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Electronic Musician

January 1996

1996

EDITORS'
CHOICE

The year's hottest,
hippest new products!



202 VLZ

LOW-NOISE MIC/LINE MIXER • MADE IN USA

MS1202 VLZ

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radio-grade mic preamps

4 stereo line-level chs.

2 aux sends per ch.

2 stereo aux returns

Aux 1 master level

Efx return to Mon. 1

Aux 1 pre/post switch

3-band EQ w/Lo Cut filter

Mutes on every channel

Extra stereo bus via Mute

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Multi-way metering

Headphone output

4 channel inserts

Sealed rotary controls

Built-in power supply

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NEW MS1202 VLZ

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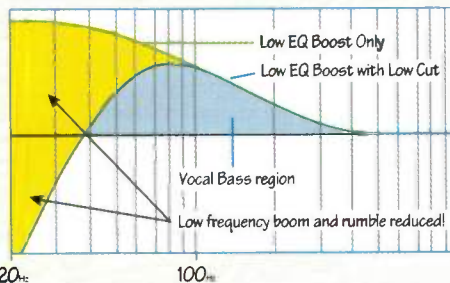
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NEW

WE'VE ADDED A DOZEN NEW

60dB GAIN on first 4 channels via balanced XLR mic inputs let you record even the faintest sound sources with incredible clarity.

LO CUT FILTER (Chs. 1-4). With the exception of bass guitar, low frequency synth sounds and kick drums, almost all sound is in the audio range



above 75Hz. Our Lo Cut Filter reduces or eliminates unwanted frequencies below 75Hz. It's great for cleaning up the "mud" in recording & live sound work, and also lets you boost lower vocal ranges without increasing stage rumble, mic thumps, etc. (see the drawing above). This 18dB/octave filter lets you safely and creatively use the Lo EQ on the higher bass frequencies.

3-BAND EQ on all channels. You asked for it. Musical EQ like on our CR-1604 & LM-3204. Others have copied our EQ points (12kHz, 2.5kHz and 80Hz) but not the warm, musical sound that our expensive, discrete circuitry produces.

EFX TO MONITOR switch and level control on Aux Return 1. When you're using the output of Aux Send 1 to feed stage monitors, you can now blend reverb or other effects back into the Aux Send 1 monitor mix, separate from the house mix (just like with our SR Series.)

A MUTE ON EVERY CHANNEL PLUS AN EXTRA STEREO BUS! As on our CR-1604, pressing a MUTE switch UNassigns the channel from the main L/R bus and reassigns it to the Alt 3-4 output. You can create two stereo pairs for output to a 4-track, bounce multiple tracks onto 2 more tracks, or preview a source not yet in the main mix via phones or monitors.

PFL SOLO makes level setting easy. Just push a solo button, watch the famous Rude Solo LED

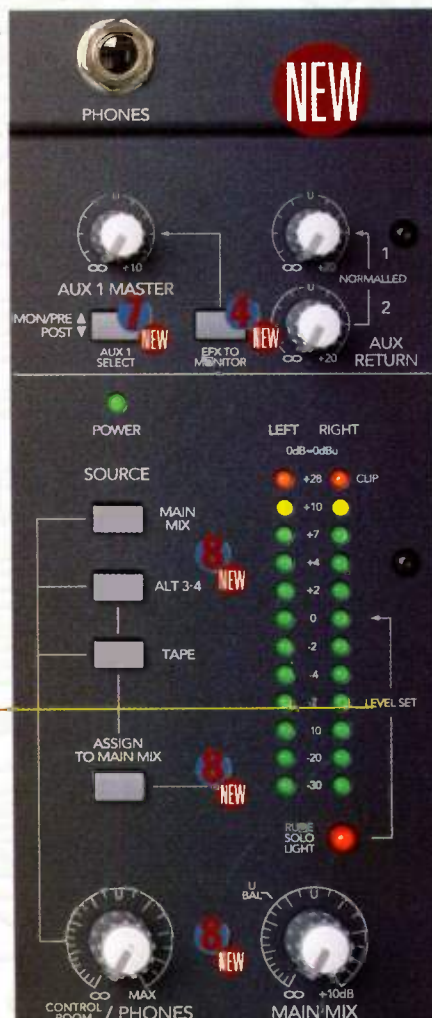
start blinking, and adjust the trim control (ch. 1-4) for 0dB on the meters. Solo also replaces your source selection, feeding the control room and phones. Great for previewing or cueing a signal prior to adding it into the mix. This solo is non-destructive. It doesn't interrupt the main left/right, 1/4" TRS or XLR outputs.

LEVEL SET MARKER. When used with PFL/SOLO, the level set procedure gives you low noise, maximum headroom and best dynamic range every time! No more guessing about how to set your gain trims. No more worrying about internal clipping!

OTHER COOL STUFF includes sealed rotary controls, solid steel chassis, thick, double-sided fiberglass circuit board and our signature built-in power supply that provides plenty of current for the MS1202 (instead of a wimpy, outlet-eating wall wart).

Global AUX 1 PRE/POST switch. Aux Send 1 on each channel can be pre-fader/pre-EQ (great for stage monitor mixes), or post-fader/post EQ (for effects in the studio).

CONTROL ROOM/PHONES SECTION with level control. A mini-version of a popular 8-Bus feature that adds boocoo monitoring, mixdown and metering flexibility. Headphone and Control room amp outputs are now separate. Switches let you select any combination of Main Mix, Tape In and Alt 3-4 signals for routing to the Phones and Control Room outputs and meters. Perfect for creating custom headphone mixes, monitoring tape levels, etc. Plus, an extra button lets you re-route this multi-source signal back to the main mix! For example, a new input via Tape In or a source from the ALT 3-4 stereo bus. It's a feature that has been appreciated on our CR-1604.



MS1202

NEW VLZ

World Radio History





IMPROVED MS1202

FEATURES & VLZ CIRCUITRY TO OUR CLASSIC 12-CH. MICROSERIES MIXER!

For 5 years, our Micro Series 1202 12-ch. mic/line

mixer has racked up an impressive track record¹. It's toured with superstars, gathered network news, worked 24 hours a day in video post suites, pinch-hit as a submixer next to mega-consoles and recorded audiophile direct-to-DAT albums. The 1202 has also been the ultra-reliable main mixer in more home studios than you can shake a patch cord at.

Why? Because the MicroSeries 1202 has proven itself to be the best sounding – and best value – small mixer you can buy. Better mic preamps. Less noise. More headroom. And legendary reliability².

But we haven't let the MS1202's success go to our heads. For the last 5 years, we've been reading warranty cards for suggestions on how we could improve it.

This is the result. Same great value. Same rack-mountable, built-like-a-tank construction. But with some exquisitely handy new goodies that make it an even more effective tool for both recording and live performance.

For instance, we've added a complete Control Room section that makes monitoring, tracking and mixdown easier. For on-stage performers, we added PFL Solo switches on every channel, reverb feedback into Mon. 1, and balanced inputs & outputs.

Plus stuff everyone will appreciate, such as midrange EQ, ALT 3-4 (the extra stereo bus first introduced on our CR-1604), mute switches on every channel and 8-Bus VLZ circuitry for even less noise and crosstalk.

Visit your Mackie dealer (the new MS1202 VLZ's in stock right now) or call us toll-free for detailed information.

WHAT IS VLZ? VLZ stands for Very Low Impedance. Originally developed for our 8-Bus consoles, it's a unique Mackie approach to circuit design that reduces thermal noise and seriously cuts down on crosstalk. The end result is that VLZ design cuts circuit thermal noise in half! VLZ demands high current – which requires a beefy power supply. Naturally the MS1202 VLZ has one with far more current output than any other ultra-compact mixer.

ALL INPUTS & OUTPUTS BALANCED (except RCA-type tape inputs & ch. inserts). The MS1202 VLZ is compatible with anything you can plug into it. Plus, balanced lines let you run long cable distances with minimal hum and buzz. You can also use unbalanced lines, if ya need 'em.

AN ESSENTIAL PART OF ANY PRO AUDIO TOOLKIT.

No matter what size your main mixer is, there's always a use for a MicroSeries 1202 VLZ. With its great specs and superb sound quality, you can use the 1202 right alongside big PA or recording consoles as...

- A keyboard or drum submixer
- A high quality mic preamp
- An effects submixer
- A -10dBV to +4dBu level matcher
- A headphone or monitor mixer
- An emergency back-up mixer

10 BALANCED XLR MAIN OUTPUTS (along with balanced 1/4" TRS output jacks). XLR outputs let you connect the MS1202 VLZ directly into amps, workstation modules, pro VTRs and other equipment that have female XLR line level inputs without having to use an adaptor. Press the adjacent 30dB pad switch to match the higher input sensitivity of camcorders and other mic level inputs.

RCA TAPE LOOP INTERFACE provides convenient hookup to tape decks and other line level devices with "phono"-style connectors. The interface's internal +4dBu operation lets you get the most from both semipro and pro equipment.

12 VIRTUAL PAD on first 4 channels' line inputs. Now there's 10dB of attenuation when trim is all the way down. Unity is at 9:00 instead of 7:00. When mixing down the hot outputs of digital multitrack recorders, this extra "pad" lets you add gobs of equalization without overload.

¹) Although the MS1202 is designed as a desktop mixer, it can also be rack-mounted in 7 spaces.

²) Keith Medley, our Application Specialist likes to demonstrate its ruggedness by throwing a 1202 onto the floor and then standing on it. No damage. A true story, but don't try this at home unless you really trust us.

IT TAKES UP UNDER ONE SQUARE FOOT OF WORKSPACE, BUT WE DIDN'T COMPROMISE. The MS1202 VLZ is directly descended from our 8-Bus consoles. Same high headroom & low noise. Same electronic components. It's designed to play in the big leagues with digital multitrack recorders, workstations and hard disk recorders. Yet its suggested retail price is just \$429*.



PHANTOM POWER (with its own switch) so that you can use high-quality condenser microphones.

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I N S I

FEATURES

28 AUDIO ABDUCTION

Capture pristine digital audio from CDs, and stash the goods safely on your PC's hard disk. We also provide some sonic kidnapping tips for Mac users.

By Dennis Miller

42 COVER STORY: 1996 EDITORS' CHOICE AWARDS

Squeeze into those tuxes and party duds, kids! It's time to whoop it up and fete the Top Twenty electronic-music marvels introduced in the last year.

By Steve Oppenheimer

64 A DAY IN THE LIFE: JAZZIN' IT UP

Survive the live recording of more than 50 world-class jazz artists. Sneak into the mobile truck as master engineer Phil Edwards tracks a tribute concert for the Concord Jazz label.

By Scott Spence

74 CREATIVE SPACE: DYNAMIC DUO

Join the musical household of Fleming McWilliams and John Mark Painter as they turn their Nashville abode into a multiformat recording studio.

By Wheat Williams

42

64



DEPARTMENTS

- 6 FRONT PAGE
- 13 LETTERS
- 18 WHAT'S NEW
- 138 AD INDEX
- 146 CLASSIFIEDS

COLUMNS

- 27 **PRO/FILE: Sweet Solitude**
Steve Hansen goes it alone to produce a pop *Underground*.
- 85 **WORKING MUSICIAN: The Name Game**
Protect your commercial identity by trademarking your moniker.
- 90 **SQUARE ONE: The Wizard of dBs**
Discern the definition of decibels to understand audio specs.
- 98 **SERVICE CLINIC: Analog Service, Part 4**
Get the inside scoop on repairing LFOs and modulation circuits.
- 104 **RECORDING MUSICIAN: Sonic CPR for Drums**
Resuscitate lame-sounding drum kits, and revive your grooves.
- 154 **TECH PAGE: Satellite Radio**
Cruise to heavenly music with a satellite dish in your car.



74

REVIEWS

- 112 **AKAI DR8** modular hard-disk recorder
- 121 **TRACER DART (Win)** noise-reduction software
- 130 **DOEPFER MS-404** analog synthesizer
- 134 **PRESONUS DCP-8** dynamics processor
- 136 **LA DRUM STUDIO/BEATBOY/D'NAI** drum patterns
- 142 **STUDIOMASTER Mixdown Classic 8** mixer



28

Cover: Digital Illustration by Dmitry Panich.

Raise Your Glasses

Life is a cabernet; EM is close behind.

Ten years is about the right age for a good bottle of cabernet to start reaching its peak. For EM, ten years also seems about the right time for us to be hitting our stride. During the last year, all the elements of the magazine—graphics, editorial, circulation, advertising, and marketing—have matured together to produce a wonderful “bouquet.”

Because I have been involved in every issue since our debut at the NAMM show in January 1986, Michael Molenda has asked me to take a guest spot here in his usual column. Rather than reminisce about some of the weird times and the many people that have been involved with us over the past ten years, I think it would be more relevant to describe some of the philosophies that have allowed us to flourish.

Our prime directive is to be constantly aware of the three important elements of the magazine: the readers, the companies that make up the music industry, and our staff. By ensuring consideration and fairness to all three of these groups, the overall quality of the magazine is kept on a high level. And because “truth” guides our interactions, we never have to compromise our editorial or client relations.

Readers deserve accurate, unbiased information to help them choose and use their gear wisely. We don't let the fact that someone is an advertiser keep us from disclosing problems with their equipment. (And some advertisers let me know about this quite directly!) However, we try to be sensitive to the impact our words have on the manufacturers. Every review gets run by the manufacturer to ensure technical accuracy as well as to give them an opportunity to discuss any criticism. Our goal is to help manufacturers be successful and create better products while giving our readers all the information—both good and bad—they need.

I'm also aware of the self-valuation that a job creates, so I consider it a successful day if each employee of EM goes home feeling good about himself or herself. Many decisions can affect this feeling, so we are always conscious of the impact each decision has on our staff. You may be asking where profit fits into this. I have always believed that profit is a byproduct of excellent work, not a goal in itself. EM and our sister publication, *Mix*, are good examples that this philosophy works well. It is a misguided company that puts its primary focus on profit.

Another subtlety behind the magazine is our choice of graphics, content, and style. Because we are all nuts about music and equipment, we try to convey that emotion in everything you read. Many of the discussions I have with Mike and Art Director Linda Birch consist of debating the “feel” of a color or image and how it helps promote the experience of making music. We believe that by maintaining an emotional consistency throughout EM, we can better communicate our thoughts about all this great stuff to you.

Much like winemakers, we strive to achieve a wonderful balance among the elements and not let one particular aspect overshadow another. As we embark on the next ten years, we will continue to pattern EM after a fine bottle of cabernet: it should be enjoyable, long lasting, and filled with approachable complexity. Cheers to EM's tenth birthday!



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Electronic Musician®

Publisher Peter Hirschfeld

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East Coast Advertising Office

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

Subscription Services Office

(Address changes and customer-service inquiries)

PO Box 41525, Nashville, TN 37204

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

Cardinal Business Media, Inc.

1300 Virginia Dr., #400, Fort Washington, PA 19034

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Electronic Musician (ISSN: 0884-4720) is published monthly by Cardinal Business Media, Inc., 6400 Hollis St., #12, Emeryville, CA 94608. ©1996. This is Volume 12, Number 1, January 1996. One year (12 issues) subscription is \$24; outside the U.S. is \$49.95. Second Class 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 #129597951. Canada Post International Publications Mail Product (Canadian Distribution) Sales Agreement No. 0478741.

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We've made selecting sounds a breeze with our proven SoundFinder™ interface – one knob selects

the sound type; the other knob picks the sound itself. And with hundreds of great sounds to pick from, you might never need to tweak one. But if you do, we made the most important sound parameters easily available for editing.

Want more? We thought so. The MR-rack has the best expansion options of any synth, with 3 card slots for up to 84 meg of wave data. And we give you tons of memory for your money. (Three times what anyone else offers!) Like our upcoming 8 meg Drums at only \$250, the 20 meg Dance/Hip-Hop card at \$425, and the 24 meg World and Piano cards at \$500 each.

Need another incentive? OK, buy an MR-rack and we'll give you a rebate coupon worth \$50 off your first expansion card. (This is a limited time offer good until we come to our senses!)

Whoops – ran out of room! So if you want to hear all the other totally cool things about the MR-rack (like the PCMCIA card slot, the 4 outputs, or the Unisyn MR editor we'll give you)

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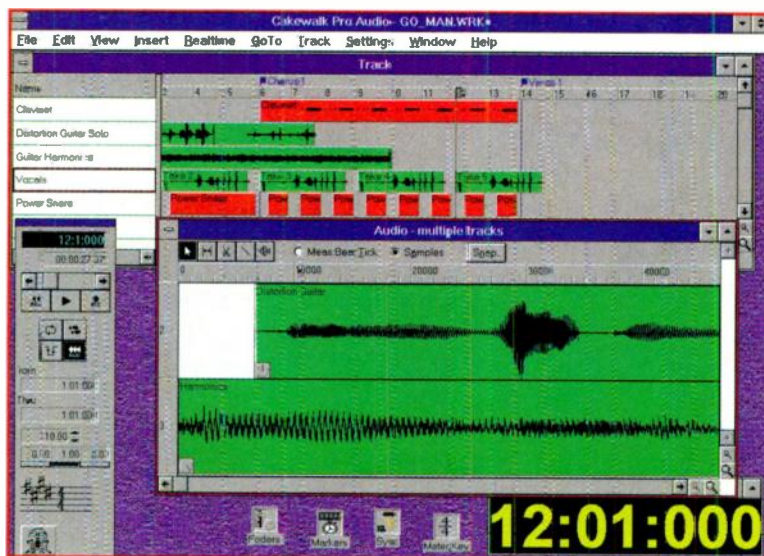


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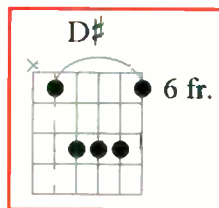


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76
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THANKS THREE TIMES

How can the November 1995 issue of *EM* have such incredible reviews? I'm getting the feeling that you folks are communicating telepathically with me to find out what types of gear I'm interested in. From a so-called bargain synth (Novation BassStation) to the E-mu Emulator IV to Passport's *Alchemy*, the magazine was right on the money. And, as if these keyboard reviews weren't enough, there were two guitar devices (Roland VG-8 and Digi-Tech GSP-2101) reviewed. Wow! Thank you for giving people who live in a one-music-store town a clue as to how this stuff really performs, and thank you thank you thank you for including the guitar gear!

Steve Wilkinson
blobola@aol.com

TAKING UMBRAGE

In the November 1995 "The Front Page," Michael Molenda concludes, "Evolution is fine. Just make sure you're not following a woolly mammoth into the tar pits."

Really! This prehistoric rumor-mongering does not reflect well upon you small, darting mammals. Considering my audio and graphics work, my live acoustic/electronic music performances, and the fact that my MIDI murder

mystery, *Show Control*, will be at your local Barnes and Noble in April, I think I'm still a ways from sinking into the goey black!

Keith Snyder
Woolly Mammoth
Multimedia
gukkle@pan.com

WHERE ARE THEY NOW?

Loved the article on new modular analog synths ("Living Fossils," November 1995). But what happened to that full-blown DIY theremin project?

Chris J. Smith
Dayton, OH

Chris—The theremin DIY has been a subject of anticipation and fear around the EM office since late last year. Unfortunately, Bob Moog's crushing schedule necessitated that his deadline for the project be extended many times over. So I'm absolutely giddy to be able to announce that Bob's theremin will be featured in our February 1996 issue. Hooray! And by the way, don't miss the exquisite documentary Theremin: An Electronic Odyssey if it comes to your local movie theater. Dr. Theremin's life story is both thrilling and sad, and Clara Rockmore's masterful performances on the instrument are downright spine tingling.—Michael M.

MULTIMEDIA WOES

What happened to the "Multimedia Musician" column? I see it is absent from the November issue of *EM*. I hope this is only temporary. This column has been the most relevant part of your magazine for me, and I hope to see its return soon. In fact, I think you should dedicate an entire issue to practical tips and tricks for scoring multimedia projects.

David Muga
afn08464@freenet.
ufl.edu

David—You must have a ton more ideas than we do if you believe a whole issue could be filled with multimedia scoring tips! We found it very difficult—stressful, even—to

deliver relevant coverage of the medium to our readers. Most of the topics that were pitched to us by multimedia mavens had more to do with digital video applications than sound and music. The video scene is already well covered by other multimedia-specific publications, and, because we're a music magazine, we were left to forage for hip audio topics. We could continue to do project profiles of popular CD-ROMs and Enhanced CDs, but many readers complained that they weren't getting any useable information from these "reviews." (I couldn't blame them.)

So, here's the deal. We have restructured the "Multimedia Musician" column as "Desktop Musician" to allow us to expand the column's coverage to computing issues and hard-disk recording applications. We will continue to enthusiastically cover multimedia, of course, but only when we can blow the lid on how to make better-sounding music tracks for the industry—as well as how to snatch up some great employment opportunities.—Michael M.

MUSICAL PROCEDURES

Ienjoyed the "Musical Windows" article (September 1995). As the PC market expands, especially with Windows 95 finally available, music lovers of all levels are looking to create music on their computers. The overview of the programs was great, especially when you singled out the features included or lacking in each program. In the future, I'd like to recommend that you write an article explaining simple sequencing procedures. This way, when computer novices start looking for a sequencing program, you can steer them in the right direction.

Lance Wysong
Naples, Italy

WINDOWS 95

Your "Windows 95 Preview" (August 1995) said that existing MIDI sequencers might not work with Windows 95. Now that it's a reality, does anybody know any different? More specifically, does Passport's *Master Tracks Pro 4* work with Windows 95? To

● LETTERS

stay compatible with the people I work with, I need to upgrade to Windows 95 yet still use my current sequencer.

trentpmcd@aol.com

trentpmcd—Passport Designs' John Rezendes assures us that Master Tracks Pro 4 for Windows should run just fine under Windows 95. However, the current version is not written for Windows 95, so it doesn't take advantage of the new features.—Steve O.

I recently upgraded from Windows 3.1 to Windows 95. I also have a Digidesign Session 8 system. I love the program, but Digidesign says that Windows 95 is not compatible with the hardware. Do you have any news about an upgrade or anything that might work in putting this conflict to rest?

ahook74552@aol.com

ahook—According to Sam Cece at Digidesign, the Session 8 hardware works fine under Windows 95. However, the company discovered a problem in the Session 8 software when it is running under Windows 95. Fortunately, this problem has been fixed in a free maintenance update. Contact Digidesign for more information: tel. (415) 688-0600; fax (415) 327-0777; e-mail 74774.3122@compuserve.com.—Steve O.

IT'S THE CHEESE

You all know I'm a big EM fan. Now, I'm not about to cancel my subscription, but one little detail is troubling. Lately the cool joke in EM articles is to make snide comments about cheesy Holiday Inn acts. You would never ridicule a musician who delivers pizza because he is too proud to play any style except Genuine Liverpool Techno Buddhist Bebop. So why make fun of guys who are too stubborn to quit being pro musicians? Some of that cheese is pretty hard to play. If people are buying purple lollipops, you either sell purple lollipops or get out of the business.

James Chandler Jr.
71333.2651@
compuserve.com

James—As a subscriber, you must be aware that all of us at EM have wacky senses of humor and no subject (or musical style) is exempt from our "respectful" ribbing. However, please believe me that we'd never maliciously slander anyone's livelihood. Most of our editorial staff began their careers playing cheesy lounges, so we're not insensitive to

that part of the pro musician's world. In addition, lounge music—as interpreted by hip, young bands such as Combustible Edison—is way cool now. Go figure.—Michael M.

MIDI SHOW CONTROL

I have gained a lot of knowledge from your magazine. There have been a lot of articles on MIDI but none on MIDI light controllers. I am in desperate need of some help.

Anthony Hill
Garden City, AL

Anthony—We don't normally cover lighting systems in our magazine. However, in our September 1992 issue, we did a feature on MIDI Show Control titled "The Show Must Go On," by Michael Brown. It covers automating everything from sound effects to hydraulic lifts. You might also try the book Control Systems for Live Entertainment, by John Huntington. You can obtain this book, back issues of EM, and other hard-to-find references on this subject through Mix Bookshelf: tel. (800) 233-9604 or (510) 653-3307; fax (510) 653-5142.—Diane L.

WE COVER IT ALL

I am always informed and educated by the wide range of topics that you cover in each issue. Although not all articles apply to my own setup, they are informative, well researched, and well written. Keep up the excellent work!

Kim Menard
Harlington, TX

GONE DOGGIE?

I purchased a Roland JD-800 a few years ago, and I've never been sorry about owning this incredible machine. It has allowed me to develop some wonderful and mysterious sounds. However, I found out that my music emporium no longer deals with the JD-800 or the expansion cards it uses. Is the JD-800 obsolete? Can I find a dealer that sells the cards I need?

Pat Gilroy
N. Huntingdon, PA

Pat—Unfortunately, the Roland JD-800 synthesizer has been discontinued. However, you may be able to obtain expansion cards through Eye & I Productions: tel. (800) 726-7664 or (408) 945-0139; fax (408) 945-5712.—Diane L.

ENCORE FOR ENCORE

Here's my two cents on Passport's *Encore* 4.0.4: the initial release of *Encore* 4.0 was a bug-ridden disaster, but the fix (4.0.4) seems to be rock solid. I use both *Encore* and Coda's *Finale*, and I am tending more and more toward *Encore* for many reasons. Aside from the overall ease of use and intuitive interface, one of the most important features of *Encore* is the ability to quickly and easily export EPS files of selected regions. The *Finale* solution to this problem is far too unwieldy.

Passport has had problems in the past with customer relations, but that seems to be improving, and I would like to support that improvement by putting in these comments regarding their products. I will still use *Finale* if a client requires it, but for general everyday use, I will choose *Encore* every time.

Doug Miner
no address given

YOU'RE NEVER TOO YOUNG

Thank you for such an excellent magazine! I am only fifteen years old, but I already work in a small video studio and own and operate an 8-track audio studio. I know that sounds impossible, but it's true, thanks to all your articles and reviews that have helped me every step of the way.

My sound engine is an E-mu Proteus FX that I inherited a year ago from my uncle, along with a subscription to EM. In that time, I have mastered synthesis, 8-track recording, and several other aspects of the business.

Mine is an incredible success story of a little guy with a dream. Please encourage the rest of your readers that if a 15-year-old sophomore in high school can do it, so can they!

Jonathan Heimberg
KJ Video House
Altered Ego Audio
Productions
Prescott Valley, AZ

WE WELCOME YOUR FEEDBACK.

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

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Vision 3.0

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The world's most popular sequencing software is now more powerful than ever. Vision 3.0 can harness the native audio engine in your Power Macintosh™ letting you record vocals or acoustic instruments right into the computer!

Built-in audio capability is only one aspect of Vision's musical power. Bundled with Vision is a suite of musical tools that gives you fast, flexible access to your MIDI studio and patch library: *OMS 2.0* (the Open Music System) and *Galaxy 2.0* the Universal Librarian.

This complete system lets you store your patches in bundles and libraries, and group them by bank or keyword. The OMS Name Browser gives you access to all of your synth patches—way beyond the 128 MIDI program change limitation. OMS also gives you enhanced communication with other compatible software. For instance, *Galaxy Plus* users can now launch an editor from Vision and edit the patch while the music plays—even save the real-time changes to a track.

All of this integration means that you can spend less time navigating and more time creating music. So put the power of Vision to work for you. Contact us today for complete information, or see your local dealer.

Call (800) 557-2633 ext. 295 for literature • (415) 856-3333 for dealer information
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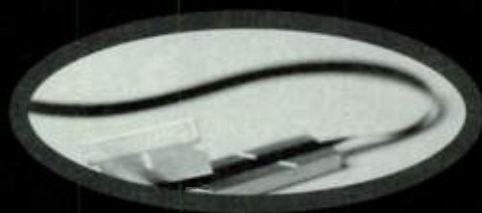


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WHAT'S NEW

By Steve Oppenheimer



▲ NADY THE LINK

With many wireless mic systems, you are limited to the mic selection offered by the system's manufacturer. Nady's The Link (\$329) is a snap-on, VHF transmitter that eliminates this problem by turning any hand-held microphone with an XLR connector into a wireless microphone.

The transmitter is powered by a 9V battery and provides 9 VDC phantom power for lavalier condenser mics. It is compatible with all Nady VHF wireless receivers and has a range of 200 feet in adverse conditions and up to 1,000 feet in line-of-sight applications.

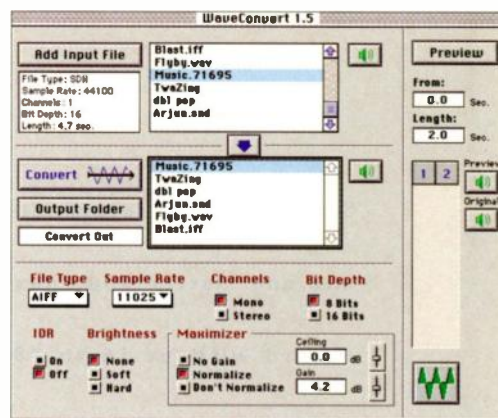
The unit features a spring-loaded, positive-locking mic connector; a "popless" audio on/off switch; and a low-battery LED indicator. According to Nady, the company's companding circuitry gives the system a 120 dB dynamic range. Nady Systems; tel. (510) 652-2411; fax (510) 652-5075.

Circle #401 on Reader Service Card

▶ WAVES WAVECONVERT

Desktop musicians, especially multimedia producers, often deal with audio files from multiple sources. These files may be in different Mac and PC formats, in mono and stereo, and they may be sampled at different rates and resolutions. To use them, you usually have to convert them to a common format, which often requires repetitive file processing. It also helps to be able to process the files to improve their sound quality. Waves' *Wave-Convert* (\$299) is intended to cut through all this by batch-processing multiple files. The program ships with both Windows and Mac versions.

The program converts between stereo and mono; SND, WAV, Sound Designer II, and AIFF file formats; 16-bit and 8-bit word lengths; and 5 kHz to 48 kHz sample rates. Audio levels of multiple files can



be maximized or normalized and their timbres can be brightened using technology from Waves' highly respected *L1 Ultramaximizer* DSP plug-in. Gating is also included. Word-length conversion can be accomplished with or without dithering. Waves; tel. (423) 588-9307; fax (423) 588-9427; e-mail waves@waves.com; Web <http://www.waves.com/waves>.

Circle #402 on Reader Service Card

▼ BELLARI RP282

Having entered the tube-processor market with its RP220 (reviewed in the February 1995 *EM*), Bellari—a new division of Rolls Corporation—followed up with the RP282 2-channel tube compressor/limiter (\$600). Each channel of the 2U rack-mount unit has threshold, ratio, attack, release, and output level controls, along with bypass switch and switchable VU meter (gain reduction, input, and output).

The RP282's two channels can be run in dual mono or linked in stereo, and a sidechain is provided. The output level remains constant with varying threshold, as the unit automatically adjusts the makeup gain. The unit offers both balanced XLR and unbalanced 1/4-inch I/O. Its frequency response ranges from 10 Hz to 40 kHz, with a S/N ratio of 103 dB.

Also new from Bellari is the ADB3 stereo tube direct box (\$200), which has unbalanced, 1/4-inch inputs on both the front and rear panels and rear-panel, transformer-balanced, XLR outputs.

Front-panel channel controls include a ground-lift switch, -20 dB pad, and ±20 dB gain switch. Frequency response is 20 Hz to 40 kHz (±1 dB, at -20 dB gain), and the S/N ratio is >90 dB (with the Gain switch in). The unit measures just 7⁵/₈ × 1⁵/₈ × 5³/₈ inches and weighs 2.5 pounds. It is powered by an external 12 VAC supply.

Finally, Bellari introduced the MP110 Direct Drive (\$230), a single-channel tube mic preamp that is essentially half of an RP220. It offers defeatable phantom power, a 20 dB pad, phase reverse, a gain pot, and an output-volume pot. Clip and power-indicator LEDs are included. The



unit offers a transformer-balanced input. Bellari/Rolls Corporation; tel. (801) 263-9053; fax (801) 263-9068; e-mail 73073.3556@compuserve.com.

Circle #403 on Reader Service Card

▼ BUCHLA LIGHTNING II

Any synth or controller from electronic-music pioneer Don Buchla is sure to be innovative. Like the original Lightning MIDI controller, Buchla's Lightning II (\$1,995) uses wireless, infrared technology to sense the position and movement of a pair of hand-held wands. User-selected MIDI messages are triggered by gestures and movement within the multidimensional zones, which are defined areas within the infrared field. The messages are triggered when you wave the wands through the zones. This provides you with direct gestural control over notes, Pitch Bend, Control Changes, and so on.

The system has three sections: the wands, a half-rackspace unit that contains the main electronics, and a remote



unit that houses the optics and the 2-character by 7-segment LED display (which shows the zones and preset numbers).

The Lightning II has enhanced programming features, increased range (up to approximately 20 feet), and a 12 x 20-foot performance window—the active area in space where the zones exist and the wands can be waved—which is a large enough area to allow dance applications. The new wands have selectable ranges and can transmit for up to 60 hours on one AA battery. Up to 30 user presets can be stored on a memory card the size of a postage stamp. One memory card is included with the system.

The most noticeable change from the original version is that Lightning II includes a built-in 32-voice, 16-part multitimbral, sample-playback synthesizer, which is not programmable. The synth has 357 preset programs, including a full set of General MIDI, Roland MT-32, and Roland LAPC-1 sounds, plus some Kurzweil SuperOrchestra sounds. Buchla and Associates; tel. (510) 528-4446; fax (510) 526-1955; e-mail buchla@aol.com.

Circle #404 on Reader Service Card

▼ AKAI S2000

Sampler manufacturers are engaged in an intense competition. As a result, the price of samplers continues to plummet as their power increases. Akai has made strong moves in this battle, introducing a new sampler and improved versions of the S3000 and S3200.

The new 2-rackspace S2000 (\$1,195) essentially replaces the S2800 Studio and uses the same sound engine as the original S3000. It offers a 2-line by 16-character LCD display; one stereo pair of balanced, 1/4-inch analog outputs; and a 25-pin SCSI port. The stock unit comes with 2 MB of sample RAM.

Akai also introduced the S3000XL (\$1,995) and S3200XL (\$2,995), which are upgraded versions of the S3000 and S3200, respectively. These units include all the features found in the S2000 and more.

The S3000 was a 3U rack-mount device, but the S3000XL is a 2-rackspace unit. It comes with 2 MB of RAM, a graphic display, eight outputs, and support for two tracks of direct-to-disk recording. The S3200XL is a 3-rackspace device, like its predecessor. It includes everything in the S3000XL, plus a SMPTE time-code reader/generator, S/PDIF and AES/EBU digital I/O, and the SampleVerb and ProFilter expansion cards.

All three new samplers support up to 32 MB of sample RAM (standard 72-pin SIMMs) and include two ROM-card slots, which can support up to 16 MB of non-volatile flash ROM. A new Multi mode lets you set up sixteen multitimbral Parts, each of which can be assigned to a different Program and respond on a different MIDI channel. Each Part includes user-selectable level, pan, tuning, transposition, output routing, and effects-send level (if used with the SampleVerb board).

The S2000 and S3000XL also accept expansion boards. Akai's Multi-8/D

board (\$299), available only for the S2000, adds eight assignable analog outputs on 1/4-inch jacks and S/PDIF digital I/O on RCA (coax) connectors. The ProFilter board (\$399) supplies highpass filtering, bandpass filtering, or 2-band graphic EQ, plus a third multistage envelope.

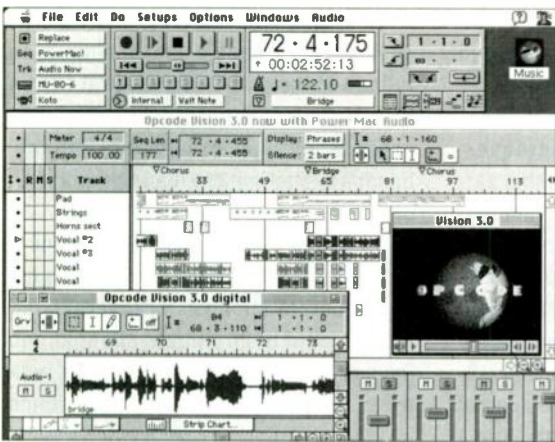
The SampleVerb board (\$399) adds a 2-channel multi-effects processor plus two separate channels of reverb. Each independent multi-effects channel can have up to six simultaneous effects, with extensive parameter editing. Algorithms include distortion, EQ, modulation effects (chorus, phasing, flanging, pitch shifting, and rotary-speaker simulation), delay, and reverb. Multi-effects programs can be stored in up to 50 presets, and 50 additional memory locations are reserved for reverb presets. In Multi mode, each multitimbral Part can be routed on a separate send (with level control) to one of the four effects channels.

The new S-series samplers are bundled with Akai's M.E.S.A. sample editor/librarian for the Macintosh computer. The program allows remote control and digital file transfers between S-series samplers, Akai DR8 and DR16 hard-disk recorders, the Akai DD1000 optical-disk recorder, and a Macintosh. It can access all sampler parameters and provides file-translation between the various Akai formats, Sound Designer II, and AIFF.

M.E.S.A.'s File Manager lets you organize and access the samples; its Wave Editor allows sample truncating, reversing, and normalizing and lets you transfer digital audio from an audio CD in the Mac CD-ROM drive. The program supports AppleScript for automating repetitive tasks and comes with a selection of prewritten scripts. IMC (distributor); tel. (800) 433-5627 or (817) 336-5114; fax (817) 870-1271.

Circle #405 on Reader Service Card





▲ OP CODE VISION 3.0

Until now, *Vision* users could be excused for jealously eyeing Opcode's *Studio Vision Pro* 3.0, with its advanced digital audio tools and tightly integrated MIDI features. Relax folks. *Vision 3.0* for Macintosh (\$495; upgrades from any version \$99.95; includes *Galaxy*) gives you the ability to record and play 16-bit, multitrack audio on a Power Mac with Sound Manager 3.1. True, it doesn't offer *Studio Vision Pro's* DSP Menu; won't support DAE (not to mention

TDM), which is required to use Digidesign's audio cards; and won't work with Yamaha's CBX-D3/D5. But otherwise, *Vision 3.0* contains most of *Studio Vision Pro's* top audio recording and editing features, not to mention all its MIDI features.

The upgrade has several features for multimedia production and includes the *OMS Movie Player* for viewing QuickTime movies. Its

AV controls offer multiple machine control, including record-enable, for MMC-compatible equipment, such as lighting and video decks.

Vision 3.0 comes as part of a major system upgrade. It is bundled with version 2.0 of *Galaxy*, Opcode's universal patch librarian. More important, the new package introduces Open Music System (OMS) 2.0, which provides integrated timing services and interapplication communications for compatible products.

Opcode Studio 4 and Studio 5 MIDI interface/patch bay users should note that OMS has now been separated from the *Patches* software that provides a front end for their units. As a result, they no longer need a special version of OMS. This will help when OMS becomes an integral part of the Mac and Windows 95 operating systems sometime in 1996.

On the Windows side, Opcode made two significant announcements. First, the company recently acquired Music Quest, a top manufacturer of PC MIDI interfaces, most notably the 8Port/SE multipoint interface. In addition, Opcode released *Vision 2.5* for Windows (\$299.95) and OMS 2.0 for Windows, which are comparable to the similarly numbered software for Macintosh. If you buy *Vision 2.5*, you will be able to buy *Galaxy* for Windows at a special price when it is available. (For details on Opcode's suite of programs for Windows, see the sidebar "On the Horizon" on p. 60 of the September 1995 *EM*.) Opcode Systems; tel. (415) 856-3333; fax (415) 856-3332; Web <http://www.opcode.com>.

Circle #406 on Reader Service Card

▶ OZ AUDIO Q-MIX HM-6

When it comes to monitor mixes, the "one size fits all" strategy causes limitless grief, whether you're recording or performing live. I might want to hear more of my keyboards than you do, and in some situations, I don't want to hear you at all! With a headphone mixer such as the Q-Mix HM-6 (\$299), we can each have a custom mix.

The HM-6 provides six independent monitor mixes that combine a stereo source (usually the L/R mix from the main board) plus four mono sources. For example, you could combine one or more submixes (say, a backup-vocal section), individual tracks, aux sends, and a click track.

The unit also has a second internal mixer for the aux send. This lets you sepa-

rately set each input's effects-send level and route the mono signal to an effects processor. The stereo aux-return levels can be set independently for each headphone mix. You want your mix completely wet, I want mine mostly dry, and we're both satisfied.

Each headphone channel has its own level pot and TRS 1/4-inch output jack, which delivers 160 mW into 60Ω. (The outputs can accept any headphone impedance from 8Ω to at least 2 kΩ.) That should be more than enough. All inputs are balanced, allowing longer cable runs and reducing the chance of induced noise.

The manufacturer apparently has designed the unit to take abuse. The jacks firmly grab the plugs, which should prevent accidental disconnection when

you're at the end of your wire. The chassis is made of rugged metal, and the pots are sealed and mounted on a fiberglass circuit board that is reinforced with metal posts. The unit has an internal power supply and IEC power connector. Oz Audio; tel. (206) 335-0771; fax (206) 335-3275.

Circle #407 on Reader Service Card



SLIPPED DISK SYSTEMS LIBRARY

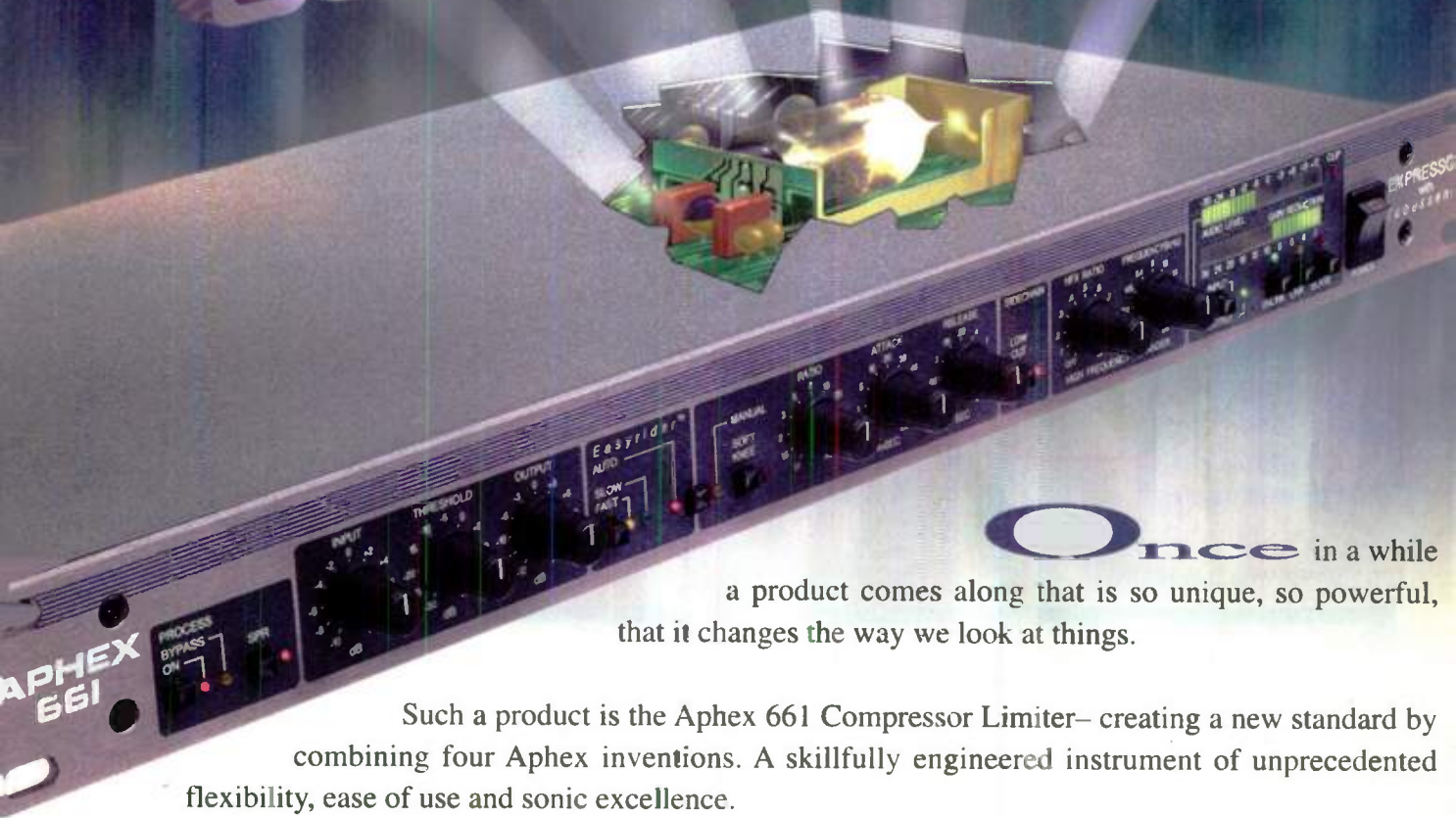
Slipped Disk Systems' *Electronic Data Dump Library* (\$19.95/disk) gives Roland TD-7/TD-7K owners 32 new kits per disk in MIDI SysEx format.

The files are available on 3.5-inch floppy disk in Mac, PC, and Atari Standard MIDI File; Alesis DataDisk; and Yamaha MDF I and II formats. The kits range from big rock drums to funky street kits,

acoustic kits, and "cyber smashers." Sixteen new sequencer patterns also are included. Slipped Disk Systems; tel. and fax (413) 552-DISK.

Circle #408 on Reader Service Card

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Once in a while
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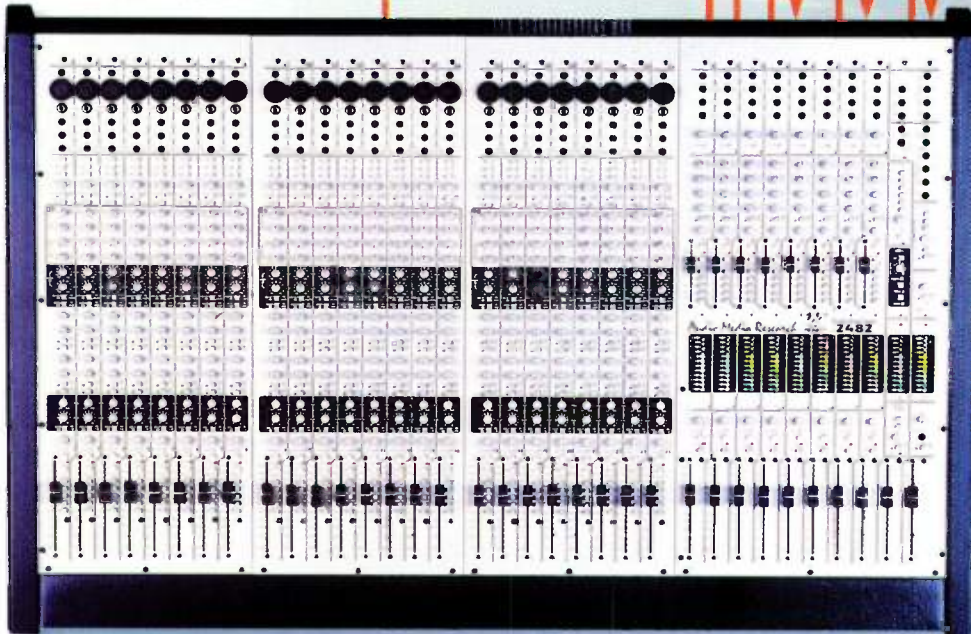
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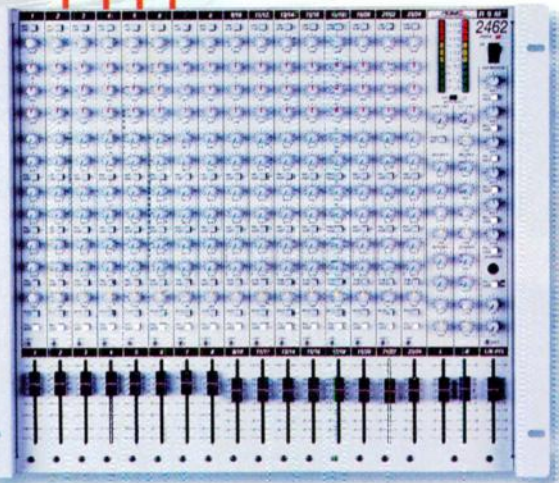
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IF YOU CAN FIND ANOTHER SYNTH THAT SOUNDS THIS GOOD,*IS THIS EASY TO USE, FEATURES 6 EFFECTS PROCESSORS AND STARTS AT UNDER \$2,000,** BUY IT.

We'll save you some time. There is not another synth that sounds as good or is as **EASY TO USE** as the Yamaha W5/W7. Period. And there isn't a synth anywhere near \$2,000 that gives you 6 DSPs for up to 10 simultaneous effects.

(That's the whole story. You don't even need to read the rest of this ad. Go out now and get a W5 or W7.)

Still reading? Then you'll want to know why it's so **EASY TO USE**. For one, it features a unique "virtual mixer" interface that's like working in a fully-equipped professional studio. Use the mixer to balance and pan all 16 sequencer tracks and put your own spin on the 384 exceptional AWM2 voices.

For instance, in the mixer you'll apply the W5/W7's digital effects to both individual voices and the overall mix. For the first time, you're able to

keep your wet voice effects and overall mix effects and stay true to your musical vision. **NO COMPROMISES.**

(These are many of the same effects you'll find on the Yamaha SPX990, a dedicated, top-of-the-line digital effects processor.)

A second feature that makes the W5/W7 so easy is the programming templates. Why run around doing "leg work" when the W5/W7 already provides you with 171 ready-made combinations of amplitude envelopes, filters, pitch envelopes and LFOs.

A third W5/W7 easy service is the **FREE** voice editing software for Macintosh® computers. Dig down deep and change just about anything you want with ease. There's no end to the control you can take.

You can also add more superb voices using the W5/W7's expansion port. Optional *Grand Piano*,

Vintage Sounds, and *Rhythm Section* cards each add 4MB of WaveROM to the 8MB on the W5/W7.

One last thought before you get in the car. The W5/W7 interface is exceptionally shallow. Virtually every feature, voice and effect can be applied with no more than two key strokes. So **MAKING MUSIC** takes precedence over using a synthesizer.

Naturally, there's lots more to the W5/W7. So ask your local Yamaha dealer. Or download information now from America Online (Keyword SSS→ Industry News→Yamaha→ Color Brochures Folder→ Synthesizers).

You can look a long, long time for another synth with all the features, the **EASE OF USE**, the sound quality and the price of the Yamaha W5/W7 synthesizer. (And you won't find it.) Or you can just go to your Yamaha dealer and start making music today.

YAMAHA®



The same 32-note polyphony, 16-part multi-timbre synthesizer is available as the 76-key W5 (\$2,495 MSRP) and the 61-key W7 (\$1,995 MSRP).



"Bottom line→User friendly, sounds great."

Keyboard Magazine

"Can I use this to make great sounding music? A resounding 'Yes'. I was incredibly productive on the W5."

Electronic Musician



For more information on the W5/W7, call (800) 932-0001 Ext. 620. © 1996 Yamaha Corporation of America, Digital Musical Instrument Dept., P.O. Box 6600, Buena Park, CA 90622. **Manufacturer's suggested retail price. All rights reserved. Yamaha and the Yamaha logo are trademarks of Yamaha Corporation of America. Macintosh is a trademark of Apple Computer, Inc.

● WHAT'S NEW

► CUNIBERTI REAMP

Sometimes you just want to capture a basic performance quickly and cleanly and process the sound later. For example, you may want to record a live act directly from the mixing board onto a modular digital multitrack recorder. But then, when you start mixing back in your studio, you may realize that the wimpy electric guitar would sound way cooler if the tape track was routed through a Marshall amp and some effects. However, if your tape recorder operates at +4 dBm and your guitar amp and effects operate at -10 dBV, you'll need a level-matching in-

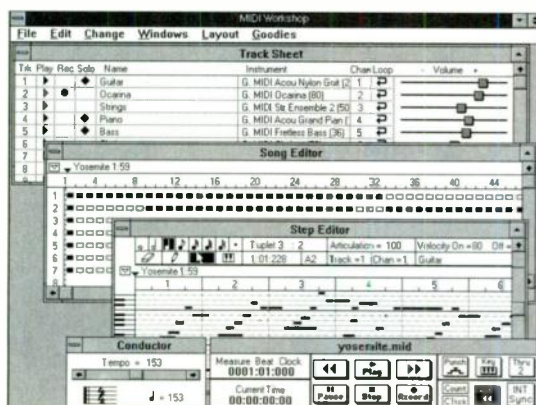
terface to make this studio magic happen. The Cuniberti Reamp (\$299) provides this simple but important function.

The Reamp has a +4 dBm, balanced, XLR input and a 1/4-inch, -10 dBV, unbalanced output with a trim control. A ground-lift switch helps eliminate ground loops. The electronics are passive, so the unit needs no power source. Its box is RF-shielded and made of anodized aluminum. The frequency response is rated at 20 Hz to 20 kHz. AXI (distributor); tel.



(617) 982-2626; fax (617) 982-2610.

Circle #409 on Reader Service Card



▲ PASSPORT MIDI WORKSHOP

Passport was one of the first sequencer manufacturers, and its products are known for friendly user interfaces. Years ago, the company had an entry-level DOS program called *Trax*, but that product faded away when Windows took over the PC world. Now Passport is offering *MIDI Workshop* (\$69.95), its first entry-level Windows sequencer.

The new program records up to 64 MIDI tracks, with 240 ppqn resolution and support for Standard MIDI Files. MCI

support lets you trigger WAV files and audio CDs. (However, the program does not sync to MTC, and after triggering, the audio file is not necessarily synched with the MIDI file.)

Tracks can be independently looped, and MIDI data can be graphically displayed and edited using the Piano Roll, Track, and Notation editors. You can punch in and out of Record. You can edit note Velocity, quantization, duration, and transposition, including support for click-and-drag editing. Onscreen faders can set values for any MIDI Control Change, not just Volume and Pan.

Passport also released *Rhapsody* (\$249; upgrades from *MusicTime* \$99), a standard-notation program for Windows that the company has targeted as a mid-level product (between *Encore* and *MusicTime*). The new program offers up to 32 staves, with eight voices per staff.

Rhapsody transcribes Standard MIDI Files and supports real-time MIDI entry, MIDI step entry, and step entry from the

computer keyboard, including point-and-click note entry. Like *Encore*, *Rhapsody* automatically "guesses" note durations and automatically provides the appropriate beams. Playback includes repeats and codas, and MIDI Bank Select is supported.

The program features part extraction and supports guitar-chord names and fret symbols, rhythm slashes, arpeggio signs, and fingering numbers. Marks are included for sustain pedal, dynamics, endings, repeats, and measure numbers. Key commands allow you to quickly change note durations, sharps, flats, naturals, enharmonics, and Velocity values. Transposing into any key changes the chord symbols and fret diagrams accordingly.

Lyrics and text can be placed anywhere in a score, in any font, size, or style. Other features include Swing Quantization and tempo changes. The program has online help and runs in color. Passport Designs; tel. (415) 726-0280; fax (415) 726-2254; e-mail passport@aol.com or 71333.1433@compuserve.com.

Circle #410 on Reader Service Card

► MIDDLE ATLANTIC GOB STOP

Two common vocal-miking problems are plosives (those explosive "p" and "t" sounds), which can put a nasty "pop" in your tracks, and airborne particles, which put even nastier stuff on your microphone windscreen. Middle Atlantic Products' Model GS Gob Stop microphone popscreen (\$37) deals with both problems.



The Gob Stop features a double nylon screen that keeps your mike clean and your vocals p-p-p-pop free. It comes with a slim-line gooseneck and all required mounting hardware, including a mic-stand mounting clamp with a non-marring tip. Middle Atlantic Products/RACKaccessories; tel. (201) 839-1011; fax (201) 839-1976. ☎

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Macintosh MIDI/Multimedia Interfaces— Starting at only \$40.00.

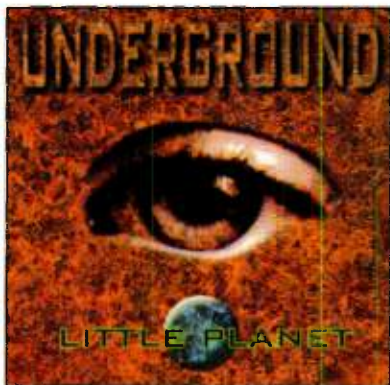
Mini Macman—World's smallest and least expensive MIDI interface. 1 in / 1 out with MIDI in, out and power LED indicators. Compatible with all Macintosh MIDI software. Serial cable included.

Macman—1 in / 3 out MIDI interface with MIDI in, out and power LED indicators. Serial thru switch allows you to select between printer (or modem) and MIDI. Compatible with all Macintosh MIDI software. Serial cable included.

Mac Syncman—2 in / 6 out MIDI interface, synchronizer and SMPTE regenerator. Professional performance priced for everyone. Supports all MIDI sync protocols including MIDI Time Code, Direct Time Lock and MIDI Song Pointer (Smart FSK). Full jam sync and flywheeling. Built-in studio quality SMPTE regenerator. Rack ears, Mac D/A and serial cables included.

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PRO

FILE

Sweet Solitude

Steve Hansen plays on his own Little Planet.

By Mary Cosola

The good news is that the electronic-music revolution has made it possible for just about anyone to put out a CD. The bad news is that the electronic-music revolution has made it possible for just about *anyone* to put out a CD, if you know what I mean. Advancements in technology are usually touted as making our lives easier, but in the realm of electronic music and MIDI, it has presented us with more challenges. If you want to create a stellar CD, it's no longer enough to be an impassioned songwriter and musician, you also have to maintain the objectivity of an engineer and producer. Just ask Steve Hansen.

Hansen recently released *Underground*, a well-crafted CD he recorded and produced under the moniker Little Planet. The songs on *Underground* betray Hansen's love of guitar-based pop music, blending acoustic and electric guitar riffs with bass, sequenced drum tracks, and a little Hammond organ thrown in for good measure.

Even though Hansen is the only member of Little Planet, he wanted to create the illusion of different band

members playing the various instruments. "I really worked to make the MIDI sequences, which were mostly the drum tracks, sound like they were played live," says Hansen. "I discovered that playing some live percussion over the sequences helped create a live feel. Just adding a tambourine or maraca made the drum parts sound more interesting than the chica-chica-chica of a sequence."

To avoid falling further into the techno-trap, Hansen focused on getting great sounds out of his instruments before he ever hit the Record button. "Electronic equipment and MIDI are great tools to support—not replace—my core instrument, which is guitar," he says. "But in working with digital equipment, like my ADAT, I found that I had to concentrate on making all the tracks breathe. To that end, I spent a long time on things such as microphone placement, so I wouldn't expend a lot of effort 'fixing it in the mix.' I just paid attention at the outset to recording the sounds exactly the way I wanted them."

From the jangly 12-string acoustic

on "Darling Darling" to the sultry wah-wah of "Rock On" (his version of the David Essex tune), Hansen stays true to his love of pop-flavored rock. "I've always been drawn to pop music," he says. "Songs that are only three or four minutes long are like short stories. When they're done right, they can say a lot."

"As for 'Rock On,' I didn't really plan to have a cover song on the album," he adds. "I've loved that song for years, the way it's mixed, the atmosphere...everything about it. I always thought that if it had a back beat and some funky wah-wah guitar it would really kick. I played around with it and had so much fun that I had to include it on the album."

When asked about the switch from performer to engineer and producer, Hansen confesses, "This was one of the most tiring and most rewarding things I've ever done. I encourage any musician out there to do it. You learn a lot about yourself by putting your talents to the test."

For more information contact Hi-Top Productions, 1861 Hyde St., #6, San Francisco, CA 94109; e-mail svendh@aol.com.

If you have a CD you recorded in your home studio, we'd love to consider it for "Pro/File." Send your CD and background information to Pro/File Editor, Electronic Musician, 6400 Hollis St., #12, Emeryville, CA 94608.



Steve Hansen



It's easy to capture CD-based digital audio with your PC.

Audio Abduction

by

Dennis
Miller

Every multimedia musician knows there is a huge demand for all types of sound and music in desktop productions. Although you can find many good samples and music clips on CD-ROM, far more material is available on audio CD. However, getting clean audio from the CD to your PC's hard disk is not as simple as you might think.

Fortunately, there are a number of hardware and software solutions that provide better results than you get when you record from the outputs of a CD player into a sound card's analog inputs. Some of these solutions require a CD-ROM drive, but others work with an audio CD player. There are also several new sound cards that provide direct digital access to your hard drive from CD or DAT.

All of the products described here are designed for PC compatibles, although similar products are avail-

able for the Macintosh (see sidebar "Audio Capture for Macintosh"). In addition, there are some legal issues to keep in mind when using other people's music.

CARD TRICKS

If you have a sound card in your PC and a CD player in your studio, you might think you have everything you need to access all the audio tracks in your CD collection. Unfortunately, recording audio from the CD player to your hard drive via the sound

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World Radio History



Audio Abduction

card's analog inputs does not generally result in pro-quality audio. The conversion from digital to analog that occurs at the CD player's output and especially the reconversion from analog to digital at the sound card's input are almost certain to degrade the quality of your source material. In addition, the audio quality could be further compromised by the radio frequency interface (RFI) that occurs inside your PC's case.

There are several ways to connect the analog audio output of your CD-ROM drive to the inputs of your sound card, but none of them result in stellar audio quality. Many internal CD-ROM drives include two pairs of analog outputs: internal and external. Connecting the internal outputs to the internal inputs on the sound card produces the best results under the circumstances. However, this is only slightly better than connecting a CD-ROM drive's external outputs to the sound card's external inputs. In addition, the digital-to-analog converters and other circuitry that passes audio data out of a CD-ROM drive is typically not up to the quality of even the cheapest audio CD player. Unless you're willing to spend a lot of time

enhancing such recordings, you can pretty much forget the standard sound card for professional work.

A better way to extract audio from CDs is to use one of the new, digitally equipped sound cards, which provide an excellent option if your CD player has a digital output. Digital Audio Labs' Digital Only CardD, Zefiro Acoustics' ZA2, and Adb's MultiWave Digital Pro let you skip the loss-causing steps of D-to-A-to-D conversion by keeping the material entirely in the digital domain. All three are single-slot, ISA cards that support multiple sample rates. Each includes a Windows driver, so you can use it with your favorite wave editor. However, there are a number of differences between these cards.

AUDIO CAPTURE FOR MACINTOSH

Did you know that the ability to transfer music or sound effects from an audio-only (Red Book) CD to your hard disk over a SCSI cable is built into your Macintosh? Indeed, you can create a 16-bit, 44.1 kHz, AIFF file out of a CD track with no A-to-D conversion, no noise, and no format conflicts. All you need is Apple system software.

Version 1.6 or later of Apple's QuickTime extension, which is compatible with System 7.1 or later, comes with an application called *MoviePlayer*. In *MoviePlayer*, you can open up the tracks on an audio CD and convert any track or portion into a QuickTime movie file on your hard disk. You can save the converted file as mono or stereo, 8- or 16-bit, and 22.05 or 44.1 kHz. It can then be opened by *Pro Tools* or *Sound Designer II* like any other AIFF file. (Make sure that, in addition to QuickTime, you have the Audio CD Access and Foreign File Access system extensions in your Extensions folder.) A number of shareware and freeware applications do the same thing as *MoviePlayer*, including *SoundApp* and *Movie2Snd*, which are available from many online services.

However, life is only this simple if you have an Apple CD300-series CD-ROM drive. If you have a different drive, there are a number of utilities that can pull this off, including *Disc-to-Disk* from Optical Media International, Gallery Software's *CD Studio*,

FWB's *CD-ROM Toolkit*, and Glyph Technologies' CD-ROM driver. However, they don't work with every CD-ROM drive, so be sure to ask the software developer.

The ability to transfer digital audio over SCSI is built into the SCSI-2 specification, which most modern CD-ROM players follow. But the actual *commands* to do the transfer are not standardized, and unless the driver software in your Extensions folder knows exactly what SCSI commands your particular CD-ROM drive expects, you're hosed. Some manufacturers—but by no means all—are hip to this and include the feature in the driver software bundled with their drives.

Fortunately, *Disc-to-Disk* and FWB's *Toolkit* support many of those players, even if the hardware manufacturers don't. With *FWB Toolkit*, you can use *MoviePlayer* and the other applications just as if your CD-ROM drive were an Apple CD300. The utility is available as a retail product—it replaces the software that came with your drive—and it is also being bundled with drives from a number of manufacturers, resellers, and catalogs. At last count, the software supported at least 95 different models. FWB and OMI constantly receive samples of drives from different manufacturers to figure out how to get the drives to transfer digital audio, so the companies can update their software accordingly.

If you already own a CD-ROM drive, check with one of these companies to see whether it will support this audio-capture feature. Some older drives won't: for example, NEC 2X-series drives, which were, for a time, popular catalog "house" brands, won't do the trick no matter what software you throw at them, because they lack the SCSI-2 command set. On the other hand, the *newest* drives may not support it either, because the manufacturer has changed (some say "broken") something from previous models and hasn't documented the change.

Not to pick on NEC, but I recently got in trouble with a brand-new NEC 3Xp*plus*, otherwise known as a CDR-401. Because the 3Xp model (CDR-400) was on everyone's list of supported drives, I assumed the "plus" would be too. I was wrong, and I had to swap my new drive for an older model. So shop carefully if you're buying a drive, and trust no one. Just because a CD player can *play* audio from the Mac desktop, or it's labeled "Photo CD-compatible," "MPC-compliant," or "multimedia ready," there's no guarantee that audio capture is supported.

And just to make things more complicated, don't forget your SCSI samplers. Check with their manufacturers before you buy a drive, and make sure the model you want shows up on their lists, too.

—Paul D. Lehrman



Audio Abduction

Digital Audio Lab's Digital Only CardD (\$495) is the newest member in the CardD family (see Fig. 1). Alternatively, the I/O CardD (\$295) can be used in conjunction with the regular CardD for digital I/O. The Digital Only CardD provides a single set of coaxial (RCA) S/PDIF inputs and outputs. Like the other cards mentioned here, the Digital Only CardD has no analog inputs; it will only accept a digital signal. This is fine if you're recording from a digital source such as a CD player with a

digital output, but you must use outboard converters if you want to record from nondigital sources. DAL's card includes Windows 95 drivers, and DAL is developing Windows NT drivers. Also, you can use two CardDs in one PC if your software supports multiple cards.

The MultiWave Digital Pro card (\$549) from A dB International (distributed by Tracer Technologies) is a well-designed, digital-only board that includes a number of useful software utilities. According to the manufacturer, the card is fully compatible with Windows 95, can be reconfigured in real time, and includes a feature that alerts you to sample-rate mismatches while recording.

Because the MultiWave Digital Pro doesn't require an IRQ, you shouldn't run into any conflicts with your exist-

ing computer hardware. Thanks to its support for AES/EBU and S/PDIF via 1/4-inch TRS or fiber-optic connectors, the board should work well in almost any setup. The card's features can also be upgraded with software, which should make it easy to add functions in the future.

The prize for most inputs goes to Zefiro Acoustics for its ZA2 card (\$495), which sports RCA, optical Toslink, and XLR connectors. The card can simultaneously play and record digital audio and provides analog outputs for monitoring. It also includes a pass-through feature that offers real-time sample-rate conversion. Using this feature, you could transfer audio from a DAT recorded at 48 kHz directly to a CD recorder or second DAT running at 44.1 kHz.

If you're doing sound for game software, you'll appreciate the ZA2's DSP chip, which offers real-time MPEG audio decoding. In addition, the included utility software plays WAV files from a DOS command line, which is something I've sought for a long time. Setting up the ZA2 card is easy using an automated installation routine, and numerous diagnostic utilities help you sort out any conflicts that might arise.

Turtle Beach Systems is well into the development of the next-generation MultiSound card, which will include audio drivers and digital I/O as a daughterboard option. The company's current Quad Studio system (\$499) has AES/EBU and S/PDIF I/O with drivers for both Windows 3.1 and Windows 95. It includes the company's *Quad* 4-channel editing software.

Digidesign will soon be in this market, too, when its long-awaited Audiomedia III audio card (\$995) makes its way to the PC. Audiomedia III is bundled with the company's *Session* 8-track editor and offers S/PDIF I/O, two analog inputs, and two analog outputs. According to the manufacturer, the analog signal-to-noise ratio is between 88 and 90 dB. The system can record up to four tracks at a time (two digital and two analog) and simultaneously play back any tracks that are not being recorded.

DAWS AND CONVERTERS

In addition to sound cards, you have several other options to consider. To begin with, you can do the job with any hard-disk recording system that has digital I/O and supports WAV files. For example, the MicroTechnology Unlimited

AUDIO-CAPTURE PRODUCT MANUFACTURERS

Hardware

Core Sound tel. (201) 801-0812; fax (201) 393-3594;

e-mail moskowit@panix.com; Web <http://www.panix.com/~moskowit>

Digidesign, Inc. tel. (415) 688-0600; fax (415) 327-0777;

e-mail 74774.3122@compuserve.com

Digital Audio Labs tel. (612) 473-7626; fax (612) 473-7915;

e-mail dalinfo@digitalaudio.com; Web <http://www.digitalaudio.com>

Glyph Technologies tel. (800) 335-0345 or (607) 275-0345; fax (607) 275-9464;

e-mail glyphguy@aol.com; Web <http://www.networlds.com/glyph>

Micro Technology Unlimited tel. (919) 870-0344; fax (919) 870-7163;

e-mail info@mtu.com; Web <http://www.mtu.com>

Techno Lab tel. (402) 895-7382; fax (402) 894-2147;

e-mail 76702.2546@compuserve.com

Tracer Technologies (A dB) tel. (717) 747-0200; fax (717) 741-6790;

e-mail tracer@cyberia.com

Turtle Beach Systems tel. (717) 767-0200; fax (717) 763-6033;

e-mail sales@tbeach.com; Web <http://www.tbeach.com>

Zefiro Acoustics tel. (714) 551-5833; e-mail hanssen@netcom.com;

Web <ftp://ftp.netcom.com/pub/ha/hanssen/index.html>

Software

Apple Computer tel. (408) 996-1010; fax (408) 974-6615;

Web <http://quicktime.apple.com> or <http://www.apple.com>

Dominic Hawken (CDGRAB) tel. 44 181 742 0755; fax 44 181 994 4959;

e-mail cdgrab@aldigital.algroup.co.uk; Web <http://www.algroup.co.uk>;

ftp (DOS) <ftp://ftp.algroup.co.uk/public/cdgrab/cdgbds33.zip>;

ftp (Win) <ftp://ftp.algroup.co.uk/public/cdgrab/cdgbwn10.zip>

FWB tel. (415) 325-4392; fax (415) 833-4655; e-mail sales@fwb.com;

Web <http://www.fwb.com>

Gallery Software tel. 44 171 431 6260; fax 44 171 435 8134;

e-mail information@gallsoft.demon.co.uk; Web <http://www.demon.co.uk/gallery/>

Jürgen Schwietering (Tartaruga) tel./fax 39 11 779 0523; e-mail tweety@torino.alpcom.it;

ftp <ftp://ftp.cica.indiana.edu/pub/pc/win3/uploads/turtle12.zip>

Optical Media International tel. (800) 347-2664 or (408) 376-3511;

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- 2AUX sends
- 109 point autolocator
- AES/EBU and S/PDIF digital I/O
- 50 pin SCSI port

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Three dedicated LSI's (Large Scale Integrated circuit) for recording, mixing, and optional EQ provide real-time performance and stability of operation that computer based units simply cannot provide.

Real-time random-access editing features like copy, insert, copy + insert, move, move + insert, erase, delete, slip, and sliptrack inspire creative efforts that are simply unthinkable with tape based recorders. The TAKE function allows you to record up to five separate takes of a critical solo, or enables you to compare separate effects treatments of a singular passage. The jog and shuttle wheels make finding precise edit points a breeze, while the familiar tape-machine style transport controls and autolocator make operating the DR Series recorders like working with an old friend.

DR8 - \$3495.⁰⁰ Sugg. Retail Price
8 Track Disk Recorder



DR16 - \$4995.⁰⁰ Sugg. Retail Price
16 Track Disk Recorder

Media The DR8 can be equipped with an optional internal 1 GB SCSI drive, while the DR16 is available with an optional 2 GB internal SCSI drive. The DR Series recorders are both equipped with a standard 50 pin SCSI port allowing a combination of up to seven SCSI drives with disk overflow recording capability. Lists of compatible drives are available from Akai product information.

Data backup is achieved through standard audio DAT or Exabyte.

At the time of this writing, the Iomega Company is preparing to go into production with their new 1 GB "JAZ" drive, a removable media SCSI drive which will greatly enhance the capabilities of our new DR Series recorders. Stay tuned for more info in our upcoming ads. Better yet, test drive a new DR Series recorder today at your local Akai dealer.

Now You Can See It.

Mixing

Some of our competitors' disk recorders use a portion of their recording LSI to provide mix capability. While this saves money, it can also produce audio artifacts like "zipper" noise when adjusting such critical functions like EQ, pan, and fader level. On top of that, many disk recorders won't even let you make real-time adjustments during mix down, eliminating a critical part of the creative recording process. The heart of the DR mixer is a 16-channel, 24 bit custom LSI designed to provide real-time dynamic digital mix capability. Built-in 99 scene snap-shot automation for all functions and dynamic automation via external MIDI sequencers, combined with 8 or 16 channel 3-band parametric EQ option, ensures that the only limit in the DR Series mixer is your imagination. With its built-in 16 channel mixer, the DR8 becomes the perfect compliment to any 8-track recorder you might currently own. It can mix down its 8 tracks of internal digital audio with an additional 8 inputs from a sampler, tape machine, or a live performance, all in the digital domain. The MT8 mix controller provides a 16 track console format for dynamic remote control of all mix and EQ parameters.

(Monitor/Keyboard/Omega Drive and Batteries not included.)



Keyboard Interface

To increase the power of SuperView™ even further, we added an ASCII keyboard input to the SuperView™ card, allowing a standard ASCII keyboard to operate as a control interface for SuperView™ equipped DR Series recorders. Function keys will provide the ability to zoom in on a single track, as well as zoom in/out timewise for precise edit capability. All tracks and locate points can be named, allowing you to manipulate and track large amounts of data in a very simple manner. A unique interface has been developed to allow track arming, transport control, and edit functions directly from the keyboard, providing enhanced productivity through an intuitive human interface design.

OPTIONS:

SuperView™ SVGA card - \$699

ADAT interface - \$299

MIDI interface - \$299

S.M.P.T.E. read/gen - \$379

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2nd SCSI port - \$299

MT8 MIX controller - \$799

8 channel 3 band parametric EQ - \$550

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Audio Abduction

MicroSound multitrack hardware/software system comes with standard Windows drivers, which let you use the hardware with any Windows audio software. The hardware's specs and sound quality are impressive.

If your CD player's digital output doesn't match your hardware's digital input, check out Core Sound's Digital Format Translator (\$95). This small box accepts digital audio on optical Toslink or RCA connectors, and it outputs both formats simultaneously. You can even add an input and/or output adapter (\$30 each) for the 7-pin connector that Sony uses in its TCD-series portable DATs.

Techno Lab also makes a box that converts between optical and coax. It comes in two yummy flavors: the battery-powered Digicon II (\$189) and the AC-

powered DX I (\$319), which displays numerous messages about the status of the signal. Both units automatically synchronize to the incoming sample rate.

CAPTIVATING SOFTWARE

One of the best ways to get audio from a CD into your PC is with audio-capture software. This type of software lets you load an audio CD into a CD-ROM drive and transfer audio tracks directly to your hard drive. The files appear as standard WAV files, and they can be manipulated with any Windows-compatible editor.

In this category, the best known program is Optical Media International's *Disc-to-Disk* (\$99.95). Several other shareware programs can do the job, too, if somewhat less elegantly. Capture software doesn't work with all drives, however, and you may be in for a bit of a guessing game, as I have discovered. Steve Gorney of Glyph Technology, an outboard mass-storage



FIG. 1: The Digital Only CardD provides digital ins and outs for direct connections to a CD player or DAT machine.

manufacturer, explains: "For audio-capture software to work with any system, you have to deal with hardware issues on the CD-ROM side and the host PC side. For starters, the CD-ROM drive must include firmware elements that support the Red Book audio extraction process over a SCSI bus. That's

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a fairly black-and-white issue, but you might not get accurate information from the vendor.

"Then, the actual transfer throughput must be high enough to keep the data moving," he continues. "If the CD-ROM drive has to stop because the PC can't keep up, the laser may not always find its way back to the exact place on the CD from which it was last reading data. This is most likely to occur if the RAM cache on the drive is not large enough or if the PC is too slow, and it will probably introduce glitches in the files you create. The whole process is a little bit of art and a lot of physics, and the only sure bet is to try it and see."

According to Gorney, it's ironic that newer EIDE CD-ROM drives don't work with existing capture software even though the EIDE spec calls for an S/PDIF digital output on the drive. Because the market is not large enough to support this feature, most manufacturers simply ignore it. Gorney's comments are confirmed by Michiel Overtoom, one of the authors of *Digital Domain*, a shareware program I tested. As it says in the program's help file,

"Don't touch anything while recording off the CD, and hold your breath until it is done!"

Despite this uncertainty, audio-capture software can be the best way to grab CD audio if you have the right components, and *Disc-to-Disk* is an especially good program for this purpose. Like the other products in this category, it should work with many common CD-ROM drives, including the Sony 55S, the NEC 3X line, and the Plextor 4X and 6X family. The software program also includes an Overlap Read feature that maintains synchronization between successive reads from the CD, even if you have buffer overflow problems.

Disc-to-Disk lets you view CD audio tracks as standard waveforms (see Fig. 2), select the range you want to grab, and set the bit resolution and sampling rate for the file once it has been transferred to your drive. You can capture all or

part of a track or establish a list of ranges for batch capturing, and you can preview your selections before making the actual transfer.

I found the program easy to use, and I particularly like the range selection options. However, the View function took quite a while to display the waveform on my 80486/33 with a double-speed Sony 55S CD-ROM. In addition, when I saved a file to disk with the same

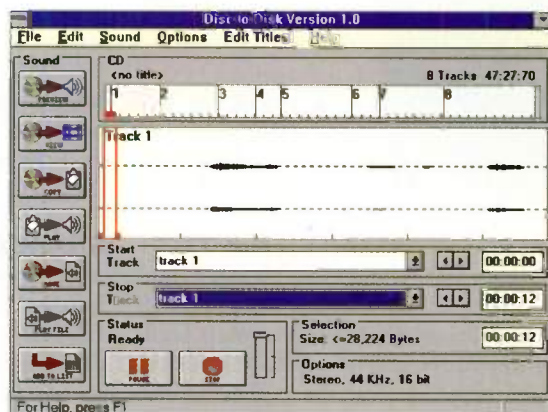


FIG. 2: OMI's *Disc-to-Disk* is a powerful program for capturing audio from a CD and transferring it to your hard drive.

The advertisement features a dark blue background with a central image of a volume knob. The knob is a black, cylindrical slider with a white indicator line, positioned between the words 'Min' and 'Max'. Above the knob, the word 'EXPANSION' is written in a stylized, glowing font. To the right of the knob, the word 'Volume' is written in a simple, glowing font. Further to the right, there are several logos: 'GENERAL MIDI' in a stylized font, a large 'G' logo, and '64 VOICE MODULE' in a glowing font. Below these logos, the text 'M-GS64' is displayed in a large, glowing font. At the bottom center, the text 'World Radio History' is visible in a small, white font.



specs as the original CD audio (44.1 kHz, stereo, 16-bit) the transfer time was longer than the audio segment itself. The transfer time, though, is highly dependent on the CD-ROM drive. Also, when you use these settings, the

program must create huge files on your hard drive, and switching to mono or 22.05 kHz greatly reduces the capture time. In any event, the simplicity and elegance of the program, not to mention the accuracy of the results, more than compensate for the wait.

SHAREWARE SOLUTIONS

Audio-capture software seems to be a favorite of shareware authors. Although I found nearly half a dozen programs of this variety online, their performance varied greatly and was generally

not impressive. The best source for these programs is the home page of CDarchives, a supplier of CD-ROM and CD-recording gear, which you'll find at <http://www.cdarchive.com>, or you can ftp to www.cdarchive.com.

Of these programs, I had the best luck with *Tartaruga* and *CDGRAB*. Several other programs either didn't support my hardware or simply didn't do the job.

Tartaruga was written by Jürgen Schwietering, a former Steinberg programming consultant. It includes a capture feature and a quick-and-dirty time-expansion function, which is intended for use in transcribing instrumental solos you've captured from a CD. The program has a simple layout (see Fig. 3) and captures at about the same speed as *Disc-to-Disk*. The shareware version captures 16-bit stereo files, but it will only work for 30 days without registering.

CDGRAB is available for DOS (with a command-line user interface) and Windows (with a graphic interface). It will only convert audio to a WAV file once you've registered it, although raw captures work in the shareware version. The program supports a variety of CD-ROM drives from Sony, Toshiba, NEC, Plextor, and other manufacturers.

LEGAL AFFAIRS

When you use music from an audio CD, keep in mind that you are actually reproducing a copyrighted work. According to Dr. Bruce Ronkin, head of the music-industry program at Northeastern University in Boston and a copyright expert, the fact that the reproduction is done electronically is irrelevant. In effect, the same regulations that cover photocopying or making

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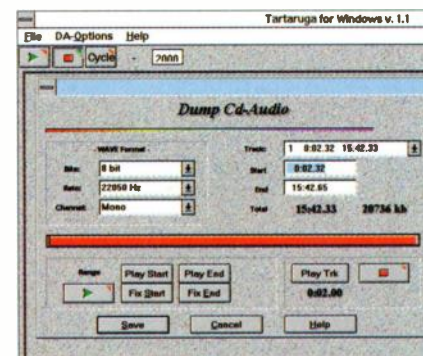


FIG. 3: *Tartaruga* audio-capture software will work with many CD-ROM players, although the shareware version does not support professional-quality transfers.

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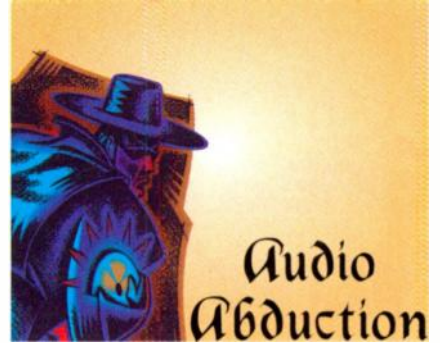
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BEATLES



tapes apply to electronic reproduction.

"Section 106 of the 1976 Copyright Act is very clear in granting the exclusive rights to copy a work to the copyright owner," says Ronkin. "Although there are dozens of exceptions for things such as fair use, none would likely apply if you are using someone else's material for your own commercial purposes. Many record companies have acknowledged sampling to be an integral part of making music today and have worked out special licensing arrangements on their own, but this doesn't vindicate the home user."

Ronkin claims that even if you were to process your samples beyond recognition, you are still making "derivative versions," which is much the same as writing a saxophone-quartet arrangement of a Beethoven symphony. Of course, if nobody can recognize the sample's origin, it is unlikely that anyone will come after you. Ronkin suggests that musicians obtain Circular 55 from the Register of Copyrights (c/o Library of Congress, Washington, DC 20559; Web <http://lcweb.loc.gov>), which covers a number of multimedia issues. Don't say we didn't warn you!

WE WANT IT NOW

Sooner or later, CD-ROM drive manufacturers will begin to take audio seriously, and they'll provide a means for high-quality digital output. It also seems likely that more sound-card manufacturers will start adopting digital inputs as standard equipment, which will make digital-audio transfers far simpler. This is not mere wishful thinking; it only makes sense given the industry-wide acceptance of digital recording.

But you don't have to wait for the majority of drive and sound-card manufacturers to take their next steps. (Few electronic musicians like to wait for new technology. We want it *now*.) You can get the job done right now using the solutions I've described here.

Dennis Miller is on the faculty of Northeastern University in Boston.

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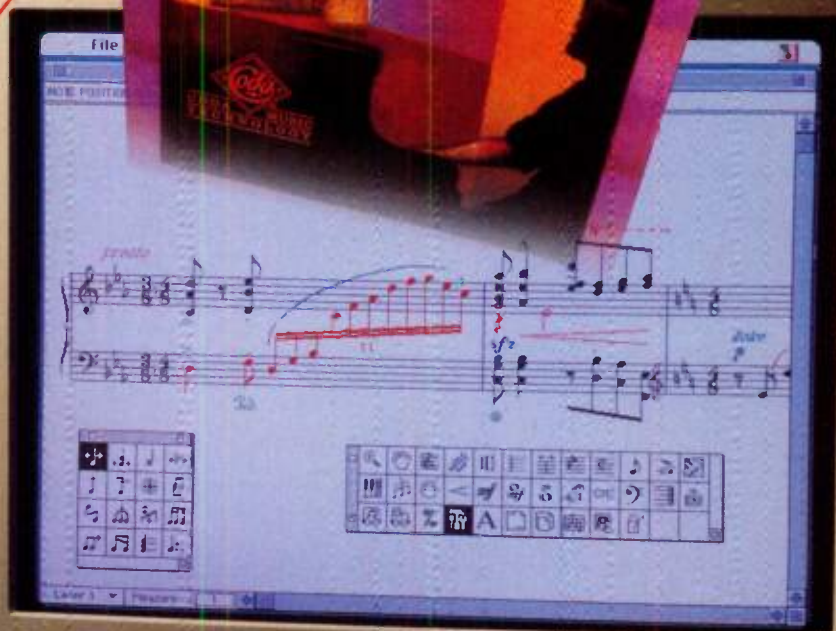
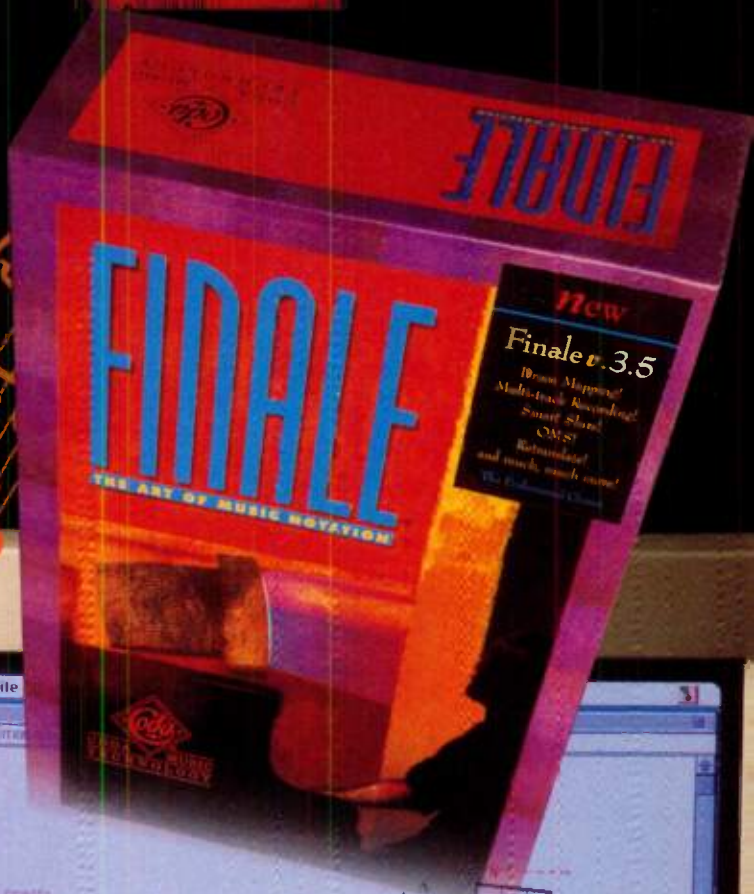
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CODA MUSIC
TECHNOLOGY

**EM's editors laud the few,
the proud, the Top Twenty new
products of the year.**

1996 EDITORS' CHOICE

Friends and business contacts have observed that I have been virtually incommunicado of late and have wondered where I've been hiding. Now the truth can be told: I was buried in an avalanche of press releases and products awaiting review. That gives you a rough idea of how many products for electronic musicians have been released in the last year. With all these hot new products, how could we choose just one Editors' Choice winner in each category?

To begin with, we decided to only give awards to products our editors (including EM Contributing Editor and *Mix* magazine Editor George Petersen) and top authors had actually used. We also limited the number of award categories to our Top Twenty. If you don't see a particular product type, it probably means we didn't feel any new product in that category was outstanding enough that it deserved an award. (The exception is sample CDs, where there were far too many good ones to choose a winner.)

To be eligible for consideration, a product must have initially shipped between October 1994 and October 1995, which is the deadline for our January feature stories. Products that shipped at the last minute (such as Cakewalk Software's *Cakewalk Pro Audio*) will be considered for next year's awards, as we haven't had a chance to evaluate them. Upgraded software was considered eligible only if the upgrade was major and significant.

Obviously, no product is perfect for everybody any more than one song or one genre of music fits all. The fact that we selected twenty products doesn't mean all the others "lost." But we think each of our Editors' Choice winners offers something especially praiseworthy. Congratulations to our Top Twenty!

By Steve Oppenheimer

World Radio History



ANCILLARY HARDWARE

Rane RC 24 PAQRAT (RC 24A \$999; RC 24T \$899)

Until relatively recently, recordists had to be satisfied with 16-bit digital audio because the price of a 20-bit or better system was high enough to give you a near-fatal shock. PAQRAT is an excellent solution, because it lets you record with up to 24-bit resolution on a stock ADAT (RC 24A) or DA-88 (RC 24T). Sure, you still have to buy 20- or 24-bit converters, which aren't cheap. But new converters plus a PAQRAT still cost a lot less than buying a full-blown, high-resolution system.

The PAQRAT does its magic by taking the stereo signal from your A/D converter and dividing it into four signals, which it records onto four tracks of the MDM. The first sixteen bits of each stereo track are recorded to two tracks, and the remaining bits go to the other two tracks. (You can monitor the two 16-bit tracks, but you may hear anomalies, as they have been truncated without dither.) During playback, the PAQRAT reconverts the four tracks into two 20- or 24-bit signals and outputs them in AES/EBU format.

Of course, this means your MDM becomes a 4-track machine, but that's the sacrifice you have to make. The PAQRAT isn't for everyone, but for those who need the very best recording resolution, this unique product is a high-quality, budget-saving solution.

ANCILLARY SOFTWARE

Free Play *World Music Menu* 2.0 (Mac and Win; \$99)

When I assigned EM Technical Editor Scott Wilkinson to evaluate *World Music Menu*, I knew the program would be put to the acid test. After all, he is widely known for his expertise in microtuning and historic temperaments, and *WMM* is aimed directly at those who want to play with alternative scales. After extensive testing, Wilkinson concluded that not only did his music benefit from the program's features, he was having a ton o' fun!

WMM retunes supported synths to any of 121 scales from such far-flung locales as Greece, India, Bali, Asia, and the Middle East. Using it is a breeze: just select a 7-note or 5-note scale from the Scales menu, and the program sends the necessary System Exclusive data to the synthesizer. (You

can't program your own scales yet, but that feature will be added in a future version.)

That's everything you need to get started, though it's not all *WMM* can do. For example, you can easily transpose the new scale by semitones or by scale intervals. A

very nifty feature allows you to create a Stack of up to 24 scales, which you can step through with the Page Up/Down keys on the computer keyboard. When you're ready to return to Equal Temperament, a menu selection or

keyboard equivalent instantly resets your instrument.

The list of supported instruments is small, because there are only a few synthesizers that support the MIDI Tuning Standard. You're in good shape if you have

a Kurzweil K150 or K2000/K2500; any E-mu Proteus; or Yamaha's DX7II, TX81Z, SY/TG77, SY/TG99, or VLI. The Turtle Beach MultiSound is supported, too. Whether your music requires a scale other than Equal Temperament or you just want to explore, this unusual program makes it not only possible but thoroughly enjoyable.

DAT RECORDER

TASCAM DA-30 mkII (\$1,599)

Most audio pros mix to DAT recorders to achieve maximum fidelity. There are lots of excel-

lent DAT machines around, but TASCAM DATs have been especially popular in the project studio. One of the company's biggest winners was the TASCAM DA-30, so you won't be surprised to learn that the DA-30 mkII is a winner, too.

Like its predecessor, the mkII offers both AES/EBU and S/PDIF I/O, multiple sampling rates, and all the basic DAT amenities, but the unit offers several new features that attracted our attention. The most obvious of

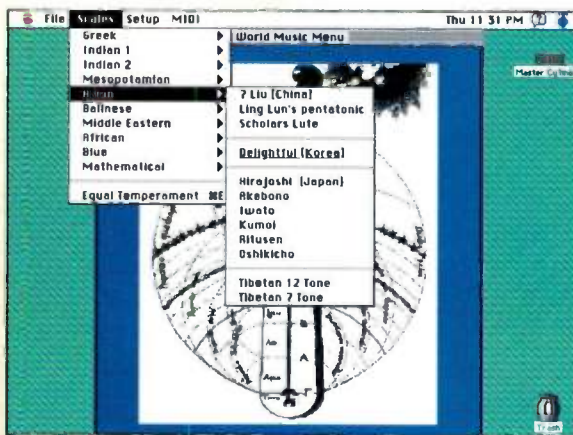
these is a dual Data/Shuttle wheel: the outer wheel is for shuttling to the desired location, and the inner wheel allows you to enter program numbers and trim the ABS time display when working with Start or Skip IDs.

The new unit also offers a locate point you can set from the front panel, which is a major plus. Equally convenient, the

DA-30 mkII lets you defeat SCMS copy protection from the front panel, which could only be accomplished by changing a jumper in the old DA-30. The mkII also has



Rane RC 24 PAQRAT

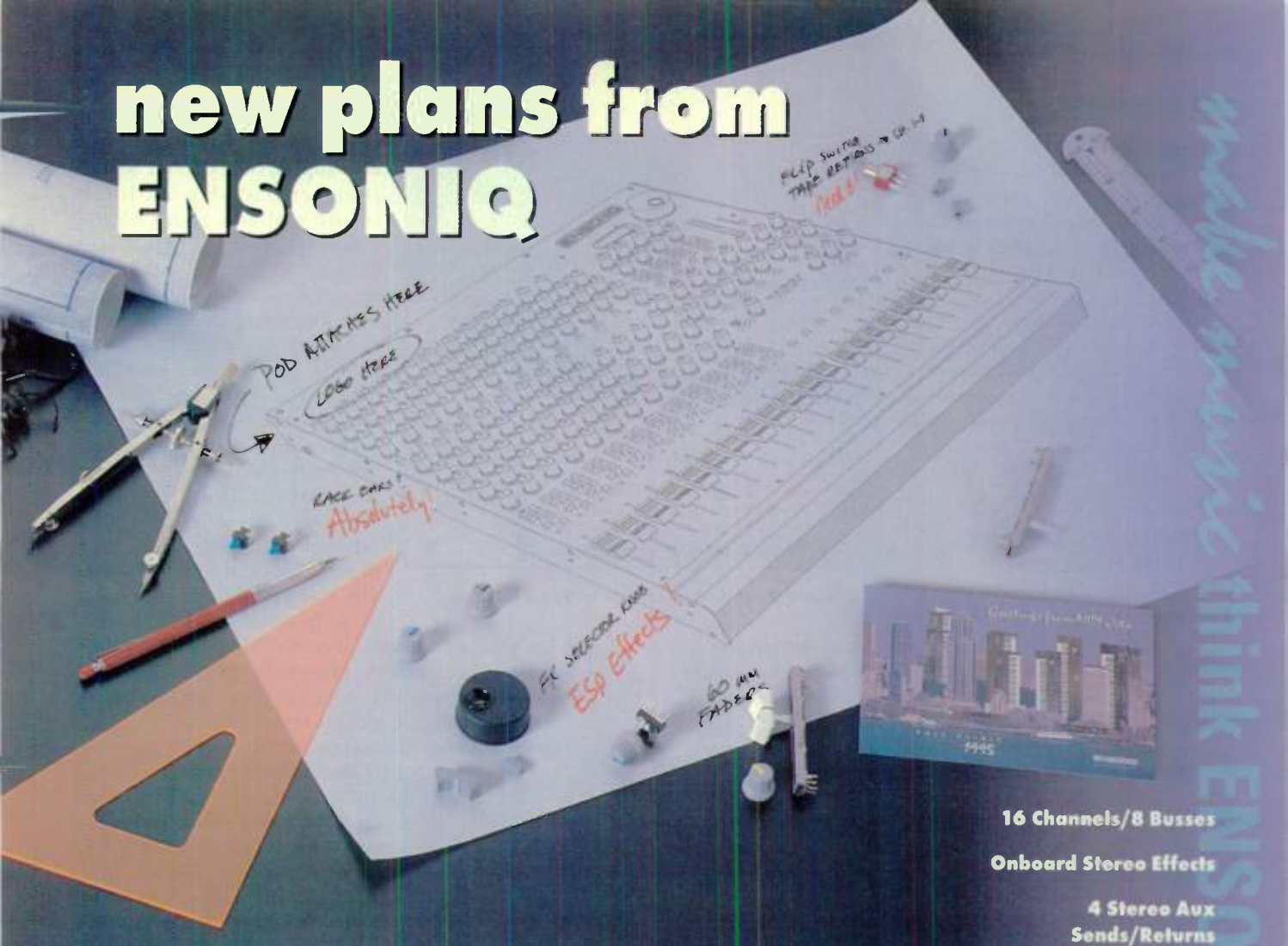


Free Play *World Music Menu* 2.0 (Mac and Win)



TASCAM DA 30 mkII

new plans from ENSONIQ



now under construction: the 1682-fx mixer

Construction crews have broken ground for the newest addition to ENSONIQ's MIDI city: the 1682-fx mixing board. Plans call for an 8-bus board, with built-in effects from our DP Series processors, open to the public in January, 1996. *(It's just around the corner!)*

Our planners surveyed the needs of the mixing community. We studied everything from basic entry-level boards to big studio consoles that most of us only dream about. The result: an affordable board that's perfect for home studio recording, remote recording, or live sound. Big enough that you've got room to work, but small enough to fit

any 10-space rack. It's the perfect complement to your 8-track, with superb audio quality and the features you need. *(Including a lot that you won't find in any other board priced under \$2500!)*

If you're in the market for a mixer, you owe it to yourself to check out the 1682-fx. But for now, you'll have to be content with a peek at our plans. We'll show you more when we're ready to cut the ribbon. *(Your tax dollars at work – courtesy of ENSONIQ!)*

Every ENSONIQ instrument is made in America. Call us at 800-553-5151, or fax 610-647-8908. You can also try our automated fax retrieval system at 1-800-257-1439. We can even be reached via CompuServe, GO MIENSONIQ, and at <http://www.ensoniq.com> on the Web. Whee!

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new converters, though the difference is almost unnoticeable.

Original DA-30 users will notice that TASCAM dropped a few features. For example, the older unit's output-level control is gone, as is the clutch that connected the L/R input-level controls so you could control both channels at once. But most people will never miss these features, and their omission undoubtedly kept the price down. Overall, we really liked the DA-30 mkII, and we have no doubt you will, too.

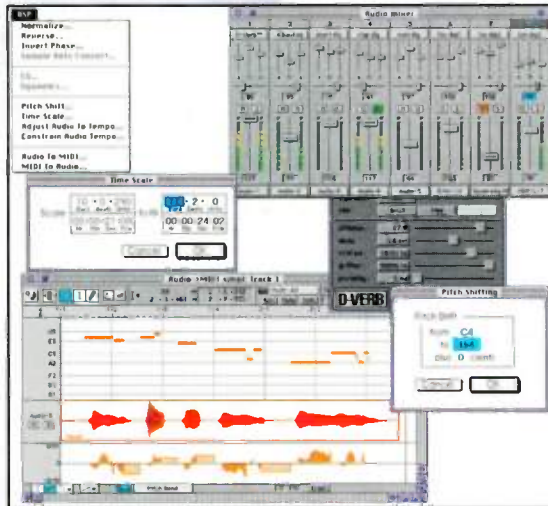
DIGITAL AUDIO SEQUENCER

Opcode Systems *Studio Vision Pro 3.0* (Mac; \$995)

The competition between digital audio sequencers is fierce, and the result is a wealth of great products. But Opcode's *Studio Vision* was the first on the market and is still the most popular. In its latest version, *Studio Vision Pro* reasserts its technical lead, as well.

As you would expect, version 3.0 has all the essential MIDI tools and then some, along with excellent audio tools. The music-notation features are pretty basic, but they're enough to show you what's going on, which is what you need when you're recording. *Studio Vision Pro's* graphical user interface has been improved, and, as in the past, it has been designed to be used by musicians, not mathematicians.

Opcode's program offers its

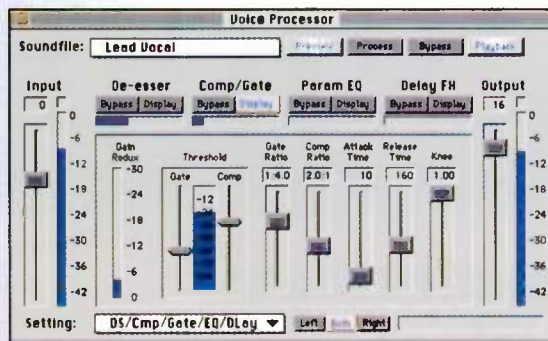


Opcode Systems *Studio Vision Pro 3.0* (Mac)

own extension architecture and also supports TDM and Sound Designer DSP plug-ins. It can record and edit audio on the Power Mac via the Apple Sound Manager without requiring additional hardware, but it also works with Digidesign's audio cards and with Yamaha's CBX-D3/D5. You can even import QuickTime movies and create and edit synchronized soundtracks.

Two aspects of the program really push it ahead. First, it supports OMS and integrates tightly with Opcode's other programs, especially *Galaxy* (which is bundled with it) and *Galaxy Plus Editors*. You get a system, not just a great program. Although integration between a universal editor/librarian and a digital audio sequencer is not new—MOTU and EMAGIC offer similar integration—Opcode did it first and has, in my opinion, a mature technology.

The new feature that has garnered the most attention is *Studio Vision Pro 3.0's* amazing ability to convert audio pitches to MIDI notes and then reconvert from MIDI to audio. Pitch-to-MIDI has been done before, with varying success. But the ability to edit the MIDI data and reconvert to the original sound, with the edits intact, is absolutely a stunning achievement. Given the product's overall quality, that accomplishment pushed it to the top of the digital audio-sequencer heap in 1995.



AnTares *Jupiter Voice Processor (JVP)*

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IMC (Akai) tel. (800) 433-5627 or (817) 336-5114; fax (817) 870-1271;
e-mail intermus@aol.com

KRK tel. (714) 524-2227; fax (714) 524-5096

Mark of the Unicorn tel. (617) 576-2760; fax (617) 576-3609;
e-mail motu@aol.com; Web <http://www.motu.com>

Neumann tel. (203) 434-5220; fax (203) 434-3148

Opcode Systems tel. (415) 856-3333; fax (415) 856-3332;
Web <http://www.opcode.com>

PreSonus tel. (504) 344-7887; fax (504) 344-8881

RiCharde & Co. (AnTares, Charlie Lab) tel. (408) 688-8593;
fax (408) 688-8595; e-mail richarde@got.net

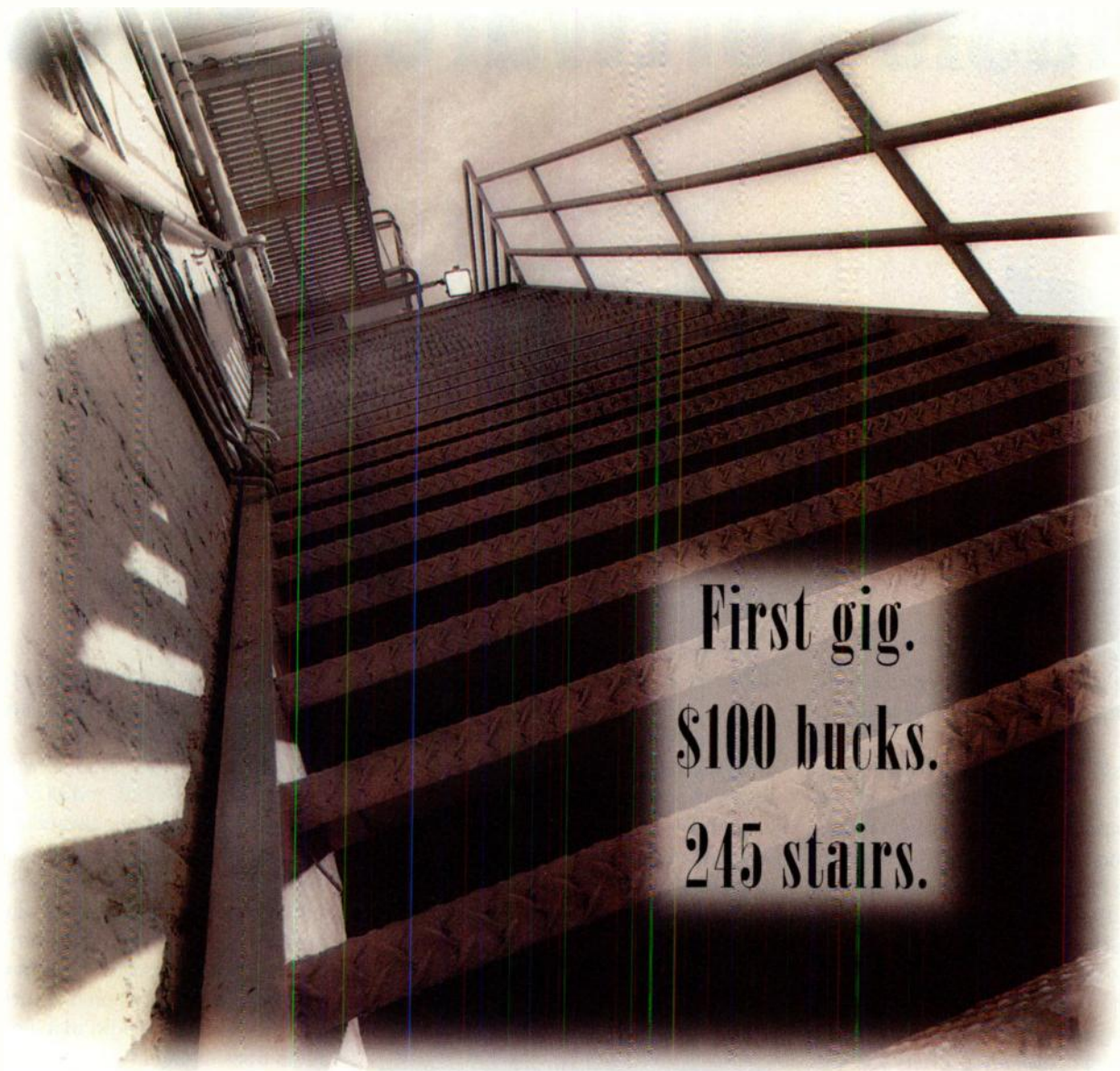
Rane tel. (206) 355-6000; fax (206) 347-7757

Roland Corporation US tel. (213) 685-5141; fax (213) 722-0911

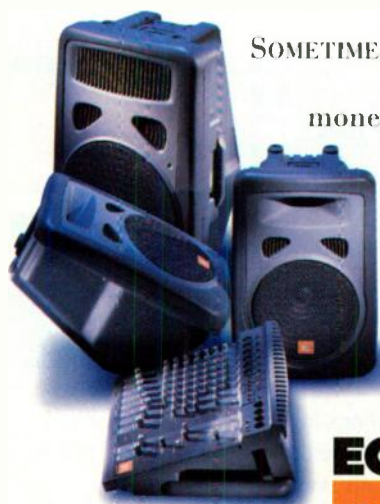
Sonic Foundry tel. (800) 577-6642 or (608) 256-3133;
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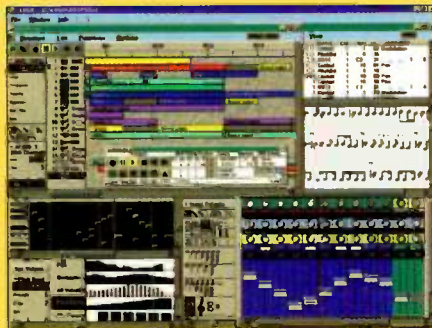
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Install the Logic Audio Module with Logic on your Mac/Power PC, and all doors to the exciting world of digital audio recording will swing wide open. You can use the Apple Sound Manager to record* and play up to 12 tracks or use any of the audio hardware options from Digidesign (4-48 tracks**). Arrange MIDI and audio tracks on one surface, edit the pitch and length of a digital audio track in one process, adapt the groove of your MIDI tracks to the groove of an audio track, turn monophonic digital



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The Logic Windows Audio Module is scheduled for Q1/96

* 16 bit Audio-in Mac only

** 16-48 tracks using TDM EXTENSION

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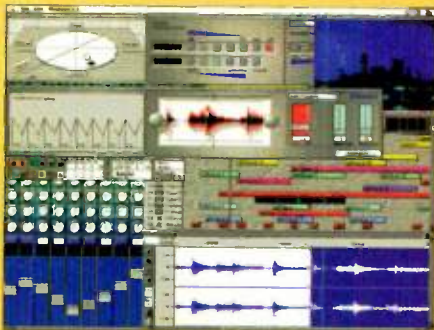
with your songs. Depending on your hardware, you can use as many Plug-Ins (inserts) per track and for the final mix/sum as you may need. Each of your TDM configurations can be intuitively copied from song to song. Digital audio recording luxury? This way you can...



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the Time Machine™, the Quantize Engine™, the Silencer™, the Groove Machine™, the Audio Energizer™, the Audio to Score Streamer™, Audio to MIDI Groove Templates™ and more. You owe it to yourself to seriously check out this program before you consider buying anything else.

** 16-48 tracks using TDM EXTENSION



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DSP SOFTWARE

AnTares *JVP* (SD II \$399; TDM \$499)

AnTares Systems is the new name for Jupiter Systems, creators of the widely acclaimed *Infinity* sample-looping software program and several *Sound Designer* and TDM digital signal-processing plug-ins. The *Jupiter Voice Processor (JVP)* is one of AnTares' latest DSP plug-ins and, in our opinion, it really shines.

Designed primarily for processing vocals, *JVP* combines a compressor/expander/gate; de-esser; 3-band parametric EQ (± 24 dB); and 6-tap, stereo, panning delay with feedback. If you record a lot of vocals, you can imagine just how useful this combination would be. The algorithms sound just fine, and because everything is being done on the computer, you can store your settings for the program's 54 parameters as a separate file for convenient recall.

The *JVP*'s user interface is friendly and sensible. Each processor and each pair of taps have their own windows, but the gain-reduction meters and master input and output faders are always on-screen. Fortunately, AnTares offers *JVP* in a TDM version for those who need and can afford real-time processing and a *Sound Designer* version for the rest of us.

DYNAMICS PROCESSOR

PreSonus DCP-8 (\$995)

The growth of digital recording has spurred interest in multichannel compressors and gates. Most of the currently available 8-channel compressors either lack flexible controls or color the sound unacceptably. But buying four quality stereo units is expensive and eats a lot of rack space. What's a recordist to do?

One thing you can do is check out PreSonus' DCP-8, which not only gives you eight full-featured, good-sounding compressors, it offers eight VCAs for gain automation and tops off the package with eight gates. All parameters can be MIDI controlled, so you have extraordinary flexibility when you use the unit with a sequencer or a MIDI fader box. There is an optional MB-8 1U rack-mount LED meter "bridge" (\$399), too.

The DCP-8 isn't perfect; for example, the only gate parameter is Threshold—there is no release-time control—and it lacks a sidechain for frequency-dependent



PreSonus DCP-8



DigiTech Studio Vocalist



Akai DR8

processing. But for the price, the DCP-8's combination of programmable gain control, compression, and gating is hard to beat.

EFFECTS PROCESSOR (HARDWARE)

DigiTech Studio Vocalist (\$1,049)

Maybe it's because I grew up on bluegrass music and old-time rhythm and blues, but whatever the reason, I go nuts over great vocal harmonies. However, some of my arrangements call for more vocal range than I can manage. If, like me, you work in a personal studio and are not willing or able to hire backup singers every time you get a neat idea, you will fall in love with DigiTech's Vocalist-series vocal-harmony processors. These "intelligent" harmony processors are also a boon if you play live and your group doesn't have enough good singers.

The Studio Vocalist tops the Vocalist line, providing four smooth, clean, pitch-shifted harmonies from one melody part. Unlike earlier Vocalist models, it can operate at -10 dBV or $+4$ dBV levels, and each harmony part is routed to separate $\frac{1}{4}$ -inch

TRS and XLR outputs, so you can process and mix the parts independently.

You can select among a variety of preprogrammed harmony styles, including chord and scale-based harmonies, or you can create sophisticated custom harmonies that change with each melody note. The product offers many special features, too, including detuning, vibrato, male- and female-voice simulation, individual gain and pan for each voice, and numerous MIDI control parameters.

Finally, don't overlook the Studio Vocalist's impressive pitch-correction features, which can save your recording session if you discover problems after the singers have gone home. If vocal arranging is your bag, this audio wonderbox might be your most rewarding purchase of the year.

HARD-DISK RECORDER

Akai DR8 (\$3,495)

It seems 1995 was the year of modular hard-disk recorders, including Roland's DM-800, Vestax's HDR-6, and Fostex's DMT-8. (E-mu

also announced its DARWIN hard-disk recorder, but at press time, that unit was not yet shipping.) Although each of these units has many good features, we think

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The Stable Platter Mechanism—another astounding advancement—helps to suppress resonance and vibration of the disc. This ensures more accurate playback and recordability.

And yet, with all these advancements, the most important feature the Elite PDR-99 CD recorder offers is the ability to record your cherished music to the incredible, durable and long-lasting format of CD. For the Elite dealer nearest you, call 1-800-746-6557.

ELITE
BY PIONEER

the best of the 1995 crop is Akai's 8-track DR8. The DR8 is not a bigger version of the DR4d; it uses a new engine and has many more features. Its internal digital mixer offers plenty of flexibility, and the entire unit is MIDI controllable.

Why did we choose the DR8 over the others? To start with, the DR8 is easier to use and far less expensive than the DM-800. It syncs to SMPTE and MTC right out of the box, and multiple units sync like a dream, which gives it an edge over the HDR-6. It is far more expandable than any of its rivals, thanks to five expansion slots. Reasonably priced SCSI, SMPTE, MIDI, and ADAT Lightpipe interfaces are already available, and more expansion cards are coming, including a card that will add three bands of parametric EQ to each mixer channel and an RS422 card for Sony 9-pin connection. And the sound quality is at least as good as that of its competitors, which is saying quite a bit.

The Akai DR8 also offers AES/EBU and S/PDIF I/O, balanced analog I/O, and a variety of sample rates and backup options. I could go on, but you get the picture: this is a professional unit all the way.

MICROPHONE

Neumann KM 184 (\$599)

Only two years ago, few home recordists could even consider buying a Neumann microphone. Neumann mics are top-quality products, but they always cost a small



Neumann KM 184

the capsule is not interchangeable with higher-end capsules. I'll accept those limitations in exchange for affordable Neumann quality any day, thank you.

MICROPHONE PREAMP

Aphex Model 107 (\$595)

Unless you are a hermit, you know that tube processors are back in a big way because they add analog "warmth" to digital recordings. But traditional tube circuits tend to be bulky and expensive, generate a good bit of heat, and sometimes create impedance-matching problems with solid-state gear.

Aphex has attempted to provide a tube sound while reducing these problems. Their Model 107 mic preamp uses Aphex's Tubessence technology, which incorporates a 12AX7 tube stage within a solid-state product. Among other advantages, the unit doesn't need an input-matching transformer, and it operates the tube at a low plate potential (under 50 VDC), thus reducing the heat and improving the tube's long-term reliability.

Technology aside, we found that this 2-channel mic pre improves the sound of vocals and miked instruments across the frequency spectrum. Presence peaks in dynamic mics are rounded and softened in a pleasing manner. You get real tube warmth, but without muddying or dulling the sound. The 107 is just fine with condenser mics, and it makes a huge



Aphex Model 107

fortune by project-studio standards. That all changed with the TLM 193 large-diaphragm condenser mic, which reached the market in early 1994. Now Neumann has followed up with the KM 184 small-diaphragm condenser mic, and it's clear the company's reputation for outstanding quality remains intact.

The KM 184 may be physically small—it could fit in your shirt pocket—but it offers a tremendous value in the studio. We especially liked its transparent crispness on cymbals, hi-hats, and acoustic guitars, but it also was a great choice for flutes. We were somewhat less enthralled when trying to record rich lows on sax, male lead vocals, and close-miked guitar amps, for instance. But that's what large-diaphragm mics are for.

The price is so good partly because you only get a cardioid polar pattern (many Neumann mics have multiple patterns), there is no pad or frequency-rolloff switches, and

difference with dynamic mics. If you want to upgrade every mic you own, this could be your one-stop solution.

MIDI CONTROLLER

Charlie Lab Digitar (\$449)

I get excited about products that are unique and solve practical problems, and the Digitar easily fulfills both requirements. The problem: How can you make a part played on a MIDI keyboard sound like it was picked or strummed on a guitar, assuming you have a good guitar sound?

Charlie Lab's solution to this is a combination controller and MIDI processor that voices 3- or 4-note, sequenced or MIDI keyboard-triggered chords to sound as if they were played on a 6-string guitar. The Digitar's six "strings"—actually rigid steel rods—can be picked, strummed, or plucked like real guitar strings. You can lay the controller on your lap, place it on



Charlie Lab Digitar



SERIOUS FUN.

SERIOUS. Like for starters: 160 great sounding Tones (128 General MIDI compatible, plus 32 unique to the KC20), crystal-clear sound quality thanks to a 16-bit DAC, a built-in IBM/MAC/NEC Serial Computer Interface requiring no external interface other than a cable, 64 User-Definable Patches that store splits, layers and parameter data for the Digital Reverb and other effects, 7 killer Drum Kits each with incredible varieties of sound textures. Kawai's been packing power into small packages for some time now, but this time we've even outdone ourselves: the KC20 is one serious machine.

Isn't it time you had some serious fun with your music? And at just \$699.00 retail, the KC20 is seriously the most bang for a buck you're going to find at your dealer's. Check it out today. Your guitar player may hate you for it, but hey, it's about time they shared some of the limelight.

FUN. Like you've never had before, because the KC20 comes with built-in pegs that allow you to strap it on and take off to some places you've never been: like center stage. With a KC20 you're no longer chained to a rack of keyboards: the elegant slim-body design and incredibly light weight (just 9.1 lbs) allows the KC20 to be played just like a remote keyboard — and unlike most remotes, it not only has a full 61-note keyboard, it also looks and functions like a true keyboard instrument, not a space probe.

KAWAI

Digital Magic.

a table, or strap it on with its convenient nylon belt.

To perform with the Digitar, you play chords on the keyboard with one hand (or trigger a sequence) and play the Digitar with the other. When you release the keys on your keyboard, the Digitar sends a MIDI note message on a different MIDI channel, which plays a General MIDI fret-noise sound. Each "string" can be individually tuned. With practice, the combination of revoiced guitar parts and fret sounds can be quite convincing. The Digitar's user interface is not the greatest, and the documentation is weak, so you should schedule some extra practice time. But once you have developed your performance technique, the results will be well worth the effort.

MONITOR SPEAKER

KRK K•RoK (\$449/pr.)

Once you get past bench tests and obvious design issues, evaluating speakers is extremely subjective. But no matter what speakers they favor, all the EM editors who have heard KRKs like them. For example, I'm a fanatic about imaging, and every KRK model I have heard excels in this regard. We have come to expect a lot from KRK speakers, and when we heard the company's cost-effective, powered K•RoK close-field monitors, we weren't disappointed.

The frequency response is smooth and well balanced. EM reviewer Rob Shrock reported that mixes he created on K•RoKs translated quite well to several other close-field monitors, which means the odds are good your mix will translate well to the listener's home system, too. The speakers don't fatigue the ear after extended listening, which you'll appreciate during lengthy sessions. Their relatively small size and light weight makes them a good choice for the independent producer who likes to carry around a favorite set of speakers.

Finally, the K•RoKs' unique appearance—they would look at home in a Mayan temple—not only improves a studio's look, it provides nonparallel surfaces that, according to KRK, improve the frequency-response linearity and add low-end punch. Whatever the reason, these affordable speakers sound great.

However, as good as the K•RoKs are, they weren't the best-sounding speakers we checked out in 1995. That honor—and our honorable mention in this category—goes to Bag End's Studio System A (\$4,906). We didn't make the System A our top prize winner mostly because it is quite expensive, so it loses "bang for the buck" points. (When calculating the entire system price, don't

forget that you will also need four juicy power amps.)

However, the System A certainly delivers plenty of bang. This integrated system—it includes the 2-way MM-8 satellite speakers, an ELF-1 low-frequency integrator (a specialized low-frequency processor), and two D10E-S subwoofers—reproduces some of the most stunning sound around. The imaging is absolutely amazing; if you can't create a good stereo soundstage when mixing on these speakers, you might as well hang it up and mix in mono. You want lots of accurate low frequencies? The subwoofers go down to 8 Hz.

The great imaging and extreme lows certainly aren't the system's only strengths; the Bag Ends simply blew away everything to which we compared them. And if you can't quite afford the System A, you might be able to handle the System B (\$2,996), which uses the lower-priced ELF-M integrator and just one D10E-S. It still reaches down to 18 Hz and uses the same MM-8 satellites. Get down!



KRK K•RoK

MOST INNOVATIVE PRODUCT

Roland VG-8 (\$2,895)

When is a synthesizer not a synthesizer? When it's a digital signal processor! With the release of the VG-8 Virtual Guitar, Roland confused a few people but thrilled almost everyone who tried this unique device. Before describing what makes it so innovative, let me assure you that the sonic results are extremely good.

Roland has been making MIDI guitar synths for a long time, but the VG-8 is not one of them. Like a Roland GR-series synth, it accepts a waveform from an electric or acoustic guitar with a Roland GK-2-series hex pickup, which provides individual channels for each string. (Piezo hex pickups allegedly work, too.)

Unlike a conventional guitar synth, however, the VG-8 doesn't translate the incoming pitch into a control signal (MIDI or proprietary) that triggers a sound. Instead, the unit modifies the audio signal by applying DSP-based, computer-generated models of various guitar bodies, pickup types, effects pedals amplifiers, speaker cabinets, and microphones. So your guitar's waveform is being processed to create the sound. By using the VG-8's friendly, icon-driven, click-and-drag user interface, you can quickly set up and save several virtual guitar systems.

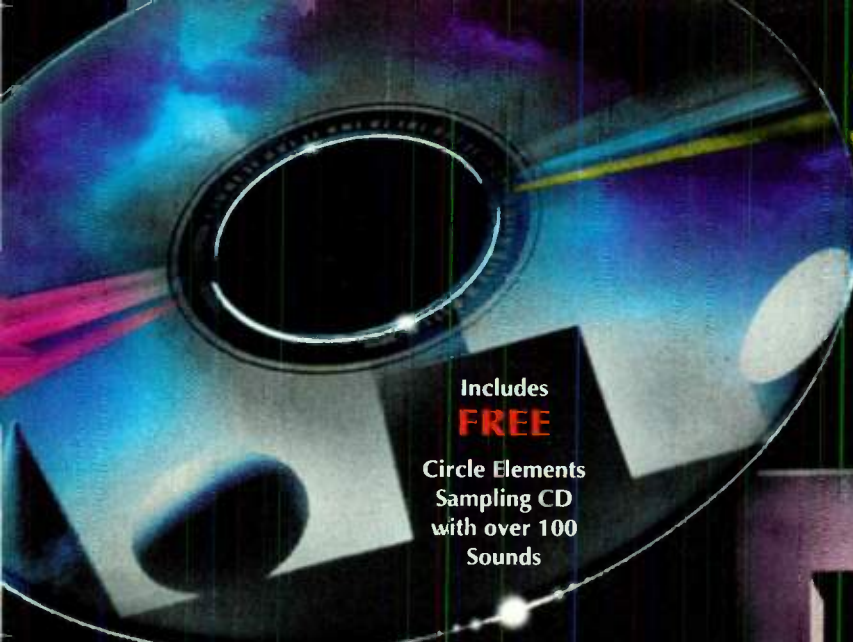
For example, you could make any guitar sound like a Gibson Les Paul with one single-coil pickup and one humbucker, which can be placed anywhere, including high on the neck. Then you can add a virtual distortion



Roland VG-8

\$299 MSRP

TURNS YOUR PC INTO AN 8 TRACK DIGITAL/AUDIO STUDIO

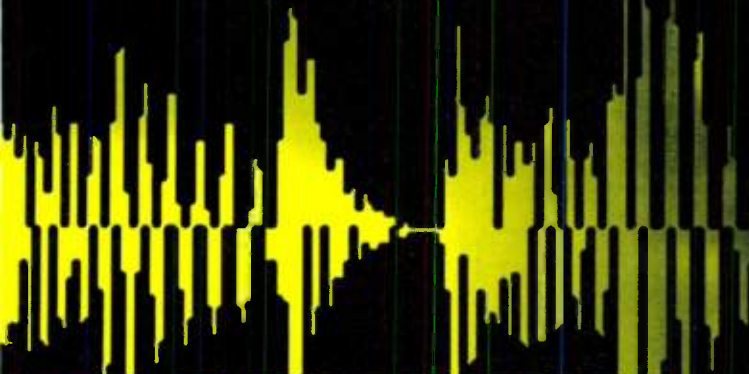
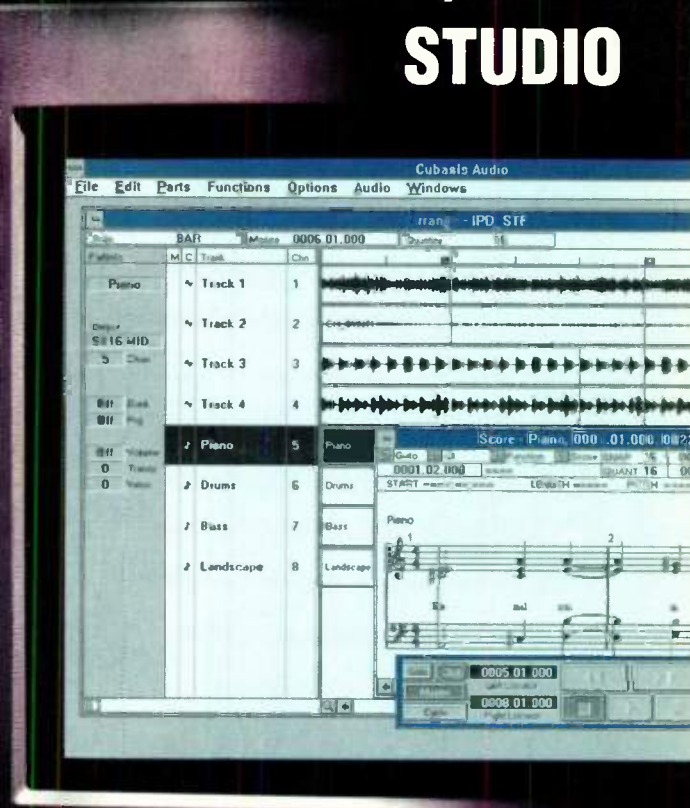


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With any Windows MME Sound Card, Play your guitar and sing directly into your PC computer! Record, Edit and Playback 8* Tracks of Digital Audio. Plus you have 64 tracks of MIDI recording with Score Editing and Printing.



*Hardware utility included to determine number of tracks obtainable

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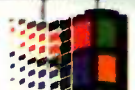
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pedal and run it through a virtual tube amp driving a virtual 2 x 12 cabinet, which is "miked" off-axis with a virtual condenser mic.

Oh yes, there's a regular digital effects processor, too. Hey, Roland had to put something conventional on this unique, ground-breaking box. The VG-8 blurs the line between instrument and signal processor and is the easy winner for Most Innovative Product.

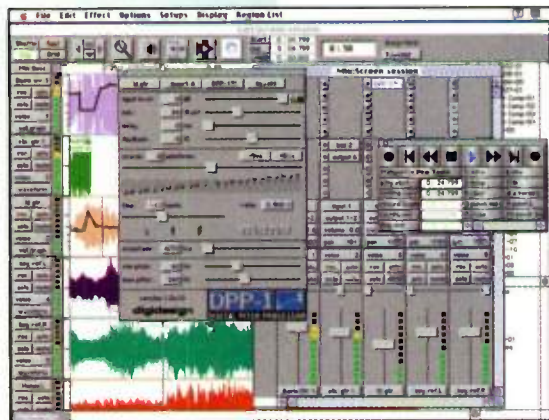
MULTITRACK RECORDING SOFTWARE

Digidesign *Session 2.0* (Mac; \$199)

Digidesign's *Session 2.0* is one of several programs that record audio using the computer's CPU alone or with a Digidesign Audiomedia II card. You can go the budget route and use the Mac's A/D/A converters or spend more for the audio card's superior performance. *Session* uses Digidesign's DAE software engine and supports Opcode's OMS for compatibility with a variety of third-party products. As with other such programs, the exact number of tracks depends on the CPU, hard-disk throughput, amount of RAM, and the other programs and system extensions you use. A fair estimate is up to sixteen tracks with one band of parametric EQ per track on a Power Mac 8100/100 or up to four tracks with EQ or eight tracks without EQ on a 6100/66.

What's so cool about *Session 2.0*? To begin with, you get real-time audio and automation editing with smooth, continuous, animation-quality scrolling and zooming. The computer never stops to redraw the screen. The Autozoom feature provides memory points so you can return to the desired viewing magnification instantaneously. I also really like the fact that when you move grouped faders, they maintain their level relationships rather than just trimming all the levels by an absolute amount.

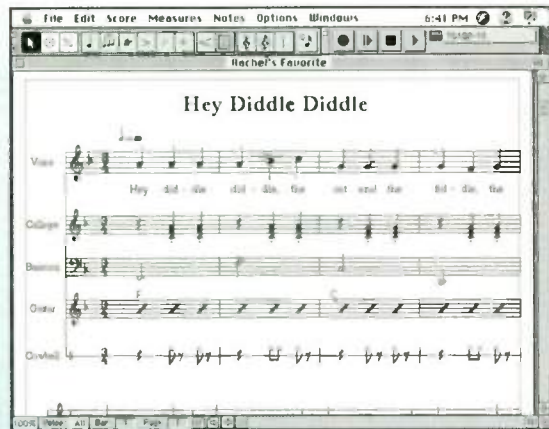
There's a lot more, including graphic breakpoint automation of volume and pan, user-defined crossfade shape and length, and time stamping of audio Regions. These features aren't unusual, but they are much appreciated. Desktop musicians will appreciate the program's sample-accurate sync to QuickTime video, which is essential for multimedia work. (*Session* cannot display



Digidesign *Session 2.0*

vast majority of users, and it's much faster and easier to use. (The native-code Power Mac version is a scorcher!)

The program uses a combination of floating tool palettes and pull-down menus, with only a few rarely used features hidden in dialog boxes. It handles pickup bars, meter changes, and lyrics with aplomb. (We had a minor problem with repeat symbols, which should be fixed by now.) Real-time MIDI entry, as always, required some editing, but *Overture* makes that process relatively painless. Its point-and-click note entry, step entry (you type in the duration and play the note on a MIDI controller), and SMF and *Vision* file transcription were impressive.



Opcode Systems *Overture 1.0.4* (Mac)

You also get a wealth of symbols, including chord symbols and slashes, plus guitar tablature and percussion notation. Page layout requires some futzing, but it's better than with most notation programs. A big plus is the ability to scale staves from 25 to 250 percent, and you can even capture EPS and PICT files to add a little visual flash. To top off the package, you get a solid dose of sequencer-style editing, including a piano-roll editor and a controller Strip Chart. *Overture's* balance between ease of use, flexibility, and professional notation power is exceptional. Nothing else even came close in 1995.

RECORDING MIXER

Studiomaster Classic 8 (\$2,750/16 ch.)

Once you have used British consoles, you will either love them or hate them, but you won't be neutral. British EQ is often described as "aggressive," "warm," or even "quirky," but whatever adjective you choose, it certainly is not transparent. We love these



Studiomaster Classic 8

HE DOES RAP N' ROLL.

HE DOES ACID HOUSE. HE DOES CHOIR.
HE DOES JAZZ. HE DOES POP. HE DOES COUNTRY[?]
HE DOES BLUES. HE DOES SOUL.
HE DOES ZYDECO. HE DOES AMATEUR NIGHT.
IN FACT, THE ONLY THING HE DOESN'T DO IS POLKA.



AS HOUSE ENGINEER FOR THE APOLLO THEATRE IN N.Y.,
SCOOTER SCOTT HAS DONE IT ALL WITH TRI-POWER.
IN FACT, THE ONLY THING THAT KEEPS HIM FROM
DOING POLKA, TOO, IS AN ANGRY MOB.
TRI-POWER. IT CUTS THROUGH THE MUSIC.



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boards, and the Classic 8 provides an excellent example of why.

Although in most respects its design is conventional, this 8-bus board (which is available in 16-, 24-, and 32-channel versions) has a few especially nifty features. We dealt the Classic 8 to EM Editor Michael Molenda, who is big a fan of the higher-end Studiomaster P7. Of course, he checked out the Classic 8's EQ first. Many mixers in this price class offer EQ with sweepable mids, at best, but the Classic 8's 3-band EQ includes sweepable mids (350 Hz to 7.5 kHz) and lows (25 to 300 Hz). Mike was delighted to report that it sounds smooth, aggressive, and, well, *British*. An EQ Cut switch bypasses the EQ for instant tonal comparisons.

We also noted with satisfaction the unit's MIDI-controlled mutes, which will be particularly useful to sequencer jockeys. There are six aux sends, five of which can be controlled simultaneously, and the phantom power can be defeated individually on each channel. These are clear indications that the Classic 8 is a professional mixing console.

SAMPLER

E-mu Emulator IV (\$5,999)

The Emulator IV represents the state of the sampling art. Its sound quality is outstanding, and the unit has plenty of the latest features, including 128-voice polyphony, up to 32-part multi-timbral operation (with an optional MIDI expansion card), up to 128 MB of RAM, and 18-bit output DACs. E-mu includes its familiar matrix modulation, so you can modulate any parameter you want using almost any modulation source. The main stereo outputs are on XLR and balanced 1/4-inch connectors, and you get three stereo pairs of submix outs, not to mention switchable AES/EBU and S/PDIF I/O.

All of this is very nice, but we've just touched the surface. The EIV sports 32 Morpheus-style Z-Plane filters (albeit 6-pole rather than the Morpheus' 14-pole variety). These allow you to apply filter morphing to your own samples, with far more control than with the Morpheus. No other sampler has anything even faintly resembling this kind of processing. In addition, there are three expansion slots; right now, the only card is the MIDI expander, but an effects processor card will almost certainly be developed. The operating system resides in Flash ROM, which means it boots instantly and usually can be updated



E-mu Emulator IV

polyphony and RAM capacity, lacks the expansion slots, and requires a factory mod to add balanced outs, but otherwise it's pretty much the same animal.

If you still cringe at the e-64's price tag, you might prefer the ESI-32 (\$1,495). This baby has a low price, but it isn't cheap gear by any means. Think of it as a 2-rack-space EIIIx (the company's previous-generation Emulator) without the submix outputs but with an optional 270 MB SyQuest drive. The EIIIx was considered one of the top pro samplers around before the EIV came along, and the ESI-32 competes quite well with most other samplers. Much to our delight, its budget price has pushed some of E-mu's competitors into making serious price cuts of their own.

SAMPLE-EDITING SOFTWARE

Sonic Foundry *Sound Forge* 3.0 (Win; \$495)

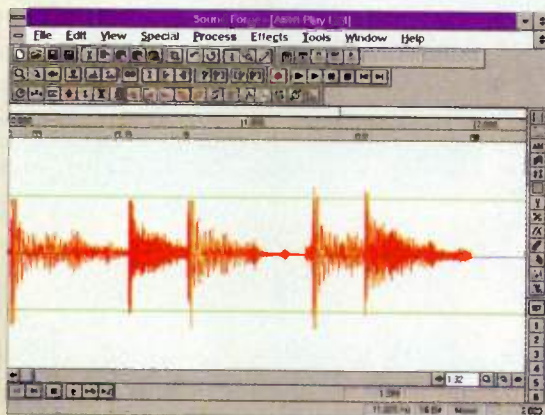
For many years, the Macintosh was the computer of choice for sample editing, and Passport's *Alchemy* was king of the sample editors. But despite the recent

upgrade to that venerable program, it has been left far behind in the dust by (Mac-o-philes may groan in unison here) a Windows program. It's a sign of the times.

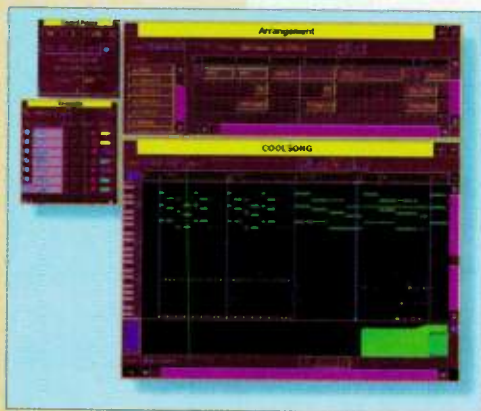
Ah, but this isn't your average program. *Sound Forge* 3.0 is a disk-based editor that not only gives you all the top-level sample-editing features, it lets you trigger individual soundfile playback using MIDI notes, create a playlist

that lets you trigger a list of sounds using MIDI notes or synced to SMPTE time code, and create new sounds via 4-operator FM synthesis. The program translates between virtually every audio-file format. You can apply a long list of effects, including good-quality parametric and graphic EQ, and if you're really ambitious, you can use the Microsoft ACM Filter to create your own DSP routines. The Search function can find pops, clicks, and so on, given a certain threshold.

And if all that isn't enough, you can add DSP plug-ins, including a



Sonic Foundry *Sound Forge* 3.0 (Win)



MOTU *FreeStyle* (Win)

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superb noise-reduction module, an enhanced FFT window, and a batch processor. All of these plug-ins are shipping except the batch processor, which is almost ready to go.

Sound Forge does everything a hardware sampler does except instantly transpose samples across the full range of a keyboard, apparently because no current CPU offers quite enough computing power to do it. If the program supported multitrack recording with crossfades—and I won't be surprised if this happens someday—it would resemble a full-blown DAW, but with sampler drivers and SMDI support. If you're a Windows user and sound designer who needs more editing power than your sampler offers, don't hesitate; buy this program.

SEQUENCER

MOTU *FreeStyle* (Win; \$195)

We were mightily tempted to give an award to the Mac version of *FreeStyle* last year, but it was edged out by a pair of Windows programs. Well, if you can't beat 'em, join 'em; *FreeStyle* is now available for Windows, and we just can't pass it up twice. We are taking a minor leap of faith here, because we only worked with the Mac version. But Mark of the Unicorn's innovative "trackless" sequencing is so cool we just have to give it the nod.

We think *FreeStyle's* user-friendly approach is especially appropriate for the Windows platform, where entry- and mid-level users dominate. Instead of using sequencer tracks, you construct Songs from Sections that contain multiple Takes of various Players

(named instruments), which are grouped in Ensembles. Linear and pattern-based song construction are integrated.

The program is explicitly designed for ease of use, with automatic MIDI device and channel assignments, and also includes piano-roll and real-time music-notation transcription and editing. You can record loops without defining the loop length in advance, and pickup notes are automatically duplicated at the end of the loop. (Be aware that *FreeStyle* requires MOTU's controversial FreeMIDI system extension.)

SYNTHESIZER/SOUND MODULE

Clavia Nord Lead (\$2,395)

EM author Peter Freeman easily matches my hard-core conservatism when it comes to evaluating products,

which is one reason he writes product reviews for us regularly. If he says a product you're interested in is really good, just go out and buy it; "really good" to him is brilliant to most folks. If he has any doubts, you should, too.

Rarely have I seen Freeman as excited and positive about a new synth than when he discovered the Nord Lead, a 4-voice digital synthesizer that uses mathematical models to emulate the sound and voice architecture of an analog synth. (An 8-voice expander is available for \$695.) The Nord Lead is *better* than any hype you may have

heard about it; it really delivers that analog fatness, warmth, and punch. I thought it couldn't be done in this century; sometimes it's great to be wrong.



Clavia Nord Lead

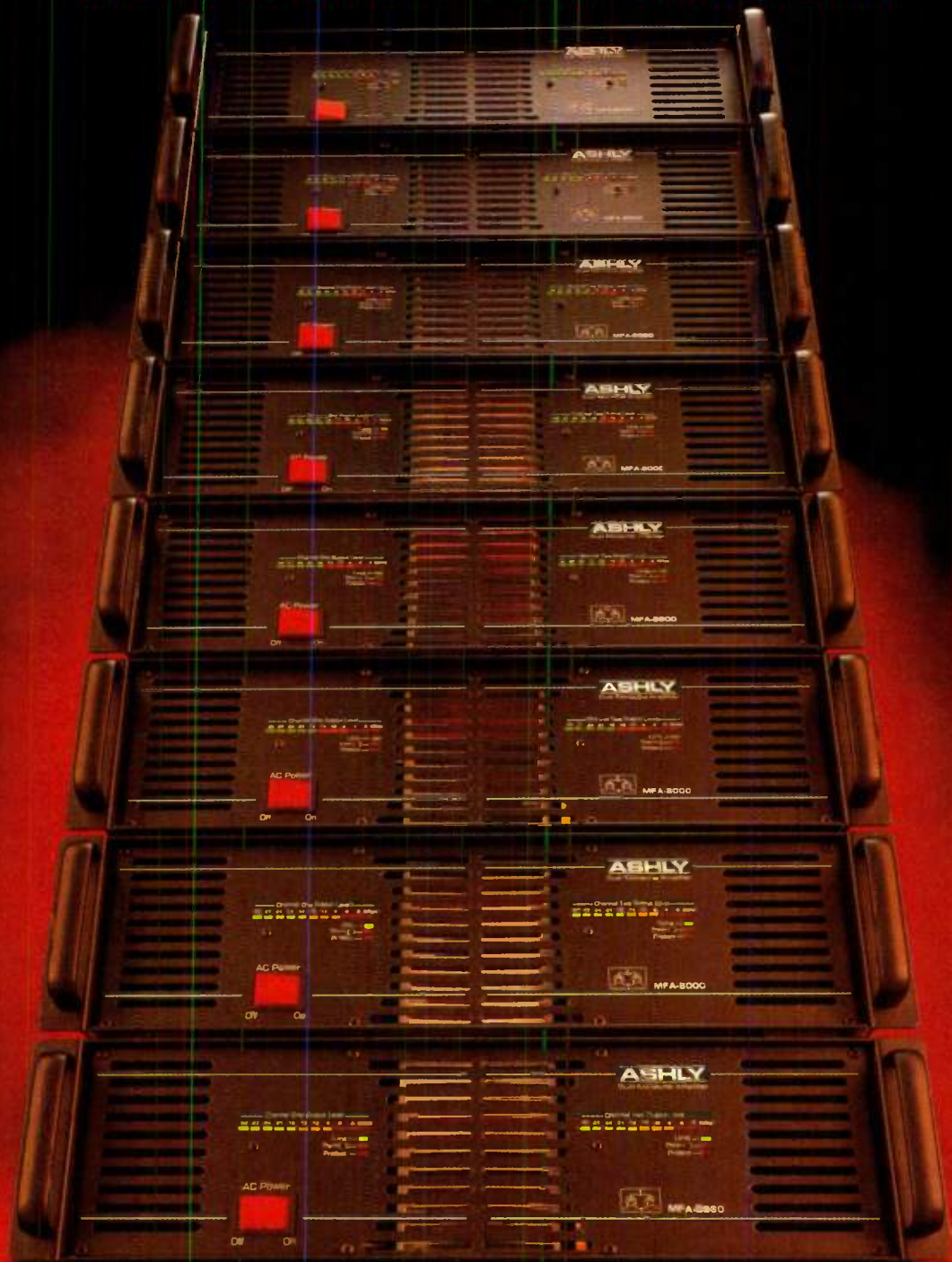
Under Review

We have had the pleasure of covering most of this year's Editors' Choice Award-winning products in recent issues. All but four have been reviewed or evaluated in feature stories. TASCAM's DA-30 mkII, Digidesign's *Session 2.0*, and Opcode's *Studio Vision Pro 3.0* will be reviewed in upcoming issues.

Dates outside of parenthesis indicate reviews of the award-winning version. Dates in parentheses refer to reviews of earlier versions. Dates with article names in parentheses indicate detailed coverage in a feature story. Back issues are available from Mix Bookshelf: tel. (800) 233-9604 or (510) 653-3307; fax (510) 653-5142.

Product	Issue	Product	Issue
Akai DR8	1/96	KRK K•RoK	8/95
AnTares <i>JVP</i>	7/95 ("The Hitchhiker's Guide to Plug-Ins")	Mark of the Unicorn <i>FreeStyle</i> (Win)	(Mac, 2/95)
Aphex Model 107	6/95 ("Retro•Active")	Neumann KM 184	5/95
Bag End Studio System A	7/95	Opcode Systems <i>Overture 1.0.4</i> (Mac)	4/95
Charlie Lab Digitar	12/95	Opcode Systems <i>Studio Vision Pro 3.0</i> (Mac)	(2/91; <i>Vision 2.0</i> , 5/94)
Clavia Nord Lead	12/95	PreSonus DCP-8	1/96
Digidesign <i>Session 2.0</i>	(<i>Session 8</i> for Windows, 9/93)	Roland VG-8	11/95
DigiTech Studio Vocalist	10/95	Sonic Foundry <i>Sound Forge 3.0</i> (Win)	4/95
E-mu Emulator IV	11/95	Studiomaster Classic 8 mixer	1/96
Free Play <i>World Music Menu</i> (Mac, Win)	9/95	TASCAM DA-30 mkII	(DA-30, 3/91)

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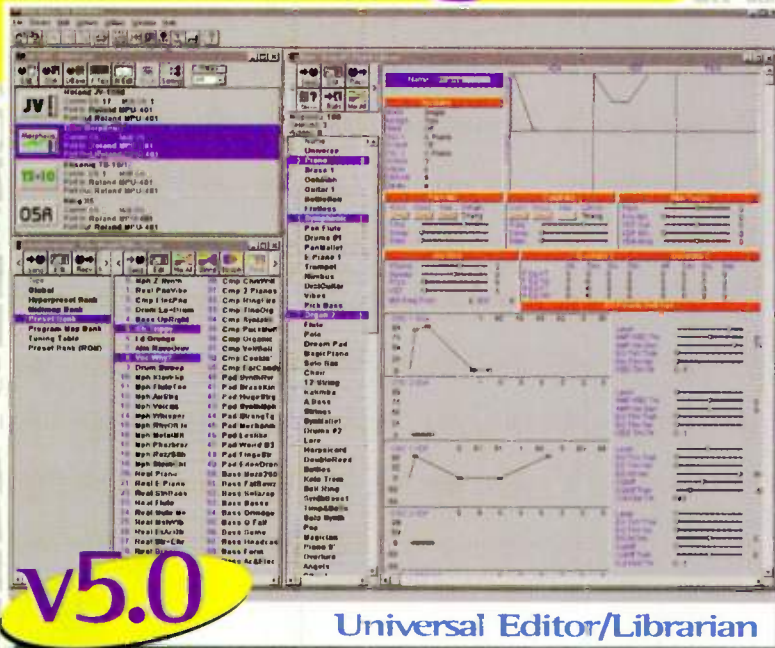
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The Nord isn't just an analog-synth substitute. It can create digital, FM-like sounds, and it offers a few unusual features. For example, it has a unique, spring-loaded, wooden pitch-bend lever with an indentation for the player's finger. This Pitch Stick has no "dead" area in the middle, so its response is immediate. And sound designers will love the ability to control virtually every parameter with MIDI, including creating a Velocity Morph that crossfades between user-selected values. (Unfortunately, the unit does not support MIDI Pressure.) A PCMCIA card slot allows you to offload programs for inexpensive storage. We like the keyboard version because of its Pitch Stick, but the rack-mount Nord Lead is still a good deal at \$1,995.

Features aside, the bottom line for a synth is its sound, and the Nord Lead sounds terrific. As Peter Freeman says, the Nord Lead is "totally happening."

CHOOSEY BEGGARS

That wraps up our Top Twenty products for the past year. We have focused primarily on affordable technology because we are determined to discuss practical, real-world solutions for the serious performer and home recordist. As musicians, we might not be wealthy, but we can still be choosey. When we extended our coverage into higher-end products, we did so because the products are so outstanding we felt they are worth stretching your budget for.

We had plenty of pleasant surprises in the past year; we certainly didn't anticipate the VG-8, Digital, or PAQRAT, for example. So we are a bit skeptical about gazing into the crystal ball to see what's next. But based on what we've seen so far, it seems plain we will see more tube processors, more DSP software, more portable hard-disk recorders, more digital mixers, and more physical-modeling synths.

Many of these products have already been announced, and we're eagerly awaiting their arrival so we can report back to you. Given the progressive, technological bent of our industry, we expect to encounter the unexpected along the way. Clearly, electronic music and the home studio are on a roll, and we're looking forward to an exciting 1996.

EM Senior Editor Steve O's top choice for 1996 is an extended vacation. Unfortunately, it is not yet available.

David Byrne. Many Stories.



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in concert leaves
little room for
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Jazzin' It Up

By Scott Spence

Capturing the nuances and subtle interplay of jazz musicians in a live setting is a challenge, especially when the venue is as huge as the Concord Pavilion in Concord, California. Now add more than 50 musicians and five set changes, and you have the horror that faced Phil Edwards Recording (PER) when they signed on to document Concord Jazz's tribute concert to its founder, the late Carl Jefferson.

The prestigious jazz label's July 8, 1995, memorial concert presented one of the biggest lineups of world-class jazz artists ever assembled on one stage. It was a high-profile benefit concert, with profits slated for the Carl Jefferson Scholarship Fund for young jazz musicians. The artists, all of whom waived their fees for the event, included Charlie Byrd, Mel Martin, Kenny Burrell, and Herb Ellis.

PER's assignment was simple enough: digitally record every note performed by each musician for a Carl Jefferson tribute CD to be mixed and released in 1996. However, even for a twice Grammy-nominated engineer of Phil Edwards' caliber, nothing about mobile live recording is "simple."

*Photograph of Dennis Rowland
by James Gudeman*

Jazzin' Up It

SURVIVAL TACTICS

Phil Edwards and the staff of PER in Hayward, California, are the recording engineers of choice for the Concord Jazz label. PER has logged more than 1,000 live recording sessions for jazz greats such as Stan Getz, Wynton Marsalis, Peggy Lee, and Mel Torme. They've also worked with pop artists such as Crosby, Stills, and Nash, Boz Scaggs, Chris Isaak, John Lee Hooker, and Bonnie Raitt. And the company is no stranger to festival gigs, having recorded the Monterey Blues Festival, the Bay Area Music Awards, the San Francisco Blues Festival, the 1988 Winter Olympic Games in Calgary, and numerous other grand-scale productions.

For the Carl Jefferson tribute concert, PER used its Mobile II unit, an unassuming truck with a 24-foot trailer that is divided into a control room and maintenance area. Mobile II, originally built in the early 1970s for Creedence Clearwater Revival, is currently equipped with three TASCAM DA-88s; two analog 3M 2-inch, 24-track recorders; a custom 40 x 32 x 24 mixing console designed by DeMedio Engineering; Auratone 5C and UREI 811A monitors; Panasonic SV-3700 and Sony 300 ES DAT recorders; and a very sexy

microphone collection. (The tribute concert was tracked on the DA-88s.)

Great equipment alone can't guarantee exemplary results when you're dealing with the "one chance to get it right" pressure of live recording. Edwards and his staff plan ahead to accommodate every conceivable foul up. Long before the concert date, Edwards and the crew at the Concord Pavilion had agreed on the stage plot for musicians and equipment, the cabling splits between the house mixer and the recording truck, and even the makes and models of the microphones to be used. In addition, the sound crews were provided with a list that identified the musicians playing in each of the five sets and the equipment needs and placement for each setup.

DON'T RELY ON THE HOUSE

PER doesn't depend on the house mix for clean, dependable signals, because sharing lines with the sound system can introduce audible distortion and the possibility of equipment and operator failures. Obviously, any problem suffered by the house mixer can sabotage the recording process, perhaps even ruining the entire project. It's safer to run dedicated mic lines to your console. Unfortunately, running two sets of mics and cables for each instrument—one for the house mix and one for your multitrack system—makes for a lot of clutter and confusion onstage.

The solution employed by PER was to split each mic line so that both parties received independent, pristine signals. This "two from one" trick was accomplished with a mic splitter that relayed 27 channels to the house sound system and 56 channels to the recording truck (see Fig. 1). Edwards, therefore, had full control over the sounds he tracked to tape.



FIG. 2: This is the final placement of three Neumann U 87 mics over the grand piano. Note the consistent off-axis tilt.

THE MIC IS THE KEY

"The recording is only as good as the microphone," says PER Assistant Engineer and Stage Manager Ryan Kallas. PER used 36 microphones for the tribute recording, but a comprehensive microphone collection isn't the only key to capturing great sounds. Edwards and Kallas stressed that optimal microphone placement reduces coloration caused by leakage from stage monitors and other instruments and diminishes or eliminates the need for equalization. (For a peek at which mics were used to track which instruments, see the table "Jefferson Tribute Mic Assignments.")

But finding the best position for a microphone is easier said than done. Because acoustics vary widely from space to space and are prone to change during a performance due to variations in temperature and humidity, there are no one-size-fits-all formulations for mic placement. Ultimately, the only way to find the best position for miking an instrument is by trial and error. It's a hands-on, ears-on procedure.

For example, although the PER staff has miked thousands of pianos throughout the years, they still invested almost 45 minutes to determine the optimum placement of three Neumann U 87s over the grand piano used for the concert (see Fig. 2).

NEATNESS COUNTS

Believe it or not, neatness really *does* contribute to a successful live recording session. Both Kallas and the Concord Pavilion stage hands were fanatical about cable placement. Rather than create numerous hazards that musicians would have to avoid tripping over, the crew bundled and taped mic cords

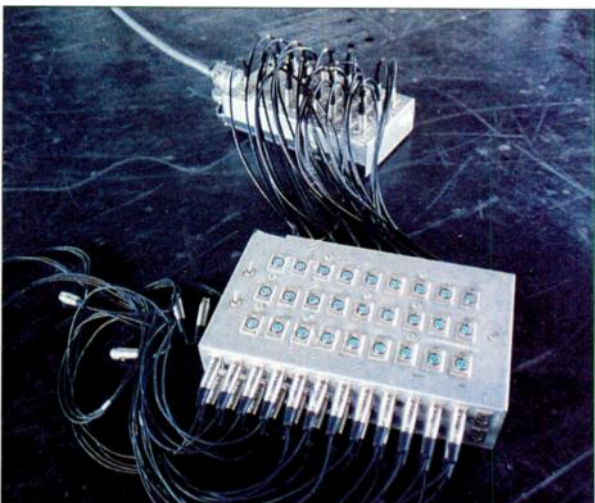


FIG. 1: PER's hefty mic splitter sent 27 signals to the house sound system and 56 to the recording truck.



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Jazzin' Up It

safely out of harm's way. Such attention to detail allowed the players to move freely onstage without fearing a pratfall. In addition, a well-configured cable setup affords easy troubleshooting if a channel goes down midshow.

Edwards himself spent a good deal of time carefully labeling each of the 24 channels on the recording console. He also marked signal-level ranges on the faders and EQ adjustments for each set. Even the excess lengths of cables in the patch bay were neatly coiled to avoid a rat's nest of cords. The mobile control room was so tidy that when world-famous saxophonist Frank Wess stopped by midconcert to see how things were going, he could only nod his head in approval.

THE SOUND CHECK

Obviously, the sound check is the recordist's main shot at getting things to sound right before the tape rolls. Any decisions made during the sound check will largely determine the outcome of the final product. The PER staff tries to allot plenty of time—way more than is probably needed—to guarantee that all critical sonic decisions can be made without caving in to time pressures.

Even when a sound check goes smoothly, it's far from a piece of cake. Edwards must critically assess the overall sound, adjust individual levels to fit in the overall mix, wring out frequency imbalances and phase anomalies, and fine tune, if necessary, individual source signals. Microphones are typically repositioned or replaced if the audio quality isn't just right. To ensure that

each musician's performance and tone is respectfully documented, Edwards typically exhausts mic-placement options before he starts adjusting the console EQ.

A good part of the sound check is spent balancing the sound of the drums. To facilitate rapid set changes for the Jefferson tribute, two "house" drum kits were set up to accommodate all the drummers on the bill. Because pro drummers are meticulous about

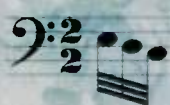


Here's a view of the monitoring area in PER's Mobile II truck.

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their instruments, considerable time was spent retuning heads, switching foot pedals, and repositioning cymbal stands. Gregg Field, who is Frank Sinatra's current drummer, even went through the trouble of putting his own drum heads on the house-supplied kit. After retuning the drums, he had Kallas play them while he and Edwards listened and made adjustments from the mobile truck.

When the sound check is complete, the PER staff double checks *everything*. All equipment is confirmed to be powered up and functioning properly, and all power cords are well secured. In addition, the staff reviews the stage manager's directions and artist schedule one last time, making sure any last-minute changes are known to everyone involved.

SOLID STAFF

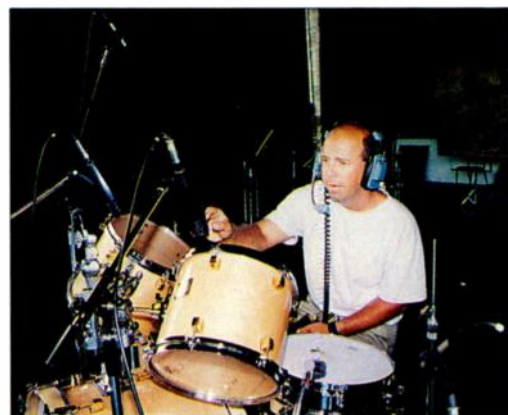
Once the show is underway, the head engineer is only as good as his staff. Fortunately for Edwards, Assistant Engineer Chris Coon and Stage Manager Kallas are an exemplary team. Coon kept accurate production records, monitored equipment operation, and changed the tapes as necessary. Kallas, fitted with a headset, remained in constant dialog with Edwards, telling him

which mics to bring up or down, when to adjust the gain on drum microphones (because a drummer was switching from sticks to brushes or vice versa), and when a musician, despite previous instruction, had somehow ended up at the wrong microphone. Kallas also helped the players plug in their instruments, and he directed the flow of musicians on and off the stage.

Edwards, meanwhile, had his hands full at the board. In addition to maintaining optimum signal levels and equalization for 24 DA-88 tracks, he was also responsible for feeding a live stereo mix to an independent video crew. This mix, because it was being recorded directly to videotape, had to be right the first time. In other words, it had to be ready for broadcast with no further sweetening. This was no mean feat, and if Edwards had been worrying about his crew's capabilities, he would have been sunk.

THE ANARCHY FACTOR

The value of a great crew and comprehensive planning is severely tested when our old friend Anarchy decides to pay a visit. The bottom line is that no matter how carefully you plan or what precautions you take, snags are a given—especially when you're working with musicians! Vocalists and horn players will walk up to the wrong microphones, pianists will scoot the piano away from carefully positioned mics, and drummers will inadvertently smack a tom mic with a stick.



SCOTT SPENCE

Stage Manager Ryan Kallas adjusts Sennheiser MD 421s over the toms of one of the two house drum kits.

The Jefferson concert was not free from Anarchy's touch. While preparing for his set, one guitarist seated himself and plugged in. After strumming a chord and getting no sound, he reached back and cranked up the volume on the amplifier. Kallas, suddenly noticing the guitarist's plight, rushed over and switched the amp off of the Standby setting. The still-ringing, massively amplified chord pegged the VU meters and nearly blew the doors off the recording truck.

Human error, of course, is only part of the equation, and it is often the easiest to correct. The bigger challenge is being prepared for equipment malfunctions and mechanical snafus. Extensive troubleshooting is rarely an option during a live recording; if the situation is dire, you must take immediate corrective action. The crew members must know every piece of gear in the signal chain intimately, so they can think quickly and clearly when a problem rears its ugly head.

It was precisely this thorough knowledge of the equipment setup that saved Edwards *twice* during the Jefferson tribute. Between songs during the third set, a saxophonist stepped up to a Neumann U 87, blew a few notes, and heard nothing through the monitors. Edwards quickly determined that all the U 87s on stage had died. The other condenser microphones, however, were working fine. Because he knew that most condensers continue to operate when power is in the 20- to 40-volt range but that U 87s tend to drop out below 40 volts, Edwards realized his phantom power had faltered. He then instructed Kallas to disconnect one of the unused U 87s,

Jefferson Tribute Mic Assignments

Acoustic bass	Neumann KM 84
Acoustic guitar, requinto	AKG C 451
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Bass and guitar amps	Shure SM56
Drums	AKG C 451 (overheads), Neumann KM 84 (hi-hat), Sennheiser MD 421 (kick drum and toms), Shure SM56 (snare)
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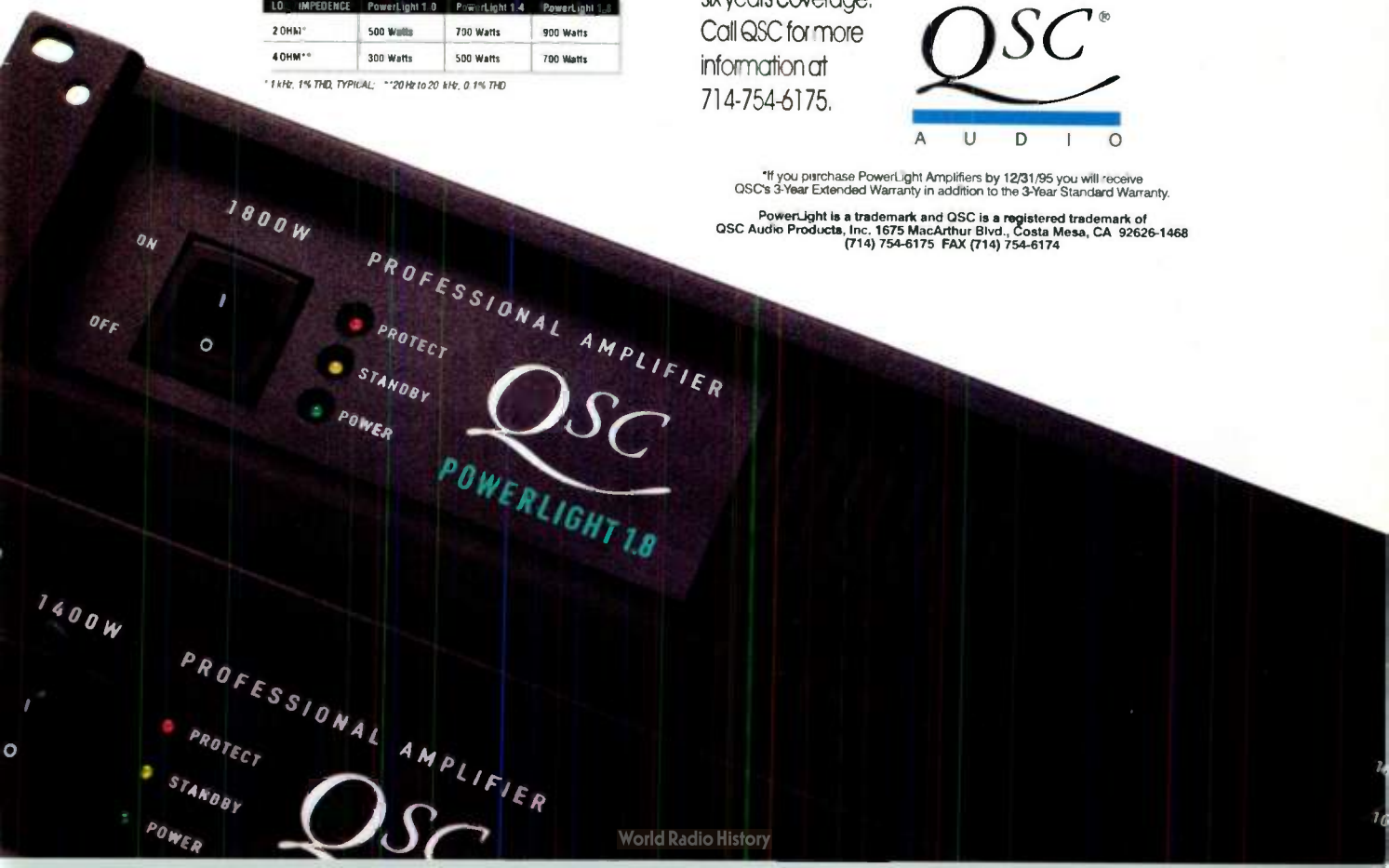
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Jazzin' Up It

thereby reducing the load on the phantom power supply. The corrective action worked, and because the problem was fixed in less than a

minute, no one but the PER staff knew that a gremlin had struck.

The second gremlin, however, was not as quickly pacified. As the musicians for the final set took the stage, Edwards noticed that his three DA-88s weren't locking up. In this case, he needed to locate the problem immediately—no time for referring to manuals—as both musicians and audience were raring to go.

Edwards knew that Coon had just changed the tapes to preformatted blanks. First, he instructed Kallas to

stall the concert. Next, he studied the front panels of the DA-88s. Slaves one and two were attempting to lock to one another but not to the master. This led Edwards to suspect an improperly formatted tape. He replaced the master machine's tape with another preformatted blank and, *voilà*, the DA-88s locked up perfectly. This was a one-in-a-million incident that Edwards had never encountered before, but because of his knowledge of modular digital multitrack systems, he was able to deduce the probable cause and take quick, corrective action. From the time he noticed the problem to the time he notified Kallas to begin the set, only three or four panic-inducing minutes had passed.

PACKING UP

It's not hard to understand why Edwards has been nominated for two Grammy Awards. He has a great ear,



SCOTT SPENCE

Two AKG C 451 microphones capture a stereo image of Jeff Linski's requinto during the sound check.

knows the tools of his trade, and dedicates seven days a week to perfecting his craft. Cutting corners is never a consideration.

It's this combination of integrity and knowledge that accounts for 90 percent of what it takes to make a great recording, whether it's being tracked live or in the studio. The elusive 10 percent is usually a matter of talent, inspiration, and luck. And it's certainly easier to be blessed with these critical little "gifts" if you've finalized all the myriad details of capturing great sounds in advance. In the live-recording arena—where anything can happen at any time—good things come to those who have their act together.

Scott Spence is grateful to the PER staff for not hanging him from the overheads by a mic cord for all the inane questions he asked.

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World Radio History



DYNAMIC DUO

By Wheat Williams

FLEMING McWILLIAMS and **JOHN MARK PAINTER** were poised on the brink of success. In 1991, they scored a development deal and recorded several songs with an established producer. Alas, they weren't happy with the results, and the anticipated major-label deal never gelled. But rather than view this as a setback, the ambitious husband-and-wife team forged ahead and made an album on their own terms.

That album, *Delusions of Grandeur* (Rising Tide/MCA), was produced in their Nashville home studio, dubbed the International House of Fleming, or IHOF. The recording process and deal shopping devoured three years of their lives, but *Delusions* is now garnering quite a bit of college and alternative radio airplay with its "Kate Bush fronting Led Zeppelin" sonic assault. The popular and critical recognition—and major-label distribution—is just reward for the trials and tribulations of self-production. (Isn't it nice to succeed when you have something to prove?)

Doodle Art by Robin Boyce



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THEIR MUSICAL

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dynamic Duo

Fleming and John, the couple, met at Belmont University in Nashville in 1987. McWilliams was a voice major, and Painter was studying bass guitar and working as a copyist.

Fleming and John, the band, burst onto the Nashville scene at a music-industry showcase in 1991. Soon, Painter was gaining a reputation as a studio whiz by playing guitar and arranging strings for the Indigo Girls, Nanci Griffith, and the October Project.

He also programmed drums and sequenced tracks on DC Talk's platinum-selling, Grammy Award-winning *Free at Last* and is currently producing three tracks for the band's forthcoming album. The income from these projects and other sessions enabled Painter to build the home studio that produced *Delusions*.



ROSS SMITH

Fleming McWilliams and John Mark Painter take a break in their well-appointed home studio, the International House of Fleming, where they recorded and produced *Delusions of Grandeur*.

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For McWilliams and Painter, building a studio in their home suited their lifestyle and working relationship perfectly. (After all, they're married.) McWilliams typically tackles the producer's role; engineering is Painter's domain. "John has to pass everything by me," says McWilliams. "I have a very strong opinion about what I like."

By working at home over the years with increasingly sophisticated recording gear, Painter has enjoyed the luxury of learning about recording and producing via experimentation. "I don't really go for anything in particular when I'm working," he says. "I just start recording and do what I think sounds good. And that's when things usually come out the best."

WORKING WITH DELUSIONS

Painter's affection for old gear forged the sonic core of *Delusions*. In the quest for timeless timbres, he scoured pawn shops, vintage-guitar stores, and recording studios to assemble an array of 1960s and '70s guitars, effects, tube preamps, equalizers, and amps. As a result, the record offers a vast palette of funky, authentic rock 'n' roll noises. The guitar tracks, in particular, exhibit brutally seductive tones.

"Most of the songs have just one guitar part, and the effects were usually recorded directly to tape," says Painter. "But to add a little more spice, I recorded the guitars in stereo by placing a Shure SM57 close to the speaker cabinet and a Neumann U 87 about four feet away. In the mix, I panned the SM57 to the opposite side of the U 87. Because I set up the amps in a long hallway, you can really hear the room, and it seems as if the ambience starts on one side and then drifts to the other."

The bass guitar was recorded direct, but Painter used a few tricks to rough up the tracks on hard-rocking numbers. His favorite gimmick was splitting the bass signal and running one side into a rack-mount SansAmp to produce a fat, overdriven quality. (Of course, the other signal was recorded cleanly to tape via a direct box.) A BOSS OC-2 octave divider was employed occasionally for that nasty stomp box-style rumble.

However, Painter did not limit himself to retro lust. He also acquired two pieces of digital gear that really kicked the *Delusions* sessions into maximum

overdrive: a Roland DM-80 hard-disk recorder and a Yamaha ProMix 01.

The ProMix's snapshot automation feature proved invaluable to Painter. "When Fleming wanted to work on a particular song, I'd just recall the previous rough mix, and she'd be ready to go," he says. "Sometimes I would store alternative Scenes [mixes] that incorporated some effects and different signal levels, so she could sing to a more elegant mix."

Because Painter's "cut and paste" production style for *Delusions* resembled an audio collage, the DM-80 became an essential tool for assembling and editing tracks. "I'd record the drums and bass and tweak the parts in the DM-80 until they were perfect," he says. "Then, I'd start editing the other tracks. It was all pretty crazy. For example, I was editing sections in the DM-80 to create new song arrangements and then pasting string parts from previous sessions to the revised songs after the fact."

Digital editing became such a large part of the production that on the song "Rain All Day" the DM-80 and ASR-10 were almost as responsible for the



**They used a
Shure Beta 58,
because McWilliams'
operatic voice
was frying \$8,000
condenser mics.**

drum track as Caroline Records artist Ben Folds. Folds' performance was recorded live into the DM-80, but then Painter sampled some fills and grooves into the ASR-10. The final percussion track on the song consists of sampled loops, assembled and triggered by Dr. T's *KCS Level 2* sequencer.

"I used a lot of different gear and a number of recording formats on *Delusions*, because I'm a firm believer in dedicated hardware," admits Painter. "I tend to stay away from Mac- or PC-based recording systems, because whenever I see somebody trying to do everything

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on one box, it always blows up." And as for another benefit to dedicated hardware, Painter says, "With the Pro-Mix, the DM-80, and an ADAT, you can pack up in five minutes and be out the door with your whole studio."

SINGING UNDER DURESS

Throughout the production of *Delusions*, Fleming and John were courted by major labels, but nobody offered a contract. So, in the fall of 1994, they signed with a small independent label, R.E.X. Records. This provided a needed infusion of cash, which enabled them to pay back some favors to the musicians who had worked on *Delusions*. The money also helped finance mixing, mastering, and album artwork. The only catch was that the album had to be completed by January 1995 (for a

March release), and none of the vocals had been recorded yet. By December 1994, McWilliams and Painter were in a stressful race to finish things up.

Further complicating the deadline was the fact that McWilliams' operatic voice made recording difficult. "We kept renting \$8,000 tube condenser mics," says Painter. "They would sound good for one range of her voice, and then she'd go to another range and they'd fry."

The pair ended up using a plain old Shure Beta 58, which McWilliams held in her hand so that she could use mic technique to level out her performance dynamics. (For more information on hand-held and other vocal miking techniques, see "Lip Service" in the October 1995 *EM*.) In addition, Painter assembled a dedicated vocal-recording rack, composed of a Kalrec mic preamp, Orban de-esser, Peavey ValveVerb, and an old UREI 1176 compressor.

"I love the sound of the UREI on vocals, especially when you're using heavy compression," remarks Painter. "When you crank up the threshold, it really

captures the resonance of your mouth. It's a tonal thing. We liked the character; it's really punchy."

With most of the vocals finished, Painter booked time in a Nashville studio called the Salt Mine for mixdown. "If we didn't go in right then, the release of the record was going to have to be put off," says McWilliams. "Those last ten days, we didn't sleep."

To add to the pressure, the vocals for two tracks were still unrecorded. So while Painter was mixing, McWilliams

REAL LIVE MUSICIANS!

Should you be floating in cyberspace and get the urge to chat with Fleming and John, they can be reached at johnflem@aol.com. They also have a Web site (courtesy of endorser Gibson Guitars) with audio and video samples at <http://www.gibson.com/fog/artists/a2m/fleming.html>.

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was in the next room engineering her own vocal sessions with their vocal rig, the DM-80, and the ProMix 01. Working with rough mixes, McWilliams recorded several different vocal takes for each song. When she was done singing, she would listen to the takes and mark down the timing and track numbers of each phrase she wanted to assemble into a final vocal track.

Each night, between sessions, McWilliams and Painter went home with the DM-80 and ProMix 01 and continued to work on mixing strategies. "We sub-mixed the instruments to two tracks and took the mixes home to sort out the vocals," explains Painter. "With the ProMix 01, I was able to go through and do a variety of different vocal mixes—vocal up, vocal down, back-

ground vocal up, background vocal down, vocal with more reverb or less reverb, and so on. The goal was to have a good idea of what we wanted to do before we returned to the studio to complete a mix."

MASTERING THEIR DESTINY

Unfortunately, after all the test mixes and planning, Painter still received a rude awakening when he flew to New York to master the album at Masterdisk. "I got to the mastering room with my DATs, and the mixes didn't sound good at all," he says. "This was the worst thing that happened to me in making this record. It was like I was hearing the mixes for the first time. I told the engineer, 'I know they didn't sound like this in the studio!'"

"He asked if I still had my original master DAT," he continues, "because we were working off the backup copies that I used to sequence the record. When he popped in the original DAT, it sounded *completely* different. Even though the backup was a digital copy of the master, the midrange was too

Fleming and John's Track Sheet

Main Recording Gear	Alesis ADAT; Atari Mega 2 ST computer; Dr. T's KCS Level 2 sequencer; Roland DM-80; Yamaha ProMix 01
Vocal Tracks	Kalrec mic preamp; Orban de-esser; Peavey ValveVerb; Shure Beta 58; UREI 1176
Guitar Tracks	Electro-Harmonix Big Muff π and Memory Man; Gibson Les Paul Deluxe, Nighthawk, SG Anniversary, and Les Paul Junior guitars; HiWatt Lead 30 amp; Maestro phase shifter; Marshall JMP 1 preamp; MXR DynaComp; Neumann U 87; Peavey ValveVerb; Shure SM57; Vox 412 25-watt Greenback amp and wah pedal
Bass Tracks	BOSS OC-2 octave divider; Electro-Harmonix Big Muff π ; Epiphone EBM5 5-string bass; Gibson Thunderbird and Les Paul basses; Ibanez auto-filter; Neve 1064 preamp; Pultec EQP-1a tube EQ; SansAmp rack-mount; Teletronix LA-2A tube limiter
Drum Tracks	Drums: Ludwig 4-piece with Supraphonic snare and Zildjian cymbals Mics: Electro-Voice RE20s for kick and floor tom; Sennheiser MD 421 for rack tom; Shure SM57 for snare; Sony C-38 for hi-hat; Studer stereo microphone for overhead
Mixdown Toys	Ensoniq DP/4; Lexicon PCM41; TASCAM DA-30; Yamaha NS-10M monitors; Yamaha ProMix 01

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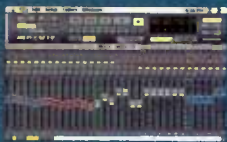
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A First, because we designed Ultramix™ to be used with any mixer or line level device without retrofitting. UltraPilot™ reads and transmits physical fader moves. Fader level changes happen electronically and are displayed on the computer screen. Second, because reliable, accurate motorized faders are extremely expensive.

Q Will Ultramix™ degrade my sound?

A Emphatically not! It's a true, pro system designed for use with digital multitrack recorders, workstations and hard disk recorders. Electronic specifications meet

or exceed those of our well-regarded 8•Bus console series. Zipper noise and audible stepping are simply non-existent thanks to our proprietary smoothing circuitry.

Q Is the Ultramix™ system expandable?

A Like many other Mackie products, our

Q Why does the Ultra-34 Automation Interface look like a patchbay?

A When used with our 8•Bus console, Ultramix™ operates through the channel and main inserts. A half-normalled patchbay on the Ultra-34 front lets you use your inserts for other purposes.

AutoMute: Possibly the coolest Ultramix™ feature of all!

AutoMute dramatically cuts down on cumulative noise by silencing any section of any track that doesn't contribute to the final mix. It works like 34 separate noise gates — except AutoMute doesn't rely on analog level sensing (and thus never cuts off the important leading edge of a sound). Instead, it scans your tracks, detects the start of a note and then backtimes its muting function so that none of the sound is lost. AutoMuting of up to 128 simultaneous mix channels can be done automatically during just one pass through your mix, a process that would take hours with any other automation system. Plus all mutes are fully editable within Ultramix Pro™'s Event Editor window.

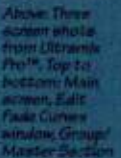


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automation system is designed to grow with your needs. You can add more Ultra-34 Interface modules for up to 128 automated channels — and control it all with your existing UltraPilot™ and Ultramix Pro™ software.

Q How do I get more info on Ultramix™?

A Visit your nearest Ultramix™-Certified Mackie dealer (listed at left) for a demo and a free VHS video (while supplies last). Or call us toll-free for our 48-page combination 8•Bus and Automation tabloid.



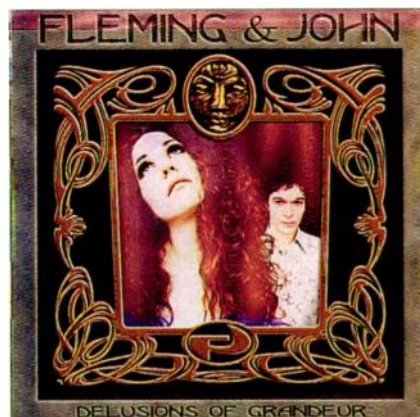
Above: Three screen shots from Ultramix Pro™. Top to bottom: Main screen, Edit Fader Curves window, Group Master Section



a lot of edits, because the master DAT was not sequenced. Since then, whenever I make a backup copy of a DAT master, I always compare it to the original and make sure that they both sound the same."

When asked how much it cost to put together *Delusions*, Painter first responds more in terms of time and effort than money. "I did more work than I wanted to," he admits. "If I'd had a bigger budget I would have been paying other people to wrap cables and things like that. Basically, I did everything."

heavy, and the top end was altered. The engineer explained that digital copies are not necessarily exact copies. And, in my case, they certainly were not. It was very scary, because I almost trashed the record. But, luckily, we just had to redo



Originally released on the independent R.E.X. label, *Delusions of Grandeur* was picked up by Rising Tide, a division of MCA Records.

However, Painter estimates that building IHOF and producing *Delusions* cost approximately \$50,000.

"The way I built the studio was extremely complicated," says Painter, "but I did it because I like to have things my way. I think it's important to keep the costs down as much as possible, so don't just spend money on impressive-looking gear. Make sure you have enough money budgeted for patchbays, good cables, and studio ergonomics. That's the stuff that people ignore. However, it's these conveniences that keep the recording process from taking ten times longer than it should. I spend more time designing racks and snakes than I do listening to the sound quality of studio gear."

McWilliams and Painter hope that what they've achieved with *Delusions* will let them continue to record and produce their music. They seem to be well on their way. Rising Tide's re-release of the CD brings the promise of national promotion and tour support, as well as the opportunity to shoot a video for the album's lead cut "I'm Not Afraid." They are particularly hopeful about touring Europe, as *Delusions* is doing well in Belgium and Austria.

But wherever fortune takes Fleming and John, the DIY spirit will follow. "I'd rather have a hundred grand and do a record myself," declares Painter, "than have five hundred grand and be stuck with some famous producer making all the decisions."

Wheat Williams studies recording-studio engineering and computer programming at Georgia State University in Atlanta. He can be reached at wheat_williams@atl.mug.org.

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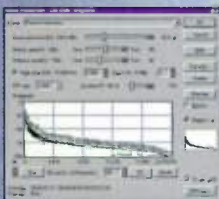
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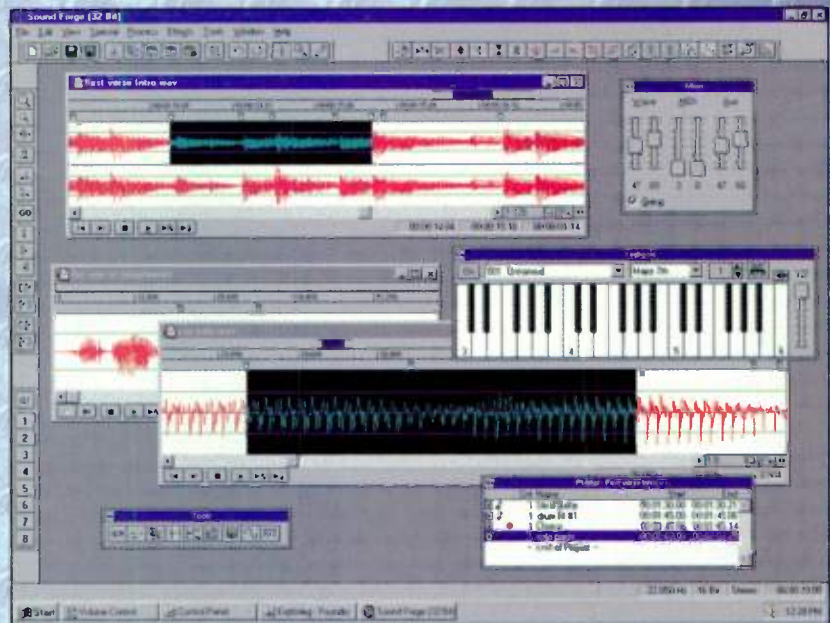
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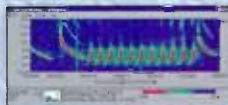


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The Name Game

Welcome to the wonderful world of trademark law.

By Michael A. Aczon

When it comes to naming your band, a rose is a rose is a rose—unless “Rose” is a trademark owned by another band and they don’t want you to use the name. Throughout the history of the music business, issues of trademarks have been hotly contested and at times hotly litigated.

And if you think trademarks are something that only big corporations or successful bands need to worry about, you’re way wrong. Your small-time club act could be held legally accountable if it happens to tread

inadvertantly on a trademarked band name. It’s not exactly a prime career move to get slapped with a court order demanding that you cease and desist using your band’s name and destroy all items—including the boxes of self-produced CDs that you slaved over—bearing the name in question. Hey, it could happen!

WHAT IS A TRADEMARK?

Trademarks are marks, such as names, logos, slogans, or particular type styles that identify the source of goods in the marketplace. The counterpart to trademarks for identifying the source of services (providing live-entertainment services, for example) are *servicemarks*. Trademarks offer protection from competitors only in similar fields, which is why naming your band Taurus will not draw fire from the Ford Motor Company, as your band is selling music, not automobiles.

Trademark law falls under the general body of law dealing with intellectual property. Before we proceed too far into a discussion of trademarks, it is important to distinguish trademarks from two other types of intellectual property you may be familiar with.

Patents protect inventions or processes developed by an inventor or team of inventors. For example, if an inventor were to revolutionize the music industry with a new musical instrument or process of synthesis, he or

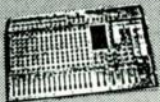


Sometimes the little guys do win big. In the mid 1980s, the supergroup Asia was issued a cease-and-desist order by a bar band with the same name. In order to play in the club band’s geographical area, the supergroup had to pay them a hefty fee.



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she would seek a patent to protect that invention or process. By obtaining the patent, the inventor is the only person who may exploit the patent or allow others to exploit the patent in exchange for money and/or royalties.

Copyrights deal with the protection of rights that arise from the expression of ideas in tangible forms of media, such as paintings, songs, or recordings. Copyright law is often confused with trademark law, because copyrightable works, such as the Rolling Stones' artwork depicting a pair of lips with a tongue sticking out, also serve as trademarks. (For more information on copyright laws, see "Working Musician: Comprehending Copyright" in the February 1992 EM.)

Trademarks, then, are those tangible forms of expression that the public identifies with the source of a specific product. "Strong" trademarks (such as the Stones' logo or the typeface used by The Beatles) are ones that, when observed by a consumer, elicit recognition of a particular company or, in the case of musicians, an act. With merchandising revenues generating millions of dollars for bands, it is crucial to establish and protect a name and/or logo that identifies your act with the source of the artistic services being marketed to the public.

PICKING AND CHOOSING

Certainly, one of the first orders of business after putting together a band is determining the group's name. In order to establish a trademark, the proposed name must be fanciful, rather than descriptive. "Guitar Trio with

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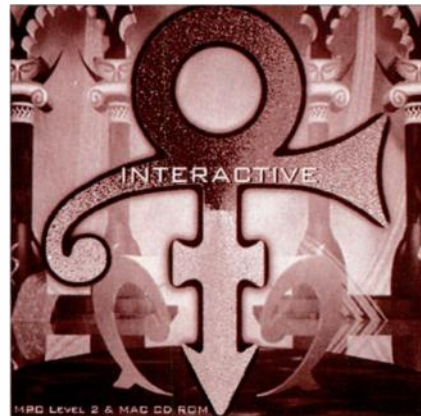


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The hot skinny is that His Purpleness changed his name to a trademarked symbol to prevent anyone other than himself from having ownership of it.

Lead Vocalist" merely describes the source of the service; "That Slimy Mess" is fanciful. Most musicians actually do an informal, local trademark search simply by going through names with each other and determining whether they have heard of other bands with that name playing around town.

Because trademarked names are a "use it or lose it" proposition, you need to strengthen the trademark by getting the public to identify the group with the name. Playing gigs, releasing a record, getting press, and otherwise promoting the name will hopefully make the public aware of the name and make the name synonymous with the act. The creation of a logo can be an important step in making the trademark even stronger. Unlike copyrights, which get immediate protection under the law, trademarks take time to develop, because the public decides how strong the trademark is.

THE LEGAL LIMBO

As with patents and copyrights, following certain legal formalities will help protect against trademark infringement.

ment. The first of these formalities is to file a fictitious business-name statement in the county in which the act does business. This usually requires filing forms with the county and doing a search of existing names in use. This filing establishes a public record and puts third parties on notice of the use of the name.

If the services being rendered by the musician or act are expected to go beyond the city or county limits, consider obtaining a state or federal trademark or servicemark. The qualifications and procedures vary from state to state, so I recommend contacting your state's Secretary of State. At the federal level, you need to prove that you have crossed state lines with your service (i.e., a band with records in stores in different states, a band with advertisements for gigs they



The Fab Four trademarked the typeface for their name, as shown above on the cover of their *Live at the BBC* CD.

have performed in different states, a production company advertising in magazines of general circulation).

In addition, at both the state and federal level, the party seeking the trademark must conduct a search to ensure

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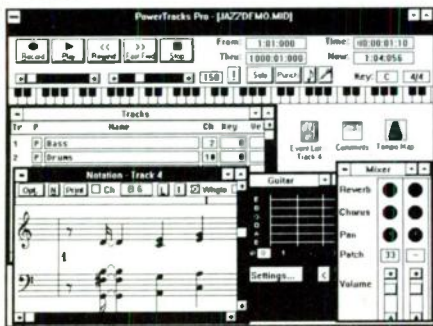
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REQUIREMENTS: PowerTracks for Windows - Windows 3.1/Windows 95 IBM Compatible AT, 386 or higher, 2mb RAM. Supports any device compatible with Windows 3.1 including Roland MPU401, Music Quest MIX interfaces, Key Electronics MIDIA70R, SoundBlaster, Auh, TurtleBeck, et. PowerTracks for DOS - DOS 3.3 or higher, 640K, XT/286/386 or better. MIDI interface (Roland MPU401, Mus: Quest MIX series, SoundBlaster MIDI and FM sounds, Miditor, Roland SC7, Yamaha TG100) or Adlib/SoundBlaster compatible sound card.

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that they are not infringing upon another party's trademark. This search is extremely important, not to mention tedious and time consuming. If you don't want to do the legwork yourself, trademark-search services are available. (You can usually find listings for them in the yellow pages.) Prices for such searches vary from a couple hundred dollars to several thousand dollars, depending on the extent of the search and the desired detail of the report. In the music field, searches are made in phone books, professional publications, and in the Federal Registry, the giant database covering all registered trademarks.

When a trademark or servicemark is determined to be valid, has met the standards of being in interstate commerce, and has not infringed upon another trademark, it is then eligible to be a registered trademark or servicemark recognized under federal law, signified by the ® after the name.

INFRINGEMENT

Infringement occurs when, by using a trademark, a party promotes confusion

in the marketplace as to the source of the goods or services. This happens many times when a band splits up and the various factions attempt to use the band name to keep the initial group's loyal audience. A famous case that provided a great deal of the body of law regarding band names concerned The Platters from the 1950s, who broke up and subsequently flooded the public with a number of different versions of "The Platters," all singing the same songs at their gigs!

A variation on this theme is when an act has established a strong local trademark that is infringed by a major act using a similar name at a later date. This was the case when the 1970's funk band Bootsy's Rubber Band was pursued by a smaller act called The Rubber Band that had established a prior use of the name.

IT'S ALWAYS SOMETHING

When drafting a band partnership agreement, take great care in determining how the important asset of the band's trademarks and servicemarks are going to be handled. Will it be ex-

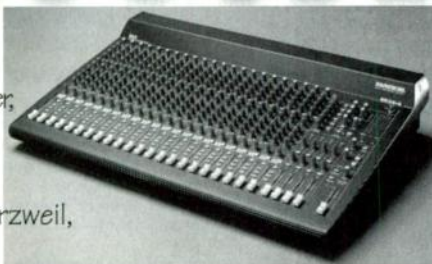
tinguished if two or more people leave the band? Can leaving members perform under the band name? What about merchandise revenue generated from the use of the band name? When signing a record deal, pay close attention to issues regarding the name of your act. I have seen record companies actually gain ownership of a group name through language found in the recording contracts. (This name-ownership issue is rumored to be the reason the artist formerly known as Prince changed his name to a symbol.) Additionally, when entering into a record deal, you are warranting to the label that they will not encounter any problems by releasing your records, including your potential infringement of another act's trademarks.

By taking some important legal steps early in your band's existence, you can establish a strong trademark and use it to its fullest advantage. Who knows? Your band name and logo could be the music-industry's answer to Nike!

Michael A. Aczon is a lawyer in the San Francisco Bay Area.

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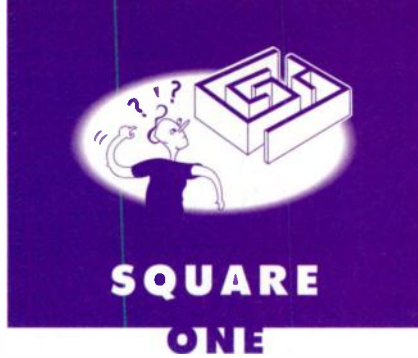
But don't just take our word for it, listen to what the experts are saying. Such as EQ Magazine, "Sound

and smooth presets...the display is big, bright and packed with information...friendly, easy-to-understand icons at every turn...this user interface is one of the best we've seen,...A+ for Sony."***

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EQ, August 1994. *Greg Rule, Keyboard Magazine, April 1995.



The Wizard of dBs

The man behind the curtain demystifies decibels.

By Scott Wilkinson

Bring me the broomstick of the Wicked Witch of the West," bel-lowed the giant, disembodied head, "and I'll grant your wish to learn about decibels!"

Dorothy and her friends were unim-pressed. "We already did that task for the Wizard of Oz over in the Emerald City," she replied. "Besides, we know you're just a man behind the curtain, so cut the crap and tell us what we want to know."

The giant head sighed and disap-peared, and a little old man stepped from behind the curtain. "Alright, you win. You must have come through the

poppy field of basic electronics and logarithm math to get here, right?" Dorothy and her companions nodded in agreement.

"I know that stuff can put you to sleep," continued the little old man, "but it is essential if you want to un-derstand decibels."

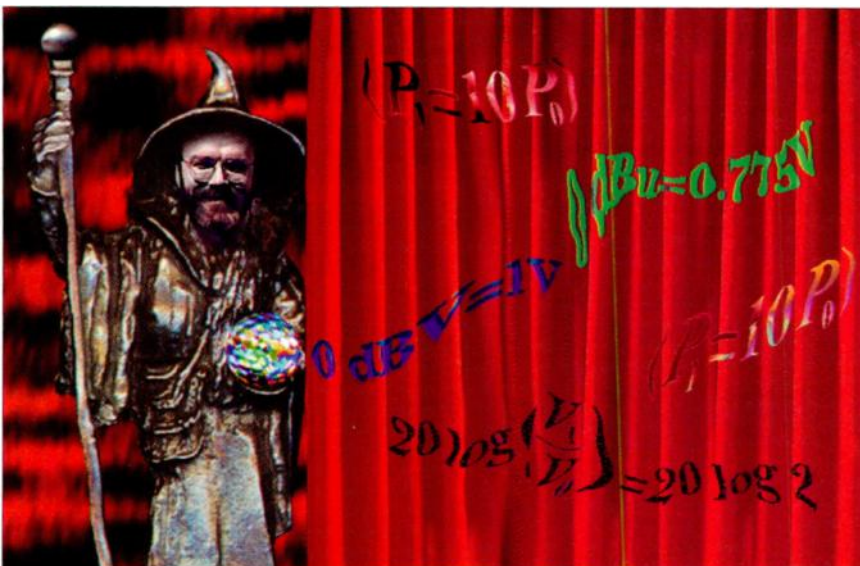
Before he began, the Wizard of dBs offered a warning. "What I'm about to tell you is pretty dense," he said. "At first, it might seem too theoretical, but have patience; I'll include some prac-tical examples after we've covered some basic concepts." With that, he launched into his tale of decibels.

(If you haven't read "Square One: Watts & Volts & Logs, Oh My!" in the December 1995 *EM*, it is imperative that you do so before continuing here. Keep in mind that audio circuits carry alter-nating current, so voltage and current are assumed to be measured using the RMS method as described last month.)

DEFINE YOUR TERMS

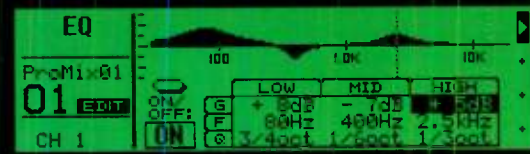
The Wizard started by explaining that many people use the term *decibel* as if it were an absolute unit for measuring audio-signal amplitudes. However, these people are misinformed, as this is not correct. When used with audio sig-nals, decibels express the *ratio* of two values.

Several years ago, scientists at Bell Labs invented the *Bel* to compare two power values and named it in honor of



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Pro Mix 01 AND THE SUBTLE ART OF eq.



ProMix 01 parametric eq gives you dozens of frequency centers in three overlapping bands, from a very low 32 Hz to a sparkling 18 kHz. Q is adjustable in 1/6th octave steps with low and high frequency shelf. A graphic LCD display shows the details of every move you make.

Call the 800 number below for your free ProMix 01 Video and Application Guide

Mixing is something like painting. Whether it's for a live audience or in the studio, equalization, or eq, is like the "palette and brushes" that let you adjust the shade and tint of each sound in your mix.

In the eq world, true parametric eq is the most precise of all. But it can be very expensive. It's normally available only as an integral part of a large console. Or as a separate add-on unit that can cost thousands.

So why would someone pay big bucks for parametric eq? With ProMix 01 you can afford to find out—because ProMix 01 is the only mixer in its class with true parametric eq on every input channel.

Fundamentals and harmonics: the hues and tints of music.

Each sound in your mix is made up of many "colors" or frequencies. If you look closely at a shiny object, you notice it's not simply gold or silver—it displays a complex array of colors that let you know it's reflective.

When you listen to a sound by itself, you mostly hear its predominant frequency—the fundamental. But like the shiny object, if you listen closely you'll hear subtle frequencies called harmonics that give the sound its character.

Eq lets you control these subtleties. Making an acoustic guitar seem larger than life—more out-front—by simply boosting the high-frequency harmonics from the strings. So the guitar becomes more noticeable in your mix, without

actually raising its volume.

You can also use eq to solve problems in a mix. Such as removing feedback in a live concert; removing hum or noise from an electric instrument; or taking the "edge" off an instrument that's stealing attention from a lead vocal. With eq, you can make sounds stand out or blend in. In short, it's the accent that can turn a group of sounds into a great mix.

A different shade of blue?

Most equalizers give you a pre-determined choice of two or three frequency locations at which you can boost or cut. That can be really limiting—like having only two or three colors to paint with. You'll quickly discover this when you want to add presence to your vocal track, solve a feedback problem, or remove electronic "hum," and need frequencies that fixed-band equalizers don't provide. Parametric eq, as provided by ProMix 01, gives you a spectrum of frequency choices. Like having all the colors of a color wheel available to paint with.

What size brush?

In addition to frequency and gain controls, the true parametric eq on ProMix 01 includes a Quality Factor or "Q" control. Going back to our painting analogy, Q is like the width of your paintbrush. It lets you determine how wide or fine an effect you want the eq to have. Unlike the pseudo-parametric or "sweep" eq some mixers provide, true parametric eq lets you boost and cut subtleties in your mix with the precision of a Renaissance artist.

The ProMix "Paint Box."

Now that you know why parametric eq is so highly regarded, just imagine applying that artistic freedom to your next project. What could you do with more colors and more control over them? With 3-band parametric eq on every channel and the main stereo output, ProMix 01 gives you dozens of frequency centers to choose from. It's like enhancing your mix with a paintbox that includes every color in the rainbow.

A memory for the details.

ProMix 01 also saves you time by remembering all your eq settings in memory. So once you've found that magic eq curve, you can instantly call it up weeks later, along with all the other settings in your mix. ProMix 01 even includes a built-in eq library which holds 30 time-tested eq curves for you to use. You can call these up as starting points, modify them according to taste, and store your own custom settings in the library for use at any time. The large, backlit LCD display gives you visual as well as precise numeric representation of your eq on each channel—making eq'ing with ProMix 01 an illuminating experience indeed.

We could go on and on about ProMix 01's other advantages. But that's another ad. In the meantime, get the book and see the movie. **Just call 1-800-937-7171, ext. 550** for your free copy of the new ProMix 01 Application Guide and Video. Then take a spin at the dealer nearest you, and see how ProMix 01's parametric eq handles the curves.

ProMix 01 gives you three bands of true parametric eq. As well as a library of 30 time-tested eq curves, plus room for 20 more custom curves of your own.



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● **SQUARE ONE**

Alexander Graham Bell. By definition,

$$\text{Number of Bels} = \log\left(\frac{P_1}{P_0}\right)$$

P_1 and P_0 are quantities of power in watts, and P_0 is usually a reference power value to which another power value (P_1) is compared.

There are several reasons to work with the log of a power ratio instead of the ratio itself. First of all, logs help us work with large ranges of numbers more easily, and audio ratios can encompass a *very* large range. For example, the ratio of the loudest sound pressure we can stand to the softest sound pressure we can hear is approximately 5 million to one. As mentioned last month, logs act as "mathematical compressors," reducing a large range of values to more manageable proportions.

In addition, the sensitivity of human hearing to amplitude is generally logarithmic. We perceive equal changes in the percentage of amplitude, not equal changes in amplitude itself. For example, if one sound appears to be twice as loud as another sound, the actual am-

plitude of the louder sound is more than three times the amplitude of the softer sound, not twice the amplitude, as you might expect. This is why logarithmic potentiometers are used in audio gear instead of linear pots.

As it turns out, Bels "compress" power-ratio values too much to be useful in audio circuits. As a result, audio engineers use the decibel, which is equal to 0.1 Bel (i.e., there are ten decibels to a Bel) and abbreviated *dB*.

$$\text{Number of decibels} = 10\log\left(\frac{P_1}{P_0}\right)$$

Decibels are often plotted on a graph with dB on the X axis and the power ratio from which they arise on Y axis. As you can see in **Fig. 1**, this can be done in two ways. If the graph uses a linear scale, the curve is relatively complex and takes ten times as much physical space to represent the ratio 100:10 as it does for the ratio of 10:1, even though both ratios are equivalent. You would need a very large piece of graph paper to represent a ratio of 5,000,000:1!

However, if you use a logarithmic scale, the curve becomes a straight line,

and all equivalent ratios (e.g., 100:10 and 10:1) occupy the same physical space on the graph. This makes it easy to see that a difference of 10 dB is the same percentage of change in the power ratio regardless of the actual power values. It also makes it easier to chart large ranges of numbers in less physical space.

VOLTAGE AND CURRENT

Decibels are also used to compare voltage values, especially with circuits that exhibit high impedance and let little current flow. However, the equation is slightly different. Without going into the mathematical derivation, the formula for voltage-referenced decibels is

$$\text{Number of decibels} = 20\log\left(\frac{V_1}{V_0}\right)$$

By the same reasoning, we can apply the same equation to current.

$$\text{Number of decibels} = 20\log\left(\frac{I_1}{I_0}\right)$$

However, decibels are rarely applied to current. If a circuit draws more than a negligible current from a voltage

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source, units of power are used. If a circuit draws next to no current (i.e., impedance is high, load is small), volts are used.

POWER TO THE DECIBEL

There are several standard reference values to which power and voltage are compared using decibels (see table "The Decibel Zoo"). Unfortunately, this leads to much confusion, which the Wizard was trying to dispel. Remember that all voltage in audio equipment is based on alternating current and measured using the RMS method.

As mentioned earlier, power-referenced decibels are used for circuits that draw some significant amount of current from the voltage source. If the measured power is equal to the reference power ($P_1 = P_0$), the difference is 0 dB. In other words, 0 dB is the reference level.

$$\begin{aligned} 10 \log \left(\frac{P_1}{P_0} \right) &= 10 \log 1 \\ &= 10 \times 0 \\ &= 0 \text{ dB} \end{aligned}$$

If the measured power is twice the reference value ($P_1 = 2P_0$), the difference is 3 dB.

$$\begin{aligned} 10 \log \left(\frac{P_1}{P_0} \right) &= 10 \log 2 \\ &= 10 \times 0.301 \\ &= 3.01 \text{ dB} \end{aligned}$$

If the measured power is ten times the reference value ($P_1 = 10P_0$), the difference is 10 dB.

$$\begin{aligned} 10 \log \left(\frac{P_1}{P_0} \right) &= 10 \log 10 \\ &= 10 \times 1 \\ &= 10 \text{ dB} \end{aligned}$$

The most common power-referenced decibels are denoted *dBm*, and the reference power value (P_0) is 1 milliwatt (mW), or 0.001 watt. In other words,

$$0 \text{ dBm} = 1 \text{ mW}$$

This type of decibel is handy when talking about small but significant power values, such as those that exist in most professional audio equipment. In fact, dBm is typically used to specify the nominal signal level in pro gear (discussed shortly).

HIGH-VOLTAGE DECIBELS

Voltage-referenced decibels are used when a circuit draws negligible current from the voltage source (i.e., when the

impedance is high and the load is small). This applies to most consumer and semipro gear, including synthesizers. The reference level is still 0 dB. However, if the measured voltage is twice the reference value ($V_1 = 2V_0$), the difference is 6 dB.

$$\begin{aligned} 20 \log \left(\frac{V_1}{V_0} \right) &= 20 \log 2 \\ &= 20 \times 0.301 \\ &= 6.02 \text{ dB} \end{aligned}$$

If the measured voltage is ten times the reference value ($V_1 = 10V_0$), the difference is 20 dB.

$$\begin{aligned} 20 \log \left(\frac{V_1}{V_0} \right) &= 20 \log 10 \\ &= 20 \times 1 \\ &= 20 \text{ dB} \end{aligned}$$

One common type of voltage-referenced decibel is denoted *dBu*. The *u* stands for "unloaded," which refers to the very small load that high-impedance circuits exhibit. The reference voltage is 0.775V. In other words,

$$0 \text{ dBu} = 0.775 \text{ V}$$

Perhaps the most common type of voltage-referenced decibel is denoted *dBV*. The reference voltage is 1V. In other words,

$$0 \text{ dBV} = 1 \text{ V}$$

This type of decibel is generally used to measure the nominal signal level in consumer and semipro gear.

You might occasionally come across a similar decibel designation (*dBv*) that is completely equivalent to dBu. Don't let the lowercase *v* in *dBv* fool you; it is not the same as dBV. This type of decibel is not used much today.

-10 AND +4

Within the audio industry, equipment is often identified as operating at "-10" or "+4" levels. These numbers refer to the nominal signal levels at the inputs and outputs of the equipment. Unfortunately, they are specified with different types of decibels, which often are

The Decibel Zoo

Type of Decibel	Standard Reference
dBm	1 milliwatt
dBu	0.775 volts RMS
dBV	1 volt RMS

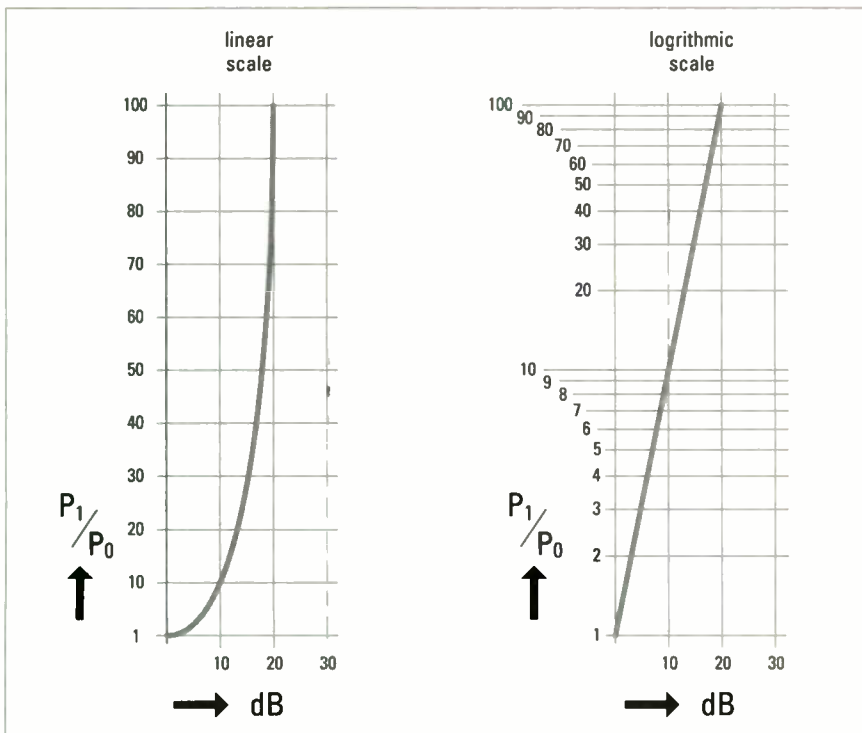


FIG. 1: If you graph decibels with respect to the corresponding power ratios using a linear scale (left), each increase of 10 dB takes up ten times more vertical space. However, if you use a logarithmic scale (right), each increase of 10 dB takes up the same vertical space, and the curve becomes a straight line.

not stated explicitly. This only adds to the confusion surrounding the concept of decibels.

Most consumer and semipro gear accepts and produces lower voltage than fully professional equipment, and it operates with higher impedance (typically in the range of 10 k Ω and above). The nominal level of this lower voltage is -10 dBV, which is equivalent to 0.316V. This typically corresponds to 0 on the level meters of consumer and semiprofessional tape decks, mixers, signal processors, and other such equipment.

Professional-audio equipment produces and accepts a higher nominal voltage of 1.228V, which corresponds to +4 dBm into 600 Ω (normally considered low impedance). This is equivalent to +4 dBu in pro-audio equipment that exhibits a high impedance, so you will sometimes see the nominal level expressed in dBu. (See table "dBV vs. dBm/dBu" to compare these types of decibels.) This typically corresponds to 0 on the level meters of fully professional tape decks, mixing consoles, and other audio equipment.

Some modern audio equipment, such as mixers and DAT machines, can be

switched to operate at -10 or +4. It's very important to make sure that all the equipment in your studio is operating at the same level to ensure a good signal-to-noise ratio (more in a moment).

For example, before the Wizard owned a DAT machine, he borrowed one from a friend to mix a demo. His studio operates at -10, but unbeknownst to him, the DAT was configured for +4. As the Wizard was mixing, he noticed that the DAT's level meters were registering very low levels, even when he raised the mixer's master fader well above its normal position. Once he re-configured the DAT for -10 operation, he got nice, strong levels on the meters (and on tape) without raising the mixer's master fader beyond its normal position.

VOLUME & LEVEL & GAIN, OH MY!

Among the many terms that are tossed around when discussing audio systems, perhaps the most misused are *volume*, *level*, and *gain*. All three words have something to do with the amplitude of an AC electrical signal, and they also relate to decibels, but their precise meaning is not clear to many people

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Volume is often used to describe acoustic sound intensity or the amplitude of an AC electrical signal. Technically speaking, however, volume is defined as power and is typically applied to the output of a power amplifier. If you turn up the volume, you are increasing the power output in watts.

Many people use the word *level* in conjunction with voltage or power values (e.g., "the power level is so many watts" or "the voltage level is so many volts"). However, level is defined as the magnitude of a quantity with respect to a particular reference value. (Sound familiar?) As a result, this word is correctly used only in conjunction with decibels. For example, the audio signal level in professional audio equipment is expressed in dBm, which is referenced to 1 mW.

Gain is defined in several different ways, which doesn't help matters any. Unless otherwise specified, it is usually assumed to refer to the *change* in a signal's power and is measured in decibels. In this case, there is no standard reference value. Instead, the gain compares the signal's power values before and after the change. For example, if a signal's power increases by a factor of two, the gain is 3 dB.

IT'S ALL RELATIVE

The concept of gain brings up another application of decibels: they are often used to compare two voltage or power values without respect to a standard reference level. When decibels are used to relate two arbitrary values in this way, they are expressed in dB without a

modifier (such as *m* or *V*) because they use no standard reference. This approach is typically used to describe the change in a signal that is altered by adjusting a control. For example, you might manipulate an equalizer control to reduce the level of a signal by 3 dB.

In addition, it doesn't matter whether power or voltage values are being compared; the number of decibels remains the same in either case. If you change the power flowing through any circuit with a given impedance, the voltage also changes, but by a different factor than the



**Decibels express
the ratio
of two values.**

change in power. The factor by which the power changes is the square of the factor by which the voltage changes. For example, if the power increases by a factor of 4, the voltage increases by a factor of 2 (the square root of 4). This is due to the fact that power is proportional to the square of the voltage, as revealed in Joule's law:

$$P = K \times V \times I$$

$$= K \times \frac{V^2}{Z}$$

In these formulas, *K* is a constant that depends on the reactance of the circuit, and it can be ignored for our purposes. Of course, *V* is voltage, *I* is current, and *Z* is impedance.

PRACTICAL EXAMPLES

At this point, the Wizard offered a few practical examples. You've probably seen *frequency-response specifications*, which identify the range of frequencies that a piece of audio gear can effectively pass from its input to its output at a given gain. For example, a piece of gear might have a frequency response of 50 Hz to 18 kHz, ±3 dB. This means that all frequencies between 50 Hz and 18 kHz will pass from the input to the output with no more than 6 dB of variation in gain (3 dB up or down from the nominal level).

Equalizers include one or more boost/cut controls that amplify or attenuate different ranges, or bands, of

frequencies (see "Square One: EQ Explained" in the April 1995 EM). For example, many EQs boost or cut the frequencies in each range by ±12 dB. At maximum boost, the signal's power is increased by a factor of 16, and the voltage is increased by a factor of 4.

For the most part, filters reduce the amplitude of certain frequencies that pass through them. One characteristic of all filters is the *slope*, which determines how much effect the filter has on frequencies outside the cutoff or center frequency. For example, some filters have a slope of 24 dB/octave. In this case, the power of a frequency that is one octave away from the cutoff or center frequency will be affected only 1/256 as much as the power of a frequency at the cutoff or center (24 dB corresponds to a power-change factor of 256), and the voltage will be affected 1/16 as much.

Another characteristic of most audio gear is the *signal-to-noise ratio*, which is the difference in decibels between the nominal signal level and the *noise floor* (see "Square One: Stop That Racket!" in the November 1995 EM). For example, in many analog tape decks, the noise floor is 45 to 65 dB below the nominal signal level, which corresponds to 0 on the VU meters. Of course, you can record signals at a level as much as 5 dB above the nominal level on an analog tape deck, which determines the dynamic range of the deck. By definition, *dynamic range* is the difference in decibels between the maximum undistorted signal level and the noise floor. In this example, the dynamic range is 50 to 70 dB.

THERE'S NO PLACE LIKE EM

After imparting a wealth of information about decibels, the Wizard climbed into a hot-air balloon and slowly ascended into the sky. Thanks to his tutelage, Dorothy and her friends (and Toto, too) finally understood the concept of decibels. Now they could talk with anyone about signal levels and equipment specs without the misunderstandings that often arise around this subject. They got what they came for, and they waved their thanks as the balloon floated away.

EM Technical Editor Scott Wilkinson is not in Kansas anymore. Thanks to Gary Davis, John Eargle, and Paul Ierymenko for their help with this article.

dBV vs. dBm/dBu		
dBV	Volts RMS	dBm (into 600Ω) or dBu
+6.0	2.000	+8.2
+4.0	1.600	+6.2
+1.8	1.228	+4.0
0.0	1.000	+2.2
-2.2	0.775	0.0
-6.0	0.500	-3.8
-8.2	0.388	-6.0
-10.0	0.316	-7.8
-12.0	0.250	-9.8
-12.2	0.245	-10.0
-20.0	0.100	-17.8

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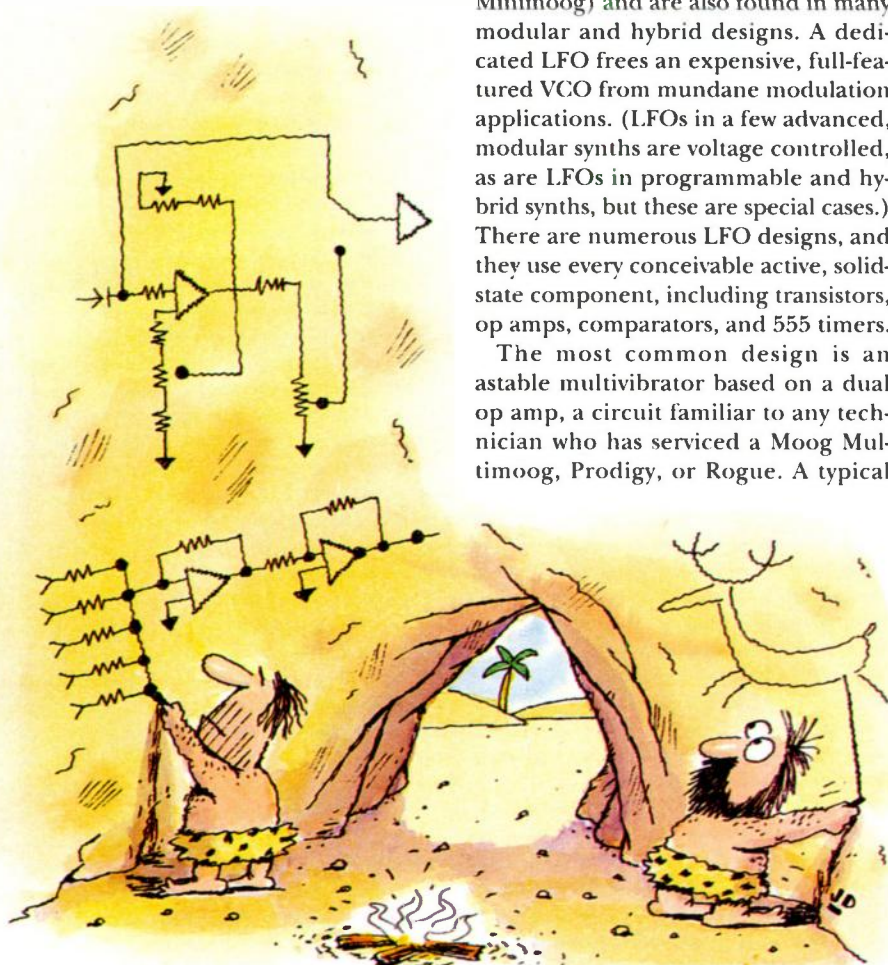
Dedicated LFOs are common features on even the earliest, non-modular analog synths (e.g., the ARP Odyssey, Moog Sonic VI, and Minimoog) and are also found in many modular and hybrid designs. A dedicated LFO frees an expensive, full-featured VCO from mundane modulation applications. (LFOs in a few advanced, modular synths are voltage controlled, as are LFOs in programmable and hybrid synths, but these are special cases.) There are numerous LFO designs, and they use every conceivable active, solid-state component, including transistors, op amps, comparators, and 555 timers.

The most common design is an astable multivibrator based on a dual op amp, a circuit familiar to any technician who has serviced a Moog Multimoog, Prodigy, or Rogue. A typical

circuit configuration is given in Fig. 1. Op amp 1a forms the basic multivibrator in which the frequency is determined by the time constant of the capacitor charge/discharge cycle. Op amp 1b provides a simple, high-impedance buffer in the form of a unity-gain voltage follower. The inherent switching characteristic of this circuit provides an accurate, 50% duty-cycle square wave and a very good approximation of a triangle wave.

This is a fully functional circuit that is appropriate for those who wish to construct a fairly bulletproof LFO for experimentation, modification, or as a stand-alone module. The circuit is highly tolerant, and resistors and capacitors of the next higher or lower value may be freely substituted. A bipolar 9-, 10-, 12-, or 15-volt power supply can be used. Two garden-variety 741 op amps or a 4558 dual op amp are entirely sufficient for this circuit.

Potentiometer R1 adjusts the circuit's time constant and, hence, the LFO frequency. For greater range, increase the value of R1; for less range, decrease the value. (Useful values are found between 500 k Ω and 2 M Ω .) For a higher base frequency, decrease C1; for a lower frequency, increase it. (Useful values range from 1 to 30 microfarads.) Trim pots R5 and R7 calibrate the triangle- and square-wave output-voltage levels; these adjustments are not critical. With a $\pm 15V$ supply and the component



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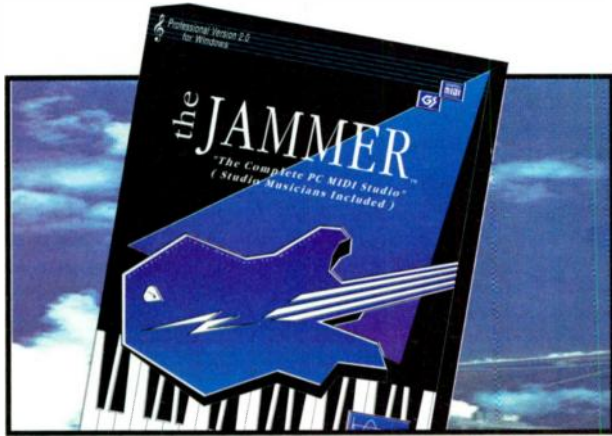
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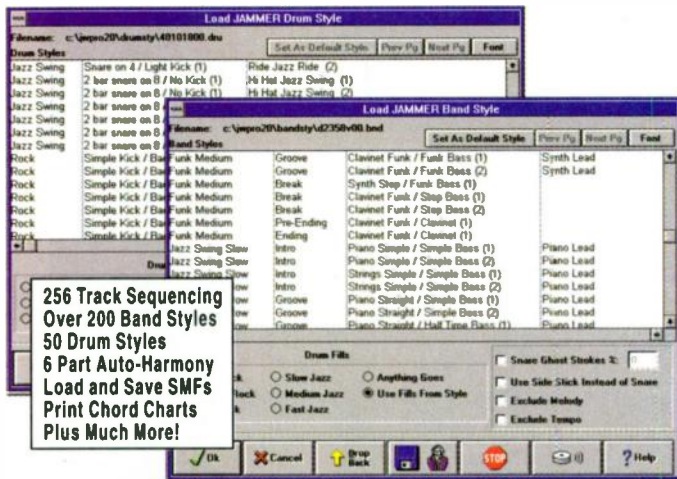
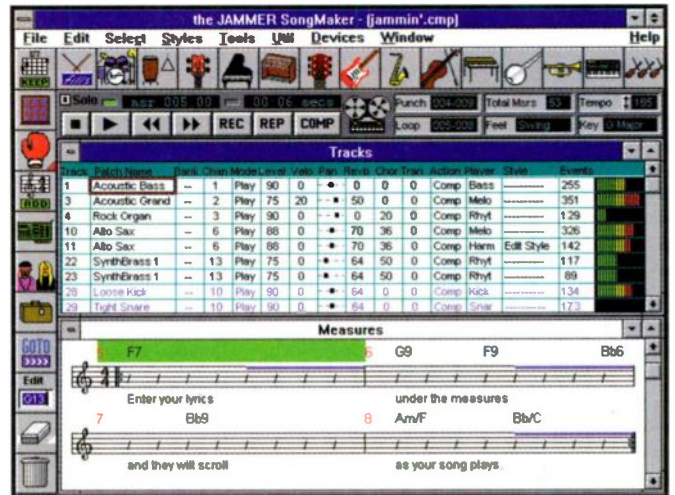
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values indicated, the circuit will easily deliver a frequency range from 0.07 Hz to well into the low audio frequencies and a maximum output voltage in excess of 20 volts peak-to-peak.

Typical failure modes in this type of circuit include a leaky timing capacitor (C1), which can cause frequency errors; distortions of the triangle waveform; erratic operation; and failure of one of the op amps. A defective op amp often exhibits an output "pegged" at one of the supply voltages. In the circuit shown in Fig. 1, if either op amp fails in this way, the LFO output itself will be "pegged." This produces a specific symptom: when the modulation amount is increased from zero, system pitch will increase or decrease markedly; when modulation is set to minimum or, where possible, switched off, system pitch returns approximately to normal.

MOD AND PITCH BEND

Most modulation-control devices use a potentiometer configured as a simple voltage divider, as shown in Fig. 2. This scheme rarely gives trouble until the pot is completely worn out. The Moog

Minimoog, however, configures its mod pot as a variable resistor, and when the pot becomes even slightly worn, excess end resistance causes modulation bleed-through at the minimum setting, even if the pot mechanical orientation is recalibrated. The solution is to rewire the pot as a voltage divider: inside the left-hand controller housing, cut the jumper between pitch-bend pot terminals 1 and 2, and add a wire from terminal 3 to pin 2 of the 12-pin Cinch-Jones connector.

Like modulation controllers, most pitch-bend devices use a pot configured as a voltage divider, though some form of "return to zero" aid is usually provided, typically a return spring or center detent. Pot wear and mechanical jitter interfere with smooth zero-return, so most circuits incorporate a reverse-parallel diode pair to add a "deadband" centered around zero volts, as shown.

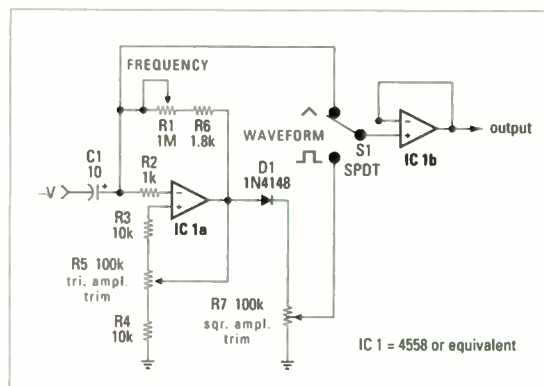


FIG. 1: This fully functional dual op-amp LFO circuit is suitable for modifications. IC1a forms an astable multivibrator that provides both triangle and square waves.

As pitch-bend pot wear increases, the amount of "slop" around the pot center increases. In some cases, especially when a replacement pot is not immediately available, it is helpful to increase the deadband width by adding more diodes, as indicated in Fig. 2b. This is sometimes the only practical fix for difficult pitch-bend circuits that, due to overall wear or poor design, will not reliably return to zero even when a new



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pot is installed. Two reverse-parallel pairs is the recommended maximum. (Note that a few circuit designs provide a zero-center trimpot for pitch bend. Check for this before replacing the pot or adding more diodes.) One pair of diodes is often quite helpful in taming front-panel tuning controls that drift slightly but annoyingly in response to mechanical vibration.

SWITCHING AND MIXING

Switching circuits in analog synths are generally electromechanical, and typical problems can be traced to com-

ponent wear and tear. Intermittent signals, "bursts" of crackles and pops, and noise during pot motion all indicate contamination or wear. Front-panel switches on many designs are simple, open-frame, slide types. They have only average reliability, but they provide access to the contacts for cleaning. Fortunately, replacements are fairly common.

Many designs use standard-size, open-frame pots of the type available from Mouser Electronics (tel. 800/346-6873 or 408/842-5522; fax 408/842-7375) and other common suppliers, but some use specialized pots for which no modern equivalents are readily available. (Only a few older designs use rugged, sealed, Military-Spec RV4 and similar pots.) Often a thorough cleaning will extend the service life of open-frame switches and pots; cleaning should be attempted before replacement.

Use only nonabrasive contact cleaner, and avoid overspray.

Footswitches and pedals are also prone to mechanical wear and tear. The principal failure mode, however, is an open or intermittent cable caused by inadequate strain relief.

Mixing circuits for control voltages are generally similar to their audio counterparts. The most frequently used circuit is the op-amp inverting/summing block (see Fig. 3). The principal difference in the control-voltage version is the omission of input-coupling caps. (The circuit must, of course, admit DC.) Typically, a second op-amp

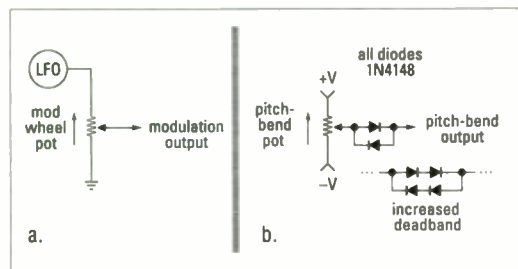


FIG. 2: Most synths use this mod-wheel scheme (a). A sloppy pitch-bend zero-return can sometimes be improved by adding deadband diodes (b).

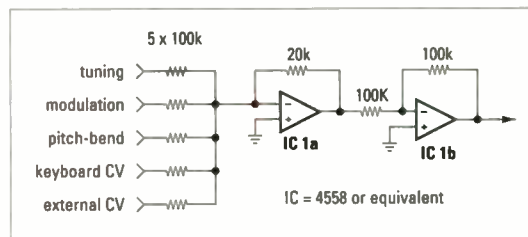


FIG. 3: In this typical control-voltage summing network, IC1a forms an inverting/summing block; IC1b is a unity-gain inverter. The gain in each stage is given by R_f/R_{in} .

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inverting/summing block reinverts the signal to maintain system polarity and sometimes provides additional gain. Common failure modes include the usual "pegged" output caused by a bad op amp. When an instrument idles at subsonic or ultrasonic frequencies and no single CV source seems affected, suspect the summing circuit.

PARTS SUBSTITUTIONS

Many analog-synth components have become difficult to obtain, but in the case of apparently odd-value resistors and obsolete op amps, some straight-forward substitutions can be made with no loss of performance. Summing and gain-stage circuits designed to process control voltages often use hard-to-find and comparatively expensive precision resistors. Though some circuits require precise, oddball values, precision resistors were often used in older designs merely because stable, less-expensive alternatives were not then available.

For example, when an op-amp circuit is used as a simple inverting/summing block, as just described, the *ratio* of the feedback-resistor and input-resistor values, not of the absolute values, determines the circuit accuracy. Replacements may be culled from a selection of near-value resistors by measurement. The Ohms function of even a basic DMM is sufficient for these relative measurements, and relative accuracy is generally good when the resistor values to be measured fall roughly within the same range (10 k Ω to 100 k Ω).

For a unity-gain stage such as that used in Fig. 3 to reinvert the control signal, the situation is even simpler, because to achieve unity gain it is merely necessary for the input and feedback resistors be the *same* value, not a specific value. The resistors might each be 103.8 k Ω or any arbitrary value. As long as they are the same (for practical purposes, very close will do), the circuit will have unity gain. Luckily, the now-common, 2% tolerance, metal-film resistors sold in blister packs (RCA or equivalent) often have average tolerances better than 2%. Moreover, series and parallel combinations of 2% resistors can sometimes substitute for hard-to-find, odd-value, 1% types. Note that, tolerance notwithstanding, metal-film resistors should *not* be replaced with wire-wound, carbon-composition, or carbon-film types. If you are not certain of the original type, use metal film.

Control circuits often employ low-performance op amps, such as the 741 and its various dual counterparts. When servicing analog gear, it is tempting to upgrade any components to be replaced. However, in the case of these old op amps, it is often inadvisable. In typical circuit configurations, such as inverting/summing blocks and noninverting buffers, the higher input impedances of modern FET-input op amps are not needed. Indeed, combined with their higher slew rates, they are a disadvantage and can promote

RFI pickup and circuit instability.

Improved offset is not advantageous, either, as system calibration compensates for this, and improved signal-to-noise figures in microvolts are irrelevant when the output signal is ten volts, peak. (Most of the noise in an analog-synth output comes from other sources.) The 741 and dual 4558 (which replaces the 1458) are still readily available, cheap, and reliable.

EM Contributing Editor Alan Gary Campbell is owner of Musitech.

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An open letter from Morris Ballen, Disc Makers Chairman

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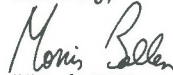
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Sonic CPR for Drums

Rush to the rescue of deeply troubled drum tones.

By Brian Knave

I don't mean to toot my own horn, but when I attended a recent songwriting conference, my productions received numerous compliments about how different they sounded from the usual, run-of-the-mill songwriter's demo. Well, the difference was simple: my songs were tracked with *real drums*.

Evidently, songwriters have relied on sequenced beats for so long that they've forgotten how good real drums can sound. (Of the 200 demos I heard at this conference, at least 95 percent used

sequenced drums.) Don't get me wrong: I sequence drums when it's appropriate, but for the classic styles of American music, such as rock, country, and jazz, the acoustic drum set is simply too legit to quit.

Unfortunately, the drum kit is also one of the hardest instruments to record well. Why? Mostly because it's hard to make a set of drums sound good in the first place. Then there's the quagmire of groans, buzzes, and squeaks attending a set of drums. The task of squelching these noises can drive even experienced pro engineers nuts, so it's no mystery that drum machines get most of the home studio gigs.

But if you've been craving real drums on your home recordings, don't despair. By learning the basics of drum tuning and a few tricks to eliminate unwanted kit noise, you can join the ranks of engineers who have tracked—and conquered—the wild drum beat. Believe me: it *will* mean a thing when your song's got that swing.

CAN'T TUNA FISH

Naturally, it's easiest to get a great drum sound if you're working with great drums, but that doesn't mean cheap drums have to sound cheap. The timbre of a drum is determined by design, construction, materials, and hardware, and therefore cannot readily be altered. The tone of a drum, however, is primarily determined by the type and



Getting great sounds from an acoustic drum set can be an exercise in frustration and terror. But a few tuning tips can save you from the fate of the Dixie Dregs, who simply tossed the whole darn kit into a ditch!

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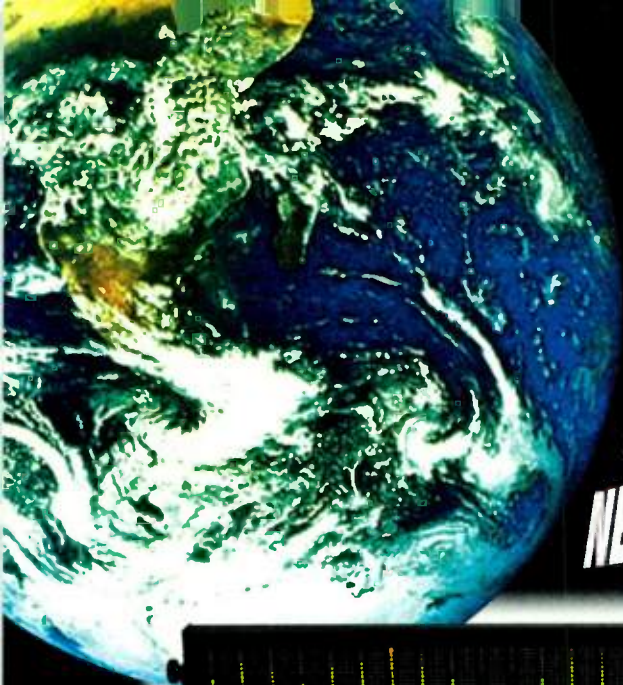
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tuning of the heads. The other critical tone factor is the acoustic environment in which the drum is struck.

Most lame-sounding drums can be resuscitated relatively easily by tuning the heads. It's not a bad idea to buy your own drum key, because drummers don't always carry one. (See sidebar "Drum Medi-Kit.") Like guitar strings, drum heads stretch and go out of tune when they're new and sound dull when old. If the drummer you've hired shows

up with blackened, dented heads caked with duct-tape residue, it might be best to get on the phone and call another prospect. There definitely is a point beyond which a drum head no longer produces a decent tone.

The concept of optimal tuning for a drum relates to finding its sweet spot. This is the pitch where the drum is most resonant or offers the most pleasing mix of attack and sustain. Like a voice or wind instrument, every drum

has its *tessitura*, or range of comfortable sounds. You know a drum is tuned above its tessitura when the heads are so taut the drum sounds choked; it is below its tessitura when the drum sounds like a soggy cereal box.

When tuning an individual drum, start with the bottom head, which is often the most neglected. First go around the drum with a stick or fingertip, tapping beside and between each tension rod and listening for variations in pitch. Tighten the "flat" notes until the pitches are the same all around. (As with a guitar string, always tune *up* to a note, so the pitch will hold.)

Once the bottom head is in tune with itself, you can raise or lower its overall pitch by means of equal, incremental turns of the drum key; I usually start with quarter turns. The process is similar to tightening the lugs on a spare tire (see Fig. 1). The fewer lugs the drum has, the more the pitches will vary between the tension rods. After tightening or loosening the head, tap, listen, and again make adjustments until all pitches are equal. Then, simply follow the same procedure for the top head.

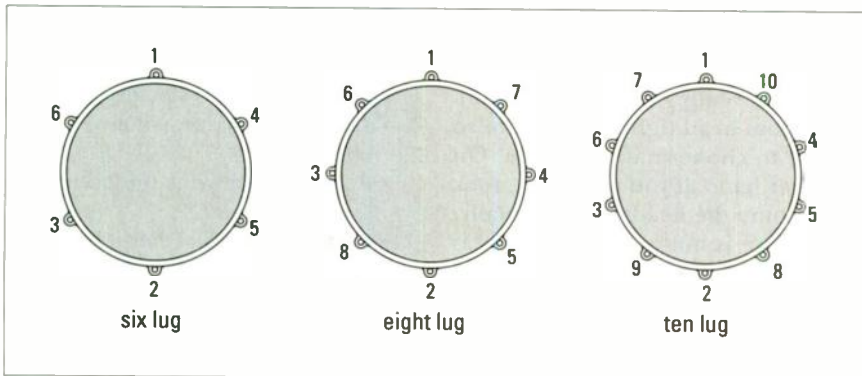


FIG. 1: For even tensioning while tuning a drum, apply incremental turns of the drum key (e.g., quarter turns) as shown in these tuning sequences.

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THE BIG PICTURE

To me, a drum kit sounds best when its tuning emulates a miniature percussion orchestra. The pitches of the drums should range from high (snare) to low (bass), with the tom tones spaced between, descending musically from smallest to largest. Here are some tips for avoiding tonal tragedies.

Kick drums. When tuning a bass drum, go for the lowest fundamental pitch the drum will support. To further reduce harmonic ringing and increase punch, loosen the heads almost to the point of wrinkling. If you want more tone and sustain—for, say, a jazz sound—tighten both heads.

To increase bass response and sheer “oomph,” have the drummer place his or her throne in a corner and set up the drum kit outward from there. If the drummer uses a double-headed bass drum and it sounds too boomy, ask whether he or she will allow you to cut a small hole in the front head, a few inches from the hoop. As long as the hole is just five or six inches in diameter and near the edge of the head, it will reduce resonance slightly (which should ensure that the drummer keeps smiling) while offering you enough mic access to capture more snap.

If the hole is much bigger or is positioned in the center of the head, air escapes so quickly that front-head vibrations are kept to a minimum. This decreases boom and accentuates attack, resulting in the blunt thud most people like in a kick drum. Of course, for optimum thud and minimum boom, remove the front head altogether.

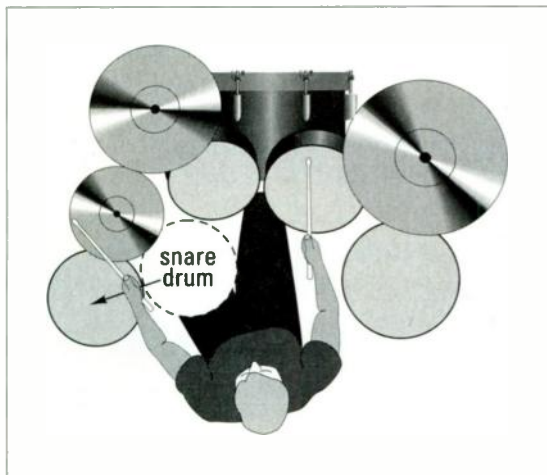


FIG. 2: As a *drastic* last resort for a snare drum that won't stop buzzing, reposition the drum to the left of the hi-hat, away from the other drums.

Obviously, the type of head the drummer uses will contribute to the overall tone. Double-ply, oil-filled, and premuffled heads minimize bass drum overtones, tighten low end, and enhance attack. Single-ply heads maximize low end but soften attack. And here's another useful fact: the beater also affects tone considerably. Ask the drummer to use wood or hard plastic if you want more attack and to use felt if you desire a warmer, rounder tone.

Snare drums. In general, snare drums best fulfill their role when both heads are fairly tight. This helps the drum “pop” and cut through the mix. For a fast, really crisp sound, crank the bottom head tight, though not so tight as to choke snare response. On the other hand, if you need a fat, rock sound, tune the heads looser. Finally, if the snare is not as live sounding as you want, loosen the claws on the snare stand so the drum can vibrate more freely.

Regarding head types, double-ply and dotted heads tend to mute the desirable crack of a snare drum. If the snare has a dull, thuddy sound, the type of batter head could be to blame. Encourage the drummer to switch to a medium-weight, single-ply batter head. Check the bottom head, too. It should be a “snare side” head: super thin, uncoated, and dotless.

A common, frustrating problem with snare drums is the susceptibility of the snares to sympathetic vibrations. When a snare drum buzzes, the culprit is usually the tom tuned closest to the same note as the snare. Often, this is the 10- or 12-inch tom that's physically mounted closest to the snare. One solution is to tune the snare drum higher (and, if necessary, the tom lower). Another solution is to loosen the bottom tension rods on either side of the snares by a half-turn or so. This knocks the snare head somewhat out of tune, making it less able to “hear” other same-note vibrations. This can also be achieved by detuning a single tension rod on the small tom. Of course, in conjunction with these remedies, you should be sure to experiment with various tensions on the snare strainer.

DRUM MEDI-KIT

A good engineer is always prepared to combat “X the Unknown.” If you want to survive acoustic drum sessions, here are some indispensable gadgets.

- Drum key
- Duct tape
- Razor blades and scissors
- Adjustable wrenches, screwdrivers, and heavy pliers
- Can of lightweight oil
- Cymbal felts and sleeves
- Assorted blankets, pillows, and towels
- Roll of strong twine (for securing snares)
- Assorted pieces of cloth, felt, and foam rubber

My own sure-fire, albeit drastic, solution for annoying snare buzz is to reposition the snare drum to the left of the high-hat, away from the rest of the drums (see Fig. 2). It may take a few minutes for the drummer to adjust, but he or she should be able to adapt. Bear in mind, however, that snares *should* buzz a little. If you eliminate all of the sympathetic buzzing, the snare drum is likely to sound like a paper bag.

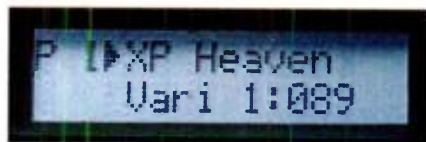
Toms. For toms, a good starting point is to tune the top and bottom heads to the same note. This yields a distinct pitch from the drum—which can then be raised or lowered—and best reveals its inherent timbre. From there, you have two basic variations: top head tighter than bottom head or top head looser. The former allows for a deeper sound without compromising stick articulation; the latter increases sustain and projection, giving the toms a more open, singing quality.

Tom fills are most dramatic when there are discernible intervals between one drum and the next. Try to get at least a minor-third interval between two toms. A smaller interval is difficult to hear, which can make a descending tom fill sound as if it were played on a single drum. Obviously, the more toms there are, the harder it is to put sizable intervals between them. That's one reason massive drum kits are not generally desirable in the studio. Usually, two to four toms are sufficient. It's worth



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Polyphony	28	32
Parts	16	16
Keyboard Modes	Dual, Split and X-Dual	Combi
Wave Memory	8 Mbyte	6 Mbyte
Tones	338 preset 256 user	128 preset 100 user
Rhythm Kits	16 preset 20 user	8 preset 0 user
Arpeggiator	Multi-function	No
Realtime Controller	PB/Mod lever, 2 sliders	PB/Mod wheels
Computer interface	Yes	Yes

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noting that many great drum tracks consist only of kick, snare, hi-hat, and a cymbal or two. (Listen to Charlie Watts with the Rolling Stones.) If you realize that the drummer isn't using the toms, it's not a bad idea to remove them from the kit. This simple action will minimize creaking hardware and the ringing of sympathetic drum overtones.

MUFFLE IT

The purpose of muffling is to reduce overtones and volume, so it should be the final stage in getting a good drum sound. If a drum is ringing too much for your taste, exhaust all the tuning options I've discussed *before* grabbing



Tom fills are most dramatic when there are discernible intervals between one drum and the next.

some duct tape and damping the life out of a tom, snare, or kick drum. Also, keep in mind that a drum that rings too much when soloed may sound great after it's mixed in with the other instruments on the track.

The kick drum is the only drum that should ever be muffled from the inside. Favorite mufflers are feather pillows, packing blankets, pieces of foam rubber, and specially designed cushions that attach to the drum's inner shell. The more the material touches the head(s), the greater the dampening effect. Experiment with various materials and placements. Also, try positioning the material lightly against the batter head. This allows a fuller tone by letting the muffler bounce with the motion of the head.

Snares can be muffled with commercially available O-rings that lie flat on the drum. (Drummers sometimes cut these from old drum heads.) These are excellent mufflers, as they don't obstruct the natural motion of the head. If an O-ring kills more sound than you want, chop it in half.

I've also gotten good results with small folds of cloth, felt, foam rubber, and even sanitary napkins taped near the hoop. With the right heads and proper tuning, toms shouldn't require muffling at all. If you must dampen, though, what works for the snare also works for the toms.

SQUEAK, RATTLE & GROAN

Drum kits often produce a symphony of rattles and squeaks, and bass-drum pedals are usually the prime offenders. Make sure all of the pedal's adjustment screws are snug, and then put a drop of lightweight household oil on each moving part (including the hinge at the base of the footplate). Do the same for the hi-hat pedal if it squeaks. Do not, however, use WD-40. This workshop wonder works great initially, but it is a solvent and can eventually cause moving parts to freeze up.

Noises from tom mounts should be hunted down and eliminated by re-adjusting clamps and tightening nuts. If mounted toms bang against the kick drum or each other, tape pieces of foam rubber in between. Noisy cymbal stands may require new sleeves or extra felts.

A common problem with old drums is rattling lugs. Unfortunately, the only sure solution is to remove the lugs and stuff them with pieces of foam rubber—a chore the drummer should perform at home. But in an emergency, you can tape dish towels or chunks of foam rubber around the offending lugs to temporarily mute the rattling.

PATIENT REVIVED

Now you're armed with enough information to resuscitate all but the most terminally dysfunctional drum. But remember, drummers (like most instrumentalists) are sometimes uncomfortable with an engineer tweaking "their" sound, so be polite when you intervene. Hopefully, the drummer will be pleased by how much better the kit sounds once you've helped tune it.

You can also help drummers help themselves by encouraging them to bring extra sticks (both wood and plastic tipped), extra cymbals, and an extra snare drum. These items offer increased tonal options that can further enhance your drum tracks.

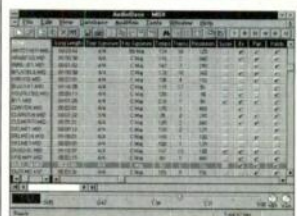
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Reviews

- 112 • Akai DR8
- 121 • Tracer Technologies DART 1.0 (Win)
- 130 • Doepfer MS-404
- 134 • PreSonus DCP-8
- 136 • LA Drum Studio/Beatboy/D'nai
- 142 • Studiomaster Mixdown Classic 8

Akai DR8

By Erik Hawkins

This professional modular hard-disk recorder offers options galore.

Two years ago, Akai produced the DR4d, the first affordable, modular, multitrack hard-disk recorder. The DR4d didn't require a computer, but it lacked the serious features and sufficient tracks to make it a completely satisfying professional machine. Fortunately, Akai's new DR8 picks up where the DR4d left off.



Akai's DR8 modular hard-disk recorder offers superior audio quality, an amazing variety of expansion options, and a completely professional design.

The 8-track DR8 boasts a cornucopia of goodies. Its many synchronization options make it a great choice for a video suite or as a companion to a MDM tape-based setup. Up to seven DR8s can be synched together for a total of 56 tracks. An onboard, automated mixer provides level and pan control for its eight internal tracks and eight external sound sources.

The 4U rack-mount DR8 is sixteen inches deep and weighs in at a hefty 35 pounds. It features an internal power supply and a detachable IEC power

cord. A convenient grounding post is located on its rear panel, which is useful for dealing with ground loops. The rocker-type power switch on its face is recessed in the on position, so you won't accidentally turn off the power.

HAVE IT YOUR WAY

No other modular multitrack recorder can approach the DR8's expandability. Five expansion slots are available on the unit's rear panel, and there is enough internal space for other upgrades. Optional expansion boards include the IB801S SCSI interface (\$299), IB802T SMPTE interface (\$379), IB803M MIDI interface (\$299), and IB804A ADAT Lightpipe interface (\$299). I was able to test all of these boards.

By the time you read this, the IB805R RS422 board for Sony 9-pin connections will also be available (\$299), along with the IB806B Bi-phase (\$299), a synchronization board for the projectors, dubbing machines, and other equipment used in film post-production.

Even more exciting, Akai will soon release two parametric EQ expansion boards. The EQ8 (\$550) adds three bands of parametric EQ to each of the eight mixer channels that handle disk tracks, and the EQ16 (\$699) adds EQ to all sixteen mixer channels. You could think of options Akai hasn't announced, but the current list of expansion boards certainly covers all the options one usually hopes for and more.

INS AND OUTS

The DR8 comes with a full complement of audio outputs. A headphone output and a level knob are on the face of the unit. Analog, line-level outputs are provided for the eight tracks, the master L/R bus, and the stereo aux send. The track outputs come before the internal mixer, and the master L/R outs and aux sends are post-mixer. All analog outputs are on balanced (TRS), 1/4-inch jacks that also accept unbalanced lines. They are switchable, in pairs, between low (-10 dBu) and high (+4 dBu) operating levels.

The unit's eight analog inputs also are on balanced, 1/4-inch jacks and accept unbalanced plugs. They are switchable, in pairs, between low (0 dBu), medium (+20 dBu), and high (+40 dBu) gain levels. A front-panel gain/trim pot is provided for each analog input. All eight inputs are available simultaneously, which makes the DR8 an excellent choice for recording multitrack instrumental and vocal sections, as well as live bands.

In addition, the unit comes with both AES/EBU (on XLR connectors) and S/PDIF (RCA coax) digital I/O. The digital outs duplicate, and are simultaneously available with, the master L/R analog outputs.

Taking full advantage of its digital architecture, the DR8 allows any input—including the digital inputs—to be assigned to any track. This is a great feature if you only have a 4-bus or 2-bus mixer; you can just plug your mixer's bus outputs into any of the DR8's inputs and do all of your track assignments from the DR8's front panel. With no need for an external patch bay, you increase the sound quality and decrease the chances of bad connections, bad cables, and grounding problems.

DISKS AND DACS

The DR8 can record and play back at 48, 44.1, 32, and 44.056 kHz. (The 44.056 kHz sample rate is recommended for use when synchronizing to 59.94 kHz NTSC color video.) The A/D converters are 18-bit, 64x oversampling, and the DACs are 20-bit, 8x oversampling. The internal processing is 28-bit linear. The unit sounds great; its sound is crystal clear and precise, as you would expect from a digital recorder, but not overly harsh. As with other such machines, the disk format is 16-bit.

The base price does not include a hard drive, but a 1 GB hard disk is available for another \$800, and you can install a second internal hard drive. The unit addresses a maximum of 4 GB internally, but its 50-pin SCSI port allows you to add up to six external disk drives for additional recording time. Akai recommends you use hard disks with a seek time less than 10 ms and a transfer rate better than 2 MB per second.

GET YOUR BACKUP

At least three types of backup media are supported. The easiest backup method is the DR8's Disk Copy func-

tion, which simply copies the internal hard-disk data to an external disk, including the new Iomega Jaz 1 GB removable drive. In fact, Akai is bundling the DR8 with the Jaz drive as its primary storage medium, which is a great package.

You can also back up to DAT via the DR8's digital I/O, but this method is tedious because the current operating system cannot back up individual songs and it takes forever to back up the entire hard drive. According to Akai, an upcoming software release will let you back up individual songs.

What's more, the DR8 is an awful judge of how long it will take to perform a backup. On one of my backups, the machine estimated a backup time of 30 minutes; it actually took 70 minutes. (The manual warns about this discrepancy.) Until this problem is fixed, I recommend using a 120-minute DAT.

The smoothest way of backing up is to ADAT via the optional ADAT Lightpipe board. It took me approximately twenty minutes to backup a 1 GB drive that was about 80 percent full. Unfortunately, there is no way to verify your backups. However, by the time you read this, support will be added for Exabyte backup, which can be verified.

GETTING AROUND

At first glance, the layout of the DR8's front panel appears well organized and thoughtfully designed. There appears to be plenty of dedicated buttons and a big jog/shuttle wheel that just begs to be manipulated. But I was surprised to find the unit's front-panel layout rather confusing. (Several people who worked with the machine commented on this.)

Data entry is tedious. Although locate points can be entered from the 10-key pad, everything else (e.g., imbedded pages and mixer values) must be dialed up on the jog/shuttle wheel. Fortunately, Akai offers the MT8 (\$799) remote control for the DR8's mixer. The MT8 wasn't available when I tested the DR8, but it should greatly improve data entry.

The wheel works great for jog and shuttle operations; in fact, it's the best jog/shuttle wheel I've found on a hard-disk recorder. It works exactly like a video-editing jog/shuttle wheel and is invaluable for finding edit points.

But using it as a data-entry device is like playing Sit and Spin: you have to spin the wheel like mad to get to a par-

ticular number. Moreover, there are no dedicated increment/decrement buttons, which would facilitate data-entry immensely.

This situation should improve when Akai releases the DL16 remote control (\$1,595) in the first quarter of 1996. The remote unit will provide transport controls, editing controls, and a complete mixer interface with sixteen faders, pan pots, and an EQ strip. In the second quarter of 1996, Akai expects to upgrade the DL16, adding a built-in MIDI sequencer for dynamic automation.

TAKING CONTROL

The Akai DR8 is roughly divided into four control sections: Mixer, Transport/Locate, Edit, and Synchronization. I say "roughly" because several buttons seem out of place. For example, I spent far too long looking for the Auto-Record Rehearsal button, which is located in the Mix section instead of with the Auto Record buttons. The Sub-Menu button is in the Mix section instead of with the rest of the data-entry buttons, and the SMPTE Offset button is not in the Synchronization section.

On the other hand, the Transport section is nicely laid out. Standard tape-style controls are surrounded by a plethora of specialized Locate and Playback buttons. There are four specialized Playback buttons: To, Over, From, and In to Out. The To function starts playback at a user-selectable point before the current position, plays up to the current position, and stops. Over starts playback before the current position, plays over (i.e., including) that point, and stops. From starts playback from the current position, plays forward, and stops. The In to Out Playback button plays from the In locate point to the Out locate point and stops.

The pre- and post-cue times for all of these playback functions are user-definable. Varispeed during playback can be adjusted from -41.3% to +58.3%.

FINDING A GOOD LOCATION

You get four specialized Locate buttons: RTZ, In, Out, and Last. An impressive total of 109 locate points are available at the press of a couple of buttons. Unfortunately, you can't name the locate points, so it's wise to keep your pen and paper handy. (As we'll discuss later, a new SuperView VGA board will solve this problem.) The

Preroll function allows a user-definable preroll time to be created. When this function is selected, the preroll time is added to any Locate or Playback button you press.

The locations stored on the In and Out Locate buttons dictate the auto-record punch points, the edit in/out points, and the loop start/end points for the Repeat Play function. The DR8 can store nine separate sets of In and Out points in addition to the locate points. The last manual recording move is automatically stored to the In and Out buttons. This includes punches made from the footswitch jack located on the DR8's front panel. This feature is excellent; if the punch was perfect but the take wasn't, the DR8 can recall that punch and automatically repeat it until you get the perfect take.

The Last button remembers the point from which you last played and the point at which you stopped. One press gets you to the last played-from point, and two presses in rapid succession gets you to the last stopped-at point.

If the DR8 is playing, hitting a locate point stops playback. Consequently,

the Play button must be pressed after hitting a locate point to begin playing from the selected location. The location features would be more user friendly if the DR8 continued playing when a locate point is selected during playback.

ON DISPLAY

The unit's parameters are shown on a big 2-line display. The first line is fluorescent and displays absolute or relative SMPTE time (accurate to a tenth of a frame) or bars, beats, and clocks. The second line uses LEDs and displays the DR8's current mode—Sub-Menu, Song, Edit, or Mix—along with the parameters' status or value in that mode. For example, in Sub-Menu mode, values for everything from LED brightness to SMPTE status to disk space are displayed.

Also on the big LED is a Busy light that indicates when the DR8 is processing information. It seems to be lit a lot of the time, but it is not usually apparent that the unit has paused to crunch numbers. In addition, eight little red lights indicate whether a track has been

recorded on. The lights are useful for anticipating an upcoming signal before it registers on a track meter.

Track metering is handled by fourteen 20-segment, LED bargraphs, which are switchable between normal or peak-hold metering. There are individual meters for all eight tracks, the stereo aux send, the L/R bus used for internal track ping-ponging, and the master L/R. Track metering can be pre- or post-mixer.

The meters for the stereo aux send, the internal L/R bus, and the master L/R bus are always post-mixer. Directly beneath the LED bargraphs are track Record Enable buttons that double as Track Select buttons for the mixer.

The DR8's metering, though comprehensive, is disconcerting at first. From left to right, there are the eight track meters; two unused meters; and the six stereo-output meters, which display the stereo aux send, the internal L/R bus, and the master L/R bus.

Unfortunately, the track Record Enable buttons and Track Select buttons are not lined up with their respective meters. Sixteen LED bargraphs are

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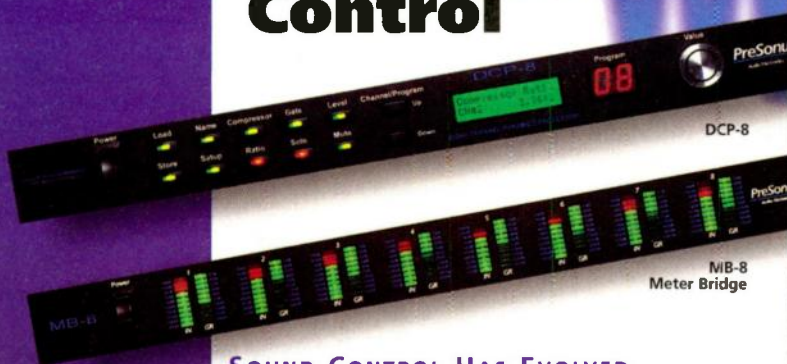


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DENNIS DURANTE
Warner Brothers,
Post Production,
Los Angeles, Ca

● DR8

packed into the same space as eight Record Enable buttons and eight Select buttons. The master L/R meters line up with the track 7 and 8 Record Enable buttons, and the meters for tracks 7 and 8 line up with track 4's Record Enable button. It is easy to make mistakes.

MIXING AND MATCHING

As mentioned earlier, the DR8 has an internal, 16-channel, digital mixer. The unit's eight channels are dedicated to the internal tracks, and eight channels accept external sound sources, such as effects returns, submixers, and synthesizers. A Thru Mix button gets you to the channels for the external sound sources. The track parameters are adjusted by selecting a track and dialing up a value with the jog/shuttle wheel.

All mixer channels have volume, pan, solo, and mute controls. The aux send for each channel only has a volume adjustment. The aux sends can operate as dual mono (i.e., the same signal is sent to both send outputs) or as a pannable stereo bus and can be placed before or after the channel's volume control.

Snapshot automation of volume, pan, master L/R bus level, EQ, and aux-send level is available on all channels. With snapshot automation, a special Fade function in OS version 1.3 allows sequential snapshots of individual tracks or the master L/R bus to be faded in or out over a specified time, from 100 ms to 12.6 seconds. The fades sound nice and smooth with no perceptible digital stepping.

However, the DR8's mixer can be dynamically automated via MIDI if equipped with the MIDI interface board. Each track and each input channel respond on their own preset MIDI channels, assigned sequentially, so that the eight tracks are on MIDI channels 1 to 8 and the inputs are on channels 9 to 16. You can assign any Control Change message (0 to 127) to enable/disable the internal L/R bus and control track level and pan, aux-send level, and master L/R bus level.

However, these MIDI messages are not transmitted when you use the unit's front-panel controls. Songs can be recalled via Program Changes. I used a JLCoooper FaderMaster Pro to remote-control the mixer and transport (discussed in the next section), which worked wonderfully.

LEGAL SLAVERY

The DR8 operates beautifully as a master or a slave. However, for best slave operation, make sure you have OS 1.41 or higher, as version 1.3 has problems with this. The unit will accept an external digital clock source, a composite color video signal, or a black-burst signal on the rear-panel BNC connector. (The BNC connector is switchable between unterminated or 75 ohms, terminated.)

With the SMPTE expansion board, the DR8 can read and write SMPTE at 24, 25 (EBU), 29.97, and 30 fps, as well as 29.97 and 30 drop-frame. The MIDI expansion board lets the unit read or output MIDI Time Code, MIDI Clock, and MIDI Machine Control. The unit also transmits Song Position Pointer; Start, Stop, and Continue; and Song Select.

In Song mode, all the synchronization settings and tempo maps can be stored for each Song. Recalling a Song recalls synchronization settings and tempo maps only. A maximum of ten Songs can be stored in the DR8 at once. When this mode is engaged, the title of the current song is displayed along with a readout of current time in bars/beats/clocks or SMPTE. The DR8 outputs sync signals only when the Sync key is on, regardless of the Song's output-sync setting.

I successfully slaved the DR8 to Alesis' BRC (via SMPTE and MTC), JLCopier's PPS-100 (SMPTE and MTC) and Digital Expression's SoftSplice digital-audio editor (SMPTE). Mark of the Unicorn's *Performer* and Opcode's *Vision* sequencers synched fine with the DR8 as a master.

CUTTING AND SPLICING

If you are used to working on a computer-based DAW, editing on the DR8 feels archaic. Compared to computer-based systems, the unit offers only rudimentary assembly-edit functions: Copy, Move, Insert, Erase, Delete, and Slip. On the other hand, these functions are invaluable if you don't own a computer-based editing system or are too lazy to boot the beast up. When you use the DR8 as a digital editor, it is a comfy feeling to know that, just like a computer-based editor, it has an Undo function that reverses your last edit.

Using the Move edit function, you can overwrite existing material with other material in the track, or you can move material to a specific spot and shift the existing program material back. The Insert command creates a

blank space and moves existing program material back; Erase clears existing material, leaving an audible gap; and Delete clears existing material, leaving no audible gap. The Slip command moves material from the In locate point to the current position (shown on the LED), leaving a gap in the program if the In point is after the current position.

The tempo map allows you to do edits according to beats and bars. This is convenient for moving musical phrases and doing butt splices precisely on beat. In addition, the Copy function allows the number of repeats to be specified, up to 99. This feature, combined with the tempo map, makes life a whole lot easier because it is a simple and efficient way of looping things into your song (e.g., drum loops or choruses).

Akai is introducing an expansion board that should simplify access to the DR8's features and increase its editing power considerably. The optional SuperView VGA board (\$699) not only adds support for a VGA monitor, it gives you a custom, interactive interface borrowed from Akai's higher-end DD1500 digital-audio workstation.

With the SuperView board, you'll be able to connect a computer keyboard for ASCII input, see all sixteen tracks or zoom in to view one track, name locate points (which answers my earlier complaint), highlight audio regions, and zoom in to the sample level. You still won't be able to edit the waveforms or custom-draw fade curves, so the SuperView board won't make the DR8 a full-blown DAW, but it will be a huge improvement to a fine machine.

SOMETHING MORE

There are so many hard-disk recorders out there on the market that for a unit to stand above all the rest, it must not only be dependable and have a killer price but must sport innovative and useful features. As if the DR8's ruggedness, plethora of locate points, mixer, editing features, sublime jog/shuttle wheel, and expandability weren't enough, the DR8 has a Take feature, that, in my opinion, blows the competition away.

The Take feature takes full advantage of random-access recording technology by allowing a bank of up to six Takes to be linked to a set of tracks. If you are unsure about a Take, you can record five more and compare all six.

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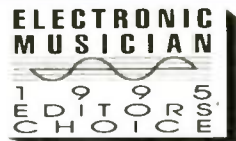
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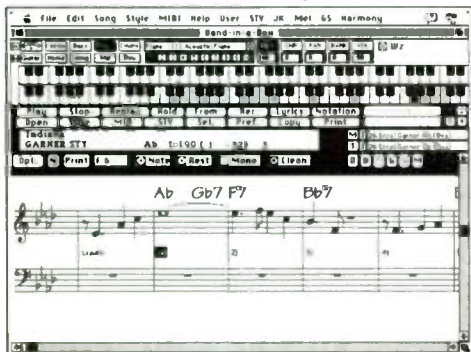
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Once you decide which Take you like, you simply write that Take to disk using the Commit function and move on to the next section. I can't extol the virtues of this feature enough; it's almost like getting another five tracks to use as a scratch pad. The Takes are retained when the power is turned off.

WOULDN'T IT BE LOVELY?

I have two constructive criticisms before I depart. First, it would really be wonderful if when you recall a Song in Song mode, the Song's set of locate

points and mixer settings were recalled along with the sync and tempo settings. Currently, you have to keep detailed records of what locate points and snapshots are tied to which songs.

My second point regards the transport functions. In Play mode, if you press Play and Fast Forward or Rewind, you can hear the audio. However, right now there's only one speed: blazing. I would like to be able to choose between three Fast Forward and Rewind speeds upon multiple presses of the FF and Rewind buttons, like on a profes-

sional MTR: one press for slow, two quick presses for medium, and three quick presses for fast.

A NICE PAIR

Although at first I got hung up with its front-panel layout, after using the DR8 for a few weeks, I learned where things were, and this ceased to be a problem. Fortunately, the manual is reasonably well written. Besides, I'll put up with its interface in exchange for its solid feature set.

The DR8 would be great for live recording and for use anyplace where portability, speed, and convenience are more important than detailed, computer-style editing. In addition, it offers a lot more editing capabilities than any tape recorder, digital or analog.

Speaking of digital tape, if you own an ADAT and are thinking of getting a second one, you should consider pairing it with a DR8 and ADAT Lightpipe board instead. You could effortlessly and endlessly bounce tracks between the ADAT and DR8, mixing to the DR8, cutting vocal tracks with automated recording, editing takes together, and bouncing it all back to tape. If you can't finish one project before the next one starts, just back up the DR8 tracks to ADAT and erase the hard disk.

Here's the kicker: with the DR8's eight external mixer inputs, you could plug your ADAT right into the back of the DR8 and automate its mixdown without an external mixer or a computer. Now that's cool!

If eight tracks aren't enough, you can link two DR8s, but it would be more cost effective to buy the DR16 (\$4,995

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AUDIO QUALITY	●	●	●	●	◐
VALUE	●	●	●	◐	

without disk drive). This 16-channel unit is identical to the DR8 in all its features and uses the same options. You can link it to DR8s or other DR16s as you expand your studio. According to an Akai spokesperson, the DR16 can record and play back all sixteen tracks with a single Iomega Jaz drive.

The DR8 is a solid, professional unit that syncs like a jewel and has enough innovative features and expandability to keep it above the glut of hard-disk recorders for some time.

Erik Hawkins, a producer and musician in Los Angeles County and the San Francisco Bay Area, is currently wrestling the space/time continuum to get more time in a day.

Tracer Technologies DART 1.0 (Windows)

By Zack Price

**Take aim at
pops, clicks,
and hiss.**

It might be hard to believe at times, but not every recording in the world can be found on CD or DAT. Even some of those that are in the digital domain might not have been recorded with the greatest care or concern for clean audio. In fact, there are many old recordings, video and film soundtracks, and personal recordings just waiting to be restored to some semblance of sonic clarity.

Tracer Technologies now provides an affordable, stand-alone alternative to high-priced audio-restoration technology with the introduction of *DART (Digital Audio Restoration Technology)*, a Windows-based program that removes pops, clicks, hiss, and other types of noise from digital audio files. This is not the only affordable software solution of this type—Sonic Foundry makes a noise-reduction plug-in for their *Sound Forge* program for \$299—but it's the only affordable stand-alone solution.

HOW IT WORKS

DART starts by analyzing a sound file and building a mathematical model of the audio signal's changes over time.

Don't be a Tape-based googlehumper.

In 1856, Charles Darwin determined that the *Tape-based googlehumper* species died off because of its failure to evolve with the times. 150 years later, E-mu's DARWIN 8-track Digital Hard Disk Recorder is proving to be the salvation of the digital recording species, with its highly evolved functionality and streamlined cost. It's true: DARWIN delivers the power of digital audio workstation-style recording and editing at a price every *Homo erectus* can afford.

Play music? Doing some recording? You won't believe what DARWIN will do for your creative process! That's because DARWIN's heart pumps with the power of non-destructive random access recording technology. Consider the benefits of that over taped-based beasts:

- Effortlessly cut and paste that perfect chorus throughout a tune
- Completely rearrange a composition without screwing up the original
- Instantly resurrect that insane guitar riff you accidentally wiped out
- Create a virtually unlimited number of tracks from a single unit
- Avoid time wasted waiting for tape rewind
- Operation so easy and evolved, even a dinosaur can run it

Any question about who will be picking who's teeth with who's bones in the recording food chain? Face it, you need this thing.

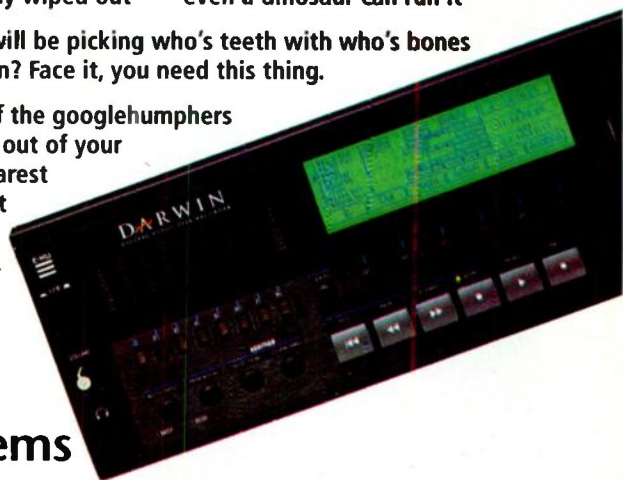
Don't make the mistake of the googlehumpers before you. Spit that tape out of your mouth and sail to your nearest E-mu dealer to learn about the DARWIN Digital Audio Disk Recorder in the flesh. After all, DARWIN is... the natural selection.

E-MU



E-mu Systems

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• DART

It then processes the file with its Tri-Cleanse filter system, which includes three stages: Smoothing, Postfiltering, and Outlier Detection.

First, Smoothing removes as much broadband noise—vinyl-surface noise, tape hiss, and other forms of constant noise—as possible, using an algorithm called a Kalman filter. Second, Postfiltering applies an adaptive lowpass filter to the file. This filter is applied to sections of the file where all high frequencies are at the same level, which *DART* interprets as hiss. If there are certain frequencies at a higher volume than the surrounding frequencies, the effect of this filter is reduced.

Third, impulsive disturbances (pops, clicks, and crackles) are removed by the Outlier Detector, which scans the file for short spikes (up to 1,500 samples in length) that exceed a certain threshold level. The initial threshold value is user definable (more in a moment), but it varies throughout the file: the threshold is lower in soft passages and higher in loud sections. The program then removes these spikes and replaces them with samples from before or after the spike that best fit in the gap according to *DART*'s analysis.

SESSION BASICS

The first step in a *DART* session is opening or recording a sound file for processing. For recording new files, *DART* defaults to a sampling rate of 22.05 kHz mono with 16-bit resolution, but the program also supports sampling rates of 11.025 and 44.1 kHz. It can handle mono or stereo files with 8- or 16-bit resolution (see Fig. 1). Recording and playback require any MME-compatible sound card. Pre-recorded files must be at one of the supported sample rates, and you can't change the rate of a file once it's recorded.

After recording a file, *DART* asks whether you want to "register" it. (You can register an existing file, as well.) Answer "yes" to take advantage of the Sound File Manager, one of *DART*'s more powerful features. The Sound File Manager is a librarian utility that helps you organize and keep track of all processed files derived from a particular root file (original sound file). All information concerning original and processed files can be accessed from the librarian's Soundtree window (see Fig. 2).

When the Soundtree window is

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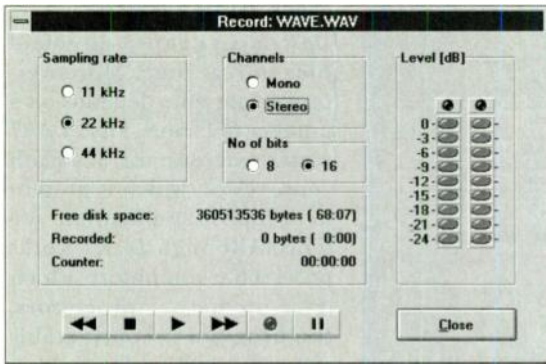


FIG. 1: The Record window allows you to record a new file into DART.

opened, you can see which files were generated directly from the root file and which files are offshoots of processed files. You can listen to any sound file in the tree or view detailed information concerning it. You can also open a file to see its waveform display or to process it further. You can even delete a sound file from this window. Finally, you can tag any file name in the tree with smiley faces to denote which files were processed to your satisfaction.

CLEAN IT UP

After opening or recording a sound file, the next step is to clean it up. You can process an entire file, the portion displayed in the sound-file window, or a selected block. New users should start with the Easy Run window (see Fig. 3). The default settings restore most sound files to acceptable standards of quality. In fact, even experienced users should be satisfied with how most sound files

turn out using the Easy Run settings. The Easy Run window is also a good place to experiment with the parameter settings. For instance, you can independently disable Smoothing, Postfiltering, and Outlier Detection. In addition, each stage offers a single parameter that determines the amount of processing performed by that stage. The value ranges of these parameters seem to be rather arbitrary and meaningless. The Smoothing and Postfiltering parameters range from 0.0 to

2.0; the Outlier Detector threshold ranges from 3.0 to 10.0. It's difficult to get a feel for what these numbers mean except by trial and error. According to Tracer, smaller values offer more precise calculations, and larger values look at the file less stringently.

After gaining a little experience,

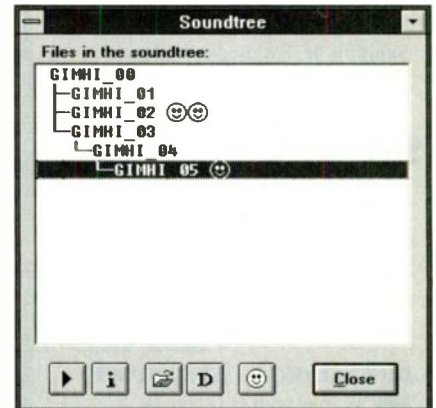


FIG. 2: The Soundtree window shows the processing history of each file derived from a particular root file. The user can also play, open, or delete files as well as display file information and mark preferred files.

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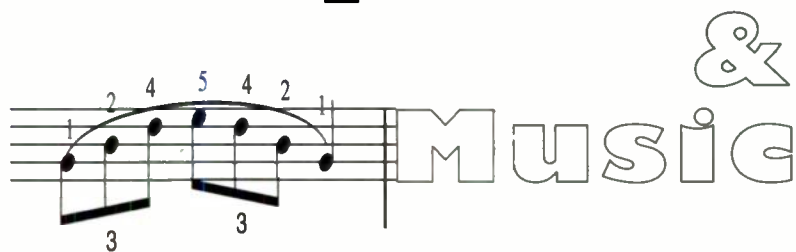
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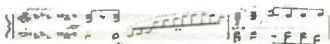
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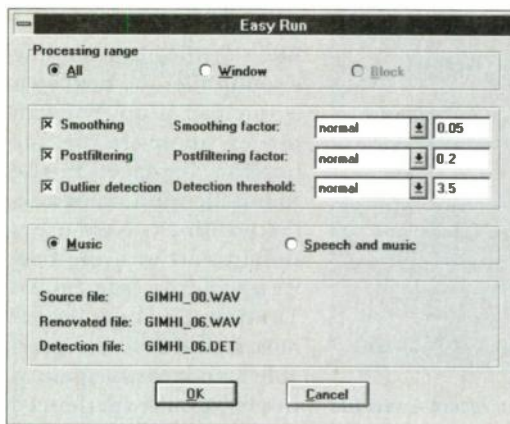


FIG. 3: The Easy Run window lets you apply the program's TriCleanse filter with default settings or with your own settings.

more advanced users may want to bypass the Easy Run option and use the Run All, Run Window, or Run Block mode. This is especially true when using the multiple-passes technique. In this technique, the destination file becomes a source file that is processed again, perhaps with different settings. Filters can be individually disabled or adjusted to fine tune the filtering process.

By its nature, spoken material poses special processing problems, as pitch-related pulses can be easily confused with noise pulses. However, *DART* includes a special routine to handle speech.

TIME IS RELATIVE

DART does not process sound files in real time. Moreover, processing time depends on a number of factors. First, *DART* makes extensive use of a math coprocessor, which is present in 80486DX and Pentium systems. Although *DART* works on '486SX computers, which have no math coprocessors, the program is considerably slower.

Processor speed is equally important. *DART* can process a 22.05 kHz, mono, 16-bit file almost as quickly as real time (1.1x) on a 100 MHz Pentium. By contrast, a '486DX-33 computer takes six times real time to process the same file. (My 100 MHz '486DX processed files at 2.2 times real time, on average.)

Although it's not stated in the manual, processing time also depends on the sample-rate settings. As you might expect, each sample rate affects the processing time by a factor of two. On my system, for instance, a 22.05 kHz, stereo, 16-bit file took 4.3 times real time to process, but the same material recorded at 44.1 kHz took 8.7 times real time to complete processing.

Processing time is also affected by the parameter settings, especially the

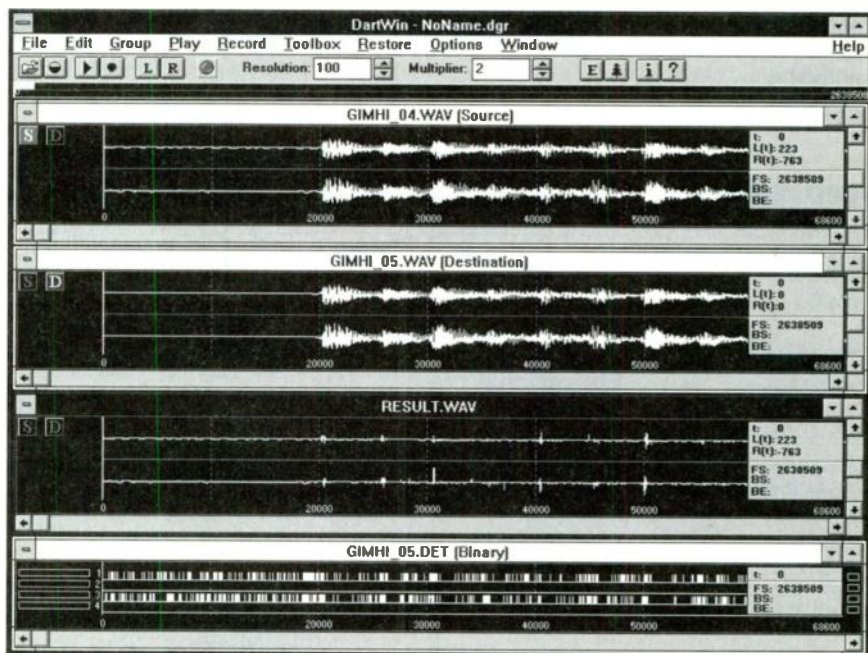


FIG. 4: Once a file has been processed, you can display the source file, destination file, result file (which includes the material removed from the source file), and the binary-detection file (which includes markers at each point where the program detected an impulsive disturbance).

Outlier Detector. Setting the detector threshold too low can cause *DART* to interpret every large transient peak as a pop or click, even when it isn't. In addition, low threshold settings slow down processing time considerably. Conversely, processing time speeds up if you turn off the Outlier Detector. In my case, the same 22.05 kHz, stereo, 16-bit file took 4.3 times real time to process with the Outlier Detector on and 3.6 times real time with the Outlier Detector off.

NAUGHTY BITS

Once a file has been processed, four windows display the source file, destination file, result file, and binary-detection file (see Fig. 4). Not surprisingly, the Source and Destination windows display a graphic representation of the original file and destination file, respectively.

The binary-detection file reveals spikes selected by the Outlier Detector. Lines 1 and 3 in this window include small, vertical bars representing any tagged spikes that encompass 60 samples or fewer. You can also override the Outlier Detector's decisions or select spikes yourself to suppress noises the Outlier Detector missed.

Lines 2 and 4 identify large sections of 61 to 1,500 samples for processing. Once these sections are removed, *DART* reconstructs each "disaster area" by replacing the block with material that immediately precedes or follows it. The replacement material can be selected automatically, or you can make the selection yourself.

TOOL TIME

As you might guess, extensively editing a binary-detection file can quickly become tedious. However, *DART* offers some extra editing tools that take care of most problems before things get to this stage. For example, you can mute the right or left channel of a stereo file to further isolate trouble spots. *DART* processes both muted and unmuted channels, but you can split one file into two separate files and process them separately. Afterwards, you can reunite the two files back into one stereo file again.

You'll find the usual Cut, Copy, and Paste functions. In addition, Scale amplifies or attenuates the signal by a desired amount, and Maximize increases the signal's volume to its maximum level before clipping. This is not the

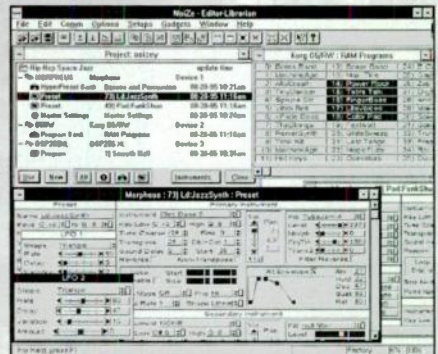
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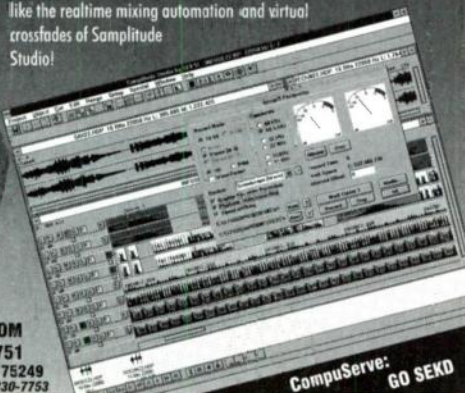
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• DART

same as normalization in other programs, where the level relationships are maintained. With Maximize, everything gets jacked up to the maximum volume. If you use this tool to increase overall volume, the result may be a distorted mess, so use it with caution.

DART's other tools, such as Mute, Mix, and Reverse, are familiar to wave-editor users. In this program, however, Reverse is not just another familiar tool. Reversing a file can make pops and clicks stand out more clearly than they do in the file's normal direction, making them easier to process.



**After opening
or recording a
sound file, the
next step is to
clean it up.**

DART also includes a Filter tool with highpass, lowpass, bandpass, and notch settings. In addition, there is a 9-band, 1-octave, graphic equalizer (see Fig. 5). The equalizer does not boost frequencies, it only attenuates them.

By far the coolest tool in DART is Compare. When this is activated, a RESULT.WAV file is created (see Fig. 2), which includes material that the Tri-Cleanse filters removed from the source file. You can then play this file to hear the filters' effectiveness. Most of the time, you simply hear the removed noise, with a faint, ghostly sound of the source material's upper frequencies mixed in. On one occasion, however, Compare helped me discover a problem I couldn't hear in the destination file. I had set the Outlier Detector threshold too low, and it was chopping off the highest peaks in some cymbal crashes. I could only hear it when I played back the RESULT.WAV file.

BUG REPORT

For a version 1.0 program, DART is amazingly glitch free. However, I did encounter a few difficulties. I experienced some stutter during playback because I hadn't included the DOS versions of SHARE and SMARTDRIVE in

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my AUTOEXEC.BAT and CONFIG.SYS files. Adding them corrected the playback problem but caused another problem by dramatically slowing down the playback and record functions of Innovative Quality Software's *Software Audio Workshop (SAW)*. Apparently, *SAW* prefers the Windows version of SMARTDRIVE.

Fortunately, the solution is simple, provided that you have MS-DOS 6.22. Just modify your CONFIG.SYS and AUTOEXEC.BAT files to define separate system configurations for each of these programs. When your computer boots up, select the appropriate program for optimum performance.

Another glitch I experienced was the inability to process a file's window display with Easy Run; processing the entire file or a marked section worked fine. However, the next day I received a corrected version of *DART* (with no change in the version number) that took care of the problem. Unfortunately, there was another glitch in that version. Whenever I accessed the Help files from the menu bar, the program froze after going three or four levels

deep. Oddly enough, I didn't have this problem when I accessed Help using the Help icon.

Whenever you select About in the Help menu, a Window appears with buttons marked About the Authors and About Gdansk. (The authors live in Gdansk, Poland.) The authors' information appeared just fine. However, when I clicked on the Gdansk button, a blank window appeared and the program froze. Tracer Technologies is aware of this bug. In the meantime, don't touch that button.

DOES IT REALLY WORK?

Does *DART* really remove noise effectively? My answer is a firm, unequivocal "It depends!" I know this sounds like hedging, but you must remember that separating noise from program material is a pretty tricky matter.

How well *DART* accomplishes this task depends on some important factors, not the least of which is the quality of the source material itself. For instance, removing pops, crackles, and clicks from an otherwise "healthy" vinyl recording can be readily accomplished.

Product Summary

PRODUCT:

DART 1.0 noise-reduction software

PRICE:

\$399

SYSTEM REQUIREMENTS:

33 MHz 80486 or faster PC running Windows 3.1 or later, MS-DOS SHARE and SMARTDRIVE utilities installed; 8 MB minimum RAM; MME-compatible sound card. Math coprocessor and separate hard drive for digital-audio files strongly recommended.

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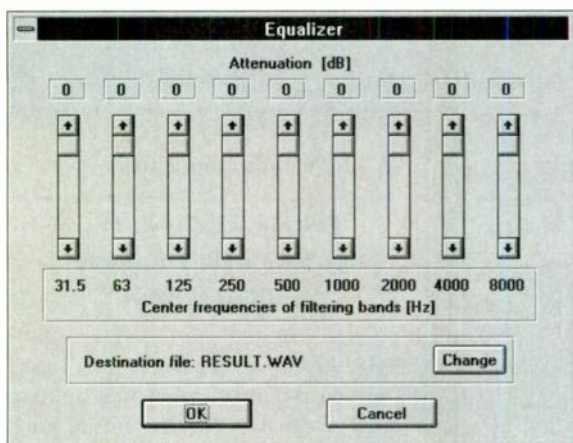


FIG. 5: The 1-octave graphic equalizer includes nine bands that can only be attenuated.

However, expecting the same results from a physically deteriorated record is asking for the impossible. Likewise, tape recordings with low signal levels and large amounts of room rumble are much more difficult to restore than tapes with adequate signal levels and some hiss. In a worst-case scenario, the best you can expect is a better-sounding but not entirely clean sound file.

Another important consideration is the content of the material you're trying to restore. Solo instruments yield outstanding results. Just listen to the program's demo file with solo organ before and after processing. On the other hand, more complex material, such as a typical pop or rock arrangement, might need close monitoring to prevent too much of the source material from being affected. Still, *DART* handles complex material fairly well, although it may take a couple of processing passes to achieve the desired sound quality.

The sample rate at which you record the source material also has a direct effect on the outcome of the processed file. Each setting presents particular problems. For example, although 11.025 kHz might seem to be an adequate setting for speech-only material, the resulting processed files sound dull to the point of unintelligibility.

The program seems to work most effectively at *DART*'s default setting of 22.05 kHz. However, some brightness may be lost after processing. This is like listening to a cassette after noise reduction has been applied. I suggest routing the audio output from your computer to a spectral enhancer before going to your mastering deck.

Recording at 44.1 kHz emphasizes any noise in material without much high-frequency content. In this case, I suggest recording at 22.05 kHz. However, if the material includes a lot of high frequencies, use 44.1 kHz.

No matter which sampling rate you choose, always select 16-bit resolution; 8-bit resolution is just too noisy. The last thing you want to do is add quantization noise while trying to remove other types of noise.

One final factor affecting the quality of the restored product is the end user's expertise and experience. Although novice users can get good results right away with *DART*, even better results can be achieved with experience. Fortunately, *DART* comes with a good manual that includes some excellent tips for getting the most out of the program.

FINAL TALLY

Processing and editing large files with *DART* is very time consuming. However, real-time noise processing is currently a very expensive proposition. If you've got money to burn, go for it. Otherwise, *DART* is a pretty good alternative.

DART isn't particularly quick when it comes to displaying sound files, either. However, after working with this program, I found that I worked by ear most of the time. Seldom did I need to look at a file's screen display.

On the other hand, *DART* excels in file management. It almost seems as if you can access any file at any time and do nearly anything you want to it. This program generates a lot of files, so file management should be one of its stronger features.

Overall, *DART* does a good job for the money. With all due respect to Sonic Foundry's *Sound Forge* plug-in, *DART* is the only low-cost, stand-alone noise-reduction program available for Windows. Being first out of the gate, *DART* is the current leader of the pack. It should be interesting to see whether it can keep that position.

Zack Price has one thing in common with scratchy records: he's prone to impulsive disturbances.

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Doepfer MS-404

By Andrew Schlesinger

Take a trip back to the '70s with a knobby analog synth.

They're everywhere you look, and it seems new ones appear every day. No, I'm not talking about Web sites; I'm talking about MIDI-controlled analog synth modules. The increasing popularity of dance, rave, and techno music has rekindled an interest in the virtues of analog-synth technology.

Recently, some smaller manufacturers have seen fit to offer monophonic analog synths with the benefits of modern MIDI control. One such instrument is the Doepfer MS-404, a true analog machine, with sound circuitry based on the original Curtis chips used in pre-MIDI instruments such as the Prophet 5, OB-X, etc. The entire signal chain is analog to maintain a warm, rich sound.

PHYSICAL ATTRIBUTES

The MS-404 is a 1U rack-mount module that is only 3.5 inches deep. It has an internal power supply and uses a standard IEC detachable power cord. The sleek, brushed-aluminum front panel is a model of simplicity with a particularly industrial look. All knobs and switches are attached directly to the circuit board and protrude through holes in the panel. The pots are not attached to the panel, so there is a bit of play when you turn them.

The front panel is divided into five sections—MIDI, VCO, VCF, VCA, and Envelope—each with its associated knobs, switches, and LEDs. There is no display or numerical readout, so there are no menus or pages of parameters.

The power switch is on the back of the unit along with the audio output, external audio input (with trim pot), control-voltage (CV) input jack, and gate input jack, all on 1/4-inch, unbalanced jacks. The CV and Gate jacks can be switched to outputs via an internal jumper. You get MIDI In and Thru ports but no MIDI Out, for reasons I'll explain in a moment.

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The Doepfer MS-404 monophonic, analog synthesizer module offers excellent analog sound, but it has few special features and no patch memory.

Because the case is so shallow, the power switch and jacks could become virtually impossible to access if you sandwich the unit between two deeper modules. This could be a true pain if you don't have a patch bay and you want to access the jacks (discussed shortly).

In addition, there is no patch memory or SysEx support; to make a new sound, you adjust the controls on the front panel. If you want to save a sound, you must write down all knob and switch settings. The unit has no MIDI Out and can't send its knob values to a sequencer. This may disappoint those musicians who depend on universal patch libraries for setting up their rigs, but you should keep in mind that the MS-404 is designed to allow you to interact live with real analog sounds in the old-fashioned way.

To top it off, the preliminary manual doesn't include a blank patch sheet that you can photocopy and use to record your patches. Interestingly, the value for each knob goes from 1 to 12 instead of 1 to 10; I guess Doepfer decided to do Spinal Tap one better.

ARCHITECTURE

The MS-404 uses a classic VCO-VCF-VCA architecture (see Fig. 1). The single VCO has a 5-octave range with portamento, which can be turned on and off by sending Control Change 65 (CC 65). The output of the VCO can be a sawtooth wave, pulse wave with variable width, or white noise. Unfortunately, you can't get both sawtooth and pulse at the same time.

The VCO has a dedicated LFO that can modulate the frequency or pulse width. One knob controls the LFO's output level and another controls its speed. An LED visually indicates the LFO's rate, which can range from very

slow up to the audio range, providing FM capabilities. Unfortunately, the LFO produces only a sine waveform. Even worse, the LFO depth is not dynamic! That's right; there is no way to control the depth of the LFO other than with the front-panel knob. This really limits the expressive capabilities of the unit.

It should also be mentioned that MIDI Pitch Bend is dedicated to the VCO and preset to a range of one octave. This is a bummer, because it is extremely difficult to do normal whole-tone pitch bends. If the pitch-bend range can't be user adjustable (which is hard to accept), it should be set to a fifth, third, or whole step. As it is, the

range is way too wide to use in the typical manner.

The VCF is a 24 dB/octave lowpass filter that uses a Curtis chip. It has an excellent sound with that "vintage" character. Front-panel controls set the initial cutoff frequency and let you select full, half, or no keyboard tracking. In addition, a resonance control can drive the VCF into self-oscillation, which is especially handy in conjunction with full keyboard tracking.

Like the VCO, the VCF has its own LFO with dedicated knobs for speed and depth. It operates exactly the same as the oscillator's LFO (no real-time depth control, sine waveform only, etc.). You can get some cool effects by modulating the filter in the audio range with the LFO while sweeping it with a controller and envelope. You can also send audio through the filter while it's oscillating, making it possible to simulate a 2-oscillator sound.

The overall level of the VCA is controlled by a front-panel knob labeled Accent. According to the manual, this knob determines the amount of envelope control to the VCA. However, I noticed no change in the effect of the envelope on the VCA when using the Accent control; as far as I can tell, it acts more like a bias control.

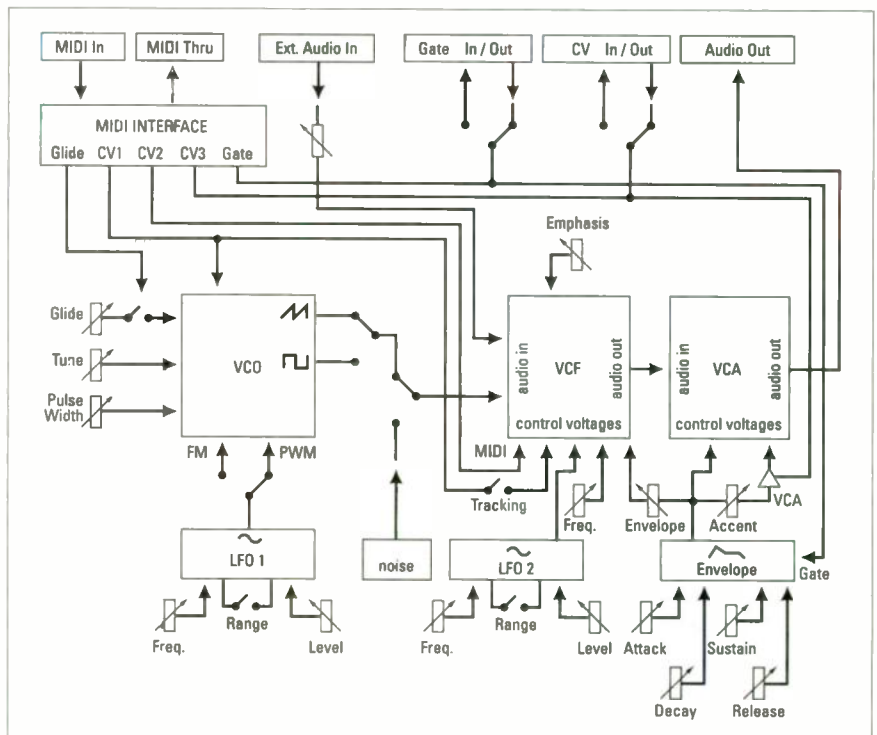


FIG. 1: The MS-404 uses a classic VCO-VCF-VCA voice architecture. The signal from the VCO can be combined with an external audio source for processing through the VCF and VCA.

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● MS-404

Speaking of envelopes, there is one ADSR. The response times are excellent, and you can program extremely short attacks and decays. The MIDI response time is also extremely fast. However, the ADSR is hard-wired to both the VCF and VCA, and there is no way to disable the effect on the VCA. If you apply a really short envelope to the filter, with no sustain, the sound will die away quickly with the filter. This is a real bummer!

The most common workaround for this single-ADSR design is a Gate/Envelope switch on the VCA, which is found on instruments such as the Korg Polysix and the Roland Juno series. In the Gate position, the VCA receives a gate signal with each Note On and stays at full level as long as the note is held. You don't get variable attack or release times, but at least the sound sustains while the ADSR is applied to the filter. It's too bad this option isn't available on the MS-404.

One cool feature is the ability to process an external audio signal through the VCF/VCA chain. In my tests, external sounds took on an analog quality with a sweeping filter, but they did not sound as warm as the internal oscillator. Nevertheless, this welcome feature greatly enhances the usefulness of the box.

The CV and Gate jacks can be configured as inputs or outputs. These jacks are preset at the factory as outputs, with the CV circuit set for 1 volt/octave and the gate at +5V. These features let you use the MS-404 as a MIDI-to-CV/Gate converter to control your other analog gear. You could pay a few hundred bucks for this feature in a stand-alone unit.

MIDI LEARNING CURVE

Another interesting feature of the MS-404 is the Learn button, which is used to teach the unit about the MIDI messages you intend to send. To begin with, you can set the synth's MIDI channel and note range by pressing the Learn button and playing the lowest note on your controller.

If you press the Learn button and send Program Change 4, the filter cutoff frequency becomes Velocity-sensitive, although there is no control over the depth of the response. Sending Program Change 3 while holding the Learn button turns off the filter's Velocity sensitivity.

If you press the Learn button and

send any Control Change, it is assigned to control the filter cutoff frequency. Unfortunately, there is no way to scale this control. When I assigned the mod wheel to the filter, there was noticeable quantization in the filter's response, which caused quite a bit of "zipper" effect when the mod wheel was moved. (Doepfer's U.S. distributor, Enport, can add a capacitor to smooth out the filter's response to MIDI CC messages.)

Note that the Control Change you assign to the filter must be set near its maximum value if you want the filter's Velocity sensitivity to have much effect. Thankfully, none of the front-panel knobs suffer from this problem, and all have an extremely smooth response.

The ADSR defaults to legato triggering on power-up, but pressing the Learn button and sending Program Change 6 sets it to multitriggering. In addition, the MS-404 uses high-note priority, which cannot be changed. I would like to see a choice in this regard; as it is, you can't do downward trills.

THE SOUND OF HAIR

Now that you know how this creature works, you probably want to know how it sounds. As I started playing it, I was bombarded with so much nostalgia that my sideburns and my hair grew longer, and my pants started to flair at the bottom! The MS-404's completely analog signal path has warmth, presence, and "hair" that sound great. The oscillator sounds full, the envelope is punchy, and the filter is the real analog thing.

Messing with the front-panel controls is both fun and glitch free. You can go

Product Summary

PRODUCT:

Doepfer MS-404 analog synth

PRICE:

\$498

DISTRIBUTOR:

Enport
tel. (402) 894-0384
fax (402) 894-2147
e-mail 76702.2546@
compuserve.com

CIRCLE #439 ON READER SERVICE CARD

EM METERS	RATING PRODUCTS FROM 1 TO 5				
FEATURES	●	●	●	●	●
EASE OF USE	●	●	●	●	●
AUDIO QUALITY	●	●	●	●	●
VALUE	●	●	●	●	●

from one sound to another quickly, and even though the control selection is limited, you can achieve a wide variety of sounds. The pulse-width modulation is particularly fat and sounds very good. All in all, it's a hairy-sounding box. That's a major plus in the analog world.

CONCLUSION

The MS-404 has some severe limitations in its control capabilities, and the fact that most of the MIDI functions are not scalable in any way is a real drag. Hard wiring the single ADSR to the VCA also limits the types of sounds you can do. A Learn function that accepts a MIDI message to disable this connection and send a gate to the VCA would be a most welcome addition. The synth also would benefit from onboard memory, but as noted earlier, it was designed for live knob twiddling.

On the other hand, the sound of the MS-404 is fully analog, and there is no mistaking its vintage character. I really like the sound and can easily imagine using the unit for techno/rave/acid sounds. When you consider the ability to process external signals and the integrated MIDI-to-CV/Gate converter, the MS-404 looks even more promising, especially for \$498.

The MS-404's main competition is probably the Novation BassStation Rack, which has two oscillators, two ADSR envelopes, a multiwaveform LFO, 60 user-patch memories, and a much more complete MIDI implementation. The rack-mount BassStation can also process external signals and provides the same type of MIDI-to-CV/Gate conversion. However, it lists for \$799. I prefer the character of the MS-404's sound, which is a bit more "phat" and "round." On the other hand, the BassStation offers more control and variation.

This one's a tough call that you will have to make based on your needs and ears. You can't audition the MS-404 at a music store; it's only available by direct order from Enport. However, the distributor offers a 2-week, money-back trial period, though the unit must be returned in new condition or no refund will be honored. This lets you try the synth before you buy it.

Andrew Schlesinger is a sound designer, composer, and synthesist. Thanks to John Muller of Sam Ash Paramus for the loan of a Novation BassStation.

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PreSonus DCP-8

By Rob Shrock

A truly dynamic dynamics processing and automation package.

PreSonus, a new company barely nine months old, has already scored a solid hit with its DCP-8 Studio Enhancement System. In addition to winning a coveted **EM** Editors' Choice Award this year (for this and other award winners see p. 42), the DCP-8 has staked out a prime niche in the home studio by offering eight channels of compression, noise gating, and VCA-based level automation in a single-rackspace unit. All parameters can be MIDI-controlled in real time, so the DCP-8 and a sequencer form a powerful team.

The DCP-8 lets you automate eight channels of levels and mutes. User-programmable Scenes can be named and saved to a bountiful 99 onboard memory locations and can be dumped and loaded via MIDI System Exclusive. Solos for the eight channels are provided, although the current software version does not put them under real-time MIDI control.

The DCP-8's compressors are full featured and all parameters can be automated with a sequencer. Eight rudimentary noise gates are included in the package, and you can bypass processing on individual channels. The price for all of this is a very reasonable \$995.

LOGICAL LAYOUT

Setting up the DCP-8 is simple. In fact, it is one of the most logically laid-out devices I've encountered in a while. The front panel has ten buttons labeled Load, Store, Name, Setup, Compressor (which actually is the threshold adjustment for the compressor), Ratio,

Gate, Solo, Level, and Mute. You also get two Channel/Program Up and Down buttons; a 16-character, backlit LCD; a 2-character, 7-segment program-number LED; and a data wheel.

The only complaint I have with the DCP-8's front panel is its nonadjustable, moderately illuminated LCD, which is often difficult to see. Of course, for users who control the DCP-8 from a computer, the LCD is not a critical issue.

Operation is a snap. Do you want to adjust the compression ratio on a specific channel? Press the Ratio button, scroll the Up and Down buttons to the desired channel, and adjust the data wheel. That's it. Want to bypass the compressor? Push the Ratio button again. (Pushing the button once more reengages the parameter.) There are few submenus, so it is not necessary to wade through page after page to find a specific function. It's so easy to use the DCP-8 that you can make changes on the fly and still get deep into the unit's parameters without losing momentum.

A very cool feature on the DCP-8 is the ability to independently set each channel's output. In Nominal mode, the output level matches the input level; -10 dB mode drops the DCP-8's output to line level. This provides flawless, no-sweat level matching, which is a real treat if your console operates at pro level (+4 dBu) and your recorder operates at -10 dBV.

The back panel consists of eight balanced, 1/4-inch inputs and outputs. Unbalanced signals are also accepted. There are MIDI In, Out, and Thru jacks and an 8-pin DIN jack for connecting the optional MB-8 meter bridge (\$399). The single-rackspace MB-8 gives you 10-segment input and gain-reduction readings for each of the eight channels.

Connections are childishly simple. You can connect the DCP-8 between your mixer and tape deck or use your console's insert points. Obviously, employing the inserts affords easy patching/repatching during mixing and tracking.

COMPRESSORS

While working on a progressive rock/metal project (tracked on ADATs), I used the DCP-8's compressors to smooth out eight channels of close-miked drum tracks as I made slave submixes for vocal overdubs. The range of control is impressive. The compression threshold range is -50 dB to +20 dB, and the ratio stretches from 1:1 to 20:1.

The compressors did a fine job of tightening up the drum sound, which gave the perception of a louder, more present kit by smoothing out the dynamic range and limiting wild peaks. I was impressed at how hard I had to hit the compressors to make them sound bad. Because I was working on rough submixes, I didn't spend a lot of time tweaking the thresholds and ratios, yet the DCP-8 was very forgiving. Even basic settings sounded good, and I didn't hear any strange pumping artifacts.

After the unruly drums were tamed, I was curious to hear the effect of the compressors on delicate orchestral music. I played a CD of Henri Dutilleux's Symphony No. 2 (Erato ECD 75362), which is an immaculate digital recording of the Orchestre de Paris. The piece contains musical passages that jump quickly from barely audible strings and harpsichord to blaring trumpets and French horns. Because of the piece's wide dynamic range, it's difficult to make a satisfactory cassette for listening in my car. Is this a job for the DCP-8?

Again I was impressed by the versatility of the compressors. As I experimented with threshold and ratio settings, I was able to place the strident trumpets and horns back in the mix to varying degrees. In addition, I was able to do some fairly extreme compression without upsetting the balance of the orchestral soundstage. The DCP-8 affected the imaging somewhat, but the image shift was minor compared to the amount of gain reduction I achieved. After settling on a 3.56:1 ratio at a threshold of -8.47 dB, I produced a great-sounding cassette version.



PreSonus' DCP-8 combines eight channels of clean, VCA-based gain control; eight good-sounding, full-featured compressors; and eight gates. Its snapshot and real-time MIDI automation offer tremendous flexibility.

The compressors can be linked in pairs for processing two channels of a stereo pair simultaneously. Right now, the software only allows odd/even adjacent channels to be linked (1/2, 5/6, etc.); even/odd linking is not possible (2/3, 4/5, and so on). PreSonus says it would be no problem to add this capability in the future, which brings up another thing I like about this small company: it has a full-time programmer who will customize the firmware if a user has a specific need that is not available in the stock unit. How about that for service?

GATES

The DCP-8's eight noise gates are a welcome feature, but they don't offer the same level of parameter control as the compressors. As a result, they are only useful for rudimentary applications, such as getting rid of hum and background noises. You get one parameter, Threshold (-90 dB to +20 dB), and no release-time control. The DCP-8 was useless for gating drums, as the fixed release rate caused the gates to chatter constantly.

I also missed having key (sidechain) inputs. A common gating technique is to split a tape return and run one of the signals through an equalizer. Then, you can greatly exaggerate the fundamental frequency of the signal you're gating—boosting 80 to 100 Hz on a kick drum, for example—and patch the equalized signal into the noise gate's key input to control the opening and closing of the gate. The boosted signal diminishes the strength of frequencies bleeding from other instruments, which helps the gate zero in on the instrument you're processing.

AUTOMATION

The DCP-8 offers both snapshot and dynamic, real-time automation. If you have fairly basic mixing needs, where snapshot settings can save a few fader moves or processing tweaks, you can recall any of the 99 user programs via MIDI Program Changes. For example, I like to use snapshot automation to clean up the noise floor of a mix by muting any channels that don't have audio present. The DCP-8 also transmits Program Changes, so you can record them to a sequencer. All snapshots can be saved and loaded via SysEx.

However, if you desire a continuously evolving mix, all DCP-8 parameters

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except Solo can be controlled, recorded, and played back in real-time using MIDI Control Changes. All you have to do is sync your sequencer and audio recorder and record the appropriate Control Change messages.

I prefer dynamic automation, so I mostly used the MIDI Control Change method. Aside from the obvious advantages of dynamically controlling the mutes and track levels, there are advantages to tailoring compression settings for different sections of a track. In most cases, compressors are set-and-forget devices. A setting is generally used that sounds best overall for a specific track, which can be a compromise. Sometimes it would be desirable to use one threshold setting for, say, a vocal track during a verse and another setting when the performance dynamics change during the chorus. Automating compressor settings in real time allows you to deal with specific problems as they appear in a track without over- or under processing the whole.

The audio path in the DCP-8 is VCA-based. Although VCAs (voltage-controlled amplifiers) offer flexibility in controlling automation and signal processing, many engineers loathe running signals through them, because they often add noise and color the sound. On the other hand, many automated consoles and processors use VCAs, so it's hard not to run across them.

I have mixed two records in the past year on an SSL E-series, VCA-based automated console, and I don't particularly like the harsh edge the console's VCAs add to the sound. So I was eager to see how the VCAs in the DCP-8 compared to the gazillion-dollar SSL.

I like the DCP-8's VCAs better. Although there is a slightly noticeable change to the original sound, the VCAs are remarkably quiet and smooth. In addition, the low end did not thin out, as frequently happens after signals are processed through VCAs. I noticed the DCP-8 added a touch of brightness in the top end—probably a result of harmonic distortion—but it is slight. By comparison, I think there is more noise and coloration in the E-series SSL modules. (And you could buy a whole warehouse full of DCP-8s for what you'd pay for an SSL!)

Automated level changes were consistently smooth, evoking the feel of a manual fade, and I didn't notice any zipper noise. Part of the reason for these silky-smooth level adjustments is the fact that PreSonus employs a 12-bit converter to control the VCAs. A full range of 4,096 steps can be accessed through System Exclusive, and the company is developing its own software to make this level of control easier. However, if you can't use System Exclusive to get the finer resolution, the front-panel data wheel divides the range of parameters into 256 discrete steps. These are logarithmically tapered for fine control in crucial areas and coarser resolution as the range expands. PreSonus has done a fine job of tailoring the response of all the parameters to MIDI control, and the DCP-8 performs in a musical way.

In addition, EMAGIC has created a custom DCP-8 environment for its *Logic* sequencing program. Moves made on the computer screen are reflected in the DCP-8 display if the appropriate parameter is called up, and any move made from the DCP-8's data wheel also appears on the computer display's mixer. Working on the DCP-8 is even easier with a screen of virtual knobs and faders to grab and tweak. Although it is fairly simple to create a group of assignable knobs and faders in most sequencing programs, it's nice to have an elegant template. The template is free; if you can't download it from one of the various music bulletin boards, just request it from PreSonus.

mented, and the compressors offer quick, comprehensive parameter control. In addition, the VCAs are quiet and clean, and the company actually *listens* to users as it improves and develops the DCP-8's software.

My only complaint is with the gates. There simply is not enough parameter control available, and not having key inputs is a drag. But overall, the only real question is whether your automation and dynamics processing needs are worth the DCP-8's price. The quality of the unit is certainly *not* in question.

Composer and producer Rob Shrock is the keyboardist and arranger for Dionne Warwick and Burt Bacharach. He is also trying to find time for his solo album.

LA Drum Studio, Beatboy, and D'nai

By Dan Phillips

A tale of three MIDI drum-pattern libraries.

Few musicians are great drum programmers, and the built-in beats in a drum machine soon get old. If you want to improve your drum programming, check out "Groove Thangs" in the August 1995 *EM*. Otherwise, you might be better off buying a collection of professionally preprogrammed drum patterns. Fortunately, Standard MIDI Files and General MIDI have made it easy for manufacturers to provide drum patterns that can be imported into a wide variety of sequencers.

In the past, *EM* has reviewed drum patterns from Cool Shoes Software and DrumTrax (April 1995 issue) and Five Pin Press (November 1992 issue). Since then, three new companies—Beatboy, D'nai Productions, and LA Drum Studio—have joined the party. To complete *EM*'s suite of SMF drum-pattern reviews, I looked at Beatboy's *Ultima 3000*, D'nai Production's *D'nai the Rhythm*, and LA Drum Studio's self-titled disk.

GM COMPATIBILITY

I auditioned the files using several General MIDI modules and a Roland sampler. As expected, the patterns sounded

Product Summary

PRODUCT:

DCP-8 dynamics processor

PRICE:

\$995

MANUFACTURER:

PreSonus Audio
Electronics
tel. (504) 344-7887
fax (504) 344-8881

CIRCLE #440 ON READER SERVICE CARD

CONCLUSION

This first offering from PreSonus is impressive. The DCP-8 is an easy box to use and delivers a lot of processing power and flexibility. The MIDI automation control is very well imple-

EM METERS	RATING PRODUCTS FROM 1 TO 5			
FEATURES	●	●	●	◐
EASE OF USE	●	●	●	◐
AUDIO QUALITY	●	●	●	●
VALUE	●	●	●	◐

better when played with high-quality drums on the sampler.

LA Drum Studio's online documentation notes that the sequences were developed on the Roland Sound Canvas, and indeed its patterns come across well on the GM modules. The Beatboy sequences suffer slightly when played on GM instruments, most often because of volume imbalances: the toms tend to be quite loud, for instance. Beatboy's Bill Messinetti notes that the sequences were developed primarily on Roland TD-7 electronic drums, although they were also tested on the Sound Canvas. As we'll see, the D'nai tracks have so many other problems that issues of GM compatibility are secondary.

FORMATTING

LA Drum Studio and D'nai Productions use a separate file for each pattern, with folders for style categories such as Funk and Swing. Within the sequence files, each drum is given its own track, which makes it easy to mix and match snares from one pattern with hats from another.

Beatboy, on the other hand, groups a large number of patterns into each sequence file, using both files and tracks to create a hierarchical catalog of styles. For instance, the "Basic Rock 01" file has seven tracks. Track 1 has eighth-note hi-hat patterns, track 2 is similar but "funkier" (more sixteenth notes on the kick), and track 3 has sixteenth-note hi-hat patterns. Track 4 is similar to track 3 but adds open hi-hat accents, and track 5 uses ride cymbal instead of hi-hats. Tracks 6 and 7 are 1-bar fills. Within each track are approximately ten individual patterns, each separated by a measure of silence (see Fig. 1).

Product Summary

PRODUCT:

Ultima 3000 drum patterns

PRICE:

\$125.95

MANUFACTURER:

Beatboy Drum Sequences
tel. (717) 685-1338
fax (717) 685-1573
e-mail beatboytec@aol.com

CIRCLE #441 ON READER SERVICE CARD

EM METERS	RATING PRODUCTS FROM 1 TO 5			
PATTERN QUALITY	●	●	●	●
DOCUMENTATION	●	●	●	●
VALUE	●	●	●	●

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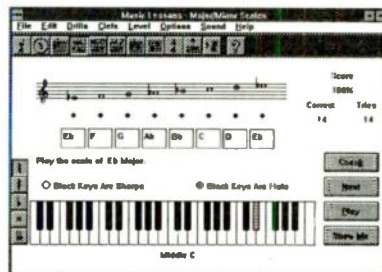
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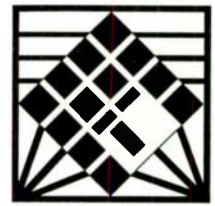
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Aphex Systems	504	21	Musitek	555	135
Artic Software	505	111	Musician's Friend	556	40
Ashly	506	61	Opcode	557	15
Axon/Music Industries	•	68	Opcode/Music Quest	558	79
Audix	507	67	Opcode/Music Quest #2	559	86
Armadillo Enterprises	508	40	Peavey Electronics	560	22-23
BBE Sound	509	59	PG Music (Power Tracks Pro)	561	87
BBE Sound #2	510	122	PG Music (Band-In-A-Box)	562	118-119
Bellari	511	107	PianoDisc	563	120
Big Briar	512	117	Pioneer	564	51
Big Dude's	513	88	PreSonus Audio Electronics	565	116
Caruso Music	514	132	QCA	566	132
Coda Music Technology	515	41	QSC Audio Products	567	71
Computers & Music	516	123	Quik Lok/Music Industries	•	82
Cool Shoes	517	122	Rhythm City	568	143
CTI Audio	518	38	Rich Music	569	133
Cakewalk Music Software	519	8-9	Rock 'n Rhythm	570	135
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DigiTech (Studio/Midi Vocalist)	521	33	Roland (XP-10)	573	109
DigiTech (Studio Quad)	522	73	Sam Ash Professional	•	137
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dynaudio acoustics/AXI	525	140	Sony	•	89
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E-mu Systems	527	121	Soundspiration	577	126
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Ensoniq (DP/2)	530	105	Speir Music	580	86
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Hafler	532	97	Studiomaster	582	106
Hohner MIDIA	533	102	Sweetwater Sound	583	78
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Kurzweil Music Systems (K2500)	541	10-11	Whirlwind	593	94
Kurzweil Music Systems (Micro Piano)	542	155	Whisper Room	594	142
L & M Music	543	117	Wildcat Canyon Software	595	125
Leigh's Computers	544	124	WinJammer	596	130
Mackie Designs (Ultramix)	546	80-81	World Records	597	124
Mackie Designs (MS1202)	547	2-3	Yamaha (W5/W7)	598	24
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D. "Creative Space: Dynamic Duo," p. 74	713	714	715	716
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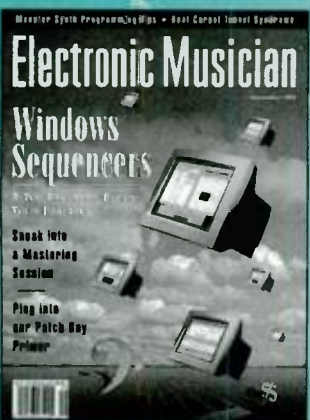
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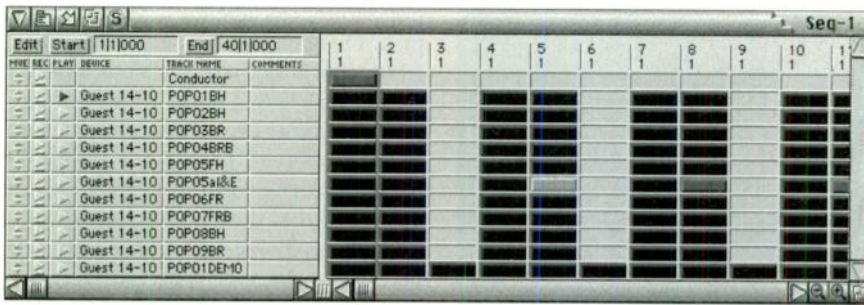


FIG. 1: This typical Beatboy file has 2-bar phrases separated by one bar of silence.

This style of organization makes it easy to choose a general feel, quickly audition a number of patterns within that feel, and select the one that best fits your song. Its only disadvantage is that all parts (kick, snare, hi-hats, and so on) are kept together on a single track, so that if you wish to have them on separate tracks, you'll have to split them yourself. (The documentation gives a brief, general description of this technique, which varies from sequencer to sequencer.)

THE GROOVE'S THE THING

Drummers achieve a rhythmic feel, or groove, by varying rhythmic placement and the volume of accents. By rhythmic placement, I mean the playing of individual hits or entire parts ahead of, or behind, the beat. To create a rushing feel, for instance, a drummer might play the off-beat eighth notes (one and two and...) a little earlier than strict quantization would dictate and might also play the snare a few milliseconds ahead of the beat. In some cases, the quarter notes on the hi-hats may be accented. A completely different, ska-like feel can be created simply by shifting the accents to the off-beat eighths.

All of this translates fairly cleanly into the world of MIDI. Accents can be created using note Velocity, and inflections of rhythmic placement can be created (often quite successfully) using swing quantization and track slipping. It never hurts, though, to start off with the performance of a live drummer, which is the approach taken in all three of these libraries.

Of course, a real drummer doesn't necessarily guarantee a good groove. In their literature, all three developers support what I believe to be an inappropriate mystique about the sanctity of the original performances. The problems with this view are especially

obvious after listening to some of the worst patterns from the D'nai collection in all their pristinely captured, unaltered, stumbling, stuttering glory.

I feel like a pince-nez-wearing, cane-bearing junior high school headmaster saying this, but what almost all of the D'nai sequences need—desperately—is a good dose of quantization. Not full quantization, mind you, but carefully applied amounts of partial, swing-adjusted quantization that would instill a solid groove into the often appallingly loose and sloppy performances. Once properly quantized, many of the patterns are quite usable. But the consumer should not have to deal with this.

Loose performances show up in the Beatboy library as well, although to a much lesser extent. The rock performances, for example, are quite solid. Particularly problematic, however, are the hip hop and house beats. Popular recordings in these genres often use completely quantized drum-machine parts as the basis for their grooves. In the Beatboy library, however, these tracks were played by a live drummer, without quantization after the fact. The result is that although they undeniably

offer true human feel, in doing so, they are not true to the genres they are supposedly emulating. Applying some strict quantizing to the house patterns and over swinging the hip hop shuffles gave them a more radio-ready feel, but again, this is not something that the buyer should have to do.

The LA Studio Drum patterns, on the other hand, have consistently solid grooves. This was a pleasant surprise, as the bulk of this library is completely quantized, without any use of swing or track slipping. The trick is that the Velocity accents are extremely expressive, so that hi-hats and rides groove naturally, kick patterns push forward, and snares snap (see Fig. 2). The programmer was obviously paying attention to feel: although many tracks are quantized on the dot, some are unquantized or were quantized using fractional strengths to draw the notes closer to the grid but not eliminate feel completely. Others are entirely quantized except for one or two notes.

Only a few patterns, such as the two 7/8 funk beats and the Latin clave, are overly, unnaturally stiff. I admit to being somewhat surprised that no swing quantization was used; this would certainly have improved the few problematic sequences.

TIME SIGNATURES

If you frequently use time signatures other than 4/4, you'll appreciate the Beatboy collection, which offers a large number of patterns in alternate meters. The jazz sets include patterns in 6/8, 3/4, and 6/4, and the new age set features a set of fusion patterns in 7/8. This collection also has a selection of

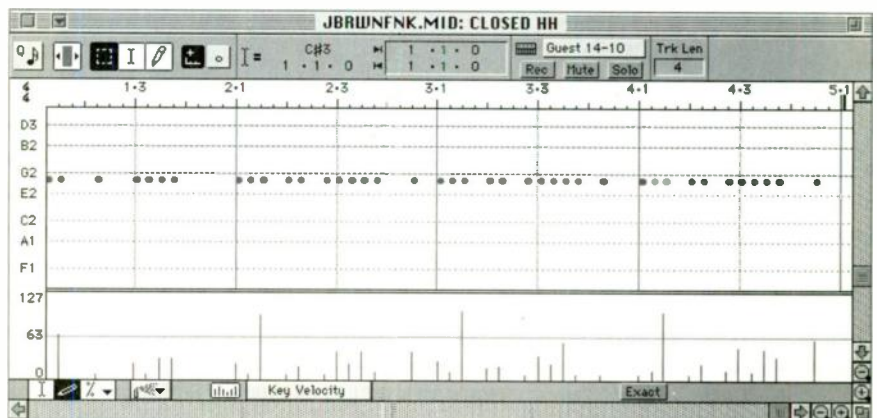


FIG. 2: In this screen shot of LA Drum Studio's patterns (opened in Opcode's Vision), notice how the Velocity of the hi-hat notes (represented by the vertical lines at the bottom of the window) varies dramatically. This Velocity variation is in large part responsible for the great, funky feel of the pattern.

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● DRUM PATTERNS

pop sequences labeled "3/4," although most of them actually seemed to be in 12/8. (Because these 12/8 patterns are played over a 3/4 click, they may take some massaging if you want the counter to read correctly.) With 269 total patterns in meters other than 4/4—and that does not include shuffle and swing patterns—Beatboy definitely takes the prize in this category.

As I'll discuss later, swing is one of the LA Drum Studio collection's high points, and you also get some good shuffles. A few of the Latin percussion patterns are in 6/4, and there are two funk patterns in 7/8 and one each in 5/4 and 9/4. Several swing patterns are in 3/4.

D'nai's patterns are mostly either in strict 4/4 or in 4/4 with swing or shuffle feels. Some variety would have been appreciated here, but after all, one collection doesn't have to fit all applications.

TONS OF PATTERNS

For sheer number of patterns, Beatboy's library is the clear leader with 1,652, including 320 rock, 182 pop rock, 128 contemporary jazz, 35 swing, 64 hip hop, 63 house, and 52 R&B patterns. My favorites were the rock and pop rock beats, especially the alternative rock set. The handful of reggae beats is cool; I wish there were a few more. (Curiously, more than half of the reggae beats use a shuffle pattern on the snare, instead of the ride, a style I haven't heard very often.) The main categories missing from the Beatboy library are Latin jazz and brush patterns. The company has more projects in the

Product Summary

PRODUCT:

LA Drum Studio
drum patterns

PRICE:

\$19.95

MANUFACTURER:

LA Drum Studio
tel. (818) 771-5551
e-mail LADrmStdio@aol.com
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DOCUMENTATION	●	●		
VALUE	●	●	●	●

works, so perhaps they'll add these.

Beatboy also provides a set of Latin percussion patterns. Unlike the other files, these are organized with each instrument on its own track, so it's easy to grab conga or guiro parts, for instance, and combine them with drum-kit patterns. Most of these are quite effective, although some of the flams on the conga parts are slightly artificial and the feel of the shakers is slightly off.

The Beatboy files do a pretty good job of pairing patterns with a selection of appropriate drum fills, which is much appreciated. I would have liked to see more of this in the other two libraries.

QUALITY, NOT QUANTITY

The LA Drum Studio library is much smaller than Beatboy's, with only 100 patterns, including funk, Latin, swing, and assorted percussion. This number is slightly deceiving, however, as a good number of patterns are eight, sixteen, or 32 bars long.

Swing is the area where the LA Drum Studio sequences really stand out. There aren't that many different patterns—just fourteen in all—but my, they are excellent. Most are sixteen or 32 bars long, complete with many realistic fills and punches, which is just the thing if you need to drop an "instant drummer" behind a swing tune. Patterns include brush ballads, up-tempo choruses, 3/4 patterns, shuffles, midtempo beats, and more.

A set of Latin percussion grooves are provided, but they left me wanting more. There are only two shaker patterns and one tambourine pattern, for instance, and although there are two timbale breaks, there is no timbale groove. On the other hand, you get two excellent marching cadences with bass drum and field snare.

The Latin drum-kit patterns were a mixed bag. The 32-bar "Fast Samba" is quite hip, with lots of subtle double-ghosted notes on the snare. On the other hand, the Latin clave and reggae patterns were completely quantized and just too rhythmically stiff; a bit of swing and randomization seemed to solve the problem.

LA Drum Studio often includes one

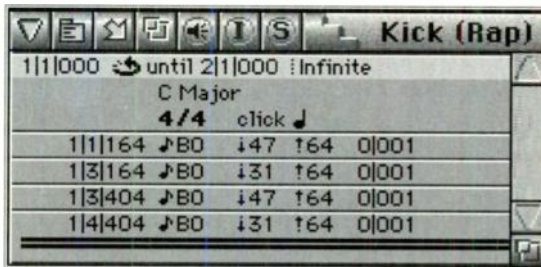


FIG. 3: This screen shot from Mark of the Unicorn's *Performer* shows a kick-drum pattern from *D'nai the Rhythm* that is supposed to start on beat 1. Notice the 164-tick offset; 160 ticks is an eighth-note triplet.

or two fills in their sequences, but if the pattern repeats, those fills get old fast. Unlike the Beatboy sequences, you don't have multiple coordinated fills to choose from. A separate folder includes some stand-alone fills, but they don't necessarily match up all that well with the other patterns.

A folder of ten "artist styles" features sequences copping the feel of famous drummers. There's a very cool, 32-bar, unquantized shuffle in the style of Peter Erskine, for instance, and Steve Gadd's pattern from Paul Simon's "Fifty Ways to Leave Your Lover."

If you want to check out examples of LA Drum Studio's patterns, you can download a set of fifteen demo tracks from America Online or via anonymous ftp; see the Product Summary sidebar for the addresses.

I CAN'T D'NAI IT

Unfortunately, I don't have much good to say about the D'nai collection. I received seven folders named Ballad, Dance, Funk, Hip-Hop, Pop, R&B, and Rap, each containing 25 numbered files ("RAP01," "RAP02," etc.), with one pattern per file. The documentation is

Product Summary

PRODUCT:

D'nai the Rhythm
drum patterns

PRICE:

\$24.50

MANUFACTURER:

D'nai Productions Inc.
tel. and fax (708) 884-0749
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● DRUM PATTERNS

almost nonexistent, and the file names aren't particularly helpful.

There are a few useful patterns, such as "Ballad23" (drum kit with shaker and tambourine) and "Dance22" (a sixteenth-note pattern hinting at a shuffle). Far too often, however, there was no realistic feel, in spite—or perhaps because—of the fact that all the patterns were played live. Parts go along well and then stumble, or don't recover from a flurry of sixteenth notes, or are simply sloppy from the start. Several patterns have upbeat but don't use pickup measures, resulting in the meter being offset by an eighth- or sixteenth-note triplet (see Fig. 3).



The LA Drum

**Studio patterns have
consistently
solid grooves.**

One track, labeled "Kick Drum," is instead assigned to play the General MIDI note for low timbale. Velocities are uneven and sometimes very low; in one dance pattern, the kick's normal Velocity is 48, which is quite soft.

In short, D'nai might be able to rework this library into something useful, but for now, there are just too many rough edges.

GROOVIN'

There are a few good patterns in *D'nai the Rhythm*, but in general the collection simply has too many problems to merit a recommendation. On the other hand, the LA Drum Studio and Beatboy *Ultima 3000* disks each have their strengths.

If you're looking for swing patterns, *LA Drum Studio* is definitely the way to go. If you're doing mostly rock and pop or just want a wide variety of patterns, Beatboy won't disappoint you, especially if you don't mind doing a little quantization yourself now and then.

Dan Phillips is a principal in Touch Productions, producing music for television, film, and album projects. He happily spends his weekdays as part of the team at Korg Research and Development.

**Studiomaster
Mixdown Classic 8**

By Michael Molenda

**Put the sound
of an empire into
your tracks.**

In the spirit of full disclosure, I must confess that I'm an unrepentant Anglophile. The brutal, sexual noise of The Who forever bound my fate to rock 'n' roll, and Monty Python's Flying Circus forged my sense of humor. I'm addicted to chicken pot pies, Earl Grey tea, and Cadbury's chocolate. I have a paralyzing crush on actress Helen Mirren. And I'm absolutely mad about British mixing consoles!

Admittedly, both Monty Python and Union Jack mixers can be acquired tastes for Yanks, especially when English humor and English engineering sometimes seem to be inextricably linked.

But music seems to come alive when the signals are tracked and mixed through a Trident, Allen & Heath, Soundcraft, or Studiomaster console. There's a certain *anger* in the sound of the EQ; it's almost as if the engineers are exorcising their ancestors' rage over losing the empire. The aggressive, robust tones render any technical quirks inconsequential. The sound is simply fab.

Studiomaster's Mixdown Classic 8 is one of the latest offerings to carry forth the tradition of British mixers. It didn't falter, either, as the Classic 8 just earned a 1996 EM Editors' Choice Award. (Check out all the winners on p. 42.) The 8-bus design is available in 16-, 24-, and 32-channel configurations, and the board boasts such features as MIDI muting, fader reverse, and 3-band EQ.

In addition, although the Classic 8 is designed for professional work, its price is aimed at a home recordist's budget: the 16-channel version costs just \$2,750. Hey, this mixer could have brought a smile to Queen Victoria's frigid puss!

THEATRE ENTRANCE

As with most consoles in this price range, the Classic 8 does not offer modular construction. A fixed top panel

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prevents the removal of individual input channel modules for repair and cleaning. Unified console design is no sin, but keep in mind that if you spill a Pepsi into this baby, you'll have to ship the entire mixer to your nearest service center.

All connections are accessible from the top panel, sound-reinforcement style, which is way cool. Even if you don't have a patch bay, you can still patch and repatch mics, signal processors, 2-track decks, and preamps with a minimum of fuss. Ten 12-segment LCDs monitor signal levels for the eight subgroups and the stereo bus. The right channel LCD also displays the level of soloed signals when the Listen function is activated. An optional meter bridge (\$395 for the MD8C-16MB, \$550 for the MD8C-24MB, and \$625 for the MD8C-32MB) provides LED monitoring for all input channels and VU meters for the stereo output.

The Classic 8 "splits" away from the pack of consoles with in-line tape monitoring by offering a split design. This means that the monitor controls are not placed on the corresponding input channels; they're located over by the subgroup section. In essence, the split design is like having two separate mixers. When you mix, the monitor returns can be used for extra signal inputs. If you're used to the Mackie 8•Bus (which is in-line), a split design may seem confusing at first, but the functionality is pretty much identical.

A rack-mountable, external power supply is included with the Classic 8. The unit doesn't need to be fan cooled, which cuts down on noise problems in

Product Summary

PRODUCT:

Mixdown Classic 8

PRICE:

MD8C-16: \$2,750

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VALUE	●	●	●	●

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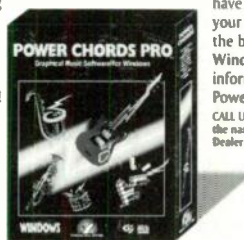
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● MIXDOWN CLASSIC 8

the studio, but you should ensure that the rack-mount power supply gets adequate ventilation.

CHANNEL STRIPPING

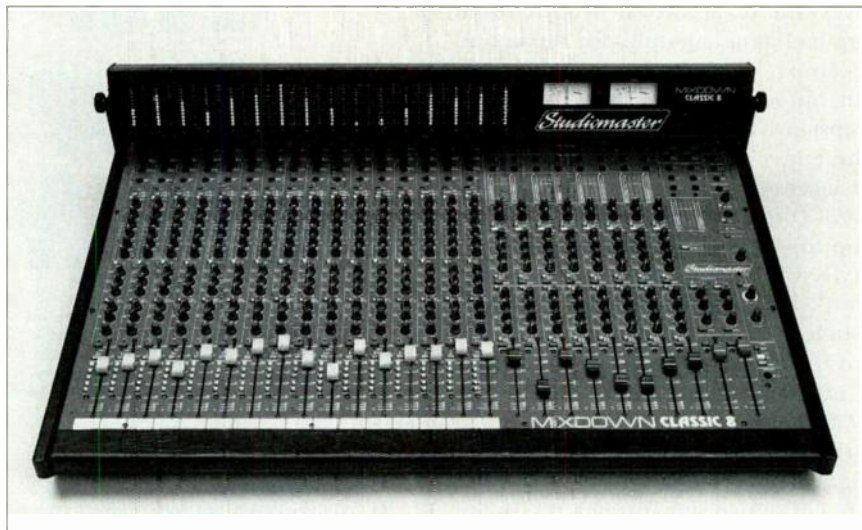
The Classic 8's input channels are well designed and uncluttered. A novice engineer could probably figure out basic operations after little more than a glance.

Each module offers a fine selection of I/O: a balanced, XLR mic input; a balanced, 1/4-inch Line B input; an unbalanced, 1/4-inch tape return or Line A input; a 1/4-inch insert (send/return) point; and a 1/4-inch direct out. The top-most control is a +48V button that switches the phantom power on and off for each channel. (Phantom power must be activated on the external power supply for the button to have an effect.)

Next up is an I/O selector button that switches between the Mic/Line B input and the Line A/Tape Return, followed by a -20 dB pad button. The buttons are constructed of plastic and tend to jiggle a bit but otherwise seem pretty robust. I punched them repeatedly, and they never jammed. A single gain knob with a 45 dB range controls the preamp level for both microphone and line signals. Below this is the EQ section, which I'll discuss in depth a little later.

The configuration of the channel aux sends is a tad on the bizarre side because you get six, but only five are simultaneously available. Here's the deal: Auxes 1 through 3 are dedicated post-fader sends. Aux 4 is a post-fader send, and Aux 5 is a pre-EQ/pre-fader send, but they are not simultaneously available. The two buses have separate outputs, but they share a single level knob, and you switch between them. Aux 6 is a dedicated pre-fader send. So what you *really* get are five aux sends, with one switchable between post- and pre-fader.

The pan pot completes the channel's menu of knobs. All are incredibly smooth and tight. The healthy bit of resistance you get when twisting the Classic 8's knobs is reassuring, because they appear to be built to withstand years of tweaking. In addition, the knobs are made of rubber, which ensures a firm grip when your hands are sweating during a tough session. My only complaint is that the pan pot and the EQ boost/cut knobs do not have center detents.



Studiomaster's classy Mixdown Classic 8 puts some British steel into its EQ and delivers enough sterling performance to capture a 1996 EM Editors' Choice Award.

The fader section begins with a red LED clip indicator, which does double-duty as an idiot light whenever the channel's Listen function is activated. (A Listen Active LED on the master section also flashes.) The Listen button lets you isolate the input module for monitoring signals on that channel (or track) alone. Unfortunately, it's a pre-fader listen, rather than the more desirable solo-in-place design that maintains pan positions when activated. I like to solo channels to confirm stereo panning, so it's a drag to have the Classic 8's Listen function return monaural signals. Of course, you can work around this limitation by muting all the channels you don't want to hear.

Manual muting is accomplished with a Channel On button. (I'll get to the MIDI muting in the "British Masters" section.) When the button is depressed, the channel strip is activated, and a green On LED illuminates. When the button is released, a red Mute LED turns on, and the channel is silenced. Although I'm more familiar with dedicated mute buttons that silence signals when pressed *in*, the channel on/off operation proved just as reliable.

The channel-assignment buttons, however, tortured me throughout the entire test. For one thing, they're positioned on the left side of the fader, and every other console I work on puts them on the right side. Call me a creature of habit, but I couldn't get used to the flip-flop and was constantly assigning the wrong channels to the subgroups. The final indignity was that the

buttons are wee things that wreaked havoc with my stubby fingers.

On the brighter side, the Classic 8 includes full-throw, 100 mm faders. Although the plastic fader knobs rattle and tug a little, their movement is generally uncompromised. A firm, but gentle hand ensures that fades are silky smooth.

THAT EQ THING

Of course, the paramount reason for buying a British console is its EQ, and the Classic 8's tonal power is absolutely smashing. The 3-band EQ is masterfully designed to offer a wide range of frequency control without leaving huge "holes" in the spectrum. The sweepable low-frequency band begins way down in the basement at 25 Hz and extends up to 300 Hz. Here's what I mean about the "no hole" design: the sweepable midrange band picks up at 350 Hz and drops off at 7.5 kHz. That's darn good coverage between the low and midrange frequencies for a 3-band design.

The only minor chasm is between the midfrequency control and the fixed, 12 kHz high-frequency band. However, I didn't find this problematic. Most instruments and vocals can be handled within the midrange's top end of 7.5 kHz, leaving the 12 kHz high-frequency control to add a little extra sparkle. All three frequency controls offer 16 dB of boost or cut, and an EQ Cut button bypasses the EQ so you can instantly compare your timbral tweaks to the flat signal.

I totally fell in love with the Classic 8's EQ sound. It preserves everything I hold dear about British EQ: warm lows, aggressive mids, and steely highs. The EQ has so much personality, in fact, that you can plug guitars and basses right into the board and tune in some brilliantly quirky, and robust—albeit clean—timbres without resorting to an amp or preamp. And the sound is almost warm enough to fool someone into thinking you tracked your axes with a tube preamp.

For electric bass and kick drums, it's a beautiful thing that the low-frequency control drops down to 25 Hz. I was able to produce some wonderful subharmonic tones that added a dance-club wallop to acoustic drum tracks. I could also kill any annoying low-frequency rumbles that happened to leak into open microphones during recording.

I was impressed with the versatility of the midrange control. The mids remain smooth and sensual on the lower end (350 Hz to 500 Hz) but evolve into a sonic slap in the face once you get above 1 kHz. Vocals, guitars, and snare drums sound extremely present. In addition, there's enough of a frequency sweep available to bring out the subtle attacks of bowed violins, snare brushes, and fingertips on tablas. And although the EQ sounds real tough—which is great for aggressive music genres such as rock and dance—sensitive hands (and ears) can produce mids that are smooth enough to enhance jazz and classical tracks.

The fixed high-frequency control is, of course, not as flexible as the low- and midfrequency bands. However, 12 kHz is a good center frequency for

adding a nice sheen to tracks without introducing the dreaded "buzzy shrieks." It's also a good frequency for undertaking that last resort of audible-hiss reduction: the high EQ cut. Because 10 kHz is untouched by high-frequency tweaking, I was able to diminish the sizzle and spit of a badly recorded cassette master without killing all the high-end information.

The Classic 8's EQ is totally brilliant. (Is that assessment a surprise?) Although I'm used to working with four bands of EQ, I didn't feel compromised. I dialed in wonderful sounds with no hassles, and that's what it's all about, isn't it?

IT'S A GROUP!

As discussed earlier, the Classic 8 is a split design that incorporates the monitor controls into the subgroup section. You can use the monitor returns for extra inputs during mixdown, but only the upper half of them have dedicated high (12 kHz) and low (60 Hz) EQ controls. This means you have to plan your signal routing to ensure the tracks that need EQ end up on the right returns. It's kind of a drag, especially when some mixers provide EQ controls for the entire monitor section, but it's nothing that a little "heads up" strategy can't solve.

You get two simultaneous aux sends (one pre- and one post-fader) and a pan pot for each monitor return, in addition to a number of nifty configuration choices. A Fader Reverse button flips the signal from the top monitor knob to a group fader for more precise level control, while a Group/Tape button assigns the lower monitor con-

trol to a tape return (or aux line input, whichever is enabled) or subgroup output. Listen is available for the monitor returns, but unlike the channel section, there is no dedicated Listen Active LED to alert you to a soloed return.

BRITISH MASTERS

The master section offers a talkback with a built-in condenser mic; a 1 kHz alignment tone; monitor, stereo aux input, and headphone level knobs; and a top-panel headphone jack. A 2-track return switch lets you instantly compare your mix to a reference CD with simple button pushes, an extremely valuable feature. There are two 100 mm master faders (left/right) instead of a single stereo fader. Some people may find it more difficult to do a smooth fade-out while manipulating two faders, but remember: Practice makes perfect.

The Classic 8 also allows automated MIDI muting via an external sequencer. MIDI In, Out, and Thru ports and a MIDI channel-select switch are placed rather inconveniently on the rear panel, but most users will probably set and forget this feature. A Dump button lets you transmit all mute data to your sequencer via System Exclusive for storing mix scenes. I programmed some pretty swift and complicated muting scenes for the test, and the Classic 8 never faltered.

In addition, a single mute scene can be stored into memory and *manually* activated via a button on the master section. This is basically a master mute, which is handy for keeping the beginnings of mixes clean and hiss free.

CHEERS!

The Mixdown Classic 8 is a winner, and not just because it snatched an **EM** Editors' Choice Award. It's a winner because it sounds great and offers excellent value for your coin of the realm. There *are* some quirks, of course. No British console worth its salt would ever make things too easy. But if you want to produce slamming masters with a true English pedigree, the Classic 8 can deliver the goods without busting your budget. And that's a far better deal than even Margaret Thatcher could muster!

EM Editor Michael Molenda digs British stuff so much that he actually watched Fergie's kiddie show on the telly.

Classic Specs	
Signal-to-Noise Ratio (+4 dBu)	mic 87 dB line 90 dB tape 90 dB
Total Harmonic Distortion (@ 1 kHz)	0.005%
Channel Crosstalk (@ 1 kHz)	-93 dB
EQ	3-band, semiparametric
Simultaneous Aux Sends	5
Dedicated Stereo Returns	2
Channel I/O	XLR, tape/Line A, Line B, direct out, insert point
Talkback/Onboard Oscillator	yes/1 kHz
Faders	100 mm

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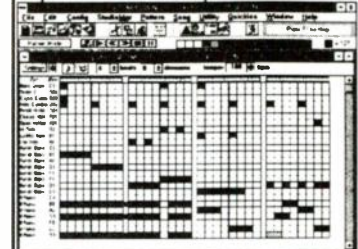
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TECH

PAGE

Satellite Radio

Music from the heavens may soon reach your radio.

By Scott Wilkinson

Ever since the Soviet Union launched *Sputnik 1* in 1957, satellites have become increasingly important in our lives. Today, the sky is crowded with them, and there is no place on Earth that cannot receive signals from at least one of these orbital spinning tops.

Among the more intriguing applications is radio broadcasting. For one thing, these broadcasts would consist of a digital signal with CD specs. In addition, they would be unaffected by mountains and other forms of interference; isolated rural areas can receive satellite signals just as well as urban centers. Finally, car radios would receive the same station no matter where they are in the country.

Most proposals under current consideration would let listeners select stations according to musical genre and other criteria. The high bandwidth of most satellite transmissions would also accommodate additional information in the signal. For example, a satellite-savvy radio might display the name of the currently playing song and artist, a list of upcoming songs, and other information.

However, the potential doesn't stop there. In conjunction with the Global Positioning System (GPS), which relies on a series of satellites that identify the location of special receivers, satellite radio can provide precise navigation for cars and backpackers with the appropriate hardware. This

would require a graphic display rather than a small alphanumeric readout, but many pundits believe this will be common in radios of this type.

In some cases, satellite radio even offers 2-way voice and data communication. For example, you could order any title you hear or instantly respond to a poll simply by pressing a button on a touchscreen display. Other services might include e-mail, paging, faxing, modem communications, and emergency calls.

There are several systems that can provide radio signals from satellites. For example, DirecTV already broadcasts approximately 30 channels of genre-specific, commercial-free, audio-only programming along with hundreds of TV channels to more than 800,000 DSS receivers (those small, 18-inch satellite dishes from RCA).

However, future satellite-radio systems will probably use different schemes, particularly for mobile receivers. For example, L-Band transmission operates in the 1,600 MHz range and uses a small disk antenna about three inches in diameter. Another option is S-Band transmission, which operates in the 2,300 MHz range

and uses an even smaller disk antenna about the size of a silver dollar.

Among the companies that have applied for FCC licenses to broadcast satellite-radio signals is Radio Satellite Corp. (tel. and fax 818/790-2152; e-mail radiosat@radiosat.com). The company plans to offer a service called RadioSat, which will include ten national, commercial-free stations in addition to AM and FM rebroadcasts for a subscription of \$5 per month. This service will use L-Band transmission from an existing satellite. Although RadioSat is not yet "on the air," you can check out a virtual prototype on the Internet at <http://www.radiosat.com/radiosat/> (see Fig. 1).

CD Radio (tel. 202/296-6192; fax 202/296-6265; e-mail cdrd@cdradio.com; Web <http://www.his.com/~cdrd/>) is taking a different approach. The company will offer 50 national, commercial-free stations for a subscription of \$10 a month. CD Radio intends to launch two satellites of its own that will operate in the S-Band. Both satellites will broadcast simultaneously; receivers will monitor both signals and select the best one. This technique, called *spatial diversity*, is similar in concept to diversity wireless-microphone systems (see "The Age of Wireless" in the July 1993 EM).

Satellite radio promises many enhancements and advantages over Earth-bound radio transmission. However, it will be a few years before satellite receivers become standard equipment in new cars. Until then, it should be interesting to watch this fledgling technology get off the ground. ☉



FIG. 1: A virtual prototype of RadioSat on the Internet lets you see how it will work with a touchscreen interface.

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