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January 2000

2000 EDITORS CHOICE



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NEW!



1202-VLZ PRO

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

NEW!



1402-VLZ PRO

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

NEW!



1604-VLZ PRO

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

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BEST RF REJECTION OF ANY
MIXER AVAILABLE

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

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

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

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

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

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



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

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

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

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

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

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

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

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

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

LUXURY VLZ PRO MIXER!

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



4 stereo line inputs (on Chs. 9-16) with +15dB to -45dB gain range.
Dual headphone outputs.
RCA inputs and outputs with tape input level control.

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

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

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

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

Master Aux Return Solo switch.

Tape Input Level.
Tape to Main Mix switch.

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

RUDE solo LED in bright ecologically-correct green.

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

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

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

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

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



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

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

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

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

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



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

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

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1642-VLZ PRO

I N S I

FEATURES

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Before you sell your hardware sampler in favor of the software variety, you should carefully consider the trade-offs. Here's the straight story on the pros and cons of software samplers and how to get the most out of these promising programs. We also tell you where to find and how to work with downloadable sound files.

By Roger Maycock with Dennis Miller

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Welcome to EM's eighth annual gear fest! Join us as we pay tribute to the 27 products that rocked our world this year.

By the EM staff

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By Julian Colbeck

84 STAGE VIEW: STOMPBOX STRATEGIES

Everything analog is new again, and that goes double for vintage effects pedals. We show you how to take advantage of their unique sounds and work around their irksome quirks in order to use them to their fullest potential.

By Barry Cleveland



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High Anxiety

Every October, my anxiety level increases dramatically. This is not a reaction to the approach of the holiday season, the AES convention, the annoying political verbiage attending the fall elections, or the beginning of the rainy season in the San Francisco Bay Area. No, the reason I get edgy is that it's time to put together our January issue, which means designating the winners of *EM*'s Editors' Choice Awards. Choosing the best products of the past 12 months is a daunting task; after all, hundreds (perhaps thousands) of music-technology products were released in those months, and we give awards to only around two dozen of them. Furthermore, because our readers (not to mention the manufacturers) take the awards seriously, we know we must choose wisely and well—and it's my job to make sure we do. I don't breathe easy until the selection process is complete and the story is written.

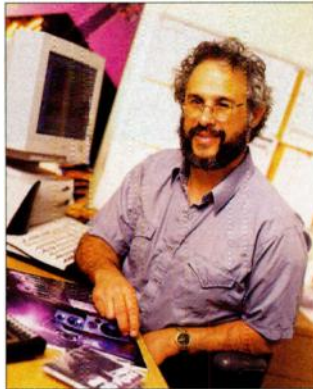
I'm breathing quite nicely now, thank you. All of this year's award winners are clearly worthy, and editors Brian Knave, Mike Levine, Dennis Miller, Gino Robair, David Rubin, and I have written an article that I'm confident you will enjoy. Now I can get back to doing the other parts of my job—at least, until next October. There is, after all, the small matter of helping to create 11 more issues of *EM* this year, not to mention the five other publications in our growing family of magazines. Which, indirectly, leads me to my next topic.

Almost ten years ago, Classifieds Advertising Manager Robin Boyce-Trubitt had the good sense to hire Mary Cosola to fill a position in her department. A year later, then-editor Bob O'Donnell spirited Mary away from classifieds to fill an editorial assistant opening, an act of piracy that has proven a major boon for the magazine. Mary's move to editorial turned out to be especially beneficial for me, because from the beginning we have worked extremely well together.

Over the years, Mary developed her ability to evaluate and improve virtually all aspects of editorial production, in addition to demonstrating considerable talent as a writer, editor, and proofreader. She has also been an excellent organizer and a leader with impressive "people skills." As a result, she earned promotion after promotion, eventually becoming managing editor—arguably the best we have had (and I speak as one who once held that position).

With the growth of *EM* and its associated publications, the focus of the managing editor position has become increasingly managerial and less editorial. But Mary's preference, first and foremost, is to write and edit. She also wants to devote more time to her family. As a result, she has decided to resign from the staff and pursue the life of a freelance writer and editor. Who will be her first client? We will, of course! Mary will continue to write and edit our monthly "Working Musician" column and *Onstage*'s "Performing Musician" column.

Mary's departure is obviously a big loss for our staff in general and for me in particular. Words cannot sufficiently express my gratitude for her friendship, loyalty, and moral support over the years. She's making a change for excellent reasons, and everyone here is delighted that she will continue to be part of our "extended family." We wish her continued success and happiness.



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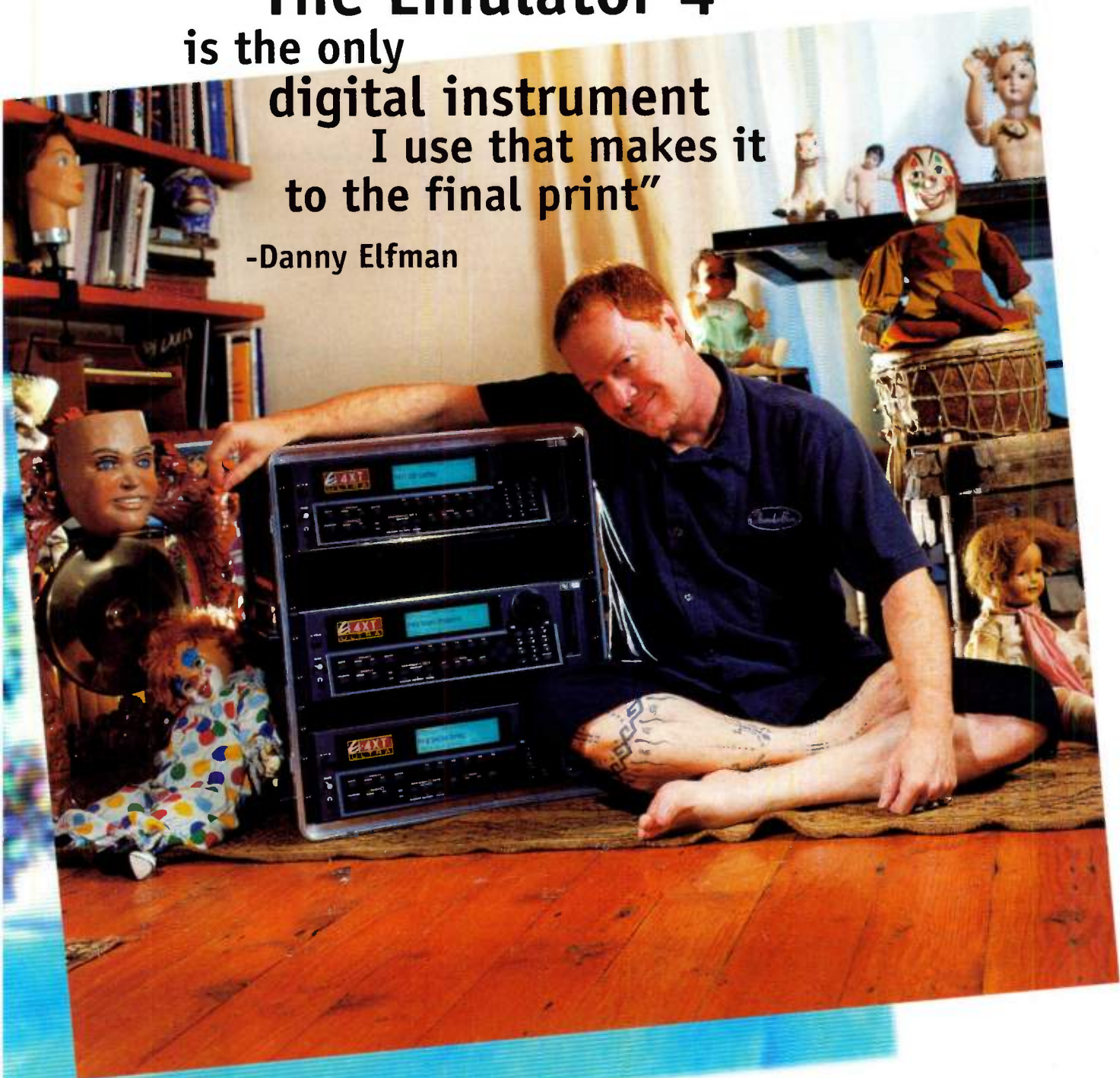
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-Danny Elfman



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Check out the complete **Danny Elfman** interview at www.emu.com/elfman.html

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Dennis Miller

Dennis Miller was appointed associate editor of *Electronic Musician* in 1997 after writing reviews for the magazine for nearly ten years. His specialties include topics related to digital audio, sound synthesis, and music composition. Dennis received his doctorate in composition from Columbia University in 1981 and is currently an associate professor at Northeastern University in Boston, where he heads the music technology program and chairs the Multimedia Studies Steering Committee. His works have been performed at concerts and festivals throughout the world, and his music appears on Opus One Records and the *Frog Peak Collaborative* CD, among others. Dennis is also active as a graphic artist and 3D animator. His works are available at www.casdn.neu.edu/~dmiller.



BRUCE HAMILTON

Gino Robair

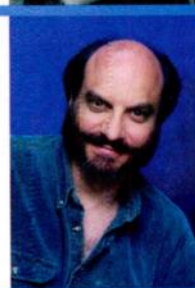
Associate Editor **Gino Robair** comes from a long line of musicians hailing from northern Italy, Hungary, and Bukovina. Trained primarily as a classical percussionist, Gino has played theremin, percussion, keyboards, and bowed Styrofoam on numerous commercials and film projects. As a composer and sound designer, Gino has worked in a wide variety of media, from Shakespearean theater and Indonesian gamelan to modern dance and MTV. His favorite gig (besides editing at *EM*, of course) was as music director for CBS's animated television series *The Twisted Tales of Felix the Cat*. In his spare time, Gino runs Rastascan Records, a small indie label devoted to experimental and improvised music. He is also the author of *Making the Ultimate Demo*, published by *EMBooks*. Gino's editorial expertise includes hard disk recording, analog studio technology, and Web audio. Gino is also editor of "Web Page," *EM*'s new column devoted to Internet audio issues.



K. PERRY

David Rubin

David Rubin has been an associate editor of *Electronic Musician* magazine since 1997. He is the author of *The Audible Macintosh* and coauthor of *The Audible PC*. His most recent book is *The Desktop Musician*, published by McGraw-Hill. Before joining the staff at *EM*, David worked as a freelance writer covering such topics as desktop music production and audio for multimedia. His feature articles and reviews have appeared in numerous computer- and music-related magazines. David holds a master's degree from the University of Northern Colorado in music theory and composition, two bachelor's degrees in music, and a certificate from the Grove School of Music. His orchestral works have been performed by the Denver Symphony Orchestra, and his film scores include the soundtrack for the Roger Corman movie *Wizards of the Lost Kingdom II* starring David Carradine. He was also the primary sound designer for *Project S.P.A.C.E.*, an interactive multimedia presentation by JPL/NASA.



Brian Knave

Associate Editor **Brian Knave** specializes in microphone technology, processors, consoles, and reference monitors. He covers *EM*'s "Recording Musician" column as well as other recording application-oriented pieces. Known as the "Knave of Arts" (the name of his production company), Brian is a poet, musician, songwriter, recording engineer/producer, and music instructor. He earned a bachelor's degree in English from East Tennessee State University and a master's degree in creative writing from the University of California at Davis. He also studied tabla at the Ali Akbar College of Music in San Rafael, California, and drums and percussion at the Percussion Institute of Technology in Hollywood. A veteran performer, Brian has been in countless bands touring the U.S. and overseas, and has played with many artists, including Norton Buffalo, John Tchicai, Paul McCandless, and Ronnie Prophet. Brian co-owns and operates Moptop Records, a children's music label, as well as a busy project studio.



GASPAR MARQUEZ

Mike Levine

The newest member of the editorial staff, **Mike Levine** is both an associate editor for *Electronic Musician* and the editor of *Onstage*. He previously was at Cherry Lane Publishing, where he was executive editor of *Home Recording* and senior editor of *Guitar*. Mike is the author of four books, including *How to Be a Working Musician*, which is in its second printed edition from Billboard Books. He also works as a session musician and commercial music composer in the New York area. Mike wrote the theme for CNN's Saturday/Sunday morning newscast, and he has composed music for numerous national commercials including spots for Miller Lite, Advil, MCI, All, Lysol, Days Inn, and Kool Aid.



Rick Waldon

Assistant editor **Rick Waldon** writes the magazine's "What's New" product-announcements column. He also assigns, writes, and edits the "Pro/File" column and various interview features about artists and producers. Pro/File discusses how up-and-coming artists self-recorded their CDs, often in personal studios. Rick attended the University of California at Berkeley, and since 1992 has released four albums with various Bay Area-based bands, as well as performed in and engineered a number of other projects. Rick is on the staff at Planet-3 Productions, a project studio located in San Francisco, California. Rick is also the editor of two music-related books, *The EM Guide to the Roland VS-880* and *Financial Management for Musicians*.



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PRAISE

I have been subscribing to **EM** for more than two years now, and I was particularly pleased to note the section on SMFs of Christian hymns in the November 1999 issue ("What's New: Sound Advice"). I am a musician and a Christian worker, and I appreciate the effort on the part of the publishers to include this section of the musical community. There is an entire group of excellent musicians and electronics users in the Christian music world, and the popular press seldom pays any attention to them. Perhaps you could explore areas of the Christian music industry and highlight some of its artists in a future issue. I believe this will stimulate and not reduce magazine sales, as it will attract the thousands of Christian musicians around today.

David Lawrence
Abundant Life Ministries
Cincinnati, OH

UNEVEN EQUAL TIME

The EQ article in your October issue was hilarious.

Joe Hardy
via e-mail

I just finished reading Jeff Casey's "Equal Time" article (October 1999), and I have to say that anyone interested in understanding the art of EQ should not read this article. From

its opening premise—that EQ can substitute for capturing a pristine performance, a perfectly tuned instrument, the proper acoustic environment, or good microphones—to the 14 totally useless and bizarre tips, this article is full of erroneous information.

I have been playing and recording music for more than 30 years; for the past 25 I have been doing audio and video engineering, band demos, and audio for video, and recording original music. I don't know who Jeff or the two other gentlemen are, but this article is full of narrow-use, extreme ideas. I would love to hear some mixes using these concepts. They wouldn't work well for most of the music that I know of or listen to.

I won't go into all of the items I find amiss, but I will delve into one, the Bass Guitar section. Bass is my main instrument. I don't know of any music in which a bass with the low end rolled off at 100 Hz and the top rolled off at 520 Hz would be considered as having a rich, fat, full tone. On a four-string bass, the low E's fundamental is 40 Hz, and it's lower for a five- or six-string. There is a lot of harmonic content well above 730 Hz, especially with round wound strings and active basses.

Some great articles about EQ have been published throughout the years, but this isn't one of them. It just gives strange EQ settings from three people and has no real-world, useful information.

Rick Bogan
via e-mail

Jeff Casey's article "Equal Time" was an extremely informative look at how the pros get such great sounds with simple EQ tools. It's the kind of article that will always be open on my desk when I'm mixing. Thanks for the tips!

However, the six Ensoniq PARIS screen shots were a complete waste of space. PARIS is a great system, but surely you could have found something with a more descriptive EQ interface. It was a bad and obviously biased decision to use the PARIS EQ strips as figures for the article. Something a little more descriptive, like the *Cubase VST* EQ interface, would have been more appropriate. Or even better, graphical EQ curves. It's a shame that all your readers will have to go out and buy a PARIS manual just to find out what you were talking about.

Christopher Thompson
via e-mail

Joe, Rick, and Christopher—Neither Jeff Casey, the two engineers he interviewed (Derek Martin and Greg Petricelli), nor the editors who worked on the article would assert that fixing a poor recording is better than recording your tracks properly to start with. As Jeff points out in his introduction, sometimes you don't have the mic you'd like to use for a particular track, or the acoustic space is flawed, or an instrument is of less-than-stellar quality, and you have to make do. EQ is one tool you can use to correct the problems at mixdown. Other times, people bring tracks to you for mixdown, and you have to deal

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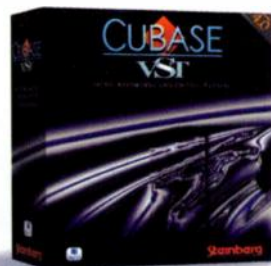
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* The Model E plug-in shown is sold separately.

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So, what else have we packed into the 386? For starters it includes features you would demand from a high-end mic pre such as:

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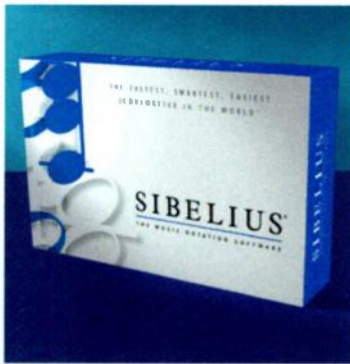
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● LETTERS

with whatever they bring you. EQ can help there, too. Obviously, if you can get it right from the start, there's nothing to fix, and life is grand.

Casey, Martin, and Petricelli suggested some techniques that surprised me and that I probably would not use. But they clearly have had success using them. Nobody is fool enough to claim that this article is sacred scripture that holds the answers to life, the universe, and everything. You can take what you think is of value—and I agree with Christopher that the article did present some valuable ideas—and leave the rest or modify it to suit you.

As far as using PARIS for the screen shots, we actually did try to use several other host programs and EQ plug-ins with more graphical interfaces. But we ran into problems because several of the techniques presented required a 4-band parametric that could be set very precisely, without rounding off the values (as many of the plug-ins did). PARIS offered that; the others we tried did not. Admittedly, given more time, we could have kept searching.

However, the values in the PARIS displays (gain in dB, Q factor, and frequency in Hz) were not PARIS-specific and could translate to other systems, including hardware. In the caption for Fig. 4 (the first PARIS screen shot in the article), we specified what each parameter value meant.—Steve O.

NT SOLUTIONS

In the October 1999 "Letters: Partitioning Dilemmas," you responded to Bill Rogers, saying that "Windows NT cannot recognize FAT32 drives." This is true only if one restricts oneself to Microsoft-only products. A software company called Winternals Software (www.winternals.com) produces a very high-quality driver called FAT32 for NT 4.0. I've been using it continuously for about six months with no difficulties whatsoever. This is a godsend for my triple-boot system (Windows 95, Win 98, NT). Winternals also produces NTFS for Win 98, which I have not used.

A minor point: you say that once one reformats for FAT32, one can't go back to FAT. There is at least one way to go back: buy *PartitionMagic* 4.0 and run the "convert FAT32 to FAT" operation.

Jim Bartram
Oakland, CA

RAZOR-SHARP HEARING

The article titled "Razor's Edge" (May 1999) by Jeff Casey states that the resolution of human hearing is 3 dB. I have had a number of hearty chuckles over this statement with mixing and mastering engineers while producing album projects and going back and forth over the merits of ½ dB changes. Finally I thought I would ask you: was it a typo? (0.3 dB perhaps?)

David Pascal
via e-mail

David—Actually, the resolution of human hearing (which is also called the just noticeable difference or jnd) with respect to changes in intensity is much more complex than a simple, constant number of decibels. Rather, it depends on the frequency and initial intensity of the stimulus (not to mention the variations in hearing ability from one individual to another).

According to Alan M. Richards in his book *Basic Experimentation in Psychoacoustics*, the jnd is 3 to 7 dB or more at low intensities (say, 5 dB above an individual's threshold of hearing), depending on the frequency. In general, the jnd for low frequencies at low intensities is greater than it is for higher frequencies at low intensities, although this is not a linear relationship. For example, the jnd is 3 dB for frequencies between 1 and 4 kHz at 5 dB above threshold, but it is 5 dB for 10 kHz at 5 dB above threshold. The jnd is 8 dB for 35 Hz at 5 dB above threshold.

As the intensity increases to about 50 dB above an individual's threshold of hearing, the jnd falls to well below 1 dB for almost all frequencies. This corresponds to most studio mixing situations, in which the material is typically more than 50 dB above the threshold of hearing. About the only time that you have very low-volume material is during a fade-out ending, in which case the jnd is significantly higher than 1 dB.—Scott W.

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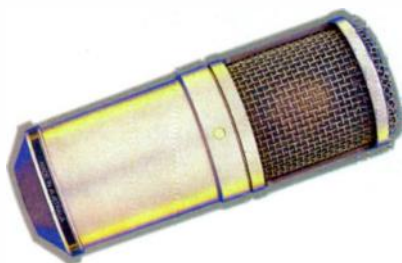
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WHAT'S

NEW

By Rick Weldon



▲ RODE CLASSIC II

The Classic II (\$1,999) large-diaphragm tube microphone from Rode retains many of the attributes of its original Classic mic: a custom Jensen transformer; a 6072 twin triode tube; and a power supply that houses a -10 and a -20 dB pad, a switchable high-pass filter at 120 Hz, a ground-reversal switch, and a switch for selecting any of nine polar patterns.

To this, the Classic II adds a dual edge-termination design for the diaphragm, which according to Rode achieves better low-end response because of the diaphragm's greater freedom of movement. Included in the package is a redesigned 30-foot cable featuring double-shielded, oxygen-free copper cabling and new connectors, and a redesigned shock-mount and stand adapter. The Classic II ships in an aluminum flight case.

Rode rates the mic's frequency response at 20 Hz to 20 kHz, <19 dBa self-noise, and a maximum SPL of 130. Event Electronics (distributor); tel. (805) 566-7777; fax (805) 566-7781; e-mail info@event1.com; Web www.event1.com.

Circle #401 on Reader Service Card



▲ DBX 386

The 386 (\$599) is a dual-channel tube preamp and dbx's latest addition to its Silver Series line of audio processors. With dbx's proprietary Type IV A/D conversion system, the 386 supports sample rates of 44.1, 48, 88.2, and 96 kHz, word lengths of 16, 20, and 24 bits, and multiple dithering and noise-shaping functions.

Each of the 386's preamps include +48V phantom power, a 20 dB pad, a phase-invert switch, and a 12 dB/octave low-cut filter centered at 75 Hz. Each channel has a back-panel balanced 1/4-inch TRS line-level input and a balanced XLR mic-level input. There is also a front panel, unbalanced 1/4-inch instrument-level jack for each channel. The 386 provides 90 dB of gain at the mic inputs, and

30 dB of gain at the line- and instrument-level inputs. Each channel has a balanced 1/4-inch and XLR connector running at +4 dBu.

Each channel of the 386 has a digital output level control that can boost or cut up to 15 dB, and a switchable 12-segment LED meter for monitoring either analog-input or digital-output levels. AES/EBU or S/PDIF stereo digital signals are output on an XLR or an RCA connector, respectively. The 386 also includes word-clock I/O on BNC connectors.

The 386's frequency response is rated at 10 Hz to 100 kHz (± 3 dB at the analog output), and THD+N at 0.04% (typical at analog outputs). dbx; tel. (801) 568-7660; fax (801) 568-7662; e-mail customer@dbxpro.com; Web www.dbxpro.com.

Circle #402 on Reader Service Card

▼ TASCAM DA-78HR

Tascam has released the DA-78HR (\$3,199), a 24-bit DTRS-based modular digital multitrack recorder. The 24-bit A/D and D/A converters can be used at a 16- or 24-bit resolution with sample rates of 44.1 or 48 kHz. S/PDIF digital data can be input at 16-, 20-, or 24-bit resolution. The DA-78HR is backward compatible with direct digital dubbing of 16-bit audio between other Tascam MDMs—DA-88, DA-38, and DA-98.

The DA-78HR has an internal digital patch bay that lets you assign the input source for each track. It also has an internal 8-x-2 mixer with controls for level and pan position of each track. The unit has variable-speed record and playback capabilities of up to 6 percent. There is a

jog/shuttle wheel for scrubbing through audio and setting locate points and data values. Other interesting features include auto punch-in recording, and a rehearsal mode that lets you practice punch-in recording before committing a pass to tape.

Balanced analog inputs and outputs are each on a 25-pin D-sub connector and operate at +4 dBu. The unbalanced analog I/O uses RCA connectors and operates at -10 dBV. Eight-track digital I/O is provided on a single D-sub connector, and stereo S/PDIF digital I/O is provided on RCA connectors. The DA-78HR also includes SMPTE time code I/O, and responds to MTC and MMC. Tascam rates the unit's frequency response at 20 Hz to 20 kHz (± 0.5 dB), the dynamic range at 104 dB, total harmonic distortion at <0.004%, and S/N ratio at 104 dB (A weighted). Tascam; tel. (323) 726-0303; fax (323) 727-7635; fax-back (800) 827-2268; Web www.tascam.com.

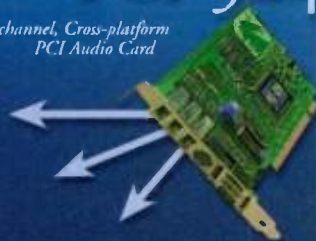
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The 308 digital I/O (\$695) — 24 channels of 24-bit digital, AES/EBU (8 ch), S/PDIF (8 ch), and optical S/PDIF (8 ch).

The 24i I/O (\$1195) — Twenty four 24-bit analog inputs (!), switchable +4/-10, in one affordable rack space.

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▼ **UNIVERSAL AUDIO LA-2A & 1176LN**

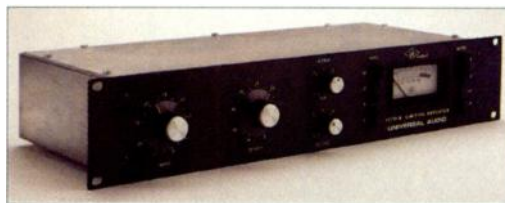
Universal Audio has rereleased two legendary '60s-era analog outboard processors: the 1176LN solid-state limiting amplifier (\$2,500), designed by Universal founder Bill Putnam, and the Teletronix LA-2A limiting amplifier (\$3,500). According to the company, now run by Putnam's sons, these hand-wired units remain faithful to the originals in both design and componentry.

The 1176LN offers FET gain reduction,



preset compression ratio settings of 4:1, 8:1, 12:1, and 20:1, attack time adjustable from 20 to 800 μ s, release time adjustable from 50 ms to 1 second, and input- and output-level controls. The unit's output amplifier uses Class A circuitry, and you can link two 1176s together for stereo operation. Its VU meter can be set to monitor gain reduction or maximum levels of +8 dBm or +4 dBu.

The LA-2A is a single-channel electro-optical compressor. It has input-gain and peak reduction control knobs and a switch for VU-meter gain-reduction monitoring at either maximum +10 dBm or +4 dBu operating levels. You can perform gain reduction of up to 40 dB. The LA-2A can also be stereo linked.



Universal Audio rates the 1176LN's frequency response at 20 Hz to 20 kHz (± 1 dB), THD at <0.5% (50 Hz to 15 kHz), and signal-to-noise at >70 dB (at +10 dBm). The LA-2A's frequency response is rated at 30 Hz to 15 kHz (+0/-1 dB); its THD and S/N specs are the same as the 1176LN's. Universal Audio; tel. (831) 454-0630; fax (831) 454-0689; e-mail postmaster@uaudio.com; Web www.uaudio.com.

Circle #404 on Reader Service Card

▼ **FOCUSRITE ISA430 PRODUCER PACK**

The ISA430 Producer Pack (\$3,499) from Focusrite is a single-channel processor featuring a preamp, EQ, compressor, gate, de-esser, and limiter. The unit boasts Class A circuitry with a design based on the Focusrite Studio Console and Red Series processors. Two of the 3U rack-mountable devices can be linked for stereo operation.

The preamp accepts line- or mic-level signals via balanced XLR connectors on the rear panel. In addition, there are



1/4-inch instrument-level jacks on the front and rear panels. Stepped knobs adjust the mic's gain from -60 to +6 dB in 6 dB increments, and the line-level gain from -18 to +18 dB. A trim control provides additional variable gain for any input signal.

The Producer Pack's compressor gives you controls for ratio, threshold, attack, release, and makeup gain. The gate has variable controls for threshold, release, attenuation range, and hold. The gate can be switched to an expander at the touch of a button. The compressor and expander/gate each have their own 1/4-inch sidechain input.

The EQ section features wideband high- and lowpass

filters, high and low shelving filters with adjustable rolloff frequencies, and a 2-band parametric EQ. The Producer Pack lets you switch the position of the dynamics and the EQ sections, as well as place the insert in one of three locations: before, between, or after the dynamics and EQ sections. The insert send and return jacks have balanced XLR connectors.

The optional digital I/O (\$499) is on a factory- or dealer-installed card. Focusrite rates the ISA430's frequency response at 20 Hz to 22 kHz, THD at 0.003% with 0 dBu, and noise at -96 dBu. Digidesign (distributor); tel. (800) 333-2137 or (650) 842-7688; fax (650) 842-7999; e-mail sales@focusrite.com; Web www.focusrite.com.

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▶ **D-LUSION MJ STUDIO**

MJ Studio (Win; \$34.95) from d-lusion is a virtual mixing console that gives you DJ-style control over MP3 and 16-bit, 44.1 kHz WAV files. You drag a file into each of the program's two onscreen turntables and perform pitch-shifting, scratching, and punch-ins to each "deck" independently in real time. There is a 3-band equalizer for each channel and a crossfade mixer for fading between files on the fly. You can output your performances as stereo 16-bit, 44.1 kHz WAV files.

The program has a bpm detector for matching the speed of the two tracks and a playlist function for adding, deleting, and moving songs. An Automix function



allows MJ Studio to play through the playlist without gaps between songs. Using d-lusion's DAS application (a free download), you can sync MJ Studio's output to the company's RubberDuck bass-line software synthesizer (\$34.95) and DrumStation virtual drum machine (\$34.95).

MJ Studio requires a Pentium 200 running Windows 95, 98, or NT. d-lusion interactive media; tel. 49-172-768-4710; e-mail info@d-lusion.com; Web www.d-lusion.com.

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▼ METRIC HALO LABS

Channel Strip (\$999) from Metric Halo Labs is a Pro Tools TDM/AS/RTAS-format plug-in that provides all of the processing functions you'd find on a high-end console's channel strip. The plug-in's layout lets you access all of its functions from a single screen.

An input gain control lets you boost or cut your signal by 24 dB. In this section of the interface, you can flip the phase of the signal and delay it by up to 255 samples. Two level meters of approximately 100 segments (with 14 calibration modes) let you monitor mono or stereo output.

At the top of *Channel Strip's* left-hand side is an expander/gate with controls for threshold, attack, and release. Its sidechain input may be used with the signal being processed or with an external key. The sidechain input has a filter that lets you control input level, peak center frequency, and bandwidth to further fine-tune how the sidechain signal activates the gate.

Below this section is a compressor with controls similar to the gate's, adding controls for compression ratio and compression characteristics. Each section has two meters that monitor input level, detector level, and gain reduction, as well as two graphs on the right side of the interface that display output response and sidechain filter shape with live dynamics metering. The system is dynamically switchable between pre- and post-EQ.



Below these two sections lies a 6-band, fully parametric EQ that uses 48-bit internal processing. Each band has six user-selectable filter types, including peaking, high- and low-shelving, and bandpass, highpass, and lowpass filters. A graph shows the frequency response of the output based on filter selections.

Channel Strip requires a Pro Tools 24 Mix (using TDM) or Pro Tools LE (using RTAS). With the TDM version, *Channel Strip* can process up to six mono or three stereo channels of 24-bit audio per MIX DSP chip. Metric Halo Laboratories; tel. (888) 638-4527 or (914) 462-1230; fax (914) 462-4865; e-mail in-foo@mhlabs.com; Web www.mhlabs.com.

Circle #407 on Reader Service Card

▲ WAVES

The *C4 Multiband Parametric Processor* (Mac/Win NT; \$595) from Waves is a TDM-format mastering plug-in with digital audio compression based on Waves' *Renaissance Compressor*. The plug-in provides four independent bands that each combine compression with a parametric EQ. It features the

same Electro and Opto modes as the *Renaissance* program, simulating solid-state and optical compression. Also included is the Auto Release Control technology of the *Renaissance* plug-in, which responds differently to peaks and RMS changes, following the same response curve that human hearing does.

The plug-in gives you a full parametric EQ and compression or expansion control for each band, with adjustable threshold, range, gain, attack, release, and bandwidth parameters. You can also employ a global Knee control. The plug-in uses 48-bit internal processing and dithers down to 24 bits for output.

While the technology for *C4's* audio compression remains rooted in the *Renaissance Compressor*, the interface is reconfigured to reflect the correlation between multiband gain reduction and EQ. *C4* displays the DynamicLine, a floating EQ curve, which is user-adjustable through keystrokes or with a mouse.

C4 Multiband Parametric Processor requires a TDM-capable Mac or PC. Mac users will need MacOS 7.6, 64 MB of RAM, and any DAE-compatible digital audio programs; PC users need Windows NT and a Digidesign-approved Pro Tools system running Pro Tools 4.2.5 or higher. Waves; tel. (423) 689-5395; fax (423) 688-4260; e-mail sales-info.us@waves.com; Web www.waves.com.

Circle #408 on Reader Service Card



▲ STEINBERG

Steinberg's *LM-4* (Mac/Win; \$99) is a virtual drum machine in the form of a VST plug-in. The *LM-4* can load in 18 pads per drum set. Within each pad, you can set up to 128 velocity zones. According to Steinberg, the *LM-4's* timing can be up to 40 times faster than a MIDI-controlled hardware device such as a sampler. Up to eight *LM-4* plug-ins can be run simultaneously, depend-



IN AN EFFORT TO AVOID ANY MULTI-FUNCTION COMPARISON TO THAT OF A SWISS ARMY KNIFE, WE HAVE ELIMINATED THE TOOTHPICK.

SYSTEM: Type: Integrated, active near/mid-field monitor. Configuration: 2-way acoustic suspension. **Woofer:** 4.5" treated paper. **Tweeter:** 1" soft fabric dome. **Magnetic Shielding:** Full. **FEATURES/CONTROLS:** Connectors: Input: XLR, TRS, RCA. Controls: Input sensitivity: -10, +4, dB. Listening proximity: near/mid-field. Auto Power: On/Off



SPECIFICATIONS: Amplifier power: 75W continuous rms/ch, 150W (100ms peak). Peak acoustic output: 111dB SPL (100 ms pink noise @ 1M). Residual hum/noise: ≤20 dB SPL (A-weighted @ 1M). THD @ 90 dB SPL: $\leq 1.0\%$ (100Hz @ 1M). Response: ±2 dB (1/3 oct. swept noise): 98Hz - 20kHz @ 1M, 93Hz - 20kHz @ 2M. -6dB LF cutoff: 80Hz (in-room response). Monitor Dimensions/Wgt: 9" h x 5.7" w x 7.3" d, 14 lbs. Monitor Enclosure Materials: Cast aluminum/zinc alloy body, micro-filled polypropylene baffle.

M-00 The comparison would have been flattering, however, the M-00 is worthy of high praise on its own merit. Not only is the M-00 extremely versatile, articulate and accurate, it delivers tremendous output, along with surprising bass and clarity for a monitor of any size. And while the M-00 is built to the construction standards of a polar ice breaker, its compact nature makes simple duty out of schlepping it from one session to the next. And because the M-00 is magnetically shielded, it is ideal for use with PC based workstations. Further, it is sold separately so you can easily gang together 5.1 systems or daisy chain up to 10 M-00's per channel for fixed installations. As for the toothpick, all considered, we simply figured it was something you could learn to live without. www.nhtpro.com



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circle #513 on reader service card



PLUG-IN BONANZA ▲▲▲▲

ing on your computer's CPU speed and RAM.

The *LM-4* is triggered by MIDI events and sends 16- or 24-bit audio into the VST host application's audio mixer. Each *LM-4* has four individual outputs and a stereo mix output. Ten 16-bit and ten 24-bit drum sets from Wizoo are included.

Each pad is polyphonic, so you can retrigger it without the initial sound being cut off. You can build your own drum kits from 16- or 24-bit AIFF or WAV files, and set pitch and pan position for each instrument. Each plug-in function can be automated and saved as song information within the host application.

To run *LM-4*, you'll need a Power Mac 250 running MacOS 8.0 or higher, or a Pentium 266 and Windows 95 or 98. Both systems need at least 64 MB of RAM. Steinberg North America; tel. (818) 678-5100; fax (818) 678-5199; e-mail info@steinberg-na.com; Web www.us.steinberg.net or www.cubase.net.

Circle #409 on Reader Service Card



▲ MCDSP

McDSP's latest plug-in, *CompressorBank* (Mac; \$495), is available in TDM, RTAS, and AudioSuite formats. The plug-in gives you standard threshold, ratio, attack, and release compression controls, with onscreen sliders and digital readouts for parameter control. *CompressorBank* emulates a number of classic hardware devices, including the Teletronix LA-2A, dbx 165, Neve 2254E/33609, Urei 1176LN, and other models. The 1176LN even models the compression characteristics that occur when all four ratio buttons are simultaneously pressed.

CompressorBank uses the company's Analog Saturation Modeling, which pre-

vents digital clipping and emulates the sound of an overdriven analog device. Also included are Knee and Bite controls that let you further customize the compression sound. Knee softens the compression curve; Bite lets signal transients pass uncompressed. You can choose a basic configuration that has just these controls, or call up more elaborate compressors with increasing amounts of control. The second version adds a prefilter, and the third gives you prefilter and a post-compression parametric EQ based on McDSP's *FilterBank* plug-in. You can use each of the three compressor versions in either mono or stereo, and each version allows you to use a sidechain input with its own highpass, lowpass, bandpass, or parametric EQ filter.

To use the TDM version, you'll need a Power Mac running Pro Tools and with TDM capabilities. McDSP; tel. (650) 320-8452; fax (707) 220-0994; e-mail info@mcdsp.com; Web www.mcdsp.com.

Circle #410 on Reader Service Card

▼ YAMAHA MSP10 AND SW10

Yamaha's MSP10 (\$749 each) active monitor features an 8-inch woofer and 1-inch titanium-dome tweeter powered by 120-watt and 65-watt power amplifiers, respectively. The drivers use magnetic structures designed to reduce distortion. The MSP10 speakers are magnetically shielded for use in close proximity to computers, video equipment, or other magnetically sensitive material.



The monitor's tweeter is designed to maximize uniform high-frequency dispersion, making the sweet spot wider. There is a 3-position EQ trim control section on the rear of the MSP10 for optimizing system response in your room. A low-cut filter is also provided so you can use the MSP10s with a subwoofer.

The SW10 powered subwoofer (\$799) was developed to complement the MSP10. It features a 10-inch speaker powered by a 180-watt amplifier. Controls include a 40 to 120 Hz variable high-pass filter, master volume control, and phase-reverse switch.

The MSP10 has a balanced XLR input, while the SW10 has three inputs and three outputs, all on balanced XLR connectors. Yamaha rates the MSP10's frequency response at 40 Hz to 40 kHz (+0/-10 dB), S/N ratio at 100 dB, and maximum SPL at 110 dB (at 1 meter). The



SW10's frequency response is rated at 25 to 150 Hz (+0/-10 dB) and a maximum SPL at 111 dB (at 1 meter). Yamaha Corporation of America; tel. (714) 522-9011; fax (714) 739-2680; e-mail info@yamaha.com; Web www.yamaha.com.

Circle #411 on Reader Service Card

► FURMAN SOUND HDS-16 & HRM-16

Designed for live and studio applications, Furman's HDS-16 headphone distribution system (\$699) and HRM-16 personal headphone mixer (\$499) give up to six users the ability to customize their own headphone mix.

The 2U rackspace HDS-16 has 16 balanced 1/4-inch and 16 balanced tiny telephone (TT) connectors on its front panel, allowing a mix that has up to eight mono and four stereo signals. Two additional 1/4-inch TRS jacks on the front panel allow the control room to send and receive signals from the HRM-16 talkback system. The HDS-16's rear

panel includes six Centronics 50-pin connectors, and ground-lift and power switches.

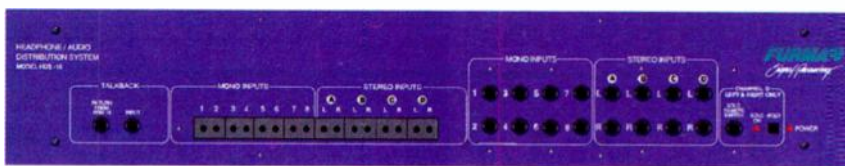
You can send a mix to up to six HRM-16s using the included 25-foot cables. The mixers can be attached to a mic stand and are powered by the HDS-16. Each HRM-16 has eight mono and four stereo level controls. The mono channels also have pan and effects-send controls. The processed signal is controlled with a stereo effects-return knob. A talkback mic



and speaker system lets everyone using an HRM-16 communicate with each other as well as with the engineer.

Furman rates the system's frequency response at 20 Hz to 20 kHz, and noise at >-90 dBu. Furman Sound; tel. (707) 763-1010; fax (707) 763-1310; e-mail info@furmansound.com; Web www.furmansound.com.

Circle #412 on Reader Service Card



► YAMAHA CS6X

Yamaha adds to its CS line of analog-style keyboards with the CS6X (\$1,795), a 61-key digital synthesizer that uses the company's AWM2 synthesis engine for 16-part, 64-note polyphony. The CS6X is designed for extensive real-time control of sounds with 14 dedicated and 5 assignable control knobs as well as pitch and modulation wheels. Two Scene buttons can take snapshots of front-panel parameters. You can store two scenes per voice in memory, and you can morph between scenes using the dedicated Scene Control knob or with the synth's modulation wheel.

The AWM2 synth engine has 16 MB of waveform presets in ROM (including samples from Yamaha's EX5), and 4 MB of RAM for storing up to 256 samples of 16-bit, 44.1 kHz audio. You store and play samples in any one of four Phrase Clip kits that you can edit, loop, and modify. The synth's Beat Remix, Loop Divide, and Loop Remix functions let you modify loops by slicing them up into individual components and rearranging them. The loops can then be played at any tempo.

The DSP chip in the CS6X gives you two system effects and two insert effects simultaneously. The available effects combine standard ones, such as

reverb and chorus, with newer ones including Lo-Fi, Auto-Synth, and Beat Change. Auto-Synth sends any voice into a LFO-controlled pitch modulation, amplitude modulation, high- and low-pass filters, and a delay; Beat Change allows the tempo of a sample or loop to be changed without changing the pitch, and to change the pitch without changing the tempo. An unbalanced 1/4-inch input on the rear panel lets you process any mono analog signal using

dition, the CS6X supports Yamaha's Modular Synthesis Plug-in System, which lets you install any two of the six PLG-Series expansion boards. These boards add not only new sounds, but new synthesis technologies, additional polyphony (up to 192 notes), and more effects.

The CS6X has MIDI In, Out, and Thru connectors. Stereo output is on unbalanced 1/4-inch connectors, and there are 1/4-inch jacks for an assignable foot



these effects in real time, and there are multimode resonant filters available for each note.

The CS6X has an onboard arpeggiator with 128 patterns. You can use 3.3V Smart Media cards to store an additional 32 MB of MIDI and audio data. In ad-

dition, momentary foot switch, and volume and sustain pedals. Yamaha Corporation of America; tel. (714) 522-9011; fax (714) 739-2680; e-mail info@yamaha.com; Web www.yamaha.com.

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Dr. D

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KEY CHANGES

Digidesign has taken over marketing and distribution of **Focusrite** products. The two companies have been development partners since 1996, when Focusrite developed the *d2* equalizer plug-in for Pro Tools... **Beatnik**, maker of the Beatnik music editor and browser plug-in, has announced that it will merge with **Mixman Technologies**. Mixman is the creator of the *Mixman Studio Pro* remix software for Mac and Windows. The companies' goal is to facilitate high-quality, interactive audio on the Web... The **Internet Underground Music Archive** (IUMA) has created a freeware Web-site-creation tool called *Artist Uplink*. The utility lets you upload and edit band bios and lyrics, photos and other artwork, and streaming audio in RealAudio and MP3 formats. You can customize buttons, background colors, and more. *Artist Uplink* can be accessed through the company's Web site, www.iuma.com, or through the Yahoo Digital site at digital.yahoo.com... **Sonic Foundry** has released the Mastering House bundle (\$749), which includes *Sound Forge 4.5*, *CD Architect*, and the *XFX-1* and *XFX-2* plug-in packages... **BIAS** has announced its Powerbook Edition, a package that provides digital I/O and recording and editing software for Mac and Windows laptops. There are three versions of the package, each of which contains a version of *BIAS Peak* and *SFX Machine*, a Digigram VXPocket PC Card, Waves *EasyWaves*, and Adaptec *Toast: Peak Le* Powerbook Edition (\$729) includes *Peak Le* and *SFX Lite*; Peak 2.0 Powerbook Edition (\$899) upgrades to *Peak*; and the BIAS Studio Powerbook Edition (\$999) includes *Peak* and adds *BIAS Deck* and *SFX Machine*... **Lexicon** is offering a credit of up to \$2,000 to anyone who wishes to trade in their used audio and video gear for the new Lexicon MC-1 digital controller... **Steinberg Cubase VST 3.7** for Windows can now import Mixman TRK files, and *ReCycle* can now export them.

▼ ALTERMEDIA STUDIO SUITE

With AlterMedia's *Studio Suite* business management software (Mac/Win; \$389), you can create and maintain customized records pertaining to virtually every aspect of your personal or commercial studio. The program's main menu lets you jump to different modules, or windows that focus on a number of typical schedules and procedures common to recording studios. The modules are grouped into three categories: Office, Studio, and Tech.

In the Office section, you can automate routine activities and cross-reference records. The Contacts module displays information on clients such as their past projects, invoices, tapes, and songs, and it can keep a log of phone calls, letters, faxes, and e-mail communications. The Calendar and Production Order modules can help you keep track of not only upcoming sessions, but also rooms, rates, equipment, engineers, and more. Other modules let you keep track of inventory, create custom invoices, generate bar-code labels, and perform clerical tasks.

In the Studio section, where session information is stored, you can generate

and print track and lyric sheets, or write down settings and patch information using one of the 133 templates for common outboard gear in the Recall module. *Studio Suite's* Tech section lets you keep track of the equipment in each room of your studio. You use the



Maintenance Log module to keep track of the maintenance of each device in your studio and the Parts module to identify and track spare parts. This section includes a patch-bay-label maker.

Studio Suite requires that you have Claris *Filemaker Pro* (v. 4.0 or 4.1) and runs on any Power Mac or any PC running Windows 95, 98, or NT. AlterMedia; tel. (800) 450-5740 or (770) 303-0970; fax (770) 303-0967; e-mail info@studiosuite.com; Web www.studiosuite.com.

Circle #414 on Reader Service Card

▶ GENERALMUSIC AS-1

Using Generalmusic's AS-1 (\$229) with any MIDI-controllable synthesizer, you can transform whatever melodies you play into microtonal Arabic melodies. The device is connected by MIDI between the keyboard controller and the synth that will play the note. The AS-1 converts the MIDI messages so that specified notes in the scale play a quarter tone below the normal equal-temperament pitch. If you want to control a synth from its own keyboard, connect the keyboard's MIDI Out to the AS-1, and the MIDI Out from the AS-1 to the keyboard's MIDI In connector.

The front panel of the AS-1 has buttons for tuning, memory storage, mode selection, and each of the 12 chromatic notes. These buttons let you configure and store up to 12 scales. A 3-character LED displays the current scale in memory. There are three operating modes on the

AS-1: Mode 1 works with Generalmusic's WK and SK series keyboards; Mode 2 works with S Turbo, SX, and WX series keyboards; and Mode 3 is a monophonic implementation for non-Generalmusic instruments.

The AS-1 has MIDI In, Out, and Thru jacks and operates on a 12 VAC adapter. Generalmusic; tel. (800) 323-0280 or (630) 766-8230; fax (630) 766-8281; e-mail gmail@generalmusicus.com; Web www.generalmusic.com.

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ULTIMATE SOUND MACHINES

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Known as a manufacturer of pristine, high quality solutions for the professional audio society, our heritage encompasses more than 20 proud years of know-how in developing cutting-edge digital technology with state-of-the-heart sound quality – combined with the world's most sophisticated, yet intuitive, user interface. For those of you who also consider our Ultimate Sound Machines to be more expensive than the average run-of-the-mill processor, we got some good news...

A Hellecaster Takes a Solo

As one of the "three tenors of guitar" in the band the Hellecasters, John Jorgenson spends much of his time recording with his bandmates, Jerry Donahue and Will Ray. His schedule is further filled with his stints as a sideman for Elton John's touring band and as a session musician: he has recorded for Bob Seger, Mary Chapin Carpenter, Willie Nelson, and a long list of others. But Jorgenson managed to find the time to write, arrange, record, and produce a solo album in his home studio. On the album, *Emotional Savant*, Jorgenson recorded all the tracks except the drums himself.

Jorgenson's studio resides in a Hollywood garage built in 1917 to house a Model T Ford. "I put a sliding glass door in the middle when I decided to transform it into a studio," he says. "One half is used as a storage space and playing room, with cabinets for guitar storage, amps along one wall, and a '50s Hammond B3 and Leslie cabinet nearby. I also keep a Roland pad drum kit set up in this room, for those times when I get a drummer to come over and play a track either into a sequencer or onto one of the ADAT machines.

"The only time I really had a full band in my studio was for the Hellecasters' *Hell III* CD" Jorgenson says. "Our drummer, Steve Duncan, had a DW kit that was already outfitted with Shure mics, so I just took the lines from the snare, toms, and kick, added the Sennheiser 421s for overheads, and put a Sony condenser mic on the hi-hat. Our bassist, Dennis Belfield, went direct, and Jerry used his Morley JD10 preamp to go direct with his guitar signal. Will Ray and I each played through small amps that were stuck back into the tool room." Although most of the guitar parts were later redone by Jorgenson, Donahue, and Ray in their home studios, this setup allowed the band to get a live feel and good dynamics.

John Jorgenson

produces an

album of

ringing pop.



John Jorgenson

"For my solo CD, I recorded Greg Morrow playing drums along with my scratch piano and vocals at Chuck Howard's studio in Nashville," Jorgenson says. He took these tracks, recorded on two ADAT tapes, back home to California to start laying down other basic tracks. "Usually I would reduce the drum tracks down to a stereo mix, then I'd rerecord the piano. I brought one ADAT machine into my living room and recorded my Steinway Vertigrand upright. The mic placement was very tricky, as it was difficult to get close to the strings without getting a lot of key or pedal noise—I learned a lot about my piano in the process! I ended up using four mics on it, two AKG C 414s and two Sennheiser 421s. These were placed on either side of the soundboard, so I'd have some flexibility in the mixing process."

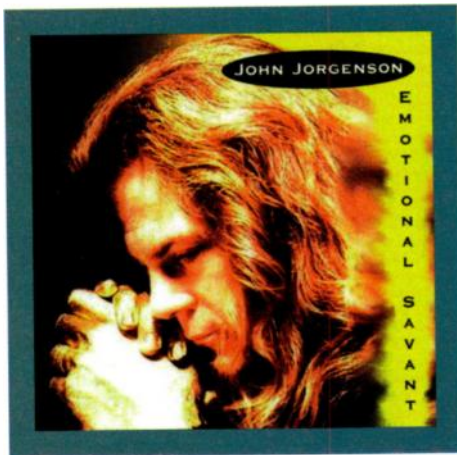
Jorgenson also borrowed equipment to help him fulfill his recording requirements. "A friend of mine loaned me two Neve 1066 modules and

a Demeter stereo tube mic pre/direct box," he says. "I used these extensively: the Demeter for recording the bass, guitars, and some of the keyboards direct; the Neves for anything that was miked. I also have a Groove Tubes mic pre/EQ, and I use the mic pres in my Mackie board, as well."

Jorgenson also owns countless stompboxes and effect pedals, having been a working guitarist for nearly 30 years.

"I'm not shy about using any of the effect pedals in unorthodox ways," Jorgenson says. He will also track a guitar sound on the spot rather than adding the effect later. "Many times, if a particular processed sound is important to the track, I'll record it as it goes to tape. I've found over the years that it's not always easy to get the sound back again later."

For further information, contact Jim Cowan at Pharoah Records; tel. (805) 531-0281; fax (805) 531-0281.



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Surround 2000

Among the paradigm shifts that will certainly occur in the upcoming century is a fundamental expansion of the way musicians and engineers conceive and produce their sonic art. This was made apparent at the Surround 2000 conference, held last November in Los Angeles "for those who create, install, and produce multichannel sound." The primary focus of the conference was multichannel music, and it certainly opened my ears to some new and exciting possibilities.

Of course, movie soundtracks have used more than two channels of audio for some time, in both commercial cinemas and home theaters. The most common configuration uses five discrete full-range channels (front left/center/right and rear left/right; see Fig. 1) and one low-frequency channel. Such a system is generically called 5.1 (see "Square One: Surrounded by Sound" in the December 1999 issue of *EM*). However, virtually all audio-only music recordings are still strictly stereo. With the proliferation of home-theater systems and the development of new storage and retrieval technologies, this is about to change.

In "Tech Page," I've written about two of the most important new technologies: Super Audio CD (SACD) in the March 1998 *EM* and DVD-Audio in the July 1998 issue. Unfortunately, nobody at the conference had one of the few existing prototype DVD-A players to demonstrate, but that didn't stop everyone from talking about this format. In fact, many of the engineers I spoke with said they are working on various DVD-A projects, recording or remastering six channels at 96 kHz with 24-bit resolution.

Sony and Philips were demonstrating a multichannel SACD on a prototype player. (Previously, only stereo SACDs and players have been available.) Most of the demo material consisted of live orchestral and choir recordings using five full-range channels (no low-frequency channel), all of

*I have heard
the future,
and it is
multichannel.*

which sounded spectacular. With my eyes closed, it was far easier to imagine I was sitting in a concert hall than it has been with any stereo recording.

This sensation is central to one of the most interesting debates at the convention: whether to place the listener of a surround recording in the "audience" or in the middle of the band. Most attendees agreed that for classical and live recordings, listeners should be in the best seat in the house. (Who wants to sit in an orchestra's woodwind section and get blasted from behind by the trombones?) With this approach, the rear speakers pri-

marily convey room ambience.

However, studio-based multichannel pop projects offer some previously unavailable creative opportunities. In studio recordings, unlike live recordings, the instruments and vocals are completely isolated from each other, which lets the mixing engineer put them anywhere in the 5.1 sound field. Early attempts at this approach were hokey and distracting, but engineers have learned a lot in the past couple of years, and the demos I heard at the conference were very rich and involving.

Looking even further ahead, TMH Corporation (headed by Tomlinson Holman of THX fame) demonstrated a 10.2-channel audio system with ten Genelec-powered speakers and two

Whise subwoofers. The demo included live recordings of a thunderstorm and Handel's "Hallelujah Chorus," recorded with 16 mics and mixed to 10.2 channels played from two synchronized DA-88s. The effect was stunning.

One thing was perfectly clear at the Surround 2000 conference: the future of music recording is multichannel. As more consumers install home-theater systems and as engineers learn how to take full advantage of the new formats, we will start hearing recorded music that goes as far beyond stereo as stereo went beyond mono. It's a great time to be a recording musician. ☺

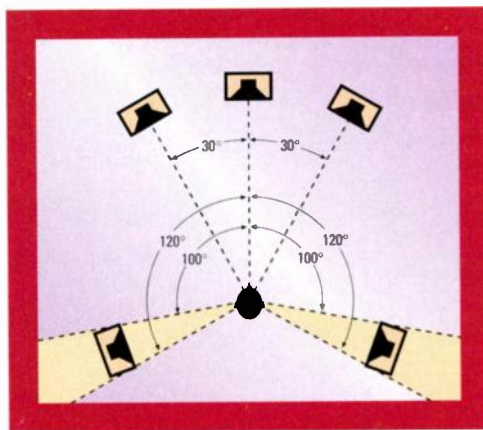


FIG. 1: A 5.1 surround-sound system includes five full-range speakers arrayed around the listening position and one subwoofer for the low-frequency channel (not shown), which can be placed almost anywhere in the room.

D-TWO FOR THE SHOW

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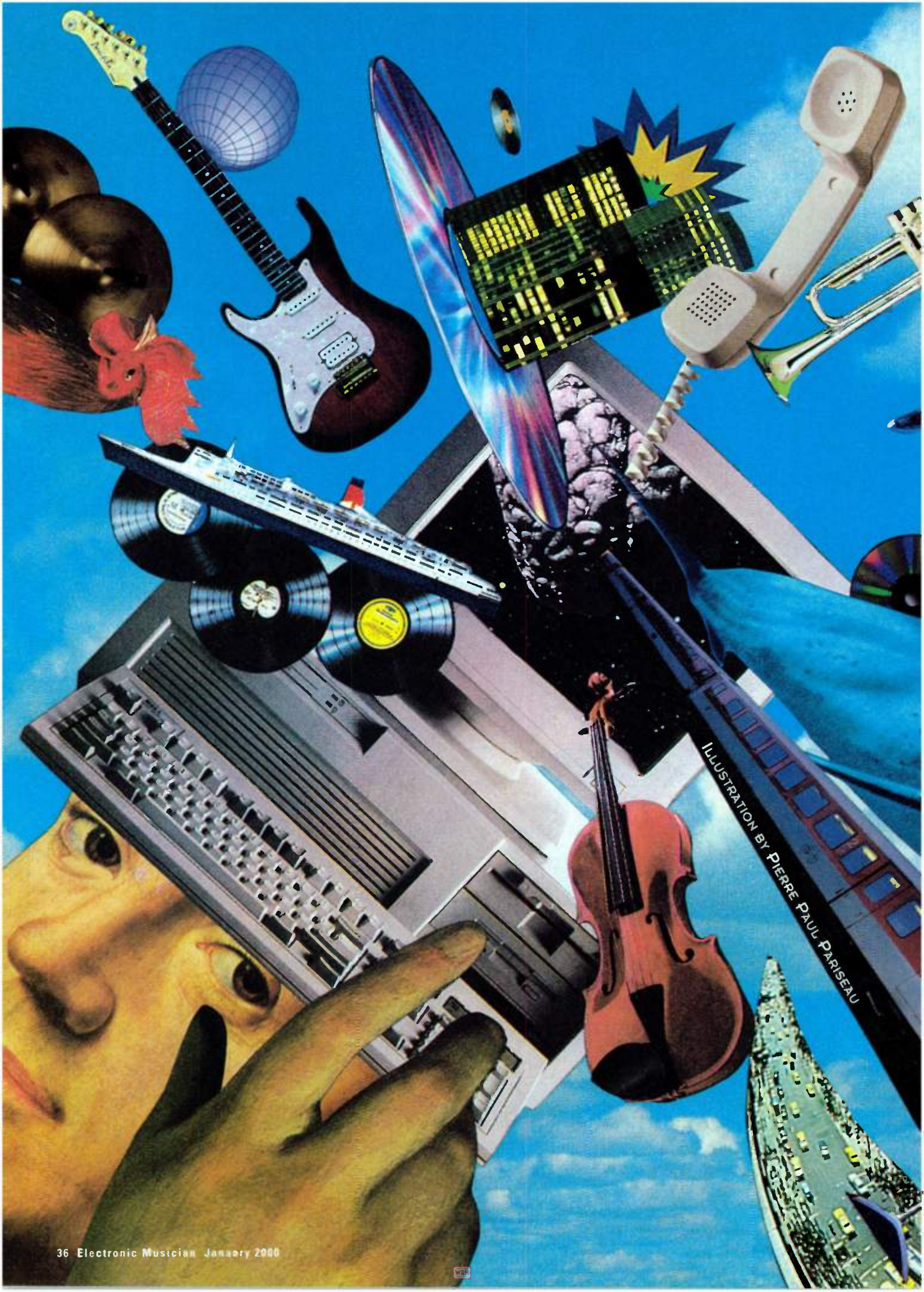
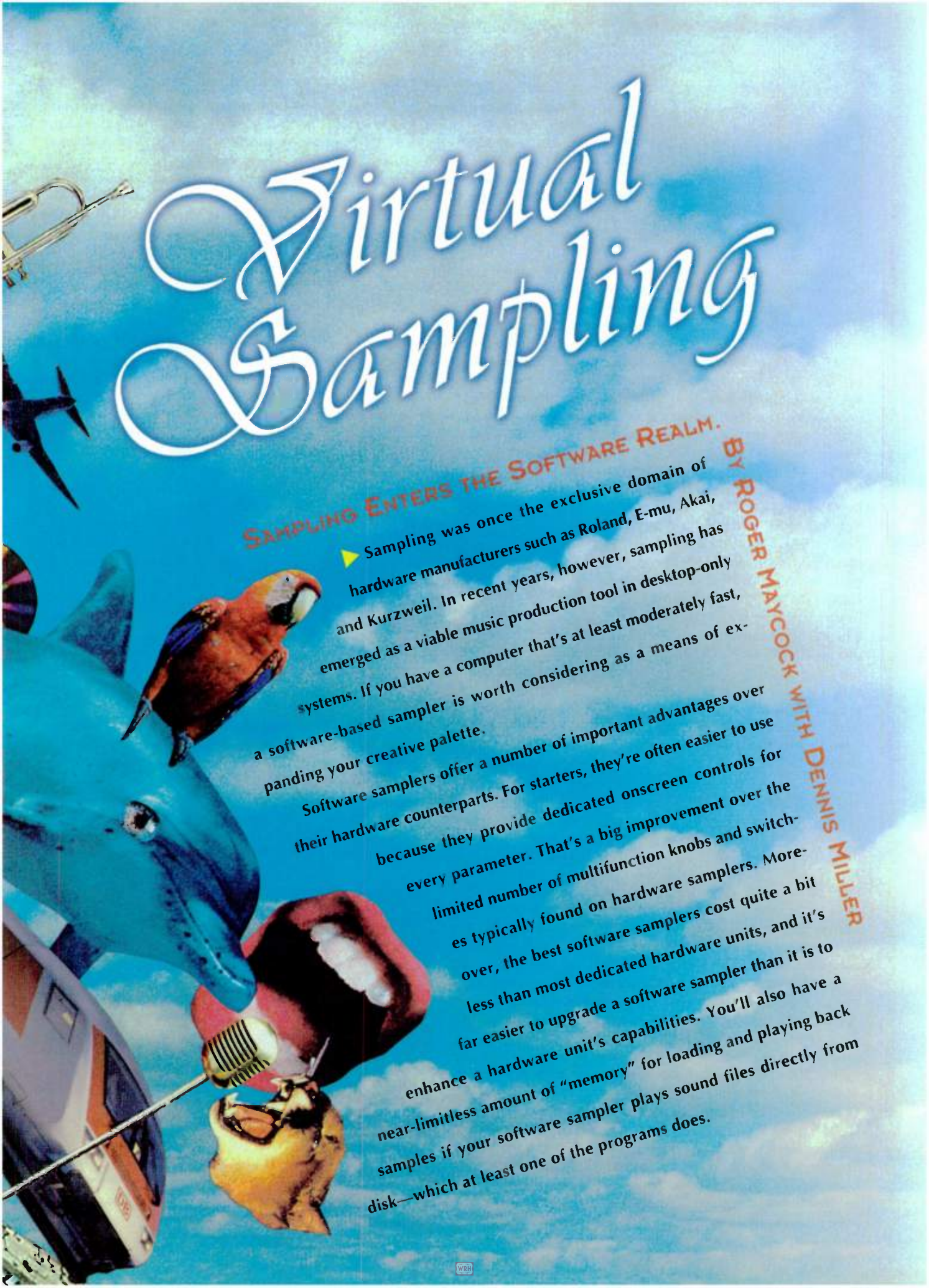


ILLUSTRATION BY PIERRE PAUL PARISEAU





Virtual Sampling

SAMPLING ENTERS THE SOFTWARE REALM.

▶ Sampling was once the exclusive domain of hardware manufacturers such as Roland, E-mu, Akai, and Kurzweil. In recent years, however, sampling has emerged as a viable music production tool in desktop-only systems. If you have a computer that's at least moderately fast, a software-based sampler is worth considering as a means of expanding your creative palette.

Software samplers offer a number of important advantages over their hardware counterparts. For starters, they're often easier to use because they provide dedicated onscreen controls for every parameter. That's a big improvement over the limited number of multifunction knobs and switches typically found on hardware samplers. Moreover, the best software samplers cost quite a bit less than most dedicated hardware units, and it's far easier to upgrade a software sampler than it is to enhance a hardware unit's capabilities. You'll also have a near-limitless amount of "memory" for loading and playing back samples if your software sampler plays sound files directly from disk—which at least one of the programs does.

BY ROGER MAYCOCK WITH DENNIS MILLER



Currently, the best-known software samplers are *Reality* from Seer Systems, *Unity DS-1* from BitHeadz, *GigaSampler* from NemeSys, and *Transformator* from Native Instruments. *Reality* and *GigaSampler* are Windows-based applications; *Unity DS-1* and *Transformator* are cross-platform (Mac and PC). You may also encounter a number of other lesser-known programs, including *Space Station Pro*, a DOS program from Digital Audio Innovation, and the interesting Mac application *Lisa*, by Tom Demeyer of the STEIM research group.

As powerful and intuitive as these programs are, it still pays to learn as much as you can about this type of software and how to use it, to make sure you get the best possible performance. In this article we'll explore some of the issues related to using a software sampler, and we'll also look closely at various downloadable sound-file formats that you can use with many of the programs. We'll also take a passing look at the sampling capabilities that many sound cards now offer, especially for the PC.

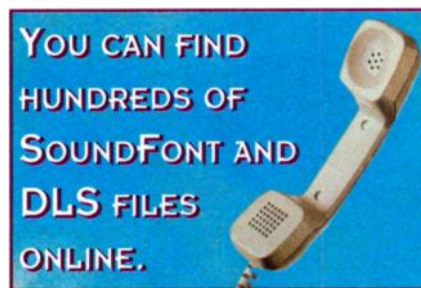
CONQUERING LIMITATIONS

As you might expect, you'll get the best results if you run a software sampler on a computer with the latest processor, a fast hard drive, and loads of RAM. If you intend to use a software sampler as part of a computer-based sequencing and hard disk recording environment, the need for a powerful computer becomes even more critical.

Many software sampler manufacturers specify minimum system requirements (though you can never have too much RAM or too fast a CPU). NemeSys, for example, specifies a Pentium 166/MMX with 32 MB of RAM and a fast hard drive as the minimum configuration for its *GigaSampler*. I work with a Pentium II/266 with 128 MB of RAM, an Adaptec 2940 Ultra SCSI controller, a Seagate Cheatah hard drive, and an Ensoniq PCI sound card. But one of the first lessons I learned is that horsepower isn't everything.

Working with *Cubase VST 3.6*, I configured my system (using ASIO) so that *GigaSampler* received the MIDI data sent out by *Cubase*; in effect, *GigaSampler* became another instrument in my studio (see Fig. 1). This worked fine, but only to a point. When I loaded an audio file into *Cubase* and tried to play it back while also sending MIDI data to the sampler, I fell into a pothole I hadn't expected.

It turns out that the ASIO driver would not allow both software applications to address the sound card at the same time. This rather serious limitation, which is a problem on both the Mac and the PC, has now been resolved with the release of the ASIO 2.0 specification. Of course, software



manufacturers will need to implement the new spec before users can take advantage of it.

One work-around for this problem is to use Steinberg's *ReWire*, an application that takes the audio output from software synths and samplers and routes it directly into the *Cubase* mixer (see Fig. 2). When you use *ReWire*, *Cubase* becomes the only program talking to the sound card. Of the software samplers mentioned earlier, however, only *Unity DS-1* for the Mac works with *ReWire* as of this writing. (*Unity DS-1* for the PC should also support *ReWire* by the time you read this.) Other software samplers and synthesizers should jump on board as more sequencers support the *ReWire* protocol. *Cubase* and Opcode's *Vision* work with *ReWire* now; Emagic has announced that it will support *ReWire* in its *Logic Audio* series.

If your software does not support *ReWire* (as is the case with *GigaSampler*), one option is to record your software sampler's output to disk as a sound file, then import the file into your digital audio sequencer as an audio track. This is done by enabling the Capture to Disk feature in your sampler program. Another solution is to use a second sound card (the option that worked for me) or to use a card with multiple outputs. Each pair of outputs should appear to your operating system as a separate sound device. Even then, however, not all multichannel cards support multiple "clients." (More on sound cards in a moment.)

Seer Systems' *Reality* offers yet another option. Using the Reality Wave driver (a utility that is installed when you load the software), you can send audio from any digital audio program into *Reality* (see Fig. 3). The incoming audio is mixed with *Reality*'s own output and sent to the sound card. *Reality* even provides a slider to balance the audio parts, or you can set the level of the audio coming out of your sequencer at its source. This solution works well and gives you the ability to send both MIDI data and audio information to *Reality* in real time. (You can load a Standard MIDI File directly into *Reality*—who needs a sequencer, anyway?—but, of course, you won't be able to play back other audio tracks at that point.)

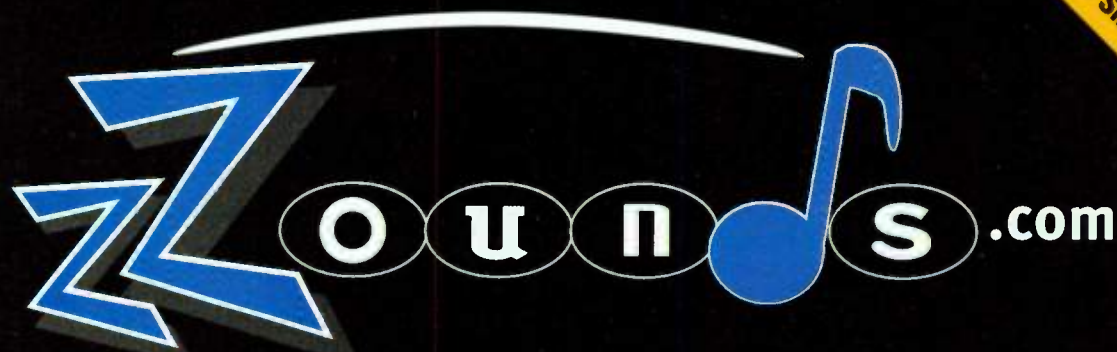
PICK A CARD

Though most software samplers work with most sound cards, some samplers have very strict timing requirements and therefore work with fewer cards.



FIG. 1: *GigaSampler* from NemeSys displays controls typically found on a hardware device.

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GigaSampler, for example, supports a reasonable number of cards, but you need to check the company's Web site to be sure your own hardware is on the list.

Reality, which initially worked only with Sound Blaster cards, can now coexist with any card that has DirectSound support or can run in DirectSound emulation mode. It also works with the WAV drivers provided by certain cards. All WAV drivers are not created equal, however, and you'll have to check the company's Web site to verify that your card is supported.

Unity DS-1 and *Transformer* are completely happy with any PC audio card that has ASIO or DirectSound drivers.

(*Transformer* will also work with a standard Windows MME card, but as always, performance varies depending on the card.) On the Mac, these two programs should perform well with any audio hardware, including the Mac's native audio with Sound Manager. *Unity* may introduce a bit of latency if your card does not allow you to tweak its buffer size, but that's a fairly uncommon limitation. *Transformer* has built-in options for tweaking its performance with whatever hardware you

SITES FOR SOUNDS

If you are looking for sound data to expand your sample library, the Internet is a great place to start your search. Though dozens of Web sites offer free and commercial samples, the sites that are listed here are among the best-known and offer some of the most comprehensive collections of sample data and other music-related offerings.

One of the most comprehensive sites for sampled sounds is Sounds Online (www.eastwestsounds.com). In addition to offering a limited number of free samples for downloading, it has a highly organized database that lets you search by category or for specific CD-ROM titles (see Fig. A). You can also shop for various kinds of music software—everything from source music libraries to applications to help you clean up your sound files.

Q Up Arts (www.quparts.com) bills itself as the provider of "the world's most unique collection of sample CDs and CD-ROMs." This site is unique in that it provides you with a narrated description, in either RealAudio or MP3 format, of the sounds in any given collection. The description provides a clear understanding of the contents of any CD-ROM that you might consider purchasing. The disc formats (Akai, E-mu, and so on) are clearly identified.

Sampleheads is well known for its collections of CD-ROM sample discs, and the Sampleheads Web site (www.sampleheads.com) provides visitors with a concise description of each CD in the company's stable. The site also allows visitors to audition sounds

from each collection via RealAudio, provides explanations of CD format issues, and offers audio CD and CD-ROM discussions.

Ilio Entertainments (www.ilio.com) offers numerous music software titles in addition to its online sample collection. Ilio's Web site is noteworthy for its FAQ list, which addresses many sampling-related issues. A special area delves into the topic of licensing sound data. You'll also find a Tips and Tricks area that discusses optimizing a sampler's gain output for getting the best sound quality for your efforts.

Jennifer Hruska's Sonic Implants site (www.hruskaudio.com) offers several highly regarded collections of SoundFonts for purchase. Game composers, in particular, will like the Industrial Dance PC and Retro Synth PC collections, which are replacements for the standard GM set. Custom collections and ports to other formats are also available, and you can pick up an occasional free sample in the Sonic Leftover area of the site.

After arriving at the German-language Best Service Web site (www.bestservice.de), the first thing most of you will want to do is click on the hyperlink that takes you to the English portion of the site. Best Service carries sample CDs from numerous companies and also has database facilities that let you perform selective searches for the type of sound data you want. Best Service has a full

complement of music software titles in addition to its collections of sample data. Unfortunately, certain hyperlinks take you back into the German-language zone.

One of the biggest names in music retailing, Sweetwater Sound (www.sweetwater.com), carries everything the professional musician

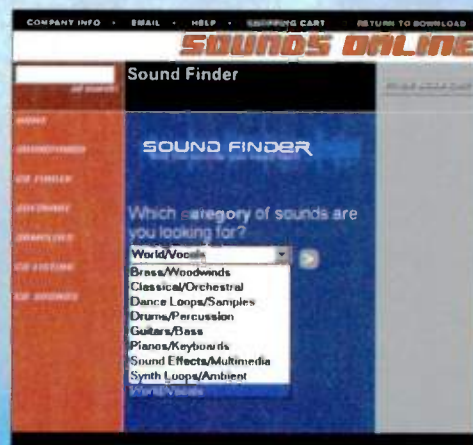


FIG. A: The Sound Finder database at Sounds Online is an excellent tool for locating the type of sounds you want. In addition to sounds for sale, a number of free samples are available.

could reasonably expect to find on a Web site. You can purchase equipment, explore the company's tech library, or download and purchase sampled sounds and sample CDs. You can even post your résumé or go looking for your next industry gig. You can also audition sounds from Sweetwater's sizable collection, and the price of any individual sounds that you purchase is deducted from the price of the CD version should you later buy the entire disc.

throw at it, so here too latency is rarely a problem (see Fig. 4).

Pro Tools users will gain additional benefits from using a software sampler with DirectConnect, a multicient audio protocol that should be available by the time you read this. E-mu has already built multicient ASIO support into its APS card, so you can use two ASIO-compatible audio applications if you own that card.

One other trend in sound cards is very promising for software sampler users: several new cards offer hardware mixing (aka DirectSound acceleration). The Sound Blaster Live, E-mu APS, Turtle Beach Montego, and others provide this feature. Soundscape's Mixtreme also provides it, though it doesn't have (or need) DirectSound drivers. With this feature, the hardware is responsible for mixing multiple applications into one or more sets of stereo outputs. For instance, with the Mixtreme system and *Reality*, you can run your digital audio sequencer and *Reality* at the same time. You could route *Reality* into Mixtreme (via Wave drivers), apply a TC Works reverb and a compressor/limiter using the DSP on the card, and then route it back into an audio input of the sequencer, all in real time. This is totally cool and is the way more cards will be implemented in the future.

SOUNDS LIKE?

With the growth of the Internet, the explosion in computer gaming, and

the general trend toward all things multimedia, musicians have become more insistent that their compositions be played back with the sounds they initially used in creating their works. Delivering those sounds to the end user, however, is no small task. General MIDI was supposed to resolve the problem, but the differences between the synthesis methods used by manufacturers still limit composers' ability to ensure that their work will sound exactly the same regardless of where it is played.

Fortunately, we can now deliver actual sample data along with the MIDI notes that constitute our compositions. This is possible if you use a software sampler or sample-based sound card that supports a downloadable sound-file format. The vast majority of multimedia sound cards have this option, as do *Reality* and *Unity DS-1*. Unfortunately, there are several data formats currently in use, which has resulted in a rather confusing state of the art.

FORMATS FOR MULTIMEDIA

Two of the most popular file formats for multimedia are DLS (Downloadable Sounds) and SoundFonts. SoundFonts were created by E-mu's parent company, Creative Labs, for use in the company's Sound Blaster sound cards. This format allows actual sound (sample) data and its associated performance parameters to be downloaded to a supported sound card or software sampler. The sounds can then be played back via MIDI. Some sound cards, such as E-mu's popular Audio Production Studio (APS) and the new Creative Sound Blaster Live, can hold as much as 32 MB of SoundFonts in RAM. *Reality* and *Unity DS-1* provide support for file sizes up to the limits of free RAM in your system.

The process of loading a card with the desired sounds is quite easy. Most cards ship with a control panel utility, such as the E-mu SoundFont Manager, which lets you manage your

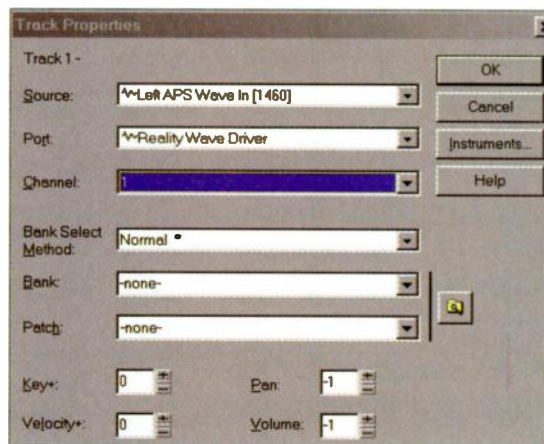


FIG. 3: Using the Reality Wave driver, you can route audio from any application directly into *Reality*, where it is mixed with *Reality*'s own audio output. This handy work-around overcomes some sound cards' limit of using only one audio application at a time.

sound library and configure the card with alternate sound sets. Such utilities also typically have functions to restore a card to its default condition and to control parameters such as DSP effects for reverb, chorus, and spatial settings. More sophisticated options are available in dedicated SoundFont editors such as *Vienna*, which ships with most Creative Labs cards (see Fig. 5). *Vienna* provides extensive sound-design capabilities for tweaking your sounds.

Loading a SoundFont into a software sampler is even easier. In *Reality*, for example, just select the Add Bankset option from the File menu, then point the program to the directory containing your files. You'll be able to access nearly all the parameters of the original SoundFont in *Reality*, and of course you can edit the sounds any way you wish. When you're done tweaking the files, you can even tell *Reality* to create an instrument definition file (a list of your presets) in the format of many popular sequencers. On the E-mu Web site, for a mere \$29.95, you could purchase all the original sounds and performance data from the E-mu Proteus III (World Music) sound module in SoundFont format. That kind of bargain doesn't come along too often!

It should be noted that programs such as *Cubase VST* and *Cakewalk Pro Audio* also provide support for SoundFonts and allow you to load a compatible sound card with alternate sounds without having to open a separate program. (You can't, however, load a bank directly



FIG. 2: Steinberg's *ReWire* allows the audio output of a program to appear inside a *Cubase VST* mixer. Here, the individual drum sounds of Steinberg's *ReBirth* application are shown inside *Cubase*.

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into a software sampler from these applications.) You may need to have a SoundFont manager installed to take advantage of this feature.

The DLS format was developed by members of the Interactive Audio Special Interest Group and leading multimedia companies, including Advanced Micro Devices, IBM, Microsoft, Yamaha, and Creative Labs. Targeted for CD-ROM and Internet entertainment applications, DLS, like the SoundFonts format, is designed to provide composers and game developers with the ability to add their own sounds to the user's system while not relying on a fixed GM sound set. The result is a universal delivery system that allows a musical performance to be realized as the composer envisioned it. (Additional information on DLS software tools is available at www.midi.org/dlstools.htm. Also see "Desktop Musician: Down and Out in Cyberspace" in the December 1998 issue of *EM* for more on downloadable sounds.)

Configuring the end user's sound card is generally a transparent process; the sounds are installed when a game is first loaded. DLS-compatible devices

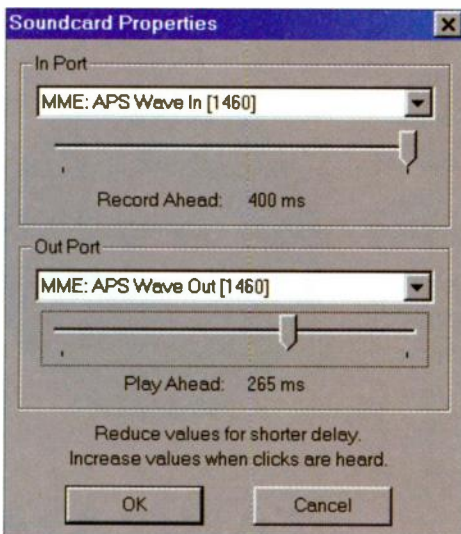


FIG. 4: *Transformator's* Audio Settings feature allows you to adjust buffer sizes to fine-tune its performance on your system.

enter a special "DLS mode" upon receipt of the following MIDI System Exclusive message: F0h 7Eh <device ID> 0Ah 02h F7h.

Once in this mode, the sound card can put the downloaded sound into any designated bank and instrument location while avoiding conflicts with other modes such as GM, GS, and XG. As with a GM-compatible device, a minimum of 24 simultaneous voices is supported. Currently, a large number of cards can work with DLS files, including the Turtle Beach Montego II, and several cards from TerraTec. You can also use the format with *Unity DS-1*.

ONE-STOP SHOPPING

Once you've explored some of the various file formats, buying new sounds for your software sampler or sound card should be a bit easier. Although you can find hundreds of SoundFont and DLS files online (see the sidebar "Sites for Sounds"), there are other options to consider.

Using a file conversion program such as FMJ-Software's *Awave* or Chicken Systems' *Translator*, you can open files in many different formats, like those used by various hardware samplers, then convert them into a format that your software sampler or sound card can use. *Awave*, for example, can convert between more than 100 different audio formats, including Yamaha, Roland, and, of course, AIFF, WAV, and SDII. *Translator* also supports dozens of formats and is especially suitable for working with sounds in the various Ensoniq formats. *GigaSampler* and *Unity DS-1*, on the other hand, can read Akai sample formats directly. These options open the door to an endless number of sounds that you can use in your projects.

When buying sounds on CD, try to purchase CD-ROMs rather than audio CDs, because CD-ROMs typically include both the sample and the performance data. You simply load the file and you're ready to play. In contrast, audio sample CDs are composed of raw data, which forces you to loop, multisample,

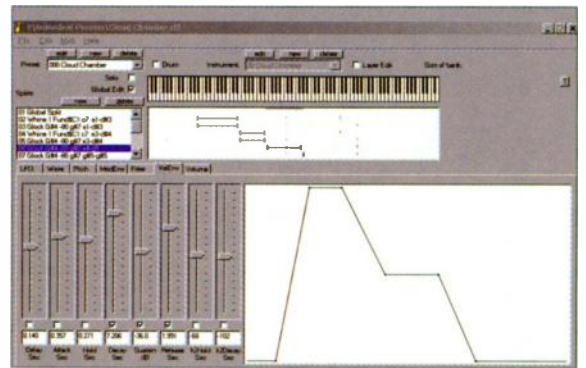


FIG. 5: The *Vienna* SoundFont editor provides numerous features for tweaking your sounds. *Vienna* can open SoundFont banks as well as standard WAV files.

and create all the various performance parameters that constitute a finished patch. Similarly, when you download samples from the Internet, you normally get only the raw sound data, not the performance parameters.

TOSS YOUR HARDWARE?

The current generation of software samplers is fully capable of functioning on a par with its hardware cousins, and as our computers get faster, these programs will only improve. We have the ability today to take advantage of sampling technology at a fraction of the price that was common just a short while ago, and the number of available sample libraries is nothing short of astounding.

So, should you throw away your hardware sampler? That's a tough call; it depends on your needs and your work environment. There are clear limits to working with a software sampler, such as the inability to run two audio programs at once with some sound cards. Furthermore, there's no question that the performance you achieve with any of these programs depends very much on the type of computer you're using. Nevertheless, many of today's limitations will disappear shortly, and as we all know, computing horsepower will increase as well. That should soon make software sampling one of the most efficient things you can ask your computer to do.

Roger Maycock is a Los Angeles-based consultant for digital audio and recording applications. Special thanks to Mark Hiskey of Ilio Entertainments, Costa Kotselas of Steinberg North America, Todd Shires of E-mu, Earl Sondreal of BitHeadz, and David Roach of Seer Systems.

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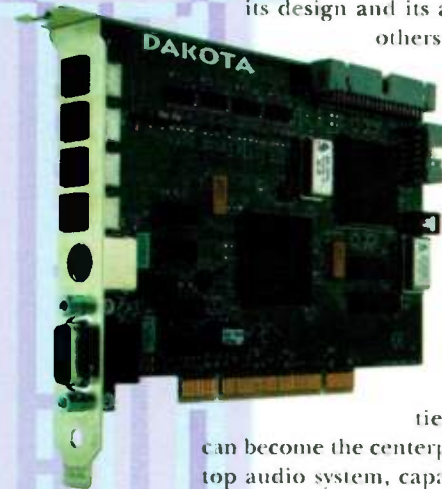


Audio Card (Under \$1,000)

FRONTIER DESIGN DAKOTA

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When we looked closely at the Frontier Design Dakota, we knew this was not your average audio card. Granted, it's not the only audio card that offers 16 channels of ADAT I/O switchable to stereo S/PDIF I/O, along with a host of MIDI and synchronization features. But what sets the Dakota apart is the quality of its design and its ability to play well with



others. Its ASIO 2.0 drivers ensure solid performance under *Cubase* and other compatible applications, and it was one of the first cards to be fully compatible with NemeSys's popular *GigaSampler*. When you use the Dakota in conjunction with a multichannel A/D/A

converter, such as Fron-

tier Design's *Tango24*, it can become the centerpiece of a powerful desktop audio system, capable of handling nearly any production task.

All its signal-routing options are managed through the efficient Dakota control panel, and you'll have no problem switching output formats or reconfiguring the card's inputs on the fly. Of course, any custom configurations you create can be saved and recalled for later use. Windows NT drivers are expected early in 2000, and a Mac driver is also coming soon. The price is very reasonable, and did we mention that the Dakota sounds great?

If you're looking for a professional audio system for your Windows PC, head for the hills and try out the Dakota.

Digital Audio Converter

APOGEE PSX 100 24-BIT A/D/A

(\$2,995)

The audio quality of your digital recorder is only as good as your converters. Use a flimsy converter, and the sounds you so carefully recorded will be sentenced to eternal two-dimensionality. We found the PSX-100 to be an excellent solution that translates sound between the digital and analog domains with superb accuracy.

The PSX-100 features two low-jitter clocks, one each for the A/D and D/A converters. This

allows each converter to be used independently. It has full digital connectivity (S/PDIF and ADAT Optical, S/PDIF RCA, AES/EBU XLR, TDIF multipin, and word clock), so it can handle just about any format conversion required. The analog I/O is balanced XLR inputs and outputs. For analog input signals, the Soft Limit feature allows you to push the recording levels a little further than usual without the worry of digital overs.

The converters are 24-bit, but the unit has a user-selectable 16- and 20-bit output using UV22, Apogee's remarkably transparent scheme for reducing word lengths. The 16-bit recordings we made with the PSX-100 are far superior to anything else we have heard at that resolution. And with Apogee Bit Splitting (ABS), you can record two channels of 24-bit, 88.2 or 96 kHz data using eight tracks of a 16-bit MDM.

Special mention must be made of Apogee's *Rosetta* (\$1,295), an A/D converter that has the same features and specs as the A/D on the PSX-100. If you just need a digital front end, and price is a consideration, the *Rosetta* is a fine choice. But if you want high-quality digital converters on both ends of your recorder, the results you'll get with the PSX-100 will take your breath away.

Digital Audio Sequencer/MIDI Sequencer

EMAGIC LOGIC AUDIO PLATINUM 4.04

(Mac/Win; \$799)

MARK OF THE UNICORN DIGITAL PERFORMER 2.6

(Mac; \$795)

Although the feud between our editors over the Digital Audio Sequencer award wasn't quite as fierce as the one between the Hatfields and the McCoys, we did have very specific preferences. The result was a 50/50 split between two monster programs: Emagic's versatile and highly customizable *Logic Audio Platinum* and MOTU's elegantly designed and popular *Digital Performer*. With such a clash of titans (and with due respect to Steinberg's *Cubase*, Opcode's *Studio Vision*, and Cakewalk's *Pro Audio*), we had to call it a tie.

These programs have been around so long that they have evolved into two of the deepest and most powerful sequencers on the market, providing musicians with a metric ton of editing and music-production tools. Both programs are available for the Mac, and *Logic Audio* also comes in a Windows version. They both support the Digidesign Pro Tools/24 Mix system and its TDM plug-in format and can record 24-bit,

96 kHz audio files. They come with lots of their own plug-ins and onboard processing tools, which



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elevates them well above much of their competition. Moreover, they support QuickTime movies and can be fully integrated with the BitHeadz *Retro AS-1* and *Unity DS-1* software synthesizers.

Logic Audio Platinum continues to center much of its power on its versatile and flexible Environment window, which has been enhanced with the addition of Macro objects, Alias objects, and Ornament objects. In the Arrange window you can now enlarge tracks individually, and in the Matrix editor you can view multiple sequences. The Score window now lets you have independent layouts for parts and score; lyric functions have also been improved.

Colorful new graphics and a more user-friendly interface spruce up version 4 of the program. The biggest news for most people, however, is the more than 30 high-end plug-ins that come in the package. Many people consider the plug-in collection alone to be worth the cost of the software. Plug-in effects include the new Fat EQ, a 5-band parametric EQ with a graphic display; BitCrusher, for creating distortion by reducing the bit depth of a sample; and Spectral Gate, which lets you set thresholds based on frequency as well as level. The program also includes a compressor, expander, noise gate, envelope generator, several types of delay, and several reverbs. *Logic Audio Platinum's* powerful mixer supports up to 128 audio tracks (with the appropriate hardware) and 16 internal effects buses, each with eight inserts.

Exciting new features in *Digital Performer* include Polar, an interactive looping/recording environment; AudioTap, a plug-in that lets you route audio from any Sound Manager-compatible program directly into *Performer*; and new color-coding schemes and customization options. *Digital Performer* also boasts a powerful, new, fully integrated 24-bit waveform editor with an overview display and scrubbing capability. It lets you zoom in, remove clicks and pops with a Pencil tool, apply automatic crossfades over edits, and adjust Soundbite boundaries at the sample level.



Digital Performer also includes a variety of high-quality DSP plug-ins, including the MasterWorks limiter and multiband compressor and an interactive, graphic 8-band EQ. Other effects include e-Verb, a real-time reverb with a graphic display and acoustic modeling capability; PreAmp-1, for tube amp simulation; and Sonic Modulator, for modulating pitch, filter, delay, and amplitude parameters. Of course, *Digital Performer* also includes auto pan, flanger, chorus, and a raft of other effects, as well as a powerful, customizable automated Mixing Board with support for as many tracks as your hardware can sustain.

Once you start tossing specifications back and forth, it's easy to see how these two great-looking digital audio sequencers could cause their proponents to feud. In the end, the choice came down to personal preferences. We think they both deserve to win this one.

Digital Audio Tape Recorder

TASCAM DA-45HR

(\$2,165)

Admittedly, there weren't a lot of new DAT recorders introduced this year, but Tascam's DA-45HR would have been a winner in any year. The Tascam engineers went beyond the call of duty when they designed this DAT machine. Not only does it record at 24 bits, it is also fully backward compatible and can record and play 16-bit tapes, including those made on machines from other manufacturers. The DA-45HR has a 24-bit A/D converter and a 20-bit D/A, and it supports 44.1 and 48 kHz sampling rates.

We've been testing the DA-45HR for months, both in the studio and in the field, and it has performed admirably throughout this time. Recordings made with the DA-45HR in 16-bit mode sound better than those made with standard 16-bit devices, presumably because of the 24-bit A/D converters. The 24-bit recordings were, as you would expect, far superior to the 16-bit tracks: the dynamic range was greater, the transients were quicker, more low-level detail was apparent, and the frequencies were evenly

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blended across the spectrum. It made us wonder how we could continue listening to mere "CD quality" audio!

In HR mode, the DA-45HR records at double the normal speed to get a 24-bit word length on tape. Although you get half as much time from a DAT tape in HR mode, the results are worth it. One nice feature is that the unit automatically recognizes when a tape has been recorded in HR mode, so you never have to set the word length during playback. And the DA-45HR allows you to title each program ID with up to 60 characters, which is handy for cataloging your mixes. Best of all, the DA-45HR is as easy to use as any other DAT machine, but leaves room for



growth and exploration. Whether you need a recorder for live recordings or mastering duties in the studio, the DA-45HR is the new benchmark in DAT technology.

Digital Audio Workstation (Computer Based)

DIGIDESIGN PRO TOOLS/24 MIXPLUS

(Mac/Win; \$7,995)

How do you improve on one of the audio industry's favorite digital audio workstations? Triple the processing power of the DSP card. Digidesign did just that by giving Pro Tools/24 Mix three times the processing power of its Pro Tools/24 system. The Editors' Choice Award, however, goes to the Pro Tools/24 Mixplus system, which includes *two* DSP cards for an even greater amount of processing power. That means you can mix the dozens of tracks of 24-bit, 48 kHz audio that Pro Tools promises while using more plug-ins than ever before.

The Mixplus package includes the Mix Core card, a Mix Farm DSP card, the DigiRack collection of TDM and AudioSuite plug-ins (with dynamics processors, a parametric EQ, and a delay), and *Pro Tools 4.x* software. (Version 5 should be out by the time you read this.) Of course, the system doesn't come cheap, but you get what you pay for. It can easily handle just about any project that comes along. The feature set is amazing: you get up to 64 channels (depending on how much processing you do) of fully automated mixing, 32 channels of I/O, sync to picture (including QuickTime movies), real-time TDM effects processing,



multiple edit playlists for each track, customizable crossfades, graphic editing for each audio parameter, and much more. You will have to work hard to max this system out.

The fact that Pro Tools remains the digital audio workstation of choice for a large number of recording and post-production facilities speaks volumes, and most of the Pro Tools users we know were very eager to upgrade to 24 Mix or Mixplus. It's easily the top new DAW of 1999.

Drum Machine/Drum Sound Module

ALESIS DM PRO

(\$899)

Ever since the groundbreaking HR-16, Alesis has been at the forefront of MIDI drum machine and drum module technology. The company's SR-16, D4, and DM5 have all been successful products, and the DM Pro more than lives up to its distinguished lineage. It's by far the most powerful drum module Alesis has ever produced.

Armed with 1,664 sparkling-clean, Velocity-switched drum, cymbal, percussion, and effects sounds, the DM Pro is a dream machine for sequencing. It has 64 kits (each of which can hold 64 sounds), with both acoustic and electric drums well represented. Although most of the the sounds are geared toward dance and pop styles, there's also a good selection of ethnic and orchestral sounds. Onboard processing is provided via two 24-bit effects processors, and six 1/4-inch TRS outputs allow for ultimate mixing flexibility.

The DM Pro is also outfitted with extensive trigger-to-MIDI capabilities, making it ideally suited for use as a sound source with a MIDI drum controller, or for replacing drum sounds from tape. To further sweeten the pot, the DM Pro is bundled with Alesis's cross-platform *Soundbridge* software, which lets you transfer samples and sequences into the module from your computer.

Because the DM Pro is positioned as a professional unit and doesn't have a rock-bottom price, you might think that it doesn't represent





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as great a value as earlier Alesis drum machines and modules. However, when you consider its innovative features and sheer number of high-quality sounds, you realize that the DM Pro is quite a bargain after all.

DSP Plug-Ins

CYCLING '74 PLUGGO 1.04

(Mac; \$74)

It isn't often that a program comes along that makes everyone's jaw drop in unison, but Cycling '74's *Pluggo* is that kind of product. Seventy-four plug-ins for 74 bucks? That's a deal that sounds too good to be true. But *Pluggo* is the real deal!

Just what do you get in this big box of goodies?

You'll find delays, filters, panners, reverbs, pitch shifters, and more. Special attention is paid to granulators—no fewer than seven unique plug-ins offer different tools for this purpose—and you'll have numerous means of manipulating the spatial dimensions of your sounds.

But wait, there's more! *Pluggo* also includes many creative ways to control your plug-ins in real time and lets you apply those controls to any VST plug-ins in your library. To top

it off, the Plug-in Manager applet lets you configure different sets of plug-ins for use in various projects.

Now that users are uploading their own *Pluggo* plug-ins to the company's Web site, there's no end to the tools you'll have for mangling samples. We've said it before, and we'll say it again: if you are serious about doing hard disk recording on the Macintosh, you must buy this software.

Dynamics Processors (Hardware)

JOEMEER C2

(\$399.99)

Photo-optical compressors have played a key role in many legendary recordings, but their high prices have kept them out of the hands of most personal-studio owners. With the release of the C2, Joemeek—long renowned for its great-sounding compressors—has brought high-quality, stereo-optical compression to the rest of us.

This green, half-rack-space unit can give its more expensive brethren a run for their money in many compression applications. We found it



particularly effective for processing guitars and drums, but it also performed admirably on vocal, bass, and keyboard tracks. To keep the price low, the folks at Joemeek designed the C2 with a minimal but functional set of controls. From the front panel, you can adjust the amount of compression, the attack and release times, and the input and output levels. The ratio (which ranges from 2:1 to 14:1) does not have its own dedicated control. Instead, it's governed by the input level.

Overall, we found the C2 to be smooth sounding, quiet, easy to use, and, most important, a great value. In most years, those attributes would be enough to make it the hands-down winner, but this year we nevertheless had a close race between the C2 and the impressive Focusrite Platinum ComPounder. In the final analysis, though, the C2's combination of high-quality photo-optical sound and breakthrough price gave it the edge.

Effects Processors, Analog (Hardware)

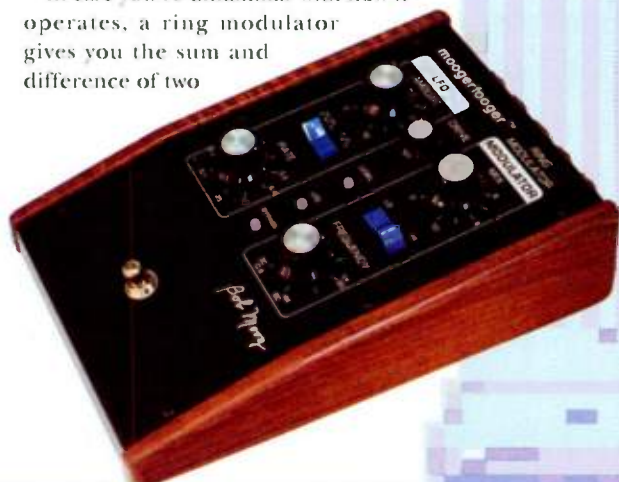
BIG BRIAR MOOGERFOOGER MF 102 RING MODULATOR

(\$299)

Deciding to give an award to a Bob Moog-designed Moogerfooger was easy; the hard part was deciding which Moogerfooger effect would be the winner. We picked the Big Briar MF-102 ring modulator primarily because several of our editors have been waiting years for a ring modulator of this quality.

Although they resemble stomptboxes, Moogerfooger effects are more like analog synthesizer modules with voltage-controllable parameters. This is great news whether you have a CV pedal, an analog synth, or a digital audio sequencer with MIDI-CV output.

In case you're unfamiliar with how it operates, a ring modulator gives you the sum and difference of two





frequencies: the carrier (often provided by an internal oscillator) and the modulator. The combination of the sum and difference tones, with the two original sounds absent, gives the ring modulator its distinctive clangorous, metallic sound. With a true ring modulator, ideally you should not hear the two source signals; this, combined with the number of parameters you can control, determines the quality of the effect. The MF-102 is a winner on both counts.

The MF-102 has an internal carrier oscillator with a frequency range of 0.5 Hz to 4 kHz, but it includes a jack so you can substitute an external carrier signal. The dual-waveform LFO (your choice of sine or square wave) has a variable range of 0.1 Hz to 25 Hz. The carrier frequency, effect mix, LFO rate, and LFO amount are voltage controllable via 1/4-inch TRS jacks. The unit also has a Drive control for introducing saturation into the sound. And for the musician who enjoys hands-on operation, the MF-102 features big, Minimoog-style knobs and switches.

Ring modulators create unique sounds that aren't for everyone. But for some electronic musicians, they're exactly what the doctor ordered. For those folks, the MF-102 is a must-have.

Effects Processors, Digital (Hardware)

TC ELECTRONIC M3000

(\$2,495)

Bells and whistles are always welcome on multi-effects processors, and the TC Electronic M3000 has them to spare. But it's the unit's extensive feature set that moves it to the front of the pack, with onboard 24-bit A/D and D/A converters, dual processors that can be routed almost any way imaginable, and comprehensive digital I/O (including two channels of ADAT Optical). For many users, though, the M3000's most desirable feature will be the realism of its reverbs: "the most natural-sounding digital reverb I have ever heard," exulted our hard-to-please reviewer. That's great news for those of us who record our tracks in an acoustically dead space not much bigger than a walk-in closet!

Responsible for this new level of verisimilitude is TC's Virtual Space Simulation (VSS) reverb algorithm. Although the M3000 includes reverb algorithms from the M2000 and M5000 (nothing to scoff at there!), the VSS patches are what put this unit ahead of the game. Each utilizes from 40 to 100 early reflections to define a room's "personality," followed by high-fidelity reverb tails up to 20 seconds long. Not surprisingly, the early reflections and reverb tails can be independently modified via numerous

parameters; indeed, there's precious little on the M3000 that *can't* be modified!

The M3000 provides plenty of patch memory, too, with 250 single and 50 combined presets in ROM and the same number in RAM. It also accepts PC Cards, providing an additional 2 MB of program storage per card. Other effects include delay, pitch shifter, EQ, expander, compressor, chorus/flange, tremolo/pan, phaser, and de-esser. Several unique features get a thumbs-up, too. The helpful Recall Wizard yields a menu of suggested patches based on what you enter for application, type of source material, and size of acoustic space. Dynamic Morphing is a creative tool that lets you morph gracefully between effects based on input level. Other useful features include dithering (8-bit through 22-bit resolution) and the ability to recognize external word clock from 32 to 48 kHz. (The unit's internal clock can also be used as the master clock.)

If all that power suggests to you an unwieldy tangle of controls, think again. In fact, the M3000's user interface is a cinch to navigate, thanks to dedicated buttons laid out in logically organized columns and a single Adjust wheel for scrolling through parameters. Patches are easy to edit by accessing first-layer edit functions or the voluminous Expert mode. If you're looking to acquire a comprehensive multi-effects unit with the latest and greatest in reverb simulation, and you could make use of some premium digital converters, the TC Electronic M3000 is a many-trick pony worth taking for a ride.

Microphone (Large-Diaphragm Condenser)

BLUE BLUEBERRY

(\$1,295)

The penultimate year of the century was an outstanding one for microphones. More new mics than ever were released, including some of the finest we've seen. In the Large-Diaphragm Condenser category, two mics in particular—the Neumann M 147 Tube and the Baltic Latvian Universal Electronics (BLUE) Blueberry—proved so superlative that we had one heck of a time choosing a favorite. (That the two mics performed so differently made the choice even harder.)

In the end, we settled on the Blueberry. At \$1,295, this piece of work is an opportunity for the personal-studio recordist to own a world-class vocal condenser at a manageable price. Hand-built (all components are made in-house by BLUE) and solid as an ingot, the mic's precision pedigree shows in every sumptuous detail. But the Blueberry is no mere looker. Inside, the mic employs Class A discrete circuitry, a custom transformer output, and a hand-tuned capsule.



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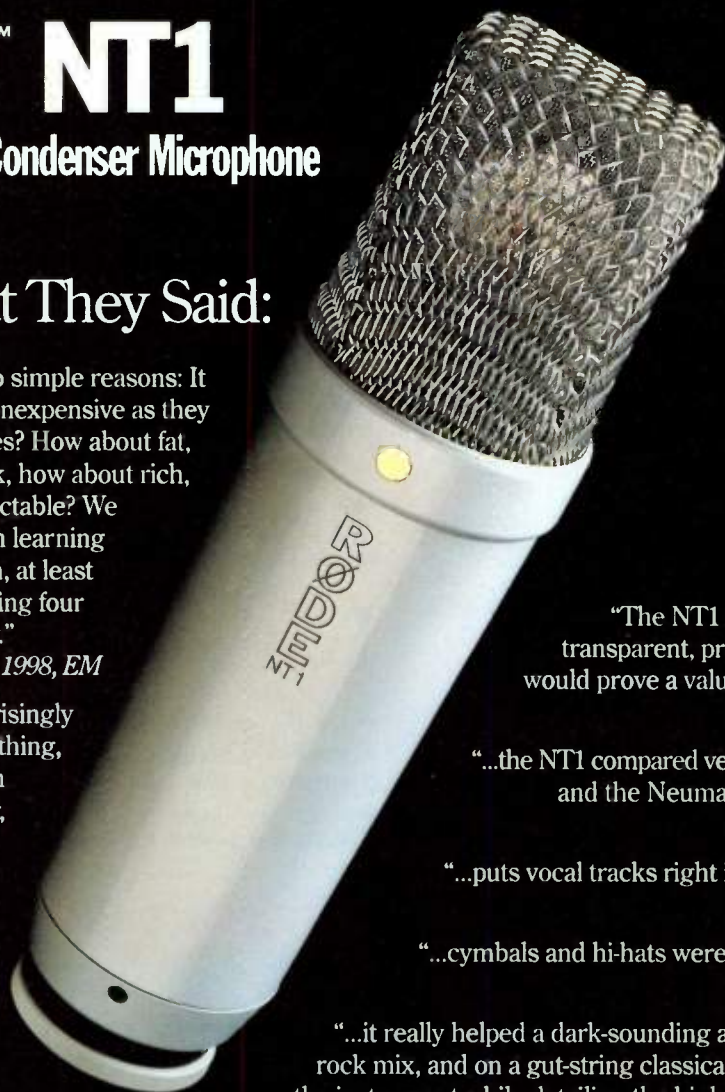
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"It gets our award for two simple reasons: It sounds great, and it's as inexpensive as they come. You need adjectives? How about fat, warm, and present? Heck, how about rich, sexy, and downright delectable? We won't hide our surprise in learning that the NT1 held its own, at least tonally, against mics costing four and five times the money."

—EM Editors, January 1998, EM

"The NT1 sounded surprisingly good on just about everything, but I especially liked it on vocals, on acoustic guitar, and as a drum overhead. This mic has a very open and detailed sound with lots of presence."

—Brian Knave,
April 1998, EM



"The NT1 has a rich, stunning sound—very transparent, present, and brightly detailed—that would prove a valuable addition to any mic cabinet."

—Brian Knave, April 1998, EM

"...the NT1 compared very favorably to both the AKG C414 and the Neumann U 87—and that's saying a lot!"

—Brian Knave, April 1998, EM

"...puts vocal tracks right in your face with startling clarity."

—Brian Knave, April 1998, EM

"...cymbals and hi-hats were reproduced exceptionally well..."

—Brian Knave, April 1998, EM

"...it really helped a dark-sounding acoustic guitar cut through a busy rock mix, and on a gut-string classical guitar, it captured the warmth of the instrument while detailing the high end and minimizing boominess."

—Brian Knave, April 1998, EM



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BLUE's focus on quality build and unique approach pays off in the mic's revealing signature sound. Although we love this mic on acoustic guitars, certain percussion instruments, and drums (as overheads), its true calling is vocals, especially when an "in your face" sound is desired. Designed to emulate the bright response of certain vintage vocal mics (especially the rare and coveted Elam 251), the Blueberry is not a tool for coloring or concealing a lame source sound. On vocals, for instance, rather than "warm up" the sound with hyped low mids, the Blueberry takes a different tack, its airy top end and superb transient response combining to deliver an open, natural sound replete with nuance. The mic is meant to be worked close (one to three inches) without causing undue bass boosting from proximity effect, and it can handle all the SPL you throw its way. Because it tends to downplay low frequencies, the resulting vocal track sits perfectly in even the densest mix, typically with no need for EQ.

Granted, the Blueberry is not an all-around, workhorse-type microphone. Its penchant for naked revelation sees to that, as do its single polar pattern (cardioid) and dearth of extras (no attenuation pad, no low-cut filter). But if your productions call for a large-diaphragm mic that delivers supreme clarity, detail, and lifelike presence, without unwanted low-end resonance, the Blueberry will definitely float your boat.

Microphone (Ribbon)

ROYER LABS R-121

(\$995)

This is the first time we've included a category for ribbon mics, and for good reason: the Royer Labs R-121 is the first new ribbon mic to hit the market in a long while (excluding Audio Engineering Associates' replicas of the vintage RCA 44B and 44BX). Of course, that alone isn't sufficient cause for a new category, especially one in which there's little or no competition. What matters is that the R-121 is one of the coolest, most useful new transducers released in 1999. That's reason enough to single out this mic for an award.

The merits of ribbon mics—smooth, warm, realistic sound; rich midrange; outstanding transient response; and phase linearity—are well known. But so are the traditional drawbacks: low output, high self-noise, nominal high-frequency response, off-axis coloration, and inability to handle high sound-pressure levels. Impressively, Royer Labs has employed advancements in magnetics, materials, and

mechanical construction to address several of these liabilities. The result is a ribbon mic with hotter output, lower self-noise, higher SPL handling, and improved high-end response that extends, according to our reviewer's tests, all the way out to 18 kHz.

We found the R-121 useful in a wide range of applications, but we absolutely loved it on electric guitar amps, violin, cello, upright bass, clarinet, trumpet, trombone, and various percussion sources. We were also impressed that it could safely handle the sound pressure from loud amps and even a kick drum. (In case it doesn't, Royer Labs offers one free rerebboning, as well as a lifetime warranty, to the original owner.) For the recordist who already has a good selection of dynamic and condenser microphones and is looking to extend the tonal palette, we highly recommend the R-121. It will prove a first-rate introduction to the sweet tones that only a ribbon mic can provide.



Microphone (Small-Diaphragm Condenser)

EARTHWORKS SR77

(\$599)

In the April 1999 issue of *EM*, we reviewed the Earthworks Z30X cardioid condenser microphone, and the high ratings our reviewer gave to the mic (a perfect 5 for both Audio Quality and Value) caused a bit of concern. We rarely give transducers a 5 in both categories. Was it possible, we wondered, that there had been a mistake? But a call to the author confirmed the



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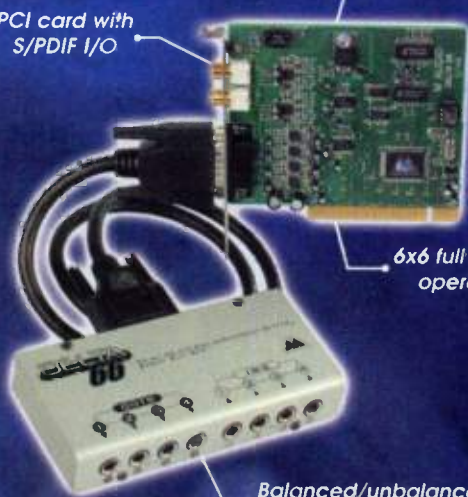
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DELTA DiO 2496™

All data paths support full 24 bit /96 kHz

S/PDIF and Toslink optical I/O

2 in/ 4 out operation

Powerful digital mixing, monitoring and routing capabilities (standard on all Delta products)

SCMS-Serial Copy Management System (standard on all Delta products)



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ratings, and those in the office who had used the mic were quick to second the reviewer's high praise.

This story is relevant because the Earthworks SR77 is essentially the same mic as the Z30X (the guts are identical), but packaged in a more rugged—and cheaper to build—body. (The Z30X was machined from three separate pieces of stainless steel, whereas the SR77 utilizes a one-piece aluminum body.) Although the Z30X has since been discontinued, its stellar capabilities survive in the SR77 at a considerably lower price. We think that's great news for the personal-studio owner.

Like all Earthworks mics, the SR77 boasts a virtually flat frequency response, in this case from 30 Hz all the way out to 30 kHz. This, coupled with the mic's amazing transient response, results in near-perfect transduction of sonic events, which in turn results in that eerie sense of "being there." The sound is full, open, detailed, and absolutely uncolored, even at 90 degrees off-axis.

Of course, being directional, the SR77 is very useful in the studio (and on stage, for that matter), because you can utilize the proximity effect to boost bass frequencies and position the mic to attenuate unwanted sounds. One of our staff editors owns a pair, and he reports that they have become his most frequently used mics, especially on acoustic guitars, percussion, and piano. The SR77 is great on vocals, too; that is, as long as the singer needs no help from the mic! In short, if realism appeals to your production aesthetic, this microphone will too.

MIDI Controller/DAW Control Surface

CM AUTOMATION MOTOR MIX

(\$995)

Faders and knobs were designed to be manipulated with fingers, not with computer mice. So a good hardware control surface is worth plenty to someone who spends a lot of time with a computer-based DAW or sound-design workstation. Cakewalk *Pro Audio* users can use the Cakewalk/Peavey SmartMix (which we considered seriously for this award), and Pro Tools users have had Digidesign's ProControl and Mackie's HUI for a while now. Of course, you can always use a MIDI fader box or Keyfax PhatBoy (a winner last year).

But until CM Automation introduced the Motor Mix, you were out of luck if you wanted a solid, automated hardware control device with motorized faders that worked equally well with a wide variety of software packages. The Motor Mix won't devastate your bank account either, which is a huge plus.

This compact, automated MIDI control surface features a comprehensive LCD that handles all



channel information, I/O assignments, effects parameters, and more, freeing up your computer monitor to show other data. Its eight 100 mm motorized faders are smooth, and its eight rotary knobs can handle panning, aux-send levels, EQ, dynamics, and more. You also get tactile switches with color-coded LEDs to control muting and soloing, record ready, automation enable, and effects in/out. You can control as many channels as you want by grouping them using the Group and Banks switches on the top panel.

As for compatibility, if your system doesn't work with the Motor Mix now, it probably will soon; we saw these boxes being used in more booths than we could count at the 1999 AES convention in New York. CM Automation has presented us with a much-needed product, and it has done it right.

Monitor Speaker

NHTPro A-20

(\$2,000)

The NHTPro A-10 powered monitors garnered high marks from our veteran monitor reviewer, which made them contenders for our pick of the year. And when we auditioned them for ourselves, we drew an even closer bead. But then something happened that turned our heads—we heard NHTPro's top-of-the-line offering, the A-20. Two thousand dollars may sound like a lot, but when you consider the importance of reference monitors in the signal chain and the unique and useful features that the A-20s provide (not to mention their amazing sound), the deal starts looking pretty darn good.

To begin with, these monitors part company with most (though not





all) active designs by employing a separate power amp. This approach maintains the advantages of a unified system, yet frees NHTPro from the restraints and compromises inherent in single-box designs. The amp provides 250W per channel and offers three 5-position controls (low-frequency compensation, high-frequency compensation, and input sensitivity) so you can readily tune the monitors to the listening environment. Because the controls are located on the amp, the amp can be positioned so that you can tweak from the sweet spot instead of having to reach around to the back of the cabinets.

The control amp also features a switchable numerical LED readout that shows average system SPL, incoming line voltage, or temperature of the output heat sink. Even the speaker cabinets employ unique design features, notably angled front baffles that help eliminate internal standing waves, minimize comb filtering, and improve stereo imaging and transient response.

As for the sound, the A-20s provide stunning resolution and clarity, a near-flat frequency response from 45 Hz to 20 kHz, and very low distortion. They're accurate in the time domain, too, which means exceptional dynamic range and representation of transients. Moreover, the sweet spot is wide, the imaging excellent, and the overall sound extremely smooth and tight. In short, everything about the A-20s evidences creative yet prudent system design. Need we add that the craftsmanship is first-rate, too?

Most Innovative Product (Hardware/Software)

KORG KAOSS PAD

(\$350)

Picking winners in this category is never easy. However, choosing Korg's KAOSS Pad was as close to a no-brainer as we could imagine. Aimed at the remix-production crowd, this tabletop box combines a phrase sampler, an effects processor, and an x-y controller pad that lets you "play" any of its 60 effects in real time. Rubbing, scratching, and tapping your fingers on the pad controls the way in which effects are applied by modifying separate parameters along the horizontal and vertical axes. You can take your sound from subtle to extreme in a single stroke.

Because of its brilliantly simple interface, anyone with fingers can get up and running with this thing. In fact, it begs to be played with, and after spending a few minutes auditioning the totally cool effects, you'll be hooked. The KAOSS sports separate line- and mic-level inputs along with phono jacks, making this an ideal companion for studio use and live gigs. What's more, its MIDI Out port lets you use it to shape and freak out your favorite synth patches.



If "Most Inspiring Product" were a category, the Korg KAOSS pad would be the undeniable champion; it has to be played to be believed. As one electronica junkie put it during the review, "Why doesn't everyone have one of these?"

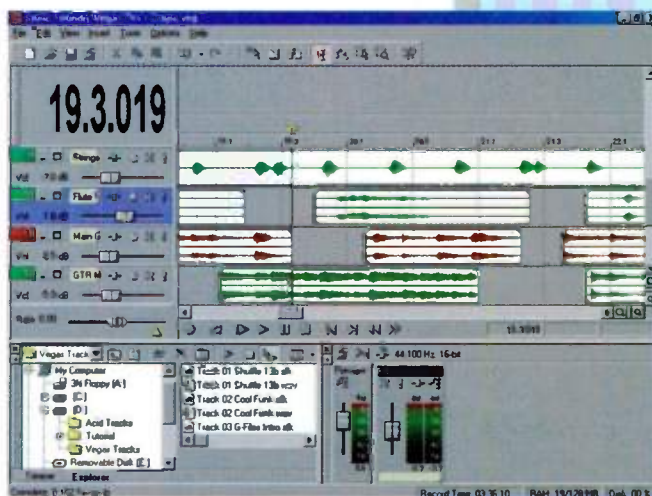
Multitrack Recording Software

SONIC FOUNDRY VEGAS PRO 1.0

(Win; \$699)

If you want to catch a great show, you should go to Vegas. If you want to show your latest production to the world, you should seriously consider this year's winning audio-editing software, *Vegas Pro* from Sonic Foundry. We've never seen a single program support so many types of data formats. Whether your project is headed for CD, CD-ROM, videotape, or the Internet, *Vegas Pro* can handle the files you'll be working with.

Vegas Pro allows you to mix and match files with different sample and bit rates on the same track, and it's easy to replace the audio track from a QuickTime or AVI file. Inserting and





The biggest thing in
samplers
 wouldn't even
 fit on this page

- Up to 128 Voice polyphony
- Up to 256 Mb RAM
- Up to 16 outputs
- Multi-channel Digital I/O opt.
- .WAV File Format

The complete list of features is too massive to print here . . . so check out the big picture at your local Akai dealer.

AKAI professional
 S5000
 S6000



www.akai.com/akaipro



editing crossfades is also a breeze, and you can draw volume and pan curves directly onto your waveforms. Though it doesn't have the range of editing and processing tools that Sonic Foundry's *Sound Forge* has, you'll find more than enough tools to finalize your projects, and its support for DirectX means that you can use any of the effects or processing plug-ins that you already have on your system.

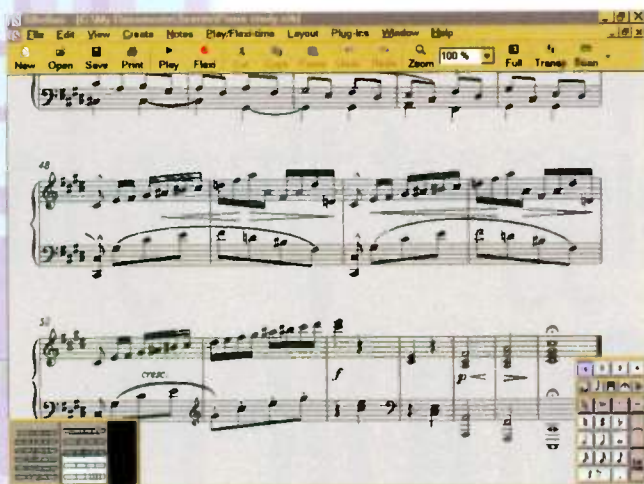
So forget about making your fortune playing the slots. We think you can win big with *Vegas Pro*.

Notation Software

SIBELIUS SOFTWARE SIBELIUS 1.2

(Mac/Win; \$599)

The arrival of a new high-end music notation program is always an exciting event at EM, and the much-anticipated release of *Sibelius* for Windows created quite a buzz. Now that a Mac version is available, the program's popularity will doubtless spread due in part to the



cross-platform compatibility of its files. Web-site developers will be intrigued by the program's ability to integrate musical scores into Web pages for viewing and playback, and everyone will appreciate the program's myriad professional-level features, such as its unlimited Undo with edit history and its unlimited number of staves with up to four voices per staff. What's more, *Sibelius*'s printed output looks terrific. The program's traditional Opus font appears clean and well spaced at any size, and its "handwritten" Inkpen font is great for jazz arrangements.

But as appealing as these features are, they are not what really sets *Sibelius* apart from the notation-software crowd. The program's greatest claim to fame is its combination of intelligence and user friendliness. Unlike most of the high-end competition, getting started on a score is a breeze in *Sibelius*. You can choose one of several score-layout

templates or create a new instrumental layout in a matter of seconds. Just choose the instruments from a list, and the software does the rest—automatically arranging the instruments in proper score order with the proper clefs and transpositions. (You can override any of the default settings.)

In just a few minutes you're ready to start entering notes, and here again *Sibelius* displays its intelligence. The program identifies and properly notates staccato and tenuto performances, and its unique Flexi-time mode offers intelligent real-time MIDI input that follows your tempo changes as you enter the music. Of course, you can also use the computer keyboard or mouse to select and deposit notes into the score.

When it comes time to play back your score, *Sibelius* shows its smarts yet again. The program automatically assigns General MIDI patches to all of the instruments in a score and responds to a wide range of markings, including dynamics, articulations, tempos, and trills. It even changes patches when it encounters indications for pizz or arco in the string parts.

But this smarty is also friendly. Its "virtual manuscript paper" lets you zoom in or out with ease and move through the score quickly. You can reposition staves, bar lines, notes, and most other elements by dragging with the mouse, and you can even change the color and "texture" of the onscreen manuscript paper. With its appealing combination of beauty and brains, this newcomer was a clear Editors' Choice.

Preamp (Mic/Instrument)

PRESONUS MP20

(\$649.95)

Here's a box that sets a new standard at its price point. The PreSonus MP20 offers recordists the benefits of premium mic/line preamplification for two channels at less than \$700, a feat that we think deserves cheers.

What makes a preamp premium? For starters, try Class A discrete input buffers, twin-servo gain stages, and Jensen transformers. Next, add a bevy of features: switches for 48V phantom power, polarity reverse, 80 Hz rumble filter, and 20 dB pad. Let's not forget the gain knob and the IDSS control, which lets you add even harmonics to the input signal for a warmer sound, a feature we found useful when recording scratchy-sounding sources such as violin and Leslie cabinet. Each channel also features a pan control and assign switch for sending the signal to a separate master section, making the MP20 ideal for live 2-track recording. With its thick, anodized,





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circle #530 on reader service card



cobalt blue aluminum front panel, large silver knobs, and backlit switches, the MP20 merits a beauty award as well.

Of course, it's the sound that cinches the deal, and here the MP20 shines. We used the unit on countless sessions, recording dozens of different instruments, and we were never disappointed. This is a supremely clean, quiet, and transparent preamp that sounds as good as units costing two and three times the money. It offers plenty of headroom, very wide dynamic range, and excellent transient-response characteristics. The unit provides balanced XLR inputs and outputs, and send and return points on both channels. Each channel also provides a high-quality instrument input that floored us for use as a bass DI. When you're ready to upgrade your signal path with a quality mic/line pre, the MP20 is one we heartily recommend.

Recording Mixer

SPIRIT DIGITAL 328

(\$4,995)

The explosion of digital mixers over the past couple of years has given us a lot of wonderful choices, especially because different companies have their own design approach. We had a tough time picking a winner this year, with Mackie's powerful Digital 8-Bus in the running at the high end (as personal-studio products go) and Roland's new VM line at the lower end. But like Goldilocks, that immortal advocate of moderation, we decided that for our money, Spirit's Digital 328 was just right.

Let's start with the sonic story: this is a clean, great-sounding board. Its 3-band parametric channel EQ is smooth and understated, and you get two Lexicon multi-effects processors. Although the mixer has only two channels of dynamics processing, the processors are assignable, and they sound much better than most digital dynamics processors we've heard. You get extensive scene automation and MIDI-based dynamic automation.

When it comes to making connections, the 328 is a lovely mate for a 16-channel MDM or hard disk recorder, offering 16 channels of ADAT Optical and 16 channels of TDIF digital I/O stock,

stereo AES/EBU and S/PDIF, and a third ADAT output that carries groups or sends. You also get MIDI ports, word-clock I/O, RS-422 for Sony 9-pin control, and SMPTE In ports. All of this comes with the unit; with most digital mixers, you have to buy optional cards to get



comparable features. All 16 mono channels have XLR inputs with mic preamps, line inputs, and inserts. And of course, the faders are motorized.

Finally, the main features of the 328 are easily learned, thanks mostly to the unit's innovative E-Strip control strip. We were able to start mixing after a few minutes of feeling our way around. This is one heck of a fine mixer, and it's a great value.

Sample-Editing Software

BIAS PEAK 2.04

(Mac; \$499)

As *Alchemy* and *Sound Designer II* faded from the audio software marketplace several years ago, BIAS *Peak* stepped in to fill the void for Mac users seeking a powerful 2-channel digital audio editor. Before long, *Peak* had become the proverbial 600-pound gorilla of stand-alone audio editors, as its popularity spread throughout the music and post-production industries. Now, with the release of version 2.0, this user-friendly gorilla has a brand-new suit!



The latest version of *Peak* sports a jazzy new user interface with customizable, dockable toolbars; user-definable display colors; bigger and better VU meters; zoomability right up to the single-sample level; and a dedicated QuickTime window with video/audio scrubbing. As you might expect from a pro-level program, *Peak* comes with a truckload of powerful editing tools, including a Pencil tool that lets you clean up clicks and bad splices, a Loop Tuner for close-up editing of loop points, and an automatic Crossfade function for blending edit transitions. You can even select left or right channels separately for independent editing.

In version 2.0, *Peak* has greatly expanded its reach to the outside world. The program now supports 24- and 32-bit files as well as Premiere, AudioSuite, and TDM plug-ins. (The program comes bundled with Waves' Easy Waves plug-in

finally!

a powerful compact **digital** mixer — with all the stuff you need to make it really get up and dance. grab a TM-D1000.

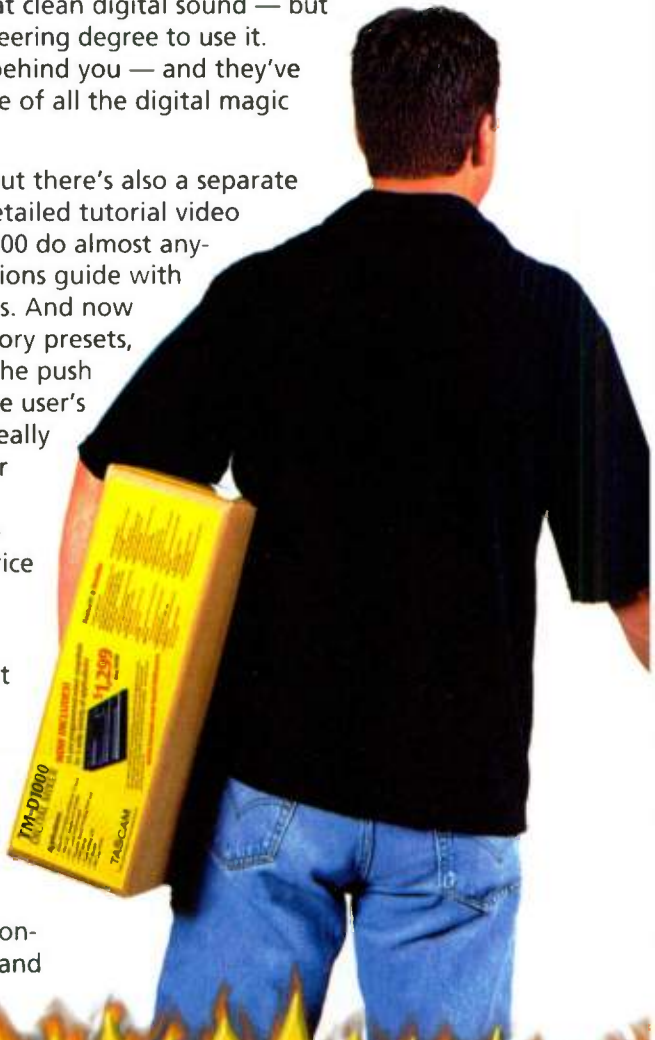
Sure, it's got a ton of built-in digital effects, MIDI control, and great clean digital sound — but cramming all that in a small box used to mean you needed an engineering degree to use it.

Now you've got the whole TASCAM team behind you — and they've put together the tools to put you in charge of all the digital magic packed into each TM-D1000.

Of course there's the owner's manual, but there's also a separate tutorial manual. And there's a really detailed tutorial video that shows how to make your TM-D1000 do almost anything. Plus there's a 32-page applications guide with page after page of hookup diagrams. And now each TM-D1000 comes with 64 factory presets, so you can be up and running at the push of a button. *Plus* there's the online user's group, product managers who really

know this mixer inside and out, and an unbeatable U.S. List price of just \$1,299.

The TM-D1000 isn't just a great digital mixer. It's like getting handed the keys to the recording studio and finding out it comes with an on-staff masseuse and 24-hr pizza delivery.



Free Bonus Offer!!

Buy your TM-D1000 now and get *your choice*:

- 1) FX-D1000 (\$220 list) card to double your internal effects power, *or*
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package to get you started.) *Peak* also supports playback and recording with Digidesign hardware. Supported file formats now include RealAudio, Shockwave, Ensoniq PARIS, and MP3, in addition to AIFF, SDII, and others. The newly enhanced Batch Processor makes it easy to modify piles of files, and *Peak's* broad sampler support lets you exchange data with most popular hardware samplers.

Peak's extensive editing and processing capabilities make this program hard to beat, but its powerful Playlist truly establishes it as an essential program for pro-level audio work. *Peak's* Playlist lets you adjust crossfades, gaps, and individual gain settings, and you can apply up to four real-time effects to each Playlist entry. The big news, however, is that you can now synchronize the Playlist to incoming SMPTE time code for triggering sound effects and music cues from video playback. That should make sound designers and post-production workers happy, but there's more. You can now burn CDs directly from the Playlist by running *Peak* in tandem with Adaptec *Toast* (included with the program) or by exporting the Playlist as a *Jam* Image file.

All in all, *Peak* has evolved into a truly impressive program. Its customizable user interface, long list of editing and processing tools, widespread file format support, and SMPTE sync capabilities make this audio editor a surefire winner.

Sampler (Hardware)

E MU E4XT ULTRA

(\$3,595)

Four years ago, we gave the Editors' Choice thumbs-up to E-mu's original Emulator IV sampler. Heading up a new sampler line, that unit offered 128-note polyphony, Z-Plane filters with morphing, extensive modulation, digital I/O, three expansion slots, and a Flash ROM-based OS. What more could you ask for?

Apparently users asked for a lot more, and got it in the new E4XT Ultra. Let's start with a lot more speed, thanks to a new RISC-based processor with 32-bit internal processing that makes CPU-intensive features much more usable. The converters have been upgraded from 18- to 20-bit, and in addition to the S/PDIF and AES/EBU digital I/O and 32-channel MIDI support available in the earlier Emulator, you now get word clock and an ASCII port for a computer keyboard—all stock.

The software improvements also are extensive. Producers of dance music will love the new Beat Munger feature, which analyzes the tempo of a sample loop and lets you manipulate the time signature, scramble the order of beats, and generally muck with the tempo and



rhythm, all in real time. An Aphex Aural Exciter is now part of the processing package. And almost everything can be controlled from a Mac or PC using *EOS Link*, a cross-platform application. The samplers can now import Akai S3000 files via SCSI and can read and write AIFF and WAV files.

The new sampler uses a card cage-like design that lets you add expansion cards the way you would add PCI cards to a desktop PC. And such cards! Some add new sound libraries (such as the sounds from E-mu's Orbit and Planet Phatt modules), and one card provides ADAT Lightpipe I/O. Mixing and multichannel effects cards are on the way. But the coolest card is the one that lets you create sound ROMs for E-mu's Editors' Choice Award-winning Proteus 2000 sound module. Clearly, the E4XT Ultra represents a big step forward for an already superior product. To top it off, the new sampler costs \$2,400 less than the original E IV. That makes it a winner in our book.

Sound Module

E MU PROTEUS 2000

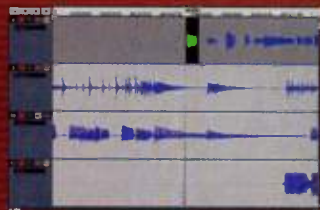
(\$995)

When E-mu released the Proteus/1 in 1989, its innovative design helped define the synth module category. On subsequent models, E-mu tinkered with and fine-tuned the original concept, but with the release of the Proteus 2000, the company has taken the line to an entirely new level. This single-rackspace unit is loaded with 32 MB of internal sounds (eight times as much as the Proteus/1), and three expansion slots for adding an additional 96 MB of samples. What's more, it offers 128-note polyphony (four times the amount on the original Proteus), and features two sets of MIDI ports, allowing it to respond on up to 32 different MIDI channels at a time. Add two 24-bit effects processors, a powerful set of editing tools, six analog outputs (four of which can be used as effects sends and returns), and an S/PDIF out, and you have yourself one powerful piece of gear.

While some manufacturers might have rested on their laurels with such a hefty feature set, E-mu went the extra nine yards and designed a friendly and clever user interface. Sound Navigator and



HDR24/96. 24-TRACK 24-BIT HARD DISK RECORDING. ADVANCED WAVEFORM EDITING. NO EXTERNAL COMPUTER NEEDED. \$4999 SUGGESTED U.S. RETAIL.



HDR24/96 editing features include 8 takes per track with non-destructive comping, non-destructive cut/copy/paste of tracks, regions or super-regions, drag-and-drop fades & crossfades, 1x/2x/



4x/8x/24x waveform views, true waveform editing with pencil

tool, bi-directional cursor scrub, unlimited locators and loops, DSP time compression/expansion, invert, pitch shift & normalize and much, much more... with unlimited undos — but without requiring an external computer!

- Built-in 20-gig Ultra-DMA hard disk plus front panel bay for additional easily available pull-out drives
- Intuitive analog tape deck interface and monitoring
- Syncs to SMPTE, MIDI, Black Burst, PAL & NTSC without extra cards
- Unlimited HDR24/96 linking! Synch 48, 72, 96, 128 or more tracks
- 96kHz upgradable via software
- Uses Digital 8 • Bus I/O cards
- 3.5-inch disk drive for software upgrades & tempo map importing
- Fast Ethernet port built-in
- Optional SCSI port
- Remotes available.

New hard disk recorders were all over the place at this fall's AES convention. A fair amount of the buzz was at the Mackie booth.

The HDR24/96 was the only recorder with built-in non-destructive graphic waveform editing. Just plug in a mouse, keyboard and SVGA monitor to view all recorder parameters on screen in real time. And enjoy complete editing control with unlimited levels of undo, drag-and-drop crossfades with 9 preset combinations plus fade/crossfade editor, DSP time compression/expansion, pitch shift and lots more.

The HDR24/96 was the only recorder that uses pull-out Ultra-DMA hard drives, so affordable that you can keep one for each project — over 90 minutes of 24-track recording time costs less than a reel of 2-inch tape!

The HDR24/96 was the only recorder with built-in 100Mbps Ethernet. And of course the only one that interfaces directly with the Digital 8 • Bus.

No wonder **Pro Audio Review Magazine** gave it a "PAR Excellence" Award right on the spot.

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Riff are innovative features that make it easy to find and audition sounds among the unit's 1,024 factory presets. Four Real-Time Control knobs make it simple to quickly tweak a patch without having to delve too deeply into the editing functions.

Of course, the bottom line for any synth is sonic quality, and the Proteus 2000 does not disappoint. Its synth engine offers depth and complexity, and its presets are, for the most part, extremely impressive. When you consider what this module has to offer and then look at its modest list price, it's clear why E-mu has given us yet another award winner.

Synthesizer (Keyboard)

KORG TRITON PROX

(\$3,800)

We've watched as Korg's keyboards have set the pace in the music industry for many years, but the new Triton proX is easily the best Korg model that's ever graced our studio. This integrated workstation combines sampling, sequencing, synthesis, and effects processing under an intuitive user interface that is as easy to navigate as any we've seen.

The Triton proX improves on its predecessors in many ways. In addition to offering double the polyphony of the Trinity, it has an improved sequencer, two arpeggiators, several new user-installable options, and a more efficient touchscreen. Tweakers will love the four real-time control knobs (totally programmable, of course), and you'll be able to get down to some serious sampling immediately because a full 16 MB of sampling RAM is included in the stock unit.

The range of sounds provided by the Triton proX is awesome. Start with your general-purpose horns, strings, pads, pianos, and guitars, then throw in banks full of evocative, otherworldly textures, sure to keep any film or ambient music composer busy for a long time. If you're doing multimedia work, you'll also appreciate the banks of more than 200 sounds that conform to the new General MIDI Level 2 standard. With more than 800 samples on board, you'll have enough raw material to tweak your way through the next, say, ten years of projects.



Good looking, loaded with features, and, above all, great sounding, the Triton proX offers a winning combination that you need to check out.

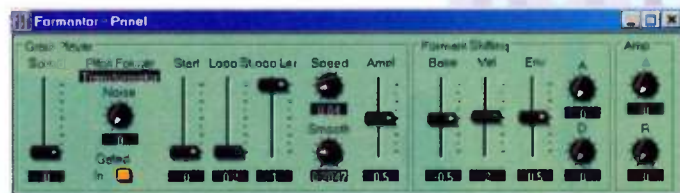
Synthesizer/Sampler (Software)

NATIVE INSTRUMENTS TRANSFORMATOR 2.0

(Mac/Win; \$298)

We had a particularly tough time picking this year's Software Synthesizer/Sampler winner. Though we liked the connectivity that Bit-Headz's *Unity DS-1* provided with other applications on our desktop, when all was said and done, Native Instruments' *Transformator 2.0* got the nod.

Transformator doesn't simply model a hardware sampler; it is a "sampler construction kit" that includes a wide range of modules to use in building the processes and functions you want. This is a very efficient approach to sampling on the desktop, as it ensures that only the specific tools you need for a certain task are currently running and drawing resources from your CPU. Of course, with *Transformator*, no assembly is really necessary because you can pick and choose



from dozens of included samplers, or you can download the contributions supplied by other users at the company's Web site.

In addition to familiar sound-processing functions such as LFOs, filters, and delays, *Transformator* offers other, far less common processes including a granulator, which can splice and dice sounds in numerous ways, and a formant, which can make truly gender-bending alterations to a sound. The resynthesis module can perform extremely accurate time stretching without changing the pitch of your sample, among other feats.

Sliders, buttons, knobs, and switches are available to customize the look and feel of your sampler designs, and a host of settings allow you to track and tune your system's performance while running the program. And to top it off, a printed manual is included that has excellent tutorials and clear descriptions of every module at your disposal.

Transformator is available as a stand-alone program, or you can purchase it in a bundle with last year's Editors' Choice Award-winning software synthesizer, *Generator*. (The combination is called *Reaktor*.) This great program will transform the way you think about sampling.

COOL Projects

Focusrite Platinum Range brings you three essential processors to ensure that your recording projects have great tonal quality, controlled dynamic range and all the power of a potential hit record.

VoiceMaster
- a great mic-preamp plus Focusrite EQ and compression - all the processing elements to create outstanding vocal performances. **\$699 SRP**



"It sounds great...all you need for recording and dynamic control of a voice in one box."
Trevor Curwen, The Mix

ToneFactory

- the same great pre-amp stage plus an instrument input so you can record guitar, bass, keyboards - anything you like - with great EQ, compression and, if desired, some creative distortion. **\$699 SRP**



"There is not much else that attempts to address this task with this sort of conviction. And what a price."
Zenon Schoepe, Studio Sound

ComPounder

- this dual compressor is designed to give your mix real power; it puts control of all parameters of dynamic control in your hands plus the unique "huge" control which will fatten up any mix at the push of a button. **\$799 SRP**



"The Bass Expander...the section that puts the pander in ComPounder"
Paul White, Sound on Sound

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Voice Processor/Channel Strip

FOCUSRITE PLATINUM VOICEMASTER

(\$749)

Professional recording engineers use the shortest route possible between source and recorder. One reason outboard channel strips and voice processors are popular is that they alleviate the need for a mixer channel and its many gain stages. In addition, the components in these processors are usually of better quality than the components in the average mixer. A number of manufacturers offer voice processors (a voice processor is a channel strip with dynamic processing added), and this year's winner has a lot of experience in the field.

Don't let the price of Focusrite's Platinum VoiceMaster fool you. It's a single-channel voice processor that provides top-notch sound and combines all the front-end features you need at an affordable price. The VoiceMaster has a Class A discrete transistor mic preamp with a frequency response of 10 Hz to 200 kHz (with -1 dB variance). This preamp has a wonderful transparency, with a clear high end and an evenly distributed frequency range.

The VoiceMaster is worth its price for the mic preamp alone.

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The opto compressor is simple to set up and includes a useful treble control for adding high end back into a compressed signal. The EQ covers four important frequency areas for recording voices. The Vocal Saturator, used sparingly, can emulate the sound of older analog equipment and lets you dial in the upper frequencies (1.4 to 7.2 kHz) you want to emphasize. And the opto de-esser is remarkably subtle. Each effect can be bypassed to keep your signal as clean as possible. Even with all the effects in, your ears won't believe the clarity. The Platinum VoiceMaster delivers Focusrite's pro-level sound at a personal-studio price. 🎧



THE AWARD WINNERS IN REVIEWS

Most of our award-winning products have been evaluated in EM, either in reviews or in face-off/roundup-type features. This year, six of these reviews are still in progress, which is more than usual, but the testing of these products is either complete or far enough underway that we feel confident about our conclusions.

Note that the Korg KAOSS Pad was reviewed for the February 2000 issue of *Remix*, our quarterly dance-music magazine, rather than in EM. The NHTPro speakers are an unusual case in that we reviewed the A-10 but gave the award to the superior A-20, which we have thoroughly tested. The Earthworks SR77 is the same mic as the Z30X but with a body of aluminum, rather than stainless steel.

Review dates indicate where you'll find write-ups of the award-winning version. Dates in parentheses indicate reviews of earlier or closely related versions of the same product, or detailed coverage in a feature story. All articles except those in the February 2000 issues of EM or *Remix* are available for download from the Article Archives section of the EM Web site at www.emusician.com. The February issues will be available online next month.

Product Issue

Alesis DM Pro	9/99
Apogee PSX-100	12/99
BIAS Peak 2.04 (Mac)	2/00
Big Briar Moogerfooger MF-102	11/99
BLUE Blueberry	10/99
CM Automation MotorMix	in progress
Cycling '74 Pluggo 1.04 (Mac)	10/99
Digidesign Pro Tools 24/Mixplus (Mac/Win)	in progress (Pro Tools 4.0, 7/97)
E-mu Proteus 2000	9/99
E-mu Systems E4XT Ultra	in progress (Emulator IV, 11/95)
Earthworks SR77	(Z30X, 4/99)
Emagic Logic Audio 4.04 (Mac/Win)	in progress (Logic Audio 3.0, 7/98)
Focusrite Platinum VoiceMaster	("The Path of Least Resistance," 9/99)
Frontier Design Dakota	9/99
Joemeek C2	9/99
Korg KAOSS Pad	2/00 <i>Remix</i>
Korg Triton proX	1/00
MOTU Digital Performer 2.6 (Mac)	in progress (Digital Performer 2.0, 7/97)
Native Instruments Transformator 2.0 (Mac/Win)	in progress
NHTPro A-20	(A-10, 12/99)
PreSonus MP20	10/99
Royer Labs R-121	5/99
Sibelius Software Sibelius 1.2 (Win)	5/99
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TC Electronic M3000	9/99

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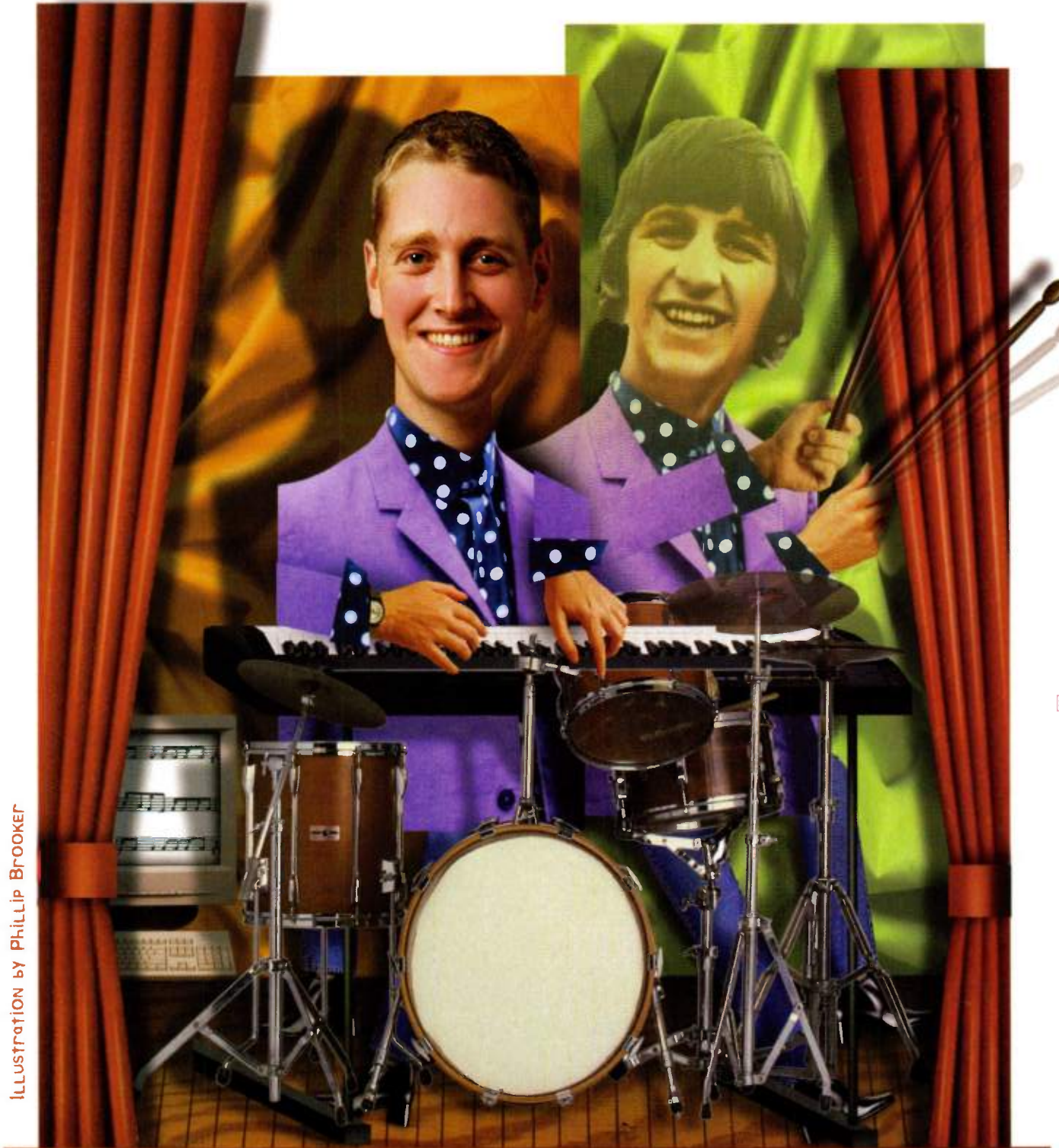


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DRUM

GROOVES

Drums don't just fuel the groove, they define it. Put a hip-hop beat beneath a bunch of chords and you have hip-hop. Substitute a reggae beat and it becomes a reggae track. Swap that for a merengue and you're in Miami.

Anyone can make a drum kit emit drum-like noises. In MIDI it's even easier: just call up a drum patch with different drum and percussion instruments mapped out across the keyboard and go Doom, Flap, Doom-Doom Flap on notes C1 and D1.

So why do electronic musicians often find killer drum grooves so elusive? For the same reason that a ticking clock will either send you to sleep or fail to register after a while: an unchanging rhythm is boring. And once rhythm composers leave the cozy confines of a straightforward beat (for example, kick on beats

1 and 3, snare on beats 2 and 4, 16th notes on the hi-hats), they're often in uncharted waters.

WEAPONRY

It's not what you have; it's what you do with it. For example, Ringo Starr used essentially the same four Ludwig drums for almost the entire time he played with the Beatles. Nowadays, more sampled drum sounds are available on the market than an electronic musician can deal with in a lifetime. The heart of the matter is how you actually create your drum tracks from your drum sounds.

You have four choices if you stick with MIDI, five if you include audio samples. You can tap into drum sounds using a QWERTY keyboard, a MIDI keyboard, MIDI drum pads, MIDI files (drum grooves offered as MIDI performance data), or audio samples.

BY
JULIAN
COLBECK



of drum pads will be a lifesaver. It may even put you ahead of the field in terms of producing realistic drum grooves. For everyone else, drum pads are not magically going to turn the rhythmically challenged into Chester Thompson. Accept this and move on.

GETTING STARTED

Once you have a MIDI controller, a sound module or sound card, and a computer sequencer, where do you begin? Just hit Record and play something. More killer drum grooves are created by polishing up an improvised groove than by painstakingly programming each note. Never be afraid to let your fingers flail about from time to time, because there is no "wrong way" to construct a drum loop.

One approach is to record yourself playing for a minute or so, then listen to what you played, keeping an ear open for segments that show promise. Cut out the good segments, paste them into a fresh track, and use them as the basis for your groove. Another way to work is to set up a four-bar loop and build up a groove, instrument by instrument, using your sequencer's Overdub Record mode.

TO QUANTIZE OR NOT TO QUANTIZE?

Quantization is the mapping of your rhythm into a particular set of timing

values, such as 8th or 16th notes, with a sequencer. Quantization was initially designed to push and pull notes into strict time so that recordings would sound more professional. In some areas of hip-hop, R&B, and electronica, such templates still work well. In fact, if this is the result you're looking for, you might as well record with a heavy quantization factor already in place.

But if you want natural-sounding grooves (similar to what a live drummer would play), then you need to record freely, without quantization (see Fig. 1). Afterward, you can either judiciously apply subtle quantization or abandon quantization altogether. Most sequencers now offer a wide variety of quantization settings.

Abandoning quantization doesn't mean you have to end up with lollypop, out-of-time drum grooves. It is relatively simple to look at your unquantized groove in either a grid or musical notation and physically adjust one or two hits that would benefit from editing. For example, if the internal structure of a groove works well except for a noticeably late first kick drum beat, don't quantize the whole groove; just move that first kick drum to the downbeat.

This kind of tweaking doesn't have to result in Swiss-watch accuracy. Moving the position of a kick drum downbeat from 000 to 002 or 003 often gives the groove a more natural give and take.

You don't need to quantize every instrument within a pattern, either. If you have your eye on the pulse and want to create a "speed garage" groove, for instance, set up a fairly standard four-to-the-floor kick, with the snare pattern on beats 2 and 4 and the hi-hats playing 16th notes. Then, quantize only the hi-hats to a shuffle pattern.

If you have a second sequencing system available, a cunning alternative to quantizing is to rerecord a groove using the other sequencer running at its own internal tempo. Begin with a groove that you like but that is out of time within its current sequence. Loop the groove and adjust the tempo on your sequencer until the groove plays perfectly in time. Rerecord the groove on your second system at this new tempo. This type of trickery is well worth doing if you have access to hours of drum pad-generated drumming.

Here are some additional groove therapies at your disposal.

Creating rhythms using a QWERTY keyboard is recommended only if you're completely broke or you're a computer nerd. Some form of MIDI keyboard, preferably one with at least a five-octave keyboard, is the way to go. It doesn't need to be expensive or have weighted keys. However, a keyboard that gives you the option of switching Velocity sensitivity on or off, or one that gives each keyboard zone its own MIDI channel, is preferable. This gives you the option of triggering individual sounds from one section of the keyboard while triggering a sampled loop from another. It also lets you combine modules so that you can, for example, use the kick drum of one sound module (using one MIDI channel) with the snare from another module (using another channel). We're talking options. We're talking crazy mixes, blends, and ideas. You want killer drum tracks? Crazy is good.

Whether you want to go quite as crazy as investing in a set of drum pads is another matter. If you were a drummer in another life, then a modest set

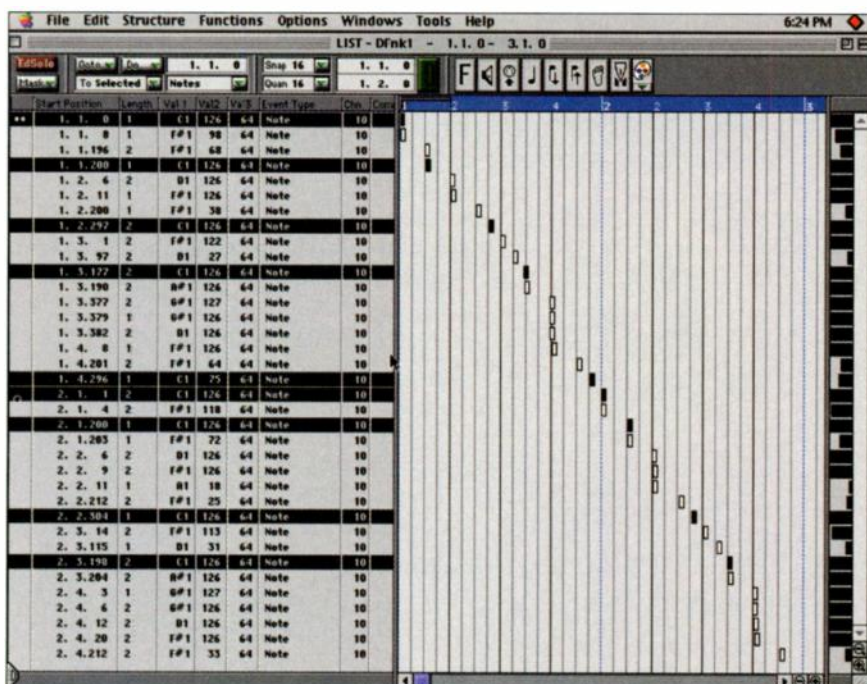


FIG. 1: The highlighted selections show unquantized kick drum notes that give a live feel to MIDI tracks.

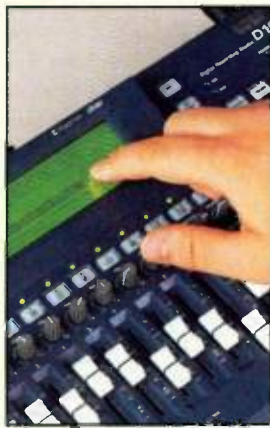
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Substitutions. Using the previous methods, almost anyone can churn out a kick/snare/hi-hat pattern of some merit. To take a pedestrian groove to the next level, try some simple instrument substitutions. To spice up a chorus, a middle section, or the third verse of a song, a real drummer will often go to the ride cymbal. A basic groove can remain the same; just transpose the hi-hat parts to the ride cymbal. A more elegant substitution is transposing closed hi-hats to a ride-cymbal edge and open hi-hats to a ride-cymbal bell.

Tempo. We are living in a wonderful time as far as variations in tempo are concerned. Drum 'n' bass artists, like the Prodigy or Chemical Brothers, gleefully storm along at speeds of 140 and 150 beats per minute, while TLC and R Kelly like to shimmy about at a groovy snail's pace of 60 or 70 beats per minute.

Typically, a sequencer's default tempo is 120 beats per minute, and although it's very easy to leave it there while you're working, don't. Get in the habit of experimenting with tempos. You may

get a killer groove by playing half-time in a fast tempo, or by playing a sequence back at double or half speed (not all sequencers have this ability, but it's a good one to look out for).

Jungle, drum 'n' bass, big beat—it seems as if the names given to these predominantly Euro-inspired beats change almost monthly. Many are based on sped-up Latin or hip-hop beats. The artists working in this field often use synth-based drums. You can enhance the sped-up effect of a groove by inserting a wide-range pitch bend (up to an octave) in your snare track (or the entire drum track if you want to get really crazy sounds). Now record a second pass, physically moving the pitch wheel on your keyboard. This is both simple and highly effective.

Remember that the tempo does not have to be rigid. A chorus that comes up a metronome marking or two can increase the realism of a track. Don't feel you have to go back down to your original tempo thereafter. Try raising the tempo again on the next chorus. The application of consistent dynamic tempo changes is a skill in itself. Create

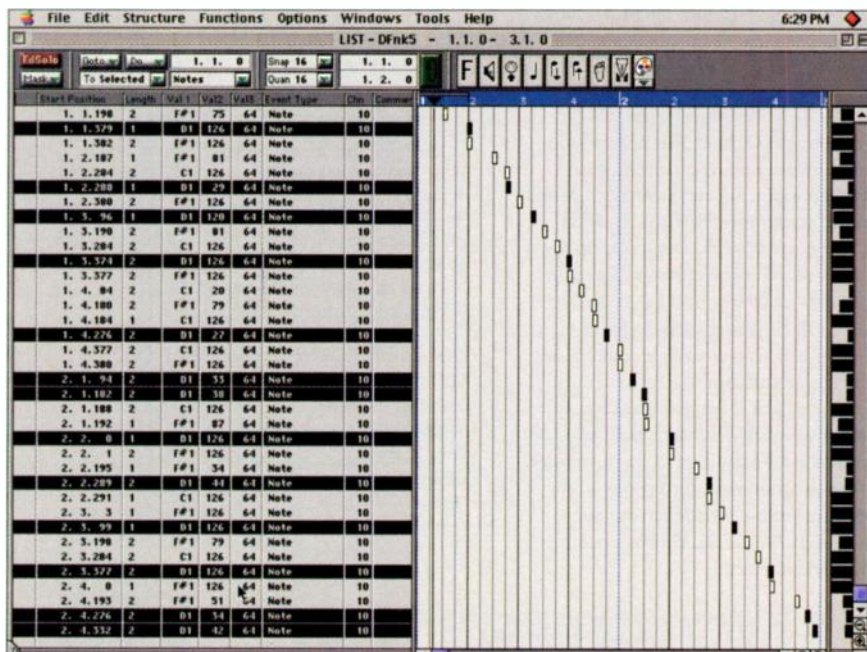


FIG. 2: Radical shifts in the Velocity of snare drum hits help you emulate the ghosting effects that real drummers achieve.

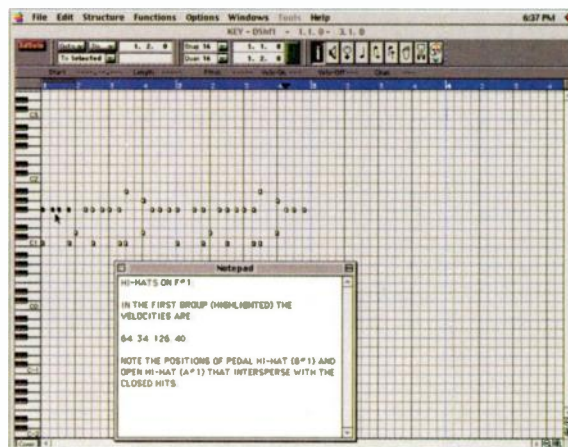


FIG. 3: Adding variations in Velocity to the hi-hat parts increases the pattern's realism.

a separate tempo track so that you can "conduct" the groove in this manner once it has been recorded. Make several passes at your tempo adjustments until you're happy with the song's ebb and flow.

Dynamics. Dynamics can add a human feel to the groove. If executed poorly, however, dynamic changes can be an annoyance. There are a couple of obvious candidates for variation in volume, each requiring its own types of subtlety.

The "ba-boom" type of kick drum beat will always sound more natural than two hits of equal Velocity. But if a consistent kick drum part on beats 1 and 3 varies from 105 to 127 (in MIDI values), your groove will probably sound insubstantial and amateurish.

Snare drum hits have a small range of ideal Velocities: full on for the main hit and less than quarter strength for the ghost notes (see Fig. 2). Programming the ghost snare beats is very difficult. If your drum loops require this type of subtlety, consider using MIDI or audio samples instead. Generally, these kinds of sampled grooves have the right feel in the ghost notes.

Hi-hats can give away that you're listening to a MIDI track. Programming the minute fluctuations in volume and tone that live players generate can be tricky. A straight 16th-note hi-hat pattern will sound mechanical when each note is played at equal strength and in perfect time. To minimize this effect, go into Edit mode and randomly make some of these notes louder or softer and earlier or later (see Fig. 3). If that doesn't work, substitute MIDI or audio samples.

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FIG. 5: Here's an example of the code used to circumvent the GM drum default.

A good tip for tracking hi-hats is to record them apart from the rest of the groove using two or more keys on the keyboard. The sounds you initially hear may be different from what you want, but that's okay. You can always edit them to trigger hi-hat sounds later. Using two or three fingers almost always yields groovier-sounding patterns than stabbing at the same note with one finger.

Exploring the position of each instrument in a pattern is another option. Because drummers often play hi-hat parts slightly ahead of the beat, consider nudging the entire hi-hat track forward within the pattern. This will add realism, along with some urgency, to your rock beats.

The element of surprise. Individual cymbal hits (as opposed to patterns) are used for punctuation, most commonly on the downbeat of the first bar of a new section. Remember that a crash cymbal played without a kick drum beneath won't sound real. Splash cymbals and China cymbals are commonly played at the same time as the snare.

Crash cymbals don't have to be on the downbeat, of course. One of Mick Fleetwood's most beguiling traits is the way he puts the crash cymbal on the second

beat of the bar. In a song with a steady groove, it's a simple but powerful technique that makes the listener wake up and reevaluate what's happening.

Audio versus MIDI. This debate could fuel an entire article. The reality is that both MIDI and audio have their place, and both have limiting and liberating factors. Here are a couple of points to ponder.

The good thing about MIDI is its flexibility: MIDI allows you to edit a groove's rhythm, tempo, and instrumentation quickly. In addition, MIDI takes up very little computer processing time and memory compared with audio. However, it's difficult to generate a realistic groove or feel using MIDI.

Audio gives you instant gratification. You like what you hear? That's how it'll always sound. In addition, audio tracks have ambience, which is something you have to create with a MIDI performance. On the other hand, audio doesn't allow you to separate the instrumental parts the way MIDI does. And making changes to tempo and pitch takes up processing power. Finally, audio files are memory hogs; an audio sample takes up ten times the space that a slice of MIDI data does.

AUDIO SAMPLES

Sampled drum loops aren't hard to find—just leaf through the pages of *EM* and you'll see dozens of ads for these products. The large number of commercially released drum loops should give you a clue as to their short life span, stylistically speaking. With some notable exceptions, sampled loops fall into the category of "use and lose."

But it doesn't have to be this way. Customize, combine, and be creative with audio samples. This not only increases their efficacy but also allows you to use and abuse the same samples many times over without sounding redundant. Programs such as Sonic Foundry's *Acid* let you customize loops in terms of tempo and pitch more efficiently than by simply playing samples within your sequencer.

You can't take effects out of a sample, but you can certainly add them, such as reverb, delay, and drastic equalization curves. Delays are particularly appropriate for drum grooves because they themselves can generate rhythm. You probably wouldn't want to slap a multi-tap delay over the loop of an entire drum kit. But delay on a single snare hit, mixed in with a loop, can be a real groove infuser. The same trick works with other percussion instruments such as claves, triangle, and tambourine. Using plug-ins in a digital-audio sequencer environment gives you the greatest amount of control over delays.

Lo-fi is particularly hip at the moment, and there are a number of plug-ins on the market that let you age a sample in the appropriate manner. To do it the old-fashioned way, tweak the filter-cutoff parameter on your sampler. Another trick is to run the sample through a stompbox, such as a distortion pedal or envelope filter. Even if you have the effect bypassed, you will probably notice an interesting change in the sound.

MIDI FILES

Instead of being captured with microphones, a live drummer's parts can be



FIG. 4: In this example, audio and MIDI tracks are running side by side. A groove with a number of sound sources lets you creatively deconstruct it later.

Why sound flat...



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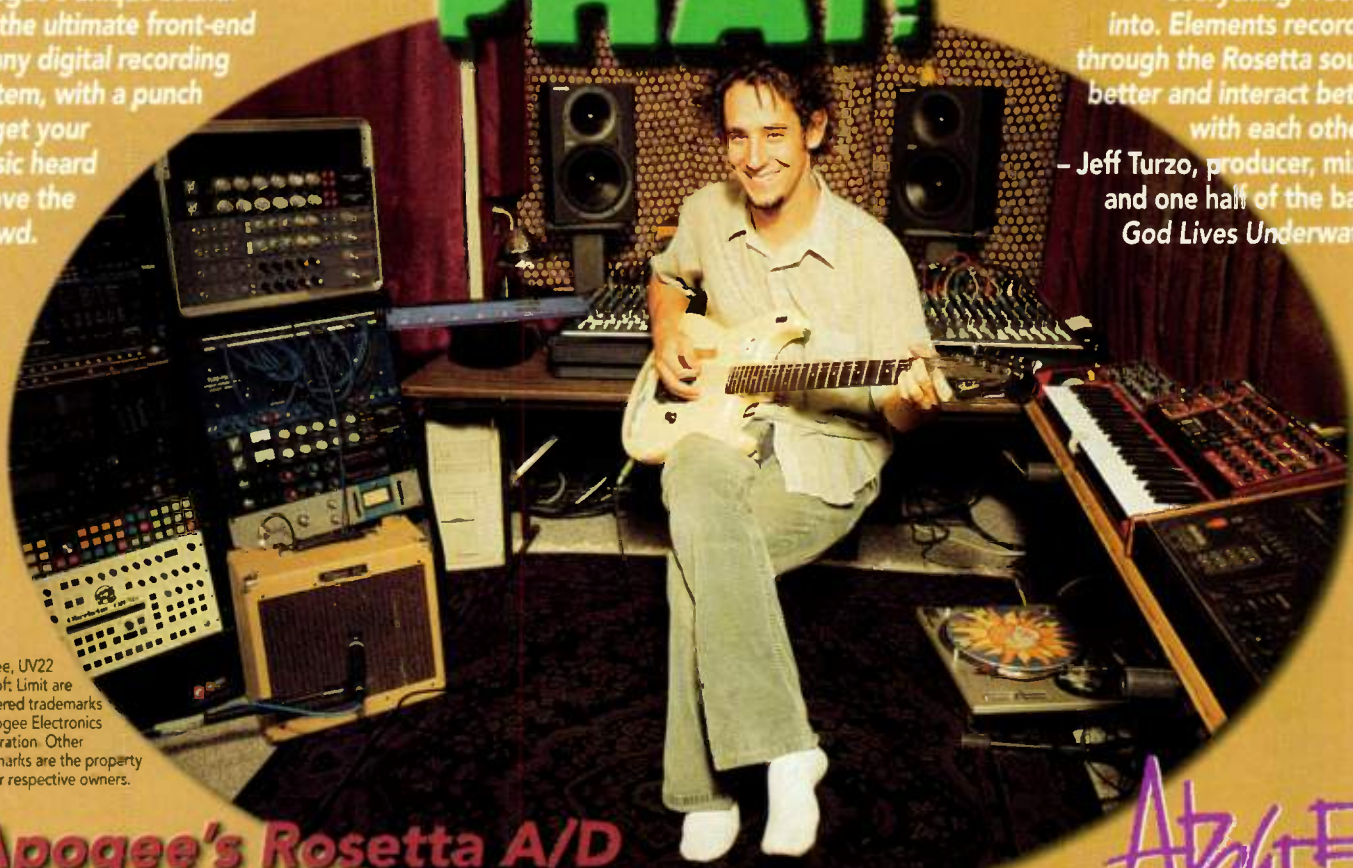
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played using an alternative MIDI controller such as drum pads or a MIDI trigger, captured in a sequencer, and served up as a Standard MIDI File (SMF). The advantage of using SMFs is that you can twist and tweak a groove almost limitlessly, while still retaining the human qualities a real player generates.

You must choose your own sounds with a MIDI file, of course, and the results will depend on the equipment you have. Even modest drum sounds from a midpriced sound card or GM module take on new life when being "played" by real drummers.

Adding delays to a MIDI file is also possible. You can, for instance, extract the snare from a groove, place it onto a separate track, universally reduce the

YOU CAN'T TAKE
EFFECTS OUT OF
A SAMPLE, BUT
YOU CAN
CERTAINLY ADD
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volume by at least 25 percent, and then experiment with delay factors within your sequencer (sequencers will always offer a range of "in-time" delay factors, but sometimes it's the ones in the cracks that inject the coolest grooves).

GROOVE COMBO

Very few recording artists would dare to use a sampled loop as is. And with good reason. A drum groove, however killer, has to fit in with the rest of a song. Therefore, it's important to view each groove in context.

The flexibility offered by mixing and matching—audio with audio, MIDI with MIDI, audio with MIDI—can

prove crucial if you want the ability to deconstruct a groove later. If your entire drum track is based on a single audio sample, your options are limited. But if your groove is built on an audio sample, some MIDI grooves, and extra percussion on top, then each part can be continually tweaked, muted, processed, or soloed at different times throughout the song (see Fig. 4).

Let your ears and the song determine what works and what doesn't. Mix a straight beat with a swing or shuffle beat. Or mix a beat that's completely out of context (perhaps in a compound time signature like 11/8) with a straight 4/4 sample. This gives you a couple of choices: let the two run, and see if you like the polyrhythmic aspect of it (the grooves in this example will hit the same downbeat every 11 bars of 4/4), or truncate the 11/8 pattern so that it loops after four beats.

One of the broad appeals of rap and hip-hop is the way artists in this genre create intricate polyrhythms by layering two or more drum loops. You can get the same effect by layering two MIDI drum loops, using different kits on different MIDI channels. On General MIDI instruments, the drums default to MIDI Channel 10. Some GM modules impose no restrictions on using other MIDI channels for drums. Some units do, however—notably Roland GS and Yamaha XG modules. Fig. 5 contains an example of the code that allows you to coax GS and XG units into freeing up MIDI Channel 9 or 11 for drums.

DIAL G FOR GROOVE

Infectious drum grooves fan the flames of creativity. But just plugging in an off-the-shelf loop from a sample CD will not get you there. Whether you're using MIDI libraries, a sequencer, or your own fingers on a keyboard, putting a little extra thought and effort into your rhythm tracks is the secret behind a killer groove.

Use every resource you can—cutting, pasting, looping, processing, and so on—to build up or break down a groove. The better the fundamentals are in your track, the less soul-searching you'll need to do later.

Julian Colbeck has traded life on the road as a keyboardist for a more dignified midlife occupation running the U.S. branch of Keyfax Software/Hardware.

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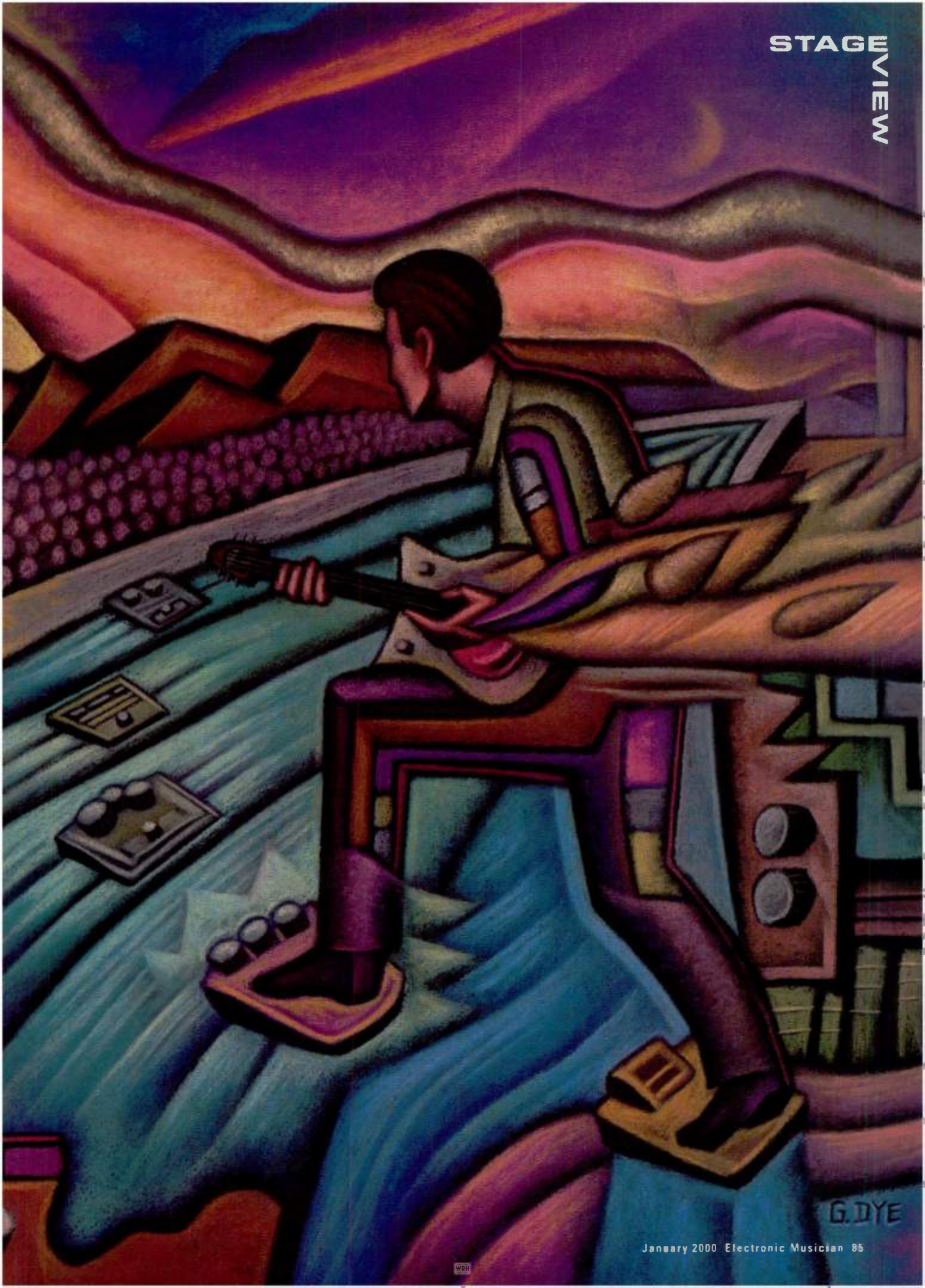
By Barry Cleveland

The recent proliferation of rack-mounted digital multi-effects processors has created a surge of interest in analog effects pedals. The reason for this surge is obvious: analog effects sound different from digital effects. And if you want true analog sounds rather than digital re-creations, you have to go analog. This trend parallels the ongoing retro craze occurring in professional audio recording, in which musicians are eagerly buying up vintage and vintage-style analog processors in order to restore warmth and life to cold digital signals.

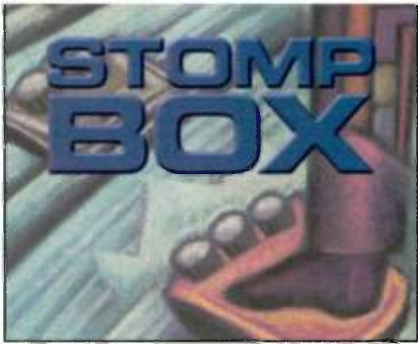
Pedals, however, have their high and low points, and vintage pedals can return you to a different era's many problems even when bringing you its great sounds. With this in mind, let's look at the historical development of analog effects, the sorts of problems people typically encounter when using them, and some solutions to those problems. Although I am writing this article from a guitarist's point of view, the information presented here pertains to keyboardists, bassists, and all other effects users.

Illustration by Gregory Dye





G. DYE



A RASH OF EFFECTS

The earliest effects were created using tube technology, and they were relatively bulky. The invention of transistors that followed not only let manufacturers use smaller circuits—thus making floor-model “stompboxes” possible—but also began the virulent tubes-versus-transistors debate. (Ironically, these two diametrically opposed technologies are now lumped together under “analog” in the controversy over analog versus digital technology.)

The first commercially available effects, tremolo and vibrato, appeared in the late 1940s. The confusion regarding the difference between *tremolo* (which modulates volume) and *vibrato* (which modulates pitch) persists to this day, as evidenced by the

use of both terms to refer to a guitar’s whammy bar.

The engineering behind many of these early effects was quite imaginative. For example, DeArmond’s tremolo used a motor-driven wheel to rock a small tube of mercury that opened and closed a circuit, thus modulating the volume. Leo Fender’s tremolo circuit, which he called “vibrato,” used a low-frequency oscillator to pulse a light source directed at a photoresistor. Fender also produced a combination vibrato and reverb unit called the Dimension IV, which used the questionable technology of an electric motor rotating an oil-filled can in front of a light source.

Stand-alone echo and reverb units were next on the scene. Les Paul created echo effects using modified tape recorders in the '40s, but dedicated tape echoes—with names such as Eccofonic, Echolette, Echoplex, and Copicat—didn’t appear until the '50s. The Binson Echorec had one of the more exotic designs, using a magnetic disk rather than magnetic tape. However, it was engineer Ray



JEREMY NUNES

FIG. 1: The Ibanez TS9 Tube Screamer is one of a number of stompboxes that differ substantially from one unit to the next because they were produced over a period of many years.

Butts who developed one of the first commercially available tape-echo units, for use in his EchoSonic amplifiers—a combination that helped define the



early guitar sounds of Chet Atkins, Scotty Moore, Roy Orbison, Carl Perkins, and Luther Perkins.

Mechanical reverb units were the result of attempts to emulate the sound of echo chambers. Rather than using a room for reverberation, manufacturers attached transducers to large metal plates or tightly coiled springs. The Hammond Organ Company developed one of the first spring reverbs and licensed it to Fender, who issued the GA-15 Reverb unit in 1961.

BIRTH OF THE FUZZ

Although the first effects pedals appeared in the early 1960s, many of their circuits were developed years earlier. For instance, examples of fuzzy-sounding guitar solos can be heard on several late-1950s records, and Chet Atkins says he had a transistorized distortion device custom-built for him sometime in the '50s. The first commercially made distortion pedal, the Maestro Fuzz-Tone, was introduced in '63 and was based on a circuit developed a few years earlier by Nashville studio engineer Glen Snotty. This circuit emulated the

sound of a blown channel in a tube mixing console. After Tommy Tedesco and Keith Richards used fuzz boxes in 1965 (Tedesco on the theme from the television series *Green Acres* and Richards on the Rolling Stones hit "Satisfaction"), it seemed as if everyone wanted that sound.

The wah-wah pedal was first released in 1966 by Vox. Called the Real McCoy, it was named after trumpet player Clyde McCoy, who wanted something that would give his organ a trumpet-mute effect. The pedal bears his picture on its underside (although later models have only his signature).

By the late '60s, most guitar amplifiers came with reverb and either tremolo or vibrato, and fuzz boxes, wah-wahs, and tape echoes were de rigueur for guitarists. Dozens of companies produced literally hundreds of versions of these and other effects,

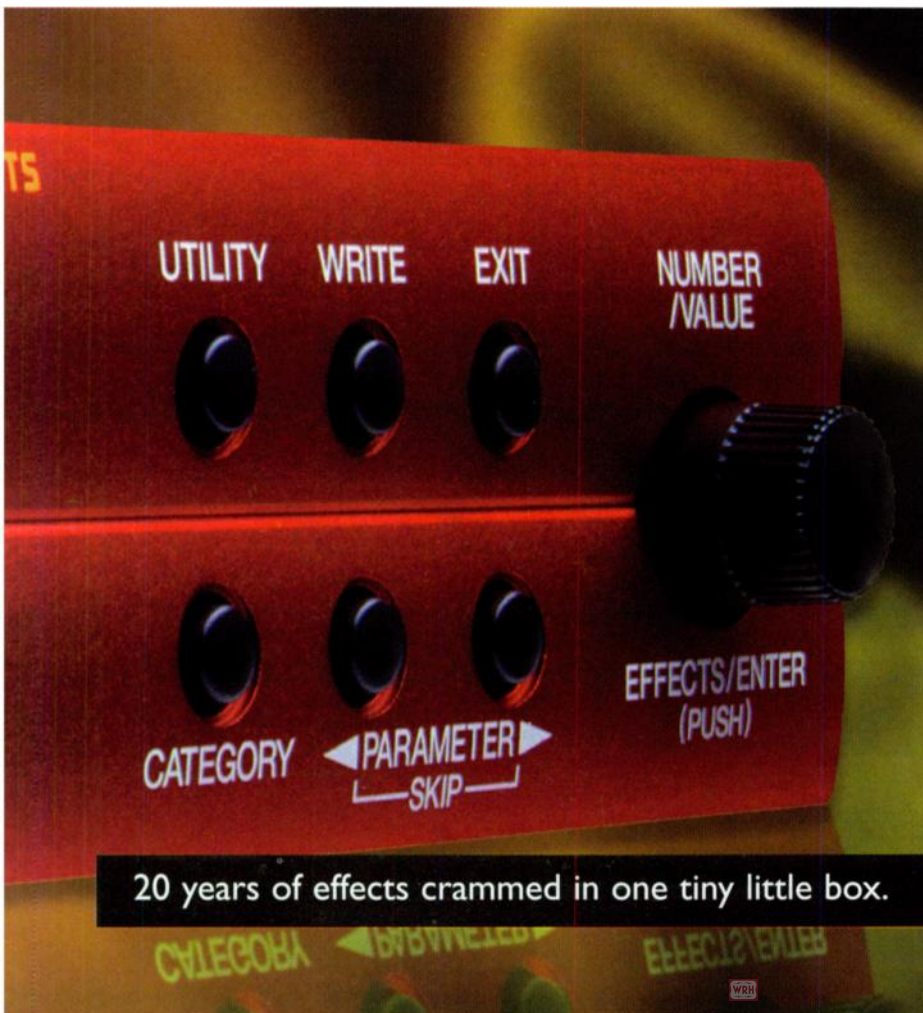


FIG. 2: By creating a pedalboard with a dedicated power supply (left) and true bypass circuits (row of buttons at the bottom), you can maximize the efficiency of your pedal setup. This custom pedalboard was designed by Tom Peck of Pedalboards.com.

including overdrives, compressors, phase shifters, octave splitters, and time-based effects such as delay, chorus, and flanging. But after the initial effects craze peaked, many of the smaller companies faded away, and only the larger manufacturers continued to offer comprehensive lines of stompboxes.

THE OLDER, THE BETTER?

The debate over the superiority of tubes versus transistors was hot in the '60s and '70s, and it continues to this



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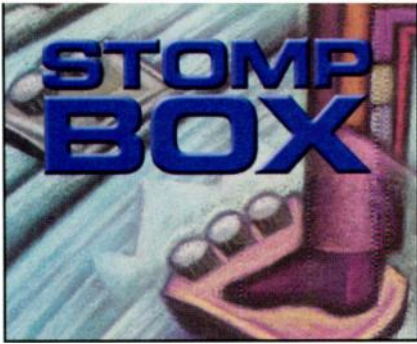
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day. For example, most musicians consider distortion produced by tube saturation sonically superior to distortion produced by a transistorized circuit. Tube versions of early tape echoes, like the Echoplex and Copicat, are also considered superior to the later solid-state models. But because tubes take up more space and the technology is more expensive, all but a few of the classic stompboxes are solid state, including the most coveted distortion and overdrive pedals.

Bear in mind that for every great fuzz box or wah-wah pedal created, there were dozens of mediocre imitations. And the pedals that sounded bad in the '60s and '70s haven't improved with age. Because prices for old pedals of every type are at an all-time high, and because price is not necessarily an indicator of sonic quality, buyers should beware. If you decide to buy a legendary pedal, keep in mind that individual units may vary considerably, particularly those models that were manufactured over a period of many years.

When tracing an individual pedal's pedigree, true pedal aficionados rely on serial numbers, variations in color and graphics, changes in transistor types, and other empirical data. A pedal's value is determined by its rarity and sound quality, and a slight difference in knob style or logo can sometimes distinguish a good pedal from a less desirable one.

For example, the Ibanez TS9 Tube Screamer (see Fig. 1) has several versions, and the hard-core collector knows that the best is the original version with the JRC4558 IC chip, the on/off switch that can be opened and cleaned, and "AC ADAPTOR^AC109 DC9V" printed at the top of the rear panel. Similarly, the Clyde McCoy and several other early Vox wahs are distinguished from later models by the sorts of rectifiers, transistors, and pots they contain.

To complicate things further, pedals that come from the same batch and have identical physical characteristics



FIG. 3: The powerful Lexicon MPX G2 provides digital emulations of vintage analog effects pedals, an analog preamp, a 20-second phrase sampler, two noise gates (one digital, one analog), and a sophisticated switching and routing system.

may have distinguishable sonic differences. One Clyde McCoy pedal may sound thin and wimpy while another sounds big and fat, and there's no way to distinguish between the two except by using your ears.

DO YOUR PEDALS SUCK?

Vintage effects pedals have drawbacks, such as their tendency to attenuate high frequencies and change the tone of a guitar. This problem, known as *tone sucking*, results from impedance mismatches and inadequate bypass circuitry. Tone sucking occurs even when the pedals are supposedly off. Connecting several pedals together exacerbates the problem and creates new ones, such as amplifying noise at every gain stage in the signal path. Though effects pedals have improved incrementally over the years (for example, most of them are no longer radiophonic), newer pedals can also suffer from these kinds of problems.

One common solution is to build a custom switching system that allows individual pedals to be removed from the signal path when they're not in use. Even so, signal attenuation and impedance mismatches can still occur when several effects are active, so the input and the individual effects loops need to be buffered and level-matched. More advanced systems allow you to switch the order of the pedals. After all, a wah-wah effect placed before a rotary-speaker effect sounds very different than it does when placed after it. And it's nice to have both options available at the push of a button. The fanciest switching systems store snapshots of the different pedal arrangements in onboard memory, where you can access them via footswitches.

Guitarists with sufficient coin can commission specialists like pedalboard gurus Bob Bradshaw and Pete Cornish to build custom systems for them. These systems go far beyond simply switching pedals around. Sometimes individual

RESOURCES ON THE INTERNET

Enthusiasts of vintage pedals will find lots of resources available on the Internet, including dealers, auctions, custom shops, and parts suppliers. The list below will point you in the right direction. Many of these sites also feature educational materials and offer links to additional sites.

Amp Heaven: www.toneheaven.ndirect.co.uk/British%20Echos.htm

Analog Man: www.analogman.com

Binson Echorec: homepages.enterprise.net/greenworld

Custom Pedal Racks: www.pedalboards.com

EH Man: www.home.earthlink.net/~theehman

Eli Rose Pedals: www2.famvid.com/dirk/index.html

FXperts: www.fxexperts.com

Gaspedal: www.gaspedal.com

Guitarauction.com: www.guitarauction.com

Mel Music: www.melmusic.com.au/vintfx.html

Mojo Musical Supply: www.mojotone.com

Neals Music: www.neals-music.com/effects.html

Pedalman: www.pedalman.com

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Rockauction.com: www.rockauction.com/oswelcome.shtml

Sounds-Fuzzy: www.soundsfuzzy.com

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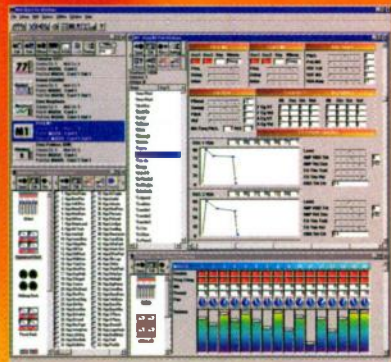
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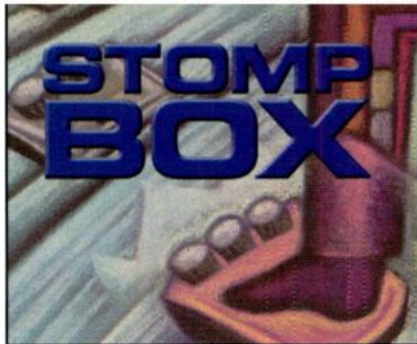
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effects are removed from their boxes, mounted together on a faceplate, and hardwired to the relays and footswitches that compose the switching system. In other cases, the effects are built into racks, with the pedalboard serving only as a remote switcher.

If you want a particular sound but the pedal that produces it is problematic, a cleaner version can be custom-made and substituted for the original. Usually, all the effects are connected to a regulated central power supply, eliminating the need for batteries and multiple adapters. These systems can be very expensive, however, and they deal only with pedals that go between your guitar and your amp's input. If you want the system to control your rack-mounted effects as well, you'll almost certainly need some sort of MIDI interface, making your setup all the more complex and costly.

WHAT TO DO

Switching systems like those described above can cost thousands of dollars, not including the effects. You can extrapolate some of the basic concepts, however, and employ them in DIY fashion. A good place to start is with signal flow—in particular, the signal flow through your cables. Using the highest-quality cables can greatly reduce noise and improve your overall sound, with or without effects pedals.

Next, listen to each pedal individually and determine the extent to which each modifies your guitar sound. If any of your pedals are tone suckers, the least-expensive solution is to avoid using them. If you must use them, consider having them modified with "true bypass" circuitry, which routes the signal around the pedal's electronics when it's inactive. Sonically this is the best solution, but it can be costly and will reduce whatever value your pedal may have as a collector's item.

An alternative that doesn't alter your pedal but works nearly as well is to use a loop selector. Loop selectors are passive devices that switch one or more effects loops in and out of the signal

path. The more sophisticated loop switchers employ active electronics to buffer and level-match signals of varying impedance loads.

For example, my vintage PMP BUF IV combines a small active-A/B switcher, loop bypass, and gain booster. I put my Little Big Muff Pi and Cry Baby (two fearsome tone suckers) in the loop, so that I can bypass them when I don't need them. I also set up the A/B function to toggle between my amp and my tuner, which allows me to switch the latter out of the signal path except when I need to use it (the tuner also sucks tone). Effects-loop switchers of all types and configurations are available from a variety of manufacturers.

You may also find it convenient to mount your pedals on a pedalboard. This lets you transport them as one unit and alleviates repatching. Many manufacturers, and some custom shops, offer empty pedalboards that you can configure to your tastes. If your pedals are AC powered, you can plug them into a power strip and have a single power line for your rig. Battery-powered effects can benefit from a regulated power supply that feeds all the pedals from a single source (see Fig. 2). A number of manufacturers make power supplies specifically designed for use with effects pedals.

STOMP IT

Vintage effects pedals may require special handling for their full potential to be realized. Before you step into the past, take a look at the floor-based and rack-mounted multi-effects processors currently available (see Fig. 3). Some have special features such as tube circuitry and digital emulations of vintage effects, and the majority have more switching, routing, and programming power than even the fanciest custom-switching systems.

If you simply must have a bunch of old effects underfoot, though, try some of the solutions I've suggested here. And remember to hold on to your digital effects, because someday they'll be vintage too!

When he's not playing guitar in the improvisational quintet Cloud Chamber (www.mphase.com/cloud.htm), or fooling around with his vintage effects pedals and tape echoes, Barry Cleveland is editor of EM's Personal Studio Buyer's Guide.

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Get the Most from RealAudio

Make your files sound their best in the RealAudio format.

By Scott R. Garrigus

Streaming-audio technology has certainly matured over the past few years. Better sound quality and greater reliability, in spite of growing Internet congestion, make it more effective than ever for showcasing audio over the Web. There are also more formats to choose from, including Microsoft NetShow and Liquid Audio. Because of its popularity, however, RealAudio remains the unofficial standard among Web developers and listeners alike. RealNetworks now boasts more than 77 million downloads of its *RealPlayer* software, and the latest version provides more advanced compression for smaller and better-sounding files.

For all its improvements, though, RealAudio is still a far cry from CD quality at low bandwidths. Over a 28.8 kbps modem, the best you can achieve is a 10 kHz frequency response with a 22.05 kHz sampling rate for a mono file. But you can have decent-sounding RealAudio files; there are a number of steps you can take to get the best audio possible. To begin, you'll need a few tools, including an audio-editing application (such as Sonic Foundry's *Sound Forge*) and copies of the latest *RealPlayer* utility and *RealProducer* encoding software. You can download free copies of RealAudio applications from the RealNetworks Web site (for details, see the sidebar "RealAudio Resources").

CAPTURE

Before you record your audio to WAV or AIFF files, you need to decide whether you want mono or stereo audio files and what the sampling rate should be. Don't assume that 44.1 kHz stereo audio is always the best choice; with RealAudio, it may not be. The latest version of the encoding software provides a large selection of codecs (compression/decompression algorithms), so you can tailor the sound quality of your file to specific Internet connection speeds.

A total of 33 codecs is available through the program, each targeted toward a different bandwidth, from 5 to 96 kbps. Every codec has an optimum sampling rate and provides a frequency



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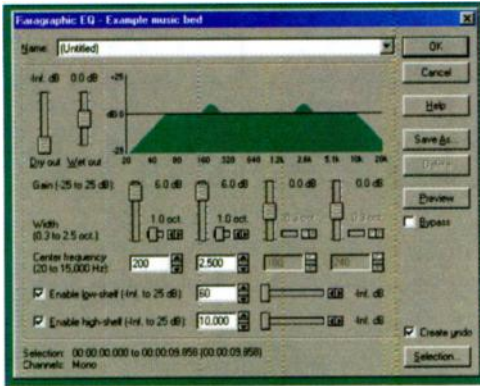


FIG. 1: It's easy to set up an EQ curve for your RealAudio chores using the Paragraphic EQ processor in Sonic Foundry's *Sound Forge*.

response accordingly. If you record your audio files using the optimum sampling rate for your target codec, you'll get better sound quality. You can find a table listing all the codecs and their qualities in the RealSystem Production Guide on the RealAudio Web site.

Whether you use mono or stereo files will also affect the frequency response.

Because stereo files have twice as much data to push over the Net, they take up twice as much bandwidth. If bandwidth is limited, something has to give; as a result, stereo files have half the frequency response of mono files. You'll have to decide which is more important: stereo content or the best possible sound quality.

One other consideration: with the free version of *RealProducer*, you can access only four of the available codecs. For more, you'll need to buy *RealProducer Plus* (\$149.95) or *RealProducer Pro* (\$499).

For consistency's sake, I'll target all examples in the following recommendations to the 20 kbps Music G2 Mono codec. It provides the best quality on a 28.8 kbps connection (with a frequency response of 10 kHz), and it's available with the free *RealProducer* software. Using this codec, you'll need to record your files in mono, at a sampling rate of 22.05 kHz. For resolution, always go with 16-bit.

OPTIMIZE

RealAudio uses a *lossy compression* scheme, which means the codec discards parts of the audio file during the encoding process to shrink the file size. That reduces the frequency response and dynamic range of the audio, but you can compensate for those "losses" by applying a bit of dynamics compression and equalization before you encode. First, be sure to remove the DC Offset (low-frequency, inaudible noise that can result from bad equipment grounding) from your file, because it can introduce unwanted artifacts when you're applying EQ or other types of processing.

Because RealAudio encoding reduces the dynamic range of your audio, adding a bit of compression beforehand will give you some control over the final signal levels rather than leaving them to chance. A good compression ratio is usually somewhere between 2:1 and 4:1; to start, try using about 2:1. That way you'll be able to increase the overall volume while keeping some of

REALAUDIO RESOURCES

You can find all the tools and information you need to work with the RealAudio format on the RealNetworks Web site at the following download locations:

RealPlayer G2
www.real.com/products/player/index.html

Download the latest version of *RealPlayer* for free, or purchase *RealPlayer Plus* for additional functionality.

RealProducer G2
www.real.com/products/tools/producer/index.html

Download the free *RealProducer* software to encode your files, or purchase *RealProducer Plus* or *RealProducer Pro*, which provide additional encoding features.

RealProducer G2 Authoring Kit
www.real.com/products/tools/authkit/index.html

The RealProducer Authoring Kit, a free download, provides information about developing your own RealAudio, RealVideo, RealPix, RealText, and RealFlash files. It includes production guides for all five formats.

RealSystem G2 Production Guide
service.real.com/help/library/guides/production/realpgd.htm

You can read the RealSystem Production Guide online if you don't want to download the RealProducer Authoring Kit.

RealAudio Bandwidth Codec Charts
service.real.com/help/library/guides/production/htmlfiles/audio.htm#racodecs

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The Real Forum
proforma.real.com/mario/devzone/realforum.html

The Real Forum listserv is an e-mail discussion group focused on the use of RealNetworks products. You can post messages about the best methods for creating content using RealNetworks technologies and about the planning and implementation of streaming-media Web sites.

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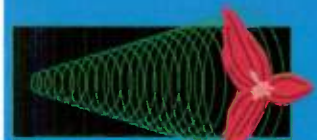
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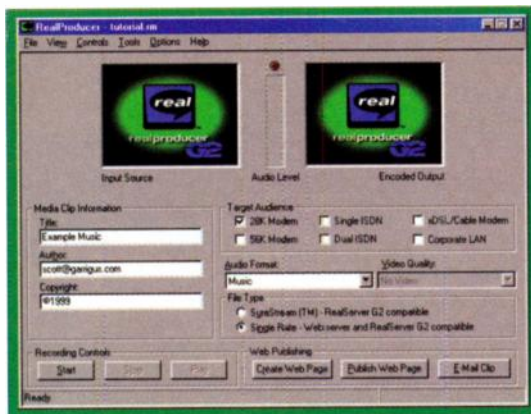


FIG. 2: *RealProducer's* Recording Wizard leads you through the process of setting the encoding parameters.

the original dynamic range. Too much compression can sometimes add unwanted artifacts to music, making it sound dull and lifeless. The optimal ratio will vary depending on the material; you'll need to use your judgment.

Next, equalize your file, keeping in mind that most of the high-end and extreme low-end content will be lost during encoding. It may take some experimenting; you might begin by cutting the low frequencies below 60 Hz and the highs above 10 kHz, which helps reduce some of the encoding artifacts. To make up for the frequency losses, you can boost some of the bass frequencies (around 200 Hz) that are still intact. You can also boost the midrange around 2.5 kHz, which emphasizes important midrange content, such as vocals. Try increasing the frequencies by about 6 dB and play around with it from there (see Fig. 1).

Now you'll need to normalize your file. Normalization, which raises an audio signal's volume as high as it can go without causing clipping (distortion), guarantees that your file will use the maximum amount of digital resolution available. It also ensures that you'll be feeding the encoder the loudest possible signal, which helps mask low-level artifacts. Don't normalize to 100 percent, though; instead, use 95 percent (or -0.50 dB). The RealAudio encoding process doesn't always handle 0 dB signals very well, so it's best to leave a small amount of room for it to work its magic.

ENCODE

Converting files to the RealAudio format used to be a bit tedious, but with RealNetworks' latest encoding software

it's simple. *RealProducer* provides a Recording Wizard, which takes you step-by-step through the process of setting the encoding parameters. The steps include specifying your source file; entering the title, author, and copyright information, which later appears in the Clip Info field of *RealPlayer*; and selecting file type, target audience, and audio format.

For file type, you choose between Single Rate or SureStream. A single-rate file is optimized for only one type of Internet connection, and

it can be streamed from any Web server. With SureStream, you can encode a file for up to six different bandwidths; when a visitor listens to your file, *RealPlayer* determines which encoding to use according to the speed of the Internet connection. For example, if a fast connection gets bogged down due to Net congestion, *RealPlayer* automatically switches to lower-bandwidth encoding to prevent playback from stalling. SureStream files, on the other hand, require *RealServer* for playback; they can't be streamed from just any Web server.

Once the Recording Wizard has guided you through the parameter settings, you simply click the Start button, located in the Recording Controls section of the *RealProducer* main screen (see Fig. 2). Your file is now encoded and saved as a RealAudio file with an RM extension. If you have *RealPlayer* installed on your system, you can click the Play button to hear how it sounds.



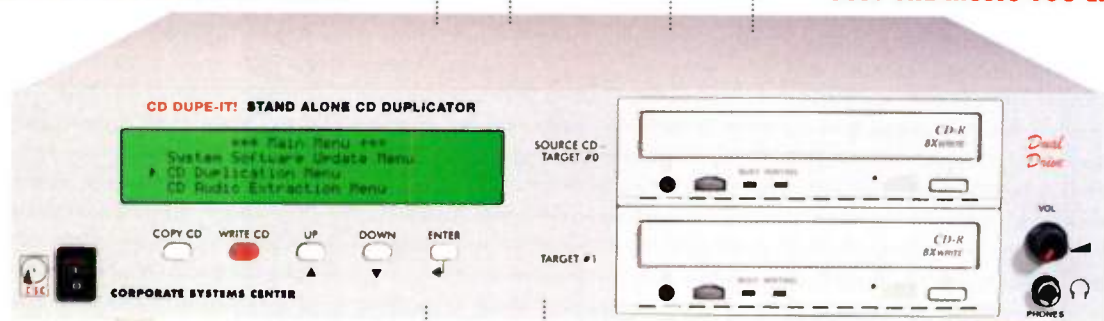
FIG. 3: You can embed *RealPlayer* into your Web page in a variety of configurations, from basic Play and Stop buttons to the full player with transport controls and information and status panels.

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RealAudio is a great way to showcase your music on the Web, provide a taste of what's on your new CD, or even enhance your site with informative sound clips, such as radio interviews. Whatever your goal, if you follow the tips I've outlined, you'll have some of the best-sounding RealAudio files on the Internet.

Scott R. Garrigus is an author, musician, and multimedia expert. You can hear excerpts from his cassette release *Pieces of Imagination* in RealAudio format on his Web site at www.garrigus.com.

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Honk if You Love Horns

Tips and techniques for recording saxes, trumpets, and trombones.

By Myles Boisen

As the recording engineer for the Rova Saxophone Quartet, Club Foot Orchestra, and numerous R&B and horn-based ensembles, I'm sure that I've learned most of what there is to know about recording brass and woodwind instruments—that is, until the next horn player walks into my studio and I invariably learn something new.

Recording horns is always exciting. It is *never* predictable, however, and it almost always presents major challenges

for the recording engineer—especially at the personal-studio level. The complexity of the sound-generating apparatus, especially for the larger saxes and woodwinds, as well as the potential high SPLs, means that microphone selection, mic placement, and room sound all become critical, interrelated factors. Bear in mind that horns were designed to be heard from a distance; therefore, achieving a balanced, pleasant sound through close-miking requires not only a discerning ear and the appropriate gear but also a good bit of recording magic.

In this column, I will focus on the horns (I'm using the term *horns* generically to cover instruments from both brass and woodwind camps) most commonly heard in jazz, blues, and pop music—that is, trumpet, trombone, and saxophones (with some mention of clarinet, cornet, and flügelhorn). Unless you're recording classical or chamber music, these are the instruments you're most likely to encounter in the personal studio. I'll also discuss recording horn sections, including techniques for incorporating ambient sound.

MIC SELECTION

Premium large-diaphragm condenser mics—the type generally preferred for recording vocals—can excel when used on horns, especially tube condensers. However, condenser vocal mics can often have significant presence boosts



Internationally recognized as the premier avant-garde saxophone quartet, the Rova Saxophone Quartet explores every known musical extreme through original and commissioned scores. From left to right: Bruce Ackley (soprano), Jon Raskin (baritone), Steve Adams (alto), and Larry Ochs (tenor).

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above 4 kHz, which can make them sound harsh and unflattering on horns. Condenser mics also tend to reveal inadequacies in the recording space and may contribute off-axis coloration to other instruments in an ensemble.

For these reasons, many engineers prefer the focused pattern, soft high end, and flatter response of ribbon mics for close-miking horns, particularly brass instruments. Certain dynamic mics also yield excellent results with brass and low-register horns. (See the table "Boisen's Recommended Mics for Horns" for a list of mics that I like to use, classified by instrument and price.)

HORNS OF PLENTY

The most important guideline for studio-miking any type of horn is to never stick the mic straight down the bell. This type of miking is standard practice for live sound; for recording, however, miking any horn too closely or aiming the mic straight down the bore emphasizes all the wrong aspects of the instrument and can cause brittleness, "fizzley" high end, erratic dynamics, booming low notes, and other ugly stuff.

In general, the richest and most balanced tone for any curved-bore horn develops around the edge of the bell. I usually start by miking three to six inches away from this area, which captures a blended, natural tone aided by a hint of room sound. This distance gives the performer room to move without going off mic, and acoustic compression helps keep dynamics under control. I advise the use of a pop filter to help protect delicate microphone diaphragms and to keep the performer oriented at a consistent distance and angle in relation to the mic. To minimize phase cancellation, make sure that music stands are placed low or to the side of the mic at an angle, so that any reflected sound is diverted away from the microphone. When using solid-metal music stands, you can further reduce unwanted reflections by placing a towel over the back.

My main goal when evaluating mic placement is to find a position from which I can hear all the notes in the instrument's range reproduced evenly, with a pleasing tonal balance from airy highs to warm, low frequencies. I listen to the horn on its own and in the mix, ensuring that there are strong low-end fundamentals—but not so strong

as to pop out or muddy the track—and smooth highs that aren't harsh, "spittley," or scratchy sounding.

All members of the saxophone family can have a problem with overprominent midrange frequencies. If mic selection and placement don't allay this problem, you can deal with unpleasant honkiness by applying subtractive EQ in the range of 600 Hz to 2 kHz either during tracking or mixdown. (If

I'm recording live to 2-track, I like to EQ while tracking; otherwise, I prefer to wait until mixdown.)

TRUMP POWER

For trumpet, miking at a distance of six inches is usually sufficient, with the mic diaphragm facing into the bell or slightly off center. When recording louder players, however, or when using old and sensitive ribbon mics, place the

SELECTED DISCOGRAPHY

The variety of recording techniques described in this article can be heard on the following CDs, engineered by Myles Boisen.

Casino Royale, *Back to Back Bacharach*, vol. 1 (Double Play Records, 1999)

(Note: In addition to their obvious strengths, Burt Bacharach's pop hits are also masterpieces of horn arrangement. Casino Royale's versions are largely faithful to the originals in this regard, using lots of muted trumpet, flügelhorn, and lyrical brass-choir voicings.)

"Wives and Lovers" (flügelhorn, bari sax)

"What the World Needs Now" (trumpet, muted trumpet, flügelhorn, bari sax)

"Bond Street" ('60s-style alto sax and trumpet)

"I'll Never Fall in Love Again" (trumpet and muted trumpet)

"Wishin' and Hopin'" (trumpet and muted trumpet)

More information is available online at www.doubleplay.com.

Rova Saxophone Quartet, *Bingo* (Les Disques Victo, 1998)

(All selections recorded and mixed live in the studio using three close microphones and a distant room mic. See the sidebar "Recording the Rova Saxophone Quartet.")

Available from disquesvicto.ivic.qc.ca.

Ben Marcato and His Mondo Combo, *Party Mix* (Urgent Records, 1999)

"Little Joe from Chicago" ('50s-style muted trumpet and tenor)

"Smack Dab in the Middle" (blend and dynamics)

"A Kiss to Build a Dream On" (trumpet solo with Altec 639b ribbon mic)

"Lickin' Stick" ('70s-style dry blend, tenor sax solo)

(trumpet and tenor horn section on all selections)

Available from www.benmarcato.com.

The Club Foot Orchestra, *Plays Nino Rota: Selections from La Dolce Vita et al.* (Rastascan Records, 1997)

"Nights of Cabiria Suite"

"Nostalgico Swing 1 & 2"

"Cimitero"

(trumpet, trombone, saxophones, and clarinet on all selections)

Available from www.rastascan.com.

The Dynatones, *Shake That Mess* (Blue Suit Records, 1999)

"Cadillac Assembly Line"

"Baby Don't Leave Me" (tenor sax solo with room mic)

"How Come My Bulldog Don't Bark" (bass trombone featured)

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mic 12 to 18 inches away to get a clear, incisive tone without transient overloads or too much buzziness. You can also remind trumpeters that they don't need to blow at peak stage volume in the studio. In fact, for recording purposes, quieter playing produces a more rounded tone; it also saves a performer's lip during long sessions.

Due to the trumpet's directionality, distant mic placement (12 to 18 inches) works surprisingly well, and the trumpet's relatively high range (rarely playing below A4, or 220 Hz) means that

proximity effect is negligible. The trombone can be approached similarly, although I advise somewhat closer miking with a ribbon mic toward the outer edge of the bell (within four to eight inches) to avoid a thin, "blatty" tone. The flügelhorn and cornet are sometimes used in the studio for a mellower, more intimate sound than trumpet, and are generally played at lower volume. These evocative horns are good candidates for close-miking (three to six inches) with the warmest-sounding mic you can find.

TOOTS WITH MUTES

When recording muted trumpet and trombone, start by tossing out all the rules. Every type of mute—solo tone, harmon, cup, plunger, straight, pixie, and bucket—has its own sonic peculiarities, and each blocks the bore of the instrument in a different manner and to a different degree.

For general solo performance, start with the mic positioned within three inches of the edge of the bell to pick up usable tone and detail. Proximity effect becomes more noticeable with close-miking like this, especially when players gravitate toward the instrument's lower range to exploit the mute's colorful resonances. And be aware that plunger and harmon mutes are often manipulated by hand to produce tonal variations or wah-wah effects, necessitating more distant and lateral mic placement.

To compound the engineer's troubles, a muted passage in the middle of a conventional trumpet track requires careful choreography, with the performer having to move up on the mic when using the mute, and then return to the original position afterward. In this situation, it can be helpful to mark lines on the floor with tape to indicate where the player should stand for the two different sections.

THE STRAIGHT AND NARROW

The soprano sax is always a challenge to record because of its unique combination of high, trumpetlike register



FIG. 1: A single, large-diaphragm condenser mic, preferably a tube model, can be located to capture a balanced image of soprano sax. Move the microphone toward the mouthpiece to accentuate highs, and toward the bell to increase "honk" and cutting power. You can bring the mic closer to the instrument to emphasize warmth and midrange or pull it back to provide a more open, natural sound.

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and warm, slightly nasal tonality. As with any saxophone, a lot of viable sound emanates from the open holes, and the linear layout of the tube means there's a long distance from the small upper holes down to the bell. In addition, the sound that focuses at the bell tends to be strident and honky, with an emphasis on any high-end edginess or sputtering from the reed.

To capture an intimate, detailed soprano track, try using two microphones: one at the bell and the other on the high keys. This technique, however, requires experimentation to achieve phase coherency and tonal balance.

I prefer to use a single mic, ideally a large-diaphragm tube condenser, placed directly above the keys somewhere between the middle of the horn and the lowest pads (see Fig. 1). You can easily adjust tonal balance by moving the mic up or down along the length of the body, with "honk" and cutting power increasing as the mic gets nearer to the bell. Once you locate the sweet spot, moving the mic closer to the instrument will emphasize a warm, fuzzy midrange, and pulling it back will provide an airier tone more like what the performer hears. These same principles apply to the clarinet, although I advise closer miking to bring out the instrument's dark, woody tone.

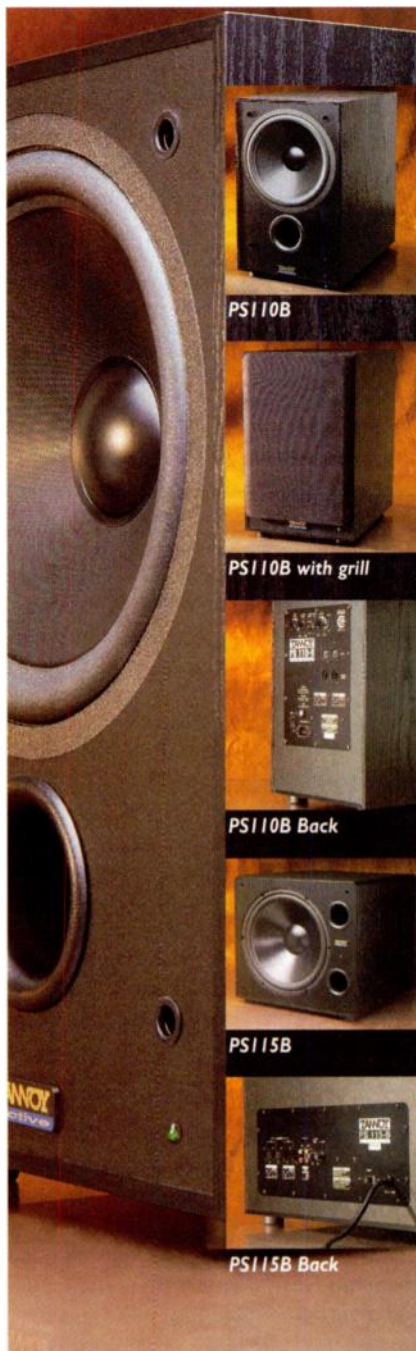
REQUIRED READING

The alto sax, though more compact physically than the soprano, presents its own challenges to the recording engineer. Many players like to exploit the instrument's piercing upper range and high-volume potential. And even exponents of "mellow alto" need all the help they can get to convey an adequate low end.

I've achieved my best results with alto saxes by miking in front of the lip of the bell, sometimes going a little *under* the lip to attenuate the abundant high frequencies that develop directly above the bell (see Fig. 2). Moving the mic closer or farther from the keys (note that the lowest keys and pads are quite close to the bell) can also have a major effect on the tonal balance, particularly on the high, airy frequencies and the low fundamentals below 200 Hz. But for a full sound, stay close, take advantage of the proximity effect, and do what you can to get the saxophonist to stay put—the balance of highs and lows shifts drastically once the mic gets more than a few inches in front of this horn.

TENOR OF THE TIMES

Although tenor saxophonists tend to traverse a wider spectrum of tone and style than do alto players, the full, resonant characteristics and wide bell of the tenor make it one of the more forgiving horns to record. I'll often take an approach similar to the technique described previously for recording alto. Miking by the lip of the bell or by the low keys really helps, particularly when a warm, jazzy sound is desired. With some players, however, this approach results in too dark a sound.



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To accentuate high end and provide a broader tonal balance, I usually move the mic up above the bell to capture the high keys and bell sound equally. This works well for bright pop music and performers who move around a lot. However, if this positioning captures too much mechanical noise or breath, move the mic down toward the bell or rotate it toward the player's left side (opposite the keys and pads).

BARI RARE

For the baritone sax, I almost always choose to mic close to the bell to cap-

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Unfortunately, because baris are costly

and their popularity is waning, most of the ones I encounter are not top-quality instruments. They share such common problems as thin sound, clattering keys, and uneven tonal balance, all of which

need to be addressed through careful mic selection and placement. As with the alto, you can compensate for deficiencies in the instrument by moving the mic around the perimeter of the bell closer

RECORDING THE ROVA SAXOPHONE QUARTET

Having worked with members of the Rova Saxophone Quartet in numerous capacities since the late 1980s, I was thrilled—not to mention nervous—when hired to record the group at Oakland, California's cavernous Sharkbite Studio in 1995. The 1995 sessions were released on the CD *Ptow!* (Les Disques Victo, 1996), and the sessions recorded in the following two years came out on *Bingo* (Les Disques Victo, 1998).

The quartet insisted on maintaining its performance configuration, standing close together in a semicircle (see Fig. A), thereby making off-axis coloration and phase cancellation major miking concerns. Some of their scores included instrument changes, and on top of that, I would be mixing live-to-DAT, meaning there would be no punch-ins or opportunities to fix things in the mix. Based on my familiarity with the group's sound, and with an excellent CD recorded live by Bob Shumaker (*This Time We Are Both*, New Albion Records, 1991), I devised a three-microphone setup for the quartet, with an additional fourth room mic to capture Sharkbite's gym-size ambience.

The group set up on carpet in front of the control-room glass, outside of the control room, where the studio's early reflections were enhanced by wood paneling on the side walls. The reverb characteristics approximated those of a bright, midsize hall. Jon Raskin (alto, baritone, and soprano) and Steve Adams (alto, soprano) occupied the center of the semicircle, with Raskin on the left and Adams on the right. A large baffle was placed behind these two horns to keep the center image of the recording dead and tight. I chose to mic the pair with a single Neumann TLM 193 routed to a Peavey VMP-2 tube preamp. The mic was positioned about two and a half feet back, a little closer to the baritone, and at the same height as the saxophones' bells. This placement was designed to keep phase cancellation

(the bane of multiple miking) at a minimum, while also avoiding extreme close-miking and its attendant problems (inconsistent levels, poor blend, and so on). By using this configuration, however, I took a calculated risk that both instruments might not be represented equally in the mix. Thanks to the neutral response of the TLM 193, and to the performers' precisely controlled dynamics, the risk paid off.

Bruce Ackley (soprano, tenor) stood at front left, miked first with an AKG C 414 B/ULS (cardioid pattern, low-cut filter engaged) through a Neve 1081 preamp, and later with a Neumann U 87 (cardioid pattern, low-cut filter engaged) running through the studio's Mackie 8-bus board and preamp. Ackley's mic was placed six to ten inches to his right, facing the pads, and about two-thirds of the way down the soprano body (and a few inches above the bell when he played tenor). I angled this mic to pick up ambient sound from Raskin's baritone, thereby adding some extra reverberation to his sound while creating a sense of stereo image with the center mic.

I took a similar approach to the right front mic used on Larry Ochs (tenor, soprano). His mic—a Neumann TLM 193 through a Neve 1081 preamp—was placed closer and was more localized than Ackley's because of a combination of circumstances. I tried to get as close as possible to Larry's tenor bell to maximize definition and warmth and to minimize level changes resulting from his tendency to move around. But despite some asymmetry in the mic placement, the distribution of room sound through the side mics is well balanced on the recording, and the relatively dry sound at the center panning position was filled in with some natural reverb from the room mic.



PEETER VILMIS

FIG. A: The Rova Saxophone Quartet in Vilnius, Lithuania, during their 1989 tour of the USSR. The members are positioned differently than in the recording sessions described here. From left to right: Steve Adams (soprano), Jon Raskin (baritone), Bruce Ackley (conducting), and Larry Ochs (soprano).

The room mic was an AKG C 414 B/ULS (omnipattern, low-cut filter engaged), placed in front of the quartet at least 20 feet away, tilted slightly skyward, and as high up as the mic stand would go in order to pick up as much reflected sound as possible. This 414 was routed to the other channel of the Peavey VMP-2 tube preamp and panned to the center of the mix. I adjusted the level on a song-by-song basis, just as one would utilize a conventional outboard-reverb return. To remove objectionable components of the mic and room sound, I used significant subtractive EQ on this channel (–6 dB at 6 kHz, –6 dB at 240 Hz, and –5 dB low shelving at 80 Hz). The other mics had conservative EQ adjustments, generally 1 to 3 dB cuts around 6 kHz to soften the saxes' high end, and 1 to 4 dB cuts between 235 and 270 Hz to tame muddiness in the room. No compression was used on individual mics or on the stereo mix bus.

A good place to start when listening for the smooth blend, natural reverb, and spaciousness of the three-plus-one miking technique described here is the short version of "Witch Gong Game." The track "Water Under the Bridge" is another favorite of mine.

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But by lunchtime you've got a groove loaded and found a workaround to incompatibility issues between your sequencer and digital audio package. The tempos are kind of limp, which you can fudge. Still you wish you could change the sound of the snare. You wish you could program decent drums yourself. At the end of a hard day you fill in some sample clearance forms and toss a pizza into the microwave.

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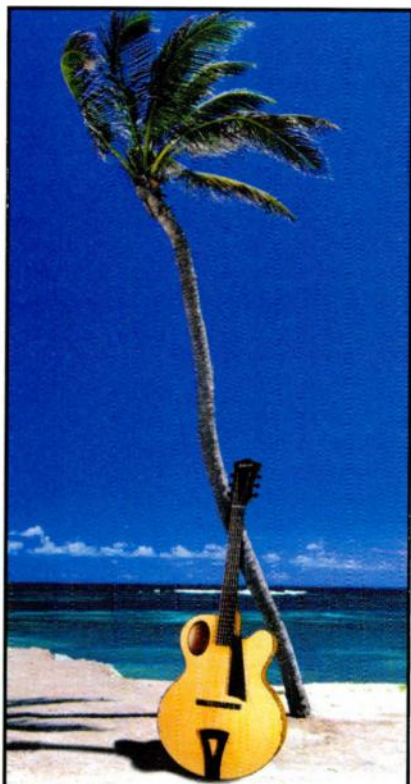
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or farther from the keys. Applying a little compression when tracking can help to control erratic low notes. Try an optical compressor, set with a mild ratio of 2:1 and just 2 to 5 decibels of gain reduction.

LOST IN SPACE

To create a vintage vibe or dramatic ambience, I recommend experimenting with distant room miking on any horn, either as a single sound source or in combination with close-miking. The plaintive nature of the saxophone really lends itself to far-off, lonely sounds. Try recording a track in a large room from at least ten feet away. In a smaller room, have performers face a wall with their backs to the mic, and use a good condenser mic to capture every ounce of ambience.

One of my favorite sax tracks was recorded in the bathroom at Guerilla Recording with a Lawson L47MP tube mic positioned in the shower stall and set for omnidirectional pickup. If you attempt to use this technique, just make sure that the showerhead doesn't drip!

You can mix a bit of distant room sound with a conventionally miked horn part to grace your recordings with a distinctive, 100 percent analog re-



FIG. 2: You can attenuate the bristling highs of an alto sax by positioning the diaphragm of the mic partially beneath the lip of the bell.

verb. Another way to deliver a unique, spatial ambience to your horn tracks is through stereo miking, employing either a coincident or spaced pair. Assigning a room mic (or stereo pair, if possible) to a separate channel on a multitrack recorder leaves even more creative options open for mixdown, including heavy compression, unusual EQ, stereo cross-panning, and more-is-more techniques such as adding reverb to the reverb.

SMOKING SECTION

With horn sections and larger ensembles, the engineer's task is further

Boisen's Recommended Mics for Horns

INSTRUMENT	MIC (under \$500)	MIC (over \$500)
Soprano Sax & Clarinet	Oktava 012	Lawson L47MP; Neumann CMV 563; Neumann TLM 193
Tenor Sax	Oktava 219	Lawson L47MP; Neumann TLM 103 or 193; Neumann U 87
Alto Sax	Sennheiser MD 421	Coles 4038; Lawson L47MP; Royer R-121
Baritone Sax	Sennheiser MD 421	Electro-Voice RE20; Neumann M147; Neumann TLM 193; RCA 44BX
Trombone	Sennheiser MD 421	Coles 4038; Electro-Voice RE20; RCA 44BX; Royer R-121; Sennheiser 441
Trumpet	Shure Beta 58	Altec 639b; Coles 4038; Neumann TLM 193

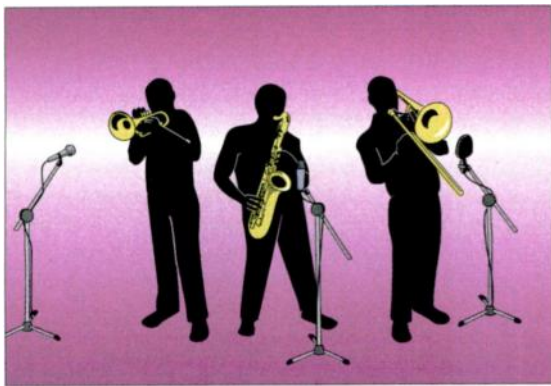


FIG. 3: You can capture the classic R&B horn section—trumpet, tenor sax, and trombone—in a number of ways. Here, three mics are used: a dynamic on the trumpet, a large-diaphragm condenser on the tenor, and a ribbon on the trombone. Try putting the tenor microphone closest and the trumpet mic farthest back.

complicated by the interrelated issues of room sound and instrument blend. These are major considerations that may be of great concern to the producer, composer, conductor, and any others throughout the tracking and mixing phases. If the individual horns are miked too closely or the room is

overly dead, your tracks, though sharply detailed, may prove difficult to blend in the mix. Conversely, if the instruments are too distant sounding—or if the room is overly reverberant, is too small, or has the wrong character for the music—it is often impossible to get adequate definition and control of the horns in the mix without resorting to gating, compression, or radical equalization.

Recording larger groups in a fairly live room is standard practice, and blend is greatly enhanced by the classical recording

practice of clustering two to three players—or an entire section—on one mic, and then augmenting the ensemble sound with carefully placed room mics. Depending on the size and sound of the room, adding some digital reverb in the mix (hall or large-room settings with smooth, non-

sibilant highs) will give the ensemble a lush, polished ambience.

Typical lineups for classic R&B, pop, and reggae horn sections include trumpet, alto or tenor sax, and baritone sax or trombone. For such sections—or any mix of two to three horns—I typically position the players side by side, setting them up in the same configuration that they use onstage (see Fig. 3). In a room with short, controlled reflections, I mic each horn at a distance that will capture some natural reverb and leakage from the other instruments. When mixing, I've found that a spring reverb or small-room and chamber settings in a digital reverb help unify and liven up these small sections nicely. And the inclusion of a room mic (or stereo pair) works wonders for the blend and depth of the horn section, especially when the individual mics are panned across the stereo spectrum.

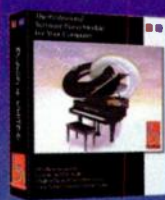
Myles Boisen is a guitarist, producer, composer, and head engineer/instructor at Guerrilla Recording and the Headless Buddha Mastering Lab in Oakland, California. Thanks to Chris Grady and Steve Adams.

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Jeff Kashiwa, Sax/Flute/EWI
Gestalt Access, Bamboo Forest



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Dave Hooper, Drums/Perussion
Rippingtons, Manhattan Transfer, James Ingram,
Hettie Hancock, Chaka Kahn, Sheryl Crow





Phantom Power

Lift the veil on this misunderstood but critical part of most studios.

By Roger Maycock

Condenser microphones have long been the first choice among engineers for many different applications in the recording studio. They tend to exhibit high sensitivity with good pickup characteristics, and their extended frequency response generally provides a crisp, accurate reproduction of the sound source. They also have excellent transient response for accurately reproducing sudden sonic impulses, such as those produced by the human voice, piano, or percussive instruments.

Of course, condenser mics must have a source of electrical power in order to operate. (For more information on condenser microphones, see "Square One: Microphonic Machinations" in the May 1995 issue of *EM*.) Some models are powered by an internal battery, but most condenser microphones receive their power through the mic cable from the input of the device to which they are connected, such as a mixer or mic preamp. This arrangement is called *phantom power*. Unfortunately, the issue of phantom power often confuses musicians and recording engineers, so let's take a closer look at this critical subject.

WHAT IS PHANTOM POWER?

Phantom power, also known as *simplex powering*, is a DC voltage (generally ranging from 11 to 48 volts) that powers a condenser mic's electronics and also provides a polarizing voltage for the capsule. In addition, different mics draw between 1 and 12 milliamps (mA) of current. Under most conditions, phantom power is supplied by a mixer, but it can also be supplied by a separate, dedicated power supply.

Most contemporary condenser mics will work with phantom power voltages from 9 to 54 VDC. These mics include an internal power regulator that makes the mic operate successfully at whatever voltage you give it.

Phantom power requires a balanced



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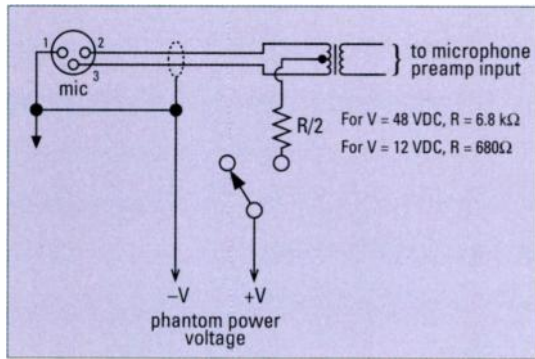


FIG. 1: One of the methods of delivering phantom power is from a transformer-coupled input, which uses a center-tap transformer to deliver equal voltage and current to pins 2 and 3.

connection between the mic and power supply. This connection uses a three-conductor cable with XLR connectors on each end. The DC voltage is applied equally to pins 2 and 3 relative to pin 1, which is at ground potential. For example, if a recording console supplies +48V of phantom power, pins 2 and 3 each carry +48 VDC relative to pin 1. Of course, the microphone cable transmits the audio signal as well as this voltage, hence the name “phantom” power.

Generally speaking, a phantom power supply that gets its juice from a wall outlet is recommended to ensure the optimum performance of any condenser mic. Battery-powered supplies should be considered only when AC power is unavailable, such as in field recording.

TYPES OF PHANTOM POWER

Three common types of phantom power exist. (I will also discuss a less-common type, called T-power, shortly.) The three common types use different voltages: 12, 24, and 48 volts.

The 12- and 24-volt varieties are fairly common in battery-powered portable mixers. Until recently, these mixers suffered from significant limitations because of their power source; many of the earlier models provided only 12 or 18 volts of phantom power and very little current. Battery-powered mixers with 12- and 24-volt phantom power, such as the Shure FP33, are still available.

Studio consoles traditionally provide 48 VDC of phantom power to each individual mic input. Because these consoles are powered from a wall outlet, there is no practical limit to the amount of phantom power they can provide. As a result, many studio-oriented condenser

microphones are designed to operate at 48 volts. In fact, some mics operate *only* at 48 volts with a specified amount of current draw.

Even if a mixer supplies 48 VDC of phantom power per microphone, you still need to pay attention to the current draw. Some consoles are not capable of providing 12 mA of current per microphone across the board. After you connect several mics, the phantom power supply might not be able to provide sufficient current to

each of them—or it might just crash altogether. This rather unpleasant possibility can occur with less-expensive consoles as well as battery-powered mixers, so you need to know the current requirements of each mic you connect to the mixer and the total current available from the mixer.

T-power is also known as A-B power. Unlike traditional phantom power, which puts equal voltage on pins 2 and 3 with respect to ground, T-power systems put a 12-volt potential difference between pins 2 and 3. In some systems, pin 2 is 12 volts above pin 3, and in other systems, pin 3 is 12 volts above pin 2. What’s more, the DC voltage on these pins is called a *floating voltage*, because it’s not referenced to ground. Some equipment, such as Nagra recorders and the Shure mixer mentioned earlier, have switches that select T-power or phantom power, which lets you determine the configuration of the pins.

T-power was invented primarily for use by location film recordists, who frequently need to run long microphone cables. Not too long ago, both T-power configurations were common in the United States and Europe; they were associated primarily with Sennheiser and early Schoeps microphones. However, T-power isn’t used much anymore.

It’s important to know that only T-powered microphones should be used with T-power supplies. Connecting a T-powered mic to a

more conventional phantom power supply is likely to damage the mic, the power supply, or both. Conversely, connecting a microphone intended for use with 48-volt phantom power to a T-power supply will result in similar consequences.

STRANGE BEHAVIOR

Unfortunately, because there are several ways to implement phantom power, some combinations of mic and power supply can behave strangely. Basically, the two methods for delivering phantom power from a microphone input are known as *transformer coupled* and *nontransformer coupled*.

A transformer-coupled microphone input generally uses a *center-tap transformer* and runs the phantom power voltage through a resistor into that transformer (see Fig. 1). This provides equal voltage and current to pins 2 and 3. (A transformer consists of two or more coils of wire wound around a central core of magnetic material. It is typically used to convert voltages from one value to another or match impedances. For more on transformers, see “Square One: Going Direct” in the July 1997 issue of EM.) A non-transformer-coupled input uses resistors that are closely matched to provide equal voltage and current to both pins (see Fig. 2).

Because no real standards exist for implementing phantom power in mixers, it is almost impossible to know what products will work together reliably. Unfortunately, microphone manufacturers do not provide a list of compatible products, so there is no way to know for sure. You simply need to plug in the mic and try it.

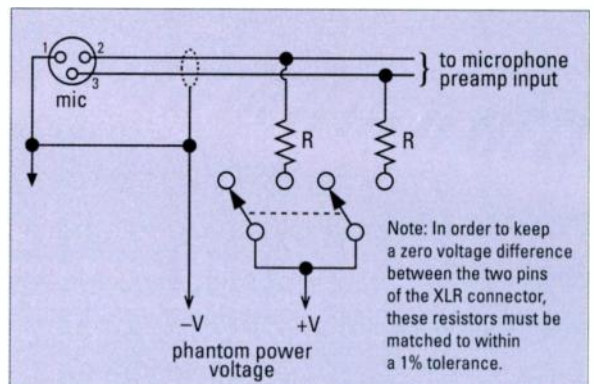


FIG. 2: In a nontransformer-coupled input, a pair of resistors, which must be matched to within 1 percent, delivers equal voltage and current to pins 2 and 3.

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Phantom power is often switched globally across groups of mixer inputs (typically eight channels at a time), so you need to know what might happen if you connect another type of microphone, such as a dynamic mic, to an input that has phantom power applied. In most cases, you will have no problem with a dynamic mic.

Condenser mics with their own power supplies should not be connected to an input with phantom power applied. In addition, you shouldn't connect tube mics to phantom-powered inputs. Tube mics require higher voltages and currents for their electronics and capsule, so they generally use their own external power supplies.



**Most contemporary
condenser mics will
work with phantom
power voltages from
9 to 54 VDC.**

If you attempt to connect a ribbon microphone to a phantom-powered input, things can get ugly very quickly. In such a case, the ribbon acts like a fuse and pops instantly. A ribbon mic should never be connected to a microphone input that has phantom power applied.

PRACTICING SAFE MIKING

It is always a good idea to regularly inspect and maintain all of your mic cables and connectors to ensure good continuity, proper polarity, good solder connections, and clean contacts. Any degradation of any of these elements can adversely affect the audio. If the phantom power going to the microphone is not consistent and clean, the microphone becomes noisy, loses headroom and dynamic range, and even makes crackling and popping noises.

The issue of phantom power can be quite maddening. During my interviews, one common theme emerged: there are no real standards. As a result, it's important to know where the bumps in the road are, which can help you steer clear of trouble. ●

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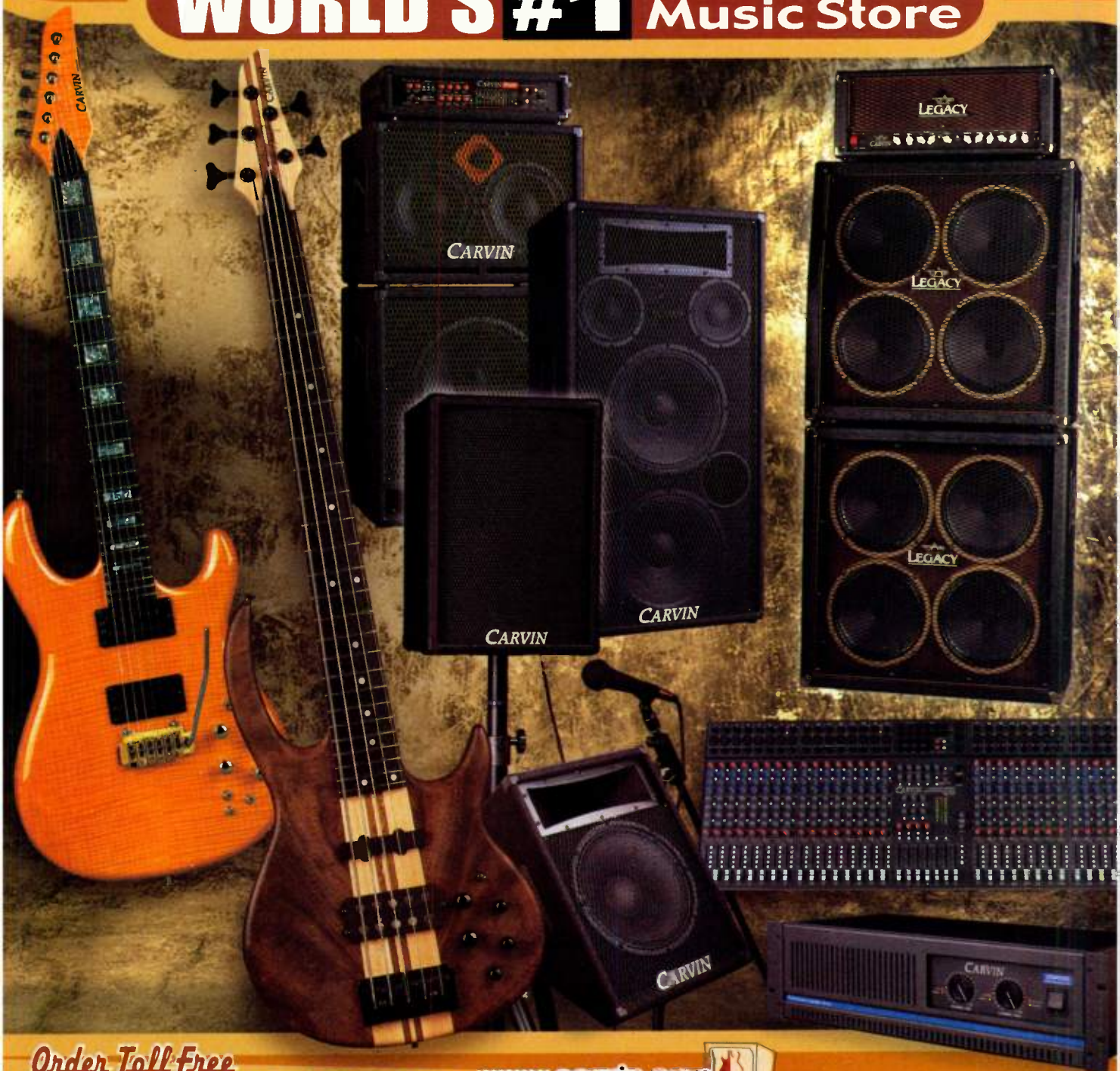
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REVIEWS

K O R G

TRITON

*Korg introduces a
“desert island” synthesizer.*

By Geary Yelton

Korg has always been good about supplying musicians with sounds that are appropriate for today's music, yesterday's music, and tomorrow's music. It is also good about improving the user interface with each new model. Every Korg workstation since the venerable M1 has been superior to previous Korg models in ways both obvious and subtle. Korg's latest offering, the Triton, is perhaps the best example ever of an all-in-one workstation that covers synthesis, sampling, sequencing, and effects processing. Unlike most workstations, it integrates these functions almost seamlessly.

The successor to the Korg Trinity, the Triton offers several improvements over its predecessor. In addition to user sampling, the Triton offers nearly twice as much polyphony, two arpeggiators, an improved sequencer,

a faster touchscreen, and options you can install yourself without voiding the warranty. Add to that four Realtime Control knobs, stereo inputs, and an extra pair of outputs, and you have one serious workstation. Unfortunately, some of the Trinity's options are not yet available on the Triton, including digital I/O and hard disk recording. Like the Trinity and Z1, the Triton is housed in a plastic case that resembles brushed aluminum.

The Triton comes in three varieties.



The Triton continues the evolution of Korg's large LCD touchscreen, and adds user sampling, increased polyphony, and exceptional effects to Korg's workstation paradigm.

116	Korg Triton
128	Mackie Designs HUI
134	Soundscape Mixtreme (Win)
142	Yamaha MD4S
148	Synchro Arts ToolBelt 1.5 (Mac)
156	Steinberg Clean 1.02 (Win)
164	Electrix FilterFactory and WarpFactory
174	Guillemot Maxi Studio ISIS (Win)
182	Quick Picks: Best Service Dance Mega Drums 2; CDP GrainMill 1.1 (Win); Prosoniq/Steinberg Orange Vocoder 1.01 (Mac); Vamtech Drumtrax 3.0 (Mac/Win)

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The basic Triton, which I looked at for this review, costs \$2,850. It's a bargain compared with just about anything else on the market. The 76-key Triton pro is \$525 more, a hefty price to pay for 15 extra keys (\$35 per key). The 88-key Triton proX weighs exactly twice as much as the standard Triton and is nearly half again as long. It's \$625 more than the Triton pro model, but if you need a piano-action, weighted keyboard, it's worth it.

ARCHITECTURE

Just as with other Korg synths, Triton's sounds are divided into banks of Programs and Combinations. A Combination can include up to eight Programs that can be layered, split into zones, or played on different MIDI channels. (See Fig. 1 for a complete diagram of the Triton's architecture.) Programs and Combinations are divided into 16 categories, such as organs or strings, so you can quickly find just the one you need. If you don't like the way the categories are defined, you can rename them and create your own.

There are 640 Programs, 512 Combinations, and 64 drum kits in battery-backed RAM. That's right, I said RAM, not ROM. That means they're all user-programmable. If you don't like the sounds that are here (but you will!), you can ditch them and stuff the mem-

ory full of your own timbral creations. Up to 62 voices can play simultaneously, nearly twice as many as the 32-voice Trinity.

The Triton also sounds better than the Trinity. In fact, it sounds better than most synthesizers. Its timbral palette has all the bread-and-butter sounds like pianos, guitars, brass, synth pads, ethnic instruments, and other emulative sounds, but it also features a wide range of new timbres all its own. The basses are fat and punchy and the drums are clean and distinct. Swirling, evolving textures abound. The overall sound is rich, full, and satisfying. There's even a bank of 256 sounds that support the recent General MIDI Level 2 specification.

In addition to being a great synth that plays sampled sounds, the Triton is also a stereo sampler. In a world of samplers that are delivered with a bare-bones 2 MB of RAM, the Triton comes standard with 16 MB of sampling memory, expandable to 64 MB via 72-pin SIMMs. The sampling rate is 48 kHz, which is better than the standard 44.1 kHz. All 425 multisamples and 413 drum samples in the 32 MB of waveform ROM are also sampled at 48

kHz, giving the Triton a crystal-clear quality.

LAYOUT

The first thing you'll notice about the Triton is its 3.5- x 4.5-inch LCD touchscreen, which is large enough to hold a well-conceived graphical user interface. The Trinity also has a touchscreen interface, but the Triton's responds much more rapidly thanks to its beefed-up computing horsepower and better design. Unlike the Trinity, the Triton has no onscreen sliders. Instead, onscreen buttons specify the function of value-entry devices mounted on the front panel.

The screen looks very much like that of a palmtop computer (see Fig. 2). There are pull-down and pop-up menus, push buttons, checkboxes, and scrollbars. Tabs for selecting various pages within a mode are displayed at the bottom of the screen. As with the Trinity, it's possible to call up an onscreen QWERTY keyboard for typing in names of Programs, sequences, and the like.

A Page Menu button in the upper right corner of the screen pulls down a menu of operations like saving changes, copying parameters, and so on, depending on the current page. Pressing the Menu button to the right of the display opens a screen with as many as ten buttons for jumping to various edit pages.

On the front panel, you can enter data with a value dial, a value slider, increment/decrement buttons, and a numeric keypad. A row of seven buttons selects banks of sounds. Any value-entry device selects Programs or Combinations within these banks. An onscreen button next to the Program name summons a display of all Programs in the current bank, as well as

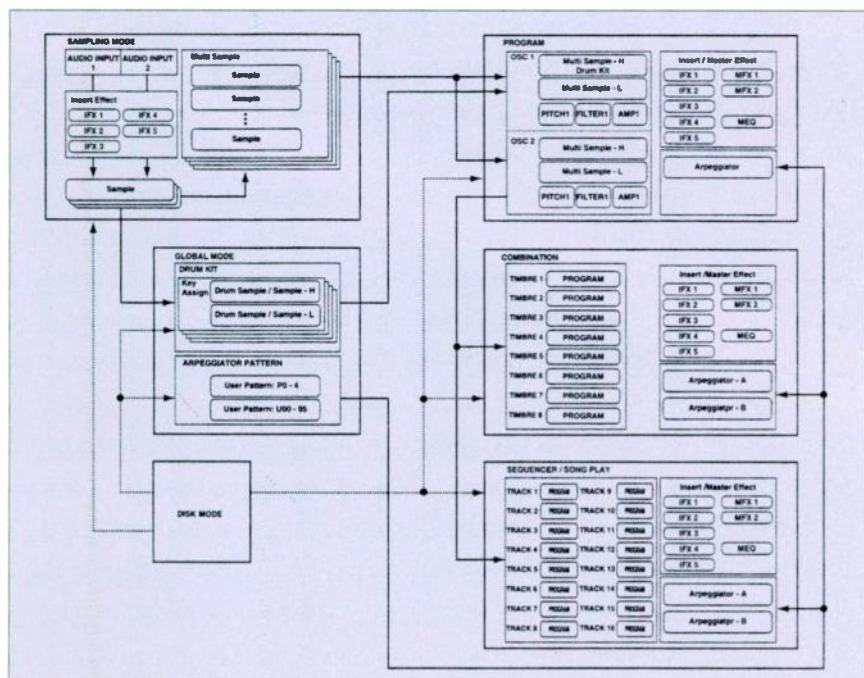


FIG. 1: The Program, Combination, Sequencer, and Sampling modes are tightly integrated and well conceived.

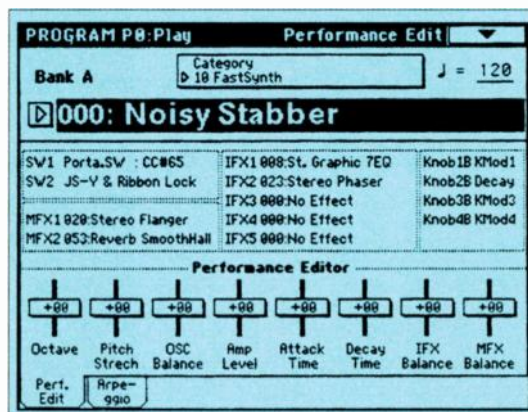


FIG. 2: In Program mode, the Triton's screen provides lots of well-organized information.

tabs for changing banks. A button at the top of the screen calls up a window displaying all the sounds in the current category; tabs on the sides of the screen provide access to other categories.

The four knobs labeled "Realtime Controls" have double functionality, controlled by a switch. In the A position, the knobs control filter cutoff, resonance, envelope depth, and envelope release time. In the B position, they are assignable to any four parameters for the current Program or Combination; they can also be assigned to a modulator that affects several parameters at the same time.

The real-time controls to the left of the keyboard include a ribbon controller, two panel switches, and a joystick. Their functions usually depend on their assignments in the current Program or Combination. The joystick is just like the Trinity's: it isn't so much a joystick as a spring-loaded lever that moves sideways within a barrel that rolls forward and back. Move it left and right for pitch-bend, and forward and back for modulation.

The panel switches are assignable for each Program or Combination. There are 12 possible assignments, including portamento on and off; octave up and down; and locking the value of the joystick, ribbon controller, or Aftertouch. The value of the ribbon controller normally returns to center when you lift your finger, but when switch 2 is assigned to locking it, the ribbon's value remains what it was at the moment of release. For example, if sliding your finger to the left side of the ribbon closes the filter, it remains closed when you lift your finger.

On the back panel are the main stereo outputs and four individual outputs (see Fig. 3). Two audio inputs can be switched to accommodate mic or line input, and a tiny knob beside them lets you adjust the input level. There are the usual MIDI In, Out, and Thru ports, and a jack labeled "To Host" connects the Triton to a computer without the need for MIDI connections. In addition to the sustain-pedal jack, there are jacks for an assignable footswitch and footpedal. The stereo headphone jack is on the front next to the floppy disk drive, where it belongs.

EFFECTS

The Triton features the most powerful effects processor I've seen in a MIDI

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instrument, and it sounds great. Every Program can use up to five insert effects; two stereo master effects; and a stereo, 3-band equalizer that's always available except in Sampling mode (see Fig. 4). Thanks to plenty of processing horsepower, the Triton does this without any loss of polyphony. A mixer page lets you specify all the routings, levels, and pan positions of the effects sends.

There are a total of 102 effects, 13 of which are "double size," which means they require twice as much

processor power as the others. All can be assigned as insert effects, but the double-size ones can't be master effects. Even with this restriction, the Triton offers far more possibilities than many other synths.

The effects are divided into types accessed by seven onscreen tabs. Most are stereo effects. Filter/dynamic effects include amp simulation, limiter, compressor, and random filter. One effect is called "talking modulator," which uses dynamic formant shifting to make an instrument sound as if it's

speaking. Another effect, analog record, simulates the scratches and warps of a dusty vinyl recording.

Pitch/phase-modulation effects include stereo chorus, flanger, phaser, vibrato, and Doppler. Among the modulation/pitch-shift effects are ring modulator, pitch shifter, and rotary speaker. Next are early-reflection/delay effects, which include cross-feedback delay, several multitap delays, and auto reverse. There are six uniformly excellent reverbs, including hall, plates, and rooms.

The mono-mono chain effects are actually two effects in series, paired up like items in a Chinese restaurant menu: one from column A, one from column B. They include parametric 4-band EQ, exciter, overdrive/high-gain distortion, wah, decimator, chorus, and flanger. If you assign mono-mono chain effects to all five insert effects, you actually get ten separate effects.

The double-size effects include a 16-band vocoder, long multitap delays, and a simulation of piano-soundboard resonance. Each double-size effect takes up two insert effects slots, so keep that in mind when assigning effects.

Effects assignments are independent for each Program, Combination, or song. In Combination, Sequencer, or Song Play mode, insert effects are applied to individual Programs or tracks. Some effects parameters can be controlled in real time by internal modulation sources (such

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CONS: No digital I/O, no index to the manuals.

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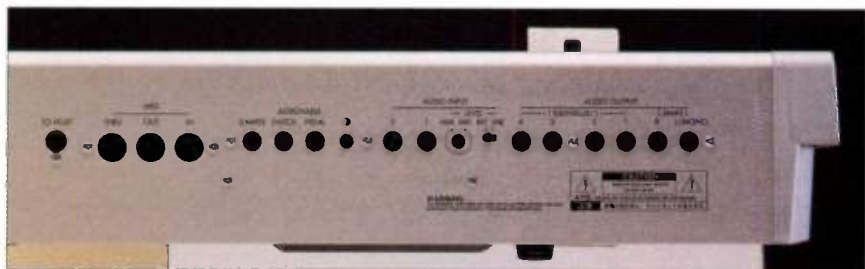


FIG. 3: The Triton's rear panel offers a variety of ports, including two analog audio inputs that can be switched between mic and line level. A SCSI port is optional.

as the joystick, Realtime Control knobs, and control pedal) or externally via MIDI.

There are several things about the Triton's effects that I find exciting. First of all, the Triton can work like a stand-alone effects processor. Plug a couple of microphones or a stereo line into the audio inputs, process the signal as if it were an internal sound, then route it to a pair of individual outputs. You can even process the signal through several different effects and route them separately to all six outputs. If the Triton's voices aren't routed through the same effects, the processed signal is completely

independent. When you're mixing, the Triton can add to your arsenal of effects processors. Very few synths or samplers can do this.

Another cool feature is that the LFOs and delay times can sync to MIDI Clock. With delay-based effects or LFO modulation, the rate can sync to the tempo of the music. If the tempo changes, the modulation rate follows.

SEQUENCING

The 16-track sequencer is more like a computer-based sequencer than any other I've seen, making excellent use of the extra real estate in that large display.

It has a maximum capacity of 200,000 notes, and up to 200 songs can be stored in memory.

Just to get you up and running, the Triton provides template songs in various musical genres. The templates contain the first eight track assignments, effects assignments, programming, and routing, as well as mix and pan settings appropriate to the musical style. You simply start recording tracks based on the combination of instruments within a template. For example, the template song Acid Jazz offers Standard Kit 2, Fretless Bass, Pro-Dyno EP, Funkin' Guitar, Stereo Strings, Percussion BX3, Tsunami Waves, and Espresso Lead. There are 16 preset and 16 user-definable template songs.

A feature new to Korg sequencers is independent track looping. Specified measures in any track can be looped to any length at any point. For example, you can record 16 measures of a bass part and loop measures 9 through 16 four times. You can then loop four measures of the drum part eight times and leave the remaining tracks unlooped.

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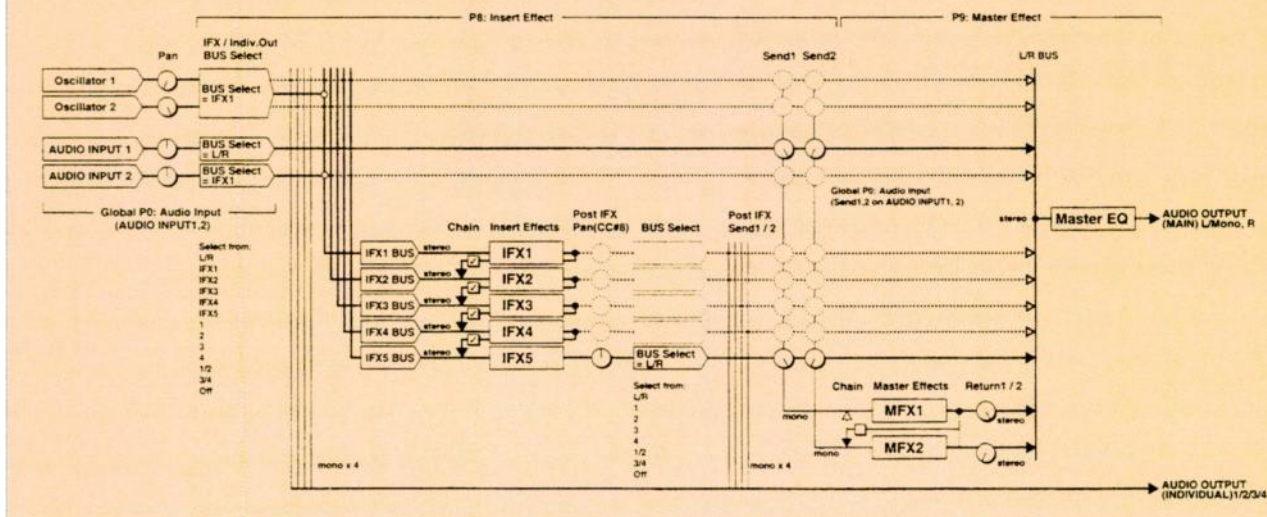
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Effect / Mixer Block Diagram in Program Mode



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FIG. 4: Up to five insert effects and two master effects can be assigned to individual Programs as illustrated here, as well as Combinations and songs.

Another way to use patterns in songs is called *RPPR*, Realtime Pattern Play Record. There are 150 preset patterns and 100 user patterns available for each song. All the preset patterns are drum patterns, ranging in style from pop to hip-hop. You can't edit the presets directly, but you can copy them to user patterns and then edit those. User patterns can be anything you like, from ostinato bass parts to chromatic piano runs.

Creating a user pattern is as simple as recording it, and pattern playback can be triggered by pressing a single key. This is great for improvising techno music in real time the way you can with groove boxes. Like template songs, RPPR is a good technique for getting a quick start on laying down tracks.

Another powerful feature of the Triton's sequencer is the cue list. This lets you specify up to 99 songs to play in succession without breaks between them, and you can store up to 20 cue lists in memory. Working with cue lists is very much like building a song from smaller sequences or chunks. Each song is a step that you can repeat as many times as you like before going on to the next step.

You can use the cue lists to assemble a verse, chorus, bridge, and solo into a song, or create a live-performance set list by specifying a number of complete songs. In addition, you can program a section to repeat until you step on a footswitch to move on to the next section. This feature lets you rearrange

the order of the various sections much more easily than with linear recording.

Once a cue list is complete, the Convert to Song command transforms the sections into a song. This is useful if you want to create backing tracks in sections, then turn them into a song and add solo parts over the entire arrangement.

The great thing about sequencing with the Triton is the manner in which these features all connect as part of the recording process. Begin with a

template song you've created yourself, plug in some of your own RPPR patterns, record some live tracks and loop them to taste, and save your new song as a verse. Repeat the process for other sections and then use the cue list to link them into a complete song. It's almost as easy as it sounds.

POLYPHONIC ARPEGGIATORS

The Triton's programmable arpeggiator section evolved from the Z1 synthesizer. Three dedicated knobs and

Triton Specifications

Audio Inputs	(2) 1/4" TS
Audio Outputs	(6) 1/4" TS
Additional Ports	MIDI In, Out, Thru; computer serial interface; (3) 1/4" TRS footswitch/pedal jacks; 1/4" TRS headphone jack
Polyphony	62 voices
Multitimbral Parts	16
Sound Engine	sample playback
Keyboard	61-note; Velocity- and Channel Pressure-sensitive
Controllers	(4) Realtime Controls; ribbon controller; (2) panel switches; joystick; slider
ROM/User RAM Programs	0/640
ROM/User RAM Combinations	0/512
Removable Storage	floppy disk
Sequencer	16-track; 200,000 notes
Effects	(102); wide variety, including reverb, chorus, flanger, phaser, ring modulator, pitch shifter, rotary speaker, amp simulation, limiter, compressor, vocoder
Dimensions	42.5" (L) x 4.8" (H) x 13.7" (D)
Weight	31.3 lbs.

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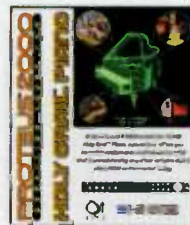
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an arpeggiator on/off switch are located on the right side of the front panel. One knob controls tempo, and the other two control offsets from the programmed gate and Velocity settings. The Gate knob changes the length of each step in a pattern, anywhere between staccato and legato. You can indicate the arpeggiator's scan zone so that playing only within a defined zone on the keyboard triggers a pattern. A flashing LED indicates tempo as it plays, and tempo can sync to MIDI Clock.

There are five preset patterns, and the other 232 are user programmable. Korg has filled up most of the user slots, but you can replace any or all of them. In addition to the usual up and down patterns, these patterns include guitar strums, drum patterns, brass riffs, and bass patterns. Many are classified by style, including trance, bossa nova, heavy rock, jungle boogie, and '70s disco bass. Others have colorful descriptive names like Euro Lights, Vice Squad, Crazy Computer, and Happy Dog.

User patterns are set up in Global mode, then assigned to specific Programs and Combinations. Each Program

has an Arpeggiator page that lets you specify the pattern, tempo, note resolution, number of octaves (one to four), and whether the Sort, Latch, Key Sync, and Keyboard functions are turned on or off.

The Sort function controls whether notes play in an assigned order or the order in which the keys are pressed. If Latch is turned on, a pattern continues running after you take your hands off the keys. Key Sync controls whether a pattern begins at its first step whenever you play a new note or chord. When the Keyboard function is turned on, holding a chord both sustains the notes and triggers an arpeggio. All these parameters are repeated on the Arpeggiator Setup page, which also lets you specify the initial gate, Velocity, and degree of swing.

Each step in an arpeggio plays up to 12 simultaneous notes, with up to 48 steps in a pattern. A Fixed-Note mode makes it easy to create drum patterns with the arpeggiator. As an arpeggio plays, other patterns can be selected without missing a beat. Arpeggios can be recorded into a sequencer track and

are transmitted as MIDI note data.

In Combination, Sequencer, and Song Play modes, you can run two arpeggios at the same time. Velocity cross-switching can alternate between two patterns, or you can play different patterns in different zones of the keyboard or with different Programs in a Combination, like bass and drums.

SAMPLING

The Triton is Korg's first sampler in over a decade and its first 16-bit sampler ever. It records in mono or stereo at a fixed rate of 48 kHz. As many as 1,000 multisamples and 4,000 individual samples can reside in memory. You can sample through the insert effects, but unfortunately, it's impossible to re-sample a signal from the Triton itself. Samples can be quickly recorded in the context of a multisample, then easily converted into a Program at the touch of a button, so they can be immediately used in the sequencer without further editing.

A number of useful sample-editing functions are available. Most, such as truncate, cut, copy, paste, normalize,

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and reverse, are obvious and necessary in any sampler. Other functions, expected in serious samplers, include insert, mix, volume ramp, and rate convert (which down-converts the rate of samples for a lo-fi effect). There's nothing terribly fancy, such as time stretch or resynthesis, but there's always the prospect of new functionality in a future OS upgrade.

One major advantage of such a large display is graphic waveform editing, which lets you view a sampled waveform and zoom in or out on the horizontal and vertical axes. You can visually indicate the start and end points of a region to be edited, and the Use Zero command ensures those points occur on zero crossings only. On some samplers, you can hold down a key and hear the result of your edits as you perform them, but on the Triton you can't hear the results until you re-strike a key.

Also unlike some samplers, you get only one loop per sample. Editing loops on the Triton is very much like editing with a computer-based sample-editing program, except there's no window to

allow you to zoom in on both loop points simultaneously. A loop-tune function lets you correct any pitch problems in the loop. If you know the tempo of a recorded phrase, you can display a grid based on note values, which is very useful if you're working with rhythmic passages like drum loops.

The Triton also plays back samples saved in AIFF, WAV, and Akai S1000 or S3000 formats. All three formats can be imported via SCSI or from floppy disk. This is very good news if you have an old collection of Akai sounds on floppy disks and no Akai sampler to play them. It's no surprise that Program parameters (envelopes, filter settings, and so on) aren't converted, but samples and multisamples are, including the first loop. (Subsequent loops are ignored.) Most samplers that translate foreign sample formats tend to skew the loop points occasionally. On the Akai samples I tried, all the loops came across perfectly.

The Triton has two slots for user-installable SIMMs—either 16 or 32 MB—and comes with one 16 MB SIMM. SIMMs don't have to be in matching

pairs; add another 16 or 32 MB for a total of 32 or 48 MB, respectively. For 64 MB of memory, remove the 16 MB SIMM and install two 32 MB SIMMs. Fully expanded, the Triton provides almost six minutes of stereo sampling time.

OPTIONS

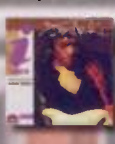
A number of upgrades are available to extend the capabilities of the Triton. These upgrades are designed to be installed by the user; an authorized technician is not required. In addition, all upgrades can be installed simultaneously, so you don't have to choose between them.

Perhaps the most important upgrade is a SCSI port (\$200). SCSI is a necessity if you want to read sample data from CD-ROMs or save your samples to a hard disk. If you don't save them to some kind of disk, they're lost the moment you power down. Without SCSI, the only medium for saving and loading sounds is the floppy drive, and saving 16 MB to floppies is a slow, tedious process. (MIDI Sample Dump and SMIDI are not supported.) SCSI transfers are acceptably fast, averaging less

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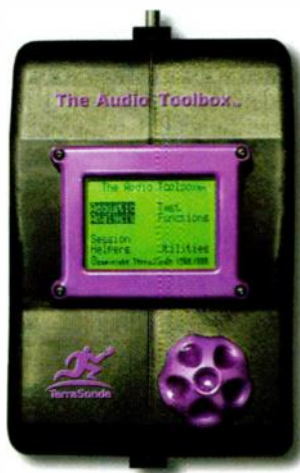
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than three minutes to load 16 MB from a CD-ROM and a little less time to load from a hard disk.

Another option that significantly broadens the Triton's capabilities is the EXB-MOSS DSP synthesizer board (\$600), which adds another six voices. This is the same 13-oscillator sound engine found on Korg's Z1. When the MOSS (Multi-Oscillator Synthesis System) board is installed, another 128 Programs are added in a dedicated bank. This board provides synthesis from scratch rather than from sample playback, including physical modeling, emulative analog synthesis, variable phase modulation, comb-filter modulation, and other techniques.

There are two EXB-PCM boards (\$200 each) that each add 16 MB of multisamples and drum samples to the waveform ROM. Each one also includes 128 Programs and 128 Combinations, which you can load into internal memory. One of the boards is called Pianos/Classic Keyboards, which features a large variety of acoustic and electric pianos, Clavinets, and other vintage instruments, with an emphasis on grand piano and Hammond organ. The other EXB-PCM board, Studio Essentials, has an emphasis on strings, vocal ensembles, and sounds that didn't fit in with the Triton's main waveform ROM.

ALL YOU'LL NEED

I call the Triton a "desert island" synthesizer because if I were stranded in a remote studio with only one MIDI instrument, this is the one I would want. Its beautiful Programs, pristine waveform ROM, full-function user sampling, flexible multi-effects processing, and touchscreen interface are only the beginning.

Strictly as a synthesizer, the Triton continues the Korg tradition of providing timbres that are both inspiring and useful. In addition, there's a flow to the process of sequencing music on the Triton that actually enhances the creative process. Of course, this has been the goal of music workstations from the beginning, but I've never seen it realized in any instrument until now. The Triton has my highest recommendation. Sell all your other synths and get this one.

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HUI (HUMAN USER INTERFACE)

A powerful Pro Tools and MIDI control surface for a moderate price.

By Peter Freeman

Probably the biggest disadvantage of Digidesign's Pro Tools and similar computer-based digital audio workstations is that they lack the hands-on physical controls of a conventional mixing desk. Various manufacturers have attempted to address this problem by coming up with inexpensive, largely generic hardware fader packs, but these generally have serious drawbacks. To begin with, most, if not all, use standard 7-bit MIDI-controller resolution, making them unsuitable for fine adjustments. Also, they usually lack the ability to address product-specific features other than simple level changes.

At the other end of the price spectrum, Digidesign offers one option for Pro Tools users: Pro Control. It has pretty much everything you need for powerful control of a Pro Tools system, but its price tag of roughly \$12,000 puts it out of most users' reach.

Mackie Designs' Human User Interface, or HUI, provides a middle ground. Similar in concept to Pro Control, it provides many of the same functions (with certain important exceptions) at approximately one-fourth the cost. A MIDI-based control surface, HUI provides simultaneous real-time control over eight channels of Pro Tools' mixer, eliminating a lot of mousing.

If you are thinking about using the HUI as a general-purpose MIDI controller, however, forget it. The HUI sends combinations of MIDI controllers designed specifically for Pro Tools, and its higher resolution will not translate into better response in a sequencer or other MIDI product that uses 7-bit messages. For practical purposes, this is strictly a Pro Tools controller.

BASIC DESIGN

The HUI has eight "channel strips," each of which has a touch-sensitive, moving fader; Auto, Solo, and Mute keys; a V-Pot (a programmable soft knob that can perform whatever function you assign it); and Rec/Ready, Insert, and Select switches (see Fig. 1). Dedicated sections of keys access various Pro Tools windows, Mac keyboard shortcuts, Pro Tools automation functions, and a set of transport controls that mimic Pro Tools' transport window. In short, pretty much all the functions you're likely to need while working in Pro Tools are covered by dedicated keys on the HUI.

Other interface features include four V-Pots for automating TDM plug-in parameters, a locate/numerics keypad for number entry, LED channel "meters" and global time-code displays, and a status/parameter LCD. A prominent Scrub/Shuttle wheel and an onboard talkback section complete the main controls.

A built-in mixer allows you to set a control-room monitor mix. To this end, the rear panel has three stereo pairs of audio monitor inputs and outputs, two mic inputs with preamps, two inserts, and stereo main ins and outs (see Fig. 2).

MIDI In, Out, and Thru are also located on the rear panel. A pair of 1/4-inch Relay outputs let you toggle electrical switches, allowing you to control solo lights, recording lights, and so on. ADB ports let you extend the distance between your computer CPU and the keyboard and mouse, but they do not offer control over the HUI. You get a switchable RS-232/422 port for connection to a DAW, and a similar 9-pin expansion jack for accommodating as-yet-unspecified external control devices.

GETTING STARTED

Setting up the HUI is impressively simple. All that's required is a computer with a correctly installed Pro Tools system (version 4.1 or higher) and a MIDI interface. I connected the HUI MIDI In and Out ports to my MIDI interface, defined the HUI in Pro Tools' Peripherals dialog box, and the HUI sprang to life, the faders moving to the positions of the first eight channels in my open Pro Tools session.

The HUI's Scribble Strips (the four-character, green LCDs above each fader) also came on, showing abbreviations of the channel names. The four-character limit on names quickly became annoying, as my tracks needed longer descriptions than "kik," "snr," or "hat." For instance, what if a track is called "filtered echo melody bits" or "Lo Chorus Harm Vox Dbl"? Shortening these to "FEMB" or "LCVD" doesn't help much, especially when you're dealing with a large session.

Assuming you are familiar with Pro Tools, getting started mixing with the HUI is mainly a matter of learning which HUI controls access the various Pro Tools functions. The rest is easy.

Since the HUI has only eight channel faders, you will need to switch banks when you have a session with more



Mackie Designs' attractively styled Human User Interface, or HUI, offers a wealth of Pro Tools-specific control features. What's more, it has audio I/O and a handy 3-channel (stereo) monitor mixer.

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FIG. 1: The HUI channel strip includes many common features. But the Pan/Send knob is actually a V-Pot, a programmable control that lets you set Pro Tools I/O assignments and send destinations. You set its function with the V-Sel switch. The Insert switch calls up inserts for editing and aids in accessing Pro Tools plug-ins. The Scribble Strip (above the channel-select button) lets you label channels, but only with four characters.

than eight channels. Using the left and right Bank Switch keys, you can scroll through banks of eight channels in your current Pro Tools session; this scrolls through the Pro Tools Mix window display at the same time. The theory is that most people won't need to manipulate more than eight faders at any given moment, so why add costly additional hardware faders when you can use the same eight and switch banks? Digidesign's Pro Control also is designed around that principle, and—although I think a minimum of 16 faders would make the HUI a lot more viable as a real mixer—it does have some validity. After all, these products are already costly, and besides, HUI isn't designed to emulate an entire mixing console.

I had no problems with the functioning of the faders. They are smooth and have capacitance-sensitive caps, a feature usually found only in high-end automation systems such as Flying Faders. You start writing channel automation by simply touching the fader cap. The fader travel length (100 mm) is comparable to that of many audio mixers, and it's adequate for use in Pro Tools.

USEFUL CONTROLS

I appreciated the inclusion of a Save button, which performs the standard Mac File-menu Save command when pushed twice. It's very convenient. I also like the Shift key, which turns the main faders into effects-send controls, making it much easier to automate the sends. The Scrub/Shuttle wheel also came in handy, easily beating out the mouse in the ergonomics sweepstakes. The same goes for the Edit Mode toggle key, which

switches between Pro Tools editing tools, and the Mode switch/arrow keys, which allow either scrolling around the Edit window onscreen or zooming in and out.

Among the more useful controllers are the V-Pots, assignable "soft knobs" (encoders) that emulate the action of real knobs but can perform whatever function you assign them. With the channel-strip V-Pots, these functions include panning and effects-send levels. As you would think, plug-in automation V-Pots control assignable plug-in parameters.

A nice feature of these controls (as well as of the HUI's keys) is the ability to engage a soft "clicking" sound generated by the HUI when they are adjusted, letting you know you did something. This function can be disabled, but I found that it made HUI's overall interface feel more solid.

ERGONOMICS

On a device that contains this many dedicated function keys, good layout and easy accessibility to frequently used functions are critically important. Therefore, it's hard to see why Mackie decided to place the bank-switching

keys up in the middle left section of the unit, where they require a deliberate effort to get to them, instead of at the lower left or right corner, where they could be accessed by touch and without having to reach across the HUI.

Another example of problematic layout is the placement of Mute and Solo keys for each channel. Rather than residing directly above the tops of the faders, where they are found on most consoles, they are above the Scribble Strips, which is nonintuitive. A better idea might have been to place the Select keys (which are not that frequently used) below the faders, where they would also be more visible, and put Mute and Solo where most people expect them to be. Similarly, most of the automation control keys are in the upper right half of the unit, instead of down next to the faders where they'd be convenient and expected.

The audio inputs and outputs provide a convenient control-room mix with three stereo inputs, three stereo outputs, and a headphone out. Although the audio ports are of good quality, monitor mixing is not the main point of the HUI. So one would think the controls for the audio section would be placed out of the way of the main automation and control functions. Instead, the less-important controls

HUI Specifications

Audio Inputs	(2) XLR mic for talent; (1) XLR talkback mic; (6) 1/4" TRS balanced monitor (config. as 3 L/R pr.)
Audio Outputs	(2) 1/4" TRS balanced L/R mix; (6) 1/4" TRS balanced monitor (config. as 3 L/R pr.); (1) 1/4" stereo headphone
Control Ports	(2 pr.) Apple Desktop Bus extension; MIDI In, Out, and Thru; (2) 1/4" TS footswitch in; (2) 1/4" TS Relay Out; (1) 9-pin serial RS-232/422, switchable; (1) 9-pin serial Expansion; (1) 1/4" TS Trigger Out
Channel Faders	(8) 100 mm, motorized
Frequency Response	20 Hz–60 kHz (±1 dB) 10 Hz–100 kHz (±3 dB)
Signal-to-Noise Ratio	>92 dB
Equivalent Input Noise	–129.5 dBm, mic preamp 20 Hz–20 kHz
Channel Crosstalk (L/R inputs 1–3)	<80 dB @ 10 kHz (unity gain)
Maximum Levels	22 dBu, all inputs and unbalanced outputs; 28 dBu, balanced outputs
Special Features	(1) internal talkback mic, switchable, w/level control; (1) jog/shuttle wheel, onboard 8-ch. meter bridge
Power Supply	internal, 60W, 120 VAC, w/IEC jack and power switch
Weight	37 lbs.
Dimensions	20.6" (W) x 6.5" (H) x 22.5" (D, R side) and 20.75" (D, L side)

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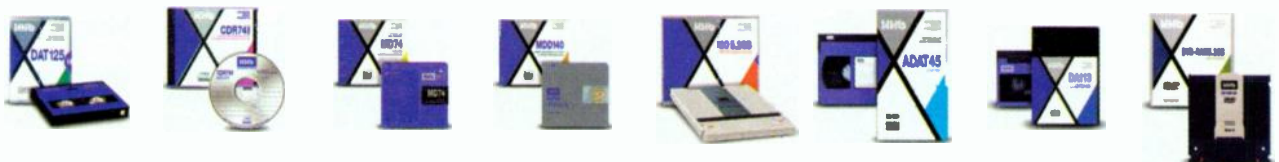
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FIG. 2: In addition to its numerous audio inputs and outputs, the HUI is laden with control ports. Along with its MIDI ports, it has Relay outputs for toggling electrical switches, and ADB extension ports so you can keep your Mac keyboard near the Mackie control surface. Another 9-pin jack is supplied for future external control devices. The RS-232/422 port is provided for connecting to a digital audio workstation, but many DAWs are not compatible with it.

governing the HUI's audio inputs are easily reached at the right center of the panel, while the plug-in automation V-Pots are at the extreme upper right, making them a pain to use.

SLOW HAND

The HUI relies on MIDI continuous controllers to transmit its commands to Pro Tools. But reliance on MIDI presents problems because MIDI is an almost laughably slow serial interface,

but if you start doing moves involving most of the HUI's faders simultaneously, you will definitely notice that the onscreen faders in the Pro Tools Mix window aren't precisely keeping pace with your HUI's fader moves.

The degree to which this is a drawback depends entirely on the type of work you do. If you are using HUI for moves involving one or two faders at a time, it's not an issue. If, however, you expect HUI to leap to attention like an

fundamentally unchanged since the original version 1.0 specification.

What does this mean in real life? Basically, it means that there's going to be lag, folks, and the more automation involved, the more this will be apparent. This lag is not normally a problem for sessions with light- to medium-density automation,

SSL or Flying Faders system, you're likely to be disappointed.

The HUI's reliance on MIDI is a more obvious problem where the metering is concerned. Continuous controllers are also used for transmitting channel-level meter data back to HUI for display, and the meter response is coarse, "chunky," and at times borderline unusable. I sincerely wish another solution had been chosen for this task, since precise metering is quite important if one is to rely on the HUI and not have to look at Pro Tools' onscreen meters.

According to Mackie, when the HUI is used with more modern (faster than 1 MHz) interfaces, it can take advantage of the extra speed and handle the metering data faster. However, after initially testing the unit using an old 1 MHz Opcode Studio 3, I switched to a faster Studio 4, and in my judgment, the improvement was insignificant.

I wish Mackie had used a high-speed ethernet interface instead of, or in addition to, MIDI. Digidesign chose ethernet for Pro Control, and it is far better equipped to rapidly transfer large amounts of data. The HUI has

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PROS: Addresses most important Pro Tools functions. Touch-sensitive fader caps. Cost-effective, especially for Pro Tools. Audio ins and outs. Variety of control ports.
CONS: MIDI control is too slow, especially for meters, which are barely adequate. Control layout needs improvement. Track naming limited by four-character Scribble Strips.

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an RS-232/422 control port, but that interface is not compatible with products most HUI users would have. In contrast, ethernet is available for (or comes as standard stock with) most Macs and PCs, and ethernet gear is easily cabled and networked.

HUI AND YOU AND I

There is no comparison between using HUI and using a mouse or even a generic fader box for doing automation in Pro Tools. Initially, I thought I'd be able to use HUI to free myself entirely from looking at the Mac screen during mixing, but perhaps that wasn't realistic. After a while, I relied on the HUI mostly for moves that would have been awkward or impossible with the mouse, and for these it was extremely useful. The unit never crashed or displayed weirdness. I can't excuse the control layout, though.

As much as I'd like to have more faders, flawless high-speed response, and real metering, this unit represents the best and most comprehensive control surface solution that's even vaguely affordable. Ultimately, if you are a Pro Tools user and are sick of struggling with the mouse when you mix, chances are excellent that the HUI will do the trick in almost any Pro Tools session.

Peter Freeman is a freelance bassist, synthesist, and composer living in New York City.

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MIXTREME (WIN)

Plenty of DSP power along with a versatile onscreen mixer.

By Brian Smithers

Are you a DSP junkie who's always trying to squeeze just a bit more processing power out of your computer? Well, Soundscape's Mixtreme multichannel audio card may be the solution you're looking for. Mixtreme combines up to 16 channels of digital audio I/O with a Motorola 56301 processor that runs a user-configurable 16-bus mixer. The software offers one or more 2-band parametric EQs per channel and support for proprietary Soundscape plug-ins. Mixtreme's mixer and its family of plug-ins are actually borrowed from Soundscape's SSHDR-1 hard disk recording system, which has a well-established reputation for quality. In fact, the Mixtreme card can be used with the SSHDR-1 for added I/O and DSP power.

Mixtreme's onboard audio I/O consists of two 8-channel digital TDIF ports along with word-clock/Super-clock In and Out. For anyone with a TDIF-compatible digital mixer or

MDM, Mixtreme is a great value right out of the box. For other users, Soundscape offers a variety of interfaces to suit many needs. The optional hardware ranges from a simple S/PDIF daughter-board to the high-end SS8IO-1 with balanced-analog and ADAT Lightpipe I/O.

MIXING IT UP

The heart of Mixtreme is its software mixer. It runs entirely on the Motorola processor to prevent any strain on the host computer's CPU. Because of this, the mixer is quite responsive, and changing settings while recording or mixing doesn't bog down your system. The mixer is also completely configurable, so you can have only what you need onscreen, thereby reducing screen clutter and DSP consumption. Of course, it's unlikely that you'll run out of processing power any time soon. The hardware provides enough juice for almost any combination and number of mixer controls you might want, although the effects plug-ins can eat up processing capacity.

For this review, I tested version 1.05 of the Mixtreme software. By press time, Soundscape had released version 1.06, which incorporates surround mixing and panning to support the Dolby Surround Encoder/Decoder plug-in.

Soundscape's buzzword for Mixtreme is *low latency*, in part because the system's DSP-based mixer nearly eliminates record-monitoring latency—even when using effects. Furthermore, Soundscape has included ASIO 2.0 and

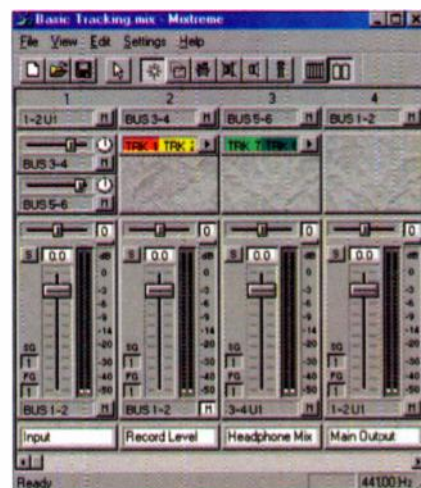
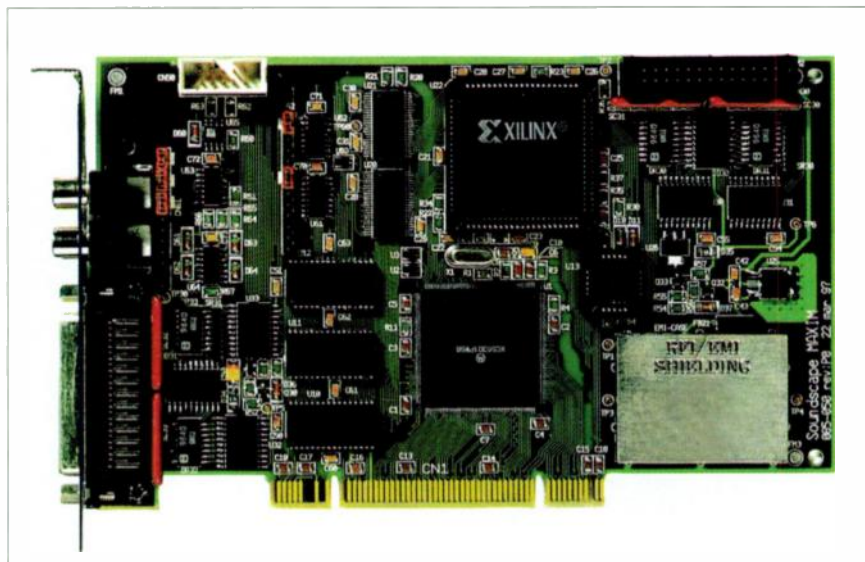


FIG. 1: Shown here is a basic tracking setup in Mixtreme's mixer. The incoming audio from inputs 1 and 2 is split to two separate buses for independent control of the recording level and headphone mix.

GigaSampler drivers (in addition to the standard multimedia drivers), for which it claims extremely low latency with the appropriate applications. It's worth noting that these are all multi-client drivers, making Mixtreme's resources available simultaneously to multiple applications. For example, you can run a sequencer such as Steinberg *Cubase VST* or Emagic *Logic Audio* while generating sounds from a software synth such as NemeSys *GigaSampler* or Seer Systems *Reality*.

Mixtreme's mixer is a blank slate on which you can map just about any sort of routing arrangement you can imagine. A handy toolbar provides one-click access to all of the important commands, such as creating, moving, and deleting channel strips, aux sends, faders, and meters, or assigning inputs and outputs to various elements. By clicking on an additional tool button you can change the mouse mode from Edit to Control. At first, I wished I could right-click to edit and left-click to control, but Soundscape has implemented right-clicking in a different but quite useful way, as you'll see. Instead, each of the tool buttons has a hotkey equivalent.

Soundscape has done a nice job of designing an efficient mixing interface, squeezing a lot of information into a small space while providing enough room for precise control of all parameters. Moreover, Mixtreme makes good use of a mouse's five basic functions. Drag a fader in the normal



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way, and it moves as you'd expect; right-click and drag a fader, and all faders in its fader group move with it. Similarly, you left-click a solo button to solo that channel, and right-click to solo all channels in the same solo group. The mixer provides up to 99 solo groups and 99 fader groups, which you assign by clicking in the small boxes labeled SG and FG, respectively. As is the case with most of Mixtreme's value boxes, right-clicking a group assignment box increments the value, left-clicking de-

crements the value, and double-clicking opens a dialog box into which you can type the group number.

Double-clicking on any effect opens its edit window, double-clicking on a mixer element opens a dialog box (when one is appropriate, as in pre- or postfader selection for a send), and the Pan control even provides a tiny "center" button. If you must mix with a mouse, this is a pretty good way to do it.

My only big complaint with the interface is its lack of Copy and Undo functions. Once you have a channel

strip set up the way you want, it would be great if you could generate seven more just like it by pressing Control-C and Control-V a few times. Instead, you have to create all seven copies from scratch. Even more annoying is the inability to undo actions. The Create tool has a hair trigger, and I found myself selecting the wrong thing more often than I care to admit. In the long run, you'll probably end up creating a handful of standard configurations that you'll use repeatedly with only minor edits, so you'll miss these functions only at first. Still, you may miss them a lot.

GO CONFIGURE

To see just how configurable Mixtreme's mixer is, let's look at a couple of examples. Fig. 1 shows my setup for basic tracking of solo parts. I separated the input into two different channel strips so I could control the input level separately from the monitor level. Channel 1 has two prefader aux sends: one sets the level of the incoming audio going to bus 5-6 for the headphone mix, and the other sets the level of incoming audio going to my digital audio sequencer via bus 3-4. Channel 1's main fader controls the level going to bus 1-2 for the control room mix. Channel 2 is the destination of the record-level send and contains just a Track module corresponding to the input I've selected in my sequencer. Channel 3 mixes the output track from my sequencer with the live audio, then sends it to physical outputs 3 and 4 for the headphone mix.

Granted, it's a pretty rudimentary arrangement, but it took only a few minutes to create it from scratch, and it represents a big improvement over the control that many sound cards provide. I've already thought of improvements I could make to this setup, and that's really the point: the mixer is what you make of it, no more, no less.

Fig. 2 shows a much more elaborate setup. To test Mixtreme's limits, I decided to entertain the classic engineer's nightmare of a finicky four-piece horn section with each player wanting



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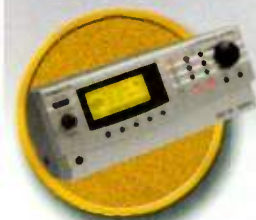
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more of himself or herself in the headphones. The classic technique for this "more me" scenario involves patience, diplomacy, and occasionally firearms, but Mixtreme can indeed provide an alternative. In channels 5 through 8, I've set up four stereo buses, one for each player's headphone mix. The input channels, 1 through 4, each have five prefader aux sends. Notice that the level of the lead trumpet's send to his or her own headphone bus (bus 1-2) is centered and maxed out, while the level of the send to everyone else's headphone buses is panned off-center at a more moderate level. Each player's input strip is set up the same way, putting them dead center and way above the din in their own personal mix.

As convoluted as this setup seems, it didn't even begin to tax Mixtreme's available DSP. I remembered that most players don't want to hear themselves dry in their headphones, so I added some reverb to fill out the sound. This entailed adding one more bus (bus 9-10), with a send from each input channel. I inserted Wave Mechanics *Reverb* into the reverb-only bus and set its output to 100 percent wet. Then I set up sends to each individual headphone mix, so I could give the players as much or as little of the reverb as each wanted. After all this, I was still using only 70 percent of Mixtreme's DSP capacity and 80 percent of its memory.

EFFECTIVE MIXING

I had the opportunity to check out some of the effects written for Mixtreme's DSP. While none of the plug-ins are included with the basic Mixtreme package,

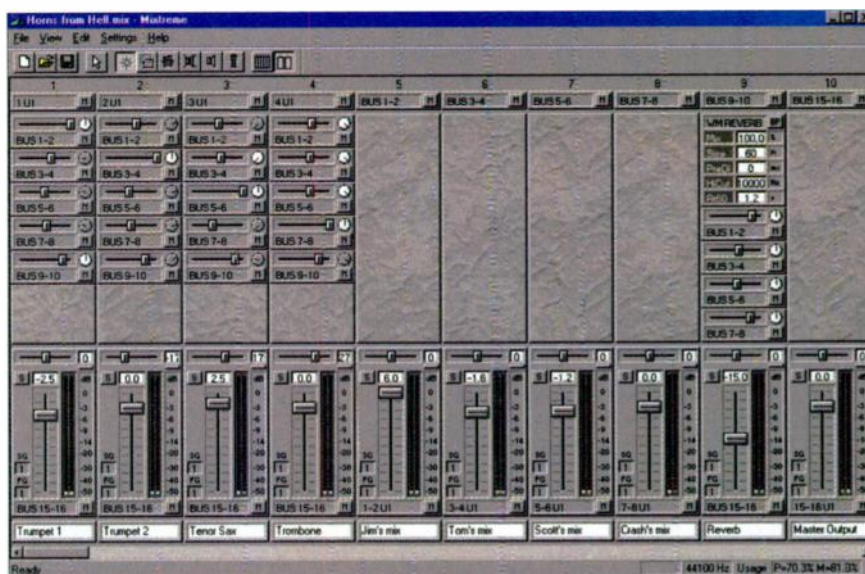


FIG. 2: The ultimate "more me" headphone mix takes advantage of Mixtreme's 16-bus, 16-output architecture. This is just one way in which the flexible mixer architecture can be used creatively.

it's important to consider them as part of the whole system. Few users will be content to let all that excess processing power sit idle.

Overall, the effects are excellent, although some of them can eat up a lot of Mixtreme's available resources. The Wave Mechanics *Reverb*, for example, required about 43 percent of the DSP's processing power and 32 percent of its memory. In most mixer setups you'll have the resources available to run one copy of this effect, but running two would leave room for little else. To keep this in perspective, though, ask yourself how many top-quality hardware reverbs you could buy for the same money and how many spare aux buses you have available for them on your console. Besides, if you really need

one more reverb, you can easily set up Mixtreme with an aux send/return to an external effect.

What do you get for that 43 percent? Quite a bit, I'd say. *Reverb* was written for the SSHDR-1, and it's a well-developed plug-in with plenty of power and control. You can vary the decay time of high and low frequencies relative to the middle band, and you can even control the crossover frequencies. It sounds great and includes a good variety of presets.

Soundscape's *Audio Toolbox* provides a useful set of common effects, including a chorus/flanger, a two-tap delay, and a dynamics processor. Their DSP needs are modest—all under 10 percent, with the exception of a long (up to 1,088 ms) delay, which requires more than 75 percent of Mixtreme's memory. The interfaces for the three devices are simple but functional.

Two effects plug-ins from TC Works are also available for Mixtreme. *TC Reverb* is everything you'd expect from TC Works; it lets you choose room shape and size and control decay across three frequency ranges. *TC Reverb* eats up only 29 percent of Mixtreme's processing power but consumes 52 percent of its memory, so you can't use more than one instance of it. *TC Dynamizer* is a 3-band dynamics processor based on TC Electronic's Finalizer. This is the sort of processor that you're most likely to use after mixing to a stereo output file, so its power needs are less consequential. However,

Optional Interfaces

S/PDIF Daughterboard	(1) stereo coaxial S/PDIF I/O	\$149
SS8IO-1	20-bit A/D/A converters; (8) balanced XLR I/O; (1) 8-channel ADAT Lightpipe I/O; word-clock/Super-clock I/O via RCA connectors	\$1,499
SS8IO-2	(1) 8-channel ADAT Lightpipe I/O; word- clock/Super-clock I/O via RCA connectors	\$199
SS8IO-3	20-bit A/D/A converters; (8) unbalanced RCA I/O; word-clock/Super-clock I/O via RCA connectors	\$449
iBox 8-XLR/24	24-bit A/D/A converters; (8) balanced XLR I/O; (1) 8-channel ADAT Lightpipe I/O; word- clock/Super-clock I/O via RCA connectors	\$1,999
iBox 2-Line	20-bit A/D/A converters; (2) unbalanced RCA I/O	\$199

because it uses 40 percent of Mixtreme's processing and 31 percent of its memory, you might be able to squeeze it into your mixer's master output bus if you really want to.

INS AND OUTS

Mixtreme comes with no analog I/O, so if you don't have a TDIF-compatible device (such as a digital mixer or Tascam DA-series MDM) to use as a front end, you'll need one of Soundscape's optional interfaces. The most basic of these is the S/PDIF daughterboard, which uses the RCA connectors that would otherwise provide word clock or Superclock I/O to Mixtreme. Of course, this still doesn't get you all the way to analog—you'll need an S/PDIF-compatible external D/A converter, as well.

The SS8IO-3 provides a direct route to and from the analog domain, with eight channels of 20-bit I/O on RCA connectors. This half-rackspace unit attaches to one of Mixtreme's two TDIF



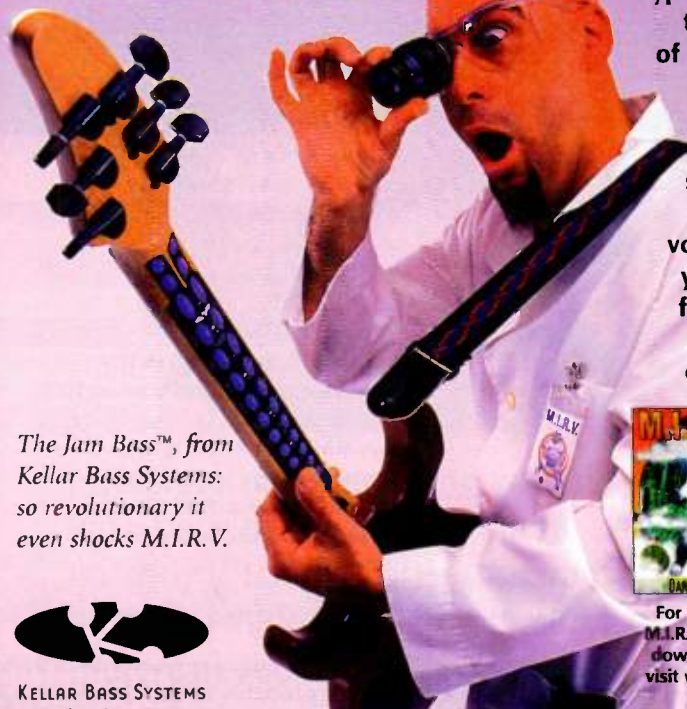
It's unlikely that you'll run out of processing power any time soon.

ports by a 6-foot ribbon cable, which provides a reasonable amount of placement flexibility. The front panel features two-segment LEDs for each channel, indicating levels of -30 dB and -3 dB. The front panel also provides selectors for sample rate and clock speed. (A 2-channel version of the SS8IO-3, called the iBox 2-Line, was released too late for this review.)

The SS8IO-2 comes in a nearly identical unit but offers eight channels of ADAT Lightpipe I/O. Like its sibling, it has sample-rate and clock selectors on the front panel. Soundscape has designed the unit to pass the full 24 bits that Lightpipe supports, even though current ADATs are only 20-bit devices.

If you have more industrial-strength needs and your budget is sufficient, the SS8IO-1 is the way to go. Its eight channels of analog I/O are provided

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Move to the next level with this MiniDisc multitrack recorder/mixer.

By John Ferenzik

If you're looking to make the leap to digital recording but are reluctant to give up the familiarity, affordability, and ease of your portable 4-track cassette machine, check out Yamaha's MD4S 4-track digital recorder. While keeping the portable studio model intact, the MD4S utilizes the nonlinear MD Data audio format, giving the user many of the same editing features found on computer-based hard disk systems that cost much more. Due to the limitations of the format (which employs Sony's ATRAC data-compression scheme), the fidelity is not quite CD quality, yet it's still considerably better than what you get with a 4-track cassette recorder. (For more information about ATRAC, as well as a discussion of the Yamaha MD4, see "Mad for the Mini!" in the July 1997 issue of *EM*.)

Although the MD4S will accept either conventional MiniDiscs or MD Data discs, you must use the latter to take advantage of the unit's 4-track recording and playback capability. Both

types of disc yield 74 minutes of stereo recording time, or a whopping 148 minutes in mono. In 4-track mode, each MD Data disc provides 37 minutes of recording time.

LILLIPUTIAN LAYOUT

Being a recorder and mixer that measures only about 16 inches in width, the MD4S must, by necessity, contain a large number of controls in a relatively small space. Nevertheless, Yamaha has designed the unit so that it's comfortable to use and doesn't feel cramped. The MD4S is split into two sections, with the mixer on the left and the recorder on the right. Conveniently, the jack field containing all of the inputs (where you'll be doing most of your patching) is located on the top of the unit, and the outputs are on the back.

In addition to the standard transport controls, a large jog/shuttle wheel lets you cue and review at a variety of speeds up to 32 times faster than normal. You can also set the MD4S to play at half speed, which is helpful for transcribing or learning riffs.

Another area in which the MD4S surpasses its analog cousins is the metering section. In addition to channel levels, the large, viewer-friendly, multifunction backlit display also shows the master L/R level, a variety of status messages, and a counter that can be configured to show elapsed time, total time, or remaining time in minutes/seconds/frames. (When the unit is transmitting MIDI clock, the display reads in measures/beats/clocks.)

MIX AND MATCH

The MD4S has an 8-channel analog mixer, with the first four channels hard-wired to tracks 1 through 4 on the recorder. Each channel provides a gain pot, a flip switch that toggles between mic/line input and playback, cue-pan and cue-level knobs (used for bringing in external sounds during mixdown), 3-band EQ, an aux control, a pan knob, and a volume fader.

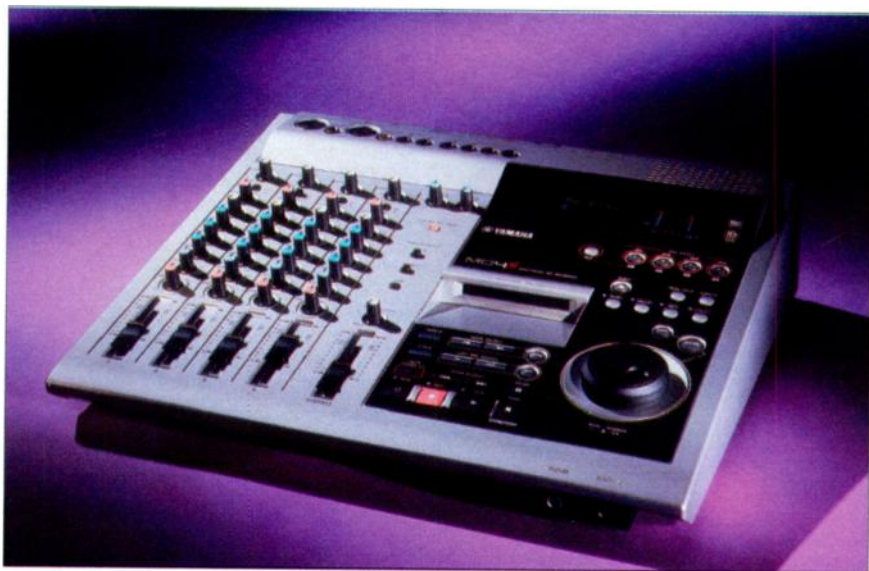
The aux control, designed to be used as an effects send, is always postfader. A single knob routes the channel signal to either the aux 1 or aux 2 send: turning the knob counterclockwise gets the signal to aux send 1; turning it clockwise gets the signal to aux send 2; and at the 12 o'clock detent, no signal is sent to either aux output. Disappointingly, because both aux sends are combined on a single knob, you cannot add more than one effect at a time on a given channel. However, you can patch in additional effects via insert points on channels 1 and 2.

The mixer also sports two stripped-down stereo channels (5/6 and 7/8), which provide only one gain knob for each pair of inputs. The signals in the stereo channels are both routed to the stereo bus, so these channels are ideal as stereo returns from external effects on mixdown, for returning sequenced tracks, or for cascading signals from an external mixer. (Using MIDI Time Code, you can sync up another MD4S and cascade the stereo out from the second deck through one of the stereo channels—in effect creating an 8-track setup.)

In the monitor/master section, there is one master stereo fader and a monitor-level output knob. A separate cue-mix switch controls routing of the cue signal to the stereo bus. Switches labeled 2Tr In, Stereo, and Cue determine which of those signals will be sent to the monitor outputs and headphones.

In general, the mixer is laid out in a sensible, easy-to-grasp fashion. However, the various knobs have a less-than-rugged, "consumer grade" feel.

Another shortcoming is the EQ section. The three boost/cut knobs control low and high shelving filters (positioned at 100 Hz and 10 kHz, respectively) and a mid-frequency filter fixed at 2.5 kHz. Although functional (not to mention typical of what you find on 4-track cassette recorders), the limited EQ left me wishing for the flexibility of a



The MD4S offers the advantages of digital recording in a user-friendly, all-in-one package.

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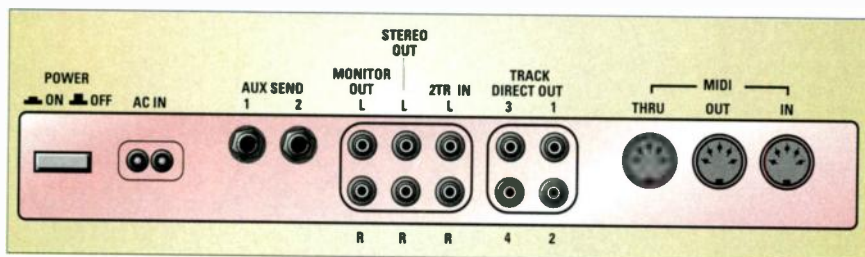


FIG. 1: All audio outputs are located on the back of the MD4S, including the four Track Direct Outs.

parametric band—or sweepable mids at least.

INS AND OUTS

Channels 1 and 2 offer mic/line inputs on balanced $\frac{1}{4}$ -inch TRS and XLR jacks (see Fig. 1). Phantom power is not available, so if you have mics that require it, you'll need an external phantom power source.

Channels 3 and 4 offer only $\frac{1}{4}$ -inch line-level inputs with no insert points, which is a drawback if you want to use mics to record to all four channels. All routing is hard-wired on the MD4S's mixer, meaning you can't bus input channels to different-numbered tracks. I circumvented this shortcoming by using XLR-to- $\frac{1}{4}$ -inch line-level cables between the mics and the MD4S. (Another solution would be to use a mic preamp that has $\frac{1}{4}$ -inch outputs.) Stereo channels 5/6 and 7/8 also accept $\frac{1}{4}$ -inch line inputs.

There are four individual RCA direct outputs that produce line-level signals from tracks 1 through 4. These give you the option of transferring tracks from the MD4S to another recorder or mixing down through a different, external mixer. A stereo pair of inputs (RCA) for 2-track return allow you to monitor back from an external mixdown deck. Finally, there are two pairs of RCA stereo outputs, one for the stereo mix and one for the monitor mix.

The RCA jacks are metal and rigidly mounted on the MD4S, but all the $\frac{1}{4}$ -inch connections are made of plastic components. It's a bit disquieting that the points where you'll do the most patching and repatching are made of the less durable material while the RCA ins and outs—which you'll probably set and forget—are the most impervious to damage.

MAKING TRACKS

I began testing the MD4S by recording and overdubbing a number of tracks, including acoustic guitar, vocal,

electric bass, and percussion. The MD4S was easy to set up and use, the tracking went quickly, and the overall sound quality was very good, especially compared with that of my portable 4-track cassette recorder. The MD4S excelled at capturing the high-end airiness of vocals, the bright zing of the steel-string acoustic guitar, and the upper-mid definition of the various percussion instruments.

Next, I plugged an electric bass with passive pickups directly into a mixer channel. Impressively, I got a nice, even sound with plenty of level. Plugging in an electric guitar yielded similar results. I had fully expected to have to patch in compressors to get something passable, so I was pleasantly surprised. This aspect of the MD4S should be especially appealing to songwriters who like to capture ideas instantly, in the heat of the moment.

The MD4S should also prove handy for recording live concerts. You could, for example, take a stereo feed from the house mixer to two tracks and use the other two tracks to bring in signals from a stereo pair of mics.

GET ORGANIZED

Recorded tracks can be organized on disc using the TOC, or Table of Contents feature. The TOC functions as a directory of what is on the disc—songs (each can be titled), disc title, location marks, playlists, and so on.

After putting three or four songs on a disc, I could effortlessly skip around among them using the Song Search function. This was a welcome change from constantly fast-forwarding or rewinding to locations on an analog deck.

In addition to being able to find a song instantly, you can also easily add location markers as you record or play back. Ten markers can be assigned per song, and location points can be nudged forward or backward using the data dial. This ability to set markers in a song comes in handy for one of the coolest functions on the MD4S—the Cue List Playback.

Cue List Playback enables you to mark off sections of music on the fly and add them to a playlist. You can then shuffle the Cue List order and determine the number of times each section will play. Twenty-six sections (labeled A through Z) can be created per disc—plenty for most musical applications.

I barely scratched the surface of this function, but let me say that it's one of the most powerful of the MD4S's many features. For example, I recorded a few songs from a CD onto the MD4S, marked off sections (verse, chorus, bridge, and so on), rearranged the sequence of the song parts, and even

MD4S Specifications

Mixer Configuration	8 x 2
Analog Inputs	(2) balanced XLR/ $\frac{1}{4}$ " TRS mic/line (channels 1 and 2); (2) unbalanced $\frac{1}{4}$ " mic/line (channels 3 and 4); (4) unbalanced $\frac{1}{4}$ " line (channels 5/6 and 7/8); (2) RCA 2-track in
Analog Outputs	(4) RCA direct outs; (2) RCA main L/R; (2) RCA monitor; (2) RCA aux send; (1) $\frac{1}{4}$ " stereo headphone
Sampling Rate	44.1 kHz w/ATRAC compression
Frequency Response	20 Hz–20 kHz (+1/–3 dB)
EQ Type	3-band
Track Count	4
Simultaneous Record Tracks	4
Synchronization	transmits and receives MTC; transmits MIDI Clock; receives MMC messages
MIDI Connections	In, Out, Thru
Dimensions	16.3" (W) x 4.3" (H) x 15.3" (D)
Weight	11.47 lbs.

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Power

The MP9000 also does double duty as a MIDI Controller. Two Internal Zones and two External MIDI Zones can be combined for each of the sixty-four performance set-ups. The Pitch Bend and Modulation wheels, plus an extensive array of pedal options are assignable and independent for each zone. The front panel knobs transmit Cutoff, Attack, Decay, Release and can also be assigned to any other MIDI Continuous Controllers for live performance or sequencing.

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changed the number of repeats of each section. After tweaking the Cue List to my satisfaction, I used the Cue List Copy command to save my rearranged piece of music as a new, separate song.

The Cue List function is an invaluable songwriting tool. A composer could construct several musical sections, and then audition the sections in different orders and iterations before coming to a final decision on the arrangement. Likewise, a remix artist could use the MD4S to deconstruct an arrangement and use it as the basis for another composition altogether. Very powerful stuff.

1-2-3 PUNCH

The MD4S offers three means of punching in: from the transport controls, with the (optional) footswitch, or using Auto punch. To use Auto punch, you simply set the in and out points while auditioning the tracks during playback. Roll times before and after a punch are adjustable and, coolest of all, you can record multiple takes and audition each before committing to a particular performance.

I used this function to lay down four guitar-solo overdubs, and then could select my favorite afterward. Thanks to adjustable pre-roll, I had ample time to get ready on the guitar after setting the MD4S in motion.

MIDI SPOKEN HERE

The MD4S is compatible with MIDI Time Code, MIDI Machine Control, and MIDI Clock, making it well suited for the desktop musician who wants to add acoustic instrumentation and vocals to sequencer-driven synth tracks. Using a few old sequences I had in my library, I succeeded in synching up my sequencer via MTC, with the MD4S functioning as both master and slave. The MD4S locked in with nary a complaint, and I was able to dump tracks to disc with no problems. I even experimented with dumping sequenced tracks one at a time to the recorder, submixing them down to two tracks, and then transferring more single tracks, performing the process over and over. No matter how many bounces I did, all the tracks synched perfectly each time.

STEP UP

From a sonic standpoint, the MD4S blows away any analog cassette multitrack. Not only does it offer wider frequency and dynamic ranges, but it has

STEPPIN' UP

Several changes distinguish the Yamaha MD4S from its predecessor, the MD4. To begin with, the new silver unit employs version 4.5 of Sony's ATRAC data-compression scheme, said to be "vastly" improved. It has a full complement of MIDI jacks—the black MD4 only had MIDI Out—and supports MIDI Time Code and MIDI Machine Control. Other new features

include balanced XLR jacks, insert points, a second aux send, and a stereo headphone bus (the MD4's was mono) that can be returned to the main stereo bus, allowing for two extra inputs at mixdown. The jog/shuttle wheel is new, as is motor loading that offers increased protection for the drive and discs.

—Brian Knave

a more transparent sound and no tape hiss—an important consideration when bouncing tracks internally. With the MD4S, it took more than ten bounces before I noticed a loss of sonic quality. (If you're wondering why there's any degradation at all in this digital recorder, it's because the mixer is analog. Therefore, the signal must pass through two digital conversions with each bounce before it goes back to disc.) Just the same, the degradation I heard was negligible.

Another advantage of bouncing on this machine is that, unlike on an analog unit, you don't need to reserve a vacant track (or tracks) to bounce to. That's because the MD4S can play back a track while simultaneously recording over it. Therefore, you can fill up all

four tracks and then bounce them to tracks 3 and 4, freeing up tracks 1 and 2 for overdubbing.

THE FINAL WORD

The Yamaha MD4S is a remarkable multitrack recorder. Compact yet well featured, sophisticated yet simple to operate, it is the logical step for musicians looking to move up from multitrack cassette recorders into the digital realm.

The MD4S sounds great, too. In fact, if you ignore the specs and just use your ears, the thing sounds pretty darn good even compared with an MDM or hard disk recorder. Sure, there are discernible differences in sound quality (due largely to the data compression), but the MD4S holds up remarkably well, especially considering the price.

Yamaha must also be applauded for the user manual, which is sensibly laid out and gives practical, step-by-step advice on virtually all of the unit's functions. It even includes a "Tracking Sheet" that you can photocopy for writing down track, session, cue list, and mixer setup information.

Although I had some misgivings about the quality of the components, particularly on the mixer side, I was impressed with the unit's flawless operation, as well as with its advanced editing, location, and playlist functions. Considering all the ways it offers to manipulate recorded material and its reasonable price, the MD4S will likely prove a leading player in the realm of MiniDisc multitrack recorders.

John Ferenzik is a multi-instrumentalist and has played with Todd Rundgren, among others. Currently he is working on a CD of his music. Readers are welcome to e-mail him at frnzck@pond.com.

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SYNCHRO ARTS

TOOLBELT 1.5 (MAC)

This processing package for audio post-production generates background sounds.

By John Duesenberry

Synchro Arts, a software developer based in the United Kingdom, makes no bones about how it is positioning *ToolBelt* in the audio marketplace. The packaging describes the program as a set of "power processing accessories for Pro Tools."

Contrary to what you might expect from its description, however, *ToolBelt* is not a TDM or AudioSuite plug-in. Rather, it's a separate application that communicates with Digidesign's Pro Tools or runs as a stand-alone program. *ToolBelt* may therefore interest sound designers regardless of whether they own a Pro Tools system.

BELT LOOPS

ToolBelt offers three signal processors: a time compressor/expander, a looper,

and a unique audio generator, which extends a segment of audio to generate background sounds without using loops. All of these processors alter the length of an audio segment, extending or shrinking it in different ways.

ToolBelt's input signal flows through all enabled processors, so you can perform up to three types of processing in a series (see Fig. 1). The order of processing is fixed: you can't, for example, pass the signal through the Looper first and then through the TimeMod section.

ToolBelt is not a real-time processor; it operates on one or two channels of audio, which normally come from a mono or stereo selection within Pro Tools. In stand-alone mode, you can open mono or stereo Sound Designer II files for processing. Surprisingly, the program supports no other file format.

ToolBelt's user interface is simple, employing a tabbed single-window design that is more often seen in Windows software than Mac software (see Fig. 2). You click on a tab to activate a page for each processing section. Each tab has a switch for enabling or disabling the corresponding processor, and a small "LED" above the switch indicates whether the processor is on or off.

The buttons at the bottom of the window are visible from any page. The Get Audio button pops you into Pro Tools to select a region or, when *ToolBelt* is

ToolBelt

Minimum System Requirements

PowerPC or 68040 with FPU; 1.5 MB RAM; Mac OS 7.1; Digidesign Sound Drivers or Mac Sound Manager required for playback within *ToolBelt*; Pro Tools 3.2 or higher recommended.

operating as a stand-alone program, lets you open input files. The Reset button sets all parameters back to their defaults. The Spot button initiates audio processing and sends the output signals to designated Pro Tools tracks and locations. The Edit button triggers audio processing without spotting the output.

Once you've set the parameters of the processors, you generate output files via the Edit or Spot buttons. Then you audition the output in *ToolBelt* or Pro Tools. *ToolBelt* can use Digidesign's Sound Drivers or the Mac's Sound Manager for playback.

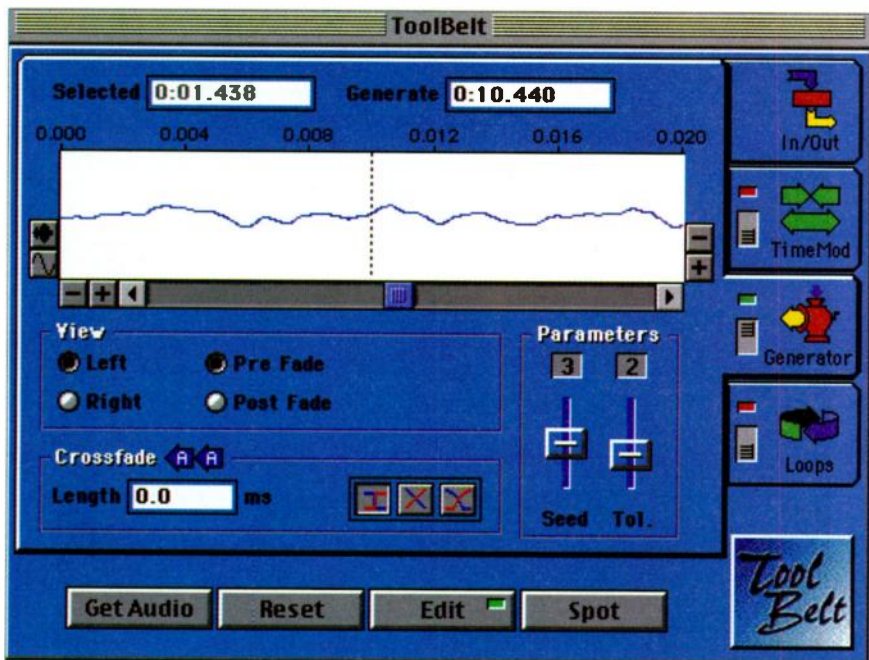
IN AND OUT

The In/Out page (see Fig. 2) displays the names of the input files or regions and includes controls to specify where the output signal should be spotted after processing. The Destination controls select which Pro Tools tracks will receive the output. The Position controls specify where the output region will be located relative to the original Pro Tools region. The Destination and Position controls apply only when *ToolBelt* is running with Pro Tools.

The Orientation controls let you pre-process the signal. The input signal can be reversed, inverted, or both before it is passed to *ToolBelt's* DSP stages.

LONG AND SHORT

The TimeMod section is a straightforward time-compression/expansion tool with many convenient features (see Fig. 3). You can enter the amount of compression or expansion as a ratio, a start and end time, a duration, or an amount of change. You can also specify changes in terms of beats per minute (bpm), which is especially handy for tweaking rhythm tracks. Video post-production workers will appreciate the Fixed Ratios pop-up menu, which lets you choose from standard pull-up/pull-down ratios (24/25, 25/24, 29/30, and 30/29).



ToolBelt's unique Automatic Audio Generator is one of its several post-production tools for processing audio.

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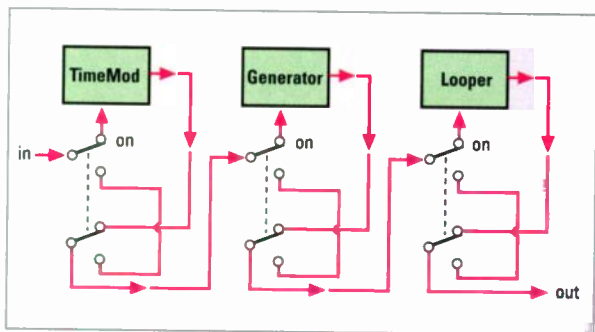


FIG. 1: The *ToolBelt* signal path routes the audio through a set configuration of processors.

I used TimeMod to process a number of rhythm tracks containing mixtures of drums, cymbals, and electronic sounds. TimeMod maintained the rhythms accurately throughout its range (50 to 200 percent). Synchro Arts states (with refreshing honesty) that the TimeMod algorithm works best within a range of ± 10 percent of the original. I found this statement accurate; at smaller ratios, TimeMod's fidelity is quite good. Artifacts do start to appear as you approach the limits, especially at expansion ratios greater than 1.5.

ROUND AND ROUND

In some ways, the Power Looper processor (see Fig. 4) resembles the sampler-oriented loop-editing tools found in such programs as Antares Systems' *Infinity* or BIAS's *Peak*. It lets you loop a selected region of audio, change the loop points, define a loop crossfade, and listen to the transition between the start and end of the loop. The main purpose of the Power Looper, however, is to generate multiple copies of a looped segment, for use in special effects, to extend background ambience, and for use in various musical applications. This processor is especially handy when you're working with rhythm tracks.

The Number field (in the top left) lets you specify the number of loop repetitions you want to generate. Alternatively, you can specify a length and *ToolBelt* will calculate the required number of repetitions. A waveform display area is provided beneath the Number and Length controls. A dotted line in the middle of the waveform display indicates the transition point between the beginning and end of the loop. You can change the transition point by moving the line or by pushing the waveform

around with a hand cursor. A zoom function provides a closer look at the waveform, but I still found the display area to be much like the LED waveform displays on many hardware samplers: too small and too restrictive. I would prefer a resizable waveform window that not only lets me zoom in, but also lets me enlarge the display to full-screen size when necessary.

You can audition a one-second region around the transition, or you can easily play the entire loop. If you can't obtain a good transition point, you can smooth things out with the crossfade controls. Unfortunately, you can't change the transition point while you're listening to the entire



TimeMod maintained the rhythms accurately throughout its range.

loop; in this respect, *ToolBelt* falls short of its competition.

Once the loop sounds satisfactory, you press the Edit or Spot buttons and *ToolBelt* spits out a region with the desired number of repetitions. To conserve disk space, you can define the loop and generate a single repetition. Spot this back to Pro Tools, then copy and paste as many repetitions of the region as you need. Each copy of the region accesses the same disk data, so almost no additional disk space is used.

OLD AND NEW

The most innovative feature of *ToolBelt* is the Automatic Audio Generator. This takes brief snippets of aperiodic audio (as short as 0.1 second), and from that produces user-defined lengths of similar-sounding audio without looping or cloning the material.

In soundtrack work, it's often necessary to produce background sounds or ambience—waves breaking on a beach, for example. Sometimes a segment of background material is extended by looping or by pasting multiple copies of the segment into a track. If this is not done artfully, however, the loop can sound obvious.

The Automatic Audio Generator takes a unique approach to creating ambience. It analyzes the characteristics of a source audio segment and generates a continuation of the original that sounds plausible but not repetitive. The Generator finds patterns in the selected audio that it randomly extends into new but similar-sounding patterns. Synchro Arts states that the Generator's processing algorithm is based on Chaos theory.

The Automatic Audio Generator's user interface is nearly identical to that of the Power Looper except for two additional sliders that control parameters called Seed and Tolerance. You select a "core" region of audio in Pro Tools and define a transition point in the waveform display, much as you would for a loop. You then specify the length of the segment you want to generate, set the Seed and Tolerance values, and click the Edit or Spot button. After a bit of number crunching, out comes your ambient sound.

That's the theory, anyway. In practice, the Automatic Audio Generator is tricky to use. The algorithm works best with short segments of aperiodic or quasi-periodic material, such as water sounds, cricket and bird sounds, or crowd sounds. You must be very careful to obtain a smooth transition point. The algorithm treats any

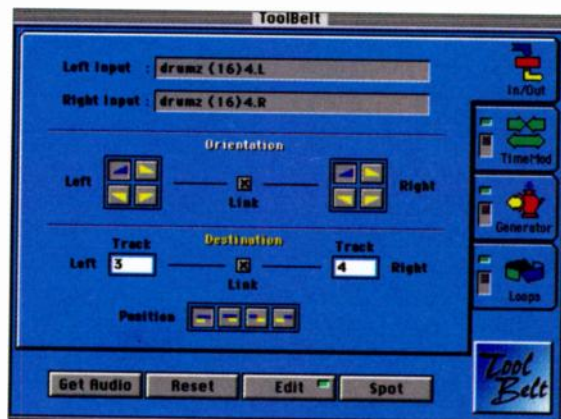


FIG. 2: The In/Out page is shown here with all of the three processors enabled.

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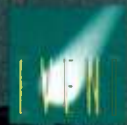
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FIG. 3: The TimeMod page provides time compression and expansion based on various parameters. In this example, the ratio is specified in bpm.

discontinuities as part of the original sample and regenerates them in the output, which then produces crackling and popping textures. If you can work within these limitations, however, you can frequently generate textures that are quite useful as background material. (In my experiments, the crickets worked best.)

I also tried music and speech recordings and got some bizarre and interesting results. The Generator altered a drum track in an intriguing way: it somehow preserved the sound of the kick drum, while mutilating everything else.

Because the Generator is such a novel and largely unfamiliar tool, Synchro Arts should provide extensive documentation for it. Unfortunately, the company doesn't. For example, the manual devotes one (uninformative) sentence apiece to the Seed and Tolerance parameters. A small table of recommended (but unexplained) settings is also provided. In effect, you are told to select two arbitrary numbers and hope for the best.

Synchro Arts has promised to provide (on its Web site) more audio examples with notes on how they were produced. However, the company also points out that detailed information may not always be helpful. The nature of the input audio is so varied in terms of level, spectral content, short-term spectral variation, and other parameters that the results for any given setting can be unpredictable when applied to different signals. In other words, a fair amount of experimentation and first-hand experience is required to achieve the software's full potential.

BACK AND FORTH

A control panel called Synchro Arts Macros comes with the software to set up communication between *ToolBelt* and Pro Tools. *ToolBelt* provides a default key combination to trigger *ToolBelt* from within Pro Tools. If you don't like the default, you can define your own key combination from the control panel. During installation you must use the control panel to inform the macro processor where to find *ToolBelt*. Given this information, Synchro Arts Macros can then activate

ToolBelt from Pro Tools and vice versa.

For Pro Tools and *ToolBelt* to exchange data properly, both programs must be set to the same time-display mode and frame rate. If you violate these requirements (for example, if Pro Tools is set to 29.97 fps drop-frame and *ToolBelt* is set to 25 fps), *ToolBelt* won't send its output to the right location in the Pro Tools session and no warning message is provided.

Once you've set the frame rate and display mode, passing a chunk of audio from Pro Tools to *ToolBelt* is simple. In Pro Tools, you just select part of a region within one or two tracks and then press the magic key combination. The Synchro Arts Macro control panel activates *ToolBelt* (launching it if it's not already running) and passes along the audio data and region information.

Returning processed audio to Pro Tools is equally simple. On the In/Out page, you designate which tracks will receive the output and where the output will be located relative to the original region. Then you click the Spot key, and Pro Tools is activated with a new audio region at the desired location.

This process has one rather odd restriction: you can't select and pass an entire region from Pro Tools to *ToolBelt*; you have to select part of a region. You can even select a section that is just one sample smaller than the region itself, but it can't be the whole region. This may be

acceptable in many cases, but other times it may not be. After all, regions exist in part so that you can work with clips whose lengths are defined precisely, right down to the sample level. Synchro Arts states that this limitation exists because the *ToolBelt* macro player works by driving the Capture Region command in Pro Tools, which is grayed out when an entire region is selected. That may be, but the limitation is counterintuitive to Pro Tools users, who think of regions as objects to be operated on as a whole.

SUPPORT

Synchro Arts responded to and resolved all of my e-mail questions quickly. One of the company's engineers even made a friendly transatlantic phone call to clear up a problem.

Having said that, my calls to tech support would have been unnecessary had the *ToolBelt* manual been more thorough. For example, a quirk caused communication between Pro Tools and *ToolBelt* to fail; it turned out that there was a simple but undocumented fix. (For the record: make sure that you put the Pro Tools display into Waveform mode when working with *ToolBelt*.) As a whole, the *ToolBelt* documentation (provided in book and online form) is readable and accurate; it just lacks some important details.

BUCKLE UP

ToolBelt is a solid utilitarian package, focusing mostly on features that are useful in everyday post-production work. *ToolBelt* is not, however, an audio Swiss army knife, as its name and \$425 price tag imply. *ToolBelt*'s



FIG. 4: The Power Looper page provides a small waveform display with a vertical dotted line that indicates the loop's transition point.



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FEATURES ■■■

EASE OF USE ■■■■

DOCUMENTATION ■■

VALUE ■■■

1 2 3 4 5

PROS: Easy to use. Tight integration with Pro Tools. Rhythmically accurate time modification. Innovative Automatic Audio Generator.

CONS: Operates only on partial Pro Tools regions. Supports only SDII file format. Sketchy documentation, especially for Automatic Audio Generator.

CIRCLE #441 ON READER SERVICE CARD

time-processing and looping features, while good, are not decisively better than many competing products, and the program's most original feature, the Automatic Audio Generator, requires that you spend a good amount of time gaining substantial experience with it before it becomes practical to use professionally.

Synchro Arts ought to consider implementing *ToolBelt* as an AudioSuite plug-in. That would tighten the interface (which is already good) with Pro Tools and eliminate the restriction on full-region selection. It would also eliminate the need for the Synchro Arts Macro mechanism. The company should also consider lowering *ToolBelt's* price. These improvements—combined with more detailed documentation—would make the product much more attractive to its target audience, the Pro Tools user community.

Nevertheless, if you're looking for a new audio-processing program, I suggest that you visit the Synchro Arts Web site, download the *ToolBelt* demo, and try it out. If you do audio processing or post-production work, *ToolBelt* may provide the right combination of tools for your particular projects.

John Duesenberry's electronic music is available through the Electronic Music Foundation. Check the EMF catalog at www.emf.org.

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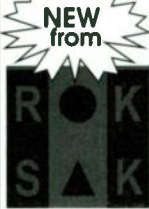
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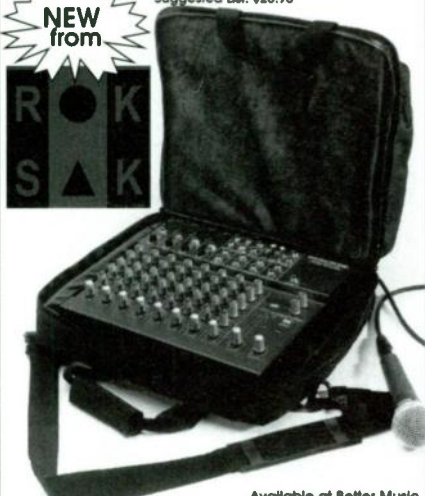
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constant background crackles, such as those found on vinyl records. The Denoiser eliminates constant background noise, such as tape hiss.

The other three effects enhance audio that has been "dulled" by restoration processing. Bass Boost provides low-end EQ amplification at a set center frequency of 60 Hz and has a Q value of four octaves. Brilliance provides high-end EQ amplification and treats frequencies from 5 kHz upward; the higher the frequency, the greater the amplification. The Stereo Spread effect widens the stereo field of the audio signal, resulting in a more transparent and open sound.

Each effect has an on/off switch, a fader control, and a value display. Steinberg has really striven for simplicity here. Despite their various individual characteristics, each effect is set using a single intensity control. This intensity control can have a value anywhere from 0 (no effect) to 100 (full effect). Novices will welcome this ease of use, but advanced users may yearn for more control.

A button allows you to toggle between monitoring in stereo and in mono during real-time processing. This is handy if you're using a slower computer, because *Clean's* processing-power requirement is cut in half when it's running in mono. (Final processing, however, is always done in stereo regardless of the stereo/mono button's position.)

You can process one track at a time or all of them at once, and each track can have its individual settings. I was able to run five effects simultaneously in real time. The Declicker took the most power, so I couldn't run it along with the others. If I tried, the CPU Load display went into the red, and I got major dropouts in playback. Fortunately, *Clean* lets you apply effects offline, too. There's no undo function, but *Clean* makes copies so the original audio files are safe.

WAVE WATCHING

The waveform display shows the audio waveform of the track currently selected in the track list. I mentioned earlier that there is an indirect way to change the time of a track; this is done by dragging the Start and End markers to your desired start and stop times on the waveform display. However, you will have to check this by ear, because *Clean* doesn't provide time indicators for the markers.

The Fade In and Fade Out markers are for defining the beginning and ending volume fades for the current track, and the Fade In and Fade Out time displays show the lengths of the fades in hours, minutes, and seconds (see Fig. 2). You can also zoom in and out of the waveform display by clicking on the appropriate buttons, and you can set the playback position by clicking the mouse anywhere within the display.

OUR SOURCES INDICATE

In addition to the four major work areas, *Clean* provides a number of informative indicators. The Available Disk Space display shows the space on your hard drive available for recording audio. A red status bar gives a quick overall reading of how much room is still available. Next to it you see how many hours, minutes, and seconds of audio can still be recorded. The CPU Load display indicates how hard your computer is working while you're using the effects section in real time.

The Total Time display shows the total time of all tracks in the track list; the Remaining Time CD-R display shows how much recording time is left on a 74-minute CD-R disc. If the Total Time exceeds 74 minutes, the value is colored red, and the Remaining Time CD-R display lists the surplus time as a negative value. *Clean* doesn't restrict you to 74 minutes of recording time, though, because you may want to record your project to



FIG. 2: You can draw Fade In and Fade Out markers directly on the waveform to specify beginning and ending volume fades for the current track. A time display shows the lengths of the fades in hours, minutes, and seconds.

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DAT—which provides longer recording times than a CD-R.

CLEAN PERFORMANCE

To test *Clean*, I dug out some of my old cassette tapes and 45s to transfer onto CD. I began by creating a new Project. Projects contain all of the settings for *Clean*'s tools, including track-list data, effects-section settings, and waveform-display markers, but they don't actually store any audio data. I had previously recorded and saved one of the songs as a WAV file using a different piece

of software, so I simply imported it; no trouble at all.

The recording process is simple enough: click on the Record button, and *Clean* immediately begins recording the signal from your sound card input. Because you'll more than likely be saving the audio to CD-R, *Clean* provides only 16-bit, 44.1 kHz, stereo recording.

However, I ran into problems when I tried to set input levels. For one thing, the program doesn't provide a way to select an audio input; you have

to access your sound card's mixer software to set the input you want to use for recording. In addition, *Clean* exhibits some latency: when I tried to adjust the input level, there was almost a second of delay before I saw a change in the level meters. This didn't prevent me from setting the levels, but it was annoying.

Luckily, with *Clean* Steinberg bundles the *Lite* version of its *WaveLab* audio editor, which provides much better recording features. *WaveLab* also offers a more sophisticated Normalize function and lets you remove DC offset, something that's missing from *Clean*.

Because *Clean* begins recording immediately (that is, without preroll), and it took me a moment to trigger the playback source, my tracks always had a few seconds of silence at the beginning. Removing the silence was a simple matter of setting the Start marker in the waveform display. But a few times, the audio kicked in too quickly, which sounded unnatural. This probably happened because there is no way to be sure that markers are set at zero-crossings in the waveform.

WaveLab Lite rescued me here because it provides some basic editing tools. I only wish I didn't have to manually find the files on my hard disk for

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FEATURES ■■■■
EASE OF USE ■■■■
DOCUMENTATION ■■■■
VALUE ■■■■
1 2 3 4 5

PROS: Easy to use, with intuitive interface. Good documentation. *WaveLab Lite* bundled with program. Excellent CD-burning tools.

CONS: Supports only the WAV file format. No online help. Very simplistic effects parameters. Effects work well only with moderately damaged audio. No advanced noise-reduction features.

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FIG. 3: Clean's CD-burning dialog box contains all of the controls for putting audio tracks on CD-R.

editing within *WaveLab Lite*. It would be great if the two programs were integrated so that, for instance, double-clicking on the waveform display in *Clean* automatically launched *WaveLab Lite* with the current track loaded. Then you could do your edits and quit *WaveLab Lite*, and the track would be saved with the new changes.

Because my source material was coming from cassette tapes and 45s, it needed restoring and enhancing. *Clean's* effects section provided a nice level of functionality in most cases. I was easily able to clear up the recordings that had a moderate amount of clicks and hiss. With those that were more heavily damaged, *Clean* didn't perform so well. If the recording had distortion, processing it with the Declicker just made matters worse. And while the Denoiser did a good job of removing typical background hiss, it didn't work on other types of continuous background noise, such as the sound of an air conditioner or 60 Hz hum.

On the other hand, I really liked the enhancement tools, especially Stereo Spread and Brilliance. They gave some nice presence to otherwise worn-out recordings. The Bass Boost worked well too, but if the audio had any 60 Hz hum in it, that was boosted as well.

NO COASTERS HERE

Clean's CD-burning features were a joy. I didn't have any problems at all. Of the ten CDs I burned, none turned into coasters. When you select Create CD-R, *Clean* opens the CD-burning dialog box, which contains all the controls you need (see Fig. 3). If *Clean* supports your CD recorder (and it probably does), it displays the recorder's name at the top of the box. You can check

Steinberg's list of supported drives on the company's Web site. Depending on your recorder's features, *Clean* lets you use 1x, 2x, or 4x burning speeds.

I especially liked the Simulation feature. This lets you simulate the burning process without actually putting anything on CD. You can use it to check for errors in the track list and to make sure your system can handle the data-transfer rate.

While a CD is being burned, *Clean* displays the number of the track being

▼

**You'll immediately
feel at ease with
Clean's interface.**

written and a status bar depicting the progress of the operation. When burning is complete, *Clean* closes the CD-burning dialog box and ejects the finished disc.

READY TO PLAY

Audio restoration and CD burning can be complicated, but *Clean* makes the process easy and accessible to all users. The program provides an intuitive interface, and although it doesn't include a Help file, the printed manual explains the software well. The bundled *WaveLab Lite* is a welcome touch and adds quite a bit of value to the package.

Depending on your source material, *Clean* may or may not be the product for you. It certainly does not take the place of a full-fledged audio-restoration package, because it doesn't provide advanced features such as continuous harmonic noise reduction or noise-print capturing. But it does a nice job with moderately damaged vinyl and analog tape recordings, and the built-in CD-burning tools are excellent. At \$129, *Clean* is a useful tool for the everyday user looking to clean up old recordings. ☺

Clean
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 - 4-band EQ on stereo line channels
 - Inserts and 100Hz low-cut filters on all mic/line channels
 - Logarithmic taper 60mm faders
 - 2 Aux sends with pre/post and int./ext. FX level sends on each channel
 - Pan, Mute, PFL solo on each channel
 - Ingenious BREAK switch
 - Headphone output w/level control
 - Tape/CD inputs with level control and Main Mix Assign + tape outputs
 - Built-in subwoofer crossover
 - 48V phantom power
 - 12V BNC lamp jack

Constant loudness pan control (actually, this is one of the CFX•16's two stereo line level channels, so it's actually a constant loudness balance control.)

Post-fader Solo switch lets you monitor the channel via headphones. It's also the key to fast, accurate level setting. Just press Solo and adjust the channel's trim control until the Zero Level LED flickers. You've now maximized headroom and minimized noise for the channel in a matter of seconds.

Subgroup buses "collect" channel signals assigned to them so you can submix vocals, drums, nose flute quartets, etc.

Long-wearing 60mm logarithmic taper faders give you smooth, linear control throughout the fader's entire travel.

Solid steel chassis is punched bent and painted by gigantic automated machines supervised by medium-sized, non-automated Mackoids.

On the back: built-in power supply (instead of an outlet-eating wall wart) uses easily-replacable standard IEC line cord.



CFX•12
8 mic/line + 2
stereo line chs.



CFX•20
16 mic/line + 2 stereo line chs.

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change as a Munchkin-to-monster effect). Q lets you dial in the width of the filters. An associated knob, Order, lets you adjust the resolution of the filter algorithm. Used in tandem, these two controls determine how clean or dirty your final output will sound. Another knob lets you add noise to the mix to make things really gritty. The Robot Pitch knob is sort of a cheater's vocoder: it's an oscillator that mimics the classic vocoder sound without needing an external source. A dimpled button called Formant Freeze lets you freeze an incoming

formant, looping its envelope. This is great for creating exciting sustained sounds and endless vowels.

MIDI MADNESS

While these machines are great for live applications, they are downright perfect for studio work because of their comprehensive MIDI implementation. Each is fitted with MIDI In, Out, and Thru. A dial on the rear selects the transmit/receive channel.

Each unit responds to its own set of Control Changes—the FilterFactory

sees CC 1 through 18, and the WarpFactory, CC 102 through 116. Distinct Control Change sets are very handy because they allow several Electrix models to be controlled on the same MIDI channel. All the knobs and buttons also transmit MIDI. This is, without a doubt, one of the best things about these processors. Hit Record on your sequencer, and every turn of a knob and push of a button is recorded. The creative possibilities are endless.

The FilterFactory responds to MIDI Note numbers. You can control the cutoff frequency by playing different notes on the keyboard. This makes for some unique effects. At one point, I had the unit feeding back on itself as I swept the cutoff frequency up and down the keyboard, creating some cool rhythmic noises. The FilterFactory responds to MIDI Clock, giving you the ability to sync its LFO speed with sequenced beats—perfect for rhythmic filter effects.

MORE BRAWN THAN BRAINS

It's difficult to assess the sound quality of processors that are supposed to mangle your audio. Well, these units click, hum, buzz, and sputter when that's your objective and don't when you don't want them to. The bypassed signal sounds identical to the original source, and the filters sound fine. The coloration of the effects is distinctively analog in flavor: round, but not so

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WarpFactory vocoder \$499

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

PROS: Easy to use and very ergonomic. Great for live applications. Comprehensive MIDI implementation. Phono preamp and grounding post for use with turntables.
CONS: No user memory.

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Capacitor Microphone*

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FilterFactory Specifications

	1/2-inch	Phono	RCA
Dynamic Range	>90 dB	>78 dB	>85 dB
Frequency Response	10 Hz–20 kHz	10 Hz–20 kHz	10 Hz–15 kHz
THD	<0.3%	<0.3%	<0.3%

round as to lose definition. I have no complaints.

For those of you not used to analog parameters, getting a happening sound

can sometimes take a while (especially since there are no onboard presets). Never fear—the manual is here. The FilterFactory guide tells you how to

achieve three manual presets (the parameters for a sound that you dial up by hand), and the WarpFactory manual gives you four. These are great starting points for creating your own mutant effects. I particularly liked the Tap Tempo Filter Swoosh and the Classic Vocoder settings for starters.

Unfortunately, once you've done all your tweaking, there are no user memory slots to save your effect to. You have two options: record the parameters into your sequencer or grab paper and pencil. Pressing and holding down the Bypass button sends out all of the unit's current settings as Control Change numbers. If you do this at the beginning of your sequence, you sort of have a user preset.

TWIST AND PUSH

Electrix takes us on a trip back to the analog gear of yore, with large friendly knobs, pressable buttons, and the only memory bank being the one in your head. And, like their analog antecedents, these units are built like tanks. Add to this a dash of modern MIDI wizardry (sending and receiving CC messages) and you have some nice machines, perfect for many of today's music styles, both live and in the studio.

They seem a bit expensive to me, though. But perhaps I'm too accustomed to the price of digital effects processors and AudioSuite plug-ins. Maybe a memory bank or two would get me more excited. However, if you flash back to the '60s and '70s, when a single analog effects unit cost an arm and a leg, the Electrix models will seem like a steal.

In the end, it's up to you to determine how reasonable the cost is, considering your needs and your budget. If money is tight and you're willing to sacrifice the unique ergonomics and real-time control features, less expensive software and hardware options are available (though they may not sound as sweet). But these are cool units; if a stand-alone, performance-oriented vocoder or filter is what you require, give Electrix a listen, a twist, and a push. During a live performance, in the studio or on stage, there is no substitute for real knobs and buttons.

Erik Hawkins is a musician/producer working in Los Angeles County and the San Francisco Bay Area. You can check out his fledgling indie label at www.muzicali.com.

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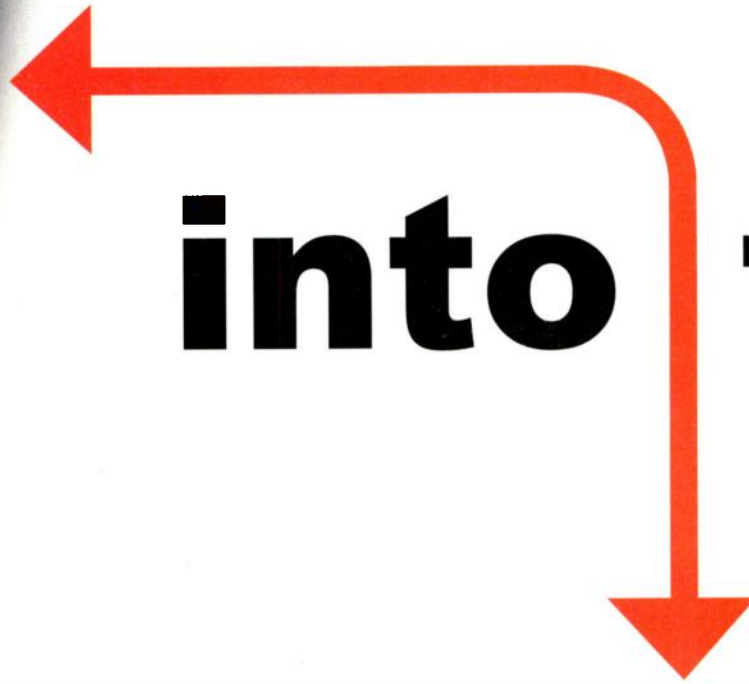
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AUTOMATIC SOLOING. Simply select the soloist you'd like to hear and play with (from over 100 available) and Band-in-a-Box 9.0 will create & play a solo in that style, along to any song! This is hot! These solos are of the highest professional quality, rivaling ones played by great musicians, and best of all, they are different every time!

NEW! ADDITIONAL FEATURES IN VERSION 9.0

THIS MAJOR NEW UPGRADE TO BAND-IN-A-BOX INCLUDES OVER 50 NEW FEATURES! We've added a full featured digital audio track, so you can add live vocals or guitar playing to your song. There's also an intelligent style selection wizard which shows you what styles would work best in your song, highlighting all styles that have a similar tempo, genre, and feel. Guitarists will love the guitar enhancements, tablature display, and a great automatic feature that creates a pro quality guitar chord solo to any melody, displayed perfectly on the guitar fretboard. There's a new **Big Lyrics Window** with selectable font and size, and a **Big Piano Window** that displays a piano with large size keys and optional note names. And much more...

OUR CUSTOMERS LOVE VERSION 9.0! Band-in-a-Box with Digital Audio – a dream come true... You're the best for guitar support... I always upgrade, I'm never disappointed... The way it adds chords to guitar solos is too cool... The Big Lyrics screen is a blessing for singers... What will you guys think of next?

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NEW! Soloist Disk Set 9: Blues Guitar, Country Piano & more!

All new Blues Guitar, Country Piano, Pop 8ths & Pop Swing 16ths solos. Four new soloist sets defined for great new blues guitar, country piano and pop solos. Soloist Disk Set 9 adds lots variety and plenty of **hot licks** to your blues, pop and country solos by playing real lines learned from top pro players. Play the solos over any chord progression. With wailing blues guitar, lightning fast country piano, and a collection of all-time favorite pop riffs, these new soloing styles are great for listening and invaluable for learning! (NOTE: requires BB version 8.0 or higher)

NEW! Melodist Disk Set 2: Country, Pop & EZ-Listening

With Band-in-a-Box's "Melodist" feature, you can compose a new song in seconds. Melodist Disk Set 2 adds Country, Pop and EZ-Listening melodists to your Band-in-a-Box. You can compose songs in these styles, complete with intro, chords, melody, arrangement & improvisation. Use Melodist Disk Set 2 to auto-generate any part of your composition, or have Band-in-a-Box create a new Pop, Country or EZ-Listening song from scratch. You can go from nothing to a complete song in less than one second! (NOTE: The Melodist Disk Set 2 requires Band-in-a-Box version 8.0)

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SYSTEM REQUIREMENTS: Windows® 98, 95, NT, 3.1, 8 MB available RAM; fast 486 or better; 15 MB available disk space (Pro version); any sound card (e.g. Sound Blaster) or MIDI module (e.g. Roland Sound Canvas). Macintosh: OS 7.5 or later; 68020 or better, including any PowerPC (601, 603, 604, G3 or iMac).

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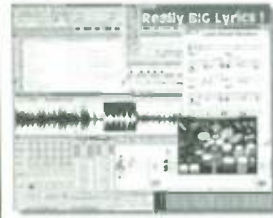
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 The Latin Pianist features popular Latin pianist Rebeca Mauléon-Santana (editor of Sher Music's Latin Real Book) playing over 50 tunes in a wide variety of Latin piano styles. Includes authentic Latin and Salsa piano songs and styles such as Conga, Cumbia, Merengue, Son, Mambo, Cha-cha-cha, Guaracha, Samba, Partido Alto, and much more. Hot, hot, hot!



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 All-time favorite Barbershop songs and an interactive multimedia history of barbershop singing in America. Made with the assistance of SPBSQSA (Society for the Preservation and Encouragement of Barbershop Quartet Singing in America).



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 Our most "feel good all over" program so far, with more than 50 virtuoso performances of Bluegrass standards played live on MIDI equipped bluegrass instruments (banjo, fiddle, bass, guitar and mandolin). We've recorded top Bluegrass musicians, these MIDI files are HOT! PLUS lots of Bluegrass pictures, biographies, and trivia (all on disk) and much more. Dazzling performances to make you "feel good all over"!



THE JAZZ SOLOIST
Instrumental Performance Program
 The Jazz Soloist is a music program with professional jazz quartet arrangements of over 50 songs (per volume). Each song features a great jazz solo played by top jazz musicians, as well as piano comping, bass and drums. Includes a stand-alone Jazz Soloist program with MIDI files (files also included in Band in-a-Box format). **Vol. 1:** Swing (50 pieces); **Vol. 2:** Swing (50 pieces); **Vol. 3:** Latin/blues/waltzes (60 pieces)



THE CHILDREN'S PIANIST
Piano Performance Program
 The Children's Pianist includes over 70 great piano performances of the worlds best-loved children's songs - ideal for listening or singalong! The words are displayed in a large "karaoke" style display while the song plays so you can sing along! (Windows® only). These pieces are presented with the care, artistry, and craftsmanship that will spark the interest of young and old alike. Includes piano arrangement tutorials.



THE NEW AGE PIANIST
Piano Performance Program
 Over 70 "New Age" and "New Age Jazz" style piano pieces, performed by top New Age artists. This is a beautiful collection of solo piano compositions inspired by the natural world. Full range of piano techniques, from the style of George Winston to Chick Corea and Keith Jarrett. Song memos, biographies and information on important New Age musicians. Includes photo album of stirring nature scenes and real time piano score. Over 4 hours of music!



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Piano Performance Program
 The Christmas Pianist contains great piano performances of over 50 all-time favorite Christmas songs and carols - ideal for listening or singalong. The words are displayed in a large "karaoke" style display while the song plays so you can sing along (Windows® version only). The onscreen piano keyboard lets you see the music as it's played. Fill your home with wonderful Christmas music!

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Can game audio and music making coexist peacefully and inexpensively?

By Brian Smithers

Guillemot's Maxi Studio ISIS (Interactive Sound Integration System) sound card covers a lot of bases, and covers them all pretty well. It offers a RAM-based wavetable synthesizer that comes standard with 4 MB (expandable to 36 MB) and complete sample-editing software. It also has a half-rackspace audio interface with eight inputs and four outputs on unbalanced 1/4-inch connectors, 20-bit converters, optical and coaxial S/PDIF I/O, and MIDI In/Out/Thru. The final touch is onboard DSP to provide surround sound and other effects on two or four speakers.

The Maxi Studio ISIS is strictly a 16-bit system—even the digital I/O passes only 16 bits—and this will rule it out for some users. Still, its sound is just fine. The recordings I made came out sounding natural, reasonably uncolored, and very quiet. Its synthesis and sampling capabilities are also good, especially if you load it with RAM. The Maxi Studio ISIS is a good value, no matter how you look at it.

Some clarification is in order, however, regarding ISIS's "RISC-based Digital Signal Processor (DSP)." Guillemot's Web site and print ads say this DSP "will provide audio enthusiasts with a powerful effects-processing engine." This

statement led me to expect that I could use it for EQ, reverb, chorus, or similar effects to take some of the load off my CPU. This is not the case. Powerful DSP-based effects such as reverb, pitch shifting, and surround processing are indeed available, but only in "multimedia" mode, which is used for games only. In its music-production mode, the processor is reconfigured to handle synthesis and audio I/O, not effects.

SETTING IT ALL UP

Installation was simple and relatively trouble free. ISIS requires an open PCI slot for its primary card and an open bracket space for its daughterboard, which does not plug into a slot. The daughterboard provides the connector for the interface and connects to the primary board via a ribbon cable. A 2-meter cable is provided for connecting the interface to the daughterboard. No additional power is required for the interface.

Windows recognized the new hardware and initiated the appropriate wizard, but I had to point it to the installation CD. The rest of the driver and software installation went pretty well, with only the usual minor bumps along the way. The package includes a floppy disk that updates the CD version. In addition, for best performance (see the sidebar "Track by Track by Track"), you should install two more update files, which total about 3.5 MB and are available from the Guillemot Web site.

After you have installed the drivers and applications, you are prompted to install the bundled software, which

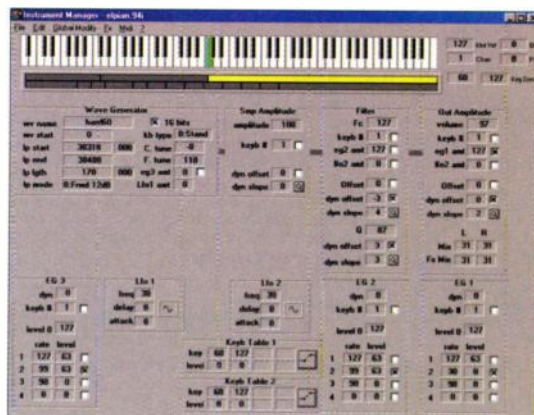


FIG. 1: Instrument Manager lets you modify existing sound banks or create your own. It may not be the zippiest interface, but all the tools for creative sample-based synthesis are right there, with two LFOs, three envelope generators, and more. The bars below the keyboard indicate split points and layers, with the current split highlighted in yellow.

includes Emagic's *Logic Audio Pro ISIS*, Syntrillium's *Cool Edit Pro SE*, and Sonic Foundry's *Acid DJ*. All are scaled-down versions of well-respected products. Together they provide ISIS users with plenty of horsepower for most music-making situations, although some users will undoubtedly want to upgrade to the full versions. Demo CDs from Steinberg and Cakewalk complete the package. I tested ISIS with the stock bundle and also with *Cakewalk Pro Audio 8.04*.

SOUNDBANKS AND SUCH

The ISIS offers two onboard synthesizers for 64-note polyphony. The synths are accessed via two internal MIDI ports, for a total of 32 channels. The two ports show up as ISIS Synthesizer and ISIS Synthesizer Extended, but they share the same RAM and therefore the same sound banks. This means, for example, that you could assign 32 patches from the same bank without having to load them into RAM twice (one time for each "separate synth").

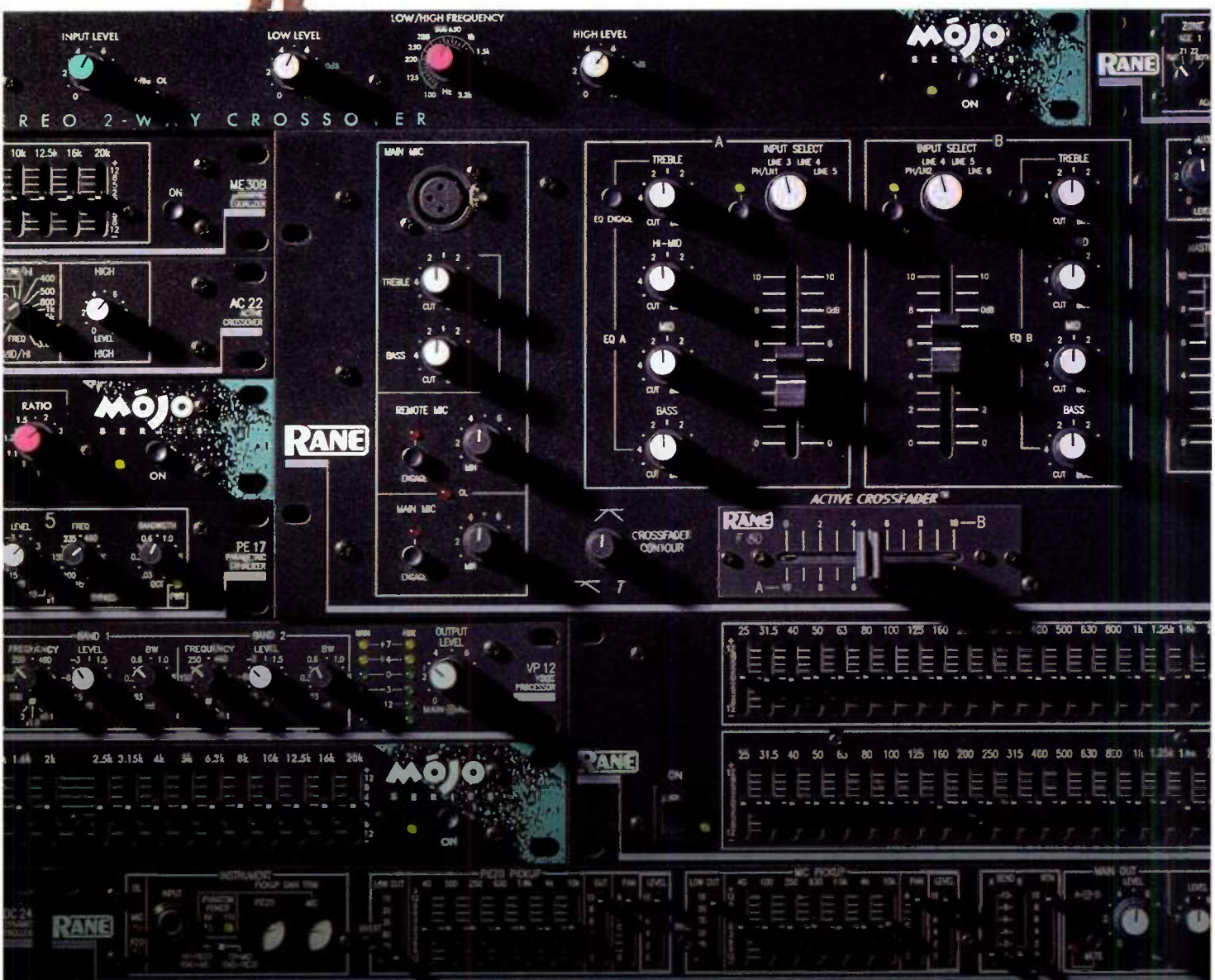
ISIS's default 4 MB GM/GS sound set is licensed from Roland, and it sounds quite good, as you'd expect, with a nice acoustic grand piano, a decent Clavinet, and much more. The drum sets are solid and convincing, if not extremely contemporary. I found the solo and ensemble strings very usable, not just as background pads, but in some classical situations as well. The wind instruments and guitars are more of a hit-and-miss proposition: weak trumpet but fair



The Guillemot Maxi Studio ISIS is a well-equipped sound card with multiple analog and digital I/O options. An audio interface keeps the system's converters outside of the computer, and a game mode provides DSP processing for those moments when busy musicians just want to relax a bit.



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bassoon, good nylon-string acoustic guitar but thin steel-string. But even the instruments that sound sorry in solo have that Sound Canvas flair for working well in context. Of course, the great thing about a card like this is that you can tweak or replace what you don't like.

Keep in mind that the default sound set takes up all of the standard memory. You'll definitely want to pick up a 32 MB SIMM at the same time you purchase your ISIS so you can experiment with additional banks without having to unload the default set. Installing the SIMM is simple, but it does require setting a jumper. The online documentation provides complete instructions for this, but no printed instructions are included. So neophytes will have to install the card, software, and online manuals in order to learn how to install the additional

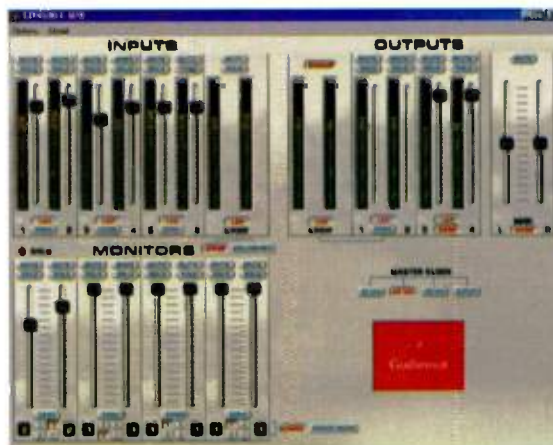


FIG. 2: The heart of the ISIS system is the Console 8/4, which manages input and output levels as well as sample rate. Its Monitors section allows you to create up to four complex mono (or two stereo) headphone mixes. The resulting mix is sent directly back out for accurate, low-latency monitoring.

RAM, then take it all apart again to perform the installation.

Guillemot has also included on the installation CD almost 200 MB of sounds from a company called Groove Style (www.groovestyle.com). These cover
(continued on p. 182)

TRACK BY TRACK BY TRACK

In the interest of science, I simultaneously recorded the same stereo mix on two pairs of ISIS inputs to see if any inconsistencies in timing or quality would result. When I played back the two sets of tracks, which should have been identical and in perfect sync, I heard a significant amount of chorusing. The delay between the two pairs of tracks was small enough that you could easily miss it if you were primarily overdubbing a track or two at a time. But try setting up eight mics on a drum set, and the results would be exasperating.

Fortunately, the latest driver solved the problem. In fact, when I compared the tracks at maximum zoom after the driver update (see Fig. A), they were so close that, still in the interest of science, I inverted the phase

of one pair and shifted them three samples to the right. I achieved almost perfect phase cancellation. So much for the question of intertrack consistency! It's also worth noting that ISIS made it very easy to set virtually identical levels for the two pairs of tracks, thanks to those nice Console 8/4 faders.

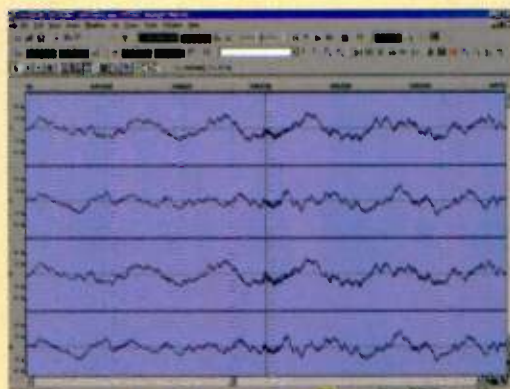


FIG. A: Recorded after the driver update, the two pairs of tracks looked virtually identical, as they should. Inverting one pair resulted in near-total phase cancellation.

COOL FRONT. SERIOUS BACK.



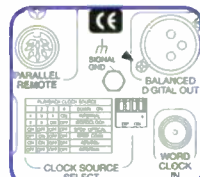
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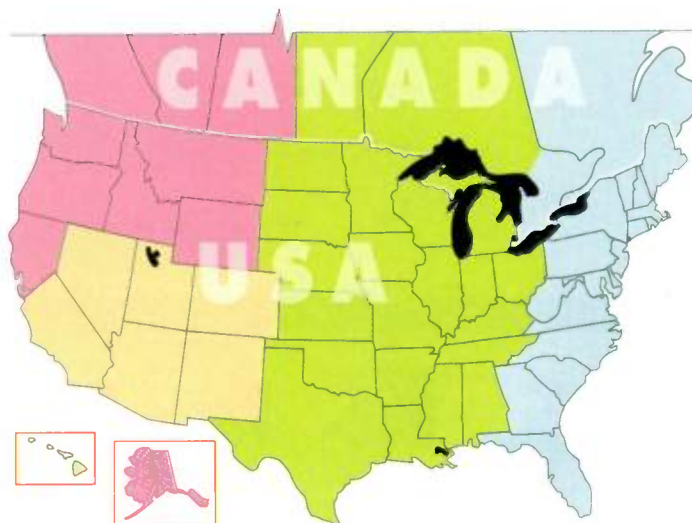
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(continued from p. 176)

a wide range of instruments and styles, from pop/rock drum kits to blues harmonica to shake-yer-booty loops to squeaky-saxophone riffs. The quality of the sounds is generally very good, giving you plenty of material to work with and plenty of ideas for programming your own sounds.

The sound-bank format is proprietary, and there isn't any simple way to convert banks from other popular sample formats. But Groove Style has lots of other sounds available on its Web site, and Guillemot promises to make more sound banks available for download from its Maxi Sound Web site (www.maxisound.com).

An applet called Soundbank Manager is included for loading and combining sound banks. You can launch it from the Start menu or by right-clicking on the ISIS Manager icon in the system tray. Soundbank Manager's interface is divided into three tabs: Bank Downloader, Memory Explorer, and Bank Compiler.

Bank Downloader is for loading and unloading banks via the available RAM. Just right-click on the first available bank number, then select Load. An Explorer window opens, from which you select any available sound-bank file. Bank Downloader also includes a "gas gauge" display to let you know how much memory you have left to work with. (Tip for Windows 98 users: It's annoying when you try to load a bank of unknown size and find you don't have room for it. Before loading, use the Details button on the Load window's toolbar to see the bank's file size.)

Memory Explorer shows the sound banks you've loaded and the MIDI banks and patches of which they're composed. You can use the onscreen keyboard or an external MIDI device to audition the sounds. Bank Compiler, the third tab, is used when you create your own sound banks. I'll describe that process next.

Instrument Manager is where the creation process begins (see Fig. 1). With it you can modify existing sound banks or create your own from scratch. It's not a simple process, but the documentation leads you step-by-step in decent fashion. Instrument Manager packs some serious power for molding your samples, allowing for everything from intricate keymappings to multilayered samples and

Velocity crossfades. With two LFOs, three envelope generators, and a resonant filter, you can tweak to your heart's content.

My big beef about the way ISIS manages its synth resources is that neither Soundbank Manager nor Instrument Manager will share ISIS with another application; they won't even share with each other. If you're working on a piece in your sequencer and decide to experiment with some other sounds, you need to save your work, exit your sequencer, open Soundbank Manager, find and load the sounds you want, exit Soundbank Manager, then open your sequencer again. At this point you can finally see if the sound works in context the way you'd hoped. This is a far too cumbersome procedure in an otherwise sensible package.

ISIS INS AND OUTS

The 2-meter cable that connects the interface to the computer is long enough for a typical desktop studio. If it's not long enough for your setup, you'll have to rearrange things, because Guillemot says 2 meters is the maximum operating length.

You can run your audio sources through a mixer first, or you can connect them directly to ISIS. Either way, you'll be making unbalanced line-level connections. If a particular source has insufficient gain, ISIS can provide a

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6 dB boost, which you enable through the Console 8/4 mixer applet. It's a global adjustment, not per-input, so you'll need to trim back your other sources accordingly.

MIDI In, Out, and Thru connections are made at the back of the interface. S/PDIF digital audio inputs and outputs are conveniently located on the front panel in both optical and coaxial formats. If you use powered monitors without a mixer, you'll long for a front-panel headphone jack. In a pinch you could use the 1/4-inch line-out jack in the back of the card; it has enough power to drive headphones. But the sound coming through the "game card" circuitry isn't as good, and you'll have to control the volume through Windows' volume control.

ISIS's A/D and D/A converters are housed in the interface, so induced electrical noise from hard drives and fans isn't a problem. I found them to be very quiet. They're 20-bit converters, but remember that ISIS operates at a maximum 16-bit resolution, even via the digital connections. (The extra bits could, theoretically, improve the recorded sound quality somewhat, but I didn't do any serious A/B comparisons with other cards during this review.) Internal processing is performed at 28-bit resolution. Buttons on the Console 8/4 allow you to select a sample rate of 32, 44.1, or 48 kHz, or slave to the digital input.

MAXI MIXING

Perhaps the most remarkable thing about ISIS is its mixer section (see Fig. 2). I'm sure "Console 8/4" sounds more poetic in Guillemot's native French, but it's a powerful applet in any language. The mixer is divided into three sections: Inputs, Outputs, and Monitors. Each section features mute and solo buttons on all channels, and faders that are plenty long enough to give you precise control over levels.

As you'd expect, the Inputs section controls the levels of the eight audio inputs as they're recorded to disk, and

Maxi Studio ISIS Specifications

Synthesis Method	wavetable
Polyphonic Voices/Multitimbral Parts	64/32
MIDI Channels	32 internal; 16 external
Sample RAM	4 MB standard; expandable to 36 MB
Effects	reverb (8 types); chorus (8 types)
Analog I/O	(8) unbalanced 1/4" inputs; (4) unbalanced 1/4" outputs; (1) 1/4" stereo line input; (2) 1/4" stereo line outputs (main/surround); (1) 1/4" mono mic input
Digital I/O	stereo coaxial S/PDIF; stereo optical S/PDIF
MIDI Ports	In, Out, Thru
A/D and D/A Converters	20-bit
Resolution/Sampling Rate	16-bit/32, 44.1, or 48 kHz
Frequency Response	10 Hz to 20 kHz (+0 dB, -1.5 dB)
Signal-to-Noise Ratio	98 dB (A weighted, 1 kHz at 0 dBFS)
THD + Noise	0.002% (A weighted, 1 kHz at 0 dBFS)

the Outputs section controls the level of playback from disk to the four audio outputs. In both sections, you have the option of ganging adjacent tracks, which is a great convenience when you're recording stereo sources. You'll probably leave your outputs ganged as stereo pairs most of the time, but it's nice to be able to separate them when necessary. The most recent software update adds a pair of faders for MIDI output level, fixing a minor annoyance in the original release.

Each input, output, and monitor channel has an LED-style meter that can be turned off when processing power is at a premium. Like the faders, the meters are long enough, detailed enough, and responsive enough to give you confidence when setting levels. You'll also find meters for the S/PDIF output pair, whose levels are linked to those of analog outputs 1 and 2. By clicking the Backup button, you can remove the output faders from the S/PDIF signal path for a direct digital copy without attenuation.

The best part of Console 8/4 is its Monitors section. These eight faders correspond to the eight inputs, but they don't affect the recording level. They bounce the signal right back to the outputs for monitoring with negligible latency, as do systems costing several times more than ISIS. This is a truly great feature for such an inexpensive system. The Monitors section can be configured to provide up to four completely different mono (or two stereo) mixes of the live inputs.

It would be nice to be able to pan the monitor channels when working in stereo mode, but the equivalent can be accomplished in mono mode with a little effort and imagination. Another complication is that MIDI output is restricted to outputs 1 and 2, so if you're setting up two stereo mixes, one will be incomplete. Of course, depending on the recording scenario, this might not be a problem.

FINAL THOUGHTS

It's unfortunate that ISIS's S/PDIF I/O doesn't support higher-resolution audio, as this would provide an easy and inexpensive upgrade path for many sound card owners. In fairness, though, good 16-bit external converters can provide some sonic benefits that higher-resolution converters housed inside a PC cannot. I also wish that ISIS supported at least a couple of popular sound-bank formats, and that Sound-bank Manager and Instrument Manager could share audio resources with each other and a sequencer.

It's silly to think that any \$399 sound card is destined to become the tool of choice for major-label music production. But there's no doubt in my mind that ISIS will spawn about a bazillion great-sounding demos. With a sizable palette of sounds, sampling support, ample audio I/O, and a respectable software bundle, it will appeal to anyone looking for an economical home studio solution. It may not be perfect, but it sure packs a lot of bang for the buck. ☉

Maxi Studio ISIS

Minimum System Requirements

Pentium 166; 32 MB RAM; Windows 95/98; PCI 2.1 slot

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David Leach
(Ben Harper)



Tito Puente
('The Mambo King')



Mike Malinin
(Goo Goo Dolls)



Giovanni Hidalgo,
(Master Conguero)



Vera Figueiredo
(Solo Artist, Brazil)



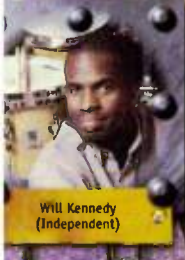
Alex Acuña
(Weather Report)



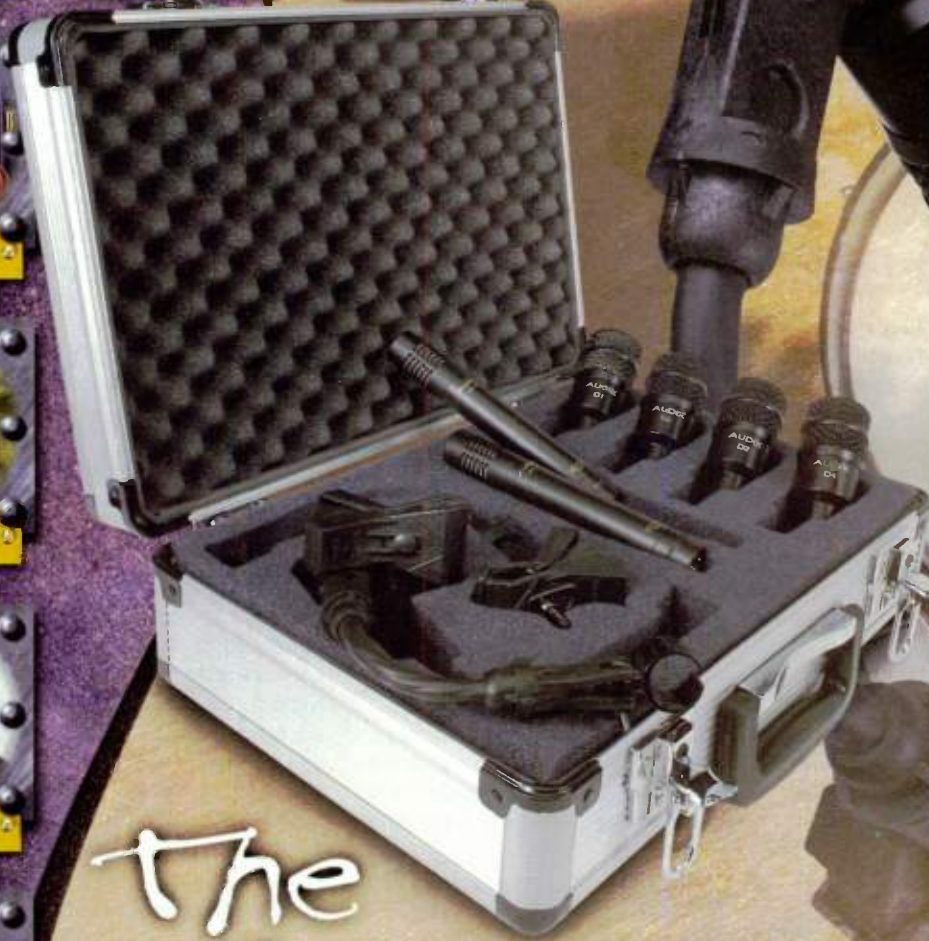
Luis Conte
(Independent)



Talking Drums - Jesus Diaz,
David Gibraltar, Michael Spier



Will Kennedy
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QUICK PICKS

BEST SERVICE

Dance Mega Drums 2

By Jeff Obbe

Best Service regularly produces discs packed to the hilt with sounds, and with some 4,000 drum samples, *Dance Mega Drums 2* (\$99.95, two-disc set) is no exception. The first CD is entirely audio; the second offers audio and samples in Akai and



Dance Mega Drums 2 from Best Service lives up to its name, offering an immense palette of electronic hits.

E-mu formats. This set focuses on electronic sounds, primarily hip-hop and house styles, with stereo samples of drum kit elements, a smattering of percussion, some popular beatboxes (in mono), and whole kits.

Mega Choices

In order to present so many samples, Best Service fits 35 to 48 samples into each track. This is a double-edged sword: there are too many sounds to index conveniently, and you're forced to audition the options as they blaze by. On the other hand, the samples and programming are very good, and you get an immense palette to choose from.

Mega Samples

The kick drums run the gamut from punchy and tight to wildly experimental.

You'll encounter synthy kicks with a resonant squidge, fat subsonic tones, full-bodied kicks with lots of "pop," and combinations like a bass drum crossed with a tambourine. Some kicks have a pinch of delay or reverse reverb, others a longer decay or a large reverb. Many can be used outside the standard bass drum role, transposed and flown into a piece as a cue or single-shot musical event.

The snares cover a lot of aural acreage. Most are bright, high-tuned hits with lots of sizzle and crunch. Many bring out the metallic aspect of the snare chain. Some of the samples have short delay tails; others use the combo effect to meld the snare with the sound of breaking glass, tambourine, or a twisted vocal bit. I particularly liked the one that sounded as if small stones were being rolled around inside the drum during its long decay.

There are a few very cool snaps, and a bunch of excellent claps. Hordes of unusual hi-hats are here, tweaked to sound squashed, synthy, noisy, ringing, and on and on. Likewise, a slew of ride and crash cymbals are presented. Shakers, tambourines, bongos, congas, toms, and tablas make up the percussion section.

A section of processed percussion adds even more appealing and strange sounds—all of them usable—onto the gargantuan heap of material on this CD.

Beatboxes include the Casio MT-36, Elka Wilgamat, Maestro 500, Roland CR-8, a couple of Univox machines, and the Alesis DM-5 and SR-16. With approximately 500 samples in this category, you will have plenty of options.

Big Finish

In practice, the number of samples, the lack of much description or indexing, and the speed at which the samples go by leave you with no choice but to be intuitive and spontaneous in your selection. This isn't a bad thing; drum samples demand little memory and are easy to snag. I liked the huge assortment, and the programming is well done. Whatever your dance style, you'll be sampling from this disc for a long time to come.

Overall EM Rating (1 through 5): 4
CIRCLE #445 ON READER SERVICE CARD

CDP

GrainMill 1.1 (Win)

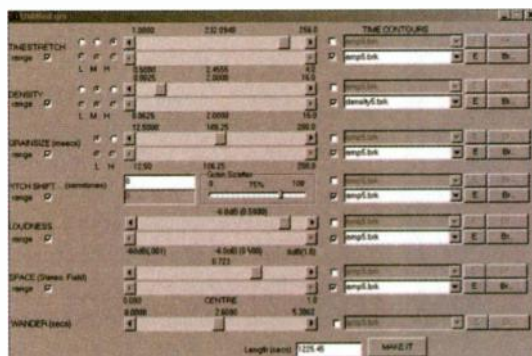
By Dennis Miller

If you're a game composer, sound designer, or anyone who enjoys manipulating sound, you're probably always on the lookout for new ways to slice and dice your material. CDP's *GrainMill 1.1* (which costs 39 British pounds, or about \$70 in U.S. currency) is a powerful and unique application that employs granular synthesis to alter audio files in numerous ways. Whether used to perform time-stretching, pitch-shifting, or far more radical transformations, this versatile software is a great resource to add to your processing toolkit.

Seeds of Creation

If you're unfamiliar with the concept of granulation, have a look at John Duesenberry's excellent article on the subject, "Square One: A World in a Grain of Sound," in the November 1999 issue of *EM*. At heart, the technique is simple: slice a sample into hundreds or even thousands of small chunks (called *grains*), then manipulate and reshape the grains before reconstructing the file and playing it back. *GrainMill* gives you precise control over this reshaping process and lets you set random amounts to create, in most cases, fascinating new sounds from your existing material.

The main action in *GrainMill* takes place in a window filled with controls for modifying the shaping parameters. Here you'll find settings including pitch and time-stretch amount, stereo placement, amplitude modification, and grain density. You can alter the range displayed by the various parameters to allow for major adjustments, such as stretching time at a rate of 256 times, or



GrainMill's parameter screen offers very precise controls for configuring the granulation process you employ. The program will also choose random values for any of the parameters.

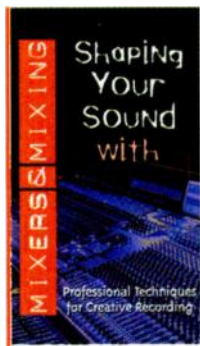
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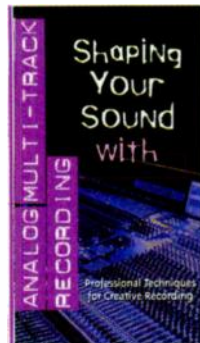


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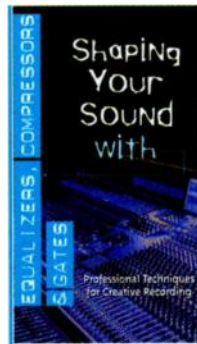


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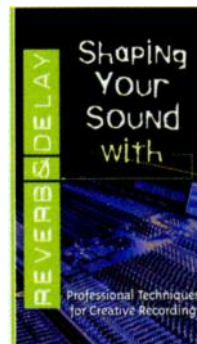


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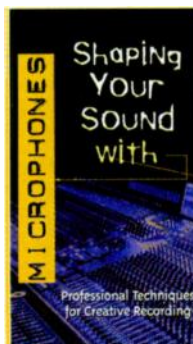


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extremely minute modifications, such as a stretching factor of 0.002%. You can also establish a range of values within which the program will make random selections.

Grain Elevator

Among the more interesting parameters are Wander, which affects the distance between successive grains that are chosen from the source file (the greater the distance, the less similar your new file will be to the original file). Also useful is Grain-size, which can vary from 12.5 milliseconds to more than 3 seconds. Depending

on the settings you use, you can create shimmering echo effects or smooth time-stretched versions of your original file.

The parameter screen also provides controls for making time-varying modifications. *GrainMill* can read text files that contain envelope segment start times and values, which means you can use any type of software to generate complex envelope shapes. Equally useful, though, is its graphic envelope designer, which you can use to build complex shapes that control any of the grain parameters. The envelope designer also has the unique ability to "play"

the envelopes you design using a sine-wave oscillator. (The envelope can control the oscillator's amplitude or frequency.) You can even save the output of the envelope as an audio file.

Individual segments of the envelope can be linear, logarithmic, or exponential, and there's no limit to the number of breakpoints you can have. And here's a twist: you can extract the amplitude envelope from a preexisting sound file by loading it into the editor, where it will appear as a waveform, complete with "handles" that are used to manipulate the individual segments of the graph. You can then use the amplitude contour of the sound file to control any of the parameters in the grain generator or map the contour to the frequency parameter of an oscillator and save *that* as an audio file to disk.

Savory Spices

GrainMill works only on mono files, and I wish there were a way to type in exact values rather than using the slider for all data entry, but these minor shortcomings hardly detract from a program that is so well designed. A very thorough tutorial, written by Philippos Theocharidis, is included with the software and explains all of the parameters in detail. There are also a number of example parameter files to get you going.

If you're looking for an intriguing new way to create sounds of many different varieties, *GrainMill* will spice up your library of unusual sound-processing resources. Add it to your next audio stew!

Overall EM Rating (1 through 5): 4.5

CIRCLE #446 ON READER SERVICE CARD

PROSONIQ/STEINBERG

Orange Vocoder 1.01 (Mac)

By Rob Shrock

Prosoniq's *Orange Vocoder 1.01* (\$199) packs a lot of punch for a VST plug-in that simulates a 24-band analog vocoder. *Orange Vocoder* is capable of creating the classic synth-voice effects made famous by 1980s funk band Zapp, and you use it in other ways, creating new sounds and effects with a little work. The idea is straightforward: use the frequency characteristics of one sound (the modulator) to alter the timbre of another (the carrier). Traditionally, a vocoder uses a vocal input to add a speechlike quality to a string or synth sound. However, with this plug-in, it's possible to combine any two

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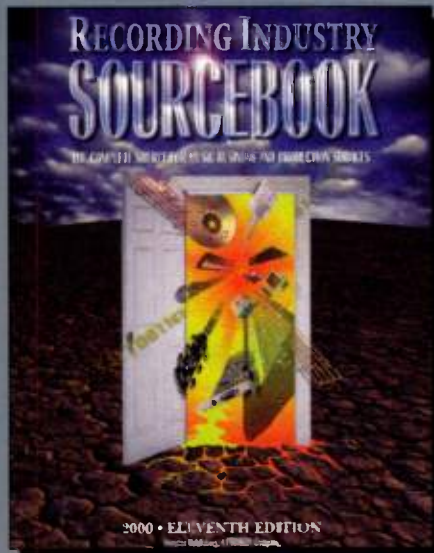
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Sound Blending

Orange Vocoder contains an eight-voice, two-oscillator synth that can function as the carrier, or you can use an external source and send it through the VST effects rack. A set of 24 band-pass filters modifies the carrier based on the modulator's harmonic content, and a 12-band graphic equalizer shapes the output further. A mixer section allows you to blend the effect with the unprocessed modulator and carrier signals. A lowpass filter (with a distortion component) and a basic reverb round out the available features. You also get 64-bit internal processing.

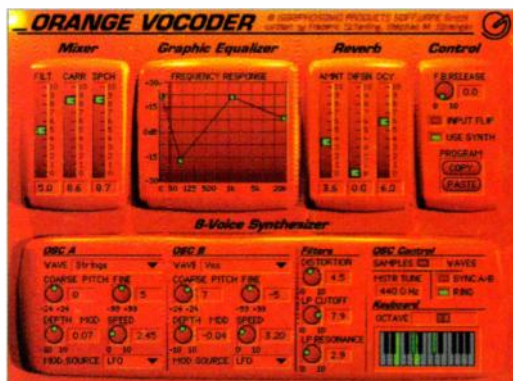
You can use two audio sources as the input signals, but you must read the manual to learn how to set up the signal path properly, which is a little more complicated than simply opening a VST plug-in. (It's not difficult, though, and the results obtained are well worth it.) For example, you can live up a dance track by modulating a synth pad with a drum loop. Furthermore, the software is flexible enough that you can avoid

creating clichéd sounds when adding vocal characteristics to a guitar or synth sound.

Juicy Synth

The included virtual synth is very handy: it sounds good and contains ten basic waveforms and seven sampled sounds (bear in mind that you cannot add to the sampled sounds). When you use *Orange Vocoder's* internal synth as the carrier, the demands on your computer's CPU will rise significantly. Although it worked without a glitch on a Power Macintosh G3 with a processing speed of 233 MHz and 192 MB of RAM, it could not consistently handle running in real-time with other tracks and plug-ins active. I found that the best way to use the *Orange Vocoder* was to concentrate on building a cool sound and saving the processed output as a new audio file rather than running the plug-in in real time.

Although you cannot play the synth via MIDI in real time (a VST 2.0 feature that will be implemented in the plug-in in its next revision), you can save presets of



Steinberg's *Orange Vocoder* provides two internal oscillators that you can use as sound sources, or you can use audio files for the same purpose. Numerous editable parameters give you the ability to create an extensive range of sounds.

different notes or chords and automate the preset selection in your sequencer application. For this reason, it's much more satisfying and versatile to use an external carrier signal, which also eases the load on your computer.

Orange Whip?

Orange Vocoder's interface is strikingly orange, so it's not always easy to read,

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especially at a 1024 x 768 monitor resolution. I found that it worked best to lower my resolution to 800 x 600, spend a few minutes creating something cool, then save the file and go back to my normal display size.

At \$199, the price is right. If you don't mind spending a little time and experimenting, the *Orange Vocoder* can generate some very dynamic sonic textures. You're responsible only for providing the imagination.

Overall EM Rating (1 through 5): 4
CIRCLE #447 ON READER SERVICE CARD

VAMTECH

Drumtrax 3.0 (Mac/Win)

By Jeff Obee

Vamtech's *Drumtrax 3.0* (\$99.95) is loaded with an unexpectedly large number of drum tracks in an impressive array of styles. Unlike other Standard MIDI File products, it comes on a CD-ROM and includes a software librarian.

Tracking the Trax

The *Drumtrax* CD-ROM comes with an installer, so you can either place the entire disc's contents (34 MB) on your computer or install just the librarian. The librarian is a tool for organizing the plentiful files. Its main screen contains a list of the files; file descriptions; information about tempo, category, and meter; and space for user comments. The librarian's search feature allows you to input specific search criteria or type in keywords. When you've selected a drum pattern, press the Launch button to open it in your sequencer. The librarian also functions as the manual, giving you an easy-to-use and in-depth help section.

Drumtrax gives you a similar level of control when you're working with the files. You can open a Type 0 or Type 1 MIDI file for each track. A nice addition is the markers, which specify which rhythmic event occurs at what bar in a track. For instance, if you've selected file ALT_105, you can see that there is a tom fill at bar 42. This is helpful when splicing, as the patterns are generally long.

Feeling the Trax

Drumtrax has SMFs in many musical styles. Categories include Alternative, Blues,



Drumtrax 3.0 from Vamtech gives you a helpful file librarian and an enormous number of Standard MIDI Files.

Country, Dance/Pop, Hip-Hop, Hard Rock, Jazz, Latin, OddMeters, R&B, Rap, Soft Rock, ToolBox, and World. Each category has numerous tracks, and each track is substantial, with an average length of around 64 bars.

So how do they feel? Overall, they're very good. The Dance/Pop category has a wealth of energetic grooves that can be mixed and matched with laudable results. It's nice to have odd meters such as 5/4, 7/8, 9/8, 11/16, and 19/8 available, although some grooves are unfocused and don't work at the designated tempos. The Hard Rock, Pop, and Alternative patterns work well, but those are a cinch. As for jazz, Elvin Jones this is not. But the Jazz category does contain enough material for you to assemble some passable tracks. In fairness to Vamtech, jazz is definitely the hardest style to create convincingly through MIDI. Everything in the World and Latin categories groove well and accurately represent their genres.

ToolBox is the icing on the cake. Its files contain all sorts of extra goodies, such as difficult-to-program snare accents and rolls, cymbal parts, percussion ensembles, and so forth. It's impossible for the ToolBox to cover every rhythmic accent, but it is an invaluable resource.

On the Right Trax

To say that *Drumtrax* is versatile is an understatement. Vamtech has produced a well-thought-out product here, which will provide a broad cross section of musicians with an abundance of rhythmic resources. If you use SMF drum patterns, this is a great investment. ☺

Overall EM Rating (1 through 5): 4
CIRCLE #448 ON READER SERVICE CARD

THE I-CUBE SYSTEM

Express, Expand, Explore



Explore new ways of controlling your MIDI gear with the I-Cube. Trigger samples with a wave of your hand. Escape menu-hell and use real knobs, sliders, buttons and lights to program. A light beam acts as your mod wheel, a touch triggers your samples, the temperature controls your volume!

Here at Infusion Systems we develop bizarre ways of controlling gear. All of our sensors are continuous control but can also act as switches (note on/note off). They are "tuned" and pre-wired to work with the I-Cube - no additional electronics or soldering required. Each I-Cube comes with a Turn sensor and a See actuator to get you started. Check out our web site www.infusionsystems.com for even more sensor options!

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greater accessibility via alternate controllers



circle #623 on reader service card

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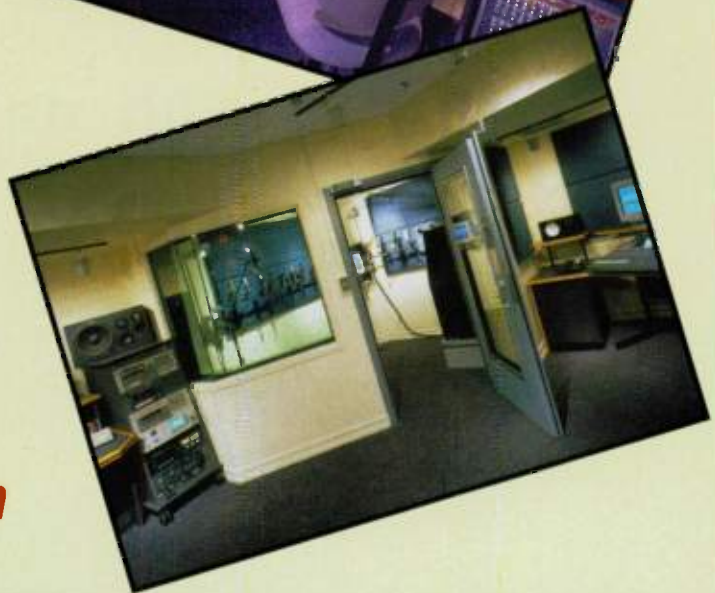
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DIGITAL MULTI-TRACK RECORDERS

TASCAM

DA-78HR Modular Digital Multitrack

Expanding on their industry standard line of DTRS multi-tracks, Tascam has just unveiled their latest DTRS recorder, the true 24-bit DA78HR, at the most recent AES show in NYC. Not only is the DA78HR the first true 24-bit MDM it also has a host of standard features that make make this DTRS not only cutting edge but cost effective. These standard features include SMPTE and MIDI Timecode as well as a built-in digital mixer and S/PDIF digital I/O that will allow you to do a quick mix right to DAT or CD or for doing track bouncing. The DA 78HR is also compatible to all of the other DTRS machines in the DTRS sync line.



- Selectable 16 bit or 24 bit High Resolution audio
- 24 bit A/D and D/A converters
- >104dB Dynamic range
- 20Hz - 20kHz frequency response ±5dB
- 1 hr. 48 min. recording time on a single 120 tape
- On-Board SMPTE synchronizer - chase or generate timecode
- On-Board support for MIDI Machine Control

- Internal digital mixer with level and pan for internal bouncing, or for quick mixes
- Track slip from -200 to +7200 samples
- Expandable up to 128 tracks (16 machines)
- Word Sync In/Out/Thru
- Analog output on DB25 balanced or RCA unbalanced
- Digital output on TDFIF or 2 channels of S/PDIF

ALESIS

Studio Pack ADAT Recoding Bundle

The ADAT Studio Pack has everything you need to get you up and running with tape based digital multitrack recording. The Studio Pack is based around the LX-20 8-track digital multitrack tape recorder that uses Alesis' renowned ADAT type II tape format, offering true 20-bit recording and playback using inexpensive and readily available S-VHS video cassettes. Also included in the Studio Pack is the S24 24 channel inline mixer as well as the NanoVerb effects processor and NanoCompressor dynamics processor.

ADAT STUDIO PACK CONTENTS--

- LX20 20-Bit digital audio recorder
- Studio 24 recording console with inline monitor
- NanoVerb digital effects processor featuring 16 programs (halls, rooms, plates, chorus, flange, delay multieffects and rotary speaker simulation)
- NanoCompressor stereo compressor/limiter w/ threshold, compression, attack, release and level controls
- Two 8-channel phono (RCA) cable snakes (for ADAT to Studio 24 connection)
- Two dual 1/4 in. stereo 1/4 in. cables for NanoVerb
- Two 1/4 in. insert cables for NanoCompressor



CD RECORDERS & DUPLICATORS

MICROBOARDS

StartREC Digital Audio Editing/ CD Duplication System

The Microboards StartREC is the first digital audio editing system combined with a multitrack CD recordable duplication system for professionals. Audio is recorded to the internal 6.2 GB IDE hard drive using analog or digital inputs. Sample rate conversion is automatic. Tracks can be edited and sequenced using the StartREC's user friendly interface and up to 4 CDs can be recorded simultaneously. StartREC is the ideal solution for studio recording, mastering, post production or any pro audio environment requiring digital audio editing and short run CD-R duplication.



Features--

- 2X, 4X, or 8X recording speeds
- 6.2GB IDE hard drive
- Editing functions include move, divide, combine or delete audio tracks, add or drop any index or sub index, and create track fade in or fade out
- Coaxial SP/DIF or AES/EBU digital input plus optical S/PDIF I/O
- XLR balanced and RCA Line inputs and outputs

- Automatic sample rate conversion from 32 and 48kHz
- Automatic CD Format Detection feature and user friendly interface provide one touch button operation
- Front panel trim pot and LCD display provide accurate input signal and time lapse metering
- SCMS (Serial Copy Management System) is supported regardless of the source disc copy protection status
- StartREC Models Include: ST2000 (2) 8x writers, ST3000 (3) 8x writers and ST4000 (4) 8x writers



CDR-850 CD Recorder

The new HHB CDR850 is one of the most comprehensive CD-R, CD-RW recorders available today. It delivers the outstanding sound quality that HHB is known at a lower price than previous models.



Equipped with a complete range of analog and digital I/O and easy to use one touch recording modes make the CDR850 suitable for any audio environment no matter how sophisticated or demanding.

- CD-R, CD-RW compatible
- All functions accessible from front panel menu
- 4 one touch recording modes: 2 manual, 2 automatic
- Sample rate converter accepts any digital signal from 32kHz to 48kHz including varispeed

- Copies all CD, DAT, MD, DVD and DCC track starts
- Complete user control over SCMS
- Balanced XLR analog I/O, Unbalanced (RCA) phono analog I/O, AES/EBU digital input, coaxial & optical S/PDIF digital I/O

TASCAM CD-RW5000 CD Recorder

The CD-RW5000 is a cost effective Audio CD Mastering system that is powerful and functional. Great for mastering sessions and will write to all currently available media.



- CD-R, CD-RW Applicable • Parallel Control of most transport functions • AES/EBU Digital Input
- Balanced XLR Analog Input

- Balanced XLR Analog Output
- Sync Start (All or 1 Track) • Erase (Disc or Track)
- Auto or Manual Track Increment • Repeat Play

NEW LOWER PRICE

PROCESSING

Lexicon MPX1 Multi-Effects Processor



The MPX-1 is truly an outstanding multi-effects device. Using Lexicon's Lexchip, it offers outstanding reverb or ambience as well as a separate processor for effects for awesome power in the studio or on the road.

FEATURES--

- Intuitive user interface for easy editing, built-in help
- Balanced Analog I/O (1/4" & XLR)
- 56 effect algorithms
- Digital Inputs & Outputs (S/PDIF @ 44.1kHz)
- 18 Bit A/D; 20 Bit D/A Conversion, 32-bit processing
- >90dB of Dynamic Range
- Intelligent Sorting by Name, Number, Application, etc.
- Parameter Morphing
- Dynamic MIDI patching & MIDI automation

ANTARES ATR-1 Intonation Processor "Perfect Pitch in a Box"

By comparing the incoming signal of a vocal or solo instrument with a target pitch defined by a preset or user defined scale, the ATR-1 miraculously corrects out of tune pitch, in real time, without unwanted distortion or artifacts. Balanced I/O, 20-bit A to D conversion and 56-bit processing ensures that the nuance and expression of the original performance is preserved. Additional parameters such as adjusting the speed at which pitch correction takes place, tailor the response of the ATR-1 to match the characteristics of a specific performance or musical style. Ideal for use in the studio or live!

FEATURES--

- Corrects the pitch of a vocal or solo instrument, in real time, without distortion or artifacts
- 20-bit data path, 56-bit internal processing
- Balanced I/O
- Factory Programs for chromatic and standard diatonic scales or customize your own scales
- Individual Scale notes can be bypassed. Bypassed notes will not be pitch corrected.
- Scales can be specified in real time via a MIDI keyboard or sequencer. Specify an exact melody via MIDI
- Completely controllable via SysEx
- Processing delay is no greater than 4 milliseconds.



t.c. electronic

M3000 Professional Reverb



Incorporating TC Electronic's new VSS-3 technology, the M3000 is a great sounding, versatile reverb that is easy to use. Combining ultimate control of early reflections with a transparent reverb tail, the art of reverbation is brought to a new level. Whether it's a phone booth, cave or concert hall, the M3000 delivers high-quality ambience.

FEATURES--

- VSS-3, VSS-3 Gate, C.O.R.E. & REV-3 reverbs as well as Delay, Pitch EQ, Chorus, Flanger, Tremolo, Phaser, Expander/Gate, Compressor and De-Esser
- 300 high-grade factory presets including Halls, Rooms, Plates, Ambience, Gated Reverbs, and more
- Up to 300 user presets in internal RAM and 300 more using an optional PCMCIA card
- Dual engine configuration featuring 24-bit A/D/D/A's
- Connections include AES/EBU, Coaxial S/PDIF, Optical Tos-Link/ADAT & analog XLR I/Os, MIDI IN/OUT/THRU, Clock Sync and External Control.



QUANTUM Digital Mastering Processor



24-bit/96kHz mastering processor with a 48-bit digital signal path and the dbx TYPE IV Conversion System that retains the warmth and body of your signal while adding punch and depth. The intuitive user interface puts several high-end mastering tools at your fingertips including Tape Saturation Emulation (TSE), compression, EQ and more.

FEATURES--

- 96 kHz, 24 bit A/D/A, and Digital I/O on AES/EBU or S/PDIF • 48 bit internal signal path for increased head room and low level resolution • Type IV A/D Conversion system with TSE • 4 band stereo compressor-gate-limiter • 5 band EQ Hi and Lo shelves, 3 band
- fully parametric • Normalizer • Stereo adjust controls stereo image • Sync I/O using dbx's own proprietary clock chips for extremely low jitter sync • Other outputs to 16, 20, or 24 bits • Sample rate conversion • Software updateable via Internet and MIDI • 4 band crossover with variable slopes

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MICROPHONES & PREAMPS

SHURE

KSM-32SL Cardioid Condenser Mic

The reviews are raving about Shure's new "classic" microphone. The KSM32 features Class A, transformerless preamplifier circuitry, low self-noise and increased dynamic range, all necessary for critical studio recording. It has a 15 dB attenuation switch for handling high SPLs, making it suitable for a variety of sound sources including vocals, acoustic instruments, ensembles and overhead miking of drums and percussion. For studios, the KSM32/SL has a light champagne finish and includes an aluminum carrying case, shock and swivel mounts and a velvet pouch. For live applications, the KSM32/CG has a charcoal grey finish and includes a swivel mount and padded zipper bag.

- Frequency response 20Hz - 20kHz



JOE MEEK

TRAKPAK TP-47 JM-47 MIC/ VC-3 MIC PRE KIT

The new Joemeek TP47 TrakPak is an ideal front end to go between you and your digital multitrack. It includes the VC3 mic-pre, compressor, and enhancer, and the new Joemeek JM-47 "Meekrophone" (microphone). This all in one system is all you need to get the warm and punchy vintage sounds of the 60's on to your digital recordings.

JM-47 MEEKROPHONE FEATURES-

- 1" Gold 6 micron hand assembled true condenser capsule
- FET pre amplifier with transformer output
- Low noise, minimalist electronics
- 10dB Pad, switchable
- High pass 100Hz filter
- Quality shockmount
- Classic and "full bodied" sound
- Frequency response, substantially flat 20Hz to 20kHz
- Output impedance, 200ohms balanced, earth free floating
- Power supply, 48V phantom

VC-3 FEATURES-

- Superlativ Mic input with ultra low noise and vast headroom.
- Input gain control with 60dB range on mic and 30dB range on line.
- Phantom power (switched on/off) with LED indicator.



- Compression attack speed switch high/low
- Compression depth control with LED indicator.
- Compressor release speed control.
- Compression in/out: switch.
- Enhancer drive control with LED indicator.
- Enhancer depth control.
- Enhancer resonance control (Q).
- An accurate peak reading meter.
- Output volume control
- XLR type microphone input, standard jack line input.
- Standard jack insert point after the mic amp and pre compressor.
- Standard jack additional mix input port pre compressor.
- Dual line level outputs.
- Compact half of 1U size.

ALSO INCLUDES-

- Heavy duty road case • 5m Meekrophone cable

ART APPLIED RESEARCH AND TECHNOLOGY

Pro Channel Tube Mic Pre/ Compressor/ EQ

The Art Pro Channel is an all-in-one mic/line channel strip featuring a tube mic preamp, compressor and four band parametric EQ. The compression section utilizes the coveted variable mu design found in vintage broadcast limiters that is distinctively fat sounding with a fast aggressive attack. Like all other ART products, the Pro Channel is also affordable. Ideal for professional recording channels for professional recording, project and home studios as a DI box for Instruments, as a front end for Digital Audio Workstations & Computer-based Recording as well as Voice-Over, Broadcast, and Edit Suites.

- Professional Tube-Based Microphone/Line Recording Channel featuring a tube mic pre, switchable optical/variable mu compressor, and tube
- Dynamic Range >100dB (20-20kHz)
- Frequency Response 10Hz to 20kHz (±.5dB)
- Low-Cut Filter Variable: -3dB@10Hz to 250Hz
- XLR balanced & 1/4" unbalanced Inputs and Outputs
- 1/4" unbalanced Insert Connections Between Preamp and Compressor, and Compressor and EQ



- Phantom Power +48v DC (switchable)
- Three Hand-Selected Vacuum Tubes
- Optical/variable mu Tube based compressor with variable threshold, compression ratio, attack and release controls
- Four-band parametric equalizer with selectable Q for the two sweepable mid-bands
- Selectable VU Metering (mic pre out, compressor out, or Main Out)
- Five-Year Warranty



audio-technica.

AT4047SV Cardioid Condenser Mic

The AT4047 is the latest 40 Series large diaphragm condenser mic from Audio Technica. It has the low self noise, wide dynamic range and high sound pressure level capability demanded by recording studios and sound reinforcement professionals.

- Side address cardioid condenser microphone for professional recording and critical applications in broadcast and live sound
- Low self noise, wide dynamic range and high SPL
- Switchable 80Hz Hi Pass Filter and 10dB pad
- Includes AT8449/SV shockmount
- Also Includes a limited edition tweed flight case while supplies last!



AM-52 Class A FET

The GT Electronics AM52 uses a super-clean Class A FET circuit. It amazingly sensitive large diaphragm is capable of handling extremely high sound pressure levels and offers a choice of three polar patterns, for unsurpassed versatility. A perfect choice for virtually any recording application... from vocals to acoustic and amplified instruments.

- Class A FET preamp for extremely transparent, low-noise performance
- Cardioid, Omni and Figure 8 polar patterns
- Large-diameter, super-thin 3 micron gold evaporated Mylar diaphragm
- Switchable -10dB attenuation pad and 80Hz low frequency roll-off filter
- High SPL handling for very loud sources
- Includes hard-shell case and hard mount
- Frequency response 20Hz - 20kHz



AM-61 TUBE

The GT Electronics AM61 offers classic tube performance in a fixed cardioid, large diaphragm condenser mic. An outstanding addition to any project studio or large commercial recording facility seeking rich, warm tube sounds and unsurpassed value.

- Groove Tube military-spec GT5840M vacuum tube preamplifier
- Large diameter, super-thin 3 micron gold evaporated Mylar diaphragm
- Fixed cardioid polar pattern response
- Switchable -10dB attenuation pad and 80Hz low frequency roll-off filter
- Includes hard-shell case, shock mount, hard mount, 6-pin cable and external power supply
- Frequency response 20Hz - 20kHz



- ALSO AVAILABLE AM-51 cardioid class A FET condenser mic
- ALSO AVAILABLE AM-62 multipattern tube condenser mic



C4000B Electret Condenser Mic

This new mic from AKG is a multi polar pattern condenser microphone using a unique electret dual large diaphragm transducer. It is based on the AKG SolidTube design, except that the tube has been replaced by a transistorized impedance converter/preamp. The transformerless output stage offers the C4000B exceptional low frequency response.

FEATURES-

- Electret Dual Large Diaphragm Transducer (1st of its kind)
- Cardioid, hypercardioid & omnidirectional polar patterns
- High Sensitivity

- Extremely low self-noise
- Bass cut filter & Pad switches
- Requires 12, 24 or 48 V phantom power
- Includes M-100 shockmount and wind/pop screen
- Frequency response 20Hz to 20kHz



STUDIO MONITORS

Hafler TRM-6

Bi-Amplified Studio Monitors

Offering honest, consistent sound from top to bottom, the TRM-6 bi-amplified studio monitors are the ideal reference monitors for any recording environment whether tracking, mixing and mastering. Supported by Hafler's legendary amplifier technology providing a more accurate sound field, in width, height and also depth.

FEATURES-

- 33 Watt HF & 50 Watt LF amplification
- 1" soft dome tweeter & 6.5" polypropylene woofer
- 45Hz - 21kHz Response
- Magnetically Shielded
- Electronically and Acoustically Matched



KRK V-6

Bi-Amplified Studio Monitors

These bi-amped studio monitors from KRK supply 90 watts of clean power. Their 6" woofer & 1" silk dome tweeter ensure consistency from top to bottom with crystal clear highs and a solid bass response.

FEATURES-

- 58Hz - 20kHz frequency response
- 1" silk dome tweeter and 6" long stroke, polyvinyl woofer • Magnetically shielded
- 30 Watt HF & 60 Watt LF amplification
- Variable system gain +6dB -30dB
- Neutrik XLR - 1/4" TRS combo connector



MACKIE HR824

Bi-Amplified Studio Monitors

These close field monitors from Mackie have a wide deep response with exceptional detail. Each pair of these bi-amplified speakers has been clinically matched to ensure optimum performance.

FEATURES-

- 8.75" polypropylene woofer, 1" aluminum dome tweeter
- 150W HF & 100W HF amps
- Full space, half space and quarter space placement compensation • 1/4" and XLR inputs
- Hi frequency adjustment, low frequency roll-off switch
- Frequency Response 39Hz to 22kHz ±1.5dB



ALESIS M1 Active

Bi-Amped Ref. Monitor

The new M1 Actives feature custom designed dual amplifiers and an internal active crossover for accurate response. The specs are outstanding with a 1" silk dome tweeter, a 6.5" woofer and 8th order high and low pass electronic crossover filters, perfect for both project and pro recording applications.

FEATURES-

- 75 watt LF and 25 watt HF amps
- 1500Hz crossover point for low midrange coloration
- Dual front mounted ports • Magnetically shielded
- Combination XLR/1/4" connectors with input level control



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COMPUTER BASED DIGITAL AUDIO SYSTEMS



MOTU AUDIO Hard Disk Recording Systems

The MOTU Audio System is a PCI based hard recording solution for the Mac and PC platforms. At the heart of the system is the PCI-324 PCI card that can connect up to three audio interfaces and allows up to 72 channels of simultaneous I/O. Audio interfaces are available with a wide range of I/O configurations including multiple analog I/O with the latest 24-bit A/D-A converters and/or multi channel digital I/O such as ADAT optical and TDIF I/O as well as standard S/PDIF and AES/EBU I/O. Each interface can be purchased separately or with a PCI-324 card allowing you to build a system to suit your needs. Includes drivers for all of today's hottest audio software and AudioDesk, multitrack recording and editing software for the Mac.

THEY ALL FEATURE--

- Mac OS and Windows compatible
- Includes software drivers for compatibility with all of today's popular audio software plus AudioDesk. MOTU's sample-accurate audio workstation software for Mac OS
- Host computer determines the number of tracks that the software can record and play simultaneously, as well as the amount of real-time effects processing it can support
- Front panels display metering for all inputs and outputs

- AudioDesk Audio Workstation Software for Mac OS features 24-bit recording, multi-channel waveform editing, automated virtual mixing, graphic editing of ramp automation, real-time effects, plug-ins with 32-bit floating point processing, crossfades, support for third-party audio plug-ins (in the MOTU Audio System and Adobe Premiere formats), background processing of file-based operations, sample-accurate editing and placement of audio, and more

2408 FEATURES--

- 7 banks of 8 channel I/O 1 bank of analog, 3 banks of ADAT optical, 3 banks of Tascam TDIF, plus stereo S/PDIF
- Custom VLSI chip for amazing I/O capabilities
- Format conversion between ADAT and DA-88
- 24-bit internal data bus for full 24-bit recording via digital inputs



- 20-bit A/D and D/A converters on analog ins & outs
- Standard S/PDIF I/O for digital plus an additional S/PDIF I/O for the main mix
- Sample-accurate synchronization with ADATs and DA88s via an ADAT SYNC IN and RS422

1224 FEATURES--

- 24-bit analog audio interface
- State-of-the-art 24-bit A/D/A
- Simultaneously record and play back 8 channels of balanced (TRS), +4 dB audio
- Stereo AES/EBU digital I/O
- 24-bit balanced +4 XLR main outputs • Word clock in/out



- Dynamic range of 116 dB (A-weighted)
- Front panel displays six-segment metering for all inputs and outputs
- Headphone jack with volume knob

308 Features--

- 8 channels of coaxial S/PDIF using 4 RCA input and 4 RCA output connectors
- 8 channels of optical S/PDIF using 4 Toslink input and 4 Toslink output connectors



- 8 channels of AES/EBU using 4 XLR male and 4 XLR female connectors • Word Clock I/O allows the 308 to synchronize with digital audio environments

241 Features--

- 24 high quality, 24-bit analog inputs
- Balanced 1/4" analog outputs
- Optical and coaxial S/PDIF outputs • Word Clock I/O
- Front panel headphone output with level control



- Connect up to three 241 rack I/Os to a PCI-324 audio card for a total of 72 inputs and six outs

Also available with MOTU's award-winning Digital Performer audio sequencer software package



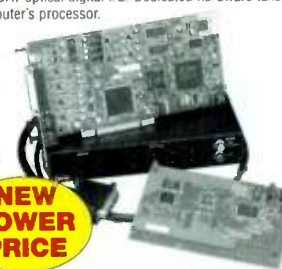
CORE 2 Recording System

High quality, true 24-bit computer based audio system at an affordable price. Easy to use interface offers 4 analog inputs and 8 outs as well as coaxial S/PDIF and 8 channels of ADAT optical digital I/O. Dedicated hardware takes on the burden of CPU intensive tasks putting less strain on the computer's processor.

FEATURES--

- Ultra wide-range 24-bit A/D and D/A converters
- Four channels of analog in, eight channels of analog out,
- Eight channels of ADAT™ digital I/O and a stereo S/PDIF pair.
- Selectable dbx Type IV™ soft-knee limiting on every input channel to simulate tape compression and provide 4dB of improved headroom.
- Ships with Lexicon Drivers and Control Panel for Win 95/98

- Includes Syntrillium's Cool EditPro SE, providing as many as 64 mixing tracks.
- An optional MP-100 daughter-board will be available soon and will include all of the effects found in the Lexicon MPX 100 Dual Channel Effects Processor: Chorus, Flange, Pitch, Detune, Delay, Echo, Rotary, Tremolo and Lexicon Reverb and Ambience



NEW LOWER PRICE

SONORUS STUDIO/O 24-bit Audio Card

The Sonorus STUDIO/O is a 16-channel plug-n-play digital audio card for Mac and PC. It's based around two ADAT compatible Toslink connectors that support 24-bit audio at 44.1 and 48kHz sample rates. The Toslink connectors are software switchable between ADAT lightpipe and standard optical S/PDIF I/O. The hardware specs are enhanced further by the ease at which this card is configurable as well as its compatibility to today's leading Mac and Windows software.

FEATURES--

- Two optical inputs and outputs ('lightpipe' connectors) software selectable between ADAT(8-channel) & S/PDIF
- 18-bit 1/4" headphone/monitor output
- 16-channels, phase-locked and in sync. No ground loops, no noise
- 24 bit audio is supported- ready for the latest generation of digital audio hardware
- Software configurable so there's no jumpers to mess with
- Comes with its own Control Panel software that makes setup simple and allows you to customize & save your settings
- PCI Plug-n-Play Cross-platform compatibility
- Full Windows audio drivers for PC and Cubase VST and Logic Audio (PC & Mac) • Onboard sample rate converter



SOFTWARE

Digital Performer MIDI/AUDIO Software for Mac

Their second major update this year, with a relentless stream of new advanced features, like sample-accurate editing, sample-accurate sync and MOTU's innovative RAM-based loop recording tool called POLAR. DP is packed full of features you won't find anywhere else:

FEATURES--

- Includes over 50 real-time MIDI & audio effects plug-ins
- POLAR window - Interactive audio loop recording the way it should be
- 24-bit recording and editing
- 32-bit native effects processing - incredible sounding EQ and other FX
- 64-bit MasterWorks™ Limiter and Multiband Compressor plug-ins included
- Advanced waveform editor
- Sample-accurate - the most reliable editing and tightest sync you can get

- OMF export - transfer your entire session, crossfades and all, into Pro Tools
- Samplers window - drag & drop samples between your Mac and your Sampler
- PureDSP™ stereo pitch-shifting and time-stretching
- Unlimited audio tracks, real-time editing, full automation and remote control • QuickTime digital video support, and much more • Compatible with Pro Tools24, the MOTU 2408 and today's other popular systems
- Digital Performer is an entire recording studio inside your computer



SONIC



FOUNDRY

FEATURES--

- 24-bit/96kHz file support • Unlimited Tracks (dependent on CPU speed and RAM) • Non-destructive Editing
- Supports multiple file formats and sample rates on a single track • DirectX plug-in support with 32 Assignable FX sends • 26 Aux outputs • Unlimited Undo/Redo

Vegas Multi-track Recording Software

From the company that brought you Sound Forge and Acid Pro comes Vegas Pro, the non-linear multitrack recording and editing software, for Windows. Whether you need better than CD quality 24-bit/96kHz file support for tracking your next album project or are authoring content for streaming audio on the internet, Vegas Pro's got you covered.



- Multiple I/O support • Dual monitor support
- MIDI Timecode support
- 4-band EQ and compressor inserts on every channel
- Audio/Video Scrub
- Direct internet streaming file authoring (Windows Media Technologies and Real Networks G2)

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TC WORKS SPARK 2-Track Editing For Mac

Intuitive, easy to use 2-track editing software for the Power Macintosh. 24 and 32-bit file support is ideal for music mastering. SMPTE synchronization and quicktime movie import capabilities for editing audio for film and video. A host of compression algorithms such as QDesign make editing audio for the web a snap. Most major professional samplers are also supported and the Loop Tuner helps create perfect loops every time.

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- Browser View- File database, audio editor and play list all in one easy to use display with movable border lines. Eliminates the need for surfing several windows to access, add, edit files
- Wave Editor- Perform off-line editing, processing, and create markers and non-destructive regions
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- DSP Processing Includes- Normalize, Reverse, Fades

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- Supports file swapping with most major samplers and any sampler that supports SMDI
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- Bundled with Adaptec's Toast Pro you can burn your audio on CD
- Extract audio from a quicktime movie for editing and then export the audio along with the video into a new file



Pro-FX Bundle Plug-ins For Mac or PC

The latest Bundle from Waves has some of the coolest sound design plug-ins available for the Mac and Windows platforms.

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- **MondoMod**- AM, FM, and Rotation (stereo panning) modulators • Gentle wandering guitar solo panning or

- bizarre destructive effects
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- **UltraPitch**- Formant-corrected pitch shifter with 6-voices
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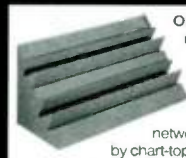
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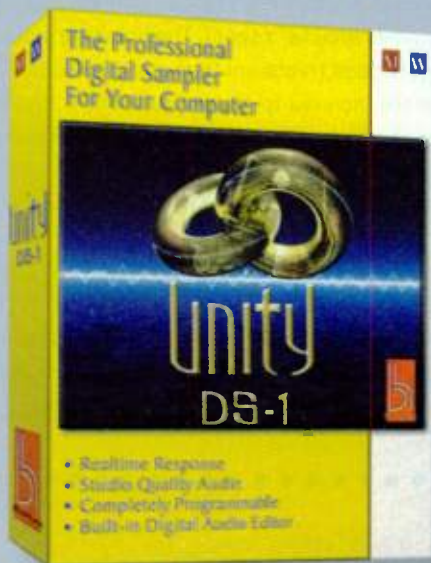
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All the News that Fits

People who hire you to compose or perform music or to provide other sound-related services often lack understanding of some basic realities. This is usually why they're hiring you to do the job: they don't have a clue about it, so they get a professional. Smart move. Sometimes a client's cluelessness is caused by inexperience. The worst cases, however, are those who are willfully ignorant, choosing neither to learn nor to make decisions.

Regardless of the reason for their ignorance, I consider it a part of a professional job to inform clients of trade-offs and issues affecting their project. Unlike some consultants who maintain a veil of secrecy over their work to "preserve job security," I keep my clients informed, because I believe that gives them more confidence in my reports and in their decisions. As a result, clients are easier to work with, and we are more likely to build an ongoing relationship.

So how does one break the news that a project requires more time or money to be successfully realized—or worse, that there is a problem (such as their poor source material) that will unavoidably force some compromise in their goals? It's not easy, but it has to be done.

A classical musician who was a client of a friend of mine had had a CD made from a cassette dub of a digital recording, and he didn't understand why it sounded so much worse than the original. Explanations about noise and frequency response elicited only a glazed look.

In such a situation, the most effective way to communicate the idea is to simplify to the basics, making your best effort to maintain accuracy: "Cassette recordings don't sound as good as digital recordings." Some may call this a dumbed-down explanation, but if it is true and makes the point clear, it is useful nonetheless.

When you must tell a client that the project will require more time or money to complete, it gets rougher.



For example, making audio files into a CD takes much more time than writing the actual CD, but many clients can't understand why it requires several hours to do what they want.

It's not unusual to have your honesty rewarded with the loss of a client to a cheaper bidder. That's not to say that the cost of the project, in the end, will be any less than your original quote; it will probably be more. Nor can you ascribe such a loss simply to a client being "cheap"; after all, we all want to pay as little as we can get away with.

But a client who goes with the lowest bid will frequently be unhappy with the results, and is likely to consider the honest, accurate bidder next time they have a project.

I had to deal with a worst-case situation recently, when I had to call a client to tell him that the master of his album, along with the safeties I had just made but not yet delivered, were among the missing items after a burglary. Ouch. In that case, there was nothing I could do but make the call as soon as I found the DATs were gone.

In general, being straight with clients enables me to avoid a lot of "unfortunate misunderstandings" while it simultaneously enforces their feelings that they got what they expected and paid for (if not more).

Finally, there's the Golden Rule or "what goes around comes around" aspect. The first-time video maker who gets good treatment from you on a soundtrack may be more inclined to shoot your band's first music video when he or she has become an established director, just as you'll do an extra nice demo mix for the plumber who came out early one Sunday morning to fix the flood in your basement.

The world is complicated, and sometimes it's not clear whether honesty is always the best policy. But being honest with clients goes a long way toward keeping you from encountering the Minotaur that often lurks in the labyrinth of project management. ☺

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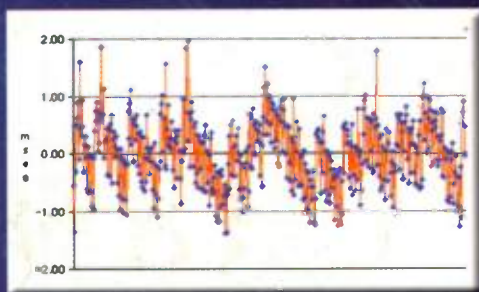


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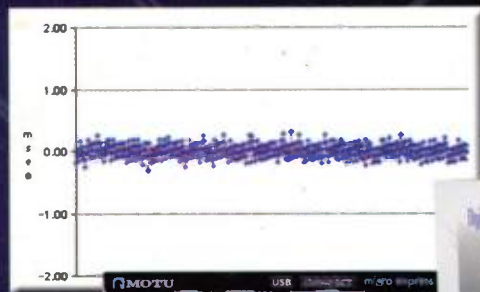
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