

WIN IN OUR \$21,892 GEAR GIVEAWAY!

Electronic Musician[®]

May 1998

IN YOUR FACE MIXING

Do Your Web Music
Right the First Time

4 Amazing Reverb
Plug-Ins Compared

NEW MIDI THEREMINS!
and 10 more reviews

INTERTEC
PUBLISHING
A PRIMEDIA COMPANY

U.S. \$4.95/Canada \$5.95



HR824 ACTIVE MONITOR

“Overall frequency was almost hard



Logarithmic wave guide helps accurately propagate high frequencies over a wider area. Result: better dispersion, more precise imaging and a far wider sweet spot.

Edge-damped 25mm high-frequency transducer is directly coupled to its own 100-watt FR Series™ Low Negative Feedback internal power amp.

Alloy dome is free from “break-up” that plagues fabric domes, causing high frequency distortion.

Signal present and overload LEDs.

Instead of a noisy port, a passive honeycomb aluminum transducer on the rear of the HR824 almost doubles the low frequency radiating surface.

“This allows the HR824 to move a large volume of air with minimal low frequency distortion & power compression.”

EM Magazine*

Specially-designed 224mm low frequency transducer has a magnet structure so massive that it wouldn't even work properly in a conventional passive loudspeaker. But servo-loop-coupled to a 150-watt FR Series™ amp, it's capable of incredibly fast transient response and extremely low frequency output.

Inside, the HR824 cabinet is 100% filled with adiabatic foam. Result: Unwanted midrange reflections from the low frequency transducer are absorbed inside the enclosure instead of being reflected back out through the cone into your listening space.

* Electronic Musician, October 1997, All quotes are unedited.

“The enclosures — dressed in conventional yet classy black motif — are shielded.”
EM Magazine*

Inside, Two separate FR Series power amplifiers with a total of 250 watts rated power — the most of any active monitor in the HR824's class.

On the back, HF Boost/Cut, Acoustic Space, Roll-Off and sensitivity controls, balanced 1/4" and XLR inputs. “The Mackie HR824 is the only system (in the comparative review) that doesn't require the user to fumble around with tiny tools in order to make adjustments.”
EM Magazine*

Actually this paragraph doesn't have anything to do with the HR824. Mackie is further expanding its R&D/Engineering department and is looking for more analog and digital engineers with experience in pro audio. Log onto our web page for particulars.

MACKIE... Running Man, and FR Series are registered trademarks or trademarks of Mackie Designs Inc.

© 1997 Mackie Designs. All Rights Reserved. All specifications are subject to change without notice.

UREI is a registered trademark of Harman International.

response was so flat that it to believe." Electronic Musician Magazine*

Ready to confront reality? The HR824 Active Monitor is now in stock at Mackie Dealers.

Owning a set of HR824 near field studio monitors has the potential of seriously altering your perception of sound.

For the first time, you'll be able to hear **precisely** what's going on all the way through your signal chain — from microphones right through to your mix-down deck. You'll suddenly discern fine nuances of timbre, harmonics, equalization and stereo perspective that were sonically invisible before.

Some tracks you've recorded will amaze you; others may send you back for an immediate remix.

But either way, for the first time, you'll be hearing **exactly** what was recorded — not what a conventional loudspeaker may or may not have been capable of reproducing.

Admittedly, these are pretty brazen claims (which is why we're backing them up with comments from a credible, third-party source).

But all you have to do to become a believer is to visit

your nearest Mackie dealer. When you

compare HR824s to the competition,

you're going to hear some dramatic differences.

First you'll notice far more openness and detail. Critical listeners tell us that it's as if a curtain has been lifted between

themselves and the sound source.

Next, you'll notice low frequency output so accurate that you might look around for the hidden subwoofer (some of the world's most experienced recording engineers have

the traditional, narrow "sweet spot" directly between the monitors, you'll discover that the HR824s really DO live up to our claim of wide, dispersion. Their sweet

zone is so broad that several people can sit next to each

other — or

if you work solo, you can move from side to side in front of large consoles — and still hear a coherent, detailed stereo panorama.

Finally, let the salesperson go wait on somebody else and enjoy an extended session with one of your favorite CDs. When you're through, you'll discover that when distortion and peaky frequency response are minimized, so is ear

fatigue. You can listen to HR824s for hours on end.

One final point... your monitors are the only part of all your studio equipment that you actually hear.

Along with good microphones, HR824s are the best investment you can

make, no matter what your studio budget. And, like premium mics, HR824

monitors cost more than less accurate transducers.

But if you're committed to hearing **exactly**

how your creative product sounds, we know you'll find owning HR824s well worth it.

"In fact, all the sonic details that I can discern on a \$45,000 reference system were very well reproduced, although not identically, on the HR824s. That was very impressive."

"The precise resolution is a major boon for finicky sound sculptors."

"The imaging and high frequency dispersion is brilliant. I was amazed at how far off-axis I could scoot my chair and still clearly hear what was going on in both channels."

"The low end was robust and present; the electric bass and kick drum thump-ed into my chest the way those huge UREI® monitors did back in the old days."

"Overall, the response was so smooth that I wasn't even aware of a crossover point."

"Stereo imaging and depth were fabulous."



Each HR824 ships with its own signed Certificate of Calibration attesting to its $\pm 1.5\text{dB}$ 39Hz-22kHz frequency response.

done this, so don't be embarrassed). The HR824 really IS capable of flat response to 39Hz. Moreover, it's capable of **accurate, articulated** response that low. Rather than a loudspeaker's "interpretation" of bass, you can finally hear through to the actual instrument's bass quality, texture and nuances.

Next, if you can "unlock" yourself from

MACKIE®

In the U.S., phone 800/898-3211 • Outside the U.S. 425/487-4333
Web: www.mackie.com • E-mail: sales@mackie.com • NASDAQ: MKIE

circle #502 on reader service card



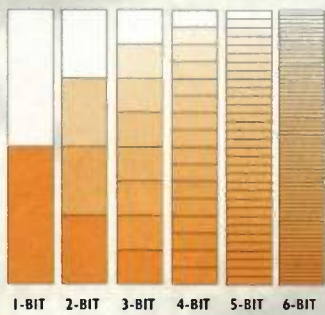
It's Not Science Fiction.



recording

ALESIS

It's Reality.



Every bit you add doubles the resolution of a digital recorder. Compared to 16-bit formats, ADAT Type II's non-compressed, linear 20-bit recording offers a wider dynamic range, less quantization distortion at low levels, more headroom and even lower noise. Result: detailed, full-spectrum audio fidelity that far exceeds the quality of any analog recorder.

While the rest of the world is trying to figure out the final frontier of recording formats, you need to make a decision. What's the best choice today that will keep you ahead of the game tomorrow?

The answer: ADAT Type II. It's the next generation of Alesis' award-winning digital audio technology that combines the proven power of ADAT with the astonishing fidelity of true 20-bit linear recording.

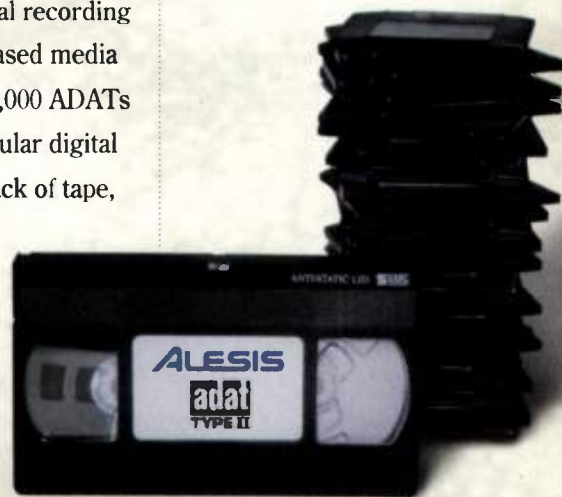
With the new XT20™, you get a serious improvement on the world standard for professional recording. The new LX20™ is the most affordable ADAT ever made. Both provide all the real-world qualities that made ADAT the most popular professional recording format: modular design, efficient tape-based media and complete compatibility with over 110,000 ADATs around the world. Plus, as the only modular digital multitracks that write 20 bits to each track of tape, the new ADAT Type II recorders offer audio quality that's miles ahead of any 16-bit system, period. And with the introduction of the ADAT-PCR™ interface card, you get the advantages of nonlinear editing on your Mac® or Windows® computer seamlessly integrated with ADAT format recording.

Most importantly, the intuitive ease-of-use, comprehensive features and incredible affordability of the ADAT Type II systems put no limits on your creativity.

Because, after all, the final frontier is really your imagination.

adat
TYPE II

There are over 110,000 ADATs in use today, and the new ADAT Type II recorders are compatible with all of them. The XT20 and LX20 will work with your 16-bit ADAT tapes, and you can combine the Type II recorders in a system with any model of older ADAT.



Don't get fooled by the science fiction of some "24-bit" recording systems. Just read the fine print: the state-of-the-art ADAT Type II recorders offer audio specs that rival any 24-bit system, without resorting to tricks like data compression or track sharing.

If you think tape isn't as advanced as other removable recording media, think again. You'd need more than 30 Zip® disks to equal the 3.4 gigabyte storage capacity of just one inexpensive ADAT tape.

For more information on ADAT Type II, the XT20, the LX20 and the PCR, see your Authorized Alesis Dealer. Or call 800-5-ALESIS to order the ADAT Type II Systems video and brochure (\$4.95 for shipping and handling).

® Alesis and ADAT are registered trademarks; XT20, LX20 and PCR are trademarks of Alesis Corporation. Mac is a trademark of Apple Computers. Windows is a trademark of Microsoft. Zip is a trademark of Iomega.

Alesis Corporation

1633 26th Street Santa Monica CA 90404 800-5-ALESIS alesc@alesis1.usa.com  www.alesis.com

circle #503 on reader service card

ALESIS

FEATURES

42 LOOK BEFORE YOU LEAP

Before becoming entangled in producing a Web music project, be sure you can clearly answer these five essential questions.

By Philip De Lancie

52 COVER STORY: IN-YOUR-FACE MIXING

Ace mixing engineers Ron St. Germain and John Seymour give you useful pointers on how to create mixes that sparkle and shine.

By Jeff Casey

64 PLUG IN, TURN ON, SPACE OUT

EM evaluates four leading reverb plug-ins for TDM: Digidesign's *D-Verb*, Lexicon's *LexiVerb*, TC Works' *TC Reverb*, and Waves' *TrueVerb*.

By Mikail Graham

52



106

DEPARTMENTS

- 8 FRONT PAGE
- 12 LETTERS
- 18 WHAT'S NEW
- 146 AD INDEX
- 168 CONTACT SHEET
- 169 CLASSIFIEDS

COLUMNS

- 40 TECH PAGE: No GUTS, No Glory**
IBM unveils a new PowerPC chip that runs at 1 gigahertz!
- 74 DESKTOP MUSICIAN: Back to School Online**
Get a free education in electronic music, courtesy of the Web.
- 86 RECORDING MUSICIAN: Will the Signal Be Unbroken?**
Sonic survival depends on your ability to adapt—so learn about adapters!
- 96 SQUARE ONE: Music by the Numbers**
Algorithmic composition techniques can kick start your creative muse.
- 106 WORKING MUSICIAN: Sonic Web Weavers**
A career in music on the Web sounds wonderful. But are the jobs there?
- 114 OPERATION HELP: Expert Advice**
Hot tips for *Cakewalk*, *ReBirth*, DA-38, and Darwin.
- 178 FINAL MIX: It's in the Air**
In your entire studio, only the transducers deal with sound.



REVIEWS

- 120 BIG BRIAR/WAVEFRONT Ethervox/Travel Case** MIDI theremins
- 132 TC ELECTRONIC G-Force** guitar effects processor
- 138 STEINBERG ReBirth RB-338 1.5 (Mac/Win)** software synthesizer
- 144 ENCORE Expressionist** MIDI-CV converter
- 148 SYMETRIX 628** digital voice processor
- 152 GENERALMUSIC RealPiano Pro 2** digital piano
- 157 AVALON VT-737** tube preamp/DI/compressor/EQ
- 161 QUICK PICKS:** *Virtual Reality 3D SFX*, vol. 1;
Bolder Sounds Granular, vol. 2; *Quantum Leap Guitar and Bass*;
Q Up Arts Kit Watkins: Ambient Realms

Editor Steve Oppenheimer

Managing Editor Mary Cosola

Associate Editors Jeff Casey, Brian Knave,

Glenn Letsch, Dennis Miller, David M. Rubin

Assistant Editors Joe Humphreys, Diane Lowery

Editorial Assistants Carolyn Engelmann, Rick Weldon

Contributing Editors Larry the O, George Petersen,
Scott Wilkinson

Art Director Dmitry Panich

Associate Art Directors Tami Herrick-Needham,

Laura Williams

Graphic Artist Steve Ramirez

Informational Graphics Chuck Dahmer

Publisher John Pledger

Eastern Advertising Manager Angelo Biasi

Northwest Advertising Manager Brian Courtney

Southwest Advertising Manager Erika Lopez

Sales Administrator Elizabeth Myron

Sales Assistants Robert Myles, Mari Stancati,

Kahlil Thompson, Amanda Weeden

Classifieds Advertising Manager Robin Boyce-Trubitt

Classifieds Sales Assistant Jeff Linson

Classifieds Assistant Valerie Wagner

Marketing Services Manager Jane Byer

Promotions Manager Christen Pocock

Marketing Assistant Daniela Barone

Director of Operations and Manufacturing Anne Letsch

Production Director Ellen Richman

Advertising Traffic Manager Joanne Zola

Production Assistant/Reprint Coordinator Sherry Bloom

Computer Systems Coordinator Mike Castelli

Circulation Director Philip Semler

Circulation Assistant Jay Sandino

Business Manager Cindy Elwell

Assistant to the Publisher Heidi Eachweiller

Human Resources/Facilities Assistant Lauren Gerber

Receptionist Carrie Gebstadt

National Editorial, Advertising, and Business Offices

6400 Hollis Street #12, Emeryville, CA 94608

tel. (510) 653-3307; fax (510) 653-5142;

Web www.emusician.com

East Coast Advertising Office

tel. (203) 838-9100; fax (203) 838-2550

Southwest Advertising Office

tel. (310) 207-8222; fax (310) 207-4082

Subscriptions, Customer Service, Back Issues

PO Box 41525, Nashville, TN 37204

tel. (800) 843-4086 or (615) 377-3322; fax (615) 377-0525

Intertec Publishing Corp.

9800 Metcalf Ave., Overland Park, KS 66212

President and Chief Executive Officer

Raymond E. Maloney

Senior Vice President Cameron Bishop

Electronic Musician (ISSN: 0894-4720) is published monthly by Intertec Publishing Corp., Inc., 6400 Hollis St., #12, Emeryville, CA 94608. ©1998. This is Volume 14, Number 5, May 1998. One year (12 issues) subscription is \$36; outside the U.S. is \$65. Periodical postage paid at Oakland, CA, and additional mailing offices. All rights reserved. This publication may not be reproduced or quoted in whole or in part by any means, printed or electronic, without the written permission of the publishers. POSTMASTER: Send address changes to Electronic Musician, PO Box 41525, Nashville, TN 37204. Editeur Responsable (Belgique): Christian Desmet, Vuurgatstraat 92, 3090 Overijse, Belgique. Canadian GST #129587951. Canada Post International Publications Mail Product (Canadian Distribution) Sales Agreement No. 0478741.

PHOTOCOPY RIGHTS: Authorization to photocopy items for internal or personal use of specific clients is granted by Intertec Publishing, provided that the base fee of U.S. \$2.25 per copy, plus U.S. \$0.00 per page, is paid directly to Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923 USA. The fee code for users of this Transactional Reporting Service is ISSN 0894-4720/1998 \$2.25 + \$0.00. For those organizations that have been granted a photocopying license by CCC, a separate system of payment has been arranged. Before photocopying items for educational classroom use, please contact CCC at 508-750-8400. Organizations or individuals with large quantity photocopy or reprint requirements should contact Sherry Bloom at (510) 653-3307. Microfilm copies of Electronic Musician are available by calling/writing UMI, 300 N. Zeeb Road, P.O. Box 1348, Ann Arbor, MI 48106-1348; (313) 761-4700; (800) 521-0600.

Also publishers of *Mix*® magazine.

Printed in the USA.

INTERTEC
PUBLISHING
A PRIMEDIA COMPANY

BPA
INTERNATIONAL

A Blast from the Past

The Great Emancipator inspires a new column—sort of.

In life and in legend, Abraham Lincoln inspired people. In his famed Gettysburg Address, he concluded with the remarkable phrase “that government of the people, by the people, for the people shall not perish from the earth.” Here, Lincoln got to the heart of democratic principles. Surely this great philosophy of government, expressed almost 135 years ago on the hallowed ground of Gettysburg, can be applied to other parts of our lives.

In fact, that very philosophy is one reason why I enjoy working at **EM**. From its beginning, this has been a magazine of the people, by the people, and for the people. That feels *right* to me, somehow.

Why is this a magazine for the people? As I noted in my January “Front Page,” we have always written our articles primarily for home recordists, who usually are working folks on a family budget. We take a look at some moderately upscale gear now and again, but mostly because the high-end pro’s tools of today often become affordable personal-studio tools of tomorrow. Clearly, we’re writing for the people.

A magazine of the people? Absolutely! Many of our editors maintain personal studios, though several of us also have worked in commercial facilities. Our musical and technical needs are essentially similar to yours, and many of us were **EM** readers before we worked here. So even though we probably have more studio experience than the average reader, we have been drawn from your ranks.

As for “by the people,” most of our freelance writers come to us because they are **EM** readers who want to contribute their ideas. We still depend on our readers not only as a source of authors but for feedback at many levels. In fact, we want you to get more involved, and we are founding a new column with that in mind.

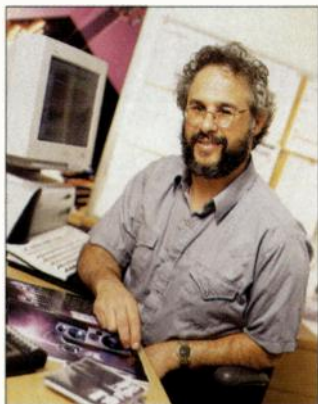
This month, we introduce “Operation Help”—or more accurately, we reintroduce it in a new form. “Operation Help” originally was a space where readers could obtain help from other readers. You could say it was “by the people, for the people.” For instance, say you needed a manual or a source of parts; you would write to “Operation Help,” and other readers would tell you where to find what you wanted. Unfortunately, by mid-1990, reader support for the original “Operation Help” had weakened, so we discontinued it.

But we like helping our readers in little ways and want to keep you involved, so we brought back a redesigned “Operation Help.” We plan to run it every other month, but if we get lots of good contributions, we’ll publish it more often.

This won’t be the “Operation Help” of old, though. The new version will be a selection of short, general-purpose and gear-specific studio tips supplied by manufacturers, editors, and freelance authors. We hope **EM** readers will contribute tips, too.

The idea is to present a mixture of tips for different types of products. That way, even though you might not have all of the products we discuss, you’ll keep an eye out for that one tip you really don’t want to miss. Each time, we’ll bring you a different bag of tricks.

So please get involved! The best way to reach us is e-mail (emeditorial@cardinal.com), but if you prefer to spend 32 cents on a letter, we will surely read it.



ANTHONY PIDGEON

have you seen?



From the moment you get a musical idea...until you've finished the final mix...the new **ZR-76** has everything you need to write your next hit. The 76 weighted-action keys are perfectly matched to the 1200 incredible sounds inside. In fact, the included 16 meg Wave Expansion Board, *The Perfect Piano™* by William Coakley, sounds and feels so good, you may find yourself tickling the ivories into the wee hours of the night.

If you perform your music live, the **ZR-76** has you covered, too. The "Favorites" buttons under the display give you instant access to the sounds you use most. An easy-to-use sequencer, built-in drum machine and a 24-bit effects processor completes the package.

The new **ZR-76** is a keyboard that you would expect from **ENSONIQ**...refined and balanced, great-sounding and easy to use...all at a great price.

Over 1200 Sounds – From realistic instrument sounds to our unique second-generation *TransWaves*, from analog emulations to evocative digital timbres, plus over 70 drum kits, made up from more than 750 fully programmed drum elements.

Perfect Piano – The ZR-76 comes with our new EXP-4 ROM Expander installed. This 16 meg expander features William Coakley's acclaimed "The Perfect Piano™", along with two practically perfect electric pianos.

Idea Pad™ – Whenever you sit down and play, the ZR is recording your performance. If you like an idea you can send it to the 16 Track Recorder for further development.

Drum Machine – Our innovative drum machine is the perfect accompanist, with 8 fills and 8 variations per rhythm, extensive rhythm and drumkit editing, and seamless integration with the 16 Track Recorder.

SoundFinder™ – Makes locating sounds a breeze. The left knob selects the sound category, the right knob selects the individual sound. You can even use the ZR's keyboard to type in the first few characters of the sound name to instantly locate it.

16 Track Recorder – A powerful 16 track sequencer with advanced quantization options (featuring our exclusive *Delta Quantization™*). Song Editor, dedicated FX and Mixdown sections. MS-DOS-based disk format, and support for Standard MIDI Files.

24-Bit Effects – Featuring our powerful 24-bit ESP-2 digital signal processor. You also get 6 stereo busses, including 3 global reverb busses, a chorus bus, a dry stereo bus, and an insert effect bus with 40 great-sounding algorithms.



ENSONIQ Corp
155 Great Valley Parkway
P.O. Box 3035
Malvern, PA 19355-0735
(610) 647-3930 fax: (610) 647-8908
www.ensoniq.com

ENSONIQ

LEADING THE WORLD IN SOUND INNOVATION

CREATIVITY WITHOUT COMPROMISE

"BUT WHAT REALLY BLEW ME AWAY
— UNQUESTIONABLY THE BIGGEST
BARGAIN OF THE SHOW —
WAS AKAI'S DPS12."

Mix Magazine
1997 AES Report

The concept seems
so obvious.

Combine a digital disk recorder and a digital mixer in one convenient box. Eliminate complex interfacing and keep everything in the digital domain. Add optional internal effects. **Creative heaven.** But **up until now**, buying anything that you could afford meant

tracks to record your music. Or a compressed data format that sounded almost as good as CD quality. Or a user interface that you could almost make sense of.

Now, finally, the concept of integrated digital recording and mixing lives up to its promise with Akai's **DPS12 Digital Personal**

unwilling to compromise their creative vision, the DPS12 combines a 12-track random-access digital recorder (with professional-quality uncompressed 16-bit sound and powerful non-linear editing) and a 20-channel MIDI-automatable digital mixer in one compact. Incredibly easy-to-use package. All at a price that is nothing short of spectacular. It's **creativity without compromise**.

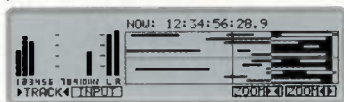


Since its founding in 1984, Akai Professional has consistently pushed the boundaries of affordable recording technology. From the original MG1212 12-track recorder/mixer, to the breakthrough A-DAM digital multitrack, to the DR4/8/16 professional disk recorders and the DD family of audio post-production tools, each Akai recording product has established new levels of performance and value.

Now, with the DPS12, Akai builds on this experience to bring professional-quality digital recording and mixing to the personal and project studio at a price that's truly unexpected. (Not to prolong the suspense, it's **\$1499** msrp.)

More Is Better

At the heart of the DPS12 is a powerful random-access disk recorder capable of simultaneously playing 12 (that's **twelve**) tracks of uncompressed 16-bit linear audio from convenient removable JAZ cartridges or SCSI hard disks. More tracks for more recording flexibility. More control of individual parts. Less need for track bouncing.



And speaking of more tracks, the DPS12 also lets you record a whopping 250 virtual tracks. At mixdown, you can assign any virtual track to any of the twelve physical tracks for playback. This gives you the freedom to compare multiple takes, experiment with alternative arrangements, even combine parts of different virtual tracks on a single track.



At the front end, the DPS12 lets you record on up to 8 tracks simultaneously through six high-quality balanced analog inputs and a S/PDIF stereo digital input at sampling rates of 48kHz, 44.1kHz or 32kHz.

The Wait Is Over

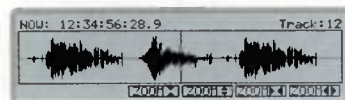
Since the DPS12 is a random-access recorder, waiting for tape to wind is a thing of the past. The DPS12's locating functions let you move instantly to any of 12 quick-locate points and 100 stack memory points. The stack points can even be named, so you can identify locations by the part of the song (FIRST VERSE, CHORUS, etc.) or even by specific lyrics.



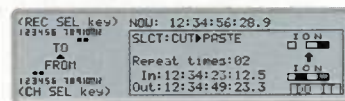
Easy Editing

Ever wonder how people managed to write anything before word processors? Well, after experiencing non-linear editing on the DPS12, you'll wonder the same thing about audio. Insert, Delete, Erase, Copy or Move sections of single- or multi-track audio from anywhere to anywhere within your project. This is stuff you just can't do with tape.

The DPS12's high-quality jogging and graphic waveform display let you zero in on your precise edit points.



Then call up an edit screen (complete with a graphic representation of your selected operation) and Do It.



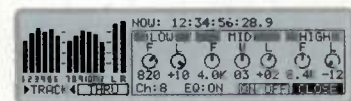
Next, use the special Play To and Play From keys to confirm that seamless edit. Changed your mind? 256 levels of Undo are only a button press away.

Mix Master

The DPS12's digital mixer is a model of flexibility.



During mixdown, for example, the inputs can be used as an additional 8-channel Thru Mix, perfect for adding tracks from sequenced MIDI modules to the 12 recorded tracks for a true 20-channel mixdown. Two AUX sends and digital EQ are also included.



Found the perfect mix? Mix setups can be saved as snapshots and recalled at any time. And since all of the DPS12's faders and panpots generate MIDI controller data, you can record your mix moves into an external MIDI sequencer (like our MPC2000, for example) and play them back in sync with the DPS12 for a fully automated mixdown.

Effects Inside

If you want the added convenience of integrated internal effects (not to mention keeping your mix entirely in the digital domain), add the EB2M multi-effect processor board. The EB2M gives you two independent studio-quality effects processors with a wide variety of programmable effect types.

It Wants To Be Your Friend

It's one thing to give you all the tools you need to do the job, but it's another thing entirely to make them useable. Here, the DPS12 really shines. It is, quite simply, **really** easy to use.

At the heart of its friendliness is its informative graphic display. Backlit and easy to read, it always gives you a clear picture of what's going on with your DPS12. Frankly, it's all so simple that most of you may never have to take the manual out of the box.

Check It Out

There's a lot more to the DPS12 than we could fit in this ad, so head down to your local Akai Professional dealer for some quality hands-on time with a DPS12. And don't forget, that's

\$1499 msrp.

circle #505 on reader service card

AKAI
professional

Akai Musical Instrument Corporation 4710 Mercantile Drive, Fort Worth, Texas 76137
[phone] 817 831 9203 [fax] 817 222 1490 <http://www.akai.com/akaipro>

W8



STANDARD BEARER

I just read Steve O's March 1998 editorial ("Solving the Plug-in Dilemma"). I would like you to explain your comment that DirectX is a limiting technology, because I am a bit miffed that you state this with nothing to back it up and then merrily offer up yet another standard. One, mind you, that doesn't really exist yet. You should be more careful because end users believe you know what you are talking about or at least that you will present realistic options.

Instead of promoting yet another standard—which nobody currently supports—why not promote a widely supported and growing installed base? If there are limitations, then speak up.

One thing I could live without is the same old tired comment directed at the development community: "Gee guys, we just want a perfect world, and it is your pettiness that is hurting us." I have heard and read this from so many other "industry insiders" that I usually ignore it.

Give it a rest. We develop what our end users want and what our product needs to succeed with our target market. The technology is also very good and not limiting in any way. The limiting factor or problems that we have seen are due to bad programming (the list I could give you of bugs we find every day in other vendors' plug-ins

would amaze you!) and RTFM on the developers' part.

Technically, though, what about DirectX plug-ins are a problem? Please be specific (i.e., what do you want to do that you can't).

Peter Haller
Software Design Engineer
Sonic Foundry, Inc.
Madison, WI

Peter—I wrote that "DirectX is a workable real-time solution. But the technology has limitations...." What I have learned since I wrote that is that a lot of the "limitations" I perceived are actually due to the various host programs' implementation. For example, some are real time, some aren't. Some let you chain as many plug-ins as the CPU will permit; others don't. Latency time seems to vary. So although there is a standard, it isn't consistently supported, as a standard should be.

So I must now agree with you that the issue with DirectX is implementation rather than technological limitations. I can understand your sensitivity about this; Sonic Foundry has made a major effort to ensure that DirectX has been well received and fully implemented, and Sound Forge's DirectX implementation is one of the best.

But comments about DirectX are beside my main point. My column clearly focused almost exclusively on plug-in issues for the Macintosh platform. And on the Mac platform, there is no common real-time standard like DirectX. So I am not proposing just another Mac format, I am proposing that a standard be adopted. It doesn't matter to me whether the standard is VST or AudioSuite or Premiere, as long as it gets the job done and is universally supported. It seems that Apple, like Microsoft with DirectX for PC, might have the best chance of establishing a Mac standard partly because it can write something at the system level, but mostly because it is not a music-software developer and therefore can avoid at least some of the political infighting between competitors.

And there has been a significant amount of pettiness and political infighting, no matter what you say. My column was based not only on the software I have seen and what our editors and authors tell me but on extensive interviews with quite a few developers. At least six software developers emphasized

the problem of competitive rivalries in the course of our discussions. (Most were Mac developers, though several develop cross-platform applications.) Top people in these companies told me that their users clearly wanted one universal, real-time plug-in format and that the developers would love to give it to them but were kept apart by politics as well as the difficulties of intercompany codevelopment.

This may be changing; intercompany development partnerships have been sprouting up in recent years. As I was writing this reply, rivals Emagic and Steinberg announced an agreement by which Emagic will support VST plug-in format and Steinberg will support Emagic's Audiowork8 and Unitor hardware. But will all the Macintosh developers get on the VST bus? If so, great! If not, Mac users are still in the same pickle.—Steve O.

BURN BABY BURN

I have a Cyrix P166 home-built computer running *Cakewalk Pro Audio 6.01*. I want to add a CD-R drive to burn audio CDs on that computer. I have read that when burning an audio CD-R, nothing can be running in the background, such as a sequencer. Is this true? Is it better to put the CD-R drive in my other computer and use an ethernet card on each computer to transfer the data? I am told that if I do that, I will get errors because the transfer is too slow. The other computer is a home-built Cyrix 200+. I know I need software for this. I just don't want to purchase a CD-R and find I can't run *Cakewalk* while burning a CD.

John Zagmester
jczag@aol.com

John—During the recent tests I conducted of Windows CD-R software, I was able to successfully burn CDs while running other programs. One of the programs, WinOnCD, nearly "dared" the user to work in the background while the CD was burning. When that worked perfectly, I proceeded to test several other programs, and they worked fine, as well. My test system was a Pentium II/266, however, and there's no way I could predict what would happen on your computer.

BOB DAHM

AFTER BECOMING A LEGEND IN THE STUDIO, WE'VE HIT THE ROAD.



THE NEW EMOTION MICROPHONE SERIES FEATURING DOUBLEFLEX™ AND VARIMOTION™ SYSTEMS

Absolutely noise-free
on/off switch with
clear status indicator.

Since 1947, innovation and quality have made AKG a legend in the studio. Now you can take that same AKG quality on the road with the Emotion Series.

- Varimotion™ diaphragm technology takes dynamic microphones to a new performance level
- Doubleflex™ anti-vibration system virtually eliminates handling and cable noise
- Maximum SPL 156 dB
- Excellent gain before feedback
- All metal housing and removable windscreen with washable wind/pop filter
- 24 karat gold plated XLR connector
- Priced to be the new industry standard



**D 880
D 880 S**

- Tight supercardioid pattern for excellent rejection of feedback and incidental stage noise
- Frequency response tailored for lead and back-up vocals
- D 880 S includes on/off switch

That Rocks!



D 770

- Frequency independent cardioid pattern for excellent response and effective feedback rejection
- Tailored off-axis frequency response minimizes equalization when mixing instruments
- Enhanced proximity effect for vocalists

The Sound

D 880

D 770

From March 1 through June 30, 1998 see your **AKG Emotion** dealer for a **\$10 Rebate** offer on D 880's.

AKG Acoustics U.S., 1449 Donelson Pike, Nashville, TN 37217
phone 615-360-0499, fax 615-360-0275

AKG Acoustics GmbH, Vienna/Austria/Europe, <http://www.akg-acoustics.com>

circle #506 on reader service card



H A Harman International Company

EM ONLINE
http://www.emusician.com

emusician

Can't get enough of EM? Our Internet home, www.emusician.com, has more columns, a discussion forum, and an article archive. And every month, our Web site gives you example files that pertain to the current print issue.

This month, you can download audio files processed with the

different TDM reverb plug-ins discussed by Mikail Graham in "Plug In, Turn On, Space Out," p. 64 of this issue. In addition, we have put up links to all the URLs from Associate Editor Dennis Miller's guide to educational Web sites (see "Desktop Musician: Back to School Online," p. 74).

offers the same CD-R support and much of the same editing capability for less than \$100. That makes it especially attractive, because it allows you to perform all four steps of the analog-to-CD process with a single program.—David R.

CABLES FOR DA-88s

I see a lot sound cards coming out in the market that interface with ADAT recorders via optical cable. What about the thousands of DA-88/38 owners who would love to edit music digitally in our computers? I know Digital Audio Labs has been developing a DA-88 interface for its V8 system, which is not cheap. Is there any hope of an inexpensive sound card with DA-88 interface in the near future?

Pepino Di Capri
inti@ix.netcom.com

Pepino—The pickings have been slim when it comes to TASCAM TDIF format (DA-88) interfaces for computers. You already know about the DAL V8 system. Aside from that, several new TDIF audio interfaces have been announced, and although none were shipping as of this writing, at least one or two should be available by the time you read this.

Upcoming PCI cards with TDIF interfaces include Aardvark's Studio 88 (\$1,295) and Soundscape's Maxim (\$700); we'll have more to say on these in next month's "What's New" column. MOTU's 2408 (core system \$995; see the April 1998 "What's New" for details) includes a PCI card that connects a rack-mount box with TDIF, ADAT, and S/PDIF I/O. The Lexicon Studio system (core system \$3,000; see the October 1997 "What's New") also includes a PCI card and rack-mount I/O box; the TDIF interface is on Lexicon's LDI-16S breakout box.

There is one other approach, which is to buy a TDIF-to-ADAT interface and use an ADAT card. I know of at least four such boxes—the Apogee FC8, Kurzweil DMTi, Otari UFC24, and Spectral Translator—though there may be others.—Steve O.

WE WELCOME YOUR FEEDBACK.

Address correspondence and e-mail to "Letters," Electronic Musician, 6400 Hollis St., Suite 12, Emeryville, CA 94608 or emeditorial@intertec.com. Published letters may be edited for space and clarity.

Because your second computer is faster, I would guess that you'd have better luck "multitasking" on it, but again, it would be hard to know. The only sure-fire method I can think of is to give it a try; for the cost of a CD-R blank, you'll find out what to expect.

You should keep in mind that with modern CD burners, you can usually run at least twice real time, so a full-length CD will only take around thirty minutes to complete. You may find that it is acceptable not to be working in your sequencer for that short a time. I suggest that you use the burn test before writing the actual data to disc, however.—Dennis M.

DIGITIZING AUDIO

What do I need to accurately capture my old cassette tape and album collection to disk so I can then burn them on CDs? I don't want all sorts of fancy processors and sequencers. I just want a basic utility to let me plug my tape deck into my Power Mac 7200 and record the music to a Jaz drive. Is everything already built into my Mac, or do I need separate software? As I understand it, all Power Macs have built in audio digitizing and/or DSP capabilities, but for the life of me, I can't find any information about what I want to do on Apple's Web site or in the manuals, Help Guides, etc. Can you please steer me in the proper direction?

Brian Fasterling
bfasterling@schlagelock.com

Brian—The process of converting old analog recordings into CDs can be roughly broken down into four steps: recording the material into the computer, editing and optimizing the resultant audio files (typically AIFF),

preparing the audio files for CD, and finally burning the CD.

The first step is relatively easy. As you point out, Power Macs all have built-in "CD quality" recording and playback capabilities, albeit the quality of their D/A and A/D converters is not as high as with many dedicated outboard converters and audio cards.

To access those capabilities, you'll need a program that can record incoming audio signals from the computer's analog mic or line-level input jack. Apple's system software includes a small utility called SimpleSound, which can record audio at several quality levels.

Most people will find the minimalist SimpleSound a bit too simple for their needs, though. As a shareware alternative, consider E. J. Campbell's Ultra Recorder (members.aol.com/EJC3). Or if you'd prefer a few more bells and whistles, check out Alberto Ricci's new shareware program SoundEffects (www.riccisoft.com). There are also many other shareware programs floating around in cyberspace.

None of these programs offer the range of recording and editing capabilities that a full-featured audio editing program provides. And don't underestimate the importance of carefully editing and cleaning up your audio files before sending them off to CD. Therefore, I suggest getting Macromedia's SoundEdit 16 v. 2 (www.macromedia.com) or BIAS's Peak (www.bias-inc.com), either of which will work with your computer's built-in recording hardware and Apple's Sound Manager system extension.

If you can wait a bit longer, BIAS is about to release version 2.0 of Peak. It provides excellent recording and editing features and also offers CD-burning capabilities with support for many popular CD-R drives. If you're on a tight budget, consider Peak LE 2.0. It

digidesign®

A division of **Avid**

Credits

Garbage

Beck

Smashing Pumpkins

Nirvana

Sonic Youth

U2

"Pro Tools takes our music into the next dimension"

– Butch Vig

Butch Vig has a few ideas about turning Garbage into platinum.

"Garbage records a lot of garbage...loops, guitar effects, vocals, and noise... With Pro Tools, we track everything into the system...then go in and tweak it out. We use a lot of Plug-Ins like D-Fi, GRM Tools, and TC Tools. The flexibility of the automation allows us to be extremely creative. As we work up a song, we're processing and mixing all the time, because it's a lot easier to experiment than with an analog board or tape."

No rewinding. No take limits. No wasted time on session recall. No wonder creativity soars.

"Recording should be fun, and Pro Tools has brought back the excitement of working in a studio again. I can't really see us ever turning back."

For more information about Pro Tools and Third-Party Development products, call 1.800.333.2137 ext. 358 for a free Pro Tools video, or to schedule a free demo.

www.digidesign.com
www.avid.com

BUTCH VIG, PRODUCER | DRUMMER
Garbage



Foreground Photo: ©1998 Stephane Sedarou
Background Photo: ©1997 Ellen Von Unwerth



Meet Gen- eration EX.

What makes the EX-series synthesizers a breed unto themselves?

It's a lot more than attitude, baby. In fact, it's even more than 128-note polyphony for \$2195 (EX5R tone generator) or \$2695 (EX5 76-note keyboard).*

AN (Analog Physical Modeling), VL (Virtual acoustic Physical Modeling) and our new FDSP (Formulated Digital Sound Processing) which models characteristics of instruments and



Ponder the FIVE tone generation technologies: sampling, AWM2,

The EX5 with SCSI and analog expansion boards installed.

**The EX7 synthesizer features 64 note polyphony, AN and FDSP*



synthesis processes. Now you can use virtually any method known to man to create and express your sound without leaving your EX synthesizer.

As workstations, they simply have no peer. Consider the 16-track linear song sequencer, the 8-track pattern loop sequencer and the 4-track arpeggiator with 50 presets, 50 user types and 17 modes (any of which can use the 100 preset groove quantize tem-

plates). And with the new MIDI keymap, tracks from the pattern sequencer,

8-track patterns or sample loops

can be assigned to any individual key.

For real-time control editing and performance there's six programmable knobs, a rib-

bon, a breath controller, a pitch bend wheel, two mod-



EX5R
Tone
Generator

wheels, four assignable foot controllers and two scene memories. The EX systems are also expandable to 65MB sample RAM, 8MB flash ROM, SCSI, and individual or digital output cards.

There has never been a synthesizer, at any price, that gives you all the EX-series gives you. Now there's three. See them at your Yamaha Digital Musical Instrument dealer or call (800) 932-0001 ext. 686 for more information or visit us at www.yamaha.com.

YAMAHA®

©1998 Yamaha Corporation of America,
Digital Musical Instruments, P.O. Box 6600,
Buena Park, CA 90622.





▲ LINE 6 AMP FARM

Using the same TubeTone physical modeling technology employed by the company's AxSys 212 guitar amp, Line 6 has released *Amp Farm* (\$595), a guitar-amp simulator plug-in for TDM (see the AxSys review in the September 1997 *EM* and "Quiet Storms" in the November 1997 issue). *Amp Farm* can be used to add a classic tube-amp sound to guitars while recording them direct, or it can add that sound to prerecorded tracks.

The plug-in ships with presets that simulate the sounds of a 1967 Fender Twin, 1964 Fender Blackface Deluxe, 1959 Fender Bassman, 1986 Marshall JCM 800, 1968 Marshall "Plexi," 1964 Marshall JTM45, 1963 Vox AC 30, and 1987 Roland JC-120.

The program's user interface is designed to look like the panels of the modeled amps. You choose the amp and cabinet from pull-down menus, and the chosen amp's knobs are replicated on-screen, along with switches for tremolo and regular or high gain (when appropriate). Line 6; tel. (310) 390-5956; fax (310) 390-1713; e-mail sales@line6.com; Web www.line6.com.

Circle #401 on Reader Service Card

▼ KORG D8

Korg's new D8 Digital Recording Studio (\$1,250) is an 8-track hard-disk recorder with a digital mixer and built-in effects. The compact, tabletop unit (15.2 x 9.8 x 3.3 inches) can record two tracks of uncompressed audio simultaneously and play back eight, using 16-bit A/D and D/A converters and sampling at 44.1 kHz. Internally, it uses a 24-bit signal path.

The D8 includes a 1.4 GB internal hard-disk drive in addition to a SCSI interface that can address up to seven external drives of up to 4 GB capacity each. You can fit 270 track minutes of audio on the internal drive.

The 12-channel, 4-bus digital mixer stores fader, 2-band EQ, and pan settings in scene memory (up to twenty scenes per song). An Audio Trigger Rec feature sets the D8 to begin recording in response to an input signal, and there's also an Auto Punch-In function. You can scrub through tracks and place as many as 100 markers. The D8's 50 types of effects include 65 preset pro-

grams, which can be applied either as inserts or globally. You can use the effects during recording or add them afterward.

The D8 sends MIDI Clock and MTC and responds to MMC. Users can create tempo maps by using a Tap Tempo button or by entering bpm values. The unit has two 1/4-inch, balanced audio inputs, one of which can be switched to accept



instrument-level signals; S/PDIF optical I/O; and aux and master outs on analog RCA jacks.

Korg rates the D8's frequency response at 10 Hz to 21 kHz ± 1 dB, signal-to-noise ratio at 92 dB, and THD at 0.03% (20 Hz to 20 kHz). Korg USA, Inc.; tel. (800) 645-3188 or (516) 333-9100; fax (516) 333-9108; Web www.korg.com.

Circle #402 on Reader Service Card

▼ DBX DDP

It seems everything has gone digital, and hardware dynamics processors are no exception. The dbx Digital Dynamics Processor, or DDP (\$599), offers comprehensive dynamics processing features—gating, compression, limiting, and de-essing—in a compact, programmable unit.

The single-rackspace DDP can operate in discrete stereo or dual mono. It offers 50 factory presets and 50 user-assignable programs. In addition to storing regular patch parameters, the DDP can also save peripheral data, such as sidechain, SysEx, and MIDI setup information. Front-panel controls, a backlit

display, and extensive metering options are provided.

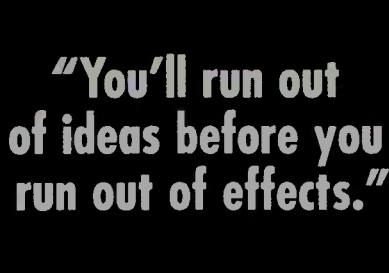
Featuring 24-bit A/D and D/A converters, the DDP provides XLR and 1/4-inch balanced inputs and outputs with selectable +4 dBu or -10 dBV operation. As an option, the DDP can be fitted with AES/EBU or S/PDIF digital outputs.

The DDP also features dbx's patented Tape Saturation Emulation technology, which can be used to generate the pleasing overload characteristics typically associated with analog tape. dbx; tel. (801) 568-7660; fax (801) 568-7662; e-mail customer@dbxpro.com; Web www.dbxpro.com.

Circle #403 on Reader Service Card



The New PCM 81 Digital Effects Processor



**"You'll run out
of ideas before you
run out of effects."**



Scott Martin Gershin
Sound Designer



NEW FEATURES • Pitch Shift algorithms on-board • 20 seconds of stereo delay • AES Digital I/O



The new PCM 81 Digital Effects Processor has everything that made the PCM 80 the choice of professionals – and more. More effects, more algorithms, longer delay and full AES/EBU I/O. Each effect has an uncompromised stereo reverb with several voices of additional effects. A full complement of *Pitch Shifters* provides everything from pitch correction to unique special effects. 300 meticulously-crafted presets give you instant access to pitch, reverb, ambience, sophisticated modulators and dynamic spatialization effects for 2-channel or surround sound applications.

With its huge assortment of superb effects, the PCM 81 is the

perfect tool for a sound designer like **Scott Martin Gershin** of *Soundlux Media Labs*. Scott, who used the PCM 81 to process his voice as the voice of *Flubber*, says, "This is the best pitch shifter I've used. Our job is to create emotional illusions in audio and the PCM 81 is a powerful tool to get us there. I feel I have only scratched the surface of what can be created on the PCM 81 and encourage everyone to explore the depths of this processor."

Explore the depths with Scott's customized presets – **Send us proof of purchase and your PCM 81 serial number by July 30, 1998, and we'll send you the Scott Martin Gershin Preset Card – FREE.**

Heard In All The Right Places

Lexicon

A Harman International Company

3 Oak Park, Bedford, MA 01730-1441
Tel: 781 • 280-0300 Fax: 781 • 280-0490
Email: info@lexicon.com Web: www.lexicon.com

Scott Martin Gershin's film credits include:
JFK, True Lies, Braveheart, Flubber
and *Mouse Hunt*
circle #509 on reader service card

FIRST WE MADE CD RECORDERS AFFORDABLE



NOW WE'RE GIVING AWAY THE DISCS

No other pro audio CD recorder sounds better. No other pro audio CD recorder is easier to use. And no other pro audio CD recorder is backed by HHB's award winning technical support.*

No wonder the HHB CDR800 is so hot.

And it's about to get even hotter. Buy an HHB CDR800 CD Recorder and you'll now receive a pack



of 10 HHB CDR74 Gold blank discs, absolutely free. That's more than 12 hours free recording on the most advanced Phthalocyanine, audio - optimised CD-R discs that money can buy.

There's never been a better time to record your work on CD-R. Call HHB about the CDR800 today.

* Winners of the Professional Recording Association Award for Technical Achievement, 1997.

ALSO FROM HHB • COST EFFECTIVE, HIGH PERFORMANCE DIGITAL RECORDING MEDIA



DAT Tape



CD-R



MiniDisc



MiniDisc Data



Magneto - Optical



ADAT



DTRS

HHB Communications USA • 626 Santa Monica Boulevard, Suite 110, Santa Monica, CA 90401, 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: hhbcna@istar.ca

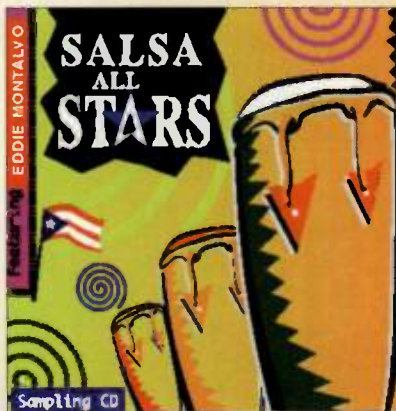
HHB Communications Ltd • 73-75 Scrubs Lane, London NW10 6QU, UK • Tel: 0181 962 5000 • Fax: 0181 962 5050 • E-Mail: sales@hhb.co.uk

Visit HHB on line at: <http://www.hhb.co.uk>

circle #510 on reader service card



SOUND ADVICE ▲ ▲ ▲ ▲



▲ BIG FISH AUDIO

Are you a little bit salsa? Are you a little bit rhythm and blues? Big Fish Audio has released two sample collections in audio-CD format that cover the rhythmic aspects of these musical territories. *Salsa All Stars* (\$99.95) features over 70 minutes of congas, bongos, cowbells, guiro, cascara, and maracas. There are 400 loops in all, performed by master Latin percussionist Eddie Montalvo.

Strictly R 'n' B (\$99.95) highlights the newest sounds in R&B with over 800 swing and soul loops and single-hit samples. The 70 minutes of sounds on the disc were produced by e-Lab, who also produced for the Vinylistics sample series. Big Fish Audio; tel. (800) 717-FISH or (818) 768-6115; fax (818) 768-4117; e-mail info@bigfishaudio.com; Web www.bigfishaudio.com.

Circle #404 on Reader Service Card

► ILIO ENTERTAINMENTS

If you've been yearning to remake your synth in the image of a guitar, take a look at two new CD-ROMs from Ilio Entertainments. Filled with acoustic guitars and nothing but, *FretWorks* and *Fingerstyles* (\$99 each for audio CDs; \$199 each for CD-ROMs bundled with the audio CDs) take different approaches to sampling this essential instrument. Coproduced by Frank Duncan, producer of *NYC Drumworks*, *FretWorks* centers on guitarists

playing notes and phrases on various vintage and custom guitars. Featured on the disc are well-known players Hiram Bullock, Nunzio Signiore, Bill Simms, C. Nausbaum, Nat Harris, and Doug Macaskill playing in styles such as Appalachian folk, Delta and Chicago blues, bluegrass, and rock. Instruments include vintage 6- and 12-string guitars from Gibson, Simms's National Steel, and Macaskill's custom baritone guitar. Approximately 700 samples are included.

Fingerstyles, produced by Dan Portis-Cathers, covers all manner of guitar playing sans plectrum. With over 400 samples organized into 38 songs, the CD is designed to be a complete kit for acoustic-guitar song construction and includes chord strums, riffs, melodic phrases, and endings in related keys and tempi. Both discs are license-free and available in Roland S-700, Akai S1000, Kurzweil K2000/K2500, and Digidesign SampleCell formats. Ilio Entertainments; tel. (800) 747-4546 or (818) 707-7222; fax (818) 707-8552; e-mail ilioinfo@ilio.com; Web www.ilio.com.

Circle #405 on Reader Service Card

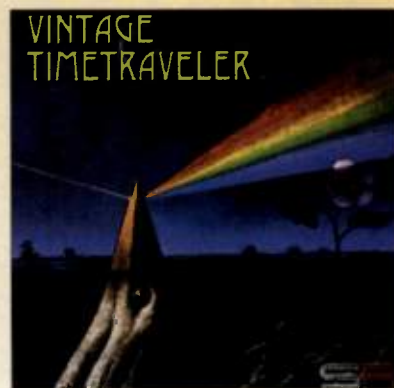


► SONIC REALITY

Sonic Reality takes you on a trip to the past with the *Vintage Time-Traveler* collection (\$199 CD-ROM; \$99 audio CD). This sample library features over 500 MB of sounds from vintage keyboards such as Hammond

B-3 organs (with or without Leslie), Mellotrons, Chamberlins, Optigans, Orchestrons, Farfisas, Vox Continentals, Wurlitzers, Rhodes, Planets, Clavinets, ARP synths, Moogs, Sequential Circuits Prophets, Gleeman Pentaphonics, and more. These are organized both by instrument type and by manufacturer.

Many sounds are multisampled and programmed with Velocity cross-switching; Leslie rotation speed can be changed by crossfading using Aftertouch, Velocity, or Mod Wheel adjust-



ments. Many of the synth programs were modeled on patches used on popular records of the '70s and '80s. In the case of the Farfisa patch, there is a reverb with an adjustable decay time that is triggered upon the release of a note. Most sound files are from 8 to 16 MB in size.

But wait, there's more! You also get vintage guitars, basses, talk boxes, drum kits, analog drum machines, and a history of analog synthesizers and digital keyboards. The CD-ROM is currently available in Akai S1000 format. Roland S-700, Kurzweil K2000/K2500, E-mu E4-series, and Digidesign SampleCell formats will be available soon, according to the manufacturer. Sonic Reality Productions; tel. (800) 232-6186 or (818) 784-3088; fax (818) 784-3018; e-mail sales@sonicreality.com; Web www.sonicreality.com.

Circle #406 on Reader Service Card



jaz
1GB

The Super-Fast, Extremely Vast
Personal Storage Drive.*



\$299 external drive

1 gig Jaz® cartridges for as low as \$89.95†

Each cartridge has a huge
one gigabyte capacity

1-Step™ backup software protects
as much as 2 gigs (compressed)‡

Access time

15.5ms read/17.5ms write

Average seek time

10ms read/12ms write

Maximum sustained transfer rate

6.62MB/sec. max

†Assuming 2:1 compression ratio. Actual compression will vary with file and hardware configuration.

‡Performance will vary when using 1GB cartridges.

©1998 Iomega Corporation. Iomega, the Iomega logo, and Jaz are registered trademarks, and "The Super-Fast, Extremely Vast Personal Storage Drive," "Because It's Your Stuff," and 1-Step are trademarks of Iomega Corporation. *Speed* is a production of 20th Century Fox, and *Apollo 13* and *Twister* are productions of MCA/Universal, Inc. All other trademarks are the property of their respective holders. The views expressed herein are the views of the endorser and are not the views of, and do not constitute an endorsement by, any person or firm for whom the endorser has provided services. *When purchased in multi-packs. Prices listed are estimated street prices. Actual prices may vary. 2GB capacity where 1GB=1 billion bytes. The capacity reported by your operating system may differ, depending on the operating system reporting utility.

"How I fit 1 speeding downtown bus,
a crippled lunar lander, and
5 car-tossing tornados into a
4 INCH SQUARE."

STEPHEN HUNTER FLICK

Sound Designer

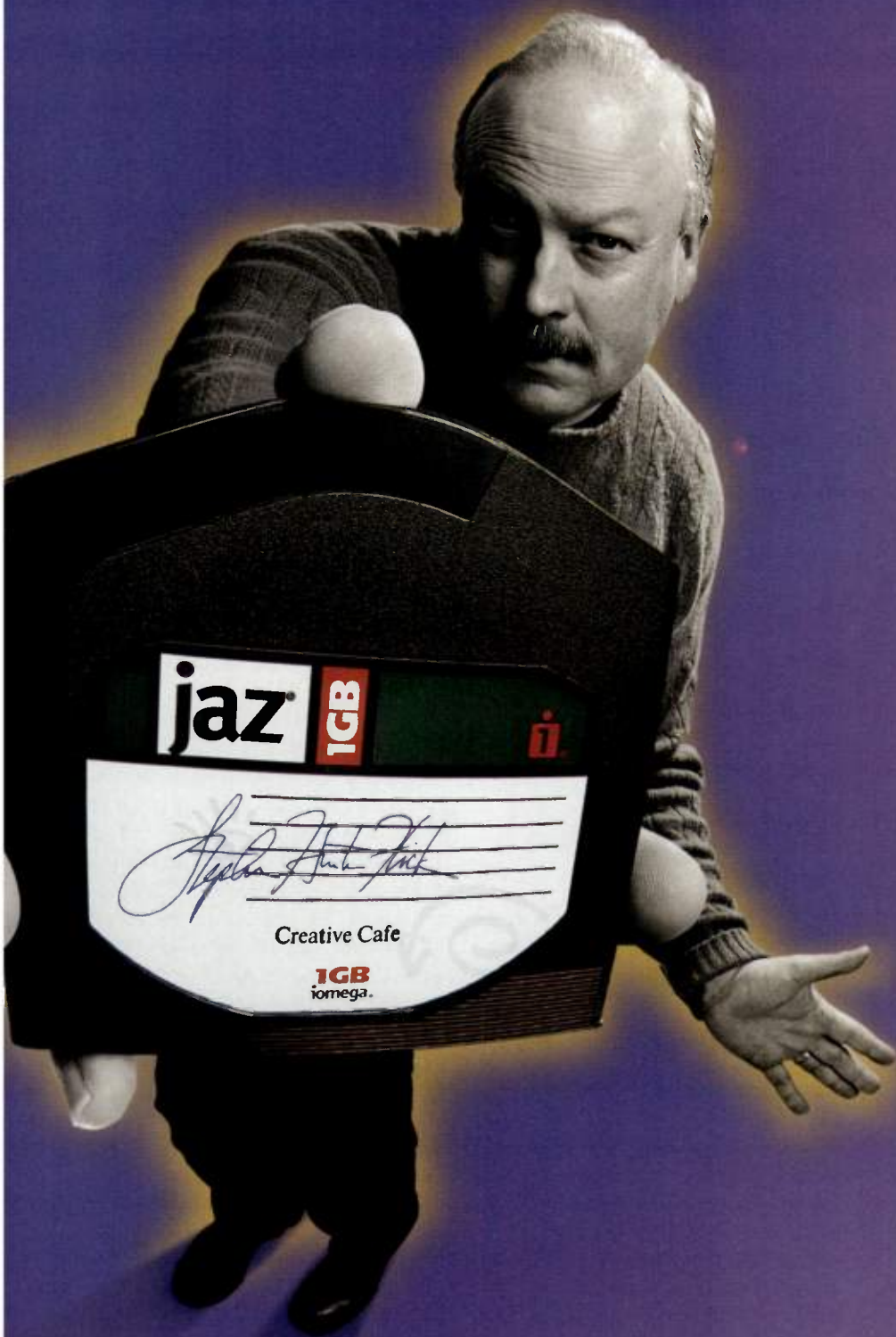
Creative Cafe

Stephen Hunter Flick is a communicator. As the two-time Academy Award-winning sound effects specialist whose work includes films like *Speed*, *Apollo 13*, and *Twister*, Stephen works with major studios (20th Century Fox, Universal, Sony Pictures to name a few) creating sounds that aren't just heard, but felt. From compiling over 2,000 sound files to create a massive tornado to transporting or even cutting straight to digital picture, Stephen's work takes space. Big space. Space like the high-capacity Jaz® drive. Incredibly, he used 41 Jaz drives at once on *Twister*, demonstrating its usefulness as an industry standard.

Stephen's work is larger than life, but thanks to his Jaz drive and handy Jaz disks, it fits neatly into his pocket.

Learn more about Stephen's story at www.4inchesquare.com/emn.

The high-performance standard in removable storage
with one million Jaz 1GB drives already out there.



BECAUSE IT'S YOUR STUFF.™



Two times the capacity and over 30% faster than the 1 gig Jaz drive.



\$649 external drive

2 gig Jaz cartridges for as low as \$149.95*

Each cartridge has
two monster gigabytes of capacity

2GB is read/write compatible with 1GB††

1-Step™ backup software can protect
up to 4 gigs (compressed†)

Access time

15.5ms read/17.5ms write

Average seek time

10ms read/12ms write

Maximum sustained transfer rate

8.7MB/sec. max

For information about connecting
your Jaz drive to a Mac or PC,
see your reseller or visit us at:

www.iomega.com

► VIRTUAL DSP MIdiAXE

Guitarists looking for plug-it-in-and-go simplicity in a MIDI guitar should check out the MidiAxe (\$3,595 to \$3,995) from Virtual DSP. This custom guitar has a built-in pitch-to-MIDI converter that works with the included piezo bridge pickup. The MidiAxe can be plugged directly into a synth module, without the external converter or add-on hex pickup required by most other systems.

A Synth Volume knob is located in the rearmost knob position on the guitar body. Two 3-way toggle switches transpose the MIDI notes up or down an octave and change the MIDI channel and mode. You can set the MidiAxe to transmit on Channel 1, with or without Pitch Bend, or on channels 2 through 7 (corresponding to strings 6 to 1) with Pitch Bend. The PitchPerfect pitch-to-MIDI converter

is powered by an AC adapter, which connects to the opposite end of the supplied MIDI cable.

The piezo pickups, manufactured by RMC, are mounted in a tremolo bridge system and connect to a preamp housed inside the body. Seymour Duncan humbucker and single-coil magnetic pickups are also provided.

A MIDI In connector allows you to update the PitchPerfect software by way of a PC sequencer. You can also merge data from another MIDI controller and send it to the MIDI Out.

MidiAxe guitars are available in Vintage and Modern styles, and in Standard and Elite versions. (For exam-



ple, the Elite versions have gold hardware, whereas the Standards have chrome hardware, and there are several different body wood and color options.) Virtual DSP Corp.; tel. (425) 379-8888; fax (425) 338-5221; e-mail sales@midiaxe.com; Web www.midiaxe.com.

Circle #407 on Reader Service Card

► FOSTEX FD-4

Fostex's FD-4 Digital Multitracker hard-disk recorder (\$595) records up to four tracks of uncompressed audio to an external SCSI hard disk or removable-media drive. Optionally, you can install a 2.5-inch EIDE hard drive. (The mounting kit costs \$249.)

The FD-4 records two tracks at a time and features two virtual tracks and non-destructive copy-and-paste editing. It uses 16-bit, linear A/D and D/A converters and samples at 44.1 or 32 kHz.

The four main channels in the analog mixer section each have a 1/4-inch line input, 3-band EQ with sweepable mid, monitor send, and pan control. Channels



3 and 4 also have XLR mic inputs and 1/4-inch TRS inserts. Each channel's Aux Send control can route the signal to either the Aux 1 or the Aux 2 output, and there are two stereo aux returns. You also get RCA tape returns, main outs,

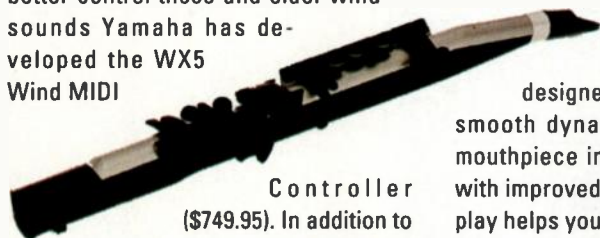
monitor outs, and a 1/4-inch, stereo headphone out. In addition to its analog inputs and outputs, the FD-4 has S/PDIF optical I/O. A 1/4-inch footswitch jack is provided for punching in and out.

The unit can slave to MTC or sync to MIDI Clock and Song Position Pointer. The mixer's dynamic range is rated at 105 dB, its frequency response at 20 Hz to 20 kHz, and THD at 0.008%. The recorder section is rated at >90 dB dynamic range and 20 Hz to 20 kHz frequency response (at 44.1 kHz sampling rate). Fostex Corporation of America; tel. (562) 921-1112; fax (562) 802-1964; e-mail info@fostex.com; Web www.fostex.com.

Circle #408 on Reader Service Card

▼ YAMAHA WX5

Recent advances in physical-modeling synthesis have resulted in great new wind-instrument sounds. To better control these and older wind sounds Yamaha has developed the WX5 Wind MIDI



Controller (\$749.95). In addition to a dedicated wind-controller output, the WX5 has a standard MIDI output so you can connect it directly to

any MIDI tone generator. It has sixteen keys in a layout similar to standard saxophone design and features single-reed and recorder-style mouthpieces.

Five sensitivity settings allow players to tailor the response of the newly redesigned air-pressure sensor for smooth dynamics control. The reed mouthpiece includes a new lip sensor with improved stability, and an LED display helps you find the lip sensor's neutral value. There's also a pitch-bend thumb wheel for use with either mouthpiece.

There are four Key Hold modes and four fingering modes, including a Flute mode. You can easily switch octaves, and you can send MIDI Program Change messages directly from the controller.

The WX5 is designed to allow especially expressive playing when used with one of Yamaha's WX-ready tone generators, such as the VL70-m, but it also has options for use with any GM or XG synthesizer. Yamaha Corporation of America; tel. (714) 522-9011; fax (714) 739-2680; e-mail info@yamaha.com; Web www.yamaha.com.

Circle #409 on Reader Service Card

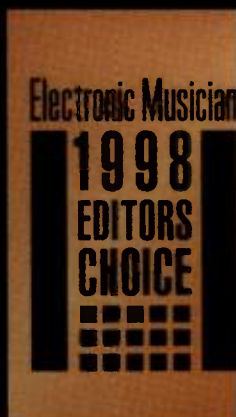
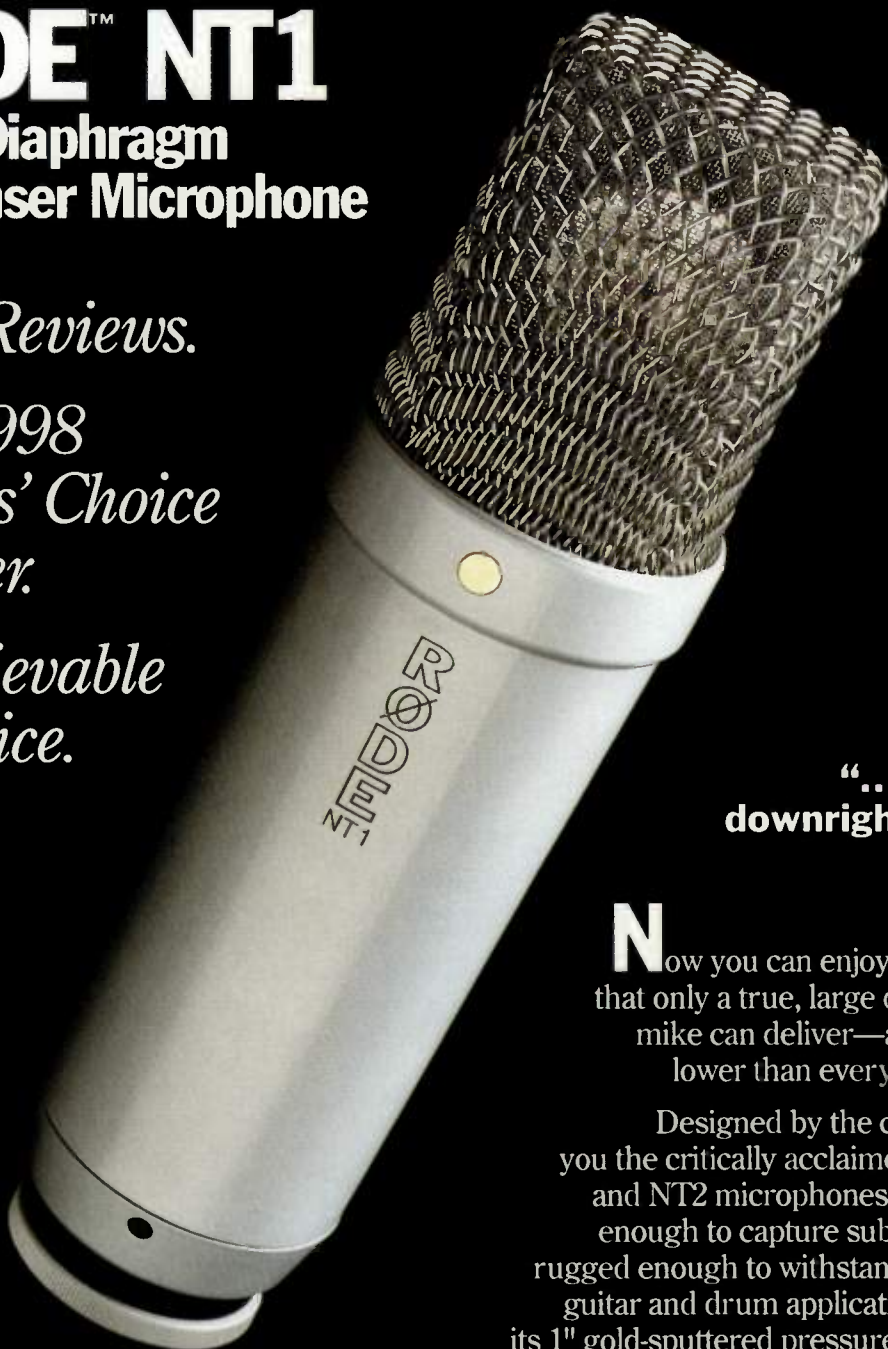
Pick the Winner.

RØDE™ NT1 Large Diaphragm Condenser Microphone

Rave Reviews.

*EM 1998
Editors' Choice
Winner.*

*Unbelievable
low price.*



**"...rich, sexy, and
downright delectable..."**

—EM

Now you can enjoy the rich warm sound that only a true, large diaphragm condenser mike can deliver—at a price dramatically lower than everything else in its class.

Designed by the company that brought you the critically acclaimed Classic Valve Tube and NT2 microphones, The NT1 is sensitive enough to capture subtle vocal nuances, yet rugged enough to withstand high SPL in electric guitar and drum applications. Couple that with its 1" gold-sputtered pressure-gradient membrane, extremely low noise circuitry, internal shock mounting system—and yes, that precise sound—and you can easily see why the NT1 is the must-have workhorse for your studio.

P.O. Box 4189

Santa Barbara, CA 93140-4189

Voice: 805-566-7777

Fax: 805-566-7771

E-mail: info@event1.com

Web: www.event1.com



RØDE NT1 \$349

THERE'S NO



The MiniDisc format has created a recording revolution. TASCAM's 564 makes the most of it to give you more creative power than any other MD multitrack available. It's the only MiniDisc multitrack system built with TASCAM's recording experience and reliability.

The TASCAM 564 Digital Portastudio®

Built for serious musicians who get inspired by great performance, the 564 is a complete 4-track digital studio with features that other MD multitracks can't match or simply don't have. The 564 complements your creativity with the intuitive operation, ease of use, and durability you expect from the inventors of the Portastudio — TASCAM.

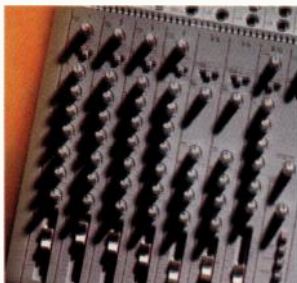
You're gonna love the 564's jog/shuttle wheel

Hear the difference! Only the 564 gives you audible, frame accurate jogging, cueing and index trimming. The others leave you guessing. Plus you can shuttle at 2, 8, 16, or 32 times normal play speed. Call up system parameters and alter values, even MOVE, ERASE and COPY with one hand tied behind your back.



Killer arrangements with exclusive Index Programming

Only the 564 lets you segment your song into as many as 20 patterns. And only the 564 has the hot new Index Program feature that lets you rearrange those patterns with as many as 99 steps for tremendous flexibility. Half the intro, double the chorus, or construct a whole new arrangement without losing the original — even after you power down.



The best mixer section in a MiniDisc Multitrack

It's all here; high quality mic preamps, responsive faders and pots, 3-band EQ with mid sweep, 2 Aux Sends and more. The routing flexibility makes it incredibly easy to Bounce Forward, overdub, monitor, even transfer tracks to another machine for sweetening. All this and only on the 564 Digital Portastudio.

5 takes per track. Only from TASCAM!

Imagine the perfect solo. Only the 564 gives you five takes per track to create it. With Auto Punch you can set frame accurate punch-in and out points, even do hands-free punches! To rehearse, just repeat between any two index markers for continuous playback. Only the 564 lets you choose from 0 to 9.9 seconds between repeats. You've got the licks. The 564 helps you make the most of them.



COMPARISON.



Bounce Forward only from TASCAM. It's incredible!

The 564's exclusive one-step Bounce Forward feature creates a stereo submix of your four tracks to the next song location on the disc with all EQ, panning and effects processing intact. Now you have 2 more tracks for overdubs. Overdub and Bounce Forward again and again until the music is just right. Even create a studio quality final mix — all within the 564!



Ins and Outs: XLRs, MIDI and Digital

4 XLR ins. 4 mono ins. 4 stereo ins. Simultaneous use of 2 AUX sends. 2 insert points. 2-Track in. Up to 4 additional live inputs at mixdown with the exclusive Buss Direct System. Sync to your sequencer without wasting an audio track for Time Code. And the only MD multitrack that lets you digitally transfer your mix to DAT or CD-R via S/PDIF? You guessed it — the 564!

Instant gratification. It's the fastest!

The 564 leaves other MD multitracks in the dust. It's so fast, it doesn't even need a pause button. With the only transport exclusively designed for digital multitrack recording, it continuously loads data for lightning-fast index trimming and song arranging, plus smooth multiple-speed shuttling capability.

Flex your creativity with non-destructive editing

With the 564, you'll never lose your inspiration. You can always UNDO or REDO the previous edit with the touch of a button. Ping pong, overdub, or create multiple mixes of your song on a re-recordable disc you can stick in your pocket. The 564 even reminds you to save your original tracks. It's a complete digital project studio you can carry under your arm. And it's from the inventors of the original Portastudio.



There's only one digital Portastudio.

All MD multitracks are not created equal. So don't buy a TASCAM wannabe. You'll end up with a lot less than you bargained for. Get the 564 Digital Portastudio from TASCAM and get the best. For the whole story, dial TASCAM FaxBack at (800)827-2268 and request document #7920.



Document #7920

TASCAM®

Take advantage of our experience.

Manufacturer's Suggested Retail Price is \$1,499.

©1998 TEAC America, Inc., 7733 Telegraph Road, Montebello, CA 90640 (213) 726-0303 • TEAC Canada Ltd., 5939 Wallace Street, Mississauga, Ontario L4Z 1Z8 Canada (905) 890-8008 • TEAC Mexico, S.A. de C.V., Privada Corina #18, Colonia del Carmen, Coyoacan, Mexico, D.F. 04100 (525) 658-1943

circle #513 on reader service card

▼ ZOOM RHYTHMTRAK ●●● 234

With its bass section, ethnic percussion samples, and regular trap-drum sounds, Zoom's Rhythm-Trak●●●234 drum machine (\$329) offers a broad palette. It has 100 drum kits and 50 bass programs and features 32-note polyphony, 16-bit resolution, real- and step-time recording, and real-time performance controls.

Rock, funk, acoustic, ballad, and modern drum kits were recorded using vintage equipment in professional drum rooms. The sampled synth-drum sounds were digitally edited for maximum punch. Most of the snares are in stereo, and all the main drums were sampled



at 44.1 kHz. The percussion sounds include Latin, Middle Eastern, Indian, Celtic, and African instruments.

The tabletop unit has thirteen pads: three toms; crash, ride, and extra cymbal; kick; snare; open and closed hi-hat; and three extras. In Bass mode, the pads sustain for as long as you hold them down.

The SoundJammer slider changes the volume or pitch or switches between two or three preset variations of a sound, and these changes are recorded by the sequencer. The Groove Play mode lets you trigger a drum and bass pattern with each pad. During recording, you can punch in and out and erase on the fly.

RhythmTrak syncs to MIDI Clock and can also be used as a GM drum module. The unit has two outputs (left/mono and stereo), a headphone out, a line in, and two footpedal inputs, all on 1/4-inch jacks. Zoom/Samson Technologies Corp. (distributor); tel. (800) 328-2882 or (516) 932-3810; fax (516) 932-3815; Web www.samsontech.com.

Circle #410 on Reader Service Card

▶ CAKEWALK METRO

Cakewalk Music Software has entered the Mac digital audio sequencer market with an audio-ready reincarnation of *Metro* (\$249). Version 4 of the program integrates MIDI tracks with up to 64 simultaneous tracks of audio playback, includes real-time effects, and supports third-party plug-ins.

Metro lets you see track, piano-roll, event-list, and fader views in one window. You can draw pan, volume, tempo, and other data in MIDI and audio tracks, and your curves can be constrained to smooth curves or straight lines. MIDI features include quantize, groove quantize, Human Feel, and a customizable, real-time arpeggiator. The Rhythm Explorer feature applies new rhythms to MIDI tracks in real time.

The program supports Sound Manager audio as well as the Korg SoundLink DRS 1212 I/O and Digidesign Audiomedia III cards. It can handle audio at sampling rates from 11.025 to 48 kHz, syncs to SMPTE and MTC, and can import and export QuickTime Movie soundtracks.

Real-time reverb, flange, chorus, parametric EQ, and delay effects are includ-



ed, along with a library of presets. The program supports Adobe Premiere and Steinberg VST plug-ins, and it ships with BIAS's *SFX Machine Lite* multi-effects plug-in.

For MIDI functions only, *Metro* runs on any Mac with 1 MB free RAM and System 7. For audio features, it requires a Mac with 16-bit inputs (Power Mac strongly recommended); 8 MB RAM, plus 0.5 MB per audio track and additional memory for real-time effects; Mac OS 7.0 or later; and Sound Manager 3.2 or later. Cakewalk Music Software; tel. (888) CAKEWALK or (617) 441-7870; fax (617) 441-7887; e-mail sales@cakewalk.com; Web www.cakewalk.com.

Circle #411 on Reader Service Card

▼ ANTARES ATR-1

While outboard effects manufacturers rush to create software versions of their signal processors, AnTares has packaged its *Auto-Tune* pitch-correction software in a 1U rack-mount, hardware unit. The ATR-1 (\$1,199) detects the pitch of a monophonic input signal and shifts it in real time to the nearest note in the selected scale. Major, minor, and chromatic scales are provided as presets, and you can create a custom scale using any combination of notes. Scales and all other settings can be stored in 50 memory locations.

Like the software version, the ATR-1 gives you control of the correction speed, so you can allow slurs and vibra-

to or remove them. You can also add vibrato with programmable delay, depth, rate, and waveform. A standard MIDI In port lets you assign the scale, key, or note from a MIDI keyboard, and you can assign Pitch Bend and Mod Wheel messages to control other functions.

The signal processor has a simple layout with an LCD, data-entry knob and buttons, and bypass button. LED meters display input level and the amount of pitch change being applied. The mono inputs are on balanced XLR and balanced 1/4-inch connectors; the mono output is unbalanced 1/4-inch. There's also a programmable footswitch jack. The box employs 20-bit A/D and 24-bit D/A converters. AnTares Systems/ Cameo International (distributor); tel. (888) 33-CAMEO or (408) 399-0008; fax (408) 399-0036; e-mail sales@cameoworld.com; Web www.cameoworld.com.

Circle #412 on Reader Service Card



SOUND ADVICE.

"I highly recommend it." -Electronic Musician Magazine, Dec. '97

"Highly recommended." -Recording Magazine, Oct. '97

"At the head of the pack." -Keyboard Magazine, Sept. '97

"#1 Selling Music Software." -Music and Sound Retailer, Oct. '97

"Cakewalk, to me, represents the future." -Jon Anderson, Yes, Solo Artist

"My most essential tool." -Aaron 'Stipko' Stipkovich, Producer,
Remixer-Mayfield, K's Choice, Bloodhound Gang, 311, No Doubt



1997
Post Magazine
Professional's
Choice



1997 Mix Magazine
Technical Excellence
and Creativity Award



1997 Music and
Sound Award



1997 Boot
Magazine's
Kick-Ass Award



1996 New Media
Awesome Award

#1 Music & Sound Software. from \$99 to \$399*

The experts agree. Cakewalk is the hottest MIDI and digital audio software available. Used and recommended by more musicians and studio professionals than any other brand, Cakewalk is the #1-selling music and sound software. That's because Cakewalk delivers features you can't find anywhere else:

- Record, edit, mix, and master up to 256 tracks of digital audio and MIDI.
- Run simultaneous audio effects in real time with DirectX-compatible plug-ins.
- Control and automate studio gear.
- Export audio in RealNetwork's RealAudio format for streaming over the Internet.
- Protect your work with the stability of a native 32-bit application for Windows 95/NT.

Whether you're creating music and sound in the home or studio, Cakewalk has a solution that's right for you.

So, take some sound advice and pick up Cakewalk 6. Available at music and software retailers everywhere.

1.888.CAKEWALK



www.cakewalk.com

*estimated street prices

circle #514 on reader service card

► SENNHEISER EVOLUTION MICS

Sennheiser's new Evolution series of dynamic mics includes four vocal and four instrument models. These rugged new mics use neodymium transducer magnets and are designed to handle sound-pressure levels up to 150 dB.

Leading off the series is the E825-S (\$129), an entry-level vocal (and general-purpose) mic with a cardioid polar pattern and a silent on/off switch. Its frequency response is listed as 80 Hz to 15 kHz, with a smooth, balanced response curve. Next up is the E835 (\$159), another cardioid-pattern vocal mic, with a frequency response rated at 40 Hz to 16 kHz and a slight presence boost. The E835-S version (\$179) adds an on/off switch.

The E845 (\$229) and E855 (\$299) feature supercardioid polar patterns. The former's frequency response is rated at 40 Hz to 16 kHz, and it has a presence boost. The E845A-S, which adds a silent on/off switch, is available for \$249. The E855 has an extended high end (out to 18 kHz, according to Sennheiser) and a

stronger presence boost than the E845.

The cardioid-pattern E602 (\$319) is designed for miking bass drums, bass guitars, and other low-frequency instruments. This microphone's lightweight voice coil and large-diaphragm design give it a deep low end (its frequency response is rated at 20 Hz to 16 kHz), and it has an attenuated mid-band response. The mic has a built-in, gooseneck stand mount.

The E604 (\$249) is a compact drum and brass mic with a cardioid polar pattern and a frequency response optimized for percussion. It includes a clip for attaching it to the rim of a drum. The mic can handle a maximum SPL of over 160 dB and boasts a frequency response of 40 Hz to 18 kHz.

Weighing in at a mere 0.7 oz., the E608 (\$299) is a gooseneck-mounted clip mic for woodwind, brass, and drums. This tiny

dynamic's supercardioid polar pattern, extensive damping and shock mounting, and humbucking coil all work to reject extraneous sounds, and its glass-fiber casing protects the capsule from damage. Sennheiser rates its frequency response at 40 Hz to 16 kHz.

Finally, the E609 (\$349) is a flat-profile, supercardioid mic for close-miking guitar cabinets and drums. It has a humbucking coil and high peak-distortion handling capabilities, and its frequency response is rated at 40 Hz to 18 kHz. All of the



Evolution microphones are protected by a 1-year exchange warranty. Sennheiser; tel. (860) 434-9190; fax (860) 434-1759; e-mail miclit@sennheiserusa.com; Web www.sennheiserusa.com.

Circle #413 on Reader Service Card

RHYTHMIC

RYTHMIC PATTERN GENERATOR with 16 simultaneous arpeggiators so you can create extreme grooves

16-PART MULTI-TIMBRAL, 4 REAL-TIME CONTROL KNOBS, 6 OUTS PLUS STEREO DIGITAL OUT provide you with ultimate flexibility and easy integration into your studio

24-BIT DUAL STEREO EFFECTS enhance your sound's sonic imagery



▶ ROLAND VS-1680

Roland's popular VS-880 modular hard-disk recorder now has a big sibling. The VS-1680 (\$3,195) can record up to sixteen tracks of compressed audio or eight tracks of uncompressed audio, and you can have up to 256 virtual tracks. You can record eight tracks simultaneously.

The unit has two balanced XLR mic inputs with phantom power; six balanced, 1/4-inch line inputs; and stereo optical and coaxial S/PDIF digital I/O (which carry the same signal). It has twelve outputs: eight analog outputs on RCA connectors and both optical and coaxial S/PDIF.

The VS-1680 has 20-bit, 64x oversampling A/D converters and 20-bit, 128x oversampling D/A converters. MT-Pro mode allows you to record and play back compressed 24-bit audio via the digital I/O or compressed 20-bit audio via the analog I/O. The internal 2.1 GB IDE drive can record

370 track minutes of maximum quality (48 kHz, uncompressed) audio or as much as 2,228 minutes of compressed, 32 kHz audio. A SCSI output lets the unit address up to seven external drives.

The VS-1680's 26-channel mixer has stereo aux and mix buses plus four effects buses that can be routed to outputs

stereo faders plus the master fader. You can use three bands of EQ (sweepable high and low shelving and parametric mid) on sixteen channels or two bands (sweepable shelving) on 26 channels.

The unit allows nondestructive, cut-and-paste editing with 999 levels of undo, 1,000 markers, and 64 locate points. A large (320 x 240-dot) LCD displays waveforms for editing, level meters, play lists, EQ and effects settings, and more. The new EZ Routing function lets you save recording, mixing, track-bouncing, and other settings for later recall. You can sync the VS-1680 to MTC, MMC, or MIDI Clock with Song Position Pointer; it can generate MTC and MMC.

The VS-1680 can read VS-880 files, and you can cascade up to five VS-1680s and VS-880s. Roland Corporation U.S.; tel. (213) 685-5141; fax (213) 722-0911; Web www.rolandus.com.

Circle #414 on Reader Service Card



or to the optional effects cards. Two 24-bit multi-effects boards (\$395) can be installed, providing up to four stereo or eight mono effects processors, with 34 algorithms. The mixer has eight mono and four

ECSTASY

RESONANT 12TH ORDER FILTERS allow you to model and create unique new sounds.

MIDI CLOCK MODULATION gives your sounds synchronized motion and life.

AUDITY 2000

- Traditional analog waveforms
- New aggressive textures
- Pitched digital noise effects
- Expandable sound set

HEAR THE FUTURE OF GROOVE SYNTHESIS AT YOUR LOCAL E-MU DEALER. EXPERIENCE THE ECSTASY OF RHYTHM.

circle #515 on reader service card

E-MU SYSTEMS

P.O. Box 660015, Scotts Valley, CA, USA, 95067-0015
Tel. 408.438.1921 • www.emu.com

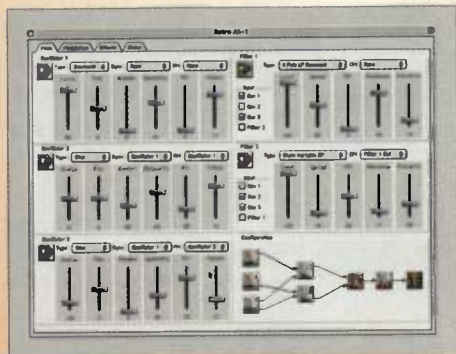
London Sales Office: Pinewood Studios, Pinewood Road
Iver, Buckinghamshire, SLO ONH, England.
Tel. +44 1753 630808 • Fax +44 1753 652040



SPEAK SOFTWARE... ▲ ▲ ▲ ▲

▼ BITHEADZ

A new contender in the software-synth market is BitHeadz Software, whose *Retro AS-1* (Mac; \$259) simulates the sound and architecture of



analog synths, with the addition of effects processing. *Retro AS-1* can be played via MIDI in real time, with up to 32-note polyphony (depending on processor speed). BitHeadz claims there is practically no latency (i.e., a note plays the instant you trigger it), and you can set the program to limit its CPU use, leaving resources for other applications. An "LED" gauge displays polyphony and CPU usage.

The voice architecture includes up to three oscillators, each with an 8-octave range and five waveforms (saw, pulse,

triangle, sine, and noise). Any oscillator can sync to another oscillator or filter. You can use two filters per voice, and seven filter types are available, including 4-pole, resonant filters. You can set up dozens of envelopes or LFOs to modulate any parameter, and you can also use four MIDI modulation sources. You can split or layer two voices.

In addition to two global effects, you can assign two insert effects to each voice. Algorithms include stereo reverb and delay, chorus, flange, overdrive, distortion, and parametric and shelving EQ.

Retro AS-1 is 16-part multi-timbral. It comes with serial-port drivers for direct MIDI input and also communicates with other software via OMS or FreeMIDI. It outputs 16-bit, 44.1 kHz stereo audio using Sound Manager. You can also record direct to disk.

The package includes a separate MIDI processor with an arpeggiator. *Retro AS-1* requires a Power Mac with 8 MB RAM and System 7.6 or later. BitHeadz; tel. (408) 465-9898; fax (408) 465-9899; e-mail info@bitheadz.com; Web www.bitheadz.com.

Circle #415 on Reader Service Card

▼ INNOVATIVE TREK TECHNOLOGY

Innovative Trek's *NovaStation* (Win; \$49.95) works with any 16-bit Sound Blaster-compatible sound card and supplies wavetable synthesis with 128-voice polyphony and sixteen multi-timbral parts. GM, XG, and TG300B MIDI formats are supported. The output is 16-bit, 44.1 kHz stereo audio.

You can set the program's CPU usage between 15 and 70 percent. There is a half-second delay when triggering sounds via MIDI. *NovaStation* has 676 instruments and 21 drum kits, and it also offers three effects blocks: reverb, chorus, and variation.

The program supports Microsoft Direct Sound and requires a 100 MHz Pentium PC (166 MHz MMX Pentium recommended), 16 MB RAM, and Windows 95. A trial version is available on the company's Web site. Innovative Trek Technology; tel. (408) 434-1555; fax (408) 456-1523; e-mail chrisng@pacific.net.sg; Web www.ittrek.com.

Circle #416 on Reader Service Card



▶ E-MU AUDITY 2000

The latest rhythm factory from E-mu is the Audity 2000 (\$1,795), a rack-mount synth module aimed at the dance-music market. It features the company's new Digital Rhythmic Modular Synthesis architecture, an arpeggiator and pattern generator, and 12th-order resonant filters. The unit is 16-part multi-timbral and 32-note polyphonic.

Audity 2000's ROM sounds start with 16 MB of traditional analog waveforms, industrial sounds, and hybrid creations; an internal slot will accept a card with an additional 16 MB of sound ROM, which should be available by late summer. Using "patch cord" style editing, you assign up

to eight LFOs and twelve 6-stage envelopes, all of which can sync to internal or external MIDI Clock. Modulation destinations include the filter, pitch, pan, volume, and more. You can layer four voices per preset and apply 24-bit, dual-stereo effects. There are 640 factory presets, and there is memory for 256 user presets.

The 16-channel arpeggiator/rhythm pattern generator plays sixteen patterns at once. There are 100 factory-preset pat-

terns and 100 RAM locations for user patterns. Pattern-flow commands let you edit the arpeggiator patterns. Four front-panel knobs give you real-time control over eight parameters per preset.

The unit has six 1/4-inch analog outs and stereo S/PDIF (RCA) output. E-mu Systems; tel. (408) 438-1921; fax (408) 438-8612; e-mail info@emu.com; Web www.emu.com.

Circle #417 on Reader Service Card



There's Only One Way To Get The Sound You Want...

Introducing the Neumann TLM 103

Regardless of your recording gear, the single best way to improve your sound is with Neumann microphones. Utilizing a large-diaphragm capsule derived from our world-standard U 87, our new TLM 103 gives you the full, rich, warm sound that Neumann is famous for. It has the lowest self-noise of any condenser mic in the world – important in today's low-noise digital recording environment. And with our new TLM 103, owning a Neumann has never been easier...for less than \$1000 US, you can have the most important piece of equipment you'll ever own.

Upgrade to the real thing – Neumann...
the choice of those who can hear the difference.



NEUMANN-MICROPHONE

NeumannUSA

One Enterprise Drive • PO Box 987, Old Lyme, CT 06371 Tel: 860.434.5220 • FAX: 860.434.3148
West Coast: Tel: 818.845.8815 • FAX: 818.845.7140
Canada: Tel: 514-426-3013 • FAX: 514-426-3953 • Mexico: Tel: 52-5-639-0956 • Fax: 52-5-639-9482
World Wide Web: <http://www.neumannusa.com>

circle #518 on reader service card

...AND CARRY A BIG SYNTH ▲ ▲ ▲ ▲



▲ KORG

The newest members of Korg's N series make this line of A12 (Korg's sample-based voice architecture) synths available at an attractive price. The N1 (\$2,099) and N5 (\$1,099) are 64-note polyphonic, 32-part multitimbral keyboard synths; the N1 has 88 weighted-action keys, and the N5 has 61 synth-action keys. Both keyboards sense Velocity and Channel Pressure.

The N5's 12 MB of PCM ROM contain 528 multisamples, including basic instrument sounds as well as a range of synth sounds and effects, plus 286 drum samples. The N1 has these sounds and an additional 6 MB ROM, which contain another 35 multisamples, including a new stereo piano. Both offer 1,269 programs and 402 combinations; 100 of each can be overwritten. Full GM support and sound maps for playing GS and XG sequences are included.

The N1 and N5 have two independent, stereo effects processors with 48 types of effects. There are dedicated, front-panel switches for portamento, starting and stopping an external sequencer, and layering and splitting two programs. Controllers include pitch and mod wheels and an assignable footswitch and footpedal. In Performance mode, four front-panel knobs control attack time, release time, filter cutoff, effects parameters, and twelve user-assigned parameters. An arpeggiator with twenty preset patterns can sync to MIDI Clock.

Editing is done on a 144 x 40-pixel LCD with an icon-based interface. The N5 has two ¼-inch outputs, and the N1 has four. Both offer MIDI In, Out, and

Thru and a serial port for connecting to a Mac or PC. Korg USA, Inc.; tel. (800) 645-3188 or (516) 333-9100; fax (516) 333-9108; Web www.korg.com.

Circle #418 on Reader Service Card

▼ QUASIMIDI

Built-in vocoding and quick access to common editing functions are the highlights of Quasimidi's Sirius (\$1,649.95). This 28-note polyphonic, 7-part multitimbral synth has an unweighted, 49-key, Velocity and Channel Aftertouch-sensitive keyboard; a pattern sequencer; an arpeggiator; and effects. The synth has 22 real-time control knobs, pitch and programmable wheels, and one footswitch jack.

Sirius uses PCM samples, many of which have been computer-processed via Fast Fourier Transform and harmonic extraction. Those sounds go through subtractive synthesis (using a modeled synth architecture) with two oscillators and two LFOs per voice and amplitude, filter, and pitch envelopes. You get 24 dB/octave and 12 dB/octave

lowpass filters and a 12 dB/octave highpass filter, all with variable resonance up to self-oscillation.

Common editing operations, such as modulation routing and oscillator tuning, are simplified by macro functions. You can generate random sounds and store sounds with one touch of a button. There are 480 user program locations in addition to the 672 ROM programs and 20 drum sets built from 256 drum and percussion sounds.

Sirius's vocoder has its own filter bank with lowpass, highpass, and nine band-reject bands. Sixteen vocoding presets are included, and there's a built-in microphone on a gooseneck mount for creating "talking" instrument effects. There are also two effects processors with 28 algorithms.

The unit's arpeggiator has sixteen patterns and syncs to MIDI Clock, MTC, or external audio using an intelligent beat-recognition algorithm. The sequencer has kick, snare, hi-hat, percussion, and three polyphonic synth channels, with step- and real-time recording. You get four levels of accent and glide per step. One hundred ROM patterns are provided, and there's space for 100 user patterns. The sequencer syncs to MIDI Clock or audio. Radical Technologies (distributor); tel. (201) 836-5116; fax (201) 836-0661; e-mail jsk1@gramercy.ios.com.

Circle #419 on Reader Service Card



Keep Up With Storage Technology That Doesn't Even Exist Yet.

Typically, by the time you commit to a digital media standard a better one has already come along. How can you keep pace without losing your mind or your savings? Simple. The brand new Fostex FD-4 gives you four tracks of fully-digital audio as only Fostex can, plus something never before offered as a standard feature in a digital multitracker at this price: choices. Because rather than loading up the FD-4 with an expensive internal hard drive in a size you may not even want, we simply provided a built-in SCSI-II interface. So you can hook up virtually any SCSI-II device you'd like—an external hard drive, let's say, or a removable Zip™ or ezflyer™ drive. That way, you can configure your recorder as you see fit. It even has an internal hard drive bay, so you can add your own IDE-compatible hard drive if you'd like.

What does such flexibility and insurance against future technology cost, you may ask? Well, try cutting your lowest estimate in half, because the retail price on the FD-4 is less than \$600. It's packed with 4-channel mixing capabilities, 4-channel recording in 16-bit, CD-quality digital audio, 2 "Virtual" tracks, easy digital editing, and something you won't get from anyone else: the simple freedom to pick the media of your choice.



The back panel of the FD-4 shows off its tremendous flexibility. Balanced XLR Mic inputs, optical S/PDIF and MIDI in and out, SCSI-II plus standard analog ins and outs make the FD-4 adaptable to any application.

Fostex

Get The Fostex FD-4 Digital Multitracker. Under \$600!!



SCSI-II
RECORDING

CHOOSE YOUR OWN SCSI OR IDE HARD DRIVE OR REMOVABLE DRIVE, SUCH AS ZIP™ AND EZFLYER™ DRIVES

4
CHANNEL
MIXING

WITH 4 INPUT CHANNELS, 2 AUX SENDS, 2 STEREO AUX RETURNS, 2 BALANCED XLR MIC INPUTS WITH TRIM CONTROL, AND 3-BAND EQ PER CHANNEL

2
VIRTUAL
TRACKS

FOR EXTRA TAKES, REHEARSALS, MASTERING, AND ADDITIONAL CHOICES AT MIXDOWN

Digital
EDITING

COPY PASTE, MOVE, AND ERASE DIGITAL EDITING WITH UNDO/REDO

2
DIGITAL
INS/OUTS

DIGITAL INPUT FROM 2-TRACK SOURCE (CD, DAT, ETC.) AND 2-TRACK DIGITAL OUTPUT

FOSTEX CORP. OF AMERICA • 15431 BLACKBURN AVE • NORWALK, CA 90650
TEL: 562-921-1112 • FAX: 562-802-1964 • <http://www.fostex.com> • e-mail: info@fostex.com

KURZWEIL EXPRESSIONMATE

Kurzweil has made some of the MIDI control features of the K2500, including the long ribbon controller, available in a stand-alone system. The Expressionmate (\$395) consists of a MIDI control/processing box and a separate 600 mm ribbon controller.

The processor box, which can be mounted on a mic-stand, has two merging MIDI Ins and two Outs and transmits on up to three channels. It also features breath-controller, footswitch, and foot-pedal inputs, and two programmable buttons. Controllers can be remapped, scaled, and programmed with entry and exit values. You can also remap Program Change numbers.

The Expressionmate includes three arpeggiators that can sync to MIDI and



run synchronously or not. You can change the scale and rhythmic template in real-time. You can crossfade from one arpeggiator to another.

A 10-foot cable from the processor box attaches to one end of the ribbon controller, which can be hand-held or placed on any surface. You can split the ribbon into three zones, each of which can be set to perform different functions on three MIDI channels, sending note or

Control Change information. You can set positive or negative tracking for each zone and scale them independently. Zones can be set to respond to absolute or relative finger positions, and you can program the unit to center the value (or not) when the finger is lifted. Kurzweil Music Systems, Inc.; tel. (800) 421-9846 or (253) 589-3200; fax (253) 983-8206; Web www.youngchang.com/kurzweil.

Circle #420 on Reader Service Card

JOEMEER VC-5 MEEQUALIZER

Two recent additions to the Joemeek line of retro-sounding audio gear are the VC-5 Meequalizer and VC-6 Meek Box (\$599 each). The VC-5 is a 2-channel, 3-band equalizer. It uses a discrete amplifier similar to those in classic mixing consoles. The low band shelves at 100 Hz, and the high band at 8 kHz; both offer 18 dB cut/boost and add a definite coloration to the sound. The warm-sounding midband can be used to adjust

the presence of vocals and other sources; it offers 16 dB cut/boost and sweeps from 600 Hz to 3.5 kHz.

Each channel of the VC-5 also includes a bypass switch, ± 12 dB gain control, $\frac{1}{4}$ -inch balanced input, dual $\frac{1}{4}$ -inch balanced outputs, and a To Insert socket for connecting to the insert point of other Joemeek VC products.

The VC-6 Meek Box combines mic and instrument preamps with a compressor and an enhancer. A balanced XLR mic

input feeds a 5-stage mic preamp with more than 30 dB headroom and switchable 48V phantom power. There are also $\frac{1}{4}$ -inch instrument and line inputs.

The VC-6 uses the same photo-optical compressor as the Joemeek VC-1 (reviewed in the February 1998 EM). The ratio can be set from 1.5:1 to about 8:1, attack time from 1 to 7 ms, and release time from 200 ms to 3.5s. The enhancer lets you adjust the amount and tuning of the harmonics added to the signal. PMI (distributor); tel. (310) 373-9129; fax (310) 373-4714; e-mail themeeekman@joemeek.com; Web www.joemeek.com.

Circle #421 on Reader Service Card



E-MU AUDIO PRODUCTION STUDIO

Integrating sampling, hard-disk recording, sound design, and audio editing functions, the E-mu Audio Production Studio (\$699) for Windows consists of a PCI card and an Audio Access Bay that fits in a computer's 5.25-inch drive bay.

The card has two balanced, $\frac{1}{4}$ -inch line inputs; two balanced, $\frac{1}{4}$ -inch outputs; and stereo S/PDIF I/O on RCA connectors. The Audio Access Bay adds two balanced, $\frac{1}{4}$ -inch mic/line (switchable) inputs with preamps, 12V phantom power, and trim

controls; a second stereo S/PDIF I/O pair on RCA jacks; and a $\frac{1}{4}$ -inch, stereo headphone output with volume control.

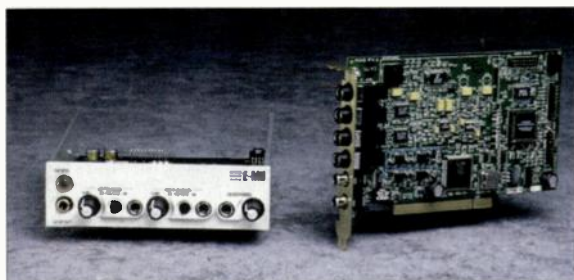
The system supports 8- and 16-bit audio at sample rates up to 48 kHz. You get 64 dynamically allocated voices, which can be either wavetable samples

or streaming audio. Sampler voices draw from up to 32 MB of sample memory (held in the host computer's RAM). The card's DSP engine offers mixing, routing, and editable, real-time effects. You can also record directly to disk.

Internally, the Studio is 32-part multi-timbral, and it has one external MIDI interface. In and Out ports are on a separate bracket that fits in a card bay but does not use a slot. The package also includes software and Windows 95 drivers.

The system requires a 133 MHz Pentium PC with 24 MB RAM. E-mu Systems; tel. (408) 438-1921; fax (408) 438-8612; e-mail info@emu.com; Web www.emu.com.

Circle #422 on Reader Service Card





Meet the family.

The award winning professional technology that set the benchmark in studios around the world is now available at every price point, meeting every users needs. Each version offers Digital Audio and real-time DSP and the same professional character – not just another pretty face.

Emagic Inc.
Tel. +530.477 1051
Fax +530.477 1052

Emagic Internet
<http://www.emagic.de>

All rights reserved. Logic™ and Logic Audio™ are Registered Trademarks of Emagic®.

circle #519 on reader service card

emagic
Technology with Soul.



DO ONE THING.



DO IT BETTER.

Claire sings for one reason, to bare her soul. Electro-Voice has designed the N/D367 Female Vocal Mic to capture the emotion of the female voice. For a microphone that listens first, then speaks just the way you want to be heard, contact your nearest Electro-Voice dealer and check out our complete line of application specific, N/DYM® Series mics.



Electro-Voice 600 Cecil Street Buchanan, MI 49107 616/695-6831 800/234-6831 In Canada: 613/382-2141 www.electrovoice.com
© Telex Communications, Inc.

circle #536 on reader service card
www

TECH PAGE

As I've said many times in this column, electronic musicians have an insatiable appetite for bandwidth and storage capacity. In the realm of microprocessors, bandwidth translates to clock speed, which is the number of processing cycles executed per second. For example, clock speed is a major factor in determining the number of simultaneous audio tracks that can be played by a digital audio workstation (DAW).

These days, the top clock speed in commercially available microprocessors is around 350 MHz. Computers operating at this speed seem mighty fast, even to jaded technology junkies. However, if we learn only one thing from the history of technology, it is that today's race car is tomorrow's jalopy.

In the pursuit of ever-faster clock speeds, IBM has demonstrated a prototype processor that operates at an astounding 1 GHz (1,000 MHz). Code named "GUTS" (Gigahertz Unit Test Site), the processor was designed at the company's Austin Research Lab by a team of 15 engineers using IBM's CMOS 6X chip-fabrication technology. The chip includes one million transistors that measure 0.25 microns across.

The new processor is based on the PowerPC architecture, which was jointly developed by IBM, Motorola, and Apple. It includes an innovative cache design that puts more of the control logic in the cache itself, allowing load and store operations to be performed

No GUTS, No Glory

IBM has demonstrated a 1 GHz microprocessor.

By Scott Wilkinson

in a single clock cycle. According to Dr. Mark Dean, director of the Austin Research Lab, "The cache uses what might be called encoded—not fully identified—addresses, which enhances cache speed." In addition, a dynamic-circuit approach greatly reduces the number of stages through which signals must propagate, and new clocking methods further reduce the chip's cycle time and allow the clock signal to be generated and distributed with exceptionally high precision.

The current prototype performs only integer operations and supports 96 of the PowerPC's roughly 230 instructions. (The GUTS instructions represent approximately 90 percent of those commonly used by integer programs.) The next steps in the project include floating-point and memory-management units as well as work on the I/O, bus interface, and other system components. The team is also working on a new DRAM design that will offer an order-of-magnitude improvement in first latency, which is the time between a request for data and the moment that data begins to arrive at its destination.

The architecture, circuits, and testing techniques used in this project will eventually be applied to microprocessors with the company's new CMOS 7S "copper chip" technology, which uses copper, a superior conductor, instead of aluminum to carry electrical current between semiconductor elements on silicon wafers.

The new manufacturing technique will allow more logic elements to fit on a smaller chip that consumes less power than previous products. In addition, this technology enhances the

electrical properties of semiconductors, which should significantly improve performance. It also reduces the transistor size to less than 0.20 microns, allowing 150 to 200 million transistors to be packed onto a single chip. Copper-chip technology should increase the performance of the GUTS processor by 20 percent.

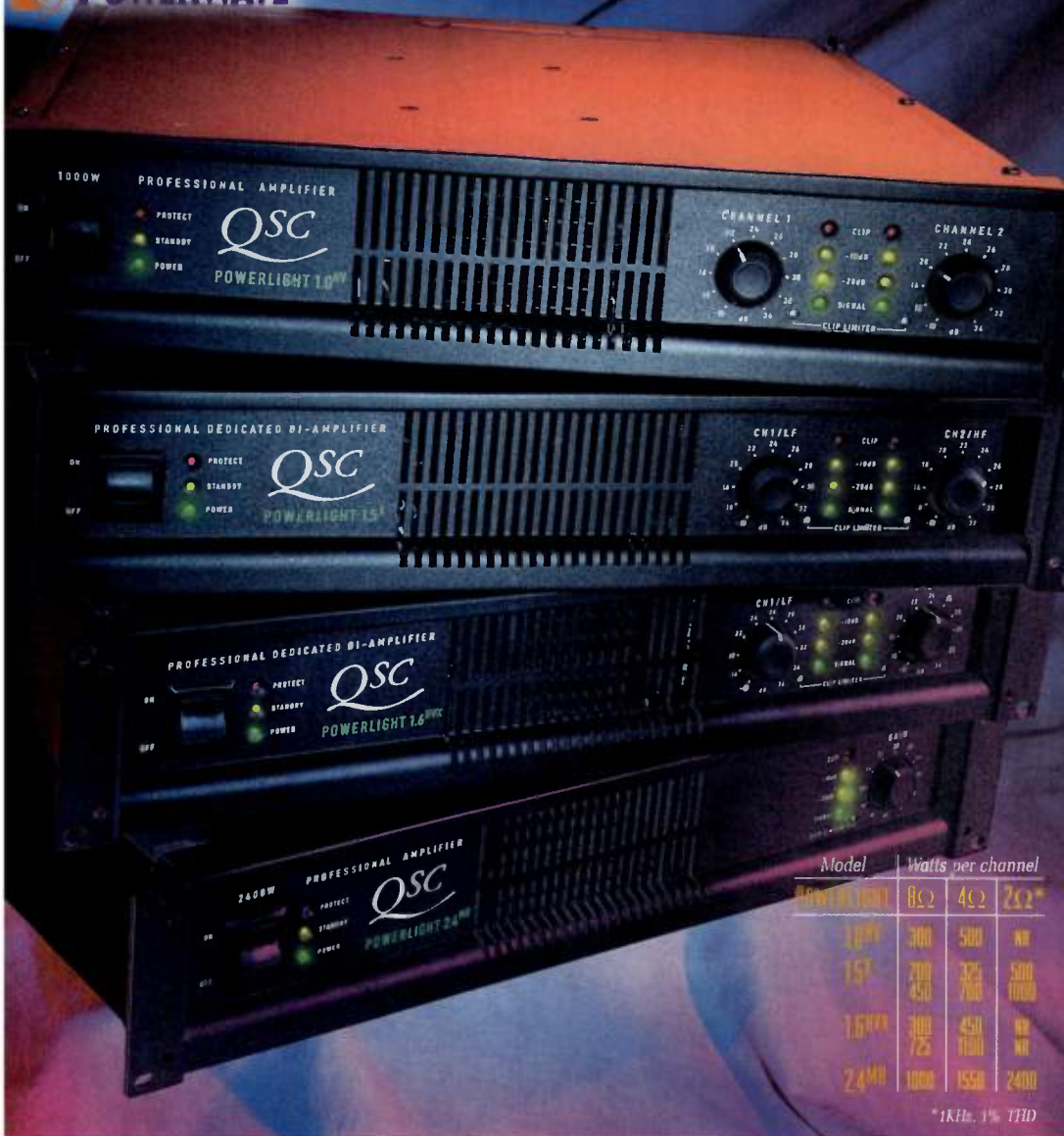
Ultimately, this technology could send processors well beyond the 1 GHz clock speed that is now the benchmark. According to Dean, "We believe that 2 GHz is quite possible." More immediate applications include using copper-chip technology to build a 500 MHz PowerPC 750 microprocessor, which should go into production later this year. Clearly, this technology will make a significant impact on computer-based media production in the very near future. ●



Dr. Mark Dean holds a wafer of GUTS processors.

PERFECT POWER.

POWERWAVE



4 AMPS THAT ARE AS SPECIALIZED AS YOUR SPEAKERS.

If all speakers were identical then maybe you would need only one type of amplifier. However, today's sound systems are comprised of complex multi-way speakers using high-power subwoofers, horn-loaded mid-ranges, and high-frequency compression drivers. Our four newest PowerLight™ amplifiers are designed to give each one of these speakers the right power for peak performance. So stop by a dealer near you for some ideas on how you might power your system, perfectly.

"HEAR THE POWER OF TECHNOLOGY"

Model	Watts per channel		
	8Ω	4Ω	2Ω*
1.0HV	300	500	N/A
1.5X	200	325	500
1.6HVX	300	450	N/A
2.4MB	1000	1550	2400

*1KHz, 1% THD

PowerLight™ 1.0HV

The PowerLight 1.0HV use a high voltage power supply to deliver 300 watts/channel at 8 ohms and 500 watts per channel at 4 ohms. Employing an ultra-low distortion Class AB output circuit (0.01% THD typical), it is ideal for powering midrange and high frequency drivers, studio monitors, and other critical sound system applications.

PowerLight™ 1.5X & 1.6HVX

Tailor made for bi-amping your monitors or your mains, the PowerLight 1.5X and the PowerLight 1.6HVX offer a high-power channel with a high-efficiency Class H output circuit to power low frequencies, paired with a medium-power channel with an ultra low-distortion Class AB circuit to power high-frequencies channel. Built-in crossovers can also be added.

PowerLight™ 2.4MB

The PowerLight 2.4MB mono-block is a single channel amplifier that delivers 2,400 watts at 2 ohms while operating from a single 15 amp 120v AC circuit. It is ideal for driving multiple sub-woofers (up to 600 watts each to four eight-ohm drivers) as well as allowing an odd number of amplifier channels to be configured in a system.

"PowerLight", "PowerWave" and "Hear the Power of Technology" are trademarks of QSC Audio Products, Inc. "QSC" and the QSC logo are registered with the U.S. Patent and Trademark Office. Powerlight Patents Pending. QSC Audio Products, Inc. 1675 MacArthur Blvd., Costa Mesa, CA 92626 USA



QSC
AUDIO

www.qscaudio.com

circle #520 on reader service card

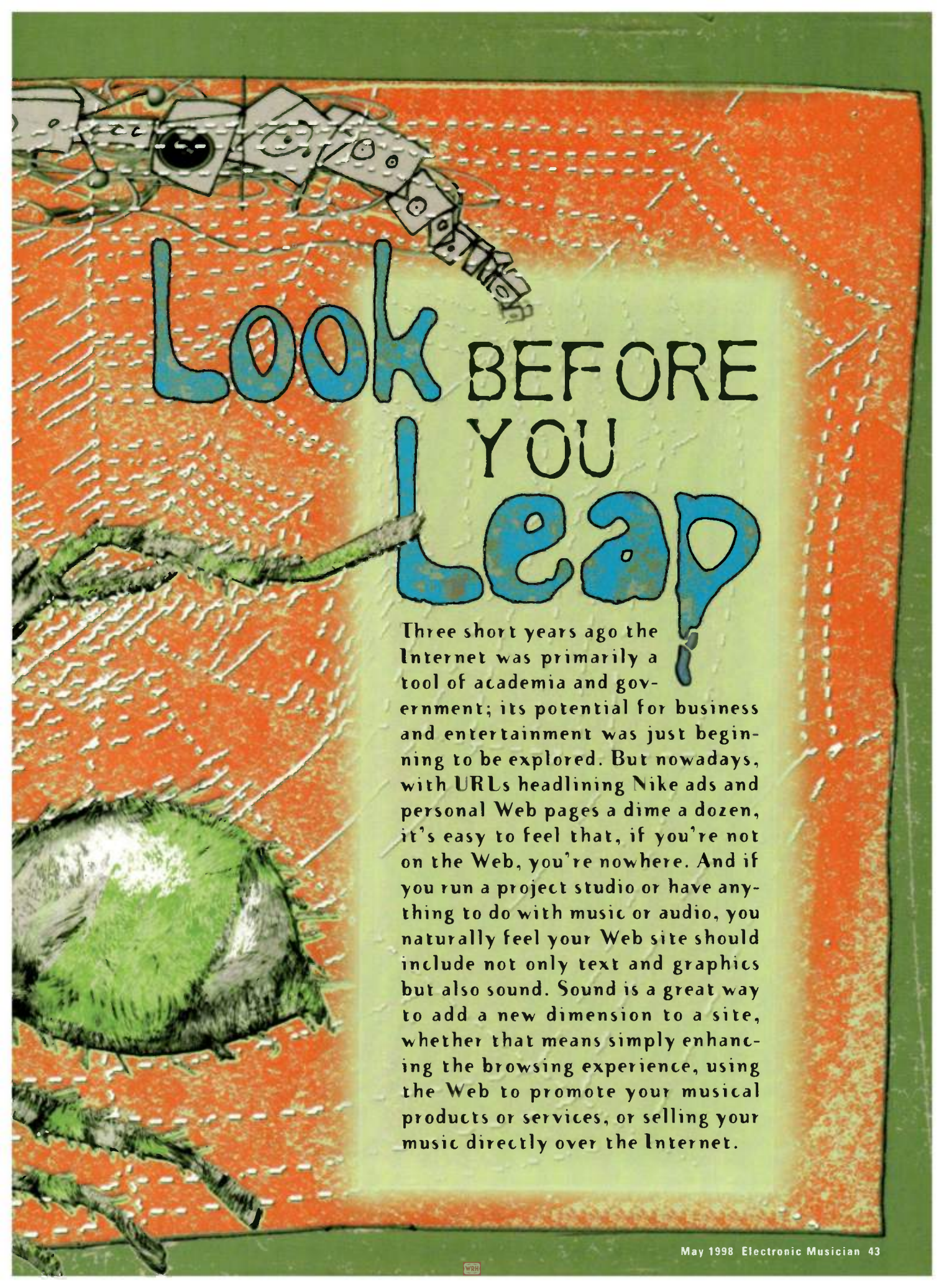
Design audio for the

Web without becoming ensnared.

GAD

Illustration by Victor Gad





Look BEFORE YOU Leap!

Three short years ago the Internet was primarily a tool of academia and government; its potential for business and entertainment was just beginning to be explored. But nowadays, with URLs headlining Nike ads and personal Web pages a dime a dozen, it's easy to feel that, if you're not on the Web, you're nowhere. And if you run a project studio or have anything to do with music or audio, you naturally feel your Web site should include not only text and graphics but also sound. Sound is a great way to add a new dimension to a site, whether that means simply enhancing the browsing experience, using the Web to promote your musical products or services, or selling your music directly over the Internet.



It's tempting to jump right in and figure out how to get your music up on the Web, but it turns out that there are a number of different approaches, each designed for a different purpose. You can save yourself a lot of time and aggravation in the long run by first taking a moment to clarify your purpose in putting audio on your site as well as your understanding of how and by whom that audio will be used. To help you do that, this article takes a look at some essential questions that should be answered before you set up your site for sound.

What is the purpose of your Web site, and why are you adding sound to it?

It's important to assess how well the site advances your personal and/or business goals. There are lots of valid reasons for operating a Web site, ranging from "just for fun" to serious Internet commerce. Once you determine what the site is intended to achieve, you will have a better idea of how sound can be used to support it.

Most instances of sound on the Web fit into one or more of the following categories.

Ambience/entertainment. With the development and spread of browser plug-in technology, browsing the Web has become a truly multimedia experience. In theory, it makes a lot of sense to use sound to create ambience for a site and to entertain visitors as they browse. But in practice, not many sites are using sound for this purpose; the vast majority of sites are still quite silent. That could be because of the general bias toward text and graphics in the world of computing. Or it may be due to the fact that most sites are not profit generators for their proprietors, so it's often hard to justify the added time and expense involved in adding sound.

Rather than adding audio as a general background or ambient element, it may be more effective to limit sound to those places where it is specifically relevant to the point of the site. This is especially true when you consider the

lack of universal standards for browser audio plug-ins. If your site does use sound to create a mood or to entertain, it's important to realize that many visitors lack audio plug-ins for their browser. Or they may have a plug-in for a different format than the one you choose to support.

If your site is designed so that ambient music starts as each page loads, these users may be confronted with one or more alert dialogs telling them that they don't have the correct plug-in. If users are visiting your site to get specific information that doesn't depend on sound (in other words, they have no real incentive to download the plug-in at that time), they may be irritated or frustrated by the experience—not the result that your ambience is intended to achieve.

Promotional. If your site is oriented toward music or sound, of course, the above concerns do not apply, because visitors to the site will be coming specifically to listen. Promotional sites are one of the most common types of sites on the Web, and they offer a great way to show off music-related services or products. Performers, composers, sound designers, and voice-over artists can all take advantage of the Web as a kind of online demo tape to which they can refer anyone who wants to hear what they can do.

Prerecorded music sales. If you have music, sound effects, or synth patches for sale, a site's promotional function can easily be extended into a sales function by offering a way for the visitor to purchase a compact disc or cassette tape after they preview the sounds on the site. Many record companies, online music retailers, and independent artists are using this approach. Implementing full-blown online commerce capabilities (shopping cart-style browsing, credit card verification, inventory control, etc.) can be a daunting task for a small independent site, but even providing a simple order form that can be e-mailed, faxed, or sent in can generate revenue if people like what they hear.

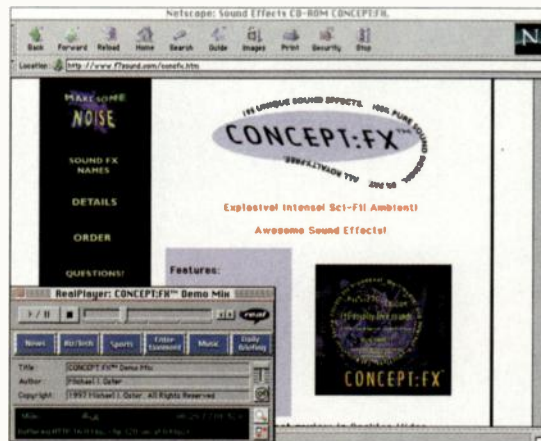
Direct download. Beyond simply offering samples online and taking orders for a CD or cassette, the Internet

also offers the possibility of selling sound files and directly transferring them to the end user—without pressing CDs or duplicating cassettes. Some purveyors of "canned music" are set up so that users (once their payment has cleared) are granted access to a protected FTP site from which they can download the file they have purchased. Other sites are using a system developed by Liquid Audio, Inc., that has been designed from the ground up to provide an alternative channel for music distribution. The Liquid Audio software transfers the music to the user's hard drive or even to a recordable CD. It can also handle the tracking and payment of royalties to the various rights holders.

Webcast. The last category of Web sound is the Webcast, where sound is available to end users in real time over the Internet. This capability is primarily in the realm of large news organizations, such as NPR or CNN, or of broadcasters who Webcast concerts and other events along with their radio or TV coverage. But if your heart's desire is to run your own little Web "radio station" or to Webcast your own poetry reading or your kid's soccer game, it's possible. Webcasting, however, is not for the technological neophyte. It requires specialized equipment and a different approach than that used for playing sound samples from a page.

How do you get people to visit your Web site?

Does an audio clip on a site without visitors still make a sound? With a zillion sites on the Web, there's little



F7 Sound's Web page (www.f7sound.com) uses RealAudio (lower left) to play a demo of its new *Concept:FX* sound effects CD.

What is Music Technology Direct?



In 1990, Sweetwater Sound created **a new way to serve musicians and studios:** We combined the **convenience** of gracious, direct mail service with an exclusive **focus** on **music technology**. Like L.L.Bean®, Dell®, and other specialty direct marketing leaders, Sweetwater is fortunate to have grown by leaps and bounds, while offering **greater and greater value**. Our exclusive "Music Technology Direct" approach has helped over 100,000 artists and engineers make their **musical dreams come true!**

HOW DOES SWEETWATER DELIVER THE BEST VALUE — GUARANTEED?



1 CONVENIENCE: *You get the right gear, when you need it!*

We've got the knowledge to help you choose the right product *the first time*. You save time, money, and avoid needless frustration. Just pick-up the phone: no waiting or noisy showrooms.

2 SAVINGS: *You get the best price and the best value!*

Our tremendous buying power means you get the best products at the best prices. In addition, we truly offer you the Best Value, Guaranteed. If you're not happy, we're not happy.

3 SERVICE: *You get expert technical support, free of charge!*

Tired of runarounds? Our huge tech support and service department makes your gear harmonize beautifully. We make your rig sing and get you back to your music — fast!

4 RESPECT: *You get treated with professional respect!*

Shouldn't shopping for gear be quick, painless, and just plain fun? We'll do everything in our power to make it easy for you to create music and have a great time doing it!

INTRODUCING:

SWEETWATER'S
*Custom
Select*
PREMIUM DIRECT LUTHIERS

**WHY NOT EXPERIENCE THE SWEETWATER DIFFERENCE
FOR YOURSELF? CALL SWEETWATER SOUND TOLL-FREE AT:**

(800) 222-4700

5335 BASS ROAD • FT. WAYNE, IN 46808
(219) 432-8176 • FAX (219) 432-1758 • sales@sweetwater.com • www.sweetwater.com

**CALL NOW FOR YOUR
FREE EQUIPMENT
DIRECTORY:**

Filled with useful
information on all
the coolest new gear!



Look BEFORE YOU Leap



chance that the right people will stumble across your site if they don't already know somehow that it exists. If you are going to the trouble of putting sound on your site (or of having a site at all), you'll probably want to devote some thought to a strategy for getting people to stop by.

If you put up the site largely for your own amusement, then word of mouth may well suffice. If the site serves as a sort of online resume, then you will probably be referring people to the site personally. Don't forget to include your URL on your business cards and hard-copy resumes.

If the site is a showcase for talents or services that you are offering for sale and you want it to be found easily by potential clients, you can register with the major search services and post no-

tices in online forums that relate to your area of activity. You can also make arrangements for exchanging links with other sites that offer complementary services or products. In addition, be sure to include several important "keywords" in your Web site's text areas so browser search engines can latch onto your site.

Finally, if you are running a full-scale commercial operation—that is, selling a product online—you will very likely need to lead customers to the site with advertising. Your options include both traditional media (such as magazines) and online ads.

Who will your end users be, and what platforms and browsers do they use?

The world would be an easier place if every sound format were equally well



As soon as licensing arrangements are complete, Trycho Tunes (www.trycho.com) plans to add audio files (based on its MIDI files) that will play in the background as you explore its Web site.

supported by every browser on every platform. For now, however, that's not the case. Unlike text and images, sound playback capabilities are typically not built into a browser. Instead, they are provided by plug-ins that work alongside the browser. These plug-ins are created by companies that market

INTRODUCING THE 48

TASCAM
DA-302
POWER

PHONES OUT
1 2 MIX

PHONES

DAT 1

AUTO ID

PHO

4.00s 1

ABS

4.00s 3

MARG

44.1k -dB 50 35 20 12 6 4 2 0 OVER

MASTER
-dB 50 35 20 12 6 4 2 0

COUNTER MODE

RESET/ MEMO (ABS)

MARGIN RESET

SELECT 1/2

COUNTER MODE

INPUT

ANALOG

EJECT

COMMON MODE

L INPUT R

ANALOG

UNCAL

32k

44.1k

48k

REC MUTE

UP

DOWN

MENU +

EXECUTE

ID MODE

AUTO ID

SKIP

STANDBY

PAUSE

RECORD

SHIFT

CLIPPING

DUB MODE

REW

F FWD

STOP

PLAY

PAUSE

RECORD

sound-playback solutions based on their own proprietary formats. Because these companies do not have unlimited time and money, they focus their efforts first on supporting the browsers that they feel offer the best chance for spreading their own technology.

The two main browsers—Netscape Navigator and Microsoft Internet Explorer—are available in versions for the Macintosh and PC. Due to continual upgrades, however, each of these browsers is in a constant state of flux. To keep current on which plug-ins are supported by which browsers on which platforms, you need to visit the Web sites of the plug-in vendors and peruse their technical support pages.

If you are serving a small group of specialized users who really need access to the sounds on your site, you may be able to use an obscure format and let the end user worry about getting a setup in which the required plug-in is supported. But the broader your audience is likely to be (suppose you work for a record label that wants to post excerpts from new releases, for example) the more consideration you

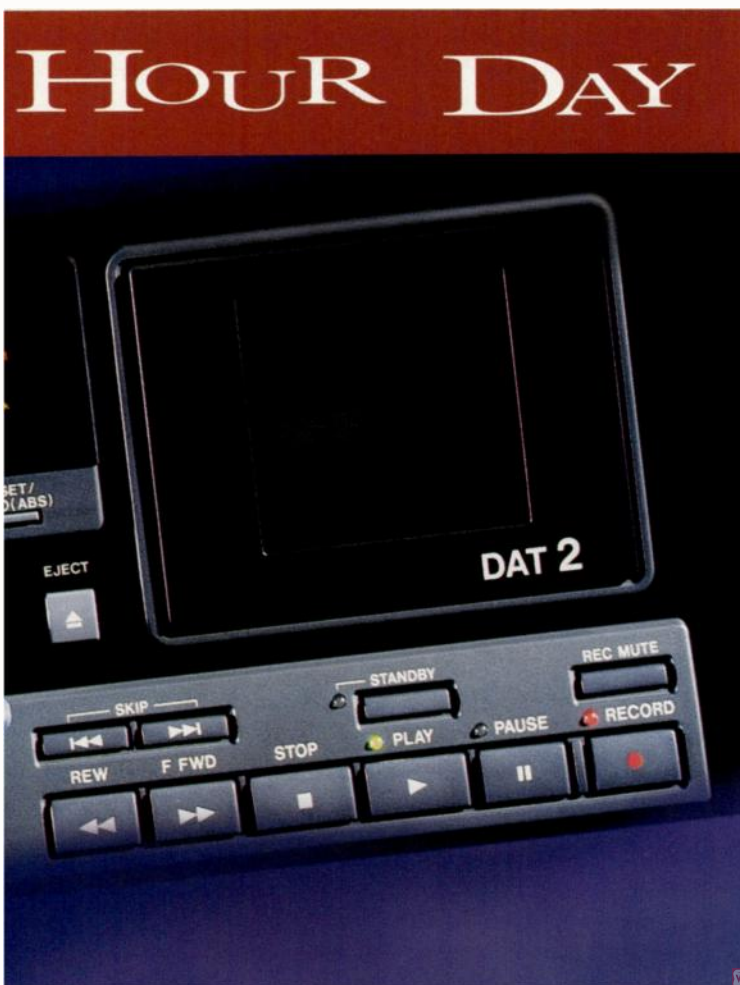
must give to which format has the largest installed base of users. Conventional wisdom has it that the current leader is RealAudio from RealNetworks, Inc. As the first commercially available product for streaming audio over the Internet, RealAudio got its foot in the door early in the game. It currently boasts many millions of users worldwide.

The RealAudio format incorporates a compression scheme based on DolbyNet from Dolby Labs and offers several different playback qualities to accommodate different modem speeds. The RealAudio system uses a traditional server/client arrangement for distributing audio. The players are free, but Web site owners must license the server software. The fee is based on the number of streams that you wish to make available at once.



The Internet Underground Music Archive (www.iuma.com) uses several different formats, including Liquid Audio and RealAudio, to provide excerpts from new albums.

RealAudio currently faces serious competition, especially from Macromedia's Shockwave and Headspace's Beatnik (more on these shortly). These plug-ins also have widespread support (with millions of users), and they offer features that differ from those in RealAudio.



DOUBLE YOUR OUTPUT FOR LESS THAN THE COST OF TWO SINGLE DAT RECORDERS

If you've been asking for more hours in the day, TASCAM's DA-302 Dual DAT Recorder makes your time count double. Finally, you can dub at twice normal speed with ABS time, subcode and PCM data intact. Make two masters at a time, even dub from any location on the source tape — no more rewinding! And the DA-302 costs hundreds of dollars less than you'll pay for two single units — only \$1999 (MSRP). See your TASCAM dealer or call TASCAM FaxBack at 800•827•2268 and request document #2330. The DA-302 Dual DAT Recorder. Put it to work in your studio 48 hours a day, 7 days a week.

TASCAM®

©1998 TEAC America, Inc., 7733 Telegraph Road, Montebello, CA 90640 (213) 726-0303
TEAC Canada Ltd., 5939 Wallace Street, Mississauga, Ontario L4Z 1Z8 Canada (905) 890-8008
TEAC Mexico, S.A. de C.V., Privada Corina #118, Colonia del Carmen, Coyoacan, Mexico D.F. 04100 (525) 658-1943

circle #522 on reader service card

An ADAT tape
that won't let
go of its oxide.

Isn't love a
wonderful thing.



Inferior tapes shed their oxide
recording layers after continued
contact with the head.
Introducing the HHB ADAT45,
advanced recording media for
ADAT digital multitracks.
It won't shed, even after 100
passes.

HHB Advanced Media Products.
Ask for them by name.

Phone: 310 319 1111
Canada: 416 867 9000



HHB Communications USA
626 Santa Monica Boulevard, Suite 110
Santa Monica, CA 90401, USA
Fax: 310 319 1311 E-mail: sales@hhbusa.com

HHB Communications Canada Ltd
260 King Street East
Toronto M5A 4L5, Canada
Fax: 416 867 1080 E-mail: hhbcna@istar.ca

HHB on-line: <http://www.hhb.co.uk>

Look BEFORE YOU Leap

The other major competitor, Liquid Audio, is rapidly gaining in popularity among those involved in music sales. It uses an enhanced version of Dolby Digital compression to deliver its music files. The basic concept behind Liquid Audio is that you can use the free player software to preview singles, albums, or other collections of sounds and music in real time from an artist's or publisher's Web site. If you like what you hear, you can order a compact disc or download a high-quality version of the music directly to your computer. If you have a CD recorder, you can download the Dolby-encoded CD-quality music to create your own CD collection at home.

As part of its orientation toward sales and distribution, the *Liquid MusicPlayer* can display album cover art, background information, copyright notices, artist bios, and lyrics. The Liquid Audio system can even attach a "watermark" to a music file to discourage bootlegging by allowing copies to be traced back to the original purchaser.

What level of interactivity do you envision for your Web site?

Strictly speaking, the ability of a Web page to play sound in response to a user action (a mouse click, for example) makes that page interactive. But if you have something a bit more sophisticated in mind, you need to consider how well your sound format supports interactivity. For example, you may want to include not only visual feedback, such as some small animation that pops up when the cursor passes over a hot spot, but also variable sound cues. In other words, you may want the computer's response to a given user action to depend on the conditions at the time the action is taken. It isn't easy to get that kind of flexibility from a tool designed solely for sound playback.



Fortunately, several of the sound formats available for the Web offer at least some support for interactivity, including the RealPlayer plug-in, which streams RealAudio files (as well as RealVideo and RealFlash), and the Beatnik plug-in, which plays a variety of sound formats, including MOD, WAV, AIFF, SDII, and Standard MIDI File. The *Beatnik Editor* integrates MIDI with digital audio and compresses everything into compact, Web-ready files for easy downloading in Headspace's own Rich Music Format (RMF). The *Beatnik Editor* also allows you to "watermark" your files with embedded copyright information.

RealAudio and Beatnik derive their interactive capabilities from tapping into the JavaScript language that is built into both *Navigator* and *Internet Explorer*. (Microsoft's implementation of Java is, unfortunately, a bit at variance with the official Sun/Netscape version.) Each plug-in uses its own special library of JavaScript "methods" for the tasks it supports. The details of these methods are beyond the scope of this article, but in general, Beatnik's musicObject library supports a deeper level of control and user feedback than that offered by *RealPlayer*.

An alternate approach is taken by Macromedia's Shockwave. This plug-in plays "movies" that are created in the company's multimedia authoring program *Director*; the movies play audio files in the Shockwave Audio (SWA) format. *Director* offers a great deal of control over the graphical look and feel of these movies, has excellent support for animation, and has its own highly developed internal scripting language (Lingo) for creating interactivity. These



Dominik Fusina's Nemo Web site in France (www.nemo.fr) uses Beatnik and Shockwave to play different kinds of audio.

Introducing two new serious synths...

MSRP: \$2099
Introductory Price \$1549
Save \$550



MSRP: \$1099
Introductory Price \$749
Save \$350

...with serious savings for a limited time!

A glance at the spec list of the new N1 and N5 pro synthesizers should tell you we're serious about performance.

And because they're from Korg you know they sound *awesome*.

Over 1700 onboard sounds, 18MB of ROM in the N1 and 12MB in the N5, 64-voice polyphony, dedicated front panel realtime controls, MIDI syncable arpeggiators, 32

part multi-timbrality, 2 dynamic stereo effects processors, built-in computer interfaces, and on and on...

And for a limited time, the introductory prices are more than a



Every N1 and N5 synth is bundled with Mark of the Unicorn's Unisyn N1/N5 and Freestyle LE software—a \$490 value!

deal—they're a steal! So get to

your Korg dealer and play the N1 and N5. You don't want to miss out on this...seriously.

KORG®

You should play it.

Don't delay!

Price offer expires May 31, 1998!

circle #524 on reader service card

© 1997 Korg USA, 316 South Service Road, Melville, NY 11747. For the Korg dealer nearest you: (800) 335-0800 • www.korg.com. Technical support: (516) 333-USER

WRN



attributes make Shockwave an attractive choice for audio playback where a highly customized user interface is desired.

Because of its versatility, Shockwave is fast becoming an important format for streaming audio. But Shockwave has another advantage: unlike most of the competition, it can stream audio directly from a Web page without needing a separate server. And that can save you money. Furthermore, you don't need *Director* to get started using Shockwave. In "Shockwave on a Shoestring" (July 1997 issue), **EM** explains how Shockwave works and offers some simple recipes for customizing existing Shockwave files.

What is your budget for "sonifying" your site, and who is going to do the work?

Adding sound to a site involves a series of steps. Some of these (for example,

pre-EQing audio files to optimize them for Web playback) shouldn't be much of a stretch for the typical computer-savvy engineer or musician. But other tasks, such as writing the HTML to embed sound objects within Web pages, may call for an entirely new set of skills.

Acquiring new skills takes time; paying others for their expertise takes money. So depending on your supply of each of these commodities, you may have to balance the audio capabilities that you want against the time and expense required to provide them. Looked at in this way, a simple plug-in that you can easily learn to use may be of greater value than a more powerful one that requires more time and/or money than you care to spend. (If you're new to the world of Internet audio and you want to learn more about compression, streaming technology, and file formats, check out "Surfing the Pipeline" in the September 1997 issue of **EM**.)

And finally, speaking of money, it's important to note that while audio plug-ins are generally available for download

free to the end user, you may need to set aside some cash for the tools that are used to prepare your sound and deliver it over the Web. The extent of your outlay depends in part on what tools you already have. Macromedia *SoundEdit 16 v. 2* on the Mac, for example, can be used to prepare SWA files. In the case of RealAudio, sites with very high traffic will get the best performance if they license the separate *RealServer* software to stream the audio. Low-traffic sites may work adequately using the same HTTP server that controls the nonaudio aspects of the site. With Liquid Audio, meanwhile, you don't have an option: you must buy the company's *LiquidServer* software if you want to take advantage of the format's specialized music-commerce features. All the more reason to figure out exactly what it is that you are trying to accomplish before you take the leap of adding sound to your site.

Philip De Lancie is a freelance writer, multimedia designer, and audio engineer in Berkeley, California. He can be reached at pdcl@compuserve.com.



The 20 bit Dry Cleaner for Computer Audio



The computer that energizes your project studio is a terrible place for analog audio signals. It doesn't matter which high powered sound card you choose, it's still locked inside a noisy, RF-plagued box.

By using the ADA1000 external rack mount A/D & D/A converter, you instantly gain at least an extra 10dB of fidelity. 20 bit conversion in both directions produces clean, crisp audio for all your recording, mastering, and archival projects.

The Lucid ADA1000. Improve your sound without taking your budget to the cleaners.

Connect an ADA1000 to any of these great digital sound cards:

PCI24 and NB24 from Lucid
Audiomedia II and III from Digidesign
I/O Card-D from Digital Audio Labs
MultiWav Digital PRO from AdB
WaveCenter by Frontier Design Group
ZA2 from Zefiro Acoustics
... or any other card with AES/EBU or S/P DIF connectors.

lucid

www.lucidtechnology.com

tel 425.742.1518 • fax 425.742.0564

The Roland Ready Strat.[®]

Finally.

When two legends get together, only one thing can happen. A new one is born. Announcing the arrival of the Roland Ready Strat. With its built-in Roland GK-2A pickup system, you can drive GK-2A compatible products and access their unrivaled collection of sounds right from the guitar's on-board controls. Play it as a straight Stratocaster[®] or combine and conquer. The Roland Ready Strat. Stop messing around.

Sold at authorized Fender Musical Instrument dealers only.

www.rolandus.com

www.fender.com

© 1998 Roland Corporation. All rights reserved.

Fender and Stratocaster[®] are registered trademarks of Fender Musical Instruments Corp.

circle #526 on reader service card

 **Roland**[®]



in your face



BY JEFF CASEY

Whether you enjoy mixing or are terrified by the very idea, there's no doubt that the mixdown is one of the most critical parts of the production process. It's the final phase before mastering and is the dominant factor in determining the ultimate sound of the project.

If you're producing anything mainstream, from rock to Top 40, the mix needs to be aggressive. It needs to have an attitude. It needs to be in your face. Whether you're recording a project of your own with the intent of sending it to record labels or you're producing an outside project for commercial distribution, the bottom line is the same: you're trying to sell the product to someone, and that product needs to get their attention.

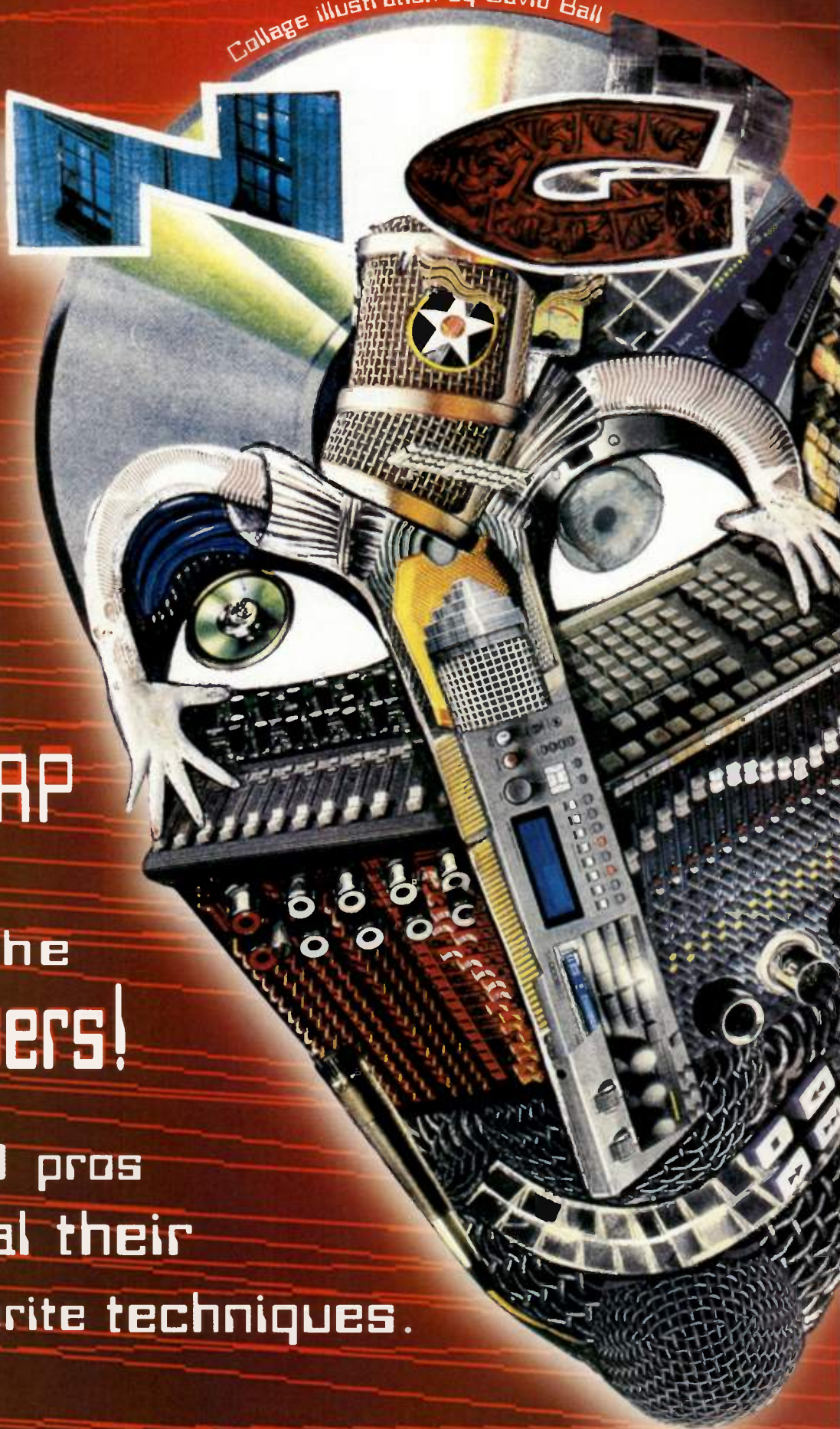
How many CDs pass across a record executive's desk every day on their way to the trash can? How many labels put out releases that come and go without notice? This is largely because the CD fails to draw in the listener. And that often is due, in part, to a lackluster mix.

To better understand the mechanics of a commercial mix, we spoke with one of the industry's most successful mix engineers, Ron St. Germain (Soundgarden, Living Colour, Jimi Hendrix), as well as John Seymour, a respected tracking and mix engineer (T. M. Stevens, Ric Ocasek, Dennis Leary). Although their opinions may differ on certain techniques, they agree on what constitutes a successful mix. So what is it that these pros do that makes even an average song sound great? Hopefully this article will give you some insight.

Collage illustration by David Ball

Create
mixes
that LEAP
right
out of the
speakers!

Two top pros
reveal their
favorite techniques.



In Your Face MIXING

THE DYNAMICS OF IT ALL

Both engineers agree that dynamic integrity is probably the biggest factor in producing a successful, in-your-face mix. Before you can even think about mixing a song, you need to fully understand the concept of dynamics and dynamic range. The dynamic range is the sonic distance between the softest notes and the loudest notes in a passage. For example, if your lead vocal track has a minimum level of -40 dB and a maximum level of -10 dB, then the dynamic range of that track is 30 dB. The final mix also has a dynamic range, which comprises the dynamic ranges of the individual tracks.

Your nemesis when it comes to dynamic range is misuse of a compressor, a very useful but risky tool that has the potential to effectively squash the dynamic range. Most people assume that heavy compression is a trademark of mainstream music and that most songs that make it to pop or rock radio airplay or CD distribution contain obscene amounts of it. Although this is true of many of today's releases, it is considered by some to be a questionable practice that removes vitality from a mix.

Seymour and St. Germain agree that openness and proper dynamics are critical to an in-your-face mix. St. Germain notes, "You should be able to shut off all of the compressors and still have a decent balance between the instruments. The compressors are there to be icing on the cake. Without them, things aren't smooth. But when they're overused, the song loses dynamics; the meters never move."

Seymour agrees that compressors are handy tools, but they need to be used with caution. "Compression can give you that added little boost to make your mix stand out, or it can smooth the dynamics in a track to bring up a performance," he says. "But it can also ruin sonic balances. If you're heavily compressing everything, the compressors will have control over the levels at mixdown, not you. This is never a good situation."

Many people assume that the best way to get their mix to stand out is to

use a lot of compression. This is simply not true. Professional engineers even fall into this trap when they mix songs for radio airplay. "I think that 'mixing for radio' is a poor excuse for the misuse of compression," explains St. Germain. "Overall, I use minor amounts of compression, and my mixes still jump off the radio. If you have dynamic integrity in your mix to begin with, it will work in any format—TV, radio, or CD—no matter how much compression they add. It's all about getting good sounds and a proper blend of the instruments."

REFERENCING

If you mix a project that someone else will listen to in any environment other than your control room, you need to reference the mix through a variety of different speakers. "I always monitor on at least two or three different speakers," relates Seymour. "I mainly use ProAc's Studio 100 monitors, which are consumer speakers, and then I check levels on either an Aurotone or some other small pair. If the tracks are all cutting through on a lower-quality speaker and you can hear everything clearly, there's really no medium that they're not going to come across on."

A key to getting a good blend of the tracks is maintaining a consistent listening level while you work. The average monitoring level is somewhere between 80 and 90 dB SPL, which is quite loud—maybe too loud. In contrast, St. Germain, who also works with the ProAc Studio 100s, sensibly does almost all of his mixing at low levels. "The ProAc's maintain a very flat fre-

quency response, even if you're monitoring at low levels," he says. "Give your ears a break if you can; you won't get listening fatigue, and you'll be more productive."

Mono compatibility is another big part of doing a successful mix. Keep in mind that a lot of music is not listened to in stereo: FM radio is not true stereo, car speakers don't give you a great stereo image, and boom boxes produce a mono signal as soon as you step away from them! It's a good idea to flip the mono switch on your console frequently to ensure that your mix is compatible. St. Germain sums it up (so to speak): "If your mix sounds just as good in mono as it does in stereo, you know you're going in the right direction."

Although soloing tracks is great for fixing problems, it is generally bad practice to create your individual tracks in solo mode. For the most part, you want to listen to a track in context with the other instruments in the mix. You may slave over a bass sound by itself for hours only to find it doesn't sit right with the kick drum. Then you're back to square one (if you even go back and fix it at all). "I only solo a track if I hear a problem," says St. Germain. "I put all the mics up in a section and then see what needs help where. I don't just assume that everything needs tweaking."

BUILDING THE MIX

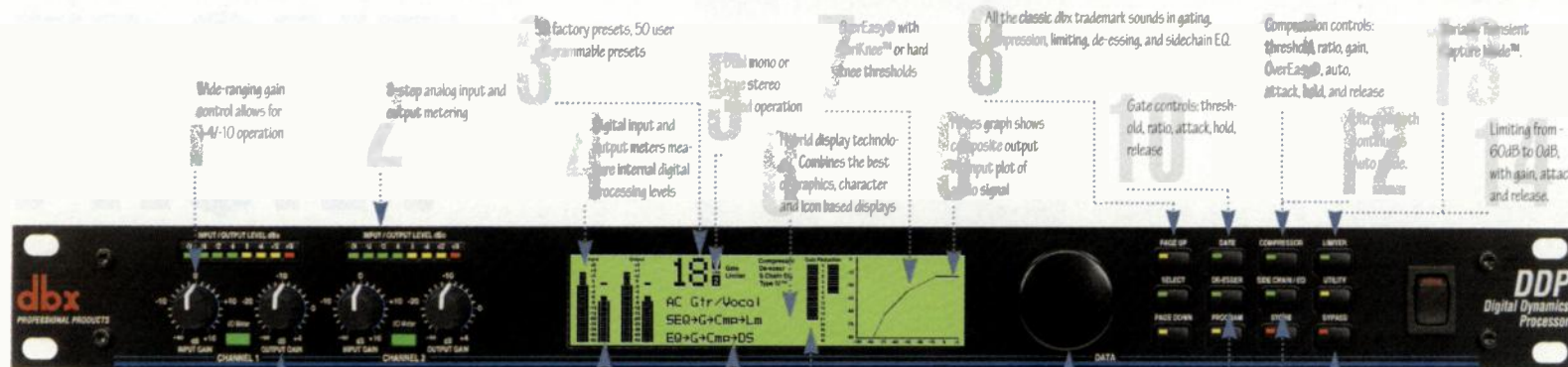
Different people approach the mix in different ways. Often, how a mix develops depends on the particular song, and your methods are sometimes dependent on how much involvement you've had

John Seymour (left) and Brian Macaluso at Electric Lady Studios in New York City. Seymour has recently engineered projects for the Dave Matthews Band and Vibrolush.



The compressor that forgives, but never forgets...

dbx digital



IT FORGIVES

- New dbx technology, the TYPE IV™ Conversion System with TSE (Tape Saturation Emulation) gives you the pleasant overload characteristics of analog tape without the harsh distortion of most digital input systems. No more dancing around with the input levels to protect the integrity of your audio.

- Ultra-wide dynamic range 24 bit A to D converters with TYPE IV™ make your signal sound better than you ever thought possible. Capturing the full dynamic range of your analog signal and coupling it with the powerful dynamic range of this patent-pending dbx process, TYPE IV™ will make your digital signal sound like it came from the quietest high-quality analog source you could imagine.

- With the extensive metering of the DDP, you can see EXACTLY what is going on with ALL parts of your signal: input, internal processing, and output, with peak and VU, as well as gain reduction for both sides of the stereo image.

- And speaking of stereo, you can work in stereo with dbx's True RMS Power Summing™ for phase-coherent tracking, or in dual mono mode, without the two channels interacting at all, making the DDP a great processing value.

IT NEVER FORGETS

- The DDP works right out of the box. It comes with 50 factory setups that are guaranteed to knock your socks off. There are presets for every application you can think of, and then some. dbx engineers are musicians and recording engineers. We know what a compressor is supposed to sound like, and we know it better than anyone else. We invented compression. We eat, sleep and breath compression.

- Want to duplicate that perfect compressor set-up? Each processor in the chain has all the parameters you would expect. After you set the parameters the way you want them, save it as a processor preset, available to be recalled any time. These building blocks allow you to save entire setups just for the way you like to work. It doesn't matter that you are doing a live gig one night, then mixing the tracks in the studio the next night, the DDP will be there, just the way you left it.

- When you save a preset, you also save the information that makes it work behind the scenes, too. Digital output (optional), sample rate performance, MIDI setup, as well as any of the other utilities, like sidechain setup and monitor, EQ settings, and SysEx functions.

- When you make changes to any parameter, you can see where your adjustments are affecting the signal, simply by looking at the Hi-Res graphical display, which shows the processing curve in real time as you make your adjustments.

Check out the DDP at your local pro audio outfitter, and experience DIGITAL performance you'll never forget.



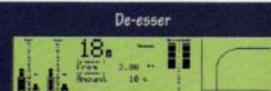
Starts with the gate. Set parameters for threshold, ratio, attack, hold, release, and output gain. See the effect of your settings on the graphical display, as well as on the gain reduction and audio level meters, they all interact in real time with your manipulation of the parameters. Start with a threshold setting of about -60dB to clean off the noise in between the vocal takes. You can save your final gate settings as a "gate preset" building block and recall it into any other setup you do.



Then move to the compressor. The effects of the gate settings are still visible on the graphic display, so let that help you determine where to set your compressor threshold. The parameters you change here will also affect the curve on the graphical display in real time. Move through all the regular parameters, like threshold, ratio, attack, release, and output gain. For vocals use a threshold of about -25dB, a ratio of about 3:1 or 4:1, and a slow attack and fast release for the most natural sounding effect. Your compressor settings can also be saved off as a building block to be called up into any other preset.



Go to the limiter. Changes you make to the limiter settings are also seen on the graphical display. Adjust the level up or down to suit your needs. The flat top of the display moves up and down as you adjust the level. You can also set the speed at which the limiter lets go of the signal as it goes below the threshold. This is truly smooth limiting, with patented dbx MaxPlus™ algorithms, so rest assured that where ever you set your threshold level, your tape will not distort, and your signal will not get butchered as it goes across the threshold. And like the other parts of the processor, your limiter settings can be named and saved for later recall.



De-essing works the same way: see the effects of your settings displayed on the graph. Parameters here are the common ones: threshold in frequency, 800Hz to 8kHz, and amount in percent. Other available processing includes EQ - both in-path and sidechain, for special-effect types of processing. When you are editing any of the building blocks, its icon is visible on the display, and the parameters are shown on the graph, so it's always easy to know where you are. Parameters are easy to see in this page driven operating system. When it's as complex as this, it's nice to know somebody was thinking when it was put together.



You can also work in stereo, or set up a completely different and independent processing chain for the other channel. Also, notice that the audio meters are capable of showing both peak and average levels for input and output. Optional digital output with the TYPE IV™ Conversion System with TSE™ (Tape Saturation Emulation) provides up to 24-bit output in either AES/EBU or S/PDIF formats with the trademark digital processing of TYPE IV™. The DDP also has full MIDI/Automation capability, with separate MIDI in and thru jacks. Entire processing setups may also be saved into one of 50 user defined presets, or use one of the 50 factory setups.



In Your Face MIXING

with the project. For example, if you were the recording engineer, you might have already formulated ideas about the mix during the tracking process. Obviously, this is an advantageous situation because you're not walking into the mix cold. If that isn't the case, however, your best bet is to do some critical listening.

"I typically put all of the tracks up on the board without any processing and see what I have to work with," St. Germain says. "I then decide whether the song needs to be mixed around the vocal or around the rhythm section."

The "where to start the mix" debate has been raging for many years. Everybody has a different opinion. Many engineers agree, though, that vocal-driven pieces should address the vocal track first, and everything else should start with the drums. St. Germain starts working on every ballad with the vocal track, especially if the artist is female. "Many female singers have really thin voices. I want to address that right away, not after I realize she's buried in the mix."

Seymour and St. Germain both start a rhythm mix with the kick drum and then move on to the rest of the drum kit, bass, and guitars. Seymour describes it as "building the mix like a house." Addressing the instruments before the vocal can allow you to really tweak the rhythm section. The instruments don't clash with the vocals as easily as they do with each other, so it's acceptable to have the vocals sit out until the instrument mix is set. Seymour explains, "On a rock song, I'll usually get the full instrumental mix going before I even *listen* to the vocal track. The rhythm tracks usually require some reworking once I bring the vocal in, but I find that it's easier to do it this way, and you get better instrument sounds."

St. Germain conveys some good advice: "Don't be afraid to go back and change things. Inevitably, the first track you tweak won't sit right with the other instruments, no matter how good it sounded by itself."

Another important element in doing a good mix is the ability to relate to all of the instruments. If you play a particular instrument, it's important that you

don't favor that instrument's track. Many engineers fall into this trap. You need to be able to relate to all of the players and appreciate what each track has to offer. That's why it's always a good idea to have the producer or a band member present for input.

THE MIX ELEMENTS

St. Germain's mixing theory comes down to two simple principles: deductive tweaking and a *slight* amount of compression. "A good mix is mainly subtractive; you should try to clean it up rather than add things to mask problems." He is also a firm believer in tube technology. "It can really warm things up," he claims. "If you're going to invest in something, make it a really nice tube compressor or EQ."

Other than that, a good mix basically finds the optimal balance between the rhythm instruments and the vocal. Lead instrument tracks are critical, but since they don't carry throughout the song, we won't focus on them here.

acts as the song's metronome. As with a tambourine, it's very noticeable when the snare is either too soft or too loud. Don't just assume that a quick level adjustment is the solution. Many times EQ can bring out the snare, by either adding some mid frequencies or subtracting some low end. Try that before boosting the level.

Many people also like to use a bit of compression on the snare drum. In fact, overcompression can sometimes be used to create a particular effect. By playing with the attack and release times on your compressor (adjusting them relative to the song's tempo), you can get a snare hit that sustains the resolution of the note and creates a more full-bodied sound.

St. Germain takes an interesting approach to his drum mix, premixing his drum kit and bouncing the drums down to just four tracks: kick, snare, and a left-right pair. "I think a good drum sound is essential to an in-your-face mix," he notes. "By premixing the

Dynamic integrity
is the **biggest**
factor in producing a
successful mix.

Let's break the mix down into four sections that represent the most important elements of an in-your-face mix and discuss some techniques that the pros use to make these tracks sound as good as they can.

Drums. The most critical relationship in the rhythm section is between the kick drum and the bass guitar. They are what drive the song. Although what you want your kick drum to sound like largely depends on the genre of music you're mixing, you must make sure that its punchiness does not interfere with any of the frequencies generated by the bass. Therefore, you should always tweak it while listening to the bass track as well.

You may not be able to put your finger on it, but sometimes something won't sound right with the mix. Many times the snare is the culprit. The snare

toms and overheads, you have the opportunity to really blend the kit well. But you haven't committed yourself to just a left-right pair of drum tracks; you still have the kick and the snare tracks to play with, and they are what usually require some tweaking once the rest of the mix comes in."

Here's another good thing to keep in mind: people *love* percussion. Almost any song can be improved and any mix fattened up by adding percussion. Tambourines and shakers are always good additives. If you have done everything you can to a mix and it still sounds empty, try throwing in these two instruments as a quick fix. If you pan them left and right (nine o'clock and three o'clock), your mix often can be improved dramatically.

Bass. Compression and EQ fatten up a bass track. Typically, the signal is routed

FEATURES • FUNCTION • FEEL

The new DPM® C8X is way beyond any other MIDI controller in its class. In addition to great keyboard action and user-friendly graphical interface, the C8X has the power to provide excellent control over all MIDI devices! From smart chord generation to massive arpeggiation to innovative guitar emulation, the C8X offers features that enable you to play more musically, and definitely have more fun!

SPECS

Smart chord • 2 MIDI INs
4 MIDI OUTs • 3 Wheels •
Aftertouch curve • CV
Inputs • Guitar mode •
Arpeggiator • 4 Footswitch
Inputs • 4 Faders • MIDI
Input monitoring • Velocity
Crossfades • 88-Key piano
Action • Sequencer control
• Strummed single finger
chords • 4 Buttons • 8
Zones per preset • 240 x 64
Graphical LCD • 128
Programmable presets

Do you want to
know more? *



DPM® C8X
FEEL THE DIFFERENCE

<http://www.peavey.com/c8x/>

Key Issues from Peavey is a publication filled with the latest information for Keyboardists and MIDI users. For a free subscription or brochure on the DPM C8X, write to:
Peavey Electronics Corporation, 7118 Street, Meridian, MS 38301. Phone: (601) 486-5265. Fax: (601) 486-1278 or send e-mail to: peavey@peavey.com

In Your Face MIXING

to an EQ and then through a dynamics processor. You may want to patch in a second EQ after the compressor/limiter. This will allow you to make minor adjustments to the sound *after* it has been dynamically processed. Sometimes compression will sustain certain frequencies that may clash with other instruments. The second EQ lets you find those frequencies and cut them from the mix.

Bass tracks usually need some compression. Each string on the bass guitar produces different dynamics, and the dynamic range of the track can be pretty large. Some light compression should compensate for the diversity and allow you to bring up the level so that the track provides the desired sonic backbone.

Seymour and St. Germain both use the dbx Sub-Harmonic Synthesizer. "It



The BBE 462 Sonic Maximizer is a 2-channel spectral enhancer that uses phase manipulation and filters to give your mix (or tracks) some extra sparkle.

adds a note exactly one octave below whatever the incoming signal is," Seymour explains. "A lot of times the bass will be tracked with only a DI box, and the dbx will produce a more full, 'woofy' sound, which will fatten up your bottom end. It's also good for the kick drum."

Guitars. Guitars should sound natural and unobtrusive. Except for the lead solo, the guitar tracks should be mixed in well with the other instru-

ments. A slight amount of compression is generally added to help accomplish this. Depending on how many rhythm guitar tracks you have, you may want to group them to a stereo pair and add the compression at the bus insert.

If you have ambient tracks to work with in addition to close-miked ones, go with the ambient. As St. Germain says, "No one listens to a guitar cabinet with their ear right in the cone!"



Visit any of our 37 locations nationwide to demo the latest in music software. Or, for your convenience, order by phone. Either way you'll get professional service and the lowest prices anywhere...guaranteed.

Visit Us On The Internet!

<http://www.musician.com>



DIGITAL MUSICIAN

1-800-638-4280

<p>CUBASE VST 3.5 Steinberg NOW ONLY \$289⁹⁹</p>	<p>SONIC FOUNDRY CD ARCHITECT NOW ONLY \$299⁹⁹</p>
<p>EVENT ELECTRONICS GINA NOW ONLY \$429⁹⁹</p>	<p>AUDIOWERK8 HOME STUDIO emagic NOW ONLY \$599⁹⁹</p>

MUSIC SOFTWARE • MIDI PERIPHERALS • MULTIMEDIA COMPONENTS • CD ROMS • HARD DISK RECORDING & MUCH MORE ... AT THE LOWEST PRICES GUARANTEED!

UP TO 65% OFF!

CALL NOW FOR YOUR

FREE CATALOG AND GET A FREE

Steinberg CD-ROM!

Keith Emerson and the new **GENERALMUSIC PRO2** ...it was inevitable.

The new **GENERALMUSIC PRO2** is the only digital piano to offer:

- **Physical Modeling Technology.**
- **Sympathetic String Resonance.**
- **True 128 Note Polyphony.**
- **8 Band Digital EQ.**

“The PRO2 has by far the best Grand Piano sound and feel I have ever experienced in any digital keyboard - and I have tried them all. It is an essential part of my kit and I use it in every performance.”

Keith Emerson
(Emerson, Lake & Palmer)



GENERALMUSIC

PRO2

GENERALMUSIC is the choice of top professionals around the world.



The Realpiano PRO series starts at a suggested \$1,865 retail price (PRO1) and is also available in a module version, the PRO Expander (pictured above).



GENERALMUSIC CORP
1164 Tower Lane
Bensenville, Illinois 60106
Phone 630/766-8230
Fax 630/766-8281
Internet: <http://www.generalmusic.com>
CompuServe: GO GMUSIC
E-mail: gmail@generalmusicus.com

In Your Face MIXING

Another common practice is to double the rhythm guitars. This sounds most natural when the guitarist simply plays the part twice on two separate tracks. However, many tracking engineers mic the cabinet from two distances, using a close mic and an ambient mic. This can create a natural delay that fattens up the sound.

It's also very important to consider the tonal characteristics of the guitars when you blend them with the other instruments. Make sure that your guitar tracks are not laden with unnecessary low frequencies that will clash with the bass. Sure, the tracks may sound fat when soloed, but when you mix them in, you'll have a muddy bottom end. Also, try not to make the guitars too bright; there's nothing more annoying than screeching guitars.

Vocals. Undoubtedly, the lead vocal is the most important track in almost any song. It needs to stand out because, like it or not, the singer usually sells the band. But as Seymour notes, "The vocal is also one of the most difficult things to get to work, because of the frequency content of the voice. It either works or it doesn't. It's something that even a lot of seasoned engineers have trouble mixing."

Although neither Seymour nor St. Germain are big fans of extreme compression, both agree that with a vocal, a lot of compression is sometimes necessary. "It's all about getting the vocal to sit separate from the other music

and have its own spot," relates Seymour. "A lot of times the only way to do that is to squeeze it with compression, to keep it loud constantly."

St. Germain says that the trickiest songs to sit vocals in are ballads. "These songs usually start with just a vocal and some simple accompaniment, and then you add the full band in mid-song. This is when the signer's dynamic range is typically the largest. I sometimes use upward of 16 dB at about a 4:1 compression ratio. But at the same time, I pull the fader back about 10 or 12 dB, just to keep the levels in line. You should isolate those sections and address them as separate entities. If you have more than one compressor available, try setting up individual ones for different parts of the song."

A common trick that many mix engineers use is to route the vocal track to a delay unit through an aux send, process it with a slight amount of delay (10 to 15 ms), and bring it back into a separate channel fader. The delay is not long enough to hear as a discrete sound, but it doubles the fatness of the vocal track.

Seymour finds working with female voices to be especially difficult. "The track needs to have a certain sibilance for their voice to blend well," Seymour explains. "I've recently been using the Joemeek Voice Channel for this purpose. It has an enhance feature that basically dials in that top-end hiss. I've also used the BBE 462 Sonic Maximizer for the same purpose."

THE STEREO SPREAD

Creating a believable stereo image is one of the hardest things to do. The sound stage needs to be wide, but the mix must sound good in mono. In ad-

dition, the spread can't be so wide that the image is unrealistic. The rule of thumb has traditionally been to position the instruments as you might hear them from an audience perspective. Seymour and St. Germain, however, take a different approach.

"I pan the drum kit from the drummer's perspective," says Seymour. "Subsequently, I set up the rest of the instruments as if I were sitting on the drummer's stool. I find it gives a nice perspective of the band and, really, a more powerful one."

St. Germain agrees. "I put the kick in the middle, the snare left of center, the hi-hat slightly left of the snare, and the cymbals and toms exactly where they appear on the kit. I really try to replicate the setup of the particular drummer that I'm working with, from his point of view."

"I put the bass down the middle and the guitars at ten and two o'clock," St. Germain continues. "Vocals go in the middle, with background vocals just left and right of center. Anything else—reverb returns, delays, etc.—goes on the outside edges. This way, you have all of your important information in mono, all the supporting cast just left and right of center, and the fun stuff on the outside—what I call the 'head-phone candy.'"

Many engineers will pan things hard left or right as a quick fix, especially with guitars and tom-toms. But remember, it's crucial to maintain an accurate representation of the instruments. Seymour says, "I rarely pan anything hard left or right; more of a three o'clock and nine o'clock positioning. Panning anything hard just sounds unnatural, and it can cause phase problems when the mix is played in mono or in a pseudostereo format like FM radio."

POLISHING THE MIX

Regardless of whether you have the project professionally mastered or do it yourself, your best bet is to leave the mix as flat as possible. The mixer's rule of thumb certainly applies here: You can always add, but you can't always subtract. However, you also want the mix to sound as good as it can when it leaves the studio. Typically, at least *some* premastering is applied to the stereo mix.

Don't assume that the mastering engineer will fix all of your mix's sonic



Joemeek's Voice Channel combines a mono mic preamp, a compressor, an instrument preamp, a direct box, and a spectral enhancer.

AFTER BECOMING A LEGEND IN THE STUDIO, WE'VE HIT THE ROAD.



Singers, guitar players, lecturers, clergy, in fact anybody who is standing in front of an audience, are discovering what top studio musicians, engineers, and producers have known for years: AKG, a leader in studio microphone and headphone technology for more than 60 years, now offers its amazing sound quality in affordable wireless systems. That's because AKG has gone on the road with its new wireless system, the WMS 60.

The WMS 60 is a VHF system that offers microcontrolled antenna

diversity for superior selectivity and reception. Available in handheld, portable bodypack and instrument configurations, its standard features include an LED battery strength indicator, an output volume control and adjustable squelch to eliminate interference. Best of all, the WMS 60 offers the most user friendly frequency selector for operating multiple interference free systems. So before you appear in front of an audience again, remember AKG studio quality wireless systems are priced light enough to carry on the road.



circle #531 on reader service card

SOUND YOUR BEST WITH AKG'S

NEW WMS 60 WIRELESS MICROPHONE SYSTEM

AKG Acoustics U.S., A Division of Harman Pro North America Inc., 1449 Donelson Pike,
Nashville, TN 37217, phone 615-360-0499, fax 615-360-0275,
AKG Acoustics GmbH, Vienna/Austria/Europe, <http://www.akg-acoustics.com>



A Harman International Company

In Your Face MIXING

problems. If you hear something you don't like, fix it! Seymour explains, "I would rather turn in a project that is exactly the way I want it, and if it can be taken to the next level in mastering, that's great. But you never want to leave your problems for the mastering engineer to fix. You always want to get it right at the studio."

How you apply compression to the stereo mix usually depends on the program material. If you're working on a rock song that really needs to hit hard, you might compress the mix by 2 or 3 dB at a 2:1 ratio, with medium attack and release times. For fast, rhythmic music, such as dance or techno, you might shorten the attack time and lower the threshold. Generally, a little compression on the stereo mix is a good idea to smooth out the song. Just don't go crazy and completely squash it!

Try to avoid any unnecessary equalizing of the stereo mix. You don't want to do something that can't be erased later. "I almost never put an EQ across the mix bus," declares Seymour. "The room you're in can sometimes fool you, and you may add, for example, an unnecessary boost at 10 kHz that won't sound natural in another environment. Leave the mastering process a little more room to breathe."

St. Germain stresses that if you have the option, you should mix down to 1/2-inch analog tape as opposed to DAT. Most people, however, don't have that luxury. As an alternative, try patching some tube equipment across the left-right bus to add some warmth. Even if you don't engage any processing, run the signal through the tube circuitry. If you're working with a digital multitrack and mixing to a digital 2-track, a simple A/B comparison should demonstrate the benefits.

Some great spectral-enhancement processors are available today. Like everything else, they should be used in moderation. Seymour frequently uses the BBE 462, which uses phase manip-

ulation and filter technology to add some zest to the mix. "It's a handy tool for a personal studio," he explains. "It can really turn a mix into a slicker product than you would normally be able to produce. You have to be careful not to overuse it, though. It can put things out of phase, and the high-frequency control can be somewhat harsh."

FADE OUT

Expensive equipment is not always the key to great-sounding mixes. The tricks that professionals use day in and day out are not dependent on SSL consoles or Sony multitracks (although these high-ticket items do make things easier). With a little guidance and some practice, anyone can learn to produce rich, full, in-your-face mixes.

So what are you waiting for? Get in your studio, throw on a tape, and start getting down!

EM Associate Editor Jeff Casey's band, the Hookahs, recently finished recording their latest CD, which employed many of the in-your-face mixing techniques discussed in this article.

Sam Ash
PROFESSIONAL AUDIO GROUP

Our staff of experts have been serving New York audio professionals for decades - now that same famous service and selection is available to you! Sam Ash Professional features the world's largest inventory of MIDI instruments - signal processors, digital recording systems, software, studio monitors, microphones, amplifiers and mixing consoles - all at the guaranteed lowest prices! One call and you will find out what New York has known for over 70 years - the name to remember for all of your audio needs is Sam Ash!

YOUR ONE-STOP PRO PARTS SOURCE!
OUR PRO PARTS DEPARTMENT OFFERS THE LARGEST SELECTION OF PRO AUDIO PARTS, CABLES, CONNECTORS, PATCHBAYS, CUSTOM WIRE AND MORE!

Most Informed Staff In The Industry!
Authorized Dealer For All Major Brands!
Extraordinary Technical Support!
All Major Credit Cards Accepted!
Courteous Personalized Service!
Super-Fast On-Time Shipping!

MasterCard VISA DISCOVER

ORDER BY PHONE!
MON. - SAT. 10:00 AM - 6:00 PM EST
(212) 586-1100
FRIENDLY SERVICE
DIRECT TO YOUR DOOR!

1600 BROADWAY • 8TH FLOOR • NEW YORK, NY 10019 • (212) 586-1100 • FAX: (212) 586-3375

Who's DMAN In Your Life?

DMAN™

DIGITAL AUDIO CARD

- Stereo analog inputs and outputs.
- Full-duplex digital audio card.
- 95dB total dynamic range.
- Frequency response: 20 Hz to 20 kHz.
- 16-bit ISA bus card.
- Standard wavetable header for adding any wavetable daughter board.
- 1 in/ 1 out MIDI interface.
- Fully Windows 95 & NT Plug-and-Play™ compliant.

\$249.95 msrp

DMAN™ 2044

PCI DIGITAL AUDIO CARD

- 4 independent audio inputs and outputs.
- 20-bit delta-sigma converters with 128x oversampling.
- All converters rated 99dB dynamic range.
- Frequency response: 20 Hz to 22 kHz at ± 0.5 dB.
- Powerful onboard digital mixer allows inputs to be monitored at any combination of outputs.
- Sample rates: 22, 24, 44.1, 48 kHz.
- Fully Windows 95 & Plug-and-Play™ compliant.

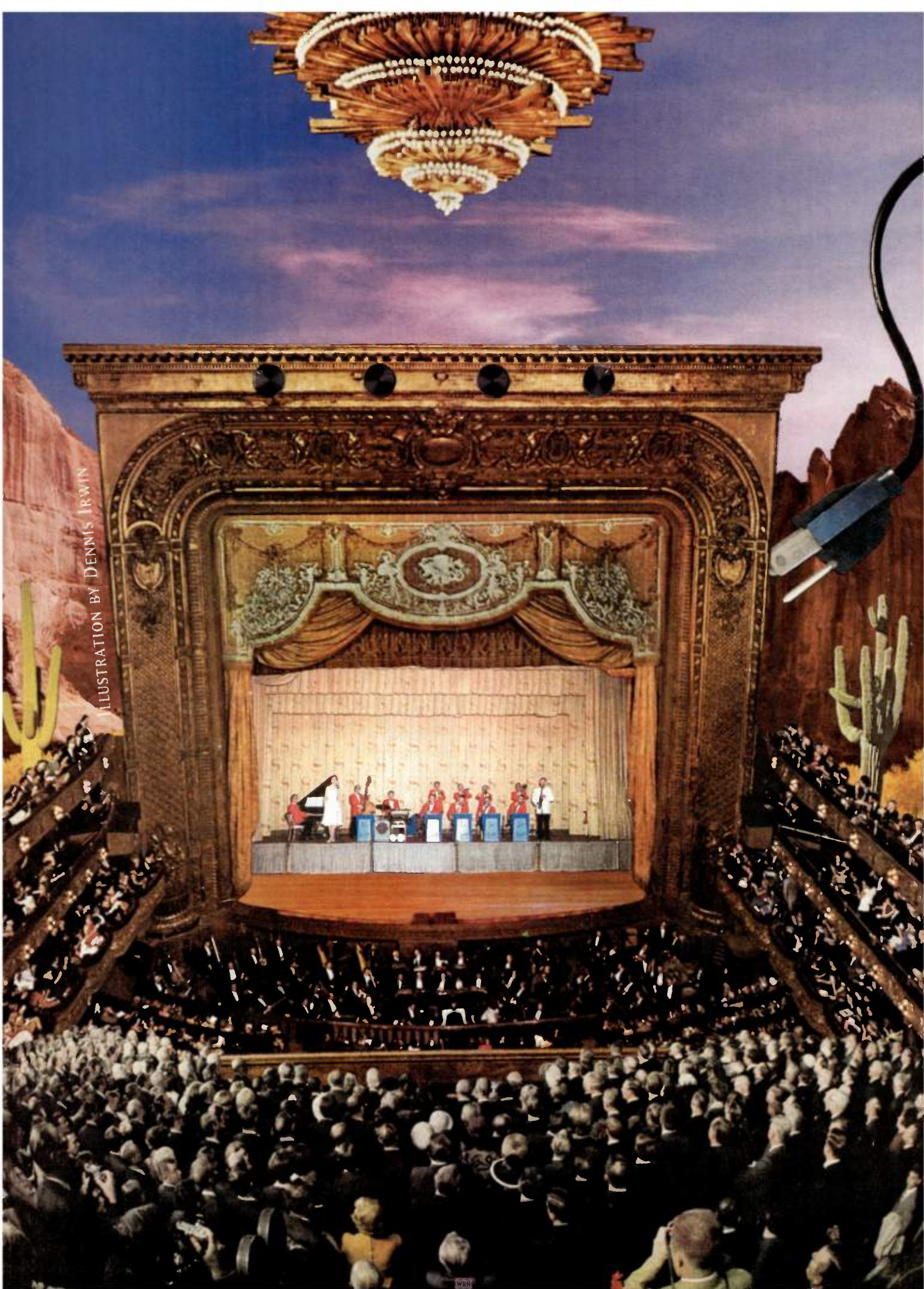
\$349.95 msrp

midiman

(800) 969-6434 • info@midiman.net • <http://www.midiman.net>

IMAGE COPYRIGHT ©1997 PHOTOdisc, INC.

ILLUSTRATION BY DENNIS IRWIN



Plug In, Turn On, Space Out

We bounce
four TDM reverb
plug-ins off
the walls to see which
one comes out on top.

➤ Since 1993, Digidesign has been expanding its Mac-based Pro Tools TDM system into one of the industry's most powerful digital audio workstations. With more than 60 plug-ins currently available from some of the biggest names in audio, the TDM system has established itself as one of the best-sup-

ported audio plug-in formats on any platform.

Whether you use Pro Tools software or a compatible MIDI sequencer, such as Steinberg's *Cubase VST*, MOTU's *Digital Performer*, Emagic's *Logic Audio*, or Opcode's *Studio Vision*, the one type of plug-in everybody needs is a good-sounding reverb. Fortunately, the TDM platform offers four of the best: Digidesign's *D-Verb*, Lexicon's new *LexiVerb*, TC Works' *TCReverb*, and Waves' *TrueVerb*. Of these plug-ins, all but

LexiVerb are also available for platforms other than TDM. If you don't want to invest in one of these reverbs before giving it a test drive, you can find demos on each company's Web site, or you can contact the companies to request a demo copy.

All these plug-ins work with mono or stereo files, and each one occupies an entire DSP chip of a TDM DSP Farm. They all offer total automation support for Pro Tools 4.0 (or later), which makes mixing quite easy and a lot of fun. For example, during the course of a song, you can alter the size of the reverb space or add more diffusion.

➤ By Mikail Graham

All support both 680X0 NuBus and PCI Macintosh computers, except for *LexiVerb*, which requires a PCI Mac, and they all offer more or less the same parameters. For example, they all have Pre Delay, Decay/Size Algorithm, Diffusion, Input Level, and Mix controls.



All in all, these plug-ins offer a lot of power and substantial savings compared with a dedicated reverb unit because they give you multiple reverb processors for one price. For example, let's say you want a tight-sounding plate reverb for your main vocals and a much larger-sounding, cathedral reverb for the background vocals. With dedicated hardware, you would need two boxes to do this. In the TDM world, however, you simply insert a reverb plug-in on one aux bus for the main vocal mix and then insert the same plug-in, with a different preset, on another aux bus to create the cathedral sound for the background vocals. And you have the added benefit of staying in the noise-free digital domain with real-time automation control.

Now let's take a look at each plug-in individually.

D-VERB

Dating back to late 1993, Digidesign's *D-Verb* (\$499) was the first TDM reverb plug-in. Though the look has changed a bit (see Fig. 1), the basic functionality has not. *D-Verb* is much like a Lexicon PCM 60 in that it's not too fancy, it sounds good, it does the job, and it costs about what you'd expect considering what it does. The user interface is straightforward and clean with a high-tech, brushed-metal look and a set of basic controls.

D-Verb provides seven presets, including smooth halls and plates, simple early reflection rooms, and ambient and nonlinear algorithms. Each preset offers a choice of Small, Medium, or Large sizes, which makes it easy to find what you're looking for with a few clicks of the mouse. Several parameters, such as Diffusion, Decay, Pre-Delay, Hi Frequency Cut, and Lowpass Filter, let you do a fair amount of shaping of the reverberated sound. I would like a bit more control over early reflections, however. For example, there is no quick way to mute only the early reflections or the reverberated signal, a feature I find very useful in *TrueVerb*.

This is the only plug-in among the four reviewed that offers a mono-return mode. The other three provide only a stereo return, which means you must tweak each preset a little if you want to maintain a pure mono signal path in a mix.

Over the years, I have found that *D-Verb* works well with most anything I throw at it. It can help enhance a vocal track or spread out any percussion or drum-kit mix with ease. The Non-Linear preset is very cool for that old Phil Collins drum sound. Oddly, none of the other plug-ins offer this algorithm, although TC Works and Lexicon have suggested that they might add a similar feature to future updates of their products.

D-Verb is also included in Digidesign's new D-Fx collection of AudioSuite plug-ins. Overall, I consider *D-Verb* a fine choice for your first TDM reverb plug-in, especially because many Digidesign dealers offer great deals on it when upgrading a Pro Tools system or buying an extra DSP Farm card.

TC REVERB

Soon after *D-Verb* was introduced, the Danish company TC Electronic debuted a TDM plug-in version of its powerful M5000 reverb unit. The TC Tools package (\$995) included *TC Reverb*, a state-of-the-art reverb plug-in, along with great-sounding chorus and delay plug-ins. Now, TC Works (the new TC Electronic software division) has released version 2.0, which adds full support for Pro Tools 4.0 automation. TC Works has also thrown in a new EQ plug-in called *TCEQsat*.

TC Reverb (see Fig. 2) offers a user interface that lets you see every detail of the current preset at once, much of it in graphic displays. The main screen includes four areas that make it easy to view and change settings. The Space Editor offers six preset shapes for defining the type of room to simulate. This is an excellent approach because it provides a quick mental picture of what the reverb is doing to the sound at any point in the edit process. Furthermore, you can edit each of

the room shapes to your own tastes, though it's unlikely that you'll feel compelled to do so; most of the presets sound fine the way they are.

In the Time Editor section, the reverb tail is divided into three frequency ranges that can decay independently at different, user-specified rates. In addition, these frequency ranges are user-definable, and they can be viewed in a window that encompasses 4, 16, or 64 seconds.

A similar interface is provided for the High Cut Filter and Pre-Delay sections. These sections let you set up sophisticated custom diffusion and early reflection/decay settings. I especially like the inclusion of two checkboxes that let you quickly switch between Insert mode (for use on a single track) and Send/Receive mode (for use with an aux bus). When you select Send mode, the wet/dry setting automatically defaults to 100 percent wet, while Insert mode reverts to the current wet/dry setting, which is very convenient.

About a year ago, I had an opportunity to use *TC Reverb* on a project. I produced a record for the great folk artist Utah Phillips on Red House Records (a division of Ani DiFranco's Righteous Babe record label). We did the record in about eight days from start to finished CD master. During that project, I used *TC Reverb* as my only reverb. It sounded great, and it was quite easy to work with and automate. I simply didn't need any other reverb. Moreover, coupled with the



FIG. 1: Digidesign's versatile *D-Verb* TDM plug-in offers a clean, easy-to-use interface.

Multichannel PC Hard Disk Recording System.

ANALOG

20 Bit A/D 20 Bit D/A
Eight 1/4" Analog I/O
Input/Output Level Meters
.002% THD+n

DIGITAL

24 Bit Digital 24 Bit DSP
S/PDIF I/O
Word Clock In/Out
Video Sync (optional)

Aark 20/20



FEATURES

10 Inputs 10 Outputs
Simultaneous Rec/Play
Digital Router & Patchbay
Monitor Mixer Controls

NOW SHIPPING

Aark 20/20
PCI Host Card
Cables & Drivers
\$ 995.00

20/20

The Perfect Vision...

Scanning the horizon for the PC workstation designed specifically for multitrack recording? Visualize this: Easily record and play eight analog channels direct to disk, all while keeping the digital connection to your DAT. Achieve a superior sound quality with shielded 20-bit converters that are far away from any noisy computer. Add to that a full digital router, volume control, individual level meters and a powerful software control panel that virtually eliminates sync and sample rate errors, and you've got the slickest multitrack system ever envisioned.

Well that vision has come into view, and at \$995.00 it's something to focus on. Now, cover your right eye and check out our specs...



Also from Aardvark...

Studio88!

Connects DA-88™ TDIF,
S/PDIF and analog to PC



Aardvark

<http://www.aardvark-pro.com>

Ph (734)665-8899 • Fax (734)665-0694 • 202 E. Washington Ste 306 • Ann Arbor, MI 48104 U.S.A.

circle #534 on reader service card



TC Chorus and EQsat plug-ins, this is one of the most powerful plug-in bundles on the block.

TRUEVERB

Waves' *TrueVerb* (see Fig. 3) is arguably the most widespread reverb plug-in on the market, and the TDM version is the most powerful version of *TrueVerb* that is currently available. After creating the first *Sound Designer* plug-ins back in 1992, Waves naturally jumped onto the TDM plug-in bandwagon. As with *TC Reverb*, the *TrueVerb* plug-in is only available as part of a bundle. The Waves TDM bundle (\$1,000) includes the *Q10 ParaGraphic Equalizer*, *L1 Ultramaximizer*, *C1 Compressor/Gate*, *S1 Stereo Imager*, and *PAZ Psychoacoustic Analyzer*. All of these support both TDM and AudioSuite (native) formats, which actually makes this combo of DSP tools quite a bargain.

TrueVerb offers lots of tonal control over the color of the space you are creating. However, you won't find easy-to-use preset algorithms, such as Plate, Chamber, Hall, and Gate, as in the other reverb plug-ins. That's because *TrueVerb* is designed to function (and sound) more like an acoustic room simulator than a reverb unit. For example, *TrueVerb* offers elaborate early reflections instead of a wet/dry mix function to achieve distance control.

This is not a negative point but a clarification of what *TrueVerb* does best.

The software includes several preset configurations with names such as Large Concert, Cathedral, Estate Ballroom, and Vocal Plate, but these are offered as pre-configured setups; they're not simply based on algorithms. Working with *TrueVerb* is like working with a kind of reverb construction kit. You can re-create many familiar types of reverb from scratch, or you can start editing from the presets if you know how. However, many people won't know where to begin. Fortunately, Waves provides an in-depth manual that goes beyond the call of duty to help you understand how to work with *TrueVerb*. It even explains the basic principles of mixing and goes a long way toward clarifying the subject. Waves deserves high marks for *TrueVerb*'s documentation.

Waves' *TrueVerb* offers useful time and frequency-response graphs that you can easily adjust with the mouse or the number keys on your computer keyboard. A feature unique to *TrueVerb* is the ability to select and change multiple parameters at once. Just click on parameters with the Shift key down, and use the mouse or keyboard to change all the selected values simultaneously. For example, you can adjust the Distance or Room Size controls along with other correlating parameters. When you're done, you need to hit the Return key to exit this data-entry mode or you might make changes

that you don't intend. I find this to be a minor annoyance.

Because Waves plug-ins were created before there were preset-management systems, as we now find in Pro Tools 4.0, all Waves plug-ins also include their own library of presets. In the early days, this was a great feature, but now it seems a bit confusing because Pro Tools has its own Plug-In Settings management system, and Waves doesn't currently include any presets for it.

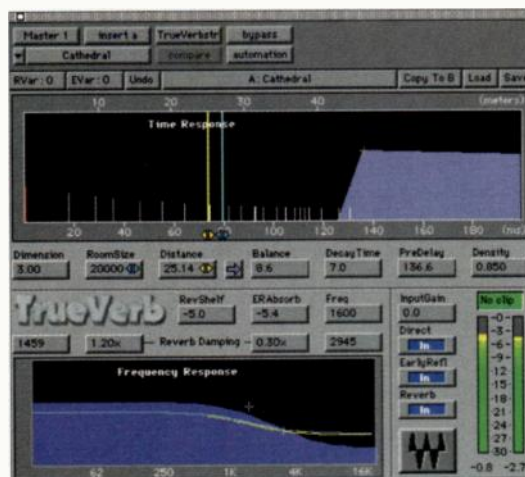


FIG. 3: *TrueVerb* is more of an acoustic room simulator than a straight-ahead reverb unit.

True, it's easy to copy the default settings and resave them in Pro Tools, but I would prefer to have the TDM version already set up for this function. Nevertheless, *TrueVerb*'s management system is advanced and well designed.

TrueVerb offers an excellent graphic and numeric interface. It lets you easily group multiple parameters by simply Shift-clicking on them and making large macro adjustments with a single mouse stroke. This approach is unique to Waves plug-ins. One of the things I especially like about *TrueVerb* is the interactive graphics in the Time and Frequency Response displays. They let you grab the graphic representations to make adjustments instead of using the graphics only as visual guides to the parameter settings.

Like the other plug-ins, *TrueVerb* provides two modes for mixing: Thru and Send. In Thru mode, all audio passes through *TrueVerb*. It is inserted directly into the selected track with the Direct, Early Reflections, and Reverb functions on. You then adjust the various parameters to create the space that you want. Even better, if the track already has some reverb on it, you can simply switch the Reverb off and use only the Direct and Early Reflection signals. In Send mode, the signal enters the reverb from an aux bus, and the wet/dry control defaults to 100 percent wet; all you have to do is turn off the Direct signal. Although the other reverb plug-ins allow for similar mixing techniques, none of them offers this degree of flexibility.

When it comes to mixing with reverberated sounds, *TrueVerb*'s interface is unquestionably the best I've found in a

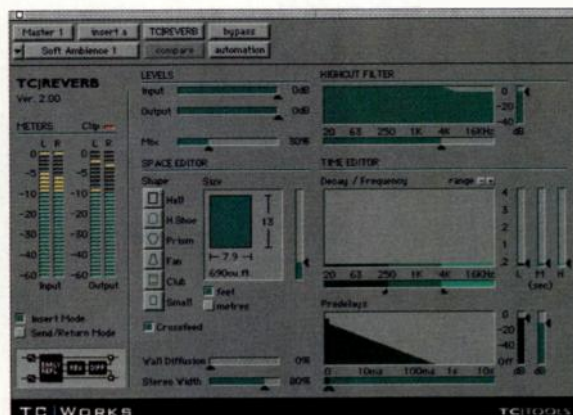
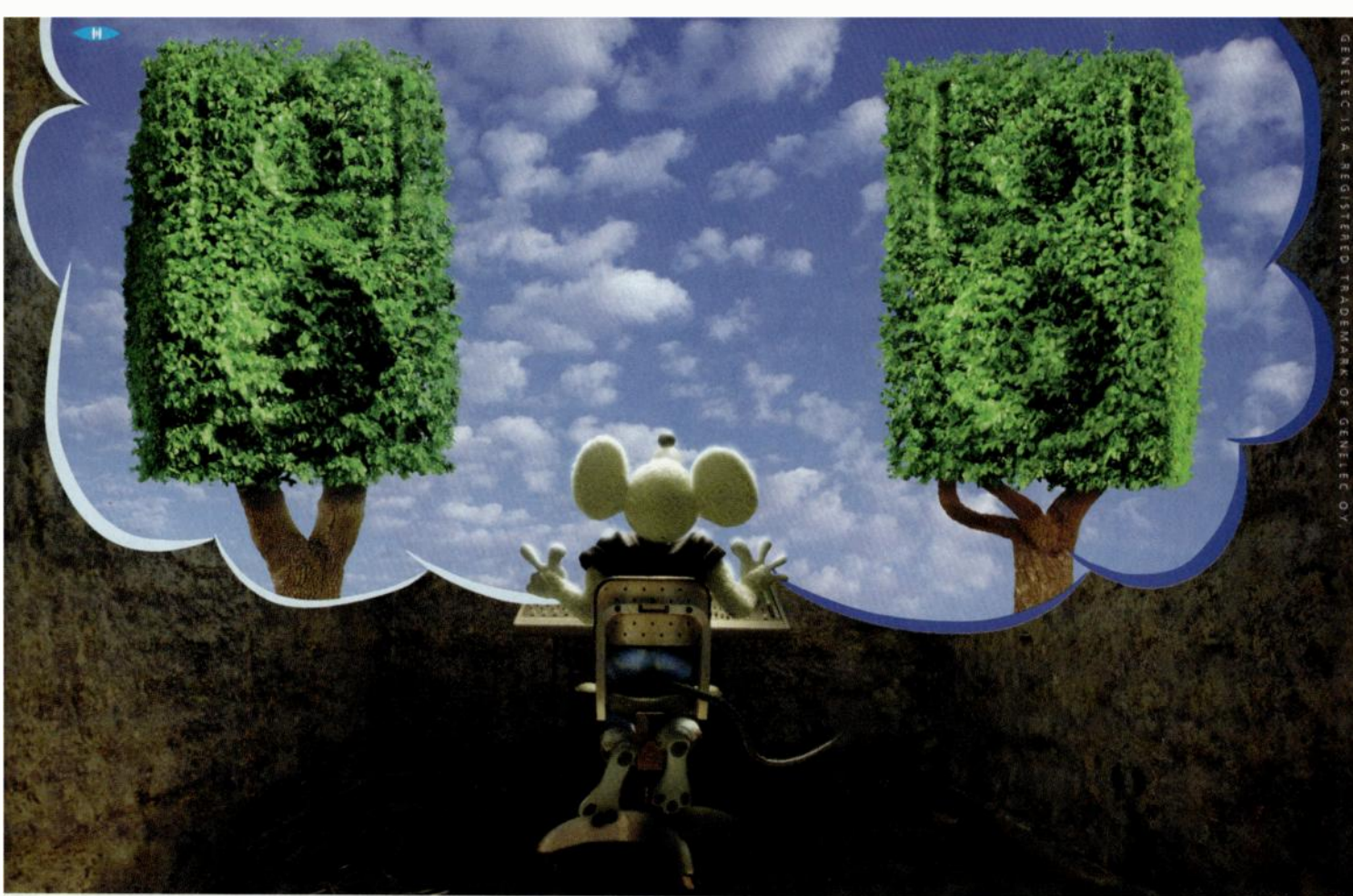


FIG. 2: *TC Reverb* provides a well-designed interface that lets you see every detail of the current preset.



ACTIVATE YOUR SPACE

Introducing the new model 1029A. It's our latest active nearfield monitoring system that has all the integrity and performance you'd expect from a Genelec. It's accurate, features amazing dynamics, and can deliver big SPL's from a plug n' play, rugged aluminum enclosure. Best of all, the 1029A is *surprisingly affordable*. Then, there's our new 1091A, a matching, active subwoofer specifically designed to be the 1029's perfect bottom-end sonic companion.

And because Genelec has 20 years of active monitor design and manufacturing, you can be sure what you hear represents the audio truth. So, regardless of your Space, large or small – or your professional persuasion – broadcaster or rock n' roll, this Genelec active monitor system will let you hear the trees – even if you're not in the forest.



GENELEC®
ACTIVE MONITORING

The Whole Truth And Nothing But The Truth.

In the U.S. please contact: Genelec Inc., 7 Tech Circle, Natick, MA 01760 Phone: 508/652-0900 Fax: 508/652-0909

International enquiries: Genelec, Oivitie 5, FIN-74100 Iisalmi, Finland, Phone +358-17-813311, Fax +358-17-812267 Web: <http://www.genelec.com>

circle #548 on reader service card

Midisoft® is Still #1!

The Leader in MIDI Since 1986!



"GET STARTED!"

•1989•
First PC
Notation Sequencer!

•1992•
First Windows® 3.1
Logo'd MIDI Sequencer!



"GET BETTER!"



"SCORE IT!"

•1995•
First 32-Bit
Windows® 95 & NT
Logo'd MIDI Sequencer!

•1997•
First & ONLY
Music Desktop
Publishing Application
Logo'd Under
Windows® 95 & NT 4.0!



"RECORD IT!"



Midisoft® **FAMILY MUSIC CENTER**

Makes your family PC the place to learn, play, compose and record all kinds of music and sounds!

INCLUDES FULL-SIZE MIDI KEYBOARD
With 4 octaves and 49 keys.

PLUS:

Step-By-Step
Connect & Play
Video Cassette



Universal
MIDI cable



Midisoft
PLAY PIANO
Software



Midisoft
STUDIO 4.0
Software



"DO IT ALL!"

circle #540 on reader service card

**Order your Midisoft software now by calling our order department
toll-free at 1-800-PRO-MIDI, or visit our Web Shop at www.midisoft.com!**

Visit Our Web Site At:
www.midisoft.com

Midisoft®
SOUNDS LIKE THE FUTURE™

Toll Free: 1 (800) PRO-MIDI • Tel: (425) 391-3610
Fax (425) 391-3422

E-mail: salesinfo@midisoft.com • Website: <http://www.midisoft.com>
1605 NW Sammamish Rd. Suite 205, Issaquah, WA 98027, USA

© 1997 Midisoft Corporation. All rights reserved. Midisoft, the Midisoft logo, Midisoft Play Piano, Midisoft Studio Recording Session, Midisoft MIDI Kit, Midisoft Desktop Sheet Music and Midisoft Family Music Center are trademarks of Midisoft Corporation. Other products and brand names are property of their respective owners.



plug-in. One of my favorite tricks is to play with the Distance setting, which lets you determine how far from the stage (or performer) the mix is. Let's say you want to move from the back of a simulated hall toward the performers on the stage. Simply add the Distance function to the list of automated parameters, and move the control while you listen. Just like that, you have an animated mix full of motion where there once was only a static, single-position performance. Once you try it, you won't want to work without it.

The overall sound of the *TrueVerb* is rich and deep. I occasionally insert two (or more) *TrueVerbs* on the same track or an aux bus with one set up for just Early Reflections and the other set up for just Reverb. This technique produces a very dense ambient experience, indeed. *TrueVerb* is truly a great-sounding reverb that has several unique features and a well-designed, easy-to-use interface.

LEXIVERB

The newest kid on the TDM block is Lexicon's *LexiVerb* (\$699). A few years ago, Lexicon made a powerful NuBus card with a TDM software interface called *NuVerb*. Although it was an amaz-

ing product, the card never made the transition to the PCI bus. Instead, Lexicon decided to develop a TDM plug-in that would take advantage of the Motorola DSP56000-series chips found on Digidesign's DSP Farm cards.

When I first saw *LexiVerb*, I was totally knocked out by the user interface (see Fig. 4). After working with just about every audio plug-in ever made, *LexiVerb*'s software design was a breath of fresh air. Each of the four algorithms—Chamber, Plate, Gate, and Inverse—have their own special artistic backgrounds, which makes this plug-in as much fun to look at as it is to use.

By holding down the Command key when you first choose *LexiVerb* from the plug-in pop-up menu, you can choose one of three views. This makes it easy to display only the parameters that are relevant to your particular needs. You can view a single row with eight of your most-used parameters or the entire main screen; *LexiVerb* lets you decide what works best. This feature helps a lot with managing onscreen real estate; I'd like to see a similar feature added to other plug-ins.

LexiVerb also makes use of Apple's *QuickDraw 3D*, which lets you view the actual space you create in graphic form. It's fun to play with and look at, but it would be a lot more useful if you could actually grab parts of the graphic display to make edits the way you can with *TrueVerb*.

In addition to the standard parameters, *LexiVerb* offers a Bass Frequency Multiplier that works in tandem with the Midrange/Reverb Time control. It also offers another parameter unique to Lexicon called Spin, which sets the randomization rate of the reverb tail. (TC Electronic is considering a similar feature for *TC Reverb* in the future.) Lexicon states that the function of the Spin control is to continuously

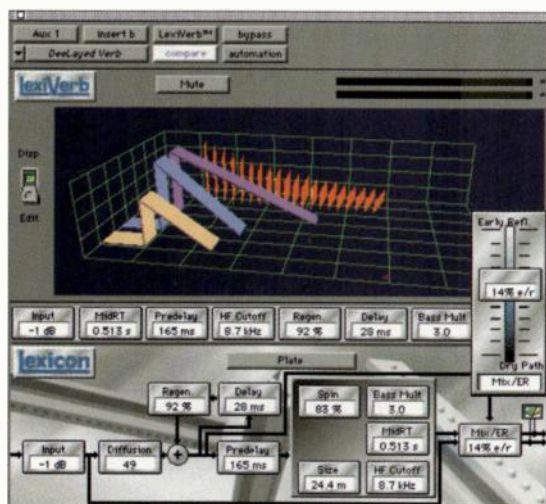


FIG. 4: Lexicon's new *LexiVerb* provides an impressive graphic display that you can customize in several ways.

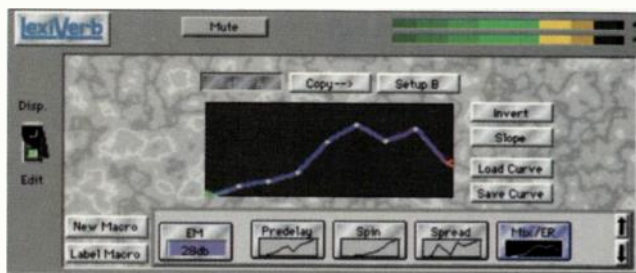


FIG. 5: *LexiVerb*'s powerful Macro Edit display lets you assign multiple parameters to a single fader.

alter the timbre of the reverberant effect to make it more natural sounding without interfering with the true position of the instruments in a mix. It works quite well.

LexiVerb includes powerful Macro-editing capabilities with a graphic display that lets you apply controller curves to any parameters you assign to the Macro. For instance, the Invert tool flips the current curve upside down. Twelve commonly used preset curves help you quickly put together a Macro. In addition, you can save and load your own custom curves.

The Macro (Soft-Row) concept should be familiar to users of Lexicon's PCM series of effects boxes. It lets you easily assign multiple parameters to a single fader for quick adjustments of complex setups (see Fig. 5). *LexiVerb* also includes a unique Preferences window for setting a variety of color, meter, fader, and display options. This is another feature I'd like to see incorporated into other plug-ins.

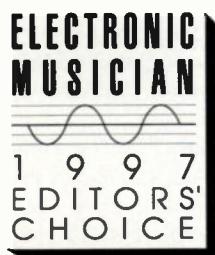
This plug-in provides online help, and the owner's manual, which is comparable to *TrueVerb*'s, rates an A+ for offering useful, in-depth examples and information. My only complaint about *LexiVerb* is that the Size control mutes the reverb signal whenever you adjust it. None of the other plug-ins exhibit this quirk.

LexiVerb's sound is rich and full bodied. The software comes with 100 presets, so you'll be ready for just about any type of session. Since I started working with *LexiVerb*, I have used it on everything, including acoustic and electric guitars, male and female voices, exotic percussion, and industrial rhythm tracks. One of my clients asked, "What box in the rack are you using?" Another remarked, "I've never heard my voice sound like that." In my experience, *LexiVerb* has proven to be an excellent, professional-quality tool in a variety of studio situations.

More Power.



More tools. More flexibility. More music.



"...Digital Orchestrator

Plus is a superb value that gives you more for the money than anything in its class."

— *Electronic Musician*,
Editors' Choice 1997

That old creative maxim, "Less is More" applies to great music. Not to the creative tools you use to make it.

Simply put, we took Digital Orchestrator Plus, the best digital audio sequencer on the market according to the editors of *Electronic Musician*, and made it better, period. At a price that blows the competition away.

Digital Orchestrator Pro puts tremendous creative power at your fingertips with powerful new features like a Graphic Controllers Editor, Graphic EQ, Position Markers and many more digital audio transforms. And with newly designed transport controls, navigation is silky-smooth. Whether you're a current user ready to upgrade, or a newcomer ready to be blown away, Digital Orchestrator Pro satisfies your craving for more.

So buy smart. Get more. Spend less.

Contact your local music retailer, software outlet, or visit us at www.voyetra.com.

Digital
Orchestrator
Pro
THE PREMIER DIGITAL AUDIO SEQUENCER

Voyetra
Technologies Inc.
1.800.233.9377
Email: sales@voyetra.com
5 Odell Plaza, Yonkers NY 10701

Download a FREE DEMO — www.voyetra.com

© 1997 Voyetra Technologies Inc. All rights reserved. Digital Orchestrator Pro is a trademark of Voyetra Technologies Inc. All other trademarks are the property of their respective companies and are hereby acknowledged.

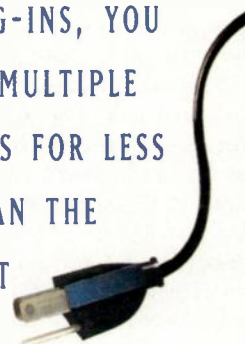
circle #537 on reader service card



THE FINAL VERDICT

DVerb retails for about \$200 less than *LexiVerb*, but it comes with only seven presets. It comes in at third place. At \$300 more than *LexiVerb*, both *TrueVerb* and *TC Reverb* finish in a very close second place. However, keep in mind that each of these plug-ins comes as part of a bundle, which might affect your decision to buy them.

WITH PLUG-INS, YOU CAN HAVE MULTIPLE PROCESSORS FOR LESS MONEY THAN THE EQUIVALENT HARDWARE.



That leaves *LexiVerb*, which ranks as my number one choice for a TDM reverb plug-in. Although it isn't cheap, none of the others can beat it in a price versus feature set comparison. On the other hand, if you are using a 680X0 or NuBus Power Mac, the other three candidates deserve serious consideration. In fairness, each of these reverb plug-ins offers something unique and useful, and they all sound quite convincing at simulating various reverberant spaces. In the end, it comes down to personal preferences.

Finally, I must say that none of the plug-ins covered here have convinced me to get rid of my various hardware reverbs, such as my Lexicon PCM 80 or Eventide H3500. However, they did come very close. Perhaps the next revision of these plug-ins coupled with the next generation of DSP chips will finally put them over the top.

Mikail Graham is currently recording and producing several Northern California up-and-coming artists and hopes to find time to produce some of his own work sooner than later!

Dimensional shift

Maximum power/Minimum cash



ESI-4000 Turbo 120 model shown

The new ESI-4000

Starting at
\$1449
MSRP

Get ready to shift into a new dimension of sound and value with the new ESI-4000:

Massive sound library — The ESI-4000 comes with 2 CD-ROMs with thousands of sounds so you can start making music right out of the box. And, there are over 20 CD-ROMs available from E-mu® Sound Central with fresh sounds arriving daily so your music will never sound stale.

64 voice polyphony — The ESI-4000 gives you 64 voices of music power so you can layer and sequence thick, lush sounds and never drop a note.

Easy to use — The ESI-4000 provides you with an intuitive user interface that is easy to learn and a pleasure to use—you'll spend more time making music and less time reading manuals.

Powerful DSP and sample editing — The ESI-4000 gives you incredibly powerful digital signal processing that lets you massage

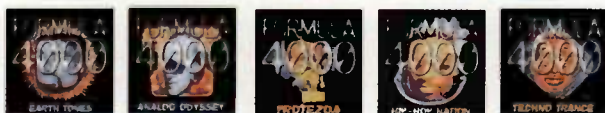
and manipulate samples to create your own unique sounds. Built-in sample editing tools such as automatic truncation, normalization, and cross-fade looping allow you to edit samples quickly and easily.

Unmatched filter technology — The ESI-4000 has 64 digital 6-pole filters with 19 different types available that make your sounds come alive as never before.

Highly expandable — Your ESI-4000 can hold up to 128 MB of RAM using 72 pin SIMMs and you can easily upgrade the number of outputs, add dual 24-bit effects, and digital I/O with the ESI Turbo Option Kit.

Unbeatable value — The ESI-4000 starts at only \$1449 with 4 MB of RAM, making it the best value sampler in its class. Shift dimensions and see the ESI-4000 at your local E-mu dealer today!

A new dimension in sound—developed for the ESI-4000



Call E-mu Sound Central at 1-888-ESC-1-ESC (US) or find us on the web at www.emusoundcentral.com.

E-mu Sound Central • CD-ROM • CD-Audio • Software • Accessories

E-MU

E-mu Systems, Inc.

P.O. Box 660015, Scotts Valley, CA, USA, 95067-0015
Tel. 408.438.1921 • <http://www.emu.com>

United Kingdom Office: Suite 6, Adam Ferguson House, Eskmills
Industrial Estate, Musselburgh, Scotland EH21 7PQ Tel. +44 131 653 6556



Back to School Online

Catch up on the latest musical concepts with these online resources.

By Dennis Miller

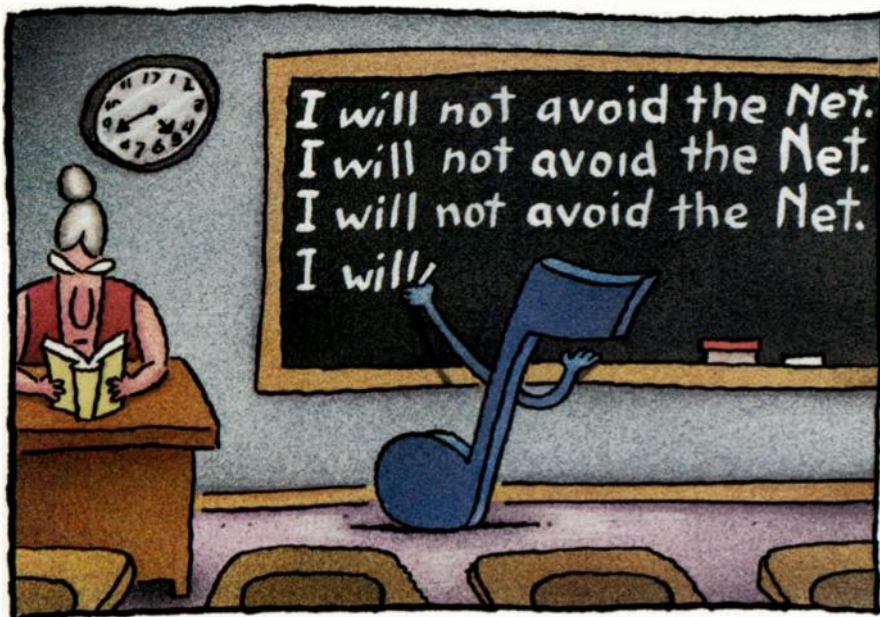
As everyone knows, the Internet offers access to vast amounts of information that would otherwise be difficult to get hold of. Add to that the ease of updating Web sites, and you can see the advantages that the Web offers over other forms of media. Today, you'll find dozens of sites on the Internet filled with every conceivable type of information about music. Whether you need to polish your theory chops or find the number for a MIDI continuous controller, there's a site out there that has just the information you need.

This article will present an overview of many sites that offer information about electronic-music theory and concepts. Sites that are strictly commercial won't be included, nor will sites that primarily offer samples or synth patches. You'll be amazed at how much good information is available online, and no doubt you'll find something here for every question you have.

Web sites typically fall into one of several categories. There are sites produced by universities, sites that are educational adjuncts to commercial ventures, sites maintained by journals and professional organizations, and a large number that are created by amateur and professional musicians. Where possible, I've organized the offerings by the subjects they cover, but some are simply too broad to fit into a single category. You'll also find a sidebar, "The Mother of All Sites," which details one of the most thorough and well-organized sites I've seen.

INTRODUCTION TO MIDI

MIDI is a common topic online. Not only can you learn all the basic concepts, but if you ever wish to see the actual MIDI Specification, you can find it online, as well. One of the best starting points for your online excursions is Northwestern University's Exploring MIDI site (see Fig. 1; URLs for all the sites mentioned in this article can be found in the sidebar "Campus Tour



Sweet FX16



11. 16 Balanced Mic/Line Inputs using Spirit UltraMic™ preamps with 60dB of gain
12. 16 direct Outputs, Pre/Post switchable per channel
13. Impedance-balanced XLR Mic Outputs
14. Four Stereo Returns assignable to Aux 1 or 2
15. 2-Track Tape Return (RCA)

Leave your effects processors at home. You don't need them anymore. The new 16-channel Folio FX16 from Spirit features a 16-program **Lexicon** effects processor built-in. Say "good-bye" to endless equipment patching and effect routing, and "hello" to lush choruses, crisp delays and rich reverbs. And, not only can you use two effects simultaneously, you can independently edit each effect's parameters then store your custom programs for future use. Of course, the FX16 still has all of the great features that you've come to expect from a Spirit mixer—British three-band EQ, UltraMic™ preamps, 100mm faders and more. All this, and a low retail price of only **\$1,199.95!** Talk about a sweet deal!

16. All metal rear connector panel repositions for rackmount use

Spirit By Soundcraft, Inc. • 4130 Citrus Ave., Suite 9 • Rocklin, CA 95677
Toll-free: (888) 459-0410 • Fax: (916) 630-3950

www.spiritbysoundcraft.com

SPIRIT
by Soundcraft

What is MIDI?	MIDI Connections Java Enabled	MIDI Connections Non-Java Page
Understanding Decimal Binary & Hexadecimal	The MIDI Language	Types of Data Transmitted through MIDI
MIDI Channels and Modes	MIDI Controllers	General MIDI
Standard MIDI Files	Using MIDI on a Web Site	Applications that use MIDI
Audio vs. MIDI Files	MIDI Timing Concepts	Author Information and Comments

FIG. 1: This Web page at Northwestern University's site is neatly organized by category and provides answers to many basic questions about MIDI topics.

Guide"). This up-to-date site, designed by Peter J. Raschke, covers topics from MIDI basics to illustrations of a MIDI signal. The Exploring MIDI site is well organized, supports both Java-enabled and non-Java browsers, and has numerous helpful graphics. Besides discussions of MIDI topics, there's also a section on using MIDI to enhance your Web site. It includes a link to an excellent report called "MIDI Options for Web Authors."

MIDI is included as part of a broader desktop-music tutorial published by the MIDI Manufacturers Association and available at Harmony Central. This tutorial was written by Jim Heckroth and provides concise explanations of many basic MIDI-software topics. It also offers clear explanations of sampling and several common synthesis methods. Making connections between your Windows PC and the outside world is covered in some depth, although the text is several years old and doesn't touch on Windows versions beyond 3.1.

Another good place to explore MIDI subjects is MIDI Farm's Library and Information Desk. This site covers subjects such as MIDI messages, controllers, and General MIDI. For the more technically inclined, there's a link to Jeff Glatt's MIDI Technical Fanatic's Brainwashing Center, where you can find detailed information on various technical subjects, such as the Sample Dump Standard (SDS). There are also "how-to" articles, including one on designing a MIDI adapter for the joystick port on Creative Labs' Sound Blaster cards. Programmers should find this site an especially useful resource.

If you do want to read the entire MIDI Spec and find other late-breaking

news about MIDI, head to the MIDI Manufacturers Association home page. Among the interesting articles at this site is an interview with Tom White, MMA president and CEO, who speculates on the future of MIDI.

DOWN MEMORY LANE

History buffs will especially enjoy the Electronic Music Foundation site (see Fig. 2). This well-organized Web site contains capsule summaries of some great moments in electronic music history, complete with photographs.

(Some of the photos are excerpted from *Electric Sound*, an excellent book by the Foundation's director, Joel Chadabe.) A worldwide calendar of major electro-acoustic musical events is maintained at the site, and you'll also find a huge list of competitions and festivals for new works. There's even a gallery containing some stunning computer-generated artwork. Overall, this site is one of the most interesting and varied of those I visited.

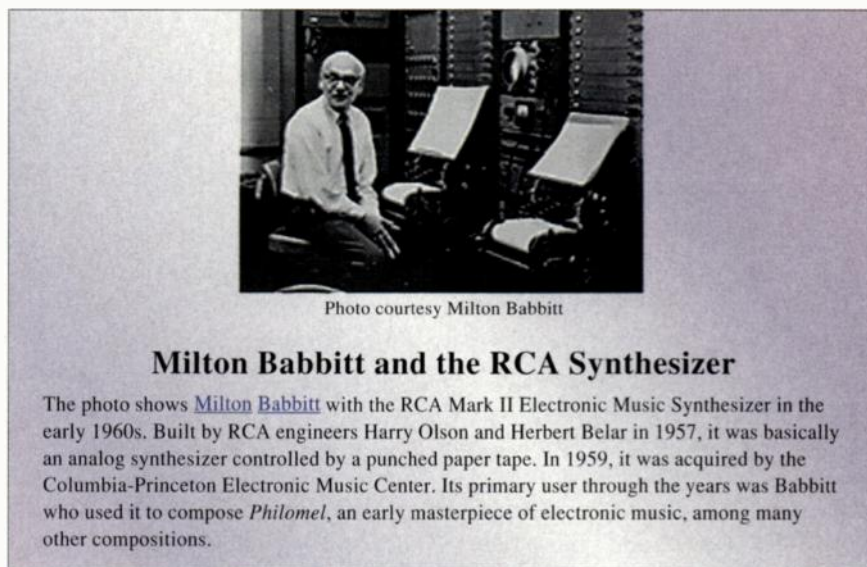
Another worthwhile location to peruse is the History of Electronic Music, where you will find links to nearly a dozen history pages. Although several of these links are out of date, this is a good place to start your historical explorations.

SYNTHESIS METHODS

If you're ready to learn more about the synthesis methods used by the hardware in your studio, there are dozens of sites where you can feed your head. One of the best of these is Dennis Nomer's Musical Physical Modeling, where you can learn everything you ever wanted to know about this modern synthesis method. This site offers background theory on the subject of modeling, an extensive overview of the way various modern synthesizers implement the method, and a summary of the major institutions conducting research on the subject. The information is current and accurate.

You can get acquainted with granular synthesis (a method of producing sound by creating thousands of short sonic "grains") at the Granular Synthesis site, created by Gordon Baird. Several graphics are used to illustrate the basic concepts, and a thorough literature search is also provided for further reading. Short definitions of many other synthesis methods can be found at the Synthesis Methods page. Though these abstracts only run a paragraph or two, the author, Herbert Janssen, mentions which commercial synthesizers employ the various methods he describes. In addition to synthesis, several dozen common MIDI and electronic-music terms are also defined.

Three-dimensional sound synthesis is one of the hottest topics around



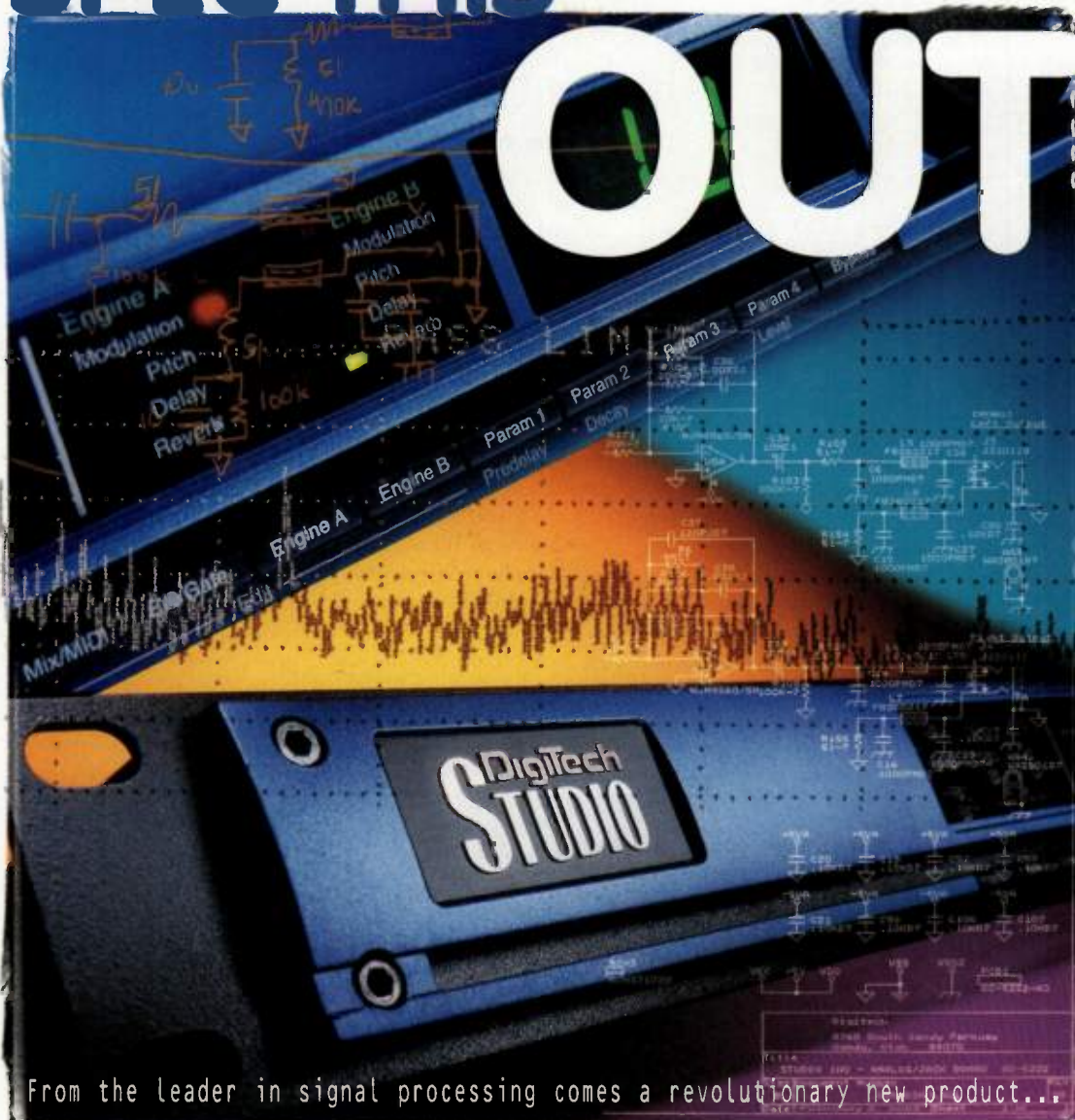
Milton Babbitt and the RCA Synthesizer

The photo shows [Milton Babbitt](#) with the RCA Mark II Electronic Music Synthesizer in the early 1960s. Built by RCA engineers Harry Olson and Herbert Belar in 1957, it was basically an analog synthesizer controlled by a punched paper tape. In 1959, it was acquired by the Columbia-Princeton Electronic Music Center. Its primary user through the years was Babbitt who used it to compose *Philomel*, an early masterpiece of electronic music, among many other compositions.

FIG. 2: The Electronic Music Foundation's well-organized Web site includes many useful features for desktop musicians. In the historical section, you'll find pictures of composers such as Milton Babbitt, shown here in front of the RCA synthesizer on which he composed many of his most famous works.

SPEC THIS

OUT



From the leader in signal processing comes a revolutionary new product...

- [20-bit A/D D/A Conversion]
- [96dB Signal to Noise Ratio]
- [Dual Engine Processor]
- [26 Effects Available]
- [Stereo Inputs and Outputs]
- [Midi Selectable Programs]
- [\$199 U.S. MSRP]

Check out the specs of the new S100, the first glimpse of the future from the DigiTech Studio Series. Behind the appealing front panel, the S100's exclusive dual engine configuration operates as two individual stereo effect processors. Pristine Reverb, Delay and Modulation effects are abundant, the S100 even offers hard to find effects like Vocoder and Ring Modulation.

Welcome to the future of the new DigiTech Studio Series...you owe it to yourself to check out these specs!



Effect List: Stereo, Room/Studio, Hall, Flange, Chorus, Arpeggio, Reverb, Reverse Reverb, EQ, Noise Gate, Chorus, Flanger, Phaser, Tremolo, Panner, Rotary, Pitch Bbifter, Distortion, Mono Delay, Stereo Delay, Ping Pong Delay, Karaoke Delay, Ring Modulator, Compressor, Limiter

circle #516 on reader service card

DigiTech STUDIO

H A Harman International Company



FIG. 3: Several categories of information are available at the Women in Music Web page, including a discussion on algorithmic composition and excellent articles on MIDI and audio.

today, and the University of Maryland offers a definitive online article on the subject, complete with references. "3D Sound Synthesis," by Cindy Tonnesen and Joe Steinmetz, describes how the brain calculates the position of a sound and describes a number of techniques for re-creating spatial effects synthetically. The article is easy to read and avoids the complex math often associated with this subject.

Finally, an excellent source for introductory material on synthesis methods and various synthesis hardware is the Beginner's Synthesizer FAQ, compiled by Chad Gould. A handy glossary of synthesis and electronic-music terms

and its colorful, animated graphics clearly depict the concepts presented.

If you were a heavy user of Cliff Notes in school, then you'll really like the layout of John Platt's Psychology 3a03—Audition. This site consists of lecture notes for an entire course on auditory perception (also known as psychoacoustics) offered at McMaster University. Here you'll find summaries of topics such as the nature of sound and the structure and function of the auditory system, frequency selectivity, masking and the critical band, and temporal processing in the auditory system. Though the site only offers an overview of these sometimes complex

is included with this well-designed electronic document.

AUDIO & ACOUSTICS

For an excellent site that covers many audio and acoustic topics, take a look at Godric Wilkie's Sound page. The page presents a basic overview of sound and our hearing system and explores numerous acoustic concepts, including pitch, volume, and timbre. It concludes with a concise presentation of "twelve easy steps" to sound. The site has an easy-to-follow layout,

topics, the materials provided here should be useful even to the more advanced reader.

There's a vast amount of information about sound and acoustics at Michael J. O'Donnell's Com Sci 295: Digital Sound Modeling site. Here you'll find nearly an entire online course on the subject. Taken from an actual class offered at the University of Chicago, this site contains numerous documents about sound. While you're there, be sure to check out the beautiful 3-D sound plot that appears on the main page. It's a gorgeous full-color image. You'll also enjoy the page that lists all the references to sound in the works of William Shakespeare!

Several common "auditory illusions" are explored at the Tritone Paradox site, created by Lloyd A. Dawe. Shepard tones, a phenomenon that often leads people to perceive a strong pitch at a frequency that is not actually present in a sound, are fully explained, complete with sound examples. Ever been curious about the mysterious "tritone paradox"? Well you can have all your questions answered about this unusual phenomenon, as well. (Here's a hint: it's an illusion whereby people hear one pitch as being below another when in fact that pitch is actually higher, or vice versa.) You'll also find interesting discussions of Shepard scales

THE MOTHER OF ALL SITES

One of the most impressive sites that I discovered while researching this article was Electronic Music Interactive (EMI). It was created by Professor Jeff Stolet in collaboration with the University of Oregon New Media Center. Professor Stolet was motivated to design the site when he was unable to find a suitable text for courses in the school's Music and Technology program. The site, which requires Macromedia's Shockwave plug-in, provides riches that will keep you busy for some time.

EMI is arranged like a daybook or tabbed notebook, which makes navigating the site a breeze (see Fig. A). Clever sound effects, such as button and tab sounds, enhance the user's experience. But despite all the bells and whistles, of which there are plenty, the content itself is what makes this site

so appealing. The site is organized into two major categories: "The Synthesis Process" and "Control of Synthesis."

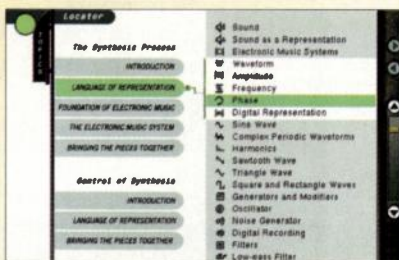



FIG. A: Electronic Music Interactive is a Web site that resembles a well-organized CD-ROM. All topics can be accessed randomly or in sequence.

Each section contains numerous subsections that you can also access individually.

In the Synthesis section, you'll find discussions of how sound is represented digitally, the way complex waveforms are created, and the ways in which sound can be controlled over time. Audio examples, many accompanied by animated graphics, are provided to reinforce most of the main concepts. The Control section introduces MIDI and related topics and also makes heavy use of graphics to illustrate key points. An extensive glossary is also available.

Like a well-designed CD-ROM, Electronic Music Interactive makes learning approachable and enjoyable and represents the best that the Internet has to offer. Don't you wish this type of learning had been available when you were sweating through school? I sure do.



what's your **studio vision?**

"We've been using Studio Vision since it came out. It's given us the freedom to make music the way we want. Editing audio in bars and beats and visually muting and arranging parts is so musical. Studio Vision lets us see and hear the tracks – that's how we get our sound."

—The Dust Brothers

John King & Michael Simpson

studio
vision pro 4.0



OPCODE

<http://www.opcode.com>

phone 800.557.2633 • fax 650.856.0777

circle #565 on reader service card

and spectral motion "after effects" at this unusual site.

Finally, to get a firsthand grasp on how various effects work, point your browser to the Effects Explained section of Harmony Central. Here you'll find a series of articles that clearly explain topics such as equalization, compression, flanging, and reverb. Each article includes audio files in different formats (typically AU, WAV, and MP2), and most include references or links to other sources of information.

JUST THE FAQs

As most Net rats know, a *FAQ* is an online document that contains answers to Frequently Asked Questions about

a subject. The Electronic and Computer Music FAQ is one of the most extensive and detailed of its type. Running dozens of pages, the FAQ covers subjects such as sound-programming languages, things to consider when purchasing new hardware, and how to find music-related newsgroups. Unfortunately, the document has not been updated in several years, so many current hot topics are not included. Hopefully, this valuable service will get renewed support.

Another great resource is the Bibliography on Synthesizers, MIDI, Computer, and Electronic Music. This list details dozens of books and articles about electronic music. You'll also find

the "Auditory" section of H:arp (the "h:yperText project about electronics") to be useful for the references it contains. There's plenty of good information here, but overall it's a bit hard to access the important material, and the heavy use of graphics might slow down your search.

SOUND PROGRAMMING

If you'd like to learn more about programming sound, head over to DLP's Csound Page for a good description of the *Csound* programming language. Created by Dave Phillips, the site explains the basic concepts of this powerful sound-synthesis language and offers numerous examples to get you

CAMPUS TOUR GUIDE

The URLs listed below are available as hypertext links at **EM's** Web site, www.emusician.com.

Beginner's Synthesizer FAQ

tilt.largo.fl.us/faq/synthfaq.html

Bibliography on Synthesizers, MIDI, Computer, and Electronic Music

ftp.cs.ruu.nl/pub/MIDI/DOC/bibliography.html

Com Sci 295: Digital Sound Modeling

www.cs.uchicago.edu/~odonnell/OData/Courses/CS295/contents.html

Computer Music Journal

mitpress.mit.edu/e-journals/Computer-Music-Journal/CMJ.html

Csound Hypertext Manual

www.vanderbilt.edu/Blair/Courses/MUSC216/Csound/title.html

Dartmouth University

music.dartmouth.edu/~larry/SHPaper/soundhack.article.html

DLP's Csound page

www.bright.net/~dlphilp/dp_csound.html

Electronic and Computer Music FAQ

www.lib.ox.ac.uk/internet/news/faq/archive/music.netjam-faq.html

Electronic Journal of Contemporary Music

arts.usf.edu/music/wtm.html

Electronic Music Foundation

www.emf.org

Electronic Music Interactive

nmc.uoregon.edu/emi/emi.html

Exploring MIDI

nuinfo.nwu.edu/musicschool/links/projects/midi/expmidiindex.html

Granular Synthesis

kcbbs.gen.nz/users/gordon/granular.html

Harmony Central Tutorial

www.harmony-central.com/MIDI/Doc/tutorial.html

Harmony Central—Effects Explained

www.harmony-central.com/Effects/#eff

H:arp—Auditory

www.create.ucsb.edu/harp/A

The History of Electronic Music

www.sci.fi/~phinnweb/history

ICMA

music.dartmouth.edu/~icma/

Journal of New Music Research

www.swets.nl/jnmr/jnmr.html

Media Technology Research Centre

www.bath.ac.uk/~masjpf/MusPapers.html

MIDI Farm's Library and Information Desk

www.midifarm.com/info

MIDI Manufacturers Association

home.earthlink.net/~mma

MIDI Options for Web Authors

www.liveupdate.com/midioptions.html

MIDI Technical Fanatic's Brainwashing Center

www.midifarm.com/info/frameglat.htm

Musical Physical Modeling

web800.com/music/vl/phymodl.htm

Psychology 3a03—Audition

www.science.mcmaster.ca/Psychology/psych3a03/psy3a03.html

SEAMUS

comp.music.lsu.edu/seamus/aboutSEAMUS/index.html

SIGSOUND

datura.cerl.uiuc.edu/schools/courses.html

Simon Fraser University

fas.sfu.ca/cs/people/ResearchStaff/amulder/personal/vmi/BSCM1.rev.html

Sound (by Godric Wilkie)

www.kingston.ac.uk/~mu_s454/godric/sound/sound.html

Synthesis Methods

www.neuroinformatik.ruhr-uni-bochum.de/ini/PEOPLE/heja/sy-prog/node3.html

3D Sound Synthesis

www.cs.umd.edu/projects/hcil/eve.restore/evearticles/I.B.1.3DSoundSynthesis.html

Tritone Paradox

www.cameron.edu/~lloyd/webdoc1.html

Women in Music

music.dartmouth.edu/~wowem/hardware/algorithmdefinition.html

Cool Edit Pro

multitrack
graphic
equalizer
NOISE
REDUCTION



transpose
change tempo
SMPTE slave
distort
find beats
flange
punch-in
convolve

compress
delay
3D ECHO CHAMBER

CREATIVITY: THE PROCESS
OF TAKING THE SOUND
STRAIGHT FROM YOUR MIND'S
EAR TO THE STUDIO
MONITORS. THAT'S OUR
DREAM AT SYNTRILLIUM, AND
THAT'S WHAT COOL EDIT PRO
LETS YOU DO. IT'S GOT
POWER: 64-TRACK MIXING,
MORE THAN 30 DSP
EFFECTS (MOST WITH REAL-
TIME PREVIEW), DIRECTX
PLUG-IN SUPPORT, AND
AMAZING WAVEFORM EDITING
CONTROL. IT'S ALSO A BREEZE
TO LEARN AND USE, AND IT
WORKS WITH JUST ABOUT
ANY SOUND CARD ON ANY
WINDOWS™ 95 OR NT
COMPUTER. CONTACT
SYNTRILLIUM OR YOUR
FAVORITE SOFTWARE DEALER
TO FIND OUT MORE.

Syntrillium Software Corporation

Download a functional demonstration version from <http://www.syntrillium.com>

sales@syntrillium.com

1-888-941-7100

toll-free sales in the US and Canada

P.O. Box 62255 Phoenix AZ 85082-2255 USA +1-602-941-4327 fax +1-602-941-8170

Cool Edit and Cool Edit Pro are trademarks of Syntrillium Software Corporation. Other products mentioned are trademarks or registered trademarks of their respective manufacturers.

circle #551 on reader service card



● DESKTOP MUSICIAN

started. Short, high-quality sound examples give you a flavor of what you can expect when you begin to explore the world of *Csound*. And if you've downloaded *Csound* but can't seem to locate the documentation, a complete, indexed manual can be found online. Prepared by Peter Nix of the University of Leeds, England, the hypertext manual is available as part of a course developed at Vanderbilt University's Blair School of Music.

Sound Hack users, and even those who don't know the program, will find useful information in Larry Polansky and Tom Erbe's article on spectral mutation. It is available at Dartmouth University's Web site. This interesting programming technique is thoroughly implemented in *Sound Hack*, but it has implications for other analysis/resynthesis systems, as well.

A complete discussion of algorithmic composition can be found at the excellent Women in Music site, maintained by Professor Kristine Burns of Florida International University. (For more information, see "Square One: Music by the Numbers" on p. 96.) In

addition to a huge amount of useful information intended for women just starting their careers in music, there are many well-written articles on electronic music topics (see Fig. 3).

JOURNALS

In an effort to keep the flow of information current, many traditional print journals now offer electronic supplements. The esteemed *Journal of New Music Research*, for example, has a number of articles online. Though not all of the topics apply specifically to sound or electronic music, there are many articles that will appeal to electronic musicians. Moreover, you're likely to find coverage of new synthesis methods and analysis techniques here well before they hit the mainstream.

Though it doesn't appear to have any recent offerings, you'll find several provocative articles on sound and composing at the Electronic Journal of Contemporary Music site. I particularly enjoyed reading Matthew Wuolle's article, "An Exploration of Everyday Sound: Are We Making Music?" It's a rather amusing tome on the limits and

scope of musical performance in a men's room. Too bad he didn't have his sampler along to capture the interesting sounds he describes!

No Web journey would be complete without a stop at the online home of the prestigious *Computer Music Journal*. This publication is the foremost journal on computer music research and composition available today and is an invaluable source of information on the field. Several current articles are available for downloading, and you'll also find the sound examples cited by authors in a number of recent issues.

TALKS AND PAPERS

Many authors and lecturers post their papers online after presenting them in public forums, and the Internet is a great place to find such offerings. Some professional organizations, such as SEAMUS and the ICMA, have their own sites where these papers are posted, but you can also find current research papers at various sites throughout the world.

One of the more interesting papers I found was at the Web site of Simon

Work better.

- ADAT I/O seamlessly integrates digital audio with digital mixers, multi-tracks & synths
- ADAT Timecode Sync—tighter sync than any ADAT-to-MTC converter
- Word Clock I/O allows S/PDIF to ADAT conversion, even while using the BRC
- 12 in and 12 out, simultaneously—analogue stereo S/PDIF, & ADAT Optical I/O
- 8-channel analog I/O expansion options
- Now available for MacOS & Windows 95 with industry-wide software support



Analog audio cards are fine—as long as you don't have an ADAT or a digital mixer and never intend to buy one. However, if you're putting together a state-of-the-art studio, you need the only card that has all the tools for multi-channel digital I/O. The Korg SoundLink DRS 1212 I/O.

SoundLink DRS KORG
Digital Recording Systems

Supported by software from:



©1997 Korg USA, Melville, NY. All logos are trademarked and/or registered by their respective parent companies. For the SoundLink DRS dealer nearest you call (800) 335-0800. www.korg.com

circle #543 on reader service card

Sonic Foundry presents

ACID

Make changes to tempo or pitch on the fly

Matches loop tempo and pitch to a project
in real time

Totally cool track mixing capability

Multiple track looping and editing

Includes hundreds of stylish loops or
bring in your own

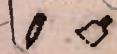
Volume/pan/effect envelopes per track

Master or slave to SMPTE timecode, whatever works for you

Multiple audio outputs

Save your funky fusion as .WAV or .AIFF

Wired for Windows 95 and Windows NT



admission:

\$300

www.sonicfoundry.com/acid

800 577 6642

Sonic Foundry is a registered trademark of Sonic Foundry, Inc.

Other products mentioned are trademarks or registered trademarks of their respective manufacturers.



**PRO
TOOLS**

LEARN AUDIO RECORDING AT THE CONSERVATORY LIKE NOWHERE ELSE.

Avid | Authorized
Education Center

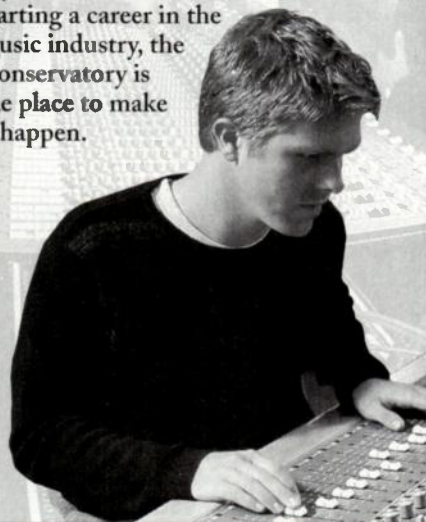
- Multi-Studio Facility
- Hands-on Training
- Affordable Tuition
- Internships
- Small Classes
- 22 Week Master Recording Program
- Financial Aid to Qualified Students
- Our Graduates are in Demand

Call Today!
1-800-562-6383

CONSERVATORY
OF
Recording
Arts & Sciences

2300 East Broadway Rd.
Tempe, AZ 85282

The Conservatory is the only recording school in the *entire country* that's authorized by Avid to teach ProTools recording, editing, and mixing functions. If you're serious about starting a career in the music industry, the Conservatory is the place to make it happen.



● DESKTOP MUSICIAN

Fraser University, where faculty member Axel Mulder presents a fascinating glimpse into the possible future of electronic instruments. Mulder's "virtual instrument" is a device for tracking numerous movements of a human performer and mapping them to synthesis parameters. Though this topic has been explored before, Mulder's concept involves far more aspects of human movement than any other model I've seen. And unlike traditional physical models, which are also often referred to as "virtual instruments," Mulder's theory deals in great detail with the interaction between the human controller and the sound-producing mechanism.



Electronic Music

Interactive makes

learning approachable.

Several papers from the Media Technology Research Centre at the University of Bath, England, can be found online. I've been hearing a lot about chaotic oscillators lately, and the paper by John Fitch and Richard Dobson gives a clear explanation of this interesting theory. The musical examples, though distinctly low fidelity, offer some of the sonic possibilities that this new synthesis method presents. The paper gets into some fairly hefty math, but the introduction is clear and explains how chaos theory can be explored for musical purposes much as it's used for generating fractals.

CLASS DISMISSED

I hope you've enjoyed this brief tour of electronic-music sources online. If you're inspired to learn more about these subjects, you can take a look at the SIGSOUND Web page, maintained by Bill Walker. It provides a list of many colleges and universities that offer programs in electronic music. But who knows? You just might find that the World Wide Web offers everything you need. And of course, you can't beat the cost of tuition when you go to school online!

Associate Editor Dennis Miller lives in the suburbs of Boston.

circle #546 on reader service card

West L.A. Music GUARANTEED LOWEST PRICES!

EVERY MAJOR BRAND!

DIGITAL MULTI-TRACK RECORDERS • MIXING CONSOLES
HARD DISC RECORDERS • EFFECTS PROCESSORS • MICROPHONES
DAT AND CASSETTE DECKS • STUDIO MONITORS • CD RECORDERS
COMPUTERS • SOFTWARE • KEYBOARDS • SYNTHESIZERS • SAMPLERS
SOUND SYSTEMS • GUITARS • AMPS • DRUMS AND ACCESSORIES

WE WILL BEAT ANY DEAL!



Mike Inez of Alice in Chains with John Cox of West L.A. Music staff



Brian Auger and Jackson Browne visit with sales mgr. Mark Spiwak



David Silveria of Corn with West L.A. Music's Glenn Noyes.

"WHERE THE PROS SHOP"



We Ship Everywhere! Call Now!

WEST L.A. MUSIC

11345 Santa Monica Blvd. Los Angeles, CA 90025
Two blocks West of the San Diego (405) Freeway
(310) 477-1945 Fax: (310) 477-2476

**ALL MAJOR
CREDIT CARDS,
FINANCING,
AND LEASING.**



SKIMP ON EVERYTHING BUT THE MUSIC. Even if your clothes say "I live in a van" your demo can say "gold record." Just be sure to use the tape more gold records are recorded on, so your music has every opportunity to sound its best. Ask for the Quantegy Professional Studio Series.



Phone: 800-752-0732 Website: www.quantegy.com.

circle #547 on reader service card





Will the Signal Be Unbroken?

Making the right connections with in-line adapters.

By Brian Knave

There's nothing more maddening than getting underway with a recording session only to discover that you can't proceed because you're missing some particular cable, adapter, or other link required to complete the signal path. At best, you have to postpone the session for however long it takes to assemble the piece you need—assuming you have the parts on hand, as well as the tools and skills to assemble them. Then again, you might have to make a run to the closest pro audio or electronics shop, and if you're working nights or weekends, as musi-

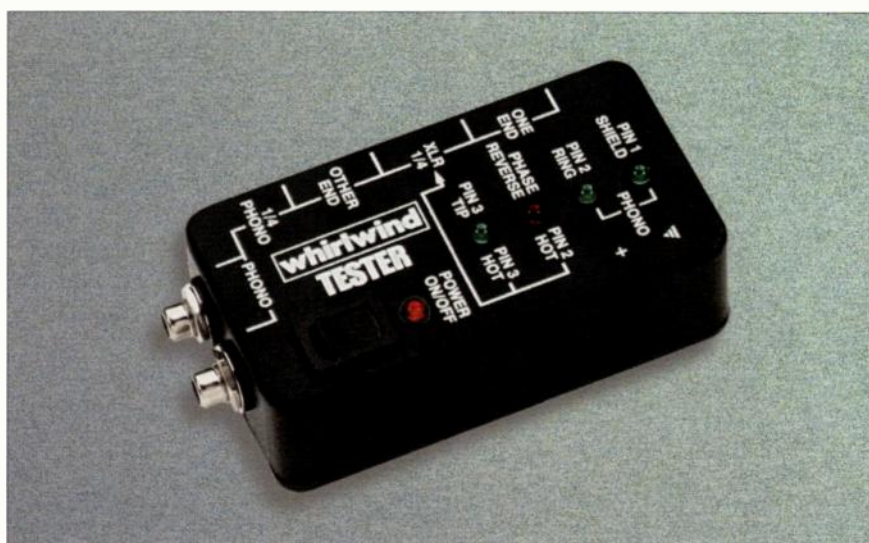
cians tend to do, you may not find the stores open when you need them. At that point, you have little choice but to abort the session—all for lack of a relatively inexpensive accessory that you didn't think to stock up on.

This month, we'll get acquainted with various in-line adapters that facilitate the connections you need to make. Most of these devices can be purchased ready-made from cable manufacturers and distributors or custom ordered. We'll also go over the basics of signal levels, impedance matching, and polarity—issues that are critical to proper connections.

After taking stock of the various connections in your studio as well as the adapters you already own, you can peruse our nifty adapter chart (see **Fig. 1**) to find potential missing links in your selection. If you typically solder your own cables and such, this article may inspire you to make up some of your own adapters. Or if you're too busy to think about adapters, prepackaged assortments are available from avPRO Audio Products Corp. The point is, be prepared. Then you will not only be ready to handle the unexpected, but you'll also have extra tools on hand for creative applications.

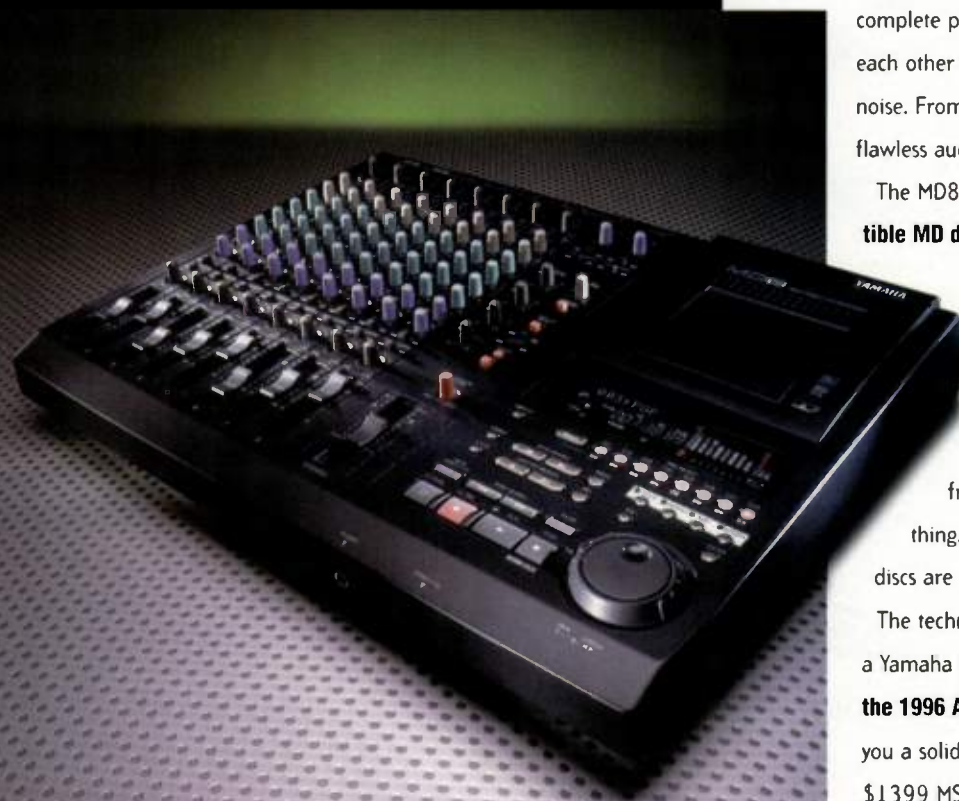
CONNECTOR FEST

To understand audio connections, the place to start is with the connectors themselves. Four types of audio



A cable tester is an invaluable studio tool. Whirlwind's Tester can diagnose shorts, opens (broken contacts), and phase in any combination of XLR, 1/4-inch, or RCA plugs.

You can record on
the Yamaha MD8
digital 8-track recorder
in less time than it
takes to read **this** ad.



There's a lot to be said for digital recording—premium sound quality, enhanced editing, etc.—but one thing

MD8

that's been hard to say,
until now, is EASY. If

you've ever used a cassette multitrack recorder, you'll be up and running on the Yamaha MD8 in the time it takes you to plug in the instruments and mics.

The MD8 can record on eight tracks simultaneously so you can get an entire performance in one pass, then mix and edit completely on the MD8. Sync

up your MIDI device. Punch in and out with complete precision. And bounce tracks onto each other without a free track and without noise. From recording to demo, MD8 gives you flawless audio quality.

The MD8 records to the **virtually indestructible MD data disc**. While a magnet can

instantly wipe out music on cassette, zip™ and jaz™ disks, the MD data disc uses optical technology to protect your music

from nearly everything. And, because the

discs are removable, you can record forever.

The technical experts at EQ magazine voted a Yamaha MD recorder **"Best Product" at the 1996 AES show**. Their blessing assures you a solid, powerful product. And at just \$1399 MSRP, it's absolutely the easiest way to break into digital recording.

Now that you're done reading the ad, hurry to a Yamaha Pro Audio Dealer for the MD8. You'll be well on your way to exceptional digital recordings.



YAMAHA®

©1998 Yamaha Corporation of America, Pro Audio Products,
(800) 937-7171 ext. 659 or visit us at www.yamaha.com.
P.O. Box 6600, Buena Park, CA 90622.

Yamaha is a trademark of Yamaha Corporation.
All other trademarks are property of their respective holders.

circle #548 on reader service card

Adapters from A to Z



a. 3-cond. XLR F to 1/4" TRS M



b. 3-cond. XLR M to 1/4" TRS M



c. 3-cond. XLR F to 1/4" TRS F



d. 3-cond. XLR M to 1/4" TRS F



e. 3-cond. XLR F to RCA M



f. 3-cond. XLR M to RCA M



g. 3-cond. XLR F to RCA F



h. 3-cond. XLR M to RCA F



i. 2-cond. 1/4" F to RCA M



j. RCA F to 2-cond. 1/4" M



k. 2-cond. 1/4" M to 3-cond. 1/4" F



l. 2-cond. 1/4" M to minijack



m. 2-cond. 1/4" F to miniplug



n. 2-cond. minijack to RCA M



o. RCA F to miniplug



p. 2 minijack to microplug



q. microjack to miniplug



r. 3-cond. XLR F to XLR F



s. 3-cond. XLR M to XLR M



t. 2-cond. 1/4" F to 1/4" F



u. 2-cond. 1/4" M to 1/4" M



v. RCA F to RCA F



w. RCA F to 2-cond. 1/4" F



x. Two 2-cond. 1/4" F to 2-cond. 1/4" M



y. Two RCA F to RCA M



z. Two RCA F to 2-cond. 1/4" M

FIG. 1: It doesn't take a genius to determine the connection problems each adapter solves. Except for the invisible part—electricity—the ins and outs tell the whole story.

Someone should build an all-tube guitar amp dedicated to recording.



Signature 284 All Tube Class "A" Stereo Recording Amplifier and Direct Source

lexicon

Lexicon does.

The Signature 284 is the ultimate direct box for guitar, delivering authentic feel and tone in only a fully-cranked, all-tube amp can.

A unique design combines a high-gain preamp with a low-watt, stereo Class "A" power amplifier. The preamp section uses three 12AX7 tubes and incorporates a

switchable high-gain stage and beautifully-voiced tone controls. The stereo amp uses two EL 84 tubes in a Class "A" configuration. A tube-driven stereo effects loop lets you place effects in-line between the preamp and power amp for sonic effects that can't be

obtained at the console. The speaker outputs handle any 8 or 4 ohm guitar cabinets — and built-in speaker loads allow silent recording.

Simultaneous stereo outputs (slave amp and recording) are post power amp — so they carry the sonic signature

of the whole amp, not just the preamp.

When you want to go direct, built-in speaker simulation eliminates the need for mic cabinets — nice when you're the artist, the engineer, and the tech.

Signature 284. An all-tube amp designed to help you record great guitar tracks.



lexicon

Heard In All The Right Places

Lexicon, Inc. • 3 Oak Park, Bedford, MA 01730 • 781/280-0300 • Fax: 781/280-0490 • Email: info@lexicon.com • Web: www.lexicon.com

A Harman International Company

circle #549 on reader service card

connectors dominate the typical personal studio: 1/4-inch (also known as *phone*), 0.141-inch (also known as *mini*, *tini*, or—incorrectly—1/8-inch), RCA (also known as *phono*), and 3-pin XLR (also known as *Cannon*). See the table “Standards, Anyone?” for a rundown of plug types and sizes. For each type of connector there is both a male and female version, known as the *plug* and *jack*, respectively. Obviously, it’s important to be able to interface between these different connectors.

Note also that 1/4-inch and mini connectors come in two flavors: tip-sleeve (TS) and tip-ring-sleeve (TRS). For many applications, a TRS connector can substitute for a TS; however, TS connectors cannot accommodate balanced signals or other 3-conductor applications.

POLAR SHIFT

When signals with opposite polarities are combined, a lot of nasty things can occur. Parts of the signals can be cancelled (hence, made softer) and other parts reinforced (made louder), causing distortion and generally compromising the sound. That’s why it’s advisable—unless you’re intentionally getting wacky—to maintain consistent polarity throughout the recording/playback system.

Polarity is an expression of phase. Both balanced and unbalanced circuits pass audio through two conductors: a positive (also called *high* or *hot*) conductor and a negative (also called *low* or *cold*) conductor. If these two connections are reversed, the signal’s polarity, or phase, is changed by 180 degrees. (Note that polarity is absolute—either “positive” or “negative”—

whereas phase differences may be anywhere between 0 and 360 degrees.)

On the XLR connector for a standard balanced circuit, pins 2 and 3 carry the alternating audio signal. (Pin 1 goes to a shield wire that is connected to ground and carries no signal.) The problem is, manufacturers differ on how they wire pins 2 and 3. Nowadays, most of them wire pin 2 hot and pin 3 cold. This wasn’t always the case, however, and even today, some gear comes with pin 3 wired hot.

Therefore, you should always refer to gear manuals, if only long enough to determine which pin is hot. If the unit is out of phase with the rest of the system and doesn’t have a polarity-reverse switch, then you’re in the market for an in-line device such as the Whirlwind Phase Reverse (see Fig. 2d). If you’re handy with a soldering iron, you can put together your own: simply take a 3-conductor cable and reverse pins 2 and 3 on one end.

KEEP A LEVEL HEAD

Signal levels are typically ranked in four categories: mic level, instrument level, line level, and speaker level. These categories are approximate; they sometimes overlap. Think of the levels from weakest to strongest: mics produce the weakest levels, with passive-instrument



FIG. 2: Whirlwind’s Little Imp (a) is used for connecting low-impedance (low-Z) mics to high-Z inputs. The Imp Pad (b) comes in four models (10, 20, 30, and 40 dB) for attenuating balanced low-Z signals. The Lifter (c) lifts the ground by disconnecting pin 1, and the Phase Reverse (d) works by reversing pins 2 and 3.

levels (e.g., from electric guitar or bass) only slightly hotter, line-level signals hotter still, and speaker levels 10 to 100 times as high as line level.

Mic and instrument levels, therefore, are in roughly the same range, somewhere between, say, -60 dB and -20 dB. (For our purposes, I’m using dB in a loose sense rather than enter the morass of converting dBu to dBV or dBm.) A big—and obvious—difference, however, exists between the cables: most mic cables are 3-conductor, carry balanced signals, and terminate in XLR connectors, whereas instrument cables tend to be the unbalanced, 2-conductor variety terminating in 1/4-inch plugs.

This brings up the purpose of *direct injection* (DI) boxes, commonly called direct boxes. Patching an instrument cable into a direct box accomplishes a few things: first, it converts an unbalanced signal to a balanced one, which allows the signal to be sent over greater distances without picking up RF and other interference (an important application for the stage); also, it lets you run the signal into a microphone preamp via an XLR male connector, allowing you to increase gain on the instrument signal with the mic preamp’s trim pot. This, of course, is a common studio application for recording, say, electric bass direct, i.e., without an amp and speaker cabinet. (See “Square One: Going Direct” in the July 1997 EM for more on DI boxes.)

LINE LEVEL

The standard line level for professional audio equipment is +4 dBu (or dBm,

Standards, Anyone?

If consistency is the hobgoblin of small minds, manufacturers of audio connectors are evidently beacons of broadmindedness. Thankfully, jack tolerances are lax enough—and thousandths of an inch small enough—that miniplugs and microplugs usually work in 3.5 and 2.5 mm jacks, respectively. There is always the risk, however, of signal-transmission intermittency. (Did anyone *really* think the U.S. would adopt the metric system?)

Type of Plug	Diameter
Phone	0.25"
Mini (aka Tini or 1/8")	0.141"
3.5 mm	0.137"
2.5 mm	0.098"
Micro	0.097"

**YOU'VE ALWAYS
WANTED A CROWN AMP.
NOW OWNING ONE IS EASIER
THAN YOU THOUGHT.**

**CROWN CE SERIES.
THE MOST AFFORDABLE
CROWN AMPS EVER.**

You know Crown amps—incredible sound, the ultimate in reliability under grueling conditions and the best support in the business. All good reasons why the world's biggest tours travel with Crown in their racks. You also know that Crown amplifiers can set you back a bit more than other amps.

But now, with the introduction of the new CE Series, Crown performance is available at a very affordable price.

Designed and built for professional use, these amplifiers have the heart and soul of what makes every Crown amp great. They're able to handle real 2 ohm loads and run for hours on end under the toughest conditions. And, they're backed by an exclusive Three-Year, Full, No-Fault Warranty.

Compare the CE1000 and CE2000 head-to-head with the competition and see why Crown is the only serious choice for you. Call us toll-free at 800-342-6939 for your nearest Crown dealer.

2Ω 4Ω 8Ω

CE1000: 560W 450W 275W

CE2000: 975W 660W 400W

CE1000 Bridged: 1100W 900W

CE2000 Bridged: 1950W 1320W



CROWN
Guaranteed Excellence

www.crownaudio.com

which is approximately the same if the impedance is around 600Ω), but for our purposes we'll consider any signal in a range from, say, -30 dB to +10 dB as being line level. Obviously, this includes devices that operate at either -10 dBV or +4 dBu levels as well as any in the general vicinity.

This would also include output signals from many "active" instruments, such as electronic keyboards and those hybrid acoustic/electric guitars that require batteries. The output from these instruments is considerably hotter than the output from a passive instrument. That's why you can typically patch an electronic keyboard directly into an unbalanced, 1/4-inch, line-level jack without needing a preamp to boost the signal.

SPEAKER LEVEL

As noted, speaker levels are quite high compared to mic, instrument, and line levels. You may have noticed, for example, that high-quality speaker cable, though thick, isn't usually shielded. That's because it carries so much signal that it masks RF and other interference. Quality mic and instrument cable, on the other hand, is heavily shielded.

The upshot is that we generally seek to increase microphone, instrument, and line-level signals to speaker levels only at one or two points in the signal path: in the instrument amplifier (going into the speaker cabinet) or in the system power amplifier as it boosts the stereo mix going to the monitors or P.A. system.



FIG. 3: No room for a straight shot? Right-angled adapters such as these made by Carver let you sneak up from the side.

LEVEL WITH ME

Ideally, one would put together studio components that all operate at the same level, either pro (+4 dBu) or semipro (-10 dBV). That way, there's less likelihood of incorrectly interfacing mismatched components—a common source of unwanted noise and signal loss in "newbie" studios. In the real world, though, it's an atypical studio that doesn't sport some mix of pro and semipro gear.

Thankfully, this is far from being the dreaded audio sin that some people make it out to be. In fact, much of the quality gear being made for the personal-studio market today—from recorders and mixers to effects and dynamics processors—can be operated at either level simply by flipping a switch or using alternative I/O.

This much, however, remains true: whether you operate your studio at -10 dBV or +4 dBu levels (and the preponderance of gear usually decides the issue), you should definitely choose one or the other and maintain it throughout the system. That is, any signals with different levels should be converted to match the overall system level using some type of active interface device.

That said, it should also be pointed out that it's wrong—not to mention

pretentious—to regard boxes operating at -10 dBV as inherently inferior to those running at +4 dBu. Properly set up and gain staged, a system running at -10 dBV will not have an appreciably higher noise floor than one running at +4 dBu. The quality of semipro gear has improved so much in the last few years that distinctions between pro and semipro are increasingly meaningless.

ADAPTER FLAVORS

Basic adapters merely convert one type of connector to another without altering the signal. Most adapters have different connectors on either end, although some, called *gender benders* or *couplers*, have the same connector on each end. A female XLR gender bender (see Fig. 1r), for example, when attached to a male XLR connector, reverses the XLR plug's gender (from male to female) without altering its type (3-connector XLR).

Other useful adapters include Y-adapters (see Fig. 1x, y, and z), which allow you to split signals and send them to two different destinations (or, going in the other direction, to merge two signals into one), and right-angled adapters (see Fig. 3), which are convenient for navigating tight spaces.

There are also in-line adapters for special applications. These include ground lifters, pads, phase reversers, and impedance transformers. Not only do these devices typically convert one type of connector to another but they usually also affect the signal in some manner. A pad (see Fig. 2b), for example, attenuates the signal, and a phase reverser (see Fig. 2d) reverses its polarity.

Another example familiar to most everyone is the ubiquitous impedance-matching transformer (see Fig. 2a), commonly used to convert a low-impedance mic signal (terminating in an XLR plug) to a high-impedance signal while also allowing for the cable to be inserted directly into, say, a guitar

BASIC GRAB BAG

Some studios are static (the gear and connections don't change from one session to the next), while others get reconfigured regularly to accommodate outside artists and gear. This makes it difficult to suggest a batch of adapters that will prove sufficient for all studios. Just the same, here are some adapters that I've found useful to have on hand and that almost any studio will have need of at some point.

20 dB pad
ground lifter
phase reverser
impedance transformer (low-Z to high-Z)
1/4" M to RCA F (2 or more)
1/4" F to RCA M (2 or more)

1/4" M to minijack (both TS and TRS)
1/4" F to miniplug (both TS and TRS)
1/4" TRS F to 1/4" TS M (stereo to mono)
gender benders: 1/4" F (2), RCA F (2),
XLR F & M
variety of Y-adapters

INTRODUCING THE MACKIE D8-B. DIGITAL MIXING DEFINED.



The most powerful, intuitive, creative digital console ever offered at any price. Twenty-four-bit definition. The superb sound quality and intuitive interface that Mackie's famous for. Expandable with cards and software plug-ins.

The Digital 8•Bus.
Well worth the wait.



Probably made in Woodinville, USA by certified Mackoids



Woodinville, WA, USA
Phone 800/898-3211
www.mackie.com

© 1998 Mackie Designs. All rights reserved.
"MACKIE" and the "Running Man" figure are
registered trademarks of Mackie Designs Inc.

circle #542 on reader service card

amp via a 1/4-inch plug. Note that this special adapter looks practically identical to the basic adapter depicted in Figure 1a, yet the two devices yield different results. Whereas the basic adapter changes only the connector, the impedance transformer alters the connector *and* the signal.

BIOLOGY LESSON

The adapter part of making connections requires only basic biological reasoning: just remember, plugs are male, jacks are female, and opposites attract! And here's a good thing to know: if you're missing the straightforward adapter for the job, you can usually rig a makeshift by connecting two or more adapters. For example, from the adapters shown in Figure 1, you could connect 1b and 1r to get the equivalent of adapter 1a.

The signal-changing part of making connections, as we've seen, requires a bit more than first-chakra thinking, but it's not exactly rocket science, either. The main thing is to identify which levels are which. Then it's simply a matter of inserting the devices that will make the changes you need. Of course, it's

critical that you listen carefully, too, after making a connection. The whole point, after all, is to route the signal without degrading it or adding noise.

IN-LINE VS. CABLES

Because in-line adapters can be fitted onto existing cables, they are convenient for keeping in the studio toolbox to solve connection problems that

and therefore needs its output signal's polarity reversed), it is generally preferable to use prepared cables (in this case, polarity-reverse cables) rather than in-line adapters connected to existing cables. Not only does this keep the signal path shorter and cleaner (thanks to fewer connection points) but it also puts less strain on the jack (because an adapter adds both weight and length to the cable).

COMPLETED PATH

Hopefully, we've clarified the ground rules for making proper connections using in-line adapters as well as hinted at the range of connection possibilities. Of course, it takes some thought to prepare your studio for the myriad connection applications that can crop up in the course of regular audio production. But by studying the adapters shown here and thinking ahead, you should be able to anticipate most of your needs.

Special thanks to Carl Cornell, Barbara Higgins, Jim Hoffman, Jim Kelsey, David Roudebush, and Jo Wolfe.

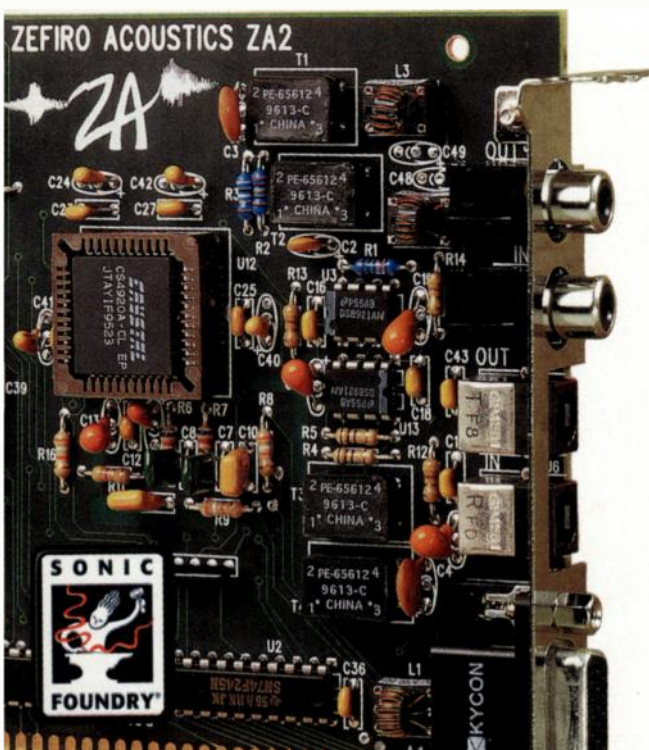
▼
**Maintain consistent
polarity—unless
you're intentionally
getting wacky.**

may arise. However, for certain applications, it may be better to use custom cables.

For example, if a permanently installed processor has special requirements (e.g., the unit is wired pin 3 hot

No Other Card Can Touch It.

With built-in Sample Rate Conversion and Multi-I/O the ZA2 is the Master of CD Mastering.



The ZA-2 includes the professional features the other cards leave out. Its powerful 24-bit DSP sample rate converter lets you take inputs directly from a 48kHz pro DAT or a 32kHz LP DAT, and converts them on the fly to perfect 44.1kHz for CD mastering. Its Multi-I/O configuration gives you AES/EBU on real XLR cables and S/PDIF (both optical and coax) inputs and outputs, plus analog outputs for monitoring. You can use all the inputs and outputs simultaneously to do sample rate or format conversion (for example, S/PDIF in and AES/EBU out) or tricks like managing SCMS, or manipulating DAT start ID's or CD PQ codes — and you can switch back and forth between inputs with just a few mouse clicks.

The ZA2 delivers up to 24-bit recording — beyond the range of any commercially available A/D converters. It also works as a Windows sound card, converting all wave audio data (even mono, 8-bit, or 11kHz) to 16-bit stereo. You get drivers for Win95 and NT, plus Sound Forge XP 4.0 editing software and a discount upgrade path to CD Architect.

Basically, the ZA2 packs in more features than we can cover in an ad. Check it out at <http://www.zefiro.com> or call 714.551.5833 and find out how affordable the right card can be.



Our new InBox has an outstanding mic-pre & built-in 20-bit A/D converter for just \$295!

things that make you go hmmmm...



ASR-X...the ultimate production studio — powerful sequencer, quality sampler/resampler, built-in synth, resonant filters, 24-bit effects, fully expandable, and much more...

Resampling — Any sound, performance or sequence can be resampled to create a new wave. Creating new grooves and loops was never this easy.

Synthesizer Built In — Turn it on and start creating right away with the ASR-X's internal ROM sounds.

Power Sequencing — 16 tracks with 128 sequence locations, song mode, real-time sequence cueing, input quantize, and lots more.

24-Bit Effects — Featuring our powerful 24-bit ESP-2 digital signal processor. You also get 5 stereo busses, including 3 global reverb busses, a dry stereo bus, and an insert effect bus with 40 great-sounding algorithms.

The Coolest Pads — 14 custom designed velocity-sensitive pads; the fastest, most responsive you'll find.

Stereo Sampling — 20-bit A/D converters, 44.1k sample rate, and lots of RAM for the highest quality sampling.

Lots of Expansion Options — User installable options include additional RAM (up to 34 meg), SCSI interface, 8-output expander, and EXP Series wave ROM boards (up too 24 meg).

Standard File Formats — Save sequences as standard MIDI files and samples as AIFF files to easily share data with other sequencers and samplers.

Read Other Sample Formats — Import ASR-10, Akai (S1000/S1100) and Roland sounds for a virtually unlimited library.

hmmmmmm...

ASR



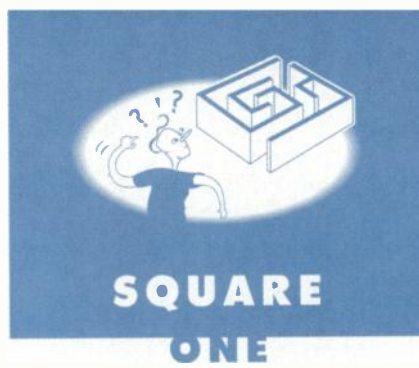
ENSONIQ Corp, 155 Great Valley Parkway, P.O. Box 3035
Malvern, PA 19355-0735 (610) 647-3930 fax: (610) 647-8908

www.ensoniq.com

circle #553 on reader service card

ENSONIQ

LEADING THE WORLD IN SOUND INNOVATION



Music by the Numbers

Algorithms can help you write your next symphony.

By Kristine H. Burns

If you've been using a computer to write music for any length of time, you've probably heard the term *algorithmic composition*. What exactly is an algorithm, and how can you use one to compose music? In this article, I'll define much of the basic terminology related to this technique and will provide you with some ideas for using algorithms in your music. You'll probably be surprised to learn how common this process is and how easily you can find software that lets you experiment with algorithmic composition techniques.

Simply stated, an algorithm is a series of steps or rules that are intended to solve a problem. Computers are particularly good at such tasks, but algorithms were in use thousands of years before computers were invented. Although the term is most commonly associated today with the fields of computer and information science, algorithms are often employed by musicians to help make compositional choices, such as selecting pitches, rhythms, or synthesizer patches. An algorithmic composition is simply one in which some process, whether implemented on the computer or not, is used to assist the composer in generating the material for a piece of music.

Using a programming environment, such as Opcode's *MAX* or the public-domain synthesis language *Csound*, you can create a scenario in which the computer is allowed to play a major role in selecting specific musical elements of a composition. Other, more common programs don't give the computer that much control but still allow you to get the computer involved in the decision-making process. Even adding a small amount of randomness to the timing or pitch of a MIDI sequence, a process commonly known as "humanizing," is algorithmic in a sense. You'll find this feature in some form or another in nearly every sequencer available today.

STEVE RAMIREZ



Need a Miracle?



MUSICIAN'S FRIEND COULD BE THE ANSWER TO YOUR PRAYERS.

It's your **FREE** guide to more than 3,000 of the most popular music gear products at the best prices you'll find anywhere. Mixers, PA systems, keyboards, amps, guitars, cables, lighting packages...everything but the stage.

THE MUSICIAN'S FRIEND BEST PRICE GUARANTEE

- We match any **PUBLISHED** price before or after the sale
- 2-day Express delivery
- 45-day money-back satisfaction guarantee
- Easy payment plan available
- Major credit cards accepted



CALL 1-800 776-5173 NOW & GET THE BEST MUSIC EQUIPMENT CATALOG FREE!

☐ **YES!** Rush me the next 3 editions of

Musician's Friend



Join hundreds of thousands of satisfied musicians in receiving the #1 music catalog, absolutely free! **CALL 1-800-776-5173**

subscribe online at: WWW.MUSICIANSFRIEND.COM

or mail this coupon to:

Musician's Friend, Dept. 36-006 • P.O. Box 4520 • Medford, OR 97501

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

CYBERSHOP ANYTIME ONLINE AT: WWW.MUSICIANSFRIEND.COM

HISTORICAL BACKGROUND

The term "algorithm" has been used for over a thousand years and comes from an Arabic mathematician named Abu Abdullah Muhammad ibn Musa of Khwarizm. His book, *Kitab al-Jabr wal-Muqabala* (*Rules of Reintegration and Reduction*), was the basis for the standardization of Arabic numerals in European mathematics. (Incidentally, the name "al-Jabr" was later reinterpreted as the word "algebra.") The word "algorithm" likely came from the writer's homeland, al-Khwarizm. "Algorism" meant "the Arabic or decimal system of numerals" and eventually was simply renamed "algorithm."

In more recent music history, algorithms refer to something extramusical, such as a mathematical process or program, used to generate music. Such composers as J. S. Bach used the names of people or places to develop melodies. For example, Bach used his own name as the main theme of a composition. (In German notation, the letter *B* represents the note B \flat , and the letter *H* is the note B.) By mapping the letters of the alphabet onto diatonic, or even chromatic, pitches (the letter *A* to the note C, *B* to the note D, and so on), you can generate an endless stream of melodic material.

You might also use numbers to represent pitches. Just as you choose your lotto numbers according to your mom's birthday, try using your phone number as a melody. Simply map every number between zero and nine to a note of the chromatic scale. (Consider the two remaining notes "wild cards," and use them whenever you wish.)

Of course there are many other uses for algorithms in composition. In the examples above, algorithmic methods are used to specify score information only. Many current programs use similar techniques to generate a score for an instrumental selection, whether acoustic or electronic, that has been predetermined by the composer. Other programs use algorithmic processes to

specify the structure of a composition or even sound-synthesis parameters. Synoptic's *Virtual Waves*, for example, uses a process known as *cellular automata* to create the spectrum of a sound. Cellular automata is a type of rule-based process, which is one of the classes of algorithms I'll discuss shortly.

How can a computer make choices, and what are the most common types of processes used for this purpose? The five essential classes of algorithms used by both scientists and musicians are stochastic (pronounced "sto-kas-tik"), chaotic, rule-based, grammars, and artificial intelligence. These are all implemented in different ways and can be used to generate different types of output.

STOCH THE FIRE

Many of the earliest experiments in algorithmic composition were focused around stochastic music and the related areas of statistics and determinism. *Stochastic* means controlled randomness and often involves the use of distribution curves to determine events in a composition (see Fig. 1). Modern composer Iannis Xenakis first promoted the idea of computer-generated stochastic music in his book *Formalized Music*, which was published in 1963 and later translated into English. In certain works, Xenakis used principles of probability theory to control the overall density of his music. He instructed the computer to generate thousands of minute "grains" of sound by following certain guidelines.

For example, if the first section of a piece is very dense, using perhaps 100 events per second, the computer is instructed to limit the number of events in the next section. Then, the computer would calculate the average density of the previous two sections, add some random number to that average value, and use the new number to determine the density of the third section. This same procedure could be used to generate each note's frequency

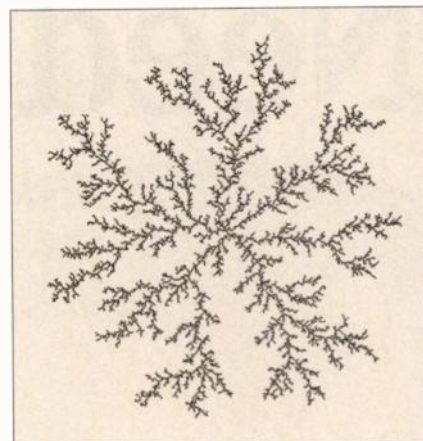


FIG. 2: Fractals often reflect irregularities found in nature and can be useful sources for generating musical material.

or amplitude or even the lengths of the sections themselves. Obviously, this technique changes the role of the composer in writing music. Xenakis was well aware of this and in *Formalized Music* wrote, "With the aid of electronic computers, the composer becomes a sort of pilot: he presses the buttons, introduces coordinates, and supervises the controls of a cosmic vessel sailing in the space of sound."

Though Xenakis has written software for his computer-assisted works, the software is not commercially available for current desktop computers. However, you can experiment with controlled randomness using Karl Essl's *Real Time Composition Library 3.1* for Opcode's *MAX* programming language. This powerful algorithmic system offers numerous distribution curves that can be used to generate many types of musical material.

You can also try out Andre Bartetzki's *Cmask*, a system that uses stochastic processes to generate events for the *Csound* synthesis language. It offers dozens of "tendency masks" that control the distribution of events according to the parameters you define. (*Cmask* works with both the PC and the Macintosh, although the Web page mentions only the Mac version.)

CHAOS THEORY

The second category of algorithmic process is based on chaos theory. Since the 1970s, the scientific community has studied the principles behind irregularities in nature, and recently this study has been applied to musical purposes. One of the most interesting types of chaotic

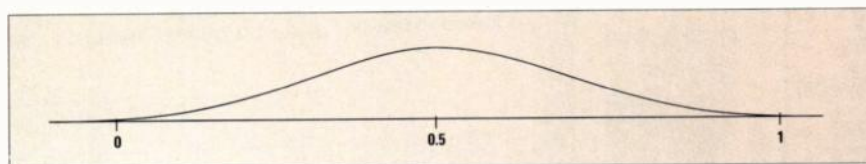


FIG. 1: Distribution curves are used to control the density of a composition's texture in stochastic music. Here, a Gaussian curve will generate a large number of events at its midpoint, with fewer events at the beginning and end of the section it controls.

Pinnacle Project Studio™ for Windows®

instant gratification...

The complete music and audio production solution for Windows®



\$599⁹⁵
MSRP



Turtle Beach™

1-800-233-9377
<http://www.tbeach.com>

Turtle Beach Systems

5 Odell Plaza, Yonkers, NY 10701
(914) 966-0600 • fax: (914) 966-1102

circle #555 on reader service card

Hard-disk recording

- Studio-quality, multitrack digital audio recording with 20 bit stereo converters (>97dB S/N)
- Transfer your music to and from an external DAT with S/PDIF digital I/O
- Award-winning Turtle Beach Hurricane™ Architecture digital audio DSP accelerator

Professional-grade 64 voice wavetable sampling synthesis

- Kurzweil™ 32-voice MASSies™ sampler with channelized FX processors, 4MB of instrument samples and up to 48MB optional sample RAM
- Second Kurzweil 32-voice expander synthesizer module with 4MB of instrument samples

Powerful software suite

- Voyetra's award-winning Digital Orchestrator Plus™ with more than 1000 MIDI and digital audio tracks, digital FX, MIDI transforms, music notation, and more!
- Patch Librarian, patch and sample files
- AudioStation™ system controller
- AudioView™ digital audio editor
- Diagnostic Utilities

Versatile interfacing

- MPU-401 MIDI Port with cable
- S/PDIF digital I/O RCA connectors
- Add more inputs/outputs with Fiji cards
- EIDE CD-ROM interface
- Compatible with Windows® 3.1, 95 and NT 4.0

Pinnacle Project Studio

includes all of the software and hardware you need to turn your Windows® PC into a MIDI and digital audio recording system.

A MIDI interface connects your external keyboard to 64 MIDI voices of pro-quality Kurzweil synthesis.

Build a custom library of instrument samples and store them on your PC's hard drive—or use the hundreds of ROM-based sounds.

Record multi-track guitar, vocals and other audio in sync with MIDI synth tracks.

Add digital FX processing then transfer your CD quality music direct to DAT with the S/PDIF digital interface.

Why settle for a digital audio-only system or a sound card designed to play games? Pinnacle Project Studio is complete, integrated, expandable, affordable and compatible with Windows music software.

Just what you'd expect from the company that pioneered pro-audio hardware for the PC platform.

Turtle Beach.



Powered by
Kurzweil Professional
Digital Audio Sampling
technology



Includes full retail version of Voyetra's award-winning Digital Orchestrator Plus™

Copyright © 1997 Voyetra Technologies Inc. Pinnacle Project Studio, Hurricane, AudioView, and Digital Orchestrator Plus are trademarks of Voyetra Technologies Inc. AudioStation is a registered trademark of Voyetra Technologies Inc. Windows is a registered trademark of Microsoft Corporation. Kurzweil and MASSies are trademarks of Young Chang Akai Co. Ltd. Pricing and specifications subject to change without notice. Turtle Beach Systems is a division of Voyetra Technologies Inc.

Is it the Ad? Or is it the Product?

Samplitude



Record and edit your music on up to 999 tracks with unlimited multiple inputs and outputs. Mix down using the real time mixer, 3 stage parametric EQ, dynamics section, delay, room simulator and more. Master your audio and burn a CD. Professionals will love Samplitude 24/96 with 24 Bit 96 kHz resolution, multiband Dynamics & much, much more!

Samplitude PRO 8 Track \$199
Samplitude Studio \$599
Samplitude 24/96 \$1,499

PRODIG 96 Digital PCI Card



Stereo digital transfer card featuring 20-bit 96kHz analog output, AES/EBU (XLR) and S/PDIF (RCA) breakout cable. High resolution 24-bit 96kHz transfer for mastering, multi tracking. Supported rates: 44.1, 48, 64, 88.2, 96kHz. Use RCA, XLR and optical outputs simultaneously. Mac, 95 & NT drivers.

Prodif 96 Digital PCI Card \$799

SEK'D 24/96 ADDA Converter

High resolution 19" rackmount A/D-D/A Stereo converter. >128 dB Dynamic range. Less than .009 THD+N. Unique feature: Store 24-bit 96kHz audio on regular 16-bit Dat machine! 24-bit 96kHz AD conversion with 135 dB s/n. DA conversion 125 dB s/n! Professional XLR balanced I/O.

24/96 ADDA Converter \$3,990

Prodif Gold, Prodif 32, Prodif 24

Prodif Gold: Alesis ADAT™ 8-channel digital card, full duplex, S/PDIF on RCA's Plug-n-Play PCI. Win '95, NT driver - \$699
Prodif 32: Stereo digital PCI card with optical 16/24 I/O, S/PDIF on RCA's, Unbalanced AES/EBU, Mac, '95, NT driver - \$599
Prodif 24: ISA based DMA card, no IRQ hassles, 24-bit 44.1, 48kHz AES/EBU, S/PDIF, 18-bit analog output, multichannel driver for Win '95 - \$399

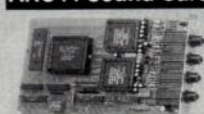
Red Rooster 24-bit



Create true audio CD masters for your fans and mass duplication. Freely place track markers between songs or on live recordings. Only Red Rooster allows you to arrange your audio master piece on multiple tracks.

Red Rooster 16 \$249
Red Rooster 24 \$399

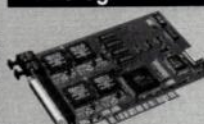
ARC44 Sound Card



Plug your guitar, keyboard or r.c. into the 4 solid 1/4" jacks of the ARC 44. Record and playback 4 tracks simultaneously. Input monitor, hardware resampling, double decker mode for 8 I/O.

ARC 44 Card \$399

Analog ARC88



PCI studio recording card with 8 analog In/Out and digital stereo In/Out. Place up to 3 cards in your PC for 24 channels. Connect via convenient break out cable with 16 female RCA plugs. Full duplex record while play and input monitoring. Connect digital devices via optical stereo I/O with 16 to 24 bit resolution.

Analog ARC 88 Card \$799

O2R Visualizer



Control your Yamaha™ O2R from a PC with the Visualizer. Imagine the O2R displayed as an analog console with all the knobs where you expect them to be. Edit and store your Automix and add 16 new valuable features. Connect from O2R host connector to serial port of your PC via provided cable.

Visualizer \$499



SEK'D America
formerly Hohner Media
P.O. Box 5497
Santa Rosa, CA 95402
Tel. 707-578-2023
Fax 707-578-2025
e-mail: info@sek.com

Visit <http://www.sekd.com> and download free demo software or call:

1-800-330-7753

For more information cut out and send to the above address!

Name _____
Address _____
City _____ State _____ Zip _____
Tel: _____
E-Mail _____

● SQUARE ONE

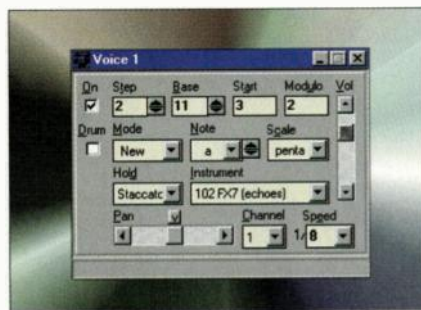


FIG. 3: *MushiNum* generates self-similar patterns that can be mapped onto MIDI notes. The program allows up to sixteen note generators to run simultaneously.

structures is fractals (see Fig. 2). Fractals were categorized by Benoit Mandelbrot in his book, *The Fractal Geometry of Nature*. They are recursive patterns that produce "parent-child" relationships in which the "offspring" replicate the initial structure. In visual art, you can picture this as smaller and smaller offshoots from the original stem.

Computer-music composers have made use of fractal processes and have often translated data from scientific applications to musical ones. How would you use this in a composition? One way would be to write out a series of rhythms and subdivide them into increasingly smaller patterns, all with the same proportions. Composer Charles Dodge used this approach in a composition titled *Profile*, and you can hear how he used fractal patterns in the composition if you listen carefully. You can also experiment with various programs that use fractals as their basis. At the Fractal Music Project Web page, there's a long list of software that incorporates fractal and chaos theory.

Lars Kindermann's *MushiNum* for Windows, for example, generates sequences of binary numbers that it converts into notes. The sequences are self-similar, meaning that the inner ordering of the numbers somehow matches the large-scale arrangement of numbers. For example, take this repeating pattern:

0 1 1 0 1 1 0 1 1 0 1 1 0...

Notice that the sequence 0 1 1 0 not only is found as the first four numbers but also is created by taking every other number:

0 1 1 0 1 1 0 1...

The same pattern can be derived by isolating every fourth number, as well:

0 1 1 0 1 1 0 1 1 0 1 1 0...

Although this simple pattern would sound very repetitive if mapped to MIDI notes, *MushiNum* allows you to create far more complex patterns using its Voice Editor function (see Fig. 3). You can even create sixteen different patterns that run simultaneously!

In addition to software, you'll find an extensive list of references on fractals at the Fractal Music Project home page. Take a look at the article "Recursion: A Paradigm for Future Music?" by Nicholas Mucherino for a very thorough discussion of how mathematical properties can be applied to music.

KNOW THE RULES

The third category of algorithmic processes found in music composition programs is incorporated in rule-based, or *generate and test*, systems. As their name implies, these processes center around a series of tests and are usually constructed in such a way that the product of one step leads to the next. For example, the computer might be asked to generate a random note, and if the note falls within a certain range, it is considered valid and would become part of the composition. But if the note falls outside of the limits set for the process, it would be discarded, and a new note would be generated.

If you've studied music theory, you've probably had to memorize numerous

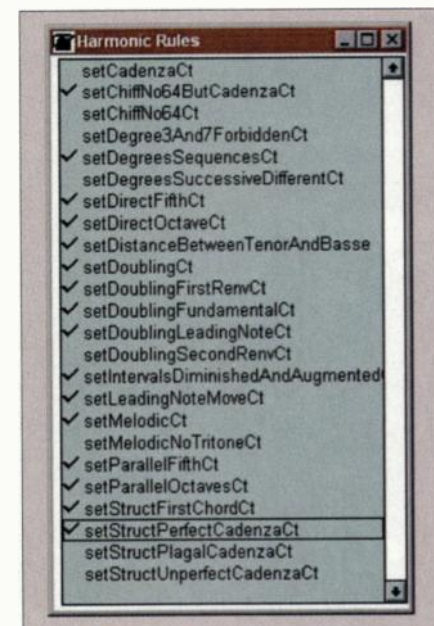


FIG. 4: The Automatic Harmonization System allows the user to select which rules should be imposed by the system as it creates an accompaniment part.

WAKE UP YOUR SUBS!!

 **POWERWAVE**

PROFESSIONAL AMPLIFIER

QSC

POWERLIGHT 2.4MB

2400W

PROTECT

STANDBY

POWER

OFF

Model	Watts per channel		
POWERLIGHT	8Ω	4Ω	2Ω*
2.4MB	1000	1550	2400

*1KHz, 1% THD

AND HEAR YOUR MUSIC COME ALIVE.

Today's subwoofers demand serious power to perform at their peak. That's precisely why we built the PowerLight™ 2.4MB Mono-Block—a single channel amp that delivers a thundering 2,400 watts of power at 2 ohms while operating comfortably on less than 15 amps (120VAC). It's guaranteed to provide a serious wake-up call to your subs. And since it's a QSC, you won't have to worry about them getting any unexpected shut-eye. To learn how PowerLight technology can bring your music to life, visit our website or call (800)854-4079.

"HEAR THE POWER OF TECHNOLOGY"

PowerLight™ 2.4MB Features

- PowerWave™ Technology
- Neutrik "Combo" (XLR & 1/4") and barrier balanced input connectors
- Advanced thermal protection
- Computer Control Data Port
- Patented Output Averaging™ short circuit protection
- "Touch proof" binding post output connectors
- Variable speed fan
- Power standby control
- Clip limiter (user defeatable)
- Detented gain controls
- DC, subsonic and thermal overload protection
- Full LED status array



QSC
AUDIO

www.qscaudio.com

circle #557 on reader service card

"PowerLight", "PowerWave", "Output Averaging", and "Hear the Power of Technology" are trademarks of QSC Audio Products, Inc. "QSC" and the QSC logo are registered with the U.S. Patent and Trademark Office. PowerLight Patents Pending. QSC Audio Products, Inc.: 1675 MacArthur Blvd., Costa Mesa, CA 92626 USA.

WRB

1-888-437-6375

CALL US
NOW

1-888-437-6375

KEYBOARDS
RECORDING
PRO AUDIO



SYNTHESIZERS • DIGITAL PIANOS
PRO AUDIO • SOFTWARE
RECORDING GEAR • SAMPLERS
AMPLIFIERS • MIXERS/ EFFECTS

1-888-437-6375

THE NUMBER
TO CALL FOR THE
ROCK BOTTOM
LOWEST PRICES
ANYWHERE



HERMES MUSIC
7325 SAN PEDRO
SAN ANTONIO, TX 78216
<http://www.hermes-music.com>

1-888-437-6375

● SQUARE ONE

rules for writing in different styles. Many composers have designed programs that automatically generate music in certain definable styles, such as sixteenth-century counterpoint or Bach chorales. Because those types of compositions must follow constrained rules (e.g., no parallel fifths and octaves, and keep your spacing smaller than an octave between consecutive voices), rule-based algorithms make perfect sense for modeling them.

The earliest computer-based algorithmic composition was generated from a system of this type. In 1957, Lejaren Hiller and Leonard Isaacson wrote the "Illiac String Quartet," which is based on rules of sixteenth-century species counterpoint.

A modern rule-based program is the *Automatic Harmonization System (AHS)*, created by François Pachet. Given a single melodic line, the system will harmonize the melody into a 4-part setting that respects all the traditional rules of voice-leading. The user can specify which rules the system should adhere to by selecting them in a dialog box, and of course, you can define your own rules if you wish to expand the system (see Fig. 4).

Though *AHS* is not yet commercially available, you can experiment with rule-based processes using off-the-shelf programs like PG Music's *Band-in-a-Box*. *Band-in-a-Box* and Soundtrek's *The Jammer* follow traditional rules of functional harmony for following chord progressions. You simply tell the program what style you want, which chords to include, and the desired basic orchestration and instrumentation, and the software improvises an accompaniment for you. You can also watch for the forthcoming update of Microworks' *Camps*, a powerful, "intelligent" sequencer that offers such features as auto-voicing and chord detection.

GRAMMAR ROCK

The fourth category of algorithmic processes is called a *grammar*. This category is related to the study of linguistics, which attempts to identify how human language functions. It examines the components of language, how they

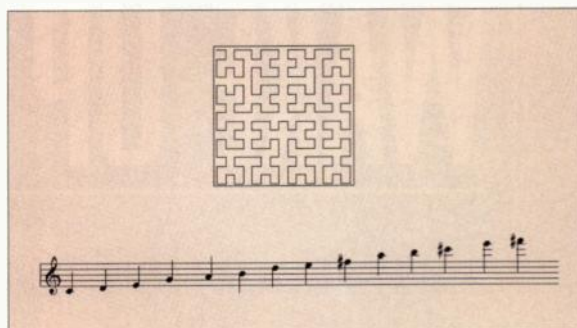


FIG. 5: An L-system image and the scale derived from it, formulated by composer Gary Nelson.

work together as a single unit, and how the components function as single entities within the larger unit.

One type of grammar, called a *formal grammar*, is concerned with establishing a hierarchy of relationships between the whole and its parts. Because music, like language, is made up of small parts that are combined to make larger entities, this type of process works especially well for composing. To use a grammar-based process, a composer would start with a *seed*, which could be a symbol representing a single note, and progress through a series of *generations*, in which each symbol is replaced by a string, or list of symbols.

Imagine that every time you play a note, you add a series of notes to it. For example, for every quarter note (Q) you start with, you then add the pattern "quarter-eighth" (QE). Here's what you would end up with before long:

Q
QQE
QQEQQEE
QQEQQEEQQEQQEE
QQEQQEEQQEQQEEQQEQQEEQQEQQEE

A similar process was used by composer Gary Nelson of the Oberlin Conservatory to compose a piece called "Summer Song" for solo flute (1991). He employed a method called a *Lindenmayer system*, or L-system, which in the visual arts is commonly used to create realistic plant structures. Figure 5 shows the visual equivalent of this grammar and the scale that Nelson derived from it for his piece.

RECEIVE THE KNOWLEDGE

What if a computer could use intuition and logic to create music? With practice, it could "learn" to write original tunes using artificial intelligence.

Knowledge-based, or *Artificial Intelligence (AI)*, systems are those in which

E-mu sound technology moves inside



Introducing the Audio Production Studio

E-mu's Audio Production Studio is a professional, yet affordable musical instrument for your computer—built on a single PCI card that plugs easily into your Windows® 95 computer. The Audio Production Studio integrates sampling, hard-disk recording, sound design, and audio editing to give you the ultimate audio experience from your computer.

And it comes from E-mu—the company that revolutionized the music world with the legendary Emulator *and* broke the price/performance mold for sample playback with the Proteus.

The Audio Production Studio supports: 64 hardware voices • 32 internal plus 16 external MIDI channels • Real-time, multi-channel effects (reverb, compressor, echo, distortion and more!) • Studio-quality, balanced 1/4" analog I/O • 48K digital I/O • 1/4" balanced mic inputs (with 12v phantom power) • Up to 32MB system RAM for samples • Bundled sound design and sequencing software, sounds and more!!

Why play games with your music? Get E-mu's Audio Production Studio—the first serious musical instrument for your computer!

For more information, visit our website at: www.emu.com



E-MU SYSTEMS

P.O. Box 660015, Scotts Valley, CA, USA, 95067-0015 Tel. 408.438.1921 • www.emu.com

London Sales Office: Pinewood Studios, Pinewood Road Iwer, Buckinghamshire, SLO ONH. England. Tel. +44 1753 630808 • Fax +44 1753 652040

computer algorithms are able to learn which solutions are acceptable by undertaking a series of comparisons with preexisting material. This type of programming is often referred to as an "expert system" because it is intended to imitate how a human expert would handle a problem. The underlying premise is that we learn from our mistakes and make better choices the next time.

How would you apply this to a musical situation? Let's say you wanted to create a jazz riff generator. Using an AI process, you could ask the computer

to analyze the style of Charlie Parker, examining in particular his use of intervals, the lengths of phrases, and the contours of his melodies. The system could then use the analysis data to recreate Parker's style.

A similar approach has been employed by a number of composers, including Charles Ames, Otto Laske, and David Cope. Cope has done a significant amount of work analyzing the styles of classical composers, and his Experiments in Musical Intelligence (EMI) system is one of the most fully

developed of its type. A version of the program for the Mac, called *Simple Analytic Recombinant Algorithm (SARA)*, is available at the composer's Web site, where you'll also find MIDI files produced by the program.

AND NOW WHAT?

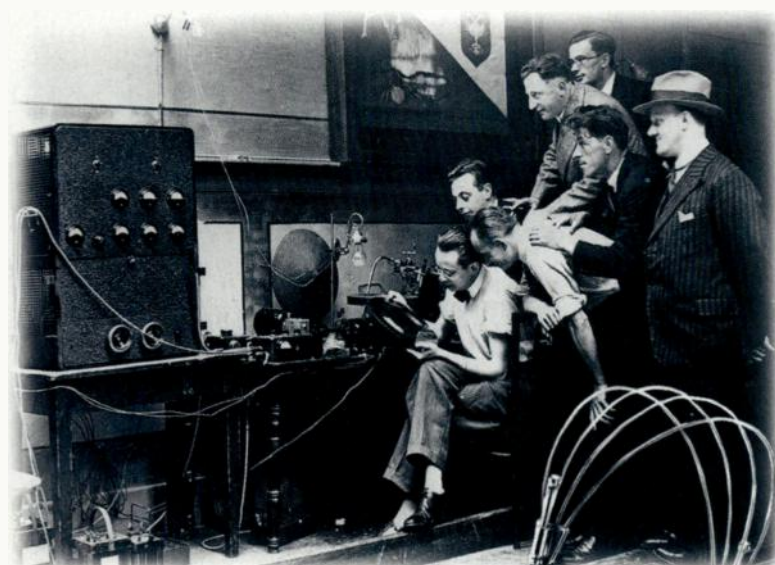
You may be surprised to learn that many of the earliest commercial algorithmic programs are still available. *Music Mouse*, developed by Laurie Spiegel in 1985, is under active development for the Macintosh. David Zicarelli's landmark program *M* was first published by Intelligent Music in 1986 and has recently been upgraded. It is available from Zicarelli's new company, Cycling 74.

You'll also find algorithmic processes in many current MIDI programs. In addition to the humanizing features available in most sequencers, very sophisticated algorithmic tools are available in Steinberg *Cubase's* Interactive Phrase Synthesizer feature (discussed in "Cubist Art" in the August 1996 *EM*). Cakewalk Music Software's *Cakewalk* offers algorithmic processes through its CAL extensions, and even Coda's *Finale* notation program allows you to randomize Note On and Note Off times and Velocity values. There are also dedicated algorithmic programs on the market, such as SSEYO's *Koan Pro*, a system used for an entire album by Brian Eno.

Of course, if you're a real control freak, you can build your own algorithmic processes in Symbolic Sound's Kyma system, one of the most powerful synthesis workstations around. Its developers have built in numerous algorithmic "presets," including several of those described here. You might also experiment with James McCartney's *SuperCollider*, a powerful software-based programming environment for the Macintosh.

Now that you know a bit more about algorithms and how to apply them in composition, go forth to your computers and multiply (and add and subtract). Hey, I never met an algorithm I didn't like!

Kristine H. Burns is currently the director of the Electronic Music Studios at Florida International University and the owner and editor of *WOWEM* (Women On the Web—ElectronMedia) at music.dartmouth.edu/~wowem.



"Eugen Beyer" founder of beyerdynamic, GmbH & Co. shown testing the World's first moving coil headphones.

A Bright Past... A Brilliant Future

Audio history. In 1937, beyerdynamic introduces the world's first moving coil stereo headphone, the legendary DT 48.

Audio future. In 1998, beyerdynamic introduces the world's first digital recording microphone, the MCD 100.

Established in 1924, beyerdynamic's legacy of innovation, fidelity and reliability is recognized and honored by audio professionals around the world. 73 years of audio excellence.

An ear to the past, an eye to the future.

beyerdynamic... Fidelity in Audio.™

for more information

1.800.293.4463
e-mail: salesUSA@beyerdynamic.com
56 Central Ave., Farmingdale, NY 11735

beyerdynamic

A R T
APPLIED RESEARCH AND TECHNOLOGY



Sonic Web Weavers

Do you have a future in music on the Internet?

By Ken Stockwell

Every day, the Internet is maturing. Sound and music are an increasingly integral part of Web sites, and delivery systems are becoming more sophisticated. Clearly, plenty of opportunities will soon be available not only for displaying and distributing music on the Web but also for musicians and music professionals who want to work in the Internet industry.

Recently, I spoke with a few Web experts working with music in various

fields. I wanted to find out what ways of making money are available right now for musicians who want to work in the Web industry. Then, I got their speculations on what the future will hold for music on the Web and the role musicians will play. These experts also dished out some practical advice for musicians who want to get involved with and learn about forging a career in this industry.

ON THE BRINK

Even though most people know him from his "She Blinded Me with Science" days, Thomas Dolby Robertson has made quite a name for himself in the Internet industry with his company, Headspace (www.headspace.com), and its flagship product, Beatnik. Beatnik includes a music editor and browser plug-in that enables sound to be sent over the

Web without the daunting file sizes and download times of other file formats.

"I think the inherent advantage of the Internet for music distribution is that you don't have to send a recorded master to a plant where it is stamped onto plastic, put in a box, and shipped to a record store," he points out.

"With the hit of a button, people can download music in their own homes."

Robertson explains that right now a record store's stock is restricted by the



Last year, Duran Duran tested the waters of music distribution over the Internet with their hit single "Electric Barbarella." The band distributed an "Internet-only mix" of the single on their Web site before they released the CD version.

Best Mics on Record

Extra large 1.5 inch hand tooled solid brass capsule!

Extra thin 3 micron gold evaporated Mylar diaphragm precisely tensioned by hand for close matching of capsules, within 1 dB!

Specially developed, custom tooled shock absorbing capsule mounting system using patented Sorbothane material.

Our unique and specially designed dual stage Mu follower circuitry offers extremely low distortion specifications from the preamplifier section, typically less than .03% THD!

Specially made and hand selected Groove Tubes 6201M dual triode offers rich tone with lowest possible self noise, broad frequency response and wide dynamic range.

Specially designed pure nickel core Cinemag output transformer hand wound by Tom Richenbach offers lowest distortion specs possible!

Only high tolerance passive components are used in GT's unique tube circuitry designs!

Internal polarization voltage regulator allows precise capsule matching for stereo pair applications.

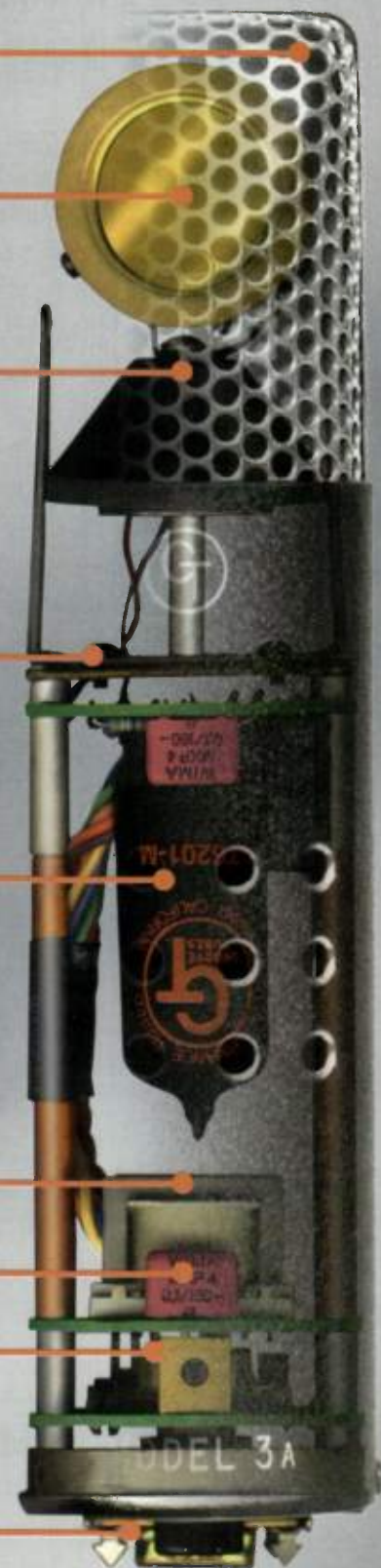
GT's unique sensitivity control allows for capsule sensitivity reduction in 10 stepped positions of 2 dB for a possible 20 dB total reduction, capable of recording signals up to 150dB SPL!

Groove Tubes

12866 Foothill Blvd. • Sylmar, CA 91342
Tel: 818-361-4500 • Fax: 818-365-9884
www.groovetubes.com
e-mail: GrooveTube @ AOL.com

circle #562 on reader service card

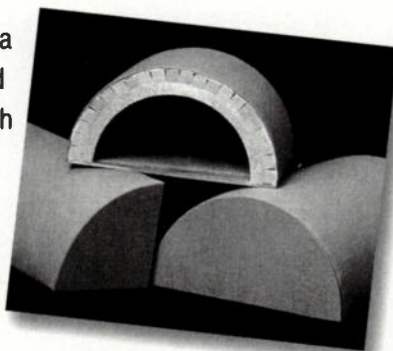
Each GT PS2M power supply can support any two GT tube microphones with 100% isolation. Just one supply works for Stereo and/or MS recording!





If only they'd work on your mother-in-law.

Geometrix sound absorbers can turn a lion's roar to a cat's meow. Constructed from 1" thick acoustical glass fiber with wooden supports, they are covered with Guilford of Maine fabric in your choice of 60 colors. ▲ Wall, corner and ceiling applications. Standard size 16" diameter x 48" high. Other lengths available ▲ .84 absorption at 125 Hz. Outstanding performance in all frequency ranges. ▲ Come to think of it, don't know why they wouldn't work on your mother-in-law. But you might have to buy two. ▲ Call for details and spec sheet.



Toll Free

1-888-765-2900

Acoustics First Corporation

2247 Tomlyn Street
Richmond, VA 23230-3334 USA
Fax: 804-342-1107
E-mail: acoustics@i2020.net
Web: <http://www.acousticsfirst.com>

circle #563 on reader service card

Practice Safe SoundSM

For more information
on protecting your
hearing call:



...HEARING IS PRICELESS

A Program of the House Ear Institute,
Los Angeles

213-483-4431

or write for Free Ear Filters

2100 W. Third Street,
Los Angeles, CA 90057



Nathan East • Bass Player: Fourplay
HIP Advisory Board Member.

SM APHEX SYSTEMS, LTD. • Photo: Alex Berliner/Berliner Studios

● WORKING MUSICIAN

store's physical space. Furthermore, record labels can only support a limited number of albums at one time, and they decline to manufacture more copies of an album once sales taper off. He says that, because distribution over the Web cuts out almost all manufacturing costs, records don't have to go out of print any more.

The Web also offers musicians the chance to get their music to the public without going through these traditional channels. Says Robertson, "Right now, filters are in place: the record label, the A&R rep, the retail-store manager, and the radio programmer all take a part in deciding what music gets heard by the public. And we all know that sometimes means the best artists don't necessarily get the attention they deserve. But the Internet is the 'Great Leveler,' and I hope it will enable the cream to rise to the surface, so to speak."

Robertson feels there's an opportunity for music to play an active role in every Web page. "The general tendency is to attempt to make the Web more like TV, and people are starting to realize how important sound and music will be to communicating their messages," he says. "In the not-too-distant future, I think we'll be looking back on the 'Silent Era of the Web' much like we look back on the film industry before the development of sound. In ten years, interactive audio will be an everyday occurrence—simply everything will be sonified."

Travis Curl is a musician, virtual-reality modeling language (VRML) programmer, and Web designer who has worked with electronic music for the last decade. But he doesn't put out CDs; he uses music in Web sites he develops. He got into the Web industry five years ago when he worked for a company called Hollywood Online that developed interactive movie trailers for major motion pictures. After that, he began freelancing as a Web designer and builder. At press time, Curl was launching www.spunmusic.com, a resource for musicians to upload and exchange their MIDI files. With streaming channels that keep download time short, users will be able to listen to continuous music while 3-D VRML content is generated to go with it.

Curl points out that the Web has just arrived at the point where the technology allows for decent-quality audio. "It hasn't been until this year that we've



DOUGLAS KIRKLAND

Thomas Dolby Robertson founded Headspace in 1993. The company's Beatnik music editor and browser plug-in allow sound to be downloaded or played over the Web without the massive file sizes and download times of other file formats.

really started to see people use audio on their Web sites," he explains. "Up to this point, it's been a silent excursion. We're limited to button sounds and other 'little' sounds right now, but it's only a matter of time before we overcome the major bandwidth constraints and start to see background ambient music throughout a site."

The new Sound Font technology could, according to Curl, hold the biggest potential for music on the Web in the next ten years. Sound Fonts are basically samples converted to tiny WAV files that are triggered by MIDI files. When a MIDI file is downloaded from a Web page, these WAV files will be downloaded with it, allowing any computer to play back an exact representation of what the artist created. Curl says this technology will enable him to take a 5-minute song file that would normally be at least 20 MB (making it unsuitable for up- or downloading on the Web) and get it down to less than 500 KB.

"With this new technology, we'll see the end of the rinky-dink General MIDI songs that are really the only choice available for displaying music on the Web now," he says. "I'd say that within a year's time, you'll be able to put your average song on the Web and get an accurate representation of it, which holds huge potential for musicians."

Darren Gibbs is a senior engineer and sound designer at Purple Moon (www.purple-moon.com), a company that creates educational games and

other online experiences for preadolescent girls. His work in graduate school with music programming and chaos theory led him to a position at game developer 3DO, where he produced audio, wrote tools, and worked with compression. He also developed the audio portion of 3DO's proprietary architecture that provided synchronized streaming services for their game-playing box. At Purple Moon, Gibbs is charged with enabling audio in all ways, including audio production, programming, and sound management.

Gibbs's hope for music since the beginning of Web development has been that we will see the end of traditional music publishing and have a more direct line between artists and audiences. "Because no substantial cost is involved in getting your music out on the Web, I hope that we will one day see the end of the middleman," he says. "Right now the biggest problem is that no one has come up with a viable sound-compression scheme. Beatnik is a huge step in the right direction, but for now, sonic Web pages are only *just* starting to happen."

He believes that once browsers better support sound and a competent, high-quality audio-compression scheme is developed, we'll begin to see a whole new audio discipline. People know what sound is like in movies and radio, but not many have explored how sound can be used as an interface or looked into ways of representing data through sound with spatialized 3-D interfaces.

Record Deals.

Publishing Deals.

Film/TV Music Deals.

Foreign Deals.

We're Not Kidding...

But you won't know that unless you call this toll-free number and request our FREE information kit.

1-800-458-2111



TAXI

The Leader in Independent A&R

circle #564 on reader service card

Bill Woods, director of marketing at Liquid Audio (www.liquidaudio.com), started his music career as a percussionist playing everything from symphonic music to rock. He migrated to the San Francisco Bay Area, where he helped market Studer's DAW development and then moved on to Digidesign. It was from there that he came to Liquid Audio, whose streaming-audio technology he hopes will forever change the way music is distributed.

Woods is very excited about the Web's distribution capabilities and sees the future of music changing dramatically once the first artist attains popularity solely through the Internet, which he thinks will happen soon. He agrees with Robertson, "There simply will be more options for artists. The Web will be an excellent opportunity to avoid A&R reps, record labels, distributors, and all the others and still reach a substantial audience."

With the availability of greater bandwidth (e.g., digital lines and cable modems) and the increasing affordability of CD burners, more and more people will be buying their albums at home over the Web. "Some people will cease to go to record stores, but I don't think this will happen in the near future," ventures Woods. He doesn't think this threatens retail stores because the shopping experience can't be replaced. He equates it to the worries the movie industry expressed when video rental became popular: "But the film industry is doing better than ever because of the money made through the video market."

CAREER OPPORTUNITIES

Everyone I spoke with said that the work opportunities at their companies for musicians are slim right now. Liquid Audio lists job openings on their Web site, but unless you have DAW engineering experience, you'll have to look elsewhere. At Headspace, about three-fourths of the employees are musicians and a quarter of them have played music professionally, but the company only employs four or five in-house musicians and sound designers.

However, Robertson sees a bright future as audio explodes onto the Web. "Both Netscape and Microsoft are integrating technology into their browsers that will pick up plug-ins 'on the fly,' meaning the browser will read the necessary plug-in like any other media



Many Web sites, including Purple Moon, whose home page is shown above, are increasingly using music and sound design to punch up their pages.

file that is being loaded to display a Web page," he explains. "When this happens, we will begin to see Web site design firms incorporating sound and music into their development effort, and they will begin to hire sound designers and composers." In the meantime, he sees increasing opportunities for musicians with personal studios working as contractors to design firms as well as licensing and publishing their music on the Web.

Curl says that the development of audio on the Web will be much like what we saw in CD-ROM development, in which games such as *Myst* used advanced audio to create and enhance an environment. He believes that the new-media departments of design companies and ad agencies will eventually be at a point where CD-ROM firms are now. "Most CD-ROM companies have a sound designer and a musician in-house, and there's definitely going to be an opportunity for at least one musician per Web development house in the near future," he says. "Frankly, I'm amazed that this isn't going on right now. We can't sit in silence much longer."

At Purple Moon, most of the sound and music come from independent contractors; currently only two in-house people are focused on audio: Gibbs, who reviews and coordinates sound coming in from contractors, and a sound designer, who works on games and sound-effects management. Eventually he sees a place in the company

for an "audio creative director" to oversee creative development and decide the role and place of music in Purple Moon's products and Web site.

Gibbs doesn't see many opportunities in the near future for making money in music for the Web, but he does see an immediate need for sound designers who work much like software interface designers. "As the Web gets faster and some standards are set, it will evolve into something that lets you tell stories in new and interesting ways. More sound designers will be needed."

THE SKILL SET

So what kinds of skills will be necessary for someone who wants to work with music for the Web in the coming decade? Robertson says that music and sound engineering skills will always be applicable. He adds, "An understanding of basic Web authoring tools such as Macromedia *Dreamweaver*, Random Noise *Coda*, and NetObjects *Fusion* is important because the trend toward using computers to manipulate sound will only get bigger. An understanding of JavaScript is crucial because, for the foreseeable future, it will be the 'wiring' between elements on a Web page."

Woods offers simple advice: Learn as much as you possibly can about music technology. But he also adds, "If you're interested in promoting your music on the Web, it would help to learn about eCommerce, client server technology, sound design, music theory, multimedia,

SOLIDTUBE

EXPERIENCE THE WARMTH



AKG Acoustics,
the leader in studio
microphones for over
50 years, proudly brings
you the latest in tube
microphone technology,
the **SOLIDTUBE**



A full complement of
accessories is included
with every **SOLIDTUBE**.



AKG Acoustics, A Division of Harman Pro North America, 1449 Donelson Pike,
Nashville, TN 37217, phone: 615-360-0499, fax: 615-360-0275
AKG Acoustics GmbH, Vienna/Austria/Europe, <http://www.akg-acoustics.com>

circle #561 on reader service card

H A Harman International Company

America's Largest Volume Dealer is Now a Part of
America's Largest Musical Instrument Chain

Guitar Center's RHYTHM CITY

- MORE BUYING POWER!
- MORE GEAR!
- MORE SAVINGS!

- All Major Brands • New and Used
- All Major Credit Cards Accepted
- Easy Terms-Financing Available
- Professional Sales Staff • Speedy Shipping

GUITARS
AMPS
KEYBOARDS
RECORDING EQUIP
EFFECTS
ACCESSORIES
KEYBOARDS
D.J.
LIGHTING
P.A.
DRUMS
PERCUSSION

**NOBODY BEATS
OUR PRICES!**

(404) 320-SALE
1485 Northeast Expressway
Atlanta, GA 30329
www.musician.com

● WORKING MUSICIAN

and the fundamentals of digital audio." He also advises aspiring Web musicians to look into colleges that teach pro audio courses and are now addressing audio for the Web.

Gibbs advises that, in addition to being educated in music and composing, it is important to understand the limitations of technology. "In my seven years in the industry, I've seen two types of people: technical and creative. We really need more people who understand the artistic implications of technology as well as the technical constraints and mechanisms required to work in this medium. If you are a musician, understanding the technical stuff helps you to better understand the parameters of how your creativity can be conveyed. You must cross boundaries; an incredible synergistic energy occurs when creatives and techies can speak the same language."

Curl thinks that within the next year we'll start to see job descriptions popping up for Web-based sound designers and musicians. "Those types of people are going to have to become very familiar not only with creating electronic music but also with the different forms of compression, how to embed files into pages, and how design theory and visual design work with sound design to create a mood or experience." He stresses that, in addition to a knowledge of design, a thorough understanding of MIDI, file formats, and compression is necessary.

If anything is certain, it is that the next decade will hold abundant opportunities for creating sound and music over the Web in a variety of ways. The only rules right now are *learn how to use the tools and forge your own way*. Curl emphasizes that musicians must play an active role in shaping the direction that music on the Internet will take. "It's going to be a pretty exciting decade for sure, and there will be a lot of opportunities for electronic musicians. But it's going to take a lot from all of us to push for interesting careers in music on the Web. So my advice to everyone would be to put up your stuff wherever you can, however you can, and work to develop tools that other musicians are going to want to use."

Ken Stockwell writes *eMusician.com*'s "Perspectives" column and is a musician and partner in Silly Bird Records, an independent label. He lives in New York City.

Your Lyrics Could Win!

Think you've got what it takes to write a hit? Here's your chance to find out — in the **Association of Songwriters and Lyricists 1998 National Competition**. You are invited to submit original song lyrics for consideration by our leading panel of experts. Selected lyrics will be published in our new anthology, *On The Road*, the premiere showcase for talented songwriters across the nation!

Here's the chance you've been waiting for —

The Association of Songwriters and Lyricists, a division of United Recording Artists Network, is committed to helping aspiring songwriters.

\$1,000 Grand Prize and the coveted Crystal Music Award

If your entry is selected, as Grand Prize winner you will receive \$1,000 cash plus the coveted Crystal Music Award and publication in the A.S.L. anthology of contemporary talented lyricists. 99 runners up will also be published. Send us your lyrics today!



Competition Rules

1. Submit only one original song lyrics, no music, 20 lines or fewer, printed or typed, any subject or style.
2. **Competition deadline: May 27, 1998**
3. To be accepted, entries must be legible and cannot contain profanity.
4. Entrants under 18 years old must include parent's name.
5. Up to 20 competitions may be held this year, each with a \$1,000 Grand Prize plus the Crystal Music Award and 99 Runners up awards.
6. No entry fee or purchase required. All winners are published. The competition is open to all unpublished and published lyricists except current and former employees of A.S.L. and their families. Authors retain all rights to their work.
7. Place your full name, telephone number and complete address on the same sheet of paper as your song.
8. **Mail your entry to:**
Association of Songwriters and Lyricists
Competition ULA-139
7095 Hollywood Blvd., #1000
Los Angeles, CA 90028

Or submit your entry through our website at www.song-lyrics.com

IMAGINE THE POSSIBILITIES



QUIKLOK

"Stands Apart From the Rest"



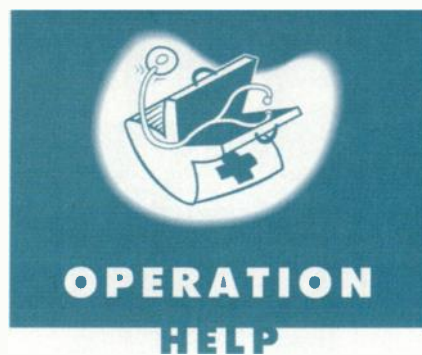
Stop by our web site to
check out our complete line
of QUIKLOK Products and
to discover our other great
professional products.

www.musicindustries.com

MUSIC INDUSTRIES CORPORATION

99 TULIP AVENUE • SUITE 101 FLORAL PARK • NEW YORK 11001
516-352-4110 • 800-431-6699 • fax: 516-352-0754

www.musicindustries.com



Expert Advice

Introducing EM's new grab bag of useful tips and techniques.

Compiled by Steve Oppenheimer

Welcome to the first installation of the new "Operation Help"! This column will present a variety of product pointers, often from the manufacturers themselves. We'll offer something of use to every reader, and we'll plan return visits for especially popular products.

This month, we offer tips for Cakewalk Music Software's *Cakewalk* digital audio sequencers, Steinberg's *ReBirth* software synth, TASCAM's DA-38 modular digital multitrack tape recorder, and E-mu's ESI-4000 sampler and Darwin hard-disk recorder. This month's tips were supplied by the products' manufacturers and their extended "families," but future columns will also in-

clude tips from **EM** editors and authors.

We invite our readers to contribute tips; just e-mail them to emeditorial@cardinal.com. (Please make sure you express your ideas clearly and give us tips that really work!)

DA-38 COMPOSITE TRACKS

The TASCAM DA-38's Digital Track Copy feature works in tandem with the Punch In/Out (Auto or Manual) function. Let's say tracks 1, 2, and 3 each represent a 16-bar guitar solo. On track 1, you like the first eight bars, but on track 2, you like the next six measures. Track 3, however, has the best exit out of the solo. You want to create a composite of these three tracks that represents the "best of" performance.

For each track segment that you intend to copy, set up the Digital Track Copy feature as follows:

1. Press SHIFT; the Digital Track Copy LED will blink.
2. Press the TRK COPY key; the display will read "tr.cp.off."
3. Press the Up Arrow key to turn the function on.
4. Press the REC FUNCTION switch that corresponds to the desired Destination track; its LED will blink.
5. Press the Up Arrow key successively until the far right area of the display identifies the Source track by number. This is represented on the display by "t1" through "t8." (For example, "tr.cp.6 t2" means track 6 is the Destination, and track 2 is the Source.)



The TASCAM DA-38's Digital Track Copy and Punch In/Out features can be used to create composite "best of" tracks.

GROOVE



The Rhythm of your mind can now become reality. With 64 voice polyphony, radical new effects, steeper resonance multimode filters, MegaMix, part Mixer, MIDI control and expandable memory/storage for your patches and patterns. Add the innovative on-board infrared D-Beam™ control system and the MC-505 becomes the ultimate synthesizer, sequencer and drum machine tool for laying down your definition of Groove.



Roland
www.rolandgroove.com

D-Beam is a trademark of Interdimension Light, Inc.

circle #569 on reader service card

● OPERATION HELP

6. Press PLAY and REC; the DA-38 will digitally copy the selected Source material.

To do the desired punch in/out recording, you'll need to define your In and Out points at measures 1 and 9 for the material from track 1. For the material on track 2, define the In and Out points at measures 9 and 15. Finally, for the last two measures of the solo, define your Punch points at measures 15 and 17.

After executing these three punch recordings, the source material from each track will have been placed onto the destination track that you specified in step 3 of our procedure.—*Courtesy Roger Maycock, TASCAM/TEAC Professional*

ESI-4000 PAD/LEAD/ORGAN

Just follow these steps to create a great pad/lead/organ sound using E-mu's ESI-4000 sampler:

1. Start by loading the ESI-4000 Bank from Zip or floppy disk.
2. Next, go to preset 042 "Warm Me Up."
3. We're going to link preset 042 with preset 017 "Street Bass FX." To accomplish this link, press Preset Definition, then press 6 VelSwitchPt/Link, and cursor down once. Turn the data wheel to select 017 "Street Bass FX" and press Enter; then press Preset Definition again.
4. Next, we'll change the modulation wheel on "Street Bass FX" to control the LFO-> VCA. First go to preset 017 "Street Bass



Although the E-mu Darwin's Version feature is generally used to create alternative mixes and composite tracks, you can also use it to create a 24-track mix. The key is to carefully plan your submixes.

FX" and press Preset Definition; then press 0 Realtime Controls, and press 2 to select the Mod Control. Now cursor down to select the destination of the mod control. Use the data wheel to select 6 LFO-> VCA, and press Preset Definition again.

5. Finally, go to preset 042 "Warm Me Up" again, and have a listen. Check out what the modulation wheel does for the sound. And don't forget, you have to save it if you want to keep it!—*Courtesy John Stoneham of Stoneham Design, and E-mu Systems*

REBIRTH S&H EFFECTS

To get really cool vintage sample-and-hold effects with Steinberg's *ReBirth* (developed by Propellerheads), set up a droning note and run it through the PCF as follows:

1. Clear a Pattern in one synth section by pulling down the Clear Pattern option from the Edit menu.

2. In the Pattern box (just to the left of the synth), click on the down arrow to reduce the number of steps in that pattern all the way down to 1.
3. Click on a key on the 303 keyboard to select any note. Click on the Rest button above Accent and Slide to activate the note for the whole first step. Then click on Slide to activate it for the whole first step. (This is necessary to give you the droning, sustaining note that you will send to the filter.)
4. In the Mix box just to the right of the synth, click on PCF to send the sound to the Pattern Controlled Filter.
5. Make sure the PCF is on by clicking on the indicator in the upper left-hand corner of the PCF section. Click on the arrows next to Pattern to select a Pattern above 18. Click on the sliders and set Freq all the way down, set any amount of Q, set Amt all the way up, and set Dec somewhere in the middle.
6. Hit Play and mess around with the controls in the 303 synth section and the sliders in the PCF section. Also try different PCF Patterns that will give you those sample-and-hold effects.

This tip requires Steinberg *ReBirth* v. 1.5 and works on the commercial and demo versions as well as on Mods. The software can be downloaded from www.us.steinberg.net.—*Courtesy Ernst Nathorst-Boos of Propellerheads, and Steinberg North America*

CAKEWALK'S SUPPORT FOR REALAUDIO AND REALMEDIA

All *Cakewalk* 6.0 products let you create RealAudio and RealMedia files, allowing you to stream music and sound from Internet sites. RealMedia is RealNetworks' enhanced version of RealAudio, which allows you to stream synchronized audio and MIDI from Web sites.



You can create RealAudio files in four easy steps using any level of Cakewalk Music Software's *Cakewalk* 6.0 digital audio sequencer.

A real musician talks about Reality™



Anthony Lombardi

Reality User

Hobbyist, Student, NASA Intern

Toolbox

Reality, Pentium® 200 MMX PC,

Cakewalk, Kurzweil™ K2000



Works with most soundcards!

"I first heard about Reality

online from Harmony Central®. It looked like it had a lot of potential. The price was good, considering what it could do and I did not want to spend \$1000 on a new keyboard."

Anthony creates entire pieces using just Reality and Cakewalk™. "Reality and Cakewalk work great together. Very straightforward—Reality shows up in Cakewalk as an instrument. The ability to make a song from start to finish, then burn it on a CD is a real good thing. Get's the whole job done."

"The sounds are very important. I spend a lot of time searching for the right sound, and if I don't have it already, Reality has the tools to make one."

"I am interested in physical modeling and the different types of synthesis. The FM synthesis is really good. Reality doesn't just do one thing. It's an all-around synth."

"Reality's real-time playing is very important, especially for solos. Also if you are playing out, it must be real time. I haven't detected any lag at all in terms of hitting the key and getting the sound."

"I don't think there is any synthesizer product to compare to Reality for the price/performance."

Reality—the PC-based synthesizer from Seer Systems. Reality puts sample playback, FM synthesis, physical modeling, and analog synthesis at your fingertips for sequencing, live performance, or programming, and comes with its own library of sounds.

For more information about Seer Systems or Anthony, visit our website at www.seersystems.com or call us toll-free at 888.232.7337.



301 South San Antonio Road, Los Altos, CA 94022

The Hunt Is Over

...for Music Software,
Hardware, & Everything
You Need to Make Your
Computer Musical!

SEK'D•PG MUSIC•STEINBERG•ANTEX
CAKEWALK•OPCODE•ADB•MUSITEK
MOTU•FATAR•CODA•CREAMWARE
DIGITAL AUDIO LABS•PASSPORT

Hard Disk Recording • Notation Programs

Midi Software • Interfaces/Soundcards

ZERO•EVENT•ARS NOVA•EMAGIC
MIDIMAN•TURTLE BEACH•YAMAHA
DIGIDESIGN•SONIC FOUNDRY•BIAS
SONORUS•ALM•WAVES & MORE

THE CATALOG

40 pages packed with a jaw-dropping selection of software and hardware for your home or project studio. Filled with product descriptions, comparison charts and, believe it or not, prices. Yours free for the asking!



THE WEBSITE

You'll want to bookmark this one—we keep our website updated weekly with the most current prices and selection. Stop by and check out our specials, read complete product descriptions and specs, download demos of programs you're interested in, and even make your purchase online.

THE PEOPLE

Without a guide, choosing the right additions to your studio can be a frustrating and time consuming experience. Give us a call for friendly, expert advice from musicians who use this technology in their own studios.

Because when you're tracking down the right gear—it's a jungle out there!

SOUND CHASER
MUSIC SOFTWARE

800-549-4371

www.soundchaser.com

tech support 707 826-2993

FAX 707 826-2994

1175 G St., Suite C • Arcata, CA 95521

● OPERATION HELP

Here are the steps for creating RealAudio files in *Cakewalk 6.0*:

1. Select the audio you wish to convert.
2. Select File/Utilities/Export Audio.
3. Choose RealAudio under Save as Type.
4. Name your file and click Save.

If you want to create RealMedia files in *Cakewalk 6.0*, do the following:

1. Select File/Save As.
2. Choose RealMedia Metafile (RTSL) under Save as Type.
3. Name your file and click Save.

—Courtesy Carl Jacobson,
Cakewalk Music Software



Steinberg's *ReBirth 1.5* has a pattern-controlled filter (PCF) that can be used to create vintage sample-and-hold effects. This works with both the commercial and the shareware versions of the program as well as with the third-party Mod versions.

To record all of these tracks on a single Darwin:

1. Create four Versions labeled Drums, Guitar/Keys, Reference, and Final Mix.
2. Select the Drums Version, and record the six drum tracks on tracks 1 to 6. Mix these (adding reverb, etc.) to tracks 7 and 8 to create a stereo drum mix.
3. Copy the drum mix (tracks 7 and 8). Select the Version called Guitar/Keys, and use the Replace command to paste the drums on tracks 7 and 8.
4. Now record the six tracks of guitars and keyboards on tracks 1 to 6. Mix these six tracks to tracks 7 and 8, replacing the drum tracks.
5. Select the Reference Version, and then copy the drum and guitar submixes to tracks 1 to 4. Mix these to tracks 7 and 8; this will create a reference submix of these tracks to use for recording the other tracks.
6. Create two new Versions (from the Reference Version), and label them BG Vocals and Lead Vocals.
7. Select the BG Vocals Version, and record the three background vocal parts; then double each of them, using tracks 1 to 6. Mix the six background vocal tracks to tracks 7 and 8, replacing the Reference tracks.
8. Select the Lead Vocals Version and record the remaining vocal and instrumental parts. Mix these six tracks to tracks 7 and 8, replacing the Reference tracks.
9. You now have four stereo submixes, each consisting of six tracks. Copy each of these submixes to the eight tracks of the Final Mix Version. Now you have a 24-track recording! This can then be mixed digitally to DAT using the internal Darwin mixer.—Courtesy John Stoneham of Stoneham Design, and E-mu Systems

RECORDING 24 TRACKS ON AN 8-TRACK E-MU DARWIN

Darwin's powerful Version feature allows you to create multiple versions of a song within a project. The most common uses of this feature are to create different mixes or vocal comps, but it also allows you to increase the number of recording tracks by intelligently submixing tracks.

Let's look at a typical recording session that would require 24 tracks. This session includes live drums, various guitars and keyboards, 3-part background doubled vocal harmony, lead vocal, lead instruments, and a little percussion.

Track	Instrument
1	kick
2	snare
3	hi-hat
4	tom L
5	tom R
6	floor tom
7	bass
8	rhythm guitar 1
9	rhythm guitar 2
10	piano
11	synth-L
12	synth-R
13	background vocal low 1
14	background vocal mid 1
15	background vocal high 1
16	background vocal low 2
17	background vocal mid 2
18	background vocal high 2
19	lead vocal
20	lead vocal double
21	lead guitar
22	sax solo
23	hand claps
24	shaker

THE GOOD STUFF.



Professionals rely on industry-standard tools from Whirlwind to protect each performance and recording from the frustrating failures and poor sonic results of second-rate components. Built to provide consistent superb results through years of tough use, these products are what sound specialists buy when they can buy what they want — *the good stuff*.



The **Hot Box™** is Whirlwind's top-of-the-line DI for sending your pure guitar sound direct to the mixer. The ultra-high input impedance, super-wide bandwidth and vanishingly low noise mean you won't find better sonic performance anywhere.

The **MD-1™** is a battery powered studio-quality mic preamp with a transformer isolated line driver output and a built-in headphone monitor. The heavy steel box, 18V phantom power and transformer isolation make it a favorite with sports broadcasters.

The **Director®** is a premium quality DI box with an input select for instrument or amp/preamp, a ground lift switch, and a filter to roll off amp noise.

The **MicPower®** is a convenient portable phantom power supply that operates from two standard 9V batteries to power condenser mics.

The **IMP® 2** brings a high-quality DI to musicians on a budget. Rugged, good sounding, with a ground-lift switch.

High Performance **PM Tubes®** are manufactured for Whirlwind using the latest techniques and specialty metals. If you own a tube amp or effects device, listen to the difference these tubes will make.

The **Mic Eliminator®** is a specialty DI that takes your direct guitar, amp, or preamp signal, and adds the clean sound of a classic SM57 + Jensen 12" mic + speaker setup for that famous "miked" sound without the mic.

The **Qbox®** is an all-in-one battery powered audio line tester. It includes a built-in mic, speaker, tone generator, headphone amp, and voltage detect LEDs for verifying phantom or intercom power.

The **Selector®** switches one instrument to two inputs or two instruments to one input using a patented totally silent Whirlwind switching circuit.

The **Tester** is the industry's favorite continuity tester, detecting shorts, opens, or cross-wiring on cables with virtually any combination of XLR, 1/4", and RCA phono connectors.

whirlwind™

99 Ling Rd. • Rochester • NY • 14609 • TOLL FREE 888.733.4396 • FAX 716.865.8930 • <http://www.WhirlwindUSA.com>

circle #572 on reader service card

REVIEWS

BIG BRIAR WAVEFRONT

*Ethervox and Travel
Case theremins
provide gestural
MIDI control.*

By Alex Artaud

In the last five years, there's been a resurgence of interest in the theremin. Some credit could be given to filmmaker Steven Martin's 1993 biography, *Theremin: An Electronic Odyssey*, a touching homage to the instrument's Russian inventor, Professor Leon Theremin. Another reason could be that no other electronic music instrument is as bewitching in its evocative voice, sensitivity to gesture, and simplicity of design.

Since its introduction over 75 years ago, the theremin has found many ardent admirers, if few masters. With the exception of Clara Rockmore, widely recognized as the first theremin virtuoso, and perhaps Lydia Kavina, Dr. Theremin's great-niece, most musicians approaching the theremin have had trouble with the subtleties of the instrument. As a result, popular culture has relegated it to ornamental duties: the instrument's reputation has been built chiefly around its eerie signature sound, which has been showcased in such classic film soundtracks as Bernard Herrmann's score for *The Day the Earth Stood Still* and a few popular records, notably the Beach Boys' "Good Vibrations."

In spite of the difficulty of playing the theremin well, many a performer has envisioned a wider range of applications for this beloved instrument. Two manufacturers seeking to meet the needs of these musicians are Big Briar



Wavefront's Travel Case theremin is a lower-priced, portable instrument that does not have onboard MIDI features but works with the company's MIDI-Wave theremin interface.

120	Big Briar Ethervox/Wavefront Travel Case
132	TC Electronic G-Force
138	Steinberg ReBirth RB-338 1.5 (Mac/Win)
144	Encore Expressionist
148	Symetrix 628
152	Generalmusic Realpiano Pro 2
157	Avalon VT-737
161	Quick Picks: Virtual Reality 3D SFX, vol. 1; Bolder Sounds Granular, vol. 2; Quantum Leap Guitar & Bass; Q Up Arts Kit Watkins: Ambient Realms

Bringing the Store TO YOUR Door

AUDIO, VIDEO, A/V & LIGHTING EQUIPMENT
Full Compass
Catalog

Catch the Tidal Wave of
Audio & Video Products in
Your **FREE** Catalog or Surf the
Web! www.fullcompass.com

Our store is at your fingertips.
Check out our customer support—
you'll be impressed!

FULL COMPASS

Audio • Video • A/V • Lights

1-800-356-5844

and Wavefront Technologies. Although these two instruments are in different leagues with regard to price and features, both give the theremin a new lease on life in the world of MIDI. We'll take a look at the two instruments, cover their high and low points, and give you an idea of what to expect from this new breed of gestural MIDI controllers.

FROM THE BRIAR PATCH

Bob Moog, the legendary inventor who began exploring electronic music by building theremins over 40 years ago, is the main man behind Big Briar. Dr. Moog recognized the theremin's potential as a controller and wisely included control-voltage and gate outputs on his acclaimed Big Briar Series 91A theremin. However, he also realized that, for the theremin to assume a more flexible role as a gestural controller, MIDI control would have to be implemented. With his associate, German software designer Rudi Linhard of Lintronics, Moog set about designing a stand-alone CV-to-MIDI interface for theremins.

This still left the challenge of being able to provide control over the theremin sound itself. Controlling the theremin's oscillator from MIDI is very hardware and processor intensive, bordering on a monstrous task. Moog's ingenious solution was to add a dedicated, MIDI-controllable VCO to accurately re-create the sound of a theremin. With Linhard's collaboration, Moog arrived at an instrument that allows musicians to edit and con-

trol their theremin performances and sounds from a MIDI sequencer.

This new instrument, aptly named Ethervox, has several tricks up its sleeve that transform the theremin into a powerful, perhaps more easily approachable, instrument.

RETRO FUTURISM, ANYONE?

Anyone who has ever seen the Series 91A theremin knows how well crafted Big Briar cabinets are. Designed by Al Shapiro and Bob Moog, the Ethervox's beautiful mahogany cabinet harkens back to the aesthetics of yesteryear yet remains modern with a round-edged minimalist feel. Both antennas are solidly constructed and insert securely into their sockets.

The front panel is straightforward and gives the Ethervox theremin a plug-and-play friendliness. A toggle-type power switch rests right above the Headphone Mix knob and headphone output. The Headphone Mix control blends an "always on" theremin tone (before the signal goes through the VCA) and the VCA volume-controlled theremin sound that appears at the main audio output. If you set this to the 100 percent "always on" sound and turn down the main (VCA) volume, you can audition the instrument on headphones without sending a signal to



Big Briar's Ethervox MIDI theremin is a high-quality theremin that also provides gestural MIDI control.

the main audio output. This is very cool, especially when you are using the theremin as part of an ensemble.

Volume and Pitch controls adjust the response of their respective antennas. Below these controls are a row of Range, Waveform, Brightness, and Filter knobs. The Range knob switches among three pitch-range options: up to two, three, and four octaves above middle C. The Waveform control varies the harmonics emphasized in the theremin tone, Brightness controls the harmonic content of the waveform, and Filter varies the cutoff frequency of a 12 dB/octave lowpass filter. Between these three tone controls, you can range from round, pleasing flute-like tones, to cello qualities, to the formant characteristics of a singing voice.

Three toggle switches independently enable Voice 1 (theremin), Voice 2 (VCO), and the MIDI Out, so you can simultaneously use any combination of these sources. Next to these toggle switches is an LCD and four associated buttons: Cursor (controls cursor movement), +1 (increment), -1 (decrement), and Enter. A MIDI activity indicator is nestled in the center of the panel.

The bottom of the Ethervox houses the power receptacle, a mix output, and a connector for a breakout box

Big Briar Ethervox Specifications

Audio Outputs	(2) 1/4" unbalanced, line-level Voice outs; (1) 1/4" unbalanced, line-level mix out; (2) XLR balanced, line-level Voice outs; 1/8" stereo headphone
Other Connections	sustain pedal and footswitch inputs; MIDI In, Out, and Thru
Tone Generators	beat-frequency oscillator, voltage-controlled oscillator
Pitch Ranges	(3) 2, 3, and 4 octaves above middle C
Tone Controls	Waveform, Brightness, Filter
Presets	100 user
Special Features	10W power amp
Dimensions	15" (H) x 18" (W) x 15 1/2" (D); 42" height w/stand
Weight	33 lbs. (w/cabinet, stand & breakout box)

Powerful 24-Bit Sound

Hear the full depth of your work for the first time.

Whether you need analog or digital I/O, the Multi!Wav PRO24 Series delivers the clarity of true 24-bit sound and brings out the best in your 16 or 20-bit files.

Introducing the Multi!Wav PRO Analog 24, two channels of the finest 24-bit analog audio available, and the Digital PRO24, 24-bit digital I/O with 24-bit analog output. Both cards record and play 24, 20, and 16-bit files.

Use the on-board Word Clock for tight synchronization with external audio and video gear. The Multi!Wav PRO24 Series even has Speaker Pop Protection to prevent destructive noise spikes from entering your audio system during system power up, a feature not found on any other audio card.

16, 18, and 20 bit converters are yesterday's technology! Why compromise when you can afford leading edge technology today?

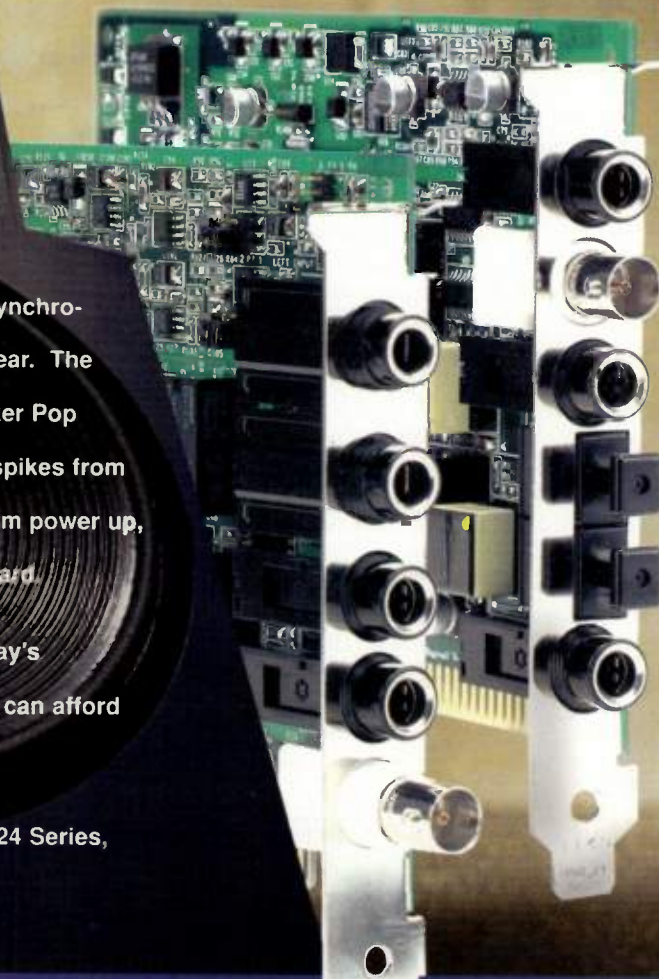
For the full scoop on the Multi!Wav PRO24 Series, give us a call or visit our web site.

PRO Analog 24 Features:

- Professional 24-Bit A/D and D/A Converters
- Balanced/Unbalanced +4, 0, or -10 Operation
- Word Clock Synchronization
- Exclusive Anti-Hum Design
- Power On/Off Speaker "Pop" Protection
- Fully Balanced Analog Signal Path

PRO24 Digital Features:

- Pristine 24-Bit Analog Output
- Professional 24-Bit AES/EBU Digital I/O Capability
- 24-Bit Optical & Coaxial S/PDIF Digital I/O Capability
- Word Clock Synchronization
- Power On/Off Speaker "Pop" Protection
- Multi-Channel 2 In 4 Out Capability
- Word Clock to AES (& S/PDIF) Clock Conversion



AdB
PERFECT SOUND

Multi!Wav PRO24 Series

W O R L D ' S B E S T A U D I O I N T E R F A C E S



Software
Included

AdB International Corporation • Voice: 770-623.1410 • Fax: 770-623.1629 • Email: info@adbdigital.com • Web: <http://www.adbdigital.com>

AdB and Multi!Wav are trademarks of AdB International Corporation. ©1998 AdB International Corporation. All Rights Reserved. Specifications may change without notice.

circle #574 on reader service card

that houses most of the connections. The breakout box (see Fig. 1) provides the three MIDI jacks, sustain pedal and footswitch jacks, pitch and volume CV outputs, balanced and unbalanced audio outputs for Voices 1 and 2, and a speaker output that is driven by the instrument's internal 10W amplifier. The Ethervox will operate anywhere you can get 90 to 264 VAC at 50 to 60 Hz.

MUSIC OF THE SPHERES

Before we go any further into technical details, let's get this out of the way: the Ethervox sounds incredible. My references include previous Big Briar instruments—the Etherwave and the Series 91A—and an R. A. Moog tube theremin built in the mid to late 1950s. Amazingly, both voices of the Ethervox really do mimic the sound of a tube theremin, retaining its warmth and vocal quality in the upper registers. (Big Briar's representative comments that with the filter control cranked all the way up, Ethervox gives the impression of an old RCA theremin, the first commercially produced theremin from the 1930s.)

The similarity between Voice 1 and Voice 2 is uncanny. I was able to comfortably go between the two and noticed no loss in tonal color. This boded well for future experiments, such as playing parts directly into my Emagic *Logic Audio* sequencer with Voice 1 and then hearing every nuance and error repeated flawlessly by Voice 2. Another cool thing is that you can play both voices together as well as tune them separately to experiment with octave relationships.

The Ethervox proved to be remarkably responsive as a theremin and accurate as a controller, whether sending CV to a Minimoog, MIDI into *Logic Audio*, or controlling samples on an E-mu E4X. Friends who had extensive experience with previous Big Briar

models commented on its smooth tracking.

MENUS: INTO THE LABYRINTH

Well, maybe the Ethervox menus are not exactly labyrinthine, but it takes a while to learn the system. On start-up, the theremin lights up a 4-section LCD. But the display is somewhat cryptic: 00 USER 0 denotes the preset number and name, PM01 is the mode and editable parameter of the selected preset, and Vol vvv and Pitch ppp are the two continuous readouts of pitch and volume antenna activity. One hundred user-programmable presets are available, more than enough for most applications.

The Utilities (UT) section is where you set the MIDI In and Out channels, display view angle, and SysEx output configuration; enable or disable either antenna's effect on Voice 2 (VCO); enable or disable incoming Program Change commands; and get diagnostic readings for service.

Getting into Utilities is a bit like going through a trap door. You enter by selecting Utilities mode (in the upper right corner of the display) and hitting the -1 button. Once you're in Utilities, you can select any Utility screen by hitting the -1 and +1 buttons. You leave the Utilities menu by hitting -1 while you're in the first utility or +1 while you're in the last utility.

THEREMIN À LA MOOG

There are four operating modes: Pitch Move (PM), Chromatic (CH), Controllers (CO), and Pitch Smart (PS). Each mode is independent, and you can use only one at a time.

Several functions are common to all



FIG. 1: Except for the power receptacle and mix output jack, the Ethervox's connections to the outside world are made via its breakout box.

four modes. These deal primarily with the assignment of the two antennas and the footswitch. For examples, each mode has a Volume Rate parameter, which adjusts the rate that the internal processor reads the volume antenna. This feature allows users to control the density of MIDI messages from 10 times/second to 200 times/second. Another common feature, Scale, inverts the action of the antennas so that pitch decreases and volume increases as you approach their respective antennas. This is primarily a playing-style tweak, but Big Briar also suggests some live-performance applications.

All modes contain parameters for sending MIDI Program Change messages as well as for naming and saving preset configurations. You can also choose between 7- and 14-bit resolution for Volume and Pitch MIDI messages. This Accuracy parameter enhances the smoothness of the controller on certain patches.

As you can imagine, each mode also has its own defining characteristics and applications. Pitch Move is the default mode and the least complex. It allows you to play traditional theremin and simultaneously send Volume and Pitch Bend MIDI information (triggered from the antennas) to control a synth or record into a sequencer. When active, the footswitch parameter can trigger a Note On message and Velocity value, leaving the left hand free to send other controller messages.

Chromatic Mode is the first notable departure the Ethervox makes as a controller. In this mode, no MIDI Pitch Bend information is sent. Rather, the information is quantized according to settings in two parameters: Pitch Octave Range, which varies the octave

Wavefront Theremin Specifications

Audio Connections	(2) ¼" outputs
Tone Generator	beat-frequency oscillator
Pitch Range	5-6 octaves
Tone Controls	Waveform, Brightness
Special Features	3-position lid opens 10°, 45°, and 90°
Dimensions	15" (H) X 19" (W) X 5" (D) (closed lid)
Weight	11.5 lbs. (w/power adapter)

Quiet as a ...



Clear as a ...



Easy on the ...



Introducing TANGO & ZULU: Digital Audio Converters Done Right

There's plenty of great audio software for computers these days, but if you've used an analog sound card you already know the sad truth — high-speed digital computers can really mess up your sensitive analog signals. And if you can't get audio in and out of the computer without adding lots of noise, then why bother? Exactly. Enter Tango and Zulu, from Frontier Design Group.

Eliminate disk drive pops, monitor hum, and video board buzz from your mixes. Tango and Zulu keep the audio converters outside the PC, taming radiated electrical noises. And to eliminate conducted noise, Tango and Zulu are optically isolated and have independent power supplies.

Both Tango and Zulu feature:

- 20-bit delta-sigma converters
- Freq. resp. ± 0.1 dB, 20Hz–20kHz
- S/N ratio greater than 98dB
- THD+N 0.002% unweighted
- Dynamic range >98dB A-weighted

These pro-quality A/D and D/A audio converters start at just \$598 and come with our 30-day money-back guarantee. And overnight delivery is available, too! *Be sure to ask about special pricing for bundled products!*



The world's most popular multichannel digital audio I/O format provides instant compatibility with a multitude of digital tape machines, mixers, signal processors, and of course WaveCenter, our own digital I/O card for the PC. Up to 33-foot cables available!

starts at
\$698

+4dBu or -10dBV levels, selectable per channel
balanced audio I/O on professional 1/4" TRS jacks
8 outputs and 0, 4, or 8 inputs (upgrade kits available)
level meters selectable to inputs or outputs
internal (44.1 or 48kHz) or external clock selection
word clock in/out • ADAT optical in/thru/out
rugged 1U rackmount enclosure

only
\$598



-10dBV on pro-grade 1/4" jacks • 4 inputs, 8 outputs
input level indicators • ADAT optical in/out
compact half-rackspace enclosure

WaveCenter™

Our acclaimed multichannel digital I/O card with ADAT optical, SPDIF and MIDI interfaces for Windows 95 & NT PCs (DA-88 solutions also available) ~~\$598~~

now **\$498**



30-day money-back
GUARANTEE



To order or find out more

800•928•3236

603•448•6283 outside the USA

<http://www.FrontierDesign.com>

FRONTIER
DESIGN
GROUP

Tango, Zulu and WaveCenter are trademarks of Frontier Design Group, LLC. All other trademarks and registered trademarks are the property of their respective holders.

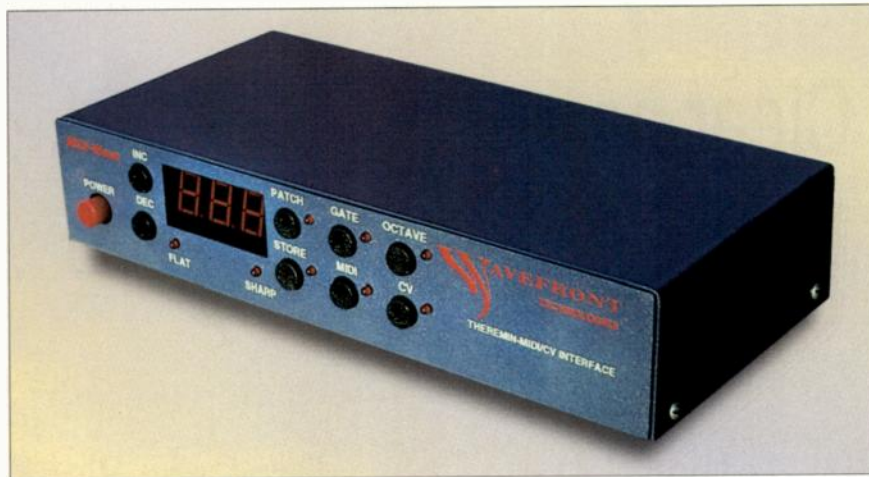


FIG. 2: In addition to its menu buttons, increment and decrement buttons, LED, and power switch, the Wavefront MIDI-Wave's front panel sports a pair of LED indicators that show the presence of incoming Pitch Bend messages.

range covered by the pitch antenna; and Pitch Lowest Note, which sets the lowest MIDI note. When you keep your left hand away from the volume antenna and your right hand moves the theremin's pitch through the chromatic scale, a Note On message is sent. The Velocity of the Note On message is controlled by the hand at the volume antenna.

Beyond tailoring the MIDI information sent, the highlight of Chromatic Mode is its Pitch Note Scale section, where you have a choice of sixteen different patterns, including whole-tone scales, diminished arpeggios, tritones, fourths, diatonic thirds, and Eastern scales, among others. This innovation is ideal for improvisation, giving novices a learning aid and experienced players ideas to bounce off.

Controllers mode is optimally suited to controlling external MIDI devices. In this mode, the pitch antenna can be assigned to send MIDI Control Change and Aftertouch messages. This is probably the best option for live performance because it provides extended MIDI control, the sound of Voice 1, and support for a sustain pedal. Here, no Note On information is generated. In this mode, Ethervox primarily becomes an open-ended MIDI continuous-control device.

Pitch Smart is the trickiest mode to explain. It helps optimize Pitch Bend control of synths and samplers and, in doing so, adds to the repertoire of theremin technique. As you pull your left hand away from the volume antenna, the Velocity values steadily increase.

When you arrive at a desired value, you *bounce* your hand lightly, which sends Note On information. The pitch antenna then instantaneously reads the position of your right hand and sends out the closest Note On, followed by Pitch Bend data. This provides a way of updating Note On values and differentiates Pitch Smart from Pitch Move mode. Updating Note On values is helpful for controlling sample-based sounds, in which pitch bending can yield artifacts or unnatural-sounding waveforms.

Pitch Smart can also aid theremin players of varied talents. This is best described as a "fudge factor" feature that adjusts the responsiveness of the antennas to your abilities. One such helper parameter is Pitch Offset. This parameter sets up a range around the note you are trying to hit, and if you get within the range, you trigger the note. Think of it as training wheels for your theremin. Say you want to hit C1 and you trigger something a bit flatter. Instead of sending out C1 with Pitch Bend information, the Ethervox will just send C1.

According to Big Briar, Ethervox's extensive software features are just the beginning. As more users get their hands on the unit, upgrades will be made available, possibly in ROMs that the user can install.

HAVE THEREMIN, WILL TRAVEL

I've seen some strange electronic musical instruments over the years, but nothing prepared me for the suitcase that arrived on my doorstep from Wavefront Technologies. The case's utili-

tarian gray/black design suggests little of the interior.

The Wavefront Travel Case theremin is one of this relatively new company's two theremin styles. A remarkable unit, it houses the electronics in one half of its case and stores the antennas and a tuning tool in the other. Preparing to play is quick and painless: antennas screw onto either side of the lid, their wires carefully secured. The finished assembly is a bizarre juxtaposition of form and function.

The control options and outputs are straightforward. Recessed oscillator adjusters set the rough/coarse/initial tuning for Volume, Pitch 1, and Pitch 2; all three are adjusted with the tuning tool. Next to the power switch are knobs for volume and pitch adjustments, which are used for fine-tuning. Tone control is covered by two knobs, Waveform and Brightness, and you get separate headphone and amplifier stereo outputs. That's it.

Wavefront has tried with some success to emulate the sound of Big Briar's Etherwave. More to the point, this is a case of imitation being the most sincere form of flattery. Readers who are familiar with Bob Moog's **EM** theremin do-it-yourself article (February 1996 **EM**) will recognize the Wavefront theremin as a close relative of Dr. Moog's design. According to Wavefront Technology's Mark Segal, the Wavefront theremin has enhanced tone controls and a larger pitch range than the Etherwave.

The Etherwave and Wavefront don't sound identical, but they're pretty close. The Wavefront can get a slightly reedier texture, but the overall timbral qualities are comparable. My favorite sound came from cranking the Waveform and Brightness controls, producing a warm, rich tone.

The Wavefront's antennas are very responsive but not as smooth as those of the Ethervox. The Travel Case model is best seen as a good portable option, whether for a studio or a live gig.

MIDIFIED

Along with the Travel Case theremin came Wavefront's MIDI-Wave, a theremin-to-MIDI interface design by Rosedene Audio's Adam Fullerton in England. Meant to be used with any theremin, the MIDI-Wave fits comfortably into half a rackspace. The unit can also be switched to respond to in-

coming MIDI signals for use as a regular MIDI-to-CV converter.

The unit's layout is pretty Spartan (see Fig. 2). The power switch is on the front panel, next to the Increment and Decrement buttons. Alongside the small LED screen are the Patch, Gate, Octave, CV, MIDI, and Store menu buttons, which access the parameters.

Flat and sharp LED indicators below the screen show the presence of incoming Pitch Bend messages. The LED display takes a while to get used to. It's a 3-position LED (chosen to cut costs), and the designer developed a shorthand that scrolls across the screen each time you press one of the mode buttons. It's not easy on the eyes, but it gets the job done and forces you to learn the nomenclature quickly.

BIG BRIAR

Ethernex MIDI theremin
\$3,500

FEATURES ■■■■■

EASE OF USE ■■■■

QUALITY OF SOUNDS ■■■■■

VALUE ■■■■

1 2 3 4 5

PROS: Two dedicated theremin voices. Exquisite control over tone. Highly responsive antennas. Extensive MIDI implementation. Gestural controller par excellence.

CONS: Relatively difficult to learn. Confusing documentation. Expensive.

CIRCLE #437 ON READER SERVICE CARD

The rear panel includes ¼-inch jacks for a footswitch (which can be used for sustain or Program Change) and the theremin input and output (see Fig. 3). In addition, you get a MIDI In port and an Out/Thru port (software selectable). Power is supplied by a 12 VAC wall wart.

Rear-panel minijack outputs (used to save space) deliver gate, trigger, and 1V/octave CV and Aux signals. (A Rosedene Audio representative indicated that a software upgrade is planned that will allow the converter to be used with V/Hz analog synths.) Gate and trigger signals are sent when the amplitude reaches a selectable

"LISTEN...NO HUM!"



HUM ELIMINATOR

- Eliminates AC Hum
- Breaks Ground Loops
- Balanced or Unbalanced
- 2 and 8 Channel Models

\$74⁹⁵

EBTECH



LINE LEVEL SHIFTER

- -10dBV ↔ +4dBu Conversion
- Balanced or Unbalanced
- Eliminates AC Hum
- 2 and 8 Channel Models

\$89⁹⁵

TURN UP THE VOLUME!

CALL FOR A DEALER NEAR YOU... (619) 271-9001

circle #576 on reader service card

circle #577 on reader service card

YOU MAKE the MUSIC

WE MAKE it EASY!

WRITE FOR YOUR FREE CATALOG TODAY!

GUITARS • AMPS • KEYBOARDS • DRUMS • PERCUSSION
PRO-AUDIO & RECORDING...AND OTHER COOL STUFF!

1-800-800-4654

THOROUGHbred

MUSIC

MAIL ALL CORRESPONDENCE TO:
7726 Cheri Court Tampa, FL 33634
VISIT ONE OF OUR STORES IN
TAMPA, FL, CLEARWATER, FL, ORLANDO, FL, SARASOTA, FL,
AND NOW OPEN IN NASHVILLE, TN.
visit our website at <http://www.tbred-music.com>

Mail this coupon to Thoroughbred Music to receive our FREE, full color catalog. It's packed full of the best brands and selection! (E&M)

NAME _____

ADDRESS _____ ST _____

CITY _____ PHONE _____

ZIP _____

LOWEST PRICE
GUARANTEE
30 DAY
60 DAY



FIG. 3: The MIDI-Wave sends gate and trigger signals when the amplitude reaches a selectable threshold, which can be set to 5V or 15V using a rear-panel switch (lower right). The MIDI Out/Thru port's function is software selectable.

threshold, which can be set to 5 or 15V using a rear-panel switch.

For proper pitch recognition, you need to connect the Wavefront Travel Case theremin to the MIDI-Wave with a stereo cable. Theremins without continuous pitch output can be plugged into the Theremin Out with a mono instrument cable. Another cool use for this feature that can produce some weird results is to extract pitch information from an alternative audio controller source, such as a preamplified guitar. (I suggest you first remove the high harmonics with the MIDI-Wave's internal lowpass filter to facilitate smooth pitch extraction. This helps the MIDI-Wave track incoming notes more accurately.)

PASS THE MENU

Once the unit is powered up, you're in the default section, which is the Patch menu. Here, the MIDI-Wave gives a continuous LED readout of MIDI notes (for example, C4) while the Flat/Sharp LEDs blink away to indicate Pitch Bend messages.

The Patch menu contains 128 user-definable presets. Each preset can be mapped to a selectable Program Change number, so you can easily customize your setup. You simply press and hold Store while you tap Patch to write a change to a preset.

The Gate menu has five parameters that adjust the threshold for opening the gate, vary the amplitude sensitivity, select the controller number, enable Aftertouch, and turn on the aforementioned lowpass filter to smooth the response to audio control sources.

The Octave menu lets you establish a Pitch Bend range of up to four octaves and includes a Portamento parameter to reduce glitches when bending through more than an octave. In addition, you'll find settings for octave and semitone transposition. Pitch is re-

solved down to ± 2.5 cents, and as with the Ethervox, resolution of Pitch Bend data is 14-bit, which provides smooth tracking.

The MIDI menu has everything you'd expect. You can set the send and receive channel, enable Program Change send and receive, and switch on an Echo function that merges the theremin data with incoming MIDI data.

The CV menu's eight parameters provide CV interface control, including a tone offset for tuning the theremin and an analog synth by semitone increments, adjustable scale values, and selectable gate polarity. Oddly, there's an important MIDI parameter here: setting the pitch range, in semitones (0–48), that can be sent from the MIDI-Wave to your synth. Setting the highest range means that a note doesn't abruptly jump as often when your tone generator receives a pitch sweep in excess of two octaves.

This "jumping" is also a function of how quickly your synthesizer responds to MIDI-Wave's pitch information, especially when pitch is swept beyond a 2-octave range. (Big Briar addresses this issue in Pitch Smart mode). Wavefront acknowledges that some MIDI instruments are much better at responding and cited the Kurzweil K2000/K2500 as among the few synths that can optimally receive Pitch Bend data from the

MIDI-Wave and work in a theremin-like fashion. I tested the MIDI-Wave with a K2000, and I agree: the Kurzweil instrument is a great partner for this unit. Your mileage may vary with other synthesizers.

TO CV OR NOT TO CV?

Theremin-to-CV operation was definitely a challenge. Controlling a Minimoog was a breeze with the Ethervox theremin, but controlling the synthesizer with the MIDI-Wave required some effort. I was only able to bend Minimoog notes from the theremin/MIDI-Wave while triggering the notes with the synthesizer's keyboard; I could not both trigger and bend Minimoog notes from the theremin. Wavefront said they had few complaints from analog-synth customers, so it is possible the problems were because of various anomalies in my modified synthesizer.

On the other hand, recording and playing back MIDI performances with a sequencer and a tone generator was easier, as was using the MIDI-Wave purely to send continuous controller messages to my synths and effects processors.

WHAT'S UP, DOC?

I have few qualms with the Ethervox. The instrument is a bold step in redefining the potential of the theremin as a professional controller. The only missing factor with this product is adequate documentation. I found Big Briar's manual layout confusing, and I needed several passes before I could figure it out. I easily got sound out of the theremin's two voices and generated MIDI/CV, but I had to work hard to get much deeper. Fortunately, a new, much larger manual is under way at this writing and might be available by the time you read this.

Wavefront MIDI-Wave Specifications

Voltage Outputs	(4) $\frac{1}{8}$ " CV, Aux, Gate, Trigger
Other Connections	$\frac{1}{4}$ " theremin In and Out; MIDI In and Out/Thru; $\frac{1}{4}$ " footswitch jack
Presets	128 user
Pitch Range	4 octaves
Special Features	MIDI Echo; selectable gate/trigger threshold
Dimensions	2" (H) x 8.5" (W) x 4" (D)
Weight	3 lbs. (w/adapter)

Ditto for Wavefront's MIDI-Wave documentation, especially given the complicated nomenclature. Wavefront should consider adding a synth and sampler compatibility chart, especially because of the issues surrounding Pitch Bend compatibility.

WAVE TO THE NICE PEOPLE!

In spite of its challenges, Wavefront's MIDI-Wave provides a flexible interface and creative MIDI options that are difficult to ignore. It's best suited for experienced MIDI musicians with a penchant for the unorthodox. Paired with the well-crafted Travel Case theremin, it's a budget option worth checking out.

WAVEFRONT

Travel Case theremin

\$625

MIDI-Wave theremin-to-MIDI interface

\$675

FEATURES ■■■■

EASE OF USE ■■■■

QUALITY OF SOUNDS ■■■■

VALUE ■■■■

1 2 3 4 5

PROS: Good theremin voices. Records and plays back MIDI performances well. Inexpensive.

CONS: Difficulty controlling analog synths. Lack of smooth pitch bend when controlling some MIDI synths. Difficult nomenclature within limited display.

CIRCLE #438 ON READER SERVICE CARD

Those with deeper pockets can move into the entirely different class of Big Briar's Ethervox. It fully explores the possibilities of a MIDI theremin while providing a rich array of theremin voices. This is exactly what you would expect from Bob Moog: transforming a traditional electronic instrument into a full-blown gestural controller that would have made Professor Theremin proud. Scrape together the cash, if you can.

Alex Artaud is a musician and editor of Mix-Spanish Edition. He recommends you check out the Theremin Home Page at www.nashville.net/~theremin.

we're not the experts...you are.



grandma's
music & sound

albuquerque, new mexico

<http://www.grandmas.com>

1 - 800 - 444 - 5252

circle #578 on reader service card

circle #579 on reader service card

Everyone Agrees!

Earthworks Mics Sound Great!

But a few have mentioned...

...that self noise may be detectable when recording quieter sources, so...

Earthworks introduces the QTC1 quiet omni!

The QTC1 offers 4dB less noise than the TC40K, ruler flat frequency response from 4Hz to 40kHz, superior impulse response and that great Earthworks sound.

...and because omnis are not for everyone,

Earthworks introduces the Z30X cardioid mic!

The Z30X offers unusually smooth on-axis response to 30kHz, very low off axis coloration, extraordinary rear rejection, clean impulse response and great sound for vocals, drums and etc.! Excellent for stage, studio, and broadcast.

...and just in case you haven't heard, the **LAB series preamps** are transparent and so quiet that the preamp noise is inaudible even at 60dB of gain. Flat response from 2Hz to 100kHz ± 0.1 dB and rise time of 0.25 μ sec. The LAB preamps allow stepped gain from 0 to 66dB as well as variable control of gain to three separately driven outputs capable of 8Vrms into 600 Ω at less than 0.02% THD. Gold plated switches! (standby, polarity, and phantom) The LAB series preamps are ideal for 96K/24 bit digital or extended frequency analog recording. If you like the clarity and realism of Earthworks mics, you'll love our preamps!

Earthworks Audio Products

PO Box 517 Wilton NH 03086 USA • 603-654-6427 (fax 6107) • www.earthwks.com

Win

The Electronic Musician JAM session Gear Giveaway!

JBL

PROFESSIONAL

whirlwind

t.c. electronic

SABINE

SENNHEISER

ALLEN
&
HEATH



Enter today to win this outstanding collection of live sound gear worth over **\$21,892.90!**

2-JBL SR4733A	Two-Way Sound Reinforcement System	\$4,392.00
2-JBL SR4719A	Subwoofer/Bass System	\$3,726.00
1-JBL MPX1200	Stereo Power Amp	\$2,418.00
1-JBL MPX600	Stereo Power Amp	\$1,428.00
1-JBL M552	Electronic Crossover	\$538.00
1-Allen & Heath	GL3300 Mixing Console	\$2,598.00
1-Allen & Heath	Meter Bridge	\$749.00
1-T.C. Electronic	G-Force Signal Processor	\$1,795.00
3-Sennheiser E835	Evolution Series Microphones	\$477.00
1-Sabine Solo SM820	FBX Feedback Exterminator	\$349.95
1-Sabine Solo SL820	FBX Feedback Exterminator	\$329.95
1-Whirlwind Snake	24 x 8 100 Foot Snake	\$695.00
Total		\$21,892.90

OFFICIAL RULES

1. NO PURCHASE NECESSARY
2. Sweepstakes will be open to residents of the United States ages 21 and older. Employees of Intertec Publishing and the participating manufacturers, their respective subsidiaries, affiliates, advertising and promotion agencies and their family/household members are not eligible to enter.
3. Enter by filling out an official entry form available in this issue or by providing your name and address on a 3x5 card. Send your entry form to Electronic Musician's Jam Session Gear Giveaway, P.O. Box 41525, Nashville, TN 37204. Entries must be received by July 15, 1998. Multiple entries are permitted. No more than one entry per envelope can be submitted. Intertec Publishing and the participating manufacturers shall not be responsible for lost, late, mutilated or misdirected mail. Entry forms or requests that are printed by machine, mechanically reproduced, tampered with, illegible or incomplete are not eligible.
4. The prize winner will be selected by random drawing from all entries on or about July 15, 1998. The drawing will take place under the supervision of Intertec Publishing. Participants agree to be bound by these rules and the decision of the judges, whose decisions are final. Odds of winning will be determined by the total number of entries received. The winner will be notified within 14 days of the drawing. To obtain a list of winners, send a self-addressed, stamped envelope, after July 31, 1998 to Electronic Musician's Jam Session Gear Giveaway, P.O. Box 8845, Emeryville, CA 94662.
5. The winner receives:
JBL SR4733A Two-way sound reinforcement system, \$4,392.00, JBL SR4719A Subwoofer/Bass system, \$3,726.00, JBL MPX600 Power amp, \$1,428.00, JBL MPX1200 Power amp, \$2,418.00, JBL M552 Electronic crossover, \$538.00, 3 Sennheiser E835 Evolution series microphones, \$477.00, T.C. Electronic G-Force Signal Processor, \$1,795.00, Allen & Heath GL3300 Mixing console, \$4,995.00, Allen & Heath Meter bridge, \$749.00, Sabine Solo SM 820 Feedback exterminator, \$349.95, Sabine Solo SL 820 Feedback exterminator, \$329.95, Whirlwind 24 x 8 100' Snake, \$695.00, Total Value, \$21,892.90. Intertec Publishing and participating manufacturers make no warranties with regard to the prizes. Prizes are not transferable. No substitutions of prizes allowed by winner, but Intertec Publishing and participating manufacturers reserve the right to substitute a prize of equal or greater value. Prizes are not redeemable by winner for cash value.
6. All entries and requests become the property of Intertec Publishing and participating manufacturers and will not be acknowledged or returned.
7. The winner will be required to execute an affidavit of eligibility, compliance with contest rules and release of liability. All taxes on prizes are solely the responsibility of the winners.
8. All entrants release Intertec Publishing and participating manufacturers, their respective affiliates, subsidiaries, directors, officers, employees, and agents, and all others associated with the development and execution of this sweepstakes from any and all liability from injury, loss or damage of any kind resulting from participation in this promotion or acceptance or use of any prize.
9. Prizes must be claimed within 21 days of notification. Failure to execute and return any requested document within 21 days of postmark, or return of notification or prize as undeliverable may result in forfeiture of prize. An alternative winner will be selected. All reasonable effort will be made to contact the winner.
10. Void where prohibited or restricted by law. All federal, state, and local laws and regulations apply.

**All entries must be
received by July 15, 1998!
To enter, fill out and
return the attached card
or coupon below.**

☐ Yes, enter me in **Electronic Musician's JAM session Gear Giveaway** and start/renew my subscription to *Electronic Musician* for only \$23.95 for 12 issues — a savings of over 55% off the newsstand price.

☐ No, I don't want to start/renew my subscription. Just enter my name in the Gear Giveaway.

☐ Bill Me ☐ Payment Enclosed

Name: _____

Address: _____

City, State, Zip: _____

Basic annual U.S. subscription rate is \$36.00. Offer good only in the U.S. Please allow 4-6 weeks for delivery for the first issue. Canada: \$34.95; all other foreign: \$65.00 for one year. U.S. funds, prepaid only. Single copy rate for 12 issues is \$59.40.

**Please send to *Electronic Musician's JAM SESSION GEAR GIVEAWAY*,
P.O. Box 41525, Nashville, TN 37204.
B80519**

TC ELECTRONIC

G-FORCE

*High-quality guitar effects
with professional
programming features.*

By Barry Cleveland

It seems that "cheap" and "more" are the buzzwords in guitar multi-effects these days. As competition in this market heats up, manufacturers become increasingly determined to offer guitarists the *most* features at the *lowest* price. Given this intense environment, one might reasonably wonder why any company would even consider making a multi-effects processor that doesn't have a preamp yet costs almost \$2,000.

TC Electronic products have never been cheap: even their early stomp boxes cost several hundred dollars. The reason for this is quite simple: they make products that are very well built, extremely flexible, and sonically superior. The company's new G-Force Guitar Effects Processor is no exception.

FEEL THE FORCE

The single-rackspace G-Force, which is designed to be patched through a guitar amp's insert point or directly after a preamp, delivers a lot for the money. Internal processing is handled by TC Electronic's proprietary chip, which is capable of handling more than 80 million instructions per second.

A/D and D/A conversion is at 24-bit resolution. Analog connections are made via 24-carat gold-plated unbalanced 1/4-inch inputs and balanced 1/4-inch outputs. S/PDIF digital I/O (at 44.1 kHz) is also available via coaxial

RCA connectors. These features contribute to the G-Force's excellent specs and impressive sound quality.

The unit has eight separate effects blocks (Reverb, Filter/EQ, Compressor, Pan/Tremolo, Delay, Pitch, Chorus/Flanger, and Drive) that can be routed in any order or combination to produce a wide array of effects. Blocks contain a single effect or multiple effects, which are also called *subalgorithms*. All eight effects blocks may be used simultaneously. A noise gate is available at the input, and although it cannot be routed elsewhere in the signal chain, the gate's parameters may be stored in conjunction with program information.

A powerful routing matrix allows sixteen possible modifiers (eight external and eight internal) to be directed to almost any of the program parameters. Internal modifiers include two pairs of LFOs, two ADSR envelopes, and an envelope follower, allowing you to create effects such as ducking delays and LFO autopan delay. Any MIDI controller or expression pedal can be assigned to serve as an external modifier, giving you real-time control of individual program parameters. (Standard MIDI ports and a 1/4-inch foot pedal jack are provided on the rear panel.)

The G-Force's effects are based on those found in various TC Electronic processors—the delay is derived from the TC2290, the reverb came from the M2000 and M5000 processors, and the chorus was inspired by the TC1210. The G-Force's Intelligent Pitch-Shifting was custom designed by Wave Mechanics.

Among the other features that distinguish the G-Force from mere mortal multi-effects processors are its detailed tempo mapping features, a PC (PCM-CIA) card slot with up to 2 MB of SRAM for storing user programs, four separate Setup banks, extensive MIDI implementation (capable of controlling up

to 25 simultaneous parameters), and sophisticated dual-display interface.

FRIENDLY INTERFACE

Given the G-Force's considerable processing power, its interface is remarkably simple and user-friendly. This is due largely to the organization and presentation of information on its 56 x 128-dot graphic LCD, which displays various global and effects menu pages in addition to routing matrix information. Besides displaying words and numbers, the LCD graphically displays EQ, filter, and compression curves; relative mix-level charts; ADSR envelopes; and room shapes. It even uses tiny keyboard and fretboard images to display the notes of a scale when programming the Intelligent Pitch-Shifter.

The Modifier matrix takes full advantage of the LCD's graphic capabilities. In the display, modifiers are represented by sixteen graphic cells that form the top row of the Matrix. The parameters are listed in a column along the right side (see Fig. 1). To connect a modifier to a parameter, you simply place the cursor at the point on the grid where their lines intersect. The ability to quickly and easily connect modifiers to parameters is one of the G-Force's greatest strengths, making it possible to create extraordinarily complex programs quickly and intuitively.

Complementing the LCD is a very versatile 5 x 14-dot LED display that shows program names and numbers and customized billboard messages (visible up to 25 feet away) that scroll at variable speeds. It also uses bursts of light to indicate global tempo. You also get LED meters for left/right input levels and gain reduction as well as LEDs that indicate incoming MIDI data, pedal information, and internal Overflow (an odd term that indicates you've used all available DSP resources).

Selecting and modifying the G-Force's parameters is accomplished primarily



With eight simultaneous effects blocks and a wealth of parameters, the G-Force offers tremendous programming potential along with the great sound quality one expects from TC Electronic.

by using the Parameter and Value knobs in combination with the Left/Right cursor arrows and the Enter and Exit buttons. The front panel sports a global Bypass button, and each effects block also has an individual Bypass button that can be used to quickly remove an effect from the signal path or to set up a program in Edit mode.

Other buttons include Input and Output level, Tap Tempo, and tuner controls. Conspicuously absent is an A/B Compare button, a function normally found on even bargain multi-effects processors.

BOUNCING OFF WALLS

The G-Force's reverb is one of its most sophisticated and best sounding features. There are two types of reverb (Advanced and Simple), each with its own character. Either is capable of creating an *extremely* wide variety of sounds.

The Advanced reverb offers a lot of adjustable parameters. Some of the more interesting ones include Room Type (Square, Round, Curved), High Color (Auto, Wool, Warm, Real, Clear, Bright, Crisp, Glass), Low Color (Thick, Fat, Round, Natural, Light, Tight, Thin, No Bass), and the very useful Decay Start (0 to 120 ms). The Simple Reverb has only five parameters: Type (Room, Club, Hall, Church, Cathedral, Grand Hall, Fast Decay, Slow Decay, Plate, Spring), Decay Time (0.01 to 20 seconds), Predelay (0 to 100 ms), Reverb Level, and Color (offering the same parameters as the Advanced Reverb's High Color).

All of the reverb programs are sonically outstanding. However, some of the program names are misleading: although the Spring and Plate programs sounded phenomenal, they weren't convincing as true spring or plate reverbs. That aside, the programs are useful and, given the variety of editing options, give you enough flexibility to synthesize nearly any reverberant space imaginable.

POTENT FILTERS

The Filter block contains five discrete subalgorithms: Formant Filters, Reso-

nance Filter, EQ, Phaser, and Wah-Wah.

The ten Formant Filters (or "vowel" filters, based on the human voice) are set up by defining three points (Start, Thru, and End) on a frequency graph, thus creating a curve. You then move the guitar signal up and down the curve with the Sweep parameter. The Sweep parameter may be assigned to any modifier, but your best bet is to connect it to a pedal of some kind. Resonance may be adjusted, and an interesting parameter called Age/Sex can be used to modify the overall curve.

TC ELECTRONIC
G-Force guitar effects processor
\$1,795

FEATURES ■■■■■

EASE OF USE ■■■■■

AUDIO QUALITY ■■■■■

VALUE ■■■■■
1 2 3 4 5

PROS: Eight effects available simultaneously. S/PDIF digital I/O. Intuitive user-friendly interface. Ingenious Modifier matrix.

CONS: Inadequate drive section. No compare function. Short delay times.

CIRCLE #439 ON READER SERVICE CARD

SPEIR

MUSIC CO.




SOUND
SYSTEMS


SOFTWARE


KEYBOARDS


MONITORS


RECORDING


MICROPHONES


SIGNAL
PROCESSING


CONSOLES

New/Used • All Major Brands
Guaranteed Best Prices!
All Major Credit Cards Accepted
M-F 9-7 SAT 10-6
510 S Garland Ave, Garland, TX 75040

800•219•3281

circle #580 on reader service card

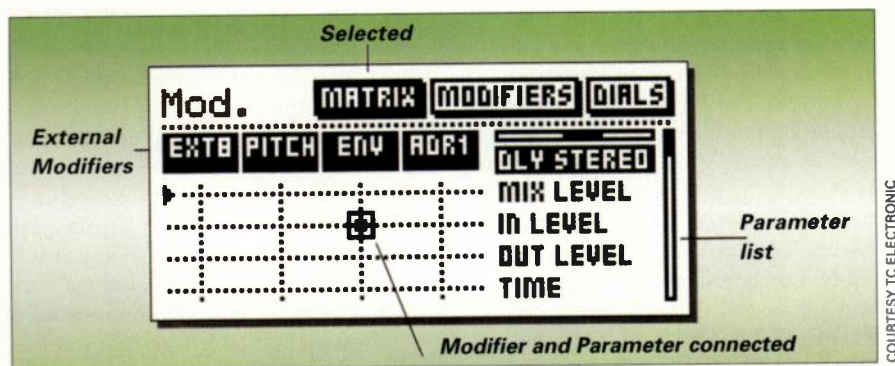


FIG. 1: Internal and external modifiers can be assigned to almost any program parameter quickly and intuitively.

The Resonance Filter provides control over low-cut frequency (20 Hz to 5 kHz) and high-cut frequency (150 Hz to 15 kHz). Adjustable resonance is available, and two slopes (12 dB/octave and 24 dB/octave) are provided. Some very interesting effects can be achieved by connecting a pedal to either frequency parameter.

The parametric EQ on the G-Force features two shelving filters and three identical bell filters. The shelving filters allow you to boost or cut by 12 dB and set the cutoff frequency (19.95 Hz to 5.01 kHz for the low shelf, 501.2 Hz to 20 kHz for the high shelf). You can also adjust the slope (3 to 12 dB) and the bandwidth (0.1 to 4 octaves). The EQ works well and sounds good, but it can only be used at one point in the signal chain. You cannot use any other filters if the parametric EQ is engaged, but separate (more limited) EQs are included as part of some of the other effects.

The G-Force's Phaser is unusual: although it can produce some classic phaser sounds, it has a distinct personality. I really like the G-Force's phaser, but it might not please you. In addition to the usual Speed, Depth, and Feedback parameters, it has controls that select the number of filters (4-, 8-, and 12-stage) and the Instrument mode (guitar or bass).

Like the Phaser, the Wah-Wah can be optimized for guitar or bass. It also has a sweepable frequency control, which is assignable to an LFO, an envelope generator, or a pedal. However, the adjustable parameters are surprisingly limited, and when connected to an expression pedal, the Wah-Wah does not follow a "classic" response curve (like that of a Jim Dunlop Cry Baby, for instance). Most wah-wah

pedals have idiosyncratic response curves, with fairly narrow peaks around midpoint. So if you are used to them, you will find that your usual foot movements do not produce the same results with the G-Force. It sounds great, but it is far from the real (Clyde) McCoy.

FIRST COMPRESSIONS

The G-Force's compressors are easy to use, work very well, and sound great. The Simple Compressor has controls for Ratio (1.12:1 to ∞ :1) and Threshold, while the Advanced Compressor has additional controls for Hard/Soft Knee and Release time. Whether going for subtle gain reduction or squashing over-the-top power chords at 32:1, compression is smooth and clean, with little or no pumping and breathing.

MAKING THINGS PAN OUT

The Simple Panner is basically an ordinary auto-panner. The Surround Panner, on the other hand, offers pulse-width and LFO Phase controls that give it added flexibility. In addition, Pan Center and Width controls are supposed to make it pan beyond a normal stereo image. However, the latter effect was unconvincing to my ears.

The Simple Tremolo sounds quite good; the Advanced Tremolo is truly outstanding. Both have controls for Speed, Depth, and Tempo (which determines the effects' relationships to the global tempo). The Advanced Tremolo also provides a choice of curves (Square, Triangle, and Sine), pulse width, and LFO phase, facilitating the creation of some very unusual effects.

TIME AFTER TIME

There are five Delay subalgorithms: Stereo, Dual, Dual Two-Tap, One-Tap, and Quad-Tap. Delay functions are

more or less standard, but the G-Force gives you added control over relative levels, feedback, panning, and EQ. Overall, the delays are crisp, clean, and clear (if you want them to be).

However, maximum delay times are limited: 1,480 ms in mono and 740 ms in stereo. This makes the unit unsuitable for doing intense looping and severely restricts the usefulness of the global Tempo function. With all of the G-Force's processing power, one might reasonably expect to have at least two or three seconds to work with. An Infinite Hold function that would allow you to create a loop and solo over it would be a welcome addition.

SHIFTY CHARACTERS

The Intelligent Pitch-Shifter sounds very good, and some of the programs that feature it are exceptional. It generates two harmony notes in any even-tempered scale. Scales not already included on the menu can be custom created, and all scales are graphically displayed in the LCD. String tracking is generally excellent, though I did encounter some minor errors.

Standard key and scale settings are provided in addition to a parameter that allows you to select between two operating modes: Stepped (the pitch shifter plays notes only within the current scale) or Smooth (the pitch shifter follows the incoming signal). By connecting the LFO modifier to the Detune parameter, you can create a vibrato effect on the pitched voices. Delay, Pan Position, and Mix controls are also provided.

THE GREAT CHORUS

TC Electronic's Chorus and Flanger effects have always been top notch, and the G-Force's are no exception. They can be extraordinarily rich and deep yet can maintain a clarity that is unparalleled by any other processor I am aware of. There are Classic and Advanced versions of both effects.

All four effects use TC Electronic's Golden Ratio feature, which automatically controls the relationship between speed and depth. Advanced parameters for the Chorus and the Flanger include LFO Curve (sine or triangle waveforms), LFO Phase, Phase Reversal, and Golden Ratio Defeat. The Advanced Flanger also offers control of Cross Feedback (which can be negative, providing reversed phase).

G-Force Specifications

Analog Inputs	(2) unbalanced ¼"
Analog Outputs	(2) balanced ¼"
Digital I/O	(1 pr.) S/PDIF on RCA coax
Additional Ports	MIDI In, Out, Thru; (1) ¼" footpedal jack; PC card slot
A/D and D/A Converters	24-bit
Presets ROM/RAM	225/100
Nominal Input Level	-20 dBu to +12 dBu
Dynamic Range	>105 dB A/D; >100 dB D/A
Frequency Response	20 Hz–20 kHz
Signal-to-Noise Ratio	90 dB @ -10 dBu
Channel Crosstalk	<-60 dB (20 Hz–20 kHz)
Dimensions	1U x 8.2" (D)
Weight	5 lbs.

NOT ENOUGH DRIVE

Although the G-Force is not designed to be used as a stand-alone preamp, a Drive section is included. It works well for adding a little overdrive to other effects and makes some nice single-note distortion sounds when used with the Pitch-Shifter, but overall, its presence somewhat confused me.

Admittedly, "good" distortion is a subjective thing, but after experimenting with nearly every combination of the drive's five controls, I had difficulty finding a useful application for it. I think that if TC wanted to include a drive section, they would have been better off to incorporate a full-fledged preamp.

GETTING WACKY

The G-Force comes loaded with 225 factory presets and 100 user-patch locations. The presets are optimized for particular applications (e.g., mono, stereo, rhythm, lead, and "Wacky"), and they run the gamut: everything from the standard "Stereo Reverb" to the complex, distorted "Sexwah Pedalead Fuzz."

The G-Force can make some pretty awful sounds if you switch presets while signal is still present, so having the volume down before changing programs is essential. Because many of the Presets include pedal parameters, I recommend using either an expression pedal or a MIDI pedal in order to take advantage of this extra potential.

I liked the presets in the Wacky category. Some standouts are "Talking Whales," which offers simultaneous pedal control over the Sweep and Age/Sex parameters of the Formant Filter and the pitch of the pitch shifter, with some delay

and reverb added; "Trance Yer Ass Off," with a pedal that morphs from flanger to Detuned Octaver to Touchwah; "Expandelay," in which four delays become increasingly louder and then softer; "Dynamic Lesley," offering a rotor where the speed changes with the dynamics; and "Pedal Hold+Reverb," a patch in which a pedal puts the Quad-Tap Delay in Infinite Repeat mode, letting you solo over a very short loop. These are some of the more unusual presets, but there are no clunkers here. And by the time you read this, more Presets should be available on PC cards.

FORCING THE ISSUE

After working with the G-Force for several months it is fair to say that I have only begun to take advantage of its vast programming potential. However, I did put it through the paces in the way that any guitarist might, and overall I was very impressed. I tested the unit in a variety of setups—plugging my Les Paul straight into the G-Force's left input, connecting my preamp's stereo outputs to its analog inputs, and connecting the digital output of my Lexicon MPX-1 to its digital input—and they all worked fine.

My previous comments about the Drive block notwithstanding, I really think this new product from TC Electronic is an excellent investment. My advice? Check out the G-Force even if you don't think that you can afford it; you might change your mind!

Barry Cleveland is the directories editor for *Mix* magazine. He is also a composer, engineer, and producer and plays guitar with the improvisational quintet *Cloud Chamber*.

THIS IS NOT A GUITAR!

This is the MiniZ, the first truly programmable, and expandable, controller for the MIDI guitarist. If you need to perform and record keyboard, string and horn parts, you can now create them with many of the same voicings and articulations of the original instruments, using using standard guitar fingerings.

Even the best guitarist would avoid fingering a block chord with two minor seconds—but it's easy on the MiniZ. The patented Ztar fingerboard offers new fingering possibilities to let you play lines you never thought possible as a guitarist. Plus, you get room to grow with new types of performance modes when you assign chords and other MIDI events to the wide variety of built-in MiniZ input devices.

You can zone the fingerboard in two dimensions. You can control sequencers, samplers and synthesizers from the String Triggers, the bank of 6 Velocity/Pressure Pads, the 4-way joystick, the Pedal Set, or the Breath Controller. With its optional on-board sound card, the MiniZ is all this *plus* a guitar synth, all in one super-compact package.

Support your creative side by opening doors to new forms of musical expression. The MiniZ will NEVER replace a guitar—but it's the most sophisticated computer music input system a guitarist can own today.

Starr Labs

<http://www.catalog.com/starrlab>
1717 5th Ave. • San Diego • CA • 92101
+1 619-233-6715 • +1 619-233-1231 [FAX]



DOWNLOAD IT
NOW !!!

HTTP://WWW.PGMUSIC.COM

You can order & download Band-in-a-Box,
PowerTracks & many other PG Music products
immediately at <http://www.pgmusic.com>

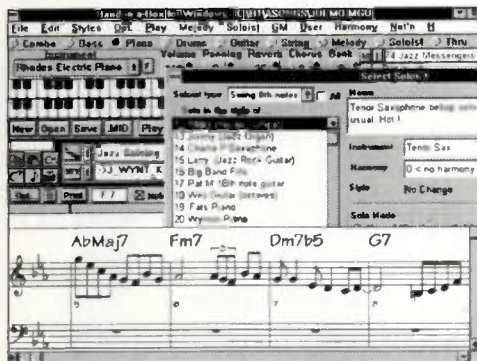
BAND-IN-A-BOX™

VERSION 7.0 FOR WINDOWS & MACINTOSH

Intelligent software for IBM (Windows/DOS) & Macintosh*

(* NOTE: ATARI Band-in-a-Box available only in Ver. 5)

Version 7 for Windows & Macintosh is here. Automatic Accompaniment has arrived!
Type in the chords to any song, using standard chord symbols like C or Fm7b5, choose the style you'd like and Band-in-a-Box does the rest... Automatically generating professional quality five instrument accompaniment of bass, drums, piano, guitar & strings in a wide variety of styles.



Windows version shown above

100 STYLES INCLUDED WITH PRO VERSION. Jazz Swing • Bossa • Country • Ethnic • Blues Shuffle Blues Straight • Waltz • Pop Ballad • Reggae • Shuffle Rock • Light Rock • Medium Rock Heavy Rock • Miami Sound • Milly Pop • Funk • Jazz Waltz • Rhumba • Cha Cha • Bouncy 12/8 Irish • Pop Ballad 12/8 • Country (triple) • and 75 more!

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

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

SUPPORT FOR OVER 70 SYNTHS BUILT-IN. Drum & patch maps included for over 70 popular synths. General MIDI, Roland GS & SoundBlaster soundcard support included.

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

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

NEW! Additional features in Version 7.0

Band-in-a-Box 7.0 for Windows & Macintosh breaks new ground with over 60 new features!

Band-in-a-Box 7.0 is here! This major upgrade includes over 60 new features. We've added an amazing new feature called "Automatic Soloing". Choose the type of soloist you'd like (from 100 available) and the program creates and plays a solo in that style, along to any song! Or create your own soloists. This is hot! These solos are of the highest professional quality, rivaling solos played by great musicians! And there's lots more in 7.0 - improved notation, step time/notation edit of StyleMaker patterns, scroll ahead option for notation, improved synth support, over 60 new features in all!

OUR CUSTOMERS LOVE VERSION 7.0! "Wow! The soloing sounds amazing... how can it do that?" "I love the notation improvements." "Another winner - thanks!" "You guys have added everything I wanted."

NEW! Add-ons for Band-in-a-Box Version 7.0! Jazz, Rock & Bluegrass Soloist Disk Sets

- Soloist Disk Set #2: "Killer" Jazz Swing Soloing \$29
- Soloist Disk Set #3: Specialty Jazz Soloing \$29
- Soloist Disk Set #4: Rock Soloing \$29
- Soloist Disk Set #5: Bluegrass Soloing \$29
- Bluegrass MIDI-FakeBook (50 songs) \$29

An exciting aspect of the Soloist feature in Band-in-a-Box Ver. 7 is that the program is able to increase its musical intelligence by analyzing new solos it is exposed to. It learns by "ear" and constantly gets better and better! Then the Soloist can incorporate the soloing we expose it to into its own playing. We've now created brand new soloist KnowledgeBases with dramatically enhanced results. We've created stunning new soloists in the jazz, rock and bluegrass styles, and are offering them as new Soloist Disk Sets for Band-in-a-Box 7. The packages include **bonus styles** (some also include demo songs) to augment your BB with your favorite types of music.

**SOLOIST PAK - ALL 4
Soloist Disks +
Bluegrass MIDI-FakeBook
on disks or CD-ROM
\$99**

Bluegrass MIDI-FakeBook
50 Bluegrass standards with
chords & melodies performed on
MIDI guitar by Bluegrass virtuoso
Marty Cutler.

NOTE: Soloist Disk Set #1 is
included with Band-in-a-Box 7.0
and upgrade, so is not offered as
an add-on.

BAND-IN-A-BOX PRICES

NEW CUSTOMERS (IBM/Macintosh/Atari*)

Band-In-A-Box Pro (first time purchase)\$88
Version 7, Styles Disks 1-3, Harmonies Disk 1 + Soloists Disk 1

ULTRAPAK (first time purchase. Also available on CD-ROM)\$189

The UltraPAK includes Pro version 7, Styles Disks 1-8, Harmonies Disk 1 + Soloists Disk 1
(* ATARI available only in Version 5)

ADD-ONS

Styles Disk #4\$29
Styles Disk #5\$29
Styles Disk #6\$29
Styles Disk #7\$29
Styles Disk #8 (included with Version 7 upgrade)\$29
MIDI-FakeBook (100 songs on disk)\$29
Bluegrass MIDI-FakeBook (50 Bluegrass standards on disk)\$29
Soloist Disk Set #2 - "Killer" Jazz Swing Soloing\$29
Soloist Disk Set #3 - Specialty Jazz Soloing\$29
Soloist Disk Set #4 - Rock Soloing\$29
Soloist Disk Set #5 - Bluegrass Soloing\$29
Soloist Pak - All 4 Soloist Disk Sets + Bluegrass MIDI-FakeBook\$99

NOTE: Soloist Pak available on disks or CD-ROM. Soloist Disk Set #1 included with Version 7 upgrade.

UPGRADES

Regular Upgrade to Version 7 (for Windows & Macintosh)\$49
Includes Styles Disk 8 + Soloists Disk 1. Upgrade from Version 6
Complete Upgrade to ULTRAPAK (also available on CD-ROM)\$89
Includes Styles 1-8 (these are all the Styles Disks we have made for Band-in-a-Box!)

MEMORY REQUIREMENTS: DOS (640K), Windows (8 mb), Macintosh (8 mb), Atari (1040)
HELP! I forgot to send in the Registration Card, but I want to upgrade now!! No problem.
Since the upgrade checks for any previous version of Band-in-a-Box, you can order the upgrade even if you forgot to register! Or register & order online at <http://www.pgmusic.com>

PG MUSIC INC. Maker of PowerTracks, The Pianist series & The Jazz Soloist
266 Elmwood Avenue Suite 111 Buffalo NY 14222

Phone Orders 1-888-PG MUSIC

1-800-268-6272 or 250-475-2874



SALES ORDERS & INFORMATION FROM OUR WEB PAGE

<http://www.pgmusic.com>

VISA/MC/AMEX/cheque/mo/po# Fax 250-475-2937

Mac OS

WINDOWS 95
3.1 & 3.11
FRIENDLY

Hot new software programs created by PG Music!

NEW!

The Pianist
Vols. 4 & 5

The Modern
Jazz Pianist

The Latin
Pianist

The Irish
Pianist

PowerTracks
Pro Audio 4.0

The Blues
Pianist

The
Bluegrass
Band

THE PIANIST SERIES

WINDOWS • MACINTOSH
ATARI • DISKlavier

Each program contains piano music performed by world-class pianists PLUS memos, trivia questions, biographies, Guess the Song games & more. They are ideal for learning to play piano, or for background music while you use other programs. Windows versions also display & print standard music notation & chord symbols for pieces. They are available for WINDOWS, MAC & ATARI, & are also available in Yamaha Disklavier & Roland SoundBrush format.

NEW! The Modern Jazz Pianist™

\$49

The Modern Jazz Pianist plays over 40 tunes in Modern Jazz styles! Jazz/studio pianists Renee Rosnes, Miles Black Ron Christian and Brad Turner play over 50 tunes in a wide variety of Modern Jazz Piano Styles. Emulating styles made famous by Charlie Hancock, Fred Hersch, Cedar Walton, Mulgrew Miller and more. Full of info on the masters of Modern Jazz Piano! Includes player program to see/study the music using notation and on-screen piano.

NEW! The Latin Pianist™

\$49

Over 50 "Latin" and "Salsa" piano and trio pieces by famed Latin pianist Rebecca Mauleon-Santana (editor of her husband's Latin Real Book). Including authentic Latin/Salsa piano songs and styles including Conga, Cumbia, Merengue, Son, Mambo, Cha-cha-cha, Guaracha, Samba, Partido Alto, and more. Includes player program, song memos, descriptions/analysis of styles and real-time piano score.

NEW! The Irish Pianist™

\$49

Greatest Piano Performances of over 50 old and new Irish piano styles by top Irish pianist, Pat Crowley. Including traditional styles like jigs, reels etc., and newer styles popularized in "Riverdance". Includes pictures of Ireland, song memos, biographies and information on Irish music. Over 3 hours of music.



Nearly 900 of the world's most popular classical piano pieces, performed by world-class concert pianists!

Moonlight Sonata, Sonata Pathétique, Minute Waltz, Claire de lune, Mephisto Waltz, Hungarian Rhapsody, Fantasia Impromptu, Military Polonaise... 900 in all!!!

PLUS... Music Trivia Game, "Guess the Song", program notes, biographies, music dictionary (on disk) & more!

OUR CUSTOMERS LOVE THE PIANIST... "Incredible... amazing... terrific... masterful... fabulous... love it... my favorite program!"

per volume **\$49**

NEW! The Pianist Volume 4

We've added 200 fabulous selections to The Pianist program. Along with the companion volumes, there are nearly 900 of the world's classical masterpieces available in The Pianist series! More music by your favorite composers includes Haydn, Mozart, Liszt, Debussy, Fauré, Schumann & Schubert. Now listen to the complete Mozart Piano Sonatas, Chopin Etudes, Preludes, Ballades & Scherzi, Schumann Carnival & Album for the Young (complete), Debussy Preludes (complete) & much more! INCLUDES... ALL NEW Program Notes!

NEW! The Pianist Vol. 5 • Beethoven Sonatas

For the first time ALL 32 Beethoven Piano Sonatas are available on NEW Pianist Vol. 5! MIDI performances for The Pianist program. The greatest sonatas ever composed for the piano have been performed by world-class pianists for your study & enjoyment. INCLUDES... program notes about the sonatas!

Volume 1 (215 selections) • Volume 2 (200 selections) • Volume 3 (170 selections)
Volume 4 (200 selections) • Volume 5 (complete Beethoven Piano Sonatas)
Each volume \$49 • Volumes 1-3, \$99 • Volumes 1-5, \$149

The Jazz Pianist™

\$49

This program makes it "too easy" to learn to be a great jazz PIANO player! Top jazz/studio pianists play 60 jazz standards in a wide variety of styles. Hear the music with CD-quality through your sound card or MIDI system. Most pieces have bass/drums as well as piano so you get a full sounding jazz trio for the tunes! Jazz Trivia game & Guess the Song game, program notes, biographies & music dictionary (all on disk).

The Jazz Pianist Volume 2

Volume II upgrade - \$49 (requires The Jazz Pianist) • first time purchase: Volume 1 & 2 - \$98
60 more fabulous jazz standards for Volume 2, complete with new program notes and biographies!

The Ragtime Pianist™

\$49

Over 90 ragtime & early jazz piano standards, played on MIDI keyboard by top Ragtime Pianists... and featuring world-renowned Ragtime performer JOHN ARPIN! Hear virtuoso performances of every Joplin rag in this program, as well as many other rags, Cake Walks, waltzes & other Ragtime Era tunes by Cubie Blake, Joseph Lamb, Daniels and, of course, Scott Joplin.

The New Orleans Pianist™

\$49

Over 60 "New Orleans Style" piano music standards, played on MIDI keyboard by top New Orleans pianists Henry Butler, Jon Cleary, Tom McDermott, Joel Simpson & David Torkanowsky playing a wide variety of New Orleans, R & B, Blues & Ragtime piano music.

The Gospel Pianist™

\$49

Over 50 Gospel style piano pieces played on MIDI keyboard by top Gospel pianists Louise Rose, Davell Crawford, Henry Butler, Sam Berkef, Derrick Bethune, Joel Simpson & Jon Cleary. The "Gospel Piano" style underlies much of the blues, jazz & popular music played today.

The Christmas Pianist™

\$49

This software includes great piano performances of over 50 all-time favorite Christmas songs and carols - ideal for listening or singalong! On-screen lyrics, notation & piano keyboard, piano notation printout, background playback, Music Trivia & Guess the Song games & more!

PowerTracks Pro Audio 4.0™

New version! Cool Features.

INTEGRATED DIGITAL AUDIO & MIDI SEQUENCER FOR WINDOWS

Same Low Price. \$29

PowerTracks Pro Audio 4.0 is a professional, fully featured digital and MIDI workstation, packed with features for musicians, students and songwriters. With seamlessly integrated digital audio/MIDI recording, and built-in music notation, PowerTracks turns a typical soundcard equipped Windows PC into a music production powerhouse! Comes with CD-ROM based video training MultiTracks CD-ROMs! Jazz, Blues & Rock MultiTracks Play along CD-ROMs available, each with over one hour of multi-track digital audio music on CD-ROM for play along or use in PowerTracks.

Pricing: PowerTracks Pro Audio \$29; Upgrade \$19; PowerPAK (program & all 3 MultiTracks CD-ROMs) \$49; Upgrade to PowerPAK \$39



NEW! The Blues Pianist™

\$49

Volume 1 (50 pieces - older styles) \$49 • Volume 2 (50 pieces - newer styles) \$49

Each volume contains over 50 great down-home blues piano stylings by top professionals! Playing in a wide variety of blues piano styles - Boogie Woogie, Slow/fast boogies, jazz blues, New Orleans style, Chicago blues & more. These are the styles made famous by Pete Johnson, Albert Ammons, Jelly Roll Morton, etc. Hours of listening pleasure! Full of info & trivia on the great masters of piano blues. Slow them down & learn the licks! The perfect gift for any blues lover.

The New Age Pianist™

\$49

Over 70 "New Age" & "New Age-Jazz" style piano pieces, played on MIDI keyboard by top performers.



A beautiful collection of solo piano compositions which draw their inspiration from the natural world. Full range of "New Age" piano techniques are presented: "ambient" performances in the style of George Winston & "New Age-Jazz" performances in styles of Chick Corea/Keith Jarrett. Includes song memos, biographies & information on important New Age musicians. Includes photo album of stirring nature scenes & real time piano score (notation in Windows version only). Over 3 hours of music!

The Children's Pianist™

\$49

Over 70 of the best-loved children's songs for listening & singalong!



Lyrics to all songs displayed on screen in large type. Chords & music notation. On-screen lessons explain the techniques of piano accompaniment. Examples of Albert bass, embellishments, syncopation, stride style & many more techniques! Over 4 hours of music! Includes words & music for 70 songs: London Bridge, Campion Racetrack, Home on the Range, My Bonnie Lies Over the Ocean, and many more!

The Bluegrass Band™

\$49

Virtuoso live performances of 50 Bluegrass standards!



These MIDI files are great! As you listen to the tunes, you can single out any of the instruments using the on-screen fretboard display, tablature or notation. PLUS... Lots of Bluegrass pictures, bios, & trivia (all on disk) & much more. Our most "feel good all over" program so far. Includes: Wildwood Flower, Sally Goodin, Cripple Creek, Fire on the Mountain, Pigtown Fling, Red Haired Boy, Jesse James & many more!

NEW! The Jazz Soloist™ Vol. 3

\$49

Vol. 1 (50 pieces) \$49 • Vol. 2 (50 pieces) \$49 • Vol. 3 (60 pieces) \$49



The Jazz Soloist is a music program with professional jazz quartet arrangements. Each song features a great jazz solo played by top jazz musicians, as well as piano comping, bass & drums. Vol. 3 of the Soloist series features Latin, Blues, & Jazz Waltz stylings. Includes Jazz Soloist program with MIDI files, & also files in Band-in-a-Box format. Sight-reading was NEVER so much fun before the Jazz Soloist series! (NOTE: Mac users get on-screen notation only when running the files in Band-in-a-Box; Volumes work together or as standalone programs.)

The Jazz Guitarist™

(Window • Mac • Atari)

\$49

Over 60 jazz standards played on MIDI guitar by top jazz/studio guitarist Oliver Gannon

Hear the music with CD-quality through your sound card or MIDI system. Most pieces have bass/drums plus guitar so you get a full sounding jazz trio for the tunes! On-screen fretboard shows you exactly what notes & chords are being played on the guitar. Slow down the performance or, better still, step through the music chord by chord, so you can learn every note as it's played!

PLUS MANY MORE FEATURES... Jazz Trivia game & Guess that Song game, memos, biographies (all on disk) • Over 60 Top jazz standards with complete guitar arrangements • Background playback so you can listen while working in other programs • Special support for Roland GS or General MIDI modules • Standard MIDI files can be used in other programs or for presentations • Use your existing sound card or MIDI synthesizer

Other products...

Multi MPU401 Driver for Windows 3.1/95 \$19

Windows driver that allows 10 programs to use the MPU401 at the same time.

SC-PRO Editor for Windows & Macintosh \$29

mixing/editing of every feature of the Sound Canvas and other Roland GS cards/modules.

"INSIDE BAND-IN-A-BOX" Video Instruction Tapes for Version 7

Over 3-1/2 hours of video instructions, narrated by program creator Peter Gannon. Vol. 1 Basics, creating & entering songs, solos & entering notation \$29; Vol. 2 Advanced, creating harmonies, new soloists & new Styles \$29; Both volumes \$49. Available in VHS or PAL format. NOTE: Video tapes demonstrate Windows version of Band-in-a-Box. Macintosh version contains similar features.

PHONE ORDERS 1-800-268-6272 or 250-475-2874

VISA/MC/AMEX/cheque/mo/po# Fax 250-475-2937

Add \$5.00 Shipping/Handling per order (\$10 outside USA/Canada)

OPEN LATE NITE: 9 am - Midnight EST

e-mail address - Internet: sales@pgmusic.com

ORDER/DOWNLOAD MOST PRODUCTS FROM OUR WEB PAGE - www.pgmusic.com

PG Music Inc.

266 Elmwood Avenue, Suite 111, Buffalo NY 14222

30 DAY UNCONDITIONAL MONEY BACK GUARANTEE ON ALL PRODUCTS

STEINBERG

REBIRTH RB-338 1.5
(MAC/WIN)

*Two old friends are
resurrected in this software
emulation.*

By Rob Rayle

Long before MIDI, computer-based sequencers, CDs, or DATs, there was a company called Roland that made a weird little analog synthesizer called the TB-303. The synthesizer didn't have a keyboard, so you couldn't "play" it in the conventional sense. You programmed it to play itself using its built-in hardware sequencer.

The 303 was marketed as a "bass machine"; it was supposed to replace a bass guitarist the way a drum machine replaces a drummer. It could sync up to Roland's analog drum machines, such as the TR-808, to create an automated rhythm section.

Most people thought the TB-303 was a bad joke. It was hard to program, and it did a lousy job of emulating a bass guitar. Ultimately, it didn't sell very well, so Roland stopped making it. The lowly TB-303 seemed totally obsolete until a funny thing happened: the machines got cheap. Nobody wanted them, so starving musicians and composers who couldn't afford the good stuff were able to buy them. Some of these intrepid souls discovered that the TB-303 had a certain charm. It didn't sound like a bass guitar, but it could sound pretty good as itself, whatever it was.

Some of the music made by these people caught on, and more people wanted those sounds. Strangely enough, the newer, "better" gear wasn't able to emulate the sound of those obsolete instruments very well. Because Roland didn't make many TB-303s in the first place, the price of a used TB-303 skyrocketed. These days, I doubt you could find a used one for sale at all, and if you do, it's likely to cost a lot.

If you need that 303 sound, though, all is not lost. Thanks to Propellerheads and Steinberg, the obsolete TB-303 and

TR-808 have now been reborn in software as *ReBirth RB-338*. (*ReBirth* is a Steinberg product that Propellerheads developed.)

ReBirth RB-338 is a software emulation of a small electronic-music studio consisting of two Roland TB-303 synthesizers synchronized to a Roland TR-808 drum machine, a synched delay, a distortion box, and an extra filter with an envelope generator. The TB-303 sounds are emulated with physical modeling, and the drum machine is sample-based with some additional software envelopes and filters for expression.

Installing *ReBirth* is straightforward. However, it uses an irritating copy-protection scheme that requires the installation CD-ROM to be in the drive when you boot the program.

TB-303 EMULATION

The *ReBirth* TB-303 emulation (which I'll call the RB-303) is very faithful to the original TB-303. It's so close, in fact, that any description of the RB-303 is pretty much a description of the TB-303. Therefore, if you are already familiar with the TB-303, you might want to skip this section.

The RB-303 synthesizer is extremely simple. It has a single oscillator that produces a square or sawtooth wave. The oscillator is routed through a 12 dB/octave, resonant, lowpass filter and then through an output amplifier. The filter is modulated by a very simple envelope generator: it's an attack-decay envelope with the attack fixed at zero; only the decay time is variable. The amplifier is always controlled directly by the note gate: the volume is fully on when a note is sounding and completely off when it's not, which is similar to an organ.

There is no sound storage as such because this is an emulation of an older synth that has no patch memory. The sound you get is determined entirely by the settings of the knobs. Of course, unlike the original TB-303, you can save a *ReBirth* file with all knob settings. In addition, you can record and play back any control

movements, which is far more than you could do with the TB-303.

Like the original TB-303, the RB-303 is a rudimentary but complete synthesizer with only one switch (to select a sawtooth or square wave) and six knobs (Osc. Tuning, Filter Cutoff, Filter Resonance, Filter Envelope Modulation, Decay, and Accent). The Accent knob sets the Velocity level of notes designated as "accented" in the pattern sequencer.

PATTERN SEQUENCER

The sequencer built into the TB-303 (and RB-303) is one of the main reasons for its unique sound. In some ways, this sequencer is inferior to the least capable MIDI sequencers made today. The resolution is only 4 ppqn (i.e., sixteenth notes). There is no way to play notes into the sequencer in real time, nor is there any kind of graphic editing. However, the sequencer integrates with the synth in such a way that it's easy to do some things that can be painful to set up with a MIDI rig, which I'll discuss in a moment.

The sequencer is pattern based, and there are two levels of programming: Pattern mode and Song mode (called Track mode on the TB-303). In Pattern mode, you program a single bar at a time. In Song mode, you specify the order in which your patterns (bars) will play in a song.

Pattern programming in *ReBirth* is almost exactly like pattern programming on the TB-303 and TR-808. First, you specify the number of steps in the pattern. The pitch for each



FIG. 1: *ReBirth RB-338* emulates two Roland TB-303 synths and a TR-808 drum machine, and it adds an extra envelope-controlled filter, delay, and distortion effect.

available in North America from

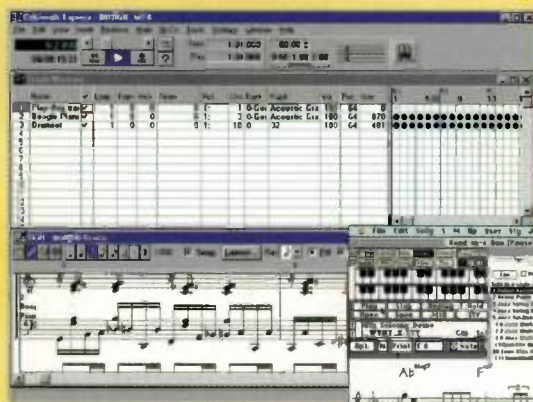
EDIROL

A MEMBER OF THE ROLAND GROUP

Creative **MUSIC** tools

R E C O R D I N G

Choose from
over 25 catalog
pages of PC &
Mac software
applications.



Cakewalk (Windows)



Band In A Box by PG Music
(Windows or Macintosh)



Connect your PC or
Mac in order to:

- > Learn Music
- > Enjoy Music On The Web
- > Compose & Arrange Music
- > Edit Audio/Video
- > Hear High Quality Music



Roland MA-20 Speakers

The highest quality professional
speaker systems to reproduce your
audio on the desktop.

The latest from the Roland Sound Canvas family has
more sounds, effects, and is easy
to use creating richer sounds.
Connect to your PC or Mac.

Roland SC-88 Pro Sound Canvas



> Choose
from the
largest
selection
of midi files.

Call 1-800-380-2580
for our Catalog

Visit our new website
www.edirol.com
circle #602 on reader service card

step is specified using buttons that look like a single octave of a piano keyboard (see Fig. 1). The Step and Back buttons select the step you're programming, and the current step is displayed in the Edit Step window. The two buttons labeled Up and Down transpose the pitch by one octave, which effectively gives you a 3-octave range for these synths. I wish that *ReBirth* didn't share this particular limitation of the TB-303; there's certainly no reason why it should.

The Accent button determines whether the current step is accented or unaccented; the unaccented level is fixed, and the accented level is determined by the Accent knob as mentioned earlier. The Slide button causes the current note to tie to the following note. If both notes have the same pitch, this results in a longer note. If they have different pitches, the first note slides to the pitch of the next note, which

Accenting a note that you slide into sounds quite different from a normal accent, and accenting a rest that you slide into creates another interesting kind of sound. With this sequencer, you have only a few functions at your fingertips, but they all interact and create interesting results.

808 EMULATION

ReBirth's TR-808 emulation (which I'll call the RB-808) is sample-based rather than modeled.

The basic control structure is identical to that of the TR-808: individual level controls for each drum, Tone and Decay controls for the bass drum, Tone and Snappy controls for the snare, Tune controls for the tom-toms, Tone and Decay controls for the cymbal, and Decay for the open hi-hat.

I like the kick on the original *ReBirth* (RB-338 version 1.0), and the snare is pretty good, too. I'm not as crazy about the other sounds in this version, but that doesn't matter very much with version 1.5, because it's now possible to replace the original samples for the drum machine with any samples you want (more on this new feature in a moment).

The drum-machine patterns are programmed using the sixteen LED buttons at the bottom of the screen, which represent sixteenth notes (see Fig. 1). To play a drum on a particular sixteenth note, first select the drum you want by turning the selection dial or pressing the corresponding button, then click on the LED button representing that sixteenth note until it is lit. To remove a drum hit, click on the LED button until it is dark. I found the drum-selection dial a little awkward to use, so I often just hit the button for the instrument and used the dial as an indicator only.

Some drums are "shared" in pairs, which means you can select one of them to sound in a particular step, but you can't play both sounds at exactly the same time. For example, the rimshot and hand-clap sounds are shared in this way. Like the RB-303 sequencer, the RB-808 includes an Accent button that increases the Velocity



FIG. 2: The TechnoBox version of *ReBirth* uses TR-909 drum samples.

level of any drum assigned to a step on which the button is activated. The accent level is determined by a dedicated knob.

SONG MODE

For each of the 808 and 303 modules, eight patterns are stored in each of four banks that are selected by the buttons on the left side of each module (see Fig. 1). There are 32 pattern-storage areas for each module, which is less than the 64 on the TB-303 but more than the 24 on the TR-808. Of course, the entire song can easily be stored in a *ReBirth* file, so this seems to be enough.

Arranging the patterns into songs (called tracks in TB-303 parlance) is a lot easier with *ReBirth* than it is with the original Roland beasts. You assemble the patterns by selecting them with the pattern-selection buttons on the left side of the display as the song plays, or you can do it in step time.

ReBirth's Song mode is a lot like recording a TB-303/TR-808 sequence to tape while "playing" the knobs. In fact, it's better because you can record all your moves and refine them after the fact. With version 1.5, it's also possible to map MIDI controllers to all of *ReBirth's* knobs, which means you can control *ReBirth* from a MIDI fader box. This feature lets you move several controls at once, which is not possible using a mouse.

To record your controller tweaks in Song mode, hit the Record button and move the knobs as the song plays. Only the controls you touch in any given pass are affected, so you can

It's easy to do

some things that can
be painful to set up
with a MIDI rig.

creates a portamento effect. To program a rest instead of a note in the current step, press the Rest button, which is labeled with a graphic of a sixteenth-note rest.

When the Pitch Mode button is activated, the sequencer automatically advances to the next step as soon as one of the pitch keys is pressed. This is as close as *ReBirth* gets to letting you play in real time.

There are some rather cool things about this goofy sequencer. When you slide between notes of different pitch, the slide begins during the sustain portion of the first note and ends at the start time of the second note. This is a very musical effect that's quite difficult to set up with a MIDI sequencer. You can also slide to a note that doesn't sound (that is, a rest) to create a "fall off" effect.

Using the Slide button can make you very conscious of phrasing. In addition, the Accent button interacts with the Slide button in some interesting ways.

make multiple passes through the same section of the song, overdubbing your moves on different knobs and buttons.

The Loop controls at the top of the screen are useful for this sort of overdubbing; they can also be used to specify a range of the song to write to an audio file. The loop is not for structuring or arranging songs; it's more of an editing device.

SYNC AND INTEGRATION

It is possible to sync *ReBirth* with a MIDI sequencer running on the same computer. On the Macintosh, *ReBirth* uses Opcode OMS to receive MIDI Clock, so any sequencer that uses OMS will work. If your Mac-based sequencer doesn't use OMS, you'll need multiple MIDI interfaces; connect a MIDI Out on one interface to a MIDI In on another. On the PC, *ReBirth* uses a custom driver called Hubi's Loopback Device to receive MIDI Clocks from any sequencer.

If you are using a sequencer that records digital audio in addition to sequencing MIDI, some resource-sharing issues might come up. On the PC, *ReBirth* requires exclusive access to one audio card unless the card has a DirectX driver and your software supports DirectX. *ReBirth* and Steinberg's *Cubase VST 3.55* both support this standard. In addition, many audio cards, such as the TerraTec EWS64 XL, include multiple wave (MME) drivers, so they can accommodate multiple applications, even without DirectX.

On the Macintosh, *ReBirth* uses Sound Manager to output audio via the on-board audio I/O. The software can share the device with a digital audio sequencer as long as that sequencer also uses Sound Manager. (Some digital audio sequencers on the Macintosh bypass Sound Manager for performance reasons.) In any case, it's possible to write *ReBirth*'s audio data to a file and then have your digital audio

ReBirth System Requirements

PC: Pentium 75 or better, Windows 95 or NT 4.0 or later, 4.1 MB hard-disk space, 16 MB RAM, Windows 95 compatible audio card, CD-ROM drive.

Mac: Mac OS 7.5.3 or later, 4.1 MB hard-disk space, 16 MB RAM, CD-ROM drive.

PROJECT STUDIO EXPERTS



WORLDWIDE DELIVERY

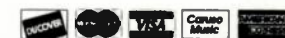
The Largest Selection Of The Best Products In The Business



- ▶ DIGITAL & ANALOG MULTITRACKS & CONSOLES ▶
- ▶ EFFECTS, MONITORS, MICS & PRE-AMPS ▶
- ▶ KEYBOARDS, GUITARS & ELECTRONIC PERCUSSION ▶

CALL NOW

800-264-6614



OUTSIDE U.S. - 860-442-9600

FAX: 860-442-0463

CARUSO MUSIC

94 State Street • New London, CT 06320 USA • E-mail: sales@caruso.net • <http://www.caruso.net>

circle #583 on reader service card

circle #584 on reader service card

SCAN & PLAY

MIDISCAN[®]

FOR WINDOWS

Music reading software



Try it before you buy it...
<http://www.musitek.com>



MUSITEK
MUSIC IMAGING TECHNOLOGIES

800-676-8055
805-646-8051

sequencer play the file. In this case, however, you won't be able to tweak the controls while listening to your song controlled by the sequencer.

SOFT EFFECTS

In addition to the 303/808 emulations, *ReBirth* also includes a distortion effect, a delay, and an extra filter with an envelope generator. These effects have their own control windows, and they are applied to the 303 and 808 modules in the corresponding Mix windows (see Fig. 1), which also control each module's level and pan position.

The delay sounds very nice; it is always synched to the sequencer, so the delay time is set in steps (sixteenth notes or eighth-note triplets). The depth of each module's delay is determined by the module's Delay knob in the Mix window.

The distortion sounds pretty good, not unlike a tube preamp. However, it can only be applied to one module at a time, which is like having a fuzz box inserted in-line rather than connected to an effects loop on your mixer. Because there are no individual drum outputs, you can only distort the whole kit. I often find it useful to distort just the snare drum—too bad *ReBirth* can't do this.

The extra filter (called a Pattern Controlled Filter, or PCF) is a great addition to *ReBirth* 1.5. This is a dual-mode filter (lowpass and bandpass) with resonance and a decay-only envelope. The envelope is triggered by one of 46 preset patterns that are synched to the

tempo of the sequencer.

Like the distortion effect, the PCF is an inline device; it can only be used on one instrument at a time. The PCF is good for superimposing an additional rhythmic feel on an instrument. I especially like using the bandpass mode on one of the RB-303s. This creates an entirely different synth sound that you can't get with the RB-303 alone; it's like having an RB-303 with two filters and two envelopes.

One of the problems with the TB-303 sound is that it has been overused in techno music. Because the synth itself is so limited, it's practically impossible to create a new and unique sound with

▼ The obsolete TB-303 and TR-808 have now been reborn in software.

it—everything that it can do has already been heard a lot. Adding a bandpass PCF to the RB-303 can give it the extra spice it needs.

CUSTOMIZING REBIRTH

If you're technically inclined and have a resource editor (such as Visual C++ 5.0 for Windows NT or *Resorcerer* for the Mac), you can change *ReBirth*'s drum samples and its graphic interface. If you're not into programming, you can still enjoy the benefit of other people's efforts in this area because Steinberg maintains an archive of modified versions of *ReBirth*. For example, a TechnoBox version uses TR-909 drum samples (see Fig. 2), and a RedTop version has a '50s look and feel with more electronic/industrial sounds (see Fig. 3).

I prefer the drum samples in the TechnoBox and Red Top versions to the original RB-808. In addition, I prefer the TechnoBox version to the RedTop for mostly visual aesthetic reasons,



FIG. 3: The '50s-retro RedTop version of *ReBirth* has five different snares and cool, "mechanical" numeric readouts.

although the five snares in the RedTop version are nice. In addition, five more modified versions are now available: Pitch Black Edition, ReVirus, Grey Top, Moon Unit, and Hempomat, and another version, from the band Daft Punk, will be available soon.

The archive of alternate versions is on the Web at www.us.steinberg.net, and anyone with *ReBirth* can download any of these versions for free. Propellerheads has also created a customization toolkit called ReNovator, which is available for free at the company's Web site (www.propellerheads.se).

RE BIRTHRIGHT

Overall, *ReBirth* is an excellent program and an excellent value. It's a particularly good choice for someone who has a computer with audio capabilities, wants to do techno music, and is starting from scratch. For such a person, this program provides a complete start-up studio at low cost with minimal setup and installation hassle. It's also a good choice for anyone who wants to add 303/808 sounds to an existing MIDI studio.

ReBirth is inexpensive by any standard and extremely inexpensive compared to the instruments that it emulates. You can even download a free demo version from the Propellerheads Web site to try it out. If you've ever wanted a TB-303 or TR-808 or you've just been curious about these instruments, you should definitely check out *ReBirth*.

Look for Bufo, which is Rob Rayle and Adam O'Hana doing psychedelic trance, on The Language of Light II at your local underground electronic-music store.

STEINBERG
ReBirth RB-338 1.5 software synthesizer
\$199

FEATURES ■■■

EASE OF USE ■■■■

QUALITY OF SOUNDS ■■■■■

VALUE ■■■■
1 2 3 4 5

PROS: Excellent sound. Extremely inexpensive. Accurate emulation of TB-303.

CONS: No way to "play" it. No controller editing. No undo. Irritating copy-protection scheme.

CIRCLE #440 ON READER SERVICE CARD

One day you'll discover what a powerful tool JAMMER is.

How JAMMER creates soulful backing tracks,
encourages creativity, and is an endless
source of new musical ideas.

And as you listen to the play back of the
hot new tune you just finished, you'll stand in awe
as so many people have done before you, wondering...
Why did I wait so long to get this incredible software?



Today is the Day. The Jam is on.

JAMMER®

To start jammin call SoundTrek today at 1-800-778-6859 or see your local music software dealer

Visit SoundTrek on the web at www.soundtrek.com (demo available)

SoundTrek 3408 Howell St, Suite F, Duluth GA 30096 tel 770-623-1338 fax 770-623-3054 email sales@soundtrek.com

ENCORE

EXPRESSIONIST

Make your dinosaurs roar with precision.

By Alex Artaud

Unless you've been under a rock for the last few years, you'll know that analog synth squawks, bleeps, and rumbles are the rage in some genres of popular music. Newer models are generally MIDI-equipped, but how will you integrate vintage synths into your MIDI rig? Enter the MIDI-to-CV converter, a lovely solution that's been around for quite a while and has, over the last five years, undergone refinements by companies based primarily in the U.K.

Now from California-based Encore Electronics comes the Expressionist, an 8-channel MIDI-to-CV converter designed by Tony Karavidas. No question about it, the Expressionist is the product of careful research and provides MIDI musicians with versatile solutions for controlling their beloved dinosaur synths.

Housed in a lightweight, 1U rack-mount box, the matte black Expressionist is a fairly austere unit. The front panel features an easy-to-read, backlit, 2-line display, to the right of which are five buttons: Increment, Decrement, Parameter (for cursor movement), Page, and Enter. It's accurate to call this interface spare, but you can adequately cover all the editing parameters and store settings with minimum hassle (see Fig. 1).

Flip the unit around, and its back panel reveals a long row of eight Control Voltage and eight Gate outputs on $\frac{1}{4}$ -inch jacks (see Fig. 2). For controlling vintage drum machines and arpeggiators, there's a DIN Sync output. The $\frac{1}{4}$ -inch jacks take up a lot of space, so you only get two MIDI ports: In and

Out/Thru (these are software configurable). In addition, a footswitch jack is provided that allows you to click through the setups that store your particular layout.

FIRST STEPS

The pitch of most vintage analog can be modulated using control voltages. Typically, an increase in voltage will bring about an increase in pitch. Most vintage mono synths are designed to respond to control voltages measured in volts per octave (V/oct.) or volts per hertz (V/Hz). Synths that are designed for volts per octave are scaled linearly, so that 1V modulates the pitch by an octave (one-twelfth volt per semitone). Moog, ARP, and Roland monophonic synths feature this approach.

Volts-per-hertz synths use an exponential scaling scheme, where doubling the control voltage increases the pitch by an octave. This was the choice of companies such as Korg and Yamaha. Fortunately, the Expressionist allows you to configure your setups to control either type. This is worth noting because it's not a feature common to other MIDI-CV converters.

Gate voltages trigger when and how long a synth should play a note. When the key is pressed, a voltage opens an electrical circuit (the gate) and passes the audio signal as long as the voltage is present. When the key is released, the gate closes.

In contrast, some mono synthesizers made by Moog, Yamaha, and Korg were designed with S-triggers ("shorting triggers"), which operate like a switch. When the key is pressed, a switch is closed, "short-circuiting" the signal to ground and completing the circuit, so the note sounds. When no key is depressed, the circuit remains open, so the note is off. Either +12V gate or S-trigger assignments can be programmed in the setup menus of the Expressionist.

PATCHING UP

You might imagine that along with the arcane world of CV and gates would

come horrific spaghetti cabling nightmares. Well, not quite. But there are some connectivity issues. All outputs on the Expressionist are $\frac{1}{4}$ -inch, but several synths—the ARP 2600 and early Oberheims, for example—use $\frac{1}{8}$ -inch CV/Gate inputs. This problem is easily solved with an adapter.

A little more work is required to modify cables with $\frac{1}{4}$ -inch connectors for S-trigger chores. If you're lucky, your S-trigger synth may already be modified to accept a gate input. (My Minimoog was.) If not, you'll need to buy a 2-conductor in-line plug, available from most any electronics store, and break out the soldering iron. That may sound like a drag, but the mod is easy to do and should only set you back about three bucks.

Once you power it up, Expressionist loads up its default setting, SETUP 0. This is for the no-manual, plug-and-play musician who wants to make noise right away. Named OmniOnAllGate, it assigns all channels to play the same thing with positive gates. You just hook up your MIDI controller and have a ball. If you get a continuous note, the gate polarity probably needs to be switched by paging through the menu of the setup. I was getting sound within minutes of unpacking the box.

BELLY OF THE BEAST

The Expressionist has 100 user setups to store configurations, more than enough for the mad scientist in you. Each setup has eighteen pages and allows you to customize thoroughly. Among the important features are note range (for creating splits on your master controller), ± 36 semitone transposition, and 2-octave pitch bend. But the godsend was a tuning feature with which individual CV outputs can be finely adjusted. Finally, I was able to tame my pesky Oberheim and avoid reaching into the oscillator with my small flat-head screwdriver. Major bonus!

Another winning feature is portamento, which is independently assignable for each channel. Two types



FIG. 1: Encore Electronics' Expressionist has a minimum of controls, which allows for very simple operation.



FIG. 2: All connections are made in the rear of the unit. MIDI Out and Thru can be switched by means of software.

of portamento are provided: fixed and variable. Fixed portamento is the type most familiar to musicians; it enables a fixed glide rate no matter where the start and end points are. Variable allows the glide rate to be calculated based on the distance between two notes. This way, the time it takes for the note to glide one octave or four octaves will be the same. A parameter is included to adjust the glide time, which can be as long as 30 seconds per octave.

MODULATION OVERDRIVE

Probably the Expressionist's strongest feature is that any CV channel can also be used as modulation control voltage. After turning NOTEINFO off for that channel in the Auxiliary Mode page, you can connect the CV out to any control destination. In my case, I patched the unit's CV 3 output to the filter input on my Minimoog and assigned an LFO to modulate it. This is a simple example of modulation routing in the Expressionist, where four MIDI modulation sources for each CV channel are provided: Velocity, Aftertouch, note position, and any of the first 121 MIDI Control Changes.

Three global LFOs are adjustable per CV channel. These LFO shapes are selectable from sine, triangle, square, up sawtooth, down sawtooth, and random (sample and hold). All these LFOs are bipolar except the square wave, which is unipolar and will only affect the played note with a positive voltage value. This proves useful for tuning trills. You can vary the mix amount of LFO on each channel with values from 0 to 99. LFO rate is also adjustable between 0.125 and 12 Hz.

Each LFO can be modulated by a controller on a separate MIDI channel. Although it's not possible to control the LFO rates, you can retrigger LFOs with MIDI Clock messages, effectively syncing them to an external pulse. Finally, MIDI-to-LFO channel assignments are made in the third LFO edit page. These LFOs are global and can be shared by all eight CV channels.

POLY WANNA?

For those of you with several monophonic synths or a polyphonic synth, the Expressionist's Polygroup page is the ticket. It allows you to group CV channels, treating the synthesizer(s) as one polyphonic instrument. Two independent setups are possible in this page, so you get a lot of room to move.

A good programming feature was to defeat NOTERANGE assignments whenever a CV channel is assigned to a Polygroup. This means that you don't have to go back and reassign note ranges for every synth you add to a Polygroup. Individual note limitations won't affect the Polygroup.

Since channel stealing has been known to happen, the Expressionist provides five modes. First is Rob None, where no notes will be played when you go beyond your synth's polyphony, and the last note played will be sustained. Another option is Rotate mode, where a note will be stolen from each channel in succession. There's Reassign, where the unit looks for a note to steal from its own channel, and Rob High, where it steals the highest note played. In Rob Low

mode, the Expressionist takes the lowest note played.

Of great importance, you can dump and load your setups (in the form of SysEx data) into a sequencer or MIDI filer. Finally, the Expressionist uses flash RAM rather than battery-backed RAM, and any future software upgrades can be done through the MIDI port.

IT'S MINE

Hands down, the Expressionist is probably the best MIDI-to-CV unit on the market. No one else provides the number of outputs nor the flexible modulation routing to truly customize a studio with several analog synths. The only problem is that now I'm searching for more analog synths to buy and will have to tear down a wall to fit them all in my studio. ☺

circle #586 on reader service card

ENCORE ELECTRONICS
Expressionist 8-channel MIDI-CV Converter
\$599

FEATURES ■■■■■

EASE OF USE ■■■■

DOCUMENTATION ■■■■

VALUE ■■■■■
1 2 3 4 5

PROS: Configurable for V/oct. or V/Hz control. Offset features for tuning and tracking. Three global LFOs. Independently assignable portamento. Controls up to eight synths.

CONS: Documentation limited. Small display. A bit difficult to maneuver.

CIRCLE #441 ON READER SERVICE CARD

LEIGH'S computers
Midi Mail Order Software

129 W. Eagle Rd.
Havertown, Pa. 19083
(USA) 800-321-6434 (CAN)
(610-658-2323) FAX- 610-896-4414
Email : leighs@ix.netcom.com
On Line Secure Shopping via WEB
Web Page: <http://www.leighs.com>



We stock : Cakewalk, Cubase, Sound Forge, Midi Scan, DSPFX, Voyetra, Midi Time Piece AV, SEKD, Performer, Encore, Midi Man ,Event Elec. - ADB, Samplitude, Fast Edit, Creamware-Finale, Band in a Box, ADB-Audiomedia Jammer, Turtle Beach, Dozens more!!!

SHOP ONLINE !!!
www.leighs.com **CAKEWALK**

 **CD Rom Recorders and software to master are our specialty!**

We sell hard disk recording **CARDs**.

Digital Audio Card +
DIGITAL ONLY CARD (SPDIF) **WAVE LAB** **ADB**
Samplitude **PERFECT SOUND**

Call for free Midi Multimedia **catalog!**

 **We ship worldwide !!**
FAX : 610-896-4414

ADVERTISER INDEX

Advertiser	Reader Service #	Page	Advertiser	Reader Service #	Page
Aardvark Computer Systems	534	67	Kurzweil Music Systems	600	179
Acoustics First	563	108	L & M Music	593	159
AdB International	574	123	Leigh's Computers	586	145
Akai	505	10-11	Lexicon (PCM 81)	509	19
AKG (Emotion)	506	13	Lexicon (Signature 284)	549	89
AKG (WMS 60)	531	61	Lucid Technology/Symetrix	525	50
AKG (SolidTube)	561	111	Mackie (HR824)	502	2-3
Alesis	503	4-5	Mackie (D8-B)	542	93
Applied Research & Technology (A.R.T.)	541	105	Mark of the Unicorn	501	180
A.S.L.F.	567	112	MIDIMAN	533	63
B & H Photo-Video	599	164-167	Midisoft	540	70
Berklee College of Music	590	155	Musician's Friend	554	97
beyerdynamic	560	104	Musitek	584	141
Brooklyn Boy Books	592	156	Neumann/USA	518	33
Cakewalk Music Software	514	29	Opcode	565	79
Caruso Music	583	141	Peavey	528	57
Conservatory of Recording Arts & Sciences	545	84	PG Music	582	136-137
Crown	550	91	QCA	594	159
Danny's Music Box	589	153	QSC Audio Products	520	41
dbx Professional Products	538	55	QSC Audio Products #2	557	101
Digidesign	507	15	Quantegy	547	85
DigiTech	516	77	Quik Lok/Music Industries	568	113
Disc Makers	587	149	Recording Industry Sourcebook	•	151
Discount Distributors	595	160	Rich Music	591	156
Earthworks	579	129	Roland (Fender)	526	51
Ebtech	576	127	Roland (MC-505)	569	115
Edirol	602	139	Sam Ash Professional	•	62
Electro-Voice (EV)	536	38-39	Seer Systems	570	117
Emagic	519	37	SEK'D	556	100
EM Gear Giveaway	•	130-131	Sonic Foundry	544	83
E-mu Systems (Audity 2000)	515	30-31	Sound Chaser	571	118
E-mu Systems (ESI-4000)	527	73	Sound Quest	598	163
E-mu Systems (Audio Production Studio)	559	103	Soundtrek	585	143
Ensoniq (ZR-76)	504	9	Speir Music	580	133
Ensoniq (ASR-X)	553	95	Spirit	539	75
Event Electronics	512	25	Starr Labs	581	135
Fender	526	51	StudioPro98	•	147
Fostex	•	35	Sweetwater Sound	521	45
Frontier Design Group	•	125	Syntrillium Software	551	81
Full Compass	573	121	TASCAM (564 Digital Portastudio)	513	26-27
Genelec	535	69	TASCAM (DA-302)	522	46-47
General Music	530	59	Taxi	564	109
Grandma's Music & Sound	578	129	Thoroughbred Music	577	127
Groove Tubes Audio	562	107	Turtle Beach	555	99
Guitar Center	529	58	Voyetra	537	72
Guitar Center's Rhythm City	566	112	West L.A. Music	546	84
Hermes Music	558	102	Whirlwind	572	119
HHB Communications (CDR800)	510	20	World Records Group	597	162
HHB Communications (ADAT45)	523	48	Yamaha (EX-Series Synthesizers)	508	16-17
Iomega	•	22-23	Yamaha (MD8)	548	87
Korg (N1/N5)	524	49	Zefiro Acoustics	552	94
Korg (1212 I/O)	543	82			

RATE THE ARTICLES IN THIS ISSUE!

May 1998

We want to know what you think of the articles in *Electronic Musician*! Now you can use your reader service card to give us feedback about *EM*'s editorial coverage. We have assigned a rating number to each of the main articles in this issue. Please select a rating for each article and circle the appropriate number on your reader service card:

Please select ONE rating number per article

	Very Helpful	Somewhat Helpful	Not Helpful	Didn't Read
A. "Look Before You Leap," p. 42	701	702	703	704
B. "Cover Story: In-Your-Face Mixing," p. 52	705	706	707	708
C. "Plug In, Turn On, Space Out," p. 64	709	710	711	712
D. "Square One: Music by the Numbers," p. 96	713	714	715	716
E. "Operation Help: Expert Advice," p. 114	717	718	719	720
F. "Final Mix: It's in the Air," p. 178	721	722	723	724

MIX Presents

StudioPro98

The Technology & Business of Audio Production

Thursday & Friday, June 25-26, 1998

New York Marriott Marquis, New York City

This is the conference you've been waiting for! Join the editors of *Mix* and more than 50 leading experts in recording and sound production in exploring the technologies and issues that are shaping the business today.

8 INFORMATION-PACKED SEMINARS

Making the All-Digital Transition - Moderator: **Ken Hahn** (Co-owner, Sync Sound, New York)

That Dangerous Upgrade Path - Moderator: **Paul Lehrman** (Author, teacher, and *Mix* columnist)

The Creative Interface: Project Studios and Commercial Facilities - Moderator: **Dan Daley** (Author and *Mix* East Coast Editor)

File Format Interchange: A Progress Report - Moderator: **Mel Lambert** (consultant and *Mix* contributing editor)

Studio Remodeling and Design: Practical Solutions to Common Problems - Moderator: **Bob Hodas** (Acoustical expert and *Mix* contributing editor)

Sound for Picture: Specialization or Diversification? - Moderator: **Dean Winkler** (President, Post Perfect, New York)

Modular Digital Multitracks: The Revolution Continues - Moderator: **George Petersen** (Editor, *Mix*; author of *Modular Digital Multitracks: A Power User's Guide*)

New Technologies—New Specialties - Moderator: **Phil DeLancie** (*Mix* media and mastering editor)

4 SPECIAL FORUMS (Both panels held each day)

The Art and Business of Producing - Moderator: **David Schwartz**. A panel of GRAMMY and TEC Award-winning producer/engineers (including Ed Cherney, Don Was, George Massenburg and others) will discuss how they work with artists in the studio, as well as the real world business issues of being a producer. Hosted by the Music Producers Guild of the Americas (MPGA).

Digital Consoles—Here and Now - Moderators: **George Petersen** and **Mel Lambert**. Digital mixing consoles—both large and small, for just about every application—are no longer a dream. Join with manufacturers and noted users of these miracle machines and get the answers you need to guide you on the digital path.

SPECIAL EVENING EVENT!

Reception/musical performance on Thursday, June 25. (Sponsored by the Recording Academy®). Relax and network with fellow audio professionals. Free to all registered attendees.

StudioPro98 Participants

(as of March 1)

Dave Amlen • Barry Beckett • David Beal • Russ Berger • Paul Berry • Danny Caccavo • Peter Chaikin • Ed Cherney • Jimmy Church • Peter D'Antonio • Patrick Dillello • Randy Ezratty • Frank Filipetti • Peter Fish • Alan Foust • Ron Franklin • Ethel Gabriel • Brooks Harris • Jay Healy • Fred Jones • Ralph Kelsey • John King • Jeremy Koch • Jeff Kracke • Joel Krantz • Josh Leo • Tommy LiPuma • Gary Lynn • Bob Ludwig • Arif Mardin • George Massenburg • Roger Maycock • Kooster McAllister • Ed McDermott • Bill Philbrick • Bob Pomann • Jonathon Porath • Steve Rainford • Rod Revilock • David Schwartz • Howard Schwartz • David Smith • Tom Stephenson • John Storyk • Michael Tapes • Bob Tudor • Tony Visconti • Don Was • Mark Yonge • Plus others TBA

In Cooperation With



Don't miss the most valuable two days outside the studio you'll spend this summer! For a brochure and registration materials, return the coupon below or call Daniela Barone at (510) 653-3307 or fax (510) 653-5142. Email: Daniela_barone@intertec.com

YES—I'm interested in attending **StudioPro98**, June 25-26 in New York City. Please send me a brochure and registration materials.

NAME _____

ADDRESS _____

CITY _____ STATE/COUNTRY _____ ZIP/POSTAL CODE _____

PRIMARY OCCUPATION _____

PHONE _____ FAX _____ E-MAIL _____

SYMETRIX

628

A one-stop digital processing solution for vocals.

By Barry Cleveland

Space and efficiency are important in most personal studios, which may account for the increasing popularity of voice processors. These devices combine four or five signal processors—usually a preamp, a couple of dynamics processors, and EQ—in a single unit, normally at a fraction of what they would cost if purchased individually. It's especially convenient to have processors that are typically used together incorporated into an integrated system when their collective settings can be stored and recalled as presets.

Symetrix is not new to this game. Many years before the current craze began, the company's 528 and 528E analog voice processors were being widely used in broadcast facilities and, to a lesser extent, in recording studios. Symetrix developed the 628 in response to 528 and 528E users who wanted a unit with presets. But the 628 is more than that, offering digital versions of the 528E's analog processors, expanded control, and additional features. However, new technology has its price: the 628 retails for almost twice as much as its predecessors.

The 628 consists of a microphone preamplifier, a de-esser, an expander/gate, a compressor/limiter, and a 3-band parametric equalizer. Like its analog predecessors, the Digital Voice Processor was developed primarily for use by commercial broadcast facilities. The unit is solidly built, has no power on/off switch, uses internal jumpers to configure its outputs, and has several

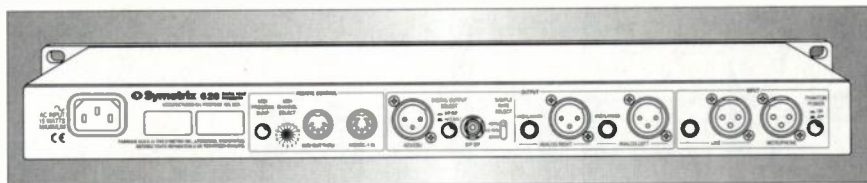


FIG. 1: In addition to the digital outputs and analog I/O, the 628's rear panel sports MIDI Channel Select, MIDI Program Dump, and Phantom Power On/Off switches. The switches' rear location is somewhat inconvenient, but there isn't enough room for them on the front panel.

critical switches on its rear panel that are located next to cable connectors. These things suggest an application where the unit will be configured and connected once, placed in a rack, and used constantly.

This fact also explains why its eight factory presets are all variations on radio-announcer voice settings. So, if you want to use your 628 to process, say, a female jazz vocalist, you'll be starting from scratch. (The unit has 120 user-programmable RAM locations.) Nevertheless, Symetrix also envisions the 628 Digital Voice Processor being used to process singing voices and instruments, and those are the applications that we will be most concerned with.

THE REAR VIEW

Around back, the unit has mic-level, balanced XLR and line-level, balanced 1/4-inch TRS analog inputs. (The 1/4-inch connectors can also accept unbalanced lines.) You select either the mic or line inputs from the front panel; you cannot use both simultaneously. Phantom power is supplied to the mic input for use with condenser mics; you can defeat it with a rear-panel switch (see Fig. 1).

The analog outputs are on balanced XLR and unbalanced 1/4-inch TS connectors, both of which are preconfigured as line level. However, you can reset either or both XLR analog outputs to mic level via internal jumpers. The analog outputs are labeled "Right" and "Left," which is strange given that the 628 is a mono unit.

There are no digital inputs, which makes sense when you consider that this

unit is designed to immediately follow a mic or instrument in the signal chain. Digital output is via either AES/EBU (XLR) or S/PDIF (coaxial) connectors. Analog-to-digital and D/A conversion are at 20-bit resolution, with a choice of three sample rates: 32 kHz, 44.1 kHz, and 48 kHz. Internal processing is handled by a 24-bit Motorola DSP.

WHAT'S UP FRONT

The 628 is a single-rackspace device with an attractive, dark gray faceplate. Its controls are arranged in a clean, uncluttered, and logical manner. Fourteen "knobs" (actually thirteen rotary encoders and one analog pot) lie in a single row, making them easy to identify and grab. Button switches and encoders are located just below the knobs, and LEDs and meters are located above them. All functions can be easily accessed using the knobs and buttons; there are no layers or multiple menus, as with many other digital processors. Each processor is engaged using an encoder button; an LED indicates its status.

Program numbers and parameter values appear on a small display on the far right side of the front panel. Output level, or "headroom," is indicated by an 8-segment LED just above it. The reason that output level is referred to as headroom is that, unlike analog equipment, digital equipment is not referenced to 0 dBm (+4 dBu) but to the clip point, or "digital zero." In the case of the 628, clipping occurs at +22 dBu, so a level of -4 dBFS (decibels, full scale) indicates that the signal is 4 dB below clipping, or +18 dBu. Got it?



Although Symetrix designed its 628 Digital Voice Processor primarily for broadcast applications, the company also intends the unit for use in music recording.

SYMETRIX RC-1

The Symetrix RC-1 Remote Controller (\$199) allows you to call up presets 1 to 11 on the 628 Digital Voice Processor and to switch the unit into Bypass mode (by calling up Program 0). It has twelve buttons that select the desired preset (or Bypass mode) as well as LEDs that indicate which button was pushed last.



Symetrix RC-1 remote controller

The RC-1 does not allow selection or adjustment of any of the 628's parameters, nor does it allow you to call up any of the other 117 presets. Also, if you change presets on the 628's control panel, the changes are not indicated on the RC-1. However, the Program Change messages that it transmits can be passed on to another MIDI device via the 628's MIDI Out/Thru, and the RC-1 can be used to control (in its limited way) MIDI devices other than the 628 when it is used with a 9-volt power supply.

Small rectangular boxes are provided next to each preset button to facilitate easy labeling, which is a thoughtful touch. The RC-1 comes with a 25-foot, 7-pin DIN cable. Overall, this is a limited but nevertheless useful remote controller; it's too bad that it cannot at least call up all of the 628's presets.

THE PROCESSOR CHAIN

At the beginning of the 628's processor chain is the preamplifier section. The preamp is transformerless and capacitorless, uses matched resistors, and (naturally) features RF filters to reduce radio interference. An analog gain pot is switchable between mic and line signal sources, and a 15 dB pad is available on the mic input. Two LEDs indicate clip-

ping and phantom-power on. Because the gain pot and the pad switch are analog, their settings are not stored and recalled as parts of presets. So if you want to be able to precisely re-create a previously stored setting and you do not always keep the pot and pad switch in the same positions, you will be forced to record their settings manually. This is, obviously, a significant limitation.

The de-esser has controls for frequency and threshold, along with a 6-segment LED gain-reduction meter. The expander/gate, and compressor/

limiter sections are nearly identical except for the range of their compression ratios (see the table "Symetrix 628 Processor Settings"). Each has an LED gain reduction meter and controls for ratio, threshold, and release time. Attack time is preset at 125 microseconds, and make-up gain is adjusted at the output stage. You should note that the threshold parameters are referenced to dBFS rather than dBu, just like the headroom meter.

The 3-band EQ is fully parametric. One set of three encoder knobs does

FREE WEB SITE ON IUMA!

it's big!

IUMA is the hottest Web spot for independent musicians. Over 20,000 people visit IUMA every day.

it's true!

Disc Makers will put your music on the Internet Underground Music Archive (IUMA).

it's yours!

If you make CDs, cassettes, or 12" vinyl records with Disc Makers.



Call Disc Makers today for a complete brochure:

1-800-468-9353

www.discmakers.com/iuma

Outside USA call 609-663-9030; FAX 609-661-3450

DISC MAKERS
EXPECT MORE

circle #587 on reader service card

triple duty as frequency, bandwidth, and cut/boost controls for all three bands. An encoder button cycles between bands, with the currently selected band being indicated by an LED.

At the end of the signal chain is the Master section, which consists of the display; the headroom meter; encoders for selecting, loading, and saving presets; and an encoder knob for adjusting output level.

On the rear panel is a 7-pin DIN connector labeled MIDI In/RC-1, which can be used in three ways. It can serve as a MIDI In port, but it can also connect to the optional RC-1 Remote Control (see sidebar, "Symetrix RC-1") or to a second 628 to facilitate program dumps. Program dumps from one 628 to another are accomplished using a small button located next to the MIDI connectors. Program Change messages from the RC-1 can be passed on to other MIDI devices via the MIDI Out/Thru jack. A small, 16-position rotary switch next to the connectors selects the MIDI channel.

ON THE AIR

For my first test, I connected an AKG Solid Tube mic to the 628's balanced XLR input and then connected one of the 628's two XLR line-level outputs to a Yamaha 03D mixer. Mackie HR824 powered monitors and Sony MDR-V4 headphones were used for monitoring.

Following the manual's advice, I disengaged the individual processors, set the output gain control to zero, spoke into the mic, and slowly brought up

the input gain until the headroom meter read approximately -6 dB. The first thing I noticed was that the AKG overloaded the input, even at relatively low settings, but without lighting the clip indicator. I solved that problem by engaging the 15 dB pad.

The next thing that I noticed was that the unit emitted a low-level, high-frequency squeal. Apparently this is the result of the preamplifier interacting with the DSP, probably due to the fact that they are both located on the same board. Engaging the expander, even at the lowest threshold, eliminated this sound.

With these problems out of the way, I proceeded to try out the eight factory presets. The presets range from the "Velvet Voiced FM Announcer," for use on a pro who already has a good radio voice, to "Bubba Budweiser the Country Music Jock," to the "Rock 'n' Roll

Animal," a creature who requires lots of processing. The presets are essentially variations on a theme, blending varying amounts of each processor. All performed quite well.

The compressor was very smooth and easily evened out my dynamic range, the gate kept background noise to a minimum without awkward ins and outs, and the EQ added warmth on the bottom and crispness to the high end. I tried modifying the "Velvet" preset to better match my voice, and I saved the results in user slot 1. I repeated the tests using a Rode NT2 mic, which has very different response characteristics, and with a little tweaking got similar results.

Finally, I connected the 628 to the 03D, first using the unbalanced analog output and then the two digital outputs, and I compared the results. The digital outputs do not require D/A conversion, and as expected, they were considerably quieter than either of the analog outputs. Of the two digital outputs, the AES/EBU was the quietest and cleanest.

For my next set of tests, I used the 628 while mixing male and female vocalists. Just for grins, I tried it out on some instrument tracks, as well. When I inserted it into an 03D channel strip using the unbalanced connectors, the 628 worked well but was a bit noisy. It was quieter when I ran the output from an analog tape deck directly into the voice processor's line-level input and then connected its AES/EBU digital output to the 03D's stereo digital input.

Overall, preamplifier operation was good but not great: the sound was not particularly "open," and sometimes it was even slightly fuzzy. The compressor section was smooth and effective, even when its controls were set in their extreme positions. Compression was

Symetrix 628 Processor Settings

Compression Ratio	1:1–15:1
Expansion Ratio	1:1–1:10
Attack Time, Comp./Limiter and Exp./Gate	125 μ s
Release Time, Comp./Limiter and Exp./Gate	250 ms–5.0 seconds
Threshold Range (all dynamics processors)	-60 dBFS–0 dBFS
De-esser Frequency Range	800 Hz–12 kHz
Parametric EQ Frequency Ranges	20–500 Hz (low); 160–6,300 Hz (mid); 680 Hz–20 kHz (high)
Parametric EQ Bandwidth	0.3–4 octaves
Parametric EQ Max. Cut/Boost	\pm 15 dB

Symetrix 628 General Specifications

Frequency Response	20 Hz–20 kHz (\pm 1 dB)
THD	0.05% (20 Hz–20 kHz, +4 dBm output)
Noise	<-89 dBu (20 Hz–20 kHz)
Digital Audio I/O	2 ch. AES/EBU (XLR) and S/PDIF (RCA coax)
Sampling Rates	32 kHz, 44.1 kHz, 48 kHz
Analog Inputs	(2) balanced XLR, mic level; (2) balanced/unbalanced $\frac{1}{4}$ " TRS, line level
Analog Outputs	(2) balanced XLR, line level*; (2) unbalanced $\frac{1}{4}$ ", line level
A/D and D/A Converters	20-bit Delta-Sigma
Internal Processing	24-bit
Internal Delay	<5 ms
ROM/User Programs	8/120
Other Connections	MIDI Out/Thru; MIDI In/RC-1 In
Dimensions	1U x 6.5" (D)
Weight	5.5 lbs.

*Individually switchable to mic level with internal jumpers

nearly transparent at lower ratios (such as 2:1) but became considerably more obvious at 6:1 and above. The compressor's preset attack time was generally acceptable, but I found myself wishing that I had more control when processing singers who employed subtle dynamic changes or sudden shifts between soft and loud sounds.

The expander/gate worked very well in conjunction with the compressor, practically eliminating all pumping and breathing sounds, but it was too coarse for my taste when used alone as a gate. Again, being able to adjust the attack time would probably have helped. The preset attack time on the de-esser, on the other hand, worked quite well.

The EQ was not particularly "sweet," but it did the job, and it introduced little distortion and no digital artifacts. Its low band was generally rich and warm, but its high band could be slightly harsh at some settings. Also, the data-encoder knob had to be turned *many* times in order to cover the full range of frequency settings, making me wish that there was some sort of coarse/fine adjustment. I would not go out of my way to run a track through this EQ for sweetening, as I might with other out-board EQs, but for basic adjustments, particularly when working with an announcer-type voice, it is more than adequate.

As mentioned earlier, I tried using the 628 on a variety of instrumental

tracks, as well as on vocals, and I was somewhat surprised at the results. Not being able to adjust attack times limited its usefulness on electric guitars and basses and made it unsuitable for woodwinds, but it sounded great on drums and percussion. For example, I used it on a conga track that was recorded at the same time as other drums, in the same room, and it enabled me to focus and tighten up the conga sound while nearly eliminating the sounds of the other drums. Very impressive!

PROCESS THIS!

The Symetrix 628 Digital Voice Processor is a rugged, high-quality, fairly straightforward device that offers a wide range of processing tools in one unit. It has been optimized for broadcast work, hence some of its limitations for recording and mixing, but it could nevertheless be useful for music recording and live performance. If there is a voice processor in your future, and particularly if you are recording directly to a digital medium, you should give the Symetrix 628 a good listen. ☉

SYMETRIX
628 Digital Voice Processor
\$1,199

FEATURES	■ ■ ■ ■
EASE OF USE	■ ■ ■ ■
AUDIO QUALITY	■ ■ ■ ■
VALUE	■ ■ ■ ■
	1 2 3 4 5

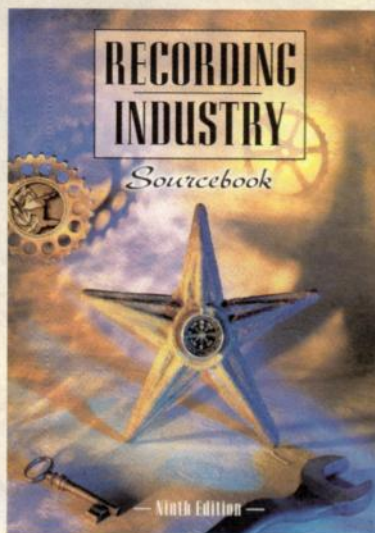
PROS: All functions easily accessed and adjusted. Extremely flexible I/O, including AES and S/PDIF digital outputs. Useful on some instruments as well as voice.

CONS: Input pot and pad settings not saved to presets. Attack times are not adjustable. Emits low-level digital noise. Mediocre preamp.

CIRCLE #442 ON READER SERVICE CARD

Serious About Music?

THE RECORDING INDUSTRY SOURCEBOOK IS THE ESSENTIAL NORTH AMERICAN MUSIC BUSINESS AND PRODUCTION DIRECTORY. FOR THE INDUSTRY PROFESSIONAL IT'S THE PERFECT DESKTOP OR TOUR BUS REFERENCE. FOR THE ARTIST, AN INSTRUMENT TO ACCESS THE BUSINESS OF MUSIC.



1998 EDITION AVAILABLE NOW!

NEW to the **1998 NINTH EDITION** are streamlined categories to quickly direct you to the information you need. This exclusive industry resource is loaded with essential information, and is clearly defined by tab sections for each category. The **SOURCEBOOK's** durable, spiral-bound construction will see it through repeated office reference or a cross-country tour.



THE RECORDING INDUSTRY SOURCEBOOK is the complete **SOURCE** for industry contact information, containing over 12,000 listings in more than 53 categories. Production categories include information about rates, equipment, credits, staff and specialties. Business listings include names and titles, phone and fax numbers, styles of music represented, whether or not unsolicited material is accepted, and more.

ORDER INFORMATION:

\$79.95 plus \$9.95 shipping & handling US Mail; \$11.95 UPS delivery. To order by phone in the US call (800) 543-7771, by fax (800) 633-6219; outside the US: TEL (913) 967-1719, FAX (913) 967-1901 or send a check or money order made payable to **Intertec Publishing**, c/o Intertec Publishing, P.O. Box 12901, Overland Park, KS 66282-2901

SOURCE CODE EM

GENERAL MUSIC

REALPIANO PRO 2

A digital piano that conjures the real thing.

By Julian Colbeck

What makes a “real” piano? Let’s start with wood, steel, iron, ivory (or plastic, nowadays), and felt. Perhaps Generalmusic is sticking its neck out by giving its latest digital instrument such a moniker. But chutzpah suits this perky Italian company. From the feel, the sound, and Generalmusic’s relentless ear for detail, I’d say the Realpiano Pro 2 is as fine a digital piano as you’re going to get at the moment, short of buying a 5-figure, top-flight Yamaha or Technics living-room grand.

The Realpiano Pro 2 is a pianist’s treat: 128-voice polyphony (yes, that’s right), bags of elbow room on the 88-note keyboard, an acoustic-piano tone you can really get your teeth into, as well as an assortment of additional keyboard tones. Sophisticated Performance memories are available for storing tone, effects, and control combinations (discussed shortly). There’s even a small sequencer in case the creative juices starting boiling over before you can make a lunge for your computer.

PHYSICAL CHECK UP

This is one heavy keyboard, though Generalmusic takes pains to point out

that the Realpiano Pro 2’s 57-pound bulk is considerably less than that of a Yamaha P150. But the Realpiano Pro 2 boasts fellow Italian manufacturer Fatar’s TP12 88-key weighted-action, Velocity- and Aftertouch-sensitive keyboard (the same model found in the Alesis QS8), and it’s worth its weight. On this instrument you’ll play *piano*, not a synth with a piano sound.

The black metal panel has quite a few features: sixteen tone selectors, an 8-band graphic EQ, effects buttons, Performance Store and Edit buttons, volume and data-entry sliders, and Stop, Start, Play, and Record controls for the sequencer.

Nothing’s going to fox anyone who’s ever played an electric anything, and although there are some hidden features, I was impressed to see pretty much the whole menu laid out before my eyes.

In addition to standard MIDI ports, the rear panel (see Fig. 1) has stereo in and out jacks. A signal coming into the unit is automatically mixed with the output (including the headphone out), which is useful for playing along with another MIDI sound module or drum machine in domestic use or, say, in a hotel room for practice. You’ll also find three programmable, ¼-inch TRS footswitch/pedal connections, each of which will accept a switch pedal, a standard continuous pedal, or Generalmusic’s continuous damper pedal. A stereo speaker minijack is provided that is virtually the same as the output on a Creative Labs Sound Blaster card.

There’s also a direct computer interface at the back of the keyboard. The computer interface—rarely seen

on a professional digital piano—enables you to connect to Mac or PC software without the need for a MIDI interface. I doubt that anyone who wants to buy this level of instrument and connect it to a computer does not already have an interface, but it’s there, anyway.

The casing is solid and professional looking, though anything of this size still needs a flight case if you’re going to gig with it.

TOUCHY FEELY

The best compliment I can pay the Pro 2 is that I was not continually reminded that I was playing a digital piano. It just behaves like a piano. You play, it performs. The underlying technology involves playback of special hybrid samples (Generalmusic calls this technology “FFT Merge”), which comprise Steinway, Bosendorfer, Yamaha, and Fazioli piano samples. The hybrid samples are routed through physical models that simulate the effect of undamped strings, strings damped while already in motion, hammer strikes, damper-pedal effects, and so on.

Half the battle with digital piano sounds is the feel. Serve up the world’s finest set of stereo piano samples on a lightweight keyboard, and you might as well be playing a kid’s Kmart keyboard. The Realpiano’s action is fast without having an alarming “return” as with some digitals; a rubber pad beneath the keys provides a nice level of kickback. The weight is substantial without being heavy and Rhodes-like.

If you press a note down slowly and gently, you won’t hear anything, just as you wouldn’t on an acoustic piano, and the gradations of tone, from pianissimo to triple forte, feel absolutely smooth and natural.

Action is also in the ear of the beholder, so to speak, and there are three Velocity-curve settings and a user-definable curve. I found the Soft setting quite useful when using the Pro 2 for synth or organ parts that beg for a lighter touch.

THE PIANO

All the technical jargon in the world won’t convince you that one piano sample is better than another if it doesn’t ring your bell. I can tell you about the sympathetic string resonance (so real that you almost feel you could stamp on the sustain pedal and hear the spacey moan of the whole string set),



Generalmusic’s Realpiano Pro 2 is the first digital piano to offer 128-note polyphony. It’s a great-sounding digital piano but falls short as a MIDI master controller.



FIG. 1: On the unit's back panel, you'll find audio inputs and outputs, as well as a direct computer interface not commonly offered on this type of instrument.

the number and length of multisamples and the amount of memory they take up, the 20-second-plus natural decay, and the left-to-right audio pan as you move from bottom to top of the keyboard. But in the end, sound is a deeply personal choice.

Personally, I love the Pro 2's bite and edge. (I grew up playing a 1910 Broadway that had teeth like a shark's.) The bottom end is great, with real rasp. I play a lot of octave left-hand parts, and the Realpiano Pro 2 is tailor-made for ringing piano bass lines. The top is clear and also "rings" naturally. Even the middle register, notoriously dull on digitals, packs some punch and presence.

You might not appreciate some of these qualities on first play. Generalmusic has not prettied up its Pro 2 piano. Heard individually, some notes come across a little harsh. I could even have preferred a softer or shorter decay of some of the overtones in order to make the note a little purer on the fade. Some notes, mainly in the bass range, also seem to have an unnatural pulse to them. There's nothing too disconcerting, just some telltale evidence that what you're hearing is a sample. But played as a whole—in other words played as a piano—the big picture comes up a real treat.

Moreover, it records well. Anything digital—be it a synth, organ, or piano—can get lost in a mix and end up as clutter on a track. The Realpiano's edge is a real savior here. You don't find yourself overplaying to get through. And don't forget (who could?) the 128-voice polyphony. Staggering.

After the delights of the primary tone, you also have two variation tones to play with: Var 1 is a "Rock Piano," harder almost to the degree of honky-tonk, and Var 2, "Bright Piano," is similar but not quite so strident.

TONI TONY TONES

The Realpiano Pro 2 excels in the piano department. "Piano 2" is indistinguishable from "Piano 1." Its varia-

tions are a full honky-tonk and a rather dull upright piano. There are sixteen nonpiano sound types, ranging from electric pianos to synths, pads, and bass (see Fig. 2), but these are not in the same class as the acoustic-piano sounds.

"Electric Grand" is a Yamaha CP80 sample that shows off all the delightful shortcomings of this seminal pre-MIDI electro-acoustic instrument (thunky midrange, lifeless bottom end, etc.). "Elec Piano 1" is a Rhodes: woody and authentically presented without having unnatural amounts of life. The first variation is what, in the U.K., we'd have called "knackered Rhodes," that is, a Rhodes that has had the life beaten out of it. Quite a lot of character in this tone. Variation 2 is quite bright and spangly.

"Elec Piano 2" is a Wurlitzer sample. Again, this is a pretty faithful rendition, even if the Realpiano's 88-note range stretches the real Wurlitzer's measly 64-note span to the limit. Variations of this are a heavily compressed version and a "Synwurli." Hmm.

"DXPiano" is a DX7 electric-piano clone, suitably bright and festive. Var 1 seems to add a touch of Wurlitzer piano, and Var 2 is a close, intimate reworking of the tone.

The "Clavinet" is superb, even down to the squeak you get as you lift your fingers off the keys. Great stuff. One of the great secrets of a real Clavinet, though, is its tonal variety when using different pickup configurations and dampings. I was disappointed to see that Generalmusic copped out here somewhat, offering just one thin Clavi as Var 1 and then the faux "SynClav" as Var 2.

"Vibes," aided by "Marimba" and "Xylophone," is standard fare, and the "Harpsi," again, is faithful more than exciting. I found the second variation of "Harpsi" quite useful as a vamping preset. It's got a slight overhang, which makes it very friendly to play,

circle #589 on reader service card

DANNY'S MUSIC BOX

Pro Shop of the Southwest

Drums

Guitars

Amps

Keyboards

Recording

Effects

Sound

Lighting

DJ Gear

& a bunch of cool stuff!

MAJOR BRAND NAMES

Name our mascot and win
a \$250.00 gift certificate!

e-mail, mail or call in your entry - deadline 5/31/98

915-593-1035

www.dannysmusicbox.com

Print our mini catalog off our website or call for a free catalog!

9417 Montana • El Paso, TX 79925 • Fax 591-5371 • Se habla Español

unlike a real harpsichord, which stops dead when you take your fingers off the keys.

There are two types of organ: "Hammond" and "Pipe." The "Pipe" organs are good, if basic. "Hammond" is pretty good, with the main tone being an all-purpose rock tone. Var 1 is a fast-Leslie type, and Var 2 is a full-on distorted tone. You can switch from slow to fast Leslie using the DSP's "Rotary" effect and assigning "Rotary slow/fast" to the footswitch, but playing organ on a weighted keyboard is about as much fun as playing piano on an unweighted one.

The strings come in plain vanilla attack, slow attack, and marcato (vigorous, rasping attack). "Choir," tonally a little one-dimensional, comes in natural attack, slow attack, and "Syn Wah" forms. Given the Italian propensity for "Doo doo doo"-type synth presets, I was shocked to find this variation off the menu today.

Two synth pads offer string-synth and bell-synth tones, which are okay but break no new ground. Finally, the "Bass" preset offers a nice acoustic up-right bass and a pair of rather indifferent electric bass guitars.

Generalmusic has spent time on these sounds and, by providing you with sixteen panel buttons, clearly expects them to be used. Perhaps the quality of the acoustic piano reflects harshly on these additional tones, only two or three of which really thrilled me and all of which you probably have

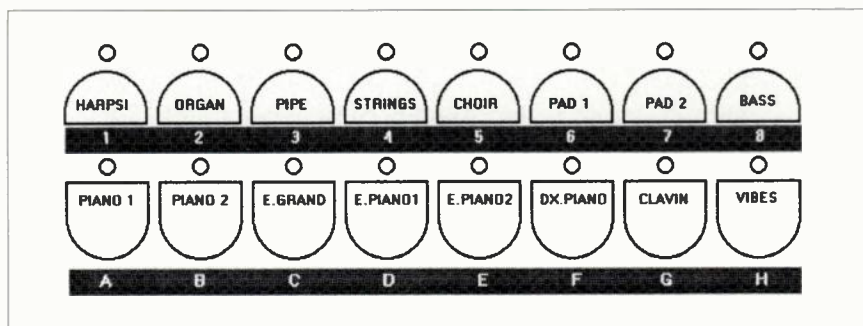


FIG. 2: In addition to its Piano patch, the Pro 2 offers 48 other preset sounds, divided into sixteen groups.

saved by the bushel on your synthesizer or sampler.

If you get to play the Pro 2, don't give it a 10-second whiz-through. The major tones—acoustic piano, Rhodes, Wurlitzer, Clavinet—are accurate to a

foible. Perhaps this could be fixed on a subsequent software revision?

EFFECTS

At the risk of annoying your front-of-house sound engineer, the Realpiano Pro 2 has a number of reverb options. First come reverbs in three varieties, Room, Stage, and Hall, which you can instantly apply to your current sound using the 4-position Reverb button. A fourth option lists "Others," which alludes to thirteen choices including Small Room 1 and 2, Stage 2, Plate, Concert, and Church. These are selected using the data slider.

The reverb quality is not astounding. Room? A cold storage cabinet perhaps. The Stage reverb is very harsh, and the Hall is rather electronic and unnatural. Of the additional thirteen types, I positively liked Church 2 (a dramatic stone reverb that works wonderfully on piano for otherworldly, ghostly piano parts), but that's about it.

A neighboring control governs applied effects, again with a choice of three immediate types: Chorus, Tremolo, and Phaser. Another "Others" options includes Flangers, Delays, Rotary Speaker, and Pitch Shift. One or two of these are also offered as dual effects, as in Chorus Tremolo.

I don't normally pay too much attention to onboard effects on a digital piano. If any are usable, that's a bonus. You can tweak the effects in Performance Edit mode (no more than two parameters at a time, from rate, depth, and time), but these effects don't rival even the babiest Alesis 'verb in either quality or range. They're there, though.

WHAT A PERFORMANCE

The Realpiano Pro 2 offers simple but powerful control over tone mixing (to layer two sounds, hit both their tone

The Realpiano Pro 2 is a piano player's treat.

fault, and while they may not seduce you with gloss, their authenticity will win you over in the end. Be patient.

An operational point: once you've selected a tone's Var 1 or 2, switching to another tone keeps the Var 1 or 2 active, a small but quite annoying

Realpiano Pro 2 Specifications

Audio Outputs	(2) ¼" TRS
Audio Inputs	(2) ¼" TRS
Additional Ports	stereo minijack speaker output; MIDI In, Out, Thru; Mac-compatible serial interface (requires optional adapter for PC); (3) ¼" TRS footswitch/pedal jacks
Polyphony/ Multitimbral Parts	128/2
Sound Engine	physical modeling and sample playback
Keyboard	88-note, Velocity- and Pressure-sensitive
Controllers	volume and data sliders
ROM/User RAM Programs	48/64
Removable Storage	None
Sequencer	2-track; 45,000 events
Effects	(32) reverb, chorus, tremolo, phaser, flanger, delay, rotary speaker, pitch shift
Dimensions	52.5" (L) x 4.9" (H) x 14.5" (D)
Weight	57 lbs.

buttons at once) in terms of balance, transposition, effects controls, and range, and you can store and name a customized sound combination in any of the 64 Performance memory locations. Data stored within a Performance also includes pedal information.

In addition, you can select any of four preset temperaments (Equal temperament, Meantone C, Kirnberger, and Tartini-Vallotti), and you can select a preset Concert Grand or Baby Grand tuning or create and save your own custom tuning.

Generalmusic has done a thorough job here, even bothering to solve problems such as those which arise when layering a main tone with one of its variations, a tedious limitation I have now come to expect on all such designs. Well done.

CONTROL PATROL

There's no pitch or mod wheel, so a quick glance will tell you this is not a serious attempt at a master keyboard. But you can kick out MIDI transpositions (as distinct from internal transpositions), there's a reasonable MIDI In and Out filter (Program Change, Volume, All Controllers, Pedal, Pitch Bend), and the direct computer interface—Mac, "fast" PC ('486 or better), and "slow" PC ('386 or earlier)—is thoughtful. An optional multimedia kit (\$45) includes cables, adapters, and drivers for connecting the unit to a standard 9-pin PC serial port.

I wondered if Generalmusic might have missed a trick here. Surely the odd

GENERALMUSIC

Realpiano Pro 2 digital piano
\$2,295

FEATURES ■■■■

EASE OF USE ■■■■

QUALITY OF SOUNDS ■■■■

VALUE ■■■■

1 2 3 4 5

PROS: Very realistic, earthy acoustic-piano tone. Simple to operate. Nice action.

CONS: Wall wart. Some less-than-stellar "additional" tones. Poorly endowed as a master controller.

CIRCLE #443 ON READER SERVICE CARD



Summer sounds great at Berklee.



New ideas

in production and technology

are changing the way music is being made.

Berklee College of Music is leading the way.

Here are two opportunities for you to

join us *this summer.*

MUSIC PRODUCTION WORKSHOP

Boston
July 17 - 19, 1998

Our teachers, technology, and equipment are tops in the field. This is your chance to try out Berklee's state-of-the-art recording studios and music synthesis labs. You'll get three days of hands-on instruction, tips, and demonstrations from Berklee's music production faculty and leading industry professionals. Tuition: \$395

TECHNOLOGY, EDUCATION, AND MUSIC PLUS SEMINAR SERIES T.E.A.M. +

July 30 - Aug. 2, 1998

Bring state-of-the-art music technology to your classroom next fall. Come to Berklee this summer for four days of new technology and teaching techniques. Learn the latest from Berklee's expert faculty and guest clinicians Jimmy Amadio and Tom Rudolph. Try out the newest electronic musical instruments, computers, and software. Take the TI:ME level-one certificate course. Tuition: 1 credit: \$475, 12 PDP: \$260, 2 credits: \$950, 24 PDP: \$520

Call 617.747.8870

Learn from the best. Come to Berklee.

FOR MORE INFORMATION:

Special Programs, Dept. C5
Berklee College of Music
1140 Boylston Street, Box 13
Boston, MA 02215-3693
E-mail: summer@berklee.edu
fax 617.262.5419

Name

Address

City

State

Zip/Postal Code

Country

Phone

E-mail

Instrument

Please send information about (check box):

☐ Music Production Workshop

☐ T.E.A.M.+ Seminar Series

www.berklee.edu

circle #590 on reader service card

KEYBOARDS

**BEFORE YOU JUMP...
CALL US LAST!**



- SYNTHESIZERS
- DIGITAL PIANOS
- RECORDING GEAR
- PRO AUDIO
- SAMPLERS
- AMPLIFIERS
- MIXERS / EFFECTS
- SOFTWARE

All Major Brands!

RICH
music

1-800-795-8493

CALL OUR SALES STAFF OF
MIDI EXPERTS

RICH MUSIC • 260 SOUTH I-35E • DENTON, TX 76205 • FAX (940) 898-8659

Store Hours: Mon. - Fri. 10-6:30, Sat. 11-5 <http://www.richmusic.com>

WE ACCEPT VISA • MASTERCARD • DISCOVER • AMERICAN EXPRESS

circle #591 on reader service card

REALPIANO PRO 2

soft slider or button wouldn't have cost much. Even a pitch wheel wouldn't have broken the bank. But Generalmusic's take is that the gigging pianist, at whom this instrument is aimed, values directness and fundamental quality over endless controls and the hassle that goes along with it. "Just give me a decent piano sound and decent keyboard action" is a cry I hear all the time. Well, folks, I don't necessarily buy that argument.

There's not much to say about the internal sequencer except that it offers two record tracks and a 45,000-event record capacity. You can vary time signature, switch metronome on and off, and erase per track. The wow factor is not in overdrive here, but you have a scratchpad if you need it.

ODDS AND ENDS

The Pro 2 has a few minor oddities worth mentioning. First, unlike most MIDI keyboard instruments (including other Generalmusic keyboards), the Pro 2 does not output 5 VDC on MIDI Out pin 4, which is required by the MIDI Specification. Therefore, if you have gadgets that are powered from the MIDI line, they won't work with the Pro 2.

Also, the keyboard has a Panic feature, but to trigger it you have to hold a combination of buttons. A dedicated Panic button would have been better because the point is to cut off hung notes on attached MIDI sound sources as quickly as possible.

FINAL ANALYSIS

The Realpiano is not going to be everyone's cup of Fernet Branca. If you want bells, whistles, and instant gratification, you should keep looking. It seems the bottom line is that the Pro 2 is a fine instrument but not a great MIDI controller.

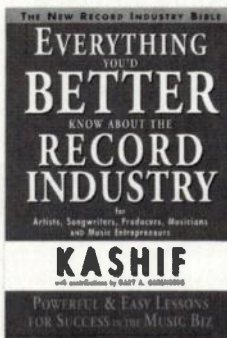
On the other hand, it offers the best real piano sound in this class of instrument today. It also has superb keyboard action, and authentic, rather than glossy, additional tones. So if you don't mind the minimal MIDI controls and lack of goosy effects, then the Realpiano Pro 2 is your baby. Sure was mine.

Julian Colbeck is an old pianist who appreciates things as they were, not as some digital Dilbert has decided they might now be improved. As a pro keyboard player for 25 years, he reckons he has earned the right to be this curmudgeonly.

circle #592 on reader service card

EVERYTHING YOU'D BETTER KNOW ABOUT THE RECORD INDUSTRY

THE # 1 SELLING BOOK ON THE MUSIC BUSINESS



EASY TO READ AND UNDERSTAND,
FUN AND INFORMATIVE.

OVER 100,000 SOLD.

**REQUIRED READING AT
USC, BERKELEY SOM,
AND THE UNIVERSITY
OF CHICAGO**

Kashif, the award winning producer for Whitney Houston, Kenny G, and George Benson shares his 24 years of experience.

- How to Get Started
- How to Negotiate Publishing and Production Contracts
- Starting Your Own Record Company
- Tips for Songwriters & Producers
- How to Obtain Record Deals
- Understanding Record Royalties
- Choosing the Right Manager
- Controlling Your Attorney
- Over 150 Pages of Contracts

Producers, singers, song writers, and musicians, all over are finding out how to transform their demos into hits and their talent into dollars. Learn about contracts, royalties, managers, lawyers, distribution, publishing, negotiating the best deals, how to start your own label, promotion, and much more.

FOR FAST DELIVERY CALL:

(800) 974-7447

ALL CREDIT CARDS ACCEPTED + ATM

Billboard Magazine Says: "Kashif's book is a penetrating look at the ins and outs of the record business. More than just sweeping generalizations, it's packed with practical information that gives the reader an insightful view of the industry. This book is a must read for record business freshmen and veterans"

- J.R. Reynolds, *Billboard Magazine*

AVALON

VT-737

*This full-featured box
makes some of the best
sounds on earth.*

By Peter Freeman

Over the last decade, Avalon Design has gained a reputation for making top-of-the-line recording and mastering gear. But for most Avalon equipment, the superb quality is matched by prices that are beyond the reach of mere mortals. Recently, however, company founder and CEO Wynton Morro developed a product that occupies a more affordable range of the price spectrum yet maintains the same quality and attention to detail found in the rest of the Avalon line.

The VT-737 is a single-channel, vacuum-tube, class-A device that combines a tube mic preamp, DI, compressor, and parametric equalizer in a 2U rack-mount package—all for \$2,195. By most personal-studio standards, of course, that's still a colossal chunk of change; but relative to the prices of Avalon's other offerings—\$1,800 for a mono mic pre, \$4,200 for a dual-mono compressor, and \$5,200 for a dual-mono parametric EQ—it's an attractive deal.

FEATURE HOG

The unit's rear panel provides three balanced XLR connectors, one each

for mic input, line input, and line output. There is also a ¼-inch stereo-link jack that allows two VT-737s to function in stereo mode. The unit is powered internally and offers a removable IEC power cord.

In keeping with the VT-737's myriad functions, its hefty front panel—a ½-inch-thick slab of machined and brushed aluminum—is densely populated by knobs and push-button switches. We're not just talking ordinary knobs, either: these are molded in a distinctive cross shape and colored bright purple to match the front panel's purple silkscreened lettering. The switches are distinctive, too, with each one clear red and backed by a yellow LED that glows brightly when the button is engaged.

A ¼-inch, unbalanced, high-impedance DI jack is thoughtfully provided on the lower left side of the front panel, a very convenient feature for direct inputting of guitars, basses, and other instrument-level signals. This feature, however, is but a small indication of the VT-737's versatility.

Also occupying the left side of the front panel is the preamp section, which offers knobs for gain; selection of instrument, line, or mic input; and a switchable, variable highpass filter with settings at 30, 32, 35, 40, 50, 60, 70, 80, 100, 120, and 140 Hz. (How's that for exacting?) Adjacent to the preamp control knobs is a column of four Input Mode switches labeled High Gain (adds a boost to overall gain), Phase (reverses polarity), +48V (phantom power on/off), and Hi Pass (filter in/out).

Next up is the compressor section, which provides knobs for Threshold (-30 to +20 dB), Compression (1:1 to

20:1), Attack, and Release (each labeled simply F and S for fast and slow). Three switches complete the compressor section. The first, labeled EQ>Com, inserts the EQ before the compressor. (Normally it's postcompressor.) A second switch, labeled Meter, switches the analog VU meter to monitor gain reduction rather than VUs. The third switch, labeled Compress, switches the compressor section in or out.

In the center of the unit, framed by an oval window beveled into a fat block of machined aluminum, is a large, backlit, very elegant-looking analog VU meter. Below that, centered on the same aluminum block beneath the words "Avalon Vacuum Tube," sits the unit's power-on indicator, a bright red LED. The block of aluminum, bolted to the reassuringly chunky front panel, not only looks good but adds to the VT-737's aura of mass and solidity.

(Incidentally, I took the review unit on tour in Europe, and it was the only device in my rack that didn't suffer a bent front panel from the stresses of shipping. Clearly, the beefy build isn't just for show.)

NOT CREATED EQUAL

The VT-737's EQ section, which takes up most of the space to the right of the VU meter, is thoroughly implemented and very impressive both in terms of design and sound. It offers 4-band parametric-style equalization via eight knobs and four switches. The top four knobs, labeled Bass, Low Mid, High Mid, and Treble, provide cut/boost while the lower four offer variable, fixed frequencies for each band. The bass and treble bands are passive, a design choice that, according to Morro, results in smoother, more natural-sounding equalization. This is not to say that the low-mid and high-mid bands sound harsh or "electronic" as compared to the bass and treble bands, but they do possess a different character.

The EQ section is remarkable for a number of reasons. First of all, the frequencies chosen for the four bands cover an extremely wide range of the spectrum, more than just about any other device I've seen. For example, the bass-frequency control, a 4-way selector knob, offers four settings: 15, 30, 60, and 150 Hz. Moreover, up to 24 dB of cut or boost is available for the bass frequencies, which is very unusual indeed; typically, equalizers offer about 12 to 15 dB.



The Avalon VT-737 combines a tube mic preamp, DI, optocompressor, and 4-band parametric EQ into a gorgeous 2U rack-mount box. The unit is superlative in every regard.

Four frequencies are offered on the treble end, as well: 10, 15, 20, and 32 kHz, with up to 20 dB of cut/boost available. Although some might argue that 32 kHz is above the range of human hearing and thus is impractical or unnecessary, I found the band quite useful. On source sounds that contained substantial high-frequency content—cymbals, for example—the 32 kHz added “air” to the signal in a very musical way. Of course, this frequency range isn’t that practical for most sounds, but it does constitute an important and thoughtful inclusion.

The low-mid and high-mid bands allow for 16 dB of cut or boost each. The low-mid band offers settings of 35, 40, 50, 75, 100, 200, 250, 300, 350, and 450 Hz. However, these frequencies can be “ranged” to a power of ten by engaging the **FREQ (x10)** switch located between the knobs. Ranging the low-mid frequencies, for example, bumps them up to 350 Hz, 400 Hz, 500 Hz, and so on.

This frequency-multiplying system is implemented on the high-mid band as well, which offers initial settings of 220, 250, 350, and 550 Hz, and 1, 1.4, 1.6, 2, 2.5, and 2.8 kHz. (The 2.8 kHz setting, when ranged times ten, becomes 28 kHz!)

VT-737 General Specifications

Audio Inputs	(1) balanced XLR, mic-level; (1) unbalanced 1/4", line-level (front panel)
Audio Outputs	(1) balanced XLR
Frequency Response	10 Hz–120 kHz (± 0.5 dB)
Distortion THD, IMD	0.5%
Output Gain	-45 dB to +10 dB
Noise	-92 dB (20 kHz unweighted)
Equivalent Input Noise, Mic	-116 dB (22 Hz–22 kHz unweighted)
Dimensions	2U x 12" (D)
Weight	22 lbs.

Q US IN

Bandwidths for the low-mid and high-mid bands can also be varied by engaging the switch labeled **HI-Q**. With the **HI-Q** switch in the out position, bandwidth is approximately 3.5 octaves; the in position narrows it to 2 octaves.

Rounding out the EQ section are two other switches, one for EQ in/out, and another, labeled **SC<EQ**, that switches the two Mid bands from the audible EQ circuit to the detector of the unit's compressor section, allowing for de-essing and other frequency-dependent

compressor applications. This is an unexpected bonus, adding even more power and flexibility to the VT-737.

As you might imagine, the VT-737's EQ provides extensive control and represents one of the most comprehensive designs around. In fact, in this price range, this much control is all but unheard of.

PRISTINE SOUND

I used the VT-737 on a variety of instruments, from trumpet to voice to electric bass, both in a studio context as a front end for Digidesign Pro Tools

TAKE THE “CLASS A” TRAIN

All audio amplifiers (including pre-amps and power amps) operate in basically the same way: a power supply converts the AC voltage from a wall outlet into DC voltages (e.g., ± 10 VDC) that are used by a set of output devices (typically transistors) to increase the amplitude of the input signal. These DC voltages are called the *power-supply rails*, and they determine the maximum amplitude of the output signal before clipping occurs.

In a Class A design, one or more output devices are used to amplify the entire signal, including both the peaks and troughs of the signal's waveform. In contrast, Class AB designs use two sets of output devices: one set handles the voltages above the midpoint between the power-supply rails (typically 0 VDC), and the other set handles the voltages below the midpoint. In other words, Class A output devices are on all the time,

while Class AB output devices are on only half the time. In addition, output devices configured for Class A operate in their most linear range, which maximizes the fidelity of the signal.

One potential problem that can occur in Class AB designs is called *crossover notch distortion*. As the signal's waveform crosses the midpoint between the power-supply rails, one set of output devices might turn off before the other set turns on, causing distortion that is especially apparent at low signal levels. This problem doesn't occur in all Class AB amps, but it is avoided altogether in Class A designs because there is no transition between output devices. However, the output devices in a Class A amp draw maximum current from the power supply when there is no load present (i.e., when nothing is connected to the outputs), so they must be designed carefully to avoid

overloading and overheating. In addition, Class A designs are not as efficient as Class AB.

One component of a power supply is called the *regulator*, which is really nothing more than a power amplifier itself. As a result, it can exhibit a Class A or AB design. In addition, the regulator can consist of discrete electronic components or an integrated circuit; in the latter case, it is called a *monolithic* regulator. Some engineers believe they can design a better discrete regulator than monolithic devices provide, especially if the performance of the power-supply rails must be very precise. Another important consideration that can be addressed by discrete regulators is output impedance versus frequency and/or noise.

—Scott Wilkinson, with thanks to John La Grou and Fred Forssell of Millennia Media

and live as part of my bass rig. With the voice and trumpet, I mainly relied on the unit as a mic preamp, using the compression and EQ only sparingly. On bass, however, I employed the compressor and EQ sections extensively, creating a range of sounds from straightforward to "hyped."

The first thing I noticed about the VT-737's sound is its immediacy and integrity. There's a wonderful directness to the sound, allowing all the subtleties of the source to be heard. Every signal I put through the unit exhibited a startling degree of clarity, as if a cover had been lifted off the sound. This is no doubt a result of the pure, Class A circuitry and highest-quality components; the benefits of Avalon's uncompromising design philosophy are clearly audible in the VT-737.

On trumpet and voice, the VT-737 did an amazing job of presenting their respective sounds both accurately and beautifully, with no noticeable coloration. In fact, the mic preamp sounded so good that practically no EQ was necessary, though I did get good results when adding a very small amount (less than 0.5 dB) of

16 or 20 kHz for a little extra "air."

Also apparent was the extremely high headroom of the mic pre's input stage. A trumpet produces large amounts of concentrated midrange energy. All the other mic preamps I've tried on trumpet (including one quite expensive, high-end unit) have produced some distortion. But with the VT-737, I was able to get a pure, clean, undistorted tone with just a bit of careful tweaking of the preamp gain control.

KILLER BASS

I had the most fun with the VT-737 on my main instrument, the bass guitar. The unit provides a pristine bass sound, and I appreciated the convenience of having the DI jack on the front panel. But it wasn't until I began working with the compressor and EQ sections that things really came to life.

The VT-737's compressor is very, very smooth and sounds

quite natural and musical no matter how you set it. Even with high ratios and a low threshold, I still got pleasing results, despite the degree of "squashing" that was taking place. This musicality allows the compressor to be

▼
**It was the only unit
in my rack that
didn't suffer a bent
front panel.**

VT-737 Processing Specifications

Preamp Gain	40 dB
High-Gain Boost	20 dB mic and instrument; 10 dB line
Phase Reverse	available on all three inputs
Phantom Power	+48V
Highpass Filter	30–140 Hz (stepped), 6 dB/oct.

COMPRESSOR

Threshold	-30 dB to +20 dB
Ratio	1:1–20:1
Attack Time	2–200 ms
Release Time	100 ms–5 sec.
Makeup Gain	None

4-BAND EQ

Bass Band	15–150 Hz, ± 24 dB (stepped, passive)
Low-Mid Band	35–450 Hz, 300 Hz–4.5 kHz, ± 16 dB (stepped, active, ranged), high/low Q
High-Mid Band	220 Hz–2.8 kHz, 2.2–28 kHz, ± 16 dB (stepped, active, ranged), high/low Q
Treble Band	10–32 kHz, ± 20 dB (stepped, passive)



L&M MUSIC

OUR INVENTORY IS
HUGE
OUR PRICES ARE
LOW
YOUR SATISFACTION IS
GUARANTEED

L&M MUSIC
www.lmmusic.com
1-800-876-8638
6228 Airport Drive, Chattanooga, TN 37421

circle #593 on reader service card

circle #594 on reader service card

**COMPACT DISC • CASSETTE
& RECORD MANUFACTURING**

**GUITARIST
GOES
CRAZY!**
Mastering Engineer
Sought for Questioning!

Local guitar lesson

**POOR REPRODUCTION IS NOT
A VICTIMLESS CRIME!**
QCA IS COMMITTED
TO STAMPING OUT THESE
SENSELESS ACTS!

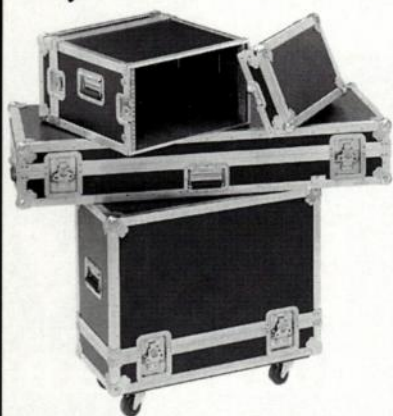
CALL TOLL FREE
1.800.859.8401
For Your Free Catalog

QCA

Serving the Music Industry for Over 45 Years.

2832 Spring Grove Ave., Cincinnati, OH 45225
Tel: 513.681.8400 • Fax: 513.681.3777
E-mail: qca@pol.com • web: www.pol.com/QCA

The Case Specialists



Medium to Heavy Duty Cases
Available for Keyboards,
Mixers, Guitars, Rack Mount
Equipment and More!

Call for pricing on standard
or custom designed cases!

**DISCOUNT
DISTRIBUTORS**

800-346-4638 (In NY) 516-563-8326

circle #595 on reader service card

Subscribe to Electronic Musician!



CALL

1-800-843-4086

VT-737

used in a wider range of applications than is possible with a lesser device; it flatters rather than flattens the sound.

In the EQ department, the VT-737 is extremely impressive. Equalization is one area where inexpensive equipment usually falls down hard because it's pretty much impossible to create a gentle, musical-sounding EQ circuit cheaply. The best way I can describe the behavior of the VT-737's EQ is to say that it makes instruments sound as if they already possessed the equalization you've chosen. In other words, there's no sense of the EQ being "imposed" on top of the original signal. The EQ is so natural sounding that even with large amounts of cut or boost, a musical quality remains, devoid of any harshness or ugliness. Again, this is something that normally costs big money.

I found the EQ's design to be extremely flexible, particularly with the two mid controls and $\times 10$ frequency multipliers. The tonal coverage goes well beyond that of any other EQ I know of in this price range. And being able to send the mid bands into the compressor sidechain only extends the unit's value.

In general, no matter what applications I threw at the VT-737, it sounded amazing. I have absolutely no reservations about its sonics. This is a totally stellar-sounding box.

CLASSY COUSIN

Avalon offers the VT-737 in another version, the VT-737sp, which is different in two respects. First, it replaces the standard purple plastic knobs with the solid, machined-aluminum variety found on the rest of the Avalon product line. Secondly, it employs a larger input transformer in the mic preamp section, which according to Morro yields greater low-end handling capability before saturation.

DIALED IN

The Avalon VT-737 bears witness to an obsession with quality at every turn. For example, instead of normal potentiometers for the front-panel knobs, Avalon chose expensive, conductive-plastic pots for their superior performance. Furthermore, there are 22 sealed silver relays inside this box, along with Teflon wiring, ceramic tube sockets, and military-spec Russian tubes—not to mention a 150W toroidal power transformer and discrete, Class A power-supply regulators. There's even an internal tube-life LCD indicator to let you know when the tubes need replacing. Indeed, the VT-737 is so impressive in every way that it's difficult to avoid the feeling that, even at \$2,195, one is getting away with something.

I have no complaints about the VT-737. How could I? It looks great, sounds fantastic, is built like a tank, and costs less than I would expect for such a premium device. When was the last time *that* happened? My only suggestion (the word "complaint" is inappropriate here) is that a secondary output-level control—postcompressor—be provided for applying makeup gain. That would be useful, but it's not essential.

The Avalon VT-737 is a top-notch, world-class device that will greatly enhance just about any instrument or recording path. We're not talking "personal-studio quality" here, people—this is the real deal. If you need any of the things the VT-737 does, just buy one and ask questions later. You won't have any, I'm willing to bet.

Peter Freeman is a freelance bassist, synthesist, and composer living in New York City. He has worked with such artists as John Cale, Jon Hassell, Chris Spedding, Nile Rodgers, Shawn Colvin, L. Shankar, Sussan Dehimi, Richard Horowitz, and Seal.

AVALON

VT-737 tube preamp/DI/compressor/EQ

\$2,195

\$2,495 for sp version

FEATURES ■ ■ ■ ■ ■

EASE OF USE ■ ■ ■ ■ ■

AUDIO QUALITY ■ ■ ■ ■ ■

VALUE ■ ■ ■ ■ ■

1 2 3 4 5

PROS: Full-featured. Minimal signal path. Class A design throughout. Huge headroom. Superb sound. Premium construction. Extremely versatile both functionally and tonally.

CONS: Does not provide makeup gain for compressor.

CIRCLE #444 ON READER SERVICE CARD

QUICK PICKS

VIRTUAL REALITY SOUND CORP.

3D SFX, vol. 1, Industrial Sound Events

By Jeff Obee

Have you ever wanted to really nail down a song? Now you can do exactly that with an audio CD loaded with the kinds of sounds you would hear in a workshop or on a construction site.

Factory Sounds

Virtual Reality Sound's *3D SFX*, vol. 1 (\$79.95), features 183 sound "events," most of which were recorded in a shipyard in Louisiana. These are the kind of sounds you would hear in an industrial workplace: lathes, grinders, welding torches, table and band saws, hand planes, sanders, air compressors, chains, cranes, hole punches, and so on.

The audio quality is outstanding; all the samples were recorded with Schoeps microphones in a double-omni setup through a custom mic preamp to a Denon portable DAT. Virtual Reality Sounds processed the samples using a Head-Related Transfer Function (HRTF), which is used in

binaural recording to avoid phase problems and to produce accurate imaging. The sounds were recorded at 48 kHz and then dumped to a Macintosh via a Digi-design Audiomedia II card and converted to 44.1 kHz using Digi-design's *Sound Designer II*. There is no signal processing or programming. When listening to the CD I was occasionally taken aback, thinking I had just heard an actual tool noise in the room with me.

The motor-based tools are sampled while starting, idling, and stopping. A number of machine ambiences are also included, along with a variety of other sounds, such as "Jet Fly By." There are some incidental sounds of wood falling, refrigerator doors opening and shutting, and even a nail being hammered sloppily. I especially liked the factory-ambience sample and the sounds of fans blowing.

Work Order

I conjured up a very cool patch using a sample of chains being handled, which I ran through a bandpass filter in stereo with a longish reverb and chorus. The resulting sound was hardly recognizable as chains but was certainly a delight. Then I reversed the 88-second "PwrGrindAmb01" sample, and using a notch filter/panning algorithm on my Kurzweil K2000RS, I swept the frequency with one LFO and the filter width with another, creating all sorts of shifting textures as it panned. I also created an industrial drum/percussion sequence using welding-torch, refrigerator-door, air-compressor, and tool-clank samples. The possibilities are endless, and I had a lot of fun experimenting.

When the Whistle Blows

At first glance, this disc appears to be just a collection of tool samples, but I found it to be an excellent source of sonic material with which to create unusual programs of my own. Whether you're doing post-production or just want some samples to twist out of shape for an experimental piece or sound effect, this CD gives you a lot to work with.

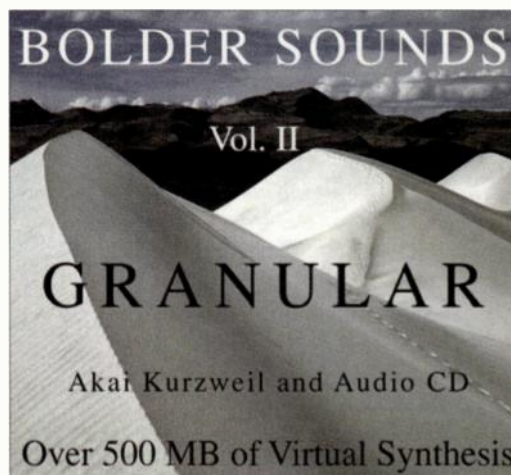
Overall EM Rating (1 through 5): 4
CIRCLE #445 ON READER SERVICE CARD

BOLDER SOUNDS

Granular, vol. 2

By Jeff Obee

If you start with source samples like guitars, gongs, conch shell, Korg Wavedrum, and vibes, and then process them with granular synthesis techniques, you can expect something out of the ordinary. That's just what Bolder Sounds supplies in *Granular*, vol. 2. (Vol. 1, *Eclectic*, was reviewed in the



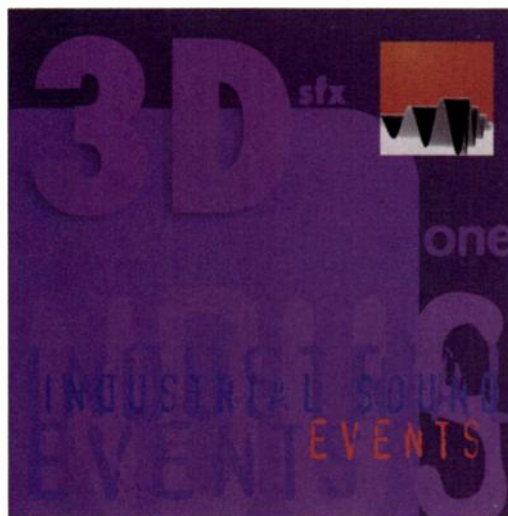
Explore the sounds of granular synthesis with Bolder Sounds' *Granular*, vol. 2, sample collection in audio, Kurzweil K2000/K2500, and Akai S1000 formats.

June 1996 EM.) *Granular* is available as a CD-ROM for Kurzweil K2000/K2500 or Akai S1000 (\$195) or as an audio CD (\$95). I reviewed the Kurzweil version.

Eighty-five percent of the sounds were processed with granular synthesis for that trademark grainy texture. All told, you get 516 MB of loops, metallic sounds, pads, modal soundscapes, effects, FM sounds, and "out there" patches. Most of the sounds have a second version that is programmed for the K2000/K2500, and these are all excellent variations.

Waves of Grain

The collection contains mostly textural sounds aimed at ambient or trance music; they would also work well for soundtracks. Some of the sounds are as long as 44 seconds, and they unfold like miniature soundscapes. In certain patches, different pitches emerge as you hold a key, forming a predetermined chordal ambience; on others, harmonic glassiness comes out and then disappears, and startling rhythms percolate through. The majority of the files are 6 to 7 MB.



The machine and tool sounds on *3D SFX*, vol. 1, are indeed the real thing. Most of the sounds were recorded in machine shops and a shipyard.

The outstanding loops offer contemporary grooves, in hip-hop and similar styles, with a sense of "alienness." For example, "Vudu" is a new age dervish groove with metallic/clay udu sounds and tambourine-like triplet flourishes that loop at a precise 160 bpm.

In the Metallic category, "Mutation" morphs from a glassy harmonica into a frayed metal sound. "Monochord" provides a bowed-metal underpinning with dirtier variations. The Modal category is chock full of goodies like the icy "Desolate" and the beefy, toothy "Moogular." I was left breathless after listening to some of the disc's stunning atmospheres.

With a Grain of Salt

The V.A.S.T. programming caused some of these samples to distort, such as "Lydian Fl VST," which was a bit dismaying. "XFile Layer VAST" in the FM files also distorted when I struck the keys at fairly high velocities, although my levels were extremely low. A couple of sounds, "Dorian Dream VST" and "Major Chord Rotation VST," didn't loop cleanly. With long, ambient patches like these, you certainly want them to loop smoothly and sustain evenly as long as you hold the note.

circle #597 on reader service card

MUSICIANS, STUDIOS, INDEPENDENT LABELS

YOU CAN'T BEAT OUR SOUND OR LOOK!! OR...

NO GIMMICKS
NO HIDDEN EXTRAS
NO BULL

Complete Package Includes

- Full color design CD insert with color photo or design on front & tray card
- Black and white type inside CD insert / CD-R Reference
- Proofs and CD-R sent by prepaid overnight courier
- Glassmastering and state-of-the-art CD replication
- 2 color CD label design and printing
- CD's fully assembled and packaged in jewel box with shrinkwrap

500 CD's only

... OUR PRICE \$1475.00

Color Front and Tray Card

► **FREE CATALOG** Includes design

WORLD RECORDS REPLICATION GROUP

1-800-463-9493

908 Niagara Falls Blvd. North Tonawanda, NY 14120-2060

Because of the way these sounds were synthesized, it wasn't possible to multi-sample them across the keyboard, so sounds often petered out at the top end. I wish there were some way the pads could have gone higher: they *are* pads, after all!

Go with the Grain

This CD-ROM gives you some truly juicy sounds; you can check out some demos at Bolder Sounds' Web site or get a demo cassette for \$5 (which is credited toward your purchase). The disc is priced to sell. The sound files are long, and for \$195 you get some extraordinary patches that you won't hear anywhere else. Despite its few problems, I recommend it if you want to add some unique textures to your music.

Overall EM Rating (1 through 5): 3.5

CIRCLE #446 ON READER SERVICE CARD

QUANTUM LEAP

Guitar & Bass

By Rob Shrock

For its *Guitar & Bass* CD-ROM (\$249.95), Quantum Leap focused on creating usable instruments with lots of character. Its assortment of instruments is not exhaustive; it is divided into three categories of multi-sampled instruments—Bass, Acoustic, and Electric Guitar—with Patches that are Velocity-switched, crossfaded, and mapped in a way that creates a versatile and musical instrument. The collection does not disappoint; practically every sampled guitar is true to its namesake and delivers a fairly detailed instrument, warts and all.

Bass

Thirteen Bass Performances, in an assortment of funk, rock, and fingered styles, are provided. The "Mmanfinger" Performance, a fingered Music Man bass sample, cross-fades between a Patch of muted samples and a Patch of long samples. It is quite playable and imparts a more realistic impression of a bass player than most synths' generic bass patches.

"Fenderdual," a Fender Jazz bass sample, consists of three Patches that are Velocity-switched between soft, medium, and a multisample of a whole step slide. The Patches are adjusted to avoid huge jumps in level from one Patch to the next.

A very nice fretless bass, "Fretlssking," consists of five different Patches: soft and medium fingered samples, short slides up



Quantum Leap's *Guitar & Bass* delivers detailed and well-sampled instruments.

and down, and harmonics. Getting a handle on the instrument takes some effort, but a believable line can be created when edited in a sequencer. Add a touch of chorus and you're set.

Acoustic Guitars

Out of the six acoustics, my favorite was "Acousticgod," a Velocity-switched multi-sample with slides, pops, harmonics, and finger noises. Used with a sequencer, this is one expressive steel string. "Acoustic-lead" is better suited for faster lead playing, and the single classical guitar is good, though not as expressive as some of the other instruments in the library. "Fake12-steel," made of two stacked 6-string Patches, rounds out the collection.

Electric Guitars

The disc also offers a multitude of electrics in a wide variety of styles. "Bluesmaster" is a versatile, 7-layer instrument consisting of fingered samples, pick, pop, long vibrato, bend up, half-step trill, and whole-step trill. The tone of the guitar and amp is authentic and full of character.

A jazzy Les Paul, "Jazzarchtop," with additional octaves and slides, is perfect for that George Benson-type sound. "Bikface-pickin'" is a clean Fender sample of four layered Patches that reminded me so much of a Blackface Fender Deluxe I used to own that I could smell it. There are Marshall Plexis and Stacks; Blues and Power chords; and Surf, Rockabilly, Grunge, and Reggae guitars—all with various amounts of stylistic articulations.

Notes

Although you will inevitably want even more articulations and control over the Performances, *Guitar & Bass* takes sampled guitars into a realm of expressiveness and sound character rarely found in sample

libraries. The recordings capture the essence of the particular guitar (and amp) and sound convincing. If you must create guitar parts with samples rather than using the real thing, this library is a must-have.

Overall EM Rating (1 through 5): 4

CIRCLE #447 ON READER SERVICE CARD

Q UP ARTS

Kit Watkins: Ambient Realms

By Dan Phillips

Kit Watkins, solo instrumentalist and veteran of the seminal '70s prog rock bands Happy the Man and Camel, opens up his private sound vaults with *Ambient Realms*. Available from Q-Up Arts in Roland S-700 and Akai S1000 CD-ROM (\$199) and audio CD (\$99) formats, this collection offers a selection of delicate, finely honed timbres with a decidedly personal touch.

The Realm of Ambience

The collection focuses on ambient beds and drones, with 82 such patches from shimmering, delicate pads to slow and spooky sci-fi soundtracks to quakelike rumblings. All samples are in stereo, generally with a single sample stretched across the keyboard. Most are generously long, from 5 to 15 seconds (with a few over 30 seconds). That's plenty of time to convey these complex, evolving textures.

"BowBass1" is a standout: a rich bowed bass with lots of resin and reverb. The result is organic and lush, great for a deep bass bed. "BowDulc" is similar, with a bowed dulcimer creating a twangy drone. "BowDulcCh" builds on that timbre to cre-

ate a washy, dissonant chord, great for an *X-Files* type of ambience.

When played low on the keyboard, the strange scraping, bouncing elements of "NervusSer" come across as sinister underwater machinery. The "Cloud Chords" patches play breathy, thick, choral timbres; "CloudCh4" has a strange melody emerging from the fog, queerly nostalgic, like vaguely threatening childhood dreams.

The modulation routings really add to these sounds. The pitch wheel controls filter cutoff, and the mod wheel controls LFO modulation of pitch and volume as well as increasing or decreasing the LFO speed. The result is very playable, making for dynamic, subtly changing timbres.

Bold Bowed Bowls

Watkins also offers a collection of struck and bowed metal bowls processed into thick, inharmonic pads. The bowed bowls sound like a cross between a metallic pan flute and a rubbed wine glass, with a strong noise component over a mellow sound. One of the brighter ones, "Bow-Bowl3," worked well to add top end and motion to a pad on my current electronic/alternative project.

Of the struck bells, "Struck4" is sweetly chorused, with a delicate attack and smooth sustain, and "Struck5" is a dark, comp-ready timbre with a little tremolo, like a cross between a Rhodes and an organ.

Other Realms

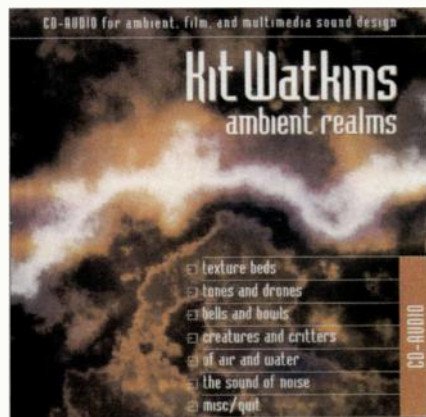
Ambient Realms also features a few natural and city ambiences, including running and dripping water, rain, thunder, car and train pass-bys, deer snorts (!), some bird calls, and a cool tree frog. The nine aggressive "Shortwave" patches seem slightly out of character, but they're very cool. They include some pulsing modulated tones, a sweep, and strange garbled burblings.

Happy the Man

There are a number of "ambient" sample collections on the market, but *Ambient Realms* delivers its own unique voice. It's also very well executed, with solid programming and good loops throughout. The well-organized file structure and eminently readable file names make browsing a breeze, and the documentation is clear and concise. If you're looking for new ambient textures for film, video, or electronic projects, *Ambient Realms* should be on your "must listen" list.

Overall EM Rating (1 through 5): 4.5

CIRCLE #448 ON READER SERVICE CARD



Ambient textural beds and drones with a unique voice make *Kit Watkins: Ambient Realms* stand out in this genre.

New for Windows 95 / 3.1 / NT

SQ Midi Tools

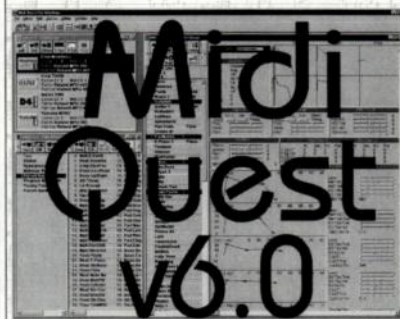
If you use MIDI, **SQ Midi Tools** features 11 MIDI tools to aid, enhance, and improve your music making. **SQ Midi Tools** includes both 32 and 16-bit versions for Windows 95, 3.1, and NT. Featuring:



You can find out everything you need to know about each of these tools or you can download a free copy of MidiXer by visiting Sound Quest's web site at:

<http://www.SQUEST.COM>

or give us a call for more information



The only Editor/Librarian software with:

- ✓ Native 32-bit Windows 95 version
- ✓ Full Windows 95 compliance
- ✓ Also includes 16-bit version for Win 3.1
- ✓ Over 50 MB of Patches (CDROM)
- ✓ Support for over 275 instruments from 28 manufacturers including: Roland, Alesis, Korg, Yamaha, Ensoniq, Emu, Waldorf, Oberheim, and Kawai
- ✓ Visit our web site for more information, demos, and a complete list of instruments

Sound Quest Inc.

1140 Liberty Dr.
Victoria, BC, V9C 4G7, Canada
US Info/Orders: (800) 667-3998
Phone: (250) 478-9935 Fax: (250) 478-5838
Email: sales@squest.com
WebSite: <http://www.SQuest.com>

circle #598 on reader service card

FOR ORDERS CALL: **800-947-5509**
212-444-6679

OR FAX (24 HOURS): **800-947-9003**
212-444-5001

Store & Mail Order Hours:
Sunday 10-5
Monday thru Thursday 9-7
Friday 9-1 • Saturday Closed

On the Web: <http://www.bhphotovideo.com>

PRO HEADPHONES

AKG K240M
Studio Headphones



The first headphone of choice in the recording industry. A highly accurate dynamic transducer and an acoustically tuned venting structure produce a naturally open sound.

FEATURES-

- Integrated semi-open air design.
- Circumaural pads for long sessions.
- Steel cable, self-adjusting headband.
- 15Hz-20kHz, 600Ω

SONY MDR 7506 Pro Headphones



The Sony 7506's have been proven in the most trying studio situations. Their rugged, closed-ear design makes them great for keyboard players and home studio owners.

FEATURES-

- Folding construction
- Frequency Response 10Hz to 20K Hz
- 1/4" & 1/8" Gold connectors
- Soft carrying case • Plug directly into keyboards

beyerdynamic DT 770 Pro Pro Headphones



These comfortable closed headphones are designed for professionals who require full bass response to complement accurate high and mid-range reproduction.

FEATURES-

- Wide frequency response
- Durable lightweight construction
- Equalized to meet diffused field requirements
- Padded headband ensures long term comfort

SENNHEISER HD265/HD580 Pro Headphones



The HD-265 is a closed dynamic stereo HiFi/professional headphone offering high level background noise attenuation for domestic listening and professional monitoring applications. The HD 580 is a top class open dynamic stereo HiFi/professional headphone that can be connected directly to DAT, DCC, CD and other pro players. The advanced design of the diaphragm avoids resonant frequencies making it an ideal choice for the professional recording engineer.

MIXING BOARDS

Panasonic RAMSA

Stop dreaming about your digital future, it's here! The Panasonic/Ramsa WR-DA7 digital mixer features 32-bit internal processing combined with 24-bit A/D and D/A converters as well as moving faders, instant recall, surround sound capabilities, and much more. Best of all, it's easy to use, and it's available NOW!

FEATURES-

- 32 Inputs/6 AUX send/returns
- 24-bit converters
- Large backlit LCD screen displays EQ, bus and aux assignments, and dynamic/delay settings.
- 4-band parametric EQ
- Choice of Gate/Compressor/Limiter or Expander on each channel
- 5.1 channel surround sound in three modes on the bus outputs
- Output MMC
- Optional MIDI joystick



MACKIE 8 Bus Series Mixing Consoles

Since its introduction, Mackie Designs' 8-Bus Series consoles have proven that excellent sonic quality, practical features and extreme durability can be affordable. All 3 versions offer extensive monitoring, 4-band EQ, accurate, logarithmic taper faders, and expansive headroom. The 24x8 and 32x8 can be expanded using Mackie's 24-E Expander console which consists of 24 input channels and tape returns and may be daisy chained to provide 128 or more total input channels.

FEATURES-

- Each channel includes Mackie's well-known Mic preamp and a -10/+4 switchable tape return
- 8-assignable submasters and a L/R mix master
- 4-band EQ with true parametric (3-control) Hi Mids, Lo Cut filter
- Extensive routing capabilities
- Available in 16, 24 & 32 channels
- Optional Meter Bridges available
- Optional 24-E Expander console available
- Rugged all-metal chassis
- In-line monitoring effectively doubles your input channels



MS1202VLZ 12-Channel Compact Mic/Line Mixer

- Gain control, pan, 3 band EQ, and 2 Aux sends.
- 4 mono, 4 stereo channels (12 inputs total).
- Great for 'extra inputs' on the fly.
- Phantom power.



MS1402VLZ 14-Channel Compact Mic/Line Mixer

- Mic preamps w/trim control (channels 1-6)
- 60mm "long" faders.
- Mute switch routes to alt 3&4 bus.
- Low-cut filter. • Phantom power.



CR1604VLZ 16 x 4 x 2 Mic/Line Mixer

- 7 Aux sends, 3 band EQ...
- Large 10-segment LED meter.
- Lowest noise/Highest headroom.
- 16 studio grade mic pre's.
- 3 different setup positions.
- Low-cut filter. • Phantom power.



The MS-1202, 1402, 1604 & SR Series all include VLZ (Very Low Impedance) circuitry at critical signal path points. Developed for Mackie's acclaimed 8-Bus console series, VLZ effectively reduces thermal noise and minimizes crosstalk by raising current and decreasing resistance.

SENNHEISER SPIRIT

LX7 Professional Mixing Console

The LX7 was designed by Soundcraft co-founder Graham Blythe. Built in the UK, it uses surface mount technology to ensure accurate, consistent insertion of all components into LX7's PCBs. Roadworthy construction and 25 years of audio console experience put this newest addition to the Spirit line at the top of the heap.

FEATURES-

- 24 Ultramic preamps
- 100mm ALPS faders
- 7 bus outputs
- Comprehensive 4-band EQ includes 2 swept mids and 15dB of boost or cut
- Separate stereo input section
- Use in FOH applications as well as studio recording
- Internal power supply



MONITORS

MACKIE HR824

These new close-field monitors from Mackie have made a big stir. They sound great, they're affordable, they're internally bi-amped. "What's the catch?" Let us know if you find one.

FEATURES:

- 150W Bass amp, 100W Treble amp
- Full space, half space and quarter space placement compensation
- Frequency Response 39Hz to 22kHz, ±1.5dB



SENNHEISER SPIRIT

Absolute Zero

Absolute Zero monitors maintain a wide frequency response at high and low listening levels, both on and off-axis for consistent results every time.

FEATURES-

- High definition linear phase design
- Wide, controlled dispersion
- CAD optimized, low loss crossover
- Custom designed drivers
- Long throw 170mm LF driver
- 25mm soft dome HF unit on proprietary waveguide



TANNOY PBM 6.5II

The PBM 6.5 II is the industry standard for studio reference monitors. They provide true dynamic capability and real world accuracy.

FEATURES-

- 6.5" low frequency driver and 3/4" tweeter
- Fully radially and ported cabinet design reduces resonance and diffraction while providing deep linear extended bass.



JBL

4206 & 4208

The 4206 & 4208 studio reference monitors are 6" and 8" respectively. Both offer exceptional sonic performance, setting the standard for today's multi-purpose studio environments.

- Multi-Radial baffle ABS baffle virtually eliminates baffle distortion.
- Superb imaging & reduced phase distortion.
- Pure titanium diaphragm high frequency transducer provides smooth, extended response
- Magnetically shielded for use near video monitors.



TO INQUIRE ABOUT YOUR ORDER:
800 221-5743 • 212 239-7765
OR FAX 24 HOURS:
800 947-2215 • 212 239-7549

New Address:
420 Ninth Ave. (Bet. 33rd & 34th St.)
New York, N.Y. 10001

B&H
PHOTO - VIDEO - PRO AUDIO

MUSIC SOFTWARE

Steinberg

CUBASE VST

Virtual Studio Technology

Steinberg's Virtual Studio Technology (VST) turns your PowerPC or Windows based computer into a music production powerhouse featuring digital audio, real-time effects, automation, MIDI and scoring in one single program. Expandable with software Plug-Ins and an audio bus system for use with the latest generation of multi I/O audio cards, Cubase VST delivers.

FEATURES—

- Up to 32 channels of digital audio
- Complete mixer with up to 128 EQs
- 2 full-featured effects racks
- All Realtime, Every action can be automated
- **CUBASE SCORE** adds professional score printing and layout functions
- **CUBASE AUDIO XT** adds support of Digidesign DAE compatible interfaces such as the ProTools System.



emagic

LOGIC AUDIO 3.0

For Mac or Windows

Logic Audio integrates Digital Audio Recording & Editing, MIDI Sequencing, and Professional Scoring into a leading-edge music composition and production system. The new Version 3.0 features extended real-time editing and manipulation options along with numerous detailed solutions for use in professional studio environments.

FEATURES—

- Custom window setups can be assigned to keys for instant recall, up to 90 screensets per song.
- Interactive Editors such as Event, Hyper, Score, Matrix, Arrange and Environment are all linked.
- Realtime DSP effects
- Highest resolution available, 960ppq
- Environment window provides knobs, faders, buttons and other virtual objects that can be defined to send out any type of MIDI data.
- New bus system, Punch on the fly, & Cycle Mode
- Support of Adobe Premiere and Digidesign Audiosuite plug-in formats



Mark of the Unicorn

Digital Performer 2.11

MIDI Sequencer for Mac

Digital Performer contains all of the sequencing capabilities of Performer V.5 and adds Digital Audio to the picture. Apply effects such as Groove Quantize, shift, velocity scaling and more—**ALL IN REALTIME.**

FEATURES—

- MIDI Machine Control, Quiktime Video playback.
- Sample rate conversion.
- Spectral effects, pitch correction.
- Real-time editing and effects processing.
- Full featured Notation section
- Virtual automated mixing

HARD DISK RECORDING



A Division of Avid Technology, Inc.

With Pro Tools Project you get 8 tracks of digital audio & 64 virtual tracks! The Pro Tools Project system includes an audio card as well as award winning Pro Tools software. You choose either an 888 or an 882 I/O to complete the package. Random access, non-destructive digital editing keeps your precious recorded material in its original form as you process and play with it, allowing you to take chances on tweaking a performance without risk. Project also features MIDI recording and playback as well as Quickpunch™ punch-on-the-fly & a direct upgrade path that lets you move to a full Pro Tools system when you're ready.

REQUIRES—

- Qualified NuBus or PCI Macintosh CPU
- Hard Drive, system software 7.1 or greater
- 24MB RAM minimum
- 14" monitor (17" recommended).

ProTools Project™

Digital Audio for Macintosh



888 & 882 I/O Audio Interfaces

The 888 and 882 I/Os each provide 8 channels of high quality A/D, D/A I/O for connection to Pro Tools Project and Session 8 PC systems. Choose the 882 and get an affordable audio interface featuring 1/4" balanced/unbalanced ins and outs in a single rack space. For more high-end applications, the 888 provides features such as XLR balanced analog ins and outs, 8 channels of AES/EBU I/O for direct digital transfers of tracks, high resolution LED metering & individual input/output level trims.

Audiomedia III

Digital Audio Card

Available for both Macintosh and Windows OS systems, Audiomedia III will transform your computer into a powerful multitrack workstation. Compatible with a wide variety of software options from Digidesign and Digidesign development partners, Audiomedia III features 8 tracks of playback, up to 4 tracks of recording, 24-bit DSP processing, multiple sample rate support and easy integration with leading MIDI sequencer programs.



TDM BUNDLE

If you're already familiar with the Waves TDM bundle, you'd better take another look! This great package is now even fatter with the addition of 5 new processors, at the SAME PRICE! TDM owners can now maximize their power with plug-ins including the famous TrueVerb virtual-space reverb, the Q-10 EQ, C1 Compressor/Gate, S-1 Stereo Imager, PAZ-Psychocoustic Analyzer, L1-Ultramaximizer as well as MultiRack, WaveConvert and TrackPac Pro applications.



DIGITAL MULTI-TRACK RECORDERS

TASCAM DA-38

Digital Audio Recorder

The DA-38 was designed for musicians. Using the same Hi-8 format as the highly acclaimed DA-88, the DA-38 is an 8 track modular design that sounds great. It features an extremely fast transport, compatibility with Hi-8 tapes recorded on other machines, rugged construction, ergonomic design and sync compatibility with DA-88s.

FEATURES—

- Hi-8mm tape format.
- Next generation 18-bit A/D and 20-bit D/A converters
- With Delta-Sigma oversampling
- Digital track copy for simple assembly composite edits
- Built in Digital patchbay
- Track advance and track delay
- Easy to use interface



ADAT XT20

Digital Audio Recorder

The New ADAT-XT20 provides a new standard in audio quality for affordable professional recorders while remaining completely compatible with over 100,000 ADATs in use worldwide. The XT20 uses the latest ultra-high fidelity 20-bit oversampling digital converters for sonic excellence, it could change the world.

FEATURES—

- 10-point autolocate system
- Dynamic Braking software lets the transport quickly wind to locate points while gently treating the tape.
- Remote control
- Servo-balanced 56-pin ELCO connector
- Built-in electronic patchbay
- Copy/paste digital edits between machines or even within a single unit. Track Copy feature makes a digital clone of any track (or group of tracks) and copies it to any other track (or group) on the same recorder.



MIDI HARDWARE



Mark of the Unicorn

MIDI Time Piece™ AV

8x8 Mac/PC MIDI Interface

The MTP AV takes the world renowned MTP II and adds synchronization that you really need like video genlock, ADAT sync, word clock sync, and even Digidesign superclock!

FEATURES—

- Same unit works on both Mac & PC platforms.
- 8x8 MIDI merge matrix, 128 MIDI channels.
- Fully programmable from the front panel.
- 128 scene, battery-backed memory.
- Fast 1x mode for high-speed MIDI data transfer.

Digital Time Piece™

Digital Interface

Think of it as the digital synchronization hub for your recording studio. The Digital Timepiece provides stable, centralized sync for most analog, digital audio, and video equipment. Lock together ADATs, DA-88's, ProTools, word clock, S/PDIF, video, SMPTE, and MMC computers and devices flawlessly. It ships with "Clockworks" software which gives you access to its many advanced features and remote control of some equipment settings such as record arm.



Studio 64XTC

Mac/PC MIDI Interface

The Studio 64XTC takes the assorted, individual pieces of your studio—your computer, MIDI devices, digital and analog multitracks and even pro video decks, and puts them all in sync.

FEATURES—

- 4 In / 4 Out, 64 channel MIDI/SMPTE interface/patchbay with powerful multitrack & video sync features
- ADAT sync with MIDI machine control
- Simultaneous wordclock and Superclock output, 44.1kHz or 48kHz for perfect sync with ADAT, DA-88 and ProTools
- Video and Blackburst in (NTSC and PAL)
- Cross-platform Mac and Windows compatibility

MIDI Translators

MIDI Interfaces

The MIDI Translator II™ and MIDI Translator Pro™ are the next generation portable interfaces. The MIDI Translator Pro™ provides twice the processing power of the MIDI Translator II and both let you switch between MIDI or peripherals with a flip of the THRU-switch - NO CABLE SWAPPING!

TRANSLATOR II FEATURES—

- 1 IN and 3 MIDI OUTS • 16 MIDI channels
- Small size fits anywhere - no power supply required!

TRANSLATOR PRO FEATURES—

- 2 MIDI INs x 6 MIDI OUTS, Supports 32 MIDI channels
- 2 MIDI OUTs accessible on front panel
- Self powered - no power supply required



FOR ORDERS CALL:
800-947-5509
212-444-6679

OR FAX (24 HOURS):
800-947-9003
212-444-5001

**MOST ORDERS SHIPPED
 WITHIN 24 HOURS**
OVERNIGHT SERVICE AVAILABLE
 On the Web: <http://www.bhphotovideo.com>

KEYBOARDS AND SOUND MODULES

Roland

A-90EX Master Keyboard Controller

The A-90EX is an 88-note, weighted master controller with one of the best keyboard actions currently on the market. It offers incredibly realistic piano sounds, powerful controller capabilities and 'virtual' programmable buttons which can be configured to operate your software and other devices. The A-90EX combines the majestic sound of a concert grand, the expressive action of a fine acoustic keyboard and the comprehensive MIDI functions of a master controller—all in a portable stage unit.



- FEATURES—**
- Master Volume Slider and Global Transpose features
 - Proprietary 88-note hammer-action, velocity sensitive keyboard with aftertouch

- 2 types of stereo-sampled grand pianos, various acoustic and electric pianos (including a great classic Rhodes).
- Stores up to 64 Performances

JV-2080 64-Voice Synth Module

Roland resets the standard with the incredibly expandable JV-2080 64-Voice Synthesizer Module. This amazingly powerful package offers unprecedented expandability, digital signal processing, and remarkable operational ease, all housed in a 2-unit rack-mount design.



FEATURES—

- 64-Voice / 16-part multitimbral capability.
- 8 slots for SR-JV80 Series wave expansion boards.
- 3 independent effects sets plus independent reverb/delay and chorus.
- 6 outputs, Main Stereo and 4 assignable.
- NEW patch finder and Phrase Preview functions for easy access to all patches.
- Large backlit graphic display
- Compatible with JV-1080, XP-50, & XP-80.

ALESIS

QS6, QS7 & QS8 Pro Keyboards

Alesis QS synthesizers all provide true 64-voice polyphony, and a huge sound library that is constructed of 16-bit linear samples. With their powerful computer and digital audio interface capability, built-in 4-bus Multi-effects and expressive performance features, there is sure to be a QS synth perfect for you.



FEATURES—

- 16-bit 48kHz sample ROM
- 64 voice polyphonic
- 512 preset, 128 user internal program memory
- 400 preset, 100 user mix memory
- RS422, RS232 port formats • ADAT interface •
- 16MB internal, 16MB expansion memory (32MB total possible) •

- 4 outputs (2 main, 2 aux) •
- SoundBridge Sample software for importing almost any sample from your Mac or PC.

QS6 - 61 key synth, QS7 - 76 key synth
 QS8 - 88 weighted keys

*Available on QS7 and QS8 only

NanoSeries Modules

The NanoSynth is a 64 Voice Sound Module featuring 512 presets and 128 user definable patches within 8MB of internal ROM. Like the QS series of synthesizers, the NanoSynth's sounds are constructed from non-compressed 48kHz, 16-bit linear samples for great sound quality. General MIDI compatible, 1/3 Rackspace.



The 64 Voice NanoBass features 256 bass sounds designed for Dance, Pop and Rock. Each program features an adjustable parameter that you can change using the convenient front panel controller. Factors like Attack, Decay, Brightness, and more let you customize the NanoBass's programs for your specific needs.

KORG

SGproX

The SGproX features newly-sampled stereo pianos recorded with attention to every detail. Carefully crafted velocity switching provides tonal changes and dynamics that come alive under your fingers and the 88-note weighted keyboard has been designed as both a stage piano and master controller.



FEATURES—

- 88-note, weighted action keyboard
- 64-voice polyphony, 24MB ROM

- 64 user-definable programs
- 12-types of stereo digital multi-effects
- Master Controller functions, Backlit LCD display

KURZWEIL

K2500 Series Music Workstations



Building on the same features that made the 2000 series popular, the 2500 series utilizes Kurzweil's highly acclaimed V.A.S.T. technology for top-quality professional sound. Available in 76-key (K2500), 88 weighted key (K2500X) and rackmount (K2500R) configurations, the K2500s combine ROM based samples chosen from the best of Kurzweil's collection, on-board effects, and full sampling capabilities on some models (K2500S, K2500RS & K2500XS).

FEATURES—

- True 48-voice polyphony
- Fluorescent 64 x 240 backlit display
- Up to 128MB sample memory
- Operating system stored in flash ROM (for software updates via floppy disk and SCSI)

- Full MIDI controller capabilities
- 32-track sequencer • Dual SCSI ports
- Advanced file management system
- Sampling option available
- Optional DMTi Digital Multitrack interface for data format and sample rate conversion with ADATs/DA-88s

MicroPiano™

The MicroPiano is a half-rack sound module featuring Grand Piano and other sampled sounds, plus built-in digital effects. Altogether there are 32 available presets, chosen from Kurzweil's highly acclaimed sample library, making the MicroPiano the ideal sound module for any player who demands great sound quality at an unprecedented price.



FEATURES—

- High quality, full-bandwidth 20-20kHz sampled sounds
- Full Digital Multi-Effects

- Easy to use front panel functions
- 32 presets including Grand Pianos, Hammond Organ, Strings, Dual Cross-Faded Rhodes and more
- 32-note poly, half-rack, MIDI In/Thru, Stereo outputs

SAMPLING

E-MU

E-mu Systems, Inc. e-6400 Emulator

The e-6400 offers the power of E-mu Systems' renowned Emulator Operating System (EOS) and superb audio quality in a package perfect for the budget-minded professional. The e-6400 comes with stereo sampling, 4MB of RAM and is fully upgradeable to E-mu's top of the line Emulator sampling synthesizers, the E4X, and E4XTurbo.



FEATURES—

- 64 voice polyphony (expandable to 128)
- 4MB sound RAM
- 2 CD-ROM's included (400MB of sounds)
- 8 balanced analog outputs

- Onboard graphic waveform editing
- Load while play
- Stereo phase lock time compression.

AKAI

MPC2000

MIDI Production Center

Whether your producing rap or hip-hop, sequencing a rack of MIDI modules, or performing live, the MPC2000 gives you powerful tools to make your music shine. It's the NEW MPC!

FEATURES—

- Large 248 x 60 LCD Graphic display
- 64-track, 100,000 note sequencer with linear drum machine style programming
- 16-bit, 32-voice stereo sampler
- Standard SCSI interface
- Soft key, Data/Digit wheels, cursor control and more.
- Keypad for directly entering sample points.



- Note variation slider gives you realtime control of any sound's tuning, attack, decay, or filter frequency.
- Floppy Disk Drive
- Powerful expansion options turn your MPC2000 into an MPC2000 STUDIO, the ultimate MPC!

TO INQUIRE ABOUT YOUR ORDER:
800 221-5743 • 212 239-7765
OR FAX 24 HOURS:
800 947-2215 • 212 239-7549

New Address:
420 Ninth Ave. (Bet. 33rd & 34th St.)
New York, N.Y. 10001

PORTABLE DAT

TASCAM DA-P1

- Rotary 2 head design, 2 direct drive motors.
- XLR mic/line inputs (w/phantom power)
- Analog and S/PDIF (RCA) digital I/O.
- 32/44 1/48kHz sample rates & SCMS-free recording.
- Built in MIC limiter and 20dB pad.
- TRS jack w/level control for monitoring.
- Includes shoulder belt, AC adapter, & battery.



PDR1000/PDR1000TC



- 4 head Direct Drive transport
- XLR mic & line analog ins. 2 RCA line outs. Digital I/O includes S/PDIF (RCA) and AES/EBU (XLR).
- L/R channel mic input attenuation selector (0dB/-30dB)
- 48V phantom power, limiter & internal speaker.
- Illuminated LCD display shows clock and counter, peak level metering, margin display, battery status, ID number, tape source status and machine status.
- Nickel Metal Hydride battery powers the PDR1000 for 2 hours. AC Adapter/charger included.

PDR1000TC Additional Features--

- All standard SMPTE/EBU time codes are supported, including 24, 25, 29.97, 29.97DF, & 30 fps.
- External sync to video, field sync and word sync.

MS1000 Master Sync module

ensures drift will be no more than 1 frame in 10 hrs.

HM1000 Headphone Matrix

provides a rotary switch for selection of Stereo, Mono Left, Mono Sum, & M/S (mid-side) Stereo modes.

SONY TCD-D10 PROII



A reliable, high-performance DAT recorder, the portable TCD-D10 PROII has many enhanced features for professionals including absolute time recording. Maintenance and servicing are also quick and easy due to the simple signal routing combined with separate board construction.

FEATURES--

- Backlit LCD Multi-Function Display
- 100X Search with up to 99 start IDs
- 140X High-Speed Spooling • Limiter/Mic Attenuator
- Built-in Speaker • RF End Search • Wired Remote Control
- AC/DC Operation • Hours Meter

SONY TCD-D8

This is the least expensive portable DAT machine available. It features 48kHz, 16-bit sampling, automatic and manual recording level, a long play mode for 4 hours of recording on a 120 minute tape, & an anti-shock mechanism. It includes a carrying case, a DT-10CLA cleaning cassette and an AC-E60HG AC adapter.



PORTABLE HARD DISK RECORDING

Roland VS-880 V2 Hard Disk Recorder

The VS880 V2 is a stand alone hard disk recorder designed for musicians looking for great sound in a flexible package. Record basic tracks at home, then take it to your saxophonist's place for overdubs, then off to the percussionists for that needed tambourine, then to the singers... It's powerful software and familiar tape-transport style interface allow you to get the most out of this baby's incredible creative potential, and with the optional CD Recorder and software, you don't even need to get a record deal.

FEATURES--

- Auto Mixing Function records and plays back realtime
- Easy recording with an inserted effect in "INPUT-TRACK" mode.
- Process the master output with a specific inserted effect such as total compression.
- Scene change by MIDI program change message.
- Simultaneous playback of 6 tracks in MASTER MODE
- Digital output with copy protection.
- 10 additional effect algorithms (30 total) including Voice Transformer, Mic Simulator, 19-band Vocoder, Hum Canceller, Lo-Fi Sound Processor, Space Chorus, Reverb 2, 4-band Parametric EQ, 10-band Graphic EQ, and Vocal Canceller.



- 100 additional preset effects.
- Use MIDI program & control change messages to edit and change effects.
- Over 20 powerful features in editing/sync sections have been added. Some require the optional effects expansion board
- Upgrade existing VS-880s to V2 software via Zip disk



Fostex DMT-8 VL Hard Disk Recorder

The latest in the Fostex HD recording family, the DMT-8 VL truly brings the familiarity of the personal multi-track to the digital domain.

FEATURES--

- 18 bit A/D, 20 bit D/A conversion.
- Built in 8 channel mixer, Ch 1&2 feature mic & line level.
- 2 band EQ and 2 AUX sends per channel
- Cut/Copy/Move/Paste within single or multiple tracks.
- Built-in MIDI Sync, 6 memory locations.
- Dual function Jog/Shuttle wheel provides digital "scrub" from tape or buffer without pitch change. 1/2X to 16X.
- Divide the drive into 5 separate "virtual reels", each with it's own timing information.
- NO COMPRESSION!



MINIDISC MULTITRACKS

TASCAM 564 Digital Portastudio

The Tascam 564 Digital Portastudio combines the flexibility and superior sound quality of digital recording with the simplicity and versatility of a portable multi-track. Using MiniDisc technology, the 564 has many powerful recording and editing features never before found in a portable 4-track machine.

FEATURES--

- Self-contained digital recorder/mixer.
- Uses low-cost, removable MiniDiscs.
- 2 AUX sends / 2 Stereo returns. • 4 XLR mic inputs.
- Channel inserts on inputs 1 & 2.
- 5 takes per track, 20 patterns, 20 indexes per song.
- Random access and instant locate.
- Non-destructive editing features with undo capability include: bounce forward, cut, copy, move.
- Full-range EQ with mid-range sweep.
- S/PDIF digital output for archiving.
- MIDI clock and MTC.



SONY MDM-X4 MD Multi-Track Recorder

MD recorders are here! Offering up to 37 minutes of high-quality 4-track digital recording, the MDM-X4 is truly the next generation of personal multi-tracks. With a built-in mixer, exclusive Track Edit system, and a Jog/Shuttle wheel for sophisticated editing with ease, the MDM-X4 will encourage you to flex your creativity.

FEATURES--

- Records on high quality, removable MD data discs
- 3.5-gen. ATRAC LSI for wide dynamic range.
- 10 Input / 4Bus mixer.
- 2 AUX sends, 3-band EQ, • 11-point locator.
- Random access memory for quick playback and record from anywhere on the disk.
- Editing features include Undo, Redo, & Section/Song editing for flying material between different tracks.



STUDIO DATS

Panasonic SV3800 & SV4100



The SV-3800 & SV-4100 feature highly accurate and reliable transport mechanisms with search speeds of up to 400X normal. Both use 20-bit D/A converters to satisfy even the highest professional expectations. The SV-4100 adds features such as instant start, program & cue assignment, enhanced system diagnostics, & multiple digital interfaces.

Fostex D-15



The new Fostex D-15 features built in 8Mbit of RAM for instant start and scrubbing as well as a host of new features aimed at audio post production and recording studio environments. Optional expansion boards can be added to include SMPTE and RS-422 compatibility, allowing the D-15 to grow as you do.

FEATURES--

- Hold peak readings with a choice of 5 different settings
- Set cue levels and cue times
- Supports all frame rates including 30df
- Newly designed, 4-motor transport is faster and more efficient (120 minute tape shuttles in about 60 sec.)
- Parallel interface
- Front panel trim pots in addition to the level inputs

D-15TC & D-15TCR

The D-15TC comes with the addition of optional chase and sync capability installed. It also includes timecode reading and output. The D-15TCR comes with the further addition of an optional RS-422 port installed, adding timecode and serial control (Sony protocol except vari-speed)

SONY PCM-R500



Incorporating Sony's legendary high-reliability 40 D. Mechanism, the PCM-R500 sets a new standard for professional DAT recorders. The Jog/Shuttle wheel offers outstanding operational ease while extensive interface options and multiple menu modes meet a wide range of application needs.

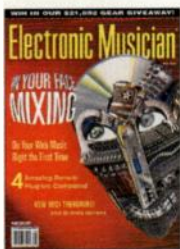
FEATURES--

- Set-up menu for preference selection. Use this menu for setting ID6, level sync threshold, date & more. Also selects error indicator.
- Includes 8-pin parallel & wireless remote controls
- SBM recording for improved S/N (Sounds like 20bit)
- Independent L/R recording levels
- Equipped with auto head cleaning for improved sound quality.

TASCAM DA-20



Suited for personal project or broadcast studios, this high performance durable DAT recorder is a great value in a digital mastering deck. It features multiple sampling rates, SCMS free recording and a full function wireless remote.



CONTACT SHEET

A GUIDE TO THE COMPANIES AND ORGANIZATIONS MENTIONED IN THIS ISSUE OF ELECTRONIC MUSICIAN

Look before You Leap

pp. 42-50

Headspace, Inc. tel. (650) 696-9400; fax (650) 696-9404; e-mail info@headspace.com; Web www.headspace.com
Liquid Audio, Inc. tel. (650) 562-0880; fax (650) 562-0899; e-mail sales@liquidaudio.com; Web www.liquidaudio.com
Macromedia, Inc. tel. (415) 252-2000; fax (415) 626-0554; Web www.macromedia.com
RealNetworks, Inc. tel. (888) 768-3248 or (206) 674-2700; fax (206) 674-2699; e-mail sales@real.com; Web www.real.com

Plug In, Turn On, Space Out

pp. 64-72

Digidesign tel. (650) 842-7900; fax (650) 842-7999; e-mail prodinfo@digidesign.com; Web www.digidesign.com
Lexicon tel. (781) 280-0300; fax (781) 280-0490; e-mail info@lexicon.com; Web www.lexicon.com
TC Works tel. (805) 373-1828; fax (805) 379-2648; e-mail tcus@tcelectronic.com; Web www.tcworks.de
Waves tel. (423) 689-5395; fax (423) 688-4260; e-mail waves@waves.com; Web www.waves.com

Recording Musician: Will the Signal Be Unbroken?

pp. 86-94

Ace Products Enterprises tel. (800) 950-1095 or (415) 492-9600; fax (415) 492-5959; e-mail apostera@aol.com
avPRO Audio Products Corporation tel. (888) 44-AVPRO or (612) 770-0441; fax (612) 770-8255; e-mail toddaudio@aol.com
Audio Accessories, Inc. tel. (603) 446-3335; fax (603) 446-7543; e-mail audioacc@patchbays.com; Web www.patchbays.com
Canare Cable, Inc. tel. (818) 365-2446; fax (818) 365-0479; e-mail canare@canare.com; Web www.canare.com
Carver Professional tel. (503) 978-3344; fax (503) 978-3302; e-mail carverpro@imagina.com; Web www.carverpro.com
Clark Wire & Cable tel. (800) 222-5348 or (847) 949-9944; fax (847) 949-9595; e-mail sales@clarkwc.com; Web www.clarkwc.com
Conquest U.S.A. tel. (800) 323-7671 or (312) 534-0390; fax (312) 534-0398; e-mail info@conquestsound.com; Web www.conquestsound.com
HAVE (Hudson Audio Video Enterprises), Inc. tel. (800) 999-4283 or (518) 828-2000; fax (518) 828-2008; e-mail prosales@haveinc.com; Web www.haveinc.com
Monster Cable Products, Inc. tel. (650) 871-6000; fax (650) 871-0641; e-mail j_kuan@monstercable.com; Web www.monstercable.com
Sescom tel. (800) 634-3457 or (702) 565-3400; fax (702) 565-4828; e-mail sescom@sescom.com; Web www.sescom.com
Switchcraft, Inc. tel. (773) 792-2700; fax (773) 792-2129; Web www.switchcraft.com
Whirlwind tel. (716) 663-8820; fax (716) 865-8930; e-mail sales@whirlwindusa.com; Web www.whirlwindusa.com

Square One: Music by the Numbers

pp. 96-104

Andre Bartetzki e-mail abart@gigant.kgw.tu-berlin.de; Web www.kgw.tu-berlin.de/~abart/CMaskMan/CMask-Manual.htm
Cakewalk Music Software tel. (800) 234-1171 or (617) 441-7870; fax (617) 441-7887; e-mail sales@cakewalk.com; Web www.cakewalk.com
Coda Music Technology tel. (800) 843-2066 or (612) 937-9611; fax (612) 937-9760; Web www.codamusic.com
David Cope e-mail howell@cats.ucsc.edu; Web arts.ucsc.edu/faculty/cope/home
Csound Web www.leeds.ac.uk/music/Man/c_front.html
Cycling 74 tel. (408) 457-0211; e-mail info@cycling74.com; Web www.cycling74.com
Karl Essl e-mail essl@eunet.at; Web www.essl.at/works/rtc.html#abs
Fractal Music Project Web www.ks.rus.uni-stuttgart.de/people/schulz/fmusic

Lars Kindermann e-mail kindermann@forwiss.de; Web www.forwiss.uni-erlangen.de/~kinderma/musinum/musinum.html

James McCartney e-mail james@clyde.as.utexas.edu; Web www.audiosynth.com/index.html

Microworks Corporation tel. (201) 492-1691; fax (201) 492-1692; e-mail mworks@microworx.com; Web www.microworx.com

NCSA Web www.ncsa.uiuc.edu/Edu/Fractal/Fractal_Home.html

Gary Nelson e-mail Gary.Nelson@oberlin.edu; Web timara.con.oberlin.edu/people/~gnelson /~gnelson.htm

Opcode Systems tel. (650) 856-3333; fax (650) 856-0777; e-mail info@opcode.com; Web www.opcode.com

François Pachet Web www.laforia.ibp.fr/~roy/BackTalk-Harmonization.html

PG Music tel. (905) 528-2368; fax (905) 628-2541; e-mail sales@pgmusic.com; Web www.pgmusic.com

Soundtrek tel. (800) 778-6859 or (770) 623-0879; fax (770) 623-3054; e-mail stsales@mindspring.com; Web www.soundtrek.com

SSEYO tel. 44-0-1344-712017; fax 44-0-1344-712005; e-mail koaninfo@sseyo.com; Web www.sseyo.com

Steinberg North America tel. (818) 993-4161; fax (818) 701-7452; e-mail info@steinberg-na.com; Web www.us.steinberg.net

Symbolic Sound Corporation tel. (217) 355-6273; fax (217) 355-6562; e-mail symsound@symbolicsound.com; Web www.symbolicsound.com/kyma.html

Synoptic tel. and fax 33-1-48-18-05-72; e-mail founel@worldnet.fr; Web www.synoptic.net

Operation Help: Expert Advice

pp. 114-118

Cakewalk Music Software tel. (800) 234-1171 or (617) 441-7870; fax (617) 441-7887; e-mail sales@cakewalk.com; Web www.cakewalk.com

E-mu Systems tel. (408) 438-1921; fax (408) 438-8612; e-mail info@emu.com; Web www.emu.com

Steinberg North America tel. (818) 993-4161; fax (818) 701-7452; e-mail info@steinberg-na.com; Web www.us.steinberg.net

TASCAM tel. (213) 726-0303; fax (213) 727-7635; faxback (800) 827 2268; Web www.tascam.com

Reviews

pp. 120-163

Avalon Design tel. (714) 492-2000; fax (714) 492-4284; e-mail avalon@avalon.com; Web www.avalondesign.com

Big Briar, Inc. tel. (704) 251-0090; fax (704) 254-6233; e-mail info@bigbriar.com; Web www.bigbriar.com

Bolder Sounds tel. (303) 440-4297; fax (303) 442-2025; e-mail dennis@boldersounds.com; Web www.boldersounds.com

Encore Electronics tel. (510) 229-8875; fax (510) 229-8875; e-mail sales@encoreelectronics.com; Web www.encoreelectronics.com

Generalmusic tel. (800) 323-0280 or (630) 766-8230; fax (630) 766-8281; e-mail gmail@generalmusicus.com; Web www.generalmusic.com

Quantum Leap/East-West Communications, Inc. (distributor) tel. (800) 833-8339 or (310) 858-8797; fax (310) 858-8795; e-mail webmaster@eastwestsounds.com

Q Up Arts tel. (800) 454-4563 or (801) 488-0062; fax (801) 488-0065; e-mail sales@quparts.com; Web www.quparts.com

Steinberg North America tel. (818) 993-4161; fax (818) 701-7452; e-mail info@steinberg-na.com; Web www.us.steinberg.net

Symetrix, Inc. tel. (425) 787-3222; fax (425) 787-3211; e-mail symetrix@symetrixaudio.com; Web www.symetrixaudio.com

TC Electronic tel. (888) 492-7684; fax (805) 379-2648; e-mail infous@tcelectronic.com; Web www.tcelectronic.com/g-force

Virtual Reality Sound Corporation tel. (714) 240-9175; fax (714) 240-8974; e-mail info@vrsound.com; Web www.vrsound.com

CLASSIFIEDS

ELECTRONIC MUSICIAN CLASSIFIED ADS are the easiest and most economical means to reach 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



AcousticsFirst™
Toll Free: 888-765-2900

Full product line for sound control and noise elimination.
Web: <http://www.acousticsfirst.com>

WhisperRoom INC.
SOUND ISOLATION ENCLOSURES

Vocal Booths
Practice Rooms
Broadcast Booths
etc...

PH: 423-585-5827
FAX: 423-585-5831

E-MAIL: whisper@kcs.net
WEB SITE: www.whisperroom.com

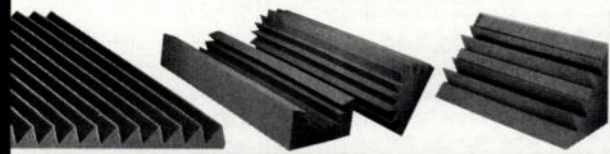
116 S. Sugar Hollow Road
Morristown, Tennessee 37813

Cloaking Device
acoustic conditioning systems
- Quick - Easy - Affordable -
modular systems start at 144.00
Start with a Good Sound
770-427-8761
fspace@mindspring.com
www.mindspring.com/~fspace
Folded Space Technologies

ACOUSTIC FOAM

Diffusors ★ Bass Traps ★ Sound Barrier & More!

Admit it: your room isn't perfect. Nobody's is...even world-class rooms need a little touch up here and there. That's where we come in. For 2 decades Auralex Acoustics has been helping the best in the business on both coasts & all points in between sound their best. So, if you've got better sound on your mind—and who doesn't—trust Auralex. We offer great no-hassle advice & design assistance plus tons of proven solutions to help you control your sound in any situation. Building a new room? Download our booklet *Acoustics 101* free on our website!



USERS: James Taylor, Clint Black, Andrew Gold, Christopher Cross, Doane Perry (Jethro Tull), Dennis DeYoung/James Young/Todd Sucherman (Styx), George Terry (Eric Clapton), Mike Wanchic (John Mellencamp), Ross Vannelli, Skid Row, Mark Lindsay (Paul Revere & The Raiders), Nona Hendryx, John Baxter (Re-Flex), Walt Disney Co., Harpo Studios, LucasArts, JBL, Shure, Opryland, Pelonis Acoustics, Sear Sound, AT&T, NASA, Sony, CBS Sports, NBC Sports, ABC TV & Radio, ESPN, MSNBC, Bose, Discovery Channel, Berklee College of Music, Music Bakery, Steven J. Klein, Former Sr. Eng. @ Criteria Studios (Bee Gees, E. Clapton, Kenny G, Average White Band, etc.) & Studio Designer (Don Was, Babyface, Larrabee, etc.), Ensoniq, Qualcomm, Wayman Tisdale, WhisperRoom, the Lincoln Center, Hitachi, Toshiba, 20th Century Fox, Universal Studios, NPR, Warner Bros., Polygram, Fruit of the Loom Country Comfort Tour, Manley Audio Labs, Lucent Technologies, Time Warner Cable, 3BTV, Electroplex, Azden, Macromedia, Adaptec, Martin-Logan, Crawford Post, ShowCo, Mormon Church TV, Pioneer, Cobra Golf, Carvin, MTX, Silver Dollar City (Branson), the voices of McDonald's, Miller Brewing & Sports on Fox and more.

These people can afford any acoustic products on the planet... they choose ours. Why? Because no other company can match our unbeatable combination of free design assistance, great products & overall value. Call Auralex today or ask for our products by name at major retail & mail-order dealers nationwide.

Auralex Acoustics Inc. ★ 8851 N. Hague Road ★ Indpls IN 46256-1284
Website: www.auralex.com ★ Email: auralex@auralex.com
Info (317) 842-2600 ★ (800) 95-WEDGE ★ Fax (317) 842-2760

COMPUTER SYSTEMS



BONUS 5 CDR FREE Shimad, Ricoh 2x6 ReWriteable bundle... **\$499**

BONUS 5 CDR FREE Shimad, Panasonic 4x8 CD-R bundle... **\$475**

BONUS 5 CDR FREE Shimad, Yamaha 4x2x6 ReWriteable bundle... **\$495**

CD-R BLANKS as low as **99¢** also available TDK & Verbatim

BONUS 5 CDR FREE Jaz + 4x2x6 CD-RW exter. bundle... **\$989**

BONUS 5 CDR FREE AFFEX CD Color Printer, 1,440 dpi... **Call**

LabelMaker with 100 FREE labels \$49

Shimad 1-888-4-SHIMAD
toll free 888-474-4623 PH. 650-493-1234
<http://www.shimad.com> FAX: 650-493-1333

MediaFORM CD2CD Duplicator... \$2,599
Call for other MediaFORM products

CD-RW Media... \$21
Jaz cart. as low as... \$79
SyJet cart... \$85
Zip cart... \$12

EMPLOYMENT OFFERED



Recording Engineer Broadcasting

Multimedia/Digital/Video/Film
Radio/TV/Sports/News/DJ/Talk Show

No experience required!

On-the-job-training

in local major Recording Studios & Radio/TV Stations
Part-time, nights, weekends - Call recorded info line for FREE video

1-800/295-4433 <http://www.sna.com/musicbiz>



DO YOU EARN ENOUGH MONEY? NO? THEN JOIN US!

SYNTHESIZER COMPANY is looking for responsible and motivated U.S. representative to manage company-owned store and distributor based in Cape Coral. Must be knowledgeable in synthesizer technology, history, and operation, and should have experience in servicing electronic musical instruments. A background in sales is also a plus. Please send your application to EM Classifieds, PO Box 8845-BW, Emeryville, CA 94608.

EQUIPMENT FOR SALE



(800) 264-6614

Looking for new and used recording, keyboard, or outboard equipment? We've got tons of super clean used as well as new products from TASCAM, Alesis, Kurzweil, Roland, Mackie, Genelec, Lexicon, Fostex, Yamaha, Korg, and hundreds more. **Discount Pricing and Worldwide Delivery!** 69 years in business. Trade-ins welcome. Visit our new **22,500 sq. ft.** location. Call, fax, or e-mail us today. carusomusi@aol.com OR sales@caruso.net. Visit us at www.caruso.net. Start saving money today! Call **Caruso Music**, 94 State St., New London, CT 06320 USA. Outside of the U.S.: **(860) 442-9600 or (800) 264-6614**.

SINGERS, ENTERTAINERS, DJS

Be Discovered: Make \$1,500 weekly singing, performing at shows locally. Free Report: Pro-Singers Soundtraxs, Attn: Max, Box 1106, Bridgeview, IL 60455.

EQUIPMENT FOR SALE



NEW, USED, DEMO EQUIPMENT BEST SELECTION OF DIGITAL/ANALOG RECORDERS, CONSOLES, DAWS, OUTBOARD GEAR

Otari C1 4032, Yamaha 02R, API 1200 rack system, Dynaudio Monitors, Alesis ADAT, TASCAM DA-88, Sony PCM-800, Otari Radar 24TK, Pro Tools III, All Digidesign Plug-Ins, Mackie 8•Bus, Apogee AD1000, Lexicon PCM 80/90, TC Electronic M5000, CD Recorders, API, GML, ADL, Summit, Focusrite, Demeter, Lucas, TL Audio, Neumann, AKG, Microtech, Rede, B&K, Genelec, Dynaudio.

Studio and System Design, Financing, Factory Service/Installation, Experienced and Knowledgeable Sales Staff.
EAR PROFESSIONAL AUDIO
(602) 267-0600
<http://www.ear.net>

we've got your n'hummer.™

it's simple. it's inexpensive. it removes hum from audio lines without transformers, noise gates or comb filters. guaranteed. numb the hum today! \$249.95 for a 2-channel unit.

more info: www.stro-lion-technologies.com 800.567.0881



SPECIALIZED FURNISHINGS

FOR YOUR **MACKIE 8•BUS**



IN STOCK, READY TO SHIP

Call for a FREE catalog 800-427-5698

OUTSIDE U.S. 573-346-8549, FAX 573-346-2789
ACI - 5687 Precision Ct. - Ocala Beach, MO 65065
www.argosyconsole.com info@argosyconsole.com



Make a MIDI Light Show

Light Master™

- Four channel MIDI controlled dimming system
- Great for Multimedia and Automation
- Delivers high quality performance
- Dimmer and Controller in one unit

only \$269!
order now!
303/252-4844
topaz@tpz.com

Dealer inquiries welcome

GUITAR SPLITTER divides guitar, bass, or keyboard signals into four separate sources. No line level degradation or unwanted tone coloring! Comes with 4-channel foot-switch, rack ears, transformer. \$300. (818) 883-9012.

Don't Get Beat

When you need equipment call

8TH STREET MUSIC
(800) 878-8882

Philadelphia's Largest Musical Instrument Dealer!!!

8th Street Music, 1023 Arch St.
Philadelphia, PA 19107

WORLD'S SMALLEST EQUIP.
DLR. GET ON THE MAILING LIST NOW! R-8, \$375; Quadra-Verb, \$275; D-50, \$600; S-900, \$650; M1R, \$700; TSR-8, \$1,500. Mics, Mixers & Processors aplenty. Call for today's availabilities.
TELESIS (714) 998-3001.

SINGERS! REMOVE VOCALS
Unlimited Backgrounds™
From Standard Tapes, Records, & CDs with the Thompson Vocal Eliminator™. Visit our Internet Site at <http://www.itsound.com>
LT Sound, Dept EM-1
7988 LT Parkway
Lithonia, GA 30058
24 Hour Demo/Info Line (770) 482-2485 • Ext 16
Best Vocal Eliminator™, Key Changer, Voice Enhancer!

OMNIRAX

STUDIO FURNITURE
MixStation / OER



Custom Design and Modifications Available

800.332.3393

FAX 415.332.2807

Outside U.S. 415.332.3392

WWW.OMNIRAX.COM

Available for All Mackie 8•Bus mixers, & Eurodesk

P.O. Box 1792, San Mateo, CA 94068

Are your artistic abilities being inhibited by studio charges?

We have the answer. It's the XYTAR ADMS, the complete 16 & 32 track recording and production studios in a box. What can you do with the ADMS? You can record your basic tracks, overdub, mixdown, EQ, Reverb, burn a master audio CD and much more! No plugins or external add-ons needed. All this and exquisite audio performance too!

Features:

16 & 32 Track Models	Parametric Graphic E.Q.
Tapeless Record & Playback	Echo, Delay, Vari-pitch
20 bit A-to-D Converters	Vari-speed, reverb, Flanging
20 bit D-to-A Converters	F.F.T. Noise Removal
24 bit DSP	Full Mixing Automation
SPDIF Digital I/O	Tone Generation
Audio CD Burner	Rack Mount Case
97 dB Dynamic Range	More ...



9 ADMS Models available starting at \$3499.00

Interested? Want more info?

Contact us At:	Voice:	650-697-7493
XYTAR Digital Systems	FAX:	650-697-4905
Box 282248 San Francisco, California 94128	E-Mail:	xytar@johana.com
		xytardms@aol.com

Sound Deals, Inc.

Specialists in **Samplers, Synths, Pro Audio, Analog & Digital Recording, Effects, Drum Machines, Computer Software/Hardware & more!**

(800) 822-6434/(205) 823-4888

Sound Deals, Inc.

230 Old Towne Rd.

Birmingham, AL 35216

Analog Modular Systems, Inc.

We buy, sell, and trade all analog synths—especially **Moog, ARP, Buchla, Serge, Roland, Mellotron**, etc. Best price paid!!! Tel. USA: (213) 850-5216; fax USA: (213) 850-1059. Visit our virtual store, <http://www.analogsynths.com>

HAMMOND B3, Leslie Speakers. Great Condition. Home-Used Only. (562) 697-2421.

The MIDIGUY knows Shop the Web

Great advice before & after the sale because you're buying from The Electronic Music Box. L.A.'s **MIDI Digital Audio Experts**. Save at <http://www.midiguy.com>
Not on the Web? (818) 789-4286.

FREE CATALOG

Classic Music Furniture
If you love music, our new catalog of fine hardwood music furniture will delight you. Music stands, sheet music cabinets, players' seating, instrument stands, and more.
Alden Lee
Depot: MDX805 1215 Chrysler Dr. Menlo Park, CA 94025
For FREE catalog call 1-800-324-5200

CLASSIFIEDS

HBB CD-R 800...Best Pricing!
 ADAT 45 @ \$6.99; DAT 65 @ \$6.22
 TASCAM DA-88/113 @ \$10.79
 Taiyo Yuden CD-R 74 @ \$1.99
 Neutrik Con/Rean TT Bays
 Sales & Info call Green Dot Audio
 (615) 366-5964 (M-F/9-5 CST)

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!
 (914) 692-6922 • 680 Rt. 211 East
 Middletown, NY 10940
 Ask for Uncle Freddy—He loves ya!

INSTRUCTION



ThunderBird
 RECORDING

 SCHOOL
**EXTENSIVE TRAINING
 IN THE RECORDING
 ARTS**
**APPRENTICE-STYLE
 PROGRAMS**
LIMITED ENROLLMENT
 CALL TODAY FOR YOUR FREE BROCHURE.
1-800-914-8004

LEARN THE ART OF RECORDING

Learn the practical skills needed to start a career as an engineer, producer or studio musician. •300 hours •Six studios/latest equipment •Small classes •Job placement assistance •Financial aid •On-campus housing
Call 800-848-9900 or 614-663-2544
The Recording Workshop
 455-L Massieville Rd, Chillicothe, Oh 45601



CL6/1800 Midi Lighting Dimmer

- 6 Independent Channels of Dimming
 - Responds to Midi Notes and Controllers
 - Only \$449.00 US List Price!
- Ask about our other Midi products of control Valves, Relays, Servo's, Lighting, Analog Keyboards & more!!

MEDIA
 2461 West 205th St.
 B100
 Torrance, CA 90501
 Phone: (310) 320-0699
 Fax: (310) 320-0699
 Visa, MC, Discover & AmEx. "Dealer Inquiries Welcome"

How BIG is Yours?

HARD DRIVES Digital Audio Specialists!
CD RECORDERS
MEMORY CHIPS
SOUND CARDS
MIDI SOFTWARE
BIG DISC
 (954) 749-0555
<http://www.bigdisc.com>

RACKCRAFT

The Desktop Studio Rack
 6-sp. for MDM,efx-
 2-sp. for pwr. amp-
 12-sp. for rack mixer-
 padded handrest
 \$299.95 + S&H
 For more info Call
 913-262-3949 email: Rackcraft@aol.com
 6819 W. 73rd • Overland Park, KS 66204

MIDI-KIT CATALOG: 30 kits, including Programmable Controllers, Relay Driver, Custom Instrument, CV-MIDI, Programmable Transmitter, Data Monitor, MIDI-project book, and newsletter for Artistic Technologists. PAVO, Inc. (800) 546-5461; www.pavo.com

EQUIPMENT WANTED



USED ADATS WANTED.

Easy exchange toward a newer or different format. Everything available. Save **THOUSANDS** when you deal with our 69-year-old company. **UPGRADE TODAY.** Call, fax, or e-mail for details. Worldwide delivery. **CARUSO MUSIC**, New London, CT.
 sales@caruso.net
 (800) 264-6614
 outside of the U.S. (860) 442-9600
<http://www.caruso.net>

INTERNET SERVICES



A La Carte Web Design

a division of **ROCKA RECORDS**



Professional Web Site Design for Musicians and/or Groups, Record Labels, Studios, etc.
 Musicians concerned about your budget... check out our Basic Plan. For more elaborate design, order our Custom or Professional Plans.

Music on the Web
<http://musicontheweb.com>



Web hosting on a T3 network
 Rocka Records Studios can handle any audio/video encoding project!

Call 1-800-96-ROCKA
www.rocka.com

TM e-mail: rocka@rocka.com fax: 425-640-6262

GET YOUR MUSIC ON THE INTERNET

Feature your full-length songs on RealAudio!!!
 The best way to maintain an updated online band presence!
 Feature your performance calendar, photos, booking information, online ordering for your CD and more!
MAMMOTH ARTISTS, INC.
www.mammothartists.com
 (800) 939-3946

BAYVIEW PRO AUDIO
 PRO AUDIO SOFTWARE & HARDWARE SALES
DIGITAL AUDIO SOFTWARE
 SampleRate 24/96-24 bit, 96kHz, Direct X\$1099
 SampleRate Studio-unl. tracks, CD-R, Autom\$379
 Red Rooster 24-24 Bit float, WIN 95 and NT\$249
DIGITAL AUDIO HARDWARE
 Profid 24-24 Bit digital I/O ISA\$279
 Analog ARC 44 Card-4 x Analog I/O\$285
 Profid 96-24 Bit kHz digital I/O PCI\$599
 Profid Gold-ADAT, S/PDIF PCI\$499
 Analog ARC 88 Card-8 x analog I/O, digital I/O\$579
 Sek d 2496-24 Bit, 96kHz converter\$2995
STUDIO SOFTWARE
 Visualizer-Control for Yamaha D2R\$499
 C-Console-User Interface for Yamaha DSP Factory\$199
BAYVIEW PRO AUDIO
 Tumwater, WA USA
 Toll-free: (888) 718-0300
 International: 1-360-753-3862
 We accept major credit cards.
<http://www.olywa.net/duper>

Sound thinking
Digital Audio:
It's What We Do!
 digidesign **ALESIS**
 ...and more
541-386-2682
www.soundthinking.com

TO PLACE YOUR AD IN THE CLASSIFIED PAGES OF

Electronic Musician

CALL ROBIN BOYCE-TRUBITT AT (800) 544-5530

Internet Radio for Eclectic

Music Lovers. Surf to
www.gogaga.com today!
 RealAudio 3.0 Stereo 24-7-365.
 Your submissions welcome!
 Get more info@gogaga.com

CLASSIFIEDS

MAINTENANCE SERVICES



DATs FIXED FAST!

Expert solutions for all
DAT recorder problems

- All makes and models
- Experienced, factory-trained techs
- Fast turnaround
- Repairs, overhauls, parts

"The DAT doctor is in!"



973-579-4849 FAX 973-579-7571

PARTS & ACCESSORIES



Dust Covers

Studio Equipment
Synths • Mixing boards
Amps • PA Cabinets

E-mail: lecover@flash.net

1-800-228-DUST(3878)

The Le Cover Co.

1223 Kingston Lane • Schaumburg, IL 60193

RECORDING SERVICES & REPAIRS



FREE WEB SITE ON IUMA!

WHEN YOU MANUFACTURE CDs,
CASSETTES, OR 12" VINYL

Call Disc Makers today
for a complete brochure:

1-800-468-9353
www.discmakers.com/iuma
FAX 609-661-3450



****A great deal!****

Real-time cassettes—Nakamichi
decks, chrome tapes—the best!
Album length \$1.50/100. On-cass.
printing/inserts avail. Grenadier, 10
Parkwood Ave., Rochester, NY 14620.
(716) 442-6209 eves.

Incredible Prices

New
White
Printables

Taiyo Yuden Sale

TY CD-R's available now - including

White Armor Protection

White Printables (Fargo-Cannon-Epson)

Gold CD-R's in Spindles/Jewel boxes

at incredible low prices.

Call Now APDC Corporation

Phone: 1-800-522- APDC (2732)

(201) 568-6181-apdc@worldnet.att.net

YOU WOULDN'T LET JUST ANYONE MAKE YOUR CDs...WOULD YOU?!

Discover the **MMS advantage**. Major label
quality at independent prices in record time.



MUSIC MANUFACTURING SERVICES

It's not just our name. It's what we do!
Manufacturing for the independent music industry since 1986.

1-800-MMS-4CDS

1-(800)-667-4237

Call us for a free brochure and custom quotation.

CDs • Cassettes • Vinyl • Graphic Design • Mastering • All related packaging

DIGITAL FORCE®

MASTERING
REPLICATION
PERSONAL
EXPERT
SERVICE

212-252-9300
www.digitalforce.com

**TOTAL CD, ECD, CD-ROM
& CASSETTE PRODUCTION**

142 Madison Avenue, N.Y. NY 10016

The Power of Excellence SM

GRAPHIC
DESIGN
PRINTING
COMPLETE
PACKAGING
POSTERS



1000 CD'S

only \$1180

Includes 3 color CD face, jewel box &
shrink wrap. Major label quality. Fast!

1 888 GROOVE 8

300 CDs COMPLETE PACKAGE

DESIGN, FILM AND
FULL COLOR PRINTING

\$1295

800-900-7995
802-453-3334

PROTOSOUND
Celebrating Our 10th Anniversary

AUDIOGRAPHIC MASTERWORKS

Fast, Full Service
CD Packages

Digital Mastering

Custom Graphic Design

Sonic Solutions No Noise™

Audio Restoration

901-821-9099

masterworks@earthlink.net

Every project is a masterpiece

Electronic Musician Classifieds Work!

For Classified Advertising Rates
and deadlines please call:

Robin Boyce Trubitt @
(800) 544-5530

Fax:
(510) 653-8171

E-mail:
emclass@intertec.com

Website:
http://www.emusician.com

**Color Classifieds
Now Available.**

CLASSIFIEDS

**MANUFACTURERS OF
CDs and CASSETTES**

CD REPLICATION =
CASSETTE DUPLICATION =
DIGITAL MASTERING -
GRAPHIC DESIGN -
PRINTING - PACKAGES -
ONE OFF CDs

Ask about our
FREE WEB PAGE
offer

HTTP://WWW.PB.NET/~CCMUSIC

C&C
MUSIC

800-289-9155
OUTSIDE U.S. 516-244-0800

SPINNER WORLD WIDE

Also Available:
• CD-Rom
• Cassettes
• Digital Mastering
• Posters

500 CD's Complete Full Color package
\$999⁰⁰

500 CD's we do it all package
\$1299⁰⁰

Call for our WHOLESALE MANUFACTURING GUIDE
1-800-582-3472
www.spinnerworldwide.com

Best Price... Best Service... Period.

CD REPLICATION

- CDs in Retail-Ready Packages
- CDs in Bulk (minimum order only 100 CDs!)
- Vinyl Records, 7 & 12" - colors available!
- Cassette Duplication

Work directly with our factory and
save! Call for Free Catalog or Quote: **(800) 455-8555**

http://www.europadisk.com Major Credit Cards Accepted

EUROPADISK, LTD.

25 CDs
IN ONE DAY
for only
\$349!

FREE Jewel Case
FREE Direct-On-Disc Printing
FREE Black & White Printed Insert
Fully Red Book Compatible

Compact Discs • Real Time Cassettes
Digital Mastering

(800) 249-1110
(302) 999-1110
National Multimedia Services

**GET A LOAD
OF THIS DEAL!!**
10-50 COPIES
from your CDR
as low as \$7.99 ea.
includes jewel box
CD LABS, INC.
(818) 505-9581
(800) 423-5227
www.cd-labs.com

RECORDS, TAPES & CDS

BASE Multimedia Inc.

Price Includes:
Full Color CD Label,
Jewel Box, Glass Master
Assembly & Overwrap
(customer supplied film)

300
\$599.00

500
\$750.00

1000
\$1150.00

Design, film and printing services available.

1-800-579-7010
www.bmmi.com

"OUR 30TH YEAR OF FAST GUARANTEED SERVICE"

FREE CATALOG

4212 14TH AVENUE - BROOKLYN, NY 11219
ANDOL AUDIO PRODUCTS INC.

LENGTH	C-10	C-20	C-30	C-40	C-50	C-60	C-70	C-80	C-90
BASF CHROME PLUS	.27	.32	.37	.41	.46	.51	.57	.63	.68
TDK SA	.25	.30	.35	.39	.44	.49	.53	.58	.63
MAXELL III	.7	.3	.38	.44	.47	.52	.67	.70	.74
BASF CHROME SUPER	.34	.38	.47	.56	.63	.69	.80	.87	.89

100 PIECE MINIMUM

TELEX
ATDK
BASF
AMPEX
maxell

IN HOUSE DIRECT ON CASSETTE PRINTING
• CUSTOM PRINTED LABELS & J-CARDS •

IN NYC 718-435-7322 • **800-221-6578** • 24 HOUR FAX 718-853-2589

FREE LABELS WITH EVERY CASSETTE ORDER
ROUND EDGE OR STANDARD NORESCO BOXES \$0.12 EACH

www.andolaudio.com
andolaudio@aol.com

THE MONKEYHOUSE

**CDs AND CASSETTES AT
ROCK BOTTOM PRICES.
YOU KNOW IT.**

888-MONKEY-5

1,000 CDs for \$800
500 CDs for \$495

Graphics & Mastering
Also Available

MOON TOWN Disc

205-851-8101
www.moontown.com

CD & CASSETTE MANUFACTURING

Serving the country with over 25 years of experience.
The Southwest's premiere full-service manufacturing facility!

PRINTING • GRAPHIC DESIGN • BLANK CASSETTES
DIGITAL MASTERING & EDITING • ONE-OFF CD-RS

RETAIL READY PACKAGES! CALL FOR FREE CATALOG!

CRYSTAL CLEAR SOUND
1-800-880-0073
mc/visa accepted
www.crystalclearsound.com

CLASSIFIEDS

RECORDS, TAPES & CDS

Rhythm City
CD & TAPE DUPLICATION

1000 CD'S \$980
1-800-320-4783
LOCAL 1-314-776-4307
ST. LOUIS, MO 63110



We Anticipate Your Every Need

CD REPLICATION

Cassette Duplication
Graphic Design & Printing
Digital Editing & Mastering

1-800-527-9225
(716) 691-7631 • Fax (716) 691-7732

CD-ROM
CD-Audio
CD-I
Mixed Mode
CD-ROM
Audio & Video
Cassettes

Bulk CD's
as low as
60¢

Toll Free 1-888-CD SONIC (237-6642)
Tel: (617) 424-0670
Fax: (617) 424-0657

Graphic Design
Printing
Interactive
Media
Slides
Floppy Disk

DRT Mastering
If your CD needs the fat NY/LA sound (or better) that major labels demand, you owe it to yourself to call us before you manufacture. Simple as that! Free broch.
800-884-2576 www.drtmastering.com

KYRIC-disc
1,000 Bulk CDS
\$850
Ready in 7 Working Days
1-800-221-0503
1131 E Locust St. Ontario CA 91761

WE'LL BEAT ANY PRICE ON CD'S

- CD
- CASSETTES
- HIGHEST QUALITY
- QUICK TURNAROUND
- PERSONALIZED SERVICE
- TOTAL COMPLETE PACKAGES
- LOWEST PRICES, CALL US LAST!

(813) 446-8273

Total Tape Services
639 Cleveland St / Clearwater, FL 34615

1000 Raw CD's for \$800

CD Replication
DVD
Digital Mastering
Professional Design
One-Offs
CD/CD-Rom Hybrids
No ± 10% (Exact Price)

PROPHET
Disc Manufacturing
call for a free catalog
1-888-DISC-MFG
3472-634
www.prophetmedia.com

www.yourmusiconed.com

10 cds - \$70
50 cds - \$300
770-931-0375
SNS

Serving You **THE WAREHOUSE** Since 1975
Studio Sales & Services

Cassette, CD, CDR duplication
RtWR • DATS • ADATS • Hi8 • VHS • CDS
Blank Cassettes, any length
warehouse prices
800-483-TAPE • fax: 904-398-9683
Visa • MasterCard • Discover
Internet:warehouse@aol.com
2071-20th Emerson St., Jacksonville, FL 32207 • 904-399-0424

\$7 CD-Rs
One day turnaround
\$15 single CD-Rs

THE MONKEYHOUSE
888-MONKEY-5

CD, Cass & CDR
Mastering & Replication

DDAI
DIGITAL DYNAMICS AUDIO INC.

Full Service Digital House
• Digital Audio Post Production
• CEDAR Sonic Restoration
1-800-444-DDAI
<http://www.4ddai.com>

adca
artist development associates

CD Singles Special \$559

- 500 CD's. 2 Colors on CD
- 500 Window Envelopes
- Layout, Design & Films included
- Glass Mastering included

no tricks, no gimmicks, just bring us your CD!

Digital Dime Bag \$1,499

- 1000 CD's. Jewel Boxes & Over-wrap
- 2 Color on CD printing
- 1000 4/1 4 PP folders & 4/0 tray cards
- Film output
- Glass Mastering included

Full color, retail ready, quick turns

UNBEATABLE DUPLICATION PRICES (888) rubber-8
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

Complete CD packages!

WAVE

	CD's	Cassettes
300	\$975	\$396
500	\$1075	\$506
1,000	\$1637	\$752

1-800-928-3310
World Audio Video Enterprises

Retail ready including full color inserts
Bar codes CD Rom
CD-R Mastering
Design and Film services available

10 CDs \$120
Single copy CDs \$25
From DAT, DCC, CD, or cassette
Up to 74 minutes
D.C. CDs
703-354-1895

CD PACKAGES Best Quality, LOW \$

SIENNA DIGITAL 1,000 CDs \$999
1997 500 CDs \$749
Grammy Winner 25 CDs \$199
Graphics Packages Available 10 CDs \$99

(888) 674-3662 Includes Jewel Box & Label

HEALEYdisc
Manufacturing

Premier Quality CD/CD-ROM, VHS and Cassette manufacturing

CD PACKAGE INCLUDES:
Color & page /2 panel insert, 2 color on CD printing
pre-master, glass master, jewel box and shrink wrap.
Barcode included.

500 CD's \$1099
1000 CD's \$1599

CALL NOW 1-800-835-1362
for your free catalogue • www.healeydisc.com

"Professional mastering at affordable rates."
"Special studio and indie label rates."

"We offer to independent artists... who's making your music!"

BDM
b digital manufacturing

- CD Replication
- CD-ROM, CD-R's
- Cassette Duplication
- Mastering
- Editing
- Graphics
- Printing, Posters, J-Cards

complete packages available
call and we'll send you info

***1000 color cassettes as low as 85¢ each**
***Bulk 2 color CD's as low as 90¢ each**
****1000 color CD package \$1,250**
1000 18x24 color posters complete @ \$1.65 each
*cust. supplied film **cust. supplied inserts from our specs • shipping not included

Call Toll Free 1-888-363-9290

CLASSIFIEDS

DI GI - ROM

130 West 42nd Street • New York, NY 10036

OUTSIDE THE USA (713) 237-8636

Office & Juice: 1221 377-3500
Demos & Fax: 1221 377-3491
Web: <http://www.1221.com>
Email: info@1221.com

CLASSIFIEDS

SOFTWARE, SEQUENCES & SOUNDS



KID NEPRO
"The Patch King"
Quality Sounds for over 100 MIDI & Vintage Instruments
From: ROLAND • YAMAHA • KORG • EMU
• BOB • AKAI • • CAMO •
• KAWAI • • KURZWEIL •
• OVERHEIM • • SEQUENTIAL •

View our catalog & soundlists at our website
<http://www.kidnepro.com>
Call for more info • Send \$3.00 for catalog

KID NEPRO PRODUCTIONS
PO Box 360101 (DEPTE)
BRCELIN, NY 11236
(718) 642-7802 • Fax: (718) 642-8385
e-mail: kidnepro@aol.com

DANGEROUS SOUNDS!

The best patches and samples for **Ensoniq keyboards**, from the ASR and TS back to the Mirage. Free Catalog! Syntaur Productions, (800) 334-1288, (409) 234-2700. Internet: <http://www.fatsnake.com/syntaur>

BAND-IN-A-BOX IMPROVEMENT PRODUCTS*** You can put a Better-Band-In-Your-Box. Power-User Styles, Fake Disks & More! Gen-MIDI SEQUENCE & CD-ROMs too! **FREE** info! Norton Music & Fun, Box 13149, Ft. Pierce, FL 34979. Voicemail/fax (561) 467-2420; <http://members.aol.com/NortonMIDI/>

Learn to Play Your Favorite Songs!

CD Looper is the perfect music software for Windows that allows you to easily learn how to play any song directly from your computer's CD player. Because CD Looper can slow down any audio CD 2, 3 or 4 times without changing pitch, you can now learn your favorite songs note for note. No matter what instrument you play, CD Looper is the perfect tool for transcribing and learning your favorite music.

- Loops can be set anywhere within a track with 1/100th of a second resolution.
- Loops can be any length.
- Slowed loops can be sped up in 10 percent increments.
- Many other features.



\$59.99

CD Looper Pro Includes These NEW Plug-Ins!

NoteGrabber: Extends CD Looper's capabilities beyond CDs. Record and slow down music from any input source or existing wav files. Graphically record any section of a wav file, down to a single note.

OverDubber: Record yourself playing over any loop in CD Looper. If your sound card supports full-duplex recording (most do), you can even record yourself playing over wav files with NoteGrabber. Record yourself playing over backing tracks. The perfect tool to help you analyze your playing.

PitchChanger: Change any loop's pitch up or down an octave in half-step increments.

CD Looper Pro is **\$94.99** or you can upgrade CD Looper for only **\$39.99**!

CD Looper To order your copy of CD Looper call toll-free **888-3REPLAY** or in NY **516-385-1398**.
See Your Local Retailer <http://www.replayinc.com> *plus shipping and handling

STANDARD MIDIFILES

WHEN QUALITY COUNTS

ONLY **TRAN TRACKS** WILL DO

World's leader in quality & service
In business over 11 years
Over 4000 popular songs
Including Italian and Opera libraries
Rhythm, Groove and Style Disks
General MIDI compatible
Email service



FREE demo & catalog

1-800-473-0797

www.trantracks.com



TRAN TRACKS
MIDI SEQUENCES

350 Fifth Ave. #3304
NYC NY 10118
voice 973-383-6691
fax 973-383-0797

THE BEST MIDI SEQUENCES MONEY CAN BUY

Classic Rock, R&B, Blues, and Jazz standards programmed by Pete Solley. LET US SEND YOU OUR FREE DEMO DISK AND SEE WHY WE SIMPLY ARE THE BEST.

Call (954) 570-9787
or fax (954) 570-9788 for song list.
CHECK OUT OUR NEW STYLE DISKS
All credit cards accepted.
Visit our Web site at
www.petersolleyproductions.com
Peter Solley Productions

K2000 Dance/R&B drum samples.

Fresh New Sounds! 5 premapped drum kits. Want a sample? Just e-mail djstudio@hotmail.com for your free minikit. For orders, specify CD-ROM or diskette. CD-ROM orders get a free bonus kit. Intro price \$24.95 (incl. shp). Send to: SAMPLE HOUSE, Box 466, Adelaide PO, 31 Adelaide St. East, Toronto, Canada M5C 2J5. (416) 410-7011.

MUSIC TOOLS BLOWOUT!

Huge Discounts on LATEST software, sound cards, sequences, samples, books, videos. FREE keyboard with Cakewalk Audio! Finale/97 Academic - \$199.95! Visa/MC/Novus/Amex. (800) 787-6434 now! FREE 9000-product Web catalog at <http://www.midi-classics.com>! Dept. E, MIDI Classics®, Box 311, Weatogue, CT 06089.

PATCHMAN MUSIC now offers over 272 pro-quality sound banks! Visit our Web site for complete details. Free catalog available. (216) 221-8282.

E-mail matteblack@aol.com
Web site <http://members.aol.com/Patchman1/>

PHI-MUSIC MICROTONE/ BRAINWAVE GENERATOR

for Windows 95. Free Evaluation Copy available for download at <http://www.seriouscomposer.com> SERIOUS COMPOSER Music Software, PO Box 18041, Asheville, NC 28814.

Phone (704) 254-7160
Fax (704) 253-4573
E-mail info@seriouscomposer.com

TRYCHO TUNES

PERFORMANCE SEQUENCES™

MIDI MUSIC WITH THE HUMAN TOUCH!

The most widely used midi sequences in the world. First in customer satisfaction for over twelve years. Over 5,000 song titles available for any musical application. All programmed in sunny California by Stephen Kern, the most respected musician in the business.

From Pop to Rock. From Country to Standards to custom programming, we've got it all!

Trycho sequences are available for most popular computer and hardware based sequencer systems. We even have stereo

audio cassette and DAT versions for non-sequencer users. Now in our 13th year, we continue to offer great selection, great prices, and full time tech support. Just a phone call away six days a week!

Whatever your musical needs, you can count on **TRYCHO TUNES** for the absolute best in midi sequences.

TRYCHO TUNES are available at many fine music & computer stores. Or order direct at:

1-800-543-8988
2166 W. Broadway St. • Suite 330
Anaheim, CA 92804
Technical Hotline (909) 696-5189 • Fax (909) 696-3571
<http://www.trycho.com> • e-mail trycho@mindspring.com

CLASSIFIEDS

Give Your Act A Good Kick In The Gas...!

Imagine what it would be like jamming with some of the best known musicians in the world. With *Midi Hits*, you just step in and play along.

Over 5,000 Premium Backing Tracks

Pop, Country, Oldies, Top 40, Big Bands, Jazz, Standards, Gospel, Show Tunes, Latin, R&B, etc.

Free Catalog



Now In our 7th Year

3 Shratton Ave.
San Carlos, CA 94070
1-(800) 593-1228

Fax (650) 637-9776

e-mail: midihits@pacbell.net

See us on the Web
www.midi-hits.com

MIDITRON—The easy way to preview sequences from the leading vendors, artists, and composers. New releases, original compositions & special promotions. **MIDITRON** 24-hour line: (614) 888-0802. Info: Data Assist, Inc., 651 Lakeview Plaza, Suite G, Columbus, OH 43085. Phone: (614) 888-0888.

DRUMZZS—The best drum sample CD ever created. Over 1,000 samples used by top producers and engineers. To order yours, please send \$79.95 plus \$3 shipping and handling to **DRUMZZS**, PO Box 654, Eastpoint, MI 48021. Allow 7 to 10 days for delivery. For more information call (810) 771-3720.

COMPUTER MUSIC PRODUCTS for IBM/PC musicians. Great prices & selection of popular MIDI software/hardware. Call for FREE catalog. (941) 746-6809. Beginners welcome!

SONGWRITING



SONG WRITERS & LYRICISTS WANTED! "SONG CONNECTION"

The best way to your next hit.
(800) 789-SONG
(818) 348-0494

SONGWRITER PRODUCTS!

Books, copyrights, cassettes, contracts & contract software, publishers, labels, radio stations, distributors. CDs & Tape dupe, graphic design, film, 8x10 photos, j-cards, labels, bar-code software, shrinkwrap. **FREE CATALOG!** **SPIN:** Box 952063 #5, Lake Mary, FL 32795-2063 USA.

(800) 487-SPIN

www.songwriterproducts.com

SOUND EFFECTS



CONCEPT:FX SFX CD-ROM

195 Sound Effects. Mac and PC AIFF/WAV Files. Experimental & Abstract sounds. Royalty Free.

\$49.95 + \$4 shipping (U.S.)

F7 Sound and Vision

17732 Nathan's Drive
Tampa, FL 33647. (813) 991-4117
<http://www.f7sound.com>

Find out how your company can be listed for **FREE**

on the Electronic Musician web page

www.emusician.com

call (800) 544-5530

EM CLASSIFIEDS WORK FOR YOU

Text rate: \$9.50 per line (approximately 25-32 character spaces per line); seven-line minimum. Add \$0.50 per bold word. Each space and punctuation mark counts as a character. \$66.50 MINIMUM CHARGE for each ad placed.

Enhancements: \$10 black border, \$15 for a gray-screened background, \$25 for a reverse, \$25 for Post Office box service. Call for 4-color pricing. Charges are based on a per-insertion basis.

Display rate: \$117 per inch (1" minimum/half-page maximum). Logos or display advertising must be camera-ready, sized to EM column widths and specs. Frequency discount rates available, call for information.

Special Saver rate: \$35 for up to four lines, including first word in bold. **Only available to individuals not engaged in commercial enterprises.** No additional copy allowable for this rate.

Closing: First of the month, two months preceding the cover date (for example, the April issue closing is February 1). Ads received after closing will be held for the next month unless otherwise stated. **Cancellations will not be accepted after the closing date.** Copy changes and cancellations must be submitted in writing.

Other requirements: Full street address (PO boxes aren't sufficient) and phone number must accompany all requests, whether included in ad or not. All words to be bold should be underlined. Copy must be typed or printed legibly in standard upper/lower case. Publishers are not responsible for errors due to poor copy. Arrangement of characters may be altered in typesetting process due to space. The publishers are not liable for the contents of advertisements.

The small print: Only ads dealing with music, computers, or electronics will be accepted. No stated or implied discounts allowed on new-equipment sales. Publishers reserve the right to refuse or discontinue any ad deemed inappropriate.

Art instructions: Logos or display advertising must be sized to EM column widths and specs. For best printing results please provide exact size film (emulsion side down) preferably with a velox proof, or camera-ready (lithotronic paper output, or a stat). We accept laser prints or photo copies but do not assume responsibility for their reproduction quality. Line screen should be between 90 & 133 LPI.

Send coupon & payment to: **Electronic Musician Classifieds:** Attn: Robin Boyce-Trubitt, 6400 Hollis St., #12, Emeryville, CA 94608
tel (800) 544-5530 or (510) 653-3307, fax (510) 653-8171, e-mail emclass@intertec.com

Payment: Must be included with copy: check, Visa, MasterCard, or American Express accepted. Sorry, no billing or credit available.

INSERT THIS AD IN THE _____ ISSUE OF EM.
Categories available (PLEASE CHECK ONE)

- ☐ ACOUSTIC PRODUCTS
- ☐ COMPUTER SYSTEMS
- ☐ EMPLOYMENT OFFERED
- ☐ EQUIPMENT FOR SALE
- ☐ EQUIPMENT WANTED
- ☐ INSTRUCTION
- ☐ INTERNET SERVICES
- ☐ MAINTENANCE SERVICES
- ☐ PARTS & ACCESSORIES
- ☐ RECORDING SERVICES & REPAIRS
- ☐ RECORDS, TAPES & CDS
- ☐ SOFTWARE, SEQUENCES & SOUNDS
- ☐ SONGWRITING
- ☐ SOUND EFFECTS

ATTACH YOUR CLASSIFIED AD COPY ON A SEPARATE SHEET, TYPED DOUBLE-SPACED OR PRINTED CLEARLY IN CAPITAL AND LOWER-CASE LETTERS.

Company Name _____

Name _____

Address (no PO boxes) _____

City _____

State _____

Zip _____

Phone () _____

Signature _____

Display (\$117 per inch) \$ _____
Lines @ \$9.50 \$ _____
(seven-line minimum)
Bold @ \$0.50 additional \$ _____
Border @ \$10 \$ _____
Reverse @ \$25 \$ _____
Screen @ \$15 \$ _____
Blind PO box @ \$25 \$ _____
Special Saver rate = \$ 35

TOTAL PAYMENT INCLUDED \$ _____

☐ Visa ☐ MC ☐ AmEx ☐ Discover

☐ Check/Money Order # _____

Card # _____

Exp. _____



FINAL MIX

It's in the Air

It's night in Baghdad by the Bay, and I am slipping through a fitful dream in which I am a contestant on a strange game show called *Find Your Foot*. (I said it was a dream.) The host of the show is posing the Big Question to me: "And now, for the lifetime supply of Doc Martens, which piece of equipment in your studio is more important, your mixing console or your speakers? Take as much time as you want to think it over, but you must decide within two seconds. Alright, what's your answer?" In my most articulate fashion, I answer, "Ip, up, ub, well, uh, hmm, my mixer is the nerve center of the whole studio, without it I'd be lost...so...I'll say *the mixer!*"

"No, you're a *complete idiot!*" the host screams three inches from my face. "What does your studio sound like without your mixer? At least you could listen to a CD player plugged into your amp and speakers. What does your studio sound like without speakers? Nothing! You couldn't hear a blasted thing! *Now* how much would you pay?"

Suddenly, the host's leering face turns into my mixer and digital reverb,

dancing around and singing, "We are the joy boys of radio, we chase electrons to and fro." (Dreams are so weird. That was actually the theme song of a pair of long-ago drive-time radio deejays in Washington, D.C.)

I woke up and realized I had just been handed two earth-moving insights on a surreal platter, one being that 2 A.M. is way too late to eat chicken vindaloo.

Look around your studio at your mixer, compressors, effects devices, synthesizers, computer, and so forth. In the end, all these things do is chase electrons around. Speakers and microphones are the only pieces of equipment in the entire joint that deal with *sound*. Heavy, eh?

Impedance matching is no longer critical for every studio connection, but nothing has changed in the interface between speakers and ears. You still have a room interacting with speakers, with agitated air molecules getting pushed around and bouncing off surfaces in the room or having their motion damped by absorptive materials. The room has a set of responses shaped by myriad variables that have to do with

sound (frequency, amplitude, phase), shape and texture (angles, curves, diffraction), and even the weather (temperature, humidity, barometric pressure).

Ever mixed an outdoor concert? Did you notice how the sound changed as the day wore on and the temperature went up and down, the afternoon wind came up, the morning fog lifted? If you thought you could tweak the system in and leave it there, you weren't giving Mother Nature her due.

Now consider the other end of the chain. Why does a given microphone sound better on some instruments than others? The answer involves the complex interaction of that mic's distinctive characteristics with the instrument's physical and acoustic characteristics, factoring in all of the other stuff, such as the player's style and technique, the room, and so on. That's why it's said that the best EQ is good mic placement (and mic choice, I might add).

Why does close-miking of acoustic instruments often sound bad? Because those instruments are complex interactive acoustical systems intended to be heard from several feet back where the outputs of all those systems are mixed together—in the air.

As you create music and sound, always remember that, even if you're working solely with electronic instruments, when all is played and sung, it still always comes down to compression and rarefaction.

Larry the O is a musician, producer, and engineer whose San Francisco-based company, *Toys in the Attic*, provides a variety of musical and audio services. His Celtic meltdown band, *Annwyn*, just released the CD *Anarchy and Rapture*.

\$20,000.⁰⁰ and worth every penny!

Special Edition Keyboard

88-Note Weighted Action

Variable Architecture Synthesis Technology

\$11,350.⁰⁰ Value Library

40 Producer's Elite CD-ROM Set

KDFX 8 Channel DSP

Full 24Mb ROM Expansion

KURZWEIL AUDIO ELITE SYSTEM



128MB Sample RAM

P/RAM-2

Program memory expansion- 1.25MB

2 GIG Internal Hard Drive

KB3 Mode/Live Mode

Operating system in Flash ROM

2 DMTi Digital Multitrack
Interface's, ADAT™, TASCAM™

Rack Mount

External SCSI CD-ROM Drive

With 50-pin terminator plug

Extended 3 Year Warranty

KURZWEIL... SOUND
IT'S THE

Ask your dealer about our Consumer Financing Plan.

Available at your authorized Elite System Dealer.

Kurzweil Music Systems Young Chang Canada, Corp.

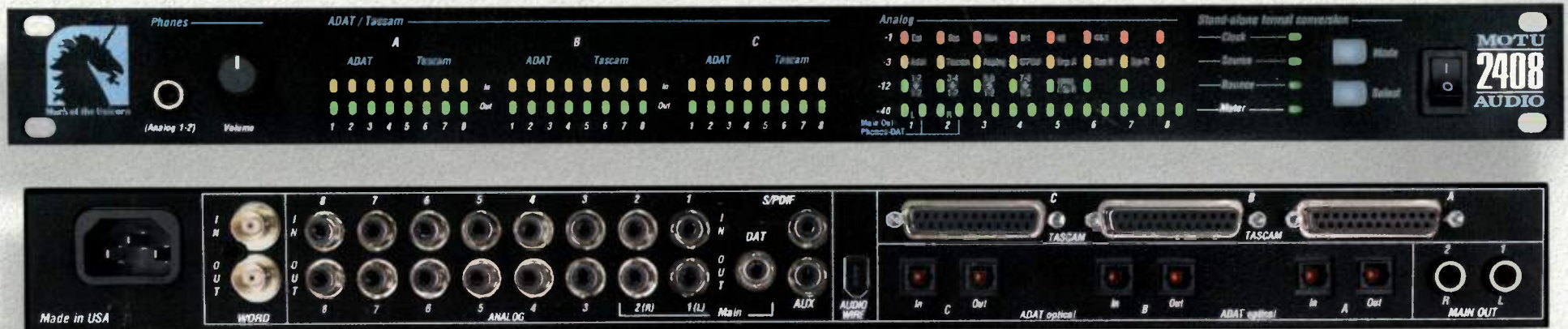
(253) 589-3200

905-948-8052

www.youngchang.com/kurzweil

circle #600 on reader service card

Introducing the 2408.



The next breakthrough in hard disk recording.

- The 2408 is a computer-based hard disk recording system that gives you 24 independent inputs and outputs • 8 analog inputs (with 20-bit 64x oversampling converters) • 8 analog outputs (with 20-bit 128x oversampling converters) • 24 channels of Alesis ADAT optical in and out • 24 channels of Tascam DA-88 in and out • 2 channels of S/PDIF in and out • 16-bit and 24-bit recording at 44.1 or 48 KHz •
- digital dubbing between ADAT and DA-88 • digital dubbing between S/PDIF and ADAT or DA-88 • ADAT sync input • Word clock in and out • MOTU Control track input for sample-accurate Digital Timepiece synchronization • includes the cross-platform PCI-324 card to connect the 2408 to your Mac or Windows computer • the PCI-324 will let you add additional 2408's for up to 72 input/output connections and as many channels as your computer allows • includes full-featured sample-accurate workstation software for Macintosh with recording, editing, mixing, and real-time 32-bit effects processing •
 - Includes standard Windows audio (Wave) driver •

\$995



Mark of the Unicorn, Inc. • 1280 Massachusetts Avenue • Cambridge MA 02138 • 617-576-2760 • 617-576-3609 fax • www.motu.com

circle #501 on reader service card