CREATING A REALISTIC STEREO IMAGE • ROLAND VS-2480, NATIVE INSTRUMENTS REAKTOR 3.0, AND 9 MORE SMOKIN' REVIEWS

A PRIMEDIA Publication

Electronic Musician®

www.emusician.com

March 2002

BURNING AMBITIONS

- Make Perfect CD-Rs Every Time
- Create Enhanced Multimedia CDs at Home
- Why CD-R Is Better Than CD-ROM

Optimizing Windows for Music Production

Up Against the Law! Sampling Legally

Introducing the HR624 active monitor and Two new sizes. Same unflinching accuracy.

Dad and the kids. All THX pm3-approved.

Our HR824 Active monitor waited until it was well-respected and famous before deciding to sire some offspring.

First it won a worldwide reputation as the most accurate near field monitor ever made. It gained acceptance in major recording studios and mastering facilities. It earned glowing reviews (*Mix* magazine called it "*...the most accurate near field monitor we've tested.*")

Now it's part of a complete THX pm3-approved monitoring system.

The HR624. A chip off the world's most accurate block.

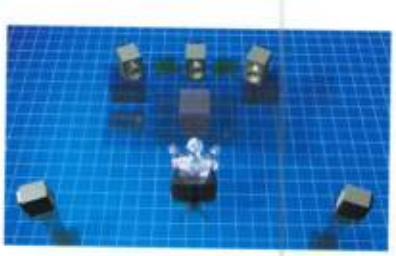
Our new 6.7-inch 2-way active near field monitor is essentially a slightly smaller HR824 with the same technological innovations:

- Cast zinc logarithmic wave guide that maximizes dispersion and helps merge high and low frequency output at the crossover point.
- Extended low frequency transducer with cast magnesium frame and mineral-damped polypropylene cone.
- Wave-guide-loaded 1-inch high frequency transducer with viscous, edge-damped alloy dome and ferrofluid voice coil cooling (the same design as in the HR824).
- Additional rear-firing passive transducer for tighter bass response.
- Dual FR Series™ high-current power amplifiers (100 watts LF, 40 watts HF).

The new HR624 has the same wide sweet spot as the HR824. Frequency response of both models is so flat that each one comes with an individual, signed test certificate.

They play well with others.

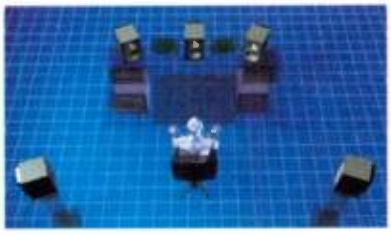
HR624s make superb primary front monitors for smaller studios (and budgets) – with or without an HRS120 subwoofer. And since they're voiced identically to the HR824, they're perfect for rear channel 5.1/7.1 surround sound.



One possible combination. HR824 front speakers with HR624 rear satellites and HRS120 subwoofer.

HRS120 12-inch active subwoofer system.

Rumpus-stomporama configuration: Dual, slaved HRS120 subs and five HR824s.



The HRS120 400-watt active subwoofer. This is not a toy.

The new **HRS120** 12-inch 400-watt active subwoofer is designed to compliment the HR824, HR624 – and Brand X passive or active monitors that need more low frequency cajonés.

One look at the HRS120 back panel and you'll understand the difference between a true recording studio subwoofer and a mere home theater sub dressed up in pro audio cosmetics.

You can switch the HRS120 in and out *with or without* its variable crossover – allowing comparison between full range front/left/rear and high pass monitors plus sub (a.k.a. "bass management).

You can slave multiple HRS120s and run them all from one foot switch.

Rear panel control options include…

- 110Hz elliptical filter for Dolby® AC-3
- Crossover Defeat switch for THX® operation
- 0dB/+10dB Output Level switch for THX® Dot1 & AC-3
- Adjustable 60-110Hz crossover
- Polarity switch and input level control.

The HRS120's front-firing RCF Precision™ 12-inch transducer has a cast aluminum frame and four-inch voice coil, servo-coupled to a knarly FR Series high-current power amplifier with generous rear heat exchanger. Its tight, accurate output is also reinforced by an extra front-firing 12-inch passive transducer.

Hearing is believing.

If you value unflinching monitoring accuracy, you owe it to the quality of your creative product to check out our family of active monitoring systems.

Hear the new HR624, HRS120 and industry-standard HR824 at an authorized Mackie dealer today.

TASCAM GigaStudio:

NEW! GigaStudio V2.5
Now Compatible with Windows 2000/Windows XP!

GIGASTUDIO 160

GIGASTUDIO 96

GIGASTUDIO 32

Giga Sound Library Sampler

TASCAM/Conexant GM150/GM500 General MIDI Kits
You've never heard General MIDI like this! Two different collections (150MB and 500MB) of multi-megabyte instruments, including a complete set of acoustic instruments and synthesizer textures.

TASCAM/Gary Garritan GigaHarp
The sound of angels! Every string of a Salvi Pedal Harp sampled in stereo representing seven pedals, four attacks/velocities per string, two harmonics per string, glissando, hand-dampening and muffling.

TASCAM/Jim Corrigan Nashville High-Strung Guitars
One of the coolest, most playable acoustic guitar collections for Giga. Recorded with incredible quality, this totally authentic collection of up and down strums and dynamically playable single strings for solo parts represents the sound of Nashville at its finest.

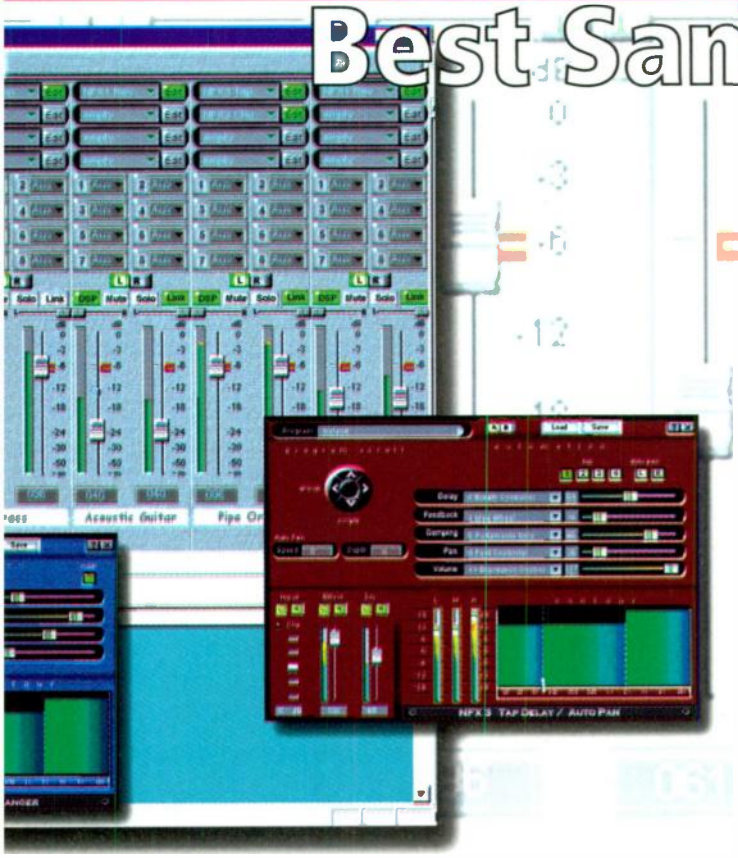
TASCAM/Scarbee J-Fingered Bass
NEW! 1046 samples are dedicated to each of the 3 pick-up settings, providing a total of 3138 samples (1.15 GB)! The musicality of this handmade Celinder J Update 4 is expressed in every hammer-on, pull-off, grace-note, staccato-release and slide. Amazing!

TASCAM/Peter Ewers Symphonic Organ
The entire, historic, grand La Madeleine, Paris cathedral and the Cavaillé-Coll organ for GigaStudio! For the first time ever in any sampled pipe organ, the original cathedral ambiance is included via release triggered samples.

TASCAM/Larry Seyer Acoustic Bass
Over 500 MB in size, every note of every string sampled in stereo at 4 velocities with no loops. Features finger-damped staccato release resonance samples that will play on the note-up (release) and body resonance volume control, fast and slow up/down slides, riffs, special effects, and more.

www.tascam.com

The World's Biggest, Fastest, Best Sampler. Period.



We don't like to brag, but there's no question: **TASCAM GigaStudio** offers the very best sample playback of any sampler, hardware or software, ever made. The reason is simple: it's the only sampler that employs a patented technology allowing samples to stream from your PC's hard drive instead of being limited to RAM storage. The result is amazing: you can access up to 160 voices of HUGE samples (over four gigabytes in size), with detail, realism and sonic quality blows away any other sampler. Period.

As a performance tool, GigaStudio rules. Its incredibly low latency when accessed with any GSIF computer interface allows for fast, tight musical performances that are indistinguishable from playing a "real" instrument. Plus, GigaStudio's QuickSound™ technology enables instant location and previewing of samples and instruments in real-time. Its zero-latency NFX™ effects provide professional-quality signal processing for your samples. And if you need great sound libraries, the world's finest have been created expressly for GigaStudio. Also, your Akai™ samples will automatically be read, and you can easily convert other sample files into the Giga format.

So if you're into the very best that sampling technology has to offer, get into Giga. Visit your TASCAM dealer or check it out online at **www.tascam.com**, because when it comes to sampling, bigger and faster is always better. Period.

There are hundreds of sample libraries that have been developed specifically to take advantage of Giga's streaming technology. Here's a small selection of the best.

TASCAM/Matt Ragan Max Strength Acoustic Guitar

The beautiful, clear tone of a massively multi-sampled Martin 000-16. More than 1,200 discreet, unlooped samples are dedicated to the instrument, providing more than a gigabyte of incredible realism with hammer-ons, pull-offs, palm mutes, release-damps and more.

Bigga Giggas/ Post Harpsichords I

Two antique harpsichords captured in every detail using world-class microphones and mastered originally in 24-bit audio. This library is perfect for keyboard purists seeking to reproduce the great early keyboard compositions on the instruments for which they were written.

Q Up Arts/Symphonic Fields Forever

Beautifully evocative solo and small section orchestral instruments. Perfect for both Pop and Classical orchestration as well as acoustic textures. Features superbly recorded multisamples of celli, violins, choir, flute, bassoon, tuba, double basses, clarinet and more.

Bigga Giggas/ Harmonica Essentials

Turn your Giga system into a professional blues harmonica player! Acoustic and electric harp in 8 keys and 4 tempos, with over 1100 licks,with effect banks in each of the keys to help fill in between licks.

Q Up Arts/Psychic Horns by Jason Miles

The killer collection of brass sections of stereo trumpet, tenor sax and trombone. Includes long and short sustains, loops, riffs, swells, falls, and stabs. For Pop, R&B, Funk, Jazz…if a brass section can play it, you can too!

Sonic Implants/ Drum Series 1

From the real to the surreal, these drums sound amazing. All drums and cymbals are recorded in stereo, with no loops, and with heavily multi-velocity. Even the snares are sampled at multiple places on the drum. Includes 250 drumkits and instruments.

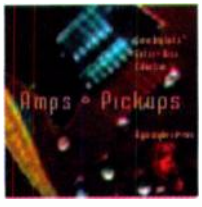
Bigga Giggas/Sune's L100 Hammond

Every note of this great-sounding organ's 9 drawbar settings, recorded in extremely long looped samples, with fully controllable virtual drawbars in GigaStudio.

Q Up Arts/ Heavy Guitars

A grungy, harsh, ruthless collection of guitar samples… leads, mutes, scrapes, scratches, power chords, slides, feedback, harmonics and more.

Bonus 60Hz hum sample included on CD-ROMs. Rock on!



Sonic Implants/ Amps & Pickups

The guitar and bass collection you've been waiting for! Collection includes acoustic guitars, Les Paul power rock, vintage Guild, Paul Reed Smith Electric, 12-string Rickenbacker, Spector Slap Bass, Hofner Beatle Bass, Fender Jazz Bass and more.

TASCAM GIGASTUDIO
powered by GigaSampler Technology

I N S I

FEATURES

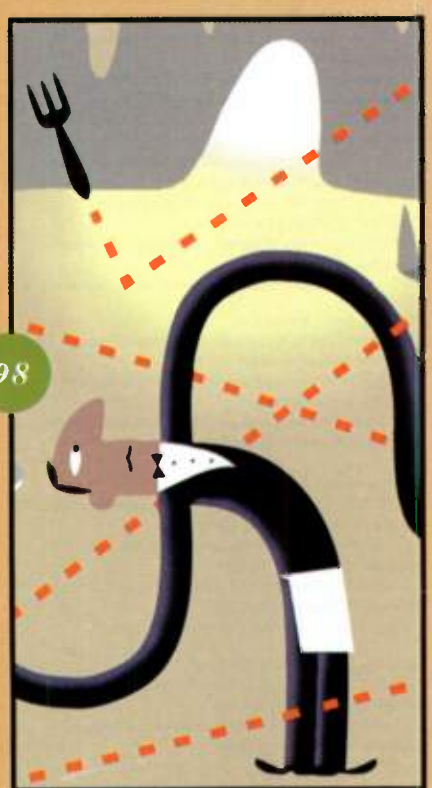
Cover by Peter Neumann

DEPARTMENTS

Electronic Musician® (ISSN 0884-4720) is published monthly except semimonthly in January at 6400 Hollis St., Suite 12, Emeryville, CA 94608, and is ©2002 by PRIMEDIA Business Magazines & Media Inc., 9800 Metcalf Ave., Overland Park, KS 66212 (www.primediabusiness.com). This is Volume 18, Issue 4, March 2002. One-year (13 issues) subscription is $40; outside of the U.S. is $75. POSTMASTER: Send address changes to *Electronic Musician*, P.O. Box 1929, Marion OH 43306. Periodicals postage paid at Shawnee Mission, KS, and additional mailing offices. Canadian GST #129597951. Canada Post International Publications Mail Product (Canadian Distribution) Sales Agreement No. 40597023.

Electronic Musician®
MARCH 2002 VOL. 18, NO. 4
www.emusician.com

COLUMNS



REVIEWS

Still Alive and Well


ANTHONY PIDGEON

Obviously, DVD is the Hot New Thing. We love it, we've written about it (see "World of Options" in the August 2001 issue), and we are working on more stories about it for future issues.

Professional-level DVD authoring can still be difficult, and though DVD-R burners are starting to become affordable, they are not yet common items in the average personal studio, and many consumers have not yet bought players. For those reasons, DVD-R is just beginning to become a practical delivery medium for the average personal-studio owner.

On the other hand, good ol' CD-R and CD-RW remain extremely popular and highly accessible. Almost every consumer has an audio CD player, and most of the newer ones play music CD-Rs. The majority of modern computers have CD drives that can read audio, video, and data CD-Rs. For many purposes, then, you are still best off delivering your product on CD.

You can do a lot more with CDs than many people realize, including creating enhanced discs that incorporate multiple types of rich media, such as music, video, text, animation, and graphics. For a musician/producer with products to market and distribute, CD remains a crucial delivery medium.

In fact, so ubiquitous is the humble CD that most of us take it for granted. Even **EM**'s publisher, a knowledgeable musician with a background in music technology, was surprised when I told him that I intended to put a story about CD-R on our March cover. After all, he posited, the CD isn't news; everyone knows about CD technology.

No, they don't. Although CD has been around since the early 1980s and CD-R is now a mainstream technology, many studio-savvy musicians don't understand how the CD technologies work, why they sometimes don't work as expected, and how to get the most out of them. That lack of understanding isn't surprising when you realize that things in the world of CD-R/RW are not always as they appear to be. To fill this information gap, I called on two top authors with very different backgrounds.

Former **EM** technical editor Gary S. Hall is one of those rare people who understands music technology at an engineering level and can communicate often difficult technical concepts in language that the average reader can understand. Therefore, I gave him the job of explaining the underlying technology behind CD-R and how to get the best results when burning discs. The result is "Burning Ambitions" (p. 58), a clear and thorough article that is interesting and enlightening.

David Battino, whose many credits include editing the 1999, 2000, and 2002 editions of **EM**'s annual *Desktop Music Production Guide*, has a knack for explaining how to do cool things with music technology that may not have occurred to you. Having himself created highly successful enhanced CDs, he was the perfect choice to explain it to the rest of us, and he delivers the goods big-time in "More Than Meets the Ear" (p. 76). If you want to take full advantage of CD-R's potential, this story is a must-read.

After reading the stories, you will not only know more about CD and CD-R/RW technology than most musicians, you will have acquired a useful bag of tricks for burning, ripping, and fully utilizing this popular but strange medium. Enjoy!

Electronic Musician
A PRIMEDIA Publication

Editor in Chief
– Steve Oppenheimer, soppenheimer@primediabusiness.com
Managing Editor
– Patricia Hammond, phammond@primediabusiness.com
Associate Editors
– Brian Knave, bknave@primediabusiness.com
– Dennis Miller, emeditorial@primediabusiness.com
– Gino Robair, grobair@primediabusiness.com
– David M. Rubin, emeditorial@primediabusiness.com
– Geary Yelton, emeditorial@primediabusiness.com
Assistant Editors
– Marty Cutler, mcutler@primediabusiness.com
– Matt Gallagher, mgallagher@primediabusiness.com
Senior Copy Editor
– Anne Smith, asmith@primediabusiness.com
Copy Editors
– Jennifer Moline, jmoline@primediabusiness.com
– Mark Smith, msmith@primediabusiness.com
Contributing Editors – Michael Cooper, Mary Cosola, Larry the O, George Petersen, Scott Wilkinson
Web Editor
– Paul Lehrman, plehrman@primediabusiness.com

Group Art Director
– Dmitry Panich, dpanich@primediabusiness.com
Art Director
– Laura Williams, lwilliams@primediabusiness.com
Graphic Artist
– Mike Cruz, mcruz@primediabusiness.com
Informational Graphics – Chuck Dahmer

Vice President – Entertainment Division
– Pete May, pmay@primediabusiness.com
Publisher
– John Pledger, jpledger@primediabusiness.com
Associate Publisher
– Erika Lopez, elopez@primediabusiness.com
Advertising Director
– Joe Perry, jperry@primediabusiness.com
East Coast Advertising Manager
– Jeff Donnenwerth, jdonnenwerth@primediabusiness.com
Northwest/Midwest Advertising Associate
– Stacey Moran, smoran@primediabusiness.com
Southwest Advertising Associate
– Mari Deetz, mdeetz@primediabusiness.com
Sales Assistants
– Kathya Fuentes, kfuentes@primediabusiness.com
– Joe Madison, jmadison@primediabusiness.com
Marketing Director
– Christen Pocock, cpocock@primediabusiness.com
Marketing Manager
– Angela Muller Rehm, arehm@primediabusiness.com
Marketing Events Coordinator
– Alison Eigel, aeigel@primediabusiness.com
Classifieds/Marketplace Advertising Director
– Robin Boyce-Trubitt, rboyce@primediabusiness.com
West Coast Classified Sales Associate
– Kevin Blackford, kblackford@primediabusiness.com
East Coast Classified Sales Associate
– Jason Smith, jasmith@primediabusiness.com
Classifieds Managing Coordinator
– Monica Cromarty, mcromarty@primediabusiness.com
Classifieds Assistant
– Diane Williamson-Suber, dsuber@primediabusiness.com

Vice President – Production
– Thomas Fogarty, tfogarty@primediabusiness.com
Senior Production Manager
– Curtis M. Pordes, cpordes@primediabusiness.com
Group Production Manager
– Melissa Langstaff, mlangstaff@primediabusiness.com
Advertising Production Coordinator
– Julie Gilpin, jgilpin@primediabusiness.com
Vice President – Audience Marketing
– Christine Oldenbrook, coldenbrook@primediabusiness.com
Group Audience Marketing Director
– Philip Semler, psemler@primediabusiness.com
Audience Marketing Manager
– Austin Malcomb, amalcomb@primediabusiness.com
Audience Fulfillment Coordinator
– Jef Linson, jlinson@primediabusiness.com

Human Resources/Office Manager
– Julie Nave-Taylor, jnave-taylor@primediabusiness.com
Receptionist/Office Coordinator
– Lara Duchnick, lduchnick@primediabusiness.com
Computer Systems Coordinator
– Denise Davis, ddavis@primediabusiness.com

Put the Power of Proteus Under Your Fingers

Send in your receipt before July 31st & receive a $99 Steinberg Software suite (Cubasis VST, Wavelab Light & Recycle Light) for FREE

$899 ESTIMATED STREET PRICE*

The new PK-6 delivers the power and sounds of E-MU®'s legendary Proteus® Sound Modules with a host of real-time performance features that you won't find on any other keyboard. Whether firing off loops on the fly with the 16 trigger buttons or tweaking filter and synthesis parameters with the programmable knobs, PK-6 puts an arsenal of professional features under your fingers at a breakthrough price.

Check out all that the PK-6 has to offer:

- New processor, 3 times faster than the Proteus 2000 providing super tight MIDI timing
- All new sound set featuring a multitude of Super Beats for interactive groove creation
- 4 assignable 24-bit audio outputs deliver pristine sound quality
- Over 100 syncable synth parameters per preset allow you to take total control of your sounds
- User expandable to 128 MB of internal sounds using any of the Proteus expansion ROM's shown below (PK-6 has three additional ROM slots).

Coming Soon!
XK-6 Xtreme Keys
with Electronica
sounds and beats

Get your fingers on a PK-6 at your local E-MU Dealer today!

E-MU®

1600 Green Hills Rd., Scotts Valley, CA 95066
Tel: 831.438.1921 Fax: 831.438.8612 www.emu.com

* Estimated Street Price based on E-MU's Minimum Advertised Price. Send receipt attn: Marketing to redeem Software.

WRH

KARMA ...INSPIRATION

Technical Specifications:

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

KARMA Features:

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

Korg USA
316 South Service Road
Melville, NY 11747

Dear Korg,

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

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

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

Sincerely,

Chuck Johns

Chuck Johns

Electronic Musician 2002 EDITORS' CHOICE

STORY #23

Chuck Johns Queens, NY

GOOD KARMA. WICKED SOUND. KORG

For a free copy of the Karma Video Intro, write to: Korg USA, Attn: Karma Video, 316 South Service Road, Melville, NY 11747. Or visit www.korg.com/karma and e-mail us your request.

PRIMEDIA
Business Magazines & Media

Chief Executive Officer
– **Timothy M. Andrews,** tandrews@primediabusiness.com
President
– **Ronald Wall,** rwall@primediabusiness.com
Chief Operating Officer
– **Jack Condon,** jcondon@primediabusiness.com
Sr. Vice President – Integrated Sales
– **Dan Lovinger,** dlovinger@primediabusiness.com
Sr. Vice President – Business Development
– **Eric Jacobson,** ejacobson@primediabusiness.com
Vice President – Content Licensing & Development
– **Andrew Elston,** aelston@primediabusiness.com
Vice President – Corporate Communications
– **Karen Garrison,** kgarrison@primediabusiness.com
Interim Vice President – Finance
– **Tom Flynn,** tflynn@primediabusiness.com
Interim Vice President – Human Resources
– **Kurt Nelson,** knelson@primediabusiness.com
Vice President – Marketing
– **Karen Garrison,** kgarrison@primediabusiness.com
Vice President – New Media
– **Andy Feldman,** afeldman@primediabusiness.com
Vice President – Technology
– **Cindi Reding,** creding@primediabusiness.com

PRIMEDIA Business-to-Business Group
– 745 Fifth Ave., New York, NY 10151
President & Chief Executive Officer
– **David G. Ferm,** dferm@primedia.com
Chief Creative Officer
– **Craig Reiss,** creiss@primedia.com

PRIMEDIA Inc.
Chairman & Chief Executive Officer
– **Tom Rogers,** trogers@primedia.com
Vice Chairman & General Counsel
– **Beverly C. Chell,** bchell@primedia.com
President
– **Charles McCurdy,** cmccurdy@primedia.com

Editorial, Advertising, and Business Offices: 6400 Hollis St., Suite 12, Emeryville, CA 94608, USA. 510-653-3307.

SUBSCRIPTIONS: One-year subscription (13 issues) is $40. Outside the U.S., it is $75. For subscription information or to report change of address, write to P.O. Box 1929, Marion, OH 43306, or call 800-245-2737 or 740-382-3322.

BACK ISSUES: Back issues are available for $10 each by calling (800) 441-0294 or (913) 967-1707. Current and back issues and additional resources, including subscription request forms, are available on the World Wide Web at www.emusician.com.

REPRINTS: Contact Reprint Management Services (RMS) to purchase quality custom reprints of articles appearing in this publication at 866-268-1219, ext. 100 (717-399-1900 outside the U.S. and Canada). Obtain quotes and place orders online at reprintbuyer.com or send e-mail to primediabusiness@rmsreprints.com.

PHOTOCOPIES: Authorization to photocopy articles for internal corporate, personal, or instructional use may be obtained from the Copyright Clearance Center (CCC) at 978-750-8400. Obtain further information at copyright.com.

ARCHIVES AND MICROFORM: This magazine is available for research and retrieval of selected archived articles from leading electronic databases and online search services, including Factiva, Lexis-Nexis, and ProQuest. For microform availability, contact ProQuest at 800-521-0600 or 734-761-4700, or search the Serials in Microform listings at proquest.com.

MAILING LISTS: PRIMEDIA Business makes portions of our magazine subscriber lists available to carefully selected companies that offer products and services directly related to the industries we cover. Subscribers who do not wish to receive such mailings should contact *Electronic Musician* subscriber services at 800-245-2737 or 740-382-3322.

CORPORATE OFFICE: PRIMEDIA Business Magazines & Media Inc., 9800 Metcalf, Overland Park, KS 66212 — 913-341-1300 — primediabusiness.com

ABM BPA

Printed in the USA.

Also publishers of ***Mix®***, ***Onstage™***, ***Remix™***, ***Desktop Music Production Guide®***, ***Personal Studio Buyer's Guide***, and ***Digital Home Keyboard Guide™***.

Anyone who says you can't buy love doesn't own Reason.

"If you don't at least try this beautifully conceived, lovingly crafted and expertly implemented piece of music software history, you really are missing out. In a word, fabulous."
Computer Music

"...it looks like we've already discovered our favourite software of the year. Knockout."
Sound on Sound

"Reason Vaporizes any possible remaining doubts about the viability of software synthesis."
EQ Magazine

"Assuming you have a modicum of musical vision and a powerful enough computer to run Reason, don't even think twice. This thing is so cool, only a fool would sit around waiting for it to get better."
Keyboard Magazine

"Reason 1.0 is a monster release, a self-contained, multifaceted music-making metropolis that contains under one hood as many sound banks, mixers, drum machines, samplers, synthesizers, loop players, and effects as you could want."
Remix

REASON

Best Software Synthesizer Workstation (stand-alone)
Electronic Musician

Listen to the voice of Reason. Download the demo.

www.propellerheads.se

propellerhead SOFTWARE

Distributed in the US and UK by:
MIDIMAN • 800 969-6434 • WWW.MIDIMAN.NET • EMAIL: INFO@MIDIMAN.NET

MAE LAROBIS

LOOK OUT OF ANY WINDOW

As a New Yorker, an American, and a human being, I can't tell you how deeply I was moved by Larry the O's inspired writing in "Final Mix: Box of Rain" in the December 2001 issue.

I have always loved **EM**. It always has a seriousness of purpose and an integrity that shows through in every article, and it manages to combine that with a small-town informality and friendliness.

But now I must add one more thing the magazine has brought to me through Larry the O's writing: pride.

"Box of Rain" made me feel proud to be a fellow music maker. It reminded me of what musicians bring to humankind in songs and symphonies; brought the loss that the nation sustained on September 11, 2001, back in rich warm harmonies and sweeping musical gestures; and, ultimately, made me bawl like a baby.

Thank you, Larry. Thank you, **EM**. Be well, all of you.

David Tcimpidis
via e-mail

DEFINE "SUCK"

After I catch my breath from running to the mailbox, "Front Page" is always the first thing I read when I eagerly open my fresh issue. I have always found Steve O's column to be an inspiration—until now. In his December 2001 column, "A Clear Message," his message was anything but clear. I am still trying to decide if Steve O is lobbying against an autonomous business exercising artistic discrimination, the same entity extending political influence, or big business in general. Maybe he's suggesting that if there are no powerful media conglomerates, political agendas won't matter. Until Steve O is qualified to explain National Public Radio, I suggest he leave that to a more appropriate publication. I can't imagine anyone reading **EM** for its views about the regulation of the broadcast industry. Obviously that is a personal issue of the editor. I know Steve O would never use the magazine to further a personal agenda, so what exactly was his message?

The magazine does a magnificent job of covering the cutting-edge tools and technology of electronic music and its production. My skills have improved immensely from the application of information I regularly glean from it. The editorial space allocated to publicize personal political views deprives me of valuable information. Besides that, Steve O's views suck. How is that for clarity?

Donald Baker
via e-mail

Donald—First of all, "Front Page" is my personal editorial space, and it exists so that I can share my views with readers. If you don't like what I have to say but you enjoy the rest of the magazine, I'm content with that.

I thought I clearly expressed my views in the December 2001 column, but because you found it unclear, I'll summarize the main point: in my view, it is potentially damaging to democracy when a significant number of major news and cultural sources (such as radio stations) are controlled by a small group of companies or individuals. Everything else I said in the column stems from that premise. Developments in the broadcast industry can have a direct impact on recording musicians and producers; therefore, the ownership and regulation of that industry are a legitimate concern of **EM***'s readers—and its editor.—Steve O*

YOU ARE CORRECT, SIR

I've just finished Steve O's response to Jason Turetsky's question regarding digital converters ("Letters," December 2001). The comment regarding the "digital clipping" between 16- and 24-bit converters was quite misleading. It's impossible to record hotter signals to a 24-bit converter versus a 16-bit converter. They both clip at the same point (provided the units are calibrated to the same reference point, which they should be). The advantage of a 24-bit converter occurs in the quieter bits, because they are more accurate in providing a better picture of the sound at lower levels. That is when the 24-bit converter on a 16-bit recorder would be an advantage, as well as the available dithering and superior design to the Roland unit.

Chris Potter
via e-mail

Chris—You're correct, sir. I blew this one, and I know better.—Steve O

ONE MUSICIAN'S TRASH...

I'm a longtime reader. Here's something gear related to think about.

It's nice when you find a new use for an old piece of equipment that was taking up closet space. For example, I have a tiny 2½ octave Reveal MusicStar keyboard, which I bought about five years ago. It was part of a music-teaching CD-ROM bundle. The keys are tiny, it's not touch sensitive, it has no pitch or mod wheels, and the only MIDI is a single MIDI Out port in the back, but it recently found a new home sitting on top of my main keyboard controller.

MAKE TRACKS

Echo's new LAYLA LapTop and MONA LapTop recording sytems easily connect to most Macintosh and Windows notebooks.

echo
digital audio

phone: 1.805.684.4593 www.echoaudio.com e-mail: info@echoaudio.com

Many of the latest audio and MIDI programs have parameters that can be triggered from MIDI note messages (such as shortcuts on a computer keyboard). Having this tiny, seemingly obsolete MIDI keyboard at arm's length is a real convenience. It's useful for triggering loops, muting or soloing tracks, jumping to markers, and using MIDI notes as a controller for synth parameters (such as filter cutoff). The keys' size and lack of touch sensitivity are actually a plus, especially for glissando effects and fast monophonic synth lines. I'm finding all kinds of uses for it, and I probably couldn't get $10 for it at a flea market!

That's just something to consider before you get rid of gear because you think you'll never have a use for it.

Joe Fry
via e-mail

A LINE BLURRED?

I've been a subscriber since the first issue and always appreciate your hard work and high standards. However, I take exception to the advertising supplement (*Studios to Go*, November 2001). Although clearly marked as an advertisement, it's a mistake to blur the line between objective reviews and manufacturers' self-promotion. By letting the manufacturers present the ads in a similar format to reviews, you risk losing your hard-earned credibility.

Is Akai's DPS16 really "spearheading greater flexibility" in the area of desktop studios? I value **EM**'s opinion; the magazine might point out aspects that lack flexibility. I won't, however, take Akai's word for it. Does Fostex's VF-16 really appeal to experienced musicians? Does the Korg D1600 have "ample" inputs? By allowing the ads to appear this way, you appear to endorse those statements.

I suggest dropping this format. If I'm interested in pursuing an item after reading a review, I'll get more product literature if I need it and then assess the unit before making a purchase.

Lonny Jarrett
via e-mail

Lonny—We have received several complaints about this, much to our chagrin. Studios to Go *was a special advertising section, and it said "advertising" in red letters on every page. It was never our intent to have it appear to be regular editorial; that was the inadvertent result of the art department designing the section in its usual style. We deeply regret any confusion this caused; as I hope you are aware, we are strong advocates of clear separation between advertising and editorial. In the future, we will design such special advertising sections so that they cannot possibly be mistaken for editorial copy.—Steve O*

NOT JUST PRETTY PICTURES

I had been considering the sound within my personal studio. I'd begun to think that I needed to replace the speakers, add acoustic baffles, give up on having decent monitoring, and use headphones at all times. Then the November 2001 issue arrived with the "Truth or Consequences" article.

After I looked at all of the pretty gear pictures, I read the article. Based on that, I measured every length and width within my studio. I recorded the room measurements into a spreadsheet program and added the calculations using the formula from the article; I then discovered the problematic frequencies. For some years, I have had an equalizer collecting dust in a corner. I placed the equalizer between the mixer and amp inputs and tweaked the problem frequencies. To my amazement, the sound is so much better that I can hardly believe the difference. A little additional testing and tweaking based on some familiar CD recordings, and I'm smiling from ear to ear. Thank you for such a great article. It has made my studio sound better, and I saved money at the same time. Keep up the good work!

Charles Shorter
Fort Washington, Maryland

ERROR LOG

January 2002, "Drawmer DS501 Power Gate," p. 134: The correct price of the DS501 Power Gate is $900. Accordingly, the correct Value meter in the Product Summary box is 3.5.

February 2002, "ProFile: Basement High Jinks," p. 46: In paragraph five, the 8-track analog tape recorder is actually an Otari MX-5050 Mk III-8.

WE WELCOME YOUR FEEDBACK.
Address correspondence and e-mail to "Letters," Electronic Musician, *6400 Hollis Street, Suite 12, Emeryville, CA 94608 or emeditorial@primediabusiness.com. Published letters may be edited for space and clarity.*

Plug. Play. Go.

The new Mbox™ from Digidesign® empowers you to capture inspiration wherever you go.

- 2 Analog Inputs and Outputs, Featuring Focusrite Mic Preamps
- 24-bit Stereo S/PDIF Digital I/O
- 2 Analog TRS Inserts
- Pristine 24-bit Signal Path from Input to Output
- Headphone Output with Dedicated Volume Control
- Zero-Latency Monitoring
- 100% USB Powered
- Pro Tools™ LE Software

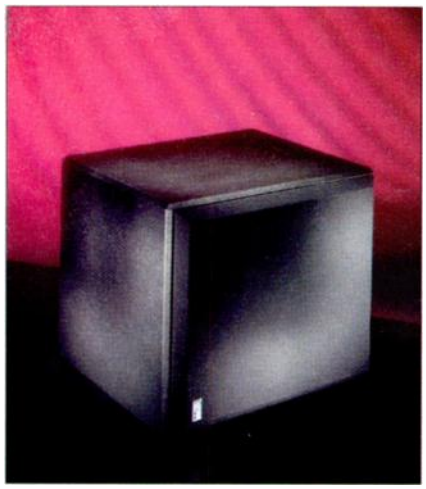
And, at $495 MSRP, taking your ideas to the next level has never been easier on you or your pocketbook.

www.digidesign.com/mbox

digidesign
be heard.

WHAT'S NEW

By Marty Cutler



▲ BAG END INFRASUB-12

The Infrasub-12 ($1,670), from Bag End, is a compact (1.5 cubic feet) powered subwoofer with an internal 400W amplifier. The subwoofer has a frequency response of 8 to 95 Hz, and Bag End's proprietary Extended Low Frequency (ELF) dual integrator promises a flat response to 8 Hz. The unit's impedance is rated at 4Ω nominal.

The Infrasub-12 accepts full-range left, center, and right signals through three unbalanced RCA jacks; speakers accommodating the upper-range frequencies are driven by three line-level highpass outputs. Bag End; tel. (847) 382-4550; e-mail info@bagend.com; Web www.bagend.com.

▶ NOVATION K-STATION

The K-Station ($899), by Novation, features a two-octave Velocity- and pressure-sensitive keyboard, 25 knobs, 4 sliders, a pitch-bend wheel, and a mod wheel. All of the knobs and sliders on the K-Station send MIDI Control Change messages.

The synth engine offers three analog-modeling oscillators. You are given a choice of square, saw, double-saw, pulse, triangle, sine, and double-sine waves. You can modulate pulse width as well as double and detune oscillators without taking a toll on the instrument's eight-note polyphony. You can modulate the frequency of one oscillator with another, and the synth engine also offers ring modulation.

The K-Station includes an unbalanced ¼-inch input that lets you use external audio as an oscillator waveform source. Alternatively, the external audio can feed the mixer, filter, or envelope generator sections without following the keyboard. The instrument also features a 12-band vocoder.

The K-Station's filter section offers 12 and 24 dB lowpass filters with resonance and overdrive. The keyboard's two LFOs give you a selection of triangle, saw, square, and sample-and-hold waveforms. You can synchronize the LFOs to MIDI Clock. Built-in effects include reverb, chorus, phaser, distortion, panning, and delay. Time-based effects will also sync to MIDI Clock.

The rear panel of the K-Station provides MIDI In, Out, and Thru jacks; one analog input; and two unbalanced ¼-inch analog outputs. Novation USA; tel. (800) NOVATION or (888) 782-3166 or 44-16-2882-8880; e-mail salesusa@novationusa.com; Web www.novationusa.com or www.novationmusic.com.

▼ IK MULTIMEDIA AMPLITUBE

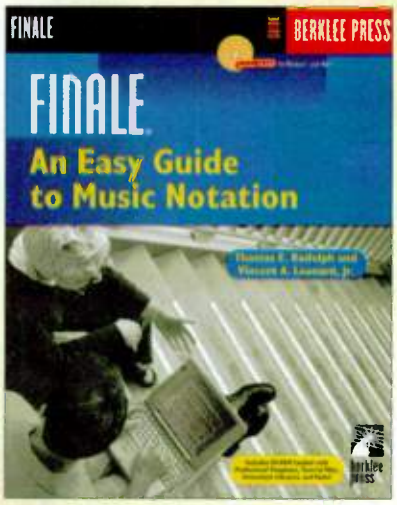
IK Multimedia introduces *AmpliTube* (VST, $299; RTAS, $399), a guitar-amplifier modeling plug-in that is available in VST and Real Time AudioSuite (RTAS) varieties. The software consists of three modules: Amps, Stompboxes, and Post-Effects.

Amp settings include British Crunch, Vintage Clean, Fuzz, Modern Hi-Gain, and Solid State. The EQ-Amp Model gives you a variety of tube amplifier settings for amps from British and U.S. companies. You also have the option of choosing from four power amplifier and nine cabinet models as well as re-creations of classic stompboxes.

AmpliTube offers ten effects, which include tremolo, spring reverb, wah-wah, chorus, flanger, and overdrive. IK Multimedia; tel. (866) 243-1718, (561) 466-9763; e-mail info@sampletank.com; Web www.ikmultimedia.com or www.sampletank.com.


SPARK. DEEP.
Twist. Mangle. Mutilate. Master.
SPARK for MacOS is the complete solution for virtual synthesis, multi-FX, mastering and audio restoration*.
Inject Inspiration: SPARK includes 22 TC-Quality FX and synthesis Plug-Ins. Build anything, from a 4-Band Mastering processor or extreme multi-FX to a modular VST-synthesizer with the supplied Plug-Ins and the SPARK FX Matrix!
Ultimate Access: use SPARK's matrix with all its signal processing right inside your favorite VST or MAS sequencer!
Spark is deep.
SparkMaxx
SparkDelly
SparkFuzzSat
>> 24/96
>> 22 TC Plug-Ins*
>> Wave Editor
>> Play List
>> Project Data Base
>> Crossfades
>> Unlimited Undo
>> Realtime Analyzers
>> VST-to-MAS Adapter
>> MP3
>> Only $499**
* SPARK XL adds 7 additional Plug-Ins including TC Native Bundle, hi-end denoising, declicking & Pro Tools TDM support. Only $699** (**=USD, MSRP).
TC | Works
Ultimate Software Machines
US & CANADA: TC ELECTRONIC INC. • 805.373.1828 • CALIFORNIA • US@TCWORKS.DE • WWW.TCWORKS.DE
© by TC WORKS Soft- & Hardware GmbH 1999 – 2002. All product and company names are ® or ™ trademarks of their respective holders. Specifications subject to change without notice. All rights reserved. TC WORKS. A TC ELECTRONIC COMPANY

GET SMART



BERKLEE PRESS

In their new book, *Finale: An Easy Guide to Music Notation* ($59.95), Thomas E. Rudolph and Vincent A. Leonard Jr. give instruction for novice and advanced users of *Finale* on Mac and Windows platforms. The authors guide you through the intricacies of creating publisher-quality notation while writing your own music.

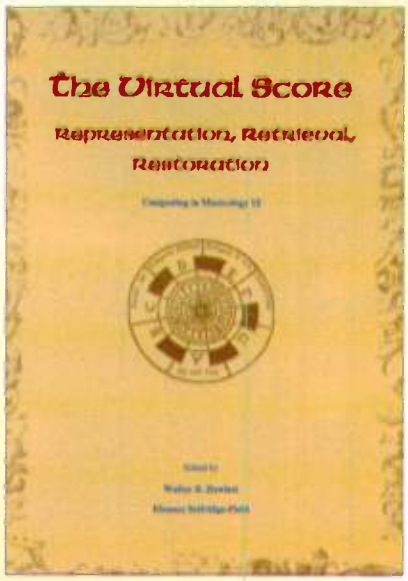
The accompanying CD-ROM gives you hundreds of files based on exercises in the book. A collection of templates includes files for choir, marching band, and orchestra, as well as single-line and grand staff templates. You also receive three libraries of articulation and dynamic markings, and General MIDI instrument libraries prepared for each template. Berklee Press; tel. (617) 747-2146; Web www.berkleepress.com.

BIG METEOR PUBLISHING

The third edition of *The Indie Bible* ($25.95) adds 33 articles written by independent-music authorities to Big Meteor's compendium of resources for the independent musician. The new section offers topics including songwriting, joining a songwriting association, copyrighting, finding a new band member, getting airplay, and more.

The book provides contacts for mainstream reviewers of different music genres and then names genre-specific reviewers. Section two lists radio stations that play indie music and offers stations that cater to specific styles.

Other sections include services that help sell and promote music, sites that accommodate uploading of music and video files, and free resources for music promotion. AMSCO Publications/Music Sales Corp. (distributor); tel. (212) 254-2100; Web www.indiecontactbible.com.



MIT PRESS

Articles that survey methods for the electronic distribution of musical scores are compiled in *The Virtual Score* ($28), edited by Walter B. Hewlett and Eleanor Selfridge-Field. The book provides information about computer applications with a focus on the Internet.

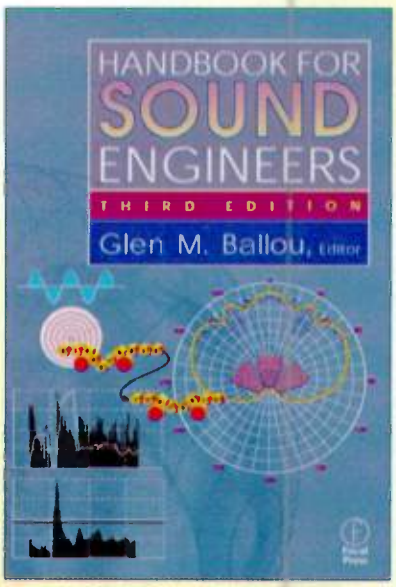
The first part of the book deals with musical representation and interchange, discussing early music and scores in Braille, the Guido format (named after music theorist Guido d'Arezzo), Extensible Markup Language (XML), and recent methods for presenting and distributing online scores.

Section two talks about retrieving and analyzing data from encoded melodies. The last section looks at image processing, which can restore and archive lost features from music prints and manuscripts. MIT Press; tel. (800) 356-0343 or (617) 253-5646; e-mail mitpress-orders@mit.edu; Web http://mitpress.mit.edu.

FOCAL PRESS

Glenn Ballou's *Handbook for Sound Engineers* ($120.99) is in its third edition. The book offers updates that cover new developments in the audio field. Guest experts include Ken Pohlmann and David Miles Huber.

Topics include virtual systems and digital interfacing by Ray Rayburn and computer-aided sound-system design and concert-hall acoustics by Dr. Wolfgang Ahnert. Ballou offers sections about interpretation systems, intercoms, assistive listening, and image projection. *Handbook for Sound Engineers* covers evergreen topics such as grounding, loudspeaker and enclosure building, and sound-system design as well as digital signal processing (DSP), modeling and auralization, DVD, and new developments in MIDI. Focal Press (Butterworth Heinemann); tel. (781) 904-2500; e-mail marketing@focalpress.com; Web www.focalpress.com.



THE NEW DIGITAL WORKSTATION FOR PEOPLE WITH MORE SENSE THAN DOLLARS.

If this all-in-one digital workstation looks familiar, that's because the new Yamaha **AW2816** strongly resembles its TEC Award-nominated big brother, the AW4416. In terms of features and performance they're remarkably similar. So, the AW2816's price – just $1,999* complete – makes excellent financial sense. Once again, Yamaha gives you more for less.

- 16+2 track, 24-bit recording with no data compression (44.1 or 48Khz)
- 28 input channels (including digital stereo input and dual stereo effects returns)
- Dynamic automation of all mix settings, including fader movements, parameter changes and scenes
- 2 Assignable 32-bit effects processors
- Premium Yamaha CD recorder for data and audio
- I/O expansion slot for digital interface options or the new WAVES® Y56K processor card
- Large, back-lit 320x640 display screen
- MIDI control of computer based recording systems
- 4-Band parametric EQ and dynamics on all channels, all the time**
- 18 Busses, plus comprehensive digital patch bay, with easy routing

YAMAHA

CREATING "KANDO" TOGETHER

www.AW2816.com

WRH

KORG TRITON LE

The Korg Triton Le (Triton Le 76, $1,800; Triton Le 61, $1,600) offers the same synthesis engine as the full-blown Triton-series instruments, with an upgrade option for adding sampling capabilities. The unit accepts SmartMedia cards up to 128 MB for storing and importing samples, programs and combinations, drum kits, and sequencer data.

The synth offers 32 MB of 16-bit, 48 kHz sample ROM containing 425 multisampled instruments and 413 drum sounds. Programs include popular presets from the original Triton and a number of new programs and combinations voiced specifically for electronic music. In all, you get 512 programs, 384 combinations, 24 drum kits, and 128 General MIDI (GM) programs with 9 GM drum kits. You can overwrite any program or drum kit in any location except for GM categories.

The optional sampling expansion board (EXB-SMPL, $260) provides two ¼-inch analog inputs and a SCSI port for storing and loading samples. The board ships with 16 MB of RAM, but you can install as much as 64 MB.

You will also need the expansion board to import samples. The Triton has a utility that lets you convert imported AIFF and WAV files into Korg's sample format. You can also import Akai S1000 and S3000 samples, including keyboard maps. The sampling option contains all of the editing features of the Triton V2 upgrade, including time slicing and stretching and grid-based editing.

The Triton Le provides two master effects, a stereo 3-band master EQ, a stereo insert effect, and a mixer to route signals internally. It has 89 effects algorithms identical to those in the original Triton instruments, which offer real-time modulation capabilities and MIDI Clock synchronization.

Triton Le's sequencer is identical to the Triton's, with a capacity of 200,000 events and 200 songs. Sequencing conveniences include a Cue List feature that lets you compile songs from individual sequence elements. You can store as many as 20 variations of the same song. Sixteen templates offer programs and effects settings tailored for different musical styles. You also get 150 preset drum patterns.

Triton Le sports dual polyphonic arpeggiators and a Realtime Pattern Play feature, which lets you trigger sequence patterns on the fly. The arpeggiator pattern memory offers 5 presets, 200 editable locations, and 16 blank user patterns for starting from scratch.

The instrument has unbalanced ¼-inch left and right analog outputs, two unbalanced ¼-inch individual analog outputs, and a ¼-inch stereo headphone jack. MIDI connections are MIDI In, Out, and Thru. It has three ¼-inch pedal input jacks: an input for a damper pedal, an assignable footpedal, and one for an assignable footswitch. Korg USA, Inc.; tel. (516) 333-9100; Web www.korg.com.

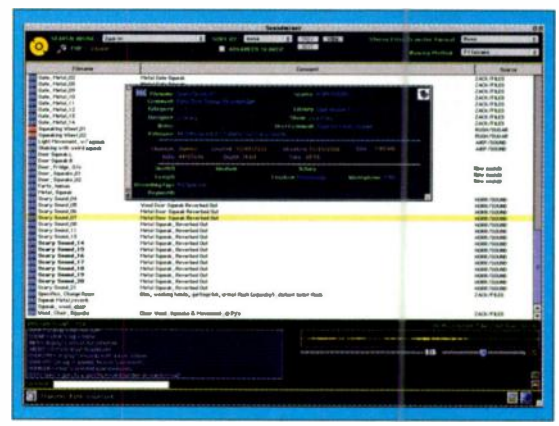
SOUNDMINER SOUNDMINER

Audio-file management using conventional databases leaves much to be desired. Perhaps the most significant missing element is the ability to audition sounds. *Soundminer* (Mac; $995) begins with that missing feature and extends its capabilities well beyond a text-based database program. The program supports sound files from a variety of formats, including Sound Designer II, AIFF, WAV, MP3, and SampleCell Instruments. You can catalog your files by simply dragging and dropping them into the program.

In addition to sound-audition capabilities, the program can perform sampling-rate and bit-depth conversions on the fly. *Soundminer* includes an Overview window that displays the file's waveform and lets you audition audio from anywhere within the file. A duration counter and an energy meter provide additional visual feedback, and the program offers a built-in volume control.

Like any good database, *Soundminer* supports multiple users and allows users to customize their working environment with searchable user-defined comment fields. The program provides multiple database support with shared library networking. For Pro Tools users, *Soundminer* offers QuicKey macros that are consistent with Pro Tools commands, including Varispeed playback and the ability to spot audio files with precise time code placement. You also get a complete Boolean search engine and advanced relevance search support.

Soundminer will work with a variety of digital-audio recording systems and software, including all versions of Pro Tools, Mark of the Unicorn *Digital Performer*, Emagic *Logic Audio*, and BIAS *Peak*; you only need to drag and drop the application onto *Soundminer*'s Transfer Options page to identify the file type and the creator. *Soundminer* will work with any PowerPC Mac and requires at least 15 MB of RAM and OS 8.6. Soundminer Inc.; e-mail info@soundminer.com; Web www.soundminer.com.



emagic
Technology with soul

Music Production
Soft- and Hardware

successful by design

Logic Platinum 5
Logic Control

Logic Platinum 5 and Logic Control set the new standard by which success must be measured. Engineering experience, inspiration and invaluable input from professional users around the world combine to make a highly-regarded music production system even better. The superiority of the Logic Platinum 5 software becomes even more apparent when connected with Logic Control and Logic Control XT hardware. With hands-on access to hundreds of MIDI and audio functions, this is a peerless combination designed to grow along with your creative needs. New automation, 11 new plug-ins, hardware independent audio scrubbing, renowned POW-r dithering and enhanced functionality in the score and MIDI editors are just some of the innovations in Logic Platinum 5. A range of optional software instruments, including the new ES2 and EVOC20, round out a music and audio production system designed to let you work faster, achieve more success, and have more fun.

Technology with soul

STOP THE PRESSES ▲▲▲▲

Digidesign has introduced three expandable digital-audio recording systems, with new ancillary hardware devices, in several configurations. The Pro Tools HD system is available in three configurations: HD 1 ($7,995) consists of a single HD Core card; HD 2 ($9,995) adds the HD Process card, which handles mixer and plug-in tasks; and HD 3 ($11,995) gives you the HD Core card and two HD Process cards. The Pro Tools HD system offers as many as 128 tracks of 24-bit, 196 kHz audio with no toll on the host computer. Digidesign is shipping the new systems with *Pro Tools* 5.3 TDM software.

The HD Core card is a 64-bit PCI card that is compatible with 33 and 66 MHz system buses. You can build a system with a single HD Core card and as many as six HD Process cards.

You can choose one of two digital-audio interfaces. The 192 I/O audio interface ($3,995) offers eight channels of analog I/O and eight channels of AES/EBU, S/PDIF, TDIF, and ADAT I/O. You can add eight additional channels of analog input with the AD expansion card ($1,295) or add eight channels of analog output with the 192 DA card ($1,195). The 192 Digital card ($995) allows you to add eight more channels of ADAT, TDIF, and AES/EBU I/O. A port at the rear of the unit lets you link an additional 192 I/O, and the Legacy Peripheral port allows you to link earlier Pro Tools interfaces. Additional features include real-time sampling-rate conversion and a Soft-Clip Limiter, which lets you record at hotter levels without digital distortion.

The 96 I/O ($1,995) gives you 8 channels of analog I/O and supports as many as 16 channels of recording. The eight channels of ADAT I/O can be used simultaneously with the analog inputs, and you can configure the digital I/O for S/PDIF. As with the 192 I/O, you can link an additional 96 I/O or link older Pro Tools interfaces. The SYNC I/O

($2,095) supports all industry-standard clock sources and time-code formats and offers near-sample-accurate lock-up to time-code or biphase/tach signals with a 192 kHz capable, low-jitter word clock. The unit simultaneously generates LTC, VITC, MTC, Super Clock, word clock, and AES Null Clock.

The front panel has a seven-segment LCD that displays time code and lights for displaying sources and time-code status. The unit can burn time-code windows to video signals. You also get a pair of dedicated 9-pin ports for Digidesign's MachineControl units.

Two additional peripheral units to be released soon are the MIDI I/O ($595), a ten-port USB MIDI interface, which boasts 160 MIDI channels and MIDI time stamping. Digidesign claims that the MIDI I/O can provide timing accuracy of less than a millisecond. The interface features a hardware MIDI Thru capability that lets you route incoming MIDI data to connected devices without the computer. The unit will support Open Music System and WDM drivers.

PRE ($2,495) is an 8-channel preamp with remote control capabilities. Each preamp can accommodate a variety of input sources and levels; you can change preamp settings from the front panel, the computer, or a hardware controller. You can change the impedance loading for any channel to accommodate mic, line, and direct injection (DI) instrument signals. Using Pro Tools to control the software lets you store settings and routing as a mix template.

In case you want to use outboard processing, eight of the mic-pre channels support inset points. The preamp includes a built-in oscillator for calibration. You get MIDI In, Out, and Thru ports for remote control, and the PRE supports all features as a standalone unit. Digidesign; tel. (800) 333-2137; e-mail prodinfo@digidesign.com; Web www.digidesign.com. ●

Get 'EM in the Loop

EM readers know they can rely on one place for outstanding sales, support, and service – Sweetwater.
Here's what a few of our customers* have to say...

Dear Sweetwater,

I've dealt with a LOT of mail order places over the last 25 years. Everyone brags about their wonderful service. But NO ONE has lived up to it, except Sweetwater. For the first time I've found a company that is worthy of the term "quality service". ...We'd be lost without you!

Thanks!
Ben Balser

"Killer prices — the specials are just about untouchable!" – Peter Guare

"I must say that I've never had friendlier, more competent and more thorough treatment from a mail-order place. It's as though you're a local retail store that is somehow able to cater to the entire country. I'll be sure to order from you guys again." – Daniel Bikel

"Great selection, great products, great service. What else is there?" – Warren Wilson

Sweetwater,
To be honest, I've never found a company as dedicated to its customers as Sweetwater. Although I don't have a multi-million dollar account with your company, I must praise you on providing the 'little guy' the feeling of receiving the multi-million dollar support and customer service.
Fred Eyerman

E-mail
To: Sweetwater
From: D. Snellbaker

Dear Sweetwater,

I appreciate the fact that if I had a question, you guys were there to help and provide any information necessary to help me understand. Not many companies are willing to do that these days. This attribute died out a long time ago, which makes what you have done for me that much more special!

David Snellbaker

Best Prices. Largest Selection. Amazing Service.

*These customer comments are the real thing and have not been made up or embellished.

Call us today and find out what Electronic Musician readers across the country already know.

Sweetwater
music technology direct

1-800-222-4700
sweetwater.com

5335 Bass Road • Fort Wayne, IN 46808 • FAX (260) 432-1758

TECH PAGE

By Scott Wilkinson

3-D Chips

A new microchip design could keep Moore's Law alive.

As I've written many times in this column, the size of transistors within silicon microchips can't continue shrinking forever; at some point, they will reach the molecular scale and disappear down the quantum rabbit hole. That raises all sorts of intriguing possibilities, such as quantum computers (see "Tech Page: Quantum Computing" in the September 1997 issue). However, any practical application of those ideas, including electronic music, is a long way off.

In the meantime, Moore's Law, which states that the density of transistors on a microchip doubles every 18 to 24 months, could soon break down as the pace of miniaturization slows. Historically, the average area of microchips has grown by 15 percent per year, but the Semiconductor Industry Association projects that figure will drop to 4 or 5 percent in the future. In addition, the minimum feature size should decrease by 30 percent every three years instead of every two. Even so, many believe that Moore's Law will exhaust itself in less than 20 years.

Fortunately, there is a way to circumvent that fate. Until now all microchips have been two-dimensional, consisting of a single layer of transistors etched directly onto the surface of silicon crystals. But if multiple silicon layers could be stacked vertically on each other in a three-dimensional configuration, many more transistors could be packed into the same footprint without needing to be any smaller than they are already.

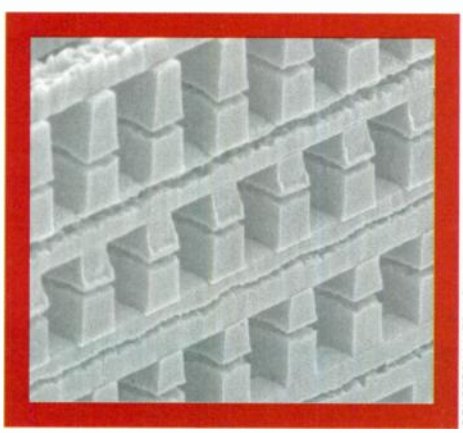
At the forefront of research into 3-D chips is a company called Matrix Semiconductor (www.matrixsemi.com) in California's Silicon Valley. According to cofounder Thomas H. Lee, the key to successfully developing such chips is twofold. First, there must be a way to deposit silicon onto a substrate with individual crystals large enough to hold many transistors. (Silicon with multiple crystals is called *polycrystalline silicon* or *polysilicon*.) That technology has been perfected in flat-panel, thin-film transistor (TFT) computer displays, in which a thin film of polysilicon forms regular single-crystal regions (called *grains*) measuring one micron or more in diameter.

Second, each layer must be extremely uniform in thickness. Matrix has adapted a polishing technique used to make 2-D chips that flattens each layer to within 50 nanometers.

Using those procedures, the company has produced 3-D chips with many layers of polysilicon separated by insulating and connecting and conducting layers. Those chips use conventional materials and fabrication methods, which will reduce manufacturing costs and greatly increase chip densities.

Like any new technology, 3-D chips are not without their limitations. Some transistor elements inevitably straddle the boundary between polysilicon grains, rendering them ineffective and requiring an error correction to route signals around them. Also, thin-film polysilicon transistors typically perform at about half the speed of monocrystalline silicon transistors, though 3-D devices use shorter connections between elements, which helps narrow the speed discrepancy. Finally, heat could be an issue because of the smaller radiating surface area. Still, the technology holds great promise, making solving those problems worth the effort.

Because memory devices are much simpler than microprocessors, Matrix Semiconductor's first commercial product, which should appear later this year under the Thomson brand, is a 3-D memory chip designed to serve as a low-cost medium for digital photography and audio (see **Fig. 1**). With 512 million memory cells in eight layers, the chip can store several hundred one-megapixel photos or more than an hour of compressed audio. The company has also developed prototypes of more complex 3-D circuits, such as static RAM, EPROM, and logic gates, which will become the basis of 3-D microprocessors and other types of chips on which all digital devices, including musical instruments, depend. ❀



COURTESY MATRIX SEMICONDUCTOR

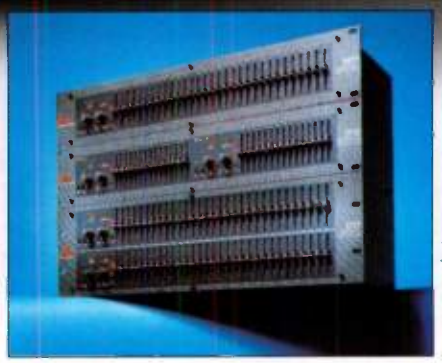
FIG. 1: This scanning electron-microscope image reveals multiple layers of storage cells in Matrix Semiconductor's new 3-D memory chip.

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

dbx®

The New Standard for EQ

From the world leader in dynamics processing, comes the dbx® Professional Products 20 Series Graphic Equalizers, the EQ series of choice by world-class sound companies. Unparalleled audio quality at a price to fit any budget.



20 SERIES EQs

dbx® 20 series EQs standard features:

- The world's first and only EQ with Proprietary Type III™ Noise Reduction system, which enables you to boost signal-to-noise ratio by up to an incredible 20dB giving you the quietest EQ available.
- PeakPlus™ Limiter technology, with a threshold range from 0dBu to +24dBu, allows you to easily safeguard your gear against hazardous dynamic surges in program materials.
- Four segment LED bargraph for both gain reduction and output levels offers the most comprehensive visual feedback available.
- Dual Channel Models; 2231, 2215, Single Channel Model; 2031.
- ISO frequency centers, +/-12 dB input gain range.
- Switchable 40Hz/18 dB per octave low-cut filters.
- 45 mm faders, selectable +/-6dB or +/-15dB boost/cut range.
- Balanced input/output XLR or 1/4" TRS connectors, plus contractor friendly, barrier strips all with chassis/signal ground lift capabilities.
- Frequency response of 10Hz to 50kHz, greater than 90dB SNR (ref +4dBu).
- Less than 0.005% THD +Noise (1kHz at +4dBu).
- Interchannel crosstalk level of less than -80dB from 20Hz to 20kHz.

Also Available 12 SERIES EQs

Visit your local authorized dbx® Professional Products dealer for a through demonstration of the full line of dbx® EQs, including the 20 and 12 series, and hear for yourself why dbx® is the new standard for Graphic Equalizers.

dbx® the Standard in Professional Signal Processing.

dbx® PROFESSIONAL PRODUCTS

A Harman International Company

For information call: 1-800-777-1363 • Harman Music Group • 8760 South Sandy Parkway • Sandy, Utah 84070 • www.dbxpro.com

WEB PAGE

By Gino Robair

WEB SITE OF THE MONTH

If you want to stay up on the latest versions of your software, **VersionTracker** (www.versiontracker.com) can help. Just select an operating system and look for your favorite programs. The systems covered in the site include Mac OS and OS X, Windows, and Palm OS. If you're migrating from an earlier Mac OS to OS X, VersionTracker is almost indispensable as software companies race to get compatible applications to market.

The left side of each system's page shows categories such as Business, Games, and Word Processing. Select a category to view a list of applications and the most recent version available, along with the file size, a brief description of the program, and licensing information (for example, whether the program is freeware, shareware, or simply an update).

Version Tracker also provides a fee-based service, TechTracker Pro, to keep you up to date.The $49.95 fee gets you a personalized page on VersionTracker.com that tracks updates to the programs you use and notifies you when they become available. The fee lets you track programs on as many as three computers.

DOTDOTDOT.COM

OpenMusicProject (www.openmusicproject.net) is a new site designed to give recording artists a place to collaborate over the Internet. What's interesting about this particular site is that older versions of the collaborative work remain on the site, so a full history of each piece is available. Only the user who posted the particular version of a piece can delete it. The OpenMusicProject's creator, David Schmidt, calls this *nondestructive collaboration.* The site favors Propellerhead's *Reason* because the commonality of the sound libraries keeps the native files small. However, you can upload projects created in any application. You'll need Macromedia Flash 5 to take full advantage of Open Music Project. . . . The practicalities of online collaboration bring to bear a tangle of issues regarding intellectual property rights, ownership, and the electronic dissemination of art works. The EFF Open Audio License, created by the **Electronic Frontier Foundation** (www.eff.org/IP/Open_licenses/eff_oal.html), is one response to the needs of creators of new-media works. In the words of the EFF, the Open Audio License "allows musicians to collaborate in creating a pool of 'open audio' that can be freely modified, exchanged, and utilized in new ways." Information about the license and how to use it is available at the EFF Web site. . . . Details about the first three Mellotron symposia are available from Ken Leonard's **Mellotron Symposia** Web site (www.kleonard.com/mellotron), which is dedicated to the venerable tape-replay instrument. The site includes troubleshooting tips to help when your tapes stick or hang up, as well as photos and details of the ultra-rare dual-manual Chamberlin Music Master. Leonard notes that Tom Waits, who has used the Mellotron on recent recordings, is a big proponent of the instrument.

WEBCAST

For interactive fun on the Web, surf to the **Piano Graphique** (Graphic Piano in English) (www.pianographique.com). Developed by Jean-Luc Lamarque, the bilingual (English and French) site features five audio/visual "pianos" that you play from your computer keyboard.

To run Graphic Piano, choose one of the

INTRODUCING THE ANTARES VOCAL PRODUCER

Need a great vocal sound? Work with a great producer.

Introducing the Antares Vocal Producer.™
Killer vocal sounds.
Auto-Tune™ pitch correction.
$495.00
(ESTIMATED STREET PRICE)

AVP FEATURES

- >> Auto-Tune Real-time Pitch Correction
- >> Antares Microphone Modeling
- >> Analog Tube Modeling
- >> Variable Knee Compressor
- >> Downward Expanding Gate
- >> Variable Frequency De-Esser
- >> Flexible Parametric EQ
- >> Automatic Mono or Stereo Double Tracking
- >> Fully Programmable
- >> MIDI Automation
- >> Factory Presets for a Wide Variety of Vocal Styles
- >> Really Easy To Use

WHILE THE AVP WORKS GREAT WITH ANY MIC, THESE MICS PROVIDE IDEAL INPUT FOR ANTARES MICROPHONE MODELING:

audio-technica®: AT4033, AT3035, ATM41a

CAD®: M177, E200, E350

RØDE®: NT1, NT2, NT3

SHURE®: SM57, Beta 58A®, KSM32

THE HEART OF ANY GREAT SONG is a great vocal sound. With Antares's new Vocal Producer, we've combined our world-renowned Auto-Tune Pitch Correction and TEC-Award-winning Microphone Modeler technologies with state-of-the-art vocal processing modules to give you everything you need to create stunning vocal tracks in any musical style.

FREEDOM OF CHOICE

Live or in the studio, the AVP lets you instantly select from a large library of sounds. From gorgeously mellow to seriously twisted, we've included factory presets for a wide variety of vocal styles as well as an interface that makes it easy to create your own signature sounds. (And given the power and flexibility of the AVP's processing modules, we've even included a selection of presets for instrumental and percussion tracks.)

NOW HEAR THIS

Check out the Vocal Producer at your local Antares dealer or surf on over to our web site for some illuminating audio examples. With an estimated street price of $495, this is one great producer you can afford to work with.

ANTARES

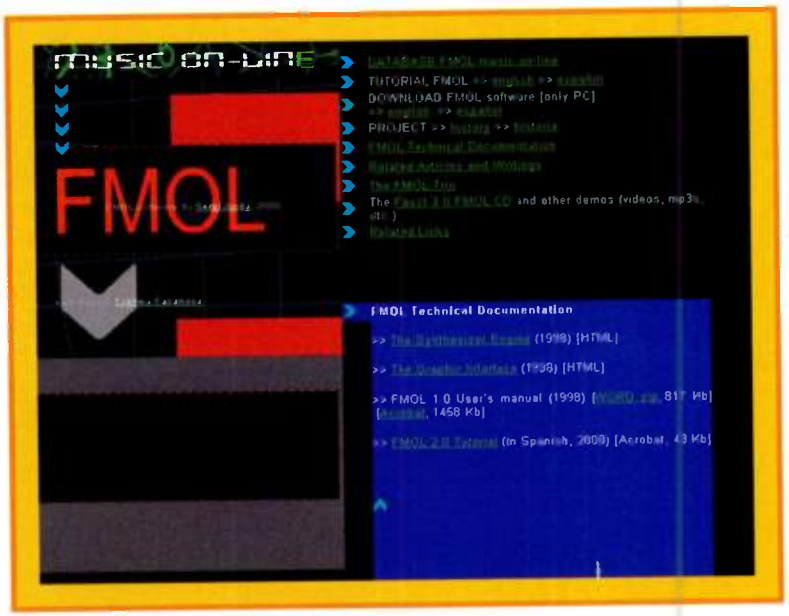
WHERE THE FUTURE'S STILL WHAT IT USED TO BE

ANTARES AUDIO TECHNOLOGIES 231 Technology Circle, Scotts Valley, CA 95066 USA
voice: 831 461 7800 | info@antarestech.com | www.antarestech.com

02

five pianos and wait for the sounds to load. Each key is assigned a sound or an image. As the keyboard loads, you are given hints about where particular elements reside on the keyboard (for example, rhythm tracks on the upper row of keys, or vibraphone samples on the lower row). Hit the Spacebar to begin a new piece, or hit the Tab key to return to the contents page.

The five pianos vary in design and playability. Angular Entropy (available in lo- and hi-fi versions) features experimental drum 'n' bass audio elements with abstract visuals. This piano lets you choose sound and animation with the letters, zoom in with the arrow keys, and change colors with the number pad. Compulsion is a jazz-based collection with swinging rhythm loops on the upper keys, solo guitar fills on the middle keys, and percussion and vibraphone licks on the lower keys. This piano also allows you to assemble the visual elements into an evocative record jacket by pressing E, O, H, or Z.



Rude Boy offers hip-hop-like instrumentals featuring a collection of sultry grooves, nasty scratches, and vocal effects. Graffiti textures can be created wherever your mouse is placed.

Lov'techno is full of electronically generated beats, vocoded voices, and repeating samples. This piano offers the most fun visually because the graphics continue to move after you've played them. Cargo has a global focus and contains more effects than the other pianos. At times, the resulting sound is reminiscent of works by the Orb or Banco de Gaia.

Graphic Pianos are also being created for mainstream music sites. My favorite example is a solely graphic piano that combines Beatles images over the song "Love Me Do" (www.thebeatles.com/lovemedo/treatment). To use Graphic Piano, you will need the Macromedia Shockwave plug-in.

DOWNLOAD OF THE MONTH

Developed in Spain by Sergi Jorda and Toni Aguilar, Faust Music On Line (www.iua.upf.es/~sergi/FMOL) is a freeware program for Windows that can be used for collaborative music making. FMOL was originally created to let musicians around the world to contribute musical phrases and short compositions to a 1998 production of Goethe's *Faust* by the Catalan experimental-theatre group La Fura dels Baus in Barcelona. Since then, the program has developed into a complete performance instrument with two alternative graphic user interfaces, one for Internet use and one for standalone software synthesis.

When used for Internet-based collaborations, players create and share FMOL score files. An FMOL file can describe musical phrases or complete compositions. The program can transfer its files between sites as well as render the scores into audio. In performance, users can create new scores or modify existing scores by adding new tracks or by adding audio processing to existing tracks. The database of score files is maintained in the form of a tree rather than a simple list. The database keeps track of the relationships between scores, some of which may be variations on earlier submissions.

The current FMOL synthesizer engine supports eight real-time 16-bit stereo audio channels at a 22 kHz sampling rate. Each channel consists of a generator that can play a waveform or sample, and three processor stages (filters, reverbs, resonators, and the like). Each composer chooses the channels' contents from more than 100 synthesis methods, algorithms, or variations.

The synthesis engine can be played externally using MIDI, or with one of the two available graphic interfaces, Bamboo or Medusa. Bamboo provides a more complete and complex interface, presenting each channel on the screen as a vibrating string that can be plucked by the mouse, with patch options editable in real time using the computer keyboard. Medusa is a looser gestural interface that tends to create thick sounds modulated by mouse movements and complex, mandala-like screen graphics. Using FMOL requires, at minimum, a Pentium/200 MHz with any 16-bit, DirectX-compatible multimedia sound card.

—Tim Perkis

WEB APP

A number of universal file formats are under development that will allow musicians to exchange music over the Internet more easily. In the field of notated music, the most exciting one is MusicXML. Developed by Michael Good at Recordare (www.musicxml.org), MusicXML utilizes the widely accepted


SONAR
MAKES
ME
INVINCIBLE
> SHAWN CLEMENT
Shawn Clement is one of the most prolific composers for film, television and video games on this planet. Always ready to take on the toughest assignments and the tightest deadlines. His secret weapon? SONAR, the award-winning, digital multitrack recording system from Cakewalk.
For his most recent battle, Shawn used SONAR to produce the soundtrack for the best-selling *Batman Vengeance* video game. With seamless audio and MIDI recording, automatable DirectX effects, powerful audio looping tools, and high-performance DXi soft synths, SONAR is the utility belt of music production. It's everything you need to record, edit, mix and deliver your next project on time and under budget.
SONAR. It gives you super powers.
SONAR™
DXi
PHOTO HARRY FRITH © 2002
Electronic Musician
2002
EDITORS
CHOICE
SONAR is available at music retailers worldwide.
Find out more at www.cakewalk.com/SONAR or call 888.CAKEWALK (617.423.9004 outside U.S.).
cakewalk®

tools of the Extensible Markup Language (XML) and was created as a universal translator for symbolic representations of music.

Unlike typographically oriented markup languages, such as HTML, XML focuses on the content of a page, making it well suited for use with notated music. At this stage in its development, MusicXML allows you to translate musical documents scanned using the Visiv *SharpEye Music Reader* (www.visiv.co.uk) into *Finale* (version *2000* or later) files (www.codamusic.com). "Up to this point," explains Good, "musical scores have been distributed online either as PDF files or in a proprietary file format. MusicXML gives you a way to move scores easily between different computer applications."

MusicXML was designed to be an "adequate" (Recodare's description) interchange format—neither too specific nor too general—so that it could easily be implemented into commercial software. For example, the Standard Music Description Language (SMDL; see the September 2001 "Web Page") was too generalized as a music-description protocol and ultimately proved too complicated for widespread use. On the other hand, the Notation Interchange File Format (NIFF; see the August 2001 "Web Page") only represents music graphically and is too limited for most uses.

Future additions to MusicXML will include the ability to handle tablature and percussion notation, and the support of analysis and database applications. It's expected to be in development for several more years, but when analysis and database support become available, users will be able to sort MusicXML documents and to search for symbolic content. For more information about MusicXML and other computer-related music-notation developments, take a look at *The Virtual Score* (MIT Press), edited by Walter B. Hewlett and Eleanor Selfridge-Field (see "What's New," p. 20, for details).

BAND ON THE WEB

Negativland (www.negativland.com) is more than just a band: it's an experimental art group, in the style of the Dadaists and Fluxus artists, whose work attacks the boundaries of art, taste, and intellectual property rights, as well as the limits of the law.

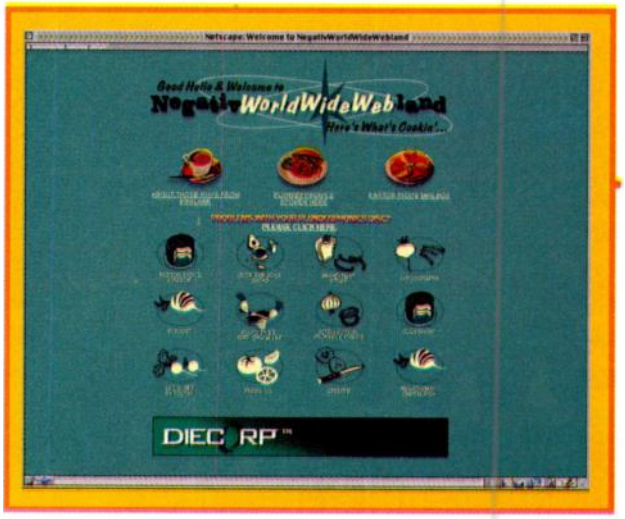
After years of operating on the fringes of commercial music, Negativland gained worldwide notoriety in 1991 with its single "U2," which featured an unusually profane diatribe by radio host Casey Kasem as (the band) U2's hit "Where the Streets Have No Name" played in the background. The resulting legal proceedings were later detailed by the band in the book *Fair Use: The Story of the Letter U and the Numeral 2.*

Negativland reuses the detritus of pop culture to create audio and visual works, including CDs, books, and now its Web site (aka NegativWorldWideWebland). Negativland's site is one of the best band sites you'll come across: it's attractive, well designed, thematically consistent, and, most importantly, packed with compelling content. For example, the site features a collection of articles about intellectual property issues. It also covers the band's "Over the Edge Radio," fostering the "democratic principles" of phone-in radio access during a *completely* free-form live radio program.

NegativWorldWideWebland's other goodies include Museit, a portable, wireless media device that works with the next wave of file sharing networks and promises "All music on Earth will be free"; and details about the recently discovered primary color, Squant. Fact, fiction, entertainment, or prank? You be the judge.

Negativland's own recordings are available at the site's online store, NegativMailOrderland. You may also order selected works from other artists who share Negativeland's penchant for cultural appropriation, such as plunderphonicist John Oswald and sample-based composer-improviser Bob Ostertag. ●

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



xp Ready!

WaMi Rack 192X

Premium 192kHz 8channel Audio Interface

The world's first rack mountable 192 kHz, 24-bit, 8 channel digital audio interface.

The first of it's kind, the WaMi Rack 192X supports the full DVD-Audio specification.
Clean 192kHz recordings from analog and digital sources, the WaMi Rack 192X is the answer.
24-bit, 192 kHz digital audio, +4dBu analog level, Coaxial S/PDIF digital connectors,
4 channels of MIC preamps, MIDI interface.
- Check our specs -- See the quality.
- Check our sound -- Hear the clarity
- Check our price -- Celebrate the Value.

EWDM
Enhanced Audio Driver

ADVANCED RESOLUTION™
192kHz/24bit

Waveterminal 192X&L

Waveterminal 192X
Premium 192kHz 6 channel Audio interface

Waveterminal 192L
96/192kHz 6 channel Audio interface

Hear and Now!

Designed for the future.
Available now.
The 192X and 192L are the world's first low cost 192kHz pro audio peripherals.
Both cards feature ultra clean,no-compromise A/D and D/A converters,
S/PDIF stereo optical digital output and simultaneous record/playback.
And the 192 Series supports the DVD-Audio standard.
Your future -- It's in the cards.

MI/ODI/O Option Bracket
for Waveterminal 192X&L
(MIDI i/o, Optical Input, Coaxial i/o)

ESI
Ego Systems Inc.
Suite 303, Ipark venture campus 3003 N. First Street San Jose, CA 95134
TEL: +1-408-519-5774 FAX: +1-408-519-5786
www.esi-pro.com sales@esi-pro.com

By Julian Colbeck

Oxford Synthesizer Company Oscar

Produced: 1983–86
Made in: England
Designed by: Chris Huggett
Number produced: 1,800
System: analog/digital hybrid, subtractive and additive synthesis
Price new: $1,000

Today's prices:		
	Like new	*$2,000*
	Like, it's okay for its age	*$1,600*
	Like hell	*$1,000*

When British manufacturer Oxford Synthesizer Company (OSC) introduced the Oscar in 1983, it was anything but an overnight success. Despite its current near-legendary status and undeniable charm, the odd-looking monophonic synthesizer was about as marketable as cricket pads in East Los Angeles. Made of plastic with a wooden base and rubber end pieces and section dividers, the Oscar has an attractively industrial appearance. A British monosynth made of plastic and rubber? Perhaps people thought it was designed by Monty Python.

The Oscar is the brainchild of Chris Huggett, who also developed the Wasp, an earlier oddball synth manufactured by the Electronic Dream Plant. OSC consisted of Chris, his mom, and Paul Wiffen—hardly enough people to compete with Japanese giants peddling their popular Junos, DXs, and CZs. Nonetheless, Oscar users have included Stevie Wonder, Jean-Michel Jarre, Ultravox, Liam Howe of the Sneaker Pimps, and Geoff Downes of Asia.

The Oscar's strength is its ability to deliver idiosyncratic lead, bass, and obbligato sounds with tremendous power and flexibility. You can create custom waveshapes, set up and externally clock sequences and arpeggio patterns, and store your tweaks into its programmable memory. Although the Oscar is lumped in with the Minimoog and friends as one of the great classic analogs, only its filters are truly analog; everything else about the Oscar is digital.

With atrocious timing, the Oscar was launched just before MIDI became standard. The Oscar underwent frequent revisions, with at least seven models during its life span. MIDI models were introduced in late 1984, and OSC made subsequent refinements to its MIDI implementation. Pre-MIDI models can store 12 user patches and 24 factory presets; MIDI models can store user patches in all 36 memory locations.

On the front panel, 36 identical knobs are so tall that you might have to crane your neck to see their functions. Two digitally controlled oscillators (DCOs) provide sawtooth and triangle waves as well as three types of pulse waves—square, variable pulse, and modulated. The Oscar is considered a monophonic instrument, but its two oscillators can independently respond to the keyboard or sequencer, allowing it to play two notes simultaneously. The envelopes, however, trigger monophonically from the keyboard. Still, the Oscar's duophonic capabilities make it possible to play one oscillator with the keyboard as the sequencer plays the other.

Two 12 dB–per-octave multimode filters can be combined in series for 24 dB–per-octave filtering. Lowpass, highpass, and bandpass filtering are supported, with control of cutoff and resonance. A unique Separation parameter governs the two cutoff frequencies independently; in Bandpass mode, it provides what David Lynch might call twin peaks—two distinct resonant

FRANK MORENO

Quirky in a way that only a British company could dream up, the Oscar was one of the last "original" monosynths produced before the retro revolution of the 1990s.


ALESIS
MONITOR
CLOCK SOURCE
INT
SELECT
SOURCE
adat HD24
The First Hard Disk Recorder Worthy of the Name ADAT.
Presenting the new state-of-the-art in digital recording systems: ADAT HD24 - The first 24-track hard disk recorder designed to match ADAT's legendary performance and affordability. With two hot-swappable drive bays. Resolution up to 24-bit/ 96kHz. 24-Channels of Analog I/O. 24-Channels of ADAT Optical Digital I/O. ADAT Sync for sample-accurate multiple machine synchronization. MIDI and Ethernet to connect your MAC or PC. Using low-cost, removable IDE hard drives for exceptionally low media costs - cheaper than ADAT tape per track minute. And offering incredible speed, performance, and stability, thanks to our exclusive, ADAT/FST™ file streaming technology - the first method of writing to the hard drive designed and built from the ground up for recording music. Not data. To learn more, visit our website, or stop by your local dealer.
ADAT HD24.
The future of ADAT.
www.alesis.com

frequencies with control over the bandwidth. If blitzkrieg power is your goal, you can overdrive the filter using the master volume control and store the overdrive setting with each program. With the volume knob turned two-thirds of the way up, full volume is attained; turning it higher increases the overdrive but not the gain.

Two ADSR generators modulate the filter and amplifier, and you can invert the filter's envelope. You can create some excellent repetitive effects by automatically triggering either or both envelopes at a rate determined by the internal clock's tempo control. On later models, you can synchronize external instruments to the Oscar's clock using a trigger output.

In addition to low-frequency triangle, sawtooth, and square waveforms, the six-position knob controlling the low-frequency oscillator (LFO) offers Env, Kbd, and R options. Env uses the filter's envelope generator instead of an LFO waveform, and Kbd provides a number of filter-tracking effects. R generates a random sample-and-hold pattern controlled by the LFO rate. The LFO can modulate pitch, pulse width, and filter cutoff, and the Intro control delays the onset of vibrato.

When you grow tired of sedately driving an Oscar along leafy Oxfordshire lanes using standard waveforms, gentle filtering, and pedestrian envelopes, you can turbocharge down the motorway by constructing custom waveforms. The Oscar's additive synthesis functions let you build upon a fundamental frequency to assemble complex, even atonal sounds, by selecting 24 harmonics and their amplitudes with the keyboard's top two octaves. One oscillator can generate an analog waveform as the other makes an additive waveform. The Oscar's memory can store as many as 24 user-defined waveforms.

The Oscar's sequencer provides 24 sequence locations, and you can link sequences with a patch change at the beginning of each sequence in the chain. MIDI models can store as many as 1,500 events, including rests. You enter sequencer information by specifying notes, rests, and rhythms one event at a time; you can develop a left-and-right-hand technique that approaches real-time entry. Many users swear by the variety of inspirational rhythms and effects they can extract from the instrument.

Although it's notoriously difficult to find one in good working condition, the Oscar has endeared itself to dance-music producers in recent years. It's difficult to service, though, and finding replacement parts is something of a nightmare. Unfortunately, when you pry off the end pieces, you have to truss up the instrument with rubber bands to prevent it from spilling its guts. Replacing the lithium battery wipes out the memory, but you can save its contents using a cassette interface, and on later models via MIDI.

If you're shopping for an Oscar, be aware of its many revisions. As production continued, OSC ironed out some of the Oscar's more irritating characteristics and added some cool features. On MIDI models, for instance, the keyboard can play external instruments polyphonically, but it lacks Velocity sensitivity. Because operating an Oscar is hardly intuitive, a user manual adds substantially to its resale value.

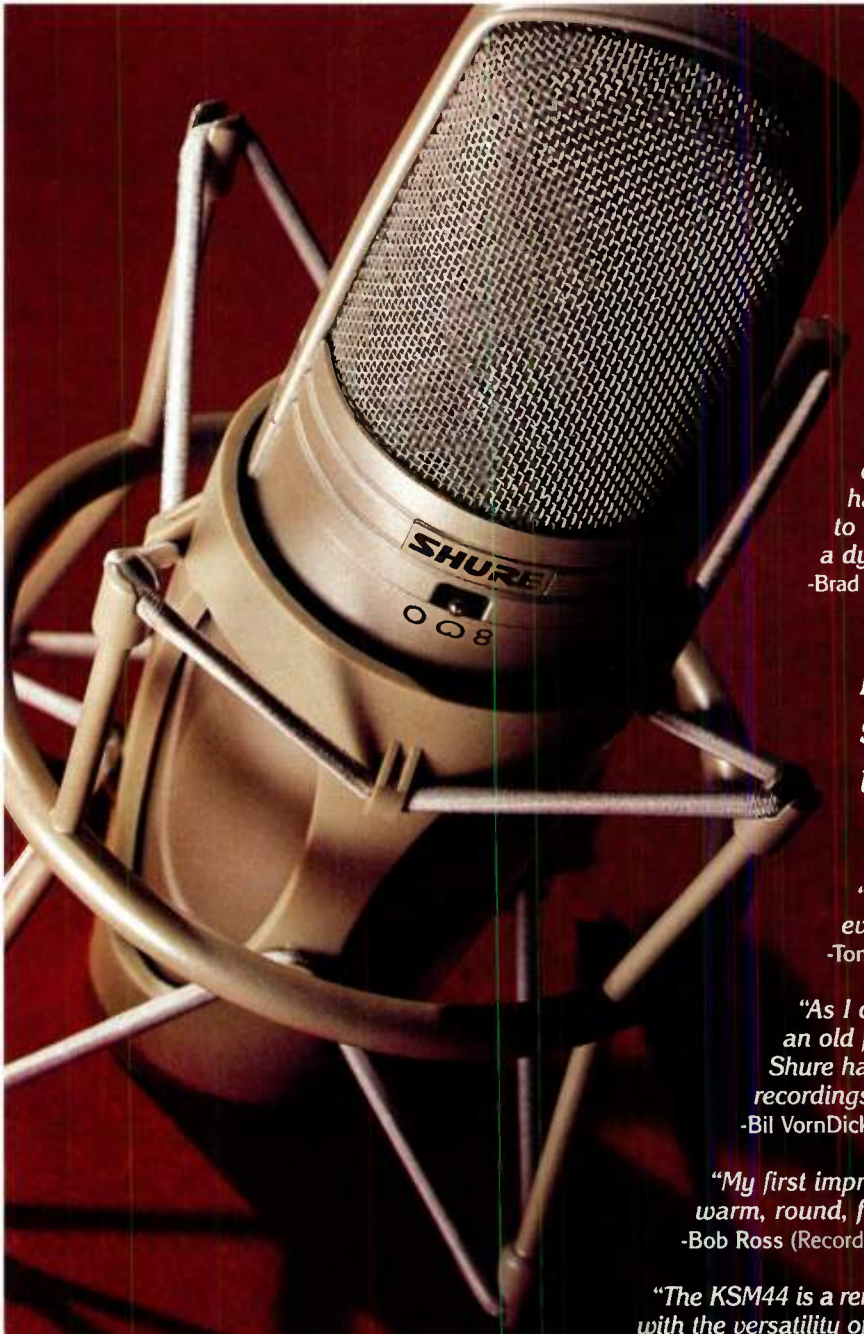
Although it frequently crops up on Web sites featuring vintage keyboards, I know of only one site dedicated to the Oscar (www.airburst.demon.co.uk/oscar). In 1986 Chris Huggett began working on the S1000 and subsequent samplers for Akai. He continued with Akai for ten years and was eventually hired by Novation to work on the Supernova series of synthesizers.

Julian Colbeck *has toured everywhere from Tokyo to São Paulo with artists as varied as ABWH/Yes, Steve Hackett, John Miles, and Charlie.*

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

PRICE GUIDE

The quoted prices reflect typical street prices you must expect to pay in U.S. dollars. The buy-in on vintage instruments, as with vintage cars, is just the beginning, though. Most of the original manufacturers are long gone, so maintenance and repairs are expensive.



"The KSM44 has amazing presence on vocals. It's a great all-around condenser mic."
-**Eddie Kramer** (Jimi Hendrix, Led Zeppelin, Kiss, the Beatles, ...)

"I found the KSM44 to have an excellent natural quality with good presence and a nice open top end. This mic is so smooth in the midrange, even a banjo sounded good!"
-**Joe Chiccarelli** (Beck, U2, Elton John, ...)

"I tested the KSM44 on vocals, bass, guitar, and drums, and haven't stopped using it since. It's hard to describe, but there is an immediacy to the KSM44 that is very appealing – sort of like a dynamic mic, but more elegant."
-**Brad Wood** (Smashing Pumpkins, Liz Phair, Better Than Ezra, ...)

For a mic with such low self-noise, it sure creates a lot of buzz.

"The KSM44 is the quietest microphone I have ever used, and one of the best sounding too."
-**Tom Jung** (Pro Audio Review, DMP Records, ...)

"As I compared the KSM44 to a mic I consider to be an old favorite, my ear immediately chose the KSM44. Shure has a fantastic studio mic that I can use for critical recordings – it's going to become a standard, very fast."
-**Bil VornDick** (Alison Krauss, Bela Fleck, Mark O'Connor, ...)

"My first impressions of the KSM44 were warm, round, full – dare I say it? Fat!"
-**Bob Ross** (Recording Magazine)

"The KSM44 is a remarkable achievement. I am especially impressed with the versatility of this microphone and have yet to find its limits."
-**Steve Albini** (Nirvana, Page and Plant, PJ Harvey, ...)

"I was given the KSM44 prototype early-on, not knowing its intended purpose - so I tried it on everything. Guess what, it worked on everything!"
-**Chuck Ainlay** (Trisha Yearwood, Mark Knopfler, George Strait, ...)

SHURE
It's Your Sound™

The KSM44 multi-pattern studio condenser microphone has become quite the conversation piece in studios around the world. Maybe that's because its incredibly low self-noise (7 dB) lets you record only what you want to hear. Or maybe it's the three polar patterns and the design of the externally biased dual-diaphragm cartridge. Once you experience it for yourself, you'll be talking, too. To discover what makes the KSM44 so buzzworthy, call 1-800-25-SHURE or visit www.shure.com.

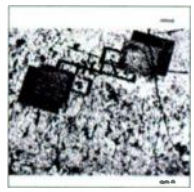
PROFILE

By Matt Gallagher

Modular Mayhem

Minus is a fixture in the Pacific Northwest's improvisational music scene. Based in Corvallis, Oregon, Minus comprises Mark France on guitar and vocals, Dave Trenkel on bass and keyboards, and Henry Franzoni on drums. France and Trenkel produced the band's second album, *Dark Lit,* which combines elements of metal, psychedelic rock, jazz, dub, funk, and the avant-garde.

Minus adds a modular synth to an already flavorful organic power trio.



"We wanted to make a big-sounding rock record as cheaply as possible," Trenkel says. "I wanted to keep the feel of a power trio playing in a room." The band booked time in a studio for recording basic tracks. "It was good to turn part of it over to somebody else whom I completely trusted and just concentrate on playing," Trenkel says. "When the basic tracks were done, I could go into geek mode and tweak things. When I try to engineer myself, I'm not satisfied with the results on either end of it."

Minus recorded 18 tracks in four days at Tucker Martine's Flora Avenue Studio in Seattle. "Almost everything was done in one or two takes," Trenkel says. Martine recorded the trio onto two-inch analog tape with an MCI JH-16, 16-track reel-to-reel machine. "On the last day, we rented a pair of ADATs and transferred everything to ADAT," says Trenkel. Back home, he borrowed an ADAT deck and transferred eight tracks at a time into his Power Mac 8500 (with a G3/300 MHz processor) through a Korg DRS SoundLink 1212 I/O PCI card. "I did all the transfers to [BIAS's] *Deck,* but about two-thirds of the way through the project, I switched to [Emagic's] *Logic Audio,*" Trenkel says.

The band continued tracking in Trenkel's home studio, the Blinky Room, located in a spare bedroom and outfitted with an A.R.T. Dual MP tube preamp, an FMR Audio RNC1773 compressor, a Joemeek C2 compressor, and a Frontier Design Group Zulu analog-to-digital converter. France and Trenkel overdubbed guitar, synths, and vocals. Guest musicians Dave Storrs and DJ Scratch 'n' Sniff provided percussion and turntable parts, respectively.

Trenkel is a self-described "analog synth fiend" and used his Synthesis Technology MOTM modular-synth system to process instruments, vocals, and effects on several of the songs. "You can get these terrific cutting sounds that work well against big guitar sounds and big drums," Trenkel says. For example, "on the first tune, 'Melvohol,' the ring modulator adds this gritty effect. The bass part is run through a pair of MOTM-420 [voltage-controlled] filters being swept by two low-frequency oscillators [LFOs] that are not synchronized to each other, so you hear the bass wander from one speaker to the other."

The Mac played a central role in the recording. "All of the mixing was done in the computer," he says. "I think that this project pushed the limits of what you could do on an 8500. One tune, 'Blum Blum Shub,' had 34 tracks in the final mix, but it worked." However, Trenkel notes that live-trio tracks such as "3 Bad Brothers" and "Baby Steps" were mixed only with EQ and compression.

Trenkel also mastered *Dark Lit* at home. "Even if you have the capability of doing mastering yourself, it's a good idea to take it to someone else just to get another perspective on it," he says. "I took the mixes around to a number of my friends. I also made friends with the guy who runs the local high-end audio store.

"We are working on a remix version of the CD," Trenkel adds. "I've handed out tracks to friends of ours who are working on them right now. I want to be surprised by the results."

For more information, contact New and Improv Media; e-mail improv@peak.org; Web www.newandimprov.com.

E. J. HARRIS

***Dark Lit*/Minus**

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

winter music conference

at the Miami Beach Convention Center

demo listening workshops

dj spin-off • exhibit hall • new artist showcases • poolside performances & dj sets

international marketplace

remixing & editing sessions

international dance music awards • seminars & panels

nightclub performances by the world's top artists and djs

AT THE CENTER OF THE ACTION IN SOUTH BEACH AND THE WORLD

MIAMI BEACH, FLORIDA
MARCH 23-27, 2002

www.WinterMusicConference.com

Office: 3450 NE 12th Terrace, Fort Lauderdale, FL 33334
Phone: (954) 563-4444 Fax: (954) 563-1599 E-mail: info@WinterMusicConference.com

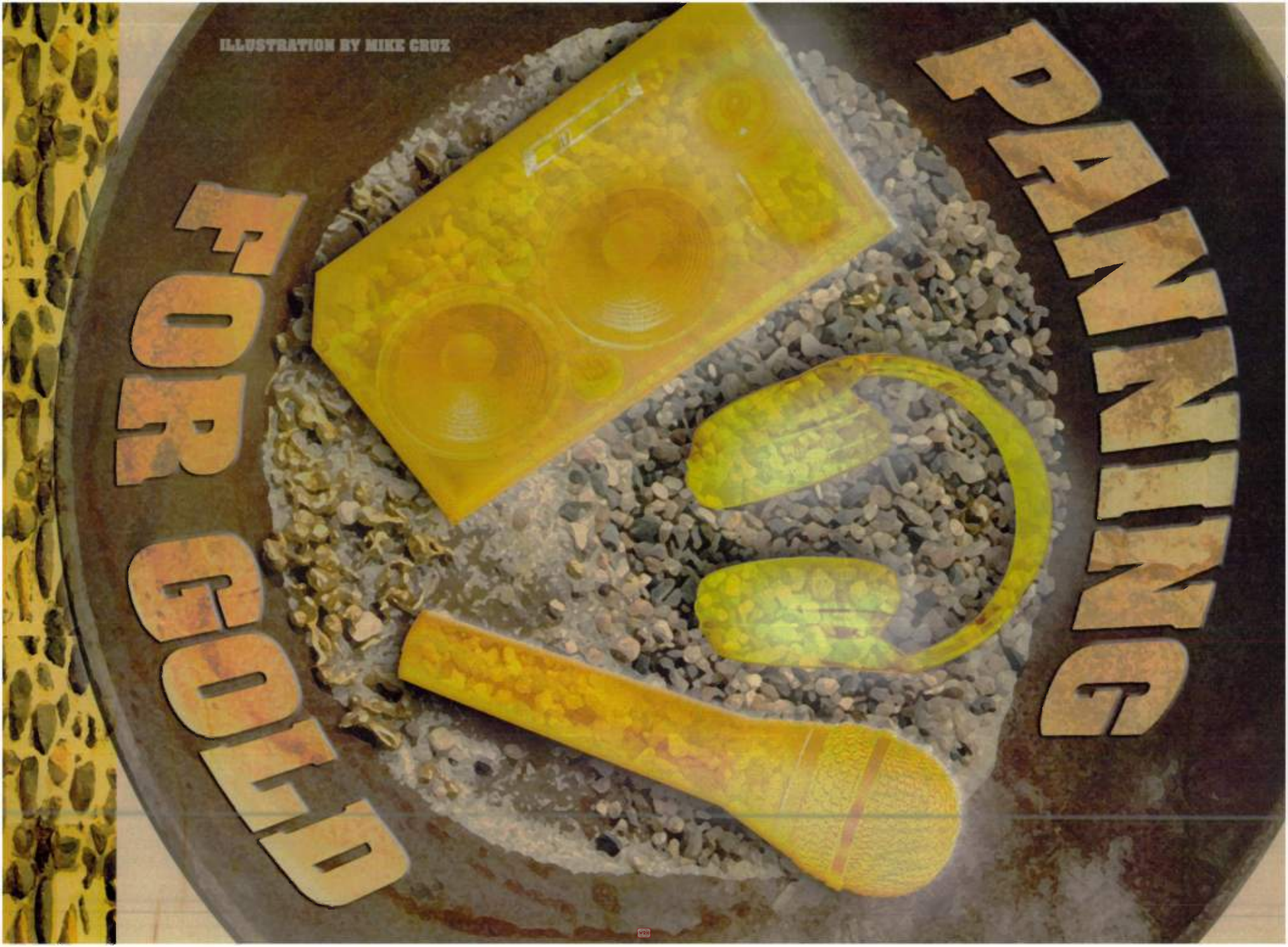


ILLUSTRATION BY MIKE CRUZ
PANNING
FOR GOLD

Once you've mastered the arcane science of signal routing, learned the ancient secrets of gain structure, and been initiated into the mysterious ways of equalization, compression, and myriad other stages in the black art of signal processing, you'll face the ultimate challenge: the final mixdown. That is where all those perfect takes—often separated by months, miles, and styles—must combine seamlessly beneath your skilled fingers to create something sonically balanced and musically cohesive.

Moving the faders comes easy: up is louder. Equalization skills come with time: find the pain and reduce the gain. But what's the rule of thumb for creating an effective soundstage? Where the heck do you place each instrument and effect in the stereo field? Is there some secret pan-pot code for creating a good stereo image? Randy Hoffner, a former audio engineer at NBC, once said, "Stereo does not equal mono times two," and though that may seem obvious, stereo imaging is more than first meets the eye—or rather, the ear.

There is no rule of thumb for creating a soundstage; as with all things musical, the only regulation is that it sounds good (or at least the way you want it to sound). Still, most engineers agree that the general goal is a clear, uncluttered, three-dimensional soundstage in which the elements can all be clearly heard and their positions can be readily identified. For the novice, that is best achieved by learning first how to create a *realistic* soundstage—that is, one that sounds believable, as though the band were set up and playing right in front of you. Just as Picasso mastered realism before venturing off into cubism, the mix engineer is well served by an initial apprenticeship to nature—that is, to making things sound the way they actually do. Naturally, once you've mastered the rules, you will have a much better idea of when and how to break them.

A measured approach to creating realistic stereo soundstages.

By Randy Neiman

This article covers what you need to know to create realistic soundstages. I'll explain how stereo imaging works, discuss critical tools of the trade, lay out general strategies, and offer practical tips, tricks, and caveats for constructing an effective, true-to-life soundstage. In addition, I have provided two detailed, real-world examples of soundstaging (see the sidebars, "Figuring It Out" and "Spinal Tap Dancer") based on actual mixes you can download from the EM Web site (www.emusician.com) and analyze at your leisure.

SOLID FOUNDATION

Although the word *stereo* commonly refers to any 2-channel system (whether audio or some other type), the original Greek word *stereo* meant "solid" in the sense of three-dimensional (having breadth, depth, and height). Combine *stereo* with the word *phonic*, which means "sound," and you get *stereophonic*, or *solid sound*. Just as stereoscopic, or solid-vision, imaging employs two slightly offset photographs to create the illusion of depth (based on the fact that having two eyes a given distance apart allows for depth perception), stereophonic recordings create the illusion of three-dimensional space from two speakers. Simply put, stereophonic imaging works because having two ears allows for *localization*, the ability to perceive the direction a sound is coming from.

The human ear is an extremely complex and precise instrument. The structure and interrelationship of the outer, middle, and inner ears allow for maximum energy transfer at specific frequencies. Impulses generated by the nerve fibers in the cochlea (inner ear) are sent to the brain, which can accurately determine, among other things, pitch (to within 0.3 percent accuracy), distance, direction, and, if the source is moving, speed. Other cues related to timing and relative intensity provide subtle clues as to the nature and size of a room or environment—whether, for example, a sound is coming from a small room, a large auditorium, or the depths of a forest. All of that happens incredibly fast, with no need for the listener to think about the complex physics involved.

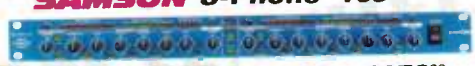
THE NEWEST TECHNOLOGY!
THE HOTTEST DEALS IN THE U.S.A.!

ZOOM MRS-1044
$699.99
List: $1199.00

ZOOM MRS-1044C
$1099.99
List: $1999.00

AVALON DESIGN VT-747-SP Call!

SAMSON S-Phone $169.99



SAMSON S-Com Plus $179.99

MPX-100 $199.99
Mark of the Unicorn 828 $699.99

Focusrite Penta $379.99

TC Electronics Triple C $199.99

RFX-2000 $199.99

PreSonus Bluetube $159.99

DBX 166XL $249.99

DBX Pro Vocal $299.99

ZOOM MRS-4
$229.99
List: $499.00

Yamaha AW-2816CD
$1999.99
List: $2399.00

Korg D1600
$1599.99
List: $2000.00

BOSS BR-532
$395.99
List: $495.00

Korg PXR4
$399.99
List: $495.00

Roland VS-2480
CALL
For Lowest Price!

Tube MP-Studio $109.99

Allen & Heath Mix Wiz DX
$999.99
List: $1195.00

Fostex VF-160
$1399.99
List: $1799.99

Mackie MDR2496
$1999.99
List: $3499.00

Tascam DM24
CALL
For Lowest Price!

Alesis HD24
$1999.99
List: $2499.00

Roland VSR-880
$499.99
List: $1795.00

Tannoy System 600
$1199.99
A Pair

Genelec 1030 AMP
CALL!

Tannoy Reveal Active
$779.99
A Pair

Roland DS50A
$499.99
A Pair

Event PS-5
$469.99
A Pair

Mackie HR824
CALL!

Yamaha MSP3
$149.99
Each

DIGITAL RECORDING
SIGNAL PROCESSING, GROOVE BOXES

Emagic Logic Audio Gold/EXS24 Power Bundle • $299.99
IK Multimedia SampleTank • $349.99

Be sure to enter our on-line contest to win great gear!

GET OUR 164 PAGE FULL-COLOR CATALOG
1 YEAR FREE SUBSCRIPTION!

Visit our website for the best deals in
Guitars • Drums • Live Sound • Books & Video

1·800·4·SAMASH
www.samash.com

SYNTHS, DIGITAL PIANOS, SAMPLERS, CD RECORDERS

HHB CDR-830
$499.99
List: $795.00

Sony CDR-W33
$469.99
List: $899.00
LOWEST PRICE EVER!

Nuemann TLM-103
CALL!
For Lowest Price!

Neumann U87
CALL!
For Lowest Price!

59% OFF LIST

Denon C550R $699.99 List: $850.00

Samson Servo 260 $199.99 List: $379.99

Audio Technica AT 4033/SM
$299.99
List: $725.00

Audio Technica AT4047
$499.99
List: $695.00

Sennheiser MD421
$299.99
List: $485.00

Rode NT2
$399.00
List: $649.00

NEW!
Tascam CDRW-402 $999.99 List: $1249.00

Tascam CD-RW4U
$399.99
List: $579.00

Roland XV5050
CALL!

AKG C-1000S
$199.99
List: $288.99

AKG C-4000
$459.99
List: $288.99

AKG C414.ULS
$799.99
List: $1258.00

AKG Solid Tube Mic
$699.99
List: $1398.00

Nord Lead 3 Rack
$1999.99
List: $2499.00

E-mu Proteus 2500
$999.99
List: $1329.00

NEW LOWER PRICE!

Roland MC307
$499.99
List: $995.00

WOW!

Marshall Electronics MXL2001
$99.99
List: $499.00

Samson C01 Condender Mic
$69.99
List: $149.99

Roland CDX-1 DiscLab
$1299.99
List: $1495.00

Shure KSM44SL
$699.99
List: $1393.60

Shure KSM27/SL
$299.99
List: $575.00

Roland JV1080
$799.99
List: $1195.00

Korg Electribe•M
$399.99
List: $499.00

TC Helicon Voice Prism
$999.99
List: $1299.00

Yamaha RS-7000
CALL!
For Lowest Price!

Akai MFC4
$499.99
List: $579.00

Korg Triton Rack
$1599.99
List: $2500.00

Zoom ZRT-123
$169.99
List: $299.00

RED HOT DEAL!
NO PAYMENTS! INTEREST! FOR 12 MONTHS
ON ANY ON-LINE PURCHASE!*

want a FREE catalog?
Call 1-800-4-SAMASH or log on to www.samash.com

We Will Beat Any Price!
LOWEST PRICE GUARANTEED!
50 STATES/60 DAYS

FREE SAME DAY Shipping on most orders over $100!**

OPEN 24 hours 7 days

samash.com

The on-line musical instrument megastore!

Mention Code EM7DP When Ordering!

1·800·4·SAMASH • www.samash.com

Samash.com is part of the Sam Ash family of companies, including 30 musical instrument megastores nationwide.

*On your Sam Ash credit card, subject to credit approval. Certain rules apply to the allocation of payments and finance charges on your promotional purchase if you make more than one purchase on your store credit card. Call 1-888-367-4310, or review your cardholder agreement for information. If balance on these purchases is paid in full before the expiration of the 12 months promotional period and your Account is kept current, accrued Finance Charges will not be imposed on these purchases. If balance on these purchases is not paid in full, Finance Charges will be assessed from the purchase date at the Standard Rate of 20.96% APR. For Accounts not kept current, the Default Rate of 24.96% APR will be applied to all balances on your Account. Minimum Finance Charge $1.00. **Applies to orders shipped in the contiguous United States. Items that require special shipping due to size or weight are excluded from this offer. See our website, www.samash.com, for complete details. Offer expires1/5/2002. Sam Ash is not responsible for any typographical errors.

PANNING FOR GOLD

PANORAMIC VIEW

A primary factor in localizing sound is intensity, also known as volume. *Volume* gives an indication of distance, because a sound's intensity decreases as it moves away from the source. In a free field, sound emanates from the source in a spherical pattern and with a determined amount of energy created by the source; as the sphere gets bigger, the energy is reduced. The inverse square law states that sound pressure decreases proportionally to the square of the distance from the source. That works out to approximately 6 dB attenuation each time the distance doubles. In other words, louder sounds closer.

Timing is another primary audio cue. The Law of the First Wavefront states that when two coherent sound waves are separated in time by short intervals (less than 28 ms), the first signal to arrive at the ears will provide the dominant directional cues. Direct sound arrives at a listener's ears earlier than reflected sound (assuming the sound source is in an enclosed space); thus you can clearly detect location, even in very reverberant spaces. For a mono sound played through two speakers at equal volume (with the signal panned dead center), a delay of even 1 ms on either side can shift the image significantly to the right or left. Signals arriving more than 35 ms later than the original are interpreted as a distinct, separate echo from the source.

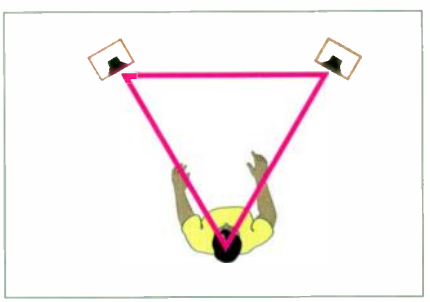


FIG. 1: Stereo imaging can be determined accurately only when the mix engineer is situated at one vertex of an equilateral triangle formed by the engineer and the two monitors.

Although knowing the mathematics is not essential to creating an effective soundstage, it is important to understand how these two principles, intensity and timing, underlie the phenomenon of stereo imaging. By altering the relative intensity and timing of signals between two identical speakers in an enclosed space, you can create a believable sense of space in a mix. The mind does the rest of the work for you by localizing the source.

During the making of the 1940 movie *Fantasia*, audio engineers at Walt Disney Studios were asked to create the illusion of sound moving back and forth across the screen. Based in part on the earlier work of Dr. Harvey Fletcher (of Fletcher-Munson-curve fame) and his team at Bell Labs, the engineers determined that a sound source that is faded between two speakers seems to move between them, provided the total sound-pressure level (SPL) in the room remains constant. A special two-gang potentiometer (essentially a two-output, variable-voltage divider) was developed for which the sum of the log attenuations equaled a constant. The Disney engineers dubbed it the *Panoramic Potentiometer*, or *pan pot* for short.

As the pan pot is turned, a mono signal is sent to two channels simultaneously; the total intensity remains constant, but the difference in intensity between the two speakers provides the cues for localization. That is called *intensity stereo*. Thanks in part to the pioneering work of Les Paul, using pan pots and intensity stereo to create a lateral soundstage has been standard practice in popular music mixing since the mid–1950s.

TOOL TALK

Of all the tools necessary for creating a good mix, none is more important than two you already possess: your ears and brain. Those instruments collect the sound from the room, process and interpret it, and let you build a mix. Needless to say, keeping them in good shape is important. Listening to extremely loud music can dull and eventually damage your hearing. Recreational chemical use, too, can be deleterious. Not to be preachy, but some effects that make booze and other drugs fun—time distortion and heightened sensory perception, for example—can lead to bad or even disastrous results in the studio. Your mix may sound great to you now, but in a few days, once your head is clear, it very well may not.

If the ears and brain are the most important tools for mixing, the next is surely the monitors and, by extension, the room. I include the room because the premise of intensity stereo is intrinsically linked to keeping a constant volume within an enclosed space. The listening environment is thus a functioning part of the speaker system—a resonator, if you will. Together, the monitors and room provide the information to the ears and brain.

SPEAKER OF THE HOUSE

Many people (myself included) do much of their mixing in spaces that are far from ideal acoustically. But by applying acoustical treatments to the listening environment, you can produce better results immediately. A number of good articles about room treatment are available, in print and on the Internet, so I won't delve deeply into the subject. However, you can do some simple things now to guarantee optimal performance from your monitoring setup.

First, if possible, make sure your monitor speakers are not positioned in corners or directly against a wall, as that can cause low-frequency buildup and standing waves, making low frequencies seem louder than they really are. A simple Rule of Thirds can be employed to determine where to position the monitors in relation to the nearest wall: place the monitors at about one-third the depth of the room. For example, if your room is ten feet deep, place the monitors a bit more than three feet from the wall.

Even more critical is speaker placement in relation to the listener. In a proper mixing setup, the listener sits at one vertex of an equilateral triangle

TWO HEADS ARE BETTER THAN ONE!

RØDE NT4
(actual size)

Especially when you want to record in true stereo.

For the first time, without having to spend thousands, **RØDE** *lets you change the way you record. Overheads, guitar and piano, even group vocals the way they should be laid down.*

Most recordings do not take advantage of stereo mic'ing techniques! Yes, they are mixed as two channels, but they lack the ambience and 'space' only a high-end stereo mic like the NT4 can deliver.

The NT4, stereo made easy.

RØDE®
MICROPHONES

USA - Ph: 310 328 7456 INTERNATIONAL - Ph: 61 2 8765 9333 Fax: 61 2 8765 9444
info@rodemicrophones.com www rodemicrophones.com

Also perfect for location, effects and sampling direct to Mini Disk and DAT via cables supplied. P48 Volt or battery powered.

formed by him or her and the two monitor speakers; that is, the speakers are the same distance from each other as they are from the listener (see **Fig. 1**). That setup allows the sound from each transducer to arrive at the listener's ears at approximately, if not precisely, the same time. An offset of just a couple of inches on either side or a delay of just a few milliseconds can shift the resulting image significantly to the left or right, seriously degrading the stereo image.

It's also critical that speaker levels be matched. A discrepancy of less than 1 dB between the two speakers can shift the stereo image several feet in terms of the perceived location of the source; a difference of 20 dB moves the image completely to one side. Simply setting the levels of your amp or matching the trim on your active monitors until they look the same won't do—the potentiometers used in those devices can have variances of 5 percent or more. Furthermore, the cumulative effects of the component tolerance variances in the amplifiers can cause 1 to 5 dB of difference in loudness between the channels, even with the level knobs set identically.

An inexpensive solution is to buy an SPL meter from an electronics store. Even an inexpensive SPL meter, though not laboratory accurate, can measure the relative SPLs coming from your speakers well enough. Use a constant tone to begin with—1 kHz is suitable for a quick measurement. First, pan the signal hard left and take a measurement. Next, pan the signal hard right and take another measurement. Then, alternate between several frequencies or use pink noise to measure the relative SPLs, adjusting amplifier or trim levels until they match.

DAILY MONITOR

The quality of your studio monitors is another important part of the equation. Buy the best system you can afford. Some people will readily spend a couple grand on a great microphone or a mic preamp and then grumble about paying that much for a pair of speakers. But this is no place to compromise; you use your monitors constantly to hear (and evaluate) every bit of audio in your studio, so ultimately, they are the most important tools you possess.

People interpret what they hear somewhat differently, so there is no one best choice for everyone. If there were, only one company would be making studio monitors. What's important is how they translate—that is, how your mixes sound once they leave your studio and get played on hundreds of other, quite different systems. Speakers that "sound good" or are "flattering" do not necessarily make the best choice. If everything played through a pair of monitors sounds great, some pretty awful mixes will leave your studio, because you'll have stopped working too soon.

That's why some engineers intentionally choose lower-quality, quite nonlinear speakers: to be able to judge how the mix will sound on similarly inexpensive consumer-playback systems. When used by someone with trained ears, such monitors (a certain white-coned model comes to mind) let mix engineers familiar with them make good decisions; I do not, however, suggest using inexpensive monitors as your main tools. Neither do I suggest using headphones as primary mix tools, because headphones are actually biphonic rather than stereophonic. Unless you intend to have your music heard only through headphones, use them sparingly, as a reference.

Select monitors that are as accurate, uncolored, and revealing as possible. A good test is to listen to material you're familiar with. If you don't hear parts that you know are there or if the image drifts or seems out of balance, those speakers aren't a good choice for you. If, on the other hand, the monitors allow you to hear subtleties you hadn't noticed before or cause you to begin to pick apart mixes you have long admired, buy them immediately; they're telling you what you need to know to make informed decisions about your mix.

If possible, try to audition monitors in your mixing space, because what sounds great in the store may cause resonance problems or give you listening fatigue at home. Mix a few songs with them and

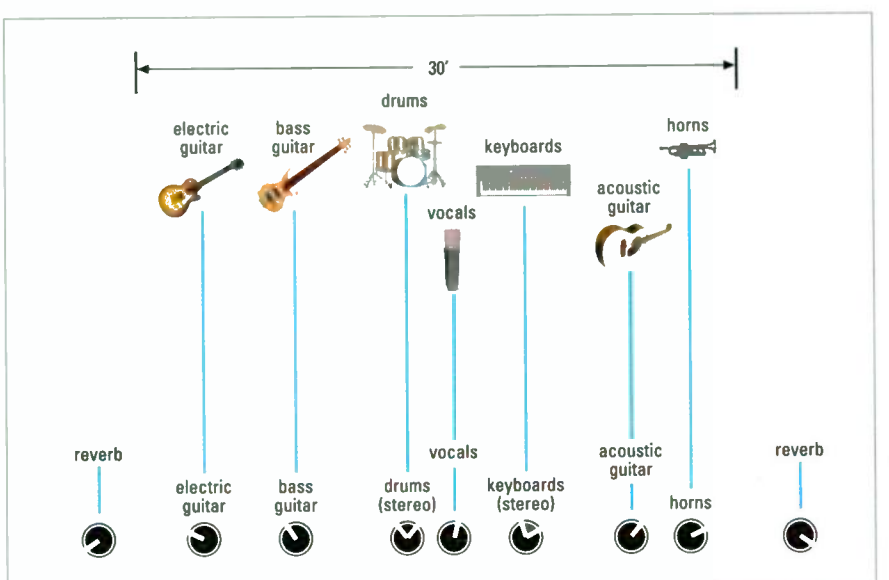


FIG. 2: On a realistic soundstage, most of the instruments will be situated between the 9:00 and 3:00 pan positions, as though they were on a 30-foot-wide stage in a small auditorium. The extreme left and right positions are good places to pan time-based effects to create space and a sense of depth.

This is the only thing missing from your home studio.

- Capture/record digital or analog audio
- Edit tracks/mix/master
- Add dynamic effects (delay, reverb, etc.)
- Publish to tape, CD or web based delivery

From the people who built the first digital audio interface & MIDI tone module – comes the **SD-90 Studio Canvas**. Connect this compact unit to your computer via **USB** and you have a professional quality digital audio workstation. Works with a variety of popular recording/sequencing software. Occupies a very small space. Makes huge amounts of music. Just add your imagination.

- Create original music with MIDI tone module
- 1,049 instruments
- 30 drum sets
- 128 note polyphony
- 32 part multi-timbral
- Use your favorite MIDI controller

Edirol is your complete DeskTop Media Production resource. Check our selection of: MIDI Controllers • USB MIDI Interfaces • USB Digital Audio Interfaces • Digital Audio Software • Amplified Audio Monitors • Digital Video editing and more...

Specifications: USB interface to computer • 24bit/48kHz AD/DA converters • Coaxial/optical S/P DIF I/O • 1/4" guitar/mic input • Stereo RCA I/O • 2 mono RCA out • 2 MIDI I/O • GM2/GS compatible • Rich Sound Source selections • ASIO 2.0 (WIN/MAC), MME (WIN), (MAC)

For more info: www.edirol.com
Email: sales@edirol.com
Dealer inquiries welcome.

Toll-Free: 800 380-2580
Voice: 360 594-4273

EDIROL

PANNING FOR GOLD

then listen to how well the mixes translate on different playback systems.

SIMPLE PLAN

Before you turn that first pan pot, take a quick inventory of all the elements to be placed in the mix. That initial assessment will help you form a mental picture of the soundstage, so you can better determine where each sound might best go and how much area it should occupy. If mixing an acoustic duet, for example, you may decide that each instrument should occupy a fair amount of the soundstage. On the other hand, in a dense mix with, say, bass, vocals, background vocals, percussion, two keyboards, three guitars, and ten tracks of drums, there obviously isn't room for each instrument to take up much of the soundstage. In that case, you will be seeking to create ample space for each instrument.

In general, each instrument should occupy a distinct area of the soundstage. The process of creating an area for an instrument is often referred to as *carving out a space*. That may mean not only finding the optimal panoramic placement for the instrument but also equalizing the sound so it doesn't mask or interfere with other instruments in the same or a similar frequency range.

When done well, that approach lets each instrument be heard distinctly, results in more dynamic range, and requires less volume from each element. Ideally, when the mix is complete, the soundstage will be clear and coherent. You should be able to close your eyes, clearly "see" the room in which the musicians are playing, and point to the position or area of each instrument.

However, don't hold to that (or any) plan rigidly; rather, use it as a starting point and let your ears be the judge from there. Imagine how you want the music to sound and begin to visualize each instrument in its place on the imaginary stage. As you start to place each instrument, some things may need to be moved or swapped around with others. That's fine as long as you leave sufficient sonic space for each element.

The practice of carving out space for instruments also helps prevent the common pitfall of fader creep. *Fader creep* results from, say, bringing up the bass to be able to hear it above the drums, then bumping up the guitar so it doesn't get lost behind the bass, then raising the vocals so as to hear them distinctly, and so on. Eventually, the console runs out of headroom, and the mix becomes unintelligible,

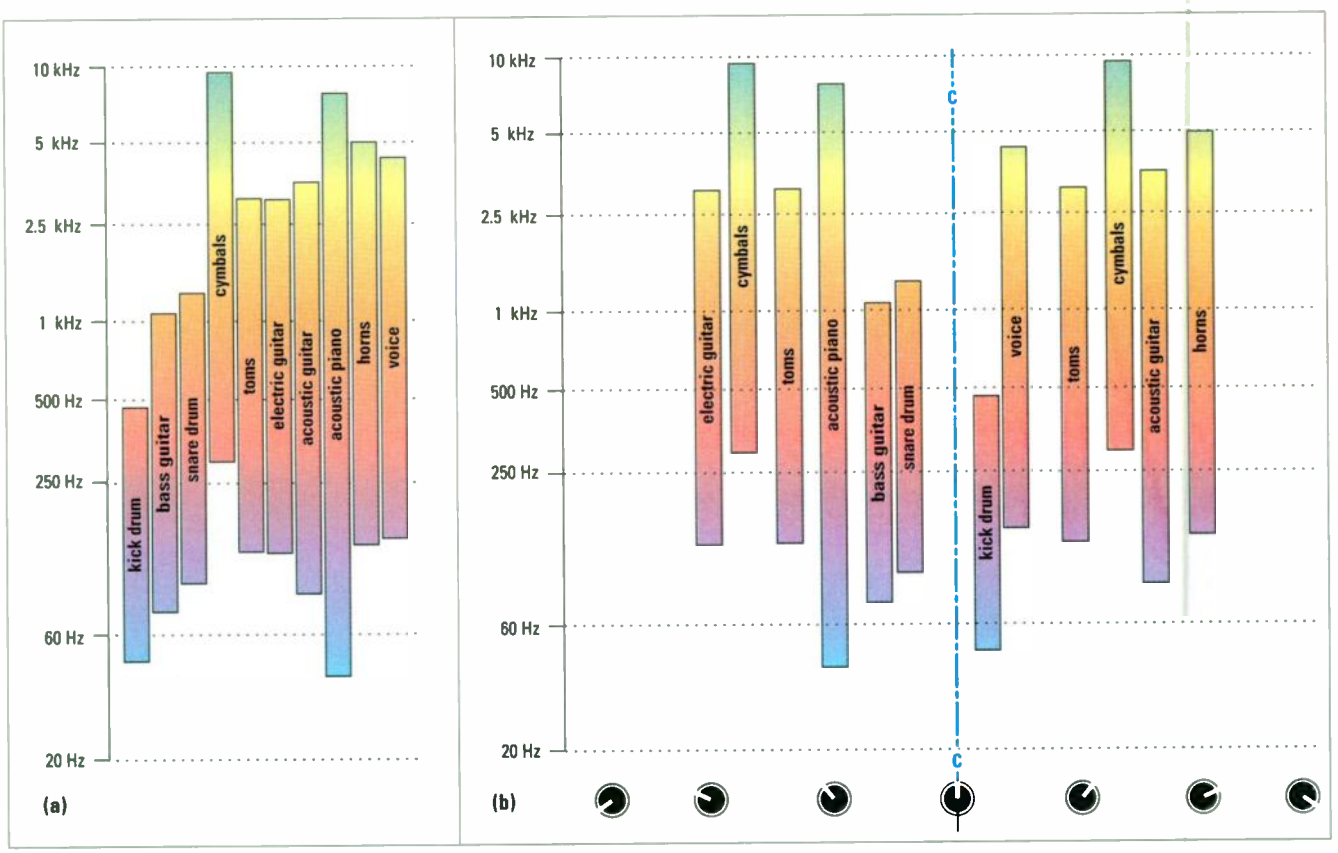


FIG. 3: Typical frequency ranges for various instruments are shown here (a). Bear in mind that each instrument may include harmonic frequencies far outside the ranges shown. Panning suggestions for the frequency ranges shown in (a) appear in (b). Note that though some instruments in the midrange are panned similarly (voice and tom-toms, for example), the timbres of those instruments are quite different. Also, instruments with the lowest frequencies are usually panned close to center.

your hands create the art

your AKG wireless mic is the glue that keeps it all together

WMS 40
WIRELESS SYSTEM

AKG®

A Harman International Company

RAISE THE LEVEL℠

914 Airpark Center Dr. • Nashville, TN 37217 • Phone: 615-620-3800
Fax: 615-620-3875 • email: akgusa@harman.com • akgusa.com

PANNING FOR GOLD

incoherent mush. At that point, it's usually best to begin the mix anew.

It is good practice, especially if you're new at mixing, to closely examine and dissect mixes that you admire or that sound the way you want yours to sound. That will give you a foundation from which to work. But even if you don't try to cop a particular mix style, comparing your work closely with that of others can help you see where you may need work, enlighten you to new mixing techniques, and give you greater appreciation for masters of the craft. Take note of those mix engineers whose work you admire and listen to more of it; many veterans can pick out specific techniques, or even a particular engineer, based solely on the style of the mix, regardless of who the artist is.

THE EARS HAVE IT

A fairly common mistake, especially among beginners, is to mix with the eyes—that is, according to what looks right rather than what sounds right. Some engineers, for example, work through what seems a logical progression: placing the vocals and bass in the center, panning stereo signals (such as keyboards and drum machines) hard left and right, and putting mono instruments into standard 9:00 and 3:00 or 10:00 and 2:00 positions. At the other extreme, I have seen "perfectionists" take excruciating pains to measure and duplicate exact pan-pot positions from left to right, assuming that doing so will produce a more exact stereo image.

Neither method, however, is likely to produce natural or even pleasing results, because each is based on logic associated with visual rather than aural cues. The problem is pan pots used in many budget consoles show variances in the 6 to 10 percent range. Therefore, pan-pot positions on the mixer won't necessarily correspond precisely to instrument positioning in the stereo field. The best approach is to ignore the position of the pan pot and simply listen to the results of turning it.

Likewise, don't have too much faith in the meters on your mixer's stereo bus. Not only are they, too, probably less than perfectly calibrated, but on a typical budget console (with, say, 12-step LED ladders and a dynamic range somewhere between 84 and 90 dB), each segment represents at least 7 dB of gain—a resolution far too low for exactitude. I bring that up because I've seen engineers attempt to balance their stereo mixes by offsetting the master-level faders (on boards that offer separate left and right master faders) in order to have the LEDs line up perfectly.

FIGURING IT OUT

I was called on to remix a medium-energy pop single called "Figure It Out." Instrumentation included an acoustic guitar, an electric bass, a drum machine, live percussion, a twangy Stratocaster, and female lead and backing vocals in the vein of Natalie Merchant and Sarah McLachlan. Upon arriving at the studio, I found a somewhat typical panning setup on the console: drum-machine tracks hard-panned left and right, the two channels of stereo acoustic guitar (miked with a large-diaphragm condenser near the sound hole and a small diaphragm near the neck) also hard-panned, vocals and bass sitting dead center, and the Strat and backing vocals panned to 11:00 and 2:00, respectively. The stereo reverb returns for the vocals were hard-panned left and right, as well.

The drum machine had its own effects, which were also hard-panned left and right. I panned them to the 8:00 and 4:00 positions to tighten the space, and then I placed a tabla part at about 2:30. Two percussion instruments of similar sonic spectra, shaker and tambourine, needed to be separated to avoid coherence (masking of one element by the other), so I put the shaker at around 3:45 and the tambourine at 8:30. The wide spacing between the two left plenty of room for the tonal instruments.

I found a nice spot for the stereo acoustic guitar by positioning the track recorded with the large-diaphragm mic just left of 11:00 and the other track slightly right of 12:00. That put the center image of the guitar a bit left of dead center and allowed for some interesting fret noise to the right. I panned the twangy Strat track far over, just shy of hard right, which let me bring its level down in the mix. I panned the Strat's reverb to the left side, which brought out a nice contrast to the main acoustic-guitar part.

People commonly pan kick drum and bass guitar right on top of each other, usually dead center, but a hint of separation between the two can provide clarity and a more natural sound—some breathing room, as it were—between two low-end instruments that often compete for a piece of the same sonic territory. I put the bass just right of center, at about 12:15, and used the drum machine's Pan menu to position the kick at 11:50. Snare drum fell in just right of the bass guitar and hi-hat slightly left of the kick, at 11:30. The result was a nice, tight image of the band playing together on a 12-by-15-foot stage in a room 30 feet wide and 50 feet deep.

Lead vocal is another element traditionally panned dead center, and there is an advantage to doing it that way: equal distribution between the speakers results in greater apparent volume, making the vocal sound more up front. But I often break with tradition and shift the voice slightly off center, usually to the right. Why? Assuming the song is released commercially, it will most often be heard in people's cars: that's the only controlled environment you can truly count on for playback. There the primary

The Carillon development team mixes writers, sound designers and producers with engineers and programmers responsible for the build and support of thousands of computer music systems, from the early days of the Apple II and Commodore 64 to the very latest fibre-channel networks.

This diverse group was drawn together by a commonly held belief: that the predictability and ease of use associated with traditional dedicated multitrack workstations, instruments and effects should also be enjoyed by an ever increasing number of computer based musicians.

More than two years in development, our PCs are based on rugged, ultra low noise hardware - designed by engineers with nearly two decades experience working on some of the world's most prestigious audio products.

Our unique *Total System Integration* marries the computer with leading music software and hardware to deliver a range of seamless systems carefully designed for a specific purpose. Each one is exhaustively tested and ready to use out of the box, supplied with detailed manuals for the system as an entity, backed up with one-stop support and constructed meticulously for audio.

The products on these pages are the beginning of Carillon's commitment to the computer music professional - the predictability of traditional technology with the power and flexibility of software.

more songs

more dance

less song & dance

Carillon

CARILLON AUDIO SYSTEMS

VST
FOUNDATION SYSTEM

Cubase VST multitrack audio & MIDI workstation with mixing, effects & Virtual Instruments, coupled with Audiotrack's Maya audio card featuring extremely low latency & a phantom powered mic input. A pro performance core system at an unbelievably low price, with Carillon's *Total System Integration* manuals and support.

Carillon Audio Computer
- Intel P4 1.5GHz
- 256MB 133MHz SDRAM
- 40GB Seagate Softsonic ATA/100 7200rpm Hard Drive (Partitioned for System & Audio Use)
- Black 40X Speed CD-ROM Drive
- 32Mb ATI Rage Pro Video Card
- 15" Black Monitor • Windows 98 SE

Studio Software
Steinberg Cubase VST V5.1

Audio Hardware
AudioTrack Maya Audio & MIDI soundcard

$1649
Ca for lease packages

Std Extras

22 MORE SYSTEMS AVAILABLE SEE FOLLOWING PAGES...

the difference is in the detail ▸▸

CARILLON AUDIO SYSTEMS

VST SONGWRITER

Carillon Audio Computer
- Intel P4 1.7GHz
- 256MB 133MHz SDRAM
- 40GB Seagate Softsonic ATA/100 7200rpm Hard Drive (Partitioned for System & Audio Use)
- Black 40x Speed CD ROM Drive
- 32Mb ATI Rage Pro Video Card
- 15" Black Monitor • Windows 98 SE

Studio Software
Steinberg Cubase VST 5.1

Audio Hardware
Yamaha SW1000XG Synth & Audio Card

A solid Cubase VST platform for audio and MIDI production with the native effects of the SW1000XG, giving you over 1200 top quality Yamaha sounds on tap, with mic input & digital output.

$2189
Call for lease packages
Plus pack available

✔ Std Extras

PRO TOOLS LE WORKSTATION

Carillon Audio Computer
- Intel P4 1.7GHz
- 512MB 400MHz RDRAM
- 20GB & 40GB Seagate Softsonic ATA/100 7200rpm Hard Drives
- Black 16x10x40 CDRW + 5 CDs
- 32Mb ATI Rage Pro Video Card
- 17" Black Monitor • Windows 98 SE
- RTM-1 transport control

Studio Software
Digidesign Pro Tools LE

Audio Hardware
Digidesign Digi 001 Audio Interface

A low cost route into Pro Tools. A professional audio editing environment, MIDI sequencing, 8 analogue I/O's, ADAT & S/PDIF digital I/O plus 2 mic preamps. RTM-1 transport buttons.

$2899
Call for lease packages
Plus pack available

✔ Std Extras

LOGIC PRO STUDIO

Carillon Audio Computer
- Intel P4 1.7GHz
- 512MB 400MHz RDRAM
- 20GB & 40GB Seagate Softsonic ATA/100 7200rpm Hard Drives for System and Audio
- Black 16x10x40 CDRW + 5 blanks
- 32Mb ATI Rage Pro Video Card
- 17" Black Monitor • Windows 98 SE

Studio Software
Logic Platinum, EXS24, NI Dynamo

Audio Hardware
M-Audio Delta 1010, Emagic AMT8

Provides up to 128 audio tracks with 8 channel 24bit/96kHz interfacing, digital I/O and wordclock, 128 MIDI channels, 8 inserts & 16 aux sends per track, effects plug-ins, soft synths, 24bit virtual sampler, score writing / printing and CD burning.

$3999
Call for lease packages
Plus pack available

✔ Std Extras

HARDWARE AND SOFTWARE SEAMLESSLY INTEGRATED

Upgrades, Plus Packs and Custom Systems

All our machines are fully upgradable, so if you want more RAM, a larger monitor or additional drives, you'll find them on our website. It's also possible to add to a standard system, perhaps with a larger MIDI interface, extra plug-ins or VSTi's, or even by upgrading the principal software, for instance by substituting Logic Platinum for Gold. If you are starting completely from

scratch, then upgrading your system with a 'Plus Pack' will give you everything you need to make music at unbeatable prices. We can of course also create completely bespoke packages to order, or 'barebone' machines without a soundcard and software. So if you don't see what you're looking for here, and your heart's set on 20" LCD monitors, twin processors etc, we'll custom build you a ready to run system, with everything but our system specific manuals and tutorials.

Our TOTAL SYSTEM INTEGRATION range includes VST FOUNDATION ($1649) on the previous page, the three systems on the left of this page and the systems in this table

SONAR	**Sonar Foundation** Ideal first time audio workstation based around Sonar with the Maya audio/MIDI soundcard.	**$1599** Call for lease packages Plus pack available
CUBASE VST	**VST Audiophile** 24bit/96kHz audiophile quality recording in Cubase with M-Audio's card of the same name.	**$1899** Call for lease packages Plus pack available
CUBASE VST	**VST Four by Four** 24bit/96kHz recording with 4 ins and outs for the more demanding musician.	**$2089** Call for lease packages Plus pack available
REASON	**Reason Workstation** An integrated rack of samplers, drum machines and phat soft synth sequencing.	**$1899** Call for lease packages Plus pack available
HALION	**VST Sampling System** Combines Cubase VST with Halion VST for a completely integrated sampling system.	**$2099** Call for lease packages Plus pack available
CUBASE VST	**VST Recordist** An ideal choice for those with a variety of existing equipment - interfacing mics, fx, synths & more.	**$2799** Call for lease packages Plus pack available
CUBASE VST	**VST Pro Recordist** Premium quality Cubase audio recording with 8 balanced I/O plus S/PDIF & optional ADAT I/O.	**$2899** Call for lease packages Plus pack available
NI	**VST Native Workstation** True to the computer studio ideal, this runs a host of virtual instruments for dance music.	**$3299** Call for lease packages Plus pack available
Logic	**Logic Pro Songwriter** MIDI sequencing with up to 64 audio tracks, effects, score notation and 24bit/96kHz I/O.	**$3099** Call for lease packages Plus pack available
CUBASE VST	**VST Pro Studio** Cubase VST audio and MIDI with MOTU 2408 56 I/O interface & Midex 8 128 channel MIDI.	**$3499** Call for lease packages Plus pack available
STUDIO	**PostRoom** Editing, batch processing, format conversion and distribution workhorse ideal for audio post.	**$4199** Call for lease packages
NUENDO	**Nuendo Workstation** 24 channel ADAT and 8 channel balanced analogue multitrack record/edit/mix workstation.	**$5899** Call for lease packages Plus pack available
PRO TOOLS	**ProTools TDM Workstation** High end Pro Tools with twin 36GB removable SCSI audio drives, dual monitors and 888/24 I/O.	**$14499** Call for lease packages
Sibelius	**Sibelius Symphonist** The world's leading notation software with quality orchestral playback from GigaStudio.	**$3499** Call for lease packages Plus pack available
NEMESYS GIGASTUDIO	**UltraSampler 160** Probably the world's most powerful sampler with up to 4GB samples, 160 note poly & 32 outs.	**$3199** Call for lease packages
RESONANCE CUTOFF	**UltraSynth 8** Heavily loaded standalone soft synth/sampler powerhouse with dual monitors & 16 outs.	**$5399** Call for lease packages
Carillon	**Barebones One** A solid and reliable audio PC making an ideal starting point for many custom systems.	**$1199** Call for lease packages
Carillon	**Barebones Two** Step up to dual hard drives, CD burning & greater processing power with confidence.	**$1399** Call for lease packages
Carillon	**Barebones Three** Built for serious pro's, this 2.0GHz monster represents the ultimate in audio PC's.	**$2199** Call for lease packages

✔ **Standard with every system**

LOOPSTATION

Our ultra flexible sample search engine micro-indexes by sound type. A growing library of Neve mixed, Apogee converted 24 bit samples now includes 5000 leading edge loops & instruments.

CUSTOM KEYBOARD

Each Carillion Audio System is supplied with a custom set of colored key caps with short-cut commands for that system's core software. Whether you use these to learn the commands or continue to rely on them, you'll find they dramatically improve productivity.

WRH

PROCESSOR / OS	MEMORY	HARD DRIVES	CD DRIVES	MONITOR & VIDEO CARD	STUDIO SOFTWARE	STUDIO HARDWARE	STD EXTRAS
P4 1.5GHz Windows 98SE	256Mb 133MHz SDRAM	40GB Seagate Softsonic ATA/100 7200rpm Drive (Partitioned for System & Audio)	Black 40x Speed CD-ROM	15" Black CRT (as std) 32Mb ATI Rage Pro Card	Cakewalk Sonar	AudioTrak Maya & MIDI Expansion	✔
P4 1.7GHz Windows 98SE	256Mb 133MHz SDRAM	40GB Seagate Softsonic ATA/100 7200rpm Drive (Partitioned for System & Audio)	Black 40x Speed CD-ROM	15" Black CRT (as std) 32Mb ATI Rage Pro Card	Cubase VST 5.1	M-Audio AudioPhile Sport 1X1	✔
P4 1.7GHz Windows 98SE	256Mb 133MHz SDRAM	40GB Seagate Softsonic ATA/100 7200rpm Drive (Partitioned for System & Audio)	Black 40x Speed CD-ROM	15" Black CRT (as std) 32Mb ATI Rage Pro Card	Cubase VST 5.1	M-Audio Delta 44	✔
P4 1.7GHz Windows 98SE	256Mb 133MHz SDRAM	40GB Seagate Softsonic ATA/100 7200rpm Drive (Partitioned for System & Audio)	Black 40x Speed CD-ROM	15" Black CRT (as std) 32Mb ATI Rage Pro Card	Propellerhead Reason	M-Audio AudioPhile	✔
P4 1.7GHz Windows 98SE	256Mb 133MHz SDRAM	40GB Seagate Softsonic ATA/100 7200rpm Drive (Partitioned for System & Audio)	Black 40x Speed CD-ROM	15" Black CRT (as std) 32Mb ATI Rage Pro Card	Cubase VST 5.1 Halion VST	M-Audio AudioPhile	✔
P4 1.7GHz Windows 98SE	256Mb 400MHz RDRAM	20GB System 7200rpm 40GB Audio 7200rpm (Seagate Softsonic ATA/100)	Black 16x10x40 Speed CDRW & 5 blank CD's	17" Black CRT (as std) 32Mb ATI Rage Pro Card	Cubase VST 5.1	M-Audio Delta 66 and Omni I/O Sport 1X1	✔
P4 1.7GHz Windows 98SE	256Mb 400MHz RDRAM	20GB System 7200rpm 40GB Audio 7200rpm (Seagate Softsonic ATA/100)	Black 16x10x40 Speed CDRW & 5 blank CD's	17" Black CRT (as std) 32Mb ATI Rage Pro Card	Cubase VST 5.1	M-Audio Delta 10/10	✔
P4 1.7GHz Windows 98SE	512Mb 400MHz RDRAM	40GB Seagate Softsonic ATA/100 7200rpm Drive (Partitioned for System & Audio)	Black 16x10x40 Speed CDRW & 5 blank CD's	17" Black CRT (as std) 32Mb ATI Rage Pro Card	Cubase VST 5.1 NI Reaktor B4 and Pro 52	Creamware Powersampler Carillon RK8	✔
P4 1.7GHz Windows 98SE	256Mb 400MHz RDRAM	20GB System 7200rpm 40GB Audio 7200rpm (Seagate Softsonic ATA/100)	Black 16x10x40 Speed CDRW & 5 blank CD's	17" Black CRT (as std) 32Mb ATI Rage Pro Card	Logic Gold EXS24 Sampler	M-Audio Omni IO Delta 44 Emagic MT4	✔
P4 1.7GHz Windows 98SE	512Mb 400MHz RDRAM	20GB System 7200rpm 40GB Audio 7200rpm (Seagate Softsonic ATA/100)	Black 16x10x40 Speed CDRW & 5 blank CD's	17" Black CRT (as std) 32Mb ATI Rage Pro Card	Cubase VST 5.1	MOTU 2408 MKII Steinberg Midex 8	✔
P4 2.0GHz Windows 2000	512Mb 400MHz RDRAM	80GB System 7200rpm 80GB Audio 7200rpm (Seagate Softsonic ATA/100)	Dual Plextor 24x10x40 CDR	32Mb ATI Rage Pro Card	Sonic Foundry Sound Forge	Lynx Two ISDN Adapter Ethernet Adapter	✔
P4 2.0GHz Windows 2000	1024Mb 400MHz RDRAM	20GB System 7200rpm 80GB Audio 7200rpm (Seagate Softsonic ATA/100)	Plextor 24x10x40 & 5 blank CD's	Dual 17" Black CRT Monitors Matrox G550 32Mb Dual Head	Steinberg Nuendo	Nuendo 8 I/O + MIDI Nuendo 9652 PCI Carillon RTM1 Midex 3	✔
P4 1.7GHz Windows 2000	512Mb 400MHz RDRAM	18GB System Barracuda SCSI Dual 36GB Audio Barracuda (SCSI with Hot Swap Caddies)	Plextor 24x10x40 & 5 blank CD's	Dual 19" Black CRT Monitors Matrox G550 32Mb Dual Head	Digidesign Pro Tools TDM	Digidesign Pro Tools Mix24 System Digidesign 888/24	✔
P4 1.7GHz Windows 98SE	512Mb 400MHz RDRAM	20GB Seagate Softsonic ATA/100 7200rpm Drive (Partitioned for System & Audio)	Black 16x10x40 Speed CDRW & 5 blank CD's	19" Black CRT (as std) 32Mb ATI Rage Pro Card	Sibelius GigaStudio 96 5x Siedlaczek Orchestral CD's	M-Audio AudioPhile	✔
P4 1.7GHz Windows 98SE	512Mb 400MHz RDRAM	20GB System 7200rpm 40GB Samples 7200rpm (Seagate Softsonic ATA/100)	Black 16x10x40 Speed CDRW & 5 blank CD's	17" Black CRT (as std) 32Mb ATI Rage Pro Card	GigaStudio 160 Sound Forge XP	M-Audio Delta 1010	✔
P4 1.7GHz Windows 98SE	512Mb 400MHz RDRAM	20GB Seagate Softsonic ATA/100 7200rpm Drive (Partitioned for System & Audio)	Black 40x Speed CD & ZIP250	Dual 17" Black CRT Monitors Matrox G550 32Mb Dual Head	Reaktor B4 Pro 52, Retro AS1, Tassman, Rebirth, Reason, Unity DS1	Mixtreme I/O, Midisport 8x8, Carillon RK8	✔
P4 1.5GHz Windows 98SE	256Mb 133MHz SDRAM	40GB Seagate Softsonic ATA/100 7200rpm Drive (Partitioned for System & Audio)	Black 40x Speed CD-ROM	32Mb ATI Rage Pro Card	N/A	N/A	✔
P4 1.7GHz Windows 98SE	512Mb 133MHz SDRAM	20GB System 7200rpm 40GB Audio 7200rpm (Seagate Softsonic ATA/100)	Black 16x10x40 Speed CDRW & 5 blank CD's	32Mb ATI Rage Pro Card	N/A	N/A	✔
P4 2.0GHz Windows 98SE	512Mb 400MHz RDRAM	20GB System 7200rpm 80GB Audio 7200rpm (Seagate Softsonic ATA/100)	Plextor 24x10x40 & 5 blank CD's	Matrox G550 32Mb Dual Head	N/A	N/A	✔

✔

PLUG-INS

PSP Audioware's flagship MixSaturator plug-in is an exclusive offer from Carillon. Other FX include DSound guitar FX , over 30 Maxim pro plug-ins including synths, a sampling drum machine & theremin from Expansion & Big Ticks Rainbow VSTi.

✔

ZAP

24 bit audio files are huge. Backup, archive & transfer of these files can be difficult. Emagic's Zap is a zero-loss audio file compression utility, that substantially reduces the space taken up by audio files. Drag-and-drop audio into Zap and files are automatically archived, without any loss of quality.

✔

PYRO

With your final mix complete delivery is the next step. Cakewalk Pyro turns your music into MP3 format for distribution over the net, or to burn Red Book audio CD's. Pyro is also a music jukebox, CD ripper and file manager, and even offers DirectX audio effects support.

The Carillon AC-1 is silent, robust and portable. I can keep it switched on in the control room without even thinking about fan noise. I wouldn't hesitate to recommend the AC-1 to anyone buying a computer for music..." Mike Hedges

Mike Hedges is one of the industry's most in-demand producers, with recent credits including *U2, Manic Street Preachers, Travis, Texas & The Beautiful South.*

He has recently taken over Wessex Studios - recording venue for a long list of legendary albums - and London's longest operating studio after Abbey Road. A complete refurb is underway, with design/ acoustics by Andy Munro, and will include a new 5.1 mix suite and dedicated programming and track-lay rooms. Hardware will include Mike's well documented collection of classic analogue, including the EMI console from Studio 2 at Abbey Rd – used to record Dark Side of the Moon.

Hedges is also involved with 2kHz Studios in West London which has been solidly booked since opening in February. Venue, personnel and equipment all contribute to a warm-sounding and spontaneous recording environment. This has been particularly popular with guitar/vocal based artists looking to make an album in days rather than months.

Mike's Carillon AC-1 system is used with Digidesign's Pro Tools 001 hardware and Logic Audio Platinum software. It is primarily used as an off-line editor for comping and editing tracks created on Wessex Studios' main Pro Tools TDM systems. Sessions are transferred between systems on CD in 24 bit .wav format. The system was supplied with Sonic Foundry's Acid Pro and Mike has installed other goodies like Fruity Loops and Beat Creator.

Mike Hedges' AC-1 specification:

- Intel Pentium III 800MHz
- 256MB 133MHz SDRAM
- 20GB ATA/100 Quantum Fireball Plus 7200 RPM System Drive
- 30GB ATA/100 Quantum Fireball Plus 7200 RPM Audio Drive
- Yamaha 8824 CD Writer
- Adaptec 2904 SCSI Card
- 16MB ATI Rage Pro Video Card
- 15" Black LCD Monitor
- PS2 Mouse & Keyboard with Shortcut Overlays

"...All the reservations people have had about using PCs for serious music applications no longer exist - Pro Tools LE runs faster on the Carillon than on our Mac. More bang for the buck has made Windows the people's platform - there are so many users out there and that means loads of useful and creative programs from small developers for the PC which just aren't available on the other platforms."

These are some others who have purchased Carillon computers to date:

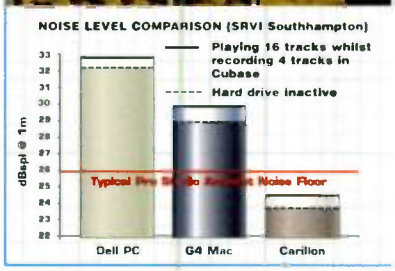
(their inclusion does not denote an endorsement)

Air Studios - Lyndhurst Hall, Grand Central Studios (leading post house), Joe & Co (award winning music house), Royal Court Theatre, Mama Mia. *Unsolicited on the net:* "What a computer - it has worked perfectly out of the box!", "I have an AC-1... I think these are easily the best PC's on the market for Pro Tools.", "Tell me these PC's don't rock! (p.s. I'm not an employee)"

The Carillon AC-1 was purpose engineered for the near silent environment of a professional recording studio. Our enclosure design reduces transmitted noise and is damped to prevent sympathetic vibration with internal components.

De-coupling rack ear gaskets and massive Sorbothane feet increase the sense of isolation and the very quietest components complete what *Sound on Sound's* Martin Walker described as "to my knowledge the quietest production PC available". But don't take our word for it - see the results of tests carried out in the anechoic chamber at Southampton University's Institute of Sound and Vibrational Research.

soft machine



Our Carillon UltraMute PSU combines special low hum transformers with an all new fan, featuring substantially smoother fan-motor bearings and a reduced turbulence fan blade design.

A unique processor fan incorporates a radical new 360° radial fin heat sink. This patented design provides a far greater surface area than conventional coolers for increased heat dissipation with a reduced airflow requirement.

To minimise hard drive noise we fit *Seagate SoftSonic*™ Fluid Bearing Drives and enclose them in a *Molex Silent Systems*™ foam-lined sleeve to reduce drive noise by over 90%.

Carillon

1.866.4CARILLON

(1.886.422 7455)

email: info@carillonusa.com

To order online and for full details on all of our systems, features and Pro Users visit us at:

www.carillonusa.com

VISA MasterCard Diners Club NOVUS

Patent Application Nos US 09/909,130 CE 01306246.8 GB 0018000.0

Don't rely on mechanical pots and meters to tell you what your ears, which are much more sensitive instruments, can better discern. In short, mix with your ears, not your eyes.

HARDLY A HARD-PAN

Because most sound modules these days present you with stereo outputs, it would seem logical to simply hard-pan each left/right output to its corresponding left/right position. Indeed, that may sound great when you solo the stereo source. But what sounds great soloed may not blend well with the other instruments. Typically, when you pan, say, a stereo piano part (from a sound module) hard left and right, the keyboard will appear more or less centered on the soundstage. That may work fine in a mix of a duet—piano and flute, for example; but if you have five stereo keyboard parts and a stereo drum machine, all of them hard-panned left and right, the images will all appear across the center of the mix, largely on top of one another. Obviously, you can't get separation and a broad stereo image if everything is in the same place.

That doesn't mean you have to make all stereo parts mono. Rather, you can retain a sense of space by slightly offsetting the pan pots, thus creating a smaller space for the instrument to sit in. For a stereo piano, for example, you could position the pan pots at 9:30 and 10:30. That would still give it some space—a sense of dimension on the soundstage—but the piano would appear smaller and to the left of center stage.

The same thing applies for guitar preamplifiers with stereo outputs; although the soloed guitar may sound enormous with the preamp outputs hard-panned left and right, the sound will likely lose definition and luster in a busy mix. Again, carve out a smaller, more appropriate space.

Note that drum machines typically have preset pan positions for each drum, cymbal, or percussion hit within a particular kit. You should therefore learn how to change the panning of individual instruments from inside the drum machine; otherwise, you'll be stuck always having to work around the preset pan positions.

String sections and pads are perhaps the best candidates for wide stereo spreads; after all, a full string section would naturally take up a large area on a true soundstage. Even there, though, I would avoid hard-panning left and right.

In fact, I rarely pan anything but effects—or those elements that I want to stand out without getting lost in the center—to the hard left and right positions. After all, it would be rare in a concert performance for any instruments to be positioned directly to the left or right of the audience. So rather than filling all of the available space with a wall of sound, it's usually best—at least, in the

(or only) listener is usually the driver, which means the listening position is left of center, sometimes quite far so. A centered vocal will thus arrive at the listener's ears from the left speakers first, which shifts its arrival time and intensity. By mixing the lead vocal slightly right of center, I essentially compensate for the driver's offset sweet spot; the result is an apparent centered vocal for the driver. (No worries—most people will never catch the change, even when listening in their homes.) This trick also thwarts center-channel elimination devices, the boxes that attempt to derive a karaoke mix by removing any midrange elements that are panned dead center (which typically means vocals).

On "Figure It Out," the female singer had a nice but not especially strong voice, so getting her vocal to stand out was a challenge, short of unnatural processing, excessive compressing, or pushing the volume too high. Fortunately, I had several takes to choose from, and I found one that, though similar to the primary take (and almost identical timingwise), had some interesting changes in inflection. I panned the primary take just right of center, to 12:45. I then put a hint of the alternate take even farther to the right, at about 4:30, and sent the reverb return almost exclusively to the left. That added some strength to the voice without causing the overt chorusing that can happen when you simply combine two takes. The left-panned reverb, set fairly hot and coming in from opposite the main vocal, helped make a thicker and wider vocal sound, and the slight changes in inflection gave the track more depth.

With the lead vox now happening, I began placing the four background vocals in spaces left open by the other instruments. This was no hairsplitting, knob-assessing affair; rather, I added the voices one at a time, without regard to pan-pot positions, simply listening until I could hear each in its own little space and then adjusting the levels so the four parts sat just right behind the lead vocal without detracting from it. To increase the sense of a real space, I delayed the reverbs slightly differently on each background vocal, based on the track's location in the stereo field. With all the instruments positioned on the soundstage, I increased the overall sense of space by panning those backing-vocal reverbs to hard left and right positions and opposite to their source tracks.

Keep in mind that none of the pan-pot positions I described (so precisely) was mapped out or clocked in advance. Rather, the mix was done by ear, without visual regard to panning. What mattered was naturalness and a sense of space, not commitment to an exact rotation of knobs. Only after the mix was complete did I bother to note pan positions, in case they were needed later (which they were—for this sidebar).

PANNING FOR GOLD

SPINAL TAP DANCER

More challenging than "Figure It Out" was "Tap Dancer," from David Bryce's new CD, *UltraMaroon* (www.mp3.com/DavidBryce). This power ballad, centered around a piano part, has an acoustic guitar; two distinct, alternating bass lines (both synths); string pads; lead and backing vocals; four electric guitars; and a Hammond B-3 organ. All that is augmented in the B sections by a "horn section"—a blend of real horns and arranged samples. Percussion was done using an Alesis DM Pro module, which supplied tabla, tambourine, and shaker samples. The project's recordings were done in Mark of the Unicorn's *Digital Performer* 2.7, and many parts were already submixed as stereo pairs.

My first step was to place the primary instruments (stereo acoustic piano, acoustic guitar, basses, and drums) into a space within which everything else would work. The song breaks down to those few instruments—piano and acoustic guitar floating over a soft string pad—at several points, so they needed to stand out to be heard distinctly at all times, without lots of volume changes.

I started the mix by establishing the intensity of the lead vocals, which are the loudest and most important element and therefore the one that largely determines the dynamic range for the entire mix. For many people, it seems most logical to begin a mix with the drums. That method is called additive mixing: building a foundation from the rhythm section (drums, bass, guitar) and then adding auxiliary and lead instruments in over the foundation, culminating with the vocal. Additive mixing, however, often hits a snag: as you begin to add in the other parts, the total volume keeps rising, and you eventually max out the console's dynamic range to get the vocals hot enough. To avoid that situation, I usually do the reverse, subtractive mixing, which means beginning with the loudest part and placing everything else in beneath it.

Having established the song's overall dynamic range, I positioned the stereo-recorded piano tracks, putting the left channel at 1:00 and the right at about 2:30. That gave the piano some space—a six-foot grand, after all, won't sound natural coming from an area seemingly two feet wide—without

taking up the entire soundstage. Next, I panned the acoustic guitar to about 10:45; that placed it about six to eight feet left of the soundstage's center.

I panned all the drums and their effects (except for the snare) from within the DM Pro module. The shaker ended up at just inside 3:00 and the tambourine at 10:30. I panned the drum overheads to just outside the 9:00 and 3:00 positions. Generally, I try to keep the drums themselves tucked around the center, as they would be on a real stage; however, I often make the reflections from the drums sound more live and intense as compared with those from other instruments. I brought kick and snare in on their own channels for better control; almost no EQ was applied to either.

As I added more instruments to the mix, it became increasingly difficult to find logical and distinct places to put them. For example, I'd ordinarily keep the Hammond organ part away from other keyboard instruments, but to get the guitars and horns to sit right, it ended up just to the right of the piano, around 3:15. This example illustrates the importance of using your ears and basing your pan and other mix decisions on the piece itself. No matter what the style of music, if you listen closely, it will tell you what needs to be done.

In "Tap Dancer," the electric guitars take precedence over the horns, both in terms of frequency range and number of bars played; therefore, I brought in the electric guitars next. Three parts were submixed to a stereo pair from within *Digital Performer*, so I did the panning in *Digital Performer* and left the console channels hard-panned left and right. The power chords fit nicely at around 9:00. I slipped in the delayed "seagull" guitar parts at 3:00, between the piano and Hammond. The delay was set at about 3 ms, just enough to place the sound back a smidgen. The solo guitar occupied its own channel and was quite easily placed just inside 11:00, which put it about four to six feet to the left on the soundstage. I delayed it about 8 ms and set its reverb predelay about 25 ms longer than that on the other reverbs.

The horn section comprised four live horns submixed to a pair of channels and a five-part arrangement of horn samples submixed to another pair of channels. Building the section took some time, and I don't have sufficient space to describe the process in detail; suffice it to say that the net result was an interleaving of the nine parts onto the four channels. I positioned the horn section to the left of the solo guitar, between 8:30 and 9:30, so it took up about five feet of the soundstage.

As in "Figure It Out," I panned the lead vocals just to the right of center, at 12:45. I then inserted several channels of individual backing vocals and vocal sections into the few remaining openings and panned each corresponding reverb return a bit farther out than opposite its source. String pads were the hardest panned parts, with one channel at 8:15 and the other at 3:45; that translates to nearly the entire span of the 30-foot-wide soundstage I imagined for the song.

You'll agree.

"The D1600 offers a good balance of straightforward operation and sophisticated capability."

"I suspect a lot of folks will see this machine as a luxury ride commanding a midsize price...give the D1600 a good look before you decide to spend more."
- Keyboard Magazine.

"The touch screen is quite wonderful; I could get around the unit fast...[The D1600] sounds great, is intelligently designed, and easy to use."

"...you can now produce truly pro-level recordings with a compact, budget-friendly box."
- EQ Magazine.

We think you'll agree. The D1600 Digital Recording Studio—all you need to record, mix and master your next CD.

D1600

- Recording Format: 24-bit/16-bit uncompressed, 44.1 kHz
- 8 track recording/16 track playback @16-bit mode
- 20 GB swappable internal IDE hard drive
- 100 scenes/4 locate points per song
- 3-band EQ per channel
- Four XLR inputs w/phantom power
- 24-bit A/D, D/A conversion
- 4 track recording/8 track playback @ 24-bit mode (8 virtual tracks per track)
- Optional internal 8x CDRW drive
- 24 channel, 8 bus digital mixer with scene memory and MIDI automation
- Up to 11 effects simultaneously
- 24-bit optical S/PDIF I/O
- Total of 128 tracks
- 106 effects algorithms
- 215 PCM drum rhythms
- Built-in tuner

Visit korg.com/d1600 for a demo.
Version 2.0 software and video manual now shipping and available online!

KORG

PANNING FOR GOLD

interest of realism—to reserve the extreme pan positions for what is sometimes called *headphone candy:* reverb tails and other effects that provide some breathing room and a sense of space around the musicians. For example, in a band mix for which I pictured the band as playing on a 20- to 30-foot-wide stage, I would pan all of the instruments somewhere between 10:00 and 2:00 or at least no farther out than 9:00 and 3:00 (see **Fig. 2**); that would leave the areas between 7:00 and 9:00 on the left and 3:00 and 5:00 on the right for reverb and other effects to mimic the natural dispersion and reflection of sound from the band.

CONFLICT RESOLUTION

Earlier I mentioned the related roles of panning and equalization in the task of carving out a space for each instrument. There are further considerations when mixing instruments with similar frequencies and timbres—two electric rhythm guitars, for example. In short, try to keep them apart spatially. That is not to say they should be as far apart as possible or even directly opposite from each other (which often works, by the way); just make sure they are clearly discernible as separate instruments. In this case, the pan positions should not overlap, and generally, I recommend at least an "hour" or two of panoramic separation between them.

Fig. 3a shows some typical frequency distributions for a standard rock piece and how the frequency ranges overlap. **Fig. 3b** shows those instruments panned in such a way as to allow space for each as well as to account for natural sound-dispersion patterns as heard from the listener's perspective. Note that instruments of the lowest frequencies are typically panned toward the center. Low frequencies are less directional and thus more difficult to localize; they also require more power to be pushed from the transducers. Therefore, distributing low frequencies more evenly between the two monitors lets the speakers work more efficiently.

Note that frequency and timbre are not the only two realms in which elements may conflict. Elements may also conflict rhythmically or in terms of importance or centrality to the mix. In such cases, look for interesting ways to distinguish the elements so they no longer conflict but rather complement or offset each other.

3-D, BUT NO CRAZY GLASSES

Because pan pots are two-dimensional controllers and you're panning between two speakers, it's easy to fall into the habit of just laying everything out in a linear fashion—drums here, guitar there, and keys over there—as though the music were happening on a straight line. But when you listen to live music, you also hear the dimensionality or depth—the clear sense, for example, that the drummer and the percussionist are located behind the singer and the guitarist.

▼

Examine and dissect mixes that you admire.

As mentioned previously, the sound localization is based on apparent loudness and timing. However, though louder elements tend to sound closer than quieter ones, what really creates a sense of depth within a mix is a judicious use of timing cues, usually through delays. In general, delays of less than 25 ms help create a sense of space; anything over 35 ms is perceived as a separate image or echo.

Under normal conditions and at sea level, sound travels at about 1.13 feet per millisecond. Therefore, 5 ms of delay will seem to move an image a bit more than five feet back into the soundstage (assuming equal volumes of the source and delay). Another way of saying the same thing, but in real terms, is that the sound from a snare drum positioned five feet behind a guitar amp will take about 5 ms longer to reach your ears than the sound from the guitar amp (assuming you are listening from the audience's perspective).

Understanding that principle can help you considerably in constructing a natural soundstage. For example, if you want the drums in a mix to sound as though they are close to the back of the soundstage, near the wall (as in a standard band setup), you could put a shorter predelay on them than you would on the instruments located in front of the drums, because the distance from the drums to the first reflective surface (the rear wall) is shorter. Depending on the depth of the stage, they'd also take about 6 to 8 ms or longer to arrive than anything closer to the front of the stage. Likewise, if you want to position a piano stage right near an imaginary side wall and you use a stereo reverb on the piano, you might want to set the predelay several milliseconds shorter on the right channel than on the left, because in reality the right side of the piano would be closer to a reflective surface.

When using effects such as room reverbs to help create a sense of space, be careful not to combine clashing or contrary-sounding rooms—for example, a small tile room for the drums and a concert hall for the vocals. That doesn't mean you have to use the same type of effect on everything; it just means that the effects should go well together to create a coherent sound. Again, though a particular effect sounds really cool on an instrument in Solo mode, it may clash or contradict when mixed in with everything else, destroying the illusion of a natural soundstage.

COMPATIBILITY ISSUES

A debate is still going on these days about mono compatibility, the main question being, "Does it matter anymore?" My answer is yes: it most certainly does matter.

Mono compatibility refers to how a mix holds up when played through a mono system (that is, when the two channels are summed to one). Phase problems, though perhaps not apparent in stereo playback, can result in dropouts, comb

The furthest these fingers
should ever have to reach
is from A-flat to G-sharp.

Introducing the Ultimate Music Management System.

Your hands are precision instruments. Their purpose: to play music. We, too, have created a precision intrument. Its purpose: to keep your hands playing music. The MusicPad Pro is an electronic sheet music viewer that solves the problem of having to turn the pages of sheet music during a performance. Combined with a software package for either Mac or PC, it lets you scan or download sheet music from the Internet, then store (at least 300 pages and can be upgraded to store more than 10,000 pages), view and annotate the music page. In rehearsal mode, you can make and save edits and notes in color right on the screen, while the performance mode lets you turn the page with a simple tap of the screen, or with an optional foot pedal. It's the best way to keep your music flowing, and to keep your hands doing what they were made to do.

FreeHand

For more information and to order your MusicPad Pro, call *1.800.503.6985*, or visit us at *www.freehandsystems.com*.

PANNING FOR GOLD

filtering, and other weirdnesses when the mix is played mono. Such phase problems may exist not only between the two channels of a stereo-recorded source but also between mono sources recorded simultaneously. Stereo effects, too, can be a culprit—what sounded spacious in stereo may evaporate or turn to mud when reproduced in mono.

Many consoles provide a Mono button that, when engaged, sums all channels of the mix to mono. That function provides a quick and easy way to check for mono compatibility. Use it. Mono playback remains ubiquitous in people's lives. Many television stations and cable networks still broadcast in mono, as do most AM and some FM stations. In addition, countless televisions, clock radios, computers, car radios, and other sound sources have only one speaker. Moreover, the stereo sound systems in many vehicles automatically sum to mono at lower volume levels so that half the music isn't lost to the driver.

TAILS OUT

You won't always want to create a natural-sounding stereo soundstage, so if the project calls for something decidedly unnatural sounding, by all means, go for it. But in many cases, a true-to-life soundstage is best for the music, and it's practically always a good starting point, no matter how much you end up deviating from natural by the time the mix is complete.

Regardless of the soundstaging strategies that you employ, avoid falling into a habitual approach—that is, automatically panning particular instruments to the same spot every time you mix. Not only will you bore yourself (and eventually your listeners) but, undoubtedly, you'll also fall short of turning out your best work. Every song and performance is necessarily unique, so it goes without saying that a formulaic approach to soundstaging will result in mixes that don't sound as good as they could.

Finally, don't rely on spatial enhancers or similar processors to improve your soundstage. If the soundstage doesn't sound right before such processing, it certainly isn't going to sound right afterward. Although I wouldn't claim there is never a time and place for spatializers and the like, you are cheating yourself if you rely on them to cover up mistakes. You're cheating your listeners, too.

Randy Neiman *is an independent audio and marketing consultant living and playing golf in sunny Los Angeles. Share studio stories and golf tips with him at audioguru@mail.com.*

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

I'M BIASED

David Torn aka splattercell
Guitarist/Texturalist/Producer

Collaborators include: david bowie • ryuichi sakamoto • carter burwell • kd lang • david sylvian • cliff martinez • me'shell ndegéocello • chute • page hamilton • b.l.u.e.

Soundtrack work includes: traffic • a knight's tale • three kings • heist • the velvet goldmine • simone

Photographed by Karjean Ng at the studio of film composer Carter Burwell, New York City

David Torn is a genuine musician's musician — one of the most respected of our time.

Whether working with David Bowie on his latest album, or creating trademark textural soundscapes for *Traffic* and other blockbuster movies, or crafting a new splattercell CD, David's aesthetic for raw sonic exploration goes far beyond a conventional approach to music, let alone guitar. And to help him make his discoveries, David turns to BIAS software.

As he puts it, "I'm not much interested in what's been done before, especially when it comes to my own work. I need to keep uncovering new ground — and I love how BIAS products help me do that so intuitively, with critical speed & stability. Like my guitar, they feel like they were built just for me, letting me create a vocabulary for the language of my music."

It only makes sense that BIAS software is an integral part of David's creative process. After all, we share a common focus: the intersection of technology and art, where creativity flows on a path of least resistance. And it's from this place we create tools to help *you* define your own unique vocabulary.

Ambitious? Idealistic? Perhaps. Unless, of course, like David, you also happen to be biased.

www.bias-inc.com • 1 [800] 775-BIAS

The BIAS family of professional audio tools:

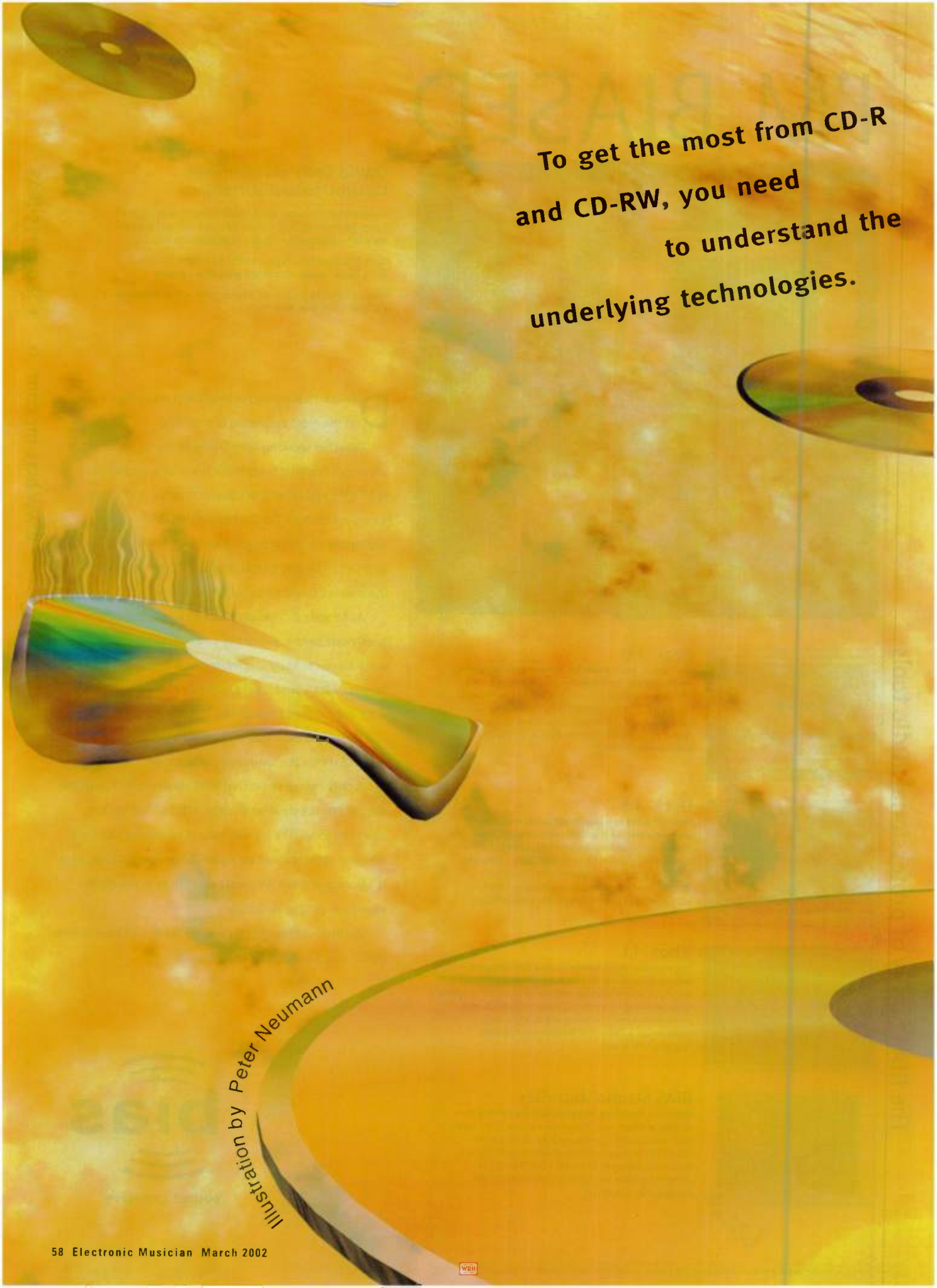
Peak™ 3.0
The fastest, most powerful, & most popular editing/processing app for the Mac — now for OS X & OS 9. Extensive plug-in support including VST & Vbox • Features LoopSurfer™ & other legendary tools • 32-bit processing • Sound Manager & CoreAudio support with performance beyond 24-bit/96kHz • Versions start at just $99 [including valuable extra software]

Deck™ 3.5
The best value in a multitrack audio workstation — soon with Mac OS X & OMF compatibility. 999 virtual tracks • 64 simultaneous tracks • Realtime automated mixing • VST plug-ins • CoreAudio & ASIO • Advanced timecode & QuickTime sync • Perfect audio-post solution for video editing/DVD authoring • Versions start at just $99 [including valuable extra software]

Vbox™ 1.1
The ultimate multi-effects control environment — now for Windows & Mac OS X. Combine up to hundreds of VST plug-ins per channel • Millions of sonic combinations • Hot-swap plug-ins • Instantly mute, solo, mix, & edit parameters • Perfect for music, DJ'ing, audio-post, sound design & radio • Just $129 [Vbox SE free with Peak VST/TDM & Deck]

BIAS Studio™ bundles
Complete desktop & PowerBook audio solutions — at huge savings. Versions bundle BIAS advanced audio tools with valuable third-party products like Roxio Toast 5 Lite & Waves AudioTrack • PowerBook Editions feature the Digigram VX Pocket PCMCIA card, the ultimate portable audio I/O solution • BIAS Studio bundles start at just $179

bias
sound creative



To get the most from CD-R and CD-RW, you need to understand the underlying technologies.

Illustration by Peter Neumann

Burning Ambitions

Many people burn compact discs almost as casually as they once used floppy disks, and CDs serve many of the same purposes as floppies. But CDs do not act like floppy disks. Whereas floppies and hard disks were conceived from the ground up as media for storage and exchange of computer data, the CD was designed for music, and it had to work within the limitations of affordable hardware technology in the early 1980s. The CD has evolved as a medium for data storage and for entertainment, but it can never fully escape its roots. That accounts in large part for the different, and at times quirky, ways that CD-Rs behave.

The variety of CD types can also be confusing. You know CD-Audio and CD-ROM are different beasts, but what are the differences, and how do they affect you? Many people don't really understand or know how to use other application formats, such as Video CD.

By Gary S. Hall

Although you may be using CD-R successfully, if you know a little more about what's going on, it's likely you'll be able to do more cool things with it. When problems strike, knowing something about what's under the hood can save your butt. With that in mind, I'll try to answer some of those nagging questions and give you practical hints for getting the most from the medium.

BURNING QUESTIONS

CD recorders write data to CD-R blanks by "burning" spots, or *pits*, onto the disc (see the sidebar "How CD-Rs Are Made"). A writing laser that draws 4 to 11 mW of power heats a special dye in the recording layer and the substrate of the disc. The recording layer melts, and the substrate expands to fill the space. The resulting spot where the substrate peeks through is seen by a CD-ROM or CD player in nearly the way that a true pit on a manufactured disc appears, and thus the disc can be read. Lingering incompatibilities, especially with CD-rewriteable (CD-RW), indicate that those spots are not precisely identical to the pits in a replicated disc, but they are close.

Burning Ambitions

So far, so good. But consider the tolerances involved. You have a disc spinning at 200 to 500 revolutions per minute. As it spins, the writing laser has to focus on a recording layer that's about one eighth of one millionth of a meter (one eighth of a *micron*), or 125 nanometers, deep. The disc is flat to a tight tolerance, but at the level of the focusing laser, it appears to be bouncing up and down by a huge amount around three to ten times per second. That absurdly tight focus is held with almost complete reliability by an electronic servo that continuously detects any tiny deviation from focus and applies the appropriate correction (see **Fig. 1**). Bull riding would be easy by comparison, but these inexpensive little mechanisms perform their task without a burp or hiccup.

At the same time, the rotational speed must be precisely controlled while the head laterally tracks a groove on the disc that is just half a micron wide and less than two microns from the next turn of the spiral. Those miracles of control are performed by the drive's controller chip and by additional servos in the drive. This remarkable control of focus and tracking is maintained as the laser writes a spiral track that is three to five miles in length. That's pretty good driving!

While all that is going on, the writing laser flashes on and off approximately 100 million times a second. Not only is it flashing that fast but it's doing so with precise control to deliver exactly the right amount of heat to melt the recording layer in precise multiples of 0.83 microns. That deserves your respect.

WRITE AGAIN

CD-RW uses the same dimensional specification and tracking mechanisms as CD-R, but the mechanism used to create the required spot on the disc is different. In CD-RW, the recording layer is made of a metallic alloy rather than a dye. The alloy is a special blend that has two states: *polycrystalline* and *amorphous*. The alloy has a distinct index of reflectivity in each of the two states; that is, it looks darker in one state than in the other.

During CD-RW writing, a laser that is slightly more powerful than the one used for CD-R heats the alloy to 500 to 700 degrees Celsius, at which point it switches from the polycrystalline state to the amorphous state, creating a spot that is seen by the reading laser as being darker than the surrounding polycrystalline material. To erase the disc, the laser heats the surface to just 200 degrees Celsius, at which point the alloy softens but doesn't actually melt, returning to its polycrystalline state. CD-RW discs can be completely erased, but erasing and writing are usually done in one operation.

The difference in underlying technology is the reason that CD-RW remains incompatible with a lot of older CD players and CD-ROM drives. The distinctions in reflectivity that enable the read process are shallower in CD-RW than they are for CD-R. If the drive was not built with CD-RW media in mind, it probably will never be able to read it. Today most drives are manufactured to be CD-RW compatible, so the problem is becoming less widespread, but it might never go away completely.

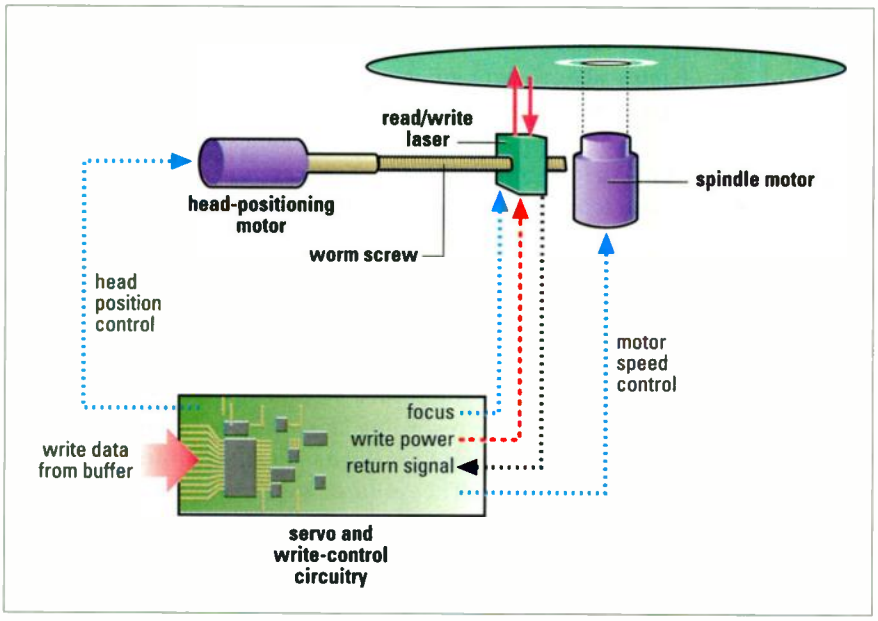


FIG. 1: When a blank compact disc is written, the write-laser focus, power, head position, and disc-rotation speed are controlled by a servo mechanism that is driven by the reflected light of the writing laser.

THE WAY TO GO

When should you use CD-R, and when should you use CD-RW? For one thing, if you are going to hand discs out, you definitely will want to use write-once CD-R. It has the highest compatibility, and the discs are cheaper—important if you don't expect to get the disc back.

When CD-RW was introduced, CD-R blanks were still a few bucks. In that context, the rewriteability of CD-RW was compelling. Today, though, blank CD-Rs cost about 50 cents each if you buy in bulk, and the need for rewriteable discs is less critical for many people. If you're backing up data and do not need to continually update the backup disc, or if you are writing discs that you want to keep, using CD-Rs is probably cheaper.

If you are dynamically iterating test discs for a CD-ROM or an audio project, are continually updating a backup (for example, doing incremental backups), or are just bugged by the accumulation of discs, it may be worthwhile to use CD-RW discs. It's up to you to

IDENTITY CRISIS?

VOICE MODELING - a first from TC-Helicon

IS THE VOICE YOU HEAR A PALE REFLECTION OF WHAT YOU WANT?
Get direct control over the character elements of a live or recorded voice!

REAL VIBRATO
Why does it sound so natural? Because our Voice Modeling Vibrato is a complex model based on extensive analysis of real singers from all styles of music - it's not just an LFO.

INFLECTION CURVES
Vocal character is also found in the way singers begin their phrases, scooping or falling into their notes. Voice Modeling Inflection can intelligently identify phrase beginnings, applying user-selected styles adjustable in realtime via MIDI.

GLOTTAL
Now you can add extra breathiness, whisper, deep growl and "whiskey and cigarettes" rasp to your voice. These effects are normally associated with vocal damage and are difficult to perform. You just dial up, audition and change at will.

RESONANCE
Voices depend on the body that sings them for their unique sound. Head, chest, throat resonance all depend on physiology. Our Warp algorithms let you dial up a chest tone enhancement, dial down nasal tone – from the subtle to the dramatic.

SPECTRAL
Physiological differences also give every singer a unique overall EQ applied in the vocal tract. VoicePrismPlus Spectral EQ works the same way! The result? You can dial up a high-boost curve but consonants and esses don't split your eardrums.

VoicePrismPlus
HUMAN VOICE MODELING | FORMANT PROCESSOR

The most advanced vocal channel available anywhere with both lead-voice and harmony processing under preset control. It features Voice Modeling, four fully adjustable harmony voices, TC Electronic compression, EQ, delay, chorus, flange and reverbs. Sophisticated MIDI implementation, AES/EBU & S/PDIF I/O are included.

VoiceCraft
HUMAN VOICE MODELING CARD

Own the original TC-Helicon VoicePrism? Upgrade to VoicePrismPlus with the VoiceCraft upgrade card.

Free Demo CD
Click Here

TC ELECTRONIC INC. USA • (805) 373 1828 • [FAX] (805) 379 2648
WWW.TCELECTRONIC.COM

TC-HELICON VOCAL TECHNOLOGIES

www.TC-HELICON.com

figure out where the exact crossover point lies. But first, make sure that all the players and ROM drives you use will read the media.

For the remainder of this article, most comments apply to both formats but primarily to CD-R. I'll note where there's a distinction, but otherwise assume that anytime I say CD-R, I also mean CD-RW.

BUFFER-LOW HUNTING

One common problem when burning a CD-R is *buffer underrun*. As Andy McFadden puts it in his excellent CD-R FAQ (see the sidebar "For Further Information"), "[buffer underrun] means you have an attractive new coaster for your table." That's true, at least for non-Multisession CD-R. But where does the nuisance come from?

CD writing is a continuous process and cannot be interrupted in midsession. Once the laser begins to write, any interruption will make a physical gap on the disc that cannot be read. To ensure writing continuity, data is stored in a buffer within the drive. Depending on the drive's make and model, the buffer ranges from 512 KB to 4 MB in size. More is better. As the host computer feeds data to the drive, the data is stored in the buffer; from there it is sent to the disc in a nice, well-behaved stream.

Thanks to the buffer, the drive can tolerate an interruption in data transfer from the host—up to a point. But if new data doesn't arrive before the buffer runs out, that constitutes an underrun (see **Fig. 2**), and at least for Disc-at-Once and Track-at-Once writing, the disc is ruined.

Underruns occur for any number of reasons relating to the host's ability to provide data continuously. Not all underruns can be prevented, but elementary housekeeping can reduce their incidence substantially. Here are a few guidelines:

• Use a fast hard drive, one that doesn't do slow thermal recalibrations in midtransfer. Almost any hard disk made in the past couple of years will work fine. For older drives, check out the characteristics before you rely on them for this purpose. If you have an underrun problem, drop the CD-writing speed.

• Be careful about using your computer during CD writing Avoid I/O-intensive tasks that might interfere with regular data transfers to the drive.

• Don't try to write from a file server on a multiuser network.

• Defragment your drives often.

• If you have trouble with underruns, try recording from a precompiled disc image instead of recording on the fly.

• Put the recorder and the hard drive on separate SCSI or FireWire buses if possible.

• Turn off virtual memory (Mac only).

• Watch out for antivirus programs that run at odd moments, screen savers that activate during the CD-creation process, unusual network activity, and background downloads of data or faxes. One way to check for those potential interrupters is to run the hard-drive defragmenter in Windows. If it restarts every few seconds, something is accessing the drive.

Buffer underruns are becoming less of a problem as faster hardware, bigger buffers, and better controller technology permeate the market. If you encounter the problem today, chances are good that it's because you're using older or dysfunctional gear. If and when an underrun occurs, keep your head and look around at what's going on in your system. Do what optimizing you can and try again.

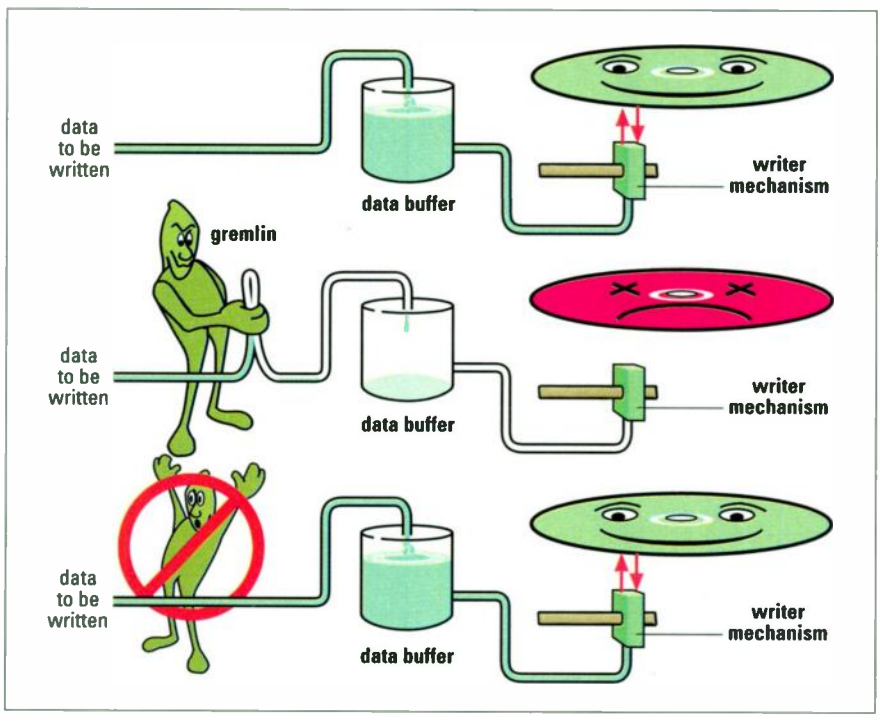


FIG. 2: Buffer underrun occurs when something interferes with regular transfer of data from the host to the buffer in the writer. Eliminate that something, and the problem goes away.

VIVE LA DIFFERÉNCE

Red Book audio tracks on CD are not accessed the same way CD-ROM data is. Audio streams sequentially, as with playing a phonograph record. For that to happen, even on dirt-cheap CD players, the method of access to the stream has to differ markedly from a computer's way of reading a CD-ROM, and the data itself must be carefully structured for robust, steady streaming. Remember, CD-Audio was created more than 20 years ago, and the specification is exactly the same today.

Spot the difference?

RØDE NT5
(actual size)

RØDE NT5
(actual size)

Everything small capsule, precision microphones, should be.

With SMOOTH 'tailored for instruments' response and LOW distortion and ULTRA low noise, the New RODE NT5's are manufactured to exacting tolerances and delivered in matched pairs.

NT5's, UNMATCHED performance in a MATCHED set.

RØDE®
MICROPHONES

USA - Ph: 310 328 7456 INTERNATIONAL - Ph: 61 2 8765 9333 Fax: 61 2 8765 9444
info@rodemicrophones.com www rodemicrophones.com

Burning Ambitions

CD-ROM uses a complete file system that tells a computer or other controlling device exactly where every piece of data starts and ends. It isn't like that for CD-Audio or for Red Book audio tracks on a combination CD-Audio/CD-ROM.

All CDs have a lead-in area, a program area, and a lead-out area. As the name implies, the program area is where the meat of the content is, whether the content is audio tracks, ROM files, or some combination of the two. The lead-in area and lead-out area help the drive and controller "lock on" to the disc and locate information in the program area.

For CD-Audio, the lead-in area includes a table of contents (TOC) to define where audio tracks start and end. On a consumer player, the information in the TOC is loaded into the player's memory when the disc starts up. When the CD format was established, memory was nowhere near as cheap as it is today, and it was important to limit the amount of information in the TOC. For that reason, the audio TOC is far simpler than any standard computer file system.

To save memory, the pointers to tracks in the TOC do not pinpoint the exact byte that begins the track; instead, they drop the read head somewhere near the actual start. Because audio CDs are designed to play sequentially, like phonograph records, that originally was not an issue. It's like dropping the needle into the space between tracks on a record: unless you're a DJ doing beat matching, you are happy as long as the needle goes in somewhere between the end of the previous song and the beginning of the song you want to hear. In contrast, a drive reading a CD-ROM must locate the exact beginning of the desired data file.

CD-ROM and CD-Audio also differ in the ways that data is formatted and grouped. All CDs are made up of 2,352-byte sectors. In CD-ROM, 304 bytes of each sector are dedicated to header information that is part of the file system and allows direct and precise access to every one of the remaining 2,048 data bytes. CD-Audio sectors also contain 2,352 bytes, but all are dedicated to audio, with no header. In normal audio play, that is perfect, but when a CD-ROM drive tries to read CD-Audio data, it has problems. Computers don't read data in continuous streams but in snippets of varying size that are loaded to memory and processed. When the computer finishes processing one snippet, the processor goes back and gets the next, and so on until completion.

The CD-R you record is of better quality than any commercial CD.

When a CD-ROM drive tries to extract *(rip)* audio data to turn it into a file, it has a hard time locating the start of each snippet. The direct addressing of CD-Audio only gets the head to within one second of a desired location. The drive controller and software then have to use data embedded into audio-data frames to home in on the desired location. But the accuracy of this subcode information is limited to 1/75 second.

To make matters worse, many older drives locate only to within four of these units so that accuracy of position is limited to something like 50 ms. That's close enough for listening, but it's a nightmare for data extraction, and it's the reason ripped files sometimes have pops and clicks. The extracting software must rely on the capabilities of the drive's controller chip to locate audio data accurately, and some controller chips can do that much better than others; in fact, many older CD-ROM drives cannot be used for audio extraction at all.

The trouble isn't over when the audio track's start point has been located. CD-Audio data is arranged into 24-byte *frames,* which include actual audio data along with sync bits, error-correction data, and control bits. The data in those frames do not appear sequentially on the disc but are interleaved with the data of many other frames. That prevents a scratch on the disc from ruining a whole chunk of data. Instead, the error is spread over individual bits and words. The player then relies on data correction and interpolation to correct the errors. That doesn't always work, but most of the time it does.

In audio play, the deinterleaving of frames is performed as the CD plays, in silicon, which can be made very efficient for the purpose. In audio extraction, software usually has to perform this job and do audio error correction, as well. Depending on the drive, condition of the disc, speed of the processor used, and sophistication of the extracting software, the whole process can grind to a halt. Do you have any discs you just can't rip with your system? That's probably why.

Improvements in hardware and software technology make audio ripping much less troublesome. One such improvement is a revision of the ATAPI specification that governs drive interfacing. The latest specification, used for many of the current generation of drive controllers, includes a new command set that supports functions that previously had to be handled by the ripping software, including a lot of error-correction and subcode functions.

With those functions embedded in the drive, audio extraction becomes much easier and more efficient, and the complexity of software required for ripping goes way down. When the drives position the heads more accurately, even older software works better, because less iterative searching is

Musician's Friend

APPLY TODAY!
YOUR CHOICE
SAME AS CASH!

3 MONTHS Minimum Purchase $199
6 MONTHS Minimum Purchase $499

NEW!
$1299.99

KORG
TRITON Le
61-Key Workstation
702236Y‡ List $1,600.00

INCLUDES FREE SOFT CASE AND STAND! ($180 VALUE)

Karma
702402Y‡ List $2,429.94
NEW! $1799.99

D12 12-Track Digital Recorder
242095Y List $1,150.00
$899.99

SAVE $90!
D12 12-Track Digital Recorder with Re-Writable CD Drive
242143Y List $1,599.99
$1259.99

50 PACK!
maxell
80-Minute 16X Blank Data CD-R Spindle
950321Y List $29.99

ONLY $16.99

NEW LOWER PRICE!
SONY
MDR-7506 Headphones
271056Y List $158.00
$99.99

Steinberg
The Grand VST Piano Instrument
708076Y List $299.99
NEW!
$229.99

TANNOY
Proto-J Plus Studio Monitors
601005Y List $349.99
NEW!
$199.99 pair

FREE CATALOG!
ONE-YEAR SUBSCRIPTION

OPEN 24 HOURS A DAY 7 DAYS A WEEK

call or Click!

WEEKLY WEB GIVEAWAY!
FREE GEAR
WORTH UP TO $1000

800-776-5173 musiciansfriend.com

Five Easy Ways To Order!

1. Call: 800-776-5173
2. Click: www.musiciansfriend.com
3. Fax: 541-776-1370
4. Write: P.O. Box 4520 Medford, OR 97501
5. Lease: 800-359-4790

Rapid Delivery!

- Most orders shipped same day!*

45-Day Double Guarantee!

- Money-Back Satisfaction Guarantee
- Best Price Guarantee

Limited to stock on hand; prices subject to change; standard catalog shipping rates apply

*On orders received by 5PM ET Mon.-Fri. ‡Additional delivery charges for 2-day service.

To get your FREE Catalog subscription, fill out this handy coupon and mail to: Musician's Friend, Dept. EM, P.O. Box 4520, Medford, OR 97501

Name _____

Address _____

City _____ State _____ Zip Code _____

E-mail address _____

Area(s) of interest: ☐Guitar ☐Bass ☐Keyboard ☐Drums ☐Studio (recording) ☐Stage (PA, lights, etc.) ☐DJ

SOURCE CODE: EMBC

Burning Ambitions

HOW CD-RS ARE MADE

Knowing something about how CD-Rs are made can be enlightening. The process is nearly the same as that of manufacturing replicated CDs. In fact, in many plants, manufacturing lines are switched back and forth according to demand. Replicators can make higher margins from replicating audio or CD-ROM titles, but the demands for CD-R are constant. From the manufacturer's point of view, it's a great way to keep those lines running. The main differences between the commercial CD and CD-R manufacturing processes are the inclusion of a dye, a distinct type of reflective metal, and the physical content of the glass master.

For CD-ROM, CD-Audio, or CD-R, the first step in the process is the creation of a glass master, using a Laser Beam Recorder (LBR). The LBR is by far the most expensive item in the process. The glass master consists of an extremely flat piece of glass that is coated with a photoresistive chemical. The glass itself is reused many times and is coated anew each time a new master is created.

FIG. A: Among the many steps in the creation of a CD is the process of washing the coated master disc. Following this step, a thin layer of silver will be applied to the disc in order to make it electrically conductive.

When replicating CD-Audio and CD-ROM, the LBR creates pits and lands in the photoresistive layer by varying the intensity as the laser beam sweeps around the disc in a tightly controlled spiral. For CD-R, the LBR simply creates a continuous spiral instead. That spiral is "wobbled" with slight sinusoidal modulation that allows the recorder to synchronize with the disc even before the disc is recorded. In replicated discs, the placement of pits and lands serves that purpose, but for CD-R they don't exist until the disc is being written. Pregrooving is one key technology that allowed CD-R to exist and take over the world.

FIG. B: Dye coating a CD is done using a process called *spin coating*. The disc is spun at a very high speed so the coating is applied evenly.

After exposure in the LBR, the coated master is washed in a solution that dissolves the photoresist wherever it has been exposed to the laser's strong beam (see **Fig. A**). That is the first point at which the smooth coating of the glass master becomes a physical representation of the disc to be manufactured.

The glass master is then tested, after which it is coated with an extremely fine layer of silver. The layer renders the disc electrically conductive. The next step in the process, called *electroforming*, turns the conductive glass master into a big electrode that is immersed in a nickel sulphamate solution. The charge on the coated master is increased gradually until the whole disc is covered with a heavy but even coating of pure nickel metal.

The metal image that results is called a *father;* it can be used directly to make discs. But only a certain number of discs can be made from a metal mold (called a *stamper*) before it wears out. If the original father mold is used, it wears out, and you have to go back to the glass master or to expensive LBR mastering. Therefore, the normal replication procedure is to use the electroplating method to create an inverse image of the father, which is known as a *mother*. Because the mother is a reverse image, it cannot be used directly to make discs, so yet another image is made by electroplating. This third image is called a *son*. Normally, the sons are used to mold discs. This process gets the maximum yield of discs from a single glass master.

The stampers thus created are used to mold thousands of copies of the disc in *polycarbonate* plastic, the transparency, stability, and general durability of which have made it the universal material of choice for CD and DVD.

Polycarbonate is delivered to the replication plant in the form of plastic pellets, which are loaded into hoppers that feed the molding lines. The pellets are melted at about 570 degrees Fahrenheit, which is one of the reasons you should not try doing this at home. The molten polycarbonate is then injected repeatedly into molds

into which the metal stampers have been mounted. This is a highly automated and efficient process. The molds themselves are carefully machined and quality controlled to ensure that the resulting discs will be perfectly flat and correctly centered. To harden the polycarbonate discs, the molds have water channels that can cool the disc evenly in four to six seconds. The hardened disc, with its microscopic, wobbled pregroove is then removed and sent to the next stage of the process.

The next step in the process, dye coating, is the really tricky part for CD-R. The dye materials are complex organic polymers, often based on patented proprietary formulas that are developed and refined by each manufacturer. That is one reason that discs from the various manufacturers look different.

The dye has to meet a lot of criteria, including compatibility with the broadest range of recorders, stability on the shelf, good bonding with the polycarbonate base, and compatibility with the solvents used to carry the dye during manufacturing. Manufacturers constantly refine their dye formulas to improve those characteristics, and end-users get the benefit in the form of high-quality, widely compatible media that they can buy at remarkably low prices.

The dye is applied to the disc by *spin coating* (see **Fig. B**). The molded disc is spun at a high speed while the dye is sprayed onto the surface. Centrifugal force takes care of spreading the dye evenly. The coated discs are then dried and cured to make sure that the dye adheres properly to the base.

To make the discs reflective to laser light, one of four metals—aluminum, copper, silver, or gold—is applied in a thin layer to the back of the molded disc. Obviously, aluminum is less costly than gold; it is therefore the metal used for most replicated CDs. But for CD-R, gold or silver is used most often because those metals are more highly reflective. For CD-R, the laser beam that reads and writes the disc must penetrate the translucent dye layer, reducing the amount of light that reaches the back layer to be reflected. Because the beam has to pass again through the dye layer on its way back to the read head, the reflective layer needs to be as shiny as possible.

The reflective layer on CD-R disc is pure silver or 24-karat gold and is between 50 and 100 nanometers thick. That's about a thousand times thinner than a typical human-head hair. After applying the reflective layer, spin coating is used to apply a protective layer of acrylic plastic to both sides of the disc. After the layers are cured by ultraviolet light, the discs are ready to be recorded. Many discs have additional coatings to accept laser printing or to further protect the discs from damage.

The last stage of manufacturing is labeling and packaging. Discs come with various options for the label side, so different runs of discs receive distinct coatings in the final stage. The discs are then packaged on bulk spindles, in individual jewel cases, or whatever and shipped off to your friendly local distributor or retailer.

The whole process of mastering, electroforming, replicating, dye coating, spin coating, labeling, and packaging is highly automated and quality controlled, and the equipment and processes are refined and sophisticated. For an eye-opening experience, take a tour of a replication plant in action. In truth, replicators and CD-R manufacturers are the unsung heroes of the optical-disc revolution.

Burning Ambitions

WHAT IS VIDEO CD?

Most Americans have probably never seen the term *Video CD* except on the front plate of their DVD player. Video CD is a data format for compact disc that is physically identical to CD-Audio/CD-ROM, but that lets the disc carry MPEG-1 video and audio instead of (or in addition to) PCM audio or ROM data. Developed and released in the mid–1990s, it is a direct predecessor of DVD. It includes stereo audio, slide shows, and simple menu navigation.

COMMERCIAL APPLICATIONS

When Video CD was released, the major film studios and consumer-electronics manufacturers concluded that commercial Video CD would not succeed in North America and Europe. One reason was video quality: MPEG-1 video is compressed several times more heavily than DVD video and is visually unimpressive. Even when encoded from the highest-quality source and with the finest equipment and care, the best you can say about it is that it approaches the quality of VHS. When done in a hurry from less than pristine sources, it can look awful.

Also, Video CD looks reasonably good in a quarter-screen window on computer, but the impression breaks down when the picture goes to full screen. The resolution of MPEG-1 (352 by 240 for NTSC) is a fourth that of DVD. The picture tends to look "soft," which even casual viewers will notice. If there are MPEG artifacts, which often occur with low-cost encoders, the picture can start to look genuinely grim. Those accustomed to VHS would see no reason to switch to Video CD.

Another drawback is that Video CD holds only 74 minutes of video, requiring at least two discs for a standard movie. Consumers hate changing discs. Commercial Video CD has been far more successful in China and the surrounding countries in Asia, because home video was previously unavailable to the average Chinese, and China's colossal CD-replication capacity has made the medium far more cost-effective than VHS.

PERSONAL VIDEO CDS

On the other hand, if you want a simple and inexpensive way to put video and audio together on a random-access disc, Video CD has its attractions. The medium (standard CD-R) is inexpensive, and the content-formatting tools are cheap and readily available. Using Roxio's *Easy CD Creator* for Windows or *Toast* for Mac and a video-capture card with MPEG-1 conversion software, you can make the discs from your desktop.

Unfortunately, there are problems with the medium for personal use, too. One is that most DVD players play commercial Video CDs but don't play CD-Rs reliably. That doesn't apply to all players, but it constrains the use of the one-off Video CDs for sharing. Even if you're not distributing widely, it's embarrassing to send people a disc that won't play on their machine. However, Video CDs will play in the great majority of computers in the field today.

Compared with DVD, Video CD's navigation and access functions are rudimentary, with a single still menu. The audio quality is MPEG-1 Layer 2, which is poorer than MP3 quality. All in all, Video CD carries a "poor cousin" air about it.

One music application to consider for Video CD is the combination of music video with Red Book audio tracks. That is perfectly legal and is supported by the format. If you have a music album and a single video cut, you can elect to format it as primarily an audio CD with "bonus" video for those who have a DVD player or computer. If the disc is replicated, it should play well on the majority of DVD players, and in the context of an audio CD, the reduced video quality may not be objectionable.

Video CD versus DVD

	Video CD	DVD
Video Quality	medium (lower than VHS)	very high
Special Video Features	none	multiple camera angles, user-selected subtitles
Audio Quality	medium (less than CD-Audio)	medium to extremely high (24-bit, 96 kHz Fs)
Special Audio Features	Red Book audio tracks	discrete surround (AC-3 or DTS), multiple audio streams
Navigation and Interactivity	simple (one menu)	extensive (multiple menus, with motion and sound options, scripting language)
Playback Compatibility	most PCs, DVD set-top players that play CD-R; replicated Video CD compatible with nearly all DVD players	DVD set-top players; many PCs
Media and Writer Cost	low	high but dropping

((DON'T BELIEVE EVERYTHING YOU HEAR.))

COMING SOON: fully digital bi-amped front end

((UNLESS, OF COURSE, YOU'VE HEARD IT FROM A KRK STUDIO MONITOR.))

Top engineers and producers know that KRK studio monitors still give you the truest, most natural mix around. And with our V series, the fact is KRK has never sounded better.

KRK Systems, LLC

But as we said - don't believe everything you hear. See your local KRK retailer and listen to the true sound of your mix from one of our new advanced studio reference monitors today.

THE V SERIES
OF SELF-POWERED BI-AMPED MONITORS

V6
Big Sound in a small package, plus built-in crossover and video shielding

THE NEW V88
More low frequencies, and more SPL thanks to twin 8" woofers

V8
Excellent translation for the most critical listening requirements

KRK Systems, LLC • 954.689.8833 • www.krksys.com
KRK is a registered trademark of KRK Systems, LLC

required to cue the next snippet. The feature is called Accurate Streaming, and if you're shopping for a new CD-ROM drive, look for it.

FILLING IN THE GAPS

The system of *tracks* and *indexes* on a CD-Audio disc has some interesting aspects that can affect your work. Audio tracks on a CD are defined as groups of indexes. Each CD has as many as 99 groups, or tracks, and each track has multiple indexes, also called *index points*.

In the original specification (IEC 908), index points on CDs were defined to allow access to tracks and for cueing to points within a track. The latter application never really caught on, though; few discs are made with indexes other than those that cue the start of tracks, and few players permit access to indexes. For that reason, most folks are probably unaware that indexes exist.

Index points are mostly used to define the start of a track and the *gap* between a track and the previous track. Index 0 defines the beginning of a gap, and index 1 indicates the start of the actual track. When you play through a disc sequentially, you hear all of the gaps. If there is audio in the gap, you'll hear that audio. But if you seek a particular track, the player will cue to index 1, and you won't hear the material in the gap. This mechanism is sometimes used to "hide" tracks on a disc. You can't find a hidden track by searching, but if you play through the disc, you'll find the track.

IN THE MODE

The various modes for writing to CD can be confusing. When you're getting this in perspective, remember that the original mode for CD recording was Not-at-All! Recordable technology evolved years after CD was created, and at every step, the ability to write has had to be grafted onto a format and technology that was never meant to go there.

Disc-at-Once. For a long time after CD-R came on the market (remember when burners were $10,000 and blank discs $50?), the only mode of writing was Disc-at-Once (DAO). People didn't call it that, because there was nothing to contrast it with. All you knew was the whole disc had to be written in one pass, and if there was any error in the content or the process failed for one reason or another, that disc was completely useless other than as arts-and-crafts materials.

In DAO mode, all the data is written to the disc without ever turning off the recording laser. These days Track-at-Once and Multisession modes are in common use, but DAO has advantages, especially for audio mastering. Because the data is recorded continuously, audio tracks can be set back-to-back, with no gap in between. That allows for crossfades and segues between cuts. If you're mastering for CD release, DAO is the way to go.

When writing in DAO mode, all the data needs to be easily accessible, because there's no time for search and retrieval between tracks. Preferably, the data is arranged continuously on a recently defragmented hard disk, though with today's fast drives, you'll probably have success even if the data is spread across one or more local volumes. Be cautious about attempting to burn multiple tracks across a network, however. Data can be interrupted on a network in lots of ways, and DAO is the least forgiving mode.

If you encounter problems completing a burn, the most foolproof tactic is to compile a *disc image*. A disc image is a single file that incorporates all the data content and the file system that will go on the disc. In the early days of CD mastering, burning from disc images was the rule, but today it is the exception. To prepare a disc image, you need to have a chunk of hard-disk space equal to the size of all the data you want to put on disc.

Track-at-Once. Track-at-Once (TAO)

DRIVEN TO EXTRACTION

Here are a few tips to increase your chances of success when ripping audio from CDs:

• Clean your discs before ripping. You don't need commercial disc-cleaning doodads and solutions to do this. Just hold the disc under warm running water and lather your free hand with liquid hand soap. Use a simple soap without skin softeners, deodorants, and so forth, and make sure it has no abrasives. With your fingers, rub the soap gently onto both sides of the disc. Then, rinse both hands and the disc well with warm water. Pat dry (don't rub) the disc with a soft, lint-free cloth.

• Avoid trying to extract audio from discs that have physical defects. If a disc has deep scratches, warping, or peeling surfaces, the head seeking will become excessive, causing slow ripping or corrupted files. In some cases, the process may fail completely.

• Use a good drive for ripping. If you have more than one drive available, try the newest or the fastest first. Many newer drives have been optimized for audio extraction. Many (not all!) older CD-ROM drives will work for this purpose, but they were not built for the task.

• Dedicate a hard-disk drive to ripped audio files, if you can. Drives used for operating systems, applications, and nonmedia data such as text documents and spreadsheets tend to become fragmented in operation, and that slows down ripping considerably. Defragmenting a big drive is time-consuming. If you dedicate a drive, you can just reformat it after a ripping session instead.

totally reliable hand-crafted DAWs?

Unthinkable,

until now...

"The combination of Sound Chaser's PC Workstations and Nemesys GigaStudio is the most powerful tool in my studio. I now have more sounds and textures at my disposal than I thought possible. Get one today !"

- Don Felder/The Eagles

Experience and Innovation

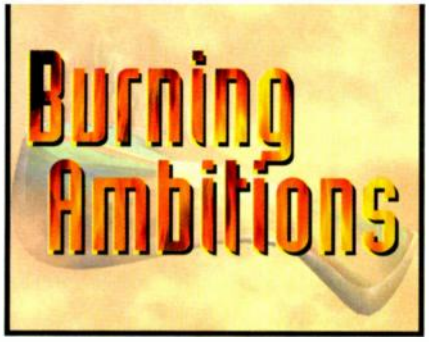
Sound Chaser creates the absolute best audio software and hardware solutions available. Take advantage of our years of experience and R&D. Our passion and dedication means superior customer service coupled with exceptional engineering and quality control. Whether custom built or preconfigured / ready to ship, our computers are the reliable tools your studio can depend on.

SOUND CHASER

1.800.549.4371

www.soundchaser.com

San Francisco New York Los Angeles Nashville



is the most widely supported mode of CD recording because of its versatility. Because the laser is turned off between tracks, the writing software can take the time to search for the next chunk of data, prompt for a new CD, and so on.

The principle disadvantage of TAO mode is that there will always be an audible gap (generally about two seconds but variable with some recorders) between tracks. If you plan to send a CD submaster out for replication, be aware that not all replicators can properly interpret a disc submaster done with TAO. That is another reason to record audio masters in Disc-at-Once mode.

Multisession. In Multisession recording, data is added incrementally, letting you add, replace, and delete files. Multisession recording makes it possible to use the CD-R disc in a way that is similar (though not identical) to the way you're accustomed to using floppy disks.

The trade-off is platform compatibility. Audio-CD players generally do not know Multisession discs from Adam, so you can't use that mode to make audio CDs. Many older CD-ROM drives also cannot interpret the Multisession structure. Multisession is most useful when the context is *vertical*—that is, you are reading back the disc on your own drive and on other drives that you know for sure are compatible.

In Multisession recording, each track of data is written in a separate session, and the session is *closed* after recording by writing a lead-out. That makes each session into a separate file system that can be recognized by a CD-ROM drive. The lead-out uses some space (about 22 MB for the first session and 13 for subsequent sessions), so you can't get quite as much data on a Multisession disc.

If you were to record sessions in that manner, without doing anything to tie them together, a Multisession-compatible CD-ROM drive would see the sessions as separate volumes. (A non-Multisession drive will see only the first session). That is known as a *multivolume* disc, and it has its uses.

More often, though, you will want to create discs that are seen as a single large volume with read, write, and delete capability. That is done by *linking* sessions together. The linking process creates a directory structure that references files in all sessions on the disc. As you record additional sessions, replace or delete files, and so forth, the directory structure is re-created to reflect updates to the disc. The Multisession-compatible CD-ROM drive has intelligence to direct it to use only the most recent version of the file system so that previous versions are effectively disabled.

You can turn a disc into a Multisession disc after recording (assuming there's space), but that can introduce other compatibility issues. Not all Multisession CD-ROM drives will recognize the disc unless the first track is recorded in a specific format (CD-ROM XA). It's all just part of the fun and games of grafting new capabilities onto an established format.

Multisession mode is not very useful for audio. In theory, audio tracks can be recorded in Multisession mode, but most CD players will see only the first track. Many CD-recording software packages support recording tracks incrementally using Track-at-Once recording. However, the disc is not readable for standard CD players and CD-ROM drives until the disc is closed by writing the lead-out area.

Packet Writing. Track-at-Once, Disc-at-Once, and Multisession are basically three ways to slice the same orange. Packet Writing, though, is a fundamentally unique approach to the medium. In Packet Writing, data is actually written in little pieces rather than in the large chunks known as Tracks or Sessions. Packet Writing must be supported at the hardware and firmware level, and it absolutely will not work on recorders and drives that predate the technology. Packet Writing brings CD recording that much closer to the grail of behaving like a big floppy disk.

With Packet Writing, there are two types of data chunks, or *packets*. *Fixed-length* packets are tailored for CD-RW, allowing data to be randomly erased and rewritten without the need to keep track of a potentially huge and changing map of different-length packets. The downside is that fixed-length packets entail a substantial overhead, which cuts the disc capacity down to something in the range of 500 MB.

Variable-length packets are optimal for CD-R recording because the mapping remains fixed once the files are written. With Multisession CD-R, you can delete files from the disc, but the data is not actually deleted. Instead, the file system that points to the files is updated so that the deleted file becomes invisible to the user. The mapping of packets is not affected. With variable-length packets, more space on the disc is available.

COLOR MY WORLD

Various types of CD-R and CD-RW blank discs do have differences, and some recorders may work better with one type than another. In some cases, the firmware of a drive may even limit it to working with certain types of media. However, that is a matter of the match of media and drive rather than a general superiority of one type to another.

CD-R versus CD-RW

	CD-R	CD-RW
Recording Layer Material	cyanine, phthalocyanine, advanced phthalocyanine, or metal-azo dye	metal alloy
Recording Mechanism	dye and substrate melting	phase-change
Player/Drive Compatibility	very good	fair to poor
Cost of Media	$0.50–$2.00	$3.00–$8.00

Now you can sound as good "Live" as you do in the shower.

You're standing in the shower, soaking wet, when all of a sudden inspiration strikes, and before you know it you're belting out a tune at the top of your voice. You sound great, and you know you could be a big star if you could only sound this way "Live."

Well thanks to DigiTech®, now you can. Because besides being a very cool mic pre, the Vocal300 from DigiTech is equipped with 26 fully programmable studio quality effects (you can use up to 7 effects at once), along with a built-in expression pedal and footswitches that let you change your sound on the fly. There's even a collection of "character" voices that will transform even the silkiest voice into a demonic fiend or a space-crazed alien.

So if you're anxious to accentuate your vocals, stop by your nearest authorized DigiTech dealer today and check out the Vocal300. It might just be the best you've ever sounded... wet or dry.

Warning: The Vocal300 should not be used in or around a shower or tub. Clothing is optional.

Come to www.digitech.com/kb and register to win free stuff.

DigiTech
The Power to Create

DigiTech® • 8760 South Sandy Parkway • Sandy, Utah 84070 • 801-566-8800

A Harman International Company

Made in the USA

These days the process of manufacturing blank discs is refined, and it's unlikely that a manufacturer will ship inferior-grade discs to the stores. In fact, recorded CD-R and CD-RW discs on the whole exhibit substantially lower error rates than pressed discs. No matter what medium you use, the disc you record is of better of quality than any commercial CD-ROM or audio title you can buy at the store.

If you have purchased different brands of CD-R and CD-RW blanks, you've probably noticed that the business side of the discs comes in several colors. Those distinctions in color result from the combination of the dye formulation and the type of reflective layer. Reflective layers are either gold or silver. For the dye layer, four formula types are used: *phthalocyanine*, so-called *advance phthalocyanine*, *cyanine*, and *metal azo*.

Cyanine-based media are usually bright green. The dye itself is blue, but it is usually paired with a gold reflective layer that shows through the translucent dye. Phthalocyanine (say that three times fast!) is a pale green color that results from pairing a yellow-green dye with a gold backing layer. Advance phthalocyanine has an aqua hue. Metal-azo dye is deep blue in color. With a silver backing layer, the deep blue color is preserved, but if gold is used, the disc appears as green. Gold or silver backing can be used with metal-azo dye.

Do those colors matter? Yes and no. Phthalocyanine and advance phthalocyanine are known to be less sensitive to ordinary light than the others. If you are going to leave your discs out in the sunlight, they may hold up better. Does that make phthalocyanine better? Not for practical purposes: you shouldn't leave your discs out in sunlight or any kind of light. Store all CD-Rs in a case, away from light, and they will be good for 30 years at least. Sensitivity to ordinary light should not be an issue.

Other differences in media affect what happens when a disc is being written. With the drive controllers and software used today, however, those dissimilarities are generally unimportant. Current drives use active control and feedback from the media itself to optimize the write strategy for the disc in the drive. You should get good, consistent results with any media.

If you use an older drive, you can take advantage of others' experience. Cyanine and phthalocyanine have been around the longest and are compatible with the largest range of legacy hardware. Of the two, cyanine has a broader range of writing power and may work in more drives than phthalocyanine.

HOT STUFF

As exciting as DVD is—and it is very exciting, indeed—the CD formats are still likely to be around for quite a while. Admittedly, sundry CD specifications have developed in peculiar ways because so much has been grafted onto what started out as a straightforward music-delivery platform. But CD-ROM, CD-Audio, CD-R, and CD-RW are proven, practical, and perhaps most important, ubiquitous. CD is as close as it's come to a universal digital delivery medium, with support for audio, data files, video, text, and graphics.

Now that you know how CD-R works, you should be well equipped to decide which CD format and mode to use for each application, and to know what problems are likely to arise, how to avoid them, and why this already venerable medium works the way it does. In short, you are ready to satisfy your burning ambitions!

FOR FURTHER INFORMATION

You can find many books on CD and CD-R, but the Web has the best resources for general use. These links will help you delve deeper.

Audio Compact Disc—Writing and Reading the Data
www.ee.washington.edu/conselec/CE/kuhn/cdaudio2/95x7.htm
If you really want to know how data is formatted on an audio CD, the place to find out is Professor Kelin J. Kuhn's site, which is complete with many diagrams and gory details.

The CD-R FAQ
www.cdrfaq.org
Andy McFadden's excellent FAQ discusses CD-R/RW technology but focuses mainly on practical tips.

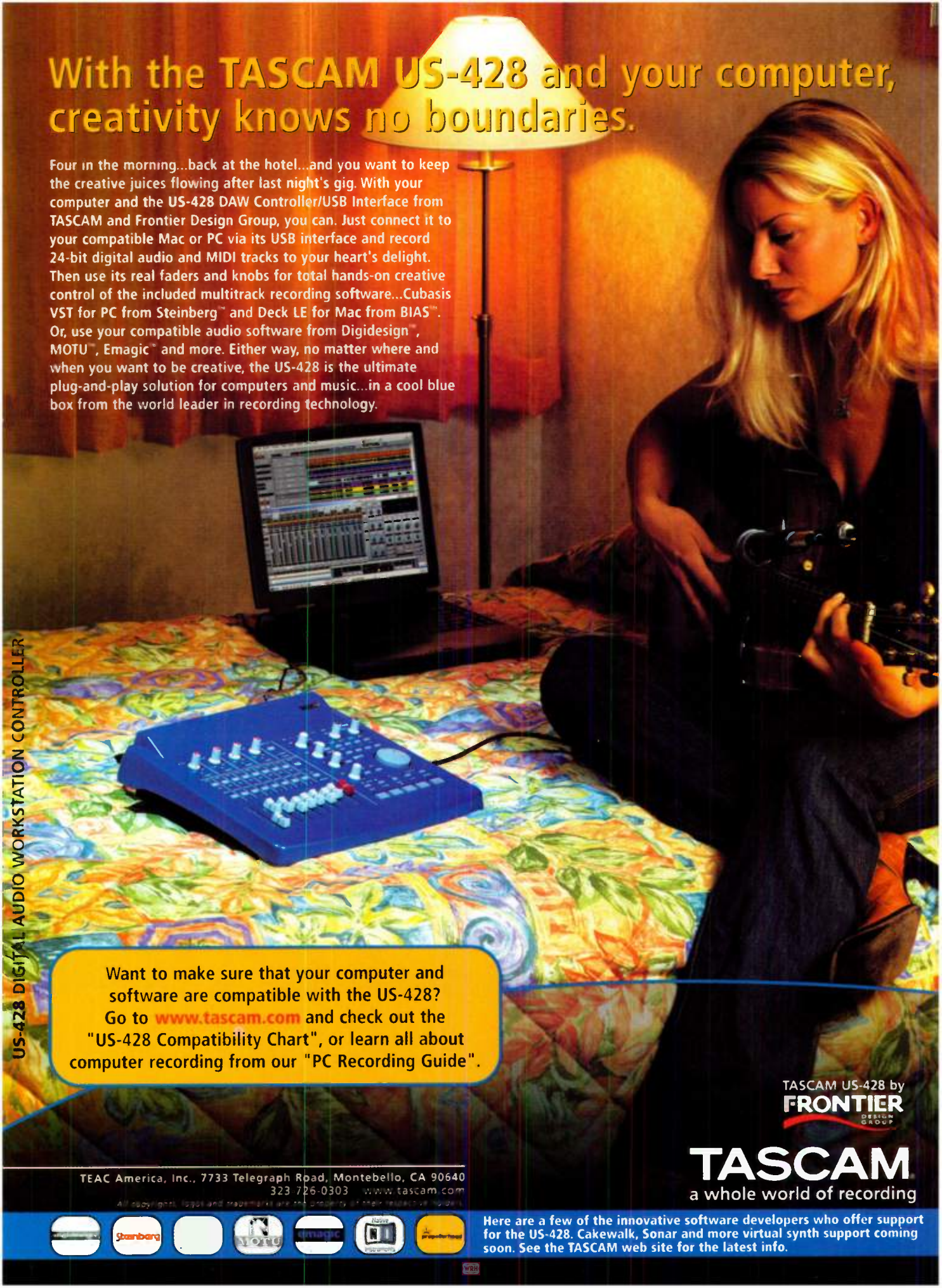
How Stuff Works
www.howstuffworks.com/cd.htm
Marshall Brain's, uh, brainchild has a great article about CD technology in general, with links to several other articles that explain particular aspects of the technology.

Optical Storage Technology Association (OSTA)
www.osta.org/technology/cdqa.htm
OSTA has a good CD-RW Questions and Answers page.

Roxio
www.roxio.com/en/support/cdr/index.html
Best known as the developer of *Easy CD Creator* for Windows and *Toast* and *Jam* for the Mac, the Adaptec spin-off company maintains an excellent technical resource on CD-R/RW technology.

Gary S. Hall *lives and works in Alameda, California. He's working on a surround techno-tribal album, to be released on DVD-Audio, with collaborators in Brazil, Switzerland, and upstate New York.* *Special thanks to Royal Scanlon of replication firm RSRT (www.rsrt.com) for helping acquire graphics.*

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


With the TASCAM US-428 and your computer, creativity knows no boundaries.
Four in the morning...back at the hotel...and you want to keep the creative juices flowing after last night's gig. With your computer and the US-428 DAW Controller/USB Interface from TASCAM and Frontier Design Group, you can. Just connect it to your compatible Mac or PC via its USB interface and record 24-bit digital audio and MIDI tracks to your heart's delight. Then use its real faders and knobs for total hands-on creative control of the included multitrack recording software...Cubasis VST for PC from Steinberg™ and Deck LE for Mac from BIAS™. Or, use your compatible audio software from Digidesign™, MOTU™, Emagic™ and more. Either way, no matter where and when you want to be creative, the US-428 is the ultimate plug-and-play solution for computers and music...in a cool blue box from the world leader in recording technology.
US-428 DIGITAL AUDIO WORKSTATION CONTROLLER
Want to make sure that your computer and software are compatible with the US-428? Go to www.tascam.com and check out the "US-428 Compatibility Chart", or learn all about computer recording from our "PC Recording Guide".
TASCAM US-428 by FRONTIER DESIGN GROUP
TASCAM
a whole world of recording
TEAC America, Inc., 7733 Telegraph Road, Montebello, CA 90640
323 726-0303 www.tascam.com
Here are a few of the innovative software developers who offer support for the US-428. Cakewalk, Sonar and more virtual synth support coming soon. See the TASCAM web site for the latest info.

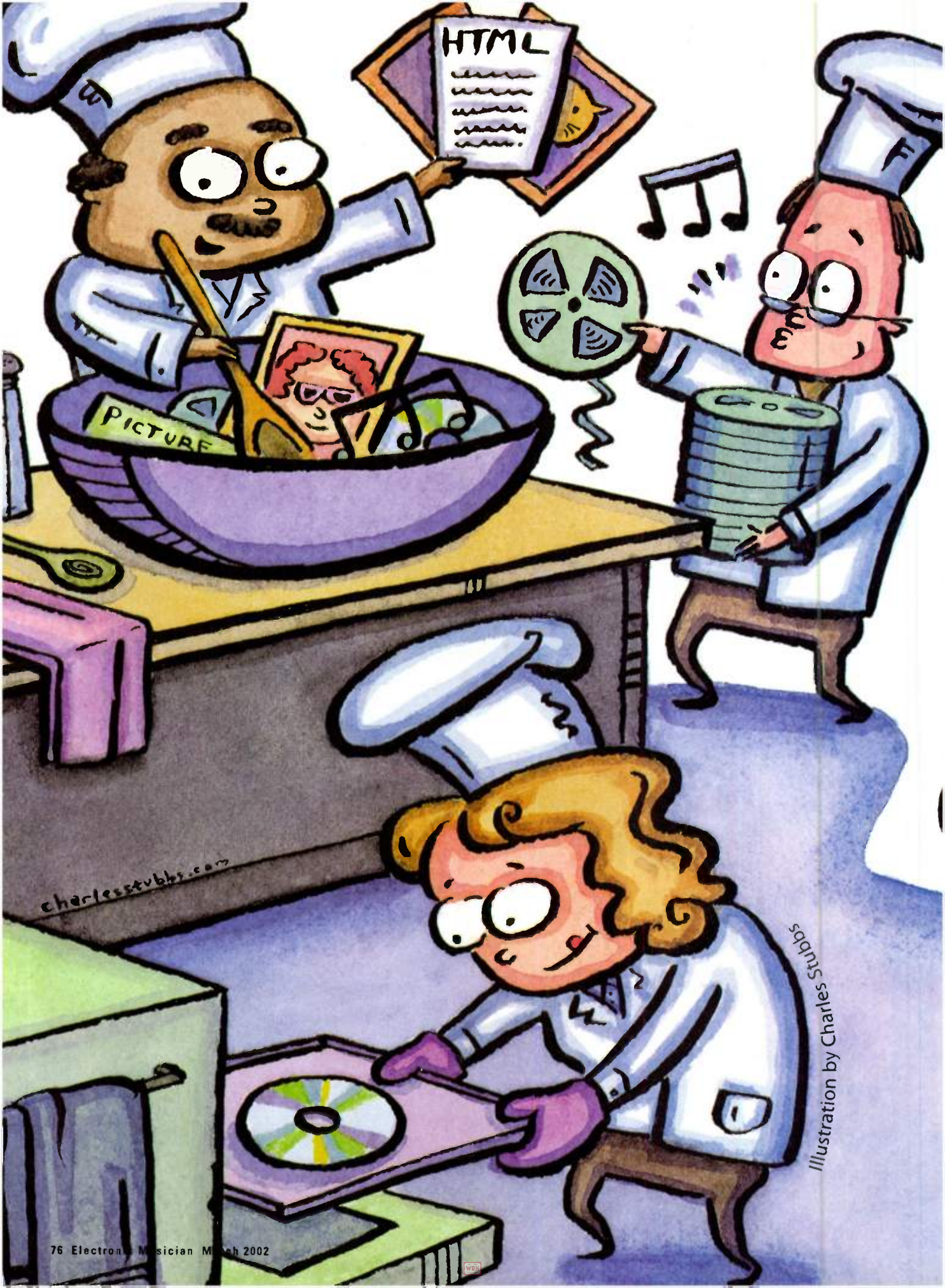


Illustration by Charles Stubbs

More Than Meets the Ear

Make your CDs sing and dance with these easy tips.

Unless you're cranking out recordings the length of Beethoven's Ninth Symphony, you probably have a lot of wasted space on your CDs. Fortunately, it's surprisingly easy to add photos, movies, MP3 remixes, and other multimedia enhancements to your discs, delivering a richer experience to anyone who pops them into a computer. All it takes is a CD burner, some inexpensive software that you may already own, and a little know-how.

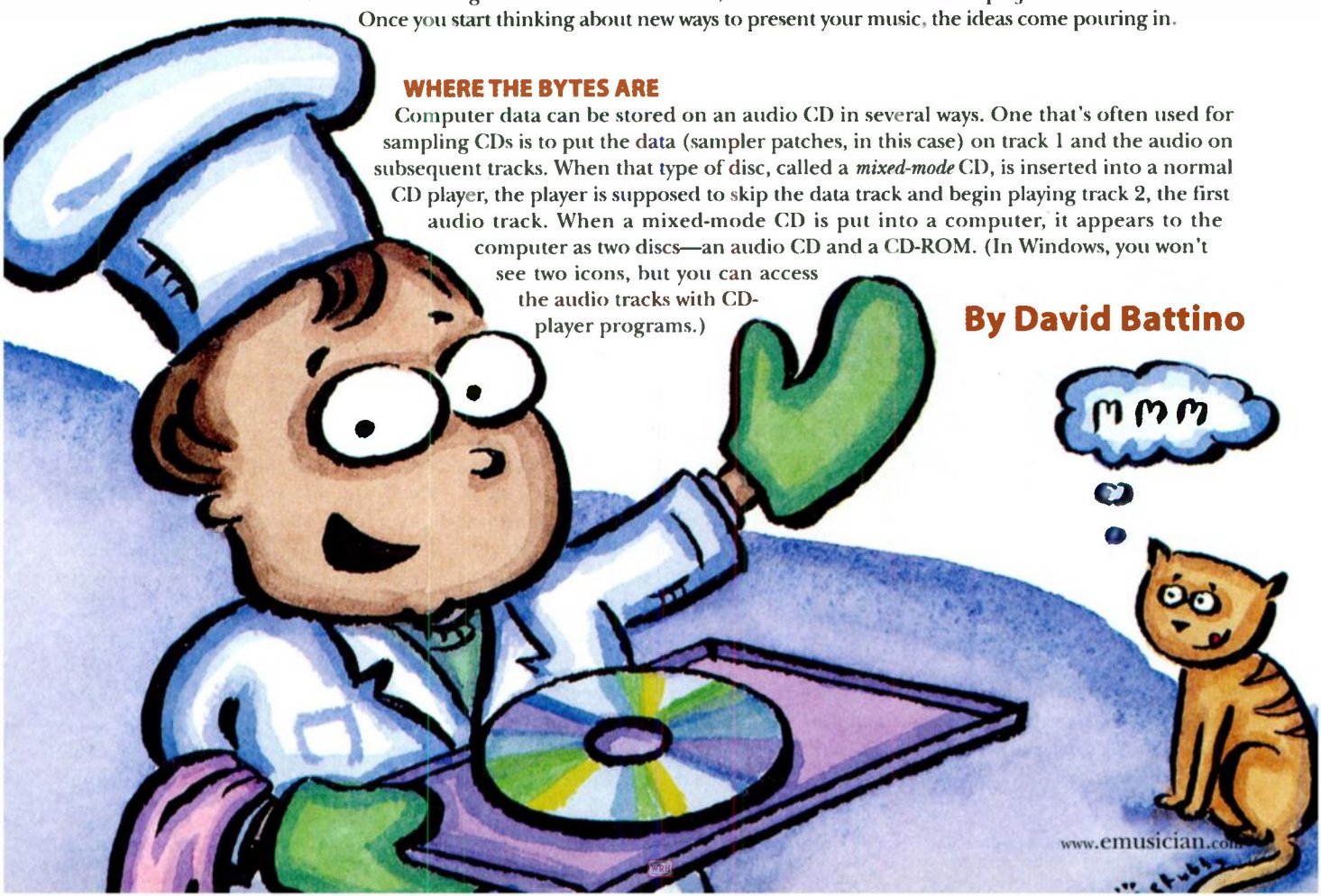
The possibilities are enormous. Instead of passing out a promo CD with your band's URL scrawled on the sleeve, you can put your entire Web site on the disc. Because even the slowest CD-ROM drives transfer data at broadband speeds, you'll be able to shower your audience with high-resolution graphics and audio without alienating modem users. You can even make your discs interactive, including hot links to your tour schedule, mailing list, and additional albums or sites. What's more, most replicators charge the same fee for pressing an enhanced CD as they do for a normal audio disc.

In this article, I'll explain how to create enhanced CDs on your home computer, reveal some pitfalls to avoid, and offer tips about what enhancements to include and how best to present them. Most of what I know I learned under the gun; I'd only had my burner for a few months when I was charged with producing the monthly enhanced CD for the largest music-magazine launch in U.S. history. I've since shipped nine enhanced CDs totaling more than 2 million units, and I was able to make each project better than the last. Once you start thinking about new ways to present your music, the ideas come pouring in.

WHERE THE BYTES ARE

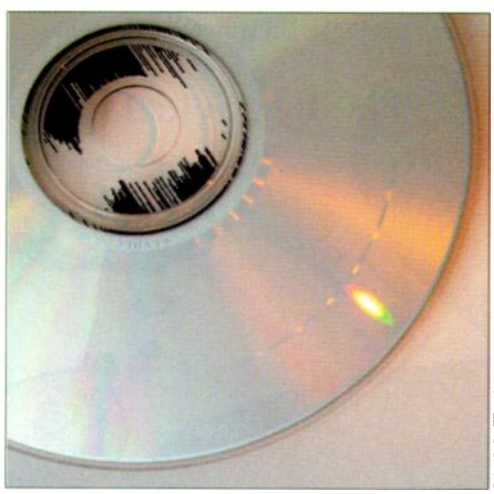
Computer data can be stored on an audio CD in several ways. One that's often used for sampling CDs is to put the data (sampler patches, in this case) on track 1 and the audio on subsequent tracks. When that type of disc, called a *mixed-mode* CD, is inserted into a normal CD player, the player is supposed to skip the data track and begin playing track 2, the first audio track. When a mixed-mode CD is put into a computer, it appears to the computer as two discs—an audio CD and a CD-ROM. (In Windows, you won't see two icons, but you can access the audio tracks with CD-player programs.)

By David Battino



Unfortunately, some older CD players aren't smart enough to skip the data track, so they play silence (or worse, ear-splitting static) instead of the first audio track. Other players offset the track numbers by one in their displays, so the numbers no longer match the printed tracklist. Sampling CDs still use the mixed-mode format because some samplers can't read *multisession* discs (discussed next), but it's best to avoid this format when making audio CDs. Roxio's *Toast*, the most popular CD-burning program on the Mac, actually displays a warning if you try to burn a mixed-mode CD.

The recommended way to structure an enhanced CD is in two *sessions*, with the audio tracks first and the data track second. A session is a physical division on a CD, a block of data that's bordered by *lead-in* and *lead-out* areas. When you close, or *finalize*, a CD-R, the burner writes data in those areas. If you look closely at a multisession CD, you can see the gap between sessions (see **Fig. 1**). Because audio-CD players can read only a single session, they will ignore whatever data you put in the second session. Computer CD-ROM drives (except for very old ones) will see both sessions.



DAVID BATTINO

FIG. 1: Like a record in reverse, CDs are written from the center out. On this multisession enhanced CD, you can see the audio session in the middle and the data session at the outside.

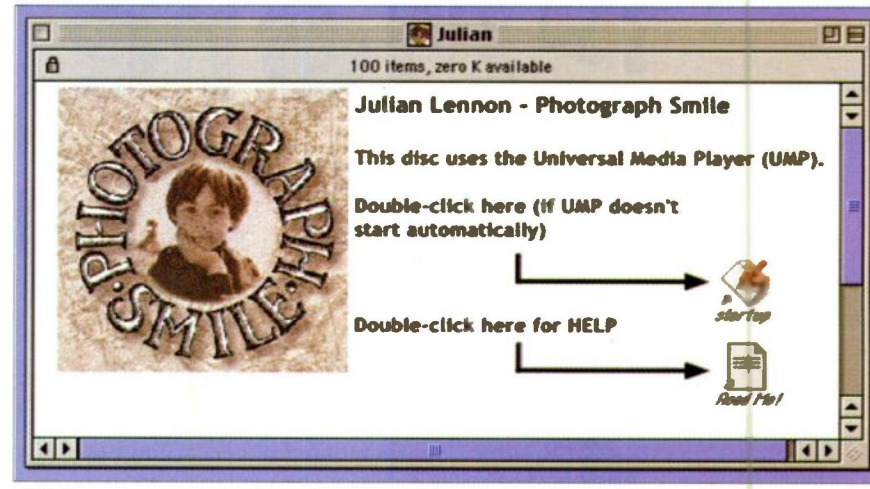


FIG. 2: When placed in a Mac, Julian Lennon's enhanced CD *Photograph Smile* launches a window with a background graphic made of overlapping icons.

To produce a multisession enhanced CD, you need software that can write the audio tracks in *Session-at-Once* mode, which finalizes the session without closing the CD. On the Mac side, Emagic's *WaveBurner*, CharisMac's *Discribe*, and Roxio's *Toast Titanium* and *Jam* can do that. In Windows, Roxio's *Easy CD Creator Deluxe* and Ahead's *Nero* (among others) will do the trick. Accessing that feature is sometimes as simple as pressing a button; in other programs, you'll have to hunt for a checkbox or an alternate menu command.

Once you've burned your audio session, your CD software should indicate how much space remains on the disc. Now it's time to add the data.

DATA FORMATS

The trickiest aspect of creating an enhanced CD is making it work on both Mac and Windows platforms, because the two use different file systems—ISO 9660 on the PC and HFS on the Mac. Fortunately, Macs can read ISO 9660 documents, so producing a basic cross-platform CD-ROM simply requires following the ISO 9660 naming conventions (see the sidebar "My Name Is True") and including only documents, not programs. Although that may seem limiting, you can actually do a lot with documents; a multimedia Web site is just a collection of text, graphics, and sound files. If you're putting a Web site on a CD, make sure its internal links are relative, not absolute. In other words, use the format href="mysite/index.htm" to point to a file in a folder called mysite, not href="/c|/mysite/index.htm". You have no idea what letter or name a viewer has assigned to the CD-ROM drive, so you need to specify a path that's relative to the file, not the drive.

You can include Windows programs (slide-show viewers, for example) on an ISO disc. If you burn the disc on a Mac and enable Apple Extensions, you can include Mac programs, as well. (Windows can't burn Mac programs without special software, which I will discuss later.) But using the ISO format has drawbacks. First, file names will be truncated to 8.3-character format on the Mac. Second, if you burn the disc on a PC, the documents may show up as generic files on the Mac, confusing the viewer or not opening when double-clicked. Third, you can't use custom window layouts, as in **Fig. 2.**

Because of those shortcomings, professional enhanced CDs are mastered in *hybrid* format, which combines an ISO part with an HFS part. Windows users see only the ISO portion, whereas Mac users see only the HFS one, though

Introducing the

PM-1 Powered Monitors

Listening doesn't need to be expensive. To understand how truely important accurate and clear sound is, you only have to go as far as the new Fostex PM-1 Powered Monitors. With 120 watts of biamped power, a bass response that's full and dynamic, and a high end that sizzles, you'll wonder how you can pay so little for so much. Priced at $499 MSRP, you can now have accurate and clear sound that is affordable as well. The PM-1 Powered Monitors from Fostex: just listen.

FOSTEX®

www.fostex.com

Fostex America, 15431 Blackburn Avenue, Norwalk, CA 90650, Tel: 582-921-1112 Fax: 562-802-1964

common files such as movies can be shared to save space. (Before burning the CD, you specify which files should be visible to each platform.) Because HFS is the Mac's native format, the CD behaves like a tiny hard drive—you can include programs, specify window layouts, and apply custom icons for complete creative control. I'll walk you through the process of creating a hybrid CD in a moment, but first, a word about the "official" enhanced-CD standard.

The original enhanced-CD specification was called the *Blue Book* standard. It required a specialized directory structure and set of files, including the notorious QuickTime Audio Containable file, or QuAC (pronounced "quack"). CDs produced to that spec are known as *CD Extra* or *CD Plus* discs and use the primitive-looking *Universal Media Player* to serve up graphics, movies, and Web links. But today it's hard to find a program to generate the required files. "Doing the QuAC file is totally useless," says Ty Roberts, a pioneering enhanced-CD producer (see the sidebar "Full Blue Book Value"). "Even though I wrote the Blue Book standard and that file is supposed to be on true enhanced CDs, it's not useful for anything, and no one's supporting those tools today. If you can get them to work, great. If you can't, don't freak out."

BUILDING THE DISC

Every enhanced-CD producer I've spoken with uses *Toast* on the Mac to burn hybrid discs, but Windows users can get in on the action, too. Surf to www.macdisk.com and download *MacImage* or *Hybridator*. The former is a comprehensive program that enables you to build hybrid discs with shared files, even embedding the codes that identify the files on the Mac. *MacImage* costs $55, but the downloadable demo version handles projects as large as 100 MB.

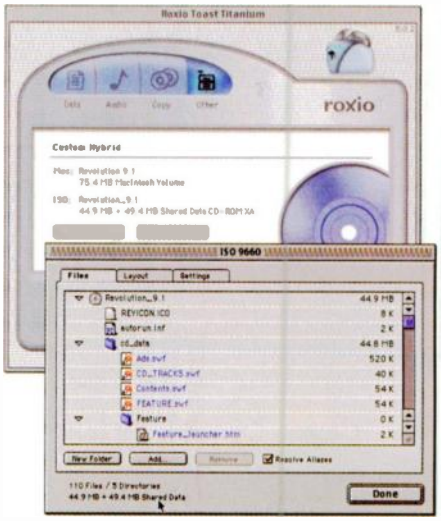


FIG. 3: The front window shows some files that will appear on the PC side of the hybrid CD-ROM. Items in blue are shared with the Mac side, saving space.

MY NAME IS TRUE

If you're not careful, differences in the ways operating systems handle file names can prevent your enhanced CD from running. To maintain strict ISO 9660 compliance, all files must have 8.3-character names and use only the uppercase letters A through Z, the numbers 0 through 9, and the underscore character. OPEN_ME.HTM or REMIX1.MP3 are legal names, for example. In addition, only eight levels of nested folders are permitted. Adhering to that standard, called ISO Level 1, will enable your files to be read on Windows, Mac, DOS, and UNIX systems.

If you're burning the disc on a Mac, you can get more control by enabling *Joliet* naming (see **Fig. A**), which supports names as long as 64 characters and any character except asterisks, forward and backward slashes, colons, semicolons, and question marks. Except for the colon, those are all legal characters on the Mac, which can cause problems if you burn a file with a date in the name—a QuickTime movie called 12/1/01 Concert.mov won't show up in Windows. Another issue is that Mac file names must be 31 characters or shorter; for one CD project, I was given a Windows program that relied on a data file with a 32-character name. The Mac truncated the name during burning, preventing the program from launching in Windows.

Although Macs can burn Joliet discs, they truncate file names on Windows-burned Joliet discs to 8.3-character format. Windows 3.1 doesn't support Joliet names, either. Those factors can potentially destroy any internal links you may have on a CD, such as <img> references in HTML documents. Programmer Thomas Tempelmann offers a superb extension called Joliet Volume Access (free from www.tempel.org/joliet) that enables Macs to read Joliet names as long as 31 characters. However, you cannot count on your audience having it. (Incidentally, the extension is handy for browsing WAV-file sampling CDs on a Mac.)

The moral? Stick with ISO Level 1 for best results; if you want fancier file names, burn the disc on a Mac with Joliet naming. Remember to include the crucial 3-character extension—for example, .htm or .mp3—that tells the PC what type of file it is. For the most elegant presentation, use the hybrid format described in this article, which presents Mac and Windows files as nature intended.

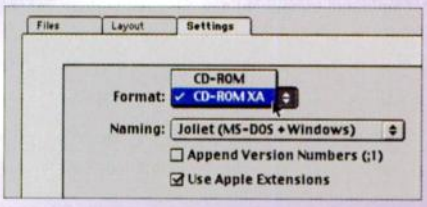


FIG. A: To preserve long file names when burning ISO 9660 discs on a Mac, enable the Joliet setting and Apple Extensions. You should also choose CD-ROM XA format if you are making a multisession enhanced CD.

It's the grooving, looping, 24-bit recording, drag and dropping, edit-while-you-play, don't-stop-the-music, real-time arranging, so-you-can-create software.

 start playing.

"Every now and then a program redefines what music is all about - like Sound Designer, Acid or Reason. Live is that kind of program. Its ability to record your performance for later editing successfully bridges the gap between stage and studio." **Craig Anderton**

live. sequencing instrument

- record, loop, effect, resample, launch sounds without stopping the music.
- independent control of time and pitch.
- improvise live, log your actions, edit later.
- all files sync automatically.
- Supports VST plug-ins, ReWire, ASIO, Direct X, and Sound Manager.
- Input ReWire programs like Reason, process with VST plug ins, and record the audio into Live.
- control every function with MIDI and hotkeys.
- Mac OS and Windows supported.

ableton

Visit your local dealer or download your demo at www.ableton.com.

live

www.midiman.net/live1/em

Distributed exclusively in the US, UK and Canada by MIDIMAN, Inc.

Hybridator is a free utility that can mount HFS volumes (disks) or files and incorporate them into a hybrid CD, though the files won't be shared. The MacDisk site is well worth visiting even if you're a *Toast* user, because it's packed with information about making cross-platform CDs.

Making a hybrid CD in *Toast* involves several steps. The first is to create a Mac volume, which can be a removable disk such as a Jaz or Zip, or a temporary partition on your hard drive, which you can create with *Toast* itself. Because the entire contents of the volume will be burned to CD (including any files in the trash), it's important to set it up exactly as you want it to appear. Give the volume a descriptive name. Select Get Info from the File menu, click on the icon in the box that opens, and paste a custom icon on top of it. Open any folders you want to show the audience and line up their contents. For an elegant effect, use a program such as *Iconizer Pro* (www.naratt.com) to assemble a background picture out of icons.

Once your volume is set up, drag it to the main *Toast* window. Next, drag any files and folders you want to put on the ISO (PC) side of the CD to the window. If the items reside on the Mac volume, they'll be shared automatically. If they reside on a different volume, they won't show up on the Mac side. That is confusing at first, because it seems like you're putting two copies of some files on the disc, but *Toast* highlights the shared items to make it clearer (see **Fig. 3**).

Click on the Select ISO button and configure the ISO side for Joliet naming, Apple Extensions, and CD-ROM XA

FULL BLUE BOOK VALUE

As part of the QuickTime 1.0 team back in 1991, Ty Roberts was one of the first people to see the potential of combining multimedia and music. Not only did he help develop the enhanced CD format but he also produced some of the most innovative and artistically successful discs, including Todd Rundgren's The Individualist, the Residents' Gingerbread Man, and Primus's Tales from the Punchbowl. Frustrated by the record industry's inability to grasp the benefits of enhanced CDs, Roberts is driving the concept in a new direction: onto the Web.

As chief technology officer of Gracenote, the online CD database service (www.cddb.com), Roberts oversees a technology called CDKey that matches CDs against Gracenote's million-album database and enables listeners to access hidden Web sites containing bonus tracks and other material. (CDKey is currently marketed only to record labels, but Infotects, the other partner in the operation, is considering offering it to independent artists. Contact them at CDKeysales@infotects.com if you are interested.) I asked Roberts to reflect on the past and future of the enhanced-CD format. (For a longer version of this interview, visit www.emusician.com.)

"What we really were trying to do was build the ultimate liner-note experience," Roberts said of his early releases on his Ion label. "Initially with David Bowie's product [Jump], we weren't able to do that. Our idea was, 'Take all the ancillary marketing materials and turn them into a CD-ROM.' It was a mistake on my part to think that would be interesting.

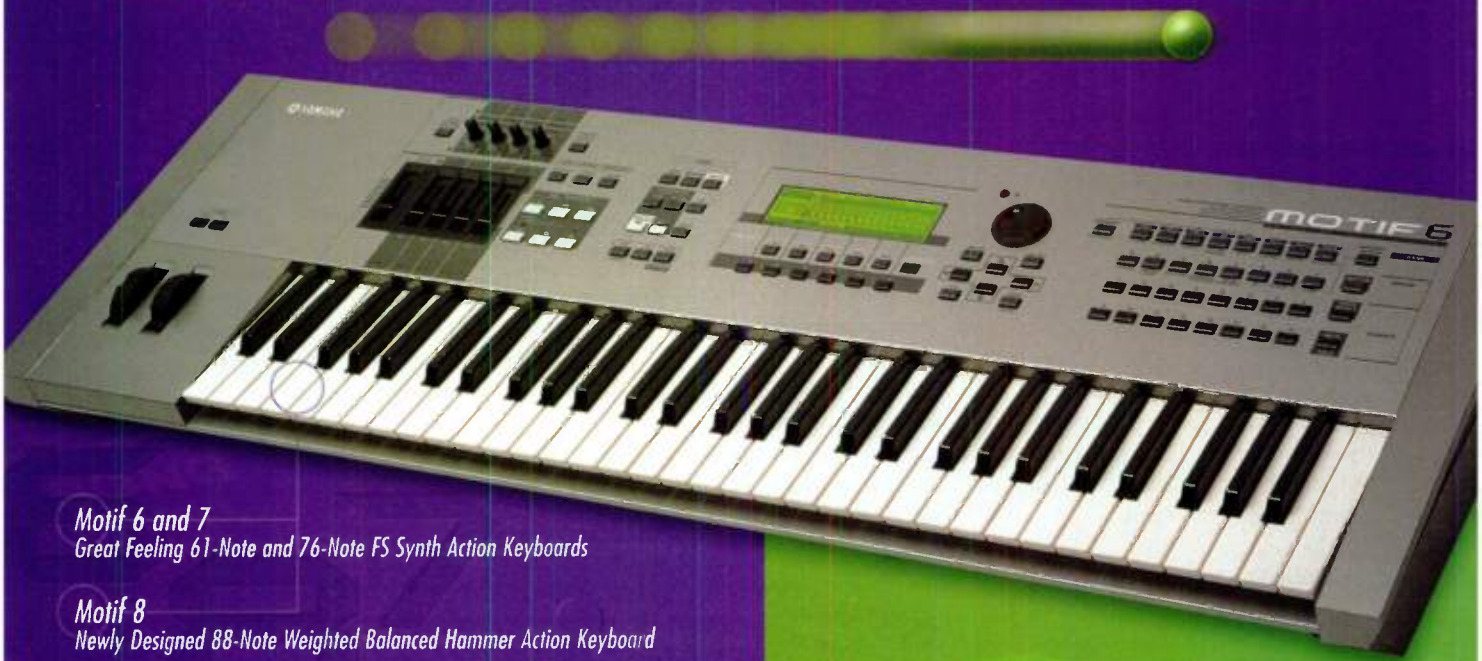
"What came later was being able to work directly with the artist to create something original and that complemented the music visually. Essentially, we animated every song. There was a world to explore, and it was all oriented around the music. One of the coolest things we did was give Les Claypool [Primus] a notebook and ask him to doodle in it. Scanning that in and letting the fans flip through it—so when you flipped the page it would synchronize with a song—was absolute magic. And it was extremely simple from a programming perspective.

"The problem [after the first enhanced CDs came out] was that unless the recording industry could prove it was going to sell more CDs by putting the stuff on there, there wasn't any financial justification to doing anything elaborate. What happened very quickly was that the enhanced CD became purely a way to collect an e-mail address. So today, although some enhanced CDs contain some interesting graphics and interactivity, they have the most minimal amount, which is about the equivalent of what someone would invest in a Shockwave animation on a Web site.

"It's kind of a shame. The recording business has not really been thinking about how to enhance its product other than enhancing the audio quality. It does these remastered box sets, and that stuff is cool. But it has done a very poor job in comparison with the movie business. Look what's going on in DVD for $19. It's something that cost hundreds of millions of dollars to make, made by thousands of people, for years. Also, the actual original producers, actors, and artists talk and describe every aspect of it, and you get all the outtakes and sketches. All that results in a product that consumers can buy for $19, and which, if you look in any consumer poll, they think is the greatest thing they've ever seen.

"Where is the record business with a thought process like that? The record has not evolved at all. That's something I think will happen. And if it doesn't happen because the record business does it, it'll happen because the artists do, as they watch their product become less competitive."

The Shortest Distance Between Inspiration Creation



Motif 6 and 7
Great Feeling 61-Note and 76-Note FS Synth Action Keyboards

Motif 8
Newly Designed 88-Note Weighted Balanced Hammer Action Keyboard

At Yamaha, we believe that making music shouldn't be work. So we designed the Motif Music Production Synthesizers with two goals in mind–inspiration and creation.

First, they were designed to inspire. Their sounds were hand tailored by top sound design professionals from around the world. So whether it's an exacting replica of an acoustic piano for a Hollywood film score or a cutting edge sound from the clubs of London, these sounds were made by people with a passion for sonic perfection.

Next, we know that moments of inspiration need to be captured immediately. So all the tools for a complete music production are right at your fingertips. The features of the Integrated Sampling Sequencer, the hands-on user interface and the built-in rhythm patterns, arpeggios and mixing templates were all focused on one goal. Letting you create your music the way you want with the fewest technical obstacles.

So if you want to be on the leading edge of music production, check out these websites for more info and then check out Motif at a Yamaha dealer near you.

YAMAHA
CREATING 'KANDO' TOGETHER

YAMAHA DMI
DIGITAL MUSICAL INSTRUMENTS

www.yamahasynth.com
www.motifator.com

MUSIC PRODUCTION SYNTHESIZER

MOTIF

Synthesizer
- –64 Note AWM2 Synthesizer with a Huge 85 MB Wave ROM*
- –668 Great Sounds and 65 Killer Drum Kits

Integrated Sampling Sequencer (ISS)**
- –111,000 Note, 16 Track Integrated Sampling Sequencer
- –4 MB of On-Board Sampling Memory (expandable to 64 MB)
- –Real Time Recording of Pattern Chains, Track Mutes and Song Scenes
- –Automatically Syncs Loops of Different BPM
- –Imports Akai & A Series CD-ROMs with Program Parameters and Wave & AIFF Sample Formats

Control Surface
- –16 Track Buttons for Track Selection, Muting and Soloing
- –4 Physical (16 Virtual) Knobs and Sliders for Hands-On Mixer Style Control
- –Templates for Control of Cubase, Logic, Cakewalk and Pro Tools

Storage
- –Built-in SmartMedia, USB and Newly Designed SCSI Interface for Convenient Data Backup

Expansion
- –3 PLG Board Slots to Expand Polyphony, Effects and Synthesis Types
- –AIEB2 and mLAN Slots to Expand Digital and Analog I/O

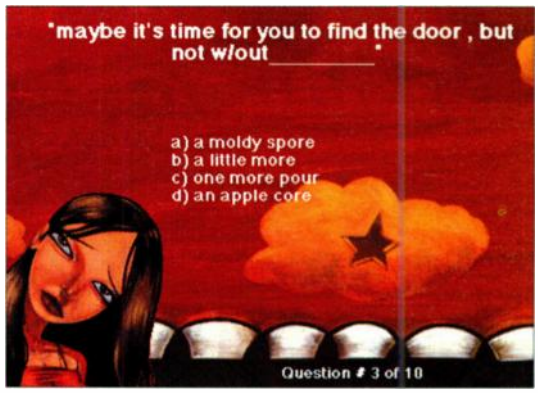
* When converted to 16-bit linear format

format. Finally, click on the Select Mac button and enable "Optimize on-the-fly," and then click Record. Within minutes, you'll have a cross-platform enhanced CD. If the process seems convoluted, you can hire a service such as Disc Makers (www.discmakers.com) to do it for you. The company charges $275 to merge an audio CD and a CD-ROM into a hybrid enhanced CD. If you go that route, provide detailed instructions for the mastering engineer to ensure the files are laid out the way you want.

ROM WASN'T BUILT IN A DAY

Now that you know how enhanced CDs are structured, what kinds of media does it make sense to include? The short answer is anything you think will enhance your music. Some appealing items are Web links, e-mail links, contact info, bios, photos of your inspirations, lyric sheets (especially scans of early drafts), "behind the music" commentary, interviews, videos, bonus MP3 tracks, remixing applications, and Web sites (great for promo discs). Also consider including band-themed *Winamp* skins, screen savers, and desktop photos. You need to have the rights to distribute anything you put on your discs.

You can present those items in numerous ways. Your CD-burning program likely came with an application that can transform a folder full of graphics into an HTML slide show or a QuickTime movie. Many commercial enhanced-CD interfaces are built with Macromedia *Director* or *Flash*, but those programs are expensive and complex. Although I haven't used it, an inexpensive Windows program called *Swish* (www.swishzone.com) can be used to create HTML-based Flash animations. One of the most intriguing multimedia playback programs is the new *QuickTime 5 Player*, which supports embedded skins and runs on Mac and Windows. You can launch it from an HTML document so it floats above the Web page (see **Fig. 4**). Apple will let you include Mac and Windows QuickTime installers on your discs for free if you fill out a licensing agreement; see www.apple.com/quicktime/products/legal for details.



Produced by www.duckmusic.com, the Drunk Stuntmen's enhanced CD links out to the Web to update its content, such as this trivia game and a tour schedule. Band members can update the text online.

POLISHING THE PRESENTATION

Many CD-ROMs exploit the Windows Autorun feature or its Macintosh equivalent, QuickTime AutoPlay, to launch a program or a file automatically when a disc is inserted. That saves the viewer from having to burrow into a folder to locate the right file. But automatically launching a file on an enhanced CD can be annoying, because many computers play audio CDs upon insertion, causing two programs to fight over the disc. It is also probable that your audience will want to play the music side of the disc more frequently than the interactive side, so forcing them to view the latter is rude.

If you do want to launch something automatically on the Mac, it's a simple matter of specifying the file in your CD-burning program. Note that the file must be at the root level of the CD, and you must burn the CD in HFS mode. In Windows, you have to create a text file named autorun.inf at the disc's root level. In it, you might write:

```
[autorun]
open=progname.exe
icon=graphics\myicon.ico
```

That will launch the program called progname.exe in the same directory as the autorun file and apply the icon myicon.ico from a folder called graphics to the CD icon. (You locate icon-making programs at www.download.com.) To launch a file that is called mysite.htm instead, substitute the following line for the progname.exe line:

```
open=explorer.exe mysite.htm
```

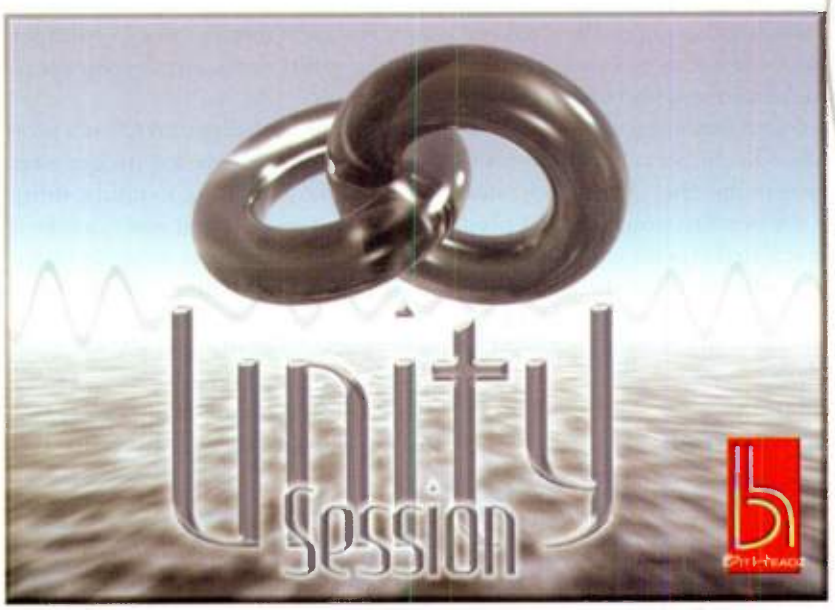
A gentler approach is to put only the icon command in the Autorun file. You could also include a command that opens a folder containing the files you want to present. The syntax for that is:

```
open=explorer.exe foldername
```

Because many computer users disable the Autorun feature, it's considerate to include a plain-text Read Me

FIG. 4: Apple's *QuickTime 5 Player* offers a fantastically flexible way to present your multimedia files. It can be launched from an HTML window and given custom embedded skins. Two players are shown here.

Obsession.



Unity Session is the cumulative effort of over a decade of planning. Even back when a Mac could barely beep, we knew this day would come. A day when you could hold a super-computer in one hand and score films with the other.

Unity Session combines the functionality of hardware samplers, analog synthesizers, and physically modeled instruments with the operational and visual ease of a Mac.

Unity Session is so pure in sound, and so rich in texture because it's a tool totally dedicated to the art of creating music. BitHeadz has united the acoustic past with the electric present to bring you the virtual future of sound generation. Let our obsession become your inspiration.

- Plays Unity 2, Retro 2, Gigasampler™, DLS, WAVE, AIFF, SoundFont 2.0, 24-bit Sound Designer II, and SampleCell II on the fly
- Imports CD-Audio, Akai™, 'live' audio, and Roland™
- True phase-locked stereo signal path throughout
- Full synth engine with multiple filters & modulation routings
- 2 insert effects per channel, plus two send, & two global FX with multiple effects types
- Gigabytes of sounds including physical models, loops & GM
- Stream samples from disk or from RAM as you define
- Built in sample editor/recorder
- Mac OS 9 and OS X
- $649.00 suggested retail price

Built for Mac OS X

Optimized for G4 with Multiple Processors and Velocity Engine

BitHeadz Inc.
2850 S. County Trail
E. Greenwich, RI 02818
Toll Free (888) 870-0070
Phone (401) 886-7045
http://www.bitheadz.com

BitHeadz

file. You can also ease navigation by making support files invisible, either in the CD-burning program or (in Windows) by right-clicking on the file, selecting Properties, and checking the Hidden box. Test the disc on multiple computers to make sure that hiding the files doesn't cause any problems. It is also wise to test your disc on other people. If you find yourself grabbing the mouse to show them how to run it, you probably need to rethink the design.

Remember that you're making a computer disc, so scan for viruses before doing the final burn. Carlo Florio, a mastering engineer at Disc Makers, says that years ago, Kiss's *Psycho Circus* almost left the plant with a virus on it because a previous project had infected the mastering computer. Disc Makers' computers now scan every disc the moment it's inserted, and the company has had no trouble since.

Finally, don't forget to burn a few backup copies of the disc, or better, the disc image. On my first enhanced-CD project, which had a press run of 500,000 copies, FedEx destroyed the master disc on its way to the plant. I sent two backups by different couriers, and one of those didn't arrive.

IT'S SHOW TIME

Record albums used to come with posters, stickers, and (perhaps most compelling) enough space for evocative and detailed graphics. Although the transition to compact discs has brought a lot of benefits, one of the losses has been that wide canvas. With emerging music-delivery formats becoming more compact—witness the coin-size DataPlay disc at www.dataplay.com—or even completely immaterial (think MP3), now is a great time for you to consider adding multimedia enhancements to your music.

Producing an enhanced CD is a powerful yet inexpensive way to get your message out, and the exciting thing about the format is that you can take it as far as you want, from a simple folder of JPEGs to a sprawling virtual world. Tony van Veen, who's seen quite a few of the silvery platters as a vice president at Disc Makers, says, "There seems to be a mystique about preparing enhanced CDs, but it's really not that hard."

David Battino *is the editor of* **EM***'s* 2002 Desktop Music Production Guide. *His favorite enhanced-CD trick is to use the AutoPlay feature to trigger rude noises.*

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

DSP2000

See it, Hear it, Believe it!

C-Port

$449 Estimated street price

Includes LOGIC SOUNDTRACK 24 software!

What the experts are saying:

"The C-Port is by far the best value for money sound card I've yet seen." - **Next Music Magazine (Australia).**

"A buyer would be hardpressed to find greater I/Os, more driver support, plus no-latency monitoring at a lower price." - **PCRecording.com (USA).**

"The best budget ASIO multi I/O audio & midi complete system you can buy for your PC." - **DANCETECH (UK).**

24Bit 96kHz
10 in, 10 out
2 mic preamps
Phantom Power
Digital I/O
Headphone amp
32 Channel MIDI
Ultra Low Latency

The STA Range also includes the following great products:

ADC III
8 Channel A/D Converter

ADC : 96Khz 24-bit, Dynamic range 120dB
8CH MIC& Line PRE-AMP : -12dB ~ 40dB,
8 volume controls
8CH Phantom powered supporting 48V
ADC to S/PDIF digital output
8 XLR jack (MIC or balanced input)
Four 1/4" jack (Line-in)
Power On/Off switch

DAC III
8 Channel D/A Converter

DAC : 96Khz 24bit
(120dB Dynamic range)
Digital input : 8CH Digital inputs
S/PDIF - AES/EBU(XLR), Optical, Coaxial in
Output : 8CH balanced output
(8 XLR connector)
and four stereo outputs(1/4" jack)

DMod III
Multi Digital I/O

Digital Audio Sample rate Converter : CS8420
8 kHz ~ 96kHz sample rate range
Four S/PDIF(Optical & Coaxial) and AES/EBU(XLR) I/O
120dB Dynamic Range
-117dB THD+N at 1kHz
Standard MIDI In/out port
44*44 pin D-sub cable

NEW SRC-VI
Digital Patch Bay

- digital patchbay/switchbox for up to 6 AES/EBU and S/PDIF signal streams - high quality realtime sample rate convertion (bypass possible) - digital signal distribution - master clock generation (WordClock out)
- signal convertion (AES/EBU <-> S/PDIF) - signal repeating to extend the max. length of digital connections

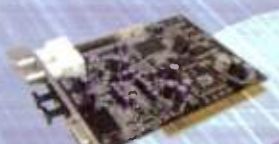
DS2000
ADAT T/DIF rack

ADAT Multi-Channel Digital Interface
TOSLINK fiber optic connector
TDIF via the 25pin D-Sub port
S/PDIF(Optical/Coaxial) & AES/EBU
ADAT Synchronization Interface
Word Clock (via BNC)
8-channel synchronous at 16-, 20- or 24-Bit

DSP VALUE

our new and very affordable professional 24bit/96kHz recording solution. This card is probably the most affordable 24bit/96kHz recording solution on the audiocard market today. The card is based on the hard- and software of the existing and sucessful DSP24 series of products.

DSP24 ADAT



Introducing the new DSP24 ADAT card
An affordable solution for interfacing your ADAT compatible hardware (digital mixers, digital tape machines, synthesizers, etc.) with your PC - a product based on our successful DSP24 series of cards. Besides ADAT the card includes: 24bit/96kHz S/PDIF I/O - analog output for monitoring (24bit/96kHz AKM DAC) - WordClock I/O (BNC connector) - internal or external sync supported - 1 MIDI input (16 channels), 1 MIDI output (16 channels)

Available at

Distributed by KAYSOUND
5 Coton Lane, Champlain, NY 12919
2165 46th Ave., Lachine,
Quebec H8T 2P1 1-800-343-0353
www.kaysound.com

www.marsmusic.com
MARS MUSIC
the musicmaker's destination

Musician's Friend
1-800-776-5173
www.musiciansfriend.com

www.STAUDIO.com

DESKTOP MUSICIAN

Windows Washing

Make your Windows sparkle and shine.

By David Roach

Say you've just purchased or inherited a PC that you want to dedicate to audio and music production, but the computer came with all kinds of software already installed on it. You're hesitant to get rid of too much, and you're not sure what you can do without or whether any of that extra software will conflict with your musical needs. Well, don't just stand there! It's time to tune up Windows for music and audio.

BRUCE MACPHERSON

The first thing you must decide is whether to configure the computer from scratch (which requires basic computer knowledge and determination) or whether you just want to optimize an existing setup. If you're able to configure a computer from scratch, then you can consistently maintain the highest possible performance and customization, but at some cost in time and effort. If you're less adventurous, there are still several things you can do to make your system work better. You should also decide if your computer is to be dedicated to audio alone or if it must be available for other tasks.

If your computer has been used previously, Windows may be less than reliable. A clean installation of the operating system is always the best plan to ensure stability. If you're not up to installing a fresh copy of Windows, however, I'll suggest a few strategies that can make your existing installation more streamlined.

MANY SHAPES OF WINDOWS

All versions of Windows are not created equal. Besides the differences among the standard versions—Windows 95, 98, NT, 2000, ME, and XP—Windows can be configured in a number of ways by computer manufacturers. Keep in

Push the envelope.

Feel the future of technology.

Move in a new direction.

As an instrument it could not have existed until now.

As a control surface its language is 3 dimensional.

As a tool it is boundless.

SURFACE ONE™

Surface One is a completely unique virtual control surface that uses a fiber optic touch-sensitive material as its primary interface. The user-configurable trigger objects can represent virtual faders, buttons, and knobs, and can be linked to multiple messages. All objects can be assigned to any MIDI commands. Surface One introduces no latency to your MIDI messages, and is compatible with any MIDI-compatible software programs or hardware.

USB MIDI

Features include: • 8 virtual pads, which can be subdivided into 5 individual triggers, offering a total of 40 objects • 11 virtual buttons • 16 knobs with 360 degree rotation • 2 in/2 out MIDI operation • USB compatibility • Functions with and without a computer

midiman

M POWERED. 800-969-6434 • WWW.MIDIMAN.NET/S1/EM • EMAIL: INFO@MIDIMAN.NET

mind that there is a significant difference between upgrade and full versions. The upgrade usually requires an earlier version of Windows to be installed and probably can't be used to configure a computer from scratch. (Not all Windows CD-ROMs tell you whether you have a full or an upgrade version.)

Computers from industry leaders such as Dell, Compaq, and Gateway come preconfigured and include a restore CD that can get you back to a baseline setup if your system crashes. Technical support from those companies may require that you use the configuration that they supplied or else you won't get software support.

If you have a restore disc, you may not have the option of configuring the computer from scratch. (For that you'll have to purchase the full version of Windows.) Furthermore, restore CDs are often locked to the motherboard with which they were delivered and will not work on another computer model.

Restore CDs typically offer two options. One is to format the hard drive and reconfigure it to the way it came from the factory; the other is to reinstall Windows without wiping out your existing data. Simply reinstalling Windows does not perform a clean sweep; most of the previous settings remain. The only way to start clean is to reformat the hard drive, restore the software from the CD, and then clean out all the extra applications that the restore disc installs.

WARNING: Back up any critical data before trying the techniques described in this article. Better yet, experiment on a computer that you can afford to mess up temporarily, in case things go wrong.

FIG. 2: For best performance, disable devices that aren't used for music and audio, including network cards, scanners, and fax modems. Don't use the Remove button to disable a device, because the device will return the next time you start Windows.

START SCRUBBING

Assuming you're not starting fresh with a clean system, the first step is to weed out stuff that is already installed. **Fig. 1** shows the Add/Remove Programs control panel on my computer. Programs listed in this control panel can be removed by selecting them and then clicking on the Add/Remove button. Unfortunately, it's not always clear what every entry in this panel is.

Some applications, such as QuickTime, have no impact on your system until you actually run them. If you remove those programs, you can recover some disk space, but that's the only benefit. Other applications, such as virus checkers, typically run in the background continuously and cause disk or CPU activity that might directly conflict with audio tasks. It's a good idea to disable those programs when running your audio applications so they don't surprise you during a hot recording session. You should also consider removing them if you're sure about what function they perform.

Keep in mind that when you install Windows from scratch, no programs should appear in the Add/Remove Programs control panel. However, the moment you begin to add new software, new entries will appear. You might even end up with items in the control panel once you add new hardware; after installing a new multifunction printer recently, I wound up with several new entries that I didn't know were being installed!

Even if you remove everything from the Add/Remove list, you won't do permanent harm to Windows. You can probably live without most things that appear in the list, and in the worst case, you can reinstall anything that is needed by some component of your system.

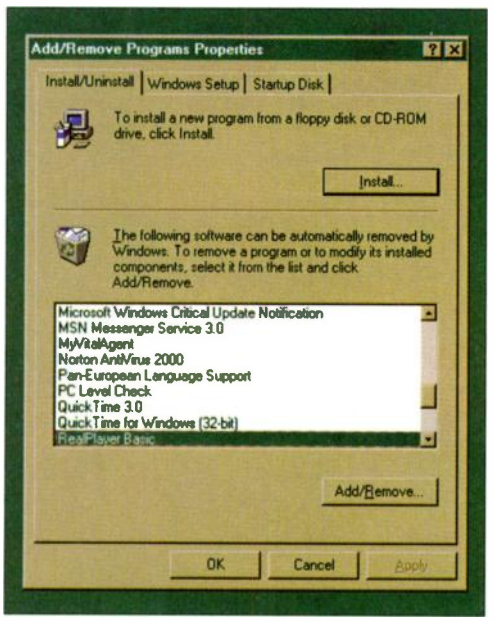


FIG. 1: Unnecessary software can be uninstalled with the Add/Remove control panel by clicking on the Add/Remove button. If you're not absolutely sure you need a program, consider getting rid of it.

DICEY DEVICES

The Device Manager section of the System control panel shows the hardware devices that are installed (see **Fig. 2**). Go through the list and disable all hardware devices that you're not using for music and audio production. You can disable devices by double-clicking on their names in Device Manager and checking the "Disable in this hardware profile" checkbox. (Don't use the Remove button.)

Especially consider disabling scanners, onboard sound chips (unless you are using them), Ethernet cards, and modems. If you've inherited your computer, check to see if it has any

WAVES

New RESTORATION

Software bundle establishes a new standard for restoration and noise reduction.

Fast and incredibly simple to use, providing real-time feedback.

Ideal for music, post-production and forensic professionals.

X-NOISE

Intelligently learns from a section of noise and then applies broadband noise reduction.

X-CLICK

Effectively removes clicks from vinyl records as well as digital spikes.

X-CRACKLE

The 2nd stage in record restoration eliminates crackles and surface noise.

X-HUM

Removes ground loop hums, rumbles, microphone pops, and DC-offset.

See your WAVES dealer. Free 14-day demo at www.waves.com.

North and South America
Waves Inc., 306 West Depot Ave., Suite 100, Knoxville, TN 37917 USA, Tel: 1-865-546-6115, Fax: 1-865-546-8445
Rest of the world
Waves Ltd., Azrieli Center 1, Tel Aviv 67011, Israel, Tel: +972-3-608-1648, Fax: +972-3-608-1656

WAVES

FIG. 3: Applications in the StartUp folder are launched each time Windows is started. This folder is empty when Windows is first installed.

unrecognizable PCI cards and remove them, as well (they might be causing subtle interrupt conflicts). Make sure that all hard drives and CD-ROM drives have the DMA box checked. If you have installed a new hard drive or reinstalled Windows, it is almost certainly not checked. Checking the DMA box in your disk drive Settings menu can make a huge difference in the number of audio tracks that you can record. If it's not checked on all drives, audio and MIDI glitching may occur. I've heard reports of three- to fivefold increases in maximum hard-disk tracks when DMA is checked.

MUSICAL DEDICATION

If you're going to use the computer only for music and audio and you're not going to be on a network, consider getting rid of things such as virus checkers, screen savers, Internet applications, and so forth. You may need a browser to read program documentation, however, and a virus checker can protect you from an attack through a floppy disk or CD-ROM. If the computer will be on a network or you frequently surf the Net, you'll probably need to keep many of these programs. Try to minimize the number of applications that run automatically, however, and definitely disable your virus checker before starting your session (and also before installing any new software, by the way).

Once you've gone through all the steps I've listed previously, restart the

computer. When it's fully restarted, hold down the Control, Alt, and Delete keys at the same time; the Close Program dialog box will appear. It shows the various programs that are running. If a program's name is cryptic and you're not sure what it is, try searching for files with that name. When you locate the program, you can right-click on it and select Properties to see who wrote the software and possibly to learn a little bit about what it does. Systray and Explorer should be present, but anything else you see in the Close Program dialog box is an application that is running.

The general rule is don't let anything else run while you're doing audio. If the Close Program dialog box shows applications running that you didn't start, then Windows must have started them. Cancel the Close Program dialog and right-click on the Start button. Select Explore from the pop-up menu. That opens Windows Explorer with the Start Menu Programs folder selected. Open the Programs folder and then locate and open the StartUp folder (see **Fig. 3**).

Any application or shortcut that appears in the StartUp folder launches automatically every time Windows starts. For a really clean system, the folder should be empty. If you see a program, ask yourself if you really want that application running in the middle of a recording session. Then remove it.

FindFast, installed by Microsoft Office, is a real problem. It detects things so quickly because it constantly checks your hard drive for changes, creating a search index as it goes. That can result in quite a lot of unexplained disk activity, certainly not the kind of thing you want happening during your next session.

A clean installation of Windows is always the best for stability.

BUSY SCHEDULE

The Scheduled Tasks application allows you to launch programs, such as disk-scanning and defragmenting utilities, at regular designated times. But do you really want a disk scan to start up at 5 A.M. during a crucial all-nighter? If you're not sure of your work patterns, that could be a real headache.

One of your goals is to make sure that the hard drive doesn't activate except when you expect it to. If the hard drive continuously makes noises when the computer is just sitting there, then you have some background applications running or the computer is swapping out data, which can be a sign that you have too little RAM. For music and audio, as in other areas, the more RAM, the better.

The Scheduled Tasks window in **Fig. 4**

includes a virus scanner and three different Web update schedulers. The virus scanner searches every file on your hard drive at scheduled times—not good. The other items are Web update sniffers. They log on to the Web as scheduled and look for recent updates. If they locate an update, they open a dialog box. That is clearly not a good thing in the midst of a recording session. Removing all scheduled tasks is probably the cleanest and safest approach.

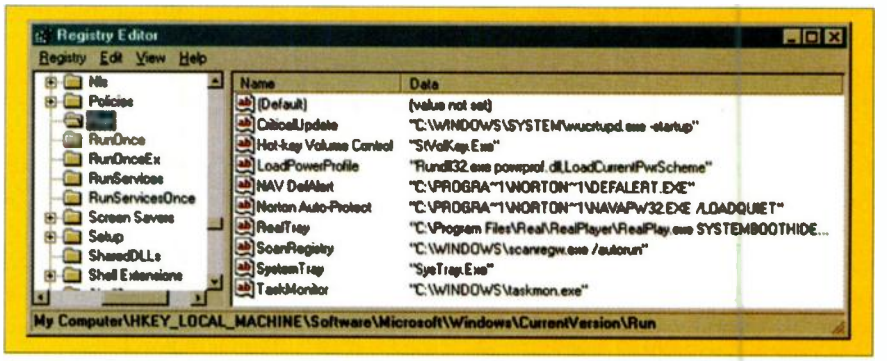


FIG. 5: When it starts, Windows launches programs based on a list stored in the Registry.

REGISTER TO RUN

Once you've cleaned out the StartUp folder and Scheduled Tasks window and rebooted the computer, you should be free of most background applications. However, if you still see programs in the Close Programs dialog box when you press Control + Alt + Delete, Windows is launching those programs from the Run and RunServices sections of the Registry.

View the Registry by left-clicking on the Start menu and selecting Run. Next, type REGEDIT into the dialog box that appears. After that, navigate through the folders to HKEY_LOCAL_MACHINE\Software\Microsoft\Windows\CurrentVersion\Run.

In **Fig. 5**, you can see that *RealAudio Player* is launched and hidden at startup. It's running 100 percent of the time. In this example, you could uninstall the RealPlayer Basic package shown in **Fig. 1**; the Registry entry would then disappear.

In a fresh installation of Windows, there is little or nothing in the Run folder. Applications that you find in the Run folder are typically part of something that has been installed and therefore can be uninstalled, removing the associated Registry entries in the process.

If you can't figure out which application has inserted a particular entry and if you have nerves of steel and aren't afraid to edit the Registry, you can remove any entry in the Run folder by right-clicking on the object and selecting Delete. That operation, however, has no Undo. (You should back up the Registry before attempting any type of edit.) The RunServices folder also launches applications, such as the scheduler for Scheduled Tasks, but it's used much less than the Run folder. You should have a good reason to remove an item from the RunServices folder before you do so.

SHATTERED WINDOWS

Although Windows ME and XP include new safeguards to prevent accidentally trashing Windows, it's still easy to completely ruin your Windows installation by messing around in the wrong places or by installing applications and hardware that conflict with each other.

Disk-imaging programs, such as Symantec's *Norton Ghost 2002* (www.symantec.com) or PowerQuest's *Drive Image* 5.0 (www.powerquest.com), allow you to save the entire Windows installation and hard-drive configuration as one large file. You can then save it on your hard drive or on one or more CDs. It's difficult if not impossible to back up and then restore a complete Windows installation unless you have a disk-imaging program.

PowerQuest's *PartitionMagic* 7.0 lets you establish as many as four boot partitions, so you could have Windows ME configured for music applications and Windows 2000 configured for business applications, both running on the same computer and not interfering with each other.

STAY CLEAN

In a nutshell, if you're really serious about setting up a lean, stable system for music and audio, your best bet is to install a fresh copy of Windows on a clean partition and then install the applications that you will be using. Once you get everything working properly, use a disk-imaging program to save an image of the C drive to another hard drive or CD. Later, if the system becomes sluggish or unstable, you can restore to the previous image. As a general rule, try to minimize the number of other things the CPU is expected to do if you want to attain maximum audio performance from your computer.

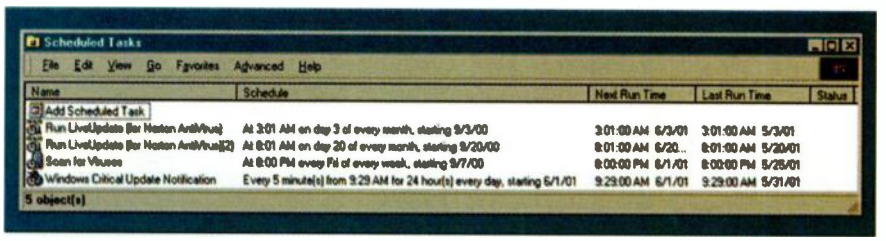


FIG. 4: Scheduled tasks are launched at the designated time. If they cause unanticipated disk activity or if they open unexpected dialog boxes, turn them off.

When he's not playing reggae or New Orleans funk, **David Roach** *designs real-time host audio applications, ranging from soft synths to voice recognition.*

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

Electribe • A
Analog Modeling Synthesizer

AND THE BEAT GOES ON AND ON AND ON...

Electribe • R
Rhythm Synthesizer

check out the demos at www.korg.com/electribe

Electribe • S
Rhythm Production Sampler

Electribe • M
Music Production Station

The beat never stops, never pauses and never dies. Not with KORG's four different and distinctive ELECTRIBES. Used together or alone, they're everything you need to create cutting-edge sounds, high velocity rhythm patterns and extreme grooves.

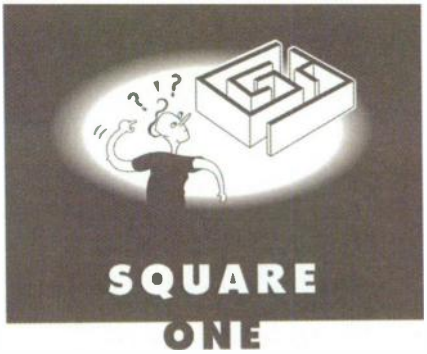
Experience them for yourself at www.korg.com/electribe then sign up for our monthly SWEEPSTAKES to win a Free ToneWorks PXR4 Digital Recorder!

ELECTRIBE. PLAY TO WIN.

KEYBOARD KB AWARD KEYBUX

ELECTRIBE KORG

NO PURCHASE NECESSARY. Sweepstakes open to all legal residents of the 50 United States and the District of Columbia, 18 years of age and older. Void in Puerto Rico and where prohibited or restricted by law. All federal, state and local laws and regulations apply. This month's sweepstakes starts March 1, 2002 at 12:01 a.m. Eastern Standard Time ("ET") and ends March 31, 2002 at 11:59:59 p.m. ET. For Official Rules, go to www.korg.com/electribe. To obtain a copy of the official rules or to enter by mail, send a 3 x 5 card with your name, address and phone number to Korg USA, Attn: Electribe Sweepstakes, 316 S. Service Road, Melville, NY 11747. Please include a self-addressed, stamped envelope. ©2002 Korg USA. For the Korg dealer nearest you: (800)335-0800.



Bouncing off Walls

Unlock the mysteries of reverb.

By Howard Jonathan Fredrics

Picture yourself dining in a large cave. As you enjoy your meal in the spacious stone surroundings, a diner sitting at the opposite end of the cave drops a fork. Rather than simply hearing a single soft ping coming from the direction of the other person, you hear several distinct pings in rapid succession that echo from various directions. Once they begin arriving at intervals of less than 50 ms, your ear can no longer discern discrete echoes. Instead, you hear only a wash of metallic noise that fills the entire area, lasting for about four or five seconds. This wash of closely spaced echoes is called *reverberation*.

JACK DESROCHER

Because of the cave's large size and hard walls, the character of the reverb is dramatic. Had the cave been smaller or had its walls been covered in plush velour, you might not have noticed the diner's mishap, because the reverberation would have been less prominent.

Sound travelling along a straight path at 1,130 feet per second takes a finite amount of time to reach the listener. The farther away the source, the more time it takes to arrive. In a large cathedral (see **Fig. 1**), the distance from the altar to the last row of pews could be about 350 feet. In that case, there would be a delay of approximately 310 ms between the time that the minister begins the sermon and the time a parishioner sitting in the back row actually hears it.

In a church that size, someone in the back row can barely make out the minister's words because the minister's voice seems relatively soft and muffled. That happens in part because amplitude diminishes at a rate inversely proportional

Novation USA LTD. Call 1-888-782-3166
Email: salesusa@novationmusic.com
www.novationmusic.com/kstation

novation
in music, anything is possible.

to distance. By the time it reaches the back row, the minister's voice is reduced to 1/100 of its original amplitude, or by about –20 dB. Moreover, higher frequencies (for example, those above 4 kHz) are attenuated more rapidly than low frequencies as distance increases—the lower the frequency, the farther it travels. Those higher frequencies are essential for maintaining clarity and intelligibility, especially of consonants. But the factor that has the greatest impact on the sound a person in the last row hears is the sound coloration imparted by the reverberant characteristics of the church itself.

MIRROR, MIRROR ON THE WALL

What causes the multitude of closely spaced echoes that form the reverberated portion of a sound? When it's unobstructed, a fraction of the acoustic energy of every sound travels in a straight path from its source to the listener. That element is called *direct sound* (see **Fig. 2**). The remainder of the sound is dispersed in every possible direction, eventually reaching a solid surface, such as a marble wall, a wooden pew, a velvet curtain, a metal domed ceiling, or a person. Part of the acoustic energy is absorbed by the surface. A substantial portion, however, is reflected away from the surface at the same angle in the opposite direction. That part of the sound is called *reflected sound.*

An important factor in the perception of distance from source to listener is the relative proportion of direct to reflected sound. For example, a churchgoer in the front row of pews would hear a greater proportion of direct sound because that sound would be traveling a shorter distance. Because each type of surface material absorbs and reflects its own unique proportion of frequency components, the reflected sound takes on a different tone color before moving toward its next destination. In general, softer materials with more surface area, such as ruffled curtains or people, are more absorbent, especially when it comes to high frequencies, than hard, flat surfaces such as marble or metal, which tend to reflect high and low frequencies with equal efficiency.

COURTESY LAUKYRKAN

FIG. 1: In a large building such as Laukyrkan, a medieval Swedish church, a sound can take more than 300 ms to reach the back-row pews from the altar.

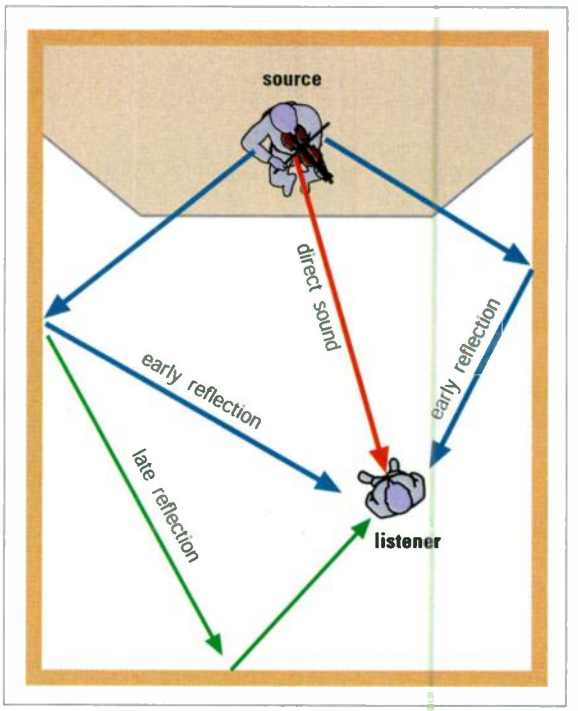


FIG. 2: Direct sound travels in a straight path toward the listener, whereas early and late reflections make contact with one or more surfaces before arriving at their destination.

Some of the first few echoes, called *early reflections,* travel directly back to the listener's ears, whereupon, if the traveling distance is large enough, they are perceived as discrete echoes. People's perception of the room size is directly affected by the *predelay time,* which is the amount of time that elapses between the arrival of the direct sound and its first early reflection. The larger the space, the more time it takes for reflections to travel back to the listener. A typical concert hall has about a 10 to 20 ms predelay time, whereas a small room might have a predelay that is shorter than 5 ms. As early reflections encounter and reflect off of other surfaces, producing *late reflections,* the time between each arriving reflection diminishes, and *reverb density* increases until it reaches a maximum and then gradually decays into silence.

In small rooms, reverb density tends to increase quickly, whereas in a good concert hall, reverb density takes about 100 ms to reach its maximum level. That figure is directly proportional to the volume of the space.

As early reflections combine in the space with later reflections, varying degrees of *phase cancellation* and reinforcement among reflected frequencies result. This coloration is most dramatic in spaces with parallel and flat surfaces because reflection delay times are more likely to be arithmetically related, thus causing a more hollow or metallic-sounding reverb decay. In well-designed concert halls, however, the large number and complexity of reflective surfaces result in a less regular and more pleasing reverb tail.

HOW LONG CAN THIS GO ON?

Although the weekly sermon always ends at noon sharp, the minister's parting words continue to float through the church as the various reflections take time to die away. In a large church, it can take many seconds for the last word to reach 1/1,000 of its

Kill Your Mouse

No, no, no . . . we're not advocating violence against defenseless little animals (if they were *rats*, maybe . . .). But we are suggesting that if you're making music with computers, you need to jump on the EZbus—and make the process way more simple, and way more *fun*.

Take mixing, for example. Without an EZbus, you adjust each of your magnificently crafted tracks one at a time with a mouse. With an EZbus, you reach for an honest-to-goodness hardware mixer, and move eight faders at a time. (Now *that's* mixing!)

Virtually every parameter of a DAW, plug-in, virtual instrument, or MIDI-capable device can be controlled from the EZbus. Use the factory **control surface** profiles (including presets for VST®, Nuendo®, Cakewalk®, Sonar®, and much more), or customize your own. With up to 32 profiles in on-board memory, the EZbus immediately takes center stage as command central of your studio or live performance rig.

But total control is only part of the story. The EZbus is also a superbly flexible **computer audio recording interface**, with 24-bit/96kHz mic, line, and instrument inputs, ADAT®, S/PDIF, and USB digital I/O—plus brilliant EQ and dynamics on every channel, and an any-input-to-any-output audio routing matrix that will leave you wondering how you ever lived without it. (Did we mention zero-latency monitoring?)

And then, when you're all done recording, disconnect the EZbus from your computer, throw it in a gig bag, and make it the heart of your live mixing setup. Because this mouse-killer is also a full-blown **digital mixer**, with all the features, sonic performance, and rugged dependability you'd expect from a piece of gear with the Event name on it.

EZbus™

The Better Mousetrap for Better Music-Making

Now Available in Finer Music Stores

Post Office Box 4189, Santa Barbara, CA 93140-4189 Voice: 805-566-7777 Fax: 805-566-7771 info@event1.com www.event1.com

EVENT ELECTRONICS

original amplitude, or –60 dB. That decay time period is called the *reverb time* and is determined by several factors, such as the number and materials of surfaces, the overall volume of the space, and even the relative humidity (see **Fig. 3**).

Had this been a holiday mass, there would no doubt have been a much larger crowd. People provide additional surface area for sound absorption, thus shortening the reverb time. If the hard marble walls were draped with soft, highly absorbent velvet curtains, the reverb time would be further reduced. On a particularly humid day, the reverb time would be even shorter. Again, these damping effects are most pronounced with high frequencies, which decay more rapidly than low frequencies. Conversely, if the church were renovated to increase its length and ceiling height, the reverb time would probably be even longer.

LET'S GET PRACTICAL

Now that I've covered the basic concepts that determine the reverb experience, I'll take a look at how they can be applied toward getting the most out of your favorite hardware or software digital reverb processor.

Most digital reverb units simulate the reflective characteristics of a space by using *regenerative delay lines*. A regenerative delay produces a series of echoes by feeding a small portion of its output back into its input (see **Fig. 4**). Because an individual delay line can be used only to simulate reflections that are a fixed time interval apart, most digital reverb units employ a complex configuration of delay lines that are connected in parallel and in series. Each delay line is adjusted to a different delay time so that the resulting reflections occur at irregular intervals. An initial user-controllable delay is often added to the front end of the chain to allow for control over predelay time. Thus, one requirement for creating a convincing reverb is to create a high degree of complexity and irregularity in the pattern and timing of delays to simulate a multitude of reflective surfaces.

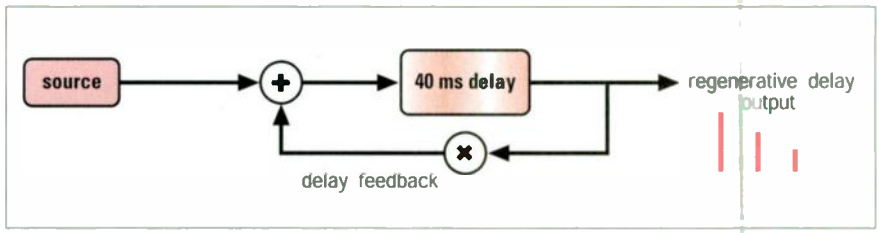


FIG. 4: A regenerative delay line is used to achieve a series of closely spaced echoes. The delay time is normally adjustable.

In order to approximate the frequency-dependent effects of various types of surfaces on reverb time, most processors have a variety of filtering and equalization capabilities. *High-frequency damping* lets you set the relative rate of reverb decay among high and low frequencies. To switch from solid granite to heavy carpet, adjust your high-frequency damping factor from, for example, 0.3 to 0.9, so that high frequencies are attenuated at a much faster rate. (The specific range of values on different reverb units varies.)

Fortunately for most individuals, many of today's processors use reverb *algorithms* that take care of the nitty-gritty details of accounting for the delay and frequency-response characteristics of spaces of various dimensions, shapes, and materials. You can simply dial up a type of space—for example, large hall, medium room, or small church—and then fine-tune the apparent size of the space using conventional room-measurement variables such as *room volume*, which is normally specified in cubic meters. Or you could brighten or darken the character of the reverb by changing equalization settings.

Some sophisticated processors, such as the Lexicon 300 series, allow for adjustments to the rate and envelope shape of the buildup of overall reverb density as well as to the density of clusters of early reflections. That gives users control of not only the apparent size of the space but also of the amount of diffuse reflections. In general, because it represents a faster buildup of early-reflection clusters, an extreme *diffusion* setting may result in somewhat decreased clarity in your reverb sound, especially when processing vocals.

Before the advent of today's digital signal processors, engineers developed a number of electromechanical devices for simulating reverb. Two devices that are still widely modeled in the digital domain are *spring* and *plate* reverbs. Both add unnatural coloration to the reverb signal. A plate-reverb algorithm normally uses a high level of diffusion. A good starting point for working with plate-reverb settings is to use short reverb times (0.5 to 1.5 seconds) and high diffusion for processing percussion sounds and longer times (1.5 to 4.0 seconds) with less diffusion for vocals and other sustaining instruments.

Most reverb processors also let you create a variety of nonlinear reverb effects. One of the more interesting and widely used drum effects is the *gated*

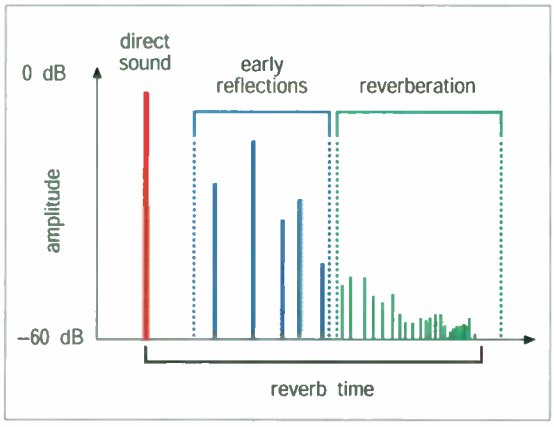


FIG. 3: This graph shows a typical concert hall's impulse response. Progressively softer reflections arrive at increasingly smaller time intervals in order to produce the perception of reverberation.

reverb, which allows you to prematurely shut off the natural reverb decay, either abruptly or by placing an amplitude envelope on it. Another commonly used nonlinear reverb is the *reverse* reverb, which simulates the effect of reflections that get louder rather than softer over time.

THE CUTTING EDGE

Thus far, I have discussed the challenges of artificially synthesizing reverb using delay lines. Many limitations of that approach have recently been overcome by the advent of the "sampling reverberator." Instead of attempting to approximate the great complexity of delay patterns by using a trusty digital reverb processor, you can use a sampling reverberator to capture the exact acoustical footprint of an actual acoustical environment.

The sampling reverberator uses a technique known as *convolution* to create a filter model of an actual space's *impulse response* characteristics, which are analogous to its original pattern of frequency-dependent reflections. First, a short impulse or noise burst—for example, a balloon pop—is generated and recorded in the desired space. Then, both the impulse and unreverberated sounds are analyzed. Next, their spectra are multiplied to produce a result identical to what you would get if you recorded the unreverberated sound in the actual space.

Initially, because of its computational overhead, convolution was only available as a non-real-time software application. Free programs, such as *Csound* (www.csound.org) and *Soundhack* (www.soundhack.com), and commercial programs, such as Sonic Foundry's *Acoustic Mirror* plug-in (included with *Sound Forge* 5.0), offer that capability. Only within the past couple of years have real-time hardware devices such as the Sony DRE-S777 and the Yamaha SREV1 became available. More modestly priced real-time software applications include *PureVerb,* the standalone Windows program from CATT, and the recently released MAS plug-in *Altiverb* from Audio Ease. For those of you who want to try out this exciting technology, you can download a nice selection of impulse-response recordings from my World Wide Soundspaces Web site at http://orpheus.tamu.edu/fredrics/isrc.html.

Gaining control over the myriad parameters found on today's sophisticated reverb processors can seem like a daunting task. But with a little understanding of room acoustics and a systematic approach to experimenting with a few parameters at a time, you'll be well on your way to finding that sweet spot in your reverb system.

Howard Jonathan Fredrics *is an Emmy Award–winning composer and assistant professor of music technology at Texas A&M University.*

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

In the Clear

Learn how to use samples legally.

By Michael A. Aczon

If you use samples when writing or producing songs, one of the biggest favors you can do for your career is to understand the legal and business issues that surround the practice of sampling. The process of securing a sample for use in your own recording is fairly straightforward, but a legal minefield awaits you if you choose to skip any steps along the way.

ARTIFISH COM

First, I should define sampling and explain why it raises legal issues. *Sampling* is the technique of taking a small piece, or "sample," of a preexisting piece of music and using the sample to create or enhance a different, new piece of music. Legal issues arise because the copyright law allows only the copyright holder of a work of art to make *derivative works* or changes in the original work. Sampling potentially violates the law regarding two separate copyrights, the copyright of the *musical composition* (the PA Copyright) and the copyright of the *sound recording* (SR Copyright). You need to obtain the permission of those copyright holders before using the original song or master. The process of getting that permission is known as *clearing* the sample.

LAYING A FOUNDATION

When clearing a sample, detail is crucial. Gather the following information for each sample you wish to clear and have it ready to present to the copyright holders: the name of the original composition, the artist who performs the master from which you obtained your sample, the record label of the master recording, the composer(s) of the composition, and the publishing company or companies of the composition. You

The perfect space, incomparable musicianship, 16 years of sampling experience...
Prepare yourself for the sublime.

Sonic Implants

SYMPHONIC STRING COLLECTION

Recorded by 2001 Emmy award engineer Antonio Oliart and RIAA engineer John Bono. Rich, multidynamic instruments with resonant string decays intact and gigabytes of articulations to choose from. Designed for the utmost in expressiveness and realism; a joy to create with. Recorded at Sonic Temple Studios, Roslindale, MA. (pictured)

Articulations:
Long Tones Detaché
Long Tones Expressivo
Bowed Tremolo Ordinaire & Sul Ponticello
Bowed Half Step & Whole Step Trills
Con Sordino (Mutes)
Staccato Martelé
Spiccato
Pizzicato Loose & Tight
Pizzicato Harmonics
Bowed Harmonics Natural & Artificial
Col Legno Tight & Loose
Sound Effects & Glissandi

Methods:
24bit-48k recordings. B&K 4011 front microphones with Schoeps CMC-6Ug and Neumann U87 spot microphones capture a rich balance of space and instrument detail. Up to 4 velocities per articulation with down & up bows. Release samples included to preserve natural instrument resonances and subtle ambient decay. Incredibly playable.

Musicians:
Sections include 1st Violins, 2nd Violins, Violas, Cellos & Basses. Unparalleled musicianship, technical proficiency and beautiful sounding instruments from members of the Boston Pops and Boston Ballet Orchestras.

Available:
April release in Gigasampler format. CD or DVD Box Set. Complete Documentation. Please visit website for details and demos.

www.sonicimplants.com/strings

ph: 888.769.3788

will need to give the length of the sample you are contemplating using, defined in min:sec time as well as in number of measures (for example, ":30 seconds/16 bars of music"). Lastly, you must provide a description of the contemplated use of the song or master in your new recording defined in min:sec time, number of measures, and whether it will be looped or repeated (for example, ":15 seconds/four bars including the hook line from the original will be used in four separate choruses throughout the new version").

Prepare a working copy of your new recording and have it ready to send to the copyright holders to show how you want to incorporate the original versions into your work. It is also a good idea to include a copy of the original recording. In this age of corporate mergers and acquisitions, you might be surprised at how many record companies and publishing companies have simply lost track of what is in their catalogs because they are so large.

CLEARANCE CORRESPONDING

With your information in place, you are now ready to contact the proper parties and begin clearing your samples. First, you must track down the addresses and phone numbers for the applicable record companies and publishing companies that own the copyrights for the original master recordings and songs. Record-label contact information can be obtained through a number of music industry directories, company Web pages, and, if all else fails, the phone book. Your detective work is a little easier for the musical compositions. Chances are the music publisher who owns the song you are trying to clear is affiliated with ASCAP, BMI, or SESAC in order to have its performance rights collected. All three of those performing rights organizations have Web sites with searchable databases that allow you to look up the contact information for their affiliated publishing companies. (For information about performance rights organizations and directories, see the sidebar "Sample Safari.")

Well before you start to manufacture your CDs, send a written request for permission to sample the song to the label or publishing company. If the record companies and publishing companies you're writing to have licensing departments, direct your correspondence there; otherwise, send it to the business and legal affairs department. Call to get the name of the person to whom you should address your request. Your request should contain all of the information you have gathered, noting how many initial units you plan to manufacture, what your contemplated release date is, and how you can be contacted. If you have a dollar figure in mind as an offer to pay for the sample, you can include it in your initial request. Most labels and publishing companies will not consider

SAMPLE SAFARI

Directories

ArtistPro, publisher of Recording Industry Sourcebook
tel. (707) 554-1935
Web www.artistpro.com

Billboard Directories, publisher of Billboard International Buyer's Guide
tel. (800) 344-7119 or (732) 363-4156
e-mail ndavis@bpicomm.com
Web http://orderbillboard.com

Music Business Registry, publisher of Music Attorney, Legal and Business Affairs Guide and Music Publisher Registry
tel. (800) 377-7411 or (818) 769-2722
e-mail info@musicregistry.com
Web www.musicregistry.com

Pollstar Magazine, publisher of Record Company Rosters and ConneXions (a guide to industry contact information)
tel. (559) 271-7900
Web www.pollstar.com

Performing Rights Organizations

ASCAP
tel. (212) 621-6000
e-mail info@ascap.com
Web www.ascap.com

BMI
tel. (212) 586-2000
Web www.bmi.com

SESAC
tel. (615) 320-0055
Web www.sesac.com

a request made over the telephone or by e-mail unless you have previously done business with them.

SAMPLING DEAL POINTS

Now that you have set the clearance process in motion, here are a few of the major points to negotiate in order to use the sampled material, all of which will be incorporated in a sample clearance contract signed by both parties.

Song ownership. Who will own the "new" work? Some labels and music publishers will let you use their preexisting works only if they own all or part of the copyright in the new recording or song.

Sharing the wealth. If there is shared copyright, what will the royalty splits be?

Compensation. How will the original copyright holders be compensated? Common payment options include paying a *flat* fee (for example, "$500 for all rights with no further payments or royalties"), a *rolling* fee that gets paid over time (for example, "$200 upon signing, $300 upon release by a major label, and $100 for every 100,000 units sold"), or an *ongoing* royalty (for example, "20 percent of the statutory mechanical license rate for every record sold"). That is all negotiable, and there are no standard rates for samples, so the actual figures vary widely.

Crediting the original. How will the original copyright holders, composers, and artists be credited on artwork, press, advertisements, and future uses of new work embodying the original material? It is important to properly credit the original material. If not done or if done improperly, your release could be stalled until the error is corrected. Sample credits generally include the original artists, writers, record labels, and publishers along with the names of the writers and publishing companies of the new master and composition. They should also include copyright ownership information for the new version of a master or composition. That information is vital when it comes to doling out royalties earned by a recording containing a master. These points are usually set out in great detail in the licensing agreement.

Extent of usage. Is the sample limited to only one recorded version of your song, or do your rights extend to uses such as remixes or live performances?

Setting things straight. Be sure to get a warranty that the label or publishing company actually has the authority to grant you the rights to sample and that the rights granted to you extend to future owners of the original material (for example, if the catalog gets sold to another publisher).

Accounting. You will need to agree on how often you render accountings and pay for royalty-based fees.

Based on a number of factors—such as how large your sample is, how much you use it, how crucial it is to your new piece, whether it was a big hit originally, and whether you have a large major-label budget or a small indie budget—the ultimate terms and conditions of sampling agreements are varied. If you are signed to a major label, a sizable portion of your recording budget might

be set aside and held back by your label simply to pay for sample clearances.

SOME ALTERNATIVES

The time it takes to clear samples yourself could be prohibitive and keep you away from your creative pursuits, so you might want to consider some alternatives. First of all, some companies have created royalty-free recordings that have authentic-sounding period pieces of music available for sampling at no cost beyond the price of the CD. You can also go into a recording studio with the musicians of your choice and create your own original master recording to sample in order to avoid going through the clearance process with a record label. Note, however, that if you take the cover-song route for sampling, you still have to clear the use of the composition with the publishing company that owns the rights to the song.

You can also hire a third party to clear the samples for you. Sample clearance specialists will do all of the necessary work to secure the rights you need to clear your samples. Their fees vary from hourly to per song to project-based. Referrals to sample clearance companies can be obtained from record labels, your performing rights organizations, or—as always—your fellow musicians and producers in the business. (See the sidebar "Sample Clearance Services" for a few of those companies.)

SAMPLE CLEARANCE SERVICES

DMG Clearances
tel. (914) 248-8319
e-mail info@dmgclearances.com
Web www.dmgclearances.com

Music Resources, Inc.
tel. (323) 993-9915
e-mail mr@musicresources.com
Web www.musicresources.com

The Parker Music Group
tel. (818) 905-9552
Web www.musicclearance.com

Songwriters Services
tel. (661) 254-7888
e-mail madsong@earthlink.net

DANGER, DANGER

I hear a few misunderstandings about sampling on a regular basis. I'd like to address those once and for all to warn you well in advance of having your CDs pulled off of shelves and your bank account frozen.

No freebies. "I sampled only six bars; I thought that as many as eight is free." That is simply a record industry urban legend. There is no "free zone" when it comes to copying someone else's work. Keep in mind that a great hook in a song could be as short as one measure or even a couple of seconds. If it's identifiable, clear it.

Safety clearance. "I processed the sample so it no longer sounds like the original, so I don't have to clear it." A good rule of thumb is this: if you didn't write it, you need to clear it.

Don't put off until tomorrow . . . "I'm just a little guy. I'll take care of it after it goes Platinum; by then I'll have the money to do it." If you follow the number of major stars who have had to pay off on uncleared sample uses, it should be obvious that waiting until a song is a hit can put you in the worst possible bargaining position to negotiate a sample use. It's better to make a good-faith effort to clear the sample up front, structuring payments based on an indie release and major releases, rather than putting it off completely.

CLEARED FOR LANDING

The art and business of sampling is here to stay, and the industry has adapted to it by shifting the responsibility of sample clearance to those who are doing the sampling. By using the tips and principles outlined here as a guideline, you can sidestep several possible problems that await you as you try to survive sampling.

Michael A. Aczon *practices entertainment law and is a member of the music business faculties of San Francisco State University and Diablo Valley College in Northern California. He recently "male bonded" with his 12-year-old, Evan, treating him to his first-ever rock concert.*

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

"Four Major Labels Came to See Me Because I Joined TAXI"

Lizard McGee -- TAXI Member

Most musicians never get a chance to meet an A&R person in the flesh. I had A&R guys from Columbia, Dreamworks, Maverick and Hollywood all come to see my band, Earwig, play live.

I spent the next day hanging out with one of them at his house. I played more songs, and we talked one-on-one for hours.

All this happened as a direct result of becoming a member of TAXI.

Ironically, I almost didn't join. Like so many other people, I didn't know a lot about TAXI, and I wondered if it was really legitimate. It just sounded too good to be true.

But I spoke with a few friends who were already members, and they explained how TAXI worked. It made sense.

I began to think about not only getting my music to record labels and publishers, but also pitching my songs to TV shows and movies to make some extra money with my music.

So, I joined, and it's already paying off big-time. Earwig is building a huge buzz because of all the contacts we've made through TAXI.

We haven't signed a deal yet, but we've definitely penetrated the so-called "inner circle" of the music industry. And that's exactly where you need to be to get yourself signed.

Can TAXI get you into the inner circle? They'd be the first to tell you they can't promise anything. But four A&R people watching my show was all the proof I needed to know that TAXI can really deliver, if your music is right on target.

TAXI®

The Independent A&R Leader

1-800-458-2111

And if your music is a little bit off-the-mark, TAXI is probably the best thing you can do to whip it into shape. The written feedback you'll get from their A&R department is incredible.

You'll also get to meet top industry executives face-to-face at TAXI's annual convention, the Road Rally. As a member, you'll get FREE passes for you and a couple of guests.

This private convention is renowned for being the best in the business. Just one pass is worth far more than your TAXI membership fee, but you'll get three for FREE.

Whether you're pitching yourself as an artist, pitching your songs, or going for Film and TV placements, TAXI is definitely the place you need to call.

Just ask for their free information kit, and get yourself signed up in a hurry.

I did, and my only regret is that I didn't do it sooner. TAXI has turned out to be the best investment I've ever made in myself.

REVIEWS

ROLAND

VS-2480

The portable digital studio grows up and gets serious.

By Mark Nelson

The Roland VS-2480 is the most recent in a long line of desktop audio workstations that began with the VS-880. Like its predecessors, the VS-2480 packs a lot of firepower into a relatively small footprint. Primarily aimed at serious home recordists and VS-series owners looking to update their gear, it has a lot to offer recording professionals, as well. When you add the optional CD burner, the VS-2480 is an attractive, full-featured audio production tool that fits on a coffee table.

What sets the VS-2480 apart from previous incarnations is its sheer abundance of features, including 24 tracks with 16 virtual tracks each, 64 channels at mixdown, 17 motorized faders, and 24-bit recording at rates as high as 96 kHz. Among other attractions are a mouse for drag-and-drop editing, support for an external VGA display, and a pair of stereo multi-effects processors, with room for six more.

FIG. 1: With 17 motorized faders and almost total automation, the VS-2480 provides impressive recording and mixing capabilities in a portable package. On the top panel are 8 balanced XLR mic inputs, 16 balanced ¼-inch line inputs, and an unbalanced ¼-inch instrument input for electric guitar or bass.

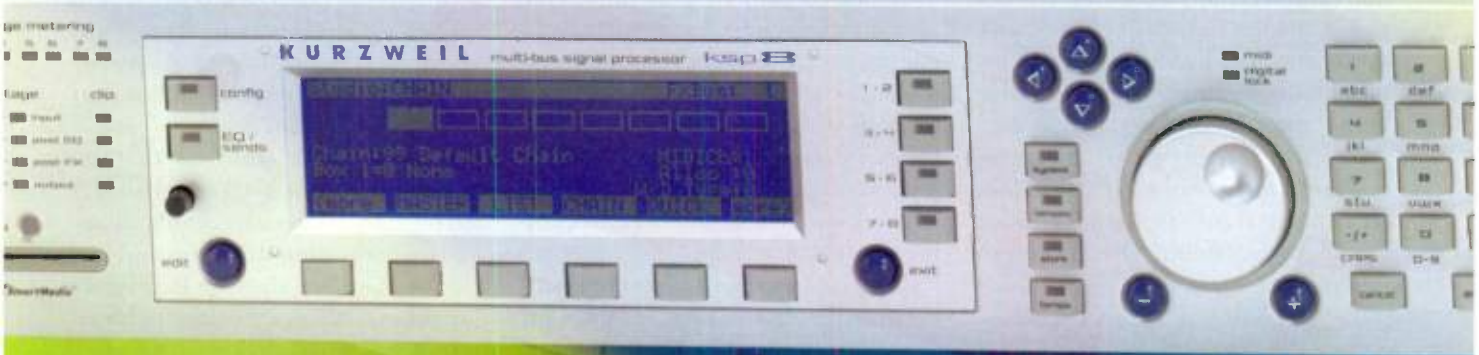
EYE OF THE BEHOLDER

About two feet across and weighing less than 27 pounds, the VS-2480 is built for comfort *and* for speed. Eight XLR microphone inputs, 16 balanced

From the creators of the finest synthesizers in the world comes the world's most powerful effects processor.

Kurzweil

ksp8



- Process 8 channels simultaneously, with 24-bit precision
- Over 700 world-class digital effects
- Flexible input/output configurations
- Ready for 5.1 surround processing
- Patchable modulation architecture for real-time control
- Optional dedicated controller for remote operation

KURZWEIL®
Music Systems

Kurzweil Music Systems
9501 Lakewood Drive, S.W., Suite D
Lakewood, Washington 98499
253-589-3200
Fax: 253-588-6809
www.kurzweilmusicsystems.com

Canadian Division
3650 Victoria Park Avenue
Suite 105
Toronto, Ontario M2H 3P7
416-492-9899
Fax: 416-492-9299

¼-inch TRS mic/line inputs, and a dedicated unbalanced high-impedance instrument input are located on the top panel's upper left (see **Fig. 1**). Each of 16 line inputs has a dedicated 20 dB pad switch and trim pot. Level knobs for the monitor send and two stereo headphone sends are just below the display's contrast knob.

Each of the 16 motorized channel faders is positioned beneath a reassignable knob and two illuminated switches. A motorized master fader is to the right of the channel faders. Everything is well marked and clearly laid out, so once I understood the logic of the user interface, I could fly.

Transport, location, and editing functions are grouped on the unit's lower-right side along with buttons to select menus for various global parameters, effects, and so on. A numeric keypad, cursor and zoom buttons, a row of function buttons, and two concentric data wheels labeled Time/Value and Shuttle are located in the same section. Above those, a large, bright high-resolution LCD is tilted for optimal viewing.

On the rear panel are ports for connections that tend to stay patched (see **Fig. 2**). Optical and coaxial S/PDIF and two proprietary Roland R-Bus ports provide digital I/O. You can connect computer peripherals to ports for the included mouse and an optional PS/2 ASCII keyboard as well as a VGA output for a remote video display. A SCSI port lets you connect an external CD burner or removable hard drive. Eight balanced ¼-inch analog outputs are configured in pairs as master, aux A, aux B, and monitor. Additional ports are provided for MIDI In and Out/Thru, word-clock in, SMPTE in, a footswitch, and power.

As many as 200 Projects fit onto each 10 GB hard-drive partition. The maximum recording time depends on the sampling rate, word length, and other factors. If you need something larger than the standard 40 GB hard drive, you can pop in another IDE drive as large as 128 GB.

SMOOTH OPERATION

If you use any of Roland's other VS-series products, you'll be on familiar ground with the VS-2480. The basic level is the Project, comprising all the tracks, edits, routing maps, effects patches, markers, and Automix data for an individual song or a collection of songs. You can even import and export Projects back and forth between the VS-2480 and earlier VS-series machines.

You have a choice of techniques for almost every action, from patching to editing to mastering. Press dedicated buttons on the top panel, navigate through nested menus with cursor and function buttons, or simply use the mouse. Such flexibility allows you to adapt your personal style to operating the VS-2480.

Plugging a standard computer monitor in to the VGA port accesses the Information Display (see **Fig. 3**). You can view the onboard and external displays simultaneously. You can show the tracklist and input levels on the external monitor—eliminating the need for an external meter bridge—as you view a different screen on the LCD. Unfortunately, not everything you see on the LCD appears on the external monitor; mouse and cursor actions, waveforms, and some screens are missing.

MIXED COMPANY

Conceptually, the VS-2480's mixer has two halves: the input mixer and the track mixer. The input mixer handles 24 inputs from any combination of the 32 external analog and digital sources as well as from the 8 aux sends. As with most digital mixers, the 16 faders serve multiple functions.

Four buttons above the master fader access the input and track mixers in banks of 16 faders. When you switch banks, the motorized faders snap into position to confirm their settings. The track mixer handles 24 recorded tracks (each with 16 virtual tracks) and 8 aux returns. At mixdown, combining the input and track mixers provides 64 fully automatable inputs. Although none of the inputs has insert points per se, you can route the direct outs from eight channels and all eight aux buses to any analog or digital output or R-Bus port to connect outboard gear.

One remarkable feature is that the 16 pan knobs (one for each channel) double as a single assignable channel strip providing dynamics and five bands of EQ. Pressing the Parameter Edit button enables the channel-strip function. The knobs for channels 1 through 5 handle dynamics, and the remaining 11 knobs serve various EQ functions. The virtual channel strip makes real-time, hands-on tweaking a snap. When you press another switch, the same knobs become pots for the eight aux sends.

Select a channel or grab a knob to automatically bring up the comprehensive Channel View screen, letting you instantly confirm all applicable settings. Like most features, the default settings can be overridden or customized.

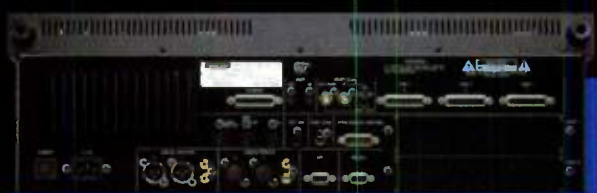
The VS-2480 supports surround mixing in three formats: 2 + 2 (two front and two rear speakers), 3 + 1 (left, right, and center speakers with a rear center speaker), and 3 + 3 + 1 (aka 5.1: left, right, and center front speakers, right and left rear speakers, and a subwoofer.)

FIG. 2: To the right of the VS-2480's power switch, AC connector, and fan exhaust vent are jacks for SMPTE input, a mouse and a computer keyboard, MIDI In and Out/Thru, a footswitch, two pairs of stereo headphones, and four pairs of balanced analog audio outputs. Below those are ports for SCSI I/O, VGA out, word-clock in, R-Bus I/O, and optical and coaxial S/PDIF I/O.

TASCAM DM-24:
The Affordable Luxury Console Is Here

DM-24 DIGITAL MIXING CONSOLE

Two DM-24s can link together with optional Cascade modules to create a seamlessly integrated 64-channel super console. For larger studios operating on a budget, it's a no-compromise affordable solution for high-end digital mixing.



The DM-24's rear panel includes AES/EBU digital I/O, S/PDIF digital I/O, MIDI In, Out and Thru jacks, ADAT Optical input and output, external footswitch connector, time code input, GPI port, word sync in, out/thru, DTRS remote port, RS-422 9-pin control port, 24-channel TDIF I/O and more. Shown here with standard interfaces. Not luxurious enough? Customize your DM-24 with two expansion ports for extra analog, TDIF, ADAT or AES/EBU modules.

Luxury usually comes with a hefty price tag. Not so with the new TASCAM **DM-24 32-Channel 8-Bus Digital Mixing Console**.

The DM-24's features are usually reserved for super high-end mixers. With 24-bit/up to 96kHz digital audio, the DM-24 blows away the standards in sonic quality for affordable consoles. With its internal automation, you'll get more power at your fingertips than you would from those huge consoles in commercial facilities. With some of the finest spatial and modeling processing from TC Works™ and Antares™, you can create fully polished productions without ever going to the rack. With incredibly flexible routing, fully parametric EQ, machine control capabilities, touch-sensitive motorized faders, and lots of audio interfaces, you can integrate the DM-24 into any studio environment.

Whether you're working with standalone hard disk recorders, DAW systems, MDMs or analog tape, the DM-24 is optimized to be the very best choice in consoles designed for 24-track recording. Ready to get everything you ever wanted (and more) in a digital console? Get the DM-24 today at your authorized TASCAM dealer.

TASCAM
a whole world of recording

www.tascam.com

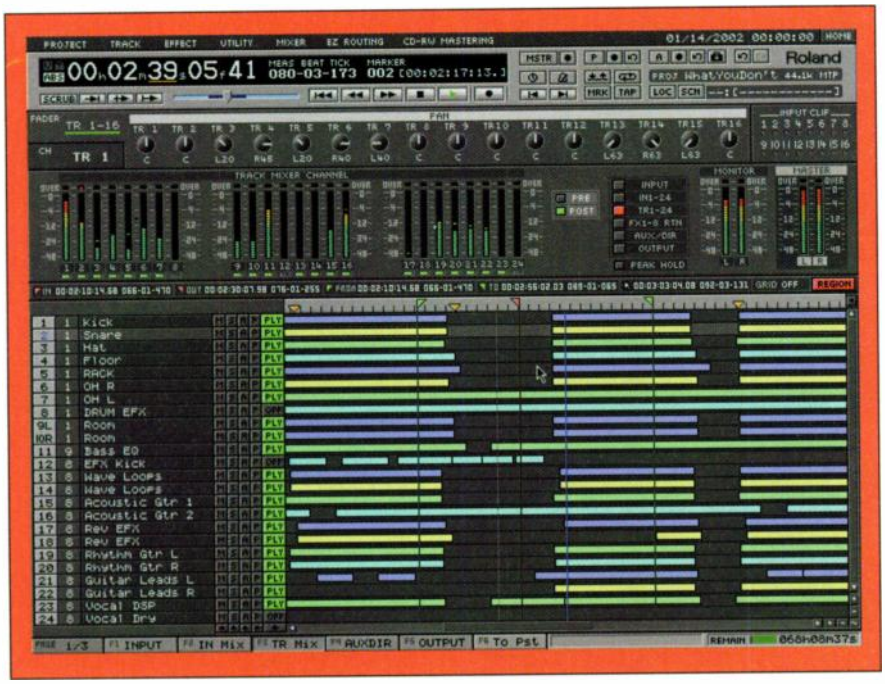


FIG. 3: Connect an optional VGA monitor to view the VS-2480's Information Display, which shows a wealth of parameters at a glance.

ON THE JOB

The VS-2480 records as many as 16 tracks simultaneously—enough to capture most bands live—so I took it to a local church for a rehearsal session. Right away I appreciated the eight XLR inputs. With a vocal mic, two mics for the piano, and another for the guitarist's cabinet, I still had enough inputs for a minimal drum-miking setup. For recording bass guitar, the high-impedance input eliminated the need for a direct box.

Signal routing is a snap. A single button brings up the Routing screen; alternate windows present patching information in diverse ways. As with most of the VS-2480's user interface, varied approaches allow each user to find the most appropriate method for his or her style.

In the Routing screen, assigning inputs to tracks is quick and easy; simply hold down a track's status button and navigate to one of the input banks, and then select the channel you want to assign it to. You can toggle phantom power for individual inputs in the Routing screen, but unfortunately, there's no indicator light for phantom power.

As the band warmed up, I fiddled with EQ and dynamics parameters. I particularly enjoyed using Parameter View to quickly engage dynamics processing on all of the inputs. The VS-2480's compression sounds good and affords ample control, providing the ability to assign any track as the key-in source.

A handy Take Management feature lets you record multiple takes and commit to them later. Locate points are arranged in 10 banks of 10 for a maximum 100 points. Thanks to ten dedicated buttons, you can quickly set locate points for later overdubs on the fly.

You can define as many as 999 markers. To set a marker, you can use the time-value wheel to maneuver to a precise time (expressed in hours, minutes, seconds, and frames) or bar:beat:tick (with 480 ticks per quarter note). Using the shuttle wheel's accelerated audio scrubbing, I quickly set markers for pinpoint control of autopunch points.

You can reassign every channel knob and fader to control virtually any parameter and to send MIDI Control Change messages. Normally, channel pans double as aux-send level controls, but you can use faders for that task by toggling a switch in the Utility menu. To quickly adjust levels on individual headphone mixes, simply press Knob/Fader Assign and then one of the eight aux buttons; the faders instantly jump to their new levels, providing an easy-to-see reference.

Multiple clock sources are supported; they range from word-clock in and S/PDIF in and out to both ADAT and Tascam sync through an optional DIF-AT interface ($395). MMC, MTC, and SMPTE are supported for interfacing with sequencers, analog recorders, and video editors. To facilitate transfers of digital data, the VS-2480 can dither on the fly. Oddly, the dither menu contains nonstandard choices such as 17 and 23 bits.

A FISTFUL OF CHOICES

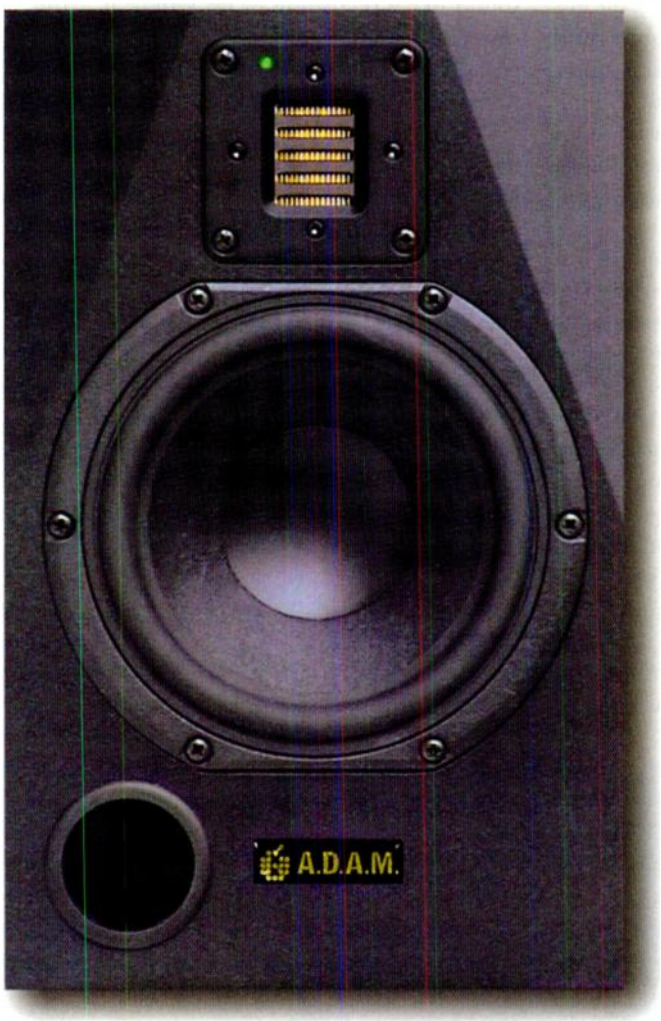
Probably the most confusing aspect of the VS-2480 concerns its recording modes. Instead of simply selecting a sampling rate and bit depth for a new Project, you're faced with an array of abbreviations: MTP, MT1, M16, and so on; each abbreviation represents a method of writing data to the hard disk (see the sidebar, "Roland's Recording Modes"). Some modes use Roland's proprietary lossless data-compression coding, Roland Digital Audio Coding (R-DAC), to increase recording time. The recording modes offer sampling rates ranging from 32 kHz through 96 kHz.

Mastering 24-bit (M24), Mastering 16-bit (M16), and CD Recording (CDR, which writes 16-bit interleaved stereo files) are the only three recording modes that don't use R-DAC. All the remaining modes compress the data, but that's not necessarily bad.

Familiar audio compression schemes such as MP3 and ATRAC (used on MiniDiscs) actually eliminate data. Such lossy compression uses algorithms to determine which audio data may not be audible at a given moment and filters out the unnecessary frequencies. Those types of compression might sound fine, but the bottom line is that once the data's gone, it's gone forever.

In contrast, Roland's R-DAC is a lossless data-coding technology. In essence,

Mixing on normal monitors is like trying to enjoy a gourmet meal with a head cold.



Imagine how great it would be if you could wave a magic wand and suddenly hear *everything* more clearly. Details that used to be buried in the mix would leap out, even the smallest tweaks would be fully audible, you could place things in the sound field perfectly, and all of your gear — all your mics and pre-amps and processors and instruments — would be that much more useful and effective.

For ADAM owners, this is no fantasy. Because ADAM Analytical powered monitors set a startling new standard for audio precision. Their exclusive DPA™ (Dynamic Panel Array) high-frequency drivers achieve air-pressure transient rise times *four times* as fast as monitors that rely on cone, dome, or ribbon tweeters. With ADAMs you can be creative at a whole new level, because you'll be hearing localization and sonic signature cues other monitors can't begin to reproduce.

Start really enjoying *your* gourmet mixes with the award-winning ADAM P-11A's (now available in the U.S. for only $1,895 a pair).

Monitors are monitors...but ADAM Analyticals are more!

McCave International, Inc.
800.218.6305 – *www.mccave.com*

R-DAC uses a form of shorthand to save space, supposedly with no loss of audio data. Roland states that in hundreds of blind tests, listeners could not distinguish between linear and R-DAC-encoded audio at MTP and MT1, the two highest-quality modes.

Naturally, I wanted to find out for myself. I set up a pair of microphones and recorded the same fingerpicked guitar piece in each of the seven modes. Using a 44.1 kHz sampling rate for each test, I took pains to play at the same relative intensity and maintain a consistent distance from the mics.

After repeated listening, I could not hear any differences between the linear modes and the two highest-quality R-DAC modes at 44.1 kHz. My big flattop sounded fantastic in the uncompressed M24 and the compressed MTP modes (both 24 bit), with a huge bottom and tons of shimmering highs. Sixteen-bit recordings made with and without data encoding sounded similar to tracks recorded directly to DAT.

I would not hesitate to use the MTP or MT1 modes for any but the most critical recording projects. Audio recorded using MTP mode is as good as any digital recording I have heard and better than many. Nonetheless, I appreciate the option to record without data coding.

I also checked out the M24 and MTP modes at 96 kHz. I was impressed by the presence and realism. It didn't sound like a recording of my guitar; it sounded like my guitar. Again, my ears could not discern any difference between the linear and R-DAC recordings.

I could hear data-compression artifacts beginning with the MT2 mode. LV1 and LV2 yielded results comparable to a well-done MP3. Considering the size and economy of modern hard drives, I doubt that any but a handful of users need to use such extreme settings.

Roland effectively covered all the bases with the various recording modes. Although it is true that track counts are reduced in the linear modes, 16 tracks of uncompressed 24-bit audio at 48 kHz should satisfy just about anyone. At the highest sampling rates, the sound simply blew me away.

EASY EDITING

The primary difference between all-in-one desktop studios and computer-based digital audio workstations (DAWs) is probably ease of editing. There's nothing better than grabbing a hunk of audio with a mouse and twisting it into shape. Consequently, I was pleasantly surprised to learn that the VS-2480 supports drag-and-drop editing. Editing is confined to the onboard display, but the next upgrade is supposed to support editing in the VGA display.

Aside from drag and drop, you can edit by scrolling through menus with a mouse or cursor buttons or by using dedicated Track Edit buttons; each method has its advantages. I used them all, but the method I chose depended on what I was trying to accomplish.

On a live demo I was recording, the vocals needed help in one or two places, so I brought in the singer for overdubs. Because she had little experience with trying to match phrasing, projection, and tone, I recorded her singing fixes on a spare track. Then, I selected the best take, entered the VS-2480's waveform view to precisely trim the phrase, and used the mouse to drag it over to the original track and replace the mistake.

ROLAND'S RECORDING MODES

The VS-2480 records at several bit depths and sampling rates using varying amounts of R-DAC data coding. Here's an overview of the recording modes:

Master 24-bit (M24) records linear (non-data-compressed) audio with a 24-bit word at different sampling rates. Selecting M24 mode cuts down the number of recording and playback tracks to 16; at sampling rates of 64 kHz and higher, the VS-2480 functions as an 8-track recorder.

Multi Track Pro (MTP) is the default mode. Audio is recorded at 24 bits using R-DAC coding. This mode provides approximately three times the recording time as M24.

CD Recording (CDR) records linear data as 16-bit interleaved stereo files. Surprisingly for a mode dedicated to CD burning, you may choose any sampling rate. The VS-2480 functions in this mode as a 16-track recorder at 48 kHz and below and as an 8-track recorder at rates above 64 kHz. Only 44.1 kHz files may be burned to CD using the SCSI port; audio can be exported as WAV files for remote editing and sampling rate conversion.

Master 16-bit (M16), like M24, is for audio purists reluctant to move their data through Roland's coding scheme. Track counts vary as with the M24 and CDR modes, giving you 8 or 16, depending on the sampling rate.

Multi Track 1 (MT1) records 16-bit audio at various sampling rates using R-DAC. This mode provides approximately twice as much recording time as the M16 mode.

Multi Track 2 (MT2) records 16-bit audio at assorted sampling rates with R-DAC coding and some data compression, for approximately three times the recording time as M16.

The final two modes, Live 1 (LV1) and Live 2 (LV2), use even greater amounts of data compression for greatly extended recording times. They're intended for recording live, archiving rehearsals, and other situations in which audio fidelity is less important than the sheer length of the recording.

MTP, MT1, MT2, LV1, and LV2 modes all feature 16 tracks of simultaneous recording and 24 tracks of playback at sampling rates of 48 kHz and below. Above 64 kHz, the number of available simultaneous recording tracks is reduced to 8 and the number of playback tracks to 12.

new technology. new tools.

Times change. So should your tools.

The soft synth is here to stay, and making music will never be the same. The Oxygen 8 is the first in a series of new controllers from MIDIMAN designed for the *software-centric* musician.

Oxygen 8 puts you in control of any 8 MIDI-assignable parameters within your favorite soft synths, VST instruments, or any MIDI-compatible software. Real time control is now yours for the taking: LFO rate, filter frequency, modulation, amplitude, whatever--it's all at your fingertips. You don't even need a MIDI interface for the Oxygen 8, because it *is* the MIDI interface. And since the Oxygen 8 doesn't use an external power supply, your laptop and the stage are sounding more like the studio than ever before.

Take a deep breath. You're in control now.

Oxygen 8 Features:

- 25-note controller with 8 MIDI assignable knobs, one MIDI assignable slider.
- USB MIDI interface integrated into the keyboard--no external devices needed.
- Laptop-ready: input and output 16 channels of MIDI via USB.
- Power the Oxygen 8 with the USB port or batteries for complete portability.
- Designed for: Soft Synths, Live Performance, Programming.

USB MIDI

midiman

M POWERED.

800-969-6434 • www.midiman.net/oxy8/em • email: info@midiman.net

A handy Arrange window manages playlist data for several tracks. I used it to seamlessly chop a solo without altering the original tracks, just in case the client changed her mind.

Editing on the VS-2480 is far easier than I've come to expect on a hardware workstation. The manual does a good job of explaining vital features. Again, alternative techniques for accomplishing a given task let you adapt the machine to your personal style instead of the other way around.

THIS YEAR'S MODEL

The recorder ships with two stereo multi-effects processors. The review unit I received was loaded with three extra VS8F-2 boards ($395 each), providing 10 stereo or 20 mono effects. The effects are routed by default to auxes 1 through 8, but you can route them almost anywhere. You can configure any effect as an insert to any input channel or recorded track. At mixdown, placing a stereo effect (or two) across the master bus allows easy access to mastering tools such as EQ and dynamics.

The reverbs, delays, chorus, and multi-effects chains for specific instruments are all excellent, though many presets were overdone. Also included is a full range of Composite Object Sound Modeling (COSM) effects: amp simulations, speaker modeling, and even microphone modeling.

Microphone modeling attempts to mimic the sonic characteristics of high-quality microphones, letting budget-conscious recordists make do with a limited mic cabinet. Mic modeling supports recording with the Roland DR-20 dynamic mic, AKG's popular C 3000 B large-diaphragm condenser, and a few other well-known choices.

To test the mic modeling, I recorded an Appalachian dulcimer using a Shure SM57 and then scrolled through various presets on the VS-2480. Although the effect wouldn't convince anyone that I had actually used an AKG 451 or a Neumann U 87, the modeling did subtly improve the track. Subsequent tests with condenser mics on both vocal and instrumental tracks yielded results that were even more pleasant. I was especially impressed with the improved sound of my dulcimer when I plugged its piezo pickup in to the VS-2480's high-impedance input and selected Line-to-Microphone from the mic-modeling presets.

Speaker modeling is another cool tool. Optimized for Roland's DS-90A and DS-50A digital powered monitors, speaker modeling allows you to quickly check your mixes on a variety of virtual speakers without investing a lot of money. In addition to models of studio stalwarts, a collection of boom boxes and TV speakers is included. Although I do not have access to the Roland monitors, I felt confident that the modeling created a usable reference of what my mixes would sound like on other systems.

PADDED PHRASEOLOGY

You can record and edit your own samples or import them from CDs or removable media into the VS-2480. By toggling a software switch visible in the Channel View screen, you can cause a channel's Track Status button to function as a sampled-audio trigger called a Phrase Pad. Because the Phrase Pads trigger the first chunk of audio data on the track, virtually the only limitation to sample length is disk space.

You can play the Phrase Pads in real time, but they're not Velocity sensitive. The real fun, however, starts when you access the Phrase Pad Sequencer. You can configure any of the 24 recorder tracks as sequencer tracks for the Phrase Pads. Phrase Pad sequencing supports both real-time and step entry, with or without quantization. After importing some loops from a CD, I could sketch out a complete song with just a few button presses—great for remixing. Sequenced tracks are fully editable. All of the channel's EQ, dynamics, and effects routing remain active when you're using the Phrase Pad Sequencer.

AUTOMIX

Although I own a dedicated control surface, I prefer mixing on the VS-2480 to using my own system; I can work faster on the VS-2480. Its faders, knobs, and switches feel significantly more responsive than my MIDI-based system, with one exception: there is a noticeable lag when unmuting a channel in real time.

Onboard automation extends across all input and track channels, sends, returns, and the master bus. You can write and edit dynamics, EQ, surround parameters, and effects patches with almost microscopic detail. Mix data appears on the display, where you can scale, trim, copy, and move it just like audio data. A selection of gradation curves helps to ease transitions between punch-ins and punch-outs. Automix also supports snapshot automation of mixer scenes.

I really appreciate Automix's flexibility and control, but not everything is rosy. Mix information doesn't flow with audio edits, and effects automation is limited to selecting patch changes. Making dynamic changes to effects parameters requires connecting a sequencer and sending MIDI controller data.

PRODUCT SUMMARY

Roland
VS-2480
digital audio workstation
$4,495

FEATURES	4.5
EASE OF USE	3.5
AUDIO QUALITY	4.5
VALUE	4.5

RATING PRODUCTS FROM 1 TO 5

PROS: Excellent sound. Plenty of inputs. Flexible routing. Motorized faders. Mouse and VGA monitor support. Drag-and-drop editing. Multiple sampling rates and word lengths. Onboard sampling and sequencing.

CONS: CD-burning functions confusing. Onboard automation doesn't extend to effects parameters. No status light for phantom power. Obtrusive fan noise. Only one (expensive) CD recorder supported.

Manufacturer
Roland Corporation U.S.
tel. (323) 890-3700
Web www.rolandus.com

GLYPH

&

Sam Ash®
THE MUSICAL INSTRUMENT MEGASTORE™

Glyph and Sam Ash have partnered to provide you with complete digital audio storage solutions and service of the highest quality.

Digidesign's Digi 001 with X-Project FireWire Hard Drive

High Performance, Hot Swappable Drives for Digidesign Pro Tools | HD

M Project: available as Single FireWire Drive, Drive + 4 Port Hub, or Dual FireWire Hotswap

Sam Ash®
THE MUSICAL INSTRUMENT MEGASTORE™
www.samashmusic.com

samash.com
The on-line musical instrument megastore!
www.samash.com

GLYPH
www.glyphtech.com

Ithaca, New York 14850 | 800.335.0345 | Fax: 607.275.9464 | www.glyphtech.com

THE MASTERING ROOM

The Mastering Room is a screen that provides access to useful functions such as inserting effects across the master bus, bouncing tracks internally, and playing back master tracks. It is also the place to go when you want to perform CD-R operations.

Creating the master tracks is a breeze. I selected one of the preset Mastering Tool Kit effects chains containing a well-thought-out selection of equalizers, frequency-based dynamics, and other enhancement tools. By default, the stereo mixdown tracks are recorded to virtual track 16 on tracks 23 and 24, but you can select any open virtual track. To facilitate CD burning, I chose CDR mode to create an interleaved pair of tracks, but the VS-2480 will burn CDs from any pair of 44.1 kHz tracks; the VS-2480 dithers the signal when lowering bit depth.

After mastering several other songs, I was ready to compile a playlist and burn a CD. I had to read the manual several times to learn where to begin. The manual is generally quite good, but the CD-burning section needs work. Most unfortunately, the VS-2480 supports only the optional VS-CDR11 CD recorder ($750). It's a fine unit that works well with any Mac or PC that has a SCSI interface, but I can't imagine why Roland doesn't support any third-party drives.

Because I had recorded each song as a separate Project, I was left with two choices: write the tracks one at a time

VS-2480 Specifications

MIXER	
Channels	24 inputs, 24 tracks, 16 aux returns (all available simultaneously at mixdown)
Faders	16 channel, 1 stereo master (60 mm, motorized)
Analog Inputs	(8) XLR balanced mic; (16) balanced ¼" TRS mic/line; (1) unbalanced ¼" high impedance
Analog Outputs	(2) balanced ¼" TRS master; (2) balanced ¼" TRS monitor; (2) balanced ¼" TRS aux A; (2) balanced ¼" TRS aux B; (2) ¼" stereo headphone
Digital I/O	(1 pr.) RCA S/PDIF; (1 pr.) optical S/PDIF; (2) DB-25 R-Bus
Dynamics Processors	compressor/expander × 24 inputs + 24 tracks
EQ	4-band parametric, single-band filter × 24 inputs + 24 tracks
Effects Processors	2 stereo multi-effects; expandable to 8 stereo
Sampling Rate	32, 44.1, 48, 88.2, 96 kHz
ADCs/DACs	16-bit, 24-bit
Internal Processing	56-bit
Scene Memory	100 (10 × 10 banks)
RECORDER	
Hard Drive	40 GB 3.5" IDE standard; expandable to 128 GB maximum
Songs	200 max. per 10 GB partition
Song Size	10 GB max.
Physical Tracks	24
Virtual Tracks	16 per physical track
Simultaneous Record/ Playback Channels	16/24 max.
Markers/Locate Points	1000/100 per song
Undo/Redo Levels	999/1
PHRASE PADS	
Trigger Pads	24
Playback	24 mono voices
Max. Playback Time	24 hr.
Sequencer	24 tracks
GENERAL	
Display	320 × 240-pixel, backlit LCD
MIDI Ports	In, Out/Thru
Peripheral Ports	(1) mini DB-15 640 × 480 VGA out; (1) 6-pin DIN PS/2 mouse; (1) 6-pin ASCII keyboard DIN; (1) DB-25 SCSI
Additional Ports	(1) BNC word-clock input; (1) RCA SMPTE input; (1) ¼" footswitch input
Dimensions	24.48" (W) × 5.48" (H) × 20.50" (D)
Weight	26.5 lb.

using Track-at-Once recording or create a new Project, import stereo master tracks from the original Projects, and edit the phrases together, dropping CD markers at the start of each song. Although time-consuming, the latter approach proved easier to take than to describe. After completing those tasks, I simply selected Disc-at-Once recording and created a fully compliant Red Book master CD for professional duplication.

By the way, you can also convert phrases and tracks to WAV files and burn them to CD for remote editing. Likewise, you can import WAV files and use them in any Project.

THE WELL-TEMPERED STUDIO

The VS-2480 is a serious tool for the experienced recordist. It offers plenty of tracks for all but the biggest projects, and if the need arises, you can chain together multiple VS-2480s. Although some users might be put off by Roland's R-DAC coding scheme, I could hear no loss in audio quality in the MTP and MT1 modes; besides, bypassing R-DAC is simple. Features such as drag-and-drop editing, the Phrase Pad sequencer, and ports for an ASCII keyboard and a VGA monitor blur the lines between a hardware recorder and a computer-based DAW. I'd much rather work on the VS-2480 than my own computer-based setup for tracking and mixing, and that's saying a lot.

The VS-2480's excellent mixer provides ample inputs and outputs for most situations. Adding a pair of ADA-7000s ($1,295) brings the total to 24 mic preamps, more than any other digital mixer in the VS-2480's class. No digital mixer is completely user-friendly, but the VS-2480 comes close. Although the learning curve is substantial, it's not bad considering all the features and the depth of control that the VS-2480 offers.

My wish list is short. Assembling a playlist for CD burning is awkward and needs improvement. I'd prefer a hardware switch and status light for phantom power. In a one-room studio such as mine, the fan noise can be a hindrance. I'd also like to see support for third-party CD burners.

The VS-2480's feature set makes the unit a serious contender in the battle of the DAWs. Roland states that by the time you read this, the external VGA display will show mouse and cursor actions, including waveform views. When you add the CD burner and options such as additional effects cards, the VS-2480 isn't cheap, but it is a solid value. With so many thoughtful features, the VS-2480 is an outstanding remote recording rig. If you're looking for a serious all-in-one recording tool, you would be wise to consider the Roland VS-2480.

Mark Nelson *dreams of packing his studio into a shoe box. He lives in southern Oregon and divides his time between performing, recording, and playing with the dog. Thanks to Lori Jo Larsen and her excellent band for their help.*

NATIVE INSTRUMENTS

REAKTOR 3.0 (MAC/WIN)

An impressive array of synthesizers, samplers, and effects processors.

By Len Sasso

With the release of version 3.0, Native Instruments' *Reaktor* has come of age. This update features a redesigned audio engine that offers greater CPU efficiency; new Modules, such as a granular sampler, analog-filter emulations, data tables, and an *x-y* controller; and a reworked user interface. Although Native Instruments hasn't magically turned the fine art of building *Reaktor* Ensembles into child's play, it has significantly expanded the large Ensemble library that comes with *Reaktor* (see the sidebar, "A Trip to the Library" for a summary of some of the Ensembles). Whether you decide to dive in to the tangle of objects and wires that make up a *Reaktor* Ensemble or just take advantage of *Reaktor*'s vast library of synthesizers, samplers, and effects processors, you'll find a variety of unique and challenging sound-design tools at your fingertips.

The *Reaktor* package includes a standalone version as well as VST 2.0 and DXi Instrument and effects plug-ins. (The plug-in versions now include the same editing features as the standalone version.) For audio I/O and streaming, there's support for DirectSound and ASIO on the PC, and ASIO, DirectConnect, and MAS on the Mac. Windows MME and Open Sound Control (OSC) handle MIDI on the PC, and Open Music System (OMS) and FreeMIDI perform that job on the Mac. The Mac and PC versions of *Reaktor* are now separate packages, and both employ a USB key (dongle) for copy protection (a parallel-port key is also available for the PC). Consequently, the huge Enigma file and frequent calls for the *Reaktor* CD-ROM, familiar from previous versions, are gone.

As with all software synthesizers, performance, sound quality, and latency depend on CPU speed, available RAM, audio drivers, and, when used as a plug-in, the host application. For this review, I used both a Mac G3/300 MHz with an Emagic Audiowerk8 PCI card running OS 8.6 and a Pentium III/700 MHz with an Emagic EMI 2/6 USB audio interface running Windows 98SE. For VST operation, I used Emagic *Logic Audio* 4.7.2 as host on each platform. The sound quality was excellent on both computers, but performance and stability were significantly better on the PC. You can download the latest update and a time-limited demo version of *Reaktor* 3.0 from the Native Instruments Web site.

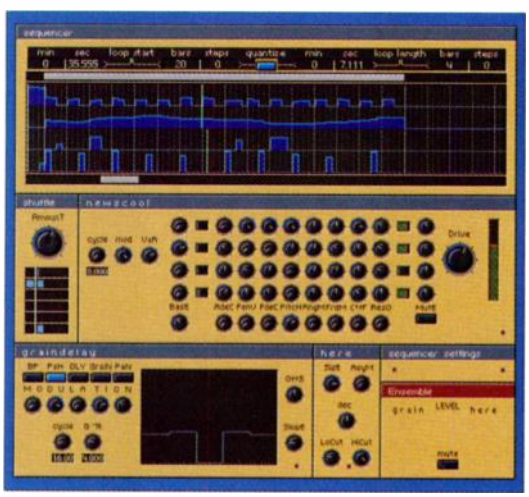


FIG. 1: The Control Panel window for the Newscool Ensemble contains the various subpanels for the individual Instruments that form the Ensemble. Global controls for the Ensemble, shown at bottom right, are found here as well. All of the panel settings can be controlled in real time.

WHO'S ON FIRST

The top level of organization in *Reaktor* is an Ensemble. Whenever *Reaktor* is running, an Ensemble is present. You interact with an Ensemble through its Control Panel and Structure windows. The Control Panel window is similar in function to the onscreen control panel of most software synthesizers and samplers. You need only be involved with the Structure window when you want to build or modify an Ensemble.

Minimum System Requirements

Reaktor

MAC: G3/300; 128 MB RAM; OS 8.6; free USB port; Opcode OMS or MOTU FreeMIDI

PC: Pentium II/500; 128 MB RAM; Windows 95/98/ME/2000/XP

Loosely speaking, Ensembles are made up of Instruments. Usually, Instruments are self-contained components such as synthesizers, samplers, effects processors, and step sequencers. Instruments are wired together to form the completed Ensemble. The reward for dealing with that extra level of complexity is that Instruments can be saved for reuse in other Ensembles. *Reaktor* comes with a large library of Instruments, letting you create custom Ensembles without getting too far into the guts of *Reaktor* programming. *Reaktor* loads only one Ensemble at a time, but each Ensemble can contain Instruments that respond on their own MIDI channel. That is *Reaktor*'s approach to multitimbral setups. For a detailed look at *Reaktor* programming, see "Building a Reaktor" in the September 2000 issue of **EM**.

Fig. 1 shows the Control Panel for *Reaktor*'s Newscool Ensemble. Newscool is a drum synthesizer combined with a 4-track step sequencer, granular delay, and reverb. (Check out reaktorexample1.mp3 at www.emusician.com for an example of Newscool in action.) As you can see, the Control Panel is divided into subpanels, each with a bluish gray title bar indicating its name. (The selected panel, Ensemble, is in red.) The subpanels contain the controls for the individual Instruments that make up the Newscool Ensemble. Notice that one of the subpanels (at the bottom right) is labeled Ensemble. It contains global controls rather than controls belonging to a particular Instrument. In this example, they control the mix levels for the dry, delay, and reverb signals.

Each *Reaktor* Instrument also has a Control Panel window that you can open by double-clicking on the empty

We know what you've been waiting for.

And here it is.

Introducing the new MRS-1044CD hard disc recorder from Zoom.

OK, we know you want to upgrade to crystal clear digital recording. We know you want a big hard drive, and the ability burn a CD. And you want it at an affordable price. Well friends, here it is. The MRS-1044CD has a 40 GB hard drive for up to 120 hours of recording time, an internal CD-R drive, 10 pure digital tracks (and 100 virtual tracks), a built-in drum and bass machine, insert and mastering effects, even non-linear editing capabilities. Simply stated, your wait is over.

ZOOM®
CATCH US IF YOU CAN

The Zoom MRS-1044CD Digital Recorder

For more on the MRS-1044CD and other cool Zoom gear, check out www.samsontech.com or email info@samsontech.com.

space in the Instrument's subpanel. At first glance, having separate Control Panel windows might seem redundant, but it is a great convenience. Although the controls' appearance is the same in both windows, their visibility and placement can be different. That means you can have a minimal set of controls for an Instrument visible in the Ensemble Control Panel window, with a more complete set of controls accessible in the Instrument Control Panel window. Newscool's Sequencer Settings subpanel is an example—its controls are infrequently used, and space is saved by having them visible only in the Instrument Control Panel window.

In *Reaktor,* presets of control settings (programs or patches) are called Snapshots. Snapshots can be stored and recalled from *Reaktor*'s Toolbar, or they can be recalled with MIDI Program Change messages. The Ensemble and the Instruments all have their own Snapshots, which provides you with a lot of flexibility. You can automatically store and recall the Snapshots of any Instrument with those of the Ensemble, or you can choose to store the Instrument Snapshots separately—that is useful for Instruments such as sequencers and effects when you want to apply the same settings to different synthesizer Snapshots. Another convenience is that any individual control can be isolated so that Snapshots do not affect its setting. The management of Snapshot banks could be improved, however. For example, you can overwrite, insert, or append into an existing Snapshot bank, but there is no way to delete multiple Snapshots—you have to delete them one at a time.

For standalone operation, *Reaktor* comes equipped with a rudimentary Standard MIDI File (SMF) player as well as an audio-file player and a recorder. The audio-file player and recorder can stream files direct to and from disk or work with files in RAM. The SMF player is one of the few disappointments in *Reaktor.* You can start, stop, and return to the beginning of the file, but that's it. I found myself constantly wanting to know where I was in the MIDI file and to loop a few bars while testing various Ensemble features.

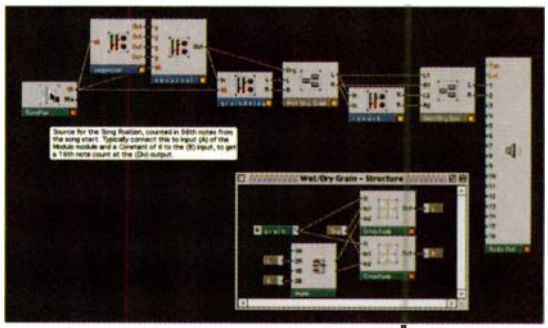


FIG. 3: The Structure window of the Newscool Ensemble contains a collection of Modules (SongPos and Audio Output), Instruments (objects with knob and fader icons), and Macros (objects with box and wire icons). The inset shows the Structure of the Wet/Dry Grain Macro above it.

TAKING THE WHEEL

One of the big changes in *Reaktor* 3.0 is the variety of onscreen controls. The biggest advance is the addition of interactive graphic controls. The Sequencer section of the Newscool Ensemble (the top subpanel in **Fig. 1**) uses two: the Event Table and the *x-y* control. The four rows of blue bars are four Event Tables, each of which displays a track of sequence data. You can enter data by drawing with the mouse, and there is a Context menu with a number of convenient operations such as rotating, mirroring, and scaling selected data.

The gray bars above and below the sequence displays that look like sliders are actually *x-y* controls. There are several modes of display for the *x-y* control, including the standard rectangle with a movable crosshair. The mode used here, called Shadowed Bar, provides independent control of the position of each end of the bar. The *x-y* control reports the mouse position, and Newscool's designer has used that feature to make clicking and dragging at the right end of either bar change the bar's length, whereas clicking and dragging in the middle of the bar changes its position. The top bar sets the sequence's loop (from the left end to the right end of the bar) relative to the sequence displays, and the bottom bar controls the zoom and position of the sequence displays. That added degree of graphic control takes Control Panel design to a new level in *Reaktor* 3.0.

Other graphic advances include three sizes of knobs instead of two, horizontal sliders and meters, slider and meter sizes definable in pixels, and independent settings for the visibility of a control's graphic, its label, and its numerical value. (You still can't enter values numerically by typing into a numerical field, however.) A new Bitmap object lets you include custom graphics in a Control Panel.

MIDI remote control. All *Reaktor* controls can be set up to send and receive MIDI Control Change (CC) messages. That allows you to use any hardware control surface to manipulate *Reaktor* controls. Setting up MIDI control is extremely easy using *Reaktor*'s MIDI Learn function, which assigns the next incoming MIDI CC message to the selected control and automatically deletes any previous assignment for that MIDI message. You can also use MIDI CC messages to automate *Reaktor* controls from your MIDI sequencer.

In a nice twist, MIDI CC messages can be routed internally, letting one *Reaktor* process automate another. The Newscool Instrument makes use of that feature to randomize its knobs in real time, synchronized to the sequencer clock. You can also use internal MIDI routing to create random Snapshots or to slave one group of controls to another.

Common tasks and the Toolbar. Aside from Control Panel programming, most *Reaktor* tasks can be carried out from the

FIG. 2: *Reaktor*'s Ensemble (top) and Instrument (bottom) Toolbars are where many critical operations are carried out. The Toolbars provide buttons and menus for easy access to the program's features.

TRITON Le

Heavy technology

Light edition

The TRITON Le takes the essential features of its namesake and distills them into one lean, mean, streamlined music workstation. It's packed with exciting new sounds as well as TRITON classics, a powerful sequencer, dual arpeggiators and SmartMedia™ storage — all at a remarkably affordable price. The newest member of the TRITON family also offers a sampling option that includes advanced editing and SCSI. TRITON Le: only the technology is heavy.

TRITON Le | TRITON

KORG

Toolbar, shown in **Fig. 2**. The top section, called the Ensemble Toolbar, is for global functions, including loading and saving Ensembles, turning audio processing on and off, indicating CPU load and audio I/O levels, and setting the audio sampling rate (for internal processing only). It's also where you manage the built-in MIDI File player and switch between MIDI Learn, panel locking, and onscreen hints. Many Ensembles come from *Reaktor* users and are without documentation. Onscreen hints (if supplied by the designer) provide the only clue to how an Ensemble works. I'd like to see some of the hints provided with the factory Ensembles enhanced a bit, as they are the first exposure most users have to *Reaktor*.

The bottom section, called the Instrument Toolbar, is where you carry out tasks associated with the selected Instrument. When you select an Instrument, its Title Bar turns red, and its name is displayed in the menu at the left of the Instrument Toolbar. Instruments can be selected by clicking on their Control Panel or using that menu. Buttons here let you open the Instrument's Control Panel, Structure, and Properties windows; mute and solo the Instrument; save the Instrument to disk (for use in other Ensembles); manage Snapshots; and set the number of voices and MIDI channel of the Instrument. If you select the Ensemble rather than one of its Instruments, those settings apply to it.

Managing CPU load is always a challenge with software synthesizers. With one as open-ended as *Reaktor*, it becomes doubly difficult—Ensembles built on someone's G4/733 MHz or Pentium III/933 MHz may bring your system to a dead stop. *Reaktor* provides several means, accessible from the Toolbar, for mitigating CPU load. One is reducing the internal audio sampling rate. Rates from 22.05 kHz up to 192.3 kHz are supported. The common choice is 44.1 kHz, but many Ensembles produce good-sounding results at lower rates. (Reaktorexample2.mp3 contains the same four-bar loop processed at 44.1, 33.075, and 22.050 kHz.) Another trick is to reduce the number of voices for one or more Instruments, and a third is to mute any unused Instruments. Muting an Instrument takes it out of the *Reaktor* signal path and completely reclaims its CPU drain. For example, muting Newscool's Grain Delay and Reverb Instruments cuts the CPU load by more than half.

What can you expect in terms of real-life performance? On my Pentium III/

A TRIP TO THE LIBRARY

Reaktor 3.0 comes with more than 200 ready-to-go Ensembles, and you can download more from the well-maintained User Library on Native Instruments' Web site. The Ensembles fall into four broad categories: synthesis, sampling, sequencing, and effects processing. (For a detailed description of 25 of the best in the collection, see the *Dynamo* 1.0.1 review in the December 2000 issue of **EM**.)

The synthesis group contains a number of emulations of classic synths, such as the Oberheim Two Voice, the Minimoog, the Roland Juno series, and the Roland SH-101. Several variations on the FM theme offer virtually any combination of operator sources and routing complexity you could want. Among my favorite synths were Uranus, which features a four-delay chorus and produces luscious pads; Matrix Modular, which lets you cross-modulate a wide variety of sound sources; a physical-modeling emulation called WeedWacker; and a mixture of three variations on wavetable synthesis called Virtuator.

Reaktor has a broad range of sampler Modules for everything from granular synthesis to pitch and formant shifting to beat-loop munging. My favorite Ensemble in the granular department is GrainStates, which uses *Reaktor*'s new Grain Cloud Module to manipulate every aspect of granulation—size and spacing of grains, pitch and pitch slide for individual grains, and the grain AD envelope. GrainStates combines that with a kind of meta-sequencer that steps through Grain Cloud setups. Another one not to miss is Kaleidophone4 (see **Fig. A**), which selects grains at random from a multisample and randomizes each grain parameter—an effect that reminded me of a video arcade run amok.

FIG. A: The Kaleidophone4 Ensemble in *Reaktor* is a granular resynthesizer that randomizes all grain parameters. It uses a collection of audio files (called a *map*) for its sound source.

The sequencer offerings are incorporated in the various synthesis and sampling Ensembles. Newscool is one of the more interesting of the drum sequencers. For beat-loop manipulation, my favorite is 6-Pack, which offers four independent beat-loop players and a pair of drum step sequencers. For an audio example using several of *Reaktor*'s multipad sequencers, download the MP3 file reaktorexample3.mp3 from www.emusician.com.

The selection of effects processors isn't large, but the main offering, GeekFX, gives a broad sampling of *Reaktor*'s processing capabilities. You can also scavenge most of the usual effects from various other Ensembles. Because *Reaktor* can be used as a VST and DirectX effects plug-in, the effects category is begging for expansion.

So many sounds. So little money. S03.

Features

- 756 Total sounds with quick access to all
- 64 Premium Yamaha digital effects
- Bundled Mac/PC sequencer, voice editor, and wave editor software
- 64-Note polyphony

Get Your S In Gear!

Over 750 extraordinary sounds (including the best of Yamaha's elite S80 synthesizer). Wild groove textures. High-end digital effects. And extensive software with hundreds of musical patterns and styles. All in one place for one oh-so-low price: just $499.* This is the Yamaha S03. With its S-Series heritage, stunning voices, and powerful tools, the portable S03 is the perfect synth for composing and performing – no matter what your budget. So don't wait; check it out today at a Yamaha DMI dealer near you.

YAMAHA DMI DIGITAL MUSICAL INSTRUMENTS
WWW.YAMAHASYNTH.COM

YAMAHA
CREATING 'KANDO' TOGETHER
WWW.YAMAHA.COM

700 MHz, Newscool with its delay and reverb running at 44.1 kHz takes up 30 percent of the CPU load. That is much better than in previous versions and is in part because of the major speed optimization that *Reaktor* 3.0 provides.

UNDER THE HOOD

Fig. 3 shows the Structure window of the Newscool Ensemble (slightly modified for visual clarity). On the Structure level, *Reaktor* uses three kinds of objects: Modules, Macros, and Instruments. Modules are the basic building blocks. Macros and Instruments are organizational units whose main purpose is to combine logical groupings of other objects in a single package, making them easier to work with. An added benefit is that Macros and Instruments can be saved to disk for use in other Ensembles. Instruments also have their own Control Panel and provide for multitimbral operation by having their own MIDI channel assignment.

All Structural objects have inputs and outputs for control (red) and audio (black) signals. Control signals use a much lower sampling rate and, consequently, use much less CPU—examples include panel controls (as the name suggests) and LFOs. Ensembles are built from the ground up by drawing wires between the inputs and outputs or by wiring together prebuilt Instruments. (If hints are turned on, placing the cursor over a wire will show the sound or event data passing through it, an essential feature for debugging.)

In addition to the *x-y* and Event Table Modules mentioned previously, several powerful new audio-processing Modules have been added in *Reaktor* 3.0. The Audio Table works like the Event Table but can be run at audio sampling rates. That lets you draw and manipulate your own waveforms. The Scanner Module crossfades between eight audio inputs, and the scanning rate can be in the audio range. Audio-rate scanning goes way beyond standard crossfading, producing a unique kind of crossfade modulation useful for all kinds of unusual effects.

Grain Cloud is a granular resynthesizer that works with multisamples and offers independent control of pitch, pitch slide, grain size, time between grains, and grain envelope. (Although drag and drop has been added to *Reaktor*'s multisample management, setting up keymaps is still rather rudimentary.) Multi-Tap is an eight-tap audio delay line. Finally, there are two new filters modeled on classic synthesizers: Pro-52 after the Sequential Prophet-5 and Ladder after the famously warm Moog filters.

DO IT YOURSELF?

Building a complex Ensemble from scratch is not for the faint of heart. On the other hand, it is not difficult to get sufficiently familiar with *Reaktor*'s Structure to make useful modifications to

the Ensembles that come from the factory or that are available online. You can easily swap one type of oscillator or filter for another, for example, to radically change an Instrument's sound. You can add an effect or a sequencer Instrument to a sound-generating Ensemble or replace one Instrument with another. You can quickly add a switch to the Control Panel to toggle an Instrument out of the signal path and retrieve its CPU load. In short, you can do a lot of customizing without becoming a *Reaktor* engineer.

The *Reaktor* 3.0 documentation is only a slight improvement on previous versions and is still cause for some serious head scratching. But, in conjunction with an active users group and the online library supported by Native Instruments, it is enough to get you over the hump. (You can join the users group and access the library at Native Instrument's Web site.)

POSITIVE REACTION

Reaktor is different things to different people. On the most basic level, you can simply use the factory Snapshots in *Reaktor*'s vast collection of preset synthesizers, samplers, and effects processors. On the next level, you can create your own Snapshots for the included devices and for Ensembles that you download from other users. Beyond that, you can do some basic customizing without spending a great deal of time mired in the Structure. On the highest level, you can create almost any audio software device you can imagine, but you'll spend considerable time doing it.

At $499, *Reaktor* seems a bargain on any level. Considering that a top-of-the-line single-purpose software synthesizer, sampler, or effects processor can cost half that amount, the price seems well justified for a package of hundreds of Ensembles, with downloadable additions coming all the time.

Len Sasso *can be contacted through his Web site at www.swiftkick.com.*

PRODUCT SUMMARY

Native Instruments
Reaktor 3.0 (Mac/Win)
software synthesizer/sampler
$499
update from version 2.x
$135

FEATURES	5.0
EASE OF USE	3.5
QUALITY OF SOUNDS	4.5
VALUE	4.5

RATING PRODUCTS FROM 1 TO 5

PROS: Large collection of prebuilt Ensembles. Excellent sound. Greatly improved graphics and controls.

CONS: Difficult to master on the deepest levels. Requires a fast CPU. Multisample management is awkward.

Manufacturer
Native Instruments USA
tel. (866) 556-6487
e-mail info@native-instruments.com
Web www.native-instruments.com

YAMAHA

MOTIF 8 MUSIC PRODUCTION SYNTHESIZER

A theme come true.

By David Battino

The dream is tantalizing: a single keyboard that can handle all your music-production needs, providing great sounds and effects and an intuitive sequencer to arrange and record them. I bought into the workstation concept years ago, but eventually, each of my workstations began to feel confining. To get the sound and features I wanted, I had to combine my underpowered instruments into an unholy alliance with various computers, sound modules, drum machines, mixers, and effects.

Just when I'd decided to start over with a single keyboard and a mass of software (admittedly still a trade-off), along comes Yamaha with a fresh take on the workstation concept. Not only does the Motif have compelling sound and features, including a sequencer that brilliantly combines digital audio and MIDI, but it's enormously expandable. Best of all, Yamaha designed the Motif to complement other gear (particularly computers) rather than replace it.

MEET THE FAMILY

The Motif family has three keyboards, differing only in the number and type of keys (and in price). The Motif 6 ($2,250) and the Motif 7 ($2,750) have 61 and 76 keys, respectively, and use the venerable Yamaha FS action, which has a snappy feel I've always liked. It's the same action found in two previous **EM** Editors' Choice winners, the Yamaha EX5 and the Korg Triton, the latter of which is the Motif's closest competitor.

The 88-key Motif 8 features a new hammer action derived from Yamaha's Clavinova digital pianos (see **Fig. 1**). To optimize the keys for playing the range of sounds that a synthesizer can generate, Yamaha added Aftertouch and made the weighting consistent across the keyboard rather than progressively lighter as on the Clavinova. Simply put, the Motif 8's keyboard feels fantastic. Coupled with its superb acoustic-piano sound and MIDI features, the Motif 8 is worth considering solely as a digital piano or a controller keyboard.

The Motif 8's construction quality is very good; the bulk of the case is made of metal, and the bottom is composed of thick pressboard. The Motif 6 and 7—the light Motifs, as it were—have sheet-metal undersides. From here on, I'll refer to all models collectively as the Motif.

MAKE YOURSELF AT HOME

Contrasting with its angular lines and cold silver finish, the Motif has a friendly control layout. The buttons feel substantial, and the ones that toggle values (muting and unmuting sequencer tracks, for example) have integrated LEDs—a welcome feature. At the left of the front panel are four multifunction knobs, four sliders, and a bank of sequencer transport controls. By pressing the Remote Control button above them, you can assign those controls to operate a computer-based sequencer instead of the Motif's onboard sequencer. The front panel also provides handy bypass buttons for global and insert effects.

Moving to the right, you'll find the 240-by-64-pixel backlit LCD and its 11 page buttons that map clearly to tabs on the screen. An Information button lists settings such as the current pitch-bend range, but I wish it had gone further. Many parameters in the Motif have baffling names; it would be great if you could point to a term such as Normalize Play Effect or INS1P10, click on the Info button, and read what it means. The Akai MPC60 had that feature more than a decade ago, and it sure beats digging through the manual.

Still, I like the layout of the cursor buttons and Data wheel, and someone put a lot of thought into the matrix of buttons at the far right (see **Fig. 2**).

SOCKET TO ME

All of the Motif's connectors are on its back (see **Fig. 3**). I would have preferred the headphone and breath-controller jacks on the front, under the wheels.

FIG. 1: Yamaha cherry-picked features from its samplers, synthesizers, groove boxes, and digital pianos to build the Motif, a remarkably flexible and relatively affordable workstation.

Save Trees.

Introducing the new RhythmTrak RT-323.

It's the closest thing yet to real drums. 64 incredible sounding drum kits that you can mix and merge. Plus 55 electric and acoustic basses that can be programmed from the piano-style keypads.

Adjust sound parameters like drum tuning, tempo, bass key transposition, stereo panning and even signal processing. All 24-bit, with full MIDI implementation.

The RT-323 is everything you need to create huge sounding rhythm tracks. Not to mention what you'll be doing for the environment.

ZOOM®

CATCH US IF YOU CAN

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

DAVID BATTINO

FIG. 2: This 32-button grid is the key to piloting the Motif. Here the Motif is in Track-Mute mode; other modes let you quickly select sounds, tracks, sequences, and oscillators.

I'm also disappointed that the Motif accepts only normally closed footswitches rather than detecting pedal polarity on startup.

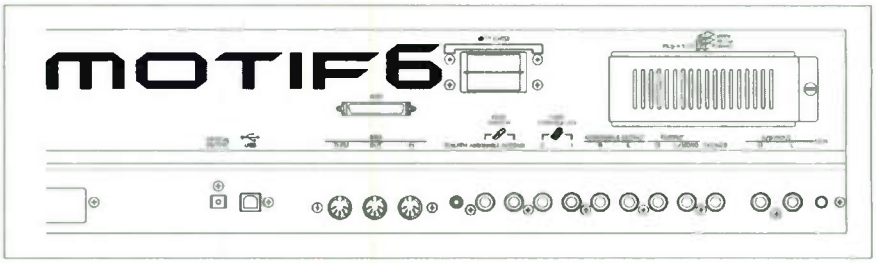
In addition to stereo analog outputs, the Motif has two individual analog outs and an optical S/PDIF output that duplicates the main stereo outs. (The digital output can be set to 20- or 24-bit format, and the analog outputs use 24-bit digital-to-analog converters.) Stereo analog inputs are available for sampling or real-time effects processing. You can plug a microphone, a guitar, or another electronic instrument in to the Motif and sing or play along; you can add as many as three effects to the input signal and record the performance (up to about six minutes) as a stereo sample.

One of the Motif's best features is its connectivity. The keyboard comes standard with SCSI, USB, and SmartMedia ports for transferring data (see www.emusician.com for background about SmartMedia). For additional audio I/O, you can install an AIEB2 or an mLAN8E expander. The AIEB2 ($269.95) provides six ¼-inch analog outputs (configured as three stereo pairs) as well as stereo S/PDIF I/O. Coaxial and optical S/PDIF connectors are included, but you can use only one stereo input at a time.

The mLAN8E ($699.95) offers three FireWire connectors that support Yamaha's Music Local Area Network (mLAN) specification. It adds six

assignable outputs, another stereo I/O, and a three-port (48-channel) MIDI I/O on a single cable; the extra two jacks facilitate networking with other mLAN gear. It's not possible to use the mLAN8E's stereo input at the same time as the Motif's built-in analog inputs, but the 8E does offer another feature: it can be used to route an additional eight audio channels from external mLAN devices, each with EQ and dynamics processing.

Perhaps the most exciting Motif upgrade option is Yamaha's PLG series of synthesizer and effects plug-in boards ($170 to $350); you can install three of them in the Motif. Unlike typical expansion boards, which simply add new waveforms, the instrumental PLG boards are complete synthesizers. For less than $350, you can add the equivalent of a DX7, a five-note AN1x, a VL70m, a digital piano, or an XG sound module to your Motif, simultaneously increasing the instrument's polyphony and multitimbral capability. A sixth PLG board, the PLG100-VH, adds an additional effects bus and vocal-harmony effects. More boards are in the works. **EM** reviewed five PLG boards in the November 2000 issue, which you can read online.



COURTESY YAMAHA CORP OF AMERICA

FIG. 3: The Motif offers extensive interfacing potential; USB, SCSI, and optical S/PDIF (output only) are standard. The port on the left accepts additional I/O modules. You can also install as many as three synthesis and effects daughterboards in the unique plug-in bay at the top right.

SYNTH CITY

The Motif is a sample-playback instrument; the basic structure in its synthesis architecture is an Element (see **Fig. 4**). An Element consists of an oscillator, a filter, and an amplifier, each with a five- or six-stage envelope generator, and a common LFO and EQ. The oscillators play mono or stereo samples with a corresponding impact on polyphony. As many as four Elements can be combined to form a Voice, which is the primary object you select and play from the keyboard. A four-Element Voice with two stereo and two mono oscillators, therefore, consumes six notes of

the Motif's 62-note polyphony. For each Element in a Voice, you can specify the Velocity and note range to create layers and splits.

Multiple filter and LFO types provide a great deal of flexibility. With the included computer-based *Voice Editor* (Mac/Win), you can even change the filter and LFO shapes. The "analog" and bandpass filters have a satisfying moistness. You can sync LFOs to the sequencer or arpeggiator for a propulsive rhythmic effect. Check out some MP3 examples at www.emusician.com.

Each Element can be routed through one or both insertion effects configured in series or parallel. You can then bus the composite signal to global effects (reverb and chorus, again in series or parallel) and a 5-band EQ. You could spend days exploring the effects (which sound great) and not just because they are woefully undocumented in the manual.

You can also layer and split multiple Voices to form Performances. Performances can also contain Voices from PLG cards and live signals from the Motif's stereo inputs. At some point, you could hold down two keys and use your entire polyphony, but it would be glorious. Another bonus of the Performance structure is that you gain an additional global effect called Variation, which offers algorithms designed to add an edge to the sound, including distortion, compression, wah, and EQ.

A second Voice type, the Drum Voice, is designed for constructing drum kits. For each key, you can configure panning (including dynamic panning), three effects, the physical output jack, highpass- and lowpass-filter cutoff and resonance, the amount of pitch change in response to Velocity, and even a three-stage amplitude envelope. When it's paired with the Motif's gargantuan supply of high-quality drum samples and its ability to play back user samples, the instrument is especially strong for drum parts.

The Motif also features the innovative Master mode, which lets you select Voices, Performances, Patterns, Songs, and four-zone MIDI controller setups from a single bank. For example, you could set Master preset 1 to call up Performance A15, preset 2 to select Voice D2, preset 3 to select Song 2, and so on. That is a terrific feature for live performance, when you just want to grab a sound or a backing track without having to worry about what type it is or its location.

FIG. 5: Editing events in the Motif sequencer would be easier if it used ties to indicate when notes are sustained longer than one measure. Here the highlighted note sustains for 16 beats and 86 ticks. Although the note ends in bar 5, you won't see any indication of that there.

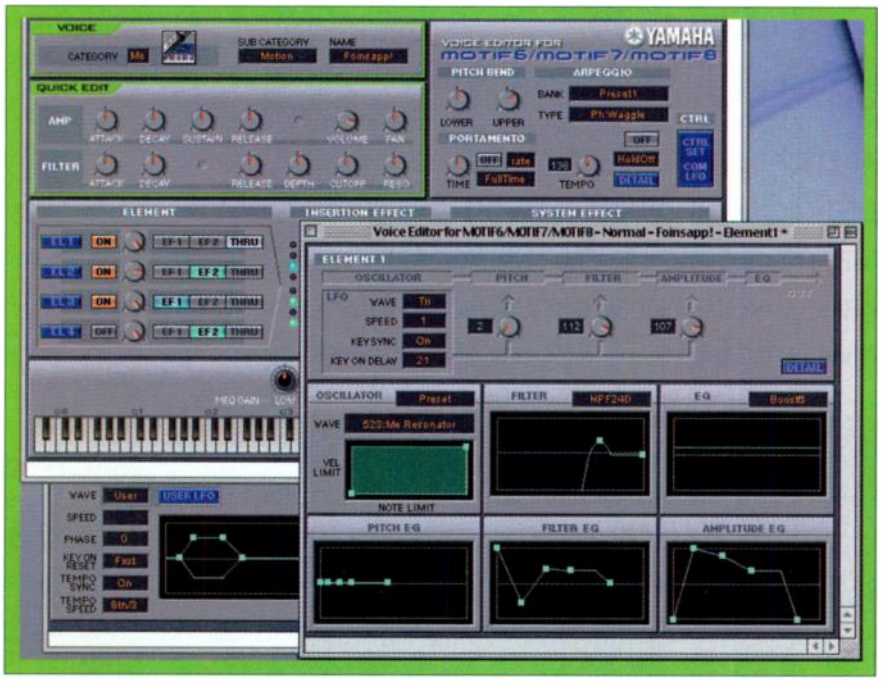


FIG. 4: A basic Motif patch, called a Voice, has as many as four oscillator-filter-amplifier layers called Elements. This shot from the bundled *Voice Editor* shows the envelope settings for a single Element.

SOUNDS ABOUND

Note the text under the top two rows of buttons of the Motif's 32-button grid. Voices and Performances on the Motif are organized into 16 categories, such as brass, strings, and organ. Finding the sound you want is simple; just press the Category Search button and then a category button. A menu will appear, and you can scroll down it to try each sound. Amazingly, this feature even works while the sequencer is running, though the Voice's effects settings will be replaced by the settings for the current track. If you find more than one sound you like, just click on the Set tab, and it will be marked as a Favorite. The sound will then be accessible from the Favorites menu.

My first impression of the presets was that many are piercingly bright. I suppose it's better to be shrill than dull, especially with the EQ knobs right at hand. As I started sequencing, the sounds

Manny's Music

The Original Music Superstore

PRO AUDIO!

THE NUMBER 1 CHOICE FOR PRO AUDIO GEAR!

Aardvark Pro Q10

Direct Pro Q10 is a computer based digital multi track recording solution from Aardvark. Powerful DSP-based virtual mixing software eliminates the need for an external outboard mixer.

Zoom MRS-1044 Digital Multitrack

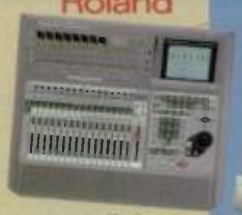
The MRS-1044 is a digital multi track workstation, featuring 10 audio tracks, a programmable stereo drum track and a programmable bass track for a total of 13 tracks.

ZOOM

Roland VS 2480 24 Track

Roland

The VS-2480 is the first self-contained recording workstation to offer 24-track/24-bit digital recording with 64-channel digital mixing, onboard effects processing and optional CD burning.



Yamaha Motif-8 88-Note Workstation

MOTIF combines the best features of a number of recent Yamaha products into an all-in-one music production workstation that will revolutionize the way music is made.

MOTIF

Novation SuperNova II Synthesizer

The Supernova II Keyboard features a 5 octave velocity sensitive keyboard with aftertouch.

novation

Tascam DM-24 Digital Mixing Console

The TASCAM DM-24 is the first affordable digital mixer that combines 24-bit, 96kHz audio quality with highly flexible routing, extremely powerful built-in automation, built-in professional-quality effect and dynamics processing and parametric EQ.

TASCAM

Korg D1600

KORG

The Korg D1600 is a 16-track digital recorder that packs recording, mixing, and final CD mastering into a professional quality all-in-one unit.

Alesis Hard Disk Recorder

The HD24 from Alesis delivers 24 tracks of Hard Disk recording at an unbelievable price, and offering incredible performance and stability, thanks to Alesis' unique method of writing to the hard drive designed and built exclusively for recording music.

ALESIS

Millennia Media STT-1 Origin

Millennia's new STT-1 Origin is like having a large rack of vintage and modern outboard recording equipment with over 130 product combinations!

T.C. Electronics Voice Prism

VoicePrism is an entire vocal channel under preset control.

t.c. electronic

Mackie MDR24/96 Digital Multi Track

Mackie's new MDR24/96 is the perfect price-busting commitment to non-linear hard disk recording for the first time recordist or those replacing aging gear!

MACKIE

Avalon VT-747SP

AVALON DESIGN

The Avalon VT-747SP combines a creative STEREO tube-discrete Class A spectral-opto-compressor with a musical six band program equalizer, L-R output level and gain reduction metering and internal regulated power supplies in a 2U space.

Focusrite ISA-430

Focusrite

The ISA 430 is truly a "Producer's Pack", which combines the best of analogue and digital technologies, the first Focusrite product to include a range of different classic Focusrite modules in a single unit!

Presonus Digimax 8 Channel Microphone Preamp

PreSonus

The Digimax combines 8 channels of pristine mic preamplification with 24 simultaneous digital and analog outputs.

Mark of the Unicorn 2408MKII

Mark of the Unicorn, Inc

If you've been wishing for hard disk recording, the 2408mkII can now make your dream a reality at an affordable price. The 2408mkII gives you 24 simultaneous inputs/outputs for under a grand!

Tannoy System 800A

180 watts with 8" bass transducer.

TANNOY

Powered!

Event PS8

The PS8 by Event features an 8" Magnetically shielded low frequency driver.

Genelec 1030A

GENELEC

Bi-amplified Powered Studio Monitors ideal for nearfield monitoring, broadcast monitoring, video post production or where space is very limited.

Powered!

Emagic Logic Audio Platinum (Mac/PC)

Utilizing the most advanced software technology available.

emagic

Steinberg Nuendo

Nuendo is compatible with virtually every format available today, allowing sources from many different places to be easily integrated into your project.

Steinberg

AKG Solid Tube

AKG has combined the benefits of tube and solid state technologies so you get the much sought after warm sound provided by tube microphones with the reliability of state-of-the-art circuitry.

AKG

Manny's Music

The Original Music Superstore

156 West 48th Street (Between 6th & 7th Aves) NYC, NY 10036
Monday-Friday: 10am-7pm • Sat: 10am-7pm/Sundays: 12-6pm

Call: 212-819-0576

SERVING MUSICIANS SINCE 1935!

FREE FREIGHT! ON MOST ORDERS OVER $100!*

VISIT OUR WEBSITE @ www.MannysNYC.com

*Applies to orders shipped in the contiguous United States. Items that require special shipping due to size or weight are excluded from this offer. Manny's Music is not responsible for any typographical errors.

MENTION CODE MEM2

blended well, which is the point on a workstation. The raw samples were often quite rich, in contrast to some synthesizers in which the samples need effects to sound good. Here's an overview of the presets in the 16 categories:

Acoustic pianos are excellent; I felt as though I was playing a piano, not a synth. Several presets exploit stereo samples, and there are some expansive layers, as well.

Keyboard presets include a heaping smorgasbord of tasty electric pianos and clavinets. Velocity switching and a juicy touch-wah are used to expressive effect. Organ sounds also cover a wide, usable range. I especially liked the thunderous Sunday, a layered church organ that showcases the Motif's reverb.

Guitar presets are especially strong, with many benefiting from the Motif's musical distortion effects. It's surprisingly easy to "play" the virtual amps with Velocity. Basses are well represented. You get a big palette of detailed acoustics and electrics—several with a top octave of performance effects such as thumps and slides—along with subsonic synth rumblers and succulent filter effects.

Strings often have built-in vibrato, which isn't very effective to my ears, but many samples feature an organic rasp that makes them quite evocative. Brass didn't thrill me, but I'm a former French horn player. The Motif's solo brass seems bland, and its ensembles lack depth. You can overcome such shortcomings by adding a few sampled licks or the expressive leads on a VL plug-in board.

Reed and pipe sounds offer more character than the brass. Some include an appealing bit of growl or controlled breathiness, but they still don't scream "Buy me."

Synth leads ooze attitude and class. However, some, such as the luscious Singleline, exhibited gritty stair-stepping artifacts when I moved the pitch-bend wheel. Synth pad and choir sounds are satisfyingly deep and clear. Several exploit the Motif's fine-sounding filters for animation. Synth comps rate only a handful of presets, and chromatic percussion resembles an upscale General MIDI (GM) bank. The bell sounds are hampered by aliasing.

Drums and percussion are outstanding and extensive. From jazz brushes and stereo rock drums to crunchy hip-hop kits and grunts, it's hard to imagine that you won't find what you need. Sound effects and musical effects were included mostly to show off the Motif's synthesis prowess, I assume. A few might be useful as ambient backdrops, but many have a harsh quality that made me pass them by.

Motif 8 Music Production Synthesizer Specifications

Sound Engine	AWM2 (sample playback)
Keyboard	88-key; transmits Velocity, Channel Pressure
Polyphony	62 notes + polyphony of any plug-in boards
Multitimbral Parts	16 plus maximum of 18 from plug-in boards
Voice Memory	ROM: 384 preset + 48 preset drum kits; 128 GM + 1 GM drum kit RAM: 128 user + 16 user drum kits
Performance Memory	RAM: 128 user
Master Memory	RAM: 128 user
Waveform ROM	48 MB, Linear Predictive Coding (LPC) compressed; 1,309 total multisamples and drum samples
Sample RAM	4 MB standard; 64 MB max.
Sample Rates	5.5125, 11.025, 22.05, 44.1, and 48 kHz; 16-bit stereo
Sample Import Formats	Akai S1000/3000; Yamaha A3000/4000/5000 and SU700; AIFF; WAV
Filters	(1) 4-pole resonant multimode; 21 types
Effects Processing	(2) insert effects (104 types); (3) global effects; (1) global 5-band EQ
Arpeggiator	256 ROM patterns; 128 user patterns
Sequencer	(16) tracks; (110,000) notes; (64) songs; (1,024) patterns; 128 ROM/256 user phrases; 480 ppqn resolution; SMF import/export
Real-Time Controllers	(1) pitch-bend wheel; (1) mod wheel; (4) assignable knobs; (4) assignable sliders; (1) rotary encoder
Audio Outputs	(4) unbalanced ¼" TS; (1) optical S/PDIF; (1) ¼" stereo headphone
Audio Inputs	(2) unbalanced ¼" TS
MIDI Ports	In, Out, Thru
Additional Inputs	(1) SCSI; (1) USB; (1) sustain pedal; (1) assignable footswitch; (2) assignable footpedal; (1) breath controller
Expansion Board Slots	(3) Modular Synthesis Plug-In System (PLG series)
External Memory	SmartMedia (128 MB max.)
Display	240 × 64-pixel backlit LCD
Dimensions	57.4" (L) × 6.5" (H) × 18.3" (D)
Weight	59.4 lb.

WHAT REALLY MATTERS IS THE SOUND

"Sonically, the 830 excels with its 24-bit AD/DA converters. The 24-bit Delta-Sigma D/A converter has a beautiful, warm, balanced sound, clear in the highs with excellent stereo separation. The CDR830 BurnIT is ideally suited for use in the recording studio or broadcast environment. The sound quality is superb, and the unit has the usual HHB reliability."

Candace Horgan
Mix, April 2001

"...one of the main reasons to get a stand-alone CD burner is sound quality, and here is where BurnIT really excels. I have found all of HHB's CD recorders to have excellent audio quality ... I just know what my ears tell me – that the BurnIT sounds great."

David Darlington
HomeRecording, June 2001

HHB Communications USA Inc · 1410 Centinela Avenue, Los Angeles, CA 90025-2501, USA
Tel: 310 319 1111 · Fax: 310 319 1311 · E-Mail: sales@hhbusa.com

HHB Communications Canada Ltd · 260 King Street East, Toronto, Ontario M5A 4L5, Canada
Tel: 416 867 9000 · Fax: 416 867 1080 · E-Mail: sales@hhbcanada.com

HHB Communications Ltd · 73-75 Scrubs Lane, London NW10 6QU
Tel: 020 8962 5000 · Fax: 020 8962 5050 · E-Mail: sales@hhb.co.uk

www.hhbusa.com

HHB

FIRST WE LISTEN

Combi patches offer the most instant gratification; many of them are splits and layers with arpeggios that play drum grooves. The cheerfully obnoxious GuitarRox, for example, plays a two-bar rock beat and splits the keyboard into one-finger power chords at the bottom, guitar chunks and noises in the middle, and a distorted lead sound at the top.

ARPEGGIATE EVERYTHING

Because I reviewed the Korg Karma shortly before receiving the Motif (see the August 2001 issue), I was intrigued by this line in the Motif press release: "On top of an extensive range of rhythmic sequences, [the Motif] also features 'human' patterns such as the strumming of a guitar or the trilling of a flute. Instead of trying to duplicate these performances with complicated algorithms, Motif creates them by using real MIDI data recorded by real musicians."

A motif is a short musical phrase. When I learned that many of the Motif's arpeggios were derived from Keyfax Software's excellent Twiddly Bits MIDI Samples, I expected the arpeggiator to be the highlight of the instrument. The Motif's preset phrases are handy, but they hardly compare with the Karma's "complicated" algorithms, which evolve as you play and respond in inspiring ways to numerous performance gestures. In contrast, the Motif's arpeggios just lope along. You can alter the pattern by changing the number of keys you're holding down, and you can trigger new arpeggios (such as the flute trill) with Velocity, but that's all.

▼ The Motif is designed to complement other gear (particularly computers).

However, the Motif's arpeggiator has one feature the Karma doesn't have yet: the ability to load user-created arpeggios. You can even export licks from the sequencer, though it was hard to predict the results. Keyfax plans to offer new arpeggios—including natural instrument articulations and synth effects (gating, portamento, and other gestures)—so it's worthwhile keeping an eye on the programmable-arpeggio feature.

IT PAYS TO RECYCLE

The true highlight of the Motif is its sampler, which works in tandem with the onboard sequencer to create a music-production environment that rivals a computer. As a sequence plays, you can sing or play another instrument into the Motif's inputs, recording onto any one of its 16 tracks in mono or stereo. New samples are saved along with the sequence, and the Motif records a single MIDI note on that track to trigger it at the right moment during playback.

Now suppose that, after refining your song, you decide it should be faster or slower. You don't need to mess with time-stretching algorithms, but if you prefer to use them, the Motif offers them in both real-time and file-based varieties. Instead, invoke the Slice command, and your sample will be chopped into individual beats and subbeats—each mapped to an adjacent MIDI note—while the Motif stealthily updates the MIDI sequence with the new notes. You can then change the tempo over an astonishing range (sometimes as

GETTING MOTIFATED

One of the best reasons to consider the Motif isn't packed in its oblong cardboard box. To complement the instrument, Yamaha hired Keyfax Software to create Motifator.com, an outstanding information resource for the Motif series. Along with the expected audio demos, you'll find downloadable patterns and patches, detailed tutorials, a schedule of upcoming clinics, and MotifMart, a comprehensive collection of Motif accessories and upgrades. Although the prices for some items (notably RAM) are higher than elsewhere on the Web, all products are guaranteed to work with the Motif.

What makes Motifator.com essential viewing, though, is the lively Motiforum, a categorized discussion area with thousands of opinions, answers, and tips from Motif owners. Want to know how others think the Motif stacks up against the Korg Triton, how to prevent parts from cutting out in dense sequences, or how to configure Cakewalk *Sonar* for remote control? Punch up www.motifator.com.

Keyfax President (and **EM** "Vintage Page" columnist) Julian Colbeck and I spoke at length about Motifator.com. Colbeck was brought in to consult on the Motif when it was still codenamed Kangaroo. In the midst of wrapping up a two-hour tutorial video to be distributed free through the site, Colbeck noted that what Keyfax and Yamaha are doing isn't rocket science. The forum and the e-commerce sections of Motifator.com are built on publicly available templates. What's surprising, he said, is that synthesizer manufacturers have historically treated their instruments as disposable, churning them out and then moving on to the next model.

Surfing through Motifator.com, it's easy to see how seriously Yamaha is taking its customers. As I completed this review, Yamaha representatives had contributed more than 1,000 authoritative postings on the inner workings of the Motif and were even soliciting ideas for new sound banks—to be distributed free. That level of support is virtually unprecedented, but for an instrument as powerful and complex as the Motif, it's welcome.

We want to turn the live power amp category upside down.

Ever wonder how come some of today's power amps cost so much? We did.

So we wondered what would happen if we offered the same huge output, sparkling audio, crucial protection and all the essential connections — only at half the price.

For example, our muscular S2000 produces 1000 Watts* of pure power per side. Its wide, linear frequency response, and fast attack means it delivers crushing sound for all types of audio. It features twin temperature controlled fans, industry standard bi-polar design, and every connection you'd ever need. But the S2000 costs $539**.

So why are the other guys charging twice the price? Beats us.

There's an S Series amplifier for every live sound requirement. Each offers the same performance for dollar ratio. Visit our web site and compare our specs and features with the competition.

*S700 – 325 Watts/side**
*$339***

*S1000 – 500 Watts/side**
*$399***

*S1500 – 750 Watts/side**
*$469***

*S2000 – 1000 Watts/side**
*$539***

SAMSON

For more information write to Samson Technologies Corp., P.O. Box 9031, Syosset, NY 11791, call 516-364-2244, email info@samsontech.com or visit www.samsontech.com.

*into 4 ohms. ** The S700, S1000, S1500 and S2000 have MSRPs of $479.99, $549.99, $649.99 and $749.99 respectively. Available at your dealer for the prices above.

PRODUCT SUMMARY

Yamaha

Motif 8 Music Production Synthesizer
keyboard workstation
$3,250

FEATURES	4.5
EASE OF USE	3.0
AUDIO QUALITY	4.5
VALUE	4.5

RATING PRODUCTS FROM 1 TO 5

PROS: Excellent sounds and search feature. Tightly integrated sampling and sequencing. Highly expandable. Outstanding online support.

CONS: Only two insertion effects. Baffling nomenclature. Convoluted sequencer. Slow file transfers. Rudimentary sample editing.

Manufacturer

Yamaha Corporation of America
tel. (714) 522-9011
e-mail info@yamaha.com
Web www.yamahasynth.com

wide as 100 bpm), and the sample stays in sync, without watery artifacts. You can also choose to have the Motif slice the sample as it's recording it.

The beat-dicing technique, pioneered in Propellerhead *ReCycle,* works best with rhythmic samples, though it does impart an interesting pulse to sustained tones. A related function called Loop-Remix can shuffle and reverse random slices, which is handy for turnarounds. For straight vocals and acoustic overdubs, you can simply use single-note sampling as you would use tape or a hard-disk recorder.

The Motif's stock 4 MB of RAM provides about 24 seconds of stereo recording time at the maximum audio quality of 16 bits and 44.1 kHz. You can increase that to a bit more than six minutes by installing two 32 MB SIMM boards. The 64 MB maximum might seem skimpy, but remember that the Motif already has 48 MB of sounds onboard. It can also resample its own output, so you can load up a lavish multisampled instrument (the Motif reads Akai and Yamaha sampler CD-ROMs, including program parameters) and resample your performance. Most likely, the performance will use far less RAM than the source multisample. Resampling is also a good way to overcome the Motif's relatively small number of effects sends. You can keep altering the effects and resampling a track until you get the sound you want.

The Motif is not designed to replace a high-end sampler. Creating complex multisampled instrument voices is cumbersome; it lacks crossfade looping, and even adjusting loop points or trimming samples is frustratingly difficult. Fortunately, the Motif's computer connectivity makes it simple to blast samples over to a software editor, massage them, and dump them back. Yamaha provides *Tiny Wave Editor* (Mac/Win) for just that purpose. I wish the Motif supported more loop types than just forward looping and that it had the option to play material after the loop-end point when the key was released.

HIDING SEQUENCER

If sounds are the heart of a workstation, the sequencer is the brain. Unfortunately, it took me quite a while to learn to think like the Motif. On the surface, the sequencer provides Song and Pattern recorders, each containing 16 tracks. The idea is that you string a sequence of patterns into a song, and the manual claims you can do that in real time by pressing a single button corresponding to each pattern.

In reality, there is no object called a Pattern, though many screens use that word. Instead, you have Styles, which are 256-bar, 16-track sequences. Each Style has 16 variations called Sections, which you'd typically use to hold a verse, chorus, or fill. Each track of a Style or Section that contains data is called a Phrase. Each Phrase can be a Preset Phrase (meaning a drum pattern) or a User Phrase, which previous generations might have simply called a track, as it contains editable note and Control Change data. (If you wish, you can convert a Preset Phrase into a User Phrase.)

Once you've sorted that out and recorded some music, you can use Chain mode to sequence your Styles or Sections into a Song. Like a groove box, the Motif has you do that in real time by sequentially pressing the 16 corresponding buttons in the grid as the sequence plays. That is a slick way to arrange songs, because you can weave individual multitrack sequences in and out on every 16th note if you want to. What the manual doesn't mention is that switching between Styles rather than Sections will create substantial glitches because the mix parameters have to be reprogrammed on the fly. That was a real hair puller until I stumbled onto a tutorial at Motifator.com that explained how to disable mix changes (see the sidebar, "Getting Motifated").

In general, the Motif's sequence editing is unwieldy (see **Fig. 5**). One saving grace is that the keyboard can export and import Standard MIDI Files, enabling you to do more involved editing on a computer. In fact, the Motif plays especially well with external sequencers, thanks to built-in support for Emagic *Logic Audio,* Steinberg *Cubase,* Digidesign *Pro Tools,* and Cakewalk *Pro Audio* and *Sonar.* Connect the Motif to your computer with MIDI or USB and configure the host program, and then you can use the keyboard's knobs, sliders, and buttons to control panning, effects-send level, EQ, volume, and muting for each of 16 tracks on the remote sequencer. The Motif's Track Select buttons determine which of four channels (1, 5, 9, or 13, for example) a given slider will control at any moment.

MORE FILING, TASTES GREAT

In addition to *Tiny Wave Editor* and *Voice Editor,* the Motif comes with a utility that lets you transfer files between a computer and a SmartMedia card in the Motif or a SCSI drive that's connected to the Motif. Although I had no problem (other than a long wait) loading Akai samples from a SCSI CD drive to the Motif, my elderly SyQuest SCSI cartridge drive crashed the instrument in endless ways. (The Motif officially supports only Zip, 640 MB magneto-optical [MO], and 2 GB Jaz drives. Yamaha does not recommend

SyQuest drives, and the Motif can render 1 GB Jaz cartridges permanently unusable.) Consequently, I mainly used the file utility with the SmartMedia card, which involved connecting the computer to the Motif with a USB cable, manipulating Open Music System (OMS), as well as toggling the Motif between MIDI and USB mode—sometimes repeatedly—until communication was established.

The Motif's USB connection is configured as an eight-port MIDI interface, not a standard USB bus, so file transfers are about the speed of a 33.6 kbps modem. It's more efficient to whip out the memory card and plug it in to a SmartMedia reader connected to your computer. But the file utility also lets you rename and delete files on the card, and for that it's far faster than using the Motif's front panel. If you're using the Motif with a Mac, be sure to upgrade to the latest Motif firmware (currently 1.4 for the OS and 1.1 for the internal USB controller). You can update the Motif's firmware from a SmartMedia card only, which is a good reason to buy a computer card reader, which costs less than $20.

GOTHEME, GO!

Feature creep is a dangerous thing. The more functions you pack into a device, the more difficult it becomes to use; by their very nature, workstations are prone to that problem. By building on the features of other groundbreaking instruments, the Motif could have become a Frankenstein's monster—big and powerful but also awkward and ugly. Fortunately, Yamaha's bionics team did a bang-up job, implanting a killer voice box in a compact body that's far more affordable than competing instruments. The team supercharged the Motif's creative potential by cleverly melding MIDI and audio, even leaving sockets to attach additional limbs.

Getting the Motif to do exactly what you want requires patience and experimentation, and a computer is nearly essential for high-powered sampling and sequencing. The Motif is highly conversant with computers and remarkably powerful on its own, however. Learning to use the instrument is worth the effort.

I doubt that I'd feel as positive about the Motif if Keyfax's support site (www.motifator.com) didn't exist, though. The owner's manual, while well organized and bursting with illustrations, is short on application tips and glosses over significant areas. For example, effects are only listed, not described, and the sequencing section neglects to mention some obscure settings you have to tweak to avoid playback glitches. I spent a lot of time with the manual trying to decipher the terms I saw on the screen and even more time online attempting to make sense of the manual.

If you're searching for a portable, great-sounding means to produce music, follow your theme to the Motif. It doesn't take the "work" out of "workstation," but it does deliver the sound, features, and flexibility you need to get the job done in style. ❁

ELECTRIX

REPEATER

Creative looping made simple.

By Tim Perkis

In the current age of digital sampling, the art of looping dominates much of the contemporary music scene, although not everywhere in the same way. For many DJs and producers, for example, looping means capturing and manipulating beat loops for recording or other kinds of music production; for some instrumentalists and vocalists, looping means capturing and layering live phrases into evolving musical textures. Several manufacturers have created specialized samplers to support one or the other of those approaches, but the Electrix Repeater loop-based recorder offers a hybrid approach with features that should interest musicians working in either mode.

With its solid, almost military-style 2U rackmount case, the Repeater clearly resembles its Electrix forebears (see **Fig. 1**). The removable rack ears, compact housing, and unusual trapezoidal profile let the recorder serve equally well as a rackmount device or a tabletop unit. When the Repeater is set on a table, its front panel tilts back slightly, offering a better viewing angle; and without the rack ears, the unit's softly rounded corners make it suitable for throwing into a gig bag with cords, pedals, and other odds and ends.

FIG. 1: The Electrix Repeater provides a colorful, user-friendly front panel. The removable rack ears and the unusual trapezoidal profile let you convert the device into a handy tabletop unit.

The back panel (see **Fig. 2**) has unbalanced ¼-inch and RCA stereo line-level inputs, but you can switch the RCA jacks to high-gain phono inputs for a turntable. A separate ground-wire attachment point is also provided. Four ¼-inch jacks offer left and right effects send and return connections, and another pair of ¼-inch jacks supply the main stereo analog outputs. In addition, you can reconfigure the two main output jacks and the two effects send jacks as four independent outputs for the four tracks that each loop can contain. The back panel also offers MIDI In, Out, and Thru ports; a coaxial S/PDIF output; a rotary switch for selecting the MIDI channel; and a footswitch jack.

FACE THE MUSIC

As with other Electrix units, the Repeater's intuitive front panel is colorful and stylish with plenty of space around the controls. If you've used a mixer or tape recorder before, you should be able to get started using the Repeater without even cracking the manual.

The Repeater's front panel is laid out in four sections, representing the signal flow from left to right. The Input section consists simply of a Level Control knob and a ¼-inch instrument input jack. The Loop Transport section is the heart of the Repeater, providing tape-deck-style transport controls, a single-line alphanumeric display, several controls for editing, and a Compact Flash Card (CFC) slot. The easy-to-read seven-segment LED display is flanked by large dedicated Loop-Select and Tempo-Adjustment knobs.

The Edit section offers simple controls for setting the pitch, time-offset, and panning parameters of individual tracks, and it also includes a Tap Tempo button for establishing the tempo of the current loop. On the far right, the Tracks section provides faders with eight-segment VU meters for adjusting the track levels within loops; four Track Select buttons activate tracks for recording, editing, and other modifications.

The Repeater's user-friendly controls make it a cinch to tackle most workaday operations. Functions such as setting the tempo, selecting and mixing tracks, starting and stopping playback, tempo-shifting, pitch-shifting, slipping loops forward and back, and recording are clearly presented and readily accessible. A few of the more obscure features are less intuitive and a bit awkward to access. For example, simultaneously pressing the Stop and Overdub buttons lets you mute or unmute the dry signal when mixing tracks.

Cumbersome key combinations are relatively few and far between, with most functions presented in a straightforward and logical manner that avoids the hierarchical menu structures and navigational nightmares of many hardware devices. In fact, the Repeater's red and green LED screen only occasionally displays text; normally it shows the tempo, loop number (you can have as many as 999 loops per CFC or 16 loops in internal memory), and bar:beat counter location.

PRODUCT SUMMARY

Electrix
Repeater
loop-based recorder
$749

FEATURES	4.0
EASE OF USE	4.0
AUDIO QUALITY	4.5
VALUE	4.0

RATING PRODUCTS FROM 1 TO 5

PROS: Easy to use. Flexible routing and mixing options. Good pitch- and tempo-shifting sound quality. Phono inputs for turntables.

CONS: Separate power supply. Can't name loops. No crossfade feature. A few functions require awkward button combinations.

Manufacturer
Electrix
tel. (250) 544-4091
e-mail info@electrixpro.com
Web www.electrixpro.com

Bayview Pro Audio

Studio Projects

UNITED STATES POSTAL SERVICE · FedEx · UPS

C1 Specifications:
Type: FET 6 µm single diaphragm
Polar pattern: cardioid.
Frequency response: 20~20000Hz.
Sensitivity: 14mV/Pa=-37dB(0dB=1V/Pa).
Output impedance: <200 Ohm.
Load impedance: >1000 Ohm.
Maximum SPL:131dB SPL
Noise: (Line): 27dB (A weighted)---17dB.
S/N: 77 dB.
Power requirment: 48 +/- 4V.
Current consumption: <2.5mA.
Circuit: transformerless
Connector: Gold-plated 3-pin XLR
Size: dia: 2.1" length: 8.9"

Sale $229.00

Sale $299.00

se.electronics

Bayview Edition SE5000 Tube Microphone

Specifications:
Type: vacuum tube condenser
Tube Type: 6072
Frequency Response: 20Hz to 18kHz
Polar Pattern: cardioid
Sensitivity: >16m V/Pa
Output Impedance: <200 ohm
Output Noise: <18dB typical, A weighted
THD: <0.5% at 120 dB SPL

Bayview Pro Audio is so convinced that you are going to be 100% satisfied with the SE5000 microphone, we are offering an exclusive 30-day money-back guarantee. We will even have UPS pick it up if you choose not to keep it (USA only).

Sale $169.00

BEHRINGER
JUST LISTEN.

BEHRINGER ULTRAGAIN PRO MIC2200
2-Channel Tube Microphone Preamplifier/Line Driver/DI Box
The extremely low-noise, high-end 2-channel microphone/line preamp with its warm tube sound lends your most demanding instrumental and vocal recordings incredible detail resolution and musical warmth. Includes two parametric EQ's.
BEHRINGER Authorized Internet Dealer

Free SE Electronics SE2000 Microphone

Aardvark Q10 Bundle
Includes Free SE Electronics SE2000 Mic ($399.00 value)
Sale: $749.00

Aardvark Q10 Specifications:
Shielded 24-bit converters
8 XLR mic inputs
Phantom power
8 1/4" line inputs
10 line outputs
4 inserts
S/PDIF in/out
MIDI in/out
Word Clock in/out
Headphone out

BEHRINGER TRUTH MONITORS
Sale: $398.00 Pair
2-Way Active
Low Frequency Power: 150 Watts
High Frequency Power: 75 Watts

KRK V4 Monitors
Sale: $499.00 Pair
The V4 has separate amplifiers for both woofer and tweeter, which make it extremely clean and virtually eliminating any distortion.

(2) AKG C1000S Microphones
Sale: $299.00 Pair

Bayview Pro Audio Line Card

emagic · TC WORKS · lucid · audio-technica · DUY FOSTEX · RME INTELLIGENT AUDIO SOLUTIONS · WAVES · Lynx STUDIO TECHNOLOGY · SONIC FOUNDRY · ANTARES · DRAWMER · A R T · M-AUDIO · Arboretum · Bellari · RaXXess · KRK V-series · GENELEC · bias sound creative · KIND OF LOUD · Funk Logic · FMR Audio Home of the Really Nice Compressor · t.c. electronic · Bomb Factory · PROPELLERHEAD · Soundcraft · SPIRIT BY SOUNDCRAFT · EGO-SYS · Aardvark · dbx · digidesign · BPA DAW SYSTEM II · MCDSP · MAGIX · RØDE · FRONTIER DESIGN GROUP · CM Labs · dynaudio acoustics · PreSonus Audio Electronics · FATAR · TERRATEC · MONSTER CABLE · NEMESYS · Grace Design · KORG · Millennia · Focusrite · maranz · AVALON DESIGN · PURE CLASS A MUSIC RECORDING SYSTEMS · MACKIE · KK AUDIO · Steinberg NORTH AMERICA · Studio Projects · Demeter amplification · FIRST WE LISTEN · ALESIS · AKG · ECHO digital audio · SONAR

888.718.0300
www.bayviewproaudio.com

Repeater Specifications

Resolution/Sampling Rate	supports up to 24 bit, 44.1 kHz audio; loops stored in 16-bit, 44.1 kHz uncompressed WAV format
Frequency Response	20 Hz–20 kHz
Signal-to-Noise Ratio	>94 dBA
Total Harmonic Distortion	<0.014%
Inputs	(2) unbalanced ¼"; (2) RCA switchable between line level and phono; mono ¼" instrument
Outputs	(2) unbalanced ¼" analog; S/PDIF coaxial; ¼" stereo headphone
Effects Sends/Returns	(2) unbalanced ¼" sends; (2) unbalanced ¼" returns
MIDI	In, Out, Thru
Footswitch Control	play, stop, record, and undo with TRS-style 3-button footswitch
Storage Capacity	4 mono (2 stereo) tracks per loop; as many as 999 loops per Compact Flash Card; 16 loops in internal memory
Dimensions	2U × 3.5" (D)
Weight	4.15 lb.

The Repeater's seemingly simple controls belie its powerful and sophisticated processing capabilities. For example, recording is easily done by punching in and out with the Record button. By default, however, the unit's Loop Point Assist function detects the current tempo and automatically trims the loop. If you hit the button anywhere near the downbeat, the Repeater figures out what you're trying to do and cleans up the loop for you.

In addition, the unit's Tempo knob smoothly changes the playback tempo without altering the pitch. If the Pitch button is engaged, the same knob changes the playback pitch without changing the tempo. You can even use a MIDI keyboard to trigger pitch shifts in semitones. The sound quality of these transformations is excellent, and with beat-based material, you can shift the tempo about 40 percent down and 100 percent up without sounding too weird. As with all pitch- and tempo-shifting functions, pushing things too far does cause the sound to get a bit wacky. However, the Repeater's pitch- and tempo-altering algorithms, sound different from others I've heard. I wouldn't be surprised if the extreme-range sounds become cult classics; they have a cool kind of distortion.

The Repeater comes with only 8 MB of internal memory; however, the memory slot on the front panel accepts the convenient CFCs in sizes up to 512 MB. Loops are recorded onto the card as simple WAV files, so you can easily import and export them to a PC or Mac with a CFC reader. If you plan to buy a Repeater, you should also buy a CFC reader for your computer; the readers are available for less than $30. Even if you don't transfer audio files to and from your computer, you'll still need a CFC reader to keep up with system software. The only method for upgrading the operating system is to download the new version to your computer, write it to a CFC, and then transfer the data to the Repeater. While I was testing the unit,

FIG. 2: The Repeater's rear panel provides ¼-inch jacks for analog I/O and effects sends and returns. A pair of RCA jacks can toggle between line-level and phono inputs, and another RCA jack provides S/PDIF output.

an upgrade (to OS 1.1) came out, and new releases are likely to follow.

CROWD PLEASER

Members of the live-looping crowd will applaud Repeater's hands-free capabilities. The footpedal input lets you trigger basic recording and playback functions, and the unit's extensive MIDI support allows for more complete recording and mixing control if you're willing to do a bit of MIDI programming. Almost all of the Repeater's controls generate MIDI Control Change messages, and all of the controls respond to Control Change and Program Change messages.

The Repeater lets you overdub each track in a loop an infinite number of times, mixing new and old material in varying proportions or just replacing the old material with the new. As with the popular Gibson/Oberheim Echoplex, loops can be multiplied in length so that, for example, one-bar, four-bar, and eight-bar phrases can coexist in sync. Also, the Repeater's resampling and mixdown capabilities allow you to build up as thick a sound as you like. The sound quality was good, but getting smooth padlike loops was a bit tricky. Without a crossfade function, it took a few tries to set up a smooth pad that didn't have a noticeable glitch at the transition point.

For beat-oriented DJs doing live or studio work, the Repeater can be an amazing time-saver. Grabbing a loop from a CD or LP and pitch-shifting and tempo-shifting it to match other material takes only seconds. The Repeater's MIDI Clock support and audio Beat Detect function let the unit get along happily with a wide range of drum machines and computer-based sequencers. Moreover, the menu-free tabletop operation of the unit makes it ideally suited to live club settings; most functions are accessible directly and are easy to find in dimly lit environments.

Unfortunately, the one-line display doesn't let you name loops, and anyone with an extensive loop collection will need a sheet of paper to remind him or her what loop is number 46 on the third CFC. The Repeater's architecture also doesn't let you load a multitrack loop from one card and join it smoothly to a loop on another card, which limits its flexibility for on-the-fly performances.

As you would any complex music machine, check out the Repeater in detail to see if it meets your needs. Electrix has followed the laudable practice of making the well-illustrated 48-page manual available for download from the company's Web site.

With its no-nonsense design and its solid list of features, the Repeater should prove a valuable tool for a wide variety of music production and performance projects. For loopers of all styles and stripes, this box is a clear winner.

Tim Perkis *is a musician and engineer living in the San Francisco Bay Area.*

WALDORF

ATTACK 1.0.1 (MAC/WIN)

A multitimbral VST synthesizer for percussion, lead, and bass.

By Len Sasso

Although specifically tailored for percussion sounds, *Attack* is a software synthesizer that's flexible and full featured enough to produce an interesting assortment of leads, basses, pads, and sound effects. Produced by Waldorf and distributed by Steinberg, this VST Instrument plug-in includes documentation, examples, and Kits that are clearly *Cubase* oriented; some features are not completely supported in other applications, so performance will vary somewhat depending on your choice of host.

Now that software-based percussion samplers are all the rage, it's significant that *Attack* is a subtractive synthesizer and not a sampler. Its multitimbral architecture features multiple-waveform digital oscillators, resonant multimode filters with distortion, and global delays for *Attack*'s two stereo outputs and four mono outputs. To add motion, *Attack* provides two envelope generators (EGs) and LFOs that sync to MIDI—one for filter cutoff and another for delay-time modulation. Audio modulation techniques include FM, AM, ring modulation, and "crack" (which is discussed later and is perfectly legal).

Attack ships with 31 Kits and over 700 sounds, ranging from classic beatbox emulations to modern drum sets from top sound designers. As of this writing, no *Attack* demo software is available, but several MP3 files that illustrate its percussion and multitimbral capabilities can be downloaded from the Waldorf and Steinberg Web sites. MP3 examples are also on **EM**'s Web site (www.emusician.com).

UNDER ATTACK

For this review, I used *Attack* with *Cubase VST/24* 4.1 and Emagic *Logic Audio Platinum* 4.72 on a Mac G3/300 MHz with OS 8.6. For audio output, I used the built-in Sound Manager and an Emagic AW8 audio card. Sound quality was high, and latency was minimal under all conditions when playing live and sequencing. The number of simultaneous notes (64 maximum) depends on your CPU; my system maxed out on some of the larger example songs.

Attack's onscreen panel is arranged into modules (see **Fig. 1**). In addition to two oscillators, two EGs, a filter, an amplifier, and a mixer, there are sections to specify crack and delay parameters. User-friendly features include the option to control the onscreen knobs with circular or vertical motion and simulated LEDs that indicate which sounds are playing and how long they're held. When you hold the cursor over a control, its description and value are displayed. When you hold the Shift key as you scroll, *Attack* shows numerical values in fine resolution.

The sounds in the current Kit are indicated by keyboard-style tabs along the left side of the panel. The tabs are numbered 1 through 12 and then 1 through 12 again rather than 1 through 24, as you might expect. The numbering system denotes that the lower 12 sounds are single-note, monophonic sounds, whereas the upper 12 are polyphonic. When one of the upper 12 sounds is selected, the keyboard graphic at the bottom pops down to indicate polyphony; you can play different pitches by clicking on the keyboard. Clicking on the tabs along the left side plays each sound at its root pitch.

Attack's keyboard mapping lets you simultaneously play monophonic percussion sounds and polyphonic synthesizer sounds from a single MIDI keyboard by reserving 24 MIDI notes (C1 through B2) to play the monophonic sounds. You can use those notes to play or sequence *Attack* as a percussion synth; conveniently, they cover the most used part of the General MIDI (GM) drum map. Use MIDI notes C3 through G9 to play the top 12 sounds polyphonically, and then the MIDI channel determines which sound is played. For example, to play the Wurlitzer sound polyphonically, you would play MIDI notes C3 through G9 on MIDI channel 7. Starting at C3 might seem like a severe limitation with bass sounds, but you can adjust the oscillator tunings to compensate.

If your host software supports MIDI automation, you can automate all of *Attack*'s sound parameters. Different MIDI controller numbers are assigned to manage the lower and upper 12 sounds. *Logic Audio* uses its own scheme for mapping MIDI controller messages to VST plug-ins, so *Attack* automation is somewhat limited in *Logic Audio*.

Attack's two stereo and four mono outputs offer a lot of flexibility for

Minimum System Requirements

Attack

MAC: PPC 604e/250; 64 MB RAM; OS 8.0; VST 2.0–compatible host.

PC: Pentium II/266; 64 MB RAM; Windows 95/98/2000/ME; VST 2.0–compatible host.

FIG. 1: Each *Attack* Kit contains 24 sounds that you can audition by clicking on the sound selectors along the left edge. The upper 12 sounds are polyphonic, and you can also click on the onscreen keyboard at the bottom to audition them.

YOU WANT MORE?

CUBASE VST

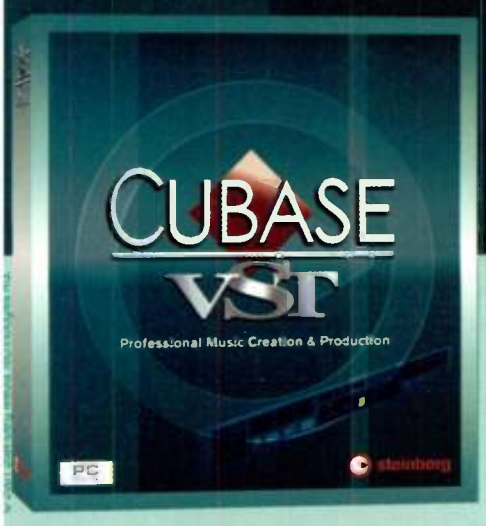
Steinberg, the creators of VST, bring you Cubase 5.1.

More VST Instruments
- 3 new virtual synthesizers; JX16, CS40, LM7 expand your musical palette

More Virtual Effect Processors
- 11 new effects; Da Tube, Phatsync, Mysterizer, BitCrusher, Vocoder and more

More Power
- Optimizations for PIII, PIV and Altivec processors keep you on the cutting edge

More tools, more power, more creativity. Cubase 5.1 simply gives you more!



www.us.steinberg.net

steinberg
Creativity First

U.S. (818) 678-5100 • Fax: (818) 678-5199 • Canada: (416) 789-7100 • Fax: (416) 789-1667

processing individual percussion sounds, but whether multiple outputs are supported is also host dependent. The factory Kits take full advantage of the multiple outs, so if some sounds don't play when you use *Attack* with a single-output host, check the sound's output routing to see if anything is assigned to outs that don't exist.

Along with the delay-time LFO, each stereo output has a dedicated stereo delay with cross-channel feedback for Ping-Pong effects. The delay settings are global, meaning that they're the same for all of the sounds assigned to a given output.

SOUND THE ATTACK

Attack's oscillators produce four waveforms (saw, triangle, sine, and square), two flavors of noise (pink and white), and three cymbal samples (open hi-hat, closed hi-hat, and crash). The enormous tuning range of the oscillators, which is approximately 0.01 to 20,000 Hz, accommodates a variety of percussive sounds.

The low end of Oscillator 2's frequency range lets it function as an LFO for modulating Oscillator 1's frequency. Because no dedicated pitch LFO is provided, however, only single-oscillator sounds are possible if you want low-frequency pitch modulation. Either envelope can modulate the pitch of both oscillators, with or without Velocity scaling, as well as frequency modulation depth. In addition, either envelope can individually control Oscillator 2's level in the mixer module.

Attack's filter has six modes: Lowpass, Highpass, Bandpass, Notch, Bell-Shaped, and Shelf. In the first four modes, the filter slope is 12 dB per octave. In Bell-Shaped and Shelf modes, the resonance control sets the amount of cut or boost as much as 12 dB. Also in the first four filter modes, maximum resonance makes the filter self-oscillate when stimulated by a quick pulse. (To generate such a pulse, simply apply a short envelope to Oscillator 2's level in the mixer section.)

A dedicated sine-wave LFO in the filter module modulates the cutoff frequency. You can synchronize the LFO to MIDI Clock or to MIDI Note On messages. A Drive control applies a maximum 54 dB of saturation to the filter's output.

In the amplifier module, you can assign mute groups (three are available). Mute groups allow only one timbre in the group to sound at a time. For example, an open and a closed hi-hat are typically assigned to the same mute group.

Attack has two attack-decay-release EGs, but when you set the Decay knob to maximum, they produce attack-release envelopes. You can continuously vary the shape of the decay and release segments from concave (which starts fast and ends slow) through linear, then convex (which starts slow and ends fast), and finally to S-shaped (see **Fig. 2**).

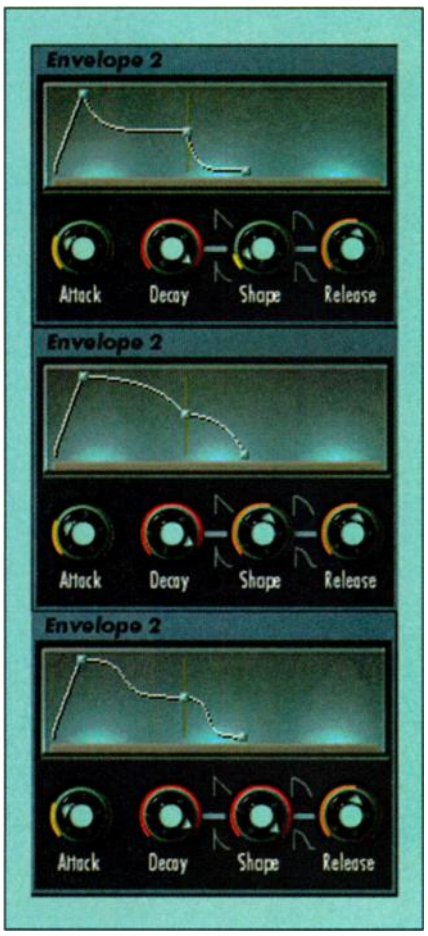


FIG. 2: *Attack*'s envelopes feature a continuously variable range of shapes for the decay and release segments, ranging from concave (top) to convex (middle) to S-shaped (bottom).

PRODUCT SUMMARY

Waldorf
Attack 1.0.1 (Mac/Win)
VST percussion synthesizer
$149

FEATURES	4.0
EASE OF USE	4.0
QUALITY OF SOUNDS	4.0
VALUE	4.0

RATING PRODUCTS FROM 1 TO 5

PROS: Polyphonic, multitimbral functionality. Includes excellent collection of Kits. Simple to program. Outstanding tutorials.

CONS: Can't use MIDI to select sounds for editing. Global delay modules are hardwired to separate outputs. No dedicated pitch LFO.

Manufacturer
Waldorf/Steinberg North America (distributor)
tel. (818) 678-5100
e-mail info@steinberg.net
Web www.steinberg.net

The capacity for variable shapes is especially useful for fine-tuning the tails of cymbal sounds.

The Crack module is a ramp-down sawtooth LFO with a built-in decay envelope. Applying it to the overall mix level provides a series of loud attacks, or cracks. The Crack module has controls for the LFO speed and the decay envelope length. A single, slow-to-medium crack is useful for many types of drum and cymbal sounds. You can dial up more extreme crack settings for a variety of sound effects.

ATTACK OF THE KILLER KITS

Attack's 31 factory Kits cover the bases from standard, GM-compatible drum Kits appropriate for straight-ahead drum sequencing to more unusual sound-effects Kits. Many Kits contain several polyphonic sounds, including two instrument Kits, each with the full complement of 12 polyphonic sounds. For *Cubase* users, there are 16 demo songs to familiarize you with the various Kits. For users of other VST hosts, the

Attack installation disc contains MP3 versions.

The GM-compatible Kits range from acoustic to electronic, and they definitely furnish enough variety to eke out extra mileage from tired drum parts. The most straightforward Kits, Latin and Acoustic, do a convincing job of replicating standard acoustic drum sounds. *Attack*'s retro percussion cabinet is well stocked, with two beatbox Kits and resident Kits (meaning that they don't need to be loaded from disk) that emulate the Roland TR-808 and TR-909 as well as the Simmons SDS-5.

The polyphonic instrument Kits emphasize lead and bass timbres, for which *Attack* is well suited. Several tuned percussion sounds, along with a few pads and organs, are also included. Conveniently, each instrument Kit contains an abbreviated GM drum Kit on the lower 12 (nonpolyphonic) tabs. With a little judicious editing of your drum parts, you can sequence a complete multitimbral song from one instance of *Attack*.

The effects Kits lean heavily toward sci-fi and video-arcade sounds but also include a number of Foley-type effects. Considering *Attack*'s extensive modulation capabilities, it's hard to imagine a synthesizer effect you couldn't program with a little dedication.

▼

You can sequence a complete multitimbral song from one instance of *Attack*.

NO RETREAT

Attack fills an important niche by providing a sophisticated subtractive synthesis architecture designed specifically for percussion sounds. *Attack*'s flexible oscillator design, variable-shape envelopes, Crack generator, and multiple outputs for independently processing different sounds open the door to a lot of creative percussion sequencing.

Right out of the box, *Attack*'s varied assortment of Kits make it easy to use, and its cost is in line with other VST Instruments of similar sophistication. Programming new sounds is a pleasure and not especially difficult. The tutorials at the end of the manual, including a fine one on synthesizing various types of percussion sounds, provide a good foundation.

If you're looking for your own sound and you're willing to spend a little time designing it, *Attack* should provide the tools you need. When you consider that *Attack*'s usefulness extends well beyond the realm of percussion sequencing, it is definitely worth considering as an addition to your virtual rig.

H H B

RADIUS 5 FAT MAN 2

A pudgy preamp and compressor with some muscle on its frame.

By Myles Boisen

The HHB Radius 5 Fat Man 2—like its predecessor, the Radius 3 Fat Man—is certainly one of the more distinctive-looking pieces of gear on the scene. Comprising a single-channel mic preamp, DI input, and compressor, the Fat Man 2 offers a novel and compact alternative in the burgeoning market of front-end processors oriented toward the personal studio. Its portly personality is rounded out by a plethora of compression presets tailored for many common studio sources. Here's the skinny on the Fat Man 2.

ROLY-POLY

For a fat guy, the component doesn't take up much space. The chunky chassis is a compact half-rack wide, letting the unit sit close at hand on a table or on another work surface. A single Fat Man (or a pair) can also be rackmounted in an optional three-space rack tray ($79) available from HHB.

The Fat Man 2's top panel, which slopes downward from front to rear, is made of perforated steel, thus providing breathing room for (and a nice view of) the unit's ECC83/12AX7A tube. Although the Fat Man 2 is advertised as a tube preamp, it is important to clarify that the preamp section is a hybrid design utilizing a solid-state front end followed by a secondary tube stage.

The upper half of the Fat Man 2's front panel is devoted to a round VU meter, status LEDs for compressor (green) and AC power (red), and logos screened on the standard HHB purple background. The bottom half is the business end of the unit, where the circuitry and controls are located. Six rotary knobs span the Fat Man's middle. The red Input-Gain knob is marked +16 at its counterclockwise extreme and +60 at the fully clockwise position and has a detented center position marked +38; the detented center also functions as unity gain for line-level input (marked as 0 dB). Beneath the knob, line-level gain is marked as –20 to +20. The next knob, moving right, is the off-white Output-Gain control (marked –∞ to +15), which has a nondetented 0 dB indication at the 12 o'clock point. Next is the gray Makeup Gain knob, which ranges from 0 to +20 and has intermediate markings at +4 and +12. (According to the Fat Man 2's manual, which is thorough, the aforementioned numerical gain values represent decibel measurements.)

The large gray Program knob beneath the VU meter lets the user select 1 of 15 compression-parameter presets: five for vocals; two each for acoustic guitar, electric guitar, and bass; and one setting each for snare, kick, loop, and keyboards. When the unit is in Program mode, all other compressor controls are disabled (though the Input-Gain control does let the user increase or decrease the signal strength relative to the fixed threshold level, thereby affecting the onset of compression).

Also provided is a Manual Compression setting. When in Manual mode, the Fat Man 2's compressor parameters can be manually adjusted by means of two black continuously variable knobs, Threshold and Ratio, located to the right of the Program knob. The Threshold knob is marked +10 to –20 (dBu), with intermediate marks at 0 and –10; the Ratio knob is marked 1:1.5 to 1:30, with intermediate marks at 1:3 and 1:10. In Manual mode, three two-position button switches at the bottom of the front panel (marked Knee, Att, and Rel) control knee characteristics (hard or soft), attack (slow equals 5 ms; fast, 0.5 ms), and release (slow equals 1.5 seconds; fast, 0.2 seconds).

Five other button switches—labeled Source (Instrument Gain), 48V On, HPF On, Comp On, and Meter—control, respectively, the input source (Mic [Hi] or Line [Lo]), 48V phantom power, a 90 Hz highpass filter, and the VU meter mode (output or gain reduction). Note that the Source switch also determines the appropriate gain mode for either source: mic or ¼-inch DI input (located on the lower-left corner of the front panel). As described in the manual, the DI input always feeds into the main signal path whether or not mic or line is selected; the gain selector basically allows

An easy-to-use, one-stop tracking solution, HHB's Radius 5 Fat Man 2 provides a hybrid solid-state and tube mic preamp followed by a tube compressor featuring 15 presets and a Manual mode.

broadjam

unleash your music

Get it up
Don't want to deal with the hassle of encoding and uploading your music? Send it to Broadjam, and we'll do it.

Get it out
We'll get it up on our site and then get it out to all the best Internet music sites.

Get it back
Oh you'll get feedback all right. From fans, peers, industry pros, professional guest reviewers and even a moron or two.

Get a homepage
A well-designed world-class page that you'll be proud to call home.

Get it on
Whatever you do, get it online and give your music a chance. And give us a chance to do it for you. If you want to talk to a human and ask questions, call us toll free at 877.527.3651. If you prefer email, we can deal with that as well.

customerservice@broadjam.com

Broadjam Corporation
1101 State Highway 69, #8 | New Glarus, Wisconsin 53574
877 527.3651


Artist: Christina Bulatao **Song:** Love Me
Genre: R & B


Artist: Impulse Ride **Song:** Funny
Genre: Alternative


Artist: Lenny Post **Song:** Spyder Web
Genre: Jazz


Artist: David **Song:** If I give my Heart to you
Genre: R & B


Artist: Steve McWilliams **Song:** Goodbye
Genre: Rock


Artist: Sabers & Roses **Song:** Sabers & Roses
Genre: Patriotic/Other

www.broadjam.com

RADIUS 5 FAT MAN 2

PRODUCT SUMMARY

HHB
Radius 5 Fat Man 2
mic preamp/compressor
$469

FEATURES	4.0
EASE OF USE	4.0
AUDIO QUALITY	3.5
VALUE	3.5

RATING PRODUCTS FROM 1 TO 5

PROS: Compact. Affordable. Well featured, with a worthwhile array of preset dynamics controls. DI input with Gain Makeup switch. Compressor On LED. Mic preamp is a useful alternative to budget mixing-console preamps.

CONS: Slight loss of high-end clarity. Compression presets tend to be excessive and lacking in subtlety. Noticeable distortion on sustained bass notes. No phantom-power status light. No phase-reverse switch. No XLR output.

Manufacturer
HHB Communications USA
tel. (310) 319-1111
e-mail sales@hhbusa.com
Web www.hhbusa.com

line-level padding for samplers or stringed instruments with high-output pickups. Finishing out the unit's front panel is a round AC power switch.

The Fat Man 2's feature-rich front panel is logically laid out and fairly easy to negotiate. The Compressor On light proved an especially handy feature. I did miss, however, having a phase-reverse switch and an indicator LED for phantom-power status.

The Fat Man 2's rear panel provides a balanced XLR mic input, a balanced ¼-inch TRS line input, and a balanced ¼-inch TRS line output (see Fig. 1). There is no XLR output. A standard IEC power cable connection is also located there, but the unit lacks a provision for AC voltage switching or fuse replacement.

PLUMP PRE

I put the Fat Man 2's mic preamp to work on a variety of sources during a daylong recording workshop. The unit

provided plenty of gain in all situations. There were no noise problems, except for an inexplicable click that occurred just before the input-gain pot reached its +60 dB maximum.

When paired with a Sennheiser e602 mic, the unit delivered a nice low end on kick drum, and the resulting track worked well in the mix, even though it was a bit shy of upper-end clarity and attack. The Fat Man 2 also complemented electric basses (patched directly to the unit's DI input and through a Manley tube direct box to the mic input). An Epiphone jazz guitar sounded good through the unit's DI input, though the instrument's healthy output level produced grainy distortion at the Mic (Hi) setting. Switching to the Line (Lo) position eliminated the grunge, and though it raised the input gain close to maximum, it still yielded clean, crisp tones, without undue noise or muddiness.

Paired with an Oktava MC 012 small-diaphragm condenser, the Fat Man 2 gave a solid, chunky sound to an acoustic guitar. But after some close comparison, I preferred the extended highs and faster transient response of a more accurate solid-state pre on this instrument. In general, the HHB is not a particularly airy or detailed mic pre, and therefore it would not be my first choice for percussion, piano, or any delicate acoustic sources.

Interestingly, on the mix of diverse vocalists in the session, the unit's somewhat veiled high end proved sometimes a strength and sometimes a weakness. With some female singers, for example, the Fat Man 2 helped soften the etched highs of the Neumann TLM 103 mic I was using, giving good results. But on softer or underconfident vocalists, the HHB preamp sounded a bit dull and didn't help the vocal track cut through, particularly in a dense mix.

PAUNCH SQUASH

I gave the Fat Man 2's compressor section a good workout on a diverse range of instruments. Overall, when applying compression to average +4 dBu microphone signals from the unit's preamp, the programmed settings were less than subtle and often drastic. On kick drum, for example, engaging the appropriate compression preset resulted in extreme, heavy-handed squashing of the signal. Similarly, engaging the loop preset on a full-spectrum music mix (line-level in at unity gain, averaging 0 VU) produced wild pumping and dramatic fluctuations in level.

One remedy for this problem is to lower the signal relative to the threshold by lowering the preamp's input gain. However, it is then necessary to raise the output or makeup gain to get a usable level to the recorder. Once the gain was properly adjusted in that manner, the gentler presets were almost perfect for acoustic guitar, vocal, and bass compression. In a hybrid tube circuit, such gain changes can also produce subtle variations in the sound of the mic preamp, making A/B comparisons a difficult proposition. Picky engineers wanting to avoid changing the gain

structure may find it easier to switch into Manual mode, duplicate the preset parameter settings illustrated in the manual, and adjust threshold and other controls to taste.

During a mixing session, I tried the Manual mode on a previously recorded tenor-saxophone track. The resulting compression was easy to hear, but it seemed a bit hard and aggressive, even with mild parameter settings (soft knee, slow attack, fast release, and low ratio). For this application, the slow attack time (rated by HHB at 5 ms) still seemed too fast and unforgiving. Additionally, an A/B comparison of the Fat Man 2 on a channel insert revealed that the sax lost some of its upper-end clarity and air when processed through the Fat Man 2. A trombone track was similarly dulled when patched through the unit, even with minimal gain reduction.

In other sessions, another engineer and I noticed that the Fat Man 2 tends to distort when compressing sustained bass-guitar notes, especially in the Bass 2 program. That is a fairly common problem with most compressors; however, it seemed worse than usual with the Fat Man 2, even when the unit was set for moderate amounts of compression and Slow release time. Fortunately, I didn't notice distortion problems on more percussive bass parts. Still, I preferred to dial in my own gentler settings (in Manual mode) to mitigate potential distortion artifacts.

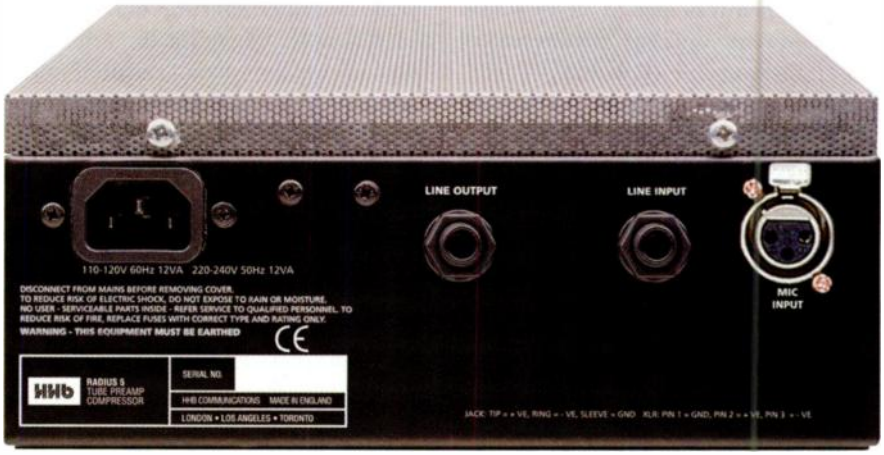


FIG. 1: The Fat Man 2's rear panel provides two inputs (mic and line) and a ¼-inch output.

Radius 5 Fat Man 2 Specifications

Inputs	(1) balanced XLR (mic); (1) balanced ¼" TRS (line); (1) unbalanced ¼" TS (instrument)
Outputs	(1) balanced/unbalanced ¼" TRS
Operating Level	+4 dBu
Input Gain Range	±20 dB
Output Gain Range	+15 dB
Maximum Input Level (input gain @ 0 dB)	+6 dBu (High); +26 dBu (Low)
Maximum Output Level	+26 dBu (balanced); +20 dBu (unbalanced)
Hum and Noise (compressor in and all gain controls @ 0 dB)	–75 dBV
Frequency Response	20 Hz–20 kHz (+0, –1 dB; line input @ 0 dB gain or mic input @ 40 dB gain)
Total Harmonic Distortion	0.5% (typical) @ nominal level, 1 kHz
Signal-to-Noise Ratio	80 dB
Threshold	+10 to –20 dB
Ratio	1:1.5–1:30
Attack Time	0.5 ms or 5.0 ms (switchable)
Release Time	0.2 sec or 1.5 sec (switchable)
Knee	hard or soft (switchable)
Tube	ECC83/12AX7A
Meter	moving-coil VU; monitors output or gain reduction (switchable)
Dimensions	8.4" (W) × 5.2" (H) × 8.3" (D)
Weight	5.5 lb.

DADDY'S LITTLE FATTY

As a mic preamp, the Fat Man 2 is true to its moniker—it imparts a noticeable low-end thickness to most sources. Although the preamp lacks the high-end clarity of some upscale designs, it is still a useful alternative to the preamps found in most budget mixing consoles.

I was less impressed by the performance of the Fat Man 2's compressor, particularly some of its preprogrammed settings, which are extreme. But it certainly has a worthwhile range of functional dynamics—some of the gentler presets are quite good—and those in search of subtler compression can always employ the Manual setting.

Overall, I'm amazed at how much control and flexibility HHB packed into the newest member of the Fat Man family. The Fat Man 2 is a solid, convenient, and quite affordable module that, despite the name, has a lot of muscle on its frame.

Myles Boisen *is a guitarist, producer, and composer and is head engineer and instructor at Guerrilla Recording and the Headless Buddha Mastering Lab in Oakland, California. He may be reached by e-mail at mylesaudio@aol.com.*

TASCAM
a whole world of recording

FULL COMPASS
Great Deals. All The Time.
www.fullcompass.com

ALL TASCAM ALL THE TIME!

DM-24 Digital Mixer

DA-45HR 24-bit DAT Recorder

MX-2424 Hard Disk Recorder

Call us *TODAY* for your *FREE* color catalog!

More Tascam in stock when you want it - *NOW!*

Besides the best deals on *Everthing Tascam*, we are also a Tascam Factory Authorized Parts & Service Center!
STOP SEARCHING, START CALLING.

FULL COMPASS
800-356-5844
9am-5:30pm M-F CST

COMPASS XPRESS
Not a 9-5 shopper?
Call us at 800-476-9886
8am to 10pm M-F CST 10am to 6pm Sat CST

IK MULTIMEDIA

SAMPLETANK 1.1 (MAC/WIN)

A virtual VST vat of samples.

By Erik Hawkins

Good things are cooking in Modena, Italy. From the *cucina* of IK Multimedia comes a new multitimbral VST sample playback instrument, *SampleTank* 1.1, with four stereo outputs, onboard effects, and a proprietary file-compression scheme that cuts sample sizes in half.

SampleTank comes in two flavors: XL and L. Although the plug-in is identical in both bundles, the sound sets differ. Version XL of *SampleTank* includes 450 instruments (orchestral sounds, electric and acoustic instruments, and synths and loops) and ships with the *STConverter* utility that lets you translate Akai S1000 and S3000 sounds to the SampleTank format (see **Fig. 1**). The L version includes *STConverter* and 200 sounds that should work well for film scoring and general songwriting purposes.

Also available is *SampleTank LE,* which is limited to stereo output and four MIDI channels. *SampleTank LE* is bundled with a number of third-party sound libraries. For this review, I used the XL bundle with *SampleTank* 1.1 on a Mac G4/400 MHz with 704 MB of RAM.

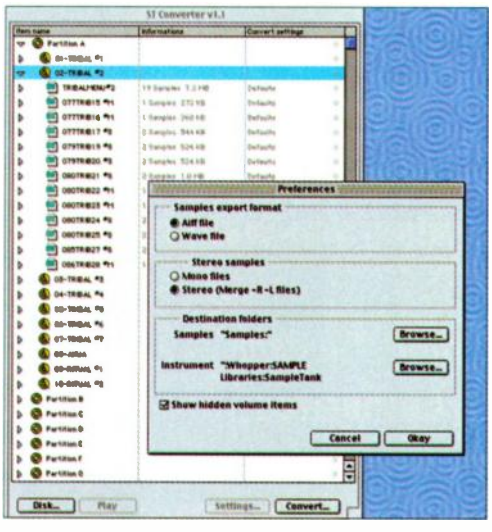


FIG. 1: The application *STConverter* is not flashy but gets the job done. The Preference menu offers a choice of sample-export file formats.

INSTALLATION JIG

SampleTank is copy protected by an authorization code. You can try out *SampleTank* without authorizing it, but you are limited to three notes of polyphony. IK Multimedia has set up a *SampleTank* Web site where you register and receive your authorization codes. To get your authorization code, enter the product's serial number and a digital ID number that is unique to your computer. The *SampleTank* installer generates the number for you, and the authorization response is immediate.

The alphanumeric strings you need to enter to complete the authorization process are quite long, and it took me a few tries to get it right. The version that came on the installer CD-ROM (version 1.0) also had problems remembering its authorization codes and recognizing its own sound library. However, the free version 1.1 update remedied the problems.

By the time you read this review, most *SampleTank* bundles will contain version 1.1. IK Multimedia says that version 1.1 is optimized for Mac G4 multiprocessor machines, has a new resampling engine, and allows the L version of the plug-in to read any sounds in the SampleTank format. (Previous builds of this version could read only their preassigned stock sounds.)

AUDIO FILE PHILOSOPHY

SampleTank has its own proprietary file structure that is composed of three file types: STH, STI, and STW. The files contain the instrument's name and description (STH), its program (STI), and its waveforms (STW). All three files must be kept together in the same root folder for a sound to load correctly.

Waveforms are compressed using IK Multimedia's 2:1 compression scheme, which the company has dubbed 2Pack. Samples are stored on your hard drive and played back in their compressed state. *SampleTank* does not use an encode and decode scheme (compressing and uncompressing waveforms as you go). Rather, it's a file-format player, much like an MP3 player. That means that the sounds you loaded use less RAM and require less storage space on your hard drive. For example, a multisampled grand piano patch that might normally necessitate 28 MB uncompressed is only 13.8 MB using 2Pack.

With the *STConverter* utility, you can choose whether you want to export an Akai file as a compressed or uncompressed *SampleTank* instrument. Advertisements for *SampleTank* claim that it can also import AIFF and WAV files, but the manual lacks directions about how to accomplish that task. As it turns out, that feature didn't make it into the software's first release. According to IK Multimedia, plans exist to integrate the function directly into the VST plug-in itself, but until that happens, *STConverter* will be updated to handle the task. As with *SampleTank, STConverter* that comes on the *SampleTank XL* CD-ROM should be updated to version 1.1. The download is free, and the update fixes some of the bugs.

ORGANIZED SAMPLES

With such an extensive collection of sounds—some are freshly baked for *SampleTank,* and others are reconstituted from IK Multimedia's *GrooveMaker* sound sets—the plug-in's well-implemented file system is greatly appreciated. A button on the plug-in labeled Root (see **Fig. 2**) lets you select *SampleTank*'s default sound

Minimum System Requirements

SampleTank

MAC: PPC 604/200 (G3/G4 recommended); 64 MB RAM (128 MB recommended); OS 8.5

PC: Pentium/200 (Pentium III/500 recommended); 64 MB RAM (128 MB recommended); MMX with Windows 95/98/ME/2000/NT 4.0

Run Your Own Recording Studio.

The Virtual/Online Recording Studio Center.

Available now at:

mixonline.com

onstagemag.com

emusician.com

remixmag.com

POWERED BY pocket NETWORK

MORE CORE.

folder. That is an invaluable feature because it allows you to store *SampleTank*'s many presets on a drive other than your system drive.

My system drive, for example, is crammed with applications, and I don't have enough space on it to store samples. With *SampleTank,* I can keep the samples on another drive (internal or external), even though the VST plug-in itself lives in my System folder. That's a cool feature.

You can easily browse through Patches in a familiar files and folders window directly on the plug-in's face (see **Fig. 3**). When you see the sound that you want, double-click on its name, and it loads. Once loaded, the patch's moniker and its associated real-time controller knob assignments appear in an easy-to-read font to the left of the files and folders area. At first glance, the plug-in's browser window appears rather hokey. But in use, it is elegant in its simplicity and user-friendliness.

To make finding sounds a snap, IK Multimedia has implemented a brilliant Search feature. In the text field labeled Search/Select, type in the name of the sound you are looking for. Press the Search key, and a list of sounds is generated. If you enter *piano,* for example, every patch with that word in it will appear in the plug-in's Browse window.

I lost the patch I had loaded, but I remembered its name: Hell's Bells. I typed in *Hell's Bells* and hit Search. *SampleTank* found the program and automatically loaded it for me. I can't say enough good things about the Search-function-and-Browser-window combination. It makes finding and loading presets as easy as dialing sounds on a good hardware sound module.

EFFECTIVE SOUNDS

The *SampleTank* Patches are multisampled, and a third of the sounds in XL are Velocity zoned (in which different samples are mapped to different Velocity ranges on a single key). Each Patch can have its own set of as many as four global real-time parameters. Those parameters are programmed into the Patch and cannot be switched. For example, one Patch might have Cutoff, Res (resonance), Touch (Velocity sensitivity), and Tuning, whereas another Patch might have only Attack, Touch, and Tuning.

The real-time parameters have an associated control knob, with the current value shown beneath. Click on the value, and its number changes to show the knob's assigned Control Change (CC) number. That is convenient for mapping *SampleTank*'s CC numbers to an external controller for real-time tweaking and automation.

As many as 16 Patches can be loaded into the *SampleTank* plug-in at the same time—one for each of the available 16 MIDI channels. Every Patch can then have as many as four effects (depending on what your CPU can handle). The first effect slot is set to EQ/Compression. The other three slots can hold any of the 20 other effects,

FIG. 2: When first opened, *SampleTank*'s plug-in does not automatically load an initial patch. That can be confusing at first because most VST Instrument plug-ins load with a sound ready to play.

MARK ISHAM, M-POWERED.

Includes Emagic's Logic Delta, a powerful 24bit/96kHz audio and MIDI program optimized for our audio cards.

If you go to the movies, you've heard his work. He's the man behind the scores for "Blade", "Kiss the Girls", "Quiz Show", "Nell", "A River Runs Through It", "The Moderns" and dozens of other films. Not one to be limited by genres, Mark's compositional palette includes orchestra, electronic, acoustic jazz, and everything in between.

Mark needs a digital audio card as flexible and diverse as his music. He uses Delta 1010's. The Delta 1010 has become a staple item in pro studios because of its ability to work well in so many environments. Mac or PC, from Gigastudio to Logic, from tracking to soft synth playback, the Delta 1010 is the card behind the scenes. To learn more about the Delta 1010 go to www.m-audio.com/em

M-AUDIO
M POWERED.

800-969-6434 • WWW.M-AUDIO.COM/EM/ISHAM • EMAIL: INFO@M-AUDIO.COM

such as Reverb, Delay, Envelope Filter, Tremolo, and Lo-Fi.

The EQ/Compression effect is fairly rudimentary, but having it built into the plug-in is handy. The EQ gives you low and high shelving with a sweepable mid. The dynamics control simply determines the amount of compression in decibels.

The other effects sound pretty good—a bit gritty perhaps but perfect for getting that dirty street sound heard in contemporary pop and dance productions. I especially like the distortion and delay effects, such as Phonograph and Slicer BPM.

FIG. 3: Once a patch is loaded, its name and remote effect settings are displayed to the left of its file hierarchy. The names of the instrument's onboard effects also appear beneath the Effects label.

AN EARFUL

The quality of *SampleTank*'s Patches varies widely. Some sound amazingly sweet (many of the acoustic pianos, basses, and cellos), whereas others are unimpressive (some of the lead sounds and the special effects loops). The 2Pack compression scheme tends to impart a sort of rough, digital edge to the plug-in's overall sound quality. That is not necessarily a bad thing—just a unique sonic coloration.

To check if a sound has 2Pack compression, click on the Info button on the *SampleTank* interface. A third of the sounds in XL, 150 Patches, use 2Pack compression.

I liken *SampleTank*'s fidelity to that of a MiniDisc recording compared to a 48 kHz DAT recording. In some instances, the sound sits just right in a mix, whereas at other times, it requires help from an effects plug-in (such as *Renaissance Compressor* by Waves) to warm it up.

To modify a sound, version 1.1's resampling engine allows you to select the Quality or Performance option. That is accomplished by going into the plug-in's *SampleTank* Settings.txt file, located in your Preferences folder. Using a text-editing program such as *SimpleText,* you can type in the setting you want on the appropriate line and resave the file. Selecting Performance exacerbates the rough, digital edge in the sound. However, that setting lets you stretch your CPU power further. Although it is less efficient in terms of CPU usage, selecting Quality helps the samples sound much better.

TANK CONDUCTING

I used *SampleTank* mostly with Emagic *Logic Audio* but also tried it in Steinberg *Cubase VST.* (By the time you read this, a MAS version of the plug-in, compatible with Mark of the Unicorn *Digital Performer,* will be available.) In *Logic Audio,* I had good luck getting the plug-in to see its Patches. However, *Cubase VST* sometimes had difficulty finding the Patches.

On the other hand, *Logic Audio* doesn't recognize the individual outs of virtual instruments or have multitimbral functionality. However, in *Cubase VST,* those features worked as expected. Latency was not noticeable using Digidesign's Direct I/O or the Mac Sound Manager with either host program.

FILL 'ER UP

Although $499 for a VST plug-in seems a bit steep, *SampleTank* is a wonderfully useful VST Instrument. Some preset sounds in the accompanying libraries are a bit rough, but most are decent. A few are downright impressive.

IK Multimedia's 2Pack compression algorithm isn't the best sounding in the world, but it certainly helps you cram tons of sounds into your computer's RAM. *SampleTank*'s Search function is excellent, and its user interface makes dialing up sounds a real breeze (which is not something I can say for every virtual instrument). I highly recommend this plug-in.

Visit **Erik Hawkins**'s *fledgling record label at www.muzicali.com to hear music made with today's hottest new studio gizmos and to purchase his new virtual studio recording book,* Studio-in-a-Box *(ArtistPro/MixBooks).*

PRODUCT SUMMARY

IK Multimedia
SampleTank 1.1 (Mac/Win)
VST software sampler
XL $499
L $249

FEATURES	4.0
EASE OF USE	4.5
DOCUMENTATION	3.0
VALUE	3.5

RATING PRODUCTS FROM 1 TO 5

PROS: Excellent patch library interface. Search function. Samples can be stored on a hard drive other than where the actual plug-in resides. Sixteen-part multitimbral. Each part can have its own set of associated effects. Onboard effects. Imports Akai sound files.

CONS: AIFF and WAV import features not implemented. Occasional problems seeing its own patches. Bundling scheme makes differentiating between *SampleTank* packages confusing. XL bundle overpriced.

Manufacturer
IK Multimedia
tel. (866) 243-1718 or (561) 466-9763
e-mail info@sampletank.com
Web www.ikmultimedia.com or www.sampletank.com

GLYPH FireWire

Link up to three *828's*, and look *cool* doing it!

Glyph introduces the M Project PLUS hard drive with built in 4 port FireWire hub.

GLYPH
735 West Clinton Street
Ithaca, New York 14850
607.275.0345
Fax: 607.275.9464
www.glyphtech.com
sales@glyphtech.com

Quick Picks

STEINBERG

Midex 8 (Mac/Win)

By Len Sasso

Steinberg's Midex 8 USB MIDI interface ($499) is an 8-In/8-Out device featuring Linear Time Base (LTB) technology for greatly improved MIDI timing accuracy. If you download the latest driver software from Steinberg's Web site, you'll be able to stack as many as eight Midex 8 units to get a whopping 1,024 MIDI channels of LTB accuracy.

Although you can use the Midex 8 with most MIDI software, you need Steinberg's *Cubase VST/32* 5.0 to take advantage of LTB. Also, the Midex 8 doesn't like to share its USB port with other variable-bandwidth USB devices. Specifically, if your computer has a single USB port—as most laptops do—and you intend to use the port for digital audio I/O, you probably won't be able to use the Midex 8.

For this review, I tested the Midex 8 on a Pentium III/700 MHz laptop with a single built-in USB port. I also used a Macintosh G3/300 MHz with a PCI card offering two USB ports. On the PC, I used Midex version 1.1 drivers with *Cubase VST/32* 5.0 r6 and on the Mac, version 1.0 with *Cubase VST/32* 5.0 r2. In both cases, I tested the unit with and without a four-port USB hub. With the hub, the Midex 8 required external power; otherwise, it did not. In both cases, I was unable to get USB audio to work on the same port.

Driver Ed

The Midex 8 ships with a brief manual and a cross-platform CD for installing the MIDI driver software on the PC and Mac. It supports Windows 98SE, ME, and 2000, as well as Mac OS 8.6 or higher. Open Music System (OMS) is required on the Mac and is included on the installation CD. No external power supply is provided, and in many cases, USB power is sufficient. When external power is needed, the Midex 8 accepts power from any wall-wart power supply that provides a minimum of 500 mA at between 6 and 12 VAC or VDC (any polarity).

In a perfect world, hooking up the Midex 8 and installing the drivers should be a piece of cake, but for several reasons, it turned out to be a bit of a hassle. On the PC, the Add New Hardware wizard that pops up when you connect the Midex 8 to the computer couldn't find all of the driver software on the CD. Therefore, I wound up with a partial installation and had to go through the usual Windows song-and-dance of trying to determine what was installed where so I could throw it away and start over. After several phone calls to Steinberg tech support, I eventually had to install everything manually.

The driver software for the Mac is missing from the CD altogether, but once you know that, it's easy to find and download it from the Steinberg Web site. On the other hand, the necessary OMS USB drivers are on the CD, but not on the Web site. Fortunately, those unnecessary bumps in the road, while annoying, are not fatal.

Timely Arrivals

LTB provides a solution to the age-old MIDI-bandwidth problem that afflicts multiport MIDI interfaces. Because it takes almost a millisecond to transmit a typical three-byte MIDI message, even a single channel of MIDI data can get clogged by a MIDI stream containing lots of MIDI Note and Control Change messages. With a typical multichannel, multiport interface, all the MIDI data has to get into the same cue, and the problem magnifies quickly. The result is noticeable flamming, and it is especially a problem when combining MIDI tracks with software plug-in instruments, which do not use MIDI yet feature sample-accurate synchronization with each other as well as with audio tracks. Although nothing short of repealing the laws of physics can solve the problem for individual MIDI ports, LTB does keep the problem from compounding over many MIDI ports by managing them in parallel.

The Midex 8 contains built-in memory and software for storing and sequencing time-stamped MIDI messages. *Cubase VST/32* adds time stamps to the standard MIDI messages and sends them to the Midex 8 ahead of time. The Midex 8 lines up the MIDI messages by port and transmits to all ports at once as needed. That eliminates the multiport cue of MIDI data waiting to get down the pipe.

Is It for You?

If you are a *Cubase VST/32* user with a free USB port (and you don't mind using OMS on the Mac), the Midex 8 is a good choice as a MIDI interface. If you regularly use three or fewer MIDI devices and rely primarily on software plug-ins, the 1-In/3-Out Midex 3 ($149) is a real bargain. Although the Midex 8 lacks advanced synchronization features (SMPTE, ADAT Sync, and word clock, for example), it's still worth serious consideration if you can take advantage of LTB.

Overall EM Rating (1 through 5): 3.5

Steinberg North America; tel. (818) 678-5100; e-mail info@steinberg.net; Web www.us.steinberg.net

Steinberg's 8-In/8-Out Midex 8 USB MIDI interface provides front-panel LED indicators for MIDI input and output activity on all ports.

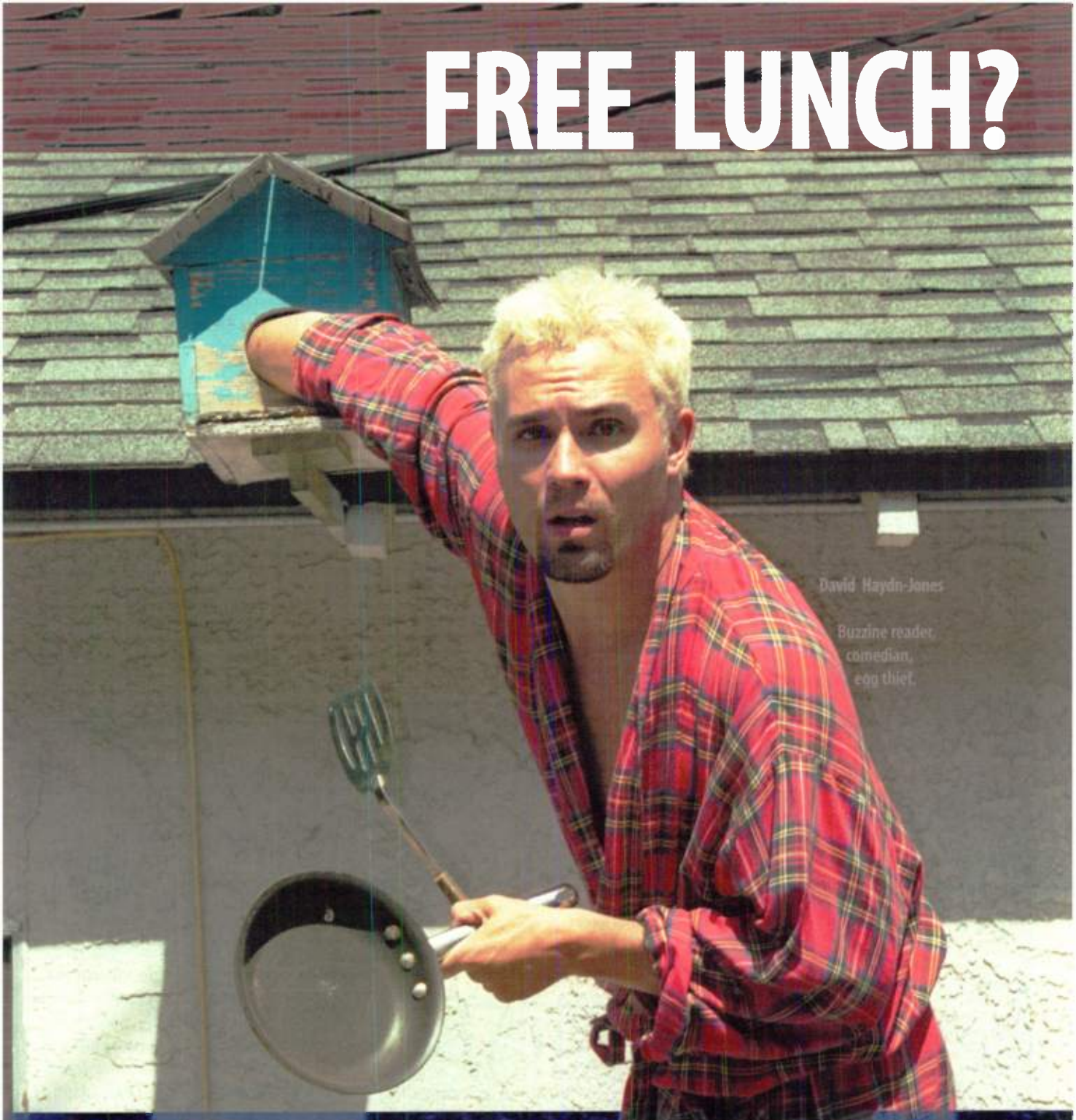
DS SOUNDWARE

Christian and Lane Ultimate Marimba and Vibes (Giga)

By Zack Price

The *Christian and Lane Ultimate Marimba and Vibes* ($199) two-CD library of marimba and vibraphone samples is another fine offering from orchestral percussionists Donnie Christian and Sean Lane. The samples for the marimba were taken from a Marimba One rosewood marimba with a five-octave range. The vibraphone samples were recorded from a Musser Gold Century vibraphone with a three-octave range.

FREE LUNCH?



Buzzine Magazine

Same original music and entertainment magazine. Great new print format. Best of all, you can get it FREE !

For a limited time only, you can get your free lunch by having Buzzine Magazine delivered directly to your door at absolutely no charge. So what's the catch? There is none. Simply visit www.buzzine.com/freelunch and tell us where you'd like your free copies sent -- We'll take care of the rest.

For more information, contact Steph Rose at steph@buzzine.com

Buzzine is a Stipko Media company.

www.stipko.com

No money. No credit card info. No strings. No kidding.

And while you're there, be sure and check out the rest of the Buzzine.com web site for a preview of the great things to come. Need a celebrity fix? Try surfing our favorite *"succes d'estime"* web site: www.safesearching.com

WRH

Each note on each instrument was recorded in stereo and mono using hard, medium, medium-soft, and soft mallets. In addition to the usual playing techniques, four Extras files include glissandi, resonator (the tubes under the sound bars) hits and scrapes, and random note runs.

The library also includes an Instrument called Marimba Rattan Handles, in which the notes are played by striking the marimba bars on the edge with the rattan shafts of the mallets. According to the documentation, the brighter-than-usual sound is a contemporary effect found in modern marimba literature. Another great nontraditional patch, Vibes Bowed, captures the haunting sound produced by bowing the vibes bars with a cello bow.

Articulating My Position

The playing techniques for the marimba patches include dead strokes, rolls, and hits. A dead stroke is produced when the player hits a bar but doesn't let the mallet head rebound, thereby damping the sound. Hits, on the other hand, allow the marimba bars to ring out freely to their natural decay. Rolls are the even repetitive strokes that "hold" a marimba note. As in live playing, the roll samples increase slightly in speed as the notes become higher to compensate for the more rapid decay of the shorter bars. Dead strokes and rolls have two Velocity levels; the hits have four.

The vibes patches include Mute, Sustain, and Motor Speed. The Mute Instrument captures the sound of the vibes when the sustain pedal is up. As you might guess, Sustain is the sound of the vibes when the sustain pedal is down. Both patches were recorded at three Velocity levels. Motor Speed lets you select the speed of the motor that controls vibrato on a vibraphone. Three speeds (controlled by the mod wheel) are provided.

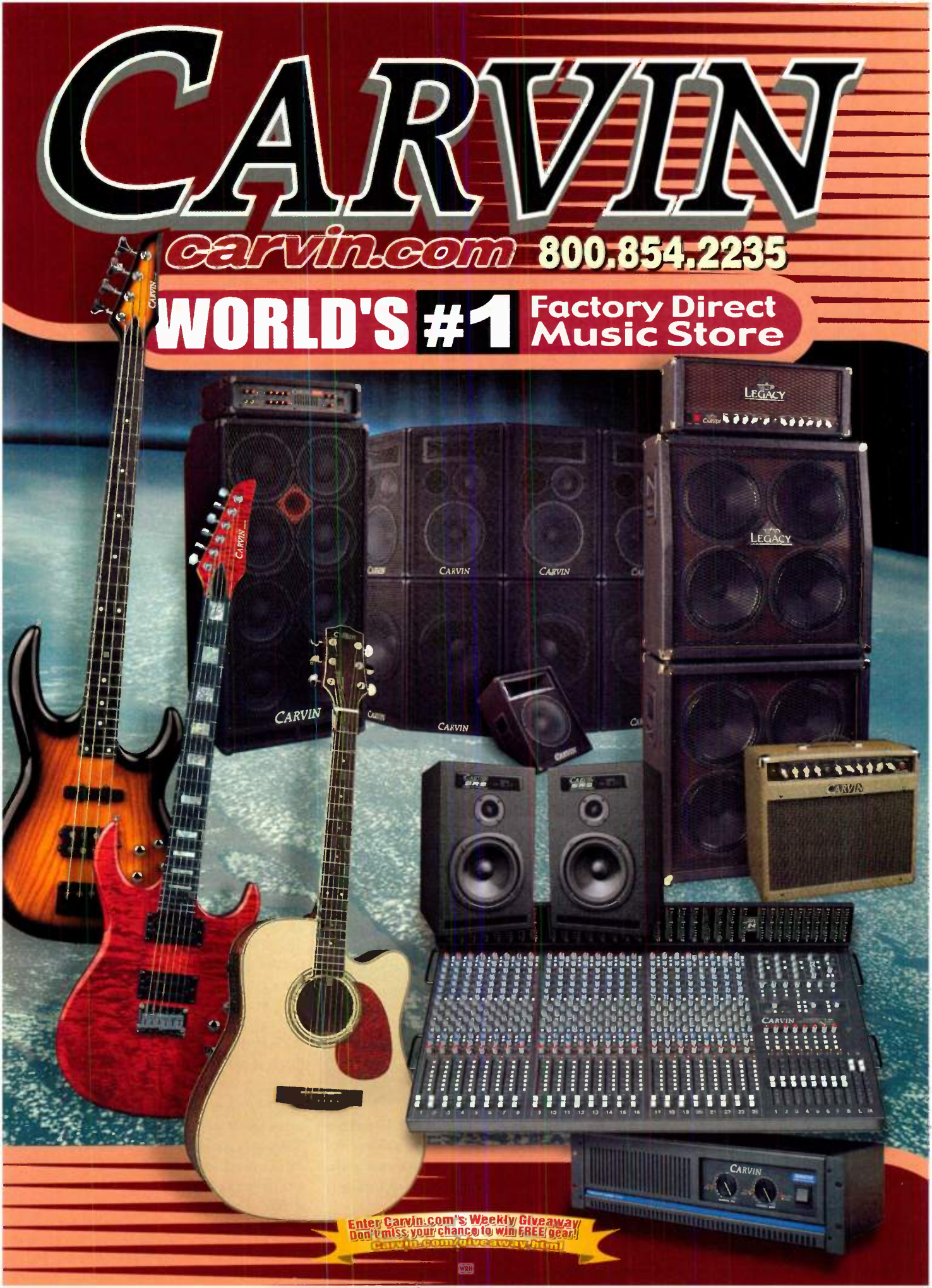
Unfortunately, the scanty documentation in *Ultimate Marimba and Vibes* offers little help in identifying the various Instruments. For example, it took a while to figure out that "Mar Hrd Sus Rolls Mod" refers to a Marimba Hard Mallet Instrument using the mod wheel to switch between hit notes (Sus) and rolled notes. "Vib Hrd Full Fs Mt" identifies a Vibes Hard Mallet Instrument using the sustain pedal (instead of the mod wheel, as in other patches) for pedal-up and pedal-down hits. The "Fs Mt" part of the name indicates that the motor speed (vibrato) is set to Fast. In the same patch, the mod wheel switches between vibrato and nonvibrato, even though that isn't indicated in the abbreviated name.

The *Christian and Lane Ultimate Marimba and Vibes* library provides an excellent collection of multilayered notes played with four types of mallets.

A Good Bit More

As a supplement to the library's limited documentation, Christian and Lane plan to offer more detailed help on their Web site (www.dssoundware.com). There's another good reason to check out the Web site: as I was completing this review, four new stereo Vibes articulation files were posted. They improve on the original CD library by increasing the number of available motor speeds to eight. In addition, the eight motor speeds are selectable using key switching instead of the mod wheel, which provides more precise real-time control over vibrato speed. Moreover, each new file offers a new Vibes Crazy Instrument that extends to the full 88-note range of a piano. It uses LFO settings that are controlled by the mod wheel to create warped, oscillating sound effects.

Skimpy documentation notwithstanding, the quality and playability of the *Ultimate Marimba and Vibes* library are outstanding. The elaborate use of controller routings and Velocity switching makes it possible to perform a wide range of techniques in real time. Clean and carefully miked, the recordings offer consistent quality whether you're playing dead strokes,


CARVIN
carvin.com
800.854.2235
WORLD'S #1 Factory Direct Music Store
LEGACY
CARVIN
Enter Carvin.com's Weekly Giveaway
Don't miss your chance to win FREE gear!
carvin.com/giveaway.html

Quick Picks

rolls, or riffs in classical or jazz settings. Overall, the *Christian and Lane Ultimate Marimba and Vibes* library is a good deal, and with its Web-site updates, it promises a good deal more in the future.

Overall EM Rating (1 through 5): 4.5

DS Soundware/Tascam (distributor); tel. (323) 726-0303; e-mail tascamweb@tascam.com; Web www.tascam.com

DISCRETE DRUMS

Series 1: Rock/Alternative

By Rob Shrock

One of the biggest disadvantages of using stereo drum loops is the difficulty of processing or changing the mix of the individual sounds. Discrete Drums addresses this issue with its 12-disc set, *Series 1: Rock/Alternative* ($299), by providing drum loops in an 8-channel format with the drums broken out into individual tracks. This approach is similar to recording a drum set in the studio. The 24-bit, 44.1 kHz WAV files are split into kick, snare, overhead left and right, toms left and right, and compressed-room left and right (no separate hi-hat track is provided).

Series 1: Rock/Alternative showcases a collection of 31 "songs" suitable for music styles implied by the series name. Each song contains several basic grooves and variations, averaging close to a dozen loops with which to build your song. The term *loop* is really not accurate; these are typically 8-bar or 16-bar phrases that you load into a digital audio workstation (DAW) and copy and edit within your software to build the desired performance.

Discrete Drums' *Series 1: Rock/Alternative* is a 12-CD collection of drum phrases and individual hits. The files are offered in audio, AIFF, and WAV formats with resolutions up to 24-bit, 44.1 kHz.

Drum Core

The audio files of the 31 songs are contained on nine discs. As you can imagine, multiple 8-bar or 16-bar loops of 8-track, 24-bit audio can add up to a lot of data. Two audio CDs contain all of the loops and variations in 16-bit stereo. Individual hits are provided for those who wish to add hits on top of the phrases. The final disc contains both 24-bit and 16-bit samples of the individual hits in AIFF format.

The performances utilize session folks from Nashville, and the quality of the playing and engineering is very good overall. The drum sound is big and expansive and some creative editing makes for a great drum track. The ability to balance the ambient/dry sounds of the overhead and room mics and to experiment with different EQ, compression, and reverb settings on the snare is a luxury usually not available to those who use drum loops in their work.

Conceptual Matters

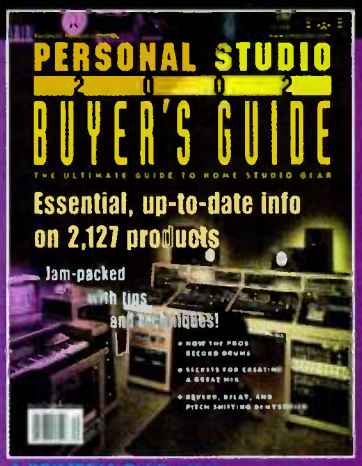
This library has a good game plan, despite some drawbacks and limitations. First, the performances of *Series 1* are very much geared toward rock/alternative songs, so don't expect a lot of stylistic variety. (Four more collections covering additional styles are due for release in the first quarter of 2002.) Next, though the songs include bpm data for the grooves, I found that sometimes I had to nudge the tempo in my DAW by a small amount to keep them in time.

In fact, plan on a lot of editing to make the tracks work to their potential—they are not ready for simple play and loop. Several phrases include pickup notes, so simply dropping eight tracks of data into the downbeat of a bar doesn't guarantee that it will land in the correct spot. Many phrases begin or end with a crash, so to create a continuous groove, you will need to extract a few bars from the middle of a loop.

Electronic Musician presents

PERSONAL STUDIO 2002 BUYER'S GUIDE

THE ULTIMATE GUIDE TO HOME STUDIO GEAR



Today's personal-studio owner has more equipment to experiment with than ever before, so choosing the right tools is a crucial step in developing recording skills and maximizing productivity.

The fifth edition of PSBG boasts pages loaded with the most comprehensive product specification charts available. Editorial features offer applications and ideas about creating the ideal personal-studio environment. Tips and tricks throughout the guide provide quick refreshers and new approaches to home recording.

Look for essential, up-to-date info about 2,127 products listed in 38 categories!

Editorial features and tech support throughout, including:

- Maximizing Your Mixer
- Creating the Ultimate Mix
- Getting a Drum Sound
- Power Hitters
- Ten Mastering Recording Tips
- Reviewing the Basics: Reverb, Delay, Compression, and Pitch-Shifting
- 300 Manufacturer Contacts

Personal Studio Buyer's Guide 2002 is available in music stores, bookstores, and wherever ***Electronic Musician*** is sold.

Order toll free in the U.S. at 800-441-0294; outside the U.S. at 913-967-1701.

Visit us online at www.emusician.com!

THE CHARTS

Analog Mixing Consoles
Audio Patch Bays
CD Recorders
Channel Strips and Voice Processors
Computer-Based Digital-Audio Workstations
Digital-Audio Converters
Digital Mixdown machines
Digital Mixing Consoles
Direct Boxes
Drum Machines
Dynamics Processors
Effects Processors
Equalizers
Headphones
Keyboard Synthesizers and Samplers
Microphone and Instrument Preamps
Microphones
MIDI Interfaces, Patch Bays, and Processors
MiniDisc and Cassette Multitracks
Modular Digital Multitracks
Modular Hard-Disk Recorders
Power Amplifiers
Reference Monitors
Sequencers
Sonic Treatment
Studio Furniture
Synthesizer and Sampler Modules
Synchronizers

Take a Hit

The individual hits sound good and come in dry and ambient versions—there just aren't enough of them to satisfy me. The brush rides sound great, and I love many of the kicks and hi-hats. The tom hits aren't great, however, and there are not enough snare hits for my taste. However, the hits are intended to supplement the main grooves and are successful as add-ons.

Generally, the kick patterns are a little too busy for my taste, and many of the variations between patterns are not subtle, which often makes it a challenge to use two basic grooves in the same song. You get a lot of musical material in each phrase to pull from, though.

The overhead of loading and editing this much data is not to be discounted. While working in demo mode, I preferred using the stereo, 16-bit versions of my favorite loops because they were easier to manipulate. (I still had the option of rebuilding the performance using the 24-bit, 8-track versions.) Many times, the stereo loops sounded great on their own for a demo or jingle.

Rock On

I love the concept of this library. The end result could potentially blow away other methods of achieving realistic-sounding drum tracks. Check out the audio disc of the loops to determine if the grooves would work in your musical context. You might find it to be an excellent addition to your songwriting or production arsenal.

Overall EM Rating (1 through 5): 3.5

Discrete Drums.com; tel. (800) 387-5720; e-mail contact@discretedrums.com; Web www.discretedrums.com

LITTLE LABS

PCP Instrument Distro 3.0

By Myles Boisen

The Little Labs PCP Instrument Distro 3.0 ($950) signal splitter and routing box is as versatile as it is compact. It has the unique ability to split a guitar's high-impedance signal without compromising audio quality and then route the output to three amplifiers or effects pedals at once. For guitar-intensive studio productions, in which different amps are selected or combined in each section of a song, the benefits of the PCP Instrument Distro are obvious. However, electric basses, keyboards, and other stage or studio instruments can also benefit from the PCP Instrument Distro's many functions.

EM ★★★★★ hot pick

Not Your Mom's Splitter

The PCP Instrument Distro is a fully professional studio tool that bears no resemblance to the footswitch splitters of the past. Each of the three high-impedance output channels features input switching, phase reverse, ground lift (with individual status lights), and trim controls. An active DI (with 16 dB of gain and a balanced, line level +4 dBu output) and a multed output are also included. The low-impedance output is designed especially for driving long guitar cables—for example, between the control room and a distant amp stack. Should you feel the need to branch out beyond the unit's three outputs, an expansion jack lets you connect a pair of PCP Instrument Distros together using a ¼-inch TRS cable.

The input/output switches are located on the front panel, and unbalanced ¼-inch input jacks are conveniently provided on the front and back panels. The back panel also features three XLR inputs and one XLR output for balanced, pro-level (+4 dBu) sources.

The front-panel ¼-inch input takes precedence over the rear-panel ¼-inch input. That means not having to crawl behind your rack to reconnect cables if you have the unit racked up in your studio: simply plug in to the front-panel input jack and you're ready to go.

The PCP Instrument Distro is 2U in height but less than a half-rack wide. Little Labs offers optional mounting hardware to accommodate the unit's narrow width in a professional rack. The PCP Instrument Distro's sturdy, foam-lined plastic carrying case can hold the external AC power transformer. This heavy-duty 48V power supply uses a standard three-prong IEC plug, thus avoiding the dreaded wall wart.

It's the Cheese

In case you're wondering, PCP stands for Professional to Cheesy Pedal, a moniker for yet another of this unit's multiple personalities. The high-quality DI portion of the device can be used to send a direct instrument signal to any effects processor or recorder that operates at +4 dBu.

Little Lab's PCP Instrument Distro is more than just a high-quality splitter for high-impedance signals. The device lets you route audio signals in a number of useful ways.

On the other hand, you can simultaneously feed different signals to the PCP Instrument Distro's three balanced rear inputs and route them in any combination to the unit's three high-impedance outputs. This function, commonly known as *reamping,* allows effortless interfacing between virtually any combination of studio devices at a variety of operating levels.

The PCP Instrument Distro can be put to use in other ways. For example, you can use it to blend or compare processed and unprocessed instrumental sources. You can also use it to perform live with prerecorded tracks or rehearse to CDs and other sources without using a mixer.

Not for Guitarists Only

Whether you're using the PCP Instrument Distro as a DI, splitter, or line driver, the transparent device doesn't color the sound. In fact, it can help a high-impedance instrument, such as a guitar, maintain its sound over long distances.

Because of the PCP Instrument Distro's versatility, you can use it on just about any instrument as well as prerecorded tracks. So if your idea of fun is running a track through a creamy tube compressor and then to the world's cheesiest stompbox (or vice versa), the PCP Instrument Distro is your invitation to a nonstop studio party!

Overall EM Rating (1 through 5): 5

Little Labs; tel. (323) 851-6860; e-mail littlelabs@littlelabs.com; Web www.littlelabs.com

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

The Professional's Source

The Professional's SOURCE for all your
PRO-AUDIO and RECORDING needs

- Built To Order Computer Based Turnkey Systems for Macintosh or Windows
- Expert Advice from Working Professionals!
- World's Largest In-Stock Inventory!

B&H
PHOTO - VIDEO - PRO AUDIO

When in New York City Be Sure To Visit Our SuperStore

420 Ninth Ave.
Between 33rd & 34th Streets,
New York, N.Y. 10001

For Information Call:
800-947-5509 • 212-444-6679
or Fax (24 Hours):
800-947-7008 • 212-239-7770

Store and Mail Order Hours:
Sun. 10-5, Mon. thru Thurs. 9-7
Fri. 9-1, Sat. Closed

WE SHIP WORLDWIDE

ADVERTISER INDEX

ADVERTISER	INTERNET	PAGE
8th Street Music	www.8thstreet.com	32
AKG	www.akgusa.com	63
Alesis/Numark (ADAT HD24)	www.alesis.com	55
Alesis/Numark (FX Tools)	www.alesis.com	85
ART	www.artproaudio.com	108
Audio Computing	www.audiocomputing.com	119
B&H Photo-Video	www.bhphotovideo.com	170-171
Bayview Pro Audio	www.bayviewproaudio.com	165
Behringer	www.ddx3216.com	31
Berklee Press	www.berkleepress.com	112
BIAS	www.bias-inc.com	50-51
Big Fish Audio	www.bigfishaudio.com	43
Big Fish Audio	www.bigfishaudio.com	45
Big Fish Audio	www.bigfishaudio.com	47
BitHeadz	www.bitheadz.com	109
Broadjam	www.broadjam.com	161
Cakewalk	www.cakewalk.com	33
Carvin	www.carvin.com	135
Cool Breeze Systems	www.coolbreezesys.com	156
dbx Professional Products	www.dbxpro.com	71
DigiTech	www.digitech.com	59
Disc Makers	www.discmakers.com	111
Discrete Drums	www.discretedrums.com	12
East-West	www.soundsonline.com	78-79
Echo Digital Audio	www.echoaudio.com	15
EGO SYS	www.egosys.net	61
E-mu Systems	www.emu.com	9
Focusrite	www.focusrite.com	125
Fostex	www.fostex.com	123
Frontier Design Group	www.frontierdesign.com	IBC
Full Compass Systems	www.fullcompass.com	155
Full Sail	www.fullsail.com	110
Furman Sound	www.furmansound.com	131
Garritan Orchestral Strings (GigaStrings)	www.garritan.com	159
Genelec	www.genelec.com	67
Glyph (FireWire)	www.glyphtech.com	101
Grandma's Music	www.grandmas.com	156
Hafler	www.hafler.com	42
HHB (BurnIT)	www.hhbusa.com	75
IK Multimedia (Sampletank)	www.sampletank.com	139
Ilio Entertainments	www.ilio.com	100
Interstate Music	www.interstatemusic.com	162
Kay Sound	www.kaysound.com	87
Korg (D1600)	www.korg.com	83
Korg (Electribe)	www.korg.com	97
Korg (Karma)	www.korg.com	10-11
Korg (Triton)	www.korg.com	129
KRK Systems	www.krksys.com	137
Kurzweil	www.kurzweilmusicsystems.com	121
Lexicon	www.lexicon.com	115
Mackie (MDR 24/96)	www.mackie.com	2-3
Mackie (1604-VLZ Pro)	www.mackie.com	73
MacWorld Expo	www.macworldexpo.com	152-153
Mark of the Unicorn	www.motu.com	BC
Midiman (Oxygen 8)	www.midiman.com	65
Midiman (Surface One)	www.midiman.com	34-35
Midiman/Ableton	www.ableton.com	27
Midiman/Propellerhead	www.propellerheads.se	22-23
MusicTech	www.musictech.com	162
Music Technology Learning Center	www.mtlc.net	144
Musician's Friend	www.musiciansfriend.com	92-93
Muska & Lipman	www.muskalipman.com	126
Muska & Lipman	www.muskalipman.com	119
NëMO	www.nemoboston.com	133
Net4Music (Finale)	www.codamusic.com/em	17
Neumann/USA	www.neumannusa.com	151
Peavey	www.peavey.com	57
PG Music	www.pgmusic.com	147
QCA	www.pol.com/QCA	163
Rode Microphones	www.rodemicrophones.com	95
Roland	www.rolandus.com	18-19
Sam Ash	www.samash.com	102-103
Samson Technology (MRS-1044)	www.samsontech.com	141
Samson Technology (RT-323)	www.samsontech.com	117
Samson Technology (S Class)	www.samsontech.com	106-107
Shure Incorporated	www.shure.com	81
Sound Chaser	www.soundchaser.com	28-29
Sound Quest	www.squest.com	132
SRS Labs Inc	www.srslabs.com	46
Steinberg (Cubase)	www.us.steinberg.net	105
Studio Projects	www.studioprojectsusa.com	145
Sweetwater Sound #1	www.sweetwater.com	25
Sweetwater Sound #2	www.sweetwater.com	182-183
Sweetwater Sound #3	www.sweetwater.com	184-185
Tascam (DM-24)	www.tascam.com	53
Tascam (GigaStudio)	www.tascam.com	4-5
Tascam (US-428)	www.tascam.com	113
Taxi	www.taxi.com	143
TC Electronic	www.tcelectronic.com	69
Technics	www.technicsusa.com	37
Wave Digital	www.wavedigital.com	32
Waves	www.waves.com	41
World Replication Group	www.worldreplication.com	149
X-Vision Audio	www.xvisionaudio.com	89
Yamaha (AW2816)	www.aw2816.com	13
Yamaha (DMI)	www.yamahasynth.com	77

ELECTRONIC MUSICIAN MARKETPLACE ADS

Alpha Media Group	www.justdupeit.com	172
CD Labs	www.cdlabs.com	175
Crystal Clear Sound	www.crystalclearcds.com	175
Earthdisc	www.earthdisc.com	173
Europadisk	www.europadisk.com	172
Gefen	www.gefen.com	172
Grandma's Music	www.grandmas.com	175
Lonely Records	www.lonelyrecords.com	173
The Disc Factory	www.thediscfactory.com	174
Media Services	www.mediaomaha.com	173
Mixmeister	www.mixmeister.com/emusician	173
Neato	www.neato.com	175
Pacific North Studios	www.pncd-arts.com	175
Professional Sound & Music	www.prosound.com	172
Shreve Audio	www.shreveaudio.com	174
The Gate	www.gatemedia.com	173
Recording Workshop	www.recordingworkshop.com	175
Triple Disc	www.tripledisc.com	173
Vancouver Film School	www.vfs.com	172

FOR FREE INFORMATION FROM OUR ADVERTISERS, VISIT www.emusician.com/rs

EM's Online Reader Service is the quick and easy way to contact advertisers to receive **FREE** product information. Simply go to **www.emusician.com/rs**. From our Online Reader Service page you can then select the issues and the advertisers you are interested in. It's that simple. Your request is immediately e-mailed to the advertiser.
Also, while you're there, take a moment to complete our RATE THE ARTICLES survey in each issue. We want to know what works for you!

IMPORTANT NOTICE TO READERS:
Reader service inquiries are sent directly to the advertiser, who is solely responsible for sending product information. *Electronic Musician* can not guarantee a response from all advertisers.

Electronic Musician's Advertiser Sales Regions and Representatives

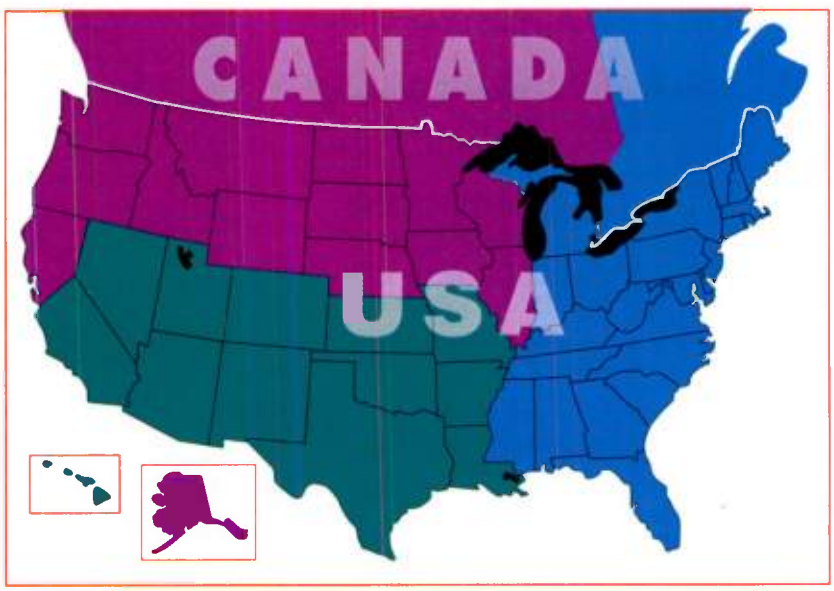
Advertising Director
Joe Perry (770) 343-9978
jperry@primediabusiness.com

Northwest
Stacey Moran (323) 782-2016
smoran@primediabusiness.com

Southwest
Mari Deetz (323) 782-2011
mdeetz@primediabusiness.com

East Coast/Europe
Jeff Donnenwerth (770) 618-0160
jdonnenwerth@primediabusiness.com

Classifieds
Kevin Blackford (West Coast)
Jason Smith (East Coast)
(800) 544-5530 or (510) 653-3307
emclass@primediabusiness.com



EM MARKETPLACE

EM CLASSIFIEDS

ELECTRONIC MUSICIAN CLASSIFIED ADS are the easiest and most economical means of reaching a buyer for your product or service. The classified pages of **EM** supply our readers with a valuable shopping marketplace. We suggest you buy wisely; mail-order consumers have rights, and sellers must comply with the Federal Trade Commission as well as various state laws. **EM** shall not be liable for the contents of advertisements. For complete information on prices and deadlines, call (800) 544-5530.

ACOUSTIC PRODUCTS

Tired Of Bad Sound?
It's Time To Take A Stand.

Introducing the Auralex

gramma

The GRAMMA is a hot new patent-pending device that floats an amp, monitor, subwoofer, turntable or more for nearly total acoustic isolation.

Whatever device you put on top of a GRAMMA will instantly perform a lot more like it was designed to!

You'll immediately notice dramatically truer tone, higher immunity to feedback and a level of resonance-free purity you never thought you'd get out of your gear! The GRAMMA absolutely ROCKS! Check it out TODAY!

"One word...WOW! The GRAMMA completely changed the bottom end in my mastering studio. So much more definition and detail. Such a simple-looking piece yet so powerful!"

"(My) low end is much more focused, no room resonances, all the little buzzes & rattles went away immediately...my two recording amps stay on the GRAMMAs!"
Lee Roy Parnell

"Really smooths out my guitar tones. The road crew started using GRAMMAs under the monitors, the Leslie® & drum mics...fantastic results all around."
Jeff Tamelier

Auralex™ Acoustics • www.auralex.com • 800-95-WEDGE

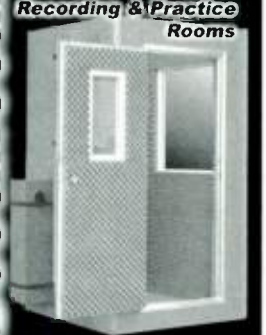
AcousticsFirst™
Toll Free: 888-765-2900
Full product line for sound control and noise elimination.
Web: http://www.acousticsfirst.com

SoundSuckers.com
1-888-833-1554
*Soundproofing Products & Supplies
*Full line of Professional booths
*Custom Projects of all kinds
E-mail: sales@soundsuckers.com

WhisperRoom INC.
SOUND ISOLATION ENCLOSURES
Celebrating over 10 years of reducing sound to a Whisper!
Recording, Broadcasting, Practicing

MDL 102126S (8.5'X10.5')
15 Sizes and 2 Levels of Isolation Available
New! SoundWave Deflection System
(Change parallel walls to non-parallel)
Immediate Shipping!
www.whisperroom.com
PH: 423-585-5827 FX: 423-585-5831

VocalBooth.com
Multi Purpose Recording & Practice Rooms



Starting at $1499
Affordable Portable 4x4, 6x6 & larger
(541)330-6045

SILENT
58 Nonotuck St., Northampton, MA 01062
INFO (413) 584-7944 • FAX (413) 584-2377
ORDER (800) 583-7174
info@silentsource.com • www.silentsource.com
Acousticore Fabric Panels • Sound Barrier
Isolation Hangers • A.S.C. Tube Traps
Silence Wallcovering • WhisperWedge
Melaflex • S.D.G. Systems • Tecnifoam
R.P.G. Diffusors • Sonex • Sound Quilt

Subscribe to EM (800) 245-2737

BUSINESS OPPORTUNITIES & CONSULTING

BREAK IN TO JINGLES FOR HIGH PROFITS
Free Report. A must for singers, musicians, and producers.
www.commercialmusic.org/EM

COMPUTER SYSTEMS

COMPUTERS for MUSIC.
Preconfigured Macs and PCs optimized for Cakewalk, Cubase, Digi 001, Digital Performer, Emagic, GigaSampler, Pro Tools LE/TDM, Sonar, and more. Featuring audio and MIDI hardware from Digidesign, MOTU, Midiman, Frontier, RME. Optimized for MIDI sequencing, hard-disk recording, A/V, CD-R mastering, and duplication. Desktop, tower, and rackmount configurations available.
www.wavedigital.com (973) 728-2425.
Call for information about our new
Rackmount Apple G4 Macs and PowerBook-based portable DAW solutions.

EQUIPMENT FOR SALE

Hard Drive Noise A Problem?
Problem Solved.

Visit us at www.iso-box.com
ISO BOX™
SOUND CONSTRUCTION & SUPPLY, INC. • NASHVILLE, TN • (615) 884-8257

The Case Specialists

Flight cases for guitars, pedalboards, mixers, drums, rackmount equipment, keyboards, DJ equipment, etc.
Call for quotes and FREE catalog
Discount Distributors
800 346-4638
In New York: 631 563-8326
www.discount-distributors.com

Tell our advertisers you saw their ad in EM Classifieds

RECORDING PRO AUDIO KEYBOARD PA SOFTWARE

New & used, trade-ins welcome
"Call every ad in this magazine, then call us last"
We Will Not Be Out Priced!

Call us about getting your productions on our Website

digital playroom 1-800-822-6434
the professional & home studio place

www.digitalplayroom.com

Every major brand of everything. Millions of dollars of musical gear in stock. **ALTO MUSIC** Guitars, recording, keyboards, amplifiers, drums, pro sound, new & used. One of the largest selections in the country. We ship everywhere!
680 Rt. 211 E.
Middletown, NY 10940
altomusic@altomusic.com
(845) 692-6922
www.altomusic.com

OMNIRAX
STUDIO FURNITURE

CODA D8
with Sidecars

OMNIRAX 800.332.3393 415.332.3392
FAX 415.332.2607
www.omnirax.com

Attention bands and musicians:

Sell your Indie Music CDs with an EM Classified Ad

sign-up online emusician.com

Pre-owned or new cosmetically flawed Digital recording equipment at near wholesale pricing. Mackie, Yamaha, Panasonic, Sony, Alesis, Tascam, Roland and more. Save thousand. Many new items have just had the box opened and never used. Over 350 brands. Absolutely the best prices anywhere! Over 72 years in business. Call today **(800) 264-6614** or (860) 442-9600. Email info@carusomusic.com.
Caruso Music 94 State St., New London, CT 06320
www.carusomusic.com

SR5.1 Surround level control
Precise tracking to .05db

Coleman Audio colemanaudio.com (516) 334-7109

Digital Recording
Factory Direct Discount Dealer
* Alesis * Yamaha * Sony * Tascam *
* Roland * Akai * Event Electronics *
* Digital Audio * Fostex * Korg *
Pro Audio Plus (800) 336-0199
Division of Rolls Music Center
www.rollsmusic.com

Indie Music CDs For Sale

Toney Ventura No Way
An eclectic blend of guitar and vocals by Toney. CD $14.
www.toneyventura.com

X Of Eden; Beyond The Gates Of Eden
Progressive Metal/Raging guitars slick orchestration. CD $15.
Hear samples www.xofeden.net

Sweet Crystal; Still Standing...
AOR power with a message you can believe. CD $15.
www.cdbaby.com/sweetcrystal

Jeffrey Luck Lucas; Calene
California Country
artists.mp3s.com/artists/228/jeffrey_luck_lucas.html $7.98

Modus; The Twin Jade Sessions
Groundbreaking improv funk jazz from S.F., CA. Check out samples at www.cdbaby.com/modus

Robert Bitte; Autumn Moon
Instrumental smooth jazz/new age Music for the Age of Anxiety
CD $15. www.cdbaby.com/bitte

Myles Boisen; Scrambledisc
A masterpiece of studio cutups and improvisation. Audio CD $15
mylesaudio@aol.com

Una Pong; I Love You Very Much
Petri-dish music, beehive ballet.
CD $15.
www.cdbaby.com/unapong

Benny Rietveld; Mystery of Faith
Alt Jazz/Rock by Miles Davis/Santana bassist. $15 w/Carlos Santana, Barbara Higbie. www.bennyworld.com

Kelly McGuire and The Detroit Lean
Band, Detroit Lean Blue-Eyed Soul Pop that grooves right in the pocket.
CD $15. www.kellymcguire.com

Media; The One and Only
Blues-rockin' styles, new songs. Get Media! Download free samples. Order at www.mediarocks.com

Gary Jennings
Nostalgic roots rock music. $10
Check out samples at www.JenningsMusic.net

Gino Robair; Singular Pleasures
Industrial Percussion Solo Performance CD $10. Audio Format
www.rastascan.com/brd023.html

Lakeside Rebar; Lost at Shore
Debut album from San Francisco's finest avante-garage roots-pop band
www.lakesiderebar.com

Peter Frank Santovito; Songman5;
"Letters To My Love"
Award-winning songwriter. $10.
www.cdbaby.com/Santovito

e:moderne; retro modern
Dance. Synthpop with a touch of trance. CD $14.
www.emoderne.net

Robert Ceely; BEEP CITY
Instrumental and Electronic music
Hear what you're missing. CD $16
www.ceelymusic.com

Sam Ryan; Blue Clouds
Shroom Cloud Psychedelic C Music. Natural Electronic Alt Jazz/Rock. CD $8. Image Art www.samryan.com.

Michael Oster; FLUID
Featured in **EM** 2/01
ProFile. CD $12.95
www.F7sound.com

Check out
www.emusician.com

DACS FREQue II
Analog ring modulator

INDEPENDENT AUDIO
www.independentaudio.com 207-773-2424

Sony MPX-3036 console
with Megamix 11 Automation
with Mac IIci
Asking $10,000 or best offer
(718) 387-7958
www.coyoterecording.com

FURNITURE

Studio furnishings [free catalog]

ARGOSY.
800.315.0878 573.348.3333
argosyconsole.com

hundreds of items in stock
just point...click...and buy
www.toyspecialists.com
800 445 3330

---

e-mail your ad to:
emclass@
primediabusiness.com

EM CLASSIFIEDS

INSTRUCTION

MUSIC PRODUCTION

MUSIC SALES

PARTS & ACCESSORIES

RECORDING SERVICES & REPAIRS

RECORDS, TAPES & CDS

EM CLASSIFIEDS

RECORDS, TAPES & CDS

SOFTWARE, SEQUENCES & SOUNDS

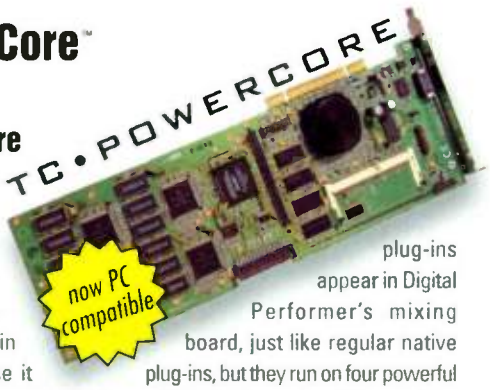
e-mail your ad to: emclass@primediabusiness.com

Expand Your MOTU Desktop Studio

Start with this ultimate FireWire-based mobile rig with plenty left over to expand

TC • PowerCore™

DSP Turbo™ for MAS • PowerCore Plug-ins



TC•PowerCore is a major breakthrough for Digital Performer's real-time MAS plug-in environment because it provides DSP turbocharged plug-in processing. At last, the renowned TC TOOLS/96 studio-quality FX package (included), with TC MEGAVERB, TC Chorus/DELAY and TC EQ[at], can be at your fingertips in Digital Performer, plus other TC I Works plug-ins such as TC MasterX and TC Voice Tools (sold separately). These powerful plug-ins appear in Digital Performer's mixing board, just like regular native plug-ins, but they run on four powerful 56K DSP chips on the TC•PowerCore PCI card. It's like adding four G4 processors (equal to 2.8 gigahertz of extra processing power!) to your computer. Run 12 studio-quality TC plug-ins with no hit on your CPU power, and run other native plug-ins at the same time! And coming soon from 3rd party developers: Waldorf Vocoder, Antares AutoTune, TC Helicon Voicecraft and others.

TC | WORKS

bias Peak™ 3.0

Advanced waveform editing and mastering

BIAS Peak 3.0 for Mac OS 9 and X, is the ultimate editing, processing, and mastering companion for Digital Performer! Peak gives you lightning fast, nondestructive waveform editing with support for audio files up to 32 bits and 10 MHz, including 24-bit/96kHz files. Unlimited Undo/Redo gives you the freedom to work creatively. Select an audio region in DP, choose the "Use External Waveform Editor" command, and instantly switch into Peak! Peak's sophisticated options for on-the-fly marker, region and loop creation are simply unparalleled. Advanced DSP and looping tools include Convolve, Repair clicks, Loop Tuner™, Loop Surfer™, Loop It™ and Guess Tempo™ and more. Process thousands of files, or just a few, using Peak's batch processor. Peak directly supports all MOTU audio interfaces and includes Roxio Toast™ Lite CD for burning your own redbook audio CDs directly from Peak's powerful playlists. Create web or multimedia content for export with multiple file formats, including Apple's QuickTime.

Aardvark Aard Sync II™

Ultra-low jitter master clock for your MOTU studio

The problem? Multiple word clock devices that you need to sync perfectly with your MOTU system. The Solution? The AardSync II Master Clock from Aardvark. The Aard Sync II will make everything in your studio slave together smoothly. With four industry standard word clock outputs and ultra low-jitter performance, you can set the Aard Sync II to generate any digital audio sample rate desired—not only 44.1 and 48 kHz, but also the pull-up and pull-down rates required for film and video applications. The AES/EBU outputs are low-jitter approved and make any converter sound more accurate. No clicks, no pops, no falling out of sync! Slaves to video blackburst in both NTSC and PAL/SECAM format. If you've got multiple digital audio devices in your MOTU studio that need to stay in sync, Aard Sync II is the wonder box you've been looking for. Call Sweetwater today to find out more.

RADIKAL TECHNOLOGIES SAC-2K™ controller

Precision touch-sensitive automated worksurface

The Radikal Technologies SAC-2K sets a new standard for hands-on control of Digital Performer with a custom plug-in for DP and easy, one-touch access to every element of the recording process in Digital Performer with responsive, touch-sensitive automated controls. Within minutes, you'll achieve a whole new level of interaction and creativity that you never thought possible with fader groups, mix automation, plug-in automation (up to 12 parameters at once), transport with jog/shttle, solos, mutes…it's all just one touch away.

order yours today

Sweetwater
music technology direct™

Apple G4 Titanium PowerBook
Or a dual-processor G4 desktop for maximum horsepower

MOTU DP3 audio workstation software
Now with full surround production up to 10.2

MOTU 828 FireWire audio interface
Or a MOTU PCI interface like the 2408mkII or 1296

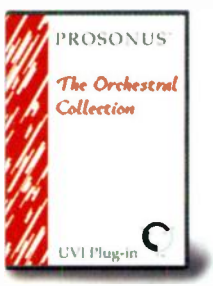
Altiverb™ Add real acoustic spaces to your mix with the first and only sampled reverb plug-in

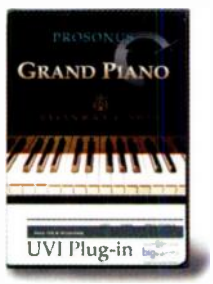
Pictured here is the Concert Gebouw, a world-famous concert hall in Amsterdam with superb acoustics. Altiverb, the first (and only) real-time sampled acoustics plug-in, delivers the sound of this hall to your Digital Performer virtual studio — along with dozens of other sampled acoustic spaces. Altiverb is an astonishing breakthrough in reverb technology because it fully reproduces the acoustic qualities of real spaces, rather than synthesizing an approximation with artificial algorithms. Only a few very expensive ($10K+) hardware processors offer sampled acoustics processing, but Altiverb gives you this unsurpassed level of realism for less than $500, thanks to the amazing "Velocity Engine" Altivec processor in all G4 Power Macs. Provides dozens of real spaces, from concert halls to closets, or sample your own! Now shipping exclusively for Digital Performer. VST version coming soon.

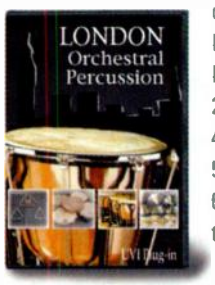
UVI Plug-ins™ Universal Virtual Instrument plug-ins for Digital Performer and MAS

bigfish audio™

The UVI Plug-in will revolutionize your Digital Performer system. It's a playback sampler that opens as a plug-in right inside your Digital Performer project. With nine brand new titles to choose from, you can have a different sound library with hundreds of samples at your fingertips. What makes this plug-in so unique? Instead of trying to cram an entire sound collection into a ridiculously small amount of RAM, these libraries serve as a virtual sound module right inside DP. No more wasted time loading CD-ROMs, waiting, listening, loading again, waiting some more... With UVI plug-ins, the patches are loaded in seconds and are available directly inside Digital Performer. There's nothing quite like this! London Orchestral Percussion, Prosonus Orchestral Collection, Prosonus Grand Piano, Six PlugSound Volumes: 1-Keyboards, 2-Frets, 3-Drums, 4-Hip Hop Toolkit, 5-Synth Collection, 6-Global and more titles on the way.







U V I Plug-in™

Cool School Interactus™ Vol. 6 — Interactive Training for Digital Performer 3

From the newbie to the guru, there's no better way to get more out of Digital Performer than CSi-Volume 6. It's like having a DP product specialist looking over your shoulder, with click-for-click tutorials, a massive glossary of DAW-related terms and over 40 movie tutorials. Includes our new "AutoPlayer" mode: just sit back and soak up the info!

SweetCare™ 24-hour support from the MOTU system specialists!

Nobody knows MOTU-based systems better than Sweetwater. So we've developed SweetCare, one of the most comprehensive approaches to technical support in the music industry. On the web or in person, our commitment to helping our customers is our passion. Our 23 years of experience with advanced music technology products from companies like MOTU is at your disposal 24/7 via our online 24-Hour SweetCare Support Center or in person six days a week with new extended hours on Saturdays. SweetCare includes on-line services beyond just Q&A, such as in-depth articles, live media, online forums, and the most complete knowledge base of musical and technical information available anywhere. Visit www.sweetwater.com/support for complete details.

www.sweetwater.com
Voice: (219) 432-8176 • Fax: (219) 432-1758 • Email: sales@sweetwater.com
5335 Bass Road • Fort Wayne, IN 46808

800-222-4700

Expand Your MOTU Desktop Studio

Start with MOTU's ultimate 96kHz, 32-bit native recording system

Avalon VT-737 SP™ Tube preamplifier / opto-compressor / Class A equalizer for your MOTU interface

The VT-737SP brings that magic Avalon sound to your MOTU workstation. Run your dullest, most sterile mic through the VT-737 SP and you'll be amazed at how warm and sweet it sounds. This 2U space combo brings a new standard to high-end audio, taking your sound to places you never thought possible and giving you precise creative control. With vacuum tube and discrete design, the VT-737SP provides a wide range of tube tone and control: Avalon sound with maximum flexibility.

AVALON DESIGN

PURE CLASS A MUSIC RECORDING SYSTEMS

PreSonus DigiMax™ Pristine 8-channel mic pre-amplification for the MOTU 2408 audio interface

Why is the PreSonus DigiMax perfect for your MOTU rig? Because it's the purest path to digital. DigiMax combines 8 channels of award winning 24-bit mic pre-amplification with our unique simultaneous RMS/peak detection limiting and EQ enhancement, giving you maximum gain before clipping while maintaining the musical transparency of a compressor. The result? Fast, natural and versatile limiting on every channel. And DigiMax connects all 8 channels via ADAT optical to your MOTU 2408 system in pristine, 24-bit digital glory. And you can expand: add up to 3 DigiMax's to your 2408.

CM Labs MotorMix™

Hands-on automated mixing for Digital Performer

With its new, custom software written specially for Digital Performer, MotorMix becomes a seamless, tactile extension of your MOTU software recording environment. Put your hands on eight 100mm motorized faders and rotary encoders to tweak your mixes in record time. Gain instant easy access to all MIDI and audio tracks with control banks. You'll never even think about mixing with a mouse again. Imagine having tactile control over most of Digital Performer's features with MotorMix's intuitive layout and easy operation. MotorMix gives you all the advantages of a professional mixing board, at an incredibly affordable price. Bring motorized mixing to your MOTU desktop today. For more info, visit cmlabs.net or contact your Sweetwater sales engineer today to enter the future of mixing.

CM Labs DashBoard™

Editing worksurface for Digital Performer

In the beginning, there was only magnetic tape and razor blades, but editors could still make over 200 edits per hour! Dashboard restores speed and finesse to editing with DP3 and eliminates fatigue caused by point-and-click editing. Dashboard will bring you the same level of control to Digital Performer as the very popular Motor Mix. Dashboard can operate as a stand-alone worksurface, or it can be fitted to one or more Motor Mixes. Dashboard's Locator, Navigator and Zoom control sections get you qickly to where you want to edit, and the Clipboard section makes your actual edits. You can arm and record tracks remotely with Dashboard just like machine control. The mixer section provides access to Digital Performer's mixer and plug-ins.

order yours today Sweetwater music technology direct.

Dual-processor G4/MP800
Capable of 128 tracks with 8-band EQ and dynamics on every track

MOTU DP3 audio workstation software
Now with full surround production up to 10.2

MOTU 1296 12-channel 96kHz audio interface
Or any MOTU PCI interface like the 2408mkII or 1224

WAVES Gold Native™ Version 3.2

Optimized perfomance and complete automation

Waves Native Gold gives you the complete line of legendary "must-have" Waves processing, including C4 MultiBand and Renaissance Reverb. Version 3.2 introduces cutting edge performance optimizations and complete MAS automation. What does this mean for you? Apply more Waves processing to your mixes than ever before possible. Automate your Waves plug-ins with pristine, sample-accurate precision and 32-bit floating point processing. You get everything you need to track, sweeten, sound design and master. Get Native Gold now and join the top industry pros who rely on Waves to make their mixes Gold everyday.

Smart Code Pro™

Surround Encoder Plug-ins For DP3

KIND OF LOUD

SmartCode Pro is the first and only surround encoder plug-in for Digital Performer. It allows you to deliver fully encoded surround mixes to your clients. Burn CDs or DVDs that you can preview using any consumer DVD player that supports Dolby Digital™ or DTS™ — a crucial final step in producing professional quality surround mixes. By encoding with Smart Code Pro directly within DP3, you avoid having to invest in expensive dedicated hardware encoders (that cost thousands), which saves you both time and money.

SmartCode Pro is available in two versions to accommodate the two most widely used surround formats: Dolby Digital and DTS. Both versions allow you to preview your 5.1 surround mixes in real time 5.1, then encode and decode the mix to create a 6-channel surround master. Smart Code Pro is a must-have for serious surround production with DP3.

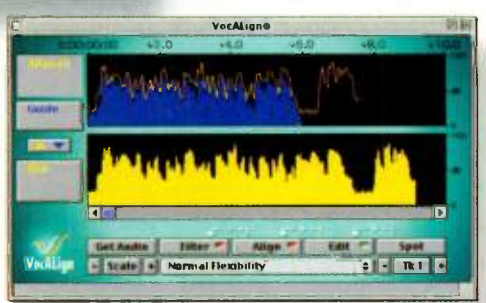
GLYPH TECHNOLOGIES, INC M Project™

High-performance FireWire hard drive storage

M Project is the new FireWire hard drive for your MOTU hard disk recording system from Glyph Technologies. M Project adds up to 75 GB of audio storage to your MOTU rig in seconds, backed by Glyph's lengendary service and support. M Project is the only MOTU-approved FireWire drive for the 828 and all MOTU PCI-324-based systems, including the 2408mkII, 1296, 1224 or 24i. M Project easily shares the FireWire bus with the 828, and even allows you to connect multiple 828s to your computer. And M Project is the ideal alternative to SCSI drives because it frees up a PCI slot. So call Sweetwater today and ask about M Project, the ultimate storage solution for MOTU hard disk recording.

SYNCHRO ARTS VocALign™ Project

Unique automated audio alignment software



Still spending hours re-recording dialog or vocals? There is another way! Because of its unique ability to align two signals, VocALign can be used creatively to take guide or even live tracks and create performances with perfectly aligned overdubs. VocALign also gives the producer the ability to choose the rhythm and pace for a specific vocal, or even lay down the required tempo pattern for the artist. VocALign gives you perfectly aligned double-tracked vocals, tight backing vocals, easy re-grooving of recorded vocals for remixing and shorter overdub sessions. For post-production, VocALign is designed to take a line of replacement dialog and precisely align it with the dialog recorded with picture. And VocALign Project™ integrates seamlessly with Digital Performer 3. At only $299 list, can you afford to be without it?

FINAL MIX

By Larry the O

Shake, Rattle, and Roll

Really rockin' the house entails all three of the title-declared motions: shakin', rattlin', and rollin'. I spend a lot of EM's ink expounding on the nature of the creative and production experiences and ways to take on the project work called for. This month I want to discuss an insight I have attained concerning the structure of these creative and production projects as it relates to rockin' the house.

Before I continue, I'll make this explicit: the words *production* and *project* are important because they suggest that the ultimate outcome of the situation is a work of some kind. Many of my comments would have no relevance to an Einsteinian "thought experiment," for instance, because only ideas are being worked on; nothing is *produced*.

That said, the structure of creative and production projects breaks down into three areas: aesthetics, technical issues, and logistics. The relationship between those is complex and bizarre, like something out of a wildlife program on TV.

Ideally, aesthetics should drive the whole effort. After all, the *idea* of the project is embodied in the aesthetics that are applied. The technical and logistical must serve those aesthetic ends—to some degree. And there, as the masseuse said, is the rub.

Although technical and logistical considerations must support the aesthetic, they impose constraints, frequently harsh ones. Constraints can be greatly beneficial and devastating to a project, both outcomes stemming from the fact that constraints force a project to change shape to fit within them. That change can be good, bad, or some combination. It is essential to understand this paradox of logistical and technical issues providing succor and rancor because it can be a defining force in a project. Yet until a name is put on the forces at work, it can be obvious what the problem is ("Nothing in this patch bay works! I can't get anything done!") but totally unclear how to attack it.

So, how *do* you attack it?

You already know my answer: pre-production and planning. My strategy for keeping the effects of logistics and technical aspects beneficial is to nail them to the wall with forethought, research, and documentation. When nailed securely to the wall, they tend to get underfoot less. My hammer and nails are my word processor's outline mode and a good database program.

Naturally, everything won't go exactly as planned, in which case, you fall back on your other plans: the contingency plans you made beforehand, knowing something would goof up.

When you think things through in advance, the aesthetic can even shape the technical and logistical. For instance, the patch-bay frustration could have been avoided if the patch bay had been tested before starting work, but testing patch bays can be a huge task. The extensive planning, however, defined a writing and demoing phase before serious recording. The aesthetics of writing dictate that speed and ease of operation are more important than absolute sound quality, so only one or two synthesizers, an electric guitar, and a vocal mic are used. You need to test far fewer patch-bay connections before starting the demo. If you aren't doing a serious multitrack recording session, the patch bay can be tested and troubleshot in chunks as needed before each type of session.

A case of the aesthetic distracting from the technical and logistical is not easily found. The other way around is the battle most often fought, and it isn't won by brute force: it must be finessed by anticipation and an ability to roll with the punches.

But I did say the relationship was complex and bizarre. Although I have described the most forceful plans of attack against logistics and technical issues, everything I have suggested, with somewhat different interpretation and weighting, applies to managing the aesthetics, as well.

Others may have equally good strategies for handling projects, but know thy motions, thy shake, rattle, and roll, and verily thy project shall rock the house. ●

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

STEVE CURL

"What sets the Dakota apart is the quality of its design and its ability to play well with others."
Electronic Musician Magazine

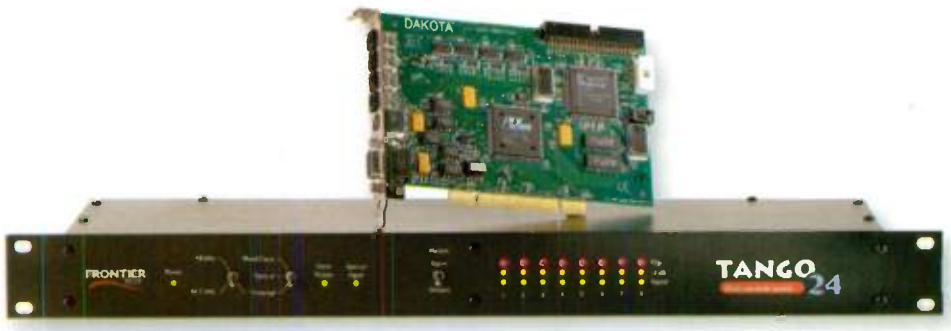
"After much critical listening, Tango24 was revealed to be a great-sounding interface. Its sound is smooth and detailed."
Loren Alldrin, Pro Audio Review

"The Dakota system worked well straight out of the box. There's not a lot of hype, just rock-solid performance."
Jim Roseberry, ProRec.com

Dakota:
16 channels ADAT optical I/O.
Stereo coax/optical SPDIF I/O.
Built-in MIDI (2-in, 2-out).
GigaSampler & ASIO drivers.
Windows & Macintosh support.
Includes Cool Edit Pro SE.
Expandable I/O options.
Sample-accurate sync.
SoDA (SMPTE on Digital Audio).
Hardware-based SMPTE lock.
Patchbay for input monitoring.

Tango24:
Professional 24-bit A/D & D/A.
Optically-isolated converters.
Balanced analog I/O (8-in, 8-out).
Switchable +4dBu/-10dBV levels.
ADAT optical in/thru/out.
BNC word clock connectors.

What's New?



The Price.

Dakota + Tango24 bundles are now available at fantastic prices.

FRONTIER DESIGN GROUP

1·800·928·3236
www.frontierdesign.com

Introducing the 896

expandable 96khz firewire hard disk recording

- Expandable 24-bit 96kHz FireWire audio interface for Macintosh and Windows with 18 channels of simultaneous I/O.
- 8 XLR analog outputs switchable between +4dB and -10dB.
- 8 Neutrik™ (TRS/XLR) analog inputs with mic preamps, front-panel switchable phantom power, front-panel trim, and 3-way level switch: LINE (+4/-10 with trim), MIC (with trim) and +4 / FIXED.
- XLR main outs and phone jack with front-panel volume control.
- 8 channels of ADAT optical I/O with sample-accurate ADAT SYNC.
- AES/EBU digital input/output with real-time sample rate conversion.
- Word clock in and out; sample-accurate ADAT SYNC input.
- CueMix Plus™ no-latency monitoring with front-panel level control.
- Connect up to four 896s (72 channels at 48kHz) with no FireWire hub required. Add more units via 3rd-party FireWire bus expansion.
- Can be combined with the MOTU 828 FireWire interface.
- 10-segment level meters on all ins/outs, including ADAT optical.
- Sound Manager, ASIO and WDM drivers for compatibility with virtually all audio software on Macintosh and Windows Me/2K/XP.
- Includes AudioDesk® sample-accurate workstation software for MacOS with editing, automated mixing & 32-bit effects processing.

MOTU
www.motu.com