because it's a bit less sticky and easier to remove than ordinary masking tape.

Plastic tape also gets a lot

of use in my studio. I keep several colors on hand. The lighter colors-gray, yellow, and white-are great for making identification labels for the ends of insert cables that are "permanently" attached to dynamics

processors, for example. (Use a felt-tip pen with permanent ink, and be sure to allow time for the ink to dry before use.) I've also used plastic label tape to mark DAT and ADAT tapes,

hard-to-read I/O on rackmounted gear,

and even specific faders and knobs I had to reach for during complicated (analog) mixes. The darker colors-red, orange, green, blue, and brown-are excellent for general cable identification. A piece of the samecolor tape around both ends of a mic cable makes for quick and easy tracing.

I also keep a couple rolls of duct tape handy—one close to me and the other close to the musicians. Duct tape is great not only for securing cable runs in high-foot-traffic areas, but also for marking the artists' feet positions after you've positioned mics. Of course, it's also unparalleled as a quick fix to subpatches, modules, and presets. You can export a synthesizer along with its subpatches and presets as a single file, and you can resize the window and use the scrollbars to focus on the area you need.

All onscreen instrument parameters offer MIDI Learn and Forget features. You can also save and load multiple MIDI assignment maps for each instrument. Instruments now support Aftertouch.

Version 3.0 of Tassman also introduces several new modules, including resonant 24 dB

lowpass and 12 dB highpass filters, an LFO that synchronizes to MIDI Clock, and ADSR and ADAR envelope generators with modulation inputs for each stage. New effects include a compressor, tremolo, and Static and Sync Delay. Three new sequencer modules are also available.

Macintosh users can run Tassman on a G4/500 MHz computer with at least 128 MB of RAM and Mac OS 9 or OS X 10.2. PC users will need a Pentium III/500 MHz with 128 MB of RAM and Windows 98, 98 SE, 2000, ME, or XP. Applied Acoustics Systems; tel. (888) 441-8277 or (514) 871-4963; e-mail info@applied-acoustics.com; Web www .applied-acoustics.com.

Roland Corp.

Version 2 software for the VG-88 is a free upgrade that must be installed by Roland's U.S. service department. Contact Roland for instructions at (323) 890-3700, ext. 2289, between 8:30 a.m. and 5 p.m. Pacific time.

A new analog synthesizer emulation lets you control the sound with picking dynamics or an envelope generator. A second nylon-string guitar and an electric sitar model are also included.

Eighteen new amp models bring the VG-88's collection to a total of 32 COSM amps, which

now include Jazz Combo, Pro Crunch (inspired by the Fender Pro Reverb), and R-Fier Red and R-Fier Orange. Five new wah-wah types include models that emulate the Vox V846 and Dunlop Crybaby. Two new effects are Uni-V, which emulates a popular old rotary speaker simulator, and De-fretter, which simulates a fretless instrument.

Guitars without divided pickups can now benefit from the unit's amp models and effects processors without making adjustments to the VG-88 internal mixer. Roland Corp. U.S.; tel. (323) 890-3700; Web www.rolandus.com.



temporarily secure a broken mic clip, hang some baffling blankets, or whatever.

In general, no matter which type of tape you're using or for what purpose, it's smart to first fashion a small "handle" by folding a half inch or so of one end of the tape strip over onto itself. The handle will allow for easy removal of the tape at a later time.

—Brian Knave

Plug-in Consolidation

One of the best things about plug-ins is that they enable you to create a fully integrated workstation inside your computer. But that benefit can quickly lead to problems if you're not careful how you apply your effects. You'll get the best results if you avoid draining your computer's processing capabilities with unnecessary plug-in instantiations.

Inserting a copy of your favorite reverb on every track, for example, will surely overburden your CPU, and it's probably unnecessary if the settings are roughly the same anyway. Instead, try adding the reverb to just the master faders. Better yet, insert the reverb in an aux track, and bus the appropriate tracks to that fader. Consolidating effects with a few aux tracks can save processing overhead and make it easier to set parameters consistently.

Reducing the number of plug-in copies can also help you avoid clipping. Many effects, such as EQ, can significantly boost the output of a track, as can effects with output gain controls. Having plug-ins on every track makes it harder to pinpoint the source of a problem when the master signal goes into the red. Consolidating your EQ, compression, and other effects into a few dedicated aux tracks makes it easier to control the levels feeding the master outputs.

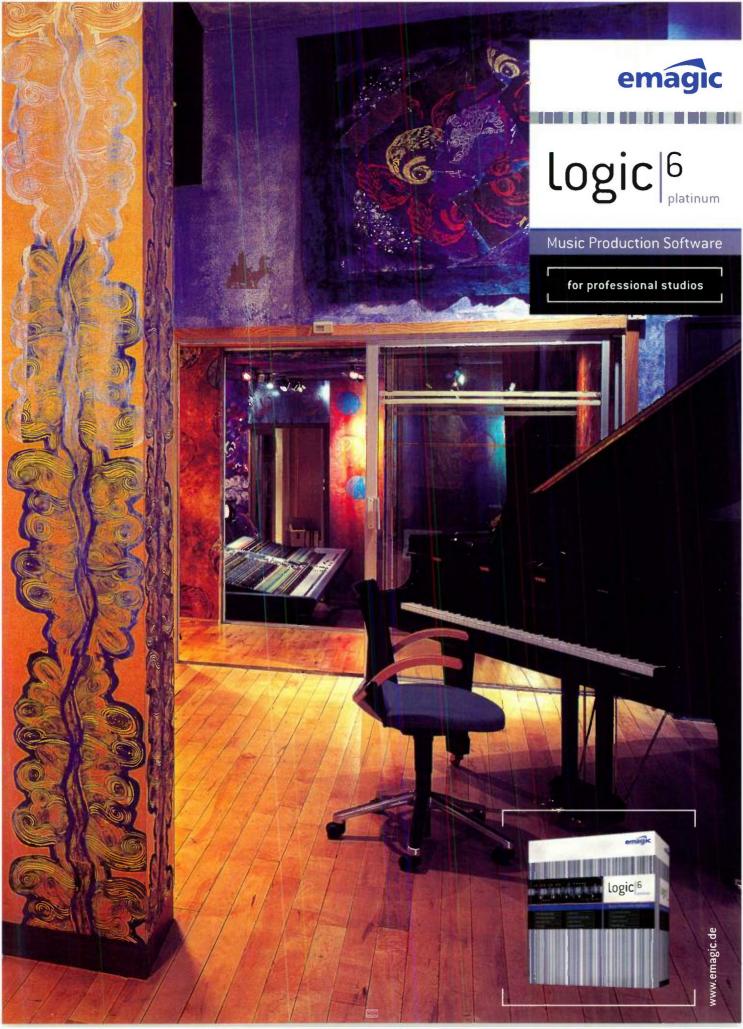
-David Rubin

The new Project Managers at Strongroom don't get paid.

And the jobs get done faster than ever.

Simon Ray, Technical Manager at Strongroom Recording Studios, is excited about the new features in Logic Platinum 6. "The Project Manager saves us valuable time, which enables our clients to be more creative. No more lengthy searching for samples, files or sampler instruments," he enthuses. "Access to single samples in multi-gigabyte sample libraries is just now a matter of seconds. This will speed up sessions considerably." The Marquee Tool also speeds up workflow, with sequence-independent selection and editing in the Arrange window. The same is true for Time Stretching and Sample-Accurate Display, both now accessible directly in the Arrange window. Optimal performance is assured with Off Line Bounce and Freeze Tracks, both of which free up valuable CPU resources. Thanks to the Video Thumbnail Track in Arrange and DV Movie playback via FireWire, sound to picture work is more convenient than ever. These and the many other new features in Version 6 ensure that Logic Platinum retains its reputation as the preeminent native production software for Mac OS X.

Technology with soul.





15 Years Ago in EM By Steve Oppenheimer

Our editorial RAM buffer overflowed with computer information in April 1988. The cover feature, "The Musical Computer," was actually a suite of articles about the Atari, Amiga, Mac, and PC.

Dean Friedman sang the praises of the Amiga 500, which cost \$599 and offered more features than any other computer in its price class. The Amiga was the only personal computer of the day that could truly multitask (simultaneously run multiple active programs). True, you could multitask Unix programs on a PC, but Unix was for networks, not desktop music production.

Carter Scholz's "Big Blue Does MIDI" should not be confused with his January 1989 PC-se-

quencer roundup. The latest Intel CPU was the 80386, and all of the music programs were still running under DOS because Windows wasn't ready for prime time.

Geary Yelton presented the state of the Macintosh. Apple had blindly stumbled into music-computing success, having made no special effort in that direction. The Mac II and SE were quite good but expensive; a user-friendly OS and outstanding thirdparty music software made the difference.

Jamie Kruz reported on the Atari ST, which was good, cheap, and had a lot of features. Third-party music software abounded, though the selection of business software was weak. The ST was a winner in Europe and found initial success with U.S. musicians but failed to crack the home-computing mainstream.

We published two DIY projects in the April issue. Thomas

Henry's LED bar-graph peak detector let you check levels on any audio signal and could even be used as a battery tester. Jim Johnson offered Chord, a DIY algorithmic-composition program, written in Atari ST BASIC, that let you create chord progressions using your own algorithms.

Our Winter 1988 NAMM report featured keyboard synths, including the Yamaha DX11 (a TX81Z with a keyboard), Kurzweil K1000, Roland D-20, and Ensoniq SQ-80. Single-rackspace gear was coming into fashion, as were the AES/EBU digital audio standard, Standard MIDI Files, and digital audio format converters. Going out of fashion were 5.25-inch floppy disks (replaced by 3.5-inch floppies) analog subtractive synthe

and-temporarily-analog subtractive synths.

First Take reviews covered the DMC's MX-8 MIDI patch bay/ processor and Stick Enterprises' unusual Patch of Shades floor box, a signal processor/router controlled by a pressure-sensitive, 3-inch-square pad. Pressing on the pad simultaneously crossfaded between direct sound and an effects loop, cut in an onboard wah-wah, and increased the dry output level at a separate output for feeding additional effects. Trippy!

We also reviewed the Kurzweil K1000 synth (great sounds, lousy keyboard action) and the Akai MPX820 MIDI-controlled analog mixer. The 8x2 mixer was a tad pricey at \$2,500, but it had great features for the time. Finally, we auditioned the Nady Tube Distortion, Chandler Tube Driver, and Bartolini Tube It fuzz boxes. Each had a different flavor, and we liked them all.

Synth Pads: An Aesthetic Exercise

The most intriguing synthesizer pads make extensive use of complex envelopes and multiple oscillators to generate subtle, evolving sounds. It can be useful to compare these sounds with the subtle changes to the taste of a fine wine over time.

Taste your favorite wine and isolate at least three elements of its flavor. What emerges first: the flavor of the oak barrel? Apricot overtones? A hint of chocolate? Choose a 3-oscillator synth and, for each characteristic, use a different waveform per oscillator. Trace the rise and fall of each of the wine's flavor elements with the envelope generators. To focus on the development of each tone, solo each oscillator in turn. Sample the wine again and trace the development of a flavor element over time; then, with envelope generator rates and levels, approximate the rise and fall of that element. Again, compare with another taste of wine and refine your envelope generator values for each rate and level. Tweak values and scale the strength of both filter and amplitude envelopes.

Perform this exercise for each of three oscillators. When you've completed your programming, enable the output of all three oscillators. Route the LFOs to control pan position, simulating the sounds spinning around the room. (By the time you finish the exercise, however, that may be unnecessary.)

—Marty Cutler

Bass Recording Basics

Combining an amp and direct sound can give life to your bass guitar tracks. Plug the bass in to the ¼-inch instrument jack of a direct box (DI) and connect a balanced XLR cable from the DI to your mixer. Then, run a ¼-inch cable from the DI's amp jack to your bass amp's input jack. Position a mic in front of the amp's speaker cabinet and route the mic cable to another input on your mixer. You can submix the two sounds to one track on your recorder, give each its own track and postpone sonic decisions until the final mix, or mix the two tracks in a stereo spread. For a thicker sound, put up a room mix and combine it with the other two sources. @

-Gino Robair



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100mm optical touch faders. Full-size backlit LCD display. Customized shortcut navigation and editing functions. The Mackie Control is much more than a way to balance levels; it allows you real-time control of your desktop studio in a way that a keyboard and mouse never will. And thanks to Mackie Control's new HUI mode, you can use a single interface to move seamlessly from Pro Tools to other platforms. Simply select "HUI" in the peripherals dialog, apply the Pro Tools overlay to the master section, and you're ready to go. What's more, you can expand your system to a 32-channel console, in 8-channel increments, at just one-third of the cost of other controllers.

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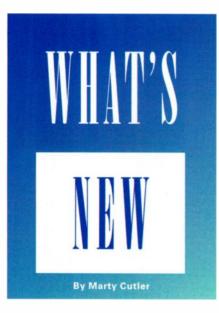
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🔺 Z.VEX NANO HEAD

he Nano Head from Z.Vex (\$499) is so small that it will fit in the palm of your hand. Yet it can drive any size speaker at 8 to 16 Ω , including a 4×12-inch cabinet. Furthermore, the manufacturer claims that the little tube-powered amp delivers a tone similar to that of some well-known 50W heads.

You can power the Nano Head with the provided wall wart, a car's cigarette-lighter socket, or a small lead-acid battery. A builtin DC-to-DC converter boosts the 12V input to 230V to feed the miniature tubes, which include a total of four triodes.

The Nano Head is protected by nickelplated roll bars. Front-panel controls include a brightness switch for adding high end at lower volumes, a 3-position highpass switch for adjusting the low end, and a highpass control for fine-tuning the filter. The amp has one unbalanced %-inch input jack and one unbalanced ¼-inch output jack. Z.Vex Amps; tel. (952) 285-9545; e-mail zvex@zvex .com; Web www.zvex.com.

ROLAND V-SYNTH

oland's V-Synth (\$2,695) combines the company's VariPhrase technology with physical modeling, sampling, and Roland's recent developments in real-time controllers. Perhaps the most intriguing controller is the target-shaped TimeTrip Pad, which lets you scan through waveforms using your fingertips. You can scan the waveform in either direction, modify the playback speed, and even freeze a portion of the sample as it plays back.

Other real-time controls on the V-Synth include a pair of D Beams. front-panel buttons, and more than 20 knobs and sliders. VariPhrase allows you to manipulate the pitch, time, and for-

mant of a sound independently.

The 61-key instrument's oscillators offer analog modeling, real-time audio input, and sample playback, in conjunction with the VariPhrase features and sampling. You configure the two oscillators into different signal paths, called Structures, which let you combine oscillator types and add FM, ring modulation, and sync.

The V-Synth includes new COSM processors, notably the Side Band Filter,

AUDIO-TECHNICA AT3060

udio-Technica's AT3060 (\$599) is a large-diaphragm tube mic that doesn't Lequire a special power supply or proprietary cable because it relies solely on phantom power. According to Audio-Technica, the cardioid-pattern condenser element provides high sensitivity and smooth sound reproduction with low noise levels. The company also says it hand selects the tubes after testing to ensure reliability.

The tube assemblies are shockmounted to minimize mechanical-noise interference. A precision-machined, nickel-plated acoustic element baffle enhances the mic's stability and sensitivity.

Audio-Technica rates the AT3060's frequency response at 50 Hz to 16 kHz, with a maximum SPL of 134 dB. Typical dynamic range is 117 dB, 1 kHz at maximum

which can create harmonic sounds from inharmonic content and vice versa. You also get polyphonic guitar-amp modeling and a wave shaper. In addition, Roland supplies effects such as reverb and chorus and 41 multi-effects.

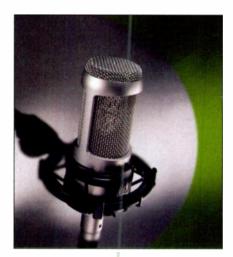
The PCM oscillator can draw from the V-Synth's supply of 300 preset waveforms, or you can overwrite these with your own samples. The unit has analog and digital

> I/O for sampling or processing external audio. You can also resample sounds that have been processed through the V-Synth architecture and ef-

fects. A built-in USB port allows you to import WAV and AIFF files directly from a computer.

> Analog input is on two balanced %-inch jacks, with switchable mic or line levels. The analog outputs-stereo, main, and direct—are on unbalanced ¼-inch jacks. Digital I/O includes optical and coaxial S/PDIF connectors; MIDI In, Out, and Thru jacks; and a USB port. A ¼-inch stereo headphone jack, a %-inch hold-pedal jack, and two ¼-inch control-pedal inputs are also included. Roland Corp. U.S.; tel. (323) 890-3700; Web www.rolandus.com.

> SPL. The microphone ships with an AT8458 shockmount and a protective pouch. Audio-Technica U.S., Inc.; tel. (330) 686-2600; e-mail pro@atus.com; Web www.audio-technica.com.



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Fantom

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NOVATION V-STATION

Novation has ported the technology from its popular K-Station synthesizer into the company's first software synthesizer. The V-Station (Mac/Win, \$199) offers 8-note polyphony with multitimbral capability through multiple instances of the software. The synth is compatible with VSTi and Audio Units hosts.

The V-Station's sound engine has the same architecture as its hardware sibling, with three oscillators, oscillator sync and FM capabilities, and a noise source. In fact, you can offload patches created on the V-Station to the K-Station or A-Station, and vice versa.

The instrument offers a resonant lowpass filter with selectable 12 dB or 24 dB slopes, and overdrive capabilities. Its multieffects include reverb, chorus, phaser, delay, panning, distortion, EQ, and a 12-band vocoder.

As with its hardware equivalent, the V-Station gives you a

programmable arpeggiator and syncable LFOs and effects. All parameters respond to MIDI controllers. eBlitz Audio Labs (dis-



tributor); tel. (310) 322-3333; e-mail salesusa@novationaudio.com; Web www .novationaudio.com.

MOTU MACHFIVE

OTU calls MachFive (Mac/Win, \$395) a universal sampler plug-in because of the number of plug-in formats-VSTi, DXi, HTDM, RTAS, Audio Units, and MAS—and sample file formats—Akai, Digidesign SampleCell, Emagic EXS-24, GigaSampler, Kurzweil, Roland, and Steinberg HALion-it supports. MachFive is 16part multitimbral, and you can load as many instances of the plug-in as your host will allow. Polyphony is limited by processor power. The sampler's 32-bit engine allows up to 24-bit, 192 kHz audio with output to as many as six channels. Each channel offers unique output assignments, and any part can receive on any MIDI channel. For complex splits and layers, the sampler features an Expert mode, which allows for dynamically controlled crossfades and sample switching.

MachFive offers six filter types, and each filter accepts real-time modulation of its frequency, resonance, and drive controls. MachFive provides up to four LFOs per preset.



Each multitimbral part can use its own set of four effects, which include reverb, tempo-synchronized delay, tremolo, chorus, bit reduction, and additional filters. All effects settings can be saved for later recall in any project or host program. Because of its support for various audio engines, a snapshot of a MachFive Performance in Digital Performer can be loaded, for example, into Cakewalk Sonar or Digidesign Pro Tools|HD, allowing a high degree of cross-platform collaboration.

MOTU bundles MachFive with UVI-Xtract, a sound-file-importing utility that lets you audition, convert, and load programs and samples from the major sampler formats. The program enables the computer to mount sampler-specific CD-ROMs on the desktop for easy conversion.

Mac users will need a PPC G3/266 MHz and 128 MB of RAM. Windows users will need a Pentium II/266 MHz and 128 MB of RAM. Mark of the Unicorn (MOTU); tel. (617) 576-2760; e-mail info@motu.com; Web www.motu.com.

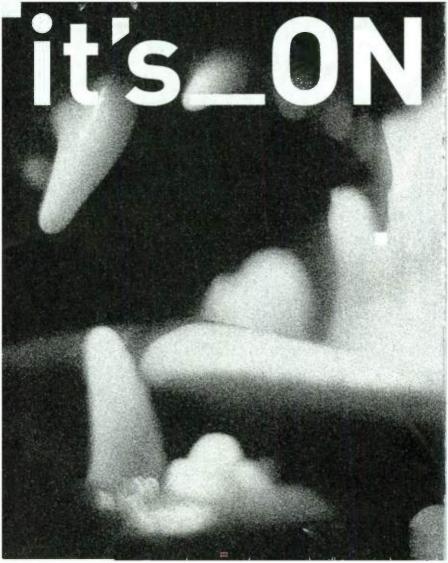
BAG END MG

Bag End's new close-field monitor, the M6 (\$596 each), sports a 6-inch highperformance coaxial driver and a 1inch soft-dome neodymium tweeter. The monitor boasts a frequency response of 60 Hz to 20 kHz, ±3 dB. Sensitivity is rated at 1W for 87 dB SPL at 1 meter. The manufacturer claims that the M6 produces a flat response in the time and frequency domain.

The M6 stands 14 inches tall and is 9 inches in width and depth. The speaker weighs in at 15 pounds. Bag End; tel. (847) 382-4550; e-mail info@bagend.com; Web www.bagend.com.







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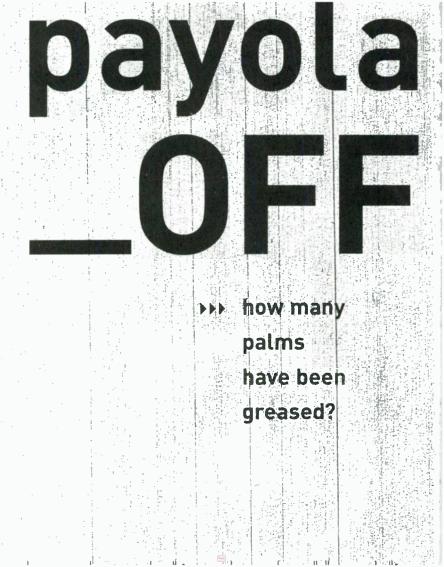
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1.1



how many times has music played second fiddle to corporate agenda? how many artists have been kept down because they didn't have the right look? how much music has gone unheard so that boy bands might be seen? when was the last time someone spun a song just because they believed in its ideas?

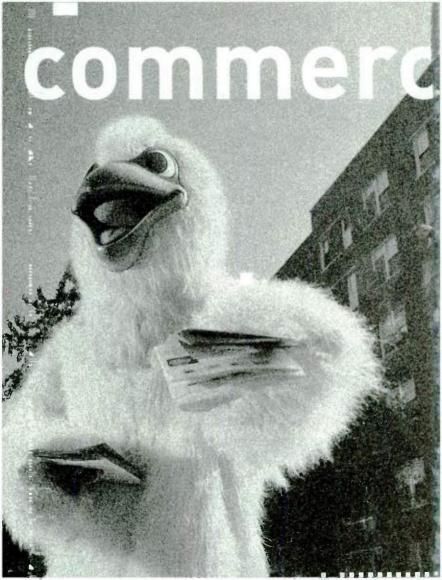
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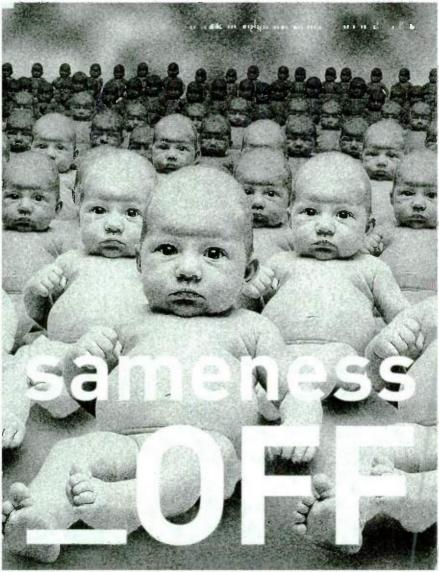
eyes aren't always windows to the soul. sometimes seductive images, allowing bright lights to pass for of an oxymoron, how could eyes have done this to us? we no longer equate seeing with believing, and we



they're glorified kaleidoscopes, misleading us with bright ideas, making "lip sync artist" a job title instead how do we stop them from doing it again? simple, put a little trust in our ears. faith, after all, is blind.



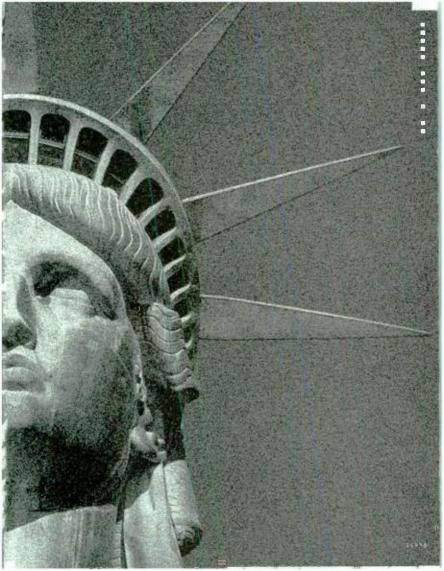
music shouldn't be brought to you by a double espresso in a can, or jeans that ride amazingly low. because with advertising come hidden agendas. corporate sponsors want music that appeals to their demographic. broadcasting companies want to keep the corporate sponsors happy and program directors just want to keep their. ĵobs. real music gets fed into this marketing meat grinder, and the next american idol comes out the other side.

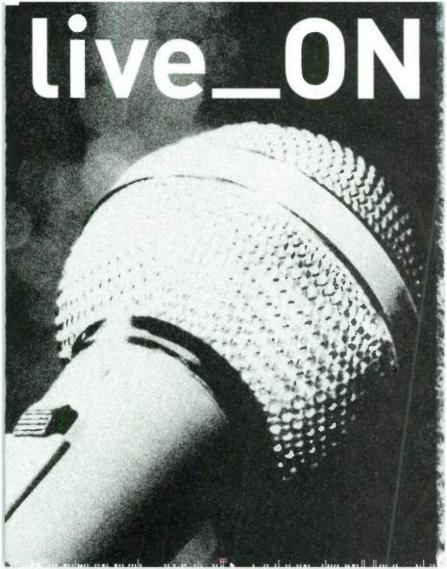


music is about change. the blues. rock. disco. metal. punk. new wave, hip-hop. dance. trance. house. garage. these names we give to change. and in music you either change or you get left behind. unfortunately the music sometimes gets hijacked and distorted for personal gain. there are times when the entire industry holds the music hostage by pumping out more and more commercially driven clones.

there are times when we wonder if the music will ever struggle free. the truth is this. In the end the music always wins. and those who stand in the way of music always lose. give us your censored, your edited, your outright banned. your pigeonholed, your unsightly. your unpromoted, your unsigned, your undiscovered. give us your struggling artists yearning to break through. send these to us. let them be heard.

expression





Ive music has an energy that can't be pressed into wax, burned into plastic or recorded on tape. it's soulful, spontaneous and totally unpredictable. attributes that might be considered liabilities in the corporate world. maybe that's why a trip around the radio dial would lead you to believe that live music is dead.

well stand clear, because we're about to shock the music world with our own brand of defibrillator paddles. think live nationwide feeds, live in-studio performances, and the recording and streaming of up-and-coming artists. witness the resurrection. music shouldn't fade out at state borders. a song shouldn't be repeated over and over and over until you can't take it anymore, lyrics shouldn't fall sitent because of a few words from some sponsor, the way music artists sound should mean more than the way they look, censorship is more profane than a few profanities.

a world without bounce, trance or ska is just as bad as a world without rock 'n roll.

sirius will deliver 100 streams of digital quality music, sports, news and entertainment to your car, 24/7, coast to coast. we will play music uncensored and unedited for content or time. every one of our 60 music streams will be 100% commercial free, we will play music no one else will. and we will have a good time. all the time. sirius will stream the music from outer space right into your 2003 dream car or whatever hunk o' junk you're rockin.



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love_ON

disk jockeys_OFF

stream designers_ON

satellites_ON

sugarcoating_OFF

commercial free music_ON

censorship_OFF

expression_ON

groove_ON

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KOSMOS PRO is an innovative requency energy and stereo image ancement system that produces lanet-rattling low end while adding rity and definition to any audio source. plications for this processor are ually limitless, from individual truments to live mixes to e-recorded audio.

The KOSMOS PRO features control options such as STRATOS, which adds clarity to the upper high register, and Barometric Shift, which tunes the include a Deeper switch for altering the THUD range and a Dynamics control for tailoring QUAKE for tight or loose response. Switchable Input/Output meters make matching levels simple and accurate.

The QUAKE sub-harmonic generator analyzes the source material's bass frequencies, then generates additional low frequencies an octave lower without muddying the sound. THUD provides an additional bass boost an octave higher than the original bass track to fill in intensifies the left-right stereo image to add improved separation, atmosphere and clarity.

To download and listen to before and after MP3 audio tracks using the KOSMOS PRO, go to www.peavey.com/kosmos and hang on.



Shop online at www.peavey.com or call toll free at 866.443.2333

FOCUSRITE ISA 428 PRE PACK

For an additional \$695, you can add an 8channel A/D converter that supports a 192 kHz sampling rate and word lengths at 16-, 20-, and 24-bit resolutions. You can connect a second ISA 428 as an analog expander to fully utilize the four extra channels of A/D input.

The ISA 428's input stage lets you choose one of four impedance settings, including that of the original ISA 110. This allows you to optimize the unit's performance with the particular microphone you're using. The ISA 428 provides insert



points, phantom power, a sweepable highpass filter, and a phase-reverse switch for each channel. You also get eight output meters and four moving-coil, peak-reading VU-type meters.

A Soft Limiter feature shields the A/D process from digital overloads and minimizes distortion artifacts. At 96 kHz, you can run up to 16 digital outputs (2×8 in a parallel array).

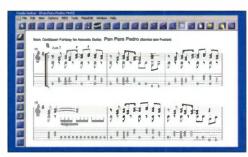
The unit offers AES/EBU, S/PDIF, and dual ADAT Lightpipe digital output, as well as BNC I/O for word clock. The AES/EBU and S/PDIF output jacks are on a pair of 9-pin, D-type connectors. (XLR or coaxial RCA digital connectors are available for \$50.)

Each channel's analog I/O features an XLR mic input, an unbalanced ¼-inch line input, and individual send and returns on unbalanced ¼-inch jacks. The unit includes four balanced XLR jacks for use when linking with a second ISA 428. Digidesign (distributor); tel. (800) 333-2137 or (650) 731-6300; e-mail sales@focusrite.com; Web www.focusrite.com.

MAKEMUSIC FINALE GUITAR

Finale Guitar (Mac/Win, \$99.99) offers features geared toward guitarists and other fretted-instrument players, and it maintains file compatibility with Finale 2003. The program supports notation for more than 50 different fretted-instrument types, as well as more-standard fare (choral, brass, percussion).

You can enter music in tablature form and automatically display notes on a traditional staff. Conversely, entries in standard notation can be displayed as tablature. The program supplies an extensive library of special symbols and shapes used with standard guitar notation and the supported instruments. A notable feature for MIDI guitarists is that the program can instantly display tablature from guitar controller input.



Makemusic claims that its improved music scanning technology provides a new level of optical music character recognition, allowing musicians to easily and quickly scan sheet music and turn it into a Finale file that is ready for editing, printing, or posting on

> the Internet. Finale Guitar can import and export Standard MIDI Files (SMF). An electronic rhyming dictionary, which enables songwriters to search all possible English rhymes for any lyric, is included.

> Finale Guitar for Windows requires a Pentium running Windows 98, 2000, ME, or XP and 64 MB of RAM. The Mac version will run on any PPC with Mac OS 8.6 and 64 MB of RAM.

Makemusic Inc.; tel. (800) 843-2066 or (952) 937-9611; e-mail finalesales@makemusic .com; Web www.makemusic.com.

🔻 EVENTIDE CLOCKWORKS LEGACY

Between the years 1971 and 1984, Eventide produced a number of classic hardware effects processors. Clockworks Legacy Plug-ins (Mac, \$695) bundles virtual versions of five of these revered devices for Digidesign's Pro Tools|HD and Pro Tools|24 Mix systems.



The plug-ins re-create the front-panel detail of the original devices and add MIDI control and automation in order to take advantage of Pro Tools' desktop production environment. You can use as many as six instances of a plug-in on a single TDM chip, depending on the plug-in used and the sampling rate.

The Omnipressor models the company's analog compressor, which was able to simultaneously provide compression above the threshold and expansion below that point. The device figured prominently in recordings by Queen guitarist Brian May.

The Instant Phaser provides a sweeping filter bank and two outputs that are 180 degrees out of phase with each other. Rounding out the package of five plugins are re-creations of Eventide's first Harmonizer, the H910; the H949, which combined delays and pitch-shifting; and the Instant Flanger.

Clockworks Legacy Plug-ins works with Pro Tools version 5.1 (Mac OS 9.2.2) and 6.0 (Mac OS X 10.2.2). Eventide; tel. (201) 641-1200; e-mail audio@eventide.com; Web www.eventide.com.

🔻 ALESIS ION

hree oscillators with continuously variable waveforms fuel the lon (\$999), an analog-modeling synthesizer from Alesis. The keyboard offers 49 Velocitysensitive keys, 8-note polyphony, four multitimbral parts, and 512 presets, all of which are rewritable. and you can use two filters per voice, configured in series, in parallel, or as a stereo pair.

Three 5-stage envelope generators (EGs) are available for every patch. The EGs can be used to loop segments, and the slope of each stage of the envelope is independently adjustable. The lon's



The lon's oscillators provide you with a variety of tools for extending the waveforms: triangle waves can morph into sawtooth waves, the pulse width of square waves is variable, and sine waves can be warped in order to add harmonic content. The lon's oscillators are further enhanced with FM and oscillator-sync capabilities.

The lon includes 24-bit A/D/A converters and can process external audio through the filters, effects, or the builtin 40-band vocoder. (The instrument's polyphony is not affected by use of the vocoder.) The lon provides 16 filter types, LFOs (two per patch) synchronize to MIDI Clock, as does the keyboard's programmable arpeggiator.

The lon's array of effects includes reverb, delay, chorus, flanger, phaser, distortion, fuzz, and com-

pression. A patch can use as many as four individual mono or stereo insert effects and a stereo master multi-effects algorithm.

The instrument's user interface includes 30 knobs, more than 70 buttons, a pitchbend wheel, two assignable modulation wheels, and a 160×160 graphic LCD. The lon provides a pair of balanced ¼-inch analog inputs, four balanced ¼-inch analog outputs, a ¼-inch stereo headphone jack, and ¼-inch jacks for an expression pedal and sustain pedal. Alesis; tel. (401) 295-9000; e-mail info@alesis.com; Web www.alesis.com.

▼ BLUE MICROPHONES THE BALL

ynamic mics usually derive their output voltage through induction. The Ball (\$279), from Blue Microphones, is a softball-shaped dynamic mic that draws 48V phantom power to provide the acoustic balance, phase coherence, and low noise of a large-diaphragm condenser mic while improving overall output. Phantom power helps the mic produce a constant 50 Ω load for a smooth, non-frequency-dependent response.

The Ball has a cardioid polar pattern and can withstand up to 146 dB SPL without distortion. Blue states the mic's frequency response as 35 Hz to 16 kHz, with a sensitivity of 3.5 mV/Pa at 1 kHz. The stand mount is built into the mic, eliminating the need for a separate mic clip. Blue Microphones; tel. (805) 370-1599; e-mail blue@bluemic.com; Web www.bluemic.com.



NATIVE INSTRUMENTS VOKATOR

Vokator (Mac/Win, \$299) outstrips the typical vocoder with a total of 1,024 frequency bands. The result, according to Native Instruments, is a smoother, more Intelligible vocoder effect. You can also group Vokator's frequency bands together to emulate vintage vocoders that offered fewer bands. Other Vokator features include a built-in dual-oscillator synthesizer and a granular-synthesis sampler.

A pair of vocoding channels can play independently, or you can combine them to generate complex spectra. Channel A can play back an audio file or accept external audio. Channel B can provide an external input or serve as a granular synthesizer and sampler with time-compression capabilities. The inputs can both serve as carrier or modulator. A special Mix mode lets both inputs act as simultaneous carriers and modulators, producing an output that mixes two processed signals with the original signal.

The synthesizer can morph between presets; Modulation messages (CC01) control the transition in real time. Other modulation



features include four LFOs, two envelope followers, voiced and unvoiced detectors, and step sequencers. You also get a built-in arpeggiator for the synth section.

Vokator can stream large audio files from disk, and the built-in file player offers MIDI controls for looping and other processes. The granular sampler lets you modulate start times, loop parameters, pitch, and speed.

Vokator is compatible with VST 2.0, MAS, Audio Units, DXi2, ASIO, Sound Manager, Core Audio, DirectSound, and OMS. You can run the program with a Mac G3/500 MHz, Mac OS 9.2 or OS X 10.2, and 128 MB of RAM. For Windows, you need a Pentium/800 MHz (or equivalent); Windows 98, 2000, ME, or XP; and 128 MB of RAM. Native Instruments U.S.A.; tel. (866) 556-6487; e-mail info@native-instruments.com; Web www.native-instruments.com.

Fuzzy MIDI

A new proposal

brings an

uproar to the

NAMM show.

his year's Winter NAMM marked the 20th anniversary of MIDI, which was first demonstrated at the 1983 show when a Roland JX-3P and Sequential Circuits Prophet 600 were connected with a MIDI cable and played as one instrument. Since then, many new features and capabilities have been added to the MIDI Specification, such as MIDI Time Code and MIDI Machine Control, clearly demonstrating the expandability and robust nature of this now-ubiquitous interface.

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TRCH PAGE

During the show each January, the MIDI Manufacturers Association (MMA) meets to consider proposals for new Control Change, Universal System Exclusive, and other messages. This year, there was one proposal that particularly caught my attention. It was submitted by General Mai Dai, a former officer in the Vietnamese army and now president of a music-technology and military think tank called M1D1 ("Music First, Defense also First"). He called his proposal Fuzzy MIDI.

General Dai started by explaining the concepts of fuzzy logic and neural networks, on which his proposal is based. The basic premise is to transcend the 1/0, yes/no left-brain binary orientation of conventional computing and instead process information in a parallel right-brain manner, using variables with many possible values. In addition, several variables can be considered simultaneously, each weight-

Dai's proposal applies these concepts to MIDI, with many new messages. For example, a new Control Change message called Note Percent would indicate the percentage by which the note is on or off. As a key is played on a keyboard, its entire movement from the Off point to the On point is tracked and used to control any number of parameters. In addition, the proposal defines a new System Real Time message: Rubato. This message will allow fuzzy sequencers of the future to follow your lead as you play with

ed differently to affect the outcome of the operation.

pin 1 pin 3 analog analog MIDI MIDI pin 4 nin 5 digital MIDI digital MIDI pin 2 ground

FIG. 1: MIDI cables have two unused conductors, both of which General Mai Dai proposes to use for analog representations of MIDI messages.

widely varying (or entirely absent) tempos.

By Scott Wilkinson

You could argue that MIDI is already a bit fuzzy. Most of the variables in MIDI can take 1 of 128 different values, and some many more than that, in order to simulate analog continuity. But it doesn't always work very well, and most variables are limited to 7-bit resolution. In response to this, Dai's proposal suggests that an analog control-voltage representation of MIDI messages be created for true fuzziness. This provides infinite reso-

lution, and it can even be transmitted on the two unused wires in a standard MIDI cable (see Fig. 1).

Also included in the proposal are the preliminary design specs of a fuzzy MIDI-mapping device in which several variables are considered before the mapping is established. For example, you could program it to accept Mod Wheel, Aftertouch, and Note Percent messages and define the relative strength of their effect on a mapping to Pitch Bend, Breath Controller, and Volume, Such a device has obvious applications in algorithmic composition as well as live performance and recording.

Interestingly, the furor that followed Dai's presentation was phenomenal. There were many fuzzy thinkers in the group who defended the proposal at the top of their lungs, while those opposed to the idea accused its supporters of being neurotic about neural networks.

The ruckus was still raging as I stole away and returned to

my room at the Weisenheimer Inn, where I could peruse the proposal without having to avoid flying bran muffins and juice pitchers. Later, General Mai Dai stopped by, so we went to the bar and talked into the wee hours over more than one mai tai. By morning, my head was a little fuzzy, but I was convinced that his proposal was worth pursuing, and I look forward to seeing it implemented in every MIDI device made from now on. @

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Closing the Loop



Groovin' easy, the loop-slice way. oop-slicing tools such as Ableton Live, Propellerhead ReCycle, and Sonic Foundry Acid have taken the electronic-music world by storm. By making it possible for musicians to freely mix and match nearly any repeating rhythmic or melodic passage, loop slicers have changed the way many music professionals work. Offering a simple building-

block approach to audio layering, these programs

have also made it possible for countless first-timers to get involved with music production.

In this article, I'll take a close look at these three tools and give some loop-slicing pointers that will apply to other programs as well. You'll find helpful information for acquiring, tweaking, and combining loops of all shapes and sizes.

PAST TENSE

Before the release of ReCycle and other loop-slicing software in the mid-1990s, matching loops that had different tempos was tremendously time-consuming. Editing and time-aligning individual drum hits, for example, was a slow, painstaking process, even with the most advanced digital audio workstations.

> ReCycle was the first program to address that problem and popularize the

idea of loop slicing. ReCycle uses transient detection to determine where peaks in an audio file are located. The program looks at amplitude envelopes and seeks out the sudden volume changes that indicate the *attack*, or beginning, of a drum hit or other note. It then places flags or markers at the beginning of each attack to indicate where the slices are to be made (see Fig. 1).



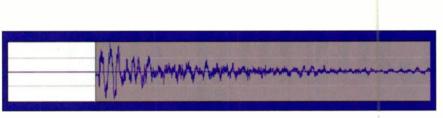


FIG. 2: A good edit typically begins immediately before (to the left of) the note's attack portion. The selection area is highlighted in gray.

ReCycle can export each slice as a separate file for playback from any hardware or software sampler. It can also save the slices as a new continuous file at any tempo for layering within an audio sequencer or other audio software.

Sonic Foundry took the ReCycle metaphor to the multitrack level with Acid. Acid was the first audio software to offer both slicing and layering within the same program. The mass-market success of Acid allowed Sonic Foundry to go public and spawned a host of imitators. Ableton Live is another contender and is the best of the post-Acid loop-slicing programs. It's also the only one that works on the Mac as well as Windows.

Later in this article I'll focus on techniques that help make the most of Re-Cycle, Live, and Acid. But first let's consider some ideas that are applicable to any loop-slicing tool.

FINDING SOURCE MATERIAL

In loop sequencing, the process of selection is a central locus of the art. Selection and juxtaposition are everything—all the rest is just craft.

Possible audio sources include the entire universe of sound and everything that vibrates, though you can divide the options into a few practical

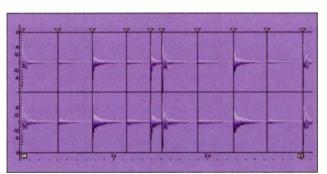


FIG. 1: This sliced loop, as seen in Propellerhead's ReCycle, is an example of the one-note, one-slice rule of thumb.

categories: provided elements, sound libraries, new original recordings, and appropriated elements.

Provided elements. "Provided" elements exist when doing an authorized remix. In such a case, the artist or label will provide you with audio files or tracks on tape. The remixer decides what portions to use. Some producers take an extreme approach, using just the vocals and casting them in an entirely new musical setting.

For the greatest ease in layering and the greatest flexibility when mixing down, use isolated instruments and vocals whenever possible. For example, loops that contain both bass and drums or both vocals and instruments are always harder to match and more problematic to mix down than cleanly separated parts.

If, as is often the case, no audio has been provided, look to the other three categories.

Sound libraries. Prerecorded loops, instrument samples, and effects sounds can be bought as part of a sample library. There are two common types of sample library: audio CD and CD-ROM.

Audio-CD sound libraries can be used with any software or sampler, but the tracks will have to be ripped from the CD and saved, typically as WAV or AIFF

files. It will probably also be necessary to edit the loops, because most audioformat libraries put several loops within each track.

CD-ROM sound libraries can spare you some editing; files can just be copied to hard disk. CD-ROM sound libraries are available in a number of formats, including proprietary hardware sample formats. Computerbased musicians who don't use hardware samplers will generally want to stick to the WAV or AIFF collections.

Responding to the popularity of loop sequencing, some firms offer presliced libraries. Sonic Foundry has become a preeminent vendor of canned loops, providing a large line of sound files that are optimized for use in Acid and other programs that support the format (such as Cakewalk Sonar).

Some sound developers have moved to online fulfillment; loops can be previewed, downloaded, and purchased directly from the Web on an as-needed basis at sites such as Sonomic (www .sonomic.com), PowerFX (www.powerfx .com), and EastWest Sounds Online (www.soundsonline.com).

Before purchasing samples online or buying a library on CD, be certain the audio is in a file format that is compatible with your computer and software, and make sure you understand the licensing terms (see the sidebar "Buyout or Per Use?").

One downside of using such sounds is that hundreds of other producers may have also bought the same sample libraries. If you care about originality, try to do something with the loop to make it your own. Possible tactics include using signal processing, chopping and rearranging the loop, and replacing sounds with new instruments.

New original recordings. A loop recording session with a live drummer or rhythm section can be wildly fun and rewarding. It's the best way to get all-original loops that are exclusively your own.

Here are some simple rules to ensure optimal results:

Have the drummer play to a click track or metronome so timing is steady.

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Do not apply any signal processing (such as delay or reverb). Tracking "dry" gives you more choices later.

If you are recording a rhythm section or full band, put each instrument on a separate track. Once you combine them, it's very difficult to "unmix" them.

Try to put each drum on a separate track when recording drum kits.

Slate your loops. Have the engineer or drummer speak into a mic at the beginning of each take. Be sure that the tempo in the slate is mentioned; for example, "This is rock pattern number 1, 100 bpm, take 2."

Jot notes on paper about every take, including the tempo, the start and end times, and any other words of description. Paper notes and audible slates make it easier to locate and edit loops after the session.

Leave time at the end of the recording session for transfers. *Transferring* means converting the audio from one recording medium to another; for example, from 2-inch analog tape to files on hard disk or CD.

Be sure that the transfer is in a format that can be used easily with your setup. Most studios today have CD burners; I always ask for an ISO 9660 (PC-format) CD-ROM of WAV or AIFF files. Such a disc will be compatible with Windows and Macintosh computers.

Appropriated elements. The word sample has come to be synonymous with the reuse of excerpts from other recordings. Appropriating elements from previous works and recasting them in a new work is a timeless artistic and literary strategy, practiced by luminaries such as William Shakespeare, Andy Warhol, and others. That legacy has nothing to do with the music business, which is a highly competitive and litigious arena.

The growing popularity of sampling gave rise to a new music-industry en-

deavor called sample clearance. To obtain sample clearance means to secure permission to reuse an excerpt of a recording. Although any kind of deal is possible, licensing samples can be expensive. I've heard of extreme cases in which sample owners insisted on taking majority ownership of a new composition.

Nonetheless, if a recording is to be released commercially, the samples should be cleared first. Settling a sample clearance after a song has become a hit can be far more problematic and expensive than getting permission in advance.

LOOP-EDITING TIPS

Once you've selected audio source material, you'll need to edit the sound files into usable loops. That is best done using professional sound-editing software such as BIAS Peak (Mac) or Sonic Foundry Sound Forge (Win).

Loop files that are edited correctly can be imported or previewed instantly by Acid and Live, which helps speed things along when selecting audio in those programs. Here are some things to bear in mind when editing loops:

• Cut on the "1," at the beginning of the first beat in the measure or bar. I always try to cut immediately before the first cycle of the attack (see Fig. 2).

• Don't cut into the transient! Edit immediately before the attack begins, or else you'll lose some of the instrument's character.

• Listen to the loop. Most audioediting programs have a "loop play" or "audition" feature that plays any selection repeatedly.

• If the loop sounds anything less than slamming, check the start and end points.

If the above four tips don't help, and things still sound weak or disjointed, try a different loop. Bands and drummers often make timing errors, so not every recording is loopable.

• Loop start and end points should always fall on *zero crossings*. Zero crossings are points at which the waveform is at 0 dB, represented as the line in the middle of a waveform display.

• As an extra precaution, meticulous

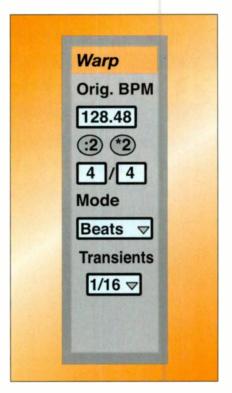


FIG. 3: In Ableton Live, click on the Transients pull-down menu from the Warp dialog to adjust the default slice grid value. (This menu was labeled Transient Res in Live 1.x.)

producers such as Mark Pistel (Consolidated, Meat Beat Manifesto) always perform a tiny fade-in at the beginning of a loop and a tiny fade-out **at** the end to force the waveform to zero. That is done while zoomed way in; the fade can occur over a single wave cycle.

• Make note of the loop's tempo and the number of measures in the loop file name when saving or renaming the file. I like names such as "rockbeat 1 – 110bpm – 4x.WAV" and "reggaepattern2_90bpm_2meas.AIFF." Loop sequencers will frequently miscalculate the tempo and length of a file if the file is more than one measure long. Having the vital statistics front and center in the file name can save time and prevent confusion when layering loops.

SLICED AUDIO FORMATS

Sonic Foundry's Acidized audio file format and Propellerhead's REX and REX2 formats combine loop audio with the loop tempo and slice-point coordinates. Acid and ReCycle can save loops in these proprietary formats, and

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you'll find a sizable selection of such loops in sound libraries ready to use.

However, the pressing need for presliced audio libraries has diminished as loop sequencers have evolved. Any WAV file can be imported into Acid and, if correctly edited, will be sliced and time-aligned instantly. Acid can also autopreview loops and play them from the Explorer display at a project's tempo prior to importing. Live's comparable feature, Pre-Listening, plays WAV and AIFF files from the Browser panel also in time with the current session.

To recap, both Acid and Live can use practically any loop without special conversion into a proprietary format. And you don't have to export or save loops in a sliced format if you're only using the loops in a single composition.

The benefit of having preformatted loops comes into play when using a nonslicing sequencer or software sampler.

Track Properties									
2 🖉 Drum Loop									
General Stretch									
Root note: Don't transpose									
Number of beats: 8									
Stretching method:									
Looping segments									
Eorce divisions at: Sisteenth notes									
Additional transient detection (%):									

FIG. 4: Sonic Foundry's Acid uses a combination of grid-value and transient-detection methods. You can change the default detection sensitivity by using the Additional Transient Detection field (highlighted).



FIG. 5: Ableton Live's Warp markers appear as yellow or gold flags in version 2; they were colored green in the 1.x versions.

Emagic's Logic, Steinberg's Cubase VST and Cubase SX, MOTU's Digital Performer, and Propellerhead's Reason support the ReCycle REX2 format, as do the Steinberg HALion and Emagic EXS-24 software samplers. These programs will import any file that has been sliced in ReCycle and will handle the slices as a single track or file, allowing free adjustment of the tempo.

ONTHE GRID

Your loop-slicing goal should be to have one note per slice. Slices containing two or more notes (or drum hits) will not time-align correctly, and notes that have been broken into two or more slices won't sound right.

The grid-slicing features of Live and Acid set slice points at predetermined intervals by applying a note-value grid. That is in contrast to the transientdetection method used by ReCycle, discussed later in this article.

In the lower part of the Live display is the Clip view, in which you'll find the Warp settings. One of the Warp settings is a confusingly labeled pull-down menu called Transients (see Fig. 3). That menu is used to set the Transient Resolution (or "Transient Res" in Live 1.x), which applies a grid to the loop. A 1/16 Transient value slices the loop at every 16th note. That default value works fairly well with many typical pop, rock, and dance drum tracks.

The Acid grid setting, named Force Divisions At, is found in the Track Properties display inside the Stretch tab. Force Divisions At also defaults to a 16th-note grid value; it's a fine starting point and can be adjusted using the pull-down menu.

Sixteenth notes may be too small a grid for pitched-instrument loops. Notes held longer than a 16th note will get split up, which can cause audible noise. If slicing makes a loop sound distorted or grainy, try increasing the grid value to eighth or quarter notes.

Conversely, 16th-note grids might be too big for busy loops. If time-shifting causes tempo variances within a loop, try a 32nd-note grid value.

In summary, the default 16th-note grid usually works well for dance-genre drum tracks. Finer grids such as 32nd notes may work better on frenzied percussion parts; larger grids are often needed for pitched melodic parts. Be sure to check the waveform display, look at where slice points are placed, and listen carefully when slicing and time-shifting.

TOO SENSITIVE

As mentioned earlier, transients are sudden increases in the volume of a waveform that normally happen during the attack or beginning of a drum hit or note. Transient-detection algorithms analyze the waveform and try to find any sudden digressions that might signal an attack.

Drum hits usually have pronounced transients caused by the drumstick displacing the drumhead or cymbal. As a result, accurate transient detection is quite feasible with drum loops. Sustained-pitched musical phrases

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such as bass, keyboard, or guitar parts can be more difficult to transient detect; legato passages might have few or no detectable transients.

Transient-detection sensitivity can be adjusted in some products. Sensitivity is a "threshold" value—only those volume changes that exceed specified decibel or displacement levels will be flagged as transients.

Sensitivity is a major feature in Re-Cycle and is easy to use. Click-and-drag on the Sensitivity slider, and slice markers will appear (or disappear) in the waveform overview.

To find the sensitivity setting in Acid, double-click on any clip to open the Track Properties display. Then click on the Stretch tab, in which you'll find the Additional Transient Detection numeric-value field (see Fig. 4). Acid uses a default value of 10 percent sensitivity, but the setting is user-adjustable from 0 to 100 percent.

Because all loops are different, there is no magic setting that will work in every instance. Again, the goal is to have one note per slice and one slice per note. Watch the waveform overview as you boost or cut sensitivity, and you'll be able to get to the optimal number of slices quickly.

SLICES YOUR WAY

As good as these software products are, they still can't do all the work for you. After adjusting grid and sensitivity values, you may still have to add or remove some slices by hand to obtain the one-note, one-slice goal.

In ReCycle, simply click on the Pencil button, which activates the Pen tool. Clicking the Pen tool in the waveform display will create a new slice marker. Markers can be moved to any location within the loop by clicking and dragging on the triangular flag at their top.

In Acid, users will again open the Track Properties display and go into the Stretch tab. Then click with the right mouse button in the waveform display. Selecting Insert Marker from the resulting contextual menu will make a new slice point in the file. Markers can be moved to new positions by clicking and dragging on the brown flag at the top of each marker.

Live uses the concept of Grid markers and Warp markers, which may be slightly counterintuitive for people accustomed to the ReCycle model. Grid

BUYOUT OR PER USE?

Sound libraries are marketed under two different licensing models: buyout and per-use.

Per-use or "needle-drop" sound libraries require payment of a license fee or "royalty" for each use of a recording. Each subsequent usage increases the cost of a per-use library. Depending on the library and usage, this fee may be cheap or expensive. Better-organized per-use libraries include forms for notifying the licensor and remitting the appropriate fees.

Buyout sound libraries take the opposite approach and have be-

come the more common model. A one-time up-front license fee is included in the purchase price of the library. Sounds purchased can then be used in practically any production, with no additional fees or paperwork. Some sound developers use the phrase "royalty free" when advertising their samples. "Royalty free" is just marketingspeak for "buyout."

Buyout libraries may be more costly to acquire initially than per-use libraries. But over the course of time and usage, a buyout library may actually be less expensive and more convenient. markers represent Live's tempo map superimposed over the loop or file. You can assign a grid position to any point within an audio file. Double-clicking on any marker number will turn it into a Warp marker; click-and-drag on Warp markers to move them to any point in the file or loop (see Fig. 5).

When working with Warp markers, begin with the first beat in the loop, and then proceed from left to right. Any markers located to the right of the currently selected Warp marker will shift as the current Warp marker is moved.

Live Warp and Grid markers really come into play with files that contain tempo changes or unsteady playing. You can use Warp markers to fine-tune the groove or to completely disrupt the time flow. Ableton founder and CEO Gerhard Behles says Warp markers were designed to align song-length audio files to the session beat but are often used for other purposes, "like moving beats back and forth in time, by milliseconds or note intervals. We have been surprised by how frequently this method is used," says Behles.

PICK YOUR FLAVOR

Acid and Live (version 2) both can optimize the slicing process according to the type of audio. That can have a tremendous impact on the sound quality of the sliced loop.

In Acid, go into the Stretch tab in the Track Properties display:

• Click on the Stretching Method pull-down menu to select the type of audio you'll be working with.

• Select Looping Segments when slicing drum tracks or other nonsustaining audio.

• Choose Nonlooping Segments for sustained phrases, including synth "pads."

• Use Pitch Shift Segments to decrease artifacts or distortion that can be caused by pitch-shifting or extreme tempo changes.

In Live 2, check out the Mode menu, which you will find in the Warp section of the Clip view:

• The Beats setting is the default and is best for drum or percussion loops.

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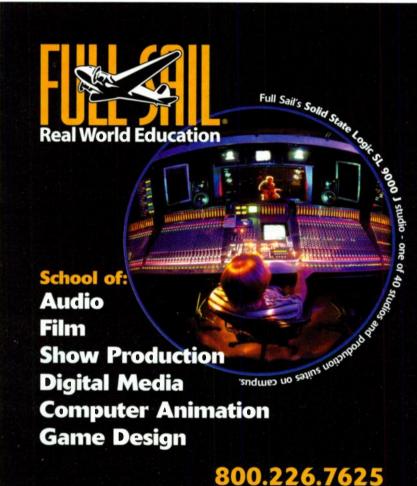
• The Tones setting is for bass lines, singing, and other monophonic melodies.

• The Texture setting works well on

polyphonic orchestral or band recordings in addition to pads and noisy textures.

• The Re-Pitch mode stretches both time and pitch, much like changing the speed on a turntable or tape deck.

• Live Tones and Texture modes have a Grain size setting instead of the Transient parameter. Grain is a type of resolution control, and it determines the size of the data-stream window that is to be processed. Ableton recommends



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©2001 Full Sail, Inc. All rights reserved. The terms "Full Sail," "Full Sail Real World Education," and the Full Sail logo are either registered service marks or service marks of Full Sail, Inc. using a smaller Grain setting on monophonic pitched passages and a larger window on complex polyphonic passages; the default values make good starting points. The Texture mode also includes a Flux value that adds a bit of randomization to the result; modest amounts can be beneficial when stretching complex passages.

As Ableton's Behles says, "By choosing the right stretching methods and setting the respective parameters, you will get very good quality even for heavy stretch factors."

CLOSING THE LOOP

To recap, remember to avoid placing slice markers or edits inside the body of a note, and always cut immediately before the attack.

In loop sequencing, the process of selection is a central locus of the art.

For pitched, melodic loops, use larger grid settings such as eighth or quarter notes. Make sure that you know how to adjust transient-detection sensitivity and how to add, move, or remove slices by hand.

Acquaint yourself with advanced controls such as Acid's Stretching Methods and Live's Warp modes. Use these optimization features anytime you're slicing a pitched or melodic part.

Start using these simple techniques and you'll be well on your way to having great-sounding sliced loops.

Todd Souvignier is the author of The Musician's Guide to the Internet, 2nd ed. (Hal Leonard, 2002), and the forthcoming Loops & Grooves: The Musician's Guide to Groove Machines and Loop Sequencers (Hal Leonard, 2003). Visit Todd online at http://souvignier.net.

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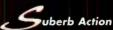
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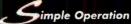
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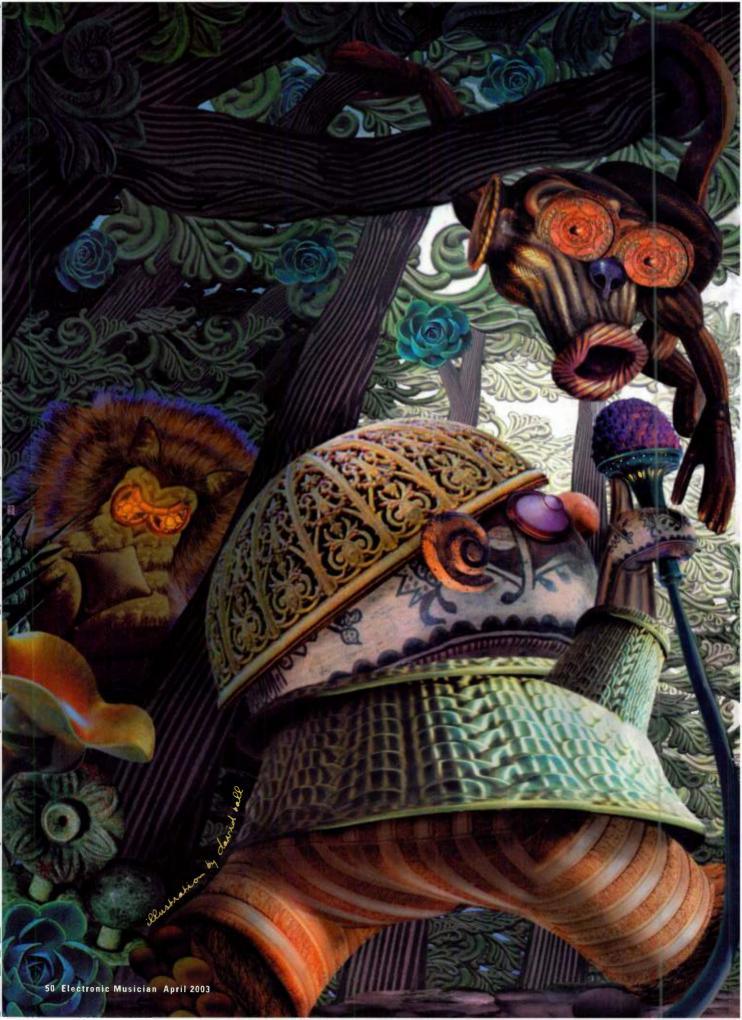
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experiencing the wonders of nature through mics and headphomes.

*Ever heard a tree singing?" asks noted composer and bioacoustician Bernie Krause. "It's 70 kHz," he adds as he reaches for a CD-R in his spartan Northern California studio (see Fig. 1).

ØING

The CD that accompanied Krause's recent book, *Wild Soundscapes* (reviewed in the December 2002 issue), included singing ants, aquatic insect larvae, and the hair-raising growl of an Amazonian jaguar. The singing sand dunes and the calving glaciers mentioned in the text didn't make the CD, so they were first on my request list as our interview wound down. Nonetheless, I was not prepared to hear the sounds of a tree. "We were listening for the sounds of bats," Krause continued, "which are up in the 47-plus kHz range. And we heard a steady signal, very unbiological in the sense of it being from a creature. As we moved closer to this cottonwood tree, the signal level increased. We drilled a little hole in **GUIDES** the tree and put this hydrophone in. We had an instrumentation device with us that could record a frequency that high, and we got a signal coming from the trunk of the tree. We couldn't figure out what

it was. Then we slowed it down by a factor of seven, to get it down within our hearing range." As we listened to the tree's music, I was startled by the regularity of its pulse and the subtle rhythmic accents. It was as if we were hearing a recording of a virtuosic percussionist playing woodblocks.

"What we discovered was that during a drought, the cells in the xylem of the tree usually maintain a certain pressure from the water that comes into the trunk of a tree during normally wet seasons," Krause explained. "When that pressure drops during a drought, the cells automatically fill with air, to try to maintain the osmotic pressure. And when they get too dry and they're pumping in air, they pop. When they pop, they die, and the dead cells form the tree's rings. So, when they pop, they make a noise: we can't hear it, but insects can. And when insects hear multiple cells popping, they're drawn to the tree because certain ones are programmed to expect sap. And when the insects are drawn to the tree, the birds are drawn to the tree to eat. It's all a microhabitat

formed by sound."



Krause points out that the world around us holds many surprises, if we would only listen. A microphone, like a microscope or a pair of binoculars, provides a way to experience the subtleties of nature that our unaided sensorial faculties might not fully grasp. This article looks at the working methods and technology used by a number of people who record nature sounds.

TRY THIS AT HOME

"People like me are afraid of technology," Krause says, "particularly when it comes to recorders. They have no problem using video or digital cameras. We're a visual culture: people develop an affinity to anything visual really quickly. But put a recorder in their hand, and they cannot figure out how to push the record and play buttons at the same time."

To counter this, in *Wild Soundscapes*, Krause introduces the reader to a simple, inexpensive listening system: the Radio Shack Stereo Amplified Listener, which lists for approximately \$35, and a pair of inexpensive headphones. This system allows even the most technophobic person to experience the natural world in a new way.

The next step is to put a recorder into the system so that you can document what you hear. The list of essentials for any kind of remote recording is fairly short: an audio recorder, a microphone, cables, blank tapes or discs, headphones, and power. Optional items—which many experienced recordists would deem essential—include a windscreen for each mic and protective cases for everything.

If there's one benefit to the continued miniaturization of recording technology, it's that a quality recording rig can be easily carried almost anywhere. But unlike the sound-effects location recordist, who often needs merely a few seconds or minutes of audio material, the nature recordist works to capture sounds in the long form: those gradually unfolding movements of Mother Nature's symphonies that can only be experienced through patient and attentive listening. Many of these sounds are quiet enough to quickly reveal the flaws of a recording system.

Sound designer Rudy Trubitt notes

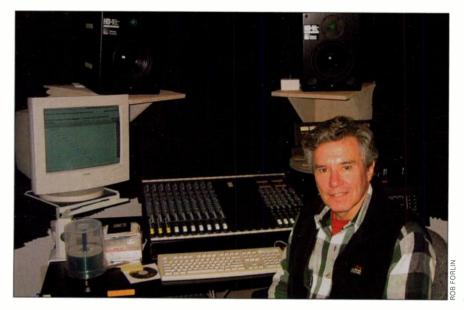


FIG. 1: Bernie Krause, seated in the sweet spot of his personal studio. He edits his tracks in the digital domain, but prefers the analog domain for processing.



FIG. 2: Krause's main recording rig is very portable. Seen here are his Sony PCM-MI DAT recorder, Sound Devices preamp, and gel cell battery, which can run 18 hours on one charge.

that the conditions and desired result determine the gear he takes into the field. "It may be advantageous to have a portable or invisible rig. You'll need to ask yourself how much mobility is required and what the power considerations are. For example, what's the smallest rig you can have for hiking when you need lots of batteries?"

The three essential elements of Krause's recording setup are a Sony PCM-M1 DAT recorder, a Sound Devices preamp, and a battery pack (see Fig. 2). Even when you add mics, windscreens, cables, a tripod, and a case, the load is light enough for backpacking (see Fig. 3).

BIOPHONY AND GEOPHONY

In Wild Soundscapes, Krause stresses the importance of capturing the biophony the collective sounds expressed by an entire habitat of creatures—when recording in what he terms the wild natural. A related term, geophony, refers to the soundscape of nonliving phenomena, such as water, wind, and geologic sounds.

"Natural sound libraries usually focus on individual creatures, which, to me, expresses a kind of 19th-century science: abstracting things from their context. The context tells a lot more about why these creatures vocalize, their vocal mechanisms, and how they learned to vocalize in the first place.

"We tend to deconstruct the natural world around us. When we just take a



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robin or a sparrow out of context, it's like taking just the strings or the horn lines out of a Beethoven symphony. You can listen to it, but you only get a partial sense of the whole."

THE INCREDIBLE SHRINKING RECORDER

The first time Krause recorded in the great outdoors was in the late '60s with his partner, Paul Beaver. "Our first record for Warner Brothers was called In a Wild Sanctuary. The mandate from Warner Brothers was to go out and try to find a way to connect sounds of the natural world to the sounds of a synthesizer and to do an album on the subject of ecology. It came about at a very propitious time because Nagra had just come out with their new portable stereo recorder, which allowed us to go out into the field and record in ways that we couldn't have done before. Also, new mic technology allowed us to record in the field without a lot of humidity and wind problems, although the mics were very sensitive. They had a wonderful dynamic range. This explosion of technology increased our capabilities to levels never before imagined."

Into the '80s, Krause's favorite setup-a rugged, nearly indestructible Nagra IV-S 2-track reel-to-reel recorder, mics, tapes, batteries, and accessoriesweighed a hefty 45 pounds. Carrying around such a weighty kit is almost unthinkable today. Besides taking size and weight into account when you choose your field recorder, it's also important to consider the equipment's ability to survive in extreme conditions. Can the recorder be used at an angle and while moving? Will it work while being jostled?

Since the late '80s, portable DAT recorders have been a popular format for field recording, replacing heavier reel-to-reel units and portable analog cassette machines, such as the Sony TCD5. The popular DAT recorders for field recording include the Sony PCM-MI, TCD-D7, TCD-D8, and TCD-D100 and the larger Tascam DA-P1 and HHB PDR1000.

More recently, the tapeless MiniDisc (MD) recorders have gained popularity, as much for their size as for their reliability. That robust optical-storage format is shock resistant and handles heat and dirt fairly well. However, some recordists are wary about Adaptive Trans-

form Acoustic Coding (ATRAC), MD's data compression scheme. "Some people are scared of ATRAC, but they really shouldn't be," says Trubitt. "MiniDisc recorders are small, inexpensive, and you can carry a spare. By comparison, DAT machines aren't so cheap that you'd want to carry two on your body."

"The favored MD recorders are the relatively inexpensive Walkman-style ones," says recordist and frog enthusiast Walter Knapp.



FIG. 4: The HHB Portadisc MDP500 is pro-level MD recorder with balanced XLR inputs, unbalanced RCA outputs, and digital S/PDIF I/O. It can be powered by AC or by AA or rechargeable NiMH batteries.

"But do your research carefully, because not all models are suitable for field recording." In the MD field, popular models include the Sony MZ-R30, MZ-R50, MZ-R55, MZ-R700, and MZ-N505; the Sharp 722, MD-DR7, and MD-MT180; the Marantz PMD650; and the HHB Portadisc MDP500 (see Fig. 4). An interesting feature of the Portadisc and the MD-DR7 is a prerecord memory buffer—they store 6 seconds and 5 seconds, respectively—which allows you to capture sounds that occur before Record is fully engaged.

On the PCMCIA front, the Marantz Professional PMD690 shows promise because it has balanced XLR inputs, coaxial S/PDIF outputs, and records in MP2, WAV, and Broadcast WAV formats. At the high end is the Nagra V 24-bit hard-disk recorder, which records in the Broadcast WAV-file format.

Core Sound (www.core-sound.com) has just announced a series of products that form an inexpensive high-resolution system that may be the answer for recordists looking to replace their DAT and MD recorders. The PDAudio-CF is a Compact Flash S/PDIF interface, with optical and coaxial inputs, that supports 24-bit, 192 kHz recording and can be mounted in PDA hosts (such as the HP/Compaq iPAQ) that run Windows CE/Pocket PC 2002 or Linux or used with laptop and desktop computers running Linux or Windows 2000 or XP. The PDAudio-CF will be priced under \$300.



FIG. 3: Although Krause's entire recording rig (including a tripod and 10 meters of coaxial cable) fits into a backpack, it allows him to record for weeks at a time. His pair of Sennheiser microphones is inside the Rycote zeppelin.



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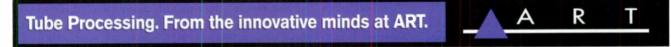
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Core Sound also offers recording applications, which include metering and WAV-file compatibility, for these PDA platforms. For the front end, Core Sound offers the portable Mic2496, a pro-level battery-powered mic preamp and 24-bit A/D converter. The dual-channel Mic2496 offers 48V phantom power, ganged level controls, a low-battery light, clipping indicators for each channel, and four selectable sampling rates (44.1 to 96 kHz). The company also has its own line of binaural microphones that complement the system.

This is by no means an exhaustive list of potential field recorders. In fact, some of the recorders mentioned above are out of production and are only available secondhand. But because of their features and price, even an older model is worth hunting down if it fits your budget and needs.

USING MICS OUTDOORS

Just as they do in the studio, the mics you use outdoors will shape the sounds you record. Field recordists agree that omnidirectional mics are better in windy situations than directional mics. Otherwise, mic choices are based on a combination of personal preference, job requirements, budget, and field conditions.

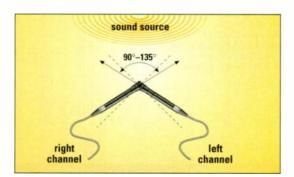


FIG. 5: With an XY pair, amplitude alone accounts for spatial positioning in the stereo field, because no time differences occur between pickup by the two capsules. Typically, the angle between the capsules is 90 to 135 degrees.

For nature recordist Douglas Quin, the choice of gear is determined, in part, as a response to the situation. "I tend to decide on what mics to use when I get a feel for a place and the sounds that I hear. It's much like a photographer, who chooses lenses, filters, cameras, formats, and lighting. The tools need to be appropriate to what you are trying to capture. For ambiences and groupings of animals, I generally use stereo microphone configurations. I also use shotgun microphones and parabolic reflectors for species-specific recordings. Parabolic dishes work well for songbirds, but not for larger animals, where there is a stronger low end."

"There are a number of interesting stereo mic techniques suitable for use in field recording," Trubitt says. "When I'm choosing one over another, sonic character is obviously a key consideration. It is not, however, the only determining factor. The other issues I consider are creating effective protection from wind noise and ease of maneuverability." The most common stereo configurations used by nature recordists are XY, M-S, ORTF, binaural, and quasi-binaural.

An XY configuration requires a coincident pair of directional microphones, positioned so that their capsules are as close to each other as possible without touching (see Fig. 5). The angle between the capsules is usually set between 90 and 135 degrees, with the greater angles offering a wider stereo spread. The XY setup gives you a narrower, more focused stereo image than other stereo-

miking techniques, but there is often a 3 dB drop in the center of the image. "I often use XY for ambient recordings," notes Quin, "where I find myself in the middle of a flock of birds or where animals are distributed all around me."

"You can make your own XY setup using two directional mics, but the result can be a bit ungainly for field work," Trubitt says. "Creating a suitable windscreen will also be an issue.

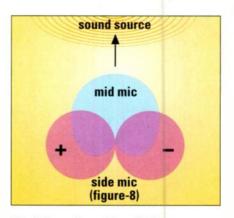


FIG. 6: Recording with an M-S stereo setup gives you a number of options. For example, you can change the width of the stereo spread during-post production or use the signals from the individual mics for different purposes.

Individual windscreens will increase the distance between capsules. If you're planning to standmount the pair, the extra bulk may not matter." The Røde NT4 is a recent example of a stereo XY microphone that addresses these issues.

"This kind of crossed-pair, stereo array provides good localization and imaging," Trubitt continues, "It's not the most dramatic picture, but it is accurate. My main concern about this technique is the quality and character of the cardioid mics. If the mics have an uneven off-axis response, which is not an uncommon problem, to my ears they can take on a pinched quality. Also, if you point a crossed-pair array directly at the sound source of interest, you are picking it up with the 45 degree off-axis response of both capsules. This may also lead to coloration.

"A pair of crossed figure-8 mics, which is called a Blumlein array, produces a spacious and pleasing stereo image," Trubitt says. "Although the proximity effect of cardioid and figure-8 mics enhances the bass frequencies when close to the subject, there is an unavoidable bass roll-off when working at a distance. Consequently, I wouldn't choose them for thunder storms or elephant snorts. In contrast, omni microphones maintain their full low-frequency response regardless of their working distance from the sound source, and they are much less sensitive to wind noise than HR. HRS SERIE ACTIVE STUDIO MONITORS AND SUBWOOFERS

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directional mics. From a subjective standpoint, I often prefer the sound of omnis; their off-axis response tends to be smoother than many cardioids." Several stereo techniques—M-S, binaural, quasi-binaural and spaced pairs—use omnidirectional mics.

M-S (middle-side) combines a "mid" microphone, which is the center and is usually a cardioid, hypercardioid, or omni, and a bidirectional "side" microphone, a figure-8, facing sideways. Using an omni in the mid position provides the most open and natural ambience, while a more directional mid mic gives greater focus and isolation to the sounds directly in front of you, at the expense of accurate stereo placement of sounds to either side.

The two capsules are placed as close to each other as possible, with the mid mic's primary axis aligned with the side mic's null axis (see Fig. 6). The M-S system yields a robust stereo image, which you can modify during post-production, and a strong center image. An advantage to the M-S system is that you can reencode the stereo mix into the original middle-side components, provided you haven't processed the signals. You can also use the middle image and side images independently.



FIG. 7: The Soundman OKM II K was designed for recording with portable devices. The mics are suitable for use as a binaural headset mic, a boundary-layer mic, or as a stereo clip-on mic.

M-S is thoroughly mono compatible.

In order to get a complete stereo image, the M-S signal needs to be decoded with a sum-and-difference matrix. A number of portable preamps offer M-S onboard decoding, so you can record and monitor a traditional stereo image. In addition, some M-S microphones are able to decode the signal, or you can use outboard hardware or a software plug-in. If you don't decode the signal, you will record the mid mic to one channel (usually to the left channel) and the side mic (usually to the right), which can be disorienting because you won't be hearing the stereo spread that you see in front of you. Any stereo mic with a width switch is probably an M-S model. The Shure VP88 is an example of a single-point M-S mic with a cardioid center capsule and a built-in M-S decoder.

"Because nearly all figure-8 mics are side-address," says Trubitt, "an M-S pair will be positioned in parallel, perhaps even touching. This compact arrangement is convenient to carry and fits easily in a single shockmount and windscreen combo such as a Rycote blimp. This yields low handling noise and high wind resistance, which is highly desirable for field work."

"An advantage of M-S," says Quin, "is that you can adjust the stereo image and enjoy the benefits of having two recordings in one—the mid channel can be a species-specific recording on its own. I also may choose ORTF, because the angle of incidence at 110 degrees can communicate certain spaces with great clarity."

Another stereo technique is to use a pair of spaced omnis. However, Trubitt notes that recordings made with a spaced-omni pair often lack a strong center image.

Traditional binaural stereo recording utilizes a dummy-head with the mic capsules tucked into anatomically correct dummy ear canals. Another less expensive option is a pair of inear mics, such as the German-made Soundman OKM binaural mics (see Fig. 7). These little omnis are foam covered and sit in the ear like tiny Walkman ear buds. A mic pair like this is

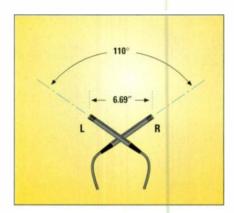


FIG. 8: The ORTF technique, which specifies two cardioid mics 110 degrees apart with 6.69 inches between the capsules, was designed to mimic human hearing.

very portable, is invisible to other people, and creates a stunningly realistic stereo image when auditioned using headphones. Omni capsules are commonly employed in binaural recording, which gives you an improved low-frequency response and better wind tolerance.

Binaural recordings are meant to be heard using headphones; over loudspeakers, binaural recordings have a weak center. Stereo shuffling, a signal process described by Blumlein, can be used to improve loudspeaker playback compatibility. A plug-in, such as the Waves S1, can be used for shuffling.

For better speaker translation, many recordists choose the Crown Stereo Ambient Sampling System (SASS-P) mic. The SASS-P is a roughly head-size although decidedly not head-shaped apparatus that provides a quasi-binaural image that is more loudspeaker friendly than a binaural arrangement.

Binaural and related mic pairs often use omni mics, but you can use spaced cardioid mics as well. "Try a pair of cardioids spaced roughly ear-width apart and angled outward from 110 degrees to 135 degrees," says Trubitt. "The French body Office de Radiodiffusion Television Francais (ORTF) specifies this arrangement as 6.69 inches from capsule to capsule with an angle of 110 degrees (see Fig. 8). In contrast to crossed-pair XY or M-S techniques, spaced cardioids provide a bit more drama at the expense of precise

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localization of individual objects in the stereo field."

Spaced capsule arrangements are generally less mono compatible than coincident techniques such as M-S and crossed pairs. On the other hand, spaced techniques generate a stereo signal that includes time-arrival differences between channels. Coincident techniques only create intensity differences between channels: a sound on the right plays back louder in the right speaker. "I am less likely to use these spaced arrangements in the field," says Trubitt, "not so much because of mono-compatibility concerns, but because the size of spaced arrays usually requires two shockmounts and two windscreens, making the apparatus ungainly unless I am putting it on a tripod and walking away."

In his work recording frogs, Walter Knapp uses a Telinga Pro 5 parabolic microphone (see Fig. 9). "A good parabolic mic can move you much closer to the sounds you want. It's the easiest way to be close to the calling frog out in the middle of the swamp. A parabolic can also be used to sort through mixtures of callers, focusing on small groups rather than the entire swamp. And you can cover a lot of area from one spot." Knapp cautions, however, that the long reach of the parabolic mic will also pick up far-away man-made sounds as well.

"A parabolic," he says, "gains a lot of its amplification by concentrating the sound before it hits the microphone. You can raise the gain electronically, but you also amplify the built-in electronic noise of the mic. A parabolic can do a good job with a microphone of lower quality (and thus cheaper)." Knapp has experimented with a DIY parabolic mic, which can be seen on his Web site (http://frogrecordist.home.mindspring .com/docs/quickparabolic.html).

Ultimately, when choosing a micro-

phone, you need to know what your power requirements will be (phantom power or plug-in power from the recorder), what kind of recording you want to get, and the environmental conditions in which you will record. In addition, your choice of mics will be gauged in part by other parts of your system, such as your recorder. For example, you need to match the impedance of a mic to your preamp and recorder. If you have a noisy preamp in your MD recorder for example, it's helpful to balance it out with a quiet but high-output mic.

ASSEMBLING YOUR SYSTEM

For the beginner, choosing the right components is difficult because of the wide range of options. "The first thing to remember is that there is no mic-preamp combo that will guarantee a hissfree recording or a situation where you won't hear some bit of gear-related selfnoise," says Trubitt. "Natural soundscapes can be very, very quiet." With that in mind, Trubitt offers examples of some of his recording setups, from an inexpensive, highly portable system to a more expensive, advanced setup.

Basic Recording. "My smallest system," he says, "consists of the Soundman OKM II K Classic Studio binaural mics, which run off of plug-in power. These are plugged directly in to the Sharp MS702

MK MiniDisc recorder, which runs off of a DIY battery pack with two D cells. This setup has the advantage of being hands free and unobtrusive, and when everything's working right, I get hours and hours of recording time. I take this setup to places where recording is not the primary purpose, but where I don't want to miss something interesting that might happen."

"The major drawback of this setup," Trubitt continues, "is poor rejection of wind noise, even though the mics are omnidirectional. And any time you use a MiniDisc's mic preamp, it's going to be noisy. In nature recording, machine self-noise is such a pervasive problem: the combination of an electret mic, which is invariably noisier than a true condenser mic, and the consumer front end of a MiniDisc recorder is going to be hissy. It's not a good system if you're trying to record a quiet bird song. And when the mics are on your head, it's difficult to get the right mic placement. You have to keep your head still while recording, and if you're using in-ear mics, you can't monitor the sound to tape by wearing headphones, because you'd get feedback."

Transducer upgrade. "The next step up is to improve the mic and reduce wind noise. I use the battery-powered Shure VP88, which has a built-in M-S decoder, although you can also record undecoded M-S. I also add a Rycote Windjammer with the optional furry high-wind cover, or a homemade windshield. I put the mic on a boom so I can move the mic around, which is helpful in finding the right place to record" (see Fig. 10).

"Next, I may add an external preamp. I use the Denecke AD-20 Zefiro Inbox, which doesn't offer phantom power and is not a high-gain device, but it's easy to use, inexpensive, and very rugged. It offers XLR connectors and digital outputs. Now I've upgraded the



FIG. 9: The Telinga Pro 5 can be fitted with stereo or mono mics, using plug-in or 48V phantom power, depending on the recorder you use.

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mic, but I'm still using a storage device that uses data compression—MiniDisc. It's still a somewhat noisy setup, but it's good in wind and you can turn your head around without problems.

Data-storage upgrade. "Next let's upgrade the data storage device. I go with DAT, but use outboard mic preamps. The good news is that there is no ATRAC data compression. However, I'm somewhat skeptical of DAT reliability in terms of transport problems and tape handling: I don't consider the format to be bulletproof. What I always do is record a little slate, then rewind it and play it back to make sure everything's working right. With some of the small DAT machines, you may see the tape counter incrementing and meters going, but the machine is not recording a signal. I've made a lot of great recordings on DAT, but I always carry an MD as a spare.

"The long-term prospects of the format are troubling, in terms of replacement parts," says Trubitt. "I wouldn't buy a new DAT machine."

A number of nature recordists share these sentiments about DAT technology: although they may currently prefer the DAT format to MD, they're looking forward to the next generation of hard-disk recorders that will

be hearty enough to meet the demands of field recording.

Upper end. "To further improve the system, I would upgrade the mic and preamp. At my top end is a pair of Schoeps—CMC-5 bodies, with either MK-41 hypercardioid or MK-6, 3-pat-



FIG. 10: Rudy Trubitt records the sound of a chunk of melting ice on the shores of a glacial lake in New Zealand using an Audio-Technica AT835ST in a Rycote windscreen and a boom pole.

> tern capsules, which offers figure-8, cardioid, and omni. I'll use the appropriate size Rycote zeppelin, and a Grace V2 preamp (see Fig. 11). This is a much quieter front end, which allows me to record dawn choruses and get a usable signal. But if it's going to be too

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"Another setup has Sennheiser MKHseries mics and the Sound Devices Mix-Pre preamp, which may be quieter than the Schoeps-Grace combo. The Sennheiser mics are much more tolerant of humidity.

"For my multichannel experiments, I use the Korg D16, but it takes a lot of effort to power it in the field. And you can't walk around with it. It also opens a can of worms in terms of miking for multichannel recording.

"Someday there's going to be an affordable hard-disk recorder, and I'll be switching to that," Trubitt says. "I'm not enthusiastic about bringing a laptop into the field, because you can't walk around with it while recording, and you cannot see the screen in the sun without a sunscreen, such as the pop-up one made by Hoodman" (www .hoodmanusa.com).

PROFESSIONAL'S CHOICE

Krause is very specific about the setup he and his crew use in the field under most conditions. "We use only Sennheiser mics—an MKH 30 and an MKH 40—because they're low noise and they've got a really nice dynamic range. They're a little bit less sensitive to wind than other mics, and we can take them into habitats that are very humid without failure, unlike other mic systems. We use an M-S system: the MKH 30 is a figure-8 and the MKH 40 is a cardioid. They're mounted piggyback on top of one another" (see Fig. 12).

"The Audio Engineering Society did a study on the noise floors of different mics," says Krause, "and the Sennheisers came out, at that time, as the best. We've not used anything else since." Krause will often set the mics on a tripod and position himself and the recorder some distance away.

Quin uses Schoeps as well as Sennheiser microphones. "The Sennheisers are workhorses and function well in extreme temperatures. There is also a fullness to the sounds that they pick up. However, I like the high end on the Schoeps, particularly for birds and insects. Ultimately, topography, climate, and the distribution of wildlife help determine the mic choice."

Quin records to DAT, but, like many recordists, he's keeping an eye on developments in hard-disk recording, particularly multichannel. "For me, the key elements are portability and ease of use."

Although she used a system similar to Krause's when they worked on projects together (see Fig. 13), recordist and biologist Ruth Happel says she often prefers a more mobile system. "I usually use a Sony D3 portable DAT. I tend to walk around with my equipment, because I find that if I can travel along with animals, I can get a lot more recorded. I'll carry a very small digital recorder and very small mics, which I attach to the top of my vest. In the vest pockets, I carry spare batteries, preamp, and recorder.

"I mainly use small omni mics," Happel says. "Sony ECM77s, and I use my own windscreens. These mics are great





for recording the quiet nuances of sound like the actual shifting of a cricket's legs before it chirps. I also have Sony ECM55s, which have a different frequency range and, consequently, pick up sounds differently. As a holdover from my field work in science, I have a couple of highly directional Sennheiser mics, which I bought when I was doing graduate work in Africa 20 years ago, because sometimes the only way to get a good recording in certain settings is with a directional mic. The current model closest to what I have would be the [Sennheiser] MKH 416-P48U3."

TRIP PREPARATIONS

Choosing where to record is part of the fun of nature recording. However, once you begin listening through mics and headphones, you immediately become aware of the presence of unwanted noise in the environment, and finding ways to avoid intrusive sounds is one of a recordist's biggest challenges.

"In terms of when and where to record," says Happel, "I have found that in just about anywhere in the United States, it's best to record on early Sunday morning to get the quietest ambiences. If you're interested in species-specific recordings or in ambiences other than a dawn chorus, it might be necessary to invest in a low-frequency filter, which often is built in to mic preamps." A lowfrequency filter is useful in removing the sounds of distant vehicles, for example.



FIG. 11: The Grace Design Lunatec V3 adds a 24-bit, 192 kHz converter to the quiet and robust V2 preamp.

"For foreign trips, it pays to do your research well in advance," Happel adds. "In all the places I've traveled, there are times of year that are vastly more rewarding for sound recording than others, depending on the activity of birds, frogs, and other wildlife. It is best to consult with field guides, which provide data on vocalizations, including the time of year when animals vocalize, and use any local scientific resourcespeople, libraries, museums, or universities-to determine the ecology of the destination."

"In selecting sites for ambient recording, I find topography to be a big challenge in terms of ascertaining the acoustic characteristics of a habitat and negotiating ac-

cessibility," says Quin. For this reason, it's wise to make an equipment list of everything you'll need and run a dress rehearsal before you leave; for example, you might set up your gear in your house or back yard and make a test recording. This will help ensure that you've thought of everything. If you did forget something, add it to your checklist. Bringing backup supplies-extra batteries, blank media, cables-is a good idea, but how much you can realistically pack depends on how much you can adequately carry while getting to and from your destination.

When you're done with your dress rehearsal, make sure to repack everything in your setup. Then, before you leave, consult your checklist again.

NOTES FROM AFIELD

Once your gear is packed, it's time to get out there and record. But like any-

> thing else, getting a good recording of natural sounds is about being in the right place at the right time.

"First, you have to put the mic in the right place," says Trubitt. "Be as fussy as you would in a studio, because the same issues apply in field recording. That's why I like to work with a boom: it encourages experimentation

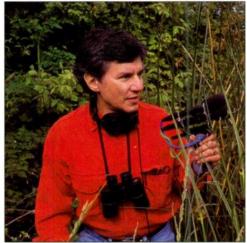


FIG. 12: Krause demonstrates his M-S steree microphone setup, which seats a Sennheiser MKH 40 cardioid above an MKH 30 figure-8. The mics can also be mounted on a tripod.

> with mic placement. The nice thing about a boom is that you can set the height and then rest it on something if you're doing very long recordings and you don't want to force yourself to be still. Having a tripod or some other thing you can clamp or bolt the mic to and walk away is helpful. Otherwise, you have to be very quiet if you're near the mic."

> One unexpected source of noise for the uninitiated is clothing. Synthetic fabrics, such as nylon, tend to be noisy and should be avoided when recording. When choosing your clothing, grab the material and rub it in your hand; you'll hear right away how noisy it is.

> "Another type of noise," says Trubitt, "is infrasonic handling noise, which happens when a mic is moved quickly. You can sometimes get it when using a shockmount. The result is a powerful lowfrequency shudder. You can partially combat handling noise and wind noise with a low-cut filter, assuming you have one available. However, you do so at the expense of low frequencies in the recording. A better solution is to use a windscreen with an integrated suspension mount."

> "You train yourself to be quiet" Happel says. "Because you're listening through headphones, you get used to hearing subtle sounds and you learn to be very quiet. If wind is a problem,

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I'll unclip the mics and put them somewhere, sometimes deep inside a shrub, well into the vegetation to protect them. It's amazing how much that cuts down on the wind. You can record in a windy ocean setting this way, and it'll completely eliminate the noise problems. And especially if I'm recording an ambience, I'll unclip them and set them down so I don't interrupt the recording with my movement. I listen interactively with the headphones in order to figure out where to place the mics."

"You must use care in what and when you eat," warns Knapp. "A rumbling stomach records very well. With some of the more sensitive microphones, I can easily record myself breathing, so I have to practice breathing control. I try to breath quietly and smoothly and position myself outside of the most sensitive part of the mic's pickup pattern. And if you shift the weight on your feet, the crunch of the soil, gravel, or grass will be picked up. But you need to be near to the mic to aim it, because you never know where something may call."



FIG. 13: Ruth Happel is using an MKH 30 and MKH 40 set up on a tripod to record a chimpanzee at Jane Goodall's research site, Gombe National Reserve, Tanzania.

GEAR TIPS

I asked Krause about the lumps of glue on the switches of his portable DAT recorder. "I hot glue them. When the recorder is in the pack or in my pocket, the switches often get jostled. And I wouldn't necessarily notice that they've been changed, because I can't see too well, even with glasses. So I just glue them into position and forget it. If I need to, I can pull the dried glue off quickly."

There are ways to protect your equipment from environmental damage. "If you are going to be recording in humid environments, like the rain forest," says Happel, "you should store your equipment in airtight containers with some sort of desiccant. Otherwise, the mics, and even your recorder, might stop working."

Quin agrees. "Humidity is always a concern. I carry homemade desiccant sacks and freezer bags when I travel. Extreme cold is also a major challenge. Keeping batteries warm, keeping gear working, and preventing moisture from condensating when transitioning from -60 degrees Fahrenheit outside to +70 inside can be tricky."

SUGGESTED READING

The Book of Music and Nature, edited by David Rothenberg and Marta Ulvaeus (Wesleyan, 2001). This excellent anthology offers essays on nature, sound, and the nature of sound by John Cage, David Dunn, Brian Eno, Bernie Krause, Pauline Oliveros, Rainer Maria Rilke, R. Murray Schafer, and many others.

The Microphone Book, by Jon Eargle (Focal Press, 2001). A fine book about microphone technology that includes chapters on recording in stereo. Eargle goes into great detail about the physics behind the various kinds of transducers. The New Stereo Soundbook, 2nd ed., by Ron Streicher and F. Alton Everest (Audio Engineering Associates, 1998). A straightforward and easy-to-read introduction to stereo recording. The authors do a fine job of explaining how our ears and brains hear and interpret audio information. A wide range of stereo and surround-sound recording techniques are explained and analyzed.

The Tuning of the World, by R. Murray Schafer (Knopf, 1977). A landmark text about acoustic ecology that has inspired many of the recordists mentioned in this article.

Why Do Whales and Children Sing,

by David Dunn (Earth Ear, 1999). Dunn's thought-provoking book and CD cover a wide variety of natural phenomena. His audio examples not only demonstrate a particular phenomenon, but his insightful comments can be used as a catalyst for further discussion. The CD alone is worth every penny.

Wild Soundscapes, by Bernie Krause (Wilderness Press, 2002). A field guide designed to introduce nature enthusiasts to the sounds of the wild natural and the joys of recording them. The accompanying CD includes a number of outstanding audio examples, such as singing ants.



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"I record frogs almost entirely at night, holding a parabolic dish the size of a very large salad bowl, in the darkness," Knapp says. "I do not turn on a light because all of the insects will home in on me and make unwanted thumps hitting the dish. Standing still and making no sound while being bitten is an art form, but it's part of recording outdoors. I never use DEETbased repellents, because they dissolve equipment. I do use citronella-based repellents, and I also wear loose clothing to keep the worst problems down."

WATER IN YOUR EARS

Human ears are meant to hear in air. When our ears are physically underwater, we get an impedance mismatch because of the air boundary between the liquid and our hearing apparatus. With the right kind of listening technology, you can experience the sounds your unaided ears cannot hear.

Many sound recordists prefer to record monophonically underwater. Part of the reason is that, to get a usable stereo recording underwater, the distance required between microphones is much larger than what we're accustomed to in air. That is because sound travels faster underwater (approximately 4,987.0 feet per second at 21 degrees centigrade) than in air (approximately 1,128.6 feet per second

Popular Mics for the Field

This list was generated by an informal survey of the mic preferences of a number of nature recordists. It's by no means an exhaustive list, and some of the models may only be available secondhand.

AKG	C 1000 cardioid	
Audio-Technica	Model 822 stereo	
	Model 825 stereo	
Crown	SASS-P quasi-binaural	
Oktava	MK012 cardioid	
Røde	NT4 stereo	
Schoeps	CMC-5/MK-41 and MK-6	
Sennheiser	ME62 omni	
	ME66 short shotgun	
	ME67 long shotgun	
	MKH-20 omni	
	MKH-30 figure-8	
	MKH-40 cardioid	
	MKH-60 short shotgun	
	MKH-70 long shotgun	
	MKH-80 multipattern	
	MKH-110 omni	
	MKH-800 variable pattern	
Shure	183 lavalier	
	VP88 stereo	
Sony	ECM-55B lavalier	
	ECM-77 lavalier	
	ECM-MS907 stereo	
	ECM-MS957 stereo	
	ECM-959 stereo	
Soundman	OKM II K binaural	
Telinga	Pro 5 parabolic	

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at sea level in 50 percent humidity).

During a trip to Antarctica, Quin recorded Weddell seals underwater, in stereo. The results are remarkable not only for their sound quality-the recording doesn't have the peaky, band-limited sound that is often a characteristic of hydrophone recordingsbut also for the clarity in the stereo image. "I used two International Transducer Corporation ITC-6050C hydrophones," says Quin, "spaced about 200 feet apart and lowered to a depth of about 50 feet. The positioning was important. I chose a stretch of sea ice that ran parallel to tidal cracks, where seals would come up to breath. It is along these cracks that males vigorously defend their territory during mating." The omnidirectional hydrophones he used have a built-in preamp and a frequency range of 20 Hz to 75 kHz.

A wide variety of hydrophones are available, with prices ranging from under \$100 to well into the thousands. Some recordists experiment with underwater recording by placing a microphone (preferably an expendable one) in an unlubricated latex condom and sealing the end.

"You can also waterproof a microphone by dipping it in Plasti Dip," says location-recordist Mark Griswold. "It's an epoxy used to rubberize handles on metal tools. The coating is waterproof and flexible enough to transmit sound vibrations, but difficult to remove. The main disadvantage of this technique is the inefficient acoustic coupling of the mic element to the water."

A DIY hydrophone can be made using the common piezo element (see Fig. 14). However, the recording quality is often colored by the narrow frequency range

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of piezos and impedance matching problems. Recordists I spoke with recommend that anyone interested in recording underwater should purchase an inexpensive hydrophone rather than build one (see the sidebar "Hydro-EMMER phone Sources" at www GLUPS .emusician.com).

Krause offers some advice when using hydrophones. "Sometimes when you drop a hydrophone into water, it gets little air bubbles around it, which changes the impedance so that it doesn't transmit the sound very well. To get rid of the bubbles, put a little grease on it, like some olive oil."

HY AND DRY

Surprisingly, some hydrophones work well for terrestrial recording, especially ones that can pick up infrasound or ultrasound. The singing tree, in fact, was captured with a B&K Type 8103 hydrophone, which has a frequency range of 0.1 Hz to 20 kHz (-1.5 dB/+0.5 dB), that also extends up to 100 kHz (-3.5 dB). Of course, you will need a device that can record the extremely low or high frequencies you are after.

Holding another mic in his hand, Krause explains, "The frequency range of this hydrophone, made by Offshore Acoustics, goes down to 3 Hz. Some of the digital Sony recorders, particularly the D10, go down to 3 Hz, into the infrasound and DC range. I used this particular hydrophone to record the sand dunes and to record elephant sounds, because elephant vocalizations are around 14 Hz. Giraffes, hippos, and elephants transmit sound through the air at very low frequencies, which carry over great distances. In fact, hippos vocalize both underwater and in the air."

A YEAR TO RECORD ONE HOUR

"Wildlife recordings are hard to 'make,' to 'get,' or to 'take,'" says Quin. "A good recording of the 'voice of the wood' is as

much a revelation as it is an acauisition. The disposition of landscape, its features, surfaces and textures, the density of forest, relative humidity and air temperature all mold sound into a distinctive experience."

However, the first time you actively listen outdoors through microphones and headphones, you may be startled to hear how much man-made sounds compete with the natural ones in the soundscape. "A fraction of what gets recorded will actually be used, in most cases," says Trubitt. "It depends on the nature of the project. And often you won't know which fraction

you're going to use while you're recording. You might use a minute out of 20. Then, two years later, you might need some distant stream ambience, and you might use seconds from the same recording. If you've been out for hours and gotten a few usable minutes, you've done well."

"When I started, in 1968, it used to take me 14 or 15 hours to get an hour of material," Krause explains. "Now it takes me 2,000 hours to get that same material. A year to get an hour of usable stuff."

But even if you're successful in avoiding man-made sounds and have focused on the soundscape you want to record, you may find interference from natural sounds you weren't aware of. "Mics don't discriminate like our ears do." Krause explains. "Even when you go outside, and your ear tells you you're in a relatively quite place, the mics will pick up ambient sound or noise you are not conscious of. They'll pick up the wind through the leaves and the boughs of trees, or a stream that's a quarter- or half-mile away even though it's a tiny stream; they'll pick up all kinds of stuff that you're desensitized to. Even when you put on your headphones, you don't really hear it until you get back to the quiet of the studio and then all you hear is hiss in the background or traffic from a distant road. And you try and figure out where it came from."



FIG. 14: This experimental hydrophone created by Rudy Trubitt and Bruce Koball places a piezo between two

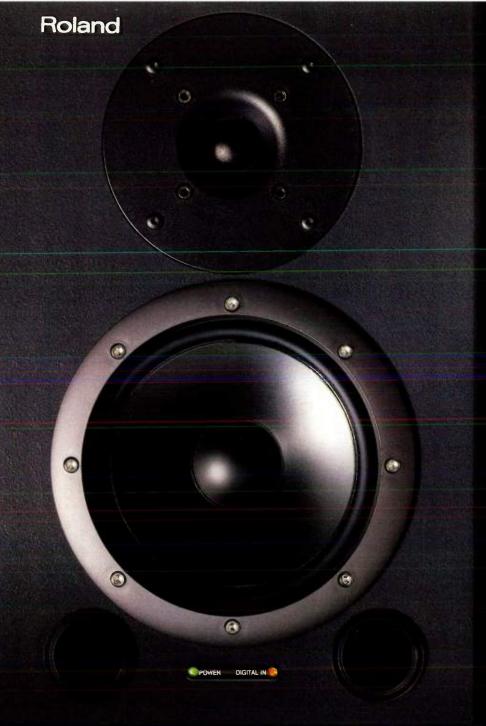
CREATING THE ILLUSION

The process of recording is just the beginning. The presentation and framing of the audio material, so that it stands on its own, is equally-if not more-important. This is a subject that has been regularly ignored over the years, especially by companies that merely want to cash in with an "environmental" release.

Krause laments about the low quality of many soundscape recordings. "A lot of them just don't sound very good. The stereo imaging and the depth and dimension are not very good. There's no indication that the recordist knows anything about the habitat they recorded in. Often there's no information on the CD about what creatures you're listening to. We need to know about a place beyond the fact that it's an 'alpine wood.' In Yellowstone National Park alone, there are hundreds of different habitats. What's there and what are we listening to? This is really important information that people need to pay attention to."

When he returns to the studio, Krause begins by determining which parts of the recordings can be kept. Then, he crossfades between the good parts, being careful to match the time of the day and the particular characteristics of the biophony.

Which moments Happel uses and how she uses them depends on the artistic statement she's making. "Usually, I end





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up with bits and pieces and then ask myself, how can I make a meaningful and aesthetically pleasing whole? People's ears are more sophisticated than we give them credit for. They can tell if there's something wrong with a recording. There is an ethics as well as an aesthetics, especially if the goal is to preserve habitat. I try to capture a moment in time, something that's genuine. If you don't, you have to say that.

"If you want a recording to sound realistic, you have to do some combining," Happel adds. "That's the art in doing this. You need to be creative with the recordings and balance the result so it doesn't sound flat. I want to make people feel like they're in the environment. When I work, the biologist in me tries to be as accurate as possible. I'll sometimes record a single species, then I'll add that to a forest ambience that I've recorded at the same time of day. I'm very aware of what habitats sound like: my background is as a scientist, and I spent ten years recording before trying to do anything musical with it.

"If I'm doing an album," she continues, "I might layer four or five tracks together: maybe two different stream sounds. It's a fine juggling act, because if you get too contrived, you begin to lose the essence of the environment. The best thing is to find a magic moment in nature and add very little."

Krause concurs. "The art form is in matching those scenes, and it has to be seamless. There are recordists out there that claim they're purists. My answer to them is that, if you choose a microphone system, you've done some editing; if you choose a recorder, you've done some editing; if you choose the time of day, the location, and where you point your mic, you've made editing decisions. And then you've only got 74 minutes on a CD. Which 74 are you going to choose? Once you've done all that editing, where's the pure?"

Krause often takes his listeners on a journey through a variety of habitats. On his release *Whales, Wolves and Ea*gles of Glacier Bay, the listener travels from the seaside to a meadow, underwater, then back again to dry land to hear the amazing sound of a calving glacier. The slow crossfading between terrestrial water sounds to the underwater world is just one of many remarkable moments on the CD.

"When you're transforming this material to a CD, you're transforming it from one medium to another," Krause says. "From the natural world intousually-an architectural interior space. And you better make sure it's listenable. That's where the 'art' of the process comes in. That's why so many recordings aren't very good, because people haven't done due diligence to consider how their work is being perceived. You may, as the recordist, be able to imagine the habitat that you've recorded in. When you play your sounds back in the studio, they evoke an image in your mind, but the listener

has no such capability, because he or she wasn't there when the recording was made. If what you've created doesn't evoke a visual or visceral sense of that space, then the result is failed 'art.'"

Krause auditions his projects for a third party for feedback. "I test my recordings on different folks all the time—typically my wife—to see if she gets it." Does he occasionally get a thumbs down? "Often. More often than I'd like to admit here. That's why I spend so much time in this studio and wear out so much equipment."

CORRECTIVE PROCESSING

Nature recordists often have to take corrective measures with their source material when they return to the studio. "I usually spend time removing unwanted sounds from otherwise good field recordings," says Trubitt. "Commonly, I have to diminish rumble, and I use the Waves Renaissance EQ plugin. A steep highpass filter between 80 and 160 Hz usually does the trick. If my mic preamp turns out to be too noisy on quiet sounds, I use a gradual lowpass filter to remove the hiss. But I'm careful to keep the high-frequency detail intact."

Krause prefers to do his corrective work in the analog domain, using an Orban parametric EQ. "I use it mostly to remove artifacts, such as low-velocity wind. There's often a low-frequency component to the recorded material in jungles because of far-away streams and stuff like that. Low frequencies carry a much longer distance through the jungle and it's just too distracting to keep it within the context of the recorded product." One process that Krause does digitally is normalizing recordings to bring up the levels after editing and before he creates the master disc.

ONLINE RESOURCES

Information

MiniDisc.org (www.minidisc.org) Phonography.org (www.phonography.org) Rudy Trubitt (www.trubitt.com) Wild Sanctuary (www.wildsanctuary.com) Yahoo groups (http://groups.yahoo.com): nature_sound_society naturerecordists

Books and CDs

CD/E (www.cdemusic.org) Earth Ear (www.earthear.com) Fourwinds Trading Company (www.fourwinds-trading.com) The New Stereo Soundbook (www.stereosoundbook.com)

Microphones and Recording Equipment Cassette House (www.tape.com) Core Sound (www.core-sound.com) Microphone Madness (www.microphonemadness.com) Micro-Cat/Fat-Cat (www.haly-tek.com) Oade Brothers Audio (www.oade.com) Sonic Studios (www.sonicstudios.com)



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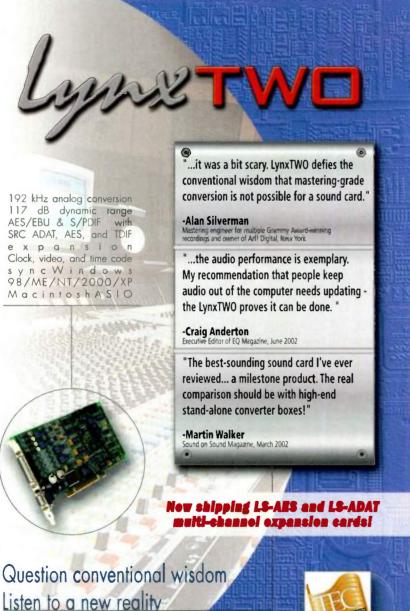




For Quin, "editing decisions are made on the basis of what I am trying to create: music, field recording, data for research, radio program, film, or sound design for a museum project. I find that I can revisit the same source recordings again and again and still hear something new, depending on what I am listening for and how I'm trying to 'translate' it for the appropriate situation."

JUST LISTEN

"One of the reasons that I record is that it teaches me critically how to listen," says Krause. "There are places within the jewel national parks where you can



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go to hear natural sound unimpeded. As a matter of fact, the National Park Service is the only federal agency and the only group in the country that has designated natural soundscape as a resource. Because they're a federal agency, it means soundscapes must be protected like any other resource. I have found that the natural soundscapes, particularly in North America, are disappearing very quickly. Fully 30 percent of my library, from 35 years of recording, comes from now-extinct habitats-habitats we can't record anymore, because there are no creature voices or they have been so seriously altered that the voice is distressing and sad to listen to."

Still, getting into the wild natural with your recording gear offers a number of important lessons. "The first thing that you notice when you listen through headphones and a microphone is how much noise there is in our environment, and how it masks much that we want to hear," Krause explains. "Second, it teaches you how far you have to go to actually get into a place where you can hear natural sound. Third, it changes how you perceive the world, because you don't get information in quick four-frame cuts. The natural story is told gently and subtlely over an extended period of time, because the expression of sound takes a very long time to establish. Often a bird call can take from 45 seconds to many minutes to express. Humpback whale songs can last a halfhour. So you have to sit there and listen while you abide in silence."

"You don't have to have a digital tape recorder" is Happel's advice to anyone thinking of adventuring outside to record. "Whatever equipment you have, go out and try it: you might be pleasantly surprised with the results."

Gino Robair is an associate editor at EM. Special thanks to Walter Knapp, Douglas Quin, Ruth Happel, Rudy Trubitt, Jim Cummings, Ben Chadabe, Mark Griswold, Marcos R. Fernandes, and Bernie Krause for their assistance.

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Carefully organizing your sound effects can streamline your projects. Whether they're working in film, television, video games, the Web, or electronic music, audio postproduction professionals inevitably find themselves surrounded by a huge stockpile of sound effects. After you've been working with sound effects a while, your collection of field recordings, commercial sound-effects libraries, and processed sounds can easily grow to encompass tens of thousands of files.

Managing that much information in a way that lets you By Nick Peck

the local welding shop are equally beautiful from the microphone's perspective.

access the appropriate sounds when you need them can quickly become overwhelming. Fortunately, there are techniques to help tame the clutter and keep your precious sounds just a couple of mouse clicks away at all times.

MATERIAL GOALS

The first step in building a sound effects library is, of course, collecting a

microphone's perspective. (For more on recording nature sounds, see "Going Wild" on p. 50.)

wealth of material, and the most im-

portant tool in that endeavor is a field

recording system. A portable DAT (or

MiniDisc) recorder combined with a

stereo microphone can make a com-

pact and affordable rig. A simple,

portable system is easy to take on vaca-

tions and trips to exotic locales. Bowl-

ing alleys, old office buildings, freeway

overpasses, the jungles of Burma, or

I began my library by taking my field recorder with me everywhere and simply experimenting. I quickly discovered that the ever-present hum of highway traffic and airplane noise during the day meant that late nights were typically better for exterior recordings.

Finders Keepers

Within buildings and factories, adopting the proper attitude is the key to getting great recordings. If you walk around looking like you're supposed to be there, people rarely question you. I've gotten terrific recordings of elevator relays booming thunderously in elevator shafts; huge, reverberant doors opening and closing in turn-of-the-century granite hallways; and dry, clinical office ambiences.

Field recording requires organization and patience. Always mark your tapes and tape boxes clearly, then capture the best material to your hard drive when you're back in the studio and the recording trip is still clear in your mind. Edit the recordings to keep only the most interesting takes, and cut out most of the dead air between the sounds you want to keep.



FIG. 1: Organizing your sounds into folders by category helps you find them again when you need them.

NAME DROPPING

A great time to gather material for your library is while getting paid for it. Every time I finish a new project, I cull through the recordings that I made to find permanent additions for my library. For example, I worked on a film called CQ, which takes place in late '60s swinging Paris. I recorded Foley artist Les Bloome manipulating all sorts

of thrift-shop junk to reproduce clunky contraptions that fit the era. Once the film was complete, I sifted through the audio-file folders of my Digidesign Pro Tools sessions from the film and grabbed the most interesting stuff for future use. Remember that you will be revisiting your recordings repeatedly throughout your career, so the tighter and better organized you make them now, the less trouble you'll have later.

When recording ambient backgrounds, I like to capture five to ten minutes in the field and keep the best three minutes or so. When recording specific events, such as door slams, I typically record a dozen and keep about half of them. I then concatenate those six door closes into a single file, with about two seconds of silence after each slam. Rather than having a slew of files named Bathroom Door Close 1.aif, Bathroom Door Close 2.aif, and so forth, I end up with a single file named Bathroom Door Closes.aif. That keeps the visual clutter down when I'm looking for sounds later on.

LIBRARY RESOURCES

It has been my experience that the most satisfying and interesting sound effects are the ones that you create yourself. However, there are situations and types of sounds that are impossible or impractical to record, such as explosions, car accidents, and cockpit-perspective jet takeoffs. In addition, having a well-rounded general library of effects is the bedrock of post-production work. It is therefore not a bad idea to purchase a few off-the-shelf sound-effects libraries. The two main royalty-free sound-effects CD-publishing houses in North America are Sound Ideas



FIG. 2: The freeware program SoundApp works well for auditioning sound files. Just drop an audio file onto the program icon to hear the sound play.

(www.sound-ideas.com) and Hollywood Edge (www.hollywoodedge.com).

Both of these companies offer generalpurpose sound libraries, such as the Sound Ideas 6000 series, as well as more specific sets, such as the Hollywood Edge *Explosions for the 21st Century* library. These libraries can be rather pricey, but look for deals and plan on buying one or two per year. I always wait for a project to come along that needs specific sounds a particular library has to offer; then I make the purchase.

I use BIAS Peak to transfer commercial sound-effects CDs onto my hard drive. Keep in mind that the copyright for these sound files is held by the CD publisher, and using libraries that you haven't purchased is prohibited. According to Sound Ideas, you can rip files from their CDs and use them from your hard drive as long as you own the CDs and have them in your possession. For further information on this subject, please refer to the company Web sites.

GET IT TOGETHER

Now that 40 GB hard drives have replaced stickers as the toy surprise in boxes of Cracker Jacks, it makes sense to keep your entire sound library readily available at all times. Materials scattered across DAT tapes, audio CDs, Zip disks, and various other sources should all be gathered together into a single hard-drive repository.

It has been my experience that many compatibility issues are resolved by deciding on a single file format, then batch-converting all your effects to the target format. For years I used the Pro Tools-compatible format of 16-bit, 44.1 kHz, Sound Designer II mono and split stereo (separate files for the left

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Finders Keepers

and right side of a stereo field). Sound Designer II has become a legacy format, though, as AIFF and Broadcast WAV have become the dominant cross-platform standard formats. Because of that, I have switched over to 16-bit, 44.1 kHz mono or stereo-interleaved AIFF files.

Over the past year, many of my newer sound effects have been recorded at 24-bit resolution. There are numerous programs you can use to batch-process your sound files to get them into a common format. Sonic Foundry Sound Forge is an excellent choice on the PC; on the Mac, Audio Ease BarbaBatch and Norman Franke's freeware Sound-App can handle the job.

CREATING CATEGORIES

So now you have a haystack of sound files, all nicely formatted to a common

file standard. The next task is to organize them into manageable groupings. Fortunately, humans already have a lot of practice at this task. Nature has given us a terrific method for sifting through the incredible amount of information that fills our heads on a daily basis: categorization.

We think by organizing all of our incoming information and memories into categories, so it makes sense to organize the data in our sound-effects collection into categories that are meaningful to us (see Fig. 1). The organizational schema can be individual and personal, although there are some pretty obvious general categories, such as ambiences, vehicles, water, and wind.

If you work within a group of designers who must all access the same data, the categories should be generally agreed upon. Furthermore, some categories, like water, can be further broken down into rather large subcategories, such as drips, pours, splashes, and waterfalls. Further subdividing the sounds into sub-subcategories generally gets too involved for my taste. I've found

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FIG. 3: Building a comprehensive database for a sound-effects library is a big job, but the results are worth it.

that dividing a library into between 25 and 75 categories, with 3 to 8 subcategories for the broader categories that need them, works pretty well.

UP THE ORGANIZATION

Coming up with an effective system for naming all your files and sticking to that system is the key to organizing and maintaining your library. File names should have a clear and concise description of the file's content, a reference to the sound's source, and in many cases, a short category abbreviation. Special attention must be paid to the prefix or beginning section of the file names; that will determine how the files are viewed when listed in alphabetical order. When dealing with a Pro Tools session with 600 files in the region bin, attention to the prefix and naming convention can really save a lot of time and trouble.

I use the source-description-suffix format in my home studio. File names look like this: 6014.07 Med Crwd Convention.aif. The prefix refers to the Sound Ideas 6000 series, disc 14, track 7. I like this system because I know my library well, and I'm used to seeing it in that format. It's easy for me to see the location from which a particular file originated, and the visual clutter is kept to a minimum.

Another format that I really like is category-description-source-suffix. It puts a three- or four-letter category indicator at the beginning of the file; for example, MOTR Sm Servo Windup NP05.aif would be a recording of a small servo motor increasing in pitch, from volume 5 of my personal library. This approach offers the benefit of automatically grouping files into categories when alphabetized, making it a real winner.

UP FOR GRABS

I often select material by simply browsing through my hard drives in the Mac Finder or searching by file name using Apple's Sherlock utility. I then audition files in SoundApp and copy the sounds into my project (see Fig. 2). That approach can eventually become unwieldy, though, particularly if you start

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adding commercial sound-effects libraries to your collection. At that point, you should consider using a database.

If looking through your hard drive's folders is the equivalent of browsing a library's bookshelves, then using a sound-effects database is the equivalent of searching the library's card catalog. A database lets you find multiple audio files that meet specific criteria, audition the sounds, decide which ones you want to use, and copy them to a particular work folder. That sounds like a great way to work, and it is. However, like creating a card catalog, it's a large and tedious undertaking, demanding attention to detail and long hours at the computer. The payoff, though, is a sleek and efficient way to search through your data, and it can save untold hours in the post-production process.

DATABASE BASICS

My sound-effects library became large enough to warrant a database about four years ago. I couldn't find any affordable solutions for a one-man production house, so I decided to roll my own (see Fig. 3). I began by determining which fields, or data elements, for each sound effect were important to me: a unique identifier, a description, a category, whether the file was mono or stereo, and a path to the physical file location on the hard drive. I wanted to be able to search for a number of sound effects, to be able to audition the files directly within the database, and to then tag the files that I wanted to use. Finally, I wanted to be able to click a button to copy all the tagged files into a Pro Tools file folder for use in a session.

To make that happen, I needed three tools to work together. For the database, I used FileMaker's FileMaker Pro, an easy-to-use cross-platform database that is commonly used in homes and small businesses. For the sound playback/ auditioning application, I used Sound-App. And to connect the two applications and handle file copying into my Pro Tools session, I used AppleScript, Apple's scripting language for interapplication communication and control.

Designing and implementing the FileMaker Pro database was quick and straightforward. The intuitive layout tools allowed me to get the core database working within a couple of hours. Next I had to fill in the database. Entering the information for my personal sound effects took a few months of tedious data entry, which I did in fits and starts between projects. Fortunately, the commercial sound-effects libraries were much easier. Both Sound Ideas and Hollywood Edge have databases in File-Maker format for all of their libraries. Adding their material was simply a matter of exporting the appropriate fields and records from their databases and importing the information into my own database.

The next phase of the project involved connecting information about the files on the hard drive to the database itself, so I could audition and copy files from within the database. That part of the project took a lot of programming and experimentation, but I eventually got it to work. I started by renaming all the commercial sound effects files from Track 1 (Peak's default track-naming scheme when extracting files) to something like 6016.25 FS Lthr Gravel.aif.

I did it by writing an application in Macromedia Director that took a text list of file descriptions from the database, then manipulated the text into the file-naming convention I wanted. The ID ("6016.25") came from the original CD volume and track information. The description "FS Lthr Gravel" came from the original database description entry ("footsteps, leather on gravel"). The tricky part was coming up with a routine to parse the description, replacing common words with abbreviations (for example, "footsteps" to "FS"). Finally, the program took the revised list of file names, renamed the appropriate files automatically, then spit out a list of the new file names that I could import back into the database, connecting the descriptions to the physical files on the hard drive. Phew!

Now that sound-effects records in the database contained information about the file names and location of their

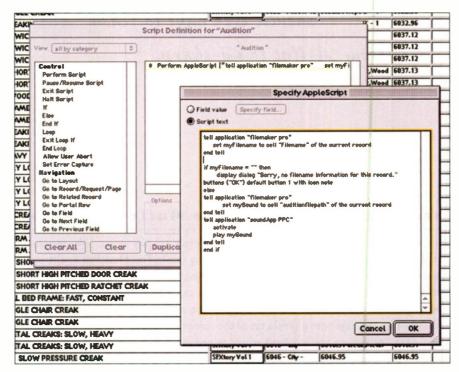


FIG. 4: AppleScript can be used to expand the capabilities of FileMaker to audition sound files.

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corresponding files on the hard drive, the last task was to put that information to work, allowing me to audition and copy the files from the database. I am far from being an expert AppleScript programmer, but with a book and some pointers from AppleScript ace Larry the O, I was able to get the job done (see Fig. 4).

Auditioning sounds involved opening the selected sound file in Sound-App, which automatically played it back. Copying selected files into my Pro Tools session involved popping up a dialog box to select the target folder, then telling the Finder to copy into that folder all the items in the database that had been marked for copying.

Developing the database was tedious and, at times, difficult. But it works flawlessly, is quite stable, and does what I need it to. Unfortunately, Pro Tools does not support an in-depth Apple-Script implementation, so I am unable to actually import sounds directly into a Pro Tools session. A future work-around would be to figure out how to drag and drop the sound files onto the Pro Tools icon via AppleScript, which would then import them directly into the session.

COMMERCIAL BREAK

If you feel that your library is large enough to need a database but you don't have the time or inclination to create one yourself, commercial solutions are available. My favorite is Soundminer's Soundminer (\$895; www.soundminer .com). Soundminer was developed by sound designers at a Canadian audiopost facility. They originally developed it for their own needs then decided to enhance it and turn it into a commercial product. They have succeeded admirably, creating a clever and easy-touse piece of software (see Fig. 5).

Soundminer's data-entry system is rather simple: dropping folders of sound files into the browser window adds them to your library. You can then add description information by typing, by searching and replacing text using their command-line interface, or by importing tab-delimited text data.

Soundminer lets you audition sound files directly within the application and displays the waveform visually. You can select regions of a sound file, then copy

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707 Jet Take Off	LOW1/22/01 00:41 2
707 Jet Land	LOW/1/23/01 00 48 2
Jet Fly-Dy	LOW1/24 01 00:15 2
NV. Jets Football Practice	
Jet Taking Off	
Medium,take off,passes overhead	2004/27:01 00:22 2
Large take off passes overhead Version # 1	2004/20.01 00:30 2
Large take off passes overhead Version # 2	
Large take off passes overhead Version # 3	
Large take off passes overhead Version # 4	2004/31.01 00.21 2
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	2004/39/01 00:16 2
	2004/40.01 00.20 2
Large landing passes overhead Version #2	2004/42:01 00.18 2
Large landing passes overhead Version # 3	
Concorde passes overhead slowly	2004/44.01 00.15 2
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just those regions directly into your Pro Tools, MOTU Digital Performer, or Emagic Logic session. You can varispeed the files and even apply VST plug-ins to them before sending them to your DAW. And Soundminer allows you to customize the color scheme of its browser window, making it as hideous and unreadable as you can possibly tolerate. The included CD-ripping software provides library descriptions for most major commercial sound-effects libraries, which makes adding them to your system quite easy.

Soundminer is not without its flaws. It is powerful but has not reached full maturity; it still has some rough edges and missing features. It's great for searching for specific items, but not as good for browsing around. Though it was written for the Mac, it doesn't have a very Mac-oriented user interface, and it relies more on command-line typing than on selection devices such as popup menus. However, it is still early in the product's development, and I would assume that comments from users will encourage improvement and refinement. An OS X version has been released, and a server package (\$995) allows multiple users to access the same online libraries with database administration routines to handle passwords, permissions, and so forth.

BEST-LAID PLANS

The larger your pile of information, the more worthless it becomes without good organization. Creating a library of your sounds requires planning, forethought, and patience. It is a project that is never completed, but grows with your library. While the implementation may not be as immediately gratifying as creating sounds or spotting effects to picture, the results of your effort can pay off handsomely with greatly enhanced productivity and creativity.

Nick Peck is Sound Supervisor at LucasArts Entertainment. His Hammond organ souljazz quartet gigs around the San Francisco Bay Area. E-mail him at nick@perceptivesound .com or visit www.underthebigtree.com.

FIG. 5: Soundminer lets you build a sound-effects database by dropping files onto a browser window.

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Pluggin' In to Windows

More plug-in choices for Windows-based musicians.

By Jim Aikin

have a dream. Someday I'd like to be able to install a new piece of music software on my Windows PC and know in advance that it will work with all of the plug-ins in my system—no hassles, no headaches, no hang-ups. Alas, that glorious day has not yet arrived, but some progress has



FIG. 1: Cakewalk Sonar is shown here hosting three VST plug-ins: Steinberg's Waldorf PPG Wave 2.V (foreground) and Waldorf Attack (center) soft synths, and Camel Audio's SuperCamelPhat (at right, mostly obscured).

been made. Recently, I set out to evaluate just how far we've come and how far we still have to go.

In the Windows world, plug-in effects and plug-in synths come mostly in Microsoft DirectX and Steinberg VST formats. To add a plug-in to a host application, the plug-in and the host must use the same format. Some host applications, such as Steinberg Cubase SL and SX, Steinberg WaveLab, and Image-Line Fruityloops, support DirectX and VST. Others, such as Cakewalk Sonar, speak only one dialect (DirectX in the case of Sonar).

All of the standard types of effects are available in both formats, so it's not as if users of a VST-only or DirectXonly host program are likely to be drastically shortchanged. Some plug-in manufacturers even provide VST and DirectX versions on the same disc, so you're covered no matter what host you're using. Nevertheless, some very good plug-ins are available only in one of the two formats. If you want one of those effects (and you don't have the proper host), you might have to do some fancy footwork.

Moreover, plug-in compatibility might not be a simple yes-or-no proposition. For example, a program that boasts DirectX compatibility might



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host DirectX effects but not support a DirectX Instrument (DXi). Similarly, a program such as an audio editor without MIDI capabilities might support VST effects but not a VST Instrument (VSTi).

In addition, programs handle the automation of plug-in parameters in various ways. Ideally, you should be able to arm the host program for automation recording, grab a knob or fader in the plug-in, and record your moves for later editing and playback. However, some programs that host DirectX effects won't let you automate them. Or you may be able to automate DirectX effects but not the controls of DirectX Instruments. And some effects are not automatable no matter what program is hosting them.

WRAP PARTY

To provide more options for users of DirectX-only host software, several developers have created *wrapper* applications. These handy utilities "wrap" a VST plug-in so that the host thinks it's a DirectX plug-in. I looked at three popular wrappers: FXpansion's VST-DX Adapter 4.0 (\$60; www.fxpansion.com), Spin Audio's VST DX Wrapper Pro (\$40; www.spinaudio.com), and Kirill Katsnelson's DirectiXer (\$49; www.tonewise .com/DirectiXer). Each performs its magic in a slightly different way.

Name	Syn Ins Outs VST File	and the second second
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Endersten		CONTRACTOR OF TAXABLE PARTY.
	General Master Mix Ind Outputs Option	
	T the parameter stage	CONTRACTOR STATES
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	T Do Not Attenuate By -1.5dB When Main	ng
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	F Earce Stereo Processing	STATE OF STATE OF STATE
	F Hide Unnamed Parameters	
	Alternative Window Sizing Method	State of the second second
	Send Parameters As MIDI NRPN Messe	ages (DXI2 host required)
	Hidden from SONAR® [2.0+ only]	Carlo Carlo
	Track Bounce Speed Fastest possib	
	CALL PROPERTY AND ADDRESS OF	CONTRACTOR OF THE
	and the second s	OK Cancel

FIG. 2: VST plug-ins already converted by Kirill Katsnelson's DirectiXer appear in its main window (background). When a new plug-in is being converted, the Options tab (foreground) lets you control various aspects of the conversion.

With all three wrappers, once you've converted your plug-ins, you should never need to run the wrapper software again (until you acquire new plug-ins). The wrappers become invisible; the plug-ins appear in the menu of the DirectX host as though they were standard DX plug-ins (see Fig. 1).

DirectiXer operates in a window that shows a list of the plug-ins you've already converted (see Fig. 2). That's useful—you won't convert the same

one twice, and you can delete items you no longer want cluttering up your menus. After using a standard file dialog box to select the DLL file corresponding to the plug-in, you can choose various options, such as Send Parameters As MIDI NRPN Messages and Force Stereo Processing. You can also enable or disable individual audio outputs for a multichannel synth plug-in. I like this program's flexibility, although I left the default settings pretty much the way they were most of the time.

VST-DX Adapter is a batch processor. You show it the disk directory paths where your VST plug-ins live,

and it converts everything in the paths. If you have plug-ins that you don't want converted, you must remove them from the folder before running Adapter. For example, some of the VST plug-ins that come bundled with Cubase can't be converted. so when VST-DX Adapter finds them, it spits out a long series of error messages (see Fig. 3). After this first stage of the process is complete, you get a list of plug-ins in a window, and you can configure their properties (though there are fewer options than in DirectiXer).

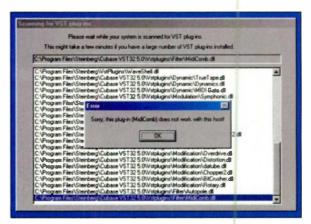


FIG. 3: FXpansion's VST-DX Adapter is a batch processor, so it automatically grabs everything in your VST plug-ins directory. During the process, it may issue error messages if it can't wrap a given plug-in.

VST DX Wrapper Pro looks rather like an installation wizard complete with Back and Next buttons (see Fig. 4). You select a VST plug-in from a list or by using the Browse button, name your converted plug-in, and the job is done. This program offers none of the options found in the other two for customizing the behavior of the plug-ins. Also, the ReadMe file suggests that VST DX Wrapper Pro is outdated—it refers to older host programs but not newer ones like Sonar. And it specifically mentions VST 1.0 but not 2.0

THE TEST SUITE

Given the vast range of software available for Windows, I couldn't test every possible combination of **h**ost, wrapper, and plug-in. I therefore chose several programs to represent a cross section of typical music applications.

My main programs were Cubase VST/32 5.1, Sonar XL 2.0, Fruityloops 3.4, and Sonic Foundry Sound Forge 6.0. My plug-ins included various VST synths, such as Native Instruments FM7, VirSyn TERA, and Steinberg's Waldorf Attack and Waldorf PPG Wave 2.V. I also included Camel Audio's nifty little distortion effect Super-CamelPhat 2.0, Big Tick Audio's Hexaline (a freeware VST chorus unit), the Waves Gold Bundle DX effects (I started with version 3.0, which doesn't allow automation, and later upgraded to 3.5, which does), and other VST

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and DX effects that are installed along with the various host applications.

CUBASING

Cubase easily hosts both VST and DirectX effects. They all show up in the pop-up menu, and for the most part they work as expected. The only DX plug-in effects that didn't work in Cubase were the ones whose names begin with *Cakewalk FX*. Other Cakewalk plug-ins worked, but the FX set wouldn't instantiate.

That is not unusual in the world of bundled plug-ins. For example, as mentioned earlier, Cubase ships with a set of VST plug-ins that can't be used in any other program. One way to view the situation is to think of the host application as a sort of copy-protection dongle for the plug-in. Older Steinberg VST plug-ins, such as Fuzzbox and WunderVerb3, can be used in other programs. Indeed, they were converted by all three wrappers and then operated as expected in Sonar.

According to the manual, Cubase will automate the first 15 effects parameters in the first 32 audio channels in the mixer as well as in the 8 Group and 16 ReWire channels. When you instantiate a software-synthesizer plug-in in Cubase, it appears in its own stereo channel, but because it's neither an audio, Group, nor ReWire channel, the effects processing the synth can't be automated.

Cubase won't let you instantiate a DX Instrument in its VST Instruments panel. Fortunately, most of the hot software synthesizers are VST compatible, so Cubase users have little cause for complaint.

SONARITEASE

When I started testing plug-in automation in Sonar, I was balked briefly because the manual fails to explain that the program won't record automation data if any tracks are enabled for recording. Once I got that wrinkle ironed out, I found that many effects, including some wrapped VST effects, would automate just fine. The Waves Gold 3.0 bundle (DirectX effects, not VST) wouldn't automate, but when I upgraded to version 3.5, automation worked as expected.

I also checked Sonar's ability to store and reload presets in wrapped VST Instruments. While I didn't assess every possible combination of synthesizer and

Selecting VST Plugin	From the list Please select VST Plugin from the list below. List of installed VST Plugins:	
Grandio	Cs40 CubaseDither FM7 FM7tk Infinity Effect Infinity Synth JX16 SuperCamelPhat2 Universal Sound Module Uv22 VstDx VSTDynamics	
	C Don't show already wrapped plugins	
	< <u>B</u> ack <u>N</u> ext>	Cancel

FIG. 4: Spin Audio's VST DX Wrapper Pro operates from a window that resembles an installation wizard. This page shows the listed VST plug-ins.

wrapper, I also didn't encounter any problems with those I tested.

The knobs in Sonar's included DXi DreamStation automated with easily edited controller data. The DXi version of FM7, however, wouldn't automate. Onscreen slider moves were not recorded into its MIDI track. I had no trouble adding MIDI controller envelopes to Sonar tracks, though, and driving FM7's limited set of MIDI controller inputs with them.

I had various problems with the wrapped version of the Waldorf PPG Wave 2.V synth. The panel appeared in Sonar, and I could play the PPG live from my MIDI keyboard, but every time I tried to record a MIDI track for it, Sonar's audio output shut down. That happened with the DirectiXer conversion and with the FXpansion conversion. Cakewalk tech support suggested choosing Alternative Window Sizing Method in DirectiXer. After I did that, the PPG worked as expected. For some reason, the FXpansion conversion worked the second time as well.

DirectiXer's performance with converted VST Instruments was not perfect. Steinberg's The Grand converted, responded to MIDI input, and allowed a MIDI track to record and play back. But Waldorf Attack consistently crashed Sonar when converted by DirectiXer. FXpansion converted Attack without errors, and I was able to edit its sounds, record a track, save and reopen my song file, and so on.

Sonar had no trouble automating the parameters of converted VST plug-ins. However, when I used SuperCamelPhat 2.0 to process the output of Attack (both having been converted by FXpansion), Sonar exhibited some instability. Sometimes when I started playback, the CPU meter jumped up to 80 percent, and playback wouldn't start. When I clicked on the Start button a second time, the two plug-ins worked together. I tried removing SuperCamelPhat from the Attack track and using it to process a stereo audio track. In that configuration, there was no CPU spiking.

A few days later, the FX pansion conversion of Attack decided to be a little

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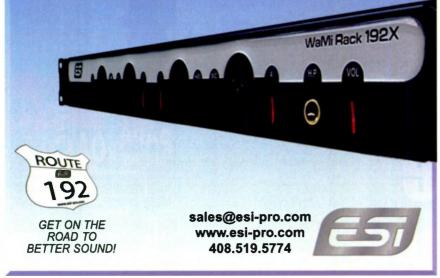
more cantankerous. After instantiating it, I could play it from my keyboard at first, but each time I double-clicked on the DX rack to open Attack's edit window, Attack's audio output went away. I had to click on Sonar's audio engine button twice to get the audio started again. When I instantiated the PPG in the same song, CPU usage suddenly shot up to more than 80 percent and stayed there, even though I was playing only one or two notes on the PPG and none with Attack. When I quit the song and reloaded it, however, CPU usage was down around 6 percent, where it belonged. (According to Cakewalk, performance might be improved a bit by slightly increasing the Latency slider setting or by changing the parameter setting StopIfStarved=n Aud.INI.)

The Steinberg Karlette tape-delay emulator wrapped and worked in Sonar, but I was unable to get it to sync to Sonar's tempo. DXi2 supports

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MIDI Clock sync, so it's difficult to say exactly where the hang-up was.

FORGING AHEAD

Sound Forge 6.0 readily used VST effects converted by all three wrappers. It provides a dialog box with which you can add the effects of your choice to the DX Favorites menu. The Preview button in the effect's edit window lets you hear what the processed file will sound like. When the parameters are set to your satisfaction, click on OK and your file will be processed.

Sound Forge affords no real-time control over the effects while the file is being processed. In fact, processing isn't even a real-time event; it occurs silently in the background. Sound Forge 6.0 does, however, include a new Audio Plug-In Chainer window that lets you link several DirectX plug-ins in a single chain. It works "nonmodally," so you can preview and change the output volume of any effect without leaving the plug-in interface.

Also, Sound Forge can't attenuate the input to an effect; it sends files to the effect at full level. If the effect boosts some frequencies (as is emphatically the case with SuperCamel-Phat), and if the effect doesn't have its own input attenuator, the output can easily overload. The work-around is to reduce the level of the file first, and then process the reduced audio as a second edit. Because Sound Forge has multiple undo and redo capability, this is only time-consuming, not difficult.

Going the other direction, the DirectX effects bundled with Sound Forge can be used in other hosts but can't be automated. (Sonic Foundry's Acid Pro 4.0 does provide DX automation and supports VST Instruments, and Acid's automatable DX effects work in Sonar.)

LOOP THE LOOP

Fruityloops will run both DX and VST plug-ins without a wrapper. The VST parameters that I tried automated in Fruityloops, but the DX versions of the same plug-ins were less consistent. According to Image-Line, DirectX 8 plug-ins that publish their parameters to the DX host can be controlled.

Fruityloops also could instantiate both DXi and VSTi synths. Not that I don't appreciate the Fruity synths, but I love being able to expand my palette. Waldorf Attack (directly as a VSTi, not wrapped as a DXi) fits well with the Fruity "all rhythm patterns, all the time" vibe. I was able to automate Attack's knobs with the mouse, but right-clicking didn't open Fruityloops' Event Edit window. Turns out, that window is accessed from a drop-down menu. Some of the VST Instruments I tried allowed parameter automation, but some, such as Spectrasonics Stylus, didn't.

The DreamStation DXi2 synth, which ships with Sonar, loaded into Fruityloops, but it wouldn't make a peep. The excellent DR-008 percussion-oriented DXi2 synth loaded and played, but I couldn't get its knobs to automate.

The Waldorf PPG Wave 2.V synth (instantiated as a VSTi) loaded into Fruityloops, but while it made its usual array of way-cool sounds, it also gave me dropped notes and stuck notes while playing a fairly simple pattern.

IT'S A WRAP

All three wrappers did the job, with some individual variations from plug-in to plug-in. When it came to automation, I was able to control some parameters some of the time, but trying dozens of different combinations and struggling to figure out what was user error and what was genuinely a limitation of the software left me echoing the bewildered words of Rodney King, "Why can't we all just get along?"

Why do the large manufacturers force musicians and plug-in developers to jump through hoops? Why can't they just agree on a single plug-in standard? According to Cakewalk, there are legitimate technical reasons why the company prefers not to support VST. As explained to me by Cakewalk's technical representative, the main issue is how the host application prevents processing conflicts in a multithreaded environment. Different approaches to multithreading in various host applications make universal plug-in compatibility extremely difficult.

Although I'm not a software engineer, I found Cakewalk's explanation to be revealing. From the outside, it may appear that the wrapper developers are solving a problem that should never have arisen in the first place. But given the complexity of real-time audio software, getting all of the companies to implement a single plug-in standard might be prohibitively expensive, even if it were technically and politically feasible. Oh, well. It's a nice dream.

Jim Aikin has been writing about music technology for more than 25 years. He is currently working on a book about software synthesizers.

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Play Rights

PROs strive to help artists get a slice of the pie in changing times.

By Michael A. Aczon

f you are ever searching for an area where the phrase "move forward or die" applies to the music industry, the three U.S.-based performing-rights organizations (PROs) are prime candidates. While many artists, companies, and fads have come and gone in the music business, ASCAP, BMI, and SESAC have each successfully weathered the changes within the industry. In fact, performing-rights organizations provide a valuable business lesson on how to survive



by adapting to technology and trends.

Let's begin with a brief review of what these organizations are and why they exist. When the copyright law was written at the turn of the 20th century, it addressed the need to protect the performance of copyrighted works. With vaudeville and musicals already thriving and the new technology of radio right around the corner, a mechanism had to be put in place for licensing the use of songs, collecting royalties based on those uses, and paying out the royalties to the owners of the copyrights. From that need came the American Society of Composers, Authors, and Publishers (ASCAP). About 20 years later, ASCAP was joined by Broadcast Music, Inc. (BMI) and SESAC. (SESAC was originally formed as the Society of European Stage Authors and Composers, but because it is no longer strictly for stage writers or for Europeans, it now goes only by SESAC.)

TECHNICALLY SPEAKING

The world has experienced an explosion of technology in the past decade, and the growing pains associated with that phenomenon are visibly evident in the entertainment industry. New ways to deliver music have presented PROs with continual challenges.

When the Internet revolution enabled

"A Dozen Labels and Publishers Came To Our Showcase Because We Joined TAXI"

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We stopped by TAXI's office to pose for this photo because we wanted to thank them for all the great things they've done for us.

If you've ever dreamed of landing a major label deal and having a hit record, then you'll understand why we're so grateful.

We're from Columbia, South Carolina. It's not the kind of town where you meet A&R people, or have them come to your gigs. We knew we needed to do something to get our music heard by the right people. After carefully researching our options, we decided that TAXI was the best choice.

We had really high expectations when we joined. And we're happy to report that TAXI has exceeded all of them.

TAXI sent our CD to several top A&R people, and the response was very positive. Piggy-backing on that, they sent our CD to more than 40 other high-level A&R people at companies like A&M, RCA, Warner Bros, Columbia, Interscope, Dreamworks, MCA, Arista, Virgin, Capitol, Atlantic, Elektra, Epic, Hollywood, Maverick, and many more. All the sudden, we found ourselves in need of a music attorney. TAXI's president made one phone call and got us a meeting with one of the top music attorneys in the business.

He signed on to represent us, and with our attorney and TAXI spearheading the effort, we began to build a buzz. That lead to an industry showcase in Los Angeles with A&R people from more than a dozen labels in attendance.

Now, we're on our way to New York to do a round of showcases there.

Can TAXI do that for *every* member? That's up to you and



your music. If you're really, really good, TAXI can deliver.

Will we get a record deal? That's totally up to us and *our* music. But, because we joined TAXI, we're getting serious attention from people in the music business we had little chance of meeting on our own.

And TAXI has given us much more than just great opportunities and helpful feedback from their A&R staff. We've also learned a lot about the music business from their monthly newsletter, and had an incredible time at the Road Rally – TAXI's FREE convention for members and their guests.

The convention alone is worth much more than what we invested to become members.

Would we recommend that you join TAX1? Without hesitation. It's the best thing we've ever done for our career.

If you're an artist, band, or songwriter, call for TAXI's free information kit, and let them help you get your music to record labels, publishers, and film & TV music supervisors. TAXI rocks!

WORKING MUSICIAN

anyone with a computer to broadcast, distribute, sell, or share music, it became clear that copyrights and technology were on a collision course. ASCAP, BMI, and SESAC each responded by creating special technology departments within their organizations. The societies took on active roles in the copyright and technology communities to educate others and to create and enforce policies that encouraged the growth of technology while protecting the rights of those who create music. Experts from the PROs championed the causes of writers and publishers by attending conferences, visiting think tanks, and participating in debates nationwide.

Technology has always been a challenge in the business of entertainment, but the issue of music on the Internet is probably the biggest challenge PROs have ever faced. The initial problem was determining which money model was appropriate for protecting copyrights and collecting royalties. The PROs, in accordance with various new U.S. laws and U.S. treaties with other countries, have adapted accordingly. The PROs monitor the streaming of music over the Internet and treat that activity very much like a broadcast. In fact, Internet tracking by the PROs can be more accurate than radio tracking because the technology involved makes it easy to identify songs and track how often they are used.

Recent controversial lawsuits and settlements with those who broadcast simultaneously on traditional radio and the Internet have resulted in the broadcasters' payment of additional licensing fees to the PROs for the use of music on the Internet broadcast. A more difficult question has been how to deal with smaller, nontraditional broadcasters such as individuals who want to put music on a site. The PROs had to maintain a delicate balance between protecting the rights of copyright holders and allowing independents to develop within the industry. They adapted by negotiating licenses on a case-by-case basis with those who stream music on the Net. Those licensing fees are based on how many people visit the site, whether the site is generating any money (by selling advertising or merchandise, for example), and how much music is being used. These licenses are for Internet streaming only and do not address music downloads, which require a mechanical license rather than a performance license.

As you can imagine, the licensing of music broadcasting on the Internet is still in flux. At press time, a number of agreements, lawsuits, proposed laws, and settlements by large and small music users are at some stage of progress. Currently, Internet aggregators (ISPs and other Internet service companies) and people who stream music are on their honor to seek licenses from the PROs. In time, the PROs are likely to become more efficient and aggressive in their efforts to identify users of music, develop fair licensing fees, and collect and distribute royalties. It would serve you well to keep up with the news on this front so that you know the status of your royalty stream.

CAN'T BEAT 'EM? JOIN 'EM

In addition to responding to the legal ramifications of technological progress, PROs are using new technology in an effort to make song licensing and royalty payments easier and more efficient. They have established systems to protect performance rights regardless of the type of new media used to broadcast musical works. For example, ASCAP's easy-to-use RateCalc system lets Web developers calculate the potential licensing fee for using music on their sites before deciding to obtain a license from ASCAP. You can access the RateCalc system on the ASCAP Web site (see the sidebar "Performing-Rights Organizations" for contact information). SESAC was the first of the PROs to track the radio broadcasting of songs using Broadcast Data Systems (BDS) and ConfirmMedia Watermarking technology. In those systems, CDs are encoded so that songs played on the radio are automatically tracked, allowing SESAC to turn around royalty payments to artists quickly.

The court battles fought by the PROs over unlicensed uses of music continue to make headlines, but less publicized are the PROs' cooperative efforts within the industry. By working with music, media, and business-community partners, the PROs are using a nonadversarial approach to get the word out about legal uses of music. For example, I have attended California Lawyers for

PERFORMING-RIGHTS ORGANIZATIONS

Performing-rights organizations have offices in many different cities. Each organization also has specific phone numbers and e-mail addresses for specialized areas such as Latin music, film and television, and classical music. Listed below are the main telephone number for each organization's offices and the Web site and e-mail address for general inquiries where available. The PROs' Web sites are all extremely comprehensive and are probably the best place to start when looking for information.

ASCAP

New York tel. (212) 621-6000; Los Angeles tel. (323) 883-1000; London tel. 20-7439-0909; Nashville tel. (615) 742-5000; Miami tel. (305) 673-3446; Chicago tel. (773) 394-4286; Puerto Rico tel. (787) 281-0782; Atlanta tel. (404) 351-1224; e-mail info@ascap.com; Web www.ascap.com

BMI

New York tel. (212) 586-2000; Nashville tel. (615) 401-2000; Los Angeles tel. (310) 659-9109; London tel. 20-7486-2036; Miami tel. (305) 266-3636; Atlanta tel. (404) 261-5151; Puerto Rico tel. (787) 754-6490; Web www.bmi.com

SESAC

Nashville tel. (615) 320-0055; New York tel. (212) 586-3450; Los Angeles tel. (310) 393-9671; London tel. 20-7486-9994; Web www.sesac.com

-Mary Cosola



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NEW FEATURES IN BAND-IN-A-BOX VERSION 12...



First off, you'll get the amazing new "MIDI-file to Style Wizard", that automatically converts a MIDI file (.MID) to a Band-in-a-Box Style (.STY). Quickly make your own simple to advanced styles from any MIDI file.

Twice as many instruments! We've added support for General MIDI 2 standard (GM2). This adds 128 new instruments to Band-in-a-Box styles and songs, including ukulele, mandolin, 12-string guitar plus many new and improved piano, organ, guitar, brass and string sounds! We've made many new styles using the new instruments, and include updated versions of previous styles.

We've enhanced the Guitar Window by adding fret display support for other instruments, including mandolin, ukulele and banjo. You'll see authentic chord voicings and melody display on the fretboard for all of these new instruments. The StyleMaker has been enhanced with support for GM2 instruments, so you can make styles that use the new instruments and have correct instrument voicings displayed on the fretboard. Guitar chord diagrams can now be included in the notation display, leadsheet, and printout. Choose from Folk, Pop or Jazz Guitar Chord Diagrams.

Bass players will now see bass tablature and correctly displayed bass parts on the new bass fretboard.

The program's user interface has been enhanced, with a single dialog for all program options and song settings, right mouse support, simplified menus, additional hot keys and more. All of the styles are enhanced! We've improved/updated EVERY Band-in-a-Box style that we've made with the newest StyleMaker features including guitar and other fretted instrument voicings, consistent volume levels, edited patterns and more.

New options for song navigation during playback, include fine control over the song looping during live performance. As the song is playing you can get it to endlessly loop the last or middle choruses with a simple hot key. Load and play an entire MIDI file in Band-in-a-Box, including interpreting the Chords with the Chord Wizard.

Harmony notation display has been enhanced. Harmonies can now be displayed or printed with separate notation tracks for each voice. View or print each harmony on a separate track. And much more...

MORE FEATURES IN VERSION 12...

- OVER 150 STYLES INCLUDED: Jazz, Latin, Waltzes, Pop/Rock, Classical, Country, Folk, Ethnic, Euro-Tek, Fusion, Blues, Unplugged, Praise and Worsbip, and more!
- AUTOMATTC SOLOING. Simply select the soloist you'd like to bear and play with (from over 100 available) and Band-in-a-Box will create & play a solo in that style, along to any song! This is bot!
- AUTOMATIC SONGS & MELODIES. Compose a new song in the style of your choice, complete with intro, chords, melody, arrangement & improvisation. You can go from nothing to a completed song in one second!
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BURN YOUR OWN AUDIO CD. Now you can convert ("burn") your Band-in-a-Box composition directly to an Audio-CD. The resulting CD will play in any standard Audio-CD player. Requires a CD-R or CD-RW drive.

> Features listed are for Windows® version. Macintosh® users: for a full list of features, please visit www.pgmusic.com/band.htm

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- From Earlier Version or crossgrade...\$59 ✓ MegaPAK UPGRADE from Previous Version...\$149 From Earlier Version or crossgrade...\$159
- ADD-ONS FOR BAND-IN-A-BOX...each \$29
- ✓ NEW! Styles Set 32 Alternative/Contemporary Rock
- ✓ NEW! Styles Set 31 20 Country Rock Styles
- ✓ NEW! Styles Set 30 World Fretboards

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SOLOISTS SETS: Soloist Set #9 – Blues Guitar, Country Piano & More...\$29 Soloists Sets #2-8...each \$29

The MIDI Fakebook for Band-in-a-Box... \$29

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WORKING MUSICIAN

the Arts lectures, Northern California Songwriters Association conferences, and California Copyright Counsel lectures and panels in which BMI, SESAC, and ASCAP representatives spoke about ways to work together rather than resorting to legal battles.

THE POLITICS OF MUSIC

The more art, commerce, and law become complex and intertwined, the more songwriters need to organize and exercise their own political clout. The PROs are obvious avenues to this influence because they already represent the concerns of writers and publishers within the music industry.

Having a voice on Capitol Hill goes a long way and the PROs know it. BMI has an office of government relations based in New York. According to the BMI Web site, "The department works with representatives of federal, state, and local government to educate them about issues of copyright that could affect our affiliates. Fred Cannon [vice president, government relations] and his staff strive to educate our affiliates about legislative activity that could affect them, and run grassroots initiatives. These include letters to Congress, meetings with government representatives, and visits to Capitol Hill."

Visitors to the ASCAP Web site can check out Capitol Connect (at www .capitolconnect.com/ascap), which the PRO uses to dispense information on legislative and political issues of interest to songwriters. ASCAP also has its own political action committee that raises funds for legislative purposes.

In short, if you are a songwriter, hooking up with PROs can be one avenue toward exercising some political clout. Bear in mind, though, that the PROs also represent the interests of their affiliate publishing companies, and your interests may not always be the same as those of multinational corporations such as Sony, BMG, and EMI. But any voice is better than no voice at all, and your PRO might be a good place for you to start.

DIVIDE AND CONQUER

The industry has become increasingly specialized over the years. With the

fractionalization of radio formats, recordlabel marketing efforts, and audience tastes, specialization has become a buzzword throughout the industry. All songwriters have certain common needs, but let's face it, the needs and servicing of classical composers and hip-hop artists sometimes don't match. Specialization is necessary, and the PROs have accommodated their affiliates accordingly.

All three organizations now have specialists who work with their writers and publishers by musical genre and by geographical area. When working with your PRO, you can develop relationships with representatives for pop, Latin, film and television, R&B, and hip-hop—all under the same roof. These specialty reps are all well versed in their specific genres and have their own sets of contacts and knowledge of industry practices, including awards shows. The geographical specialization also works in a writer's favor. If your local PRO rep has a good relationship with you, he or she can introduce you to another rep in another office if you will be relocating or working in that region.

INDEPENDENCE DAY

One of the biggest trends in the industry is the emergence of independent artists: the grunge scene from Seattle, the hiphop artists from the Midwest, and the R&B scene from Atlanta are all testaments to how quickly unknowns can become known. ASCAP, BMI, and SESAC now offer a variety of services that allow and encourage indies to join the party.

The PROs are reaching out beyond the traditional music markets of Los Angeles, Nashville, and New York City to markets that were virtually ignored a decade ago. At music-business conferences in almost any part of the country, you can find PRO representatives sharing information about their companies. The PROs have gone a step further by initiating educational programs, contests, workshops, and showcases in a variety of regions. Any of the PRO Web sites will give you an idea of the upcoming events that they make available to their members as well as to the general public.

Performing-rights organizations have become more involved in songwriters' careers in the past few years. They are all embracing the notion that an informed writer is better for the industry than a naïve one. ASCAP and BMI have long dominated the performingrights scene, but SESAC has made no secret of its recent and aggressive efforts to turn the choice of a PRO into a three-horse race. That healthy competition can help your career and ultimately benefit everyone involved.

Music educator and entertainment lawyer Michael A. Aczon is experiencing the joy of listening to his son Evan's recent discovery of playing a Fender Stratocaster through a 400W amp in the Aczon garage.

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Scott Rouse - Producer, Grammy Nominee, Nashville, Tennessee

I have a microphone "wish list". You have allowedme to check off both the U87 with the C1 and the C12 with the T3. **Ted Perlman** - Producer/Arranger/Composer

Bob Dylan, Chicago, Kaci, 2gether, Young MC

One of the best vocal mics in the world is the \$300 Studio Projects C1. You can spend way more for "one of those" mics from Germany if your ego demands it, but the C1 is certainly the sonic equivalent. **Pete Leoni** -Producer Engineer, Tech writer and reviewer

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REVIEWS

A N T A R E S KANTOS 1.0 (MAC/WIN) A new breed of synthesizer hits the street.

By Larry the O

htares's Kantos 1.0 is something new under the sun. Not because it's a 2-oscillator synthesizer with analog-sounding filters and a modulation matrix; there's nothing particularly new about that. Nor because it's a plug-in that works in all the major host environments, as there are plenty of those around.

What sets Kantos apart from other software synthesizers is that instead of being controlled by MIDI, it is controlled by audio. Kantos extracts the pitch and timbral information from an appropriate audio source and uses it to control its many parameters. (Applying an inappropriate source produces less predictable, though possibly still useful, results.) Let's take a closer look at Kantos's facilities and then get into how it works.

RUNNER UP

Kantos 1.0 runs as an RTAS and VST plug-in on both the Mac and PC, under a MAS host on the Mac, and under a

DirectX host on the PC. The RTAS version is compatible with any RTAS version of Pro Tools, including Pro Tools Free. Kantos requires at least a Mac G3



100

106

114

120

130

138

Antares Kantos 1.0 (Mac/Win)

Digidesign Digi 002

Roland MMP-2 (Mac/Win)

Quick Picks: Akai MPD16; reFX VSTi Plug-Ins

(Mac/Win); Frontier Design Group Apache;

BIAS Peak 3.11 (Mac)

Radial JD-7 Injector

ART DPS

FIG. 1: The colorful and unique main screen of Anteres's Kantos offers ready access to all the major features of the program. The interface consists of sliders, graphic displays, and text boxes for adjusting parameters.

Only the Best Will Do.

Introducing the Kurzweil KSP8 – an 8-bus MDSP (Multi-Bus Digital Signal Processor) that redefines the standards for quality and power in the digital studio. In fact, the KSP8 redefines a whole lot of things – including who can afford to own the very best in audio processing.

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"...I set up a Studio with one stereo and three mono inputs feeding four stereo effects buses. I configured a stereo Chain for the sax on effects buses 1 and 2 and placed a warm plate reverb on buses 3 and 4 for the vocal. Next I submixed all the bass and drum tracks to stereo and inserted a mastering effects Chain across buses 7 and 8 to pump up the low end and tame the dynamics. Last, I set up a basic club ambience for the entire mix.

"The fact that I was able to process an entire mix of this complexity through a single device is amazing. Better still, it sounded great! If I could only have one piece of gear in my rack, this would be it." —Mark Nelson, Electronic Musician Feb. 2003

KURZWEIL

KANTOS

(a G4 is strongly recommended) or a Pentium II-class Windows machine that meets the minimum spec of whatever host you are using. It runs under Mac OS versions 8.6 through 9.x (an OS X version is in the works) and under all current flavors of Windows. I evaluated it on a dual-processor G4/800 MHz using the MAS version with Digital Performer 3.11 as the host.

Because Kantos accepts audio input, you can run it only as an insert plugin, not as a virtual instrument. When inserted on a mono channel, you can choose mono-to-mono or mono-tostereo versions; stereo channels get a stereo-in-stereo-out version. Once inserted, the Kantos screen comes up. The interface is an arty, neopsychedelic study in green that looks like a cross between a biological structure and a printed circuit board (see Fig. 1).

At the upper left of the screen is the Input fader, and to its immediate right is a meter showing the input level. Kantos likes a hot signal, and Antares suggests setting the level so that the red clip indicator lights on the highest peaks. To change a parameter's value, you drag the white "blob" on the value's associated slider or fader, or you type a value in the text box below or next to it. You can also use your keyboard's Up and Down Arrow keys to increment or decrement values.

The input signal flows into the Gate Generator, which is a critical element in the chain. The Gate Generator determines how triggers for new notes are extracted from the signal. How well you configure the Gate Generator for a particular input signal determines how well Kantos's output follows the input's note attacks. Setting the On and Off thresholds, Floor (a noise gate for reducing or eliminating the effects of unwanted artifacts in the source, such as hum on a guitar track), and Hold (minimum time before a note is turned off) parameters can require some work.

Pitch and timbral characteristics are extracted automatically; there are no parameters to adjust for those. Antares is reluctant to divulge details of Kantos's analysis methods, but they clearly encompass spectral transfer similar to vocoding, formant analysis, and frequency and envelope tracking.

The output of Kantos's Input section shows up in three ways: the original

input signal is available to be mixed with Kantos's synthesizer output, the pitch and timbral characteristics are used to control synthesizer parameters, and an additional pitch-controlled sine wave is available to be mixed into the final output for special effects such as added bass.

SYNTHOMATIC

The synthesizer itself has a fairly standard configuration. There are two wavetable oscillators, each of which can use any of the roughly 40 factory waveforms that appear in a drop-down menu or any 16-bit AIFF file (on the Mac) or WAV file (on the PC) you put in a dedicated Kantos audio-file directory (see Fig. 2). If that's not enough for you, Antares posts additional waveforms on its Web site. The manual states that there is no restriction on the size of the files that you can use as waveforms; however, files smaller than 400K work "most efficiently."

An oscillator's pitch can be offset by octaves (± 2 octaves), semitones (± 12 semitones), and cents (± 100 cents), for a total range of just over 3 octaves up or down. A pitch quantizer, shown as a small keyboard whose keys you click on to select pitches for quantizing, is available for each oscillator. Clicking on E, G, and B, for example, quantizes the output of the pitch extractor to the notes of an E-minor arpeggio. Clicking on a single key restricts the oscillator to a constant pitch and effectively disables pitch control by the input.

Each oscillator passes through a chorus algorithm and multimode filter and is then fed into the Articulator, where the timbral information extracted from the input is applied in ways too top secret for Antares to reveal. In addition to the oscillators, there is a noise source with its own multimode filter, whose output is also directed into the Articulator.

You adjust parameters for the filters

FIG. 2: Shown here are some of the nearly 40 waveforms included in Kantos for use with its two oscillators. More waveforms are available from the Antares Web site, and users can also add their own.

> (cutoff frequency and Q) and the Articulator (amount and Q) by dragging a white dot around an x-y display that is rather grandly referred to as a Biaxial Graphic Adjuster. That is a great way to tweak two parameters at once.

> In addition to its basic more-than-avocoder processing, the Articulator has a Format Offset parameter and an Emphasis section; the latter is essentially a 3-band tone-control-

style EQ (gain is the only parameter that is variable for each band). Although it might appear that the oscillators and the noise source are mixed together before being fed into the Articulator, they are, in fact, processed separately.

The Articulator's output feeds the Sub-mixer and, in parallel, a delay (up to 999 ms of delay with feedback is available). The Sub-mixer has faders for each oscillator, complete with mute and solo buttons, sine waves carrying the pitch of each oscillator, and the noise source. At the end of the signal path, the output of the Sub-mixer feeds the output Mixer, which has faders for the Sub-mixer, delay, and unprocessed original source, as well as master output. In a stereo-output version, the faders in the output Mixer have pan controls.

The basic signal path itself is fairly powerful, but the really wacky results are obtained from Kantos's Modulation Matrix (see Fig. 3). The Modulation Matrix has eight "slots," each of which maps a source to a destination. Seven sources are available: two LFOs (with a choice of six waveforms for each); two ADSR

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DIGI 002

Digidesign ups the ante with its FireWire-based Pro Tools console.

By Nick Peck

or years, Digidesign has dominated professional music and post-production with its TDM-based Pro Tools hardware and software. The company has also made strong inroads into the lower-end, projectstudio market with products such as the Digi 001 digital audio interface and the Mbox USB audio interface.

With the introduction of the Digi 002, Digidesign aims squarely for the middle ground. The Digi 002 is a highresolution, portable, host-based Pro Tools system that has robust, flexible I/O and a comprehensive integrated control surface. With four built-in microphone preamps, a terrific suite of bundled plug-ins, and a standalone mode that allows the unit to perform double duty as a digital mixer, the Digi 002 sets a new high standard in terms of bang for the buck.

INS AND OUTS

The rear panel of the Digi 002 has a comprehensive array of inputs and outputs (see Fig. 1). The system is fixed: there are no I/O ports for optional cards to fit your particular system. But the choices made by Digidesign are solid. Input channels 1 through 4 are configured as four mic inputs on XLR jacks, with 48V phantom power, as well as four ¹/₄-inch line/instrument inputs. These are controlled by front-panel selector switches and input gain knobs. Defeatable 75 Hz highpass filters are thrown in for good measure. There are four additional ¹/₄-inch line-level analog inputs, each with individual +4 dBu/ -10 dBV level switches.

For added flexibility, the Digi 002 has two Alt Source inputs on -10 dBV RCA jacks. They can be used to route a CD player or tape deck through the system and directly out to the monitors. Selection buttons on the front panel allow you to switch between the standard Digi 002 output and the Alt Source output going to the monitoring section. In addition, the Alt Source can be routed to Digi 002 inputs 7 and 8.

In my configuration, I routed the stan-

dard audio of my Mac into the Alt Source inputs. That way, I could switch back and forth quickly between Pro Tools and other audio applications such as SoundApp and Amadeus II, without having to concern myself with the software contention issues that crop up when you route non-Digidesign audio through Digidesign hardware using the sound control panel.

The Digi 002's 12 analog outputs consist of a pair of monitor outs, main outputs 1 through 8, and an alternate pair of main out. All outputs are on ¹/-inch jacks operating at +4 dBu, except for the Alt outs, which are -10 dBV RCA jacks designed to connect to a consumer-level device, such as a tape deck. Monitor level is controlled by a front-panel volume pot. There are also Mono and Mute buttons for the monitoring system, as well as a headphone jack with its own level knob. As a final touch, the Digi 002 boots up with the monitor Mute button engaged, which keeps any nasty pops or thumps from blowing your head off when you first boot up your rig. All in all, the output section is well conceived and well implemented.

Note that the Digi 002 is clearly designed for creating music in stereo. You could conceivably connect outputs 3 through 8 to a 5.1 system, but the lack of control within the hardware (and Pro Tools LE software) for that type of configuration makes such an approach less than optimal.

All analog ^{1/2}-inch inputs and outputs are on balanced TRS connections, although unbalanced TS cables may be used as well. The unit I received for review exhibited a marked difference in noise and hum when I switched from using balanced cabling to unbalanced; I recommend using balanced cabling wherever possible.

The Digi 002 supports two channels of S/PDIF I/O on unbalanced RCA jacks, at resolutions from 16-bit, 44.1 kHz to 24-bit, 96 kHz. There is also Lightpipe I/O, which can be configured to accept two channels of optical S/PDIF (running up to 24-bit, 96 kHz), or eight channels of ADAT data, also at 24 bits but limited to the ADAT standard of a 44.1 or 48 kHz sampling rate.

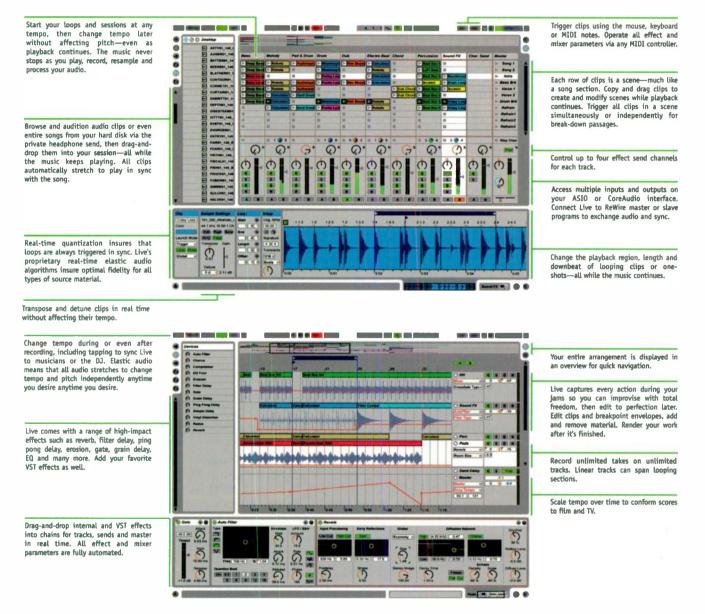
The Digi 002 connects to your computer with a FireWire (IEEE 1394) cable and offers two FireWire ports, allowing you to daisy-chain other devices. In practice, I connected the computer to a FireWire hard drive and put the Digi 002 last in the chain, which worked well. As a bandwidth test, I tried recording and playing back 32 simultaneous channels at 24-bit, 96 kHz resolution to a single FireWire drive. The Digi 002 handled the job without a hitch,



interface for Pro Tools LE or as a standalone digital mixer.

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*...the Holy Grail of software. Now I do cues in 7 minutes. I had to have it at any price." ---Chartle Clouser, former leyboardist, Nine Inch Nails; composer, Fox TV's "Festiane"



Download a demo from www.m-audio.com.



These include single-key keyboard shortcuts for most editing functions, surround capabilities, the time-code ruler, and an advanced audio-quantization tool called Beat Detective. While the lack of SMPTE rules out using the Digi 002 for any film or video work, the software is fine for music production and non-SMPTE-based sound production.

However, Digidesign is bundling a variety of RTAS and AudioSuite plugins with the Digi 002. The ones I received include the Waves Renaissance compressor, EQ, and reverb; IK Multimedia's SampleTank software sampler and AmpliTube speaker simulator; Native Instruments' Pro-52 synthesizer; and Digidesign's D-FX chorus, flanger, and delay. Digidesign says that the contents of the bundle and the number of plug-ins included are subject to change at any time.

IN SITU

As soon as the Digi 002 arrived, I put it to the acid test of high-resolution acoustic recording. It took less than 15 minutes to set up the Digi 002 and install Pro Tools LE 5.3.2. From there, I plugged pairs of Neumann KM 184 and Earthworks QTC-1 microphones directly in to the Digi 002's mic preamps using Blue Kiwi cables. I recorded musician Jory Prum singing folk songs while playing his steel-string guitar in a quiet, acoustically treated studio, at a resolution of 24-bit, 96 kHz. The results were clean, clear, and smooth, with a detailed top end. The highs sounded neither harsh nor hyped but were instead extended and well integrated into the sound. The Digi 002's mic preamps are quiet, neutral, and colorless. They are solid in their performance and well suited to the rigorous demands of highresolution audio.

I continued to throw the most difficult audio tasks that I could think of at the Digi 002: jingling keys, tambourines, shakers, metallic hits, and big low-frequency thumps—all at 24-bit, 96 kHz. In each case, the Digi 002 held its own, recording everything faithfully, with a minimum of the harshness and highend distortion that is so often characteristic of 44.1 kHz recording.

CRACKING THE WHIP

Just after receiving the Digi 002 for review, I got the call to do sound design for LucasArts Entertainment Company's new game *Indiana Jones and the Emperor's Tomb*. Time was short, and I needed to set up an office on-site and get rolling right away. I decided to subject the Digi 002 to a grueling realworld project. So I set it up with my Apple 600 MHz iBook, a Maxtor 120 GB external FireWire drive, a pair of Mackie HR824 powered monitors, and an Akai Z8 sampler.

For the most part, the Digi 002 did its job admirably, helping me quickly create the whip cracks, pistol fire, zeppelin motors, and magical energy zaps that are a signature part of the *Raiders* of the Lost Ark universe. I worked back and forth between Pro Tools and other audio apps constantly, all the while checking e-mail, using the Internet, and transferring files using FTP. Outright crashes were fairly rare, although a bug in the Pro Tools software (which I'll describe in a moment) left me reaching for the aspirin from time to time. All in all, though, the Digi 002/ Pro Tools LE system was a very good choice for video-game audio production, and it's the one I intend to use in future projects with LucasArts Entertainment.

The Digi 002's control surface had its chance to really shine during the mixing process. I had one week to design and create final mixes for 30 cineractives (short, linear movies that appear throughout the game to move the story along). Because of the short timeline, I was editing sound effects and ambiences and recording Foley directly into the same sessions that held

nalog Inputs	(4) XLR mic inputs, +4 dBu; (4) TRS line inputs.
	+4 dBu/–10 dBV switchable; (4) TRS line inputs, +4 dBu;
	(2) RCA alt-source inputs, –10 dBV
Analog Outputs	(2) 1/2" TRS monitor outputs, +4 dBu; (8) 1/2" TRS line outputs,
	+4 dBu; (2) RCA alt-main outputs, –10 dBV
Digital I/O	(8) channels ADAT Lightpipe optical;
	(2) channels S/PDIF (RCA or optical)
MIDI I/O	(1) In, (2) Out
Additional I/O	(2) FireWire ports; (1) footswitch port
Number of Channel Strips	8
Frequency Response	20 Hz–20 kHz (+0.15/–0.5 dB)
Sampling Rates	44.1, 48, 88.2, 96 kHz
Bit Depths	16, 24
Audio Tracks	32
MIDI Tracks	32
Dimensions	18.9" (W) × 6.1" (H) × 17.1" (D)
Weight	15.2 lb.
A/D Converters	
Dynamic Range	Inputs 1–4: >101 dBA, 98 dB (unweighted);
	inputs 5–8: >108 dBA, 105 dB (unweighted);
	alt-source inputs: >99 dBA, 97 dB (unweighted)
Total Harmonic Distortion	Mic inputs: 0.004% @ 62 dB gain;
+ Noise	line inputs: ≤0.004% @ +17 dBu input level
D/A Converters	
Dynamic Range	Main/monitor outputs: ≥112 dBA, 110 dB (unweighted);
	alt outputs: 98 dBA, 95 dB (unweighted)
Total Harmonic Distortion	Main/monitor outputs: <0.0016% (-60 dBFS @ 1 kHz);
+ Noise	outputs 3-8 and Alt outputs: <0.0023% (-60 dBFS @ 1 kHz)

Digi 002 Specifications







Yeah...we do DAWs

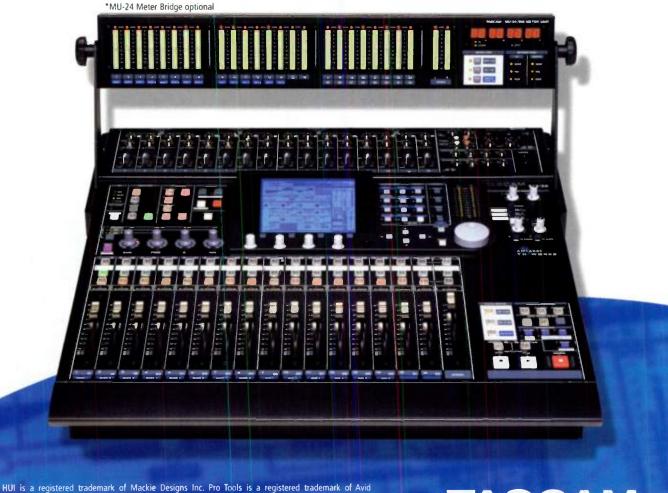
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4-band parameteric EQ, dynamics processing and more. Plus, with standard interfacing like 24 channels of TDIF and 8 channels of ADAT, it's a perfect companion to DAW interfaces like Digidesign's 001TH and MOTU's 2408TH.

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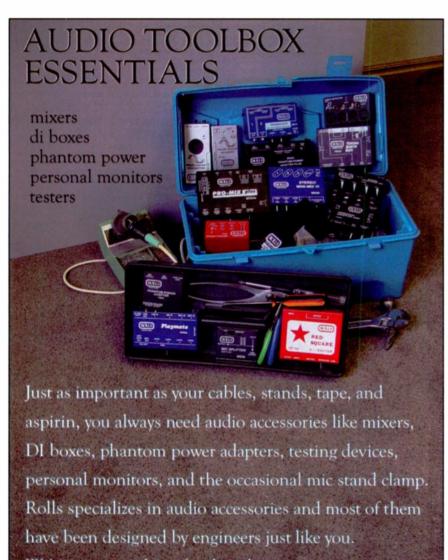
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www.tascam.com

the music and dialog stems. The Digi 002 performed like a champ, allowing me to track, process, and mix almost simultaneously.

After I had worked with it for a while, I refined my mixing style to best take advantage of the control surface: I would rough in a mix by moving the faders until everything sat fairly well, then write an automation pass. Next, I played through the mix, finding any area that needed refinement. Finally, I would select that region and move the faders during playback to overwrite the previous automation for that section. At no time did I pay any attention to levels or meters, other than to make sure that the master fader's levels were hot without clipping. The resulting mixes breathed with life and had a wonderful dynamic quality not usually present in breakpointautomation-style mixes. I never needed compression, relying instead on fader moves to make everything audible.



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ALL ROSES HAVE THORNS

While the Digi 002 performed its duties admirably, there was one nagging bug that caused frustration and impeded my progress. The Digi 002 occasionally emitted a loud click at the end of playback. Far less frequently, the bug manifested itself as a high-pitched whine or even fullscale white noise blasting out of my monitors. Quitting and restarting Pro Tools always solved the problem.

Eventually, I determined that the problem had to do with moving virtual or physical faders during playback, in sessions that had a master fader. I was then able to replicate the problem on an Mbox and a Digi 001, all on different computers. The bug is in Pro Tools LE and Pro Tools Free software, versions 5.x and up. The bug is not present on Pro Tools TDM systems. After I went back and forth with Digidesign for several weeks about the bug, the company was able to replicate it. Shortly before I finished this review, Digidesign released a patch (DAE 5.3.2cs2) to fix the bug. Preliminary results are encouraging, but I

PRODUCT SUMMARY

Digides ign Digi 002 digital audio interface/control surface \$2,495

FEATURES	4.0
EASE OF USE	4.5
AUDIO QUALITY	4.0
VALUE	5.0

RATING PRODUCTS FROM 1 TO 5

PROS: Excellent sound quality. Capable of 24-bit, 96 kHz resolution. Comprehensive control surface. Tight integration between hardware and software. Standalone mixer mode. Generous plug-in bundle. A lot of bang for the buck.

CONS: No BNC word-clock input. No scrub/shuttle wheel. No numeric keypad. No dedicated Save button. Intermittent audible click/noise bug.

Manufacturer Digidesign tel. (800) 333-2137 or (650) 731-6300

e-mail prodinfo@digidesign.com Web www.digidesign.com did not have sufficient time to work with the update to guarantee that all problems with this bug have been solved.

LOW-LATENCY MODE

At this stage of digital audio development, latency is still the bugaboo of all host-based systems. The Digi 002 is no exception, but it offers a Low Latency Monitoring mode to negate the problem during the overdubbing process.

Enabling Low Latency Monitoring defeats any plug-ins or sends assigned to Record-enabled tracks and requires that the tracks be routed to audio outputs 1 and 2. In addition, these tracks won't register their levels to the master faders during playback. These limitations are small, though, and the improvement in timing due to lower latency is well worth it.

MIX AND MATCH

The Digi 002 has one more trick up its sleeve: it can function as a stand-

alone $8 \times 4 \times 2$ digital mixer. So when you are done recording, you can take the Digi 002 out to the coffeehouse and use it as a perfectly serviceable mixer for small gigs.

In mixer mode, the Digi 002 can receive input from the eight analog in-

In each case, the Digi 002 held its own, recording everything faithfully.

puts or the optical or coaxial S/PDIF inputs, but not the eight channels of ADAT Lightpipe. It is limited to 44.1 or 48 kHz sampling rates, but it has enough internal DSP to offer 3-band EQ on all eight channels, dynamics processing on channels 1 through 4, and reverb and delay effects. All effects are editable from the rotary knobs and faders and, while not spectacular, are certainly good enough for a live situation. Snapshots of settings can be stored, and input/output channels 7 and 8 can be used to connect external effects processors.

тор Notch

The Digi 002 is undoubtedly the coolest portable studio I have ever seen. It offers robust inputs and outputs; nicesounding mic preamps; excellent sound quality; 24-bit, 96 kHz capabilities; a full-featured and well-designed physical interface; standalone mixer mode with built-in processing; and a generous plug-in bundle. And you get all of that for just over two grand.

If you are primarily a Pro Tools user and you don't want to take the expensive step into TDM-based systems, the Digi 002 is the box for you. I give it two enthusiastic thumbs up. @

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WRH





Versatility and quality at a rock-bottom price.

By Eli Crews

n this age of soaring technology and plummeting costs, the recording engineer's dollar is stretching further and further. Products coming out today are making us slap our foreheads for spending twice the money on similar devices last year.

With the new DPS (DI/O Preamp System), ART has managed to render two of its own products nearly obsolete by combining them into one unit. A marriage of the TPS (Tube Preamp System) and the DI/O (though without the D/A conversion), the DPS costs a little more than either of those devices but considerably less than the two combined. At \$319, it brings a combination stereo tube-hybrid mic preamp and A/D converter within reach of even the most budget-minded engineer.

MIRROR, MIRROR

The face of the single-rackspace DPS is a nice royal blue, and the contrast of bright-white markings makes for easy reading of the controls (see Fig. 1). As on the TPS, the analog section of the DPS's front panel is laid out in a symmetrical, mirror-image fashion, with channel 2's controls appearing in the opposite order of channel 1's. Between the two channels, six vents, arranged in a sort of V shape, permit a view of the unit's single dual-triode 12AX7A tube. The controls themselves are not reversed; the VU meters, for example, both function as you would expect, with the needles moving to the right as the signal increases. Although it's easy on the eyes, I found the DPS's layout a bit hard to get used to—I kept reaching for the wrong knobs. Every other stereo preamp I own, including ART's Dual MP, has the controls for the second channel in the same order as the first, which seems more logical to me.

From left to right on channel 1 (and right to left on channel 2), the DPS provides a combination balanced XLR/unbalanced TS input jack; two rotary knobs labeled Gain (-11 dB to +30 dB) and Output ($-\infty$ to +10 dB); three button switches labeled Gain (+20 dB/Norm), Phantom (+48V/Off), and Phase (Invert/Norm); a VU meter showing output level; and a third knob, labeled Voicing, that offers varying amounts (including none) of tube saturation and peak limiting in 15 different presets optimized for different instruments (vocals, guitars, bass, and drums among them) and a 16th preset labeled Flat.

To the right of channel 2's XLR/TS input jack is the section for controlling the unit's digital amenities. It provides two rotary Digital Level (output) knobs (one for each channel; $-\infty$ to +10); two red LEDs to indicate digital clipping (one for each channel); and two other rows of colored LEDs, along with a button for toggling through settings on each. The upper row, labeled Sample Rate, has six LEDs, labeled, from left to right, 44.1, 48, 88.2, 96, ADAT (which indicates that the DPS is synced to incoming ADAT clock on the ADAT input), and Ext (which indicates that the DPS is looking to the word-clock input for sync). The lower row, comprising five LEDs, shows whether the DPS is transmitting over S/PDIF or ADAT channels (actually, the S/PDIF output is always active), as well as which ADAT channels are selected (1-2, 3-4, 5-6, 7-8, or all eight at once). When none of the LEDs



FIG. 1: ART's affordable new DPS allows personal-studio recordists to own a quality dual-channel tube-hybrid mic preamp and high-quality A/D converter and still have money to pay next month's rent.

are lit, all digital channels are bypassed.

Though it's nice having these digital indicators and controls grouped together in one place, I prefer having output pots in the vicinity of gain controls. Also, the two Digital Clip LEDs are positioned close together directly above the Digital Level knob for channel 2, which is inconvenient—if you aren't looking directly at them when one lights up, you have no way of knowing which channel went into digital clipping.

BRINGING UP THE REAR

One of the most impressive things about the DPS is its range of I/O options. In addition to the analog input jacks on the front panel, which are easy to access even when the unit is rackmounted, the DPS's rear panel provides, for each channel, a balanced XLR input and output and an unbalanced ¹/₄-inch TS output (see Fig. 2). Each channel also has an unbalanced 1/2inch insert jack (pre-digital fader). Digital I/O includes an S/PDIF coaxial output on an RCA jack, ADAT optical input and output on Toslink connectors, and a word-clock input on a BNC jack. Other rear-panel amenities include a standard IEC power jack, fuse access, and a legend showing XLR pin-outs.

Interestingly, though the DPS's manual maintains that the front and rear XLR jacks cannot operate simultaneously, I was able to get signal from two microphones plugged in to the two jacks at the same time. Though slightly attenuated, there was still signal from both mics. The manual does say that the 1/2inch input on the front and the XLR on the rear can both be used and that the XLR will "slightly" attenuate the ^{1/4}-inch. I found the ¹/₄-inch input in that scenario to be extremely attenuated, however, and would agree with the manual that "this is not normally suggested." But it's nice to know that in a pinch you can double your inputs to the DPS. Be aware that sound quality will suffer, though.

Thankfully, the rear-panel XLR balanced outs and ¼-inch TS unbalanced outs can function simultaneously without affecting one another. This is ideal if you need to route the input signal to two places at the same time—for example, to a console in through the XLR output



and to an amp through the ¼-inch out.

The inclusion of both ADAT optical and S/PDIF coaxial digital outputs simultaneously available—is one of the things that makes the price of the DPS so hard to believe. It also makes the unit especially attractive as a front end for ADATs or multitrack hard-disk recorders that provide ADAT optical as their only form of digital I/O.

To test the digital outputs, I routed them into a MOTU 2408 and recorded into Digital Performer on a G4/450 MHz. Both digital outputs worked flawlessly at 44.1 and 48 kHz, with the 2408 synced to the respective input's clock. (The MOTU sound card can't handle 88.2 or 96 kHz, so I couldn't test those sampling rates.) Note that, in addition to being able to use the S/PDIF and ADAT outputs simultaneously, both analog outputs also remain functional at all times—very handy for amp and headphone feeds.

HOOK, LINE, AND SYNC

The DPS can receive sync from one of two external means: either from an ADAT source by way of the optical input or from any device that can supply word clock over a BNC cable. This feature helped when I wanted to compare the DPS to a similarly designed but more expensive preamp-converter and I needed to get signal through both preamps into the computer at the same time. Since the 2408 can get sync only from one source, I had to have some way of getting the preamps in sync with one another.

By coming out of the optical output of the DPS and out of the S/PDIF output of the comparison preamp-converter, I was able to get both signals into Digital Performer simultaneously. Hooking up a BNC cable from the word-clock output of the comparison unit into the DPS enabled the 2408 to look at only one source to get sync.

INSERT HERE

The insert jack for each channel on the rear of the unit is a standard TRS female jack, but it is wired in reverse from most console and preamp inserts. The jack is wired for ring output (send) and tip input (return). This configuration allows you to use a regular TS cable for bringing external signals straight into the converters through the tip of the insert jack. The inserts are directly in front of the converter, which means they provide immediate access to 24bit conversion without going through the preamp section. That makes it possible to use other preamps in tandem with the DPS's converters or to patch in line-level signals for high-quality A/D treatment. Of course, it also means that those using either an insert cable or a

DPS Specifications			
Analog Inputs	(2) combination balanced XLR/unbalanced ½" TS (front)		
	(2) balanced XLR (rear)		
Analog Outputs	(2) balanced XLR; (2) unbalanced ¼" TS		
Digital Output	(1) ADAT optical; (1) coaxial S/PDIF		
Synchronization	(1) ADAT optical; (1) BNC word clock		
Inserts	{2} ¼" TRS		
Phantom Power	+48V (switchable for each channel)		
A/D Resolution	24-bit		
Rates	44.1, 48, 88.2, 96 kHz (selectable)		
Frequency Response	5 Hz–50 kHz (±0.1 dB)		
Equivalent Input Noise (EIN)	-129 dBA (XLR to XLR); -105 dBA (½" to ½")		
Dynamic Range	>100 dB		
Total Harmonic Distortion	<0.01% (clean); <0.1% (warm)		
Tube Type	12AX7A, dual triode		
Dimensions	1U × 6.5" (D)		
Weight	5.5 lb.		

Y-cable (with one TRS connector breaking out to two mono TS connectors) must reverse the TS plugs: the one wired to the ring of the TRS must go into the input of the outboard unit and the one wired to the tip of the TRS must go into the output—opposite from the standard insert scenario.

The tip-ring reversal also allowed me to easily compare the A/D conversion of the DPS with that of the comparison preamp-converter—I simply put a standard TRS patch cable between the insert jacks of the two preamps, thereby swapping converters, as the comparison unit's inserts are wired tip-send-ringreturn. I was very impressed by the DPS's converters—they gave the sound sources (vocals, electric guitar, and electric bass) a good deal more air and presence than the other unit's converters, which in comparison sounded slightly boxy.

VOICINGS GALORE

The DPS's Variable Valve Voicing (V3), accessed using the Voicing knob on either channel, is a distinctive feature few other tube preamps in this price range provide tonal control, much less offer customized presets. According to the engineers at ART, the different presets vary frequency response, gain, and distortion characteristics, primarily by changing the feedback loop around the tube circuit. That means each preset saturates the tube differently, has a different EQ profile, and has a different output level, which can make rapid comparison of presets a bit dicey.

Most of the settings of the Voicing knob are labeled by the instrument for which the preset is optimized (with a few exceptions such as Valve and Multi), providing a starting point for almost any recording application. Of course, the manual is wise to advise us not to stop there, but rather to give the knob a twist. After all, the A-Gtr setting could offer exactly what your vocals need to make them stand out in the mix.

In general, the four Neutral settings (Flat, Vocal, Guitar, Bass) sounded slightly dull; the four Warm settings, (E-Kbd, E-Gtr, Vocal, Valve), which are not limited, boosted the entire signal (especially the lows and high mids); and



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DPS

the eight OPL (Output Protection Limiter) settings, four of which are Warm (Multi, Vocal, A-Gtr, Piano) and four of which are Neutral (Bass, A-Gtr, Perc, Limit), all sounded, well, limited. From kind of squashed to super-duper squashed, the OPL settings are not great for subtle limiting, and in general I would advise careful auditioning before committing to one, especially during tracking-after all, it's practically impossible to revert to an unaffected state after recording with dynamics processing. Just the same, the OPL settings are useful for catching transients before they make it to the converters, which can save a take from digital distortion.

SHALL I COMPARE THEE?

To compare the DPS and the aforementioned preamp-converter, I first found the voicing on the DPS I liked best for a given instrument, and then I compared that sound to the same instrument recorded (with the same mic)



FIG. 2: The DPS's range of I/O options makes interfacing with other devices in your studio a breeze.

through the comparison unit. First I tried electric guitar plugged directly in to the combo jack on the front of the DPS, with the Voicing knob set to Warm E-Gtr. Overall it sounded typical of a guitar plugged in to a cheap DI box—a little anemic on single-note lines and undefined and floppy on low chords. The comparison unit, which also has a ¼-inch high-impedance Instrument jack on the front panel, gave a similarly lackluster performance, though I thought the DPS sounded a bit better, providing rounder lows and a bit more high end.

On an upright bass miked with an Oktava MC012 small-diaphragm condenser, the Warm E-Gtr setting sounded best. Both Bass settings (OPL and Neutral) were too scooped in the high mids for my taste, making for a bas sound with far too little presence to cut sufficiently through the mix. The Warm E-Gtr setting gave me a smooth, warm bass tone, without the *boom* so common on upright bass. The comparison unit sounded much less smooth, more **b**rittle, and muddier in the low end th**an** the DPS.

ON LOCATION

To further test the DPS, I used it as the front end for a DAT machine in a live concert setting, using a pair of Oktava MC012s and going into the recorder from the stereo S/PDIF output of the DPS. The first group I recorded was a large ensemble of strings, winds, and voice. In OPL Limit mode, the sound on tape was actually better than that in



the room—the amplified voice sounded more natural and pleasing than it had live through the P.A., and the balance of the instruments was more even.

However, on the next band, a loud jazz sextet, I could tell during soundcheck that the OPL Limit mode was compressing the cymbals and horns in unpleasant ways. After a little trial and error. I settled on the OPL Warm Multi voicing-the setting ART actually suggests for this application. The limiter caught most of the transients before they made it to the converters, but it also produced some harsh high mid resonances I hadn't heard in the room, especially in the upper range of the trumpet. Though the limiting sounded surprisingly natural and musical on the cymbals and other ultrahigh frequencies (one sign of a decent limiter, in my book), the lack of a stereo-link function meant that each channel crossed the limit threshold at a slightly different time, producing a wavering, pulsating stereo image. I therefore wouldn't recommend using the DPS's OPL settings-or any other non-

PRODUCT SUMMARY

DPS mic preamp/ADC \$319

FEATURES	4.0
EASE OF USE	4.0
AUDIO QUALITY	4.0
VALUE	4.5

PROS: Extremely flexible I/O. Voicings offer wide tonal variety. Handsome VU metering. High-quality 24-bit A/D converters. Direct access to converters over insert jacks. External sync capability with optical Lightpipe or word clock.

CONS: No documentation on what voicings are actually doing. No dithering. Awkward placement of digital-clipping LEDs. No center detent for digital outputs. No stereo-link option for limiter.

Manufacturer

ART (Applied Research and Technology) tel. (585) 436-2720 e-mail cserve@artproaudio.com Web www.artproaudio.com stereo-linking dual-mono limiter—on loud stereo sources.

VALUE AND VERSATILITY

I am very favorably impressed by the ART DPS. Its flexible I/O and high-quality A/D conversion make it extremely useful, especially as the front end for a DAW or digital recorder. In addition, the DPS's preamps rival those found in some units costing twice as much. Given this kind of value, I can see the DPS becoming a hot item for novice and pro engineers alike. Whether you are shopping for your first outboard tube mic pre and A/D converter or just looking to add to your collection, the DPS is most worthy of your consideration.

Eli Crows has worked for the Center for Contemporary Music, the Center for New Music and Audio Technology, and Ex'pression Center for New Media, all in the San Francisco Bay Area. He feels very centered.

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R O L A N I

MMP-2 (MAC/WIN)

A compact mic-modeling preamp with loads of capabilities.

By Eli Crews

ne of the wonders of the digital audio revolution is the ability to simulate analog devices. From amplifier emulators to soft synths to plug-ins patterned after classic effects boxes, the practice of modeling is here to stay. And why not? By providing the functionality of more expensive or vintage gear without the price, rack space, or footprint associated with the real thing, well-constructed models can save recording engineers and desktop musicians heaps of money and space.

The Roland MMP-2 Mic Modeling Preamp figures into this lineage quite nicely. It promises users the ability to turn a small microphone collection into a veritable arsenal of microphones, with preamplifiers, equalizers, and dynamics processors.

CONTROL ISSUES

The MMP-2 is roughly the size and thickness of a hardback book, but with a slightly sloping top panel to facilitate desktop usage (see Fig. 1). Analog inputs are provided on two combo XLR/ TRS jacks on the upper left-hand corner of the top panel. Below each jack is a 20 dB pad switch and a rotary trimcontrol pot. The pots are labeled Sens (sensitivity), and the values given reflect the expected output level of the microphone (or other sound source) being used. Values range from -16 dBu to -64 dBu without the pad and from +4 dBu to -44 dBu with the pad engaged. (Some people may find this a little odd, as most preamp trims are marked by the amount of dB by which the signal is being amplified.) Below each pot is a tiny red peak LED that lights up when the input reaches a userselectable level of 0, -3, or -6 dBfs. The default setting is -3, which affords a bit of headroom before digital distortion occurs.

Below the peak LEDs are two buttons (one for each channel) labeled, jointly, Phantom/Phase/Lo-Cut, which provide access to 48V phantom power, polarity reverse, and a highpass filter sweepable from 20 Hz to 2 kHz. The buttons select the functions, and parameters are adjusted using the three rotary value-control knobs beneath the



FIG. 1: The LCD screen is the center of attention on the MMP-2. Navigation through the many parameter screens is fairly straightforward.

Minimum System Requirements

MMP-2 Editor MAC: G3/233; 128 MB RAM; Mac OS 8.6; OMS 2.3.5 or FreeMIDI

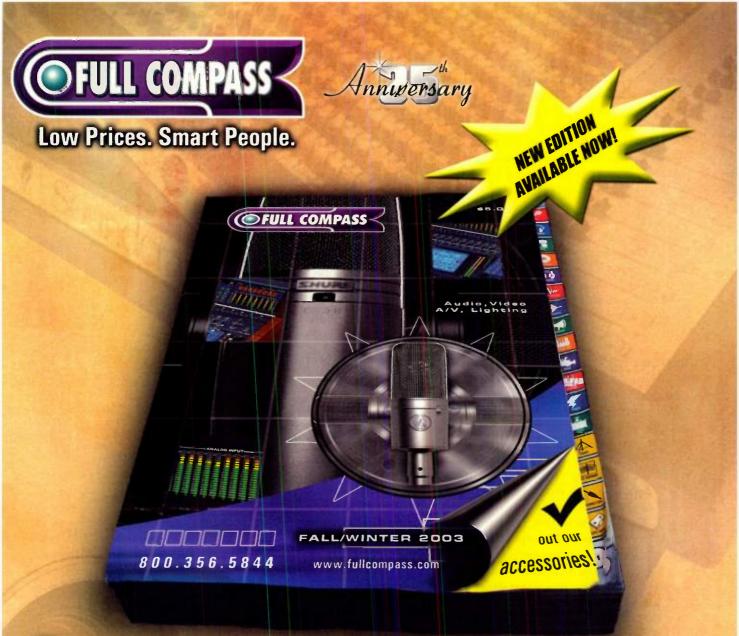
PC: Pentium II/200; 64 MB RAM; Windows 98/2000/ME/XP; USB port

LCD screen. In addition, pressing the Page button to the right of the LCD screen gives you access to the inaptly named Attenuator control. I say "inaptly" because, though it does allow attenuation of the signal by up to 42 dB, it also can boost the level by up to 6 dB. "Level" would be a better name for this control.

On the bottom left of the MMP-2 are two buttons, labeled Edit Ch Select, for selecting the channel you wish to edit effects parameters on. It's very handy being able to flip back and forth between the effects parameters of the two channels in order to compare settings and make quick adjustments. That feature is one of my favorite aspects of the MMP-2—no parameter is ever more than a few button pushes away.

Another function of the Edit Ch Select buttons, referred to as Link mode, is enabled by holding down the button for channel 1 and then pushing the button for channel 2. That links the two channels into a stereo pair, after which all changes to the effects settings are applied equally to both channels. The Link feature affects only the DSP functions, though, and not any of the input controls (Pad, Sens, Phantom, Phase, Lo-Cut, Att). To get out of Link mode, you simply press either Edit Ch Select button. Whatever changes you made stay with channel 1, and channel 2 reverts to the state it was in before you linked the channels. That's a very clever feature-it allows you to experiment with linking the two channels but then change your mind at any point and instantly recall your previous channel 2 setup.

Yet another function accessed by the Edit Ch Select buttons is referred to as Channel Copy. The manual states that in order to copy all of the effects



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MMP-2

parameters (excluding those listed earlier) from channel 1 to channel 2, you hold down the channel 2 button for several seconds and then press Enter when prompted. But apparently the manual is mistaken, because I found the reverse to be true: pushing one channel's Edit Ch Select button for a few seconds allows you to copy that channel's parameters into the other channel, and not vice versa. That function can come in handy when you want the two channels to start out having the same set of effects but still be tweakable individually. You can't undo Channel Copy, so be sure you really want to copy before you commit to it.

METER PATCH

Above the MMP-2's LCD screen are four cool-looking translucent buttons labeled, from left to right, Meter, Patch, System, and Enter. Each of the three leftmost buttons provides access to three different screens and glows green, red, or orange, depending on which parameters it is accessing. Pressing the Meter button makes the LCD screen display Input meters, Dynamic meters (compression or expansion gain reduction), or Output meters. (At first I missed having dedicated meters; however, I quickly became accustomed to them residing just a few button presses away.)

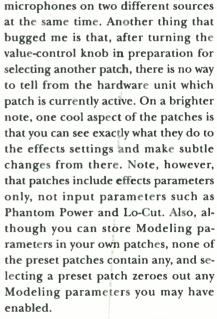
The Patch button's green, red, and orange hues correspond to Select, Store, and Reset, respectively. Those functions do just what their names suggest. Select allows you to choose 1 of the 43 preset patches, which are optimized for different sound sources (Violin, Wood Bass, Rock Male Vocal, and so on). The Store feature allows you to store your own settings into any



FIG. 3: The MMP-2 Editor software provides an excellent graphic interface for almost all of the unit's parameters and includes cute little pictographs of microphones, transistors, and tubes.

of the 64 user patches or to reset the parameters of the currently selected patch. The only twist is that Reset completely zeroes out whichever effects you select (Model, EQ, Dynamics, Plug In, or all effects) instead of resetting them to the default state of the patch itself. In order to return them to the default setting, you need to reselect the preset or user patch using the Select function; however, that will overwrite *all* effects parameters for both channels.

Actually, that is my biggest gripe with the Patch function and perhaps even with the whole device: selecting a patch always affects both channels. There doesn't seem to be a way to select a patch for one channel while maintaining different settings on the other—a major drawback if you want to use two



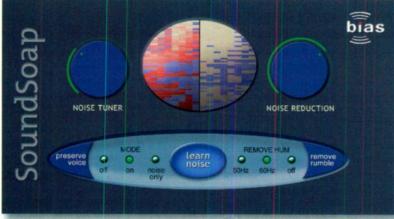
The System button provides access to three sets of screens: Clock, USB, and Others. The Clock screen is where you choose the audio-input source (Mic or Digi), the clock source (Int or Digi), and the sampling frequency (44.1, 48, 88.2, or 96 kHz). You can choose only Digi as the clock source if the S/PDIF input is receiving valid clock. Moreover, you can choose only Digi as the input source if the clock source has already been successfully



FIG. 2: All of the MMP-2's outputs (analog, S/PDIF, and AES/EBU) are functional simultaneously.

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• MMP-2

switched to digital, and once you are in digital-input mode, the unit obtains the sampling frequency from the source and renders the frequency selector inactive. Actually, I find these limitations quite useful—I have never understood why other digital devices let you select the improper clocking source if they are able to sense that there is no solid sync coming in.

The USB screen lets you choose the driver, the device ID, and whether you want to send metering information over USB to a computer. You'll probably want to leave these settings alone, unless you want to delve deep and set up the MMP-2 as a MIDI controller. The unit will, in fact, send MIDI data over the USB port, and the manual provides seven pages of very specific MIDI implementation data.

One more click turns the System button orange and brings up the Others screen, which comprises controls for the contrast of the LCD screen and

PRODUCT SUMMARY

Roland MMP-2 (Mac/Win) mic-modeling preamp \$695	
FEATURES	4.0
EASE OF USE	4.5
AUDIO QUALITY	4.0
VALUE	3.5

RATING PRODUCTS FROM 1 TO 5

PROS: Impressive array of I/O options. Tons of sound-shaping capabilities. Relatively easy LCD-screen navigation. Handy stereo-linking function. Editing software is powerful and intuitive.

CONS: Can't select patches from editing software. No way to tell which patch is currently active from the hardware unit once you turn the knob. Patch changes always affect both channels—can't set up different patches for the two channels. Writing style makes the manual difficult to follow in places.

Manufacturer

Roland Corp. U.S. tel. (323) 890-3700 Web www.rolandus.com Peak LED level; the Route control; system initialization; and backing up and recovering user patches to a computer using the USB port. You can adjust the contrast of the LCD screen over a range of values from 1 to 16, and at any value setting you have approximately a 20degree viewing range. This is not a trivial matter-you'll need to adjust the contrast to suit your viewing angle. When I first placed the MMP-2 on my desk, all I could see was a completely black LCD screen. I had to prop the unit up with a wedge of foam so I could read the screen-until I discovered the contrast control.

The Route control allows you to set up the MMP-2 as a signal splitter, with the input signal showing up at both channels of the digital and analog outputs simultaneously. You can split the signal either pre-DSP, which allows you to retain control over the EQ and dynamics of the second output, or post-DSP, which lets both outputs come directly from channel 1's effects section. I can imagine a number of situations in which this feature would come in quite handy. For example, you could split a signal's frequency range, or you could feed four separate inputs at the same time.

From the Initialize screen (a subscreen of the Others screen) it is possible to reset all system parameters, all user-effects patches, or both to the factory-default state. The Backup screen lets you save all user patches to a computer, and the Recover screen lets you overwrite the existing user patches with a previously saved set. You can back up as many sets as you like, so at 20 KB a pop you have virtually infinite backup resources (on your computer's hard drive).

The fourth button, labeled Enter, lights red when you have changed a parameter that can be saved (although merely exiting the current screen saves most changes). This button is also useful as part of the unit's "dummy check" when you turn on phantom power or choose to erase all of your user patches, a message comes up on the LCD screen asking if you really want to execute that action. You push the Enter button to answer yes.

LIGHT SHOW

The 20-character-by-2-line LCD screen on the MMP-2 is a nice deep orange with black lettering. When adjusted to the proper contrast, it is easy to read in any environment, no matter how well or poorly lit. Also nifty are the little decibel markings at the top of the LCD screen, which correspond to the meters (when they are visible). The three value-control knobs beneath the screen are flanked by two Page buttons, which let you scroll left or right when there are more than three parameters for a given screen. Though I generally deplore working with LCD-screen menus, I found the MMP-2's screen surprisingly navigable.

Below the LCD screen and its associated buttons is the Edit Select section. which contains eight buttons: four on the bottom, labeled, from left to right, Model, EQ, Dynamics, and Plug In, and an associated Bypass button directly above each of those. The Model, EQ, Dynamics, and Plug In buttons glow green when selected, and the Bypass buttons red. I like having dedicated hardware buttons for bypassing the effects stages-it makes it much easier to hear how the sound is being affected by the given digital signal processor. Of the four types of effects, only three can be used at one time. Model and Dynamics are always available, but EQ and Plug In share DSP resources, so those two sections cannot be active at the same time.

'ROUND BACK

The MMP-2 provides a fairly diverse array of input and output options (see Fig. 2). Next to the power switch is the AC jack, which uses a standard IEC cable to bring juice to the internal power supply. From left to right, the other provisions are an AES/EBU Digital Out on an XLR connector, an S/PDIF digital output and input on RCA (coaxial) jacks, a USB B-Type (square) jack for connecting the MMP-2 to a computer, a switch for selecting the nominal analogoutput level (your choices are -16 dBu or +4 dBu, rather than the standard -10 dBV or +4 dBu), and two analog Line Out XLR connectors.

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It is important to note that no audio passes through the USB connection to or from the computer. This connection is for exchanging control information with the MMP-2 Editor software and for updating the unit with future firmware releases or effects algorithms.

Speaking of the Editor software, I consider it the MMP-2's icing on the cake (see Fig. 3). It has an excellent graphic interface and is even easier to use than the unit's hardware controls. The software was also very easy to install (though familiarity with OMS or FreeMIDI, one of which is needed in order to communicate using MIDI with a Mac, is helpful). My only complaints are that the software doesn't provide control over the Plug In settings, and it doesn't allow you to select patches (although it does tell you which patch is currently active). Also, you must start the computer with the MMP-2 already powered up and connected over USB to get the Editor to recognize the hardware unit-which means if the unit somehow gets unplugged, you have to reboot to reestablish communication. In other words, contrary to what the manual says, the MMP-2 is not exactly "plug and play."

SOUNDCHECK

I tested the MMP-2's mic modeler with an AKG C 3000 B-one of the mics recommended by Roland-as my input microphone. I compared the results with microphones that matched the somewhat vague descriptions of the MMP-2's six models. For "small dynamic" I used a Shure SM57; for "vocal dynamic" I used a Shure Beta 58; for "large dynamic" I used a Sennheiser MD 421; for "small condenser" I used an Oktava MC012; for "large condenser" I used a Neumann U 87; and for "vintage condenser" I used a Neumann M 149 (a descendant of the M 49 and U 47, and the closest thing to a vintage tube condenser I could get my hands on).

I like that Roland kept the descriptions of the models generic—other companies' claims that their mic modelers can make an ordinary microphone sound like a Neumann U 47, a Telefunken U 47, or any other giant

MMP-2 Specifications

Analog Inputs	(2) balanced/unbalanced %" TRS/XLR Neutrik combo connectors
Analog Outputs	(2) balanced XLR
Digital Inputs	(1) S/PDIF on RCA connectors
Digital Outputs	(1) AES/EBU on XLR connectors;
	(1) S/PDIF on RCA connectors
Nominal Analog Output Level	–16 dBu or +4 dBu (switchable)
Frequency Response	44.1/48 kHz: 20 Hz-20 kHz (+0.1/-0.5 dB);
	88.2/96 kHz: 20 Hz-40 kHz (+0.1/-3.0 dB)
Signal-to-Noise Ratio	105 dB
Equivalent Input Noise	–132 dBu
A/D Conversion	24-bit; 64× oversampling
D/A Conversion	24-bit; 128× oversampling
Sampling Rates	44.1, 48, 88.2, 96 kHz
Power Supply	Internal; 117, 230, or 240 VAC
Dimensions	9.9" (L) × 6.5" (H) × 3.0" (D)
Weight	4 lb.

among transducers just seem ridiculous to me. The approach of providing fewer models with more generic descriptions is more realistic, not to mention hard to dispute.

So does a vocal track produced by a male singing through a C 3000 B and modeled to sound like a "vocal dynamic" sound just like it would through a Beta 58? Not exactly—but it does sound more like it than the C 3000 B with no modeling at all.

In general, on vocals, acoustic guitar, electric bass, and upright bass, though none of the microphone models sounded exactly like the actual microphones, they all had characteristics that approximated the sound of the target mics. Of course, that doesn't address the more important issue of whether the modeled sound was better or worse for a given situation. Indeed, to my surprise, the models sometimes sounded better than the mics they were modeling. For example, on one acoustic-guitar track, I much preferred the C 3000 B modeled as a small condenser to the actual small-condenser MC012 (my usual microphone of choice for recording acoustic guitar).

For the vocals tests, I generally preferred the real mics; then again, I was using Neumanns that cost thousands of dollars. For upright bass, I achieved the best sound for the particular track by using the C 3000 B with the large-dynamic setting (which shouldn't have surprised me, given that I often use a Sennheiser MD 421 or Electro-Voice RE20 on acoustic bass). The result was a nice, rich, and full—yet not boomy tone. The bottom line is that achieving the best results involves a little experimentation with the many variables the MMP-2 affords—you can't just stay with what you think should work.

The MMP-2's 4-band fully parametric EQ was quite transparent and musical, sounding at least as good as any digital EQ I have used. Ditto for the dynamics processing, which includes compression and expansion as well as a switchable de-esser/enhancer.

As of now the only plug-ins on the MMP-2 are microphone-preamp models. I tested these by recording a full mix played on Genelec 1030As miked with a tiny-diaphragm measurement mic. Comparing the results proved an exercise in distinguishing subtleties. The difference between the Red7 (Focusrite Red) and the CSSISt (Crane Song Solid State) presets, for instance, was pretty minimal. In general, the presets that model tube preamps sounded a little crunchier, especially in the cymbal



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Samplitude offers a huge range of professional editing functions. Recorded samples can be arranged in any way, cut, and be reworked into soft crossfades. Dozens of tools are available. Precision volume and pan envelopes that can be automated while remaining true to the original sample round off the tool pallet. Of course, editing is performed virtually – and therefore non-destructive – so that every parameter can at any time be altered without losing valuable material.

Unique Object-Oriented Editing

As an enhancement to the traditional concept of mixer-supported editing of complete tracks, all versions offer countless possibilities for direct real-time sample editing. Recorded audio tracks can thus be cut into as many objects as you wish. Every object can be edited with individual fades and effects, such as Equalizer, Timestretching, Pitchshifting or plugins. Samplitude also offers Aux-Sends on the object level, the well-known linearphase mastering effects, and a widely variable signal flow.

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From mixing to mastering, all production needs are met: Award-winning equalizers, various dynamic processors, Timestretching, Pitchshifting, Reverb and Delay, plus the high-end mastering effects: Multi-tape compressor, Multi-band stereo enhancer, FFT filter with over 30,000 bands, Amp Simulator, Vocoder, room simulator with folding principle, Denoiser (utilizing the noiseprint method) and Dehisser for real-time noise reduction. Besides routing possibilities for all effects that allow a freety configurable signal flow, these possibilities are not only available to the object level, but also in each mixer channel.

Further features: improved solo effects, unlimited routable busses and Aux-send busses, VST and DirectX plugin support, flexible routing of all integrated and plugin object effects and mixer channel effects.

Burning CDs

It couldn't be easier: Red Book-compatible audio CDs can be burned on-the-fly from the arrangement, without having to take any destructive intermediary steps. The continuously updated support makes sure that even the latest models burn perfectly with Samplitude.

Track Speed and Stable Playback

Intelligent cache management means that the harddisk installed will be used to its fullest capacity – confining to history the old problem of too few tracks while producing with 24 bit/96 kHz. Stable playback: Arrangement playback has priority over all other operations such as opening menus. No more crashing or bumping playbackst

2 GB File Breakthrough

The Windows WAV file size limit of 2 GB is history. Now you can record up to 2 billion stereo samples. That means 10 hours of sounds in just one file with 44,1 or 48 kHz. Complete radio broadcasts can now be recorded in one take.

Further Features

- Easier handling: Work area presets offer interface clarity whereby only the pallet of the function being used currently is displayed - 5.1 Surround capability (only Samplitude Pro /Sequoia)

- Midi and VST* instruments (Samplitude Pro/Sequoia)

- Support of all audio and internet file formats, such as Broadcast WAV, MP3, OGG Vorbis and WMA

- Visualizer: optimal metering with highly precise and size-variable peakmeter and spectroscope
- Total control via configurable shortcuts: Samplitude is renowned for its flexibility and effective functionality. For almost every command there's an individually configurable shortcut available (only Samplitude Pro /Sequoia)

Support of all Important driver models: ASIO*, WDM, MME
 Outstanding helpful user community.

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introduction in the second sec

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MMP-2

range, as compared with the solid-state models, which sounded clearer and crisper—just as you might expect.

I do have a few minor gripes about how the MMP-2's various effects sections work. What bothered me most were bypass redundancies. Each section has both on/off and Bypass switches. The manual says these are functionally the same (except in the Dynamics section, where the Bypass switch bypasses all of the dynamics processors as a group and the on/off switches pertain only to individual effects). That means that for the Modeling and EQ sections, bypassing does the same thing as turning the effect off. Typically, a dedicated bypass button means that circuitry is taken out of the signal path. But according to Roland, physically bypassing any of the effects sections is impossible, given their DSP architecture. Okay, then-so why have both an on/off switch and bypass function? To add insult to injury, choosing the Flat modeling setting seems to do exactly the same thing as bypassing (or turning off!) the Modeling section. Redundancy for no apparent reason just irks me.

I also discovered what appears to be a small labeling mistake: the letters "BEF" show up on the LCD screen and in the Editor software for the Band-Reject Filter parameter. I suspect that that should have been "BRF."

MODEL CITIZEN

The Roland MMP-2 mic-modeling preamp is a very powerful tool, especially for personal-studio recordists with few resources. Will it really make your AKG C 3000 B sound as good as a Neumann U 87? No. But it can dramatically increase the available sound palette of the mics you do have. In addition, the MMP-2 offers good preamplification, high-quality A/D conversion, and better-than-average EQ and dynamics processing. The unit is easy to use, is very portable, and has a very small footprint. Granted, at nearly \$700, it's not the best deal in the universe. But it probably won't break your bank either. If you are looking for the Swiss Army knife of digital front-ends, give the MMP-2 a good hard look. @

The Professional's Source



B A PEAK 3.11 (MAC) Early out of the gate and still ahead of the pack.

By Daniel Keller

A s an early OS X adopter, BIAS is to be commended for releasing Peak 3.0 right on the heels of OS X's introduction. The popular stereo editing program was the first professional audio application to work with OS X's Core Audio protocol, and expectations have been understandably high. Fortunately, Peak does not disappoint. Now at version 3.11, the program's look, feel, and functionality are better than ever.

Part of Peak's appeal lies in its minimalism. Its colorful interface is straightforward, well organized, easy on the eyes, and filled with visual clues (see Fig. 1). The program's apparent simplicity, however, belies the depths of its capabilities; this is a serious application and one that combines features

not typically found in other Macintosh programs.

Peak supports resolutions up to 32bit and sampling rates up to 10 MHz-well beyond the range of any hardware presently available. The program supports and seamlessly converts a wide range of common formats, including AIFF, SDII, WAV, Broadcast WAV, AU, MP3, RAW, QuickTime, Paris PSF, and Sonic Solutions AIFF. The version 3.1 update added compatibility with Quick-Time 6 files, allowing Peak to read and write Dolby's new AAC encoding format-a compression scheme that has been gaining in popularity as an alternative to MP3 for online audio delivery. Peak also works with OS X's Core Audio, Sound Manager, and ASIO and supports the VST plug-in format.

As it did in the previous versions, Peak 3.11 works much like a word processor for audio; indeed, BIAS even refers to audio files as documents. You can arrange, resize, and tile multiple documents, and it's easy to cut, copy, and paste from within any open document window; each document has its own unlimited Undo/Redo menu with a graphic history. Documents can reside in the Dock for retrieval, and you can use the number keys on the Mac-

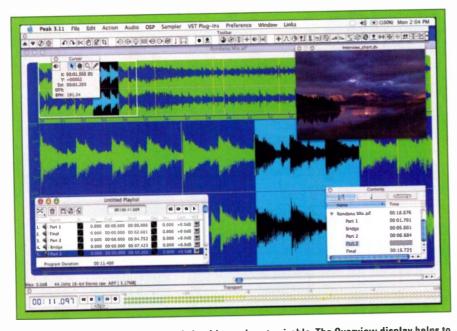


FIG. 1: Peak's colorful user interface is intuitive and customizable. The Overview display helps to navigate the larger waveform display. The resizable VU-style meters at the bottom are always clear and easy to read.

Minimum System Requirements

Peak 3.11

G3/200; 64 MB RAM; Mac OS 8.6 or higher, including OS X; hard drive with 18 ms average seek time; Sound Manager 3.3 (for Mac OS prior to OS X); QuickTime 4.0

intosh keyboard to trigg**er** the last ten documents for instant playback—a nice touch.

THE RIGHT TOOLS FOR THE JOB

A high degree of flexibility is one of Peak's strongest assets. The user interface is fully customizable, allowing you to resize, rearrange, and color most onscreen elements. Most menu commands can be added to or removed from the toolbar, and few tasks require more than a couple of mouse clicks. Keyboard shortcuts are in ample supply, and you can freely reassign key combinations to better suit your working style. The editing palette floats in its own window, and the cursor toggles with the Tab key between the Select, Move, Zoom, and Pencil tools. The Transport bar is also free-floating and features long, multicolored VU-style meters with adjustable peak- and clip-hold times. Above the main waveform view, the Overview display shows the entire waveform, making it easy to locate and zoom in on specific areas.

Peak has a host of features designed to streamline editing tasks, and no matter how you normally use a 2-track editor, you'll find a range of useful tools, including several types of scrubbing (Jog, Tape-Style, and Dynamic), crossfading (and automatic blending at edit points), and a full arsenal of standard editing commands for cropping, deleting, inserting, and extracting selected audio. The program lets you record directly from a live input, or you can import audio tracks directly from a CD. Adding markers to the waveform display is a snap during playback or when the audio is stopped. You can then relabel and color the markers and use them to navigate audio files, create loops, or designate regions.

Peak's Playlist is one of the program's

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• PEAK

most powerful features. The Playlist is a nondestructive environment that lets you string together a list of regions (from one or more audio documents) without altering the original files. With the Playlist you can assemble a full musical program, replete with crossfades, DSP effects, gain changes, various gap times, and track markers and then save the results as a new audio document in a number of formats. You can even burn the Playlist directly to CD with the included Roxio Toast Lite. I also found the Playlist to be a great remixing tool, useful for experimenting with shuffling parts of a song around while leaving the original file unchanged.

Peak sports a full range of excellent mastering tools, including several highquality dithering options. The Movie window lets you view QuickTime and DV movies, and you can extract the soundtracks for editing. The movie window syncs to the audio even while you're scrubbing and selecting, which makes Peak an excellent tool for audio post-production.

Peak's Batch File Processor (see Fig. 2) can perform an amazing range of editing and processing functions (bounce, invert, swap channels, fade out, normalize, change pitch, and much more). The program also supports Apple Events, allowing you to automate batch processing and manage file libraries using database applications.

THERE AND BACK

Peak features a number of easy-to-use tools for creating, tuning, duplicating, and exporting loops, edit markers, and regions. One very cool feature is Loop Surfer. It lets you modify the loop during playback, and it can also adjust the loop based on the tempo or on a selected section of audio. Among Peak's other useful features are Guess Tempo, which can estimate the tempo of a designated audio selection, and Loop Tuner, which allows for extremely fine tuning of a loop's start and end points.

Unfortunately, Peak lets you create only one loop per audio document. That's not a major problem because you

can always create a copy of the file, but it's an unnecessary extra step if you're pulling multiple loops out of a single audio file. On the other hand, it's easy to transform loops into regions and drop them into a Playlist multiple times for loop-style playback, so having multiple loops in a single document may not always be necessary.

Peak supports sampler transfers using SMDI or SCSI, and it provides dedicated support for several popular units, including Kurzweil's K series, Peavey's

> SP/SX, Yamaha's A series, and E-mu models. It would be nice to see support for software samplers such as HALion and the Windowsonly GigaStudio. In fact, given GigaStudio's popularity among cross-platform Mac professionals, direct GSIF support might be a popular move (although no Mac audio editors currently support proprietary software sample formats).

DSP FOR DAYS

In addition to its standard set of digital signal-processing tools (gain change, normalize, time stretch,



FIG. 3: BIAS Freq is a real-time VST plug-in that delivers high-quality 4-band paragraphic EQ along with a clean, straightforward interface.

pitch change, sampling-fate convert, fade in/out, and so forth), Peak 3.11 also has other features worth noting. The Threshold command analyzes the amplitude levels in an audio file and splits the file into sections much like Propellerhead ReCycle **does**. It's great for splitting up successive notes from a musical instrument, breaking up a drum loop into its component parts, adjusting the gain of individual drum hits (such as snare or kick drum), and more.

Another interesting DSP tool is Reverse Boomerang. It mixes a reversed copy of the selected audio with the original. I tried it on several drum loops with unexpected but surprisingly usable results.

Several of Peak's DSP tools should be of special interest to sound designers. Convolve allows you to apply the spectral characteristics of one sound to another to create exotic ambiences and frequency combinations. It can also be used with impulse-response files from various acoustic spaces to apply natural reverb to an otherwise dry audio file.

Rappify can degrade a signal and add in a lo-fi grungy element, and you can use Phase Vocoder to introduce some strange spectrum-based resynthesis.

As its name suggests, Click Repair is a handy tool for removing a variety of

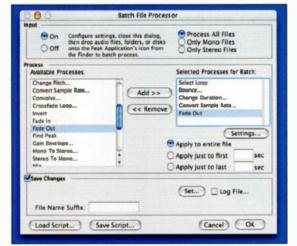


FIG. 2: Peak's Batch File Processor can automate a wide variety of repetitive tasks, including a number of editing, processing, and conversion functions.



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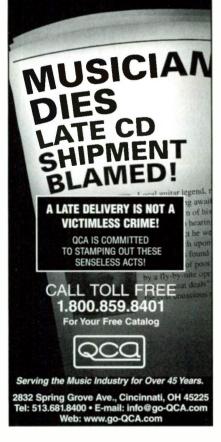
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• PEAK

clicks and pops. It works by scanning the audio document for what the manual describes as "significant discontinuity" from sample to sample. For example, a radical jump in sample value from -100 to 10,000 and back is most likely a spike, so the offending click is removed, and the area is automatically smoothed over. The smoothing factor, detection level, and size of the repaired area are all user configurable.

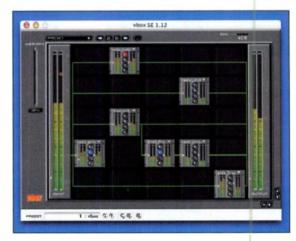


FIG. 4: Vbox's simple matrix environment makes it possible to combine VST plug-in effects in myriad serial and parallel configurations.

PLUG-IN PACK

BIAS's decision to support

VST plug-ins in Peak's 2.5 update was a very prudent one. The ubiquity of the VST protocol and the availability of excellent VST products from numerous developers provides an openended opportunity to customize Peak's toolkit and to expand the program's versatility.

That's not to say that Peak's own set of plug-ins is at all shabby-far from it. The software ships with more than two dozen high-quality plug-ins, including BIAS's easy-to-use Freeverb and the excellent Freq 4-band paragraphic EQ (see Fig. 3). The Freq EQ features a simple graphic interface that lets you control the gain, frequency, and bandwidth parameters with onscreen dials or by directly grabbing and dragging the displayed EO curve. Each of the four bands is sweepable from 20 Hz to 20 kHz and includes an individual bypass button. Filtering options include highand low-shelf, notch, and peak filters. (For \$49, Peak users can also upgrade to SuperFreq, which offers up to ten frequency bands and adds low- and high-cut filters.)

Peak now includes a full complement of excellent Carbonized VST effects from Maxim Digital Audio. The effects run the gamut from AutoPan and Leslie simulation to dithering, dynamics processing, and subbass synthesis. Some of the plug-ins offer unique capabilities: RePsycho, an event-based pitch shifter, chops audio into individual beats and shifts each beat down in pitch. It's great for retuning drum loops while maintaining exceptionally tight timing. Mixed with the original source, RePsycho produces several novel effects, including adding subharmonics to selected parts of a rhythm track.

Splitter is another intriguing plug-in; it chops up a signal based on frequency or level. For example, a drum loop could be split so that only the louder or higher-frequency components are sent to a reverb. Splitter also works well as a frequency-based gate.

THINKING INSIDE THE BOX

Peak now ships with a fully integrated version of BIAS's simple yet powerful Vbox application (see Fig. 4). A VST plug-in itself, Vbox serves as a host and management system for other VST plug-ins. Through its intuitive matrix interface, Vbox lets you instantly mix and repatch signal paths among multiple plug-ins. You can create any combination of serial and parallel effects chains and hot-swap plug-ins in real time.

Each plug-in is represented in its own draggable box with input and output faders and meters and solo, mute, bypass, and edit buttons. Master input and output meters appear on either side of the matrix. To try a different routing scheme, you simply drag any of the plug-in boxes from one slot to another; that's all there is to jt. You can resize the matrix up to 99 by 99 slots, affording a nearly endless variety of effects combinations. And of course, you can save setups and recall them for future use. What's more, Vbox routing and parameter states can be applied to Playlist regions, allowing for VST routing and parameter-state automation. And for mastering, any of the effects can be bounced to disk and/or burned directly to CD. (Vbox is available in Mac, Windows 2000, and Windows XP versions.)

DOCS AND INSTALLATION

When my review copy arrived, the first thing I did was shake the box to make sure it wasn't an empty display pack. All the 3-inch-thick box contained was an envelope-packaged CD-ROM, a 14day-trial CD (of other BIAS products), and a registration card. BIAS has joined the disturbingly popular trend of not printing its product manuals. True, PDFs are economical and updatable,

PRODUCT SUMMARY

BIAS				
Peak 3.11				
audio-editing software \$499				
FEATURES	4.0			
EASE OF USE	4.0			
DOCUMENTATION	3.0			
VALUE	4.0			

RATING PRODUCTS FROM 1 TO 5

PROS: Intuitive user interface. Supports OS X, high-resolution audio, CD burning, and a wide range of file formats. Includes dozens of VST plug-ins. Powerful playlist and batch processing capabilities. Several useful loop-editing tools. Includes Vbox for combining VST plug-ins. Supports several hardware samplers.

CONS: No printed manual. No softwaresampler support. Allows only a single loop per audio document. Occasional malfunctions.

Manufacturer

Berkley Integrated Audio Software tel. (707) 782-1866 e-mail sales@bias-inc.com Web www.bias-inc.com and they save trees. But for learning a complex program with 211 pages of documentation, a paper owner's manual is essential. I was disappointed to find out that BIAS doesn't even offer a printed manual for an additional fee.

That quibble aside, installation was quick and painless. The program runs as a fully functioning demo for 14 days, during which time you need to register with BIAS. I ran into some minor kinks in the online registration process (which BIAS should have fixed by the time you read this), but registering by e-mail garnered me a response in less than 24 hours. Registration by fax or snail mail is also supported.

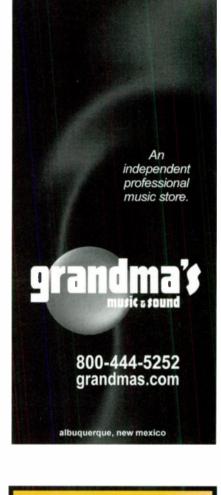
JAGUAR ON THE BUS?

My test machine for this review was an 800 MHz G4 PowerBook, so I was somewhat limited in my choices for audio I/O; I opted for a Tascam US-224 USB interface. Sonic performance was excellent for the most part, but I did run into a few stumbling blocks. At least once or twice a day, the machine would hang for minutes at a time or lock up completely. At other times, one channel would simply cease playing until I closed and reopened the program. These were never fatal crashes, and I never lost any data, but it was irksome just the same.

In BIAS's defense, these symptoms very likely point to more global issues with Core Audio development in general. On checking several developers resources and user groups, I found a number of references to issues with various USB audio devices under OS X (specifically Jaguar) that mirrored my own experiences. Clearly, Apple and Mac OS developers still have some finetuning to do.

Minor protests aside, Peak is easily a winner. It is well designed and intuitive enough for nontechnical users, but its straightforward user interface is accompanied by a very deep feature set, making it a serious tool in the hands of a professional and a program worthy of one.

Daniel Keller spends his days in pursuit of the Any key. He can be reached at algorhythm@ csi.com.





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AKAI **MPD16** By Michael Cooper

f you've been hammering out drum tracks on MIDI keyboards, the tabletop Akai MPD16 USB/MIDI Pad Control Unit (\$349) offers an attractive alternative. Its surface is fitted with 16 pads, each roughly 1.25 inches square, inherited from Akai's MPC-series workstations. Accurate drummers might get away with playing its closely spaced pads with drumsticks, but the MPD16 is designed to be played with your fingers, and using drumsticks might damage it. The pads are sensitive to both Velocity and Polyphonic Aftertouch.

Welcome to My Pad

Alongside the MPD16's pads are four buttons (each with a status LED) and a slider to edit the unit's MIDI parameters. The Full Level button fixes the Velocity of all pads at the highest possible value (127), regardless of how softly you hit the pads. Pressing the 16 Levels button lets you assign a different Velocity value to each pad and plays the note assigned to the last pad struck in the previous mode. The Bank button toggles between Bank A and Bank B pad assignments, letting you control a total



You can edit the Akai MPD16's MIDI parameter values using either the front-panel controls or the supplied MPD16 USB MIDI Pad Editor software.

of 32 different sounds. Pressing the Active button alternately enables and disables the MPD16's slider, which dynamically adjusts the value of whatever continuous controller has been assigned to it.

The MPD16 has three ports: USB, MIDI Out, and DC In. The USB port connects directly to your computer using the supplied cable, providing power, MIDI data output (on the Mac, for OMS-compatible applications only), and communication with the included MPD16 USB MIDI Pad Editor (Mac/Win) utility software. The MIDI Out port accommodates data output to MIDI devices that lack a USB port. When you use the MPD16 without USB, power is supplied by plugging in the optional MP-9 9V AC-to-DC adapter (\$20) to the unit's DC In jack. The MPD16 has no power switch.

Editorial Assistance

You can edit the MPD16's parameters either directly from the unit's front panel or by using the included utility software. By successively pressing different combinations of the MPD16's 4 buttons and 16 pads, you can independently edit each pad's MIDI note assignment, the slider's continuous controller number, and the global MIDI channel. Because the MPD16 lacks a data readout, you'll need an external MIDI device (with a display) to verify the values of any parameters you edit from the unit's front panel.

The Pad Editor software allows you to view and edit each pad's MIDI Note number and corresponding GM Drum Set name, as well as adjust and visually confirm the unit's global MIDI channel and the slider's controller number. The software also

lets you copy settings from one Bank to another, save and load settings to and from your computer, and restore factory default settings.

In addition, the software offers 17 different Velocity curves that you can set independently for each pad. The ability to select a Velocity curve is especially noteworthy, as you can't edit the pads' Velocity sensitivities directly from the unit. Because no Velocity scaling is offered and all 17 curves can produce the full range of MIDI Velocities, the effects produced by choosing alternate pad sensitivities are fairly subtle, but nevertheless useful.

I used the MPD16 to trigger drum programs in Native Instruments Kontakt and BitHeadz Unity Session, both running as plug-ins in MOTU Digital Performer. As I edited the pads' note assignments, making the Editor's window active muted the drum sounds, preventing me from immediately hearing the result of my tweaks. Fortunately, when I ran Kontakt and Unity Session in standalone mode, they responded instantly to changes I made in the Pad Editor. Considering the MPD16's computer connectivity, though, I wish the Editor could operate as a plug-in within all popular sequencers.

I also wish that the Editor could communicate bidirectionally with the MPD16. The software sends parameter changes, but it doesn't update its settings when you change the MPD16's front-panel controls. Bidirectional communication would have let me use the Editor as a graphic user interface under hardware control.

Though the MPD16 offers many pluses---great-feeling pads, alternate pad-assignment banks, USB connectivity, Aftertouch response, an assignable data slider, dedicated editing software-it can be awkward to set up within a sequencer environment. I hope that Akai will update the Pad Editor to address those concerns. Setup is much easier when you're controlling a virtual instrument in standalone mode or an external module that has its own display. If you don't mind working around those limitations, the MDP16 delivers a generous feature set for a modest price.

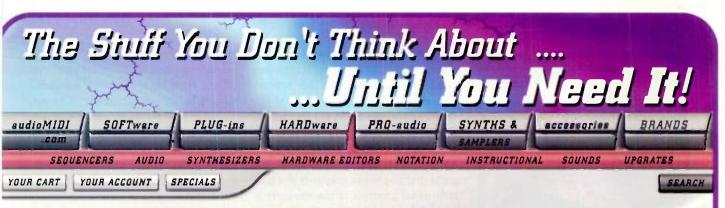
Overall EM Rating (1 through 5): 3 Akai Musical Instrument Corp.; tel. (800) 433-5627 or (817) 831-9203; e-mail info@ akaipro.com; Web www.akaipro.com

REFX VSTi Plug-Ins (Mac/Win)

By Len Sasso

ReFX offers a diverse and unique range of VST Instrument (VSTi) plug-ins that use standard subtractive-synthesis techniques as well as newer techniques, such as wave shaping and physical modeling. The plugins are sold separately, with prices ranging from free to \$59.99.

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FIG. 1: Slayer, one of reFX's synth plug-ins, is a physically modeled guitar. It features 7 string models, a variable-position pickup, 16 amp and cabinet combinations, and 15 stompbox effects.

All of reFX's products are obtained by download, and you receive Mac (OS 9 and OS X) and Windows (98/98 SE/2000/ME/XP) versions of every plug-in you buy. Timelimited demo versions (which require you to relaunch the VST host after 15 minutes) and MP3 audio examples are available from the reFX Web site.

Synthtastic

JunoX² (\$39.99) is a 16-voice emulation of the Roland Alpha Juno, the last of the popular Juno series of inexpensive synths. It's simple to program and has a raw, biting sound that will be most at home in techno and pop genres. JunoX² has two multiwaveform oscillators tuned to the same pitch, and a suboscillator tuned one or two octaves below the others. The oscillator mix is fed into a multimode resonant filter. JunoX²'s single ADSR envelope can modulate volume, pulse width, and filter frequency in any mix and polarity.

Beast (\$29.99) features parallel signal paths, each containing two oscillators, a resonant filter, and a distortion unit. Each oscillator's waveform is a mix of triangle, sawtooth, and pulse waves; an LFO is provided for pulse-width modulation. The mixed output of both signal paths passes through a feedback delay-line followed by a reverb unit. Beast is a simple beast, but it's capable of fat, synthlike sounds, as the bank of factory presets amply illustrates. To get a free taste of Beast, download its little brother, Claw (short for "one claw of the beast").

ReFX's other classic is the QuadraSID (\$59.99), based on the SID 6581 and 8580 synthesizer chips found in the Commodore 64 line of computers. Unlike the other reFX synths that emphasize simplicity and limit front-panel controls to the essentials, QuadraSID gives you access to every parameter on the SID chips. Each virtual SID chip contains three complete 1-oscillator synths as well as a noise generator. The three synths can operate in three modes: unison (all three play each note), poly (notes cycle consecutively through the three synths), and multi (each synth has its own MIDI channel). The noise generators are capable of a wide range of effects. Altogether you get 12 synth voices and 4 noise voices with a variety of MIDI configurations. QuadraSID programming can get quite complex, but with all voices activated, QuadraSID is surprisingly easy on your CPU. As you might imagine, given its heritage, QuadraSID excels at cheesy effects and retro video-arcade sounds. However, it is also good for vintage drum-machine and synth sounds.

My Favorite Things

Aside from QuadraSID, which is in a class all its own, my favorite reFX synths are PlastiCZ (\$59.99) and Slayer (\$59.99). PlastiCZ is a 2-oscillator, no-filter synth that lets you morph between a sine wave and 1 of 64 other waveshapes, using an ADSR envelope and Velocity. The oscillators can be fine-tuned by a semitone as well as offset to the first four overtones of the base frequency. A mix of the two oscillators and a ring-modulated combination of both is sent to one of ten effects, including reverb, delay, gate, chorus, phase, flange, distortion, bit reducer, Leslie, and a moving-formant-filter effect called Talkbox. The waveform morphing (called Digital Controlled Wave-shaping), the absence of filters, and the wide range of effects give PlastiCZ a fresh and unique sound.

Slayer (see Fig. 1) does everything you could ask of a guitar synth. It starts with 7 variations of a Karplus-Strong physically modeled guitar string, adds 3 pickup options (none, single, and double-coil) with variable position, and ends with 16 amp and cabinet combinations and 15 stompbox-style effects. Front-panel controls are provided for tone, Velocity-controlled slap, fret noise, harmonic brightness, and string damping. Playing aids (incoming MIDI processors) include strumming, power chords, autochording, and fixed and dynamic glide. Slayer excels at electric guitar and bass sounds, but is also capable of tasty emulations of acoustic guitars, basses, and other pluckedstring instruments.

Best of Show

The MP3 file MrMorse illustrates the variety of sounds available from reFX synths. The piece was recorded in one pass, using EMMEB instances of QuadraSID,

ReFX also offers a distortion and filtering VST effect, Trasher II (\$19.99), which is ca-

pable of lightly massaging or totally mangling your audio material (including the output of the reFX synths). Whatever your musical tastes, you're bound to find something you'll like in the reFX catalog. These plug-ins are easy on the wallet as well as the CPU, well documented, and definitely unusual.

Overall EM Rating (1 through 5): 4

reFX; tel. 49-6131-5701-748; e-mail support@refx.net; Web www.refx.net

FRONTIER DESIGN GROUP

By Daniel Keller

E ven as the VHS tape format begins its descent into history, ADAT Lightpipe is alive and well and has become de facto standard on much of our digital gear. The format's success is hardly surprising: it offers eight channels of audio over a thin fiber-optic cable, as well as terminals small and inexpensive enough for several to fit on a computer card.

For all its advantages, though, the linguini of Lightpipe comes with its own set of routing and management issues. Frontier Design Group, a small but influential company that has long advanced the use of Lightpipe in its products, has created the MANNY'S NYC. OPENED 1935!





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The Frontier Design Apache Lightpipe patch bay offers 12 inputs and outputs and supports up to 96 channels of 24-bit audio. The unit is programmable from the front panel and using MIDI.

Apache Lightpipe patch bay (\$799) to address those issues.

Hook 'Em Up

Generally speaking, patch bays and other connectivity tools don't have the glamour of other gear. But if you've ever had trouble with one, you know how essential they are. The Apache is a 12 I/O Lightpipe patch bay housed in a single rackspace, capable of providing routing and connectivity for up to 96 channels of 24-bit, 48 kHz audio or 48 channels of 24-bit, 96 kHz audio. It's aimed squarely at DAW users and is ideal for interconnecting multichannel systems employing computers, digital mixers, hard-disk recorders, and MDMs. It's as simple as you'd expect a patch bay to be but has some nice programmable extras as well.

The Apache's front panel is simple and uncluttered. Twenty-four small buttons and associated LEDs correspond to the unit's 12 inputs and outputs. Store and Recall buttons directly access as many as 12 userdefined presets; unlimited additional presets can be addressed using MIDI. Also on the front panel are a MIDI button for configuring the Apache's extensive programming capabilities and a Patch button for front-panel setup. A Status button toggles between Activity status, a mode in which the Apache's LEDs indicate which inputs and outputs have active signals, and Scanning status, in which the Apache continuously scans all 12 inputs in succession, giving a visual indication of the currently active routes.

The rear panel houses 24 Lightpipe inputs and outputs as well as MIDI I/O for saving and recalling snapshots using SysEx and for cascading multiple units. In multiple setups, each unit can be assigned a unique device ID number and fully controlled using SysEx messages. The rear panel also contains a standard IEC power connector.

Setting up routing on the Apache is simple and straightforward. First press the Patch button to bring up Patch mode; then select an input and any number of outputs. Once you've created a routing scheme, you can capture it as an internal preset for later recall and even save it to an external device.

In order to avoid clocking issues when using multiple units, each input and output reclocks the signal with its own phaselocked loop (PLL). That is particularly nice because it makes selecting a clock master unnecessary, and routing changes are fast and clean.

Each of the Apache's 12 inputs and outputs can handle ADAT optical signals. Mixing multiple 2-channel inputs to ADAT format is not possible, nor is breaking out ADAT multitrack signals into Toslink pairs. It would be nice to see Frontier expand this product line to include versions that incorporate channel splitting and combining.

That said, the Apache is the ideal device for the majority of Lightpipe-based setups and an obvious choice. It's a great timesaver and a worthy addition to your digital world.

Overall EM Rating (1 through 5): 4

Frontier Design Group; tel. (800) 928-3236 or (603) 448-6283; e-mail apache@ frontierdesign.com; Web www.frontierdesign.com

RADIAL JD-7 Injector

By Richard Alan Salz

Radial Engineering's JD-7 Injector guitarsignal distribution amp and router (\$850) takes the direct box to an-



other level, allowing you to route a guitar or bass signal to as many as seven different amps or amp simulators without ground loops or phase problems. You can also record your instrument direct, then route the recorded track through the JD-7's linelevel inputs and route them to multiple miked guitar amplifiers. This technique, known as *reamping*, is a hot ticket nowadays, because you can record the guitar parts dry and sweat the amp sound later.

Getting There from Here

The JD-7 is a 1-in, 7-out splitter/router. Two front-panel ¼-inch inputs allow simultaneous connection of two instruments; a button selects the active input. Input B has a defeatable 8 dB pad. You also get a clip LED.

Line-level, %-inch outputs 1 through 6 are on the front panel; output 7 is on the rear. Channel 1 is an active, direct out and is used for connection to a "clean" amp. It features an on/off button and an indicator LED. The other five front-panel outputs are transformer isolated and feature on/off, groundlift, and polarity-reverse buttons. Outputs 5 and 6 also include an effects loop that can be switched for wet/dry comparisons; the send and return jacks are on the back of the unit. Rear-panel output 7 is a %-inch, active, direct, "always on" output—ideal for connection to a tuner or rack effects.

The rear panel also sports a balanced direct output on a male XLR jack (with polarity reversal and ground lift) and a balanced XLR input with level control. These are not alternatives to the ¼-inch I/O; the balanced output is designed to send a dry, low-impedance signal to a recording device, and the balanced input allows you to return a track from the recorder to the JD-7 for routing.

A power jack for the included wall-wart power supply completes the rear-panel connections. A retainer clip provides stress relief for the power cable.

The construction quality of the JD-7 is nothing less than superb, especially considering the asking price of \$850. The heft of the enclosure is reassuring, and the highquality Jensen transformers, discrete Class A audio circuitry, and socketed IC chips clearly indicate that the designers cut no corners. Note that no op amps or ICs are in the signal path; Radial's objective is to create a sonically transparent splitter/router so that the guitar's pure sound is preserved. To my ears, the company has met this goal.

Drag Your Axe

The Drag feature, controlled using a rotary potentiometer (sans knob), varies the loading on the input source, changing the feel of the input signal's response. According to the manufacturer, Drag emulates the



Radial's flexible, transparent-sounding JD-7 Injector allows you to split and route a signal seven ways without phase or ground-loop problems.

natural loading that occurs when a guitar and an amplifier are connected together.

In addition to impedance matching, Radial has compensated for the resistance in the amplifier circuit, as well as the cable capacitance. Drag is essentially turned off when the control is turned fully clockwise.

Sound Tests

I used and creatively misused the JD-7 in a variety of ways. Using a Turner Renaissance bass guitar, I compared the new unit

to a Radial JDI, the company's most basic direct box, which consists of the same Jensen JTBE transformer found in the JD-7, a pad, and ground lift. The two units sounded nearly identical, which is particularly impressive considering that the JDI is a passive, audiophile-quality unit, while the JD-7 is an active unit with multiple outputs.

I then connected my Strat through the JD-7 to three miked amps while at the same time sending a signal directly to tape through a direct box. Using outputs 2 to 4, I encountered no untoward noises that couldn't be eliminated with the controls. I also sent output 5 direct into a tube preamp and printed that to tape. That let me create huge stereo tracks without the need to double- or triple-track individual parts.

Finally, I used the JD-7 to reamp several tracks, including a snare track that needed

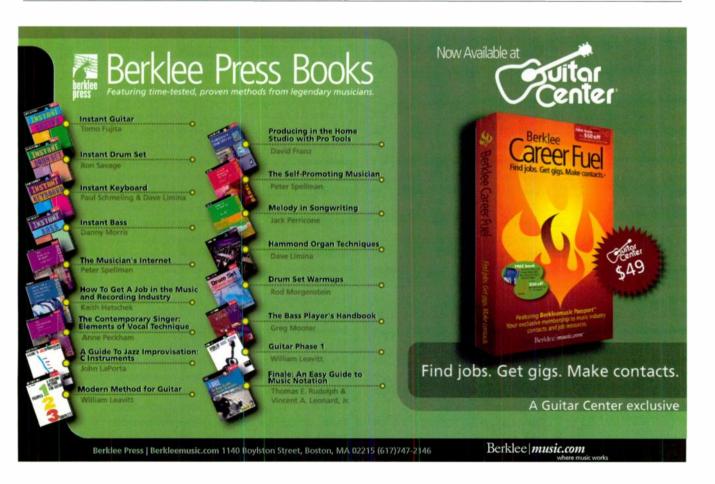
some real room tone and a vocal track that I thought might sound good through an MXR stompbox compressor. I had a blast and got some great results.

Injecting My Opinion

The JD-7 lets you interface equipment in strange and wonderful ways, leading to sonically interesting results. I'm not thrilled with the wall-wart power supply, and I would have appreciated level controls for the individual outputs, but these are quibbles, and good arguments could be made for leaving out these features. Given its transparent sound, high-quality parts, and solid construction, the JD-7 is the best tool available for reamping a track or splitting an instrument- or linelevel signal into multiple outputs.

Overall EM Rating (1 through 5): 5 Radial Engineering; tel. (800) 939-1001 or (604) 942-1001; e-mail info@cabletek.ca; Web www.radialeng.com

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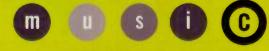
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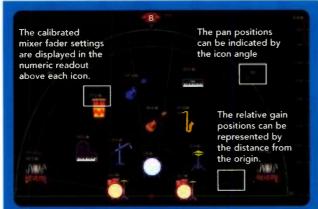
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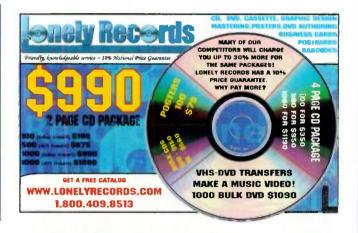
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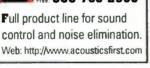
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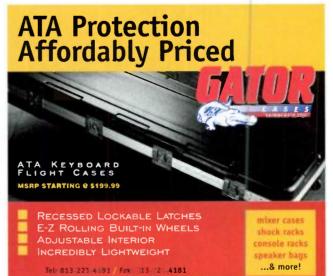
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They LAUGHED when I said they could have **Perfect Pitch** ... until I showed them the simple secret

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Learn to recognize EXACT tones and chords—BY EAR!

The true story behind the worldwide #1 best-selling ear training method

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It all started as a sort of teenage rivalry.

I'd slave at the piano for five hours daily. Linda practiced far less. Yet somehow she always shined as the star performer at our school. It was frustrating. What does she have that I don't? I'd wonder.

Linda's best friend, Sheryl, bragged on and on to me, adding more fuel to my fire. "You could never be as good as Linda," she would taunt. "Linda's got Perfect Pitch.

"What's Perfect Pitch?" I asked

Sheryl gloated about some of Linda's uncanny abilities: how she could name exact tones and chords-all BY EAR; how she could sing any tone -from mere memory; how she could play songs -after just hearing them!

My heart sank. Her fantastic EAR is the key to her

success. How could I ever hope to compete with her? But it bothered me. Did she really have Perfect

Pitch? I finally asked Linda point-blank if it was true. "Yes," she nodded to me aloofly.

But Perfect Pitch was too good to believe. I rudely pressed, "Can I test you sometime?"

"OK," she replied.

Now she'd eat her words ...

My plot was ingeniously simple: When Linda least suspected, I challenged her to name tones-by ear.

I made her stand so she could not see the piano keyboard. I made sure other classmates could not help her. I set up everything perfectly so I could expose her Perfect Pitch claims as a ridiculous joke

With silent apprehension, I selected a tone to play. (She'll never guess F#!)

—and they heard it for themselves!

I had barely touched the key.

"FI," she said. I was astonished.

I played another tone.

"C," she announced, not stopping to think.

Frantically, I played more tones, skipping here and there all over the keyboard. But somehow she knew the pitch each time. She was AMAZING!

"Sing an Es," I demanded, determined to mess her up. She sang a tone. I checked her on the keyboard-but she was right on!

Now I started to boil. I called out more tones, trying hard to make them increasingly

difficult. Still she sang each note perfectly on pitch.

I was totally

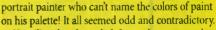
boggled. "How in the world do you do it?" I blurted. "I don't know," she

sighed. And that was all I could get out of her!

The dazzle of Perfect Pitch hit me like a ton of bricks. My head was dizzy with disbelief. Yet from then on, I knew that Perfect Pitch was real.

I couldn't fiqure it out ...

"How does she DO it?" I kept asking myself. On the other hand, why can't everyone recognize tones by ear? It dawned on me: people call themselves musicians and yet they can't tell a C from a C#?? Or A major from F major?! That's as strange as a



Humiliated and puzzled, I went home to work on this problem. At age 14, this was a hard nut to crack

You can be sure I tried it for myself. With a little sweet-talking, I would get my three brothers and two sisters to play tones for me-to name by ear. But it turned into a guessing game I just couldn't win.

Day after day I tried to learn Perfect Pitch. I would play a tone over and over to make it stick in my head. But later I couldn't remember any of them. And I couldn't recognize any of the tones by ear. Somehow they all sounded the same after awhile; how were you supposed to know which was which-just by listening?

I would have done anything to have an ear like Linda, but it was way beyond my reach. So, finally, I gave up.

Then it happened

It was like a miracle . . . a twist of fate . . . like finding the lost Holy Grail. Once I stopped straining my ear, I started to listen NATURALLY. Then the incredible secret to Perfect Pitch jumped right into my lap.

I began to notice faint "colors" within the tones. Not visual colors, but colors of pitch, colors of sound. They had always been there. But this was the first time I had ever really "let go"-and listened-to discover these subtle differences.

Soon-to my own disbelief-I too could recognize the tones by ear! It was simple. I could hear how F# sounds one way, while Bb has a totally different sound-sort of like "hearing" red and blue!

The realization struck me: THIS IS PERFECT PITCH! This is how Bach, Beethoven, and Mozart uld mentally envision their masternieces.



"How in the world do you

do it?" I blurted. I was totally

boggled. (age 14, 9th grade)

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know tones, chords, and keys-all by ear!

It was almost childish—I felt sure that *anyone* could unlock their own Perfect Pitch by learning this simple secret of "color hearing."

Bursting with excitement, I went to tell my best friend, Ann (a flutist).

She laughed at me. "You have to be born with Perfect Pitch," she asserted. "You can't develop it." "You don't understand Perfect Pitch," I countered.

I showed her how to listen. Timidly, she confessed that she too could hear the pitch colors. With this jump start, Ann soon realized that she had also gained Perfect Pitch for herself.

We became instant celebrities. Classmates loved to call out tones for us to magically sing from thin air. They played chords for us to name by ear. They guizzed us on what key a song was in. Everyone was endlessly fascinated with our "supernatural" powers, yet to Ann and me, it was just normal.

Back then I never dreamt I would later cause such a stir in the academic world. But as I entered college and started Join musicians around the world who have discovered a new secret for success with the **Perfect Pitch***

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my life!" T.B. • "Learn it or be left behind." P.S.

college and started to explain my discovery, many professors laughed at me.

"You must be *born* with Perfect Pitch," they'd say. "You can't *develop* it."

I would listen politely. Then I'd reveal the simple secret—*so they could hear it for themselves.* You'd be surprised how fast they changed their tune!

In college, my so-called "perfect ear" allowed me to *skip over* two required music courses. Perfect Pitch made *everything* easier for me—my ability to perform, compose, arrange, transpose, improvise, sight-read (because—without looking—you're sure you're playing the correct tones)—and my *enjoyment* of music skyrocketed. I learned that music is very definitely a HEARING art.

Oh, so you must be wondering what happened with Linda? Please excuse me, I'll have to backtrack...

It was now my senior year of high school. I was nearly 18. In these three-and-a-half years with Perfect Pitch, my piano teacher insisted I had made ten years of progress. And I had. But my youthful ambition still wasn't satisfied. I needed one more thing: to beat Linda. And now was my final chance.

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each spring, complete with judges and awards. To my horror, they scheduled me that year as the *grand finale* of the entire event.

The day arrived. Linda gave her usual sterling performance. She would be tough to match, let alone surpass. But my turn finally came, and I went for it.

Slinking to the stage, I sat down and played my heart out. The applause was overwhelming.

Later, posted on the bulletin board, I discovered my score of A+ in the most advanced performance category. Linda got an A. Sweet victory was music to my ears—

mine at last!

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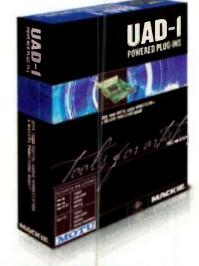
Focusrite VoiceMaster Pro / Baby Bottle Bundle Class A tube mic and preamp — add that Focusrite sound to your MOTU workstation

Your MOTU workstation captures every nuance, so you need a premium mic and preamp. Start with Focusrite's awardwinning Blue Baby Bottle™, a hand-made Class A studio mic ideal for recording vocals, percussion, or any acoustic instruments. Connect Baby Bottle to VoiceMaster Pro™, Focusrite's next-generation all-in-one vocal channel. Focusrite delivers a Class A mic preamp, Vintage Harmonics processor, Voice-optimized EQ, Opto-compressor, Tube Sound circuit, 24-bit 96kHz A/D option, revolutionary Latency Free Monitoring and much more. Add the Blue Pop/Shock kit and you have an outstanding bundle. \$1548 retail value, now \$999 for a limited time.

Mackie Control and UAD-1 Powered Plug-ins Version 3

Mix and process your Digital Performer sessions with hands-on control and accelerated effects processing

Imagine the feeling of touch-sensitive, automated Penny & Giles faders under your hands, and the fine-tuned twist of a V-Pot[™] between your fingers. You adjust plug-in settings, automate filter sweeps in real-time, and trim individual track levels. Your hands fly over responsive controls, perfecting your mix — free from the solitary confinement of your mouse. Mackie Control delivers all this in an expandable, compact, desktop-style design forged by the combined talents of Mackie manufacturing and the MOTU Digital Performer engineering team. Mackie Control brings large-console, Studio A prowess to your Digital Performer desktop studio, with a wide range of customized control features that go well beyond mixing. It's like putting your hands on Digital Performer itself. UAD-1 Version 3 is here, with multi-card support and many other enhancements. Run dozens of sophisticated effects plug-ins inside Digital Performer without bringing your Mac to its knees. What's the secret? UAD-1 is a custom DSPequipped PCI card. It's like adding an extra \$20,000 worth of effects gear to the dozens of native plug-ins included with DP. UAD-1 ships with a growing list of powered plug-ins, including Nigel, a complete palette of guitar tones combined with every effect a guitarist could ever need. Authentic vintage sounds include the Pultec Program EQ, a stunningly realistic recreation, and the1176LN Limiting Amplifier and Teletronix LA-2A Leveling Amplifier, two more analog classics reborn inside Digital Performer. Apply liberally with host CPU cycles to burn.





THE MOTU STUDIO CALL SWEETWATER

Universal Audio Cambridge EQ for UAD-1 Add smooth British equalisation without taxing your CPU

The Cambridge EQ, with its surgical precision, is the perfect complement to the warm, musical Pultec. In addition to its five-band fully parametric EQ, Cambridge features high and low cut filters with a wide variety of filter types and curves, and switchable shelving filters for each EQ band. Cambridge uses complex lattice filters and a special algorithm to achieve a warm analog sound without oversampling. An A/B function allows for quick comparison of two different settings. Cambridge also features a graphic display of the EQ curve, which has "edit handles" for click and drag control of the EQ parameters, plus editable text displays for parameter values. A must-have addition to your Digital Performer plug-in arsenal.



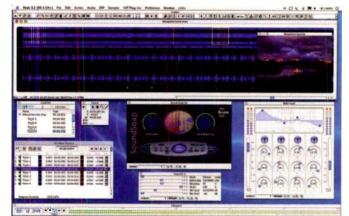
Universal Audio DreamVerb for UAD-1 New flagship reverb for DP from the gurus at Universal Audio

DreamVerb's unparalleled flexibility, power and intuitive interface allows you create any acoustic space inside Digital Performer using a huge list of different materials and room shapes. Blend or "morph" different room shapes and surface materials, adjusting the effect of the room materials on the sound space, and even varying the density of the air to simulate different ambient situations. With flexible 5-band active EQ and unique level-ramping for the early and late reflections, you can create sounds ranging from ultra-realistic dynamic room simulations to lush reverb effects. Universal Audio's proprietary smoothing algorithm lets you adjust parameters in real-time with no "zipper-noise" or other undesirable artifacts.

Positioning Direct Internet Internet Internet Early Internet Internet Internet Distance Internet Inter

BIAS Peak 3.2 The ultimate waveform editing companion for Digital Performer

Burn redbook CD's. Read and write MP3, Dolby AAC[™], 24 bit WAVE and more. Batch process hundreds or even thousands of files. Ultra-fast waveform editing. Run standalone or launch directly from DP3. Unlimited undo/redo with graphic edit histories. Unique DSP and looping tools like Convolve, Repair Clicks, Loop Tuner[™], Loop Surfer[™], Guess Tempo[™], Duplicate, and more. Hot swap real-time effects in series, parallel, or hybrid using Peak's Vbox[™] SE VST matrix. Noisy tracks? Add SoundSoap[™] from BIAS — the ultimate one-click audio cleaning solution. Native for Mac OS 8.6 thru 10.2 Jaguar. Optimized for Apple's G4 Velocity Engine. The ultimate editing, processing and mastering and sound design companion for Digital Performer.



Glyph Trip2 FireWire storage / archiving system Bullet-proof, high-performance storage backed by legendary service and support

Glyph Technologies, the industry leader in high-performance audio storage, brings you the ultimate in FireWire disk storage: Trip2. Early-warning SMART technology alerts you to potential drive problems before they happen. Slide a Glyph-engineered, vibrationresistant (and therefore ultra-quiet) drive cartridge into one of six expansion bays and feel the bullet-proof reliability through your fingertips. Glyph FireWire is the perfect compliment to MOTU PCI on today's latest Power Macs because FireWire disk access and PCI audio streaming are handled on different busses, so you maximize the performance of your system.

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By Larry the O

Believe What You Read

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INAL MIX

But the omnidirectional shotgun microphone is not a hoax. It exists, pretty much just as I described it. (Remember that, at the time, I had not actually laid ears on it.) No, really, it *does* exist. No kidding.

Jeez, you're hard to convince.

I talked in my column about how I became aware of the omnidirectional shotgun mic at an audio-industry schmooze event in San Francisco. Now San Francisco is well-known as a place where things occur that some people consider to be beyond the limits of credibility.Take, for example, the Golden Gate Bridge. The plan for the bridge was dismissed as a practical impossibility from an architectural standpoint. Even today there are some who hold that opinion. Yet, it's there, and it's orange.

Golden Gate Park, too, was considered an absurd proposal, and the location (largely sand dunes at the time) was rejected as not viable by no less than the famed designer of New York's Central Park, Frederick Law Olmsted. But several years later, with the park in bloom and growing, Olmsted wrote park designer and original superintendent William Hammond Hall, admitting that he was wrong and congratulating Hall for his achievement.

When considering how the seemingly impossible can happen in San Francisco, let's not forget that the famed Trips Festival in the 1960s was a profit-making, nonunion event held in the Longshoreman's Hall—the very bastion of American unionism.

Still not convinced? How about the fact that a bunch of not particularly pretty San Francisco musicians who played endless, formless, meandering songs, frequently with out-of-tune vocals and out-of-mind substance-enhancement, lasted for 30 years in the rock 'n' roll business, during which time they were consistently one of the nation's largest live-performance draws whenever they were on the road which was most of the time. Some Grateful Dead-deniers now claim that they never really existed; all you need to do is look around at all the tie-dye in American society today to know that, in some fashion, they did exist. So you see, San Francisco has a long history of the unlikely, impossible, and bizarre coming to pass. I'm sure that, by now, you can understand how aggrieved I was to receive missives accusing me of using my bull-dinghy pulpit to foment untruths. I am *not* pleased at this accusa-

tion, which casts aspersions not only at my veracity but on that of *Electronic Musician*. No, I am very angry about these unjustified attacks and so is my little dog, Fala.

The part that frustrates me most is that, as far as I know, the patent for the omnidirectional shotgun has not yet been filed, so I am not at liberty to disclose the hard details that would prove my statements and indicate vindication. But it *really does exist*, and it works almost exactly as I described it. I saw and held an omnidirectional shotgun microphone in January at the 2003 Winter NAMM show.

Admittedly, I had to change the names to protect the unpatented. And to make sure that the inventor wasn't recognized, I admit that I filled out the biographical information on Norman Hardiheering (not his real name) a bit. So, okay, I stretched a few facts, but everything else I said is true.

Oh, don't be so picayune! Fine, I admit it, there was one other thing in the story that wasn't quite true: the omnidirectional shotgun microphone was invented in New Jersey, not San Francisco. And that's the truth. Believe it. You can ask Scott Wilkinson—if you can figure out what his real name is.

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

STEVE CUR



Charlie Steinberg needs no introduction. His products have had a major impact on the way we make music. **Over the last 20 years Steinberg's innovative** approach to the user interface, native processing and the plug-in concept, amongst many other things, has established the company's products as market leaders worldwide.

Charlie remains a driving force for new development, most recently *System Link* technology enabling multiple computers to function as a single integrated workstation.

System Link was developed on Charlie's Carillon AC1, one of his main development machines for over a year now. One of the first things to impress was power and efficiency for the level of processor employed.

"It was clear that the computer was very well optimised and carefully built with good components. It's also been completely reliable and the physical access is easy - very useful in a development situation." "The Carillon is one of my main development machines. It's extremely fast for the level of processor and it's so quiet. It has to be, I sit right beside it every day!"

Charlie Steinberg

Founder Steinberg Media Technologies

Carillon *Cubase* and *Nuendo* Solutions are painstakingly configured and optimised to run lightning fast and rock solid, straight out of the box. For full details and user testimonials visit us at www.carillonusa.com





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Patent Application Nos US 08 909,130 CE 01306246.8 G8 0018000.0

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- Surround work with true multichannel samples in 5.1 surround.

- Fast operation enjoy instant access to all parameters in one window.
- Built-in effects apply up to four separate effects on each preset for instant recall in any project.
- Plug-in convenience save everything with your host session for instant recall. No separate application to manage. Supports MAS, VST (Mac & PC), RTAS, HTDM, Audio Units and DXi.

