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the EM Guide to Gigging

Electronic Musician®

April 1998

THE WAR of the WORKSTATIONS

7 keyboard synths battle it out

Everything you need to know about software synths

5 CD-ROMs teach you to play guitar like a pro

Plus 11 must-read reviews!

INTERTEC PUBLISHING

U.S. $4.95/Canada $5.95

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The only 24x4 mixer with

Built with advanced technology & premium components,

SR24•4

After you've gone store-to-store, checking out mixer after mixer, they can start to appear pretty much alike.

But if you could "look under the hood," you'd discover that all 4-bus mixers aren't created equal in many critical areas. These important differences can affect sound quality, noise floor, mix head room and durability.

Greg Mackie initially intended the SR24•4 to be a very competitively priced live sound mixer.

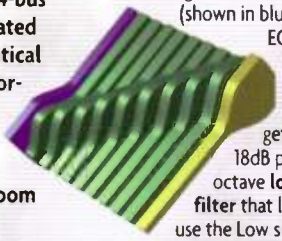
But having been a Musician On A Strict Budget himself, he knew that few bands have the bucks for a separate studio mixer. So instead of cutting corners, he made the SR24•4 a "downsized" Mackie 8•Bus with much of its circuitry and many of the same cool features.

The result is a compact console with premium mic preamps, natural-sounding equalization, ultra-low noise floor and EIGHT tape outputs. Just the thing for recording demos — or whole albums — on a limited budget.

Call toll-free for a comprehensive tabloid brochure or log onto our Web site for the full story of the SR24•4 and its big brother, the SR32•4. They look good outside. But more imporant, they SOUND good inside.

Flexible, creativity-enhancing equalization. Mono mic/line channel's swept midrange has a super-wide 100Hz-8kHz sweep range (and a broad, natural -sounding 1.5-octave wide curve (shown in green below). Low shelving EQ is fixed at 80HZ (shown in blue); high EQ is at 12kHz (yellow). Plus you get a sharp, 18dB per octave **low-cut filter** that lets you use the Low shelving EQ to enhance vocals, floor toms, etc. without boosting unwanted mic thumps and stage rumble.

VERY useful.



Six aux sends per channel. Auxes 1 & 2 are **pre**-fader (for live sound monitors). Auxes 5 & 6 are **post**-fader (for studio effects). Auxes 3 & 4 are switchable to either **pre or post** so you can always have four of the kind you want most.

Trim control has a 10dB "virtual pad" that tames ultra-hot line inputs; 60dB total gain range lets you boost timid vocalists and low level line inputs.

In-place stereo solo on channel strips & sub buses. Master section has solo level control & AFL/PFL global mode switch.

60mm logarithmic-taper faders. Many conventional faders "give up" about ¾ of the way down. Fades sound sorta like this:

LA LA LA LA LA.....?

The log-taper faders on the SR24•4 and SR32•4 have extra screened resistance elements that provide a linear-sounding fade, throughout the full travel of the control. Something like this:

LA LA LA LA LA LA LA LA LA

Your LA LAs may vary.

Special pan controls maintain the same apparent loudness even when you pan a channel hard right or hard left — a must for accurate studio mixes.

Super-twitchy Signal Present LEDs on every channel are so responsive that you can differentiate between vocals, rusty chainsaw samples, percussion, etc. All channels also have an overload LED.

Mute/Solo LED on every channel.

Ultra-high "AIR" EQ on submix buses centered at 16kHz. As one magazine review put it, *"The AIR controls turned out to be effective in adding top end clarity... it's almost an 'exciter' kind of effect, except without the harshness."*

Also available in a family-size 32-channel model!

enough guts to strip in public.

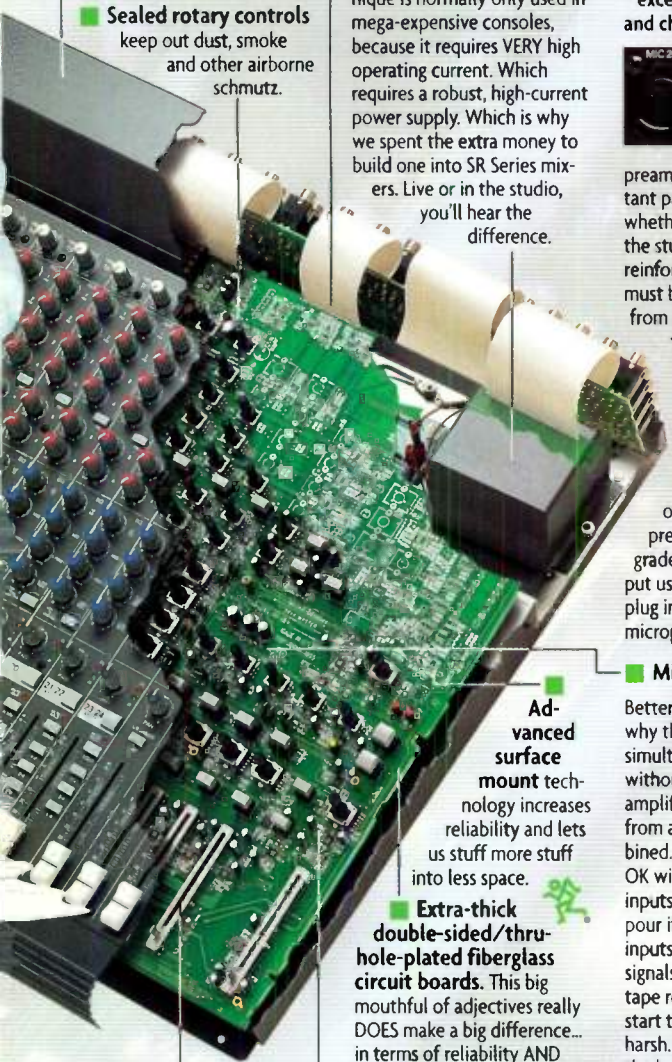
the SR24•4 is equally at home in the recording studio or on the road.

Solid, cold-rolled steel chassis. Not aluminum or plastic. Monocoque design resists flexing and bending.

Gold-plated internal interconnects remain corrosion free for perfect electrical contact, even if used repeatedly in industrial sections of New Jersey.

Sealed rotary controls keep out dust, smoke and other airborne schmutz.

Large, high-current internal power supply lets us use VLZ® (Very Low Impedance) circuitry at critical points in the SR24•4 and SR32•4. **VLZ®** significantly reduces thermal noise and crosstalk by using extremely low resistor values in certain circuits. This innovative technique is normally only used in mega-expensive consoles, because it requires VERY high operating current. Which requires a robust, high-current power supply. Which is why we spent the extra money to build one into SR Series mixers. Live or in the studio, you'll hear the difference.



Advanced surface mount technology increases reliability and lets us stuff more stuff into less space.

Extra-thick double-sided/thru-hole-plated fiberglass circuit boards. This big mouthful of adjectives really DOES make a big difference... in terms of reliability AND sound quality. The expensive thru-hole plating process maximizes electrical conductivity and eliminates the possibility of intermittant contact. The SR Series' flexible fiberglass main board soaks up downward impacts that would shatter brittle phenolic circuit boards.

Ultra-wear-resistant fader wiper surface derived from automotive sensor technology won't develop "the scratchies" even after years of use.

100% genuine name brand electronic parts throughout. Nuff said.

All inputs and outputs are balanced* to eliminate hum and allow extra-long cable runs (they can also be used with unbalanced connectors). Tight-gripping 1/4" jacks are solid metal; XLR's are genuine Neutrik®s with internal ferrite beads to reduce radio frequency interference.
* except RCA-type tape jacks and channel inserts.

Low-noise, high-headroom discrete mic preamps. It can be argued that the preamps are the most important part of a mixer — whether you're recording in the studio or running a sound reinforcement system. They must be accurate and free from coloration...yet be able to handle screaming vocalists and close-miked kick drums without overloading. And, they have to be ultra-quiet. Nowadays, we're not the only ones to claim our mic preamps are "studio-grade." So we invite you to put us to the test. In the store, plug in a good, high-output microphone and a pair of headphones and decide for yourself whose preamps have the most headroom, the least noise and the best sound.

Double tape outputs eliminate repatching during tracking. Okay, we'll be the first to admit that eight buses are a nice feature. But if you're on a tight budget, the SR24•4's "double-bussing" feature is a great solution (and besides, how many times do you REALLY track more than four channels to tape at a time?). Each of the SR24•4/SR32•4's four submix buses feed two different outputs. For example, Sub Bus 1 feeds Tracks 1 and 5; Sub Bus 2 feeds Tracks 2 and 6, etc. Instead of repatching, you route the bus' destination by what tape tracks you put into Record.

Dual headphone outputs with enough level to satisfy even most drummers. And a separate input for a talkback mic (so you don't tie up a mixer channel).

Inserts on all mono channels. Plus submix and main stereo mix inserts, separate control room outputs, extra RCA-type tape inputs and outputs, both 1/4" and XLR stereo outputs, and XLR mono output with its own rear panel level control.

The SR Series in a proverbial nutshell.

	24•4	32•4
Total Channels	24	32
Mono Channels	20	28
Stereo Line Inputs	2	2
Mic Preamps	20	28
Submix Buses	4	4
EQ (mono chs.)	12kHz HF	
	80Hz LF	
	100-8kHz Swept Mid	
	18dB/octave low-cut filter	
EQ (stereo chs.)	12kHz HF	
	80Hz LF	
	800Hz Lo Mid	
	3kHz Hi Mid	
Aux Sends/Ch.	6	6
Stereo Aux Returns	4	4
Tape Outputs	8	8
Channel Inserts	20	28
Width (inches)	31.0	39.25

Mix amplifier headroom. The SR24•4's inside story.

Better mix amplifier design is why the SR24•4 can handle 24 simultaneous HOT inputs without distorting. The mix amplifier is where signals from all channels are combined. Some mixers sound OK with just a couple of inputs...but when you pour it on with lots of inputs — particularly signals from digital tape recorders, things start to sound pretty harsh. Backing off on the bus or main faders doesn't help, since the mix amp comes before these gain controls.

The mix amp funnels multiple channel inputs into a single bus.

The SR24•4 and SR32•4 use Mackie's innovative **negative gain mix amplifier architecture**. Instead of mixing at unity gain where headroom is quickly used up, our mix amps operate at –6dB. At this negative gain level, SR Series mixers are capable of summing **FOUR TIMES** the number of channels before clipping. That nets out at **DOUBLE** the amount of mix amplifier headroom compared to any competitive mixer. It's a critical difference that you can plainly hear.

Below: A few of the 500+ folks who build the SR Series, our other mixers, amps and studio monitors at Mackie Designs in Woodinville, Washington, 20 miles northeast of Seattle.

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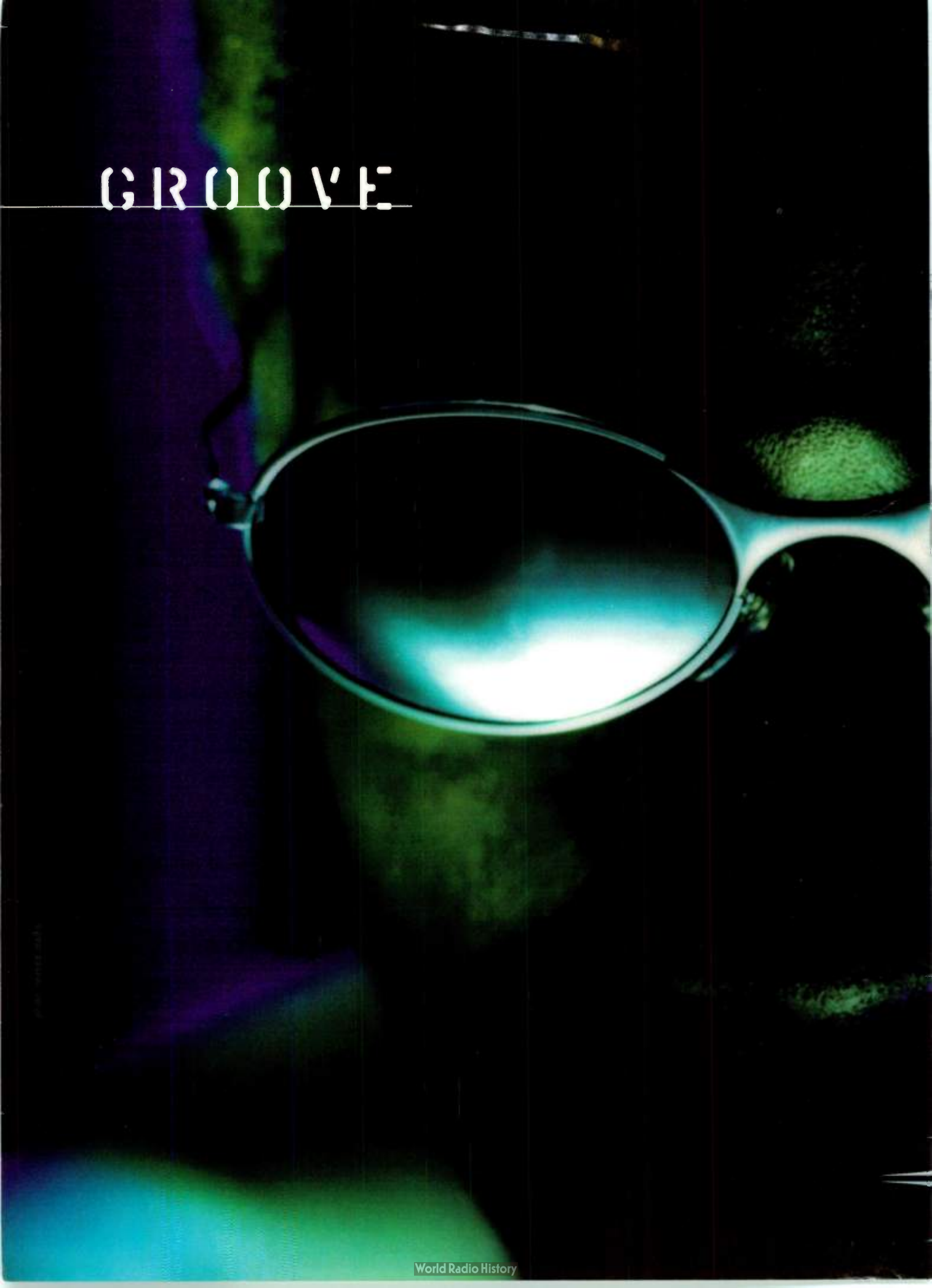

The Rhythm of your mind can now become reality. With 64 voice polyphony, radical new effects, steeper resonance multimode filters, MegaMix, part Mixer, MIDI control and expandable memory/storage for your patches and patterns. Add the innovative on-board infrared D-Beam™ control system and the MC-505 becomes the ultimate synthesizer, sequencer and drum machine tool for laying down your definition of Groove.

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I N S I

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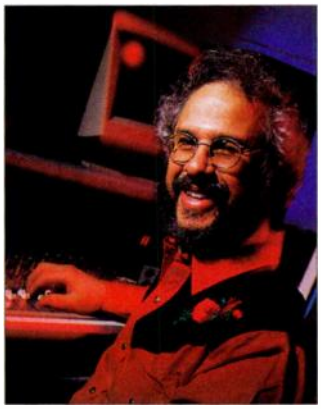
Cover: Photography by Ron Miller

Special thanks to Kawai America Corp., Kurzweil Music Systems, and Roland Corp. U.S.

I'll Take One of Each

Great software doesn't necessarily replace great hardware.



ANTHONY PIDGEON

There's nothing quite so reassuring as a handful of hardware. Don't get me wrong; I am very much at home with computers, and I appreciate the flexibility and features that quality software provides. When it comes to precision editing, automating your work, and storing every aspect of it, computer-based systems are unbeatable.

But doing *everything* with software has its drawbacks. Have you ever tried to edit for extended periods and then mix in real time—controlling levels, effects, EQ parameters, and so on—using only computer input devices? After a few hours of that, I hate meeses to pieces! I fancy a fine fader. Hardware controllers, such as MIDI fader boxes, make mixing and adjusting software parameters bearable. (In fact, a MIDI fader box is useful for controlling some hardware units with small displays and brutal interfaces.)

Physical controllers aren't the only advantage of hardware devices, of course. For one thing, discrete hardware components don't have to compete for system resources. Even with your hot, new 300 MHz PowerPentium Macintel CPU, you *know* you will find a way to burn every cycle and come up craving more. And how often does an outboard effects processor crash and burn? Compare that to using a DSP plug-in with audio recording software.

If you've been around this block a few times, you get the point: to take full advantage of both worlds, you need to integrate them into one working studio.

So when I told a few friends that we were doing a major piece on some very cool software synthesizers (see "Software Synths on Parade" on p. 68), I was dismayed to get responses like "So I guess this means hardware synths are obsolete now, right?" Now, there's no doubt that some of these software synths are potent dope for sound-design junkies. But as you'll learn, they have their drawbacks, too. Hardware versus software? I'll take some of each, thank you!

On the other hand, you could just go the hardware route. Take one keyboard workstation, add a 2-track recorder and headphones, mix well with two audio cables, and you have an instant studio that is capable of recording instrumental music in very little time and can be used live, as well. Of course, your keyboard workstation can also be the starting point of a much larger studio—with or without a computer. If that seems more your style, sample "Workhorse Workstations" on p. 50.

Speaking of samples, this month, as part of a Reviews redesign that began with our January 1998 issue, we have reincarnated our Quick Pick reviews, which last appeared in the May 1991 **EM**. Quick Picks are short reviews that get right to the point in 500 words or less, with one "Overall" **EM** Meter. This allows us to cover three or four products in the space we formerly allocated to one large review. This new Reviews subsection will be a great place to check out sample libraries, though they will not be the only products you'll find there.

Quick Picks bring us a step closer to our goal of making **EM** a complete resource for the personal studio owner.

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Intertec Publishing Corp.
9800 Metcalf Ave., Overland Park, KS 66212

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Electronic Musician (ISSN: 0884-4720) is published monthly by Intertec Publishing Corp., Inc., 6400 Hollis St., #12, Emeryville, CA 94608. ©1998. This is Volume 14, Number 4, April 1998. One year (12 issues) subscription is $36; outside the U.S. is $65. Periodical postage paid at Oakland, CA, and additional mailing offices. All rights reserved. This publication may not be reproduced or quoted in whole or in part by any means, printed or electronic, without the written permission of the publishers. POSTMASTER: Send address changes to Electronic Musician, PO Box 41525, Nashville, TN 37204. Editeur Responsable (Belgique): Christien Desmet, Vuurgatstraat 92, 3090 Overijse, Belgique. Canadian GST #129597951. Canada Post International Publications Mail Product (Canadian Distribution) Sales Agreement No. 0478741.

Also publishers of *Mix*® magazine.
Printed in the USA.

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have you seen?

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

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

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

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

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

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

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

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

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

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

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CREATIVITY WITHOUT COMPROMISE

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

Mix Magazine
1997 AES Report

The concept seems so obvious. Combine a digital disk recorder and a digital mixer in one convenient box. Eliminate complex interfacing and keep everything in the digital domain. Add optional internal effects. Creative heaven. But **up until now,** buying anything that you could afford meant settling for almost enough tracks to record your music. Or a compressed data format that sounded almost as good as CD quality. Or a user interface that you could almost make sense of.

Now, finally, the concept of integrated digital recording and mixing lives up to its promise with Akai's DPS12 Digital Personal Studio. Designed for those unwilling to compromise their creative vision, the DPS12 combines a 12-track random-access digital recorder (with professional-quality uncompressed 16-bit sound and powerful non-linear editing) and a 20-channel MIDI-automatable digital mixer in one compact, incredibly easy-to-use package. All at a price that is nothing short of spectacular. It's **creativity without compromise.**

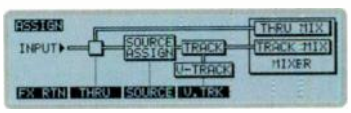
Since its founding in 1984, Akai Professional has consistently pushed the boundaries of affordable recording technology. From the original MG1212 12-track recorder/mixer, to the breakthrough A-DAM digital multitrack, to the DR4/8/16 professional disk recorders and the DD family of audio post-production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

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

More Is Better

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

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



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

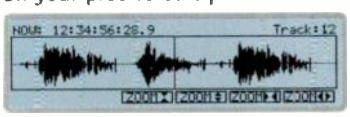
The Wait Is Over

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

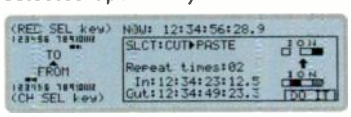
Easy Editing

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

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



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



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

Mix Master

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

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

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

Effects Inside

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

It Wants To Be Your Friend

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

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

Check It Out

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

$1499 msrp.

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AKAI professional

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BIG BROTHER

Are you guys watching my house? Tapping my phone? Once again, I'm amazed at how one of the periodical upgrades necessary to my modest bedroom studio coincides with an article in **EM**. It seems it's been that way for years, from my selection of close-field monitors to my choice of microphones. They've all been made with the help of **EM**, and your timing is uncanny.

A few months back, I purchased the awesome Roland VS-880X. For this 57-year-old hillbilly, it was difficult to learn, but I'm getting there; I've learned enough to be dangerous now. Then once again, just in the nick of time, the February 1998 **EM** arrived with Tom Stephenson's "Master Class: Secrets of the Virtual Studio," loaded with tips and tricks for the VS-880. Amazing! My timing with demo submissions to publishers should be so good.

I look forward to each copy in the mailbox like a kid anticipating his "secret encoder ring" after sending in the dozen cereal box tops. In short, thanks for a really great magazine.

Jim Cox
Muncie, IN

NOT A BEST BUY?

After reading your "1998 Editors' Choice Awards" (January 1998), I decided to look into buying a Creative Labs Sound Blaster AWE 64 Gold sound card. I have an AWE 32 and have been happy with its performance except that when using *Cakewalk* 6.01 in full-duplex mode, the playback is 8-bit and record is 16-bit. The *Cakewalk* newsgroups are full of people complaining about this.

I thought by your magazine's glowing review that the new AWE 64 had overcome this problem, but after hearing from owners of this card, I find out that the quality is no better in full-duplex mode than the previous card. I think this is a very important factor in buying a sound card for serious hard-disk recording and feel that your readers should know about this before they run out and buy the sound card that is an *Electronic Musician* "best buy."

Eric Arseneau
Nova Scotia, Canada

Eric—I agree with you that upgrading a single "level" from a Sound Blaster 32 to a Sound Blaster 64 Gold might not be worthwhile, though the 64 does have advantages over the 32. However, for the thousands of users who own earlier versions of Creative Labs sound cards or who simply default to the audio capabilities built into their computers, the Sound Blaster 64 Gold is a wise upgrade choice.

We praised the 64 Gold for the level of performance it offers at a very reasonable price, and we said that it sounds very good, especially when you use the larger sound sets that the extra RAM allows you to load. We did not claim, nor should you infer, that it was the best-sounding or most-powerful card we've tested.

I'm sorry if we didn't make it clear exactly what type of user we thought would be best served by choosing an AWE 64 Gold card. However, I still believe the card is worth considering for musicians stepping up from a basic level. Creative Labs deserves the kudos we gave it for putting together an attractive system at a very reasonable price.—Dennis M.

NOTATION ELATION

The article on low-cost notation software ("Noteworthy Deals," December 1997) was a great help. I had been looking around for a while for a program that would let me edit musical sheets, but all I found were programs that included notation as a secondary interest. I was wondering how I was going to find a decent notation program when I saw the article.

I was impressed by your fair assessment of Sion Software's *QuickScore Elite*, and I was even happier to find out an updated version was available that addressed many of the problems with the program you pointed out, such as a lack of drum notation. I'd like to thank you for your detailed examination. Keep on reviewing so they'll have to keep getting better!

hambhlper@aol.com

COPYRIGHT SOURCE

I've been using a Korg 01/W at my school and church to produce background "tracks." Several people have noted that they are better than commercial tracks, and I even made a little money producing a tape of an original arrangement for the high school choir.

I have been trying to find out the what, how, and where of copyright issues. I assume it's illegal to just start selling tracks of other people's music. The music I do is highly selective. It is aimed at schools and more directly at conservative churches desiring less contemporary arrangements. I know there is a market for this stuff!

Are there any directories, companies, businesses, organizations, etc., that I could contact to find more information? Should I continue to make arrangements for "personal" use? Do I need some kind of license or contract? Is there a blanket copyright-use license, for example?

By the way, I am a long-time subscriber to **EM**. Believe me, it's a real breath of fresh air out here in the sticks. I especially appreciate the lack of politics, glam, hype, etc.

K. G. Weber
cfjh@digisys.net

K. G.—You're right: it is illegal to sell copies of other people's music without their permission. Your other questions cover a broad range of music-business law. For an

BOB DAHM

WHAT'S NEW

By Joe Humphreys and Jeff Casey

▲ CROWN CE SERIES

Anyone in the market for high-rated, reasonably priced power amplifiers will appreciate Crown's latest offerings, the CE 1000 ($700) and CE 2000 ($1,000). The CE 1000 is rated at 560W into 2Ω, 450W into 4Ω, and 275W into 8Ω; the CE 2000 is rated at 975W into 2Ω, 660W into 4Ω, and 400W into 8Ω. The amps can also operate in a bridged-mono mode at either 4Ω or 8Ω.

The compact amplifiers will fit into shallow racks. They feature front-panel controls; proportional, fan-assisted cooling; and a signal-present indicator. In addition, a rear-panel jack allows the activity of the fault circuit to be monitored from a remote location.

Crown claims that the CE Series delivers 50 percent less distortion than other amplifiers in its class. Both amplifiers are rated at 0.5 percent THD with a damping factor greater than 400.

The CE Series features Crown's System Solution Topologies (SST); this feature lets users interchange the input card for active crossover modules. The company promises an assortment of other processing modules in the future. Crown International; tel. (219) 294-8314; fax (219) 294-8250.

Circle #401 on Reader Service Card

▶ SONIC FOUNDRY ACID

The new loop-based arranger and editor from Sonic Foundry, *Acid* (Win; $399), works with audio loops drawn from the included library or from your own collection. You can preview any loop and then click and drag it into (or out of) the mix. Key and tempo are automatically (or manually) adjusted in real time. You get control of volume, pan, and effects envelopes for each track. *Acid* supports multiple real-time effects with DirectX plug-ins and provides quick access to audio-editing software. You can also import and place nonlooping audio. Finished projects can be output as WAV files.

The number of loop tracks depends only on the loops' size and your system RAM. *Acid* supports 16- and 24-bit audio and imports WAV and AIFF files. It generates or chases SMPTE and supports multiple sound cards.

The included loop library has hundreds of loops in such styles as techno, rock rave, hip-hop, alternative, industrial, and more. The program requires a Pentium 133 or Alpha processor (Pentium II recommended for real-time preview), 32 MB RAM, Windows 95 or NT 4.0, and a CD-ROM drive. Sonic Foundry; tel. (800) 577-6642 or (608) 256-3133; fax (608) 256-7300; e-mail sales@sonicfoundry.com; Web www.sonicfoundry.com.

Circle #402 on Reader Service Card

▼ ENSONIQ ZR-76

Ensoniq has begun revamping its keyboard line, starting with the ZR-76 keyboard synthesizer ($2,795). The new synth features a large, expandable sound collection; 24-bit effects; an onboard drum machine; and a 16-track sequencer. Its 76-key, weighted-action keyboard senses Velocity, Release Velocity, and Channel Pressure. Controllers include pitch-bend and mod wheels, and it offers jacks for four programmable footswitches (two are provided) and one programmable footpedal.

Fourteen megabytes of waveform ROM hold 1,200 sounds, including multisampled acoustic instruments, synths, and digitally created Transwaves. More than 70 drum kits are built up from more than 750 drum sounds. There are also 256 RAM sound locations and three slots for user-installable expansion boards, which hold either 24 MB of wave data or 4 MB of flash-ROM sample memory. The unit ships with a 16 MB expansion board containing William Coakley's *Perfect Piano* grand piano programs (reviewed in the May 1997 issue of **EM**).

The 16-layer voice architecture provides 22 modulation sources and eight destinations, one LFO with seven waveforms that sync to the onboard sequencer or MIDI Clock, and more. The effects architecture features six stereo buses: three reverb buses, a chorus bus, a dry bus, and an insert-effect bus with 40 algorithms.

The ZR-76's Idea Pad runs in the background, recording whatever you play and dividing it into phrases. Any phrase can then be sent to the sequencer for further development. The onboard 16-track sequencer has 384 ppqn resolution, real- and step-time entry, extensive quantize options, tap-tempo control, and more. Sequences can be imported and exported as SMFs via the 3.5-inch, high-density floppy-disk drive. There's also an onboard drum machine with 119 built-in rhythms, each with eight variations and eight fills. Ensoniq Corp.; tel. (800) 553-5151 or (610) 647-3930; fax (610) 647-8908; faxback (800) 257-1439; Web www.ensoniq.com.

Circle #403 on Reader Service Card

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circle #551 on reader service card

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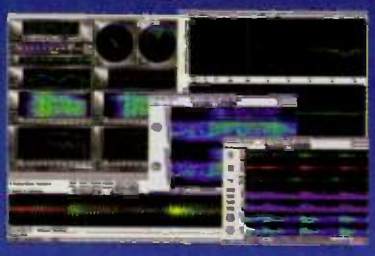
The SpectraFooTDM plug-in environment for ProTools and ProTools24 systems features unparalleled audio analysis and metering tools that are completely synchronized with the program material being monitored. SpectraFooTDM runs concurrently with all other plug-ins in order to provide instant feedback on any channel or an entire mix. You can even monitor the effect of DSP processes as you are changing parameters! The SpectraFooTDM system is only $500. Other configurations are available from $99.95. For more information or to order call +1 (888) 638-4527 or check our website at www.mhlabs.com.

At only 500 bucks, you can even afford one for each eye!

These standalone products are also available from Metric Halo Labs:

MLM-100

Real Time Rack



SpectraFoo Standalone

circle #507 on reader service card

Key Features

10 types of track assignable audio analysis instruments

- Lissajous Phase Scopes
  - Oscilloscope and Vectorscope modes
- L-R Stereo power balance meters
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- Band limited history meters
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- Full-featured audio frequency oscilloscopes
  - Adjustable, calibrated graticule
  - Adjustable timebase/sensitivity
  - Adjustable level and slope triggering
  - Clip/Polarity check triggering
- Spectragram spectral history meters
- PhaseTorch™ frequency-sensitive phase meters
- Sample accurate digital level meters
  - Peak, RMS, and average
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Persistent instrument windows

- Runs concurrently with other plug-ins to provide instant feedback on any channel or an entire mix.

Uses only one DSP for up to 22 channels of analysis

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"SpectraFoo is the future & science of computer animated audio metering."
— Frank Serafine, Serafine Studios

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— Jim Jorden, Audio Media US

Dealer Inquiries Invited

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GET SMART ▲ ▲ ▲ ▲

RISING SOFTWARE

Rising Software combines computer technology with time-honored, drill-based instruction methods in its *Musition* music-education package for Windows ($99; $299 lab pack of five copies, $795 site license). The software covers fifteen topics: scales, intervals, instrument range, note reading, advanced clefs, key signatures, symbols, scale degrees, terms, musical concepts, chord recognition, meter recognition, rhythm notation, and instrument transposition.

Each topic has an accompanying Information screen with example questions and MIDI examples. *Musition*'s graded exercises range from multiple-choice vocabulary quizzes to fixing notation on a staff using the mouse. All results are recorded to a database, which has twenty built-in reports. (The database is stored in dbf format so users with database skills can create their own reports.)

Teachers can customize the program by adding their own chords, instruments, terms, and concepts. They can also set up customized tests, assign them to particular students, and record the individual results. The software allows for centralized record keeping and administration when installed on a network.

Musition requires an 80486/100 or better processor, Windows 95 or NT, and a Sound Blaster–compatible sound card. Thinkware (distributor); tel. (800) 369-6191 or (415) 777-9876; fax (415) 777-2972; e-mail tware@ix.netcom.com; Web www.risingsoftware.com.

Circle #404 on Reader Service Card

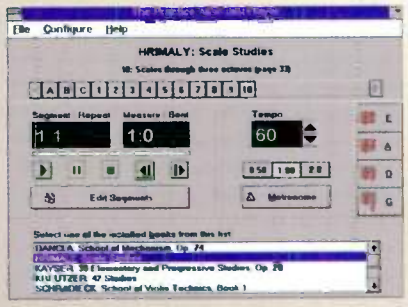
THE VIRTUAL VIRTUOSO

The Virtual Virtuoso's Practice Assistant package is an instructional aid for violin, viola, and cello students. The system consists of the *Practice Assistant Player* software ($59) and one or more technical study books ($8 to $15). While you practice scales and études, the *Practice Assistant Player* plays along. The program lets you break down each piece into segments, which can range in length from one measure to the entire piece. For each segment, you can choose the tempo, number of repetitions, whether you want a lead-in measure, and the number of steps to transpose. For example, you could set the player to repeat a difficult segment three times at a slow tempo and then play it again at normal speed before moving on.

The study books contain the MIDI sequences used by the *Player*. Available books include the popular technical studies by Wohlfahrt, Sevcik, Kreutzer, Dotzauer, and many others. Sheet music is not included.

The company also offers the *Performance Assistant* series of MIDI accompaniments to popular sonatas, concertos, and short performance pieces for violin, viola, or cello ($20 to $30). Each title comes with a MIDI player that plays the accompaniment or your solo part. You set the tempo. Playback can be stopped, started, or paused with single keystrokes, and you can loop a section. You also get a metronome and a tuning reference.

The catalog contains many popular pieces, including sonatas by Handel and Mozart, concertos by Bach and Vivaldi, and more. Sheet music is not



included. Both programs require an 80386 or better PC, Windows 3.1 or 95, 4 MB RAM, and a sound card or MIDI interface and external tone generator. The Virtual Virtuoso; tel. (650) 747-0166; fax (650) 747-9529; e-mail virtvirt@webcom.com; Web www.webcom.com/virtvirt.

Circle #405 on Reader Service Card

HOPKINS TECHNOLOGY

For classical-music lovers or those seeking an introduction to the topic, *Classical Notes* (Win, $49) by Dr. Richard E. Rodda (CD-ROM implementation by Hopkins Technology)

offers a wealth of information. Rodda, who teaches music at Case Western Reserve University and the Cleveland Institute of Music, has collected the program notes to nearly 2,000 musical events, many with text in both the original languages and in English translation. Five hundred links within the text illustrate points with musical examples, and a search engine helps you locate topics of interest.

The CD-ROM includes biographical sketches of more than 500 composers, conductors, and music directors, with anecdotes about their lives and work. There's also an hour-long audio lecture by Rodda, with accompanying music and charts. Titled "Listening for Musical Form," the lecture explains forms such as minuet, trio, and sonata and the processes they are built on.

An illustrated library describes dozens of instruments, and a hypertext glossary defines hundreds of terms. *Classical Notes* requires a PC with Windows 3.1 or higher, a sound card, and a CD-ROM drive. Hopkins Technology; tel. (612) 931-9376; fax (612) 931-9377; Web www.hoptechno.com.

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

STEPHEN HUNTER FLICK

Sound Designer

Creative Cafe

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

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

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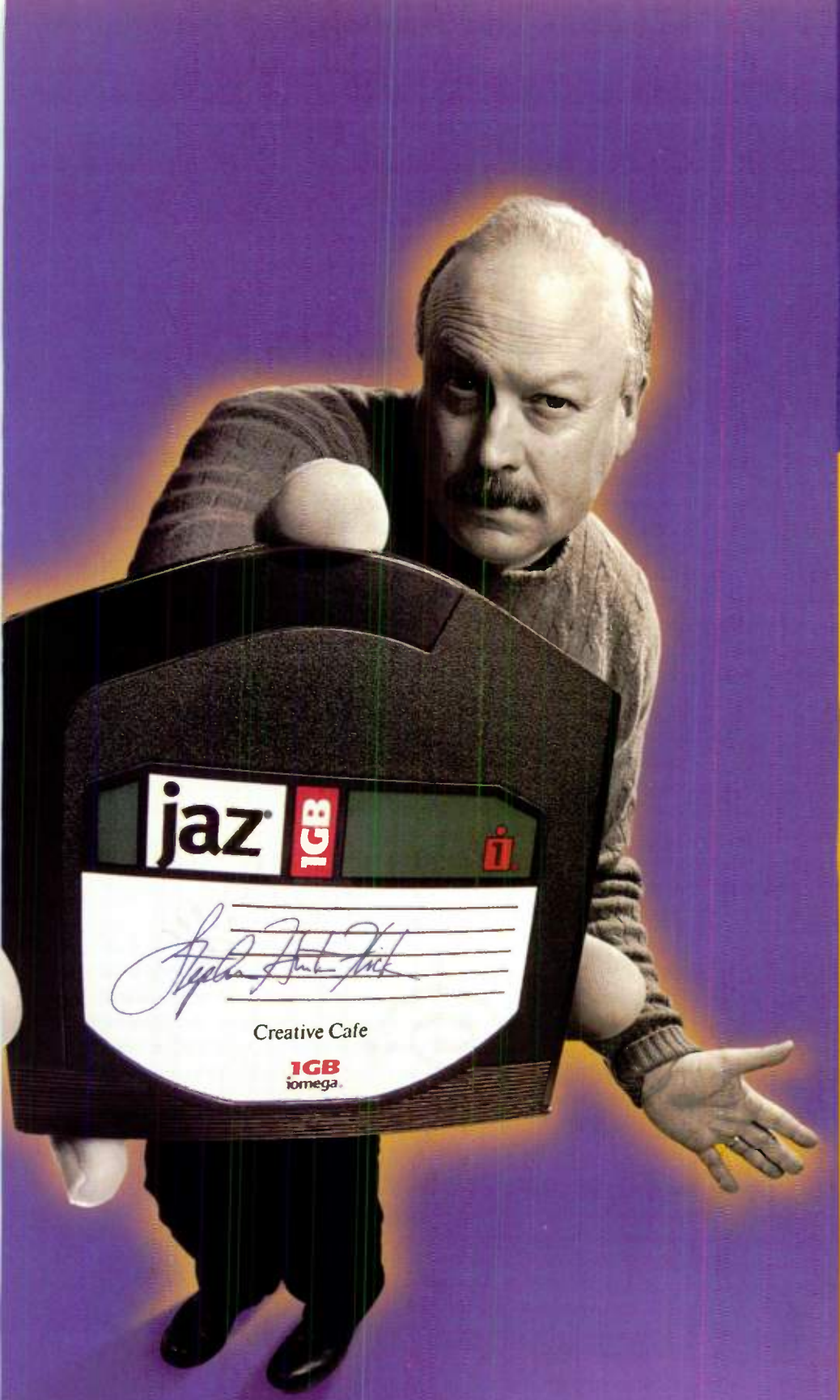

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ON THE HORIZON ▲ ▲ ▲ ▲

Designed to make digital mixing easy for anyone familiar with analog consoles, Spirit's Digital 328 ($4,999.95; available in spring 1998) has an interface based on console controls rather than display pages. The 328 features eight buses, multitrack digital I/O, and internal effects by Lexicon. Each of the unit's sixteen mic/line channels offers balanced XLR and balanced ¼-inch inputs, Spirit's UltraMic+ preamp with 66 dB gain range and 28 dBu headroom, phantom power, and a dedicated insert point. There are also five stereo channels, each with two ¼-inch inputs. Add to that sixteen digital tape returns on two TDIF or two ADAT optical jacks, and you get 42 total inputs. There are also AES/EBU and S/PDIF I/O jacks (one pair of each) that can be assigned as effects send/returns or mix inserts. Optional modules connect to the TDIF inputs and supply extra analog I/O, AES/EBU I/O, or UltraMic preamps.

Each input can be routed to any of the eight bus groups, and each has three bands of parametric EQ (with frequency ranges of 40 Hz to 800 Hz, 200 Hz to 8 kHz, and 1 kHz to 20 kHz; 15 dB boost/cut; and Q range 0.3 to 3.0) plus four aux sends, two internal effects sends, and pan control. These functions are all accessed from the 328's E-strip, a horizontal bank of rotary encoders. Select a channel and the E-strip becomes a channel strip for that channel; a ring of LEDs around each pot displays the value for that parameter. Settings can be copied and pasted from one channel to another, and an Undo/Redo function lets you compare your new settings with the previous ones.

Sixteen motorized, 100 mm faders can be switched between mic/line inputs, tape returns, and group and master levels. Each fader has a 10-segment bar-graph meter, mute button, and solo (which can be globally switched between solo-in-place or pre- or post-fader listen). The two editable, onboard Lexicon effects units feature reverb, chorus, delay, flange, and dual algorithms. There are also two dynamics processors with compression, limiting, gating, or ducking; these can be assigned to any input, output, or group.

You can save up to 100 snapshots of the console's status, which can be recalled manually or set to restore at a given SMPTE or MTC value. Each mixer function is assigned a MIDI message to allow dynamic automation from a sequencer. The 328 reads and writes MTC and reads SMPTE. A large timecode readout sits above a transport bar for controlling devices, such as MDMs, via MIDI Machine Control.

The Digital 328 uses 24-bit A/D and D/A converters with 128x oversampling. It samples internally at 44.1 or 48 kHz and accepts external signals with 30 to 50 kHz sampling rates. Spirit rates its frequency response at 10 Hz to 22 kHz and dynamic range at 109 dB (mic input) or 112 dB (stereo input). Spirit by Soundcraft; tel. (800) 255-4363 or (916) 630-3960; fax (916) 630-3950; Web www.spirit-by-soundcraft.com.

Circle #407 on Reader Service Card

▶ LEXICON MPX G2

Lexicon is rolling out its new Custom Shop line, starting with the MPX G2 guitar effects processor ($1,800). This single-rackspace, 32-bit processor is designed to work with any guitar amplifier in both recording and live-performance situations. The MPX G2 can also function as a stand-alone, programmable analog preamp with effects.

With its two separate signal paths, the MPX G2 lets you place such effects as compression, wah, and overdrive in front of the amp, after which multi-effects (e.g., delay, chorus, and reverb) are routed through the effects loop. The preamp section features Dynamic Gain, Lexicon's new analog-distortion technology.

Using multiple processors (a Lexichip for reverb and a math DSP chip for multi-effects), the MPX G2 provides a total of 60 effects. In addition to the standard array (e.g., pitch shifting, delay, chorus, flanger, EQ, and tremolo), the unit also offers recreations of several classic effects, such as the MXR Dyna-Comp and Crybaby and the Dunlop Uni-Vibe.

The operating system of Lexicon's MPX R1 MIDI pedal board ($579) has been updated to support the MPX G2. Lexicon, Inc.; tel. (781) 280-0300; fax (781) 280-0490; e-mail info@lexicon.com; Web www.lexicon.com.

Circle #408 on Reader Service Card

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"The Finalizer is capable of producing first-rate professional results. There's a lot of "bang for the buck" in this single rackspace mastering tool."

Bob Ludwig
Gateway Mastering Studios
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circle #509 on reader service card

YAMAHA DSP FACTORY

The new DSP Factory system puts the power of Yamaha's 02R digital mixer into your desktop recording setup. The system, which is scheduled to ship in spring 1998, currently consists of the DS2416 digital mixing card ($999) and the AX44 analog I/O expansion unit ($299). It works with Windows PCs, and Mac drivers are under development; Cakewalk, Emagic, Sonic Foundry, SEK'D, Musicator, Innovative Quality Software, Canam Computers, and Steinberg have announced support for the system.

The DS2416 is a half-length PCI card with a full-function, 24-channel digital mixer and the ability to record eight tracks and play back sixteen tracks of 32-bit digital audio. The onboard mixer has all the features of an 02R (except I/O), including ten output buses and six aux sends. In addition to 104 bands of parametric EQ and 26 dynamics processors, it features two effects processors equal in quality to the company's REV500. Comprehensive metering and digital cross-patching of ins and outs are also available. All of this is handled by the card's five onboard DSP chips without taxing the host CPU.

The card has stereo 24-bit digital coaxial I/O (IEC-958 type II) and analog I/O, all on RCA jacks. The A/D and D/A converters are 20-bit and offer 44.1 or 48 kHz sampling frequencies. The manufacturer rates the analog I/O's dynamic range at 93 dB (A/D + D/A) and THD at 0.02% from 20 Hz to 20 kHz (48 kHz sampling rate; +6 dBV).

The AX44 Audio Expansion Unit installs in a 5¼-inch drive bay and offers four analog ins and four outs on ¼-inch jacks. The first two inputs operate at mic (-50 dBV) or line (-10 dBV) levels (switchable). There's also a ¼-inch, stereo headphone jack with volume control. Yamaha cites a 100 dB dynamic range for the AX44's I/O (A/D + D/A) and a THD of 0.01% from 20 Hz to 20 kHz (48 kHz sampling rate; +2 dBV).

Up to two AX44s can be attached to each DS2416 card (for a total of twelve channels of I/O), and two DS2416s can be cascaded. Other interface units are planned; the first one will provide two ADAT Lightpipe connectors, allowing sixteen tracks of digital I/O. Yamaha Corporation of America; tel. (714) 522-9011; e-mail info@yamaha.com; Web www.yamaha.com.

Circle #409 on Reader Service Card

▶ MOTU 2408

Mark of the Unicorn is working toward a total digital audio solution with its 2408 hard-disk recording system ($995 core system), which includes drivers for both Mac and PC. The new hardware offers 24 I/O connections, expandable to 72. The basic package includes the PCI-324 card and one 1U rackmount 2408 I/O unit; up to three I/O units can be attached to one card. (Additional I/O units cost $695 each.)

Each 2408 I/O unit has status LEDs on the front panel and gold-plated I/O connections on the rear. You get one bank of eight analog RCA inputs and outputs (operating at -10 dBV), stereo S/PDIF (RCA coax) connectors, three 8-channel TDIF connectors, and three 8-channel ADAT optical connectors.

Internally, the unit has three 8-channel buses; included software lets you assign I/O ports to these buses. For example, you could assign the analog I/O to one bus, a TDIF connector to another bus, and an ADAT connector to the third. For main stereo output, analog outputs 1 and 2 are duplicated as balanced ¼-inch outs (+4 dBu), an S/PDIF out, and a ¼-inch headphone out with volume control. BNC word-clock connectors are also provided.

The analog I/O uses 20-bit A/D and D/A converters, but the system's internal signal path (and software) supports 24-bit audio. The I/O unit also functions as a stand-alone ADAT/TDIF format converter, processing up to 24 channels at a time.

The PCI-324 card handles all I/O processing (independently of the host CPU) and acts as a 72 x 72 patch bay, routing any input to any output. The card also has a 9-pin ADAT Sync In jack for sample-accurate sync to ADATs. An RS-422 connector allows you to connect a MOTU Digital Timepiece via a proprietary sync protocol, so DTP owners can achieve sample-accurate sync with TASCAM MDMs, as well.

The 2408 system comes with Macintosh DAW software that includes multichannel waveform editing; automated virtual mixing; real-time, 32-bit, floating-point effects processing; support for MOTU Audio System and Adobe Premiere plug-ins; and more. Mac users can also opt to use the system with *Digital Performer*. Mac Sound Manager and Windows WAV drivers are included. For both Mac and Windows, the number of simultaneous record and playback tracks is dependent on the computer's performance. Mark of the Unicorn, Inc.; tel. (617) 576-2760; fax (617) 576-3609; e-mail info@motu.com; Web www.motu.com.

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KEY CHANGES

Midisoft Corporation has signed a letter of intent to acquire Passport Designs. The exact nature of the agreement is subject to various legal and governmental conditions...Ensoniq is shipping its SP-5 SCSI-2 interface for the ASR-X, which will allow the ASR-X to import ASR-10/88, Roland S-770, and Akai S1000 samples from a CD-ROM or other SCSI device...Emagic is selling its *Logic Audio* software in four new packages, each with its own set of features. The packages are, in ascending order of sophistication, *MicroLogic AV* and *Logic Silver, Gold,* and *Platinum. Logic Platinum* will come bundled with BIAS *Peak SE* in the Mac version and Syntrillium *Cool Edit Pro LE* in the PC version... Arboretum Systems has moved. You can contact the company at tel. (800) 700-7390 or (650) 738-4750; fax (650) 738-5699. Also, prices have dropped for Arboretum's *Hyperprism* TDM (now $499), *Ionizer* ($399), *Hyperprism* Power Mac bundle ($289), and *Hyperprism* 68K ($249)...E-mu's E4-series samplers will now be supported by Emagic *SoundDiver,* BIAS *Peak,* Sonic Foundry *Sound Forge,* Steinberg *ReCycle,* Interval *Music Transfer Station,* Gallery Software *E-mu File Assistant* and *EOS Browser,* and MOTU *Digital Performer* 2.1... Music Industries Corp. is now the exclusive distributor of Invisible Keyboard Stands...SyQuest announced that its SyJet 1.5 GB hard drive is qualified for use with Digidesign Pro Tools 24...Roland has licensed its Sound Canvas sound set and GS MIDI format to Apple for inclusion in QuickTime 3.0...Furman has extended the warranty on all of its products from one to three years. The warranty covers parts, labor, and return shipping costs.

—Rick Weldon

ELECTRO-VOICE N/DYM MICS

The new N/DYM microphone line from Electro-Voice features a range of mics tailored to specific applications. The N/D367 (shown) is unusual in that it is specifically intended for female vocalists. With its added sensitivity in the 1 to 2 kHz region and a smooth response above that, the N/D367 is designed to exhibit a balanced response to female vocal harmonics, without adding low-end boominess. It comes with a multistage shock mount and a removable windscreen. Electro-Voice; tel. (800) 234-6831 or (616) 695-6831; fax (616) 695-1304; e-mail sdupaix@eviaudio.com; Web www.electrovoice.com.

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Model	Function	Pattern	Frequency Response	Dynamic Range	Retail Price
N/D168	snare drum	cardioid	25 Hz–15 kHz	141 dB	$182
N/D267	performance vocal	cardioid	65 Hz–19 kHz	144 dB	$140 ($150 w/on-off switch)
N/D367	female vocal	cardioid	60 Hz–17 kHz	144 dB	$200
N/D468	instrument	super-cardioid	60 Hz–20 kHz	144 dB	$232
N/D767	lead vocal	super-cardioid	50 Hz–20 kHz	144 dB	$242
N/D868	kick drum	cardioid	20 Hz–10 kHz	140.3 dB	$282
N/D967	concert vocal	super-cardioid	50 Hz–13 kHz	142 dB	$282

TC WORKS NATIVE EQ WORKS

TC Works, a subsidiary of TC Electronic, announced TC Native EQ Works ($499), a new package of DSP plug-ins that are available in DirectX or Cubase VST formats for Windows 95 or NT. The package features two discrete plug-ins: a 10-band parametric EQ *(Native EQ-P)* and a 28-band graphic EQ *(Native EQ-G).*

Native EQ-P is a 10-band stereo (20-band mono) EQ. Seven of the bands are fully configurable and can be independently assigned as parametric, high-shelving, low-shelving, or notch filters. *Native EQ-G* offers a 28-band stereo (56-band mono) graphic EQ that can work in 28-, 14-, or 7-band configurations. Bands can also be grouped together for more complex signal shaping.

Both of these plug-ins feature SoftSat, a Lexicon algorithm that generates analog tube characteristics within the digital medium, providing a warmer sound. *Native EQ-P* requires a Pentium 133 processor, and *Native EQ-G* demands at least a Pentium 200. Both plug-ins need 32 MB of RAM. TC Electronic U.S.; tel. (805) 373-1828; fax (805) 379-2648; e-mail tcus@tcelectronic.com; Web www.tcworks.de.

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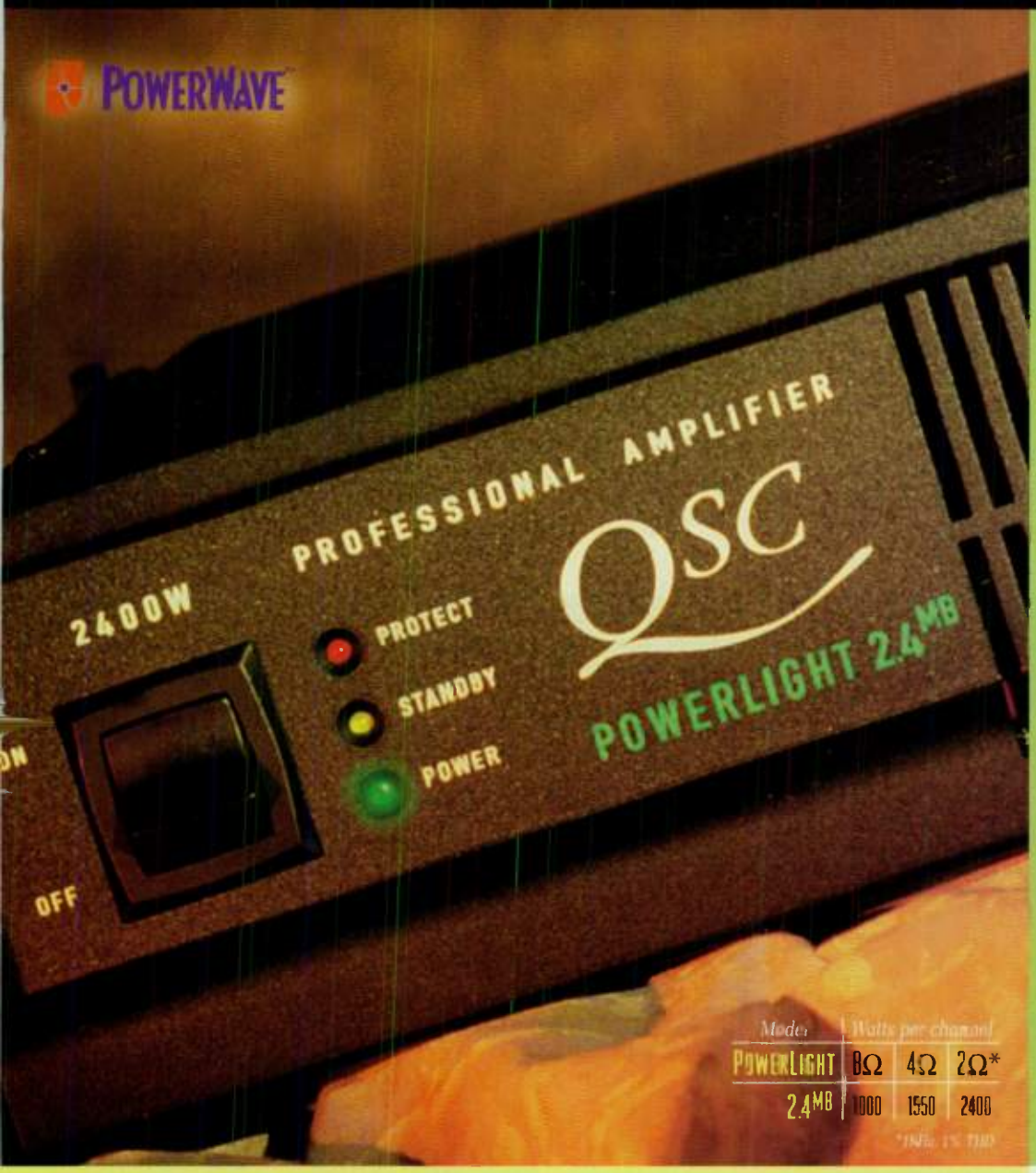
WAKE UP YOUR SUBS!!



Model	Watts per channel		
POWERLIGHT 2.4MB	8Ω	4Ω	2Ω*
	1000	1550	2400

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Today's subwoofers demand serious power to perform at their peak. That's precisely why we built the PowerLight™ 2.4MB Mono-Block–a single channel amp that delivers a thundering 2,400 watts of power at 2 ohms while operating comfortably on less than 15 amps (120VAC). It's guaranteed to provide a serious wake-up call to your subs. And since it's a QSC, you won't have to worry about them getting any unexpected shut-eye. To learn how PowerLight technology can bring your music to life, visit our website or call (800)854-4079.

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SOUND ADVICE ▲ ▲ ▲ ▲

▶ BEATBOY

Looking for Latin percussion loops? Beatboy's *Percussion Ensembles* ($99.95) audio CD features loops in Latin, hip-hop, and house styles as well as single-hit percussion samples. The loops are performed by Richie Gajate-Garcia, who has recorded and performed with Diana Ross, Tito Puente, Art Garfunkel, Hiroshima, and others; he has also worked on numerous Hollywood soundtracks.

The CD contains more than 240 loops, most of which are eight bars in length. There are complete Latin percussion ensemble mixes as well as smaller ensemble mixes and individual-instrument loops. The traditional styles covered are salsa, guaguancó, songo, guajira, cumbia, merengue, plena, abacua, and naningo. Hip-hop,

funk, house, and dance loops add a contemporary touch.

The single-hits sections include high conga, medium conga, tumba, djembe, timbales, bongos, gaita, nada, and more. Most of these hits are supplied in three variations: panned left, panned right, and an alternate tone. In addition, both the conga and tumba sections include strikes with hand, leather beater, hot rod sticks, and wood sticks.

The CD's documentation gives track, start time, tempo, and number of bars for each loop. Single hits are listed in order by track. Beatboy; tel. (800) 838-BEAT or (717) 685-1338; fax (717) 685-1573; e-mail beatboytec@aol.com; Web www.beatboy.com.

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SYNTAUR PRODUCTION

The flood of new synths on the market doesn't mean that old ones have disappeared. With the new Soundset 5 ($19.95) for Ensoniq ESQ-1 and SQ-80, Syntaur Productions aims to bridge the gap between the factory sounds of these decade-old machines

and the needs of modern hip-hop and rap artists.

The set of 40 patches includes deep synth basses, worm-type sounds, wah-wah sounds, synth brass and strings, bass guitar and upright bass, electric guitar chord chop, synth bell, some hip-hop–flavor effects, and other sounds aimed at these genres. Also included are some commonly requested additions to the ESQ's library: acoustic and electric pianos, organs, Roland TR-808–style kick drum, snare drum, and cowbell.

Soundset 5 is available as System Exclusive on floppy disks for the SQ-80 or in PC, Mac, and Atari format with loading software. Syntaur Productions; tel. (409) 234-2700; fax (409) 234-2900; e-mail syntaur@juno.com.

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SAMPLEHEADS

For the new *Pocket Syndrome* guitar-loop collection ($99.95 audio CD; $149.95 CD-ROM), Sampleheads recorded the grooves of guitarist Bernd Schoenhart, whose credits include John Secada, George Michael, Kenny G, Slash, Marc Anthony, and C+C Music Factory. Produced by Jeremy Roberts, the disc has more than 700 1-bar or 2-bar loops, each with multiple tempi and keys. More than twenty styles of loops are provided, for a total of 74 minutes of audio.

Schoenhart uses ESP and John Suhr guitars, Zoom processors, a Vox wah-wah pedal, and DR strings. Most of the tracks are recorded dry.

The documentation lists the loops by tempo, style, or both, with precise start times. In addition to CD-audio, the disc

is available in Akai S-1000, Roland S-760, Digidesign SampleCell, E-mu E4, and Kurzweil K2000/K2500 formats. East-West Communications, Inc. (distributor), tel. (800) 833-8339 or (213) 656-4135; fax (213) 656-4457; Web www.sampleheads.com.

Circle #415 on Reader Service Card

TECH PAGE

Sleepless in Santorini

Insomnia inspires an incredible new product.

By Scott Wilkinson

Normally, the winter NAMM convention is an ideal place to look for new musical technologies. This year, however, I was most intrigued by something at the Consumer Electronics Show (CES), which is held in Las Vegas.

Morpheus Designs, a company based on the Greek island of Santorini, was demonstrating a product called the MusicMat, which is a mattress pad embedded with numerous force-sensing resistors (FSRs). As you move around on the pad, the FSRs send signals directly to a sound module using a proprietary wireless protocol called SleepeNhancing Object-oriented Radio Energy (SNORE).

The head of the company is Dr. Hypnos Morpheus, a sleep specialist who conceived of the idea as he was lying awake with chronic insomnia. His condition was caused by his teenage daughter, Nyx, who built and played MIDI percussion controllers in their basement. One night, she was banging away as Morpheus was reading some poetry by Tennyson in a vain attempt to fall asleep. He happened upon a certain passage that provided the catalyst for his idea:

> Music that gentlier on the spirit lies,
> Than tir'd eyelids upon tir'd eyes,
> Music that brings sweet sleep
> down from the blissful skies.

This passage reminded the doctor that certain types of music and sounds are especially conducive to falling asleep, dreaming, and waking up. He also knew that certain sounds can effectively mask other sounds. In addition, most people shift their weight in bed many times during the night, especially as they fall asleep.

Recalling that Nyx's percussion pads use FSRs to sense the force of a drumstick hitting the pad and generate a corresponding electrical signal, Morpheus realized that he could use the same technology to sense when a person moves around in bed and use that information to trigger music.

A Morpheus Designs spokesperson, Snoozie Kurtz, explained some of the possible applications of the MusicMat. For example, it helps you fall asleep by playing hypnotic sounds or soft, ambient music in response to your movements. A remote microphone samples any extraneous noise (such as drummers in your basement), and a computer in the headboard unit automatically adjusts EQ and volume in real time to optimize the system's masking effects.

Alarm Clock mode plays bird sounds and music such as Bach's *Sleepers Awake!* that gradually gets louder after the programmed alarm time. The system also sends a remote signal to start your coffee maker if you install the optional Java module.

Another interesting mode helps you develop the skill of lucid dreaming, in which you become aware that you are dreaming while you are dreaming. Electrodes sewn into a sleeping cap detect brain waves, which are used to control the system as you dream. Because the brain cannot directly access RAM or ROM, Morpheus invented a new kind of computer memory called Read Encephalogram Memory (REM). The Lucid Dreaming music is stored in REM, from which it can be accessed and played within your dream.

At CES, the MusicMat was demonstrated in a suite at the Comforter Inn ("Our blankets are the best!"). Interestingly, a closed room was being used for some demos, which seemed to take longer than the others. These were rumored to be demos of an Adult mode which plays increasingly energetic music triggered by more rhythmic in-bed activities. Obviously, this technology has many applications, and I can't wait to try it out.

FIG. 1: The Morpheus MusicMat can be installed on any mattress. The headboard unit houses the sound module, control computer, and user controls.

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6-String Computer Tutors

The CD-ROMs I covered are not intended to replace human teachers. Instead, they're meant to give students an independent study program that could be an excellent companion to a lesson regimen. The CD-ROM format offers several advantages: Students can work at their own pace in a nonthreatening environment, alleviating the pressure of playing in front of someone. Lessons can happen at any time of the day or night. And students can save a pile of money by learning note names, how to tune up, and how to play some chords on their own. (Private lessons to teach these things could easily cost more than these products.)

All of these programs cover the basics, and some cover a heck of a lot more. They all have great stuff as well as a few things I feel they should have left out, included, or done better. When I ran into snags (which I did in varying degrees with all of them), each and every one of these companies provided top-notch tech support, never making me feel stupid or bothersome, even when I was.

Beat the Beginner's Blues

Play Music's *Play Guitar with Ross Bolton* ($59.95) is aimed at beginning rock and blues players. After the introductory section, which illustrates the parts of the guitar and tuning, the course is divided into four main sections: Open Position Chords, Open Position Melodies, Movable Chords, and Movable Melodies. Each of these sections has several lessons that use simple tunes, and instructional videos illustrate many points. Bolton starts out nice and slow so as not to leave anyone behind.

When you get to the "Play" section of the lesson, a virtual guitar neck appears on the screen to show you what to play. You can view the guitar neck from a variety of angles (facing, overhead, left-handed, and my favorite, bird's-eye), all of which could come in handy at some point (see **Fig. 1**). I do wish the names of the chords would appear above the tab as it rolls by.

You can control the tempo of an exercise and assign loop points to continuously repeat any section, which is a great feature. You also get control over the mix but not enough control to salvage it. The drums aren't nearly loud enough, and the metronome is turned off by default. You have to bring the guitar and bass down to practically zero to hear the drums, and the mixer won't remember your settings: it always reverts back to the original funky mix. Come on, folks.

After you've made it through a couple of exercises, you get to try some songs that range from very simple to not so simple. Once again, Bolton is helpful and explains things very clearly; he just seems like a nice guy. The chord charts for the tunes are very good and not overly busy. This whole program seems geared toward people who just want to play some stuff without having to master rocket science first. It doesn't teach you how to read music (which you won't need to play these tunes and millions of others), nor does it get into a bunch of music theory. It does show you a lot of basic, meat-and-potatoes techniques to get you playing right away. For this reason, it scores well on the instant-gratification meter.

As for my gripes, I wish that the tuning section called the strings by name as well as by number. (Let's reinforce those string names at every opportunity!) A couple of the chord diagrams on the screen (which you can click on to hear the chord—cool!) are labeled incorrectly (it says D but it's actually a G—not cool!). On my 90 MHz Pentium with a 2× CD-ROM drive, which meets the minimum requirements but not by much, the videos are glitchy. Despite these drawbacks, however, the beginning blues or rock hobbyist can learn a lot from this.

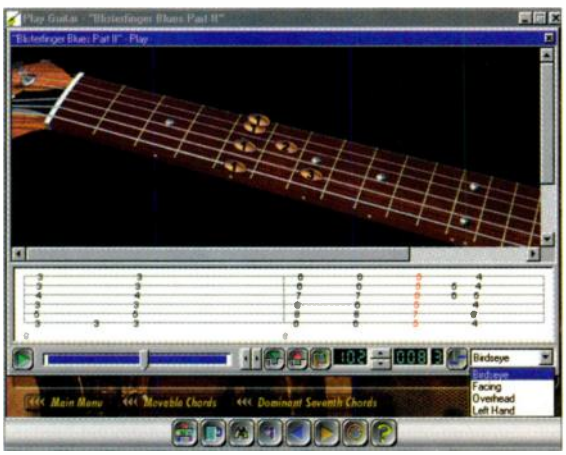


FIG. 1: When working through exercises in *Play Guitar with Ross Bolton*, you can view the virtual neck from a variety of angles. Note that the tab at the bottom of the screen is highlighted to show where you are in the tune.

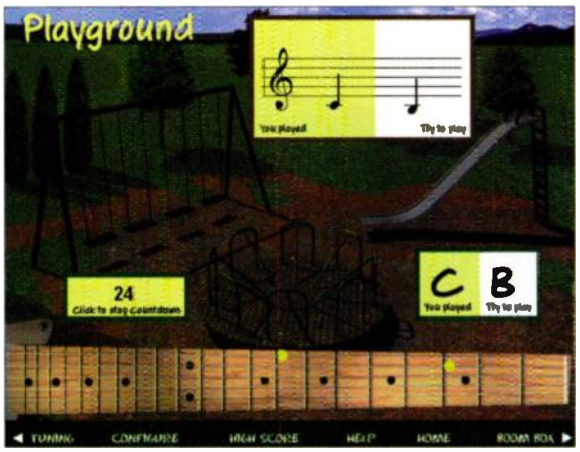
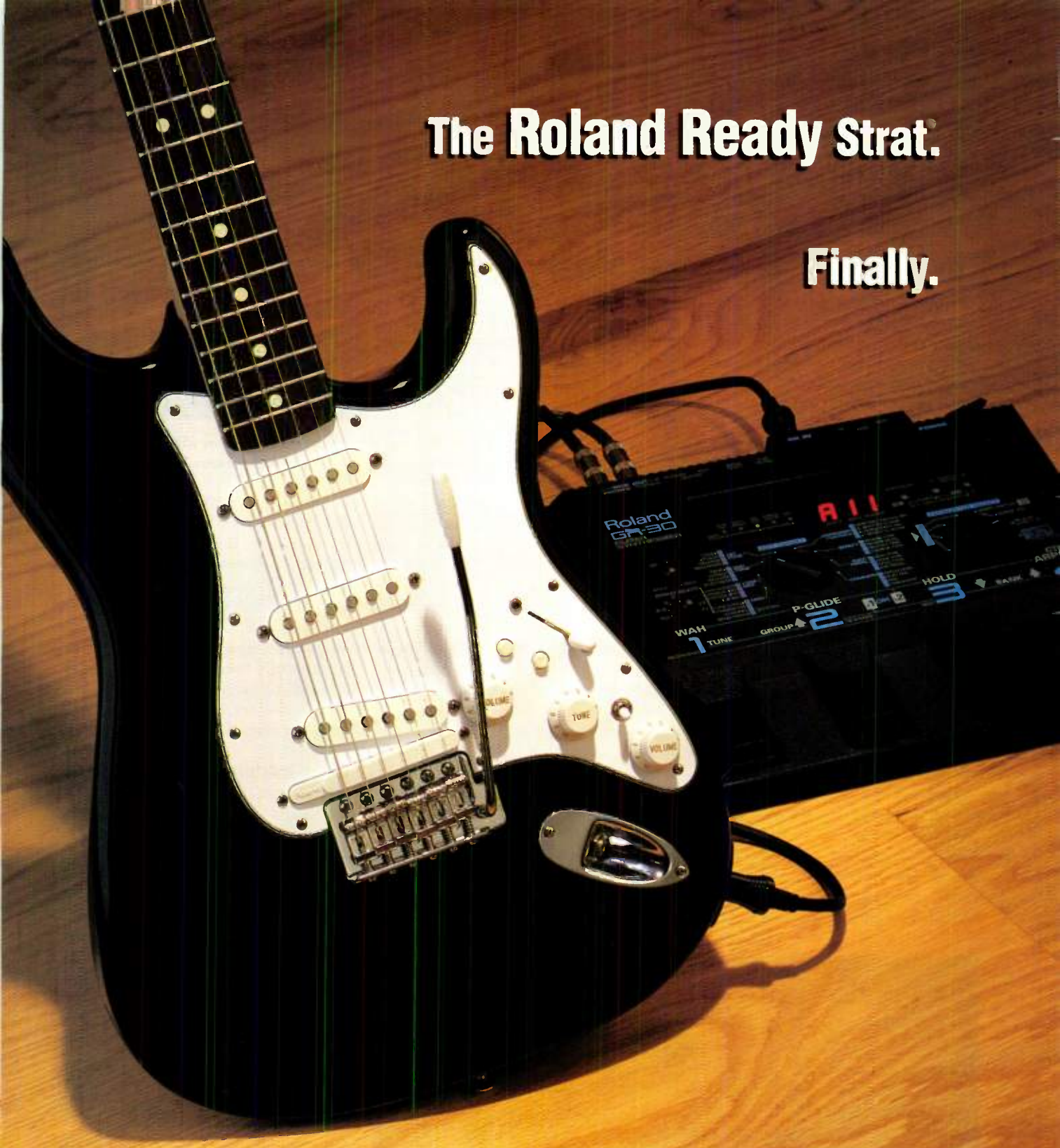


FIG. 2: In the Playground section of *Guitar 101*, you try to beat the clock by playing the notes on the screen either with a mouse click or, if you have the optional G-VOX system, by playing them on your guitar.

Back to the Classroom

As soon as I installed *Guitar 101: The Fender Method* ($39.99 from G-VOX, available for Mac, as well), I was struck by how slick and professional-looking the graphics were. This one wins the beauty contest hands down. The program, which can be used with or without the G-VOX pickup and belt pack (see the sidebar "Rocking with the G-VOX"), is aimed at beginning guitarists from a wide age group. Its techniques and exercises apply to lots of different styles, with rock and blues being illustrated most often.

Guitar 101's narrator, smoking-hot L.A. studio ace Carl Verheyen, has a great shot at Mr. Congeniality. He speaks in a clear, friendly manner, and he plays some absolutely jaw-dropping



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6-String Computer Tutors

very high corn factor), but these tunes, coupled with this singing, will undoubtedly hurt eMedia in the 13-year-old-kid-who-wants-to-play-Nirvana market. Some of the tunes (most notably Bob Dylan's "Knockin' on Heaven's Door" and the Grateful Dead's "Uncle John's Band") sound okay and provide great chord exercise.

Guitar Method features good sound quality because the musical examples are recorded in real time and not played via MIDI. This is great when using the chord dictionary: you get to hear a nice, acoustic strum rather than a synth. It can be problematic, though, if you want to vary the speed of songs or exercises. Some sections have slow and fast options, but many don't.

Like my old 8-track, the songs have a nasty habit of stopping abruptly in the middle, only to continue (after a count-in) on the next page. This idea of breaking time seems to plague *Guitar Method* throughout; the instructor stops every exercise to announce the next chord. Although the company says its testing showed that this method is helpful to the student, I wish the program would at least play the whole exercise again with a consistent meter.

Speaking of meter, the program does include a metronome (as well as a cool digital tuner and a recorder), but you can't use it where you need it the most: when the songs are playing. These problems are a shame because the course itself has potential. It's easy to use and logically laid out. With a slightly hipper approach and a steadier groove, they could broaden their appeal beyond the strumming-folk-tunes-after-work crowd.

Multimedia Magic

Unlike the previous three courses, which are aimed at beginners and give you a definite sense of closure once you've worked through them, SDG Soft's *Guitar Magic* ($99) tries to do it all. It's not only going after beginners (I hope these beginners aren't easily overwhelmed!) but, according to one company representative, it's after frustrated guitarists at all levels. (I've never met a guitarist who *wasn't* frustrated.) Given the staggering amount of information presented here, there probably *is* something for just about everyone.

Lessons are divided up into beginning, intermediate, and advanced, and then they're divided further into Fretboard Theory, Music Theory, Styles, and Exercises. Whew! Add to that the Library (a huge reference of chords, scales, and arpeggios), Jam Sessions (a collection of tunes in various styles that lets you practice playing along with a band), the Gym and Licks sections (a series of dexterity-building exercises and musical examples to use them in), and finally the Studio (a sequencing program), and you'll start to get an idea of how much is in here.

Then you have all the different options: Do you want to view note names, scale degrees, or fingerings? Twelve- or 24-fret neck? Guitar or bass? Right- or left-handed? Just the notes that you're playing or the entire scale shape they came from? (This last option is accessed with a right mouse click and is useful for uncluttering the screen for chromatic passages.) I'm sure I'm leaving out a bunch of stuff, but you get my point (see **Fig. 5**).

As if that isn't enough, the program is designed to be compatible with Optek's SmartLIGHT guitar (see the sidebar "Seeing the Light"). If you made it through one tenth of the material in

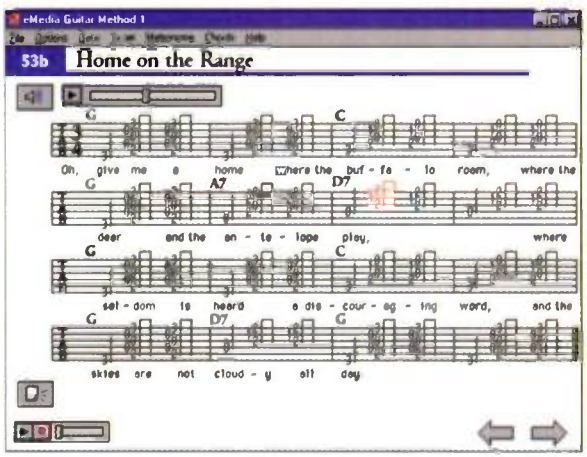

FIG. 4: *Guitar Method*'s tablature with rhythmic notation built in is the next best thing to reading standard notation.

Keith Emerson

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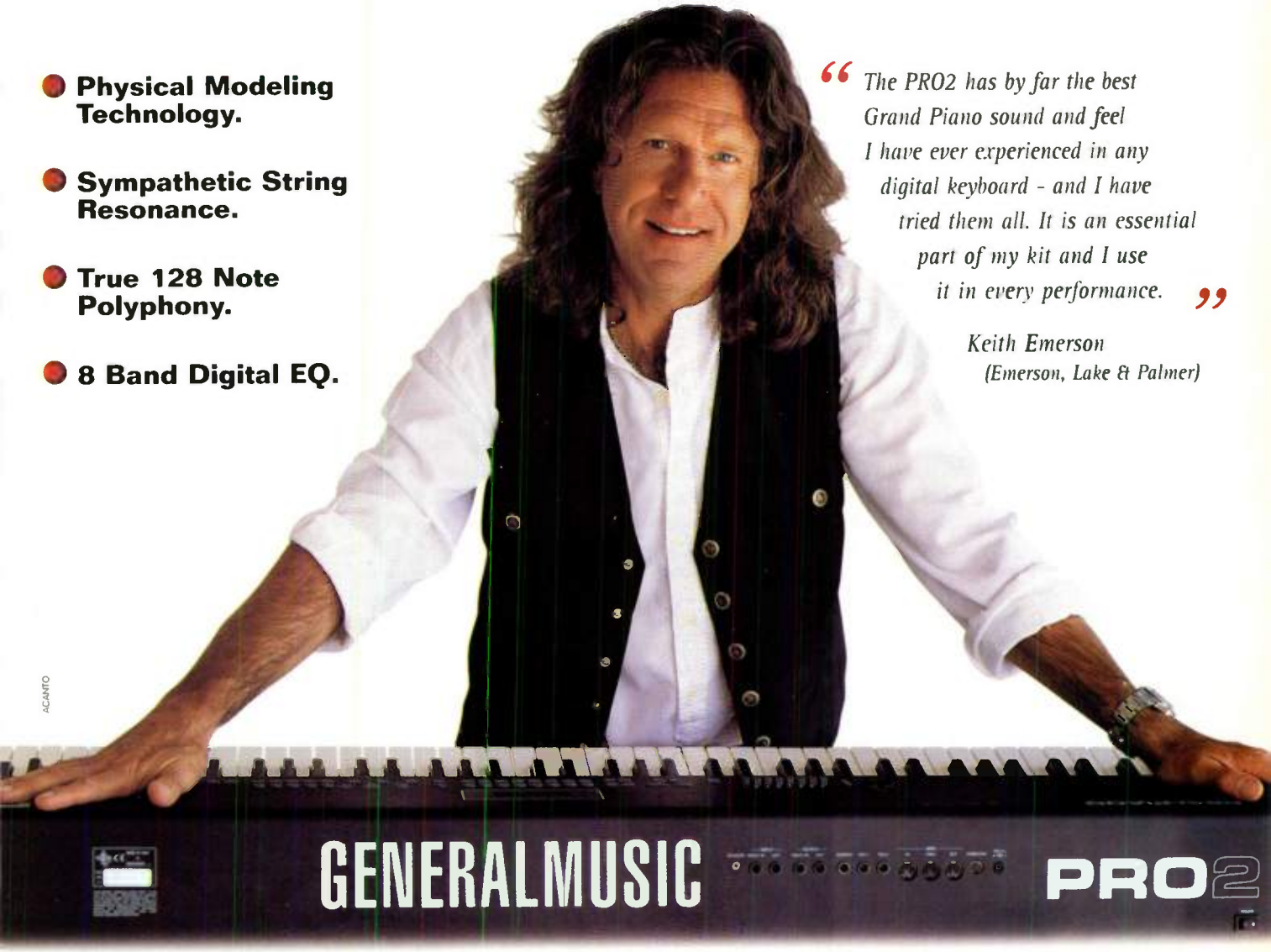

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(Emerson, Lake & Palmer)

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this course, you would have massive chops and a solid foundation in fretboard and music theory. For those who like an open-ended program that they can work with for years to come, *Guitar Magic* has a lot to offer. For those who suffer from option anxiety, this course will push you right over the edge. It is sometimes hard to know where to look for some things, such as tuning up. It *is* covered in an instructional video, but if you type "tuning up" in the Search form, you get nothing.

The program doesn't teach you how to read music, which strikes me as a glaring omission. We're talking about *mastering* the guitar here—it says so right on the box! I don't quarrel with the inclusion of things like chord substitutions and key signatures, but let's have some priorities here, people. SDG Soft is coming out with a separate title devoted to an in-depth study of reading music, but I wish *Guitar Magic* at least touched on it.

My other gripes would include the rambling nature of some of the videos. The instructor, Greg Brown, seems to be ad-libbing some of his dialog, and several of these videos could use another take. Greg's guitar tone in the videos is swimming in reverb, which can obscure the notes. In the Gym section, notes are often referred to as B♯, F♯ (F double sharp), etc. in the chromatic exercises. Of course, there are instances when those names are correct, but this feature seems unnecessarily confusing to me. It's hard enough as it is to get students to remember note names.

I don't mean to come down too hard on the fine folks at SDG Soft; it just seems that they bit off more than they could chew. The parts of *Guitar Magic* that are good are very, very good, and I mean it when I say that there is something for everyone. Teachers who can navigate the vast ocean of material presented in this program could easily incorporate hundreds of these exercises into their own curriculum, and students after serious fretboard knowledge and blinding speed can definitely find it here.

The Interactive Axe

Targeting roughly the same target market as *Guitar Magic* (i.e., everyone),

SEEING THE LIGHT

Optek's cool learning tool, SmartLIGHT, began life as the FretLIGHT guitar: you know, the one with LEDs built into the fretboard. My test instrument (with a suggested retail of $749.95) is the flagship model, a Telecaster-shaped body with a gorgeous bird's-eye maple top, two single-coil–sized Seymour Duncan humbuckers, and gold-plated Gotoh tuning machines. It ships with the SmartPORT (an interface between guitar and computer), a footswitch for scrolling through patterns or turning the lights on and off, and all the software you need to get the system up and running. This includes *Guitar Magic Lite*, a scaled-down version of the full program's Library section, and a demo of Passport Designs' *Master Tracks Pro*, a sequencing program that lets you use the six included SmartLIGHT songs, which are given as Standard MIDI Files. You can use this product without your computer if you purchase the FretLIGHT Plus box for $124.95. This box has controls similar to those on the previous versions of FretLIGHT for selecting chords, scales, and arpeggios as well as different keys.

What's it like to play this thing? It's a blast. The SmartLIGHT has the biggest "wow!" factor of any product I've experienced in a long time. You select a chord from the Library, and the chord lights right up on the fingerboard. For beginners, the computer screen is a must for seeing the proper fingerings, but intermediate or advanced players can just step on the footswitch and run through the patterns. You wouldn't believe how this opens up the fretboard. It absolutely makes you play stuff that you wouldn't otherwise. Then again, so does standard notation, but this is way more fun.

Optek will sell the full version of *Guitar Magic* to registered SmartLIGHTers for $89.95. Hang on to your hats for this one. You just choose a lick, hit play, and then watch your guitar come to life, with lighted notes jumping all over the neck. You'll have to slow them all way down to keep up, but this will blow your mind. The same is true with the songs. Once you get over being mesmerized by the lights, you really can play the tunes.

Now, I know what some of you are thinking: "That's just a gimmick. Turn off the lights and they won't remember a thing." I thought about that, too. So I tried it. I called up a really weird arpeggio that I've never played before (I *am* a rocker, so the list of things I've never played before is pretty long), practiced it for a minute, and then turned the lights off. I found that I could actually remember it pretty well, as if the lights had etched it into my brain. And bear in mind that, once a student closes a book, they don't have that to rely on anymore, either. You still have to commit stuff to memory, but this thing will undoubtedly open doors for you.

As for the guitar itself, it looks great and sounds killer, thanks in part to the Duncan pickups (a Little '59 in the bridge and a Duckbucker in the neck) and the all-around good workmanship. The neck is too skinny front-to-back for my taste, but plenty of folks go for this style. The back of the body is not beveled, and its upper edge hurts my ribs when I play standing up, but I've brought this guitar (with the SmartPORT) to two gigs, and even though I brought it for the lights (which went over huge), I kept on playing it for the tone. It has a great, punchy midrange and, despite its maple top, is not overly bright. This thing is no joke. And about the time you're reading this, Optek will be rolling out a new line of high-end electrics, basses, and classical acoustics. This company is in it for the long haul with certified instructors, SmartLIGHT schools, and more, so stay tuned.

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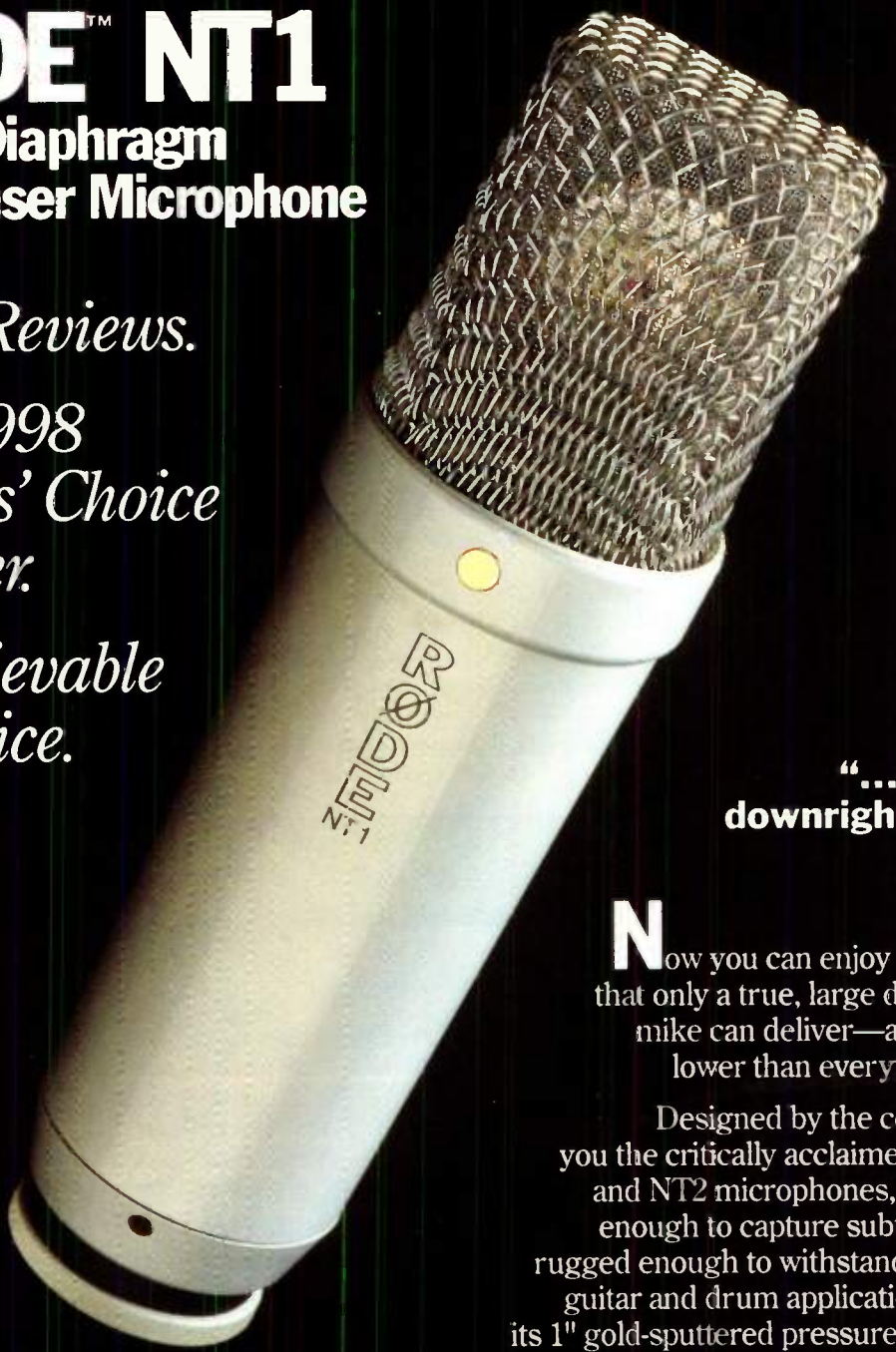

Electronic Musician 1998 EDITORS CHOICE

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–EM

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6-String Computer Tutors

the above criticisms. The company really stresses the importance of listening, whether you're playing alone or with a group. They seem to have a good chance at getting students excited about playing, which is what I struggle with daily as a teacher. To be fair, *Guitar Magic* does have more information, but *Interactive Guitar* strikes me as more fun.

End of Lesson

I see these products as going after different sectors of the guitar population, which makes head-to-head comparisons difficult. If you're a beginner looking to jam on blues and rock tunes, you should try out *Play Guitar*. If it's more of a folk thing you're interested in, look into the eMedia *Guitar Method*. Beginners who want to learn how to read music should definitely check out *Guitar 101*. Supershredders-in-training will find everything they need with *Guitar Magic*, and *Interactive Guitar* should appeal to those players interested in a variety of styles, especially if they can't or don't want to be in front of their computer all the time.

I'd also like to add that I hate teachers who snipe at other teachers—the old "I could do that better" attitude. The fact is I couldn't and wouldn't try to do better than any of these companies. Every one of these courses represents a truly massive undertaking. They are venturing into relatively uncharted territory, and the future for this technology looks very bright indeed. My hat is off to all those involved for supporting and furthering music education and for bridging the gap between guitars and computers. A lot of us guitarists need all the help we can get on that score.

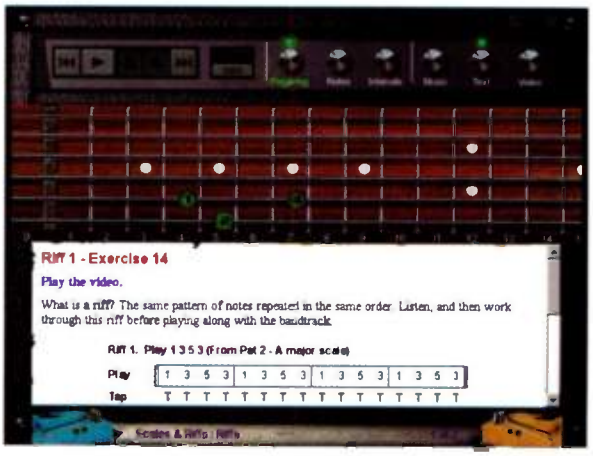

FIG. 6: The buttons on *Interactive Guitar*'s virtual amp control the playback of the current exercise. The knobs give you options over what is displayed on the screen, e.g., note names vs. fingerings or music vs. text.

When he's not in front of his computer, Northern California guitarist and instructor **Matt Blackett** *grooves with his band, Loveland, in the San Francisco area.*

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Workhorse Workstations

By Geary Yelton

The 1930s has come to be known as Hollywood's "Golden Age." Exciting new sound technology let film makers push the limits of their artistry, and the results were remarkable. Throughout the 1990s, the music world has also seen an outpouring of technological advances (digital recording, hard-disk editing, and refinements in computers and MIDI interfacing, to name a few) that are now finding their way into our everyday tools. In essence, we are entering our golden age of production, thanks mainly to this new crop of equipment, which helps us realize our creative potential. Probably the finest example of such a tool is the synthesizer workstation.

Synthesizer workstations provide a tremendous level of creative control with sounds and features that were scarcely imagined until recently. As a result, we now perform musical feats that for years were no more than wistful dreams of how things *might* be done. By yesterday's standards, today's music workstation is nothing short of pure wizardry. No instrument has ever offered such a diverse timbral palette or such a refined environment for creating music.

Walk into any big music store and head for the keyboard department. You'll probably be overwhelmed by a bewildering assortment of musical technology. With so many models available, how do you know which synth will speak for you? Hopefully, this article will help you decide.

Workhorse Workstations

AURAL EUPHORIA!

Picture this: I've been assigned to surround myself with some of the finest instruments that music technology has ever created. For weeks, I've been playing, probing, sequencing, and auditioning thousands of sounds. It's a tough job, but hey, I'm glad to be of service!

For the purpose of this article, the term *synthesizer workstation* describes an electronic instrument that offers sounds sampled into ROM (often referred to as wavetable, sample-playback, or PCM synthesis); sound generation through subtractive synthesis (i.e., shaping sampled sounds by changing their harmonic content with filters); a musical keyboard; an integrated multitrack sequencer; and onboard effects processing. Some of today's workstations also feature additional forms of sound generation, such as additive synthesis, physical modeling, or sample RAM.

Though capable of producing complete recordings without any other instruments, a good workstation should also be a competent master controller for external MIDI devices such as synthesizer sound modules.

THE CURRENT CROP

To qualify for this face-off, synthesizers had to fit our definition of a pro-level workstation and have a retail price between $1,795 and $2,695. If a manufacturer had two models that fit the bill, we chose the less expensive one. We found only six manufacturers with current products that matched these criteria and one prototype that should be shipping by the time you read this.

One workstation is Italian, one German, and another Korean; the remaining four are made by Japanese companies. Although American manufacturers such as Moog, ARP, and Sequential Circuits once dominated the synthesizer market, those days are ancient history. Kurzweil, originally an American company, is currently owned by the Korean company Young Chang. The only major-league synth makers left in the U.S., Ensoniq and E-mu, are now owned by Creative Labs, a company from Singapore. Neither had current models that were appropriate for this article.

Without a doubt, today's synthesizers are much more powerful than those of yesteryear. A decade ago, not many synthesizers played more than sixteen simultaneous notes; now it's unusual if one can't play sixteen different *sounds* at the same time. Recent synths offer 64-note polyphony, and 128-note instruments are starting to hit the market. Ten years ago, onboard storage rarely exceeded 128 programs; now an instrument with so few programs is considered unacceptable, and more than 500 is typical. Until recently, 4 MB of waveform ROM was considered more than generous; now 8 MB is the norm. Some of the instruments in this article even contain 16 MB of ROM, with the ability to expand to as much as 48 MB.

Many of our contenders offer extensive expansion options. You can typically add more memory for storing programs, a hard disk for saving sampled sound data, or additional wavetable ROM on an expansion card. Some of the workstations even contain user-programmable sample RAM for storing sounds imported from other instruments or computers. All except one have a floppy drive for storing sequencer data and reading MIDI files.

User interfaces have certainly come a long way, too. All seven models have detailed panel displays that show text on a brightly backlit LCD screen. All but one have a data dial (an infinite-rotation wheel for changing parameter values). Most also have increment/decrement buttons for changing values one step at a time. And the latest trend offers reassignable, or *soft*, buttons whose functions change depending on the mode you're in.

So what are these mysterious modern machines that sound like an electronic musician's dream? Let's meet them.

KURZWEIL K2000VP

The K2000VP is the latest and most affordable version of Kurzweil's K2000 series (introduced in 1991). The original K2000, along with its hefty price tag, has been retired and replaced by the even more expensive K2500. The K2000VP is almost identical to the K2000 except for its upgraded operating system, some new Setups, and new ROM-based Programs. It is also available as a rack-mounted module without a keyboard.

The K2000VP's voice architecture is a bit different from that of other manufacturers' workstations. It uses a type of synthesis called Variable Architecture Synthesis Technique, or V.A.S.T. (The "VP" in K2000VP stands for "V.A.S.T. Player.") V.A.S.T. combines up to four sound sources for each voice without using up any polyphony. Voice architecture is variable, based on 31 different algorithms that define the signal path. Raw sounds are assigned to Keymaps defining their key and Velocity ranges. Up to three Keymaps are assigned to a Program, which is shaped by the selected algorithm. Three Programs may be combined into a Setup, which is essentially the same thing as a multitimbral Performance on other synths. There is one stereo effects processor that provides all the basic effects.

The K2000VP's user interface is logical and intuitive, featuring six soft buttons whose functions change depending on the mode and the page. Eight operating modes control everything from programs and effects to sequences and disk operations. Parameter values are entered with a data wheel, a data slider, increment/decrement buttons, and a numeric keypad.

The 32-track sequencer allows extensive event-list editing, and you can cut, copy, and paste sequence events. Mixes can be performed in real time using on-screen faders and panning knobs. A feature called Interactive Sequencer Arranger lets you trigger

The K2000VP from Kurzweil uses a unique type of sound generation known as Variable Architecture Synthesis Technique (V.A.S.T.).

For manufacturer information, please see Contact Sheet, p.163.

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different sections of a sequence by pressing single keys.

Though it's beginning to show its age, the K2000 series is far from becoming a dinosaur. However, the K2000VP does lack certain refinements found in most newer series. Its polyphony is limited to 24 notes, as compared to 64 notes in most modern synth workstations. There's no arpeggiator and no built-in General MIDI bank, although you can obtain Kurzweil GM files on floppy disk, CD-ROM, or from their FTP site. It is, however, the only one of these instruments that comes standard with a SCSI port.

KAWAI K5000W

Seeing that the "W" in Kawai's K5000W stands for "workstation," this instrument obviously belongs with the others here. Aside from its alternate versions, the K5000S and K5000R, it's probably the most advanced additive synthesizer you can buy. (For a complete review, see the May 1997 issue of **EM**.) I'm pleased to report that it is also a fine subtractive synthesizer. The K5000W is 64-note polyphonic with 32 notes of additive sounds and 32 notes of wavetable sounds. For all practical purposes, it's two synthesizers in one. It even has four audio outputs: a stereo pair and two assignable.

Three banks each store 128 Singles (programs). One holds additive Singles, another holds PCM-based (wavetable) Singles, and the third is a General MIDI set, also composed of wavetables. In addition to the Single banks, there is a Combi bank with 64 user-programmable locations. A Combi consists of up to four Singles, which may include any combination of additive and wavetable sounds. The PCM and General MIDI banks share 12 MB of wave data in ROM. To enrich the additive timbres, the additive bank also contains 4 MB of PCM samples, mostly transients and loops.

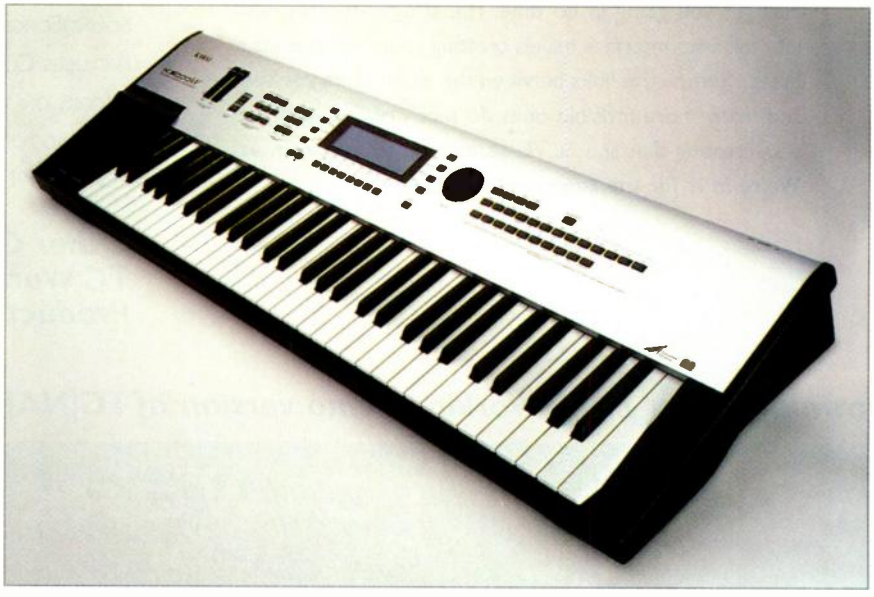
The K5000W ships from the factory with only 60 additive programs—due to their complexity, that's all that will fit into its standard memory. However, none of the additive programs are ROM presets, so they can all be replaced (additional programs are provided on a floppy disk). In addition, an optional RAM upgrade is available that adds two extra memory banks for additive sounds. The PCM bank contains 69 ROM presets and 47 user-programmable locations. The General MIDI bank offers only ROM presets, although they can be edited in the PCM bank.

The K5000W's keyboard feels quite good, and it has a few features that make it a good MIDI master controller. In the place of assignable sliders, eight virtual faders appear in the display. Selecting a fader lets you send continuous changes using the data wheel. There's also a Quick MIDI function that allows you to send certain types of commands to external instruments. The commands aren't actually sent until you press a button though, so Quick MIDI won't send a continuous stream of parameter changes. For hands-on real-time control, you'll probably want the optional K5000W Macro Controller. This small box adds sixteen knobs for real-time control of various parameters. These knobs can transmit to any MIDI channel; four are user-assignable and the others are preassigned. The K5000W has two sets of MIDI ports, although the keyboard can only transmit on one MIDI channel at a time.

The K5000W sequencer is impressive. It has 40 tracks—enough to play 32 parts on its own with eight left over for external synthesizers. Because there are two sets of MIDI ports, you can sequence with 32 external MIDI channels. Overall, the event list–style editing is comprehensive and easy to use, and the K5000W gives you clear control over an array of parameters. However, the panel lacks any real-time mechanism for recording certain parameter changes (e.g. volume, pan, tuning, filter cutoff, envelope, looping, and effects routing) on the fly.

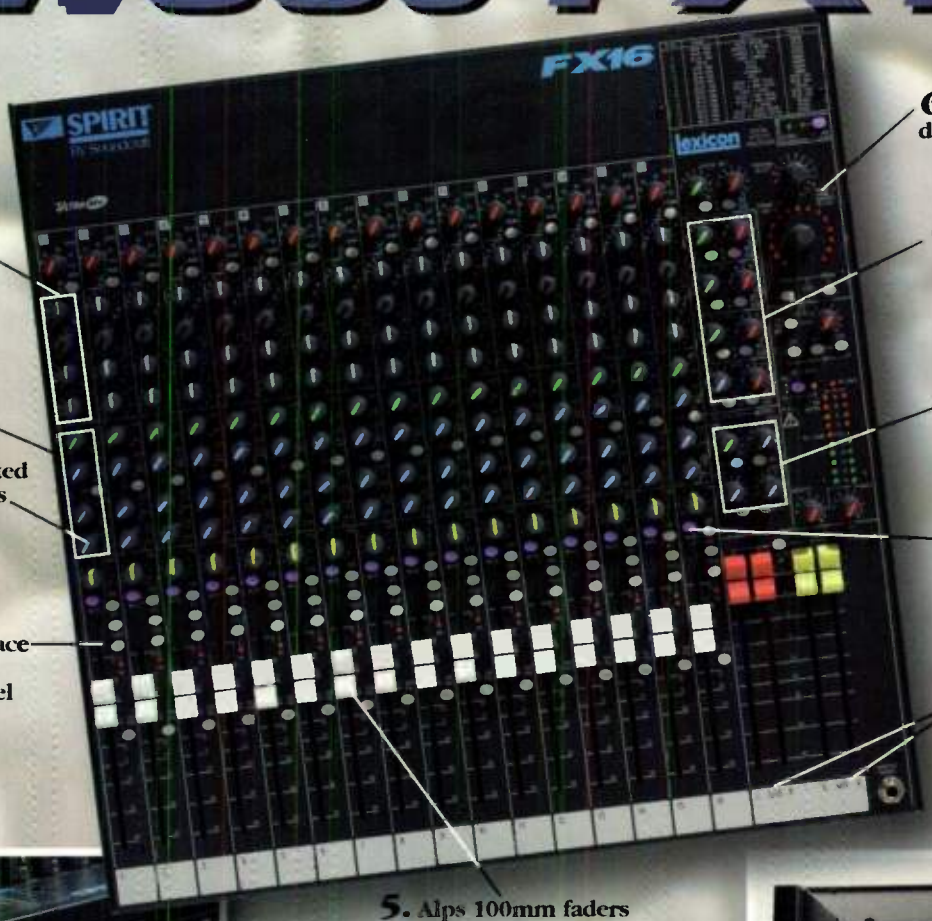
The Automatic Phrase Generator (APG) is a phrase-based composition tool. Instead of operating in real time, it analyzes the chords in a recorded track and generates up to eight accompaniment parts on playback. You can select from 105 preset styles, and there are two locations for storing styles imported from Korg, Roland, and a few other companies, using a floppy-disk conversion utility. The Automatic Phrase Generator is not designed to be a composition substitute but rather an additional tool for spicing up arrangements. It's also nice to have something like APG when you need a fresh musical perspective.

Overall, the K5000W sounds really good. The additive bank contains some very cool timbres that you can't find anywhere else. The sweepable formant filter produces some of the juiciest filter sweeps in the world. Most of the wavetable sounds are truly top-notch. I was especially impressed with the General MIDI bank—not only the sounds themselves but also how balanced they



Kawai's K5000W is one of the most advanced additive synths on the market.

Sweet FX16



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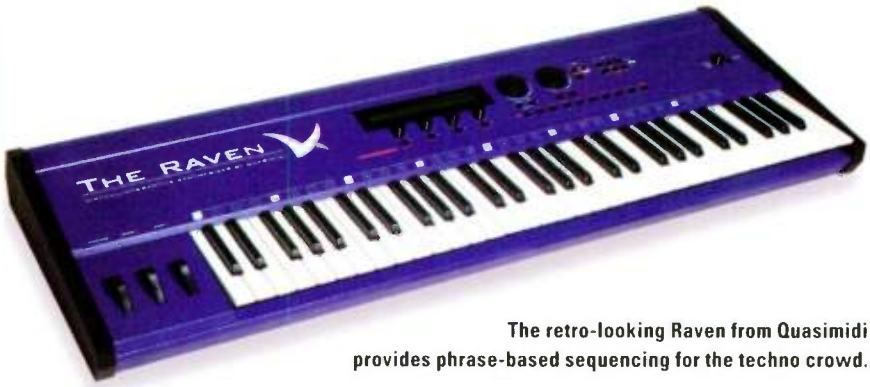
Workhorse Workstations

sounded while playing MIDI files that I downloaded from the Web.



The retro-looking Raven from Quasimidi provides phrase-based sequencing for the techno crowd.

QUASIMIDI RAVEN

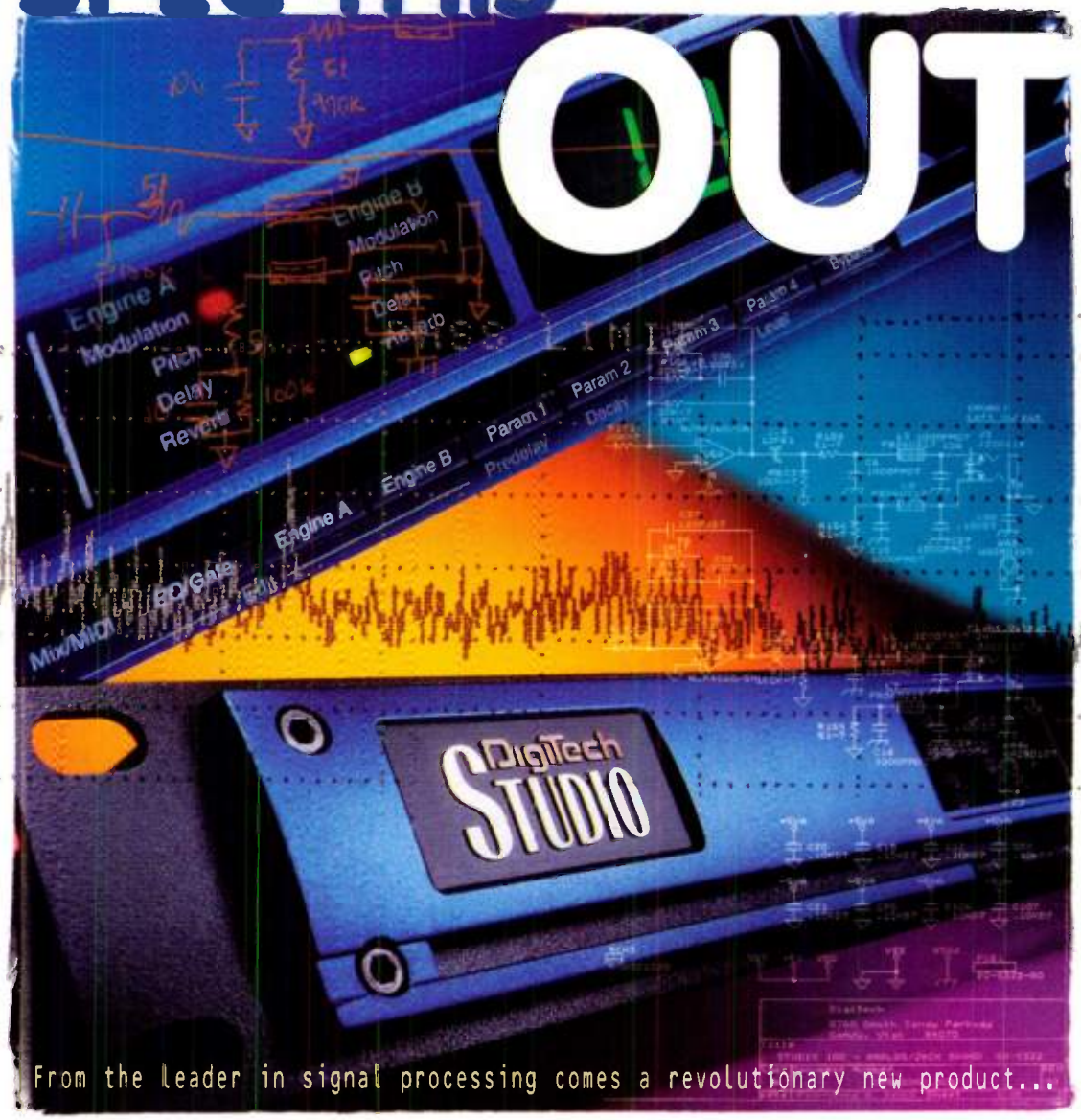
The Quasimidi Raven looks and sounds like something from the middle to late '80s. Its knobs, display, and wood side panels are totally retro—a perfect match for that old Sequential Circuits Pro-One in the corner. The German-made Raven is definitely the odd bird in this bunch.

The Raven is geared toward techno, and you shouldn't expect to arrange a full symphony or a folk song with one. Why not? Well, of its 512 single sounds, only some of the percussion instruments and a handful of others sound acoustic in origin. None of the 81 basses sound like a bass guitar. There are 96 lead synths, 91 synth pads, and 99 tuned drums. Most of the timbres in the sixteen drum sets probably began life in a Roland TR-series analog drum machine. All 54 sound effects are synthetic. There are only 24 sounds classified as "natural," and most of these are distinctly Yamaha-style FM in origin. Only acoustic pianos and vocal ensembles sound like the real thing. In fact, analog synth samples and FM sounds make up the bulk of the Raven's timbral palette.

All of the Raven's sounds were developed on a computer and then transferred to ROM chips for playback. Sounds are edited by organizing them into 50 performances that supplement the 200 preset performances that are stored in ROM. Each performance contains up to four sounds, layered or split. Once sounds are assigned, they can be edited within the context of a performance. Editable parameters are limited to oscillator tuning, filter frequency and resonance, envelope offsets, LFO values, and velocity scaling.

The front panel has no controls dedicated to sound editing. Every button serves double duty, with functions dependent on the operating mode. There are two data dials, one for changing

SPEC THIS OUT



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

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The 76-key, semiweighted action on the Roland XP-80 workstation delivers an exceptional performance feel.

pages and the other for changing parameter values. During sequence playback or record, the second dial is also used to change tempo.

The Raven's entire user interface is geared toward phrase-based sequencing. To compose with the Raven, you have to understand the hierarchy of sequencing elements. There are eight tracks, one each for kick drum, snare drum, hi-hat, assorted percussion, bass, chords, and two melodies. The ROM contains 400 looping musical phrases or Motifs for each instrument, every one of them patently danceable. In addition, up to 100 user Motifs for each instrument can be recorded in real time or step time. Each Motif can be up to eight measures in length.

Motifs are combined on the eight tracks to form Grooves. Tracks can be muted, and the sounds can be changed at any time. Grooves are combined to form Patterns, and up to ten Patterns can be arranged into a Song. There's enough memory for ten Songs.

In addition to the eight tracks, there's a solo channel for live playing. Amazingly, this channel cannot be recorded into the sequencer! Fortunately, the solo channel can be recorded into an external sequencer via MIDI channel 9. Although the Raven can sync to another sequencer using MIDI Clock, it doesn't support song position pointer or MIDI Time Code.

The Raven is not designed to be a master MIDI controller: there are no specific controls for sending commands to external instruments. It can, however, be played on all sixteen MIDI channels simultaneously, making it a good choice as a MIDI slave rather than a MIDI master.

Despite its differences and limitations, the Raven definitely qualifies as a synthesizer workstation. It has a keyboard, a sequencer, and two effects processors, and its sound sources are based on sampled waveforms. Though it may not be the ideal heart of a MIDI studio, you can produce complete recordings with the Raven, just as long as those songs contain no more than phrases.

GENERALMUSIC SK76

Like the Raven, Generalmusic's SK76 (reviewed in the March 1998 **EM**) is obviously aimed at a specific target market: those who want auto-accompaniment features in a workstation that provides some pro-level features. With the external microphone input and an optional video card, you can even use the SK76 as a sophisticated karaoke machine, with scores and lyrics displayed on a television screen. It's fun for the whole family!

In addition to the SK76's collection of internal sounds, you can also import PCM sounds from other instruments. The SK76 has 2 MB of battery-backed RAM designated just for this purpose. Additionally, up to 32 MB of volatile RAM can be added for storing even more sampled sounds, and an optional internal hard disk may be installed. It can also access Akai and Kurzweil sample libraries from floppy disks and read computer formats such as AIFF and WAV files. Sounds can also be imported through its MIDI ports via the Sample Dump Standard. But because there's no option for adding a SCSI port, the SK76 cannot read sample CD-ROMs or transfer large amounts of data quickly.

The quality of internal sounds ranges from quite realistic to unbelievably thin. If you're looking for thick analog simulations, you had better keep looking. Instead of the usual oscillator-filter-amplifier configuration, there are five algorithms combining a variable number of oscillators, filters, and envelope generators.

With no fewer than 125 buttons, ten sliders, and a data wheel, the front panel of the SK76 is more densely populated than any of the other workstations. Unlike most of the other contestants, the SK76 dedicates the majority of its buttons to a single function. The controls are neatly divided into sections by function. The sliders can be assigned to volume and pan for either local or external sound control, and there are three footswitch jacks that are assignable to a number of functions. All of the sliders are part of the 9-channel mixer section, which can mix in an external signal for accompaniment purposes.

About a third of the buttons and most of the text on the front panel are backlit. The LCD screen is 250 percent larger than any of the others. The SK76 is the first synthesizer I've ever seen that displays a scolling score on the screen when playing sequenced song

Generalmusic's SK76 offers a comprehensive user interface with more than 125 dedicated buttons.

For manufacturer information, please see Contact Sheet, p.163.

files—something quite useful when you're learning to play an arrangement. On the external control side, the SK76 provides 32 programmable MIDI splits and two sets of MIDI ports.

Two effects buses are provided with two processors each: one dedicated to reverb and the other to delay and modulation effects. In addition to processing your live playing and sequenced tracks, the onboard effects can also process external sounds in real time.

Unlike the Automatic Phrase Generator on the Kawai workstation, the SK76's accompaniment feature works in real time, and it works surprisingly well. It's also pretty simple to use: just pick a style, select a variation, and press play for a percussion lead-in. Once you start playing, the virtual players come in behind you.

There are 96 preset styles in addition to 32 user-definable styles. Most of the accompaniments are quite impressive—it almost sounds like there's a band of talented musicians hanging on your every chord change. If the SK76 makes a wrong guess as to which chord you'll play next, it quickly jumps back into the groove on the very next beat. Thanks to the bank of volume sliders, you can perform a mix of the automatic backing tracks and record it into the SK76's sequencer. Auto-accompaniment is not something that every professional player really needs, but it sure is a lot of fun.

ROLAND XP-80

The Roland XP-80 is everything a MIDI workstation should be. Poised near the top of the Roland product line, it's an excellent-sounding synthesizer and a flexible master controller. With 76 semiweighted keys, it also has the best performance feel of the bunch. A 61-key version, the XP-60, will be available in April.

The XP-80 is similar in many ways to the recently discontinued XP-50 (reviewed in the September 1995 **EM**), and its synthesis capabilities are identical to the modular JV-1080. Up to four sampled waveforms, which Roland calls Tones, can be assigned to each program, called a Patch. Up to 16 Patches can be organized into a multitimbral Performance.

The XP-80 has twice as much waveform ROM as the other workstations. Though it can't import samples the way some other synths can, the XP-80's waveform ROM can be augmented by installing up to four Roland SR-JV80–series Wave Expansion Boards. The expansion boards offer a wide array of sounds and are easy to install, making the XP-80 an extremely versatile workstation.

Overall, the XP-80 has a very intuitive design. On the front panel, four very useful sliders, labeled "Sound Palette," give you real-time control over filter cutoff and resonance as well as amplitude attack and release. Press a button and these four sliders can be used to change the volume of four tones in a Patch or four Patches in a Performance. There are also two assignable data sliders conveniently located just above the modulation lever.

The XP-80's sequencer, called the MRC Pro, is a descendant of Roland's MicroComposer. It features sixteen tracks as well as a separate tempo track. Each track can send information to any of (or all) sixteen MIDI channels, a capability that's especially useful for layering sounds with external instruments. A loop-recording feature is ideal for laying down

Workhorse Workstations

a rhythmic foundation, and automated punch-ins are available. Standard MIDI Files can be played back directly from floppy disk.

With Realtime Phrase Sequencing (RPS), you can play an entire 16-track pattern by pressing a single key (up to eight patterns can play simultaneously). The sequencer can hold up to 100 patterns, so you can assign a different pattern to each key and still have some patterns left over. Patterns can play back once, loop until the key is released, continue looping until the key is pressed again, or play until you press the stop button. Patterns can also be triggered by commands during playback of a sequence.

The XP-80 is most impressive in its fine details (Undo and Quantize Preview features, for example). Roland clearly put some thought into all the little things that make a synthesist's life easier.

AESTHETICS!

Do a workstation's name and appearance affect what you think of it? If so, the futuristic Yamaha EX7 wins in the "looking cool" department. The sleek Roland XP-80 is no slouch either. In fact, all these instruments are very easy on the eyes, with the possible exception of the Korg N364, which I find bleak and unattractive. Think of it as the Volkswagen Beetle of synthesizers—it's not pretty, but it gets the job done!

The Raven has the best name simply because it's the only one that's a word rather than a combination of letters and numbers. In second place I put the name N364 because it contains a unique letter—the most popular letter to use in a workstation name is apparently *K* (K2000VP, K5000W, SK76), with *X* (XP-80, EX7) in second place.

KORG N364

Korg's N364 (which we reviewed in the April 1997 issue) comes from a long and respected lineage, having descended from the Korg M, T, O, and X series of sample-playback synthesizers. If you've felt comfortable working with any Korg synth made in the last ten years, you'll feel right at home on the N364.

Like its predecessors, the N364 has top-notch sound quality. It excels at orchestral sounds, pop instruments, techno timbres, and new age ambiences—in fact, there are no obvious areas where it's lacking in timbral variety. Maybe that's why there's no PCM expansion slot. Bottom line? Its sounds are hard to beat.

The inexpensive Korg N364 workstation has a plethora of great-sounding patches and a mature sequencer.

Despite its luxuriant sound, you definitely get the feeling that the N364 is stripped down to the bare essentials; its front-panel controls are pretty sparse. The LCD screen is the smallest of the bunch, yet it still manages to display a surprising amount of information. This is the only workstation here that doesn't sport a data dial, offering instead a single data slider and a pair of increment/decrement buttons. It's also the only one in the lot that doesn't have any soft controls.

The N364's user interface is sometimes less than intuitive, and it's not always obvious which buttons you're supposed to press to get where you want to go. On the plus side, though, the N364's joystick provides pitch bend, and because you can push it forward and back (unlike the XP-80's joystick), both positive and negative modulation are possible.

The 16-track sequencer features Korg's Realtime Pattern Play & Record (RPPR) phrase-based composer, which provides preset and user-definable patterns that can be assigned to any key on the keyboard. Patterns can be recorded in real time, giving you the freedom to arrange a performance on the fly and to find the right groove. Songs are assembled from the patterns, which may be up to 99 measures long. The sequencer allows you to overdub on top of a previously recorded track, and individual events can be edited, moved, deleted, cut, copied, and pasted.

I really like the N364 and have to recommend it as a "best buy" among this group of instruments. It's a solid, well-rounded, flexible synth workstation that should suit the needs of most electronic musicians (not to mention that it has the lowest sticker price of the bunch).

YAMAHA EX7

When this article was written, the EX7 and its big sibling, the EX5, were still weeks away from being announced. By the time you read this, they should be shipping. I had a prototype EX7 for just twelve days, and in that short period of time I determined that it's the most exciting instrument I've seen in years. This new beauty from Yamaha may represent the future in electronic music workstations. It's both a powerful synth and a full-fledged sampler, rolled into a single 64-voice workstation with a 16-track sequencer and a large assortment of very cool effects.

Although the EX7's fundamental sound set is wavetable-based, the synthesizer offers several other methods of sound generation. In addition to the Yamaha standard AWM2 (their name for wavetable synthesis), the EX7 offers analog emulation and Formulated Digital Sound Processing (FDSP), which essentially generates sound from scratch using a polyphonic DSP-based synthesis process. There are ten types of FDSP, including several kinds of physical modeling.

Programs (which Yamaha still insists on calling "Voices") can each contain

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up to four sounds, and each Performance can contain up to sixteen Voices. If there were enough keys, you could have 64 voice splits! In addition, any program can act as a drum kit, so if you want to use the EX7 as a massive drum machine with 256 kits, you can!

Though it has a very powerful DSP-based synthesis engine, there's only so much DSP to go around, so certain methods of sound generation reduce the number of Voices. For example, a Voice of analog emulation consumes almost the entire DSP allocation. Effects processing also uses up DSP power. At best, you can get two global effects and four insertion effects, but depending on the synthesis technique, you may not even get that many inserts.

As a sampler, the EX7 shares many capabilities with the Yamaha A3000. In fact, it uses the same custom VLSI DSP chip as the A3000. The EX7 comes with only 1 MB of user RAM but has slots for adding two 32 MB SIMMs. You can also add 8 MB of flash ROM for storing samples. All together, that gives you a maximum 73 MB of sample memory—more than any sampler except the A3000.

The EX7 will offer General MIDI compatibility as an option in the form of wavesamples stored in the optional flash ROM. Installing the General MIDI patches will use up one set of 128 user programs. At the time I wrote about the EX7, the GM set was not yet available.

Easily the cleanest design of the bunch, this dark, metallic blue glimpse into the future crams an amazing amount of control onto its front panel. With one of the most intuitive user interfaces I've ever seen, it's a pleasure to operate—you can go to almost any page with no more than two button presses. There are six soft knobs and six soft buttons below the display to handle any task that lacks dedicated controls.

For left-hand control, the EX7 has a pitch-bend wheel, two assignable modulation wheels, and a small *x-y* pad. You can program the pitch-bend wheel so that the interval up performs a different task than the interval down. For example, you may bend a whole *tone* up and an *octave* down.

Editing EX7 sounds is simple and direct. Front-panel buttons take you directly to dozens of editing pages. You simply use the cursor keys to position the cursor and then make edits with either the soft knobs, data dial, numeric keypad, or increment/decrement buttons. In 25 years of synthesizing, I've never been able to fly through so many different parameters so quickly.

The EX7 offers sixteen tracks of linear and eight tracks of pattern-based sequencing. A 4-track arpeggiator can be recorded into the sequencer, and sequences, patterns, and sample loops can be assigned to play from any note on the keypad.

Oh, and there's one more thing: the EX7 sounds amazing! I think that Yamaha is about to have a huge hit on its hands.

THE ENVELOPE, PLEASE

I've lumped my findings into several categories. These short summations reflect areas of performance that are typically most important to people looking for a synth workstation.

Sound. There's not a clunker among them, but if I had to pick two finalists, they'd be the Korg N364 and the Roland XP-80. They're both factory loaded with sounds that are rich and satisfying, though the XP-80 offers more expandability options than the N364. I'm so glad that most synths now feature 64-note polyphony, because voice layering breathes life into their timbres and still leaves enough polyphony to play the keyboard as it's meant to be played.

General MIDI programs on both the Korg N364 and the Kawai K5000W really stand out. It's hard to recommend one over the other—both are excellent. The General MIDI sounds are sufficient and realistic, especially within the context of a musical arrangement. Both synthesizers do very well at playing back Standard MIDI Files, though the K5000W has the added advantage of being able to play sequences directly from floppy disk. The Generalmusic SK76 also has a decent MIDI set and supports many of the dedicated Sound Canvas NRPNs.

Considering that a lot of people who arrange MIDI for the Web are using Roland Sound Canvas, I was disappointed by the Roland XP-80, which rated only average in GM performance. A General MIDI bank is available as a set of floppy disks for the Kurzweil K2000VP. They're barely worth the hassle, though. Although the individual sounds are satisfactory, they don't sound balanced when playing back MIDI files that weren't arranged specifically for the K2000. The Quasimidi (not surprisingly) doesn't support General MIDI at all.

Though I was very impressed with what I heard from the Yamaha EX7, it was only a prototype, and some of its voice banks were empty. What I did get to hear sounded clear and warm and very, very good.

Sequencing. All the sequencers are excellent, though some may be better for certain applications than others. For recording songs with a MIDI system, the Kawai K5000W comes out on top if only for the sheer number of tracks it provides. Its event editing lets

The futuristic Yamaha EX7 is a powerful workstation with an intuitive, logical design.

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you really hone in on minute details to polish and refine your performance. It's too bad it only has room to store two sequences, but I guess that's what floppy disks are for.

The Roland XP-80 and the Korg N364 sequencers are the most mature and intuitive. The only shortcoming of the XP-80's sequencer is that it holds just one song at a time in memory, whereas the N364 can store ten songs. On the other hand, the N364 can't play song files directly from disk as the XP-80 does. Both machines, however, offer the ability to assign patterns to single keys, something extremely useful in live performance.

If you're partial to phrase-based composition, you'll really like the Raven's sequencer. It's amazing how you can improvise on stage when your synth offers 800 hip-sounding musical phrases at your fingertips. However, if you prefer real-time recording and you want other MIDI instruments in your songs, the Raven's sequencer is not for you.

The huge display on the General-music SK76 almost makes you feel like you're sequencing on a computer. Its sequencer is flexible and easy to use, and it's the only one that lets you

Comparative Figures

	Kawai K5000W	Korg N364	Kurzweil K2000VP
Retail Price	$2,395	$1,900	$1,995
Polyphony	64 notes	64 notes	24 notes
Multitimbral Parts	32	16	16
Waveform ROM	16 MB	8 MB	8 MB
Filter Types	lowpass, bandpass, 128-band programmable formant filter	lowpass	lowpass, highpass, bandpass, band-reject, allpass
Filter Resonance	yes	no	yes
Number of Keys	61	61	61
Portamento	yes	no	yes
Aftertouch	Channel	Channel	transmits Channel, receives Channel and Poly
Left-Hand Controllers	pitch-bend wheel, mod wheel	pitch-bend/mod joystick	pitch-bend wheel, mod wheel, data slider
Controller Inputs	sustain, expression	sustain, assignable	2 assignable switches, assignable pedal
Keyboard Zones (maximum)	4	8	3
Sequencer Tracks	40	16	32
Resolution	96 ppqn	96 ppqn	768 ppqn
Types of Quantization	grid, groove	grid, input	grid, input, groove, swing, step
Storage Capacity	40,000 notes; 2 songs	32,000 events; 100 patterns; 10 songs	100 patterns; 10 songs
Arpeggiator	no	yes	no
Effects Processors	1	2	4 plus reverb
Effects Types	reverb, delay, tremolo, celeste, chorus, flanger, phaser, EQ, pan, wah, distortion, exciter, enhancer	reverb, delay, chorus, flanger, phaser, rotary, exciter, enhancer, pan, EQ, distortion, tremolo	reverb, EQ, chorus, flange, delay
Audio Outputs	4	4	6
Single Programs	372	536	199
Multitimbral Performances	64	400	100
Drum Kits	12	16	any program
MIDI Ports	6	3	3
General MIDI	yes	yes	optional
Special Features	Automatic Phrase Generator	Real-Time Pattern Play	2 MB sample RAM; Kurzweil Analog Collection (30-disk set); Interactive Sequencer Arranger
Options	parameter RAM upgrade; K5000 Macro Control; additional programs	None	PRAM upgrade; sampling option; up to 64 MB of sample RAM; 8 MB orchestral ROM block; 8 MB contemporary ROM block; hard disk
Storage	HD floppy drive	HD floppy drive	HD floppy drive, SCSI port

record world-class automatic accompaniment with your tracks. It's a niche market, but if you need auto-accompaniment capabilities, the SK76 is a sure winner.

MIDI Control. My favorite of the bunch is the Roland XP-80. It's one of the most expensive instruments here, but its level of MIDI sophistication, sixteen programmable splits, assignable sliders, and wealth of pushbuttons are really appreciated when you're trying to take control of a rack of MIDI modules. Its four assignable foot-controller inputs don't hurt either.

The SK76 is also a good choice if you really need 32 channels of MIDI control because it offers double the usual number of MIDI ports. It also stands out because it has 32 programmable splits (although I can't remember the last time I needed more than sixteen splits in 76 keys).

The only keyboard that's unsuitable for controlling other instruments is the Quasimidi Raven. If you insist on using the Raven as your MIDI master, just make sure there's a computer or at least a good MIDI patching system between it and your mountain of modules.

Effects. With up to five simultaneous effects processors, the Yamaha EX7 takes the prize for the best sounding and the greatest variety of effects, hands down.

Interface. While most of the user interfaces offer intuitive, well-thought-out designs, the standout (again) is the

Quasimidi Raven	Roland XP-80	Yamaha EX7	Generalmusic SK76
$1,795	$2,495	$2,195	$2,695
21 notes	64 notes	64 notes	64 notes
16	16	16	16
8 MB	16 MB	16 MB compressed (equal to 29.1 MB 16-bit linear)	8 MB
lowpass	lowpass, highpass, bandpass, peaking	lowpass, highpass, bandpass, inverted lowpass, parametric EQ, shelving, boost	lowpass, highpass, bandpass, parametric boost and cut
yes	yes	yes	yes
61	76	61	76
yes	yes	yes	no
Channel	Channel	Channel	transmits channel, receives Poly
pitch-bend wheel, 2 mod wheels	pitch-bend/mod lever, 2 assignable sliders	pitch-bend wheel, 2 mod wheels	pitch-bend wheel, mod wheel
sustain	sustain, 4 assignable	sustain, volume, assignable switch, assignable pedal, breath	sustain, volume, 2 assignable
4	16	64	32
8	16 + tempo	16	32
96 ppqn	96 ppqn	480 ppqn	192 ppqn
grid, groove	grid, input, groove, shuffle	grid, groove	grid, groove
800 motifs; 100 patterns; 10 songs	60,000 notes; 100 patterns; 1 song	30,000 notes; 1 song	250,000 notes
yes	yes	yes	no
2	3	5	4
reverb, delay, chorus, flanger, phaser, EQ, wah, rotary, overdrive, distortion, tremolo, ring modulation	reverb, chorus, delay, EQ, phaser, flanger, distortion, enhancer, wah, pitch shift, rotary, limiter, compressor	reverb, chorus, flanger, tremolo, autopan, rotary, distortion, amp simulator, exciter, compressor, noise gate, wah, pitch shift, talking modulation, scratch, low resolution, EQ, etc.	reverb, delay, autopan, chorus, phaser, flanger, distortion, pitch shift, rotary, EQ
2	4	2	4
512	640	512	600
250	96	128	256
16	10	any program	29
3	3	3	6
no	yes	optional	yes
	Realtime Phrase Sequencing; VS-880 sync	user sampling (monophonic)	auto-accompaniment; 1.9 MB user RAM; 2MB nonvolatile sample RAM
16 MB waveform ROM	up to 4 SR-JV80–series Wave Expansion Boards	SCSI port; General MIDI; 4 individual outputs; AES/EBU digital I/O; 8 MB flash ROM; 64 MB of sample RAM	32 MB volatile sample RAM; video card; hard disk; additional accompaniment styles
HD floppy drive	HD floppy drive	HD floppy drive	HD floppy drive

Yamaha EX7. It provides an unobtrusive, logical way to navigate around pages and parameters. The Generalmusic SK76, with its wealth of dedicated keys, knobs, and faders, comes in a close second. The Roland XP-80 also sports a sensible design.

WRAP IT UP, I'LL TAKE IT

Just as long as you're aware of their strengths and limitations, you really can't go wrong with any of these workstations. A couple of them are aimed at particular markets; if that's what you're looking for, they deliver completely. None of them requires a degree in physics to understand, and all have good keyboard actions, sequencers, and effects.

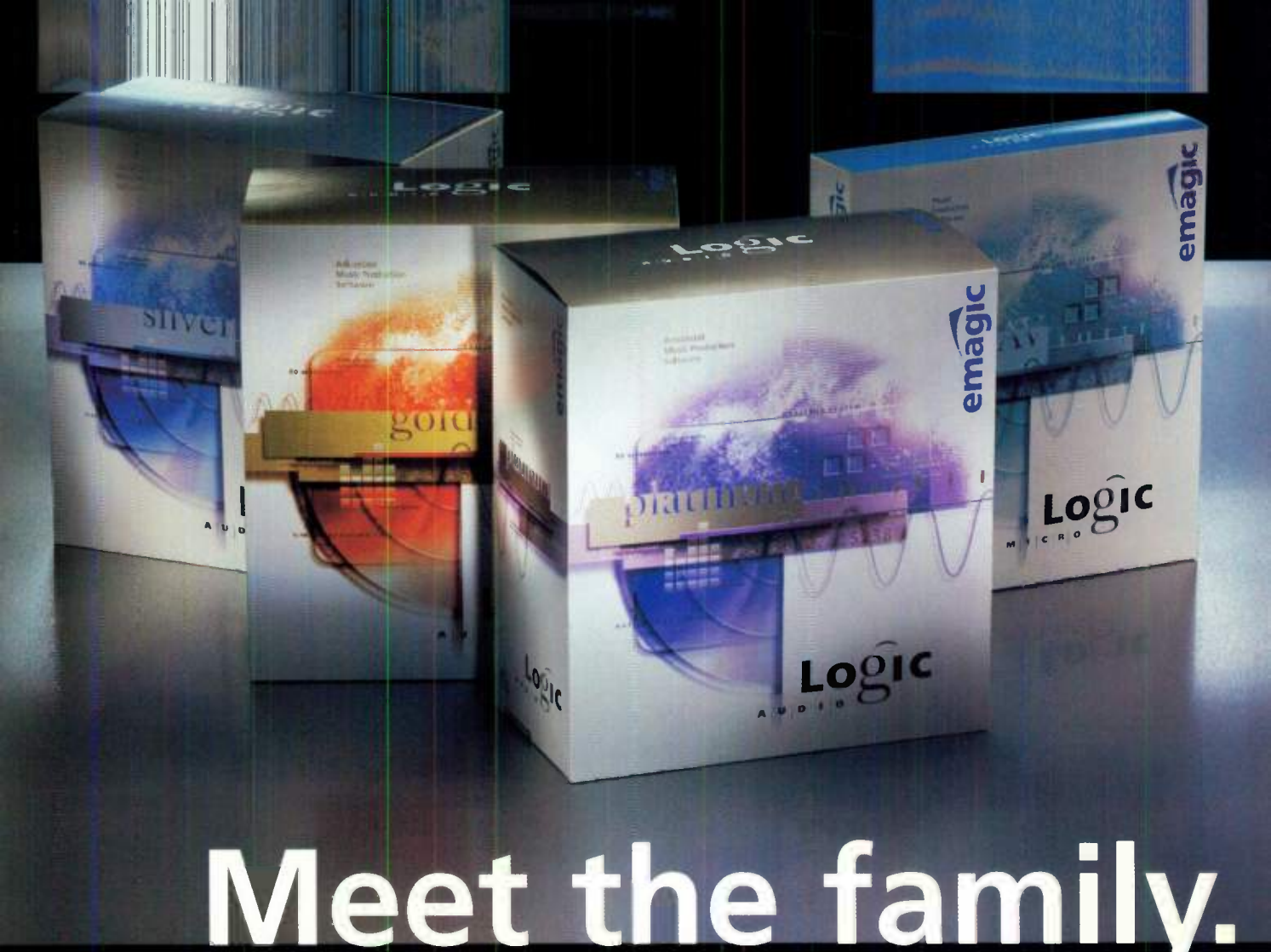
For those who need a well-rounded synth workstation that delivers impressive features and superb sonic quality, I recommend you look at the Yamaha EX7. Its variety of sound-production techniques, intuitive user interface, expandability, and sheer processing power (at a reasonable price!) make it a great choice. If the EX7 represents the future of synthesizer workstations, I can't wait for that future to arrive.

However, there are no losers in this group of keyboard products. The Kurzweil K2000VP's powerful voice architecture keeps it up to date. If you're looking to stand out from the crowd, the Kawai K5000W is probably your best bet, thanks to its additive synthesis architecture. For the techno folks or those people just looking for new ways to have fun, the Quasimidi Raven really delivers. If you like to work with auto-accompaniment, you'll probably love the Generalmusic SK76. For the rest of us, the Korg N364 and the Roland XP-80 are all-around excellent instruments for playing and producing a wide variety of musical styles.

So go get yourself a workstation—and get working!

Geary Yelton *has reviewed synthesizers for* EM *since the magazine's first issue. His book,* The Rock Synthesizer Manual, *is back in print fifteen years after it was first published.*

For manufacturer information, please see Contact Sheet, p.163.



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Software Synths on Parade

By Zack Price

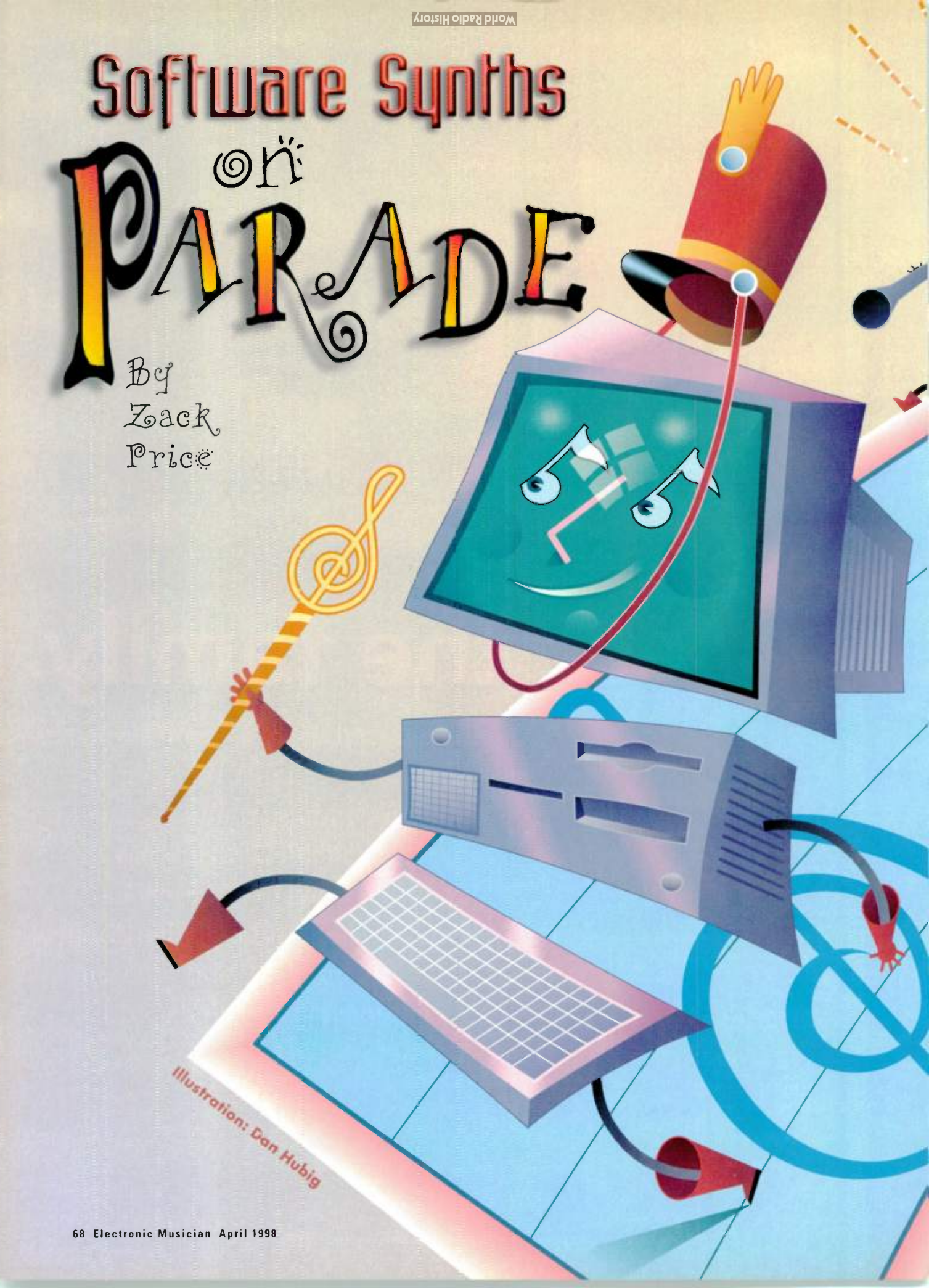

Illustration: Dan Hubig

For many years, desktop musicians have been marching toward the goal of turning personal computers into real-time, playable, professional instruments. Until recently, however, many obstacles were in their path. Not only was the computing power inadequate for the task but the sound quality of early software synths was typically inferior to that of their hardware-based brethren. Furthermore, there was often a noticeable delay between the moment a MIDI note was externally triggered and a virtual synth's response to that information.

Today's software synths have dramatically improved in sound quality and performance, thanks to the current crop of faster computers and more sophisticated software design. Though virtual synth programs still require a large portion of the computer processing power, it's easier than ever to incorporate the results of their output into existing desktop environments. Even the ultimate goal of integrating software synths into a unified, real-time, desktop production environment has finally been attained, albeit on a limited basis.

Get in step

with the latest in software synthesis technology.

The recent flood of both commercial and shareware software synthesis programs shows no sign of abating. Although that's good news for desktop musicians, the downside is in knowing how to distinguish between the different types of available synthesis software and in determining what is needed to take advantage of this technology. Fortunately, software synthesis programs fall into a few major categories that are easily defined by their features and intended use. I'll discuss these categories in detail and also cite different programs as examples of each. Though not an exhaustive survey, this article will provide you with information and resources about synthesis programs, allowing you to determine what will work best for you. You can also refer to the sidebar "Web Site-Seeing" for additional resources and contact information.

SOUND BY DESIGN

For a number of years, desktop musicians have been using sound-design programs to create synthesized sounds on their computers. In fact, it's been over 40 years since the first research in programming sound on a computer occurred. Modern applications of this type often employ a variety of synthesis methods to generate sounds and store their output on disk as sound files. The resulting files are then exported to sample-editing programs for additional modifications before being dumped into an external sampler or a sound card with sampling capability. A somewhat different approach was employed by Digidesign's *TurboSynth SC* (reviewed in the January 1994 **EM**), which was used with the company's SampleCell hardware to turn a computer into a sampler.

Sound-design software offers users the advantage of being able to create complex sounds that often aren't possible to produce on an individual hardware synthesizer. For example, one early sound-design program, Digidesign's *SoftSynth*, offered 32-operator FM synthesis at a time when the classic Yamaha DX7 could only provide six operators to produce sound. Currently, even relatively simple shareware program such as *Synthia* (developed by Yan Terrien and Hameau de Peymian), which is a virtual model of an analog synthesizer, provides eight oscillators for sound generation (see **Fig. 1**). That's more than most current hardware analog-synth emulators can offer.

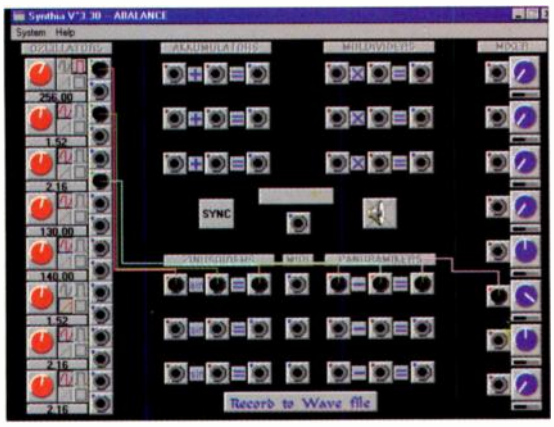

FIG. 1: Though the shareware program *Synthia* has relatively few features, it offers more oscillators than many of the hardware synths it emulates.

Modern sound-design programs offer a dazzling array of synthesis methods that can be structured into complex modular networks, as in the case of Synoptic's *Virtual Waves* (see **Fig. 2**; reviewed in the November 1997 **EM**). Other applications, such as Jeorg Stelkins's physical modeling program *PHYMOD*, allow the user to explore techniques of synthesis that are only recently showing up in hardware devices. Such programs are not without their limitations, however. Unlike the real-time synthesizers I'll discuss later, sound-design programs until very recently had to process sound parameters offline before you could hear their results. That could mean waiting a few minutes to calculate sounds with relatively simple settings or several hours for sounds with extremely complex parameters. Of course, the speed problem was due to the computers themselves, whose processors ran excruciatingly slowly by today's standards. Fortunately, current computers run much faster, and calculations of sound structures or networks often take only five to fifteen seconds.

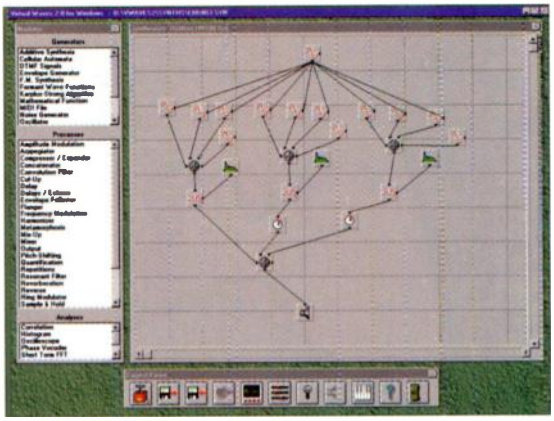

FIG. 2: Like other sophisticated sound-design programs, *Virtual Waves* offers a variety of synthesis methods and processors to create complex sound networks. Often, these sounds are not possible with most hardware-based synths.

Several new programs, including *Audio Architect* from the Karnataka Group, let users hear sound networks instantly without waiting for calculations to occur. To accomplish this feat, you'll need a fast computer (see the sidebar "Computer Requirements" for more details), and the sound network you create must be calculable within the sample rate and time frame selected. If a network is too complex to be processed and heard in real time, you may get garbled noise as output. If that happens, you can lower the sample rate, simplify the network structure, or just process the sound offline as you would with any other sound-design program.

Another major drawback of older sound-design programs was the inability to adjust parameters in real time and immediately hear the results of the changes being made. In other words, you couldn't tweak a sound as it played back. This barrier has been breached by a number of recent programs, including Arboretum's *MetaSynth* and DUY's *DSPider*. Though *DSPider* is only available as a plug-in for the Pro Tools system, *MetaSynth* and other standalone synthesis programs do real-time sound editing, as we will see later.

Many current sound-design programs allow users to play and control a sound using MIDI devices or sequencers once the sound is calculated. Depending on the program, a calculated sound can be controlled by MIDI parameters, such as Note On, Velocity, Aftertouch, and Modulation. However, this feature is usually monophonic, and the sample generated will probably be useful only within a limited note range. Although it's possible to think of sound-design programs as monophonic instruments, that's certainly not their main function. You're better off modifying your design to generate additional samples at different pitches and using MIDI only to test the effective note range of a sound.

Another feature commonly found in sound-design programs is an analog-style or step sequencer. Programs such as *Virtual Waves* and *Audio Architect* allow the user to create a musical phrase or riff that plays a newly generated or preexisting sample. Different sounds within an overall sound structure can also be plotted along a time line in a technique referred to as *wave sequencing*.

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Wave sequences can often be treated as musical phrases or patterns, as well. In both cases, digital audio files of these riffs and phrases can be exported to hard-disk recording programs or digital audio sequencers, wherein higher-level song structures can be built from or around these files.

TB OR NOT TB

Do you recall looking down your nose at the Roland TB-303 because it didn't play like a real instrument? Do you remember when you decided to sell your Roland TR-808 because you wanted to get a drum machine that made "real" drum sounds? Who knew back then that these devices would become the signature sounds of a whole genre of music or that they would become red-hot commodities that sell for far more than their original retail price? (Of course, that's assuming you can get your hands on either of these instruments!)

Well, in a textbook demonstration of free-market forces at work, a number of companies have been filling the need for readily available, lower-priced alternatives that can emulate the classic TB-303, TR-808, and TR-909 sounds. Some of these new products are hardware-based, such as the Novation BassStation, DrumStation, and Super Bass Station. Other companies, however, have developed software versions that play on personal computers. The best known of these analog-emulator programs is *ReBirth RB-338*, created by Propellerhead Software and distributed by Steinberg (see **Fig. 3**). There are shareware programs, such as D-Lusion's *Rubber Duck* and *VAZ*, created by Martin Fay, however, that do an excellent job of recreating TB-303 and other analog bass sounds.

All of these programs share several features. First, they were designed to be software emulations of classic analog devices. Second, their screen appearance is similar to the front-panel layout of the hardware device that they emulate. Their mimicry, however, goes

COMPUTER REQUIREMENTS

What sort of computer do you need to join the soft-synth parade? The obvious answer is the fastest, most powerful computer possible. Realistically, the answer is whatever the system requirements are for the programs you intend to use. For instance, many Windows-based sound-design programs will work just fine on a '486 DX2/66 with 16 MB of RAM, although it will obviously take longer to calculate sounds because of the slow CPU speed. Naturally, a Pentium-based computer will yield quicker results as well as allow you to take greater advantage of the program's features, such as real-time MIDI control over its output.

Users of analog emulator software will definitely need a Pentium-class computer. *ReBirth*, for example, requires at least a Pentium 75 for Windows or a 601-based 66 MHz Macintosh processor (both versions require at least 16 MB of RAM). It is possible to run some shareware analog emulator programs on a '486 DX4/100, but the synth's response to onscreen parameter changes is sluggish at best. More often than not, though, synth response is just downright glitchy on '486-based computers.

Those using virtual synth modules like the *VSC-88* will also need Pentium-class computers, preferably with 32 MB of RAM. Furthermore, as mentioned earlier, sound quality will depend on computer speed. The minimum requirement for high-quality playback is usually a Pentium 133 with MMX or a Pentium 166 without MMX. Otherwise, the sample-playback rate is reduced to 22 kHz (or even 11 kHz on slower systems), and there is a corresponding reduction in polyphony. Additionally, real-time MIDI input and control may be compromised if you attempt to run virtual synth modules on slower machines.

Similarly, those working with pro real-time synths, such as *Reality* or *Generator*, will need at minimum a Pentium 133 MMX or a Pentium 166 and 24 MB of RAM. However, if you want to be a power user of either of these programs, you may want to upgrade to a Pentium II system. Prices for Pentium IIs are coming down rapidly, and it may be worth getting one to be ready for the next phase of synthesis software development. After all, bringing virtual synths into a real-time desktop-production environment will only be achieved by using very powerful personal computers.

Windows users have to be concerned not only with processor speed but processor type, as well. Not all Windows computers run on Intel processors, and certain processors made by Cyrix or AMD, though less expensive and otherwise fine for running non-real-time applications, are not suitable for processor-intensive applications, such as synthesis software. Furthermore, some software synthesis programs won't run properly on non-Intel computers. *Reality*, for example, will not work with early Cyrix processors because they do not implement the full Pentium instruction set. Fortunately, most soft-synth applications do work with non-Intel processors, though they will probably run a little slower or with limited polyphony. The bottom line is, if your computer has a non-Intel processor, confirm that a particular soft-synth program will work with it before buying the software.

Other Windows system capabilities may affect overall synthesis software performance, as well. For instance, Pentiums with MMX technology often perform better than Pentiums with the same speed processor but without MMX. Though most synthesis programs don't take advantage of the MMX's enhanced instruction set, the improved architecture and expanded cache should definitely improve performance by as much as ten to twenty percent or better. Also, those users with audio and graphics cards that use DirectX drivers should see an increase in system and software performance in programs that take advantage of these features.

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beyond mere appearance. As much as possible, these applications provide the same type of pattern-oriented sequencer found on the original hardware devices to program drum patterns or bass lines. Furthermore, they employ the same type of filter controls as the original hardware.

None of these programs can be played like a real-time MIDI instrument but keep in mind that the original instruments they mimic weren't meant to be played that way, either. (You can hear changes to the pattern sequencer in real time, as in the hardware versions.) Nevertheless, unlike their hardware forebears, most analog emulators do have some MIDI capability. For example, all three of the programs mentioned here accept MIDI note input as well as Control Change messages for controlling various parameters. And like others of this type, they also accept MIDI Clock input as a timing reference, so you can play these virtual-analog synths along with sequencing programs or external sequencers.

Running these programs with a digital audio sequencer or a hard-disk recorder is not always possible, although, under some very exacting conditions, you could end up with a self-contained, real-time desktop environment. Naturally, you need a fast computer to use the sequencing, digital audio, and virtual-synth programs simultaneously. You may need to use particular types of hardware and software, as well.

For instance, Power Mac users who want to run *ReBirth* with other music software will need to use Opcode's OMS, which allows you to run MIDI Clock signals from one program to another. Windows users have no standard multiapplication MIDI software devices, but there are utilities such as *Hubi's Loopback Device*, created by Hubert Winkler, and Jamie O'Connell's *MIDI Yoke* that allow multiple MIDI applications to interact in Windows.

Getting the different types of programs to share digital audio resources is trickier. Mac users can use Sound Manager to mix the audio output of programs that use it. This would allow, for example, *ReBirth* to run in conjunction with a digital audio sequencer, such as Steinberg's *Cubase VST*. You could also use *ReBirth* and send its output to Sound Manager while running a program that uses the Digidesign Audio Engine or Steinberg's Audio Stream In/Out Interface for *Cubase VST*, assuming you have the appropriate hardware and software installed. In this scenario, *ReBirth*'s audio output would be sent to the Mac's external outputs while the other digital audio program would use the audio card's outputs.

Windows applications don't normally share audio cards. If you launch two digital audio applications, one of them

WHAT'S ON THE PLATFORM?

You may have noticed that I've highlighted software for Windows computers while stressing Mac programs less. As it turns out, the majority of the newly developed soft-synth programs have been written for the Windows 95 operating system. That's no slight against the Macintosh platform; indeed, there are a number of Mac shareware programs that we didn't cover. It's simply that the overall trend in the synthesis software market is toward the PC.

Does this mean that the Mac is being shut out of some great software? Unfortunately, in some cases the answer is yes. Though Seer Systems claims that a Mac version of *Reality* is feasible, for instance, there are no plans to move in that direction at this time. Also, Native Instruments' *Generator* is Windows-based and works only with Windows sound cards. According to its developers, however, it appears that this program has a chance of being ported over to the Mac, provided the computer is equipped with a cross-platform PCI audio card.

On the other hand, all is not dark in Appleland. There's still a lot of cool synthesis software available for the Mac, and some new releases, such as *MetaSynth* and *DSPider*, have generated substantial buzz. Furthermore, some developers, such as Propellerhead Software, make the effort to write for both platforms.

There is at least one scenario where platform dependence may become a thing of the past. System developer Be, Inc.'s BeOS operating system for Intel and PowerPC processors is scheduled for release early in 1998. (The BeOS was profiled in the September 1997 "Desktop Musician" column.) According to company president Jean-Louis Gasée, "Our goal is to meet the needs of customers doing digital content design, no matter what hardware platform they may be using." Having a platform-independent operating system designed for "digital content" is good news for electronic musicians and digital audio/video professionals.

Another advantage of BeOS is that it is not encumbered with backward compatibility issues (at least not yet) because it is an entirely new operating system. As a result, it takes less code to run a BeOS computer, and a BeOS computer will operate much faster and more efficiently. That also means that developers can develop programs easier, thus bringing down software size and costs while increasing program performance. (At least, that's the theory.) The downside is that users will have to decide whether platform independence and increased performance is worth investing in an entirely new round of software.

The good news is that Be is already gathering some developer support for a wide variety of music software. For instance, David Karla's *rack747* is a shareware, BeOS-based TB-303/TR-808 emulator with full MIDI control of parameters and a 16-note MIDI-compatible sequencer. Up to eight "TB-303" modules can run simultaneously and can be controlled from one virtual rack panel. *ObjektSynth* is a multitimbral, real-time virtual synthesizer like *Reality* and *Generator*, and all its parameters are MIDI and mouse controllable. There are dozens of other programs, as well. I suggest you go to the Be Web site to check it out further.

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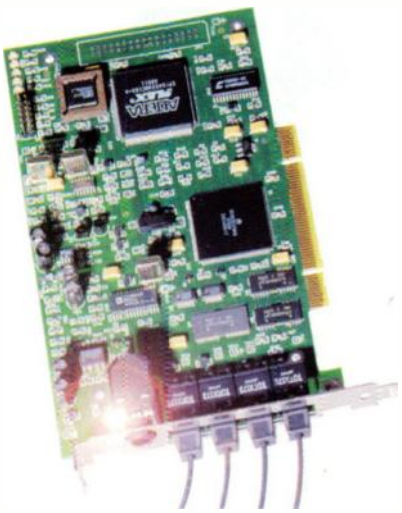

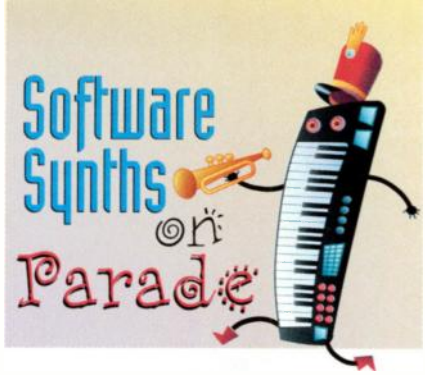

will grab all the audio card's resources, effectively blocking the other program's output. One solution to this problem is to use two sound cards and assign each to a separate application. A related solution is to use a multichannel sound card whose drivers mimic multiple stereo cards in a Windows environment. Set one "stereo" card to one application and the other "stereo" card to the next application. (Some applications won't share MME resources with other programs. In other words, even with two cards, one program will hog all the resources, and the 2-card technique will not work.)

Finally, if all the programs support DirectX 3.0 (and above), if the sound card has a DirectX driver, and if the software uses Microsoft's guidelines on how DirectSound programs should cooperate, you should be able to mix the audio output of multiple audio programs. Unfortunately, unlike "consumer level" cards, few if any pro sound cards use DirectX, so despite Microsoft's best intentions, you might not get the desired results.

As you can see, performing these desktop daredevil feats really requires a lot of computer resources. But what if you have only enough computer power to run the analog-emulator program and little else? Fortunately, the answer is very simple: capture the program's output to a sound file. All analog emulators have this capacity, and it's easy to export the sound files to digital audio sequencers or multitrack hard-disk recording programs. However, it's also a good idea to save your "synthesizer" setup in the analog emulator's native file format beforehand in case something goes wrong with the real-time audio capture. That way, you'll have a backup of your work. Besides, the native-format backup file is a good reference for recalling certain parameters that don't translate into digital audio files, such as tempo, time signature, and number of measures.

VIRTUAL PLAYBACK MODULES

Two other hardware sound modules that have been emulated in software are the Roland Sound Canvas series and Yamaha's XG line of sound modules. Sound Canvas technology is the basis for the Roland *Virtual Sound Canvas VSC-55* and the new Edirol *VSC-88ME*. The technology is also used in both the Apple QuickTime and Microsoft Synthesizer, the latter being part of Microsoft's Interactive Music Control. Yamaha's XG has been ported to soft-synth technology in Yamaha's own *S-YXG50* and Innovative Trek Technology's *NovaStation MMX*.

As with their hardware counterparts, sample playback is the sound-generation method of choice for these virtual playback modules. Increasingly, though, physical modeling is being used as an adjunct to sample playback in order to create some more realistic instrumental sounds. For instance, Creative Labs' acclaimed Sound Blaster AWE 64 sound-card package bundles the *Creative WaveSynth/WG*, a software synth that includes wave-sample playback as well as waveguide (a type of physical modeling) synthesis. Likewise, Yamaha and Sondius are working together to produce a software version of Yamaha's VL70-m physical-modeling synth, which will work as a stand-alone soft synth or with the *S-YXG50*.

Although virtual playback modules, such as the *VSC-88ME*, are probably the most recognized type of software synths, virtual playback technology has found

FIG. 3: Steinberg's *ReBirth* emulates the classic appearance and sounds of the Roland TB-303 and TR-808. Unlike the original hardware, *ReBirth* responds to a variety of MIDI messages, including MIDI Clock for synching to sequencers.

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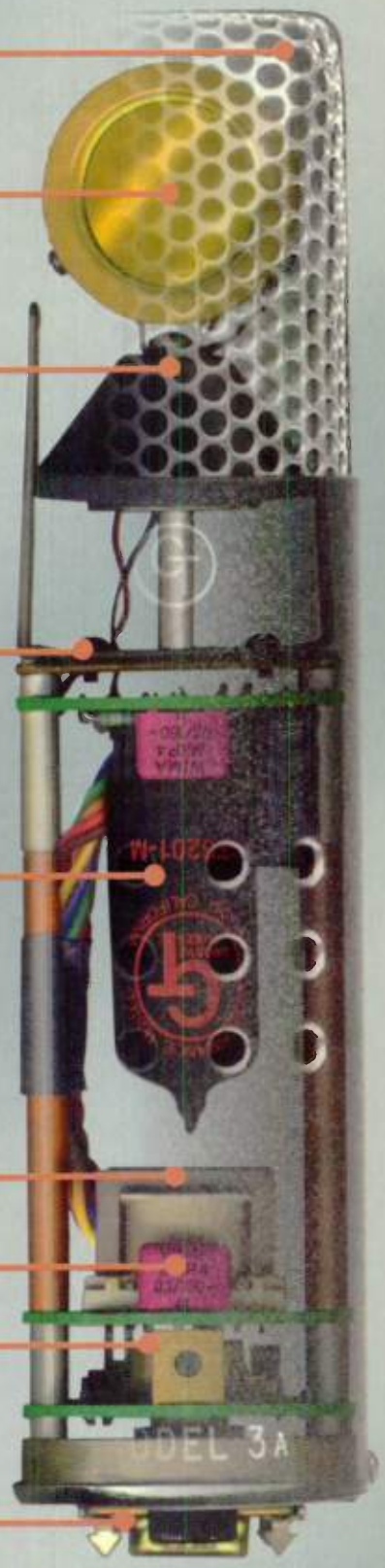

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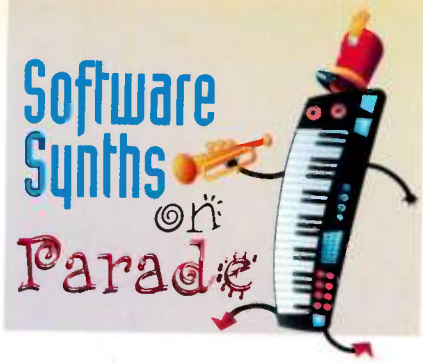

its way into a variety of applications and situations. This technology is widely used in Internet-browser and Web-development software. If you have Macromedia's *Shockwave*, LiveUpdate's *Crescendo*, *NetSynth* (codeveloped by Creative Labs and Seer Systems), or Yamaha's *MIDI Plug XG* on your system, then you've got a virtual synth that lets you hear MIDI files either as background music from Web sites or as an online auditioning tool.

Many consumer sound cards also come packaged with software synthesizers. In addition to the Sound Blaster series, both the Addonics Awesome 128 and the Turtle Beach Malibu card, for example, offer virtual-synth technology. This feature is intended to expand sound capacity or add greater realism to the cards, even if they already have a good-quality set of wavetable sounds in hardware.

Clearly, the new generation of virtual playback modules has better sound quality than the software synths of just a couple of years ago. In fact, I find it amazing just how similar the sound of these virtual modules is when compared with that of their hardware-based counterparts. Of course, to

WEB SITE-SEEING

To learn more about specific software synthesis programs and related products, take some virtual tours to the following Web sites. Although this list of synthesis software is by no means complete, it is a good starting point for extended exploration. Just follow any links provided by these Web sites and you'll have your own software synthesis program database in no time. Hypertext links to these URLs are available at EM's Web site, www.emusician.com.

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Creative Labs and Seer Systems *NetSynth* (Win)
www.ctlsg.creaf.com/club/connect/music/music.html

Digital Sound Page
www.xs4all.nl/~rexbo/pc_synth.htm

D-Lusion *Rubber Duck*
www.neurotix.303dim.com/tools.htm#RubDuck086

Edirol, Inc. *Virtual Sound Canvas* (Win)
www.edirol.com

Martin Fay *VAZ*
www.cp.umist.ac.uk/users/martin/vaz.html

Harmony Central
www.harmony-central.com

Hiro's Page *WinGroove* (Win)
www.cc.rim.or.jp/~hiroki/english

Innovative Trek Technology *NovaStation MMX* (Win)
www.ittrek.com/novastn.html

InVision Interactive *CyberSound VS* (Mac/Win)
www.cybersound.com

David Karla *rack747* (BeOS)
www.be.com/beware/Audio.html

Karnataka Software *Audio Architect* (Win)
www.audioarchitect.com/main.htm

LiveUpdate *Crescendo*
www.liveupdate.com/crescendo.html

Macromedia *Shockwave* (Mac/Win)
www.macromedia.com/shockwave

Microsoft, Inc. *Microsoft Synthesizer* (Win)
microsoft.com/music/Home.htm

Native Instruments *Generator* (Win)
www.native-instruments.de

Objekt *ObjektSynth* (BeOS)
www.objektsynth.com

Jamie O'Connell *MIDI Yoke*
www.channel1.com/users/jamieo/jsoft.html

Perceptive Solutions, Ltd. *Making Waves* (Win)
www.pslnet.demon.co.uk

Seer Systems *Reality* (Win)
www.seersystems.com

Staccato Systems *SynthBuilder*
www.staccatosys.com

Steinberg *ReBirth RB-338* (Mac/Win)
www.propellerheads.se/products/rebirth15.html

Jeorg Stelkins *PHYMOD* (Win)
www.harmony-central.com/Software/Windows/phymod20.html

Synoptic Software *Virtual Waves* (Win)
www.synoptic.net

Synth Zone
www.synthzone.com

Yan Terrien and Hameau de Peymian *Synthia*
www.hitsquad.com/smm/programs/Synthia

Virtual Synth Page
www.users.zetnet.co.uk/white/vsp

Windows 95 Music Shareware and Freeware
www.hitsquad.com/smm/edit/win95.html

Hubert Winkler *Hubi's Loopback Device*
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achieve CD-quality sound from a virtual module requires a healthy dose of computer power. And the number of voices that can be simultaneously generated also depends on the percentage of computer resources devoted to the virtual synth module (see **Fig. 4**). As always, overall system capabilities ultimately determine the level of performance in virtual playback modules.

Despite the amount of computer resources these virtual synths require, they do offer some important advantages. For one thing, the price of the software synth is often one-quarter to one-eighth the cost of the comparable hardware version. Furthermore, adding a virtual synth to your system doesn't require any additional hardware. Although the quality of many sound cards' onboard synthesizers has improved, there are still cards that sound less than stellar. You might find it easier and more cost effective to use a high-quality virtual synth than try to tweak a substandard sound card's onboard sound set.

It's also great to have a good-sounding synth available when you boot up your computer. This convenience lets you get to work right away on desktop music production and arranging. I like to use a virtual synth with my rhythm editor and my auto-accompaniment software. I also know of an arranger who likes to spot-check scores and arrangements using just his notation software and Apple Quick Time. Inexpensive virtual modules are also cost effective for those who create GM-, GS-, and XG-compatible Standard MIDI Files. Though GM, GS, and XG are standard formats, there are distinct sonic differences between the various sound modules that employ them. Having virtual versions of common modules lets you customize patch selections or System Exclusive setups according to the types of hardware or software synths employed by the end user.

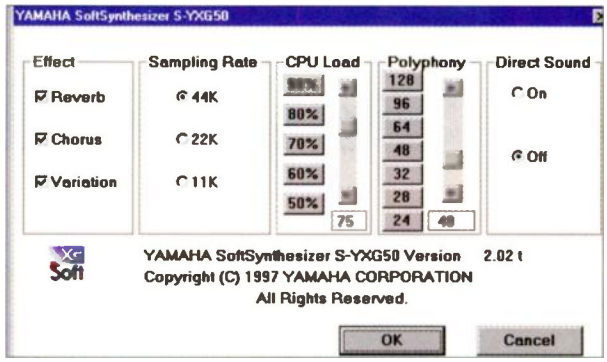

FIG. 4: The control panel of the Yamaha *S-YXG50* virtual synthesizer module is where users adjust different parameters to ensure glitch-free playback.

However, virtual playback modules have several disadvantages. One is the large requirements for computer resources referred to earlier. Another is *lag time*, the delay between the external triggering of a MIDI note and the

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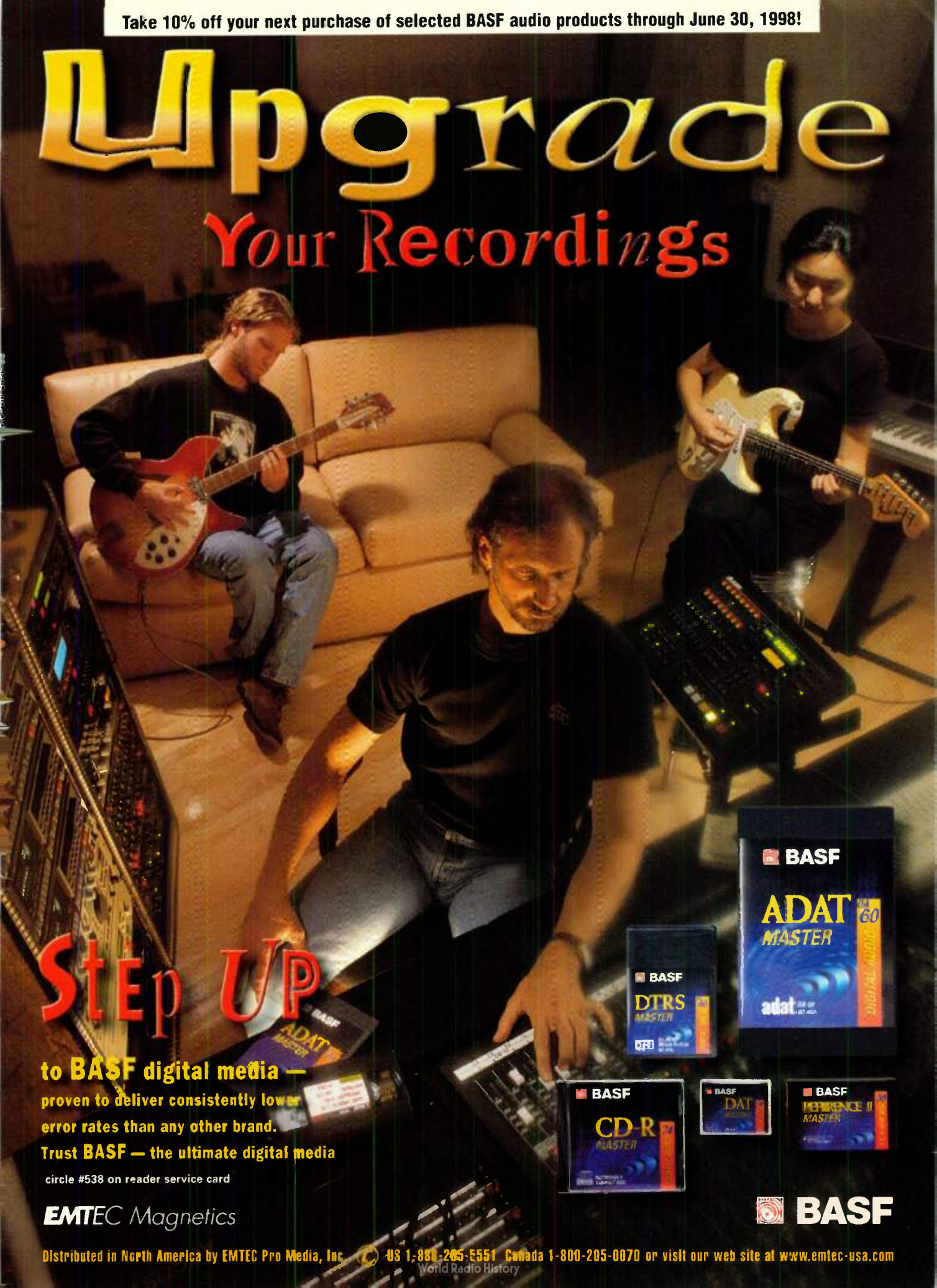

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moment the note sounds. Though lag time has been eliminated in some high-end soft synths, it remains a problem with many virtual playback modules. How large a problem it will be depends on a variety of factors, including overall computer power, resource allocation, playback settings, and number of voices being triggered and/or played back.

Finally, virtual synths for the Web aren't of much use to composers creating projects on the desktop. Not only can't they be controlled by your own sequencer or notation program but, like the virtual synths that reside on your desktop, their output can't be captured to disk. Also, Windows-based virtual synths like the Roland and Yamaha modules are often treated as wave devices, which means you can't use them with other digital audio programs simultaneously if you have only one sound card in your system. You need either two cards or a multichannel audio card to hear the playback of both types of output. (And as mentioned earlier, the programs themselves must be willing to share resources.)

BETTER THAN THE REAL THING

With the release of Seer Systems' *Reality* (followed shortly by Native Instruments' *Generator*), desktop musicians have finally reached the goal of a professional, real-time, multitimbral software synthesizer that doesn't rely on hardware. Well, almost no extra hardware. *Reality* only works with certain Sound Blaster–brand cards and the Sound Blaster Vibra 16, which is found in many laptop computers. (The company says it will be supporting other cards in the future.) *Generator* will work with multimedia cards, but it offers best performance using its own card or with Emagic's Audiowerk8 card and a driver optimized for use with *Generator*.

However, these programs are truly real time in all respects. Unlike other virtual synth modules, they exhibit no lag time or glitching of input from external MIDI sources. There is also real-time control over synth parameters: you can tweak sounds as they play, just as you can on a hardware synth. In fact, because of their graphic interfaces, you can probably edit sounds faster than on some hardware synths (see **Fig. 5**). And as with hardware, you can assign MIDI functions to particular synth parameters so that you can tweak sounds in real time with Control Change messages, too.

Unlike most hardware synths, real-time virtual synths typically employ a variety of synthesis methods simultaneously. For example, *Reality* uses analog (subtractive) synthesis, FM synthesis, sample playback, and various forms of physical modeling. *Generator* is a modular system and offers a large selection of modules that can be wired together for subtractive, FM, wave-shaping, or sample-playback synthesis; simple physical models; or effects algorithms.

Real-time virtual synths differ from hardware synths in another important way. Real-time virtual synths have the capacity to be software expandable. Adding a new form of synthesis is simply a matter of downloading and installing the upgrade. While some recent hardware synthesizers can be updated to include new features, most often these features are upgrades or improvements to the existing operating system. There is usually no fundamental change or addition to the type of synthesis method available in a particular hardware synth.

However, real-time software synths aren't without their drawbacks. For example, polyphony will vary depending on the hardware constraints of the computer, whereas regular synths don't have that problem. Furthermore, polyphony is affected by the complexity of the synth structure or network in a virtual synth.

Hardware-synth sounds can be easier to edit because the basic synthesis method is already established. All you have to do is edit the parameters of that existing structure. With some real-time virtual synths (and sound-design software, for that matter), you must first "build" the synth before you can edit the established parameters. (*Reality* loads with a preset patch "in memory" that is ready to play.) But then again, designing unique sounds by creating specialized synth structures is the main reason you get into software synthesis in the first place. And there will no doubt be many example patches included with these systems to get you started.

I'VE GOTTA WEAR SHADES

Let's face it, we desktop musicians are living in pretty good times. We now have powerful sound-design programs, specialized instrument emulators, low-cost, good-sounding virtual synth modules, and real-time, editable, multitimbral software synthesizers. Naturally, more and probably better programs are bound to be on the way soon.

There is also the hint of a possibility that desktop musicians may achieve platform-independence and greater software/hardware performance with an operating system that seems to be tailor-made for desktop music and video production (see the sidebar "What's on the Platform"). Only time will tell on that score, though.

Finally, we have powerful laptop and desktop computers that let us incorporate these instruments into an integrated desktop-production environment, though clearly with limitations. With more powerful computers due to be released in the future, the possibility of total desktop production integration (simultaneous MIDI, digital audio, and software synthesis) is no longer merely a dream but rather an inevitability.

As the song says, "The future's so bright, I've gotta wear shades."

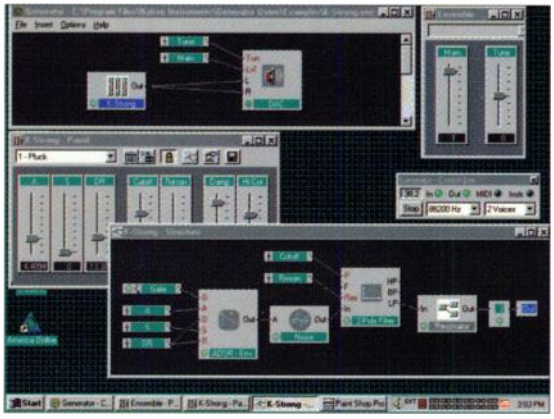

FIG. 5: Real-time software synthesizers like Native Instruments' *Generator* display numerous parameters on the screen simultaneously, making patch editing easy.

Zack Price *would like to thank Dennis Miller for his help.*

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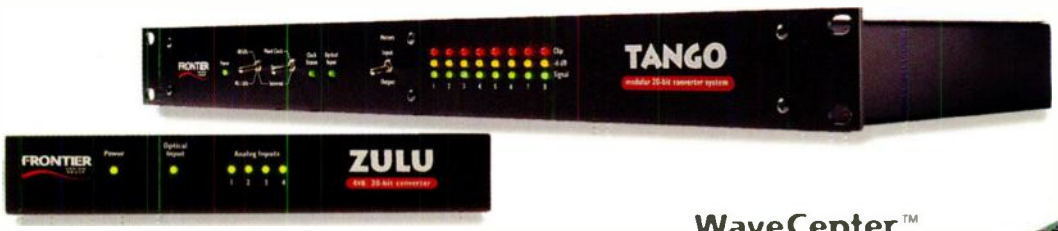

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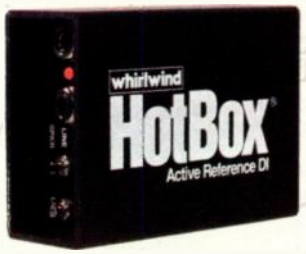

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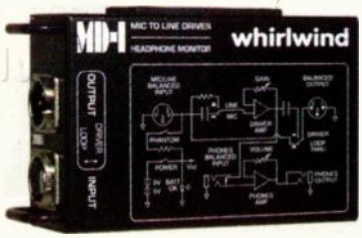

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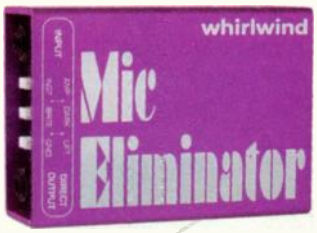

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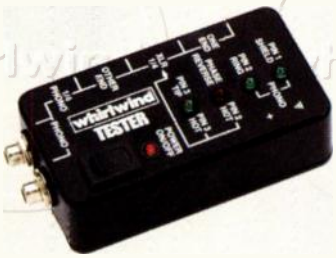

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JAM #6, April 1998
A special editorial supplement
to Electronic Musician

JAM

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UP AGAINST MURPHY'S LAW OF P.A. SYSTEMS

VR pioneer Jaron Lanier, apostle of ethnotech

set List

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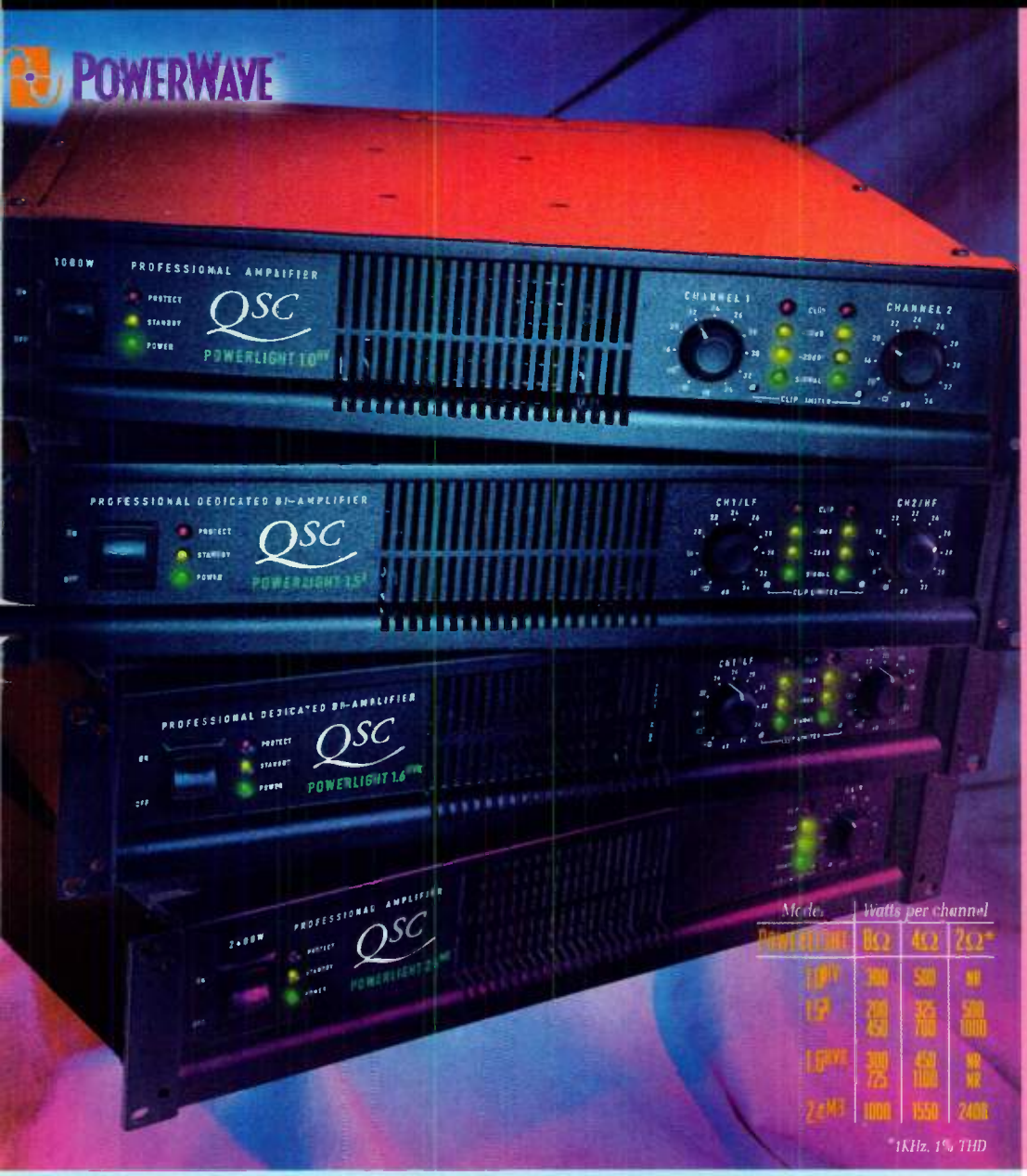
Original Art Design Linda Birch

Cover and Set List photos of Celine Dion Steve Jennings

PERFECT POWER.



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Opener

THE TRUTH IS, I WAS NEVER A BOY SCOUT. In fact, I was a Cub Scout dropout, and it didn't take me long to bail out of that pillar of the establishment. But even though I was not formally trained to follow the Boy Scout motto, I nevertheless believe in being prepared, especially when it comes to rehearsing and performing.

In the years when I was touring as a keyboardist and singer, the toughest part of preparing for the gig was not learning the material, nor was it configuring and repairing the gear. It wasn't loading in and setting up during a blizzard in below-zero degree weather, evading the drunks, keeping the drummer from punching out local wiseguys, or dealing with band squabbles.

No, the hardest part was getting a chance to warm up properly. After all, nobody wants to hear you singing arpeggios, and it's pretty rare to have a piano in an isolated practice room. In short, nobody makes it easy for the musicians to get ready. We're supposed to be born ready.

So I often strained my voice trying to take it easy, using the first set as a warm-up. Warming up on keyboards was a bit easier, assuming I was using electric or electronic keyboards. I simply climbed on stage with the lights out, plugged in my headphones, and played Hanon exercises in the dark.

What I needed was some guidance of the sort you now have in this issue of *JAM*, which provides several systems for warming up. As with many issues of *JAM*, you would be wise to read *all* of the columns, not just the ones that are about your principal instrument, because each author has something different to contribute. This will help you and your bandmates down the line. And in the music business, you need all the help you can get.

Speaking of warming up and needing help, *JAM* has been getting warmed up lately too, now that we're publishing it every other month. It's going to warm up quite a bit more in the next few issues as we gradually add features, new-product coverage, and more. In fact, producing *JAM* has become so demanding that we have decided to bring in some more editorial help.

To this end, regular *JAM* contributor Glenn Letsch has agreed to join the team as an associate editor. His mission is to bring in new ideas, recruit new authors, and help us to create articles that will take *JAM* to the next level.

If you have read *JAM* recently, you are familiar with Glenn's work as author of our "Bottom" column. In that case, you probably have figured out by now that he really knows his stuff when it comes to performing live. And he darn well *should* know his stuff; he has played bass for numerous major acts, including stints with Montrose and Edgar Winter and a decade with Robin Trower. He also is a respected teacher and has written numerous articles for **EM** and other publications. So when Glenn advises you how to handle yourself in a band, on stage and off, I suggest you listen up!

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Vox

By Joanna Cazden

Singer's Tune-Up

The singing voice is often considered to be the most sensitive and expressive instrument of music. It offers a wide dynamic range, a "fretless" flexibility of pitch, and a nearly infinite variety of tone colors. However, its sensitivity presents several challenges that must be addressed when warming up for a gig.

Celine Dion is known for taking great care of her voice, including a thorough warm-up.

PHOTO BY STEVE JENNINGS

First, the voice is located entirely within the body, and its muscles are under far less conscious control than, say, the hands and fingers. Second, because singing seems so instinctive, even the most experienced performers might feel exempt from—or even fear—the care and discipline they routinely devote to other instruments.

As a result, warming up the voice is a different experience than the typical instrumental routine of opening the case, setting the instrument up, plugging it in, and limbering up your fingers. But it's no less important to your performance or to your longevity as a working musician.

The warm-up sequence I recommend for singers includes four basic steps: (1) focusing the mind; (2) warming and loosening the body; (3) strengthening the breath; and (4) developing the tone and pitch range. This might sound like a lot of things to handle, but the procedure is simple and efficient once you learn how.

Find your focus. The first step corresponds to the moment you lift the lid of the guitar case or first unpack your keyboard. To "open" your voice, you must turn your mind inward toward your body and emotions. This is best done by finding a place where you can concentrate; a restroom, hallway, or spare office will do if you don't have an actual dressing room. Bring some water, juice, or tea with you.

Now do a quick internal check-in. Have you had a good day or a stressful one? Try to notice, label, and then set aside any mental distractions so you can concentrate on the task at hand. This process is what actors call "returning to neutral," and it will help you develop vocal awareness and project a strong stage presence.

Get physical. Next, do a few minutes of light aerobics to increase blood circulation and energy. This can be as easy as marching in place or lifting and lowering your arms like the top half of a "jumping jack." You can also use warm-up exercises you might have learned in sports, dance, or martial arts.

After three to five minutes, stop and do some basic stretching. Circle your head, shoulders, and hips for flexibility. Yawn deeply a few times, and shake out your arms and legs to help get rid of tension.

Catch your breath. Now that you're mentally tuned in and physically warm, begin to pay attention to your breathing. After all, this is the power supply for your voice.

Keep your neck long (as if it were being pulled up by your ears), your ribcage expanded, and your shoulders low as you inhale silently into the area around your waist. Exhale slowly, with

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riffs

By Matt Blackett

Six-String Stretching

PLAYING GUITAR IS NOT A COMPETITION; it's not a sport. It is, however, a very demanding physical, mental, and emotional exercise. In that regard, we can learn a lot from our friends in competitive sports. We all know that a world-class sprinter would never hit the track without properly warming up and stretching. So why do we world-class guitarists think we can get away with hitting the stage cold? I will admit I am not a huge fanatic when it comes to warming up, and I am not suggesting that career-ending injuries will result if you don't. But I can only say that I have never regretted warming up; I have only regretted not warming up. So give it a try. It might just make all the difference between a good performance and a bad one.

Pros like Steve Lukather love to warm up using chordal exercises.

Nonmusical stuff. Drink water all day. I know that sounds like a vocal tip, but it's just as important for guitarists. Trust me. Dehydration can lead to tendon problems and other illnesses that will ruin your gig. Coffee and alcohol only make it worse, so slam water all day, not just on stage. This is an easy one, folks. Do it.

Eat well—another no-brainer. Granted, this article is about taking care of our hands so they won't conk out on the gig, but don't let the rest of your body conk out either. If you're running late and have to skip a meal, bring a few sports bars in your gig bag. They can be lifesavers. You can munch them in no time (always with lots of water), and they'll keep you going until you can have a nice, healthy fast-food meal at 2:00 A.M.

Stretch your whole body. This step might not seem important for a quiet little guitar/flute duet, but a 4-hour bar gig is another story. If you don't take care of the big muscles, you won't be able to rely on the small ones, including the ones that control the tendons and ligaments in your hands. Jesse Tobias, who plays guitar in Alanis Morrisette's touring band, does a whole series of stretching exercises before every show. Some basic ones include touching your toes, stretching your arms above your head and behind your back, and rotating your head and wrists gently. Plenty of these can be done while you're waiting on a sound check or a beer—I mean water. Ask anyone who has studied dance, yoga, or martial arts to show you a few stretches.

Musical stuff. Start warming up slowly. No matter what you play, do it slowly. Don't start burning right away. I prefer chord exercises to scales initially, as do pros like Steve Lukather, but the rule applies to both. Also, start high and then go low. Because the frets are closer together higher up the neck, you don't have to spread your fingers as far.

Use a light touch. Anything can be a warm-up exercise if you do it slowly and with a light touch. Lots of injuries result from squeezing too hard and slamming your fingertips into the fingerboard. If

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you're aware of this when you warm up, you'll be more aware of it on the gig. After playing some chords and scales, I've had great success playing very simple patterns without using my first finger. This is the musical equivalent of swinging two bats before you're up in baseball. Play with only your weakest fingers for a couple minutes, and when you go back to using your first finger, it will seem so easy you'll feel like Superman. Your first finger always works; it's your pinky you can't count on.

Let's try a few specific exercises. With your last three fingers, grab a C major triad at the twelfth position on the three highest strings. You should now have your second finger on a G (twelfth fret, G string), your third finger on an E (twelfth fret, E string), and your pinky on a C (thirteenth fret, B string). Walk down a C chord scale on these three strings without using your first finger.

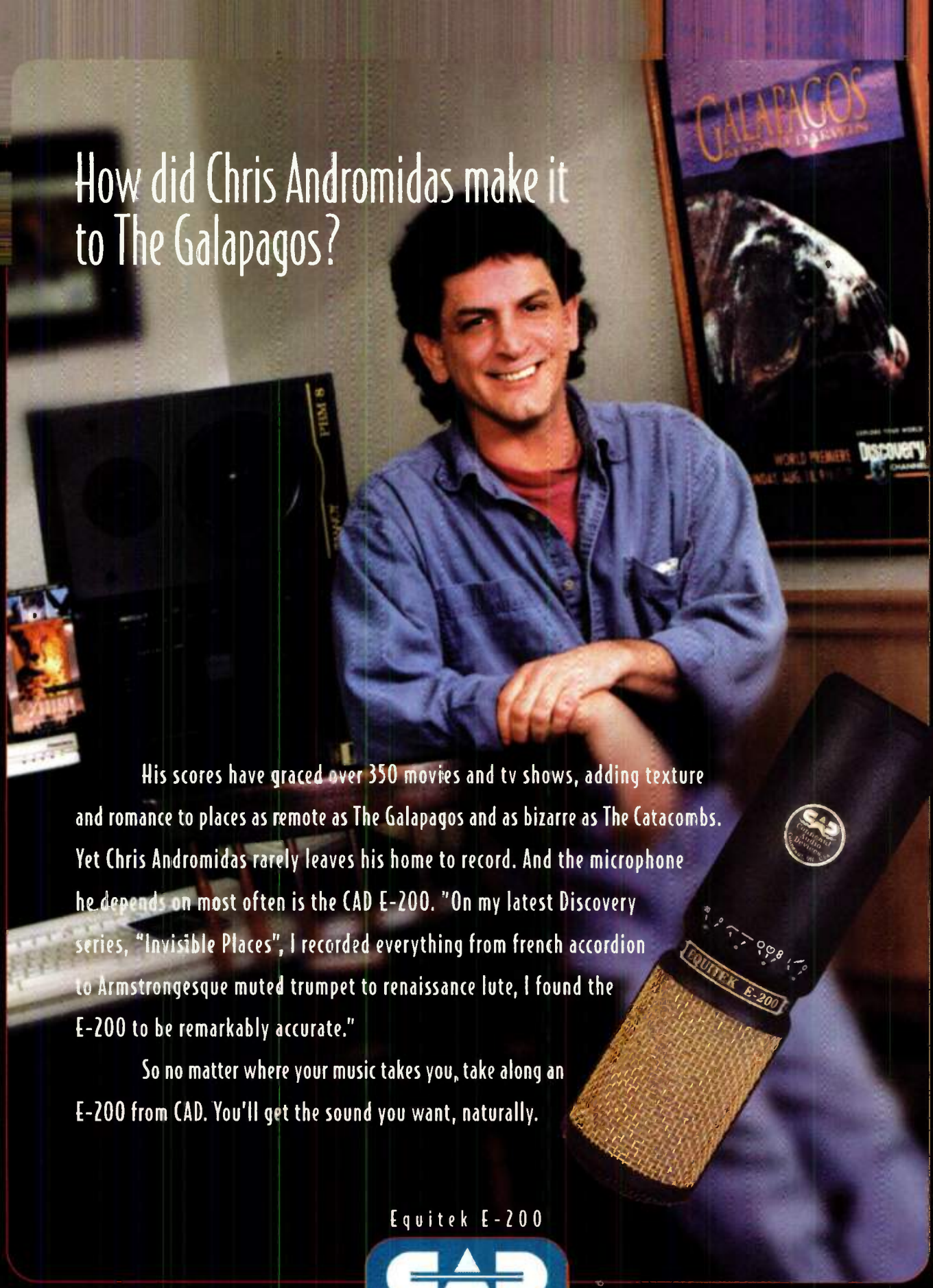
Your next move is to a B diminished triad at the tenth position (F, B, and D, low to high) and then to an A minor at the eighth fret, G7 at the seventh fret, etc. When you get to C major at the first position, you can go back up, or you can apply this same "last three fingers" concept to scales and arpeggios.

Simple blues licks can prove pretty challenging with this method. So, at the risk of repeating myself, *take it slow*. You're doing these warm-ups so that you *don't* hurt yourself. These pinky isolators are best attempted after you've done some simple chording to wake your hands up. When done correctly, they can be great for building accuracy and dexterity, not to mention your confidence.

Warm up (literally). No one can play with cold hands. To combat this problem, classical star Liona Boyd keeps a hot water bottle with her at gigs. Those camping hand warmers do a great job, too. Keep something like this handy (pun intended) for outdoor gigs or anytime cold hands are an issue.

This all probably sounds like a big hassle. Well, playing poorly, hurting your hands, ruining a gig, getting fired, and dying penniless and insane are bigger hassles. (I may be overstating this.) On the other hand, you have to be realistic about warming up: if it takes too long, you'll never do it. You can do minor stretching and chording in less than ten minutes. Whatever you do, don't cram in a bunch of fast exercises because you're pressed for time. That defeats the whole purpose. Pick a couple and do them right. A full warm-up is an all-day affair, but most of this is just common sense. Take care of your hands and your hands will take care of business. ◆

How did Chris Andromidas make it to The Galapagos?



His scores have graced over 350 movies and tv shows, adding texture and romance to places as remote as The Galapagos and as bizarre as The Catacombs. Yet Chris Andromidas rarely leaves his home to record. And the microphone he depends on most often is the CAD E-200. "On my latest Discovery series, "Invisible Places", I recorded everything from french accordion to Armstrongesque muted trumpet to renaissance lute, I found the E-200 to be remarkably accurate."

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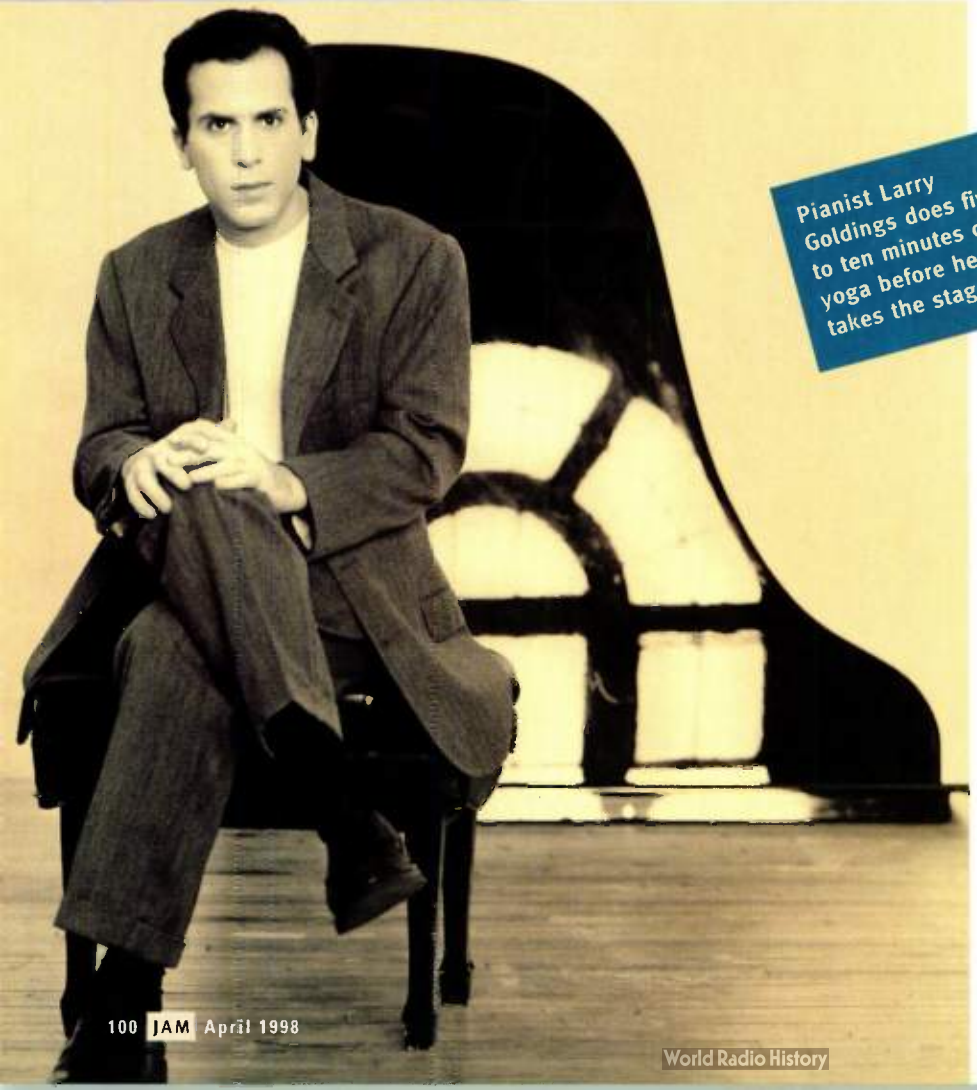
By Sam Molineaux

Ready for Action—Weighted or Not

How many times have you sat down at your keyboard and gone straight into a song, only to find that your fingers aren't doing what your brain is telling them to? Maybe you haven't practiced in a few days, or your mind is occupied with other things. During or after your practice session, do you experience tension in your shoulders, arms, or back? Or perhaps you've strained a muscle or tendon at some point from not paying sufficient attention to the needs or limitations of your body.

Whatever the reason, it's a rare player who can jump straight in and give a great rendition without some form of physical or mental preparation, especially in a gig situation, where factors such as pressure and nerves come into play.

The causes of strain. For a keyboard player, the type of instrument you play can affect how likely you are to push yourself past your physical limit. A piano or a weighted MIDI keyboard are the prime offenders because they demand a great deal of physical strength and dexterity to produce the dynamic range of which they're ultimately capable.



Pianist Larry Goldings does five to ten minutes of yoga before he takes the stage.

"I sometimes use a Yamaha KX88, which is a weighted controller, and I find that if I haven't been practicing on that for a while, it can cause considerable strain in my arms and fingers," remarks Kiki Ebsen, singer-songwriter and keyboardist with a host of touring acts, including Tracy Chapman, Michael McDonald, Peter Cetera, Christopher Cross, and Al Jarreau. "If it's more of a rock kind of gig where there's lots of pounding, I would definitely recommend warming up on the instrument as much as you can."

"I get more strain from playing the piano; it's just more of a physical workout," says Larry Goldings, a jazz organist and pianist touring with guitarist John Scofield this summer. "I also have problems in situations where there aren't enough monitors, and I might be struggling to hear myself. You end up compensating by playing harder, which can put a lot of strain on your hands, arms, and back."

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Goldings's latter point is worth highlighting because it is the bane of so many keyboardists. Make sure you can hear yourself properly in the monitors when possible, and whether you can hear yourself or not, don't play harder to overcome stage volume. This requires mental and physical discipline, but it is extremely important.

Proper posture. Relaxation is critical. Physical strain can occur as a result of not being sufficiently relaxed, causing tension in the upper body that can manifest itself in a range of assorted aches and pains.

"Sometimes I've had a lot of pain in my arms that I could have avoided by just concentrating more on how I was sitting and by realizing that I was a lot more tense than I was conscious of," admits Goldings. "If you notice that your shoulders are up and you're tensing up a lot, you need to spend some time before the gig relaxing and mentally preparing yourself."

David Garfield, popular L.A. keyboardist and member of the all-star Los Lobotomys, whose most recent live appearances have included opening for Boz Scaggs and Steve Lukather, also admits to having strained his body through not paying enough attention to his posture and movement. In fact, one time after a practice session, he injured a tendon in his arm by merely trying to grab a water bottle that was just out of his reach. Following that experience, Garfield took lessons on positioning and posture at the keyboard. He learned how to play with far less force, thus reducing any potential strain on the forearms.

"There's a theory of leaning, based on three different positions at the keyboard. You lean to your left, middle, and right depending on where on the keyboard you're playing. It sounds obvious, but a keyboard player's instinct is to play from top to bottom. This way, you think more about horizontal movement," says Garfield. "I studied with Phil Cohen, a teacher from Montreal, and he gave me a series of glissandi to do on a piano to practice leaning. For example, there's one you can do with your palm down and all four fingers together, with your thumb curled up. It seems awkward to do at first, but it's very useful to get you to move from side to side and to get a lightness on the keys. I use this particular exercise with both hands to warm myself up on the instrument when I'm in the studio and when I'm on the road."

Flexible fingers. Whereas most of the other members of the band can physically warm up on their instruments before a gig, this is rarely the case for the keyboard player, who often has to think up more creative ways to flex the fingers.

"If you're lucky enough to get a warm-up keyboard, it's usually just a regular synth with an unweighted action, which is provided in the dressing room. Some venues have a piano, but that's a luxury," says Ebsen. "Usually I'll spend about ten minutes stretching out my fingers really gently and maybe running my hands under hot water for a while if there's no keyboard to warm up on."

"If I don't have a warm-up keyboard, I just find a quiet room, sit down at a flat surface, and pretend it's a piano. I'll put my arms out, move my fingers and move from left to right just for a few minutes. I also massage my wrists and apply gentle pressure to the tendons just to loosen them up a little," says Garfield. "On one tour, I borrowed a small piano-type keyboard—I think it was made by Steinway—and I did finger exercises on that every day. It's an old product, though, and I don't think they make it any more. It had a special, adjustable spring action, but it didn't make any sound!"

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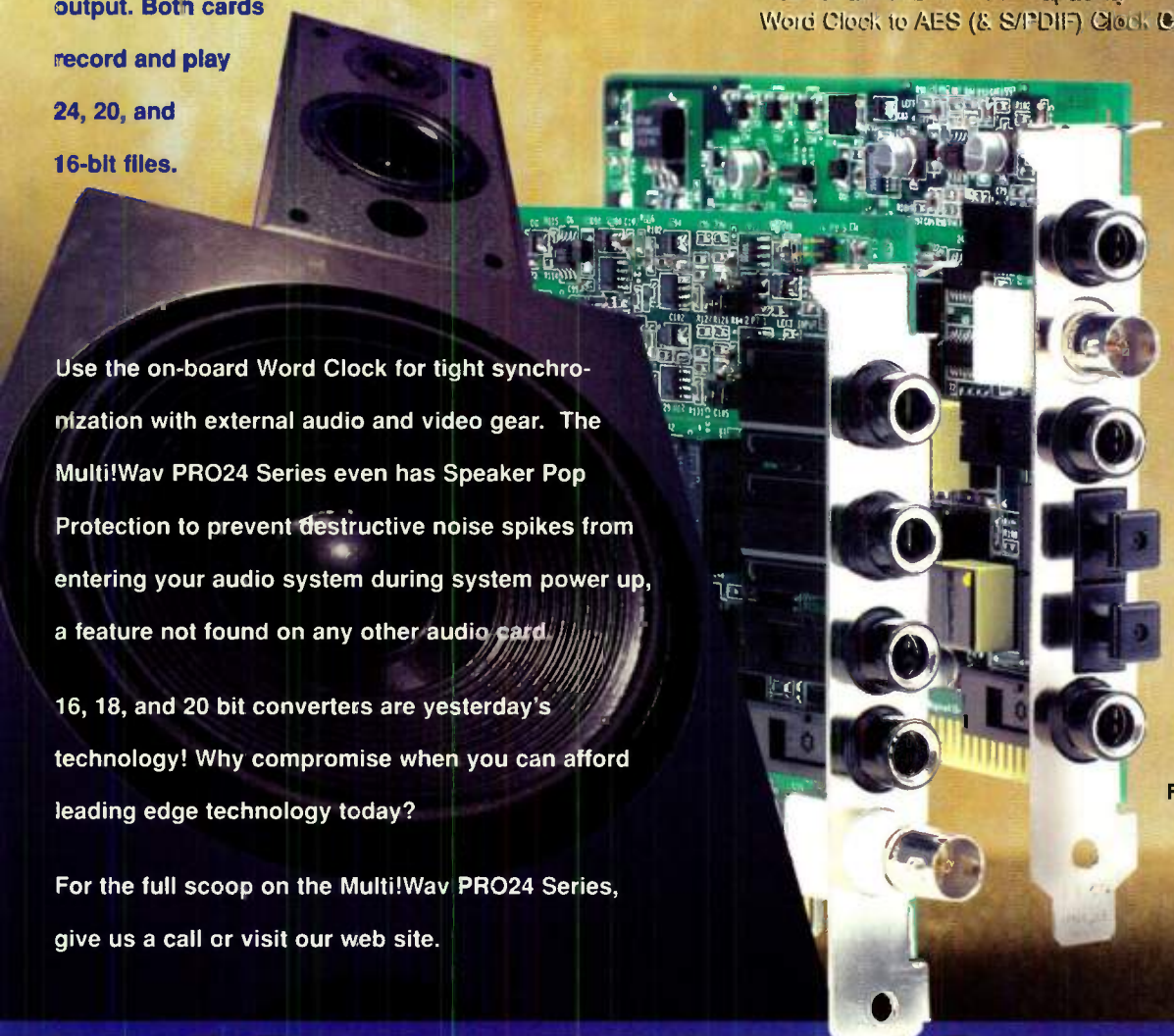

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"Sometimes I take a small portable keyboard with me if I'm on the road, and I do 5-finger exercises before the gig to strengthen my fourth and fifth fingers," says Goldings. "I've also tried those steel balls you roll around your hand. They relax you and limber up your hands a little bit, and I found them very good for the circulation in my arms."

Work that body. Even though the keyboard player is usually the most static band member on stage, it's surprising how effective a short physical workout before a gig can be. Not only will this get you physically prepared but it will also help you relax mentally.

"For the last year or so I've been doing yoga. I concentrate on my lower back region; if that area isn't strong, it can really affect how I play and how I *feel* I play," says Goldings. "I'll generally do five or ten minutes of lower back exercises before a gig. There's a yoga position where you lie face down and lift up your legs for a minute or so. Sit-ups are good, too. I tend not to get nervous much anymore, but on the occasions that I am, I do five minutes of deep breathing before I go on stage."

Mental preparation. Whether it be for relaxation purposes, to assure yourself you're confident of your parts, or just to generally chill out, the mental preparation before a gig is probably the best form of warm-up you can give yourself.

"I think it's a good idea to be mentally focused, so I'll take maybe half an hour and think about what I'm going to play, especially if it's a gig where there are lots of cues," says Ebsen. "I find it's best to be really prepared musically, especially when you're not reading, which I'm usually not."

"I find that being psychologically prepared is more important than anything," says Goldings, who swears by ten deep breaths and a *que sera sera* attitude. "As a pianist, first of all, I have to get accustomed to a different piano every night. Then, I might have a bad mix, I might hate the piano, or I might be feeling sick. All these things contribute to a psychological state that's going to interfere with the music, so anything you can do to calm yourself down and put a little perspective on it is good. I think, 'What the hell, I'm just playing music; it's not brain surgery.' Music is all about taking chances: you're going to fail a little, and you're going to succeed. I probably do more of that type of preparation than physical."

Although it certainly doesn't suit everybody, it's surprising how many players rely on a drop of the old amber nectar to prepare themselves mentally for the gig. "I'm strictly a 'one beer and yer on' kind of guy," commented one high-profile keyboard player I approached. He wasn't the only person to state that alcohol is the only form of warm-up he requires. Of course, a spot too much of this medicine, and you could end up entirely *too* relaxed before you know it.

Practice makes perfect. Although the pre-gig warm-up, in whatever form, is an important factor in preparing for the show, the real key to a good performance is confidence in your ability, something you need to work on regularly in order to stay in shape. "A good warm-up routine is always going to be enhanced by how prepared you are for the gig, so if you do a few scales every day and you know you've learned the material fully, that's more than half the battle," advises Ebsen.

When he's not on tour, Garfield tries to practice every day, even if it's just for half an hour, paying particular attention to scales and 5-finger exercises. "When you're on the road, you're never around a piano. So unless you've done advance preparation, when it comes to the actual performance your fingers are going to be a little clumsy," he explains. "I think scales are very good for practicing, with two hands and four octaves. I also really believe in the Beringer system of daily technical studies. These 5-finger exercises are extremely helpful for developing clarity. They not only limber up your fingers but improve your technique."

"You can do things on a synthesizer that you wouldn't necessarily get away with on a piano, so if you're on the road a lot and playing keyboards, try to get to a piano as much as possible just to keep your chops in shape," says Goldings. "Also, if you're a person who experiences tension, it can be a good idea to use a mirror or videotape yourself when you're practicing so you can see when your shoulders are up or if you're generally tense. It's good to address those sort of problems early on, because if you don't, it will affect you more when you're performing, and you're bound to pay for it in later life."

"Being on the road is a very unnatural experience: you may roll into a city and have half an hour to go to your hotel and get dressed before you show up and play," he continues. "But ironically, those can sometimes be the best gigs: you're tired, and you hadn't any time for mental or physical preparation, which means you also didn't have time to get nervous or stressed out. You just get on stage and play." ◆

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bottom

By Glenn Letsch

Bass Line Routine

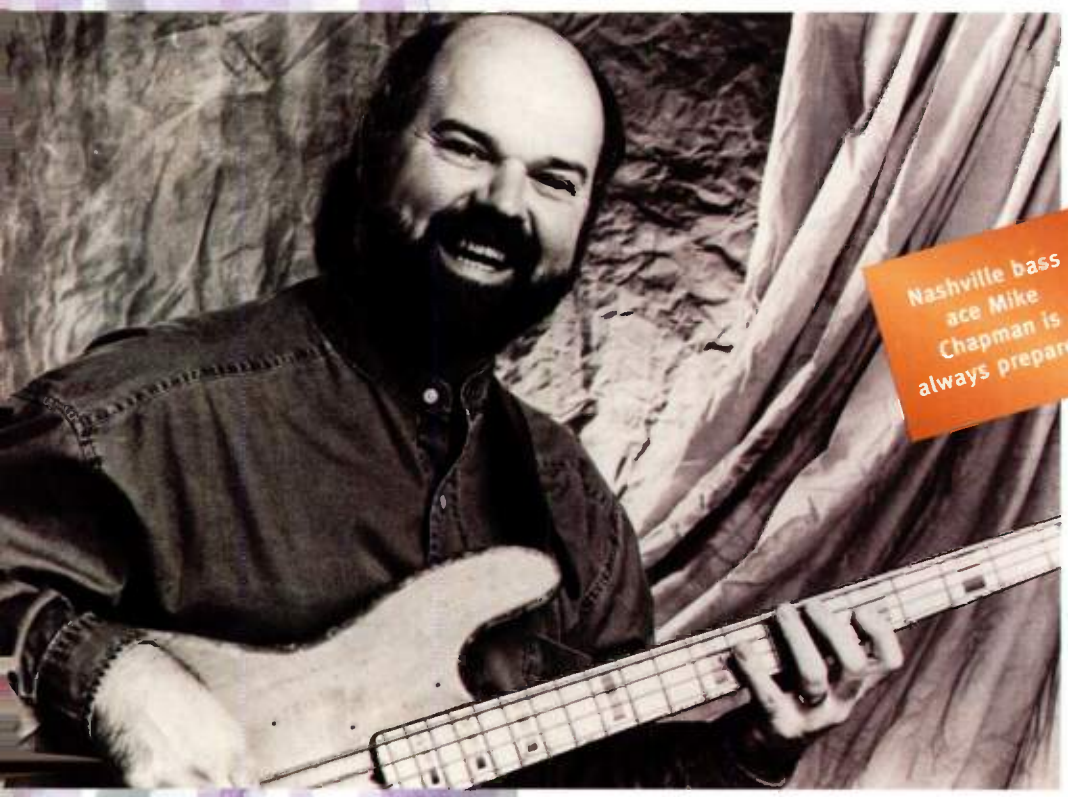
It's showtime! The curtain begins to rise. It's now or never. Are you ready to hit that stage, play your best, and burn some heavy grooves? Whether the gig is at the House of Blues or the Black Diamond Brewery, you want to be a confident, loose, and energized soul, ready to set the musical world on fire. Here are some general points to consider in getting ready as well as specific routines that I like to do before the gig.

Be prepared. Know your material, backward, forward, and upside down. If you need to tape record rehearsals for home-alone study, do it. Your bandmates will love you because group rehearsals will be qualitative, not quantitative.

If you have your tunes down cold, performance anxiety will be minimal. It's just like final exams: if you study and go to class all year, the test is a breeze. If you have to cram, you will be uptight and won't do as well.

In similar fashion, be sure your gear is in perfect working order. Replace tubes and the like *before* they go bad. Have a spare bass head, a backup bass, strings, cords, batteries, and so on. Remember, regular, preventative maintenance is the key.

If you move your own equipment, arrive early for setup. If you have a road crew, arrive early for sound check. This is the time for your final tweaks, so be careful and deliberate. If you are late or hurried, you will be uptight. Chances are, the first set will not be a memorable one.



Nashville bass ace Mike Chapman is always prepared!

In addition, it helps to make sure there is a small practice amp and a bass for you in the dressing room. If that is impossible, at least get your axe, have a seat, and warm up. The following are some of my favorite routines for being prepared.

Bass isometrics. This exercise accomplishes three things. It will make each finger stronger. It will *teach* them to hover closer to the fingerboard. And each finger will *learn* to move independently of the others. The result is efficient technique. First, number each of the fingers on your fretting hand one through four, starting with the index finger. Now, place the

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four fingers on E F F♯ G (frets 9, 10, 11, 12 of the G string), and fret each note simultaneously. Place fingers #1 and #2 on the D string at notes B and C (frets 9 and 10). Alternate plucking between B and C, lifting finger #1 up when fretting with finger #2. Be sure to hold down fingers #3 and #4 while plucking with #1 and #2. Do this with every finger combination (1-3, 1-4, 2-3, 2-4, 3-4). Be sure to play all exercises very slowly for maximum effect.

Rhythm intervals. Fret the root interval with finger #1, the perfect fifth with #3, and the octave with #4. Arpeggiate between the three notes. Play legato. Ascend and descend the notes, but do not let the octave sustain into the fifth nor the fifth sustain into the root when descending. Play the exercise with precision and even tempo. Move it up and down the fingerboard. I like to call these the rhythm intervals because so many great bass routines have been written with them.

▼

If you have your tunes down cold, performance anxiety will be minimal.

Pickin' a winner. If you play any tunes with a pick, you will need something to warm up on. My favorite picked bass line is Anthony Jackson's "For the Love of Money" by the O'Jays. If you don't have a copy, you should find it because it is one of the all-time baddest bass lines. Listen to it, study it, and nail it! Playing this song puts me (and anyone else listening) *in the zone*.

Rockabilly Walking Eights. This is one of Nashville great Mike Chapman's favorite routines and mine, too. This 12-bar, walking bass line is simple, but it grooves and will put you in just the right frame of mind. The note pattern is 1-1-3-3-5-5-6-5, which you play over A, D, and E chords. (For example, on the A chord, you would play A-A-C♯-C♯-E-E-F♯-E.) If there is a guitar amp and a drum pad in the dressing room, try to get a jam going. There is no better way for the band to bond before a gig. If you can get off a good joke and a hearty laugh, then I'd say you are ready to hit the stage! ◆

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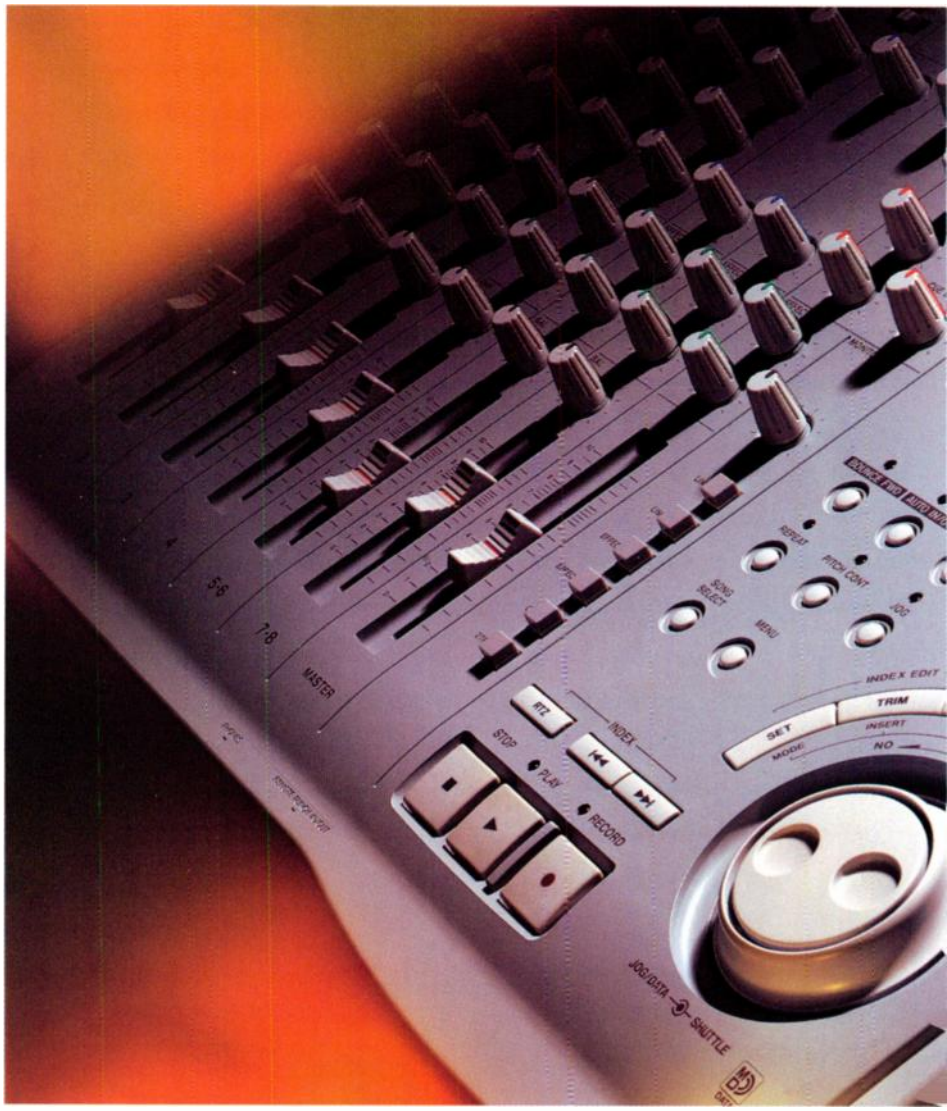
Hear the difference! Only the 564 gives you audible, frame accurate jogging, cueing and index trimming. The others leave you guessing. Plus you can shuttle at 2, 8, 16, or 32 times normal play speed. Call up system parameters and alter values, even MOVE, ERASE and COPY with one hand tied behind your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



Killer arrangements with exclusive Index Programming

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

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

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

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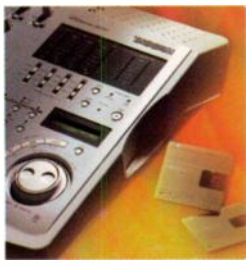

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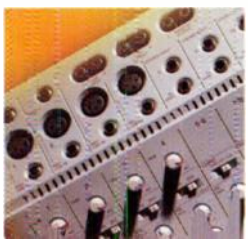

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bang

By Brian Knave
and John G. Hvasta

There Is Power in the Blood

Okay, so maybe bass players can get away with showing up five minutes before the gig starts, plugging in their rigs, and getting a sound just in time for the first song. But that won't cut it for drummers. Aside from the time we need to lug in our gear, set it up, and tune, we also need time to warm up. Playing a drum set is a demanding physical activity. To simply sit down at the drum set and start banging away without first warming up is risky business—and not very smart musically.

The key to warming up is increasing the flow of blood to the hands and feet. There are several ways to accomplish this goal, including physical exercise, such as push-ups. (Don't laugh: a set or two of 30 push-ups will do wonders for warming up your hands. Try it!) Of course, drum-specific warm-ups should be done directly with hands, sticks, and feet.

For warming up the hands quietly at the kit, a gum rubber pad that sits atop the snare drum is ideal. Gum rubber is good because it creates a strong stick bounce, which conditions the hands to "catch" the returning upstokes. An excellent model is the RealFeel pad, made by HQ Percussion Products (tel. 314/647-9009; fax 314/644-4373; e-mail gtwyterc@aol.com; Web www.hqpercussion.com). To include your feet in the warm-up without making noise on the kit, position them on the floor to the sides of the pedals.

The warm-up. The drum-set warm-up routine described here is thorough and challenging. It is divided into three parts and combines five sections (see sidebar, "The Routine") in various ways. Once mastered, the routine can be played in fifteen to twenty minutes.

Note that the subdivisions (**A**) alternate between duplet- and triplet-based lines. Alternating between these two different types of notes not only improves your sense of time but also prepares you for playing different styles of music: duplet based for quarter-, eighth-, and sixteenth-note grooves and triplet based for swing, shuffle, and 12/8 grooves.

Part one. Part one consists of playing four different stickings (**B**) through seven time subdivisions (**A**) over a feet ostinato (**C**). First, choose an ostinato from section **C.** Playing over feet ostinatos increases the efficacy and efficiency of your warm-up by promoting limb coordination while you focus on technique.

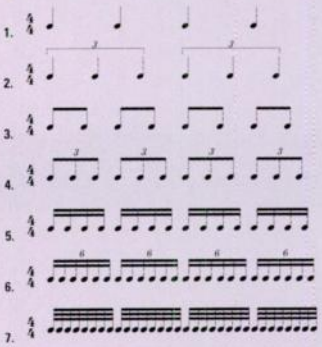
Begin with the four basic stickings (**B**), playing each through the subdivisions. Repeat each subdivision line two or four times, going up from quarter notes to 32nd notes and then back down. Then

Pictured are three aids for warming up: HQ Percussion's RealFeel gum rubber pad (model RF-12G), Power Wrist Builders (model PWB6-170), and Drummer's Helpers' Air Stix.

PHOTO BY BRIAN KNAVE

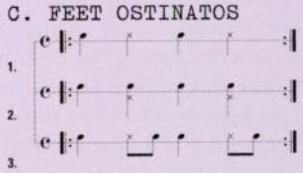
The Routine

A. SUBDIVISIONS

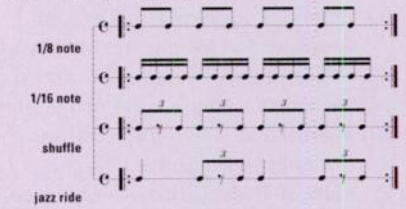


B. STICKINGS

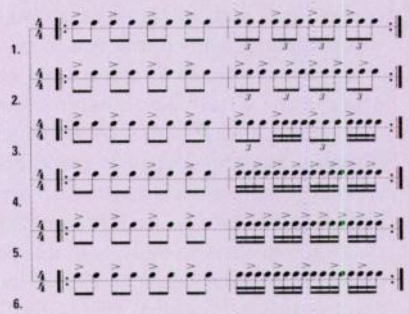
C. FEET OSTINATOS



D. RIDE PATTERNS



E. ACCENT PATTERNS



proceed to the next sticking. Start with a slow tempo, say, quarter note equals MM 50. You will need to play slowly to comfortably reach the 32nd notes—especially on the flam taps!

Play only up to levels you can play *without tension.* If any part of your limbs (fingers, wrists, or arms) tightens up as you play a particular sticking, then drop back down to the prior subdivision and focus on playing at that level without tension.

For maximum blood flow, use heavy sticks and keep your stick heights as high as possible. Stay loose and grip the sticks lightly. In addition, be sure to watch your hands for uniformity and stick-height consistency.

For singles, play quick downstrokes, concentrating on getting a good bounce for the upstroke. The higher and quicker the stroke, the greater the blood flow. For doubles, make sure the second stroke is the same height (volume) as the first. When playing paradiddles and flam taps, go for extremes in volume: that is, stick the accented notes as high as possible and the nonaccented notes as low as possible. For a variation, paradiddles and flam taps can be played with no accents (equal stick heights for each stroke). For another variation, start the stickings with the left hand.

Part two. The ride patterns (**D**) cover limb coordination and polyrhythms used in commonly played drum-set grooves. Think of the ride pattern as a 1-limb ostinato against which you will play subdivisions with the other three limbs. For the first pattern, play eighth notes with your ride hand and subdivisions 1 through 5 (repeating each line twice) with your other hand. Now play the same subdivisions with each foot.

A good tempo for these warm-ups is quarter note equals MM 80 or 90. Against the sixteenth-note ride, play subdivisions 1, 3, and 5. Against the shuffle and jazz rides, play subdivisions 1 through 4.

Part three. The Accent Patterns (**E**) can be played a number of ways. First, play them as flat flams (hands hitting at the same time) over top of a feet ostinato. Second, play them as flat flams with the feet (splashing the stepped hi-hat accents). You could also play them as 4-limb flat flams. Or, play the ride patterns with one hand and the accent patterns with the other, both over a feet ostinato.

The key thing is to maximize the dynamic range between the notes. That is, make the accented notes as loud as possible and the nonaccented notes as quiet as possible. This will bring blood to the limbs fast. In fact, this section alone makes for a good quick warm-up.

More blood, please. Want maximum blood flow to the hands? Try warming up with weighted sticks. There are several varieties on the market, including aluminum and brass models made by Power Wrist Builders (tel. 800/645-6673 or 408/997-9560; fax 408/997-9780; e-mail taloose@taloose.com/power; Web www.taloose.com/power).

When using metal sticks, it's especially important to grip the sticks lightly. Listen for the sticks to ring after each stroke. If they don't ring, you are gripping too tightly. Also, make sure the wrists are properly aligned, to help guard against developing carpal tunnel syndrome.

Another excellent aid that can be used anywhere—because it is silent—is Air Stix, made by Drummer's Helpers (tel. 888/247-7849 or 914/398-2900; fax 914/358-3007; Web www.airstix.com). Air Stix are fitted with brass weights on one end. Designed to be played in the air only, they can be held with the weights at either end for working different muscles.

For the most blood-churning results during feet warm-ups, use full-leg as well as feet-on-the-floor strokes. That is, use feet-on-the-floor strokes for part of the routine and full-leg strokes for the other. Each stroke has two different techniques. Feet-on-the-floor techniques include toe up/heel down and heel up/toe down. Full-leg strokes (where the whole foot comes off the ground before each hit) include ball-only hits as well as stomps.

Between sets. No matter how vigorous the set, the muscles in your hands and feet will naturally cool down during breaks. Therefore, it's advisable to take to the bandstand a few minutes before each new set to run through a section of the warm-up routine. Even one or two minutes of exercises is enough to stretch the muscle groups and get the blood flowing again. Not only will this prepare you to play your best, but it will also help avert injuries. ◆

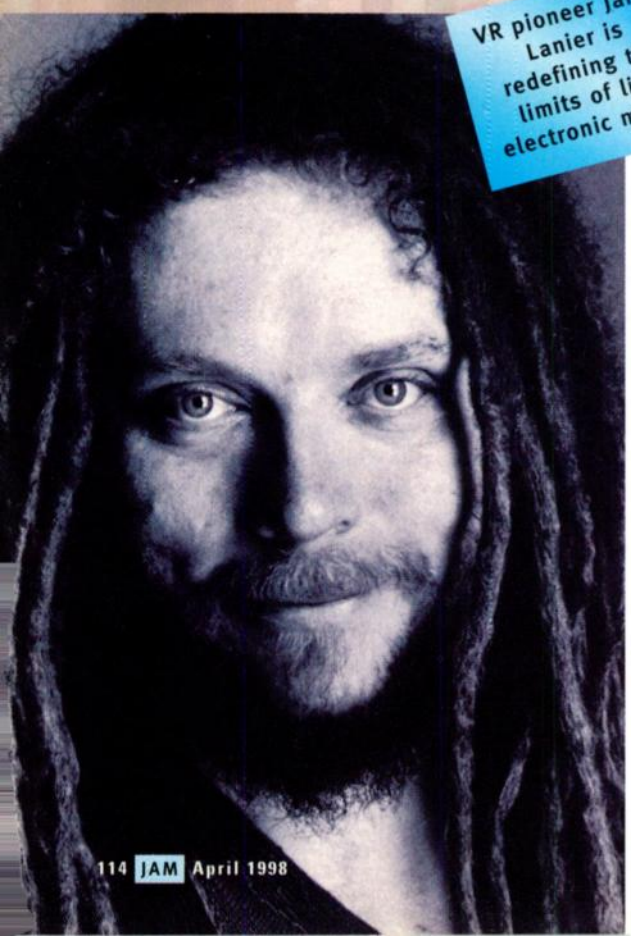
tech

By Bean

No Secrets in Cyberspace

Those on the cyberscene in the early '90s may remember Jaron Lanier, a wild-looking pioneer of the virtual reality movement. After coining the term "virtual reality," Lanier became a full-time visionary, spokesperson, and developer of the tools of the virtual trade. Now, Lanier has a whole new bag of tricks, and his passion for virtual, ethnic, and classical instrumentation should garner enough attention to turn the music community on its ear.

Lanier's performances feature an array of ancient and futuristic instruments that breathe new life into the genre of ethnotech. Using piezo pickups through a Roland GI-10 guitar pitch-to-MIDI converter, Lanier plucks a Chinese Gu Zcheng (the ancestor of the koto) with unbridled delight. He runs it through a Waldorf Miniworks 4-pole filter and a Digi-Tech Studio Vocalist harmony processor, creating a phantasmagorical soundscape.



VR pioneer Jaron Lanier is redefining the limits of live electronic music.

The resonance of the filter drives the Studio Vocalist, creating a chord cadence as part of each note's decay. Integrating the pitch-shifting features of the Vocalist, Lanier can add vibrato, change intervals, or create harmonic progressions while retaining the natural harmonics of the source signal.

Ascension Bird. Perched atop Lanier's head is Ascension Bird, a 6-axis magnetic tracking device that Lanier connects to SGI Maximum Impact and Octane workstations. This unit is similar to a Polhemus device used for motion capture and 3-D digitization in VR worlds, but it is slightly more stable in performance. (Lanier's system also includes a series of Macintosh computers that connect to the sensors via an Opcode Studio 5 MIDI interface/patch bay/processor.)

Ascension Bird works in a multiunit configuration called Flock of Birds. Used with a series of transmitters and receivers and VPL's *Body Electric* software, this system creates 3-dimensional virtual environments where objects can be linked and rendered in real time. For example, Lanier's face is glommed onto a slithering insectlike creature reminiscent of *Alice in Wonderland*. (*Body Electric* is a *MAX*-like programming environment specialized for virtual reality applications. At present it is not commercially available, but it may be available soon for noncommercial academic distribution.)

Sensitive to the slightest movement, Ascension Bird has a life of its own and slides across Lanier's face, projecting its travels up and down its circuitous route onto the entomological image.

Virtual flute lathe. An exotic collection of acoustic wind instruments shares the microphone input of the Roland GI-10. Lanier plays a Celtic rosewood flute while a 3-D virtual lathe of animated wood expands and contracts and spoon-shaped metallic arms bang into each other in the virtual world behind him.

In an acoustic twist, the colliding models trigger a Yamaha Disklavier grand piano via MIDI. The result is a diatonic accompaniment to the flute. Sound complex? Lanier claims this process is relatively simple compared to some of his older virtual music worlds, such as "Sound of One Hand."

Cyberpolitics. In another composition, Lanier controls the movements of

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Senator Twoface, a virtual cigar-puffing puppet, directly from the Disklavier. Designed by BIGTWIN (Web www.users.interport.net/~bigtwin), the senator's face responds to various intervals and chord changes and turns into Pig Newton on his backside. "It's fun to control him and figure out viable music at the same time," says Lanier.

To counterbalance the sinister senator, Lanier introduces Vernon Reid as Guitar Bugman. Presented live and onscreen via Sony projectors, Guitar Bugman's role is to overshadow the red-faced performance-animation character with his processed electric guitar riffs.

Inklings in infrared. Just to prove that there's still a bit of humor in cyberspace, Lanier plays a little "air" piano with the Interactive Light Dimension Beam. (The Dimension Beam was reviewed in the July 1996 **EM** and was further discussed in "Tech: Hacking the Hydra" in the November 1997 *JAM*. Visit Interactive Light online at www.interactivelight.com for more information.) Later, he turns the music off and conducts a visual symphony of geometric imagery using a Buchla Lightning II controller.

The Lightning II (reviewed in the August 1996 **EM**; Web www.buchla.com) uses infrared sensors to track two batons' movements and translates the positional information into MIDI messages (such as Pitch Bend, Volume, and Modulation) that Lanier uses to control both musical and visual interactions. With a potential range of motion as large as twelve feet high by twenty feet wide, the Lightning II provides plenty of room for gestural activity.

Drone morphology. Depending on Lanier's roster of special guests, a variety of instruments from all over the world weaves in and out of his orchestral web, including Persian-and Pygmy-inspired vocals, clarinet, balafon, guitar, violin, oboe, banjo, didgeridoo, and kora.

Lanier himself brings a veritable smorgasbord of instrumentation from around the world to the stage. With his affinity for wind and string instruments from Asia, Lanier might be found playing anything from a Ba Wu (a Chinese flute/reed instrument) to a Seljefloyte (Lapp Arctic flute). An East Indian drone might transport the listener off into a field of stars where floating letters morph with each pitch bend of a soprano sax.

If we stay tuned for more, Lanier (who can be reached at www.well.com/user/jaron) may turn into a cuttlefish, and then again, so could you. ◆

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house

By Brett Ratner

Breaking Murphy's Law

WHAT CAN GO WRONG at a gig usually will: mics die, cables short out, breakers trip. The trick is to learn to anticipate problems *and* their solutions. You may not totally avoid mishaps, but you can certainly lessen their impact. Make no mistake, old Murphy will come a knockin' either at sound check or during the show, so it's up to you to be prepared.

Sound check means check the *sound*. Arrive early at the venue so you can get acquainted with the P.A. system. Audio engineer and sound designer Eric Snodgrass, currently with the touring Broadway production of *Tap Dogs*, advises engineers to allow plenty of time to tune the system. "Pop in a favorite CD or take a pink-noise generator, and play it through the house speakers," he suggests. "Walk around, listening to the room and asking yourself some questions. Is the room muddy or bright? How do the speakers sound? Are there any dead spots? Is the mixing board in a good location? Your answers will affect the house mix *and* monitor mix."

Eric Snodgrass always checks out the room acoustics as well as the P.A. system.

Common sense. It is important to understand common P.A. malfunctions and how to correct them. The best engineers fix problems *before* the audience realizes something is wrong; they have backup plans in place. "Mic problems are the most prevalent," says Snodgrass. "If the singer's microphone goes out, have a backup ready to go at a moment's notice. Don't worry about blowing the performance illusion when you jump on stage. You won't ruin the moment, you'll save the day."

Dan Heidingsfelder, engineer at the Stagedoor Lounge in Nashville's Opryland Hotel, adds that erring on the side of caution is one way to avoid unnecessary breakdowns. "Monitor cables and mic cords are likely to break because they get stepped on continuously," he says. "Make sure you have plenty of spares on hand, and replace anything that looks suspicious."

Road rack. Bringing along some of your own tried-and-true gear can help you deal with some obstacles. "A lot of engineers have compressors, effects processors, and other devices they like," Heidingsfelder says. "Put together a small rack of your own gear so that no matter what happens, you'll have some equipment you can depend on."

Power house. Even if you bring your own P.A., the venue itself can present problems. Learn some basics about power requirements, amperage, grounding, and so on so you can assess the potential for disaster. "Club owners are notoriously cheap," Heidingsfelder notes, "so properly wired electricity is not a priority with them." As a precaution, do not feed everything off the same electrical service. Keep the power amps separate from the lighting rig. Also, get yourself a power conditioner and plenty of ground lifts.

Stage rigs. Snodgrass says that musicians, too, can help avert problems. "They should know their equipment well enough to help out if something breaks down," he advises. "Personally, I love working with musicians who understand how their rigs work. That makes it so much easier to define and solve problems." ◆

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RECORDING MUSICIAN

Studio Leapfrog

Position your studio as a link in the "great chain" of recording.

By Brian Knave

One of the more interesting developments in modern recording is the symbiotic relationship that is developing between professional and personal studios. Thanks to the proliferation of MDMs, MHDRs, and other portable, digital recording media, studios at most every level can now readily interface with one another, each contributing its share to a given project.

This arrangement is particularly advantageous for self-produced artists piecing together their albums because it lets them "leapfrog" from one studio to the next according to their needs and budgets. After all, an artist intent on having her CD sound as good as, say, last year's Shawn Colvin or Fiona Apple release is probably not best advised to record all of the instruments in a bedroom.

A wiser approach would be to schedule critical sessions (e.g., acoustic drum set or grand piano) in a major facility, taking advantage of the expertise, great-sounding rooms, and extensive gear collections that big studios have to offer. Other tracks (keyboards, electric guitars, vocals, etc.) can then be recorded in personal studios for a fraction of the cost and with considerably lower stress levels. When tracking is complete, the artist can go back to the high-dollar digs, using the studio—and mix engineer—best equipped to turn out a stellar final mix.

Obviously, to position your personal studio as a link in this chain-style recording process, your contributions need to be first rate. After all, your tracks will likely be mixed at a top-notch facility, and the final product may even get picked up by a major label. Therefore, your aim should be for the mix engineer to *smile* as he brings up the tracks you recorded. Also, quality work done at this level will enhance your reputation as a recordist, which in turn should lead to more work.

BRIAN KNAVE

FIG. 1: An AKG C 460 and Røde NT1 capture a stereo image of Lygia Ferra's Takamine EF36 guitar. Several mics were auditioned, but these were chosen because they played down this particular guitar's bassy response, making for a brighter sound that worked better in the mix.

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I recently was hired to record tracks for an up-and-coming Los Angeles–based singer-songwriter who is producing her debut CD in just this manner. The artist, Lygia Ferra, has been shuttling back and forth between various pro and personal studios for many months, toting her Alesis ADAT and S-VHS tapes in a backpack. I'll use those sessions as a springboard for discussing preparation, studio interface issues, session protocol, recording techniques, and other concerns related specifically to this increasingly common approach to multitrack recording.

INITIAL CONTACT

Before booking a session, find out exactly what services the potential client is seeking. It's important to pinpoint what is wanted so you can determine whether you have the necessary gear and capabilities to render the services. Also, regard the initial telephone conversation as a kind of interview—both for you and the client. Here's your chance to get a sense of the project and find out what work has already been done on it and for the client to ascertain whether your studio will be able to provide the level of service he or she requires. Also, you can both gauge whether or not the relationship is one that you feel will work.

Be prepared to describe your studio, your specialties, and your credits. Some clients may ask for a gear list, so it's not a bad idea to keep this information in a computer file, ready to print upon demand. Also, be sure to state your prices up front, including cost of media if you, rather than the client, are to supply the material.

BRIAN KNAVE

FIG. 2: Michael Masley's cymbalom is stereo recorded with a matched pair of Neumann KM 184 small-diaphragm condenser mics. The Shure SM 58 is patched into a DigiTech Talker vocal synthesizer. From there, the signal goes onto a separate track, giving the mix engineer and effects track for added options.

Every client, of course, will have different needs, levels of studio savvy, and ways of working. For an album project like Ferra's, the client may need a recordist only, because the songs are already arranged and the fundamental instruments recorded. In other situations, the client may also seek your help as an arranger, performer, coproducer, or whatever. Understanding your role from the get-go will help you determine the appropriate level of interaction once the sessions are underway and will hopefully prevent misunderstandings.

Inquire about each instrument you'll be recording because some may benefit from using particular mics, preamps, or other gear. For example, when I

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learned that I would be recording upright bass for one of Ferra's songs and cello for another, I made arrangements to borrow two ribbon mics I knew to be excellent for capturing warm, full tones from those instruments: an RCA 44BX for the acoustic bass and a Coles 4038 for the cello.

Of course, I could have saved myself the hassle of procuring the ribbon mics by simply using lesser mics from my own arsenal; however, knowing the market level at which Ferra intends her CD to compete, I took the trouble to get the best sound I could. Obviously, if you determine it necessary to rent gear for a session, make sure the client knows about the rental and approves all fees.

HAVE ADAT, WILL TRAVEL

The ability to interface with other studios is central to studio leapfrogging, and most major studios these days are equipped to handle practically any interface predicament. This is typically not the case, however, in the average personal studio. Fortunately, the only requirement is that you be able to interface with any gear the client brings into your studio.

Ferra's approach of schlepping her ADAT back and forth between various studios (precipitated by the fact that many personal studios, including mine, have only one ADAT) involves relatively straightforward interfacing: the receiving studio needs only an ADAT sync cable, eight spare patch cables, and eight extra channels for returning signals. (Something else you would want in this situation is an ADAT lightpipe connector, for making digital backups of master tapes.)

Not all interface tasks, however, are so easily accommodated. For instance, interfacing different brands or types of gear—a Fostex open-reel deck, say, with a TASCAM MDM or an E-mu Darwin—opens up a whole new can of worms. Fortunately, most currently available sync boxes can handle various interface applications for a range of makes and models of gear. I recently used a JL-Cooper DataMaster, for example, to synchronize a TASCAM TSR-8 open-reel deck with an ADAT-XT.

PREPARATIONS

Be prepared for the session by knowing in advance what the client wants to accomplish and by having the studio organized to record the particular instruments on that day's agenda. Hopefully, the client will come well prepared, too. Don't hesitate, during initial phone conversations, to encourage thorough preparation, as ultimately it will save the client time and money. A well-prepared client will arrive with all tapes clearly labeled, with track sheets accurately (and legibly) filled out, and with a clear idea of which song to work on first, second, third, etc. A backup plan is not a bad idea, either, in case something goes awry (such as a musician not showing up).

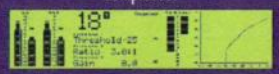
If the client, acting as producer, employs outside musicians, it is his responsibility to make sure the players know what is expected of them. (On the other hand, if you have been entrusted to book the musicians, then it could become your responsibility.) Many times I've watched poor communication between a client and a musician (often a friend) bring a session to a standstill. Therefore, urge the client to also prepare musicians as much as possible in advance, whether with sheet music, practice tapes, or whatever.

The compressor that forgives, but never forgets...

Gate

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

Compressor



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

Limiter

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

De-esser

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

and More

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

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AT THE SESSION

Here's the most important advice I can impart in this column: don't even think of pushing the record button until you have verified that the track sheets are accurate and that you are recording on the right tracks. To do this, bring up each fader and check it against the track sheet. Then, before enabling the tracks to be recorded, ask the client, "Are you sure these are the tracks I'm to record on?" This may sound overly cautious, but trust me, at this stage in the process, extreme caution is called for.

Depending on the role (or roles) you have been hired to play, keep verbal intervention to a minimum during sessions. It's okay to ask key questions, of course, but in general, don't offer advice unless asked—or, in the case of a communication breakdown, until you've sized up the situation and feel you can truly assist without stepping on anyone's toes or spoiling the vibe. When it comes to capturing a great performance on tape, patience and a good attitude are just as important as having the right mics.

As the session proceeds, remember to keep clear, accurate notes on the track sheets. A pencil is preferable to a pen for this task so that notes can be erased if a track is later bounced or rerecorded. Aside from noting the instrument, I usually also jot down which mic I used on each track.

When the session is over, make backup copies of all the tapes. The time and materials required to make backups should always be allotted for. As they say, digital data doesn't exist until it is stored in at least two places.

SHORT AND SWEET

Because studio leapfrogging involves several engineers working in tandem with each other, your goal should be to capture the cleanest sounds possible. Remember, the way you mix a project may not be the same as the way another engineer does. So when recording instruments, strive for the shortest, cleanest signal path possible. Ideally, this means the signal goes from microphone to mic preamp and then directly to the multitrack. To facilitate quick, direct-to-tape recording, have your mic preamp(s) patched directly into the inputs of the recording medium. Most MDMs provide a built-in digital patch bay, so you can readily assign a signal to any track.

If you typically borrow or rent mic preamps for critical sessions, set up a patch bay between the outputs of your mixer and the inputs of your record deck so you can readily bypass the mixer during tracking. However, make sure to match operating levels. Many high-end mic preamps output at +4 dBu only, which means you will probably have noise problems if you try to patch them into -10 dB inputs.

If huge fluctuations in performance dynamics require you to insert a compressor into the signal path, patch the unit directly between the mic preamp and recording medium, again to keep the signal path as short and clean as possible. The same holds true for other processors.

BRIAN KNAVE

The disparate volumes of two percussion instruments were balanced by positioning the performers at different distances from the Røde NT1 mic—a technique that also adds dimension to a mix.

MIC CHOICE AND PLACEMENT

The knowledge of how various microphones sound on different instruments and how best to position those mics should be one of your strong suits. This knowledge, however, should never be blindly substituted for on-the-spot testing, lest it devolve into dogmatism.

Here's a case to illustrate my point. While miking Ferra's Takamine EF36 acoustic guitar, I had pairs of both Neumann KM 184 and AKG C 460 small-diaphragm condenser mics at my disposal. Having already used and compared both in numerous sessions, I had developed a preference for the Neumanns, which sounded more natural to my ears and clearly had a better low-end response. Naturally, I tried the Neumanns first. Had I simply stopped there, however, I wouldn't have captured the best sound of that particular guitar. As it turned out, Ferra's Takamine had a warm, dark sound with a rich bass response and soft highs. In the context of the song, the Neumanns proved to be not as flattering as the AKGs: they simply captured too much bass. After testing several different mics, I hit upon a combination that played down the guitar's bass and nicely accentuated its high end (see **Fig. 1**).

Clearly, regardless of how much you know—or think you know—it pays to approach each session with fresh ears and a "beginner's mind." My usual procedure for testing different mics is to have three mic stands set up and ready to go, with cables already attached. That way, I can quickly throw up two or three mics and audition them simultaneously. Often, it's readily apparent which mic is most flattering to a sound source. Other mics can then be auditioned next to that one, until you've clearly identified which to use for the track.

Of course, if both you and the client (or musician) immediately love what you hear when a mic is positioned on an instrument, who's to say that you shouldn't just go with your instincts and use that mic? Such magical happenstance occurs from time to time and should be allowed for.

You should also respect the knowledge and prior experience of others, including studio musicians, the client, or whoever else is present. During one Ferra session, for example, I recorded several curious instruments played by innovative instrumentalist Michael Masley, including his main ax, a customized cymbalom which Masley plays with a unique, 10-bow/hammer technique. (The cymbalom is a chromatic hammer dulcimer of Hungarian origin.)

Having never recorded a cymbalom before, let alone one played in a unique manner, who was I to argue when Masley, after surveying my mic selection, asked that I use the KM 184s? As it turned out, he had recorded with those same mics in other studios and gotten excellent results. Heck, I even went along with his recommended mic positioning (see **Fig. 2**)—after first auditioning a few other positions, of course!

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STEREO OPTIONS

When stereo recording an instrument to be used in a very full mix, I sometimes opt for using two different-sounding mics (as illustrated in **Fig. 1**) rather than a matched pair. That way, the mix engineer can alter the tonality of the instrument—without using EQ—simply by varying the amount of each track. After all, in a busy mix, the two tracks will probably not be panned much apart.

On the other hand, if the instrumentation consists of, say, acoustic guitar and vocals only, I will more likely use a matched pair of mics on the guitar. That way, the mix engineer can pan the two tracks wide to create a big stereo image, yet maintain a more "true" tonal representation of the instrument.

MONITOR MIX

A key tracking duty is to set up a monitor mix that enables the musician to deliver an inspired performance. Obviously, this requires clear communication with the performer. I start by dialing in a mix that sounds good to me, and then I ask what the musician wants more or less of. This sounds simple enough, but often I find that musicians are so preoccupied with their parts that they don't fully understand that I can tailor the mix to suit their tastes. So, I ask very specific questions, such as, "Would you like more kick drum? Less vocals? The whole mix louder or softer?" et cetera.

Here are some general guidelines for setting up a good monitor mix for tracking. First, clearly define the song's rhythm by panning kick and snare (or other principal drums) dead center and setting their levels slightly above the other instruments. If necessary, lightly compress each.

Pan bass dead center and other rhythm instruments around ten and two o'clock. This opens up a space "center stage" for the instrument being recorded. Pan that instrument to the center (or spaced at eleven and one o'clock if it's in stereo) and turn it up louder than the other tracks so the performer can hear what he's playing. Pan lead instruments hard left and right and bring their levels down lower than the other instruments' so they don't compete with or obscure the instrument being recorded.

Lightly compress the lead vocal track, add some reverb, and pan the track to the center. Depending on the role of the instrument being recorded, the vocal can usually be kept low so as not to obscure the other instruments. (At this stage, the vocal is usually a scratch track anyway.) If you're recording a rhythm track, such as acoustic guitar, it may even help to remove the vocal from the mix entirely so the player can better concentrate on timing. If it helps the performer, add some reverb (in the monitors only) to the instrument being recorded.

Clearly, to do the kind of work described in this article, you need good communication and accurate information from the get-go. Knowing your level of involvement with the project and understanding exactly what is expected of you will make a for tighter relationship between you and your client. With this information you can successfully position your personal studio as a player in the recording chain gang.

BRIAN KNAVE

The initial positioning of a Røde NT1 on this bass recorder resulted in a bright, articulate sound with lots of air and attack. The mic's final position was about a foot and a half lower, aimed near the performer's left hand, where it captured a warmer, more round, and less sibilant tone.

Brian Knave *is an associate editor at* **EM**. *Special thanks to Lygia Ferra, Michael Masley, and Neumann. Ferra can be reached at tel. (310) 226-2916 and Masley at www.idiom.com/~tonehenge.*

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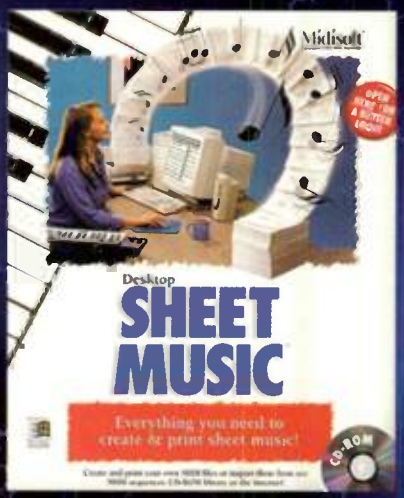

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Modulation 101

Make your sounds come to life with MIDI modulation.

By Neil Leonard III

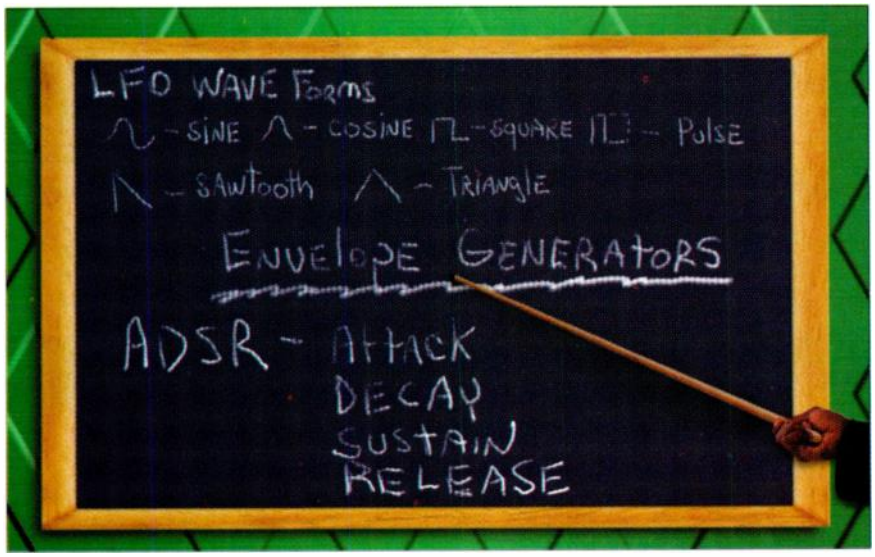
People often think of electronic instruments as cold and impersonal. Expressive playing is much more difficult with electronic instruments than with acoustic instruments. For instance, saxophonists encode their signature in individual notes by varying the placement of their tongue, teeth, and lower lip; altering wind velocity; and using their larynx. As a result, the pitch, timbre, and volume of each note evolve in complex and subtle ways. Beginning and accomplished wind instrumentalists alike labor to control such variations.

In contrast, a beginning synthesist can effortlessly create programs that have absolutely no variation in pitch, timbre, and volume after the onset of the sound. Master synthesists such as Jan Hammer, Wendy Carlos, Bernie Worrell, and Josef Zawinul recognized the idiosyncrasies of their instrument and found ways to work with the time-variant nuances that help make their electronic music so memorable.

The way to introduce nuance into electronic sounds is through the use of modulation, both in performance and when designing patches. Though the modulation architecture of today's sleek digital synthesizers is often hidden deep within layers of menus, it was unavoidable in early analog synthesizers. When you look at a modular analog system in use, the first thing you notice is a tangled mess of patch cords covering the front panel. (This is, of course, where the term "patch" came from.)

These instruments made no sound until the performer took a patch cord and routed a control voltage, such as the keyboard's control-voltage output, to an oscillator's control-voltage input. In the case of the Moog modular system, the keyboard and oscillator were designed to work on a scale of one volt per octave. Oscillators had additional control-voltage inputs that could be used to connect the control signals from a low-frequency oscillator, envelope generator, or other source.

The modulation principles at work in today's keyboard synthesizers are



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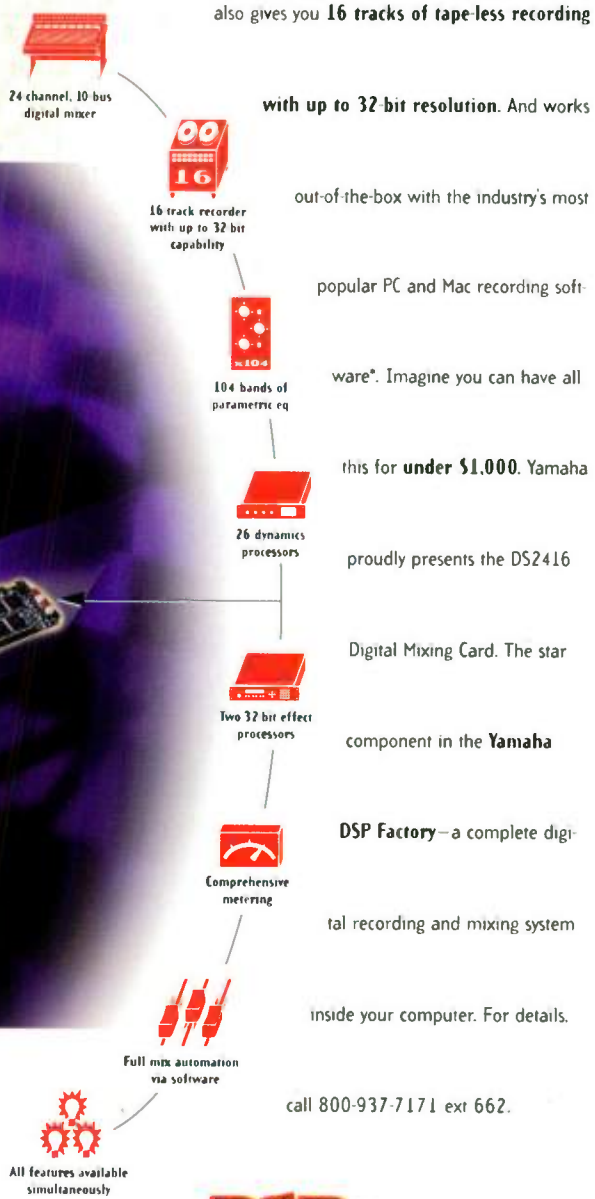

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FIG. 1: Yamaha's AN1x synthesizer offers an array of knobs and sliders to control patch parameters in real time.

based on those developed for modular synths. Whether your sound chip is designed to play samples or uses the latest form of synthesis, dynamic changes in individual notes can be created by using a tactile interface or by programming such variations using LFOs and envelope generators. Although the principles of modulation are the same, the implementation of modulation features and associated terminology is far from uniform in today's synths.

To get a feel for the lay of the land, let's look at the three essential parts of a modulation architecture: control sources, patching methods, and sound parameters that are often modulated.

GET CONTROL

There are three common types of external control sources that are used to perform musical nuances. In the case of electronic keyboard instruments, these start with the physical controllers: the keyboard (including keys, velocity sensors, and key pressure), pitch-bend wheel, modulation wheel, data sliders, program-change buttons, and so on. The arrays of knobs and sliders that were characteristic of earlier synthesizers are now making a comeback and can be found on many midrange synthesizers, particularly instruments that use physical-modeling algorithms or emulate analog synthesizers (see **Fig. 1**). Obviously, some of the physical controllers are quite different on a guitar or percussion synthesizer.

Next are the sockets provided by many devices for connecting additional controllers, such as expression pedals, sustain pedals, and breath controllers. Some effects units are made to work with custom foot controllers that have multiple pedals and a matrix of buttons. For example, the Lexicon MPX-R1 foot controller has a programmable toe switch at the tip of the pedal. This enables a performer who is using both hands, such as a guitarist or reed player, to toggle a chorus effect on and off and control its depth with the pedal at the same time.

The third way to create control signals is by using external MIDI controllers. These include sequencers; fader boxes (see **Fig. 2**); pitch-to-MIDI converters; wind, drum, or guitar controllers; assorted alternative controllers; and specialized kits that sense things like proximity, pressure, and temperature changes.

Most MIDI messages can also serve as a control source. In the typical preset, the MIDI Note On message modulates the pitch of the oscillator in increments of a half step. However, this message can also be used for other purposes, such as opening a filter. The Pitch Bend message typically modulates the pitch of the oscillator in ±64 steps. The size of the steps depends on the Pitch Bend range you define for the program—so if you set your synth to bend by a whole step, you can bend the pitch in relatively fine increments, but if you set the range to, say, three octaves, the individual increments are much larger.

The MIDI specification defines 127 Control Change (CC) messages, of which 121 can be used to modulate synth parameters. Some of these Control Change messages have default assignments, such as Modulation (CC 1), Volume (CC 7), Pan (CC 10), and Sustain (CC 64). However, when programming some synthesizers and effects units, you can assign any controller message to any parameter. In fact, in the most programmable systems any MIDI Control Change message can modulate any sound-generation parameter.

FROM THE INSIDE OUT

The most common internal control sources are the low-frequency oscillator (LFO) and the envelope generator (EG). The LFO typically creates single-cycle waveforms, including some of the following: sine, triangle, square, sawtooth/ramp up, inverted sawtooth/ramp down, pulse, and inverted pulse (100 percent pulse width). A quasi-random waveform is available on some machines. The waveform shape, rate, phase, and pulse width can be programmable, though all of these parameters are not necessarily editable (see **Fig. 3**). LFOs are most commonly used for vibrato and tremolo.

FIG. 2: Peavey's PC 1600 features faders and buttons that send MIDI controller and SysEx messages.

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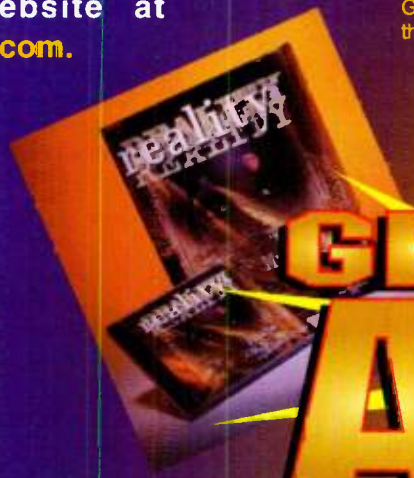

GET BLOWN AWAY

ELECTRONIC MUSICIAN 1998 EDITORS' CHOICE

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Envelope generators come in all shapes and sizes, but the classic model from the days of modular systems is the ADSR envelope generator, which stands for attack, decay, sustain, release. Envelope generators in modern synths may be far more sophisticated, often including as many as eight segments. The function of an envelope generator might be assigned to one fixed parameter but does not have to be. In addition, some synthesizers offer as many as five envelope generators that can be assigned to any parameter.

Control sources, whether internal or external, need to be routed to a desired parameter. One vintage analog system, the Electronic Music System VCS3 (often referred to as the Putney and used on Pink Floyd's *Dark Side of the Moon*), used a patch-board matrix to establish these connections. In this case, the control and audio signals could be routed anywhere in the system by inserting metallic pegs in the matrix. Through systems like this one, the term "matrix modulation" was coined. This matrix-style design is still used by some manufacturers who implement the matrix in software.

By contrast, some synths, including many inexpensive General MIDI synths, use fixed modulation routings. What you gain in terms of ease of use is lost in terms of flexibility in programming and variety of available sounds.

PATCH IT UP

In between these two extremes, there are a wide variety of designs for modulation routing. On Lexicon's popular PCM 80 effects processor, "patches" are specified in software by entering a source (selectable from any internal or external controller) and a destination (any effects parameter). Other manufacturers have implemented different schemes but provide the same "any controller to any parameter" result. If you like rolling up your sleeves and digging deep into programming, this approach is ideal.

The sound-generation parameters that are commonly modulated are oscillator pitch, amplifier output level, and filter cutoff frequency. However, any sound-generation parameter can be modulated. When using a physical-modeling synthesizer to emulate a brass instrument, for example, a breath controller can be used to vary the model's parameters for wind velocity and position of the lip and teeth or to create idiosyncratic harmonic slurs.

Some effects units can morph between two entirely different effects algorithms by moving one slider. Modulators can even modulate parameters for other modulators. When you increase the modulation-wheel setting while playing a flute patch, the vibrato depth might increase. In this case, the modulation wheel is scaling the depth of the LFO being used to create the vibrato. This is sometimes referred to as "second-order modulation." Another common example is the use of a control source, such as Velocity, to scale the depth of an envelope generator. This can be quite effective when creating piano sounds.

Some synths have a low Velocity envelope and a high Velocity envelope and interpolate between the two envelopes in response to Velocity. This is also second-order modulation. Some synthesizers enable the synthesist to use first-, second-, third-, and fourth-order modulation, a feature preferred by advanced synthesists such as Wendy Carlos.

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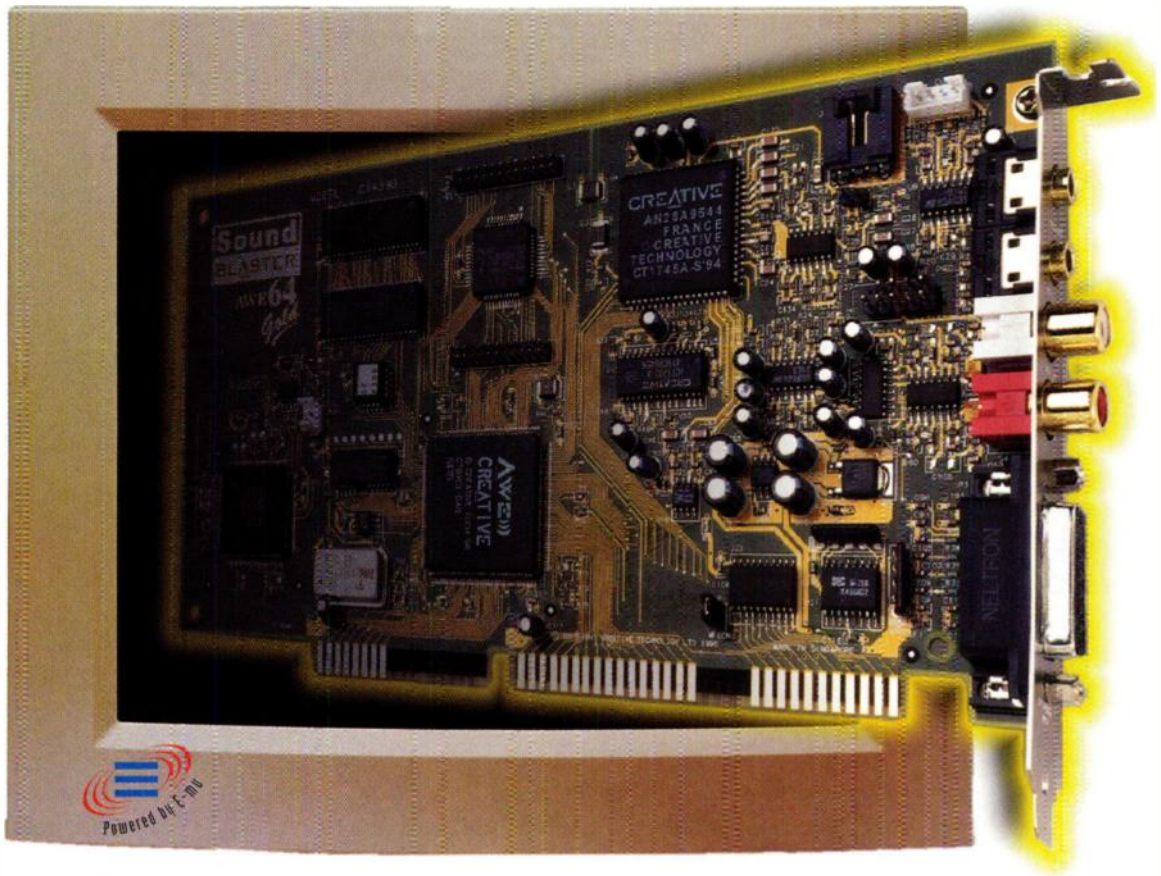

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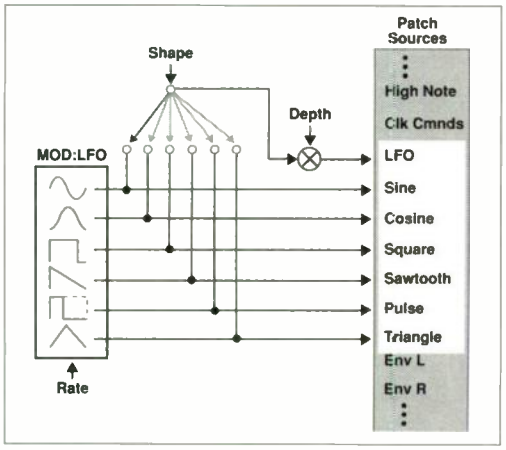

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FIG. 3: Many modern effects units and synthesizers offer numerous wave shapes for controlling LFO shape and depth.

TIPPING THE SCALES

Though I've touched on many of the fundamental issues regarding modulation, there are other techniques at your disposal. Many instruments, for example, can process control inputs before they are assigned. One common implementation of this technique is the ability to scale controller values. Using this technique, the synthesist might designate what values a slider will send when it is at its minimum and maximum position. This offers some possibilities that may not be immediately obvious. Moving a slider from its minimum to maximum position causes the synthesizer to interpolate in-between values. This simple linear relationship is the default on many instruments.

But what if you could change the response of the slider so that, for example, the values moved from low to high and then back down to low as the slider moved along its path? Or how about the ability to program a pitch wheel so that a bend up shifted the pitch a major third and a bend down shifted it a minor seventh? This configuration, which approximates the intervals that a guitarist can perform by bending strings and using a whammy bar, would be a nonlinear relationship. Some digital instruments provide ten or more scaling pairs for creating a wide variety of nonlinear contours, and others provide numerous mathematical functions for scaling and combining controller values. You might not want to get this involved in editing patches, but you will hear these techniques at work on the presets of some of today's most popular synths and effects units.

AUDIO CONTROL

Analog synthesizers are often preferred by today's dance musicians for their warm sound and tactile interfaces. Some modular analog systems have another distinguishing quality: audio signals can serve as control signals and vice versa. While this might seem esoteric and impractical, consider this aspect: the average LFO on today's digital synthesizer doesn't typically produce a signal higher than 20 to 50 Hz, which is comparable to the rate of a fast vibrato.

But an oscillator can produce a sine wave of any frequency, which can modulate another oscillator, also at any frequency. If you listen to the output signal from the second oscillator, the waveform will be much more complex and richer in harmonics than the sine

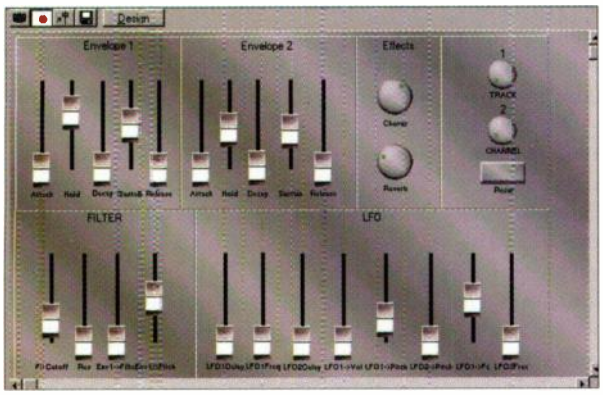


FIG. 4: New sequencers offer many features that allow users to control their hardware directly from within the program. Here is a Panel view from within *Cakewalk Pro Audio* 6.0 that is used to control an internal sound card.

wave. This is called frequency modulation (FM), the same technology used in FM radio and for synthesis on multimedia sound cards. The first mass-marketed synthesizers that used FM were the Yamaha DX series. Synthesists using modular systems have been using FM for years, and this type of control source is now often found in desktop synthesis systems that are modeled after modular systems.

SEQUENCER CONTROL

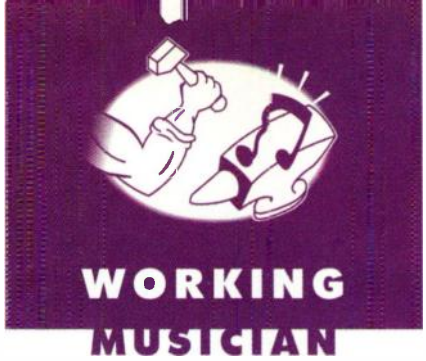
Though we have discussed the use of modulation in performance and synthesis, sequencers can also record and generate MIDI controller data. Many musicians sequence data for pitch-bend, volume, panning, and effects levels. You can even dedicate a separate track for each parameter. This data might have been played using a MIDI controller or generated within the program. Once recorded, this modulation data can be cut, pasted, scaled, or limited in a graphic editor or event list.

Many modern sequencers allow the musician to create custom consoles to generate control data. On the PC, these consoles or "panels" can be used to control the synthesizer on a sound card (see **Fig. 4**). In some cases, software sliders and dials can also be controlled by external devices, such as MIDI fader boxes. You can often find custom-built consoles and panels on the software manufacturer's Web site that can be used for both new and older instruments.

ALL IN GOOD TIME

As a saxophonist and synthesist, I have found that there are at least as many ways to create time varying nuances with a synthesizer as there are with a saxophone. A good understanding of the principles of modulation goes a long way towards achieving successful results. Despite how much synthesizers, samplers, and effects units have changed, much of the expressive power of the instrument remains in its modulation architecture. As a great philosopher once said, "It's not what you've got, it's how you move it!"

Neil Leonard III *recently received the award for the most valuable contribution to the Music Technology Division curriculum at Berklee College of Music.*



Doing It from a Distance

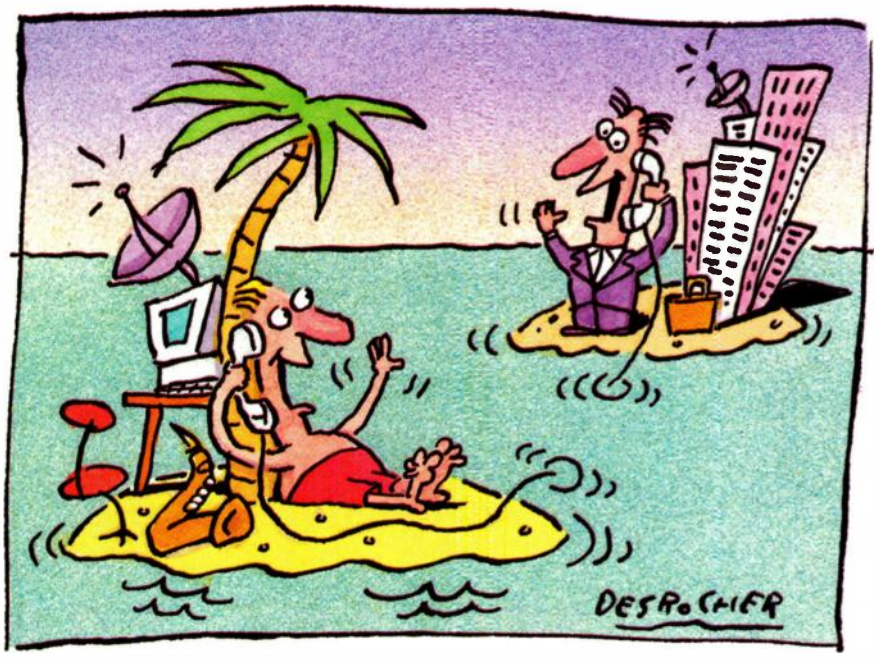
You don't have to live in a big city to hit the big time.

By Michael A. Aczon

A question that lingers in many musicians' minds is whether you need to live in a "music town" to make a living in the music industry. After all, the smog of southern California, the breakneck pace of New York City, and the slow Southern culture of Nashville aren't for everyone.

Despite what you may think, it is possible to savor artistic freedom and success while living in the location of your choice, and many artists have done so. For example, look at Steely Dan legend Walter Becker, who now lives in Maui, Hawaii, has a studio there, and continues to produce records. Or consider multiplatinum producers Jimmy Jam and Terry Lewis, whose Flyte Time Productions is located in Minneapolis, Minnesota.

Granted, Becker made it big and *then* chose Maui as a retreat, but many musicians have nurtured successful careers far away from the major music meccas. With that in mind, this month's column contains some tips on maintaining your long-distance relationship with the music industry. After speaking to a number of musicians around the country, I have chosen to relate the thoughts of a songwriter from the San Francisco Bay Area and two musicians from Cleveland, Ohio, who all manage to "do it from a distance."



JACK DESROCHER

Multiplatinum songwriter Andre Pessis lives in Corte Madera, California, a suburb of San Francisco. Pessis has had a number of successes, including "Slow Ride," recorded by Bonnie Raitt on her blockbuster *Luck of the Draw* album; "Wrong," covered by Waylon Jennings; Tim McGraw's first hit, "Welcome to the Club"; and cowriter credits for several songs on Mr. Big's *Hey Man.*

Kenny Anderson is a saxophonist who lives in Cleveland, although he spends a great deal of his time touring with Gloria Estefan's band, which operates out of Miami, Florida. Anderson has also toured and recorded with Expose,

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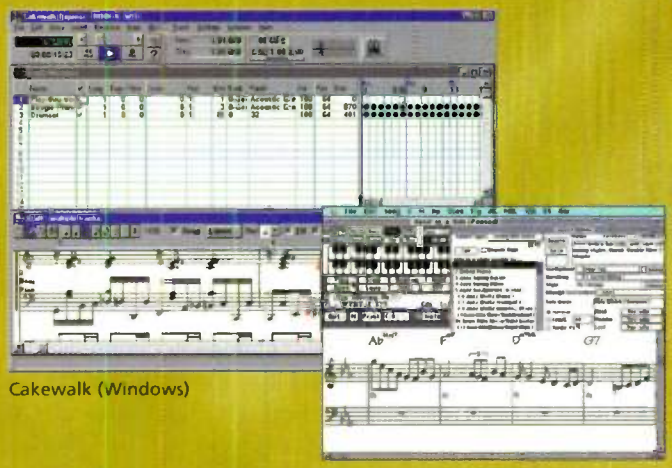

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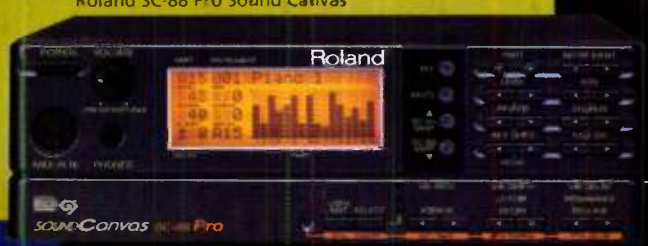

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Laura Porter is a professional saxophonist who has played on stage with the likes of Natalie Cole and the Temptations.

Arturo Sandoval, Tower of Power, and Bobby Caldwell.

Singer/songwriter Laura Porter, another Clevelander, is a saxophone player who has performed with many of that city's rock and R&B bands. She has also toured with Natalie Cole, the Temptations, and several other acts.

TALENT THAT NEEDS NO ADDRESS

All three artists agree that living in a remote geographical area is no excuse for being a second-rate artist, and allowing your talent to stagnate will undoubtedly confine you to those regional boundaries. Keeping your chops polished, however, does not necessarily mean that you need to move to Nashville, New York, or L.A.

"Learning your craft can be done anywhere," says Pessis. "There's a lot of good music *everywhere*, and it all needs to be developed *somewhere*." Sometimes it's better to do this development away from the industry centers so you can catch the business by surprise after you have reached a certain level of competence in your music and business skills.

School can be a haven for growing as an artist. "I went to the University of Miami, which is known nationally as the place where lots of great jazz players develop," explains Anderson. "It's kind of like a musician's fraternity. The players I hooked up with all over the country knew the level of education and excellence required at the school and recommended me for gigs based on the school reputation alone."

"I went to the prestigious Eastman School of Music, but upon graduating I found that there really wasn't a scene in Rochester [New York]," Porter says. "I came back to Cleveland and did everything from playing with local rock bands to theater gigs in order to grow and learn even more. I found that if you reach a certain level of playing or writing, you can live just about anywhere and be successful."

GIG LOCAL, THINK GLOBAL

In addition to honing your craft in your home town, you should also start

Electronic Musician 1998 EDITORS CHOICE

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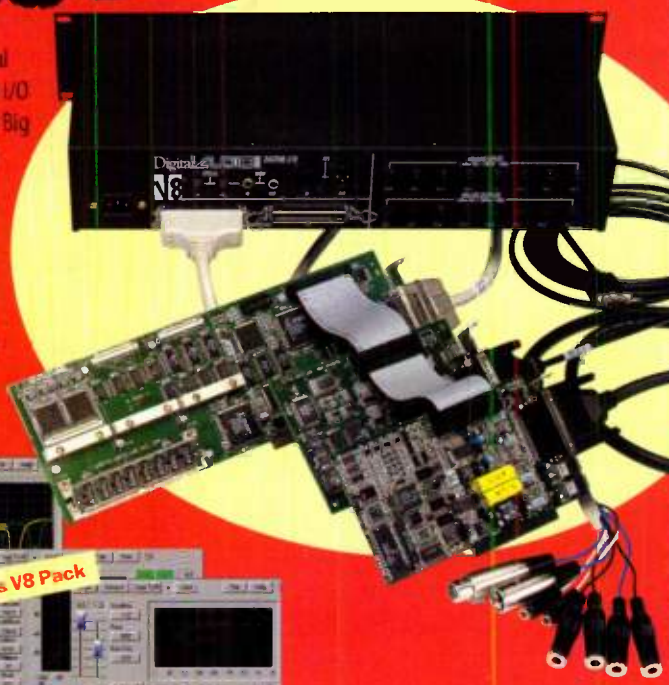

"I wish my mixer was this flexible"

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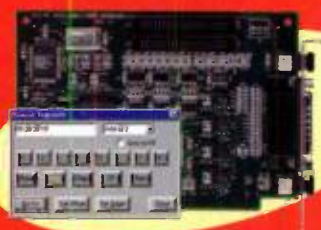

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networking to get your name known on a local level. It's important to develop a good reputation among your peers, whether you're a musician, songwriter, producer, tech, or businessperson. This reputation, combined with connections in your community, can be a tremendous stepping stone to success on a broader scale. For an example of how this works, I took a close look at Cleveland. Even though it is the headquarters of the Rock and Roll Hall of Fame, Cleveland still fights for respect in the music industry. A diverse collection of the city's musicians have developed a loose network, sharing information and contacts with each other. Their common bond is that they have all managed to move up to the top of the club and studio scene in the Cleveland area because of their excellent musicianship.

"I'm a sax player by trade, and I've gotten to know many of the top players in a number of different circles—rock, classical, jazz, and R&B," says Porter. "Eventually, the show, club, and studio session gigs from those circles were passed around among us when someone needed a sub or was overbooked. That networking resulted in discovering a second circle of top people in the business—songwriters, producers, and engineers. These people mostly knew me as a sax player, but when I started to let members of both of these circles hear stuff I was writing and let them know that I was coming out of the closet as a singer/songwriter, they were all very supportive. I find that the higher the caliber of talent and musicianship, the more giving and sharing of information there is."

The floodgates may soon open on this scene: one of the members in the circle Porter describes has signed with a major label and a music-publishing company; another got a call from the West Coast to write and produce music for a movie project. If either of them are successful and the music industry repeats its pattern of mining from the source of this gold, the A&R teams can't be far behind. (Remember the frenzied signing of talent from Athens, Seattle, and Austin?) So, it pays to be at the top of your local scene should the national spotlight shine on your town.

There is no substitute for being good at your craft, whether you want your career to thrive locally or nationally.

Pessis illustrates this point with a story about coming up with his peers. "I've had a lot of successes here because I've concentrated on the local scene and milked it. I have in the past and continue to pitch songs sideways—meaning I don't always go after the major stars—and it really got my career going. I wrote a song for a guy I played with in a local band, and he liked it. The song happened to be 'Walking on a Thin Line,' the guy happened to be Huey Lewis, and *Sports* happened to be a huge

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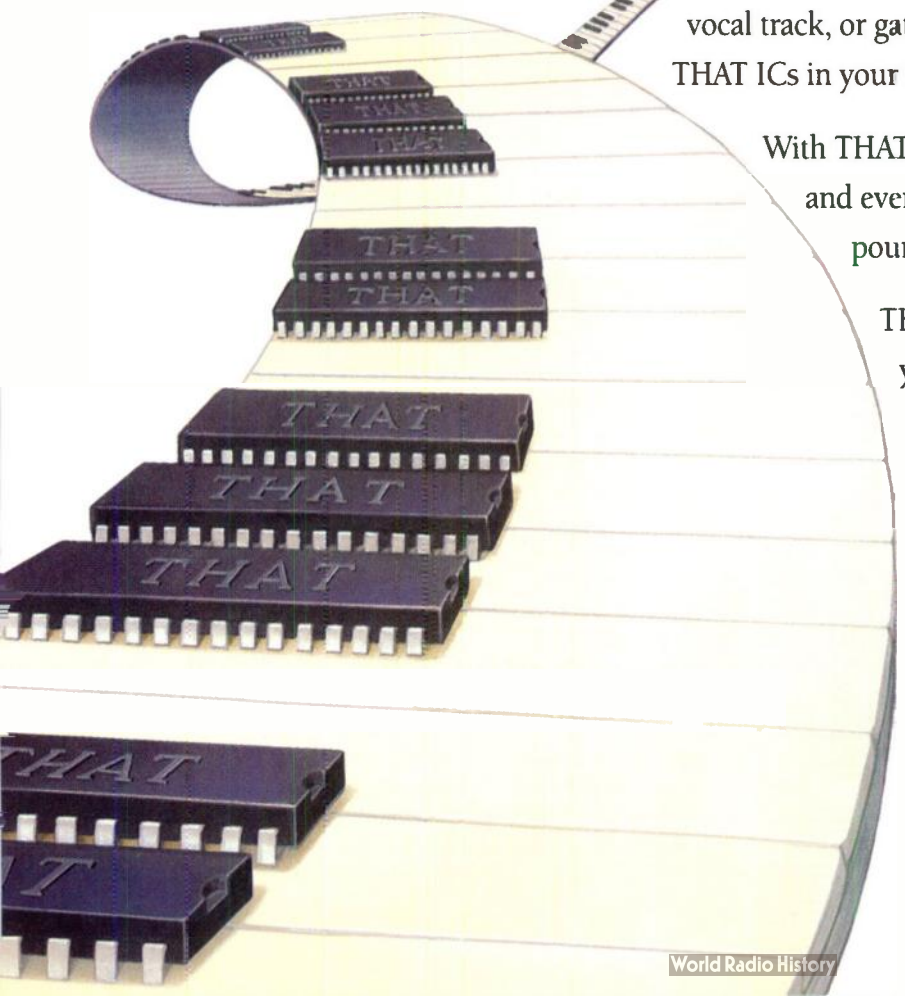

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FREQUENT FLYING

Sitting at home sulking about being ignored by the industry will not make things happen for your career. And when you are ready to show your wares, all three artists agree that taking aggressive measures to make solid industry connections is absolutely necessary—even if they're not in your home town.

"As far as being a writer is concerned, having a good publisher in one of the major music markets is essential," stresses Pessis. "My publisher [Bob-A-Lew Music] is based in L.A. but also has a Nashville office. They are right in the middle of things, so they are constantly in contact with projects that may need my music. Writers need to get on the plane and try to make direct contact with the publishers and record labels in these markets. A writer's work can just die in the mail. Anybody who thinks they can pitch songs entirely by mail is simply being unrealistic."

Conversely, the road gigs are picked up more by word of mouth from other musicians than through "business" types like managers or agents. "I was actually at a low spot in my career, arguing with a Cleveland club owner over a hundred bucks for a gig," says Anderson, "when I got recommended for the Gloria Estefan tour by a University of Miami alumnus I hadn't heard from in eight years! By being on the road, I meet other musicians doing similar gigs and don't have to go to New York or L.A. to find a tour."

When she set her mind on establishing herself in the industry, Porter says she simply "cold" called. "I took a leap, was ready for rejection, and took it a call at a time," she explains. "It resulted in hooking up with an A&R person here, a lawyer there, each one leading to another contact. I've managed to keep contacts on both coasts abreast of what I am doing, and the important ones have given me good advice that I have taken in working to develop myself, my music, and my career plans."

MAINTAINING CONTACTS

Whether your fingers are dancing across the computer keyboard while you work on your Web site or doing the walking through your tattered old telephone book full of industry contacts, making contact and then staying in touch is crucial.

The World Wide Web offers the widest range of exposure and a bit of an industry curiosity factor. If you are considering using the Internet as a way of promoting yourself, remember that simply putting cool music and graphics on the Web does not ensure that people will see it. The number of sites featuring new talent has exploded, so an effective marketing campaign—both to the general public and to industry types—is necessary for you to be seen. Label people I have spoken to do admit to cruising the Net, but remember, once an A&R person has bookmarked a site that she thinks will provide a steady supply of new talent, she is likely to keep going to that spot rather than searching for new sites. When seeking a "showcasing" site (for example, the Internet Underground Music Archive), don't be afraid to ask if they have regular contact with major and independent labels. Many services will charge you a hefty fee and can't even prove that A&R people visit the site! (For more on using the Internet for promoting your act, see "Working Musician: Networking with E-mail" in the October 1995 **EM** and "Going Global" in the December 1996 issue.)

Regardless of the availability of high-tech communication tools, some kind of personal contact is still a necessity. After all, the business side of the music industry is based on communication, which can be a disadvantage for those who choose to do it from a distance. A large phone bill was a universal trait among the people I interviewed for this article.

"Dealing with a band based in Miami, handling the details of travel all over the place, and then calling home and taking care of my band from the road ends up costing a lot," says Anderson.

Porter adds, "My phone bill? Arghh!!! When I'm on my 'staying in touch' calling sprees to industry contacts on both coasts, it's hundreds of dollars a month. But it's the price I have to pay. As with any other small business, it's a cost of doing business in a national marketplace."

Pessis echoes this sentiment, saying that his phone bill reflects scheduled writing sessions conducted over the phone with collaborators in Nashville and Los Angeles.

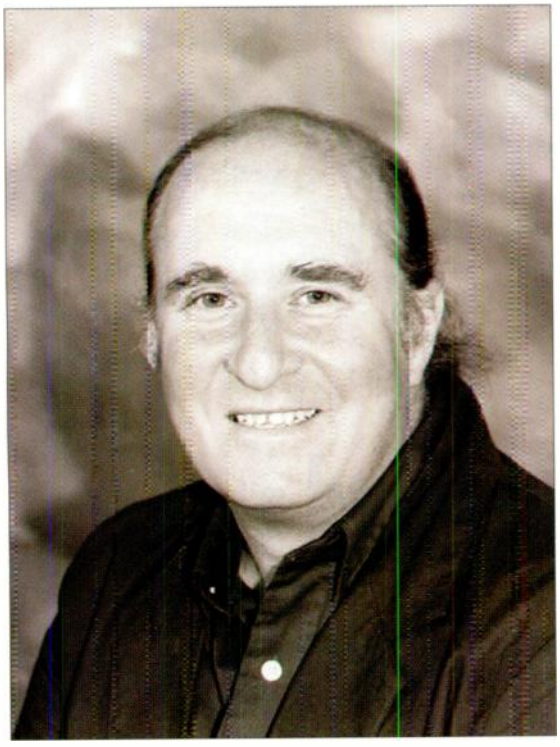
Nonetheless, the effort put into keeping up your personal contacts is well worth the trouble and the expense. Artists who work far from the major music centers can't "do lunch" or see contacts regularly at industry events, so they need to be in touch with someone who will, for instance, help oversee the submission of a demo. "Staying in contact is key," says Pessis, pointing out again that the more personal contacts you can make, the better. "Being Johnny-on-the-spot will always get you closer to success."

THE MUSIC-GO-ROUND

A number of musical communities have formally organized in an effort to bring the music industry to them. Numerous regional songwriting associations, such as the Arizona Songwriters Association and the Alaska Songwriters Association, lobby to get industry representatives

LASKY

Saxophone player Kenny Anderson lives in Cleveland but spends much of his time touring with Gloria Estefan's band, which is based in Miami.



Songwriter Andre Pessis has found success penning multi-platinum hits from his home base in Corte Madera, California.

from performance-rights societies and A&R reps from labels and publishing companies to come to their towns to see and hear talent. Some of these efforts have evolved into major industry events, as evidenced by the continued growth and success of South by Southwest in Austin, Texas.

Be cautious in choosing which of these industry events to attend. Some independent promoters, understanding that many musicians are willing to spend a lot of money to make a connection, will sell tickets to such events without delivering the education or contacts necessary to make a difference in your career.

The National Association of Recording Arts and Sciences (NARAS), the organization responsible for the Grammys, currently has a music-industry outreach program that it takes on the road, traveling to colleges across the country to promote opportunities in the industry. Your local college or music conservatory may also be interested in sponsoring an educational event, which could include bringing industry executives to you.

WHAT'S MY ADDRESS?

The artists I interviewed acknowledge that some kind of contact is necessary with one of the major music markets, but they point out that permanent relocation is not a requirement for success, and each cited the quality of life in their respective towns as a major factor in their overall well being. "To be fair," says Pessis, "I could make more money living in one of the music centers. I think about it now and then when things get slow. I grew up in New York, settled here in northern California, and love it here. The quality of life means a lot to me, and I'll forgo the extra money to enjoy that."

"I'm prepared to spend a considerable amount of time in my working year on one of the coasts networking, writing, and doing the things necessary to promote records and songs, but I'll maintain a residence here in the Cleveland area," explains Porter. "I'm just a Midwest kind of girl and need this environment for my sanity."

"Cleveland will remain my town, primarily for family reasons but also for the artistic opportunities available here," says Anderson. "I have a solo project I'm working on and a band called the Power City Horns as well as local gigs that I can leave when I tour and pick up every time I return. My friends in Los Angeles can't do that. When they leave town to go on a road gig, someone is always ready to jump right into the spot they left open, and it's sometimes hard to reconnect all over again, time after time."

With all this in mind, maybe you can put that move to L.A. on hold. Just polish up your demo, get your Internet site up and running, and buy a roll or two of postage stamps and a couple of round trip tickets to the music centers. Then brace yourself for the phone bills, and hit the streets with your music. If planned well and done right your career, too, can reach fruition from a distance.

Michael A. Aczon *is a Bay Area entertainment lawyer, music-business educator, and frequent* **EM** *contributor. He is currently working on his first book.*

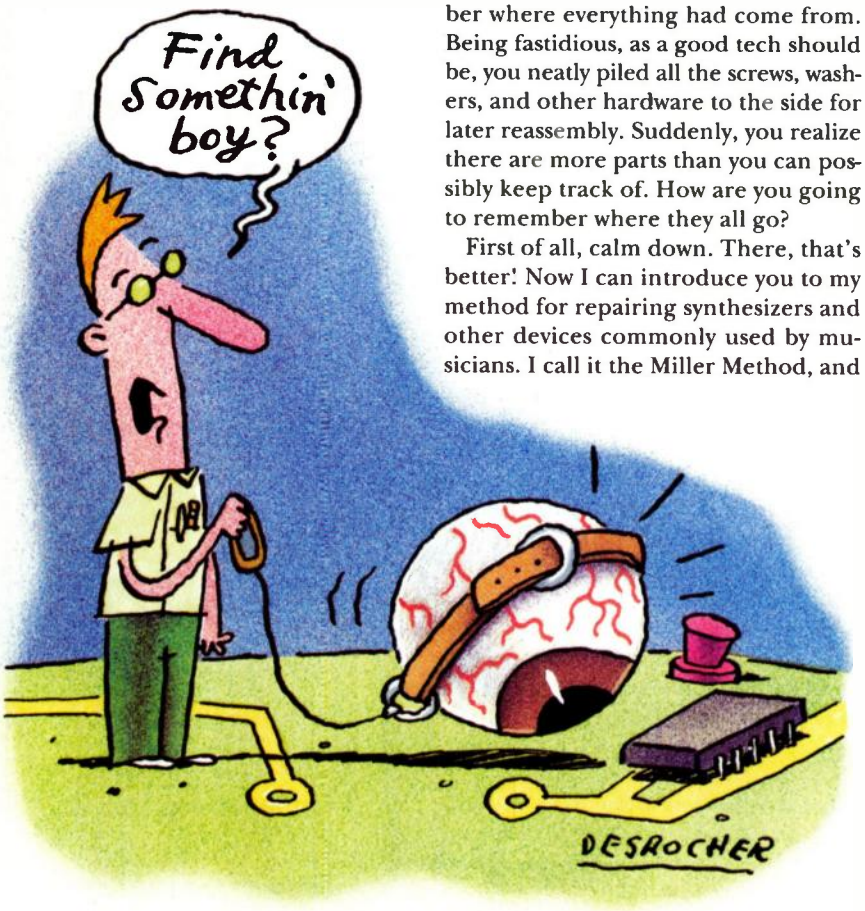
Learn the Miller Method

A cogent repair method now can ward off madness later.

By Peter Miller
with Paul Howard

You're in your shop on a hot afternoon, looking at a synth you've just disassembled. Having worked previously on smaller pieces of equipment with fewer fasteners and parts, you thought you could remember where everything had come from. Being fastidious, as a good tech should be, you neatly piled all the screws, washers, and other hardware to the side for later reassembly. Suddenly, you realize there are more parts than you can possibly keep track of. How are you going to remember where they all go?

First of all, calm down. There, that's better! Now I can introduce you to my method for repairing synthesizers and other devices commonly used by musicians. I call it the Miller Method, and I've used it to train many technicians. This month, we're going to discuss three basic principles of the Miller Method. In future columns, we'll discuss additional principles and get into more detailed explanations.



JACK DESROCHER

BEFORE YOU START

First you must understand what the customer wants and doesn't want. If you're a professional service tech, that means reading the work order. Obviously, if you are repairing your own gear, you are the customer, which simplifies things.

Next, before taking anything apart, you must do a bench test. The idea here is to get familiar with each repair job. Carefully examine the gear and record all the symptoms that you can. This is sort of like playing Sherlock Holmes: we are seeking clues to solve a mystery. Sometimes the symptom described by the customer doesn't match your observations, and that's where the fun begins. We have to find a match between the clues brought to us by our customers and the clues we observe ourselves. A simple bench test is the place to start. Let's get to it.

ASSUME NOTHING

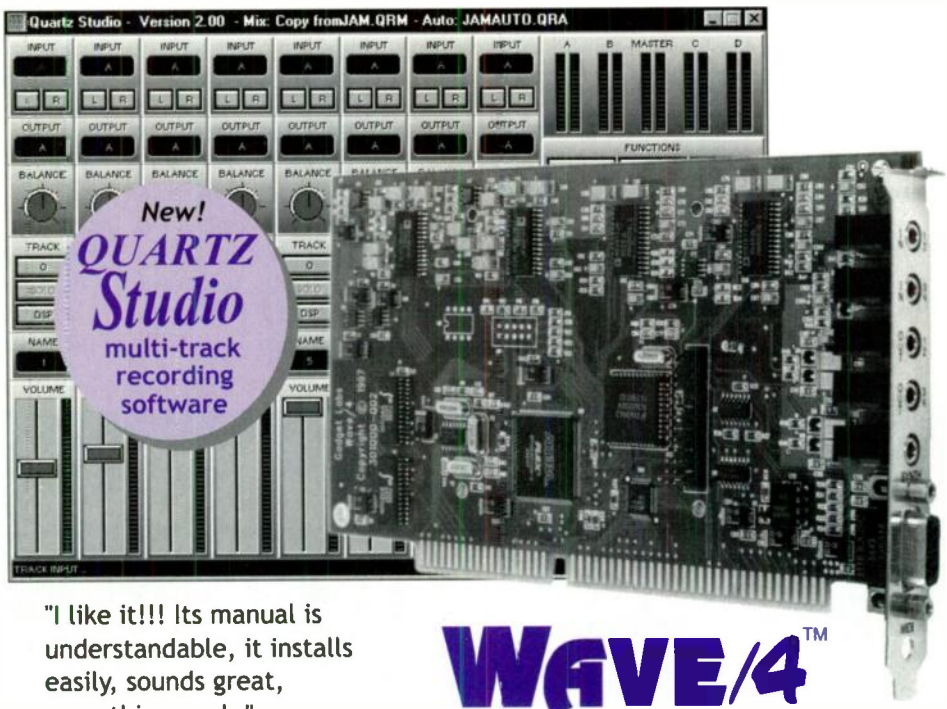
The first principle of the Miller Method is *assume nothing*. Verify everything empirically, even things that seem as obvious as a blown fuse. Write down all important details. Before repairing

eas·y (ēz´i), *adj.*

1. not difficult; that which can be done with ease.
2. free from trouble & anxiety

"The install was a snap - no problems at all... I think you have a GREAT product here"
JG in California

"This card is pretty kick-ass!"
DB in Massachusetts



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anything, set the gear in question up on the bench, and make it do what it's supposed to do.

For example, I recently played a keyboard that was in my shop for repairs. In doing so, I found several problems in addition to the customer's original complaint of a bad output jack. Now I can tell the customer about these newly discovered problems, and she can decide whether she wants our techs to proceed with the repairs.

After the initial bench check, unplug the device and wait 15 to 30 minutes for stored electrical energy to dissipate before disassembly.

SENSE AND SENSIBILITY

The second principle is *use your senses.* Before opening an instrument, take advantage of this moment to observe carefully any telltale signs on the exterior of the instrument. Then remove the cover, and thoroughly examine the interior. After all, you may be the first person to look inside the instrument since it left the manufacturer or the last service shop, and that's a privileged perspective.

Look carefully for any obvious problems. This is easier said than done, of course; it takes a well-trained eye to spot some problems. But most repairs are mechanical in nature. After all, these products "live" in a hostile environment: they are carried around the world, getting bumped and banged along the way; they sit in smoky bars; and they generally get all manner of contaminants in them.

Look for signs of internal structural damage or contamination, such as spilled coffee. Sniff around for burned or otherwise damaged electronic components. Feel for components that have overheated if the instrument was powered up recently. Use all your senses (with the exception of taste, of course). Always make notes on everything you find.

MEMORY LANE IS POORLY LIT

If I were to walk into your shop right now while you have that synth disassembled, would I see a box of assorted fasteners next to the synth? Do you remember where they all came from? Hold on, don't panic. That brings us to the third principle of the Miller Method: *don't rely on your memory—no matter how good you think it is.*

Keeping track of every fastener may seem awfully picky, but placing the wrong fastener in the wrong hole can have serious consequences. When the designers of electronic instruments specify a type and size fastener for a given application, it's for a very good reason. Those fasteners, despite their simplicity, are critical to the proper functioning of all electronics.

Once you've tested a piece of equipment and identified its problems, carefully remove all the fasteners in the correct sequence to examine the interior of the instrument.

Buy some compartmentalized plastic bins, and use them to keep track of the fasteners so they don't get mixed up or misplaced. As I remove the fasteners, I use the bins to organize each one according to where it came from. Most of my bins are labeled with the common fastener locations—front panel, back panel, circuit board, etc.—and I leave some blank spaces to label new ones. I also often draw a simple sketch showing the location of different parts.

Design engineers also specify how much force should be used when a fastener is tightened. Too much force may strip threads, compromising ruggedness and reliability. Too little force can cause a fastener to work its way out over time. Then it can rattle around inside the instrument, causing electrical shorts. This can make a very expensive instrument burn up in a cloud of noxious smoke.

MAKE YOUR MARK

As you disassemble anything electronic, keep track of what you're doing. Mark internal electronic connectors with a felt-tip pen, noting their location and orientation. Putting a connector in backward can have disastrous consequences. If you must remove circuit boards from an instrument, make liberal use of marking pens: show exactly where each board was located, the positions of mounting screws and connectors, and so on. Use different colors, if necessary.

Make simple, clear drawings as you go along, and keep them with the instrument. Nothing compares to the unspeakable panic you experience when you realize you haven't a clue how something goes back together. Memory fails us most often when we're under pressure.

Other handy tools for marking things are self-adhesive colored dots, file-folder labels, and colored nylon wire ties. It takes far less time to make a simple note reminding you of where or how something is assembled than it does to piece together something that resembles a 3-dimensional jigsaw puzzle.

MOVING RIGHT ALONG

We've made a good start this month. Remember, the first three principles of the Miller Method are *assume nothing, use your senses,* and *don't rely on memory*. Is there more to this method? Certainly! We'll continue this discussion in future columns.

In the meanwhile, get out that schematic, buy some plastic bins and colored markers, and sort those fasteners!

Peter Miller *has specialized in the repair of electronic musical instruments for over 30 years. He has owned CAE Sound since 1980 and has designed custom audio electronics for groups such as Tuck and Patti, Counting Crows, and the Grateful Dead. Paul Howard is a staff service tech at CAE.*

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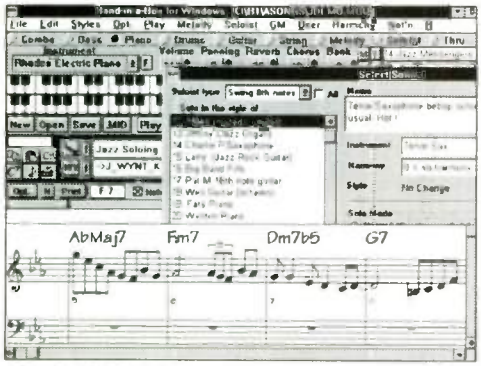

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OUR CUSTOMERS LOVE VERSION 7.0! ***"Wow! The soloing sounds amazing... how can it do that?" "I love the notation improvements." "Another winner – thanks!" "You guys have added everything I wanted."***

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- **Soloist Disk Set #5: Bluegrass Soloing $29**
- **Bluegrass MIDI-FakeBook (50 songs) $29**

An exciting aspect of the Soloist feature in Band-in-a-Box Ver. 7 is that the program is able to increase its musical intelligence by analyzing new solos it is exposed to. It learns by "ear" and constantly gets better and better! Then the Soloist can incorporate the soloing we expose it to into its own playing. We've now created brand new soloist KnowledgeBases with dramatically enhanced results. We've created stunning new soloists in the jazz, rock and Bluegrass styles, and are offering them as new Soloist Disk Sets for Band-in-a-Box 7. The packages include **bonus styles** (some also include demo songs) to augment your BB with your favorite types of music.

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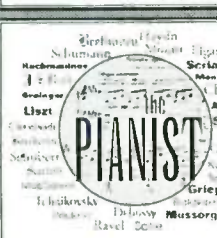

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NOVATION

SUPER BASS STATION

Big, fat analog synthesis in one thin rackspace.

By Jeff Obee

I play an electric bass, but I also love synth bass sounds and use them frequently in my music. I've often wished for a dedicated monophonic synth that would fill the role of my long-departed Minimoog, offering the same punch and warmth but with stable oscillators, more parameters, and greater control. Novation must have heard my prayers.

Having built a reputation for inexpensive, quality analog gear, Novation released the original analog BassStation keyboard in 1994 and later released the BassStation rack. Its latest offering, the Super Bass Station, is a great-sounding, monophonic synth module that can fill an important niche for those who love electronic bass.

REAR AND FRONT

The 1U rack-mount module's black front panel features blue and gray trim, an array of black switches, and gray knobs—lots of gray knobs. Happily, the headphone jack is up front. A small 12-button keypad allows you to set ranges and navigate through a host of parameters: Pitch Bend, Filter Mod, Breath Mod, and so on. Related groups of sound-shaping parameters for each section exist as pages under each soft button. In Program mode, the keypad allows access to Program banks A and B (100 patches each).

The Novation Super Bass Station re-creates the glory of analog sounds with plenty of MIDI control and a front panel festooned with knobs and switches.

3. Get it right.

Mixer window

Automating a mix is child's play. Just click on "write" and record levels, pans, solos and mutes on the fly. EVERYTHING is automated - effect sends, effect parameters, etc. You can no longer call yourself a tortured artist.

2. Get it sweet.

EQ/Effects rack

Each channel strip has 4 bands of parametric EQ. There's also a four-space effects rack loaded with reverb, chorus, delay, etc., with room for more third party plug-ins than you've ever had compromising dreams about.

You're independent, stubborn, one of a kind, on a first name basis with your inner self.

Let it flow.

1. Get it together.

Arrange window

This is the nerve center, where most of the work is done - MIDI and audio recording, editing and trying out new arrangements. There's up to 32 tracks of digital audio at the ready - just follow your intuition.

4. Get it warm.

Magneto™

This plug-in is outrageous. It adds tape saturation warmth to digital recordings. Yowza.

5. Get it ready to burn.

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Here's where the true mastering comes in. There's an *additional* four-space effects rack for pin-point EQ fixes and other mastering effects. With the ultra high-end Loudness Maximizer™, your master mix is guaranteed to pack a whallop. Amateur hour is officially over.

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A Select button scrolls through five modes: Program, MIDI Receive Channel, MIDI Transmit Channel, Utility, and Save. A demo button triggers the sounds and also enables a Finder mode that allows you to recall sounds by category.

The display is a 2-character LED that shows patch numbers but not names. The preset names are listed on a separate sheet that comes with the manual. Instead of typical patch names, you get basic descriptions of each patch. This is a rather prosaic approach, but it works well; the name tells you the patch's function. Some names are repeated because the patches are variations on a similar theme.

The rear panel has left and right ¼-inch outputs, CV/Gate outputs for interfacing with vintage synths, and a Clock output. You also get an External Mixer input, which allows you to run an external synth signal through the Super Bass Station's filters, envelopes, and effects section. Of course, the unit has the standard MIDI In, Out, and Thru connections, and it features a 9 VAC lump-in-the-line adapter rather than an outlet-eating wall wart.

THE SOUNDS

The Novation Super Bass Station comes with 200 presets: 50 in ROM and the rest in RAM. The presets aren't categorized according to patch type, but when you activate the Finder mode, the plus or minus keys step through the sounds in that style. There is a protect switch for protecting your custom patches, and a default patch is included to make it easy to build your own. That's a helpful touch.

I started at the beginning of the presets, and my ears were greeted not by a bass patch but by a cool, synched sound with the LFOs pinging through the stereo field. It is aptly named "Synched LFOs Sync Sweep." The next patch is an excellent bass sound that is slightly resonant at low Velocities. Higher Velocities open the filter and produce even more resonance. It has all the elements that you want in an analog bass patch: healthy doses of snarl and punch. In the higher registers, it even makes a good lead patch.

"Arpeggio Sq with Reso Sweep & Glide" is an intriguing bit of programming that produces an arpeggiated square wave panning across the stereo field with a nice bounce—the result of some portamento thrown into the mix. Another patch, "Soft Lead Reso Rise in 5ths," has the filter and resonance opening up and sounds cooler as a low drone effect than as a lead. "Arpeggio Clavs with Filter Sweep" is a tasty patch that has a resonant Clavinet sound arpeggiating and panning at the same time. It's perfect to use as a gurgling backdrop. I enjoyed changing the arpeggiator speed and pattern while letting this one play.

"Bass Sub Bass" is a killer low bass sound that's perfect for rap or trip-hop. It has very little high end or midrange presence, just a subsonic rumble that shakes your speakers. Several patches, such as "Saw 303 Dist with Autoglide," have the envelope generators triggering the portamento when you play legato, which produces that popular, smooth, glide-bass sound.

A great arpeggiated, '80s-style bass with a filter sweep pulses in even time for that good ol' eighth-note, new-wave rock feel. Several other bass sounds are also in this arpeggiated style, and they're ideal for dance music. "Arpeggio 303 with Glides and Filter Sweep" stands out because of its churning rhythm and swirling resonance in the high end. I loved "Arpeggio Rave," which is programmed to arpeggiate with a house-style rhythm. And I also liked "Arpeggio 303 2saws with Glides," which bubbles along in a "trancy" beat as the glides interact with the resonance and filter sweep.

In spite of its name, the Super Bass Station offers several excellent lead patches. It operates in last-note priority, monophonic mode, so you can hold down a key and play a second note, and when you release the second note, the held key will sound again. This mode makes lead patches come to life because you can do hammer-on–type runs. I particularly liked "Hard Lead Saw 24db with Autoglide," a lead with oodles of edge to it and the distinctive Autoglide feature that gives it color. "Soft Lead Saws" is a classic meat-and-potatoes lead patch. Its appeal is in its simplicity, which harkens back to the days when sawtooth-based leads were often heard from the likes of Jan Hammer.

The Super Bass Station also offers some synth drum re-creations, but bear in mind that this is not a multitimbral synth. If you have a sampler, however, you can use these sounds as material for creating your own custom drum

kits. As drum sounds go, these are pretty cheesy, but hey, I occasionally indulge in *le fromage de la musique*. I liked the closed hi-hat simulation and a number of synth toms. If you take the time to program your own "drum" patches, you can sculpt some nice ones.

You're not going to create breathlessly stunning effects patches with a monophonic analog synth, but this instrument has its special place for creating some nice analog effects. "SFX Rise with Synched LFOs," for example, has a classic spiraling, rising effect, and it finishes with a touch of noise at the end. Furthermore, it pans in sync with the LFOs as it rises. "SFX Spit" is a percussive effect and has a tinge of a low tom sound blended in with a "squirting" type of resonant noise. "SFX Ring Mod Noise" is a metallic rising patch that is detuned but gradually comes into tune at the end of the rise.

I like the sound of this synth very much. There is something indefinable about its bass sounds—a unique "feel" that makes them appealing. The analog filters and the sub oscillator give the sounds an aura that is rich, deep, and powerful. The leads are also very good, and there are many with lots of presence and analog "dirt." The special effects patches work well, and they provide good templates to work from when creating your own patches.

CLASSIC ARCHITECTURE

The voice architecture in the Super Bass Station is modeled after the classic analog synths of yesteryear, such as the Minimoog, ARP Odyssey, or Sequential Pro-One. The synth has two digitally controlled analog oscillators (with oscillator sync and ring modulation), two LFOs, a resonant lowpass filter with 2-pole and 4-pole settings, a sub oscillator, envelope generators for filter and amplitude, a white-noise generator, portamento, a volume control, and a mixer section to control the level of each oscillator.

One set of knobs serves both oscillators; an Oscillator Select switch toggles between them. In the tradition of early analog synthesizers that descended from electric organ technology, you can select from a range of 16', 8', 4', or 2' for oscillator 2. Oscillator 1 is permanently set at 8'. Each oscillator can be modulated by Envelope 2 or LFO 1. Oscillator sync is provided, allowing you to produce those hard-sync sounds characteristic of monophonic analog synthesizers.

You can select either sawtooth or variable-width pulse waveforms. A switch selects the modulation source for the pulse width: envelope 2, LFO 2, or manual control via the Pulse Width knob. The width is specified as a percent of the wave's period (as it should be), so when it is set to 50 percent, you get a square wave. If Envelope 2 or LFO 2 is the modulation source, the Pulse Width knob controls the amount of variation in the source.

A knob enables you to tune the pitch of Oscillator 2 in semitones up to a full octave. This Semitone knob also makes timbral changes when the oscillators are synched. A Detune knob allows for finer levels of tuning and enables you to produce a "thickening" effect.

The two LFOs can produce random, triangle, sawtooth, or square waves, with variable speed and delay. The envelopes are of the time-honored ADSR

This is also the control used to set the various sound categories for the Finder mode. You can assign a sound to any of sixteen categories.

The fun really begins with button 4, the Chorus/Distortion section. I programmed a simple lead patch and ran it through these effects to see how they sounded and how I could creatively alter the patch. The Chorus proved to be quite nice. There are seven types of chorusing, including five emulations of classic Roland Juno-6 and Juno-106 chorusing. The last two choruses are user programmable and are controlled by the LFOs. This is a clever feature. You can select from various LFO waveforms and sync them to MIDI Clock so that the chorusing effect pulses in time with your music. Someone was thinking when they designed this instrument!

The Super Bass Station's distortion is more subtle than I expected it to be; at least, when added to a simple lead patch. Even at full value, it didn't overdrive the filter too much and create excessive distortion. It adds a warm, compressed distortion effect to a patch and gives it more sizzle and presence. I added some ring modulation to a patch, synched the oscillators, and modulated Oscillator 2 with a good dose of LFO 1 (set at a medium/slow speed). The distortion became more "in your face," and the lead patch really shined.

My favorite feature is the arpeggiator. I have always been an arpeggiator freak, and the one in this synth is lots of fun. It comes with 99 built-in rhythmic patterns, which emulate the glide, slide, and accent of the Roland TB-303. You can sync your pattern to LFO or MIDI Clock, a marvelous feature. This arpeggiator especially sparkles when you sync the LFOs and the waveforms in the Chorus section to MIDI Clock. An Arpeggiator Latch function causes the pattern to repeat indefinitely after you release the keys.

A major feather in this synth's cap is the MIDI Clock Utility. Its six pages of parameters open a world of possibilities because they enable various parameters on the Super Bass Station to be synchronized to your sequencer's MIDI Clock output. For synching LFO 1, you can choose from a long list of rhythmic variations that start in smaller subdivisions of a note and go up from there, including 32nd-note triplets, eighth notes, and quarter notes. LFO 2 offers the same options as LFO 1 along with even more subdivisions. I was able to program some delightfully bizarre gurgling effects by recording a simple pattern of music, assigning each LFO sync to different values, and experimenting with the parameters on the front panel.

Synchronizing the arpeggiator to MIDI Clock turned out to be a tricky proposition. After consultation with the Novation rep, I got it to work, and it proved to be lots of fun. I created some fascinating rhythmic interplay by combining this feature with different instruments and sequences. If you have a second or third Super Bass Station, you can go bonkers weaving patterns that play off each other in interesting ways.

Other pages in the MIDI Clock Utilities section control the trigger out for the clock output on the back of the unit. You can choose the LFO or arpeggiator as the source for the Trigger output and can select either negative-edge or positive-edge trigger pulses. Which you use depends on the type of vintage analog synth you are triggering. The CV/Gate Utility section lets you select from a list of preset CV/gate types according to the manufacturers original specs.

In the Triggering section, you can select how the envelopes and LFOs will trigger. There are eight Envelope Trigger modes, most of which control how the envelopes react to the Portamento setting in Program mode. One setting of particular note is the all-important Autoglide mode. It gives contemporary bass sounds their unique "loping" feel. When you play distinctly separate notes, you trigger the envelopes. When you play legato notes, you engage the Portamento effect. That enables you to recreate TB-303–type glides.

The Super Bass Station also includes a panning feature, with control of Pan Mod Source and Pan Mod Depth. Modulation sources include Manual, LFOs 1 and 2, and Envelope 2. Because the LFOs can be synched to MIDI Clock, you can pan in rhythm with your music. The panning works beautifully, moving smoothly across the entire stereo field. Using panning with the arpeggiator enables you to create dramatic stereo effects.

MIDI MODULATION

MIDI control on the Super Bass Station is extensive by programmable analog-synth standards. The unit sends and receives on all sixteen MIDI channels, supports SysEx, and responds to Velocity, Aftertouch, Pitch Bend, Program Change, and Bank Change. It also responds to 38 different Control Change messages, including Volume, Pan, Sustain Pedal (which functions as an arpeggiator latch), and Breath Control. Additional MIDI messages are assigned to the knobs on the front panel.

That's right, you can record Control Change data to your sequencer from the knobs on the front panel. In fact, most parameters can be recorded directly to a sequencer. I played an arpeggiator pattern synched to MIDI Clock and created separate tracks on the same MIDI channel. I then let the arpeggiator sequence play while I recorded the filter, opening it and closing it as fit my musical mood. Next, I sequenced a track that tweaked the

Super Bass Station Specs

Oscillators	2 audio (sawtooth and square/pulse wave forms); 1 sub oscillator (square wave only, tied to Osc. 1); 2 LFOs
Filters	1 (5 Hz–10 kHz frequency range; 12/24 dB per octave cutoff)
Envelopes	2 (ADSR)
LFOs	2 (random, triangle, sawtooth, and square wave)
Programs (ROM/RAM)	50/150
Audio Outputs	(2) ¼" unbalanced; ¼" TRS headphone out
Control Connections	CV/Gate Out; Clock Out (analog trigger); MIDI In, Out, Thru
Audio Input	¼" unbalanced
Dimensions	1U rack-mount x 4 3/16" (D)
Weight	4 lbs. 3 oz.

resonance. After that, I recorded a separate track of Volume messages; what a terrifically tactile way to record CC 7 levels on the fly! I finished with a slight twist of the filter LFO depth along with some chorusing in real time. I was delighted by this feature. It works great and offers wonderful real-time interaction with your sequences. (You can get free control panels for *Cakewalk StudioWare* from Novation's Web site.)

JUDGING THE BOOK

The manual provided with the Super Bass Station does a solid job of teaching you the unit's basic design and guiding you through the machine. One major shortcoming is the meager amount of information on how to record controller data to your sequencer via the knobs.

Also, there is no section on MIDI, only a MIDI implementation chart in the back. This leaves the novice with no explanation of the different MIDI controllers. You will also find yourself jumping around the manual as you are referred to other areas to explain some further detail of a feature. The lack of an index makes matters worse.

MORE THAN MEETS THE EYE

This is not just a preset bass module. Though it appears to be a simple analog synth aimed at making bass sounds, a lot of thought went into the deeper architecture of the Super Bass Station. When you start to grasp the signal flow and understand how the features can work together, you realize just how many fascinating things you can do. The Super Bass Station is rich with possibilities.

Nonetheless, it takes a little time to adjust to the design of this synth. The 2-digit LED window and the programming hierarchy make for a rather "cramped" user interface. If you are familiar with subtractive analog synthesis, however, you won't have a problem getting to know this machine.

If you love analog as much as I do, you'll really like the sound of the Novation Super Bass Station. Dance, techno, ambient, or whatever your style, it's a great synthesizer for any electronic musician.

Jeff Obee *is a fretless bassist and synthesist from the San Francisco Bay Area who lays down a serious groove in bands with cool names like Haunted by Waters and Sculpting the Muse.*

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larger pots and more silkscreened info on the front panel.

THE LAST STAGE

Completing the chain of processing in the Channel Strip is the dynamics-processing section, which includes a gate/expander and compressor. Focusrite has done a commendable job of providing all the useful parameters yet still cramming everything into a single rackspace.

The Channel Strip can be switched between a gate and an expander, with a switchable attack time (normal or Fast mode) and a variable release between 100 ms and 4 seconds. The attack time is not continuously variable, but the preset times work well. There is only one expansion ratio (1:2).

The gate/expander can be keyed from an external source or the High and Low filters in the EQ section, as mentioned earlier. Both the gate and expander work as one would expect, attenuating unwanted noise when no signal is present. The Channel Strip provides plenty of control for dialing in an appropriate setting for most applications. I am cautious when using gates and expanders for tracking vocals because an incorrect setting can destroy a good vocal performance by inadvertently clipping the beginning or end of phrases. However, I found the Green 5's gates/expanders very useful in several tracking situations.

The compressor section is more extensive, providing threshold, ratio, release, and makeup-gain pots. A program-dependent Auto-release switch is also provided: the higher the signal rises above the threshold, the longer the release time. Auto-release works very well, especially for vocals. When in doubt, start with this setting and go from there. I didn't care for the Auto-release setting on clean electric guitar, but otherwise it performed well.

MAKEUP, PLEASE

As mentioned earlier, there are several places in the signal path where the level can be adjusted. When in Line Level mode (rear-panel switch set to Line and Mic pot clicked to Line), no gain is added to the signal. The Instrument setting provides an additional 18 dB of gain. The front-panel Input Trim sets the desired final level. The Input Trim remains active when using the Mic preamp. I'm not sure why it is still active, but it is possible to add a little more gain to the signal going to the equalizer or compressor if you feel you are pushing the mic-preamp level too much. It can, of course, also trim back the level if you feel you are hitting the EQ or compressor too hard—but then, I thought that's what the mic-pre level pot was for.

The EQ section has no gain control going in or coming out, but the compressor section has an output-makeup pot for restoring the level of a signal that has been crushed by compression. All of these gain stages are interactive, so you must take care not to cause the unit to clip by pushing a stage too hard.

PRINT IT

After a short period of time, I found it a breeze to get a handle on the Channel Strip. Although there are a lot of features in this unit, it is fairly easy to use. If you currently don't have a pristine signal path for important signals, such as vocals or miked acoustic guitars, you will notice a drastic improvement in the quality of your recordings.

If you are accustomed to quality outboard preamps and EQs, you may find it advantageous that the Channel Strip is self-contained. (A word to the wise, though: the Channel Strip gets very warm, so you should provide plenty of ventilation and not try to jam it into an overcrowded rack.) The ability to route the High and Low filters as sidechains to the gate/expander and compressor make the unit's versatility rival its sonic capabilities. In short, the Channel Strip is a winner.

Composer-producer **Rob Shrock** *is the musical director for Burt Bacharach. He has also worked with LeAnn Rimes, Dionne Warwick, Al Jarreau, and Stevie Wonder.*

Channel Strip Specifications

FILTERS	
Low	12 dB/octave highpass; 15 Hz–10 kHz cutoff
High	12 dB/octave lowpass; 65 Hz–25 kHz cutoff
EQUALIZER	
Low Shelving EQ	30–480 Hz cutoff; ±18 dB
Low Mid EQ	40 Hz–1.2 kHz parametric; ±18 dB; switchable bandwidth 0.7 or 2.5 octave
High Mid EQ	600 Hz–18 kHz parametric; ±18 dB; switchable bandwidth 0.5 or 1.1 octave
High Shelving EQ	2.5 kHz–18 kHz cutoff; ±18 dB
EXPANDER/GATE	
Threshold	-40 to +10 dBu
Attack Time	6 ms or 70 µs (Fast mode)
Release Time	100 ms–4s
Expander Ratio	1:2
COMPRESSOR	
Threshold	-24 to +12 dB
Ratio	1.5:1 to 10:1
Attack Time	8 ms or 1.5 ms (Fast mode)
Release Time	100 ms–4s; Auto-Release is program dependent
Makeup Gain	0 to +20 dB
GENERAL SPECS	
Frequency Response	line level <10 Hz to >200 kHz +0/-1 dB; instrument level <10 Hz to 90 kHz +0/-1 dB; mic level <10 Hz to 140 kHz @ +10 dB gain, to 50 kHz @ +60 dB gain +0/-3 dB
THD (dynamics out)	0.001% @ 20 Hz–20 kHz
Inputs	(2) ¼": instrument, key; (2) XLR: line, mic
Outputs	(1) XLR
Dimensions	1U x 6" (D)
Weight	5.75 lbs.

For manufacturer information, please see Contact Sheet, p. 163

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DL8000R Specifications

Inputs	(2) ¼" unbalanced
Outputs	(2) ¼" unbalanced
Other Connections	Bypass, Control, Hold, Trigger, MIDI In/Out/Thru
Presets (ROM/RAM)	128/128
Frequency Response	20 Hz–20 kHz (± 1 dB)
Dynamic Range	96 dB @1 kHz (A weighted)
THD + Noise	0.03% @ 1 kHz
ADCs and DACs	18-bit linear, 128x oversampling
Sampling Rate	48 kHz
Maximum Input Level	+20 dBu
Maximum Output Level	+20 dBu
Display	12-digit alphanumeric
Maximum Predelay Time	400 ms
Maximum Delay Time	4.8s
Dimensions	1U x 8.5" (D)
Weight	5 lbs. 4.66 oz.

In addition, each tap can have its own modulation source, selectable between LFO, Envelope, or Controllers 1 to 8. The Modulation Depth, Target Time, and polarity (direction) of each modulator can be set independently for each tap. Impressive. But wait, there's more: the Feedback Time (in milliseconds) for each tap has all the same modulation parameters! Can you say "tweakoid"? Needless to say, some very complicated delay settings can be derived, with a little care and patience.

If calculating time in milliseconds isn't your bag, you can easily switch to Tempo mode and work with bpm units by pressing the "ms" button on the front panel. This is especially cool for dance music. The Factor parameter (×¼ to ×4) is used to set the delay times based on the bpm value. And yes, if you alter the tempo, the DL8000R will track the changes to the delay time, although abrupt changes in tempo (delay time) don't always create flawless changes in the delayed signal (more on this later). You can modulate the tempo the same way as the delay taps and feedback. A Note Resolution feature allows you to set delay time in terms of note durations. The unit supports eighth notes to whole notes—why not sixteenth notes?

The feedback can be damped, or attenuated, which essentially rolls off more high end from the delayed signal with each additional repetition. (This is the traditional sound of analog solid-state and tape-recorder styles of delay.) Damping can be set to Thru or from 16 kHz to 1 kHz.

The LFO has quite a few useful parameters that make it a handy modulation source. Of course, you can set LFO speed (0.01 kHz to 16 kHz) and waveform type (sine, triangle, exponential, logarithmic, or random). You also can set phase anywhere between 0 and 180 degrees. LFO Trigger and Trigger Threshold are also available.

Although the DL8000R has an impressive LFO for modulating the delay times, I can't help but wish there was a bit of pitch modulation available to the individual taps. When creating a doubling effect, especially for a lead vocal, a small amount of modulation applied to both time and pitch can really enhance the effect and make it less stagnant. This was a cool feature of the old Lexicon Prime Time II, and I was hoping to find it in the DL8000R.

An in-depth mixer section allows you to tweak level, panning, and phase. The direct signal can be routed either pre- or post-EQ, or it can be muted so you can run the processor 100 percent wet for use with a console's send/return bus.

WARP AHEAD

A unique feature of the DL8000R is the Warp knob. This allows you to assign any parameter to a front-panel knob. You can even set the range of the knob

and save it with the user program. This makes it handy, for instance, for controlling feedback amount on the fly without having to resort to a more elaborate form of modulation routing. Each ROM preset has a parameter assigned to the Warp knob, and there are some fun surprises for those who don't mind adding a little unexpected "twist" to things.

There is a Seamless parameter that supposedly allows a delayed signal to continue throughout its duration after you change programs. However, this feature is not always seamless. When the Seamless parameter is off, the signal (and all of its delay components) abruptly shut off when you change programs, as expected. When Seamless is turned on, I found that delayed components still active from the previous program took on the delay-time and feedback characteristics of the new program. Sometimes this was cool, but don't expect a long 500 ms delay with feedback to continue unabated when you change to a stereo chorus with a short repeat, for instance.

Also, when you drastically jack the delay time up or down with the Value knob, the pitch of the delay sometimes changes, too, in Darth Vader or Chipmunks style. This appears to be the result of internal sample-rate conversion on the fly, and it can be used creatively, but the DL8000R is not always error-free in its calculations when it has to drastically modulate quickly.

REAL-TIME & MIDI CONTROL

For those who don't mind spending time creating elaborate processing patches, the DL8000R won't disappoint. Whether you like to ride lots of wheels, sliders, and pedals in real time or prefer autopilot with a sequencer, the DL8000R gives you plenty of MIDI-controllable parameters with which to experiment.

In fact, the unit's control implementation is so extensive that you can create patches that morph from one effect into another. Some interesting guitar and synth effects can be created by using a number of short, modulated taps for chorus or flanging, crossfaded (using an expression pedal) into a couple of long delay taps. I did a little experimenting with some vocal effects of this nature that would be cool in a techno or electronica style.

As mentioned, practically every parameter can be modulated by an LFO, Envelope, or Controllers 1 to 8. The eight controllers are assigned globally but can be selected from any pedal, Control Change message, Aftertouch, Pitch Bend, Velocity, or note number. If you're into creative processing, there are a lot of potentially cool effects to be mined from the DL8000R that go well beyond the ROM presets. My instinct says this box could become a cult favorite of dance-music producers, and I wouldn't be surprised to find banks of custom-programmed patches floating around on the Net in the near future.

FINAL ECHO

Korg has created a nice blend of quality, features, and affordability with this unit. The DL8000R would be at home in a commercial recording studio, personal studio, sound-reinforcement rig, or musician's stage rack. It's solidly built and has loads of useful features.

A good delay line is always useful, although it may not be the sexiest thing on the block. Even if I have a few handy, I can always exploit another one, especially if it's as good as this. If you're not interested in tweaking lots of parameters and taking advantage of real-time control, Korg's new delay processor might be overkill. But the DL8000R is a deal for those who need a serious delay.

KORG
DL8000R digital multitap delay
$600

FEATURES
EASE OF USE
AUDIO QUALITY
VALUE
1 2 3 4 5

PROS: Sonically clean with minimal coloration during processing. Extended delay time. Hot output. A wealth of parameters. Extensive real-time MIDI control. Large LED display.

CONS: Inputs summed to mono. No pitch modulation for individual taps. Seamless feature is not quite seamless. Minor processing noise.

CIRCLE #440 ON READER SERVICE CARD

STEINBERG

DECLICKER, DENOISER, LOUDNESS MAXIMIZER, AND MAGNETO (MAC/WIN)

A new set of powerful plug-ins for the virtual studio.

By Mikail Graham

A few years ago, when Digidesign introduced Pro Tools II with TDM, a door suddenly opened wide for the burgeoning real-time audio plug-in market. One of the first companies to jump onto the bandwagon was Steinberg, maker of *WaveLab, ReCycle, Time Bandit,* and other popular digital audio programs. Soon after the TDM plug-in explosion began, Steinberg released its VST (Virtual Studio Technology) version of *Cubase,* first for the Mac and later for the PC. Both support real-time native DSP processing.

In the past couple of years, Steinberg has produced more than a dozen plug-ins in TDM, VST, and WaveLab formats and now also for all DirectX-compatible systems. We'll take a brief look at four of these popular plug-ins. They might be just what the doctor ordered for your own virtual studio.

All of the plug-ins in this review are available in WaveLab and DirectX formats for Windows PC users. They're also all available in VST format for the Mac. *DeClicker* and *Magneto* also come in a Mac TDM version, and *Loudness Maximizer* alone is available in the Macintosh AudioSuite format.

DECLICKER 1.02

We'll begin alphabetically with *DeClicker* (see **Fig. 1**), a plug-in for removing clicks, pops, and digital audio artifacts, such as DC offsets. In some cases, it can even handle unwanted sounds from microphones and other sources.

With only one slider and two groups of buttons (in the TDM version), *DeClicker* is a cinch to use. The WaveLab version differs somewhat from the other versions in appearance and also includes a DePlop function—essentially a highpass filter that works on signals below 150 Hz. In my tests, it seemed to work like a smoothing control when a very loud click had been removed and there was still a bit of a gap where the click once was. I found the DePlop feature to be quite a useful tool. It's too bad that it isn't available for the other formats, as well.

To test *DeClicker,* I used some vintage 78 rpm R&B vinyl records that came from the early '50s. Setting up *DeClicker* was a snap. First, I selected one of the three possible modes: Old, Standard, or Modern. Each provides a different level of processing relevant to the condition of your LP. Standard mode was the one I used most often because it gave me the most natural sound. Sometimes, however, the Old setting did a better job at ironing out some very beat-up records. Next, I adjusted the level of "click reduction." What this setting boils down to is mainly an issue of quantity versus quality. *DeClicker* offers a range of 1 to 4, with 1 being the most powerful in terms of click removal and 4 being the most powerful restoration quality. For my needs, either 2 or 3 gave the best results, but experimentation is always advisable.

Finally, I set the Threshold value for determining the level at which *DeClicker*'s algorithm would kick in. This turned out to be the most critical part of the process: too low and nothing much happens, too high and you lose a lot of clarity in the processed audio. In general, a Threshold setting of somewhere between 15 and 30 dB seemed to work best for my old records.

DeClicker's graphic displays come in handy for helping to set the optimum Threshold value, and they give you a good idea of how many clicks are being processed. It's advisable not to let the curve in the DSP Performance display reach the top. At that point, the upper limit of *DeClicker*'s processing power has been reached, which makes it difficult (if not impossible) to process anything more.

As with most Steinberg plug-ins, *DeClicker* can be used with mono or stereo audio sources. Using a true stereo version, however, requires more processing because it takes two *DeClickers* (i.e., one for each channel). In fairness, though, points go to Steinberg for including a less DSP intensive stereo version as well for those on a DSP budget. It's a bit less powerful in terms of processing, but I found for many applications it works just fine. A real-time plug-in sure has advantages over other declick methods that require physically changing the audio material on the hard drive before you can use the file. In addition, the real-time aspect lets you audition as much of the audio as you need rather than limiting you to just a few seconds (due to the limitations of your computer's available RAM). Of course, real-time performance depends on having a fast enough processor.

When Steinberg first gave me the TDM version of *DeClicker,* I thought I'd probably never use it and promptly placed it on the shelf. Recently, however, I had some sessions that required restoring some vintage 78s like the ones mentioned in this review. I had to find a way to declick them, so I quickly pulled *DeClicker* down off the shelf. Lo and behold, with a bit of tweaking here and there, it worked wonders for about

FIG. 1: Clean up those noisy old 78s with Steinberg's *DeClicker* plug-in (TDM version shown).

For manufacturer information, please see Contact Sheet, p. 163.

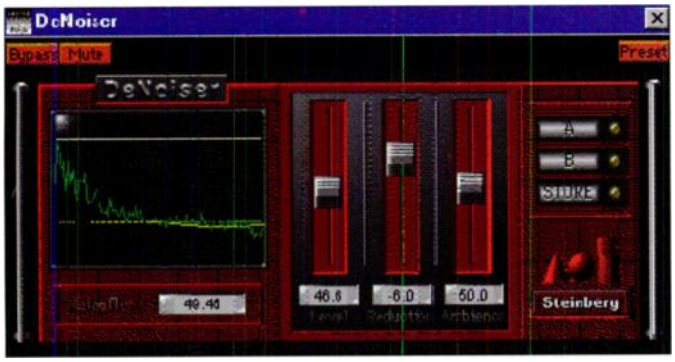


FIG. 2: Clean up your old 8-track and cassette tapes with Steinberg's *DeNoiser* plug-in (WaveLab version shown).

90 percent of the material that I was restoring. The other 10 percent was improved with some careful EQ, compression, and very judicial usage of Digidesign's *DINR* TDM plug-in.

As with any new tool, finding the appropriate use is paramount. In my experience, the material that seems most suitable for *DeClicker* is vintage analog-recorded music, sound on vinyl, or an occasional digital recording with prominent DC-offset clicks or pops. You can, however, also use it to remove pick noise from acoustic guitar tracks, some types of digital distortion, and other transient noise that can arise when working with audio. Be aware, however, that *DeClicker* is not capable of removing all clicks and pops in all situations. That's especially true of vinyl surface noise.

The bottom line? I highly recommend *DeClicker*, as long as you understand that some audio materials will benefit from it more than others. I suggest you give it a try; you might like it.

DENOISER 1.02

Mac users can only get *DeNoiser* in Steinberg's VST format. The TDM format, by design, does not allow for chip sharing yet. Apparently, *DeNoiser* would need to be spread across at least two DSP chips of a TDM DSP Farm card. AudioSuite, on the other hand, is strictly a file-based format. It doesn't offer real-time processing. So Steinberg is still deciding whether to support these formats with a version of *DeNoiser*.

As with *DeClicker*, the controls are about as simple as can be. Three sliders offer easy control over parameters. The Level control is actually more of a threshold control for setting the level at which the noise reduction will be engaged. This parameter works in tandem with the light green line pictured in the graphic display (see **Fig. 2**). Raising or lowering the Level slider lets you visually set the noise-reduction threshold relative to the noise floor of the audio—represented by the yellow line in the display.

Beneath the noise-floor/threshold graphic, a numeric display indicates an overall average of the current noise-floor amount. The Reduction slider adjusts the amount of noise reduction to be applied to the audio, with higher values offering the greatest overall noise reduction. The final result of this parameter is dependent upon the last slider, Ambience. This control is like a sophisticated EQ control. At lower settings, for example, it can make a recording with lots of hiss sound much less noisy. There's a trade-off, however, because it can also rob the overall liveness (brightness) of the recording. The name Ambience, therefore, is quite apt in this case.

There are also three buttons labeled A, B, and Store. The A and B buttons allow you to store two setups that you can toggle between for a quick comparison of settings. That's a nice touch. You can also use the Store button to save the current setting as a preset for quick retrieval.

DeNoiser is relatively easy to use. While playing back the audio in question, you first adjust the Level slider to set the desired threshold while watching the dark green line move until it is slightly above the noise floor level represented by the yellow line. Then you adjust the Reduction slider to set the amount of noise that you want removed. Finally, you play with the Ambience slider until you find the best balance of these three settings. It typically takes a few tries until you get it right. One thing I do not like is that there is always an annoying delay while *DeNoiser* calculates the current settings. In fairness, though, that depends greatly on how powerful your computer's CPU is.

Now that you know how *DeNoiser* works, you are probably wondering how it sounds. Well, it sounds quite good. *DeNoiser* produces smooth results without as many of the artifacts that, for example, Digidesign's *DINR* tends to add if you're not careful with your settings. When compared with Arboretum's *Ionizer*, however, I'd probably choose *Ionizer* because it offers a much deeper set of controls, although it also costs almost twice as much, so it's a tough choice.

Finally, Steinberg says in its less-than-informative 7-page manual that a 133 MHz Pentium will do for the PC versions of *DeNoiser*, but I strongly recommend at least a 200 MHz CPU to really get the job done smoothly. The same holds true for the Power Mac platform.

Overall, this is a very cool plug-in and one that will help in cleaning up noise on old or new audio tracks—without hours of work. *DeNoiser* and *DeClicker* together form an especially powerful dynamic duo for solving a variety of noise problems.

LOUDNESS MAXIMIZER 1.03

Steinberg's *Loudness Maximizer* plug-in (see **Fig. 3**) is not really a true compressor/limiter in the conventional sense, although it has some similar traits. Steinberg claims that *Loudness Maximizer* works by increasing the perceived loudness of the audio signal above the actual maximum amplitude. It lets you take, for example, already normalized

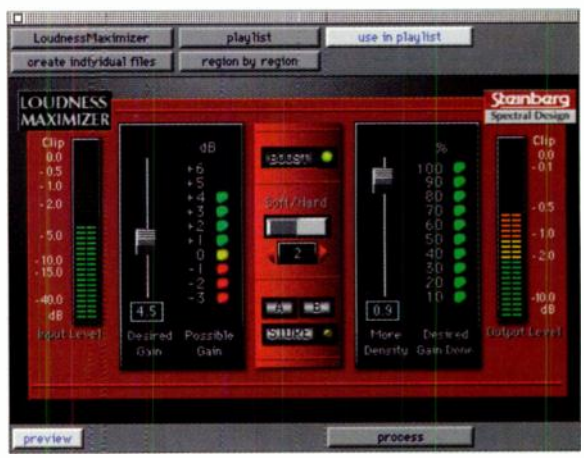


FIG. 3: Pump up your mix with Steinberg's *Loudness Maximizer* plug-in (AudioSuite version shown).

audio and still make it sound louder with very little timbral change.

As with the other plug-ins reviewed here, the controls are quite simple. Meters for monitoring input and output levels are provided for all audio signals. As with *DeNoiser,* there are A and B buttons for storing two quick settings that you can toggle between. And you can also store presets. To the left of the A and B buttons, a slider coupled with an LED-like meter offers control over what Steinberg calls the Desired and Possible Gain settings. These parameters let you determine how much the apparent loudness should be raised or lowered with values in increments of 1 dB.

To use the *Loudness Maximizer* effectively, you need to understand how the Desired Gain setting interacts with the Possible Gain meter. For example, if you raise the Desired Gain setting by 1 dB, the Possible Gain meter will decrease by 1 dB. To optimize the audio signal path, therefore, Steinberg recommends that you adjust these settings until the Possible Gain meter rests at about 0 to 1 dB.

In the middle, above the A and B buttons, there is a Boost button and a Soft/Hard switch. The Boost button simply adds an extra 2 dB regardless of how the other parameters are set. This adds a bit more punch to the audio signal. Steinberg recommends that this parameter should be used with care, however, and only on "uncomplicated" material, such as modern dance music. In other words, classical music, with its extreme peaks and dips in dynamics, is not a good candidate for the Boost function. Much of pop music, on the other hand, tends to have a more uniform dynamic range, so the results will likely be better. Ultimately, you'll have to be your own judge. I liked the added punch on most everything I tried it on.

The Soft/Hard button affects the audio signal by altering the response of the internal limiter section. The range is from 0 to 9, with the higher values giving a harder or more aggressive edge to the overall sound. The lower settings work best when the material has minimal high-frequency content. The Density slider allows you to balance the compressor/limiter section. Higher values send more of the audio signal into the compressor section, producing a denser or thicker sounding effect.

Last, we come to Desired Gain Done. (Try saying that twenty times in a row!) This meter indicates the final result of the Desired Gain slider. Steinberg recommends that this meter should never stay continuously at a value less than 50 percent, or the audio signal may be degraded. In my tests, I rarely found this meter falling that low unless there was a very quiet passage in the material being processed. Even then, I could detect no major problems.

Loudness Maximizer supports stereo processing, and it's interesting to note that there is hardly any difference in the amount of processing overhead between a stereo or mono version. Of the formats tested, I did find the AudioSuite version to be a bit problematic in the Preview area, which may be the result of not using fully native PowerPC code. Playback on some CPUs tended to stutter, stop, and start. To be fair, I've had this problem with some of the other AudioSuite plug-ins that I've tested as well. (Having a slow processor, a slow hard drive, or too little free RAM may also cause problems.)

How does *Loudness Maximizer* sound? Overall, I liked the sound very much and found this plug-in to be quite useful for maximizing poorly recorded audio. There are, however, some strong competitors in the marketplace, and how "musically appropriate" their results sound to you may ultimately be largely a matter of taste. I prefer

FIG. 4: Steinberg's *Magneto* plug-in adds the warmth of analog recording to digital audio (TDM version in stereo shown).

either DUY's *DUY Max* or Waves' *L1+* plug-ins because they produce more of the type of sound that I'm looking for. In addition, the *L1+* offers many dithering options that neither the DUY nor the Steinberg plug-ins provide. Nonetheless, the *Loudness Maximizer*'s algorithms sound fine and will likely appeal to many users.

MAGNETO 1.01

Besides having one of the coolest-looking retro interfaces I've seen, *Magneto* (see **Fig. 4**) really sounds great. It adds a big, over-the-top, fat-sounding kick to just about anything you process through it. Looking at *Magneto*'s graphics, you are at once reminded of the old days of analog reel-to-reel tape recorders and big, expensive mixing consoles. The graphics are perfect for putting you in the proper mindset to appreciate what this plug-in has to offer.

Magneto is based on extensive studies of different analog tape recorders and offers virtual simulations of the many characteristics of these classic analog machines. As you probably know, analog tape pushed into the red zone (above 0 VU) adds a certain warmth to recorded material. With digital recorders, however, once you get above 0 dB, things break down into a harsh-sounding, abrasive mess as the analog-to-digital converters fail to accurately interpret the incoming data. *Magneto* lets you return to the fabled sound that was once possible only in the analog world. It emulates many of the aspects of analog recorders, such as the bias current, the recording and playback EQ curves, and the record and playback heads. (Well, it may not achieve its goal completely, perhaps, but it does get pretty close.)

By now, it should come as no surprise that this plug-in joins the others in presenting a clear and simple control surface. Four knobs, three buttons, and one large slider are all it takes to operate *Magneto*. On the far left is the Input Level knob, which enables you to adjust the incoming signal so that the level is strong enough. I typically leave this set at 0 dB. If you have to adjust the input level, be sure to set the Input meter monitor button to On. That way, you can monitor the level of the incoming audio signal and accurately set the level so that the material doesn't go beyond 0 dB.

The Tape Speed knob offers two choices: 15 ips and 30 ips. Each option provides a slightly different harmonic

STEINBERG
DeClicker, DeNoiser, Loudness Maximizer, and Magneto plug-ins (Mac/Win)
$399 for all versions except DeClicker TDM, which is $799

DECLICKER ■■■■
DENOISER ■■■■
LOUDNESS MAXIMIZER ■■■
MAGNETO ■■■■■
1 2 3 4 5

PROS: Powerful feature set. Simple user interface. Nice graphics. Wide range of supported plug-in formats.
CONS: Plug-ins lack comprehensive documentation. Little "how to" information provided.
CIRCLE #441 ON READER SERVICE CARD

content, and depending upon the material being processed, each of these settings can be quite useful. For most of the material that I worked with, however, I preferred the 30 ips setting because it offered the greatest clarity.

The HF-Adjust knob either adds to or subtracts from the high-frequency content of the audio being processed. It emulates the way in which different types of tapes and machines add to the overall playback sound. I found it useful at times, but it must be used with care because it can give the sound quite an edgy quality.

The Output Level knob is usually best left set at 0 dB unless you plan to add a lot of HF-Adjust. In that case, you might want to back off the overall output level a bit. The Output monitor meter button enables you to monitor the overall audio output. And the On Tape button lets the meters monitor what is added via the Drive slider. The Drive slider is in many ways the heart of the *Magneto* interface. By moving this simple slider upwards, you can create an amazingly fat mix with little or no effort.

It's quite strange to see the Input/Output meters holding steady at 0 dB while the On Tape monitor shows the signal reaching close to +10 dB. Believe me, your ears will confirm what it shows. I found that it took a lot to cause any noticeable digital clipping, but if you do encounter clipping, just back off the Output level 1 or 2 dB, and you'll be fine.

Plug-In System Requirements

VST version: 120 MHz Power Mac (200 MHz recommended), 32 MB RAM. TDM version: Pro Tools III or 24, TDM-compatible 680X0 or Power Mac. DirectX and WaveLab: 133 MHz Pentium, 16 MB RAM (32 MB recommended).

Magneto can process stereo or mono audio, and the mono version only requires half the processing power of the stereo version. That makes it useful for individual tracks. Though I've found it works great when used on (or near) the last insert point of a final stereo mix, it can be used with equal success for individual tracking. Just be aware that delays might creep into a mix if you use *Magneto* on only one track and not the others in a multitrack session. These timing issues, however, vary a bit from system to system—for all plug-ins, not just *Magneto*—so be sure to check the requirements for your system of choice.

Magneto's only competition at the moment is DUY's *DaD Tape*, which offers more detail and a greater number of tape-emulation options (five types of tape machine emulations, three types of noise reduction, and a 7.5 ips setting). That makes it a better plug-in for true tape-emulation enhancement, but *DaD Tape* doesn't focus on the extra gain aspects that *Magneto* does. Consequently, these two plug-ins are the perfect pair for getting as close as possible to the analog world.

Steinberg claims that *Magneto* "brings the positive qualities of analog recording to your digital system." In fact, it does add a warm sound and feel to digital recordings, which makes it a valuable tool for use at almost any stage of a session.

THE FINAL VERDICT

Steinberg has created an excellent suite of powerful plug-ins for a wide variety of Mac and PC systems. My biggest complaint concerns the paltry documentation that comes with the software. The manuals are only seven to ten pages long, and they mainly cover the basics. At these prices, you should get more. I'd really love to see more in-depth examples; a "tips and tricks" section would also be nice. (The closest that Steinberg comes is a "tips and tricks" document that loads with the VST plug-ins.)

Users who want to delve a little deeper into these plug-ins may wish that there was a bit more control over the nuts and bolts of the processing, but I think the approach that Steinberg takes provides a good balance between too little control and too much complexity. As studio tools go, these are some of the best. They combine easy-to-use interfaces with great sounding algorithms and graphic designs that are fun to look at and use. I recommend them all.

Mikail Graham *lives and breathes DSP plug-ins and has recently taken up the fine art of dreaming once again. Now if only he could get paid for it!*

C O D A

VIVACE PRACTICE STUDIO (MAC/WIN)

Practicing has never been this much fun.

By Scott Wilkinson

When I was in college, I used to buy "Music Minus One" records to make practicing more interesting and fun. These LPs contained recorded performances with one part missing, and they came with the missing music in printed form so you could play along with the recording.

These records were great as far as they went, but they had some serious limitations. You couldn't change the tempo (e.g., slow down to practice a particular passage) without changing pitch, and you couldn't easily repeat a section over and over until you got it right. In addition, there was no musical connection between the accompaniment and soloist, which meant there was no way to play with expressive rubato or subtle variations in tempo that a sensitive accompanist can provide.

Coda Music Technology has tried to transcend these problems with a product called Vivace. This hardware/software system helps students practice woodwind, brass, and vocal pieces by playing synthesized, sequenced accompaniments. In addition, students can repeat any section of a piece until they are proficient. Most importantly, the system "listens" to the soloist through a microphone, and it can follow the performer as he or she speeds up and slows down.

The first incarnation of this product was introduced in 1994; the hardware included an E-mu Proteus within a Coda chassis. This original version was expensive, which kept it out of many students' hands. The current version, called Vivace Practice Studio, is much less expensive, but it requires a fair amount of computer horsepower because the accompaniments are played by a software synth. (The older, more expensive version is still available for those with less-powerful computers.) The sequenced accompaniments are stored in ROM within a special cartridge. Without the cartridge, the software does nothing, which effectively prevents piracy.

INSTALLATION

A small, printed start-up guide explains the installation procedure reasonably well. The system is available for Macintosh and Windows platforms in two versions: the newer Cartridge Reader and the older Modular System. For this review, I used the Cartridge Reader version with a 225 MHz, 604e-based Mac clone running System 7.6 with 48 MB of RAM.

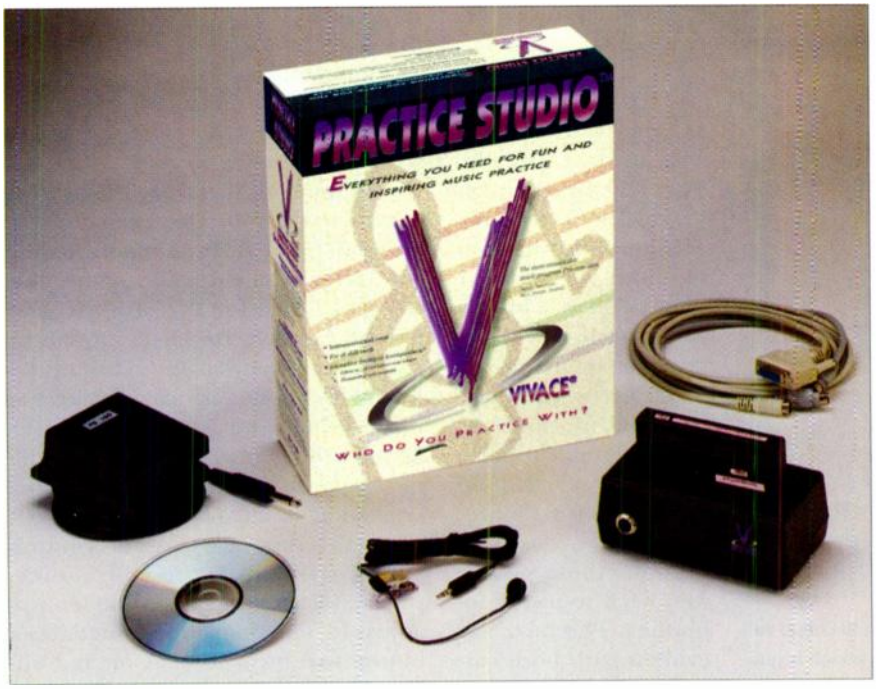
The cartridge reader itself is a small, black, plastic box with a ¼-inch TS connector on the front, two ⅛-inch TRS connectors and a DB15 serial connector on the back, and a rectangular slot for accompaniment cartridges on the top. The serial and ⅛-inch connectors are clearly labeled, but the ¼-inch jack is not labeled at all. (It's for a start/stop footswitch.)

To set up the hardware, you start by connecting the included serial cable from the reader's DB15 connector to the Mac's modem port. Microphone connection takes two steps. First you connect the supplied instrument mic to the corresponding ⅛-inch jack on the reader. Then you connect the reader to the microphone input on the Mac using the supplied patch cord.

Why not simply connect the microphone directly to the Macintosh's mic input? The mic input on the Mac is nonstandard; it uses a longer-than-usual, ⅛-inch TRS connector for mic-level signals. If you connect a standard ⅛-inch plug, the Mac expects a line-level signal. Coda tried to find a reliable source for the nonstandard plugs, but this turned out to be virtually impossible. As a result, the cartridge reader includes a mic preamp, and the patch cord uses a standard ⅛-inch plug to send a line-level signal to the Mac's mic input.

To finish the hardware installation, you connect the Mac's audio output to an amp and speakers or headphones, and the included footswitch to the ¼-inch jack. The mic attaches to your instrument with a padded clip; singers will need a special headset mic ($99 from Coda or a Vivace dealer).

The software for the Cartridge Reader version is on CD-ROM (floppy disks are used for the Modular System version). The installer also installs Adobe *Acrobat Reader* 3.0 (if you don't have it already), which is required for the online documentation. Unfortunately, the installer doesn't have a "custom install" option that lets you select the parts you want to install; I wish the setup documentation made this clear.



The Cartridge Reader version of Vivace Practice Studio includes a simple hardware box and all the necessary cabling.

Vivace uses Apple Sound Manager only, so it doesn't work with Digidesign hardware, such as Audiomedia cards. On the PC, you'll need a card that supports full-duplex operation. Most newer pro and semipro sound cards should work. However, the company has only tested the system with Sound Blaster–brand sound cards, so you may want to contact Coda to see whether your card has made it onto their compatibility list.

OPERATION

To use the system, you must buy cartridges that hold the accompaniment sequences. Each cartridge comes with accompaniment files that are installed on your hard drive and used by the Vivace application to control playback. The extensive library of accompaniments includes many standard solo pieces for all common woodwind and brass instruments as well as male and female vocal solos; it also includes many jazz and pop selections.

Most cartridges cost between $16 and $50; a few cost as much as $250, but these are intended for schools. Most include 1 to 10 titles, and a few hold more than 300. As of this writing, there are more than 500 cartridges containing nearly 4,000 pieces. The printed solo music is widely available and sold separately; some collections are available from Coda. The basic system comes with a tutorial cartridge that includes two pieces—"Long, Long Ago" and "Blues in B♭"—for all instruments and voices.

After making all the physical connections and installing the software, you start by inserting a cartridge into the reader's slot. There is no indication about the correct orientation of the cartridge. It works no matter which way you insert it, but I wish the documentation made this clear; I wondered until I asked a Coda representative.

When you first run the application, the main screen appears briefly, but it is immediately overlaid by the Open Accompaniment dialog box, which lets you select a piece from those installed on your hard drive. If a cartridge is inserted in the reader, this dialog box only displays the titles that correspond to the cartridge, which makes it easier to find files when you have many titles installed. It is possible to launch the application by double-clicking on a piece in the Finder, but the files have coded names that are not very descriptive. The Open dialog box displays the names in a more meaningful way.

Once you select an appropriate piece, the Volume Controls dialog box appears (see **Fig. 1**), letting you set the main volume (accompaniment plus mic signal), accompaniment volume, and mic input level, which is indicated in real time with a ladder-type meter. A Mic Play Thru checkbox mixes the mic signal with the accompaniment, playing both through the sound system. This is a particularly important feature for using the program with headphones. Unfortunately, activating this checkbox produces a fairly loud buzz (not 60 Hz hum), which is a serious drawback for those people who need to use headphones. The buzz was evident with both cartridge readers I tested, which could mean it's endemic.

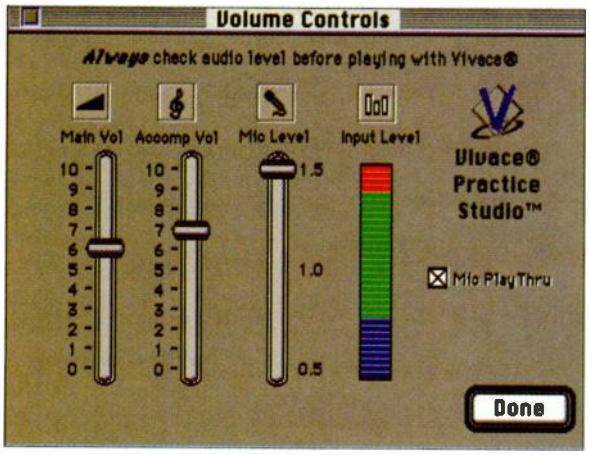


FIG. 1: The Volume Controls dialog box lets you set the main volume, accompaniment volume, and mic input level, which is indicated by the adjacent meter. The Mic Play Thru checkbox mixes the mic signal with the accompaniment, but it also introduces a loud buzz into the signal.

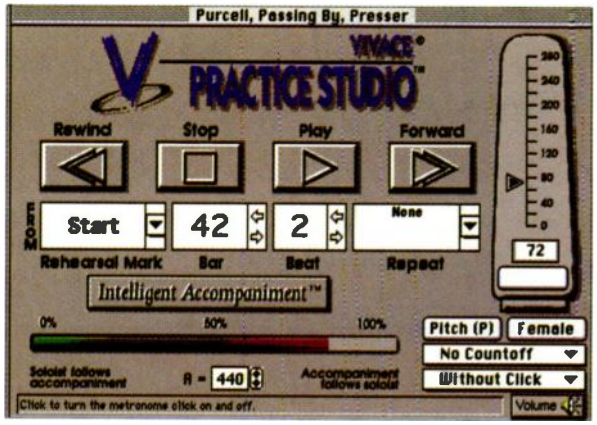


FIG. 2: Vivace's main screen includes transport controls, starting-point controls that double as current-location indicators, a metronome, and an Intelligent Accompaniment percentage indicator. A brief description of each control appears at the bottom of the window as you move the mouse cursor around the screen, which is very helpful.

Finally, you get to the main screen (see **Fig. 2**). Standard transport controls let you start, stop, pause, and jump to different locations in the piece. The "From" fields let you specify the point in the music from which the system will begin playing. These fields include rehearsal marks, bar, beat, and repeated sections. Many pieces include several rehearsal marks (e.g., letter A, etc.), and these are used in the accompaniment files, which are based on particular published versions of the pieces. The From fields also indicate the current location in the piece, including first and second repeats.

Interestingly, the bar numbers are reset at each rehearsal mark rather than being continuously incremented from beginning to end; for example, the Rehearsal Mark and Bar fields might progress from letter A, bar 8 to letter B, bar 1. It is common for the conductor of an ensemble to say something like, "Start at the fifth bar after letter B," so Coda decided to count the bars in this manner. In addition, this type of bar numbering makes it easier to reconcile different editions of a particular piece. If there are no rehearsal marks in the piece, the bar numbers are incremented in the normal manner.

To the right of the transport controls and From fields is the metronome, which indicates the tempo and lets you adjust it. The metronome includes a button that turns its click on and off, but this button is not labeled in any way. The online documentation includes graphics of the metronome with

For manufacturer information, please see Contact Sheet, p. 163.

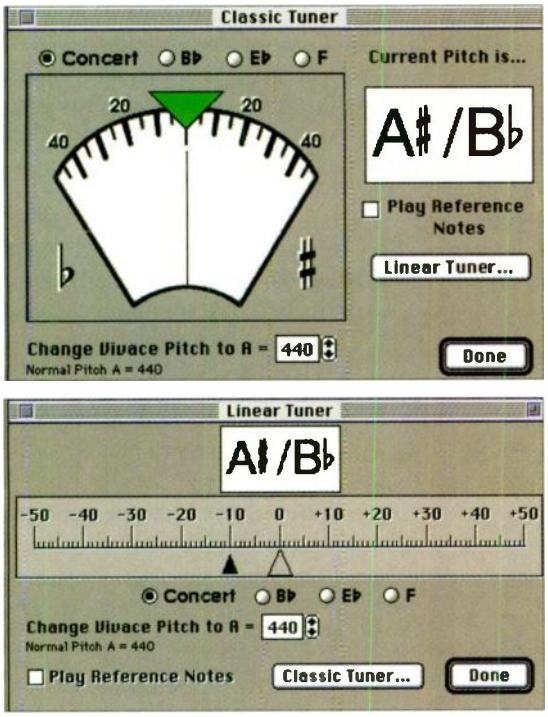


FIG. 3: The tuner can be displayed in two ways. In the classic "strobe" display (top), I played the note perfectly in tune. In the linear display (bottom), I played the note ten cents flat.

this indication, but it is not evident in the actual software. (According to Coda, this is not a problem with any of the systems they have in house or in the field, and they don't know why it happens in my system.) In addition, there is no way to adjust the volume of the metronome. There should be a separate metronome slider in the Volume Controls dialog box; as it is, the click was difficult to hear over the accompaniment and my playing.

Underneath the metronome are several more controls. The Pitch button plays the first note of the currently loaded solo part, which is quite handy, especially for singers. A Male/Female button lets you specify whether a man or woman is singing a vocal solo; this adjusts Vivace's "listening" range. This button appears only with vocal accompaniments.

The Countoff pop-up menu lets you select one, two, four, or no bars of count off. If Intelligent Accompaniment is active (explained in a moment), this menu also lets you specify whether Vivace should wait for the soloist to start playing before it begins the accompaniment. The pop-up menu below the Countoff menu lets you specify whether or not the metronome will play during the count off. The Volume button opens the Volume Controls dialog.

The vocal warm-up feature is an excellent adjunct to the system.

FOLLOW ME

The heart of the Vivace system is its ability to adjust the tempo dynamically in response to the soloist's performance; Coda calls this Intelligent Accompaniment (IA). It works by measuring the time between the beginnings of the soloist's notes and calculating the tempo accordingly.

The degree to which Vivace follows the soloist is determined by the percentage setting displayed in the main screen. At 100 percent, the system follows the soloist very closely; so closely, in fact, that the performance often loses stability. A maximum setting of 70 or 80 percent is fine in most cases. At 0 percent, the system does not follow the soloist at all. Intelligent Accompaniment can be turned off by clicking a button in the main screen. All classical and many pop accompaniments are programmed with Intelligent Accompaniment, but the jazz selections do not use it because this style of music requires a steady beat regardless of what the soloist does.

IA works surprisingly well. The Vivace system was able to follow me through some pretty radical tempo changes, at least when the percentage was set very high. With a more reasonable percentage (such as the preset values for each piece), the system still follows the performance but not as much or as immediately. In this range, IA exhibits a surprisingly natural feel, which is great.

CUSTOMIZATION

Each piece can be customized in a wide variety of ways, and these settings can be saved as part of the accompaniment file to be used later. All pieces include at least one "marker" or default setting at the beginning of the piece that specifies the tempo and IA percentage (if any). In addition, they often include other markers that change the tempo and IA percentage at various points in the piece, which helps enhance the musicality of the performance. Other markers include places at which Vivace should wait for the soloist to play a note, breath marks that tell the accompaniment to insert a slight pause for a breath, repeated sections, and sections to cut from the performance.

The user can also insert additional markers at other locations in the piece to change performance parameters. There's also a Remember Tempos function that lets you tap the tempo on the spacebar for a specified region. It can even remember a continuously changing tempo, as in a ritard or accelerando.

When the system is waiting for the soloist to play a note, it isn't supposed to start until the correct note is played.

However, when I played a French horn solo that begins with the horn, the music started when I played the first note a half step too high or low; it didn't start when I played the first note a whole step or more away from the correct note. According to Coda, this latitude allows for singers who scoop into notes, but I think the tolerance should be tighter for instrumental pieces.

Virtually all pieces include a piano accompaniment; many also include an ensemble accompaniment. The Instrumentation option lets you select which accompaniment you want to hear. In some cases, especially the jazz accompaniments, you can select specific instruments within the ensemble to play or not. You can also specify whether or not you want the synth to play the solo part, which can be helpful when you're first learning a piece. These and other customization options create a very flexible practice environment.

OTHER FEATURES

The Warmup feature guides you through a vocal warm-up, which is an excellent adjunct to the system. An onscreen keyboard lets you select notes to match vocally. This function can play a single note or a major or minor chord (arpeggiated or not) when you select a note on the keyboard. You can also activate new notes by stepping on the footswitch, which shifts the pitch up or down by a half step each time, depending on the setting in the Warmup window.

From time to time, all musicians need to practice certain sections of a piece. Vivace facilitates this with Practice Loops. This feature lets you play a section of the piece repeatedly while you practice. You can specify the loop section by bar and beat number and/or rehearsal marks; its controls are much like the main window's. Sections you have cut are skipped in a Practice Loop, and you can tell Vivace to pause for a user-specified time between loops. IA is not active in this mode, but programmed changes in tempo are followed unless you check the Strict Tempo checkbox.

A loud buzz is evident when Mic Play Thru is active, making headphone use difficult.

The Practice Metronome is a separate timing reference that does not depend on an accompaniment. It simply provides a very flexible metronome to use while practicing any music. It can play many preset time signatures, as well as asymmetric patterns such as 2+2+3+2. Downbeats can be accented, and offbeats can be performed with a different sound. This is a very handy function I wish I'd had when I was learning to play. The Practice Metronome's Start/Stop button is labeled and indicates its status, unlike the button for the main window's metronome.

Vivace includes a cool tuner that detects the pitch you play and tells you if you are sharp or flat with respect to the reference pitch (typically A440, although you can set this to something else if you want). The tuner can be displayed as a classic "strobe" type or a linear tuner (see **Fig. 3**), and it can play an in-tune version of the notes you play so you can match them aurally as well as visually.

Educators and parents will appreciate Vivace's ability to keep track of the time a student spends on Warmup, the Tuner, Practice Loops, the Practice Metronome, and each piece of music. The first time you use this feature, you enter your name, instrument, and other pertinent info. When you begin a practice session, you open the Practice Report window and start a timer clock; when you're finished, you stop the clock. The software automatically keeps track of the time you spend on each activity. Each practice session generates a new report, which can be displayed or printed (see **Fig. 4**). For example, a teacher might want the students to turn in a practice report each day in lieu of other homework.

Even better, the reports for different students can be compiled into a database, which is great for classes or families in which several members use the system. The Vivace software on both the Mac and PC includes a runtime version of Claris *FileMaker Pro* 3.0, which organizes and displays the database. In addition, the database is password-protected for classroom security.

The Info menu provides access to notes on the composer and composition as well as definitions of musical symbols and terms. The musical-terms dictionary is searchable by word or phrase, which is very handy. You can also display a catalog of cartridges and launch the tutorial from this menu.

Speaking of the tutorial, it is excellent. A pleasant female voice describes the entire system, and onscreen graphics follow these descriptions. The tutorial includes seven chapters, each of which is further divided into sections. You can run the entire tutorial from beginning to end, or you can access any section independently by using a set of well-designed navigation controls. You can also pause the tutorial and go back to the main application to try what you just learned.

The Info menu also provides access to the Online Reference documentation, which is an Adobe *Acrobat Reader* 3.0 file. You can print this file if you want to, but it's 107 pages long. In addition, the online version includes many hyperlinks that jump to the relevant section when you click on them, which is very slick. I found one hyperlink that jumps to the wrong place, but on the whole, the documentation is very helpful; it's easy to find the information you're looking for.

System Requirements

Macintosh:
Cartridge reader version: Power Mac with a 604 processor or any Power Mac with a clock speed of at least 180 MHz; Mac OS 7.5 or higher; at least 16 MB of RAM.

Modular System version:
68030 Mac with a clock speed of at least 25 MHz; Mac OS 7 or higher; at least 4 MB of RAM.

Windows:
Pentium 166 MHz or faster; Windows 95; 16 MB RAM; any of the following sound cards or chip sets: Creative Labs Sound Blaster 16, AWE32, AWE64, Daytona, Vibra 16; serial port; sound system; CD-ROM drive recommended.
Slower machines (minimum 80486DX2) require Sound Blaster AWE32 or AWE64.

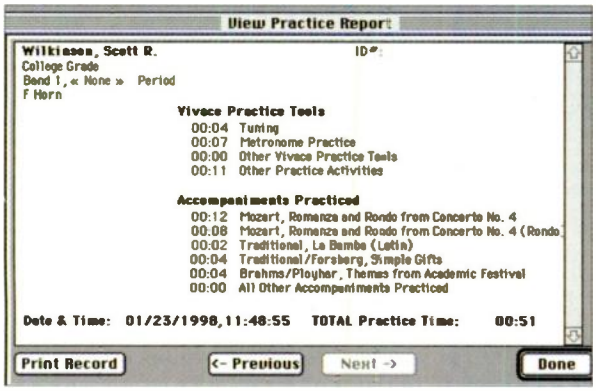


FIG. 4: Practice Reports automatically keep track of how much time a student spends on each Vivace activity.

CONCLUSIONS

Wynton Marsalis has compared music with basketball: you can't learn to play all by yourself. Both are team activities, and no matter how much you practice alone, you can't get good at the game. In addition, you can't learn to love the game because it's no fun practicing by yourself.

With Vivace Practice Studio, you never practice alone. The system provides an interactive experience in which you can practice listening, intonation, and balance along with the notes in a particular piece of music. With Intelligent Accompaniment, you can also practice expressing yourself musically, projecting your personality into the music. Most importantly, Vivace makes practicing fun, which encourages you to practice not only longer but also more effectively.

At $199, the Cartridge Reader version offers a lot of value to music students and educators. However, this version requires a pretty high-powered computer to run the software synth. If you have an older machine, it might make more sense to purchase a faster computer rather than shelling out over $1,600 for the Modular System version of Vivace.

The sequences in the cartridges are very musical and include subtle tempo changes and IA settings that just feel right. According to Coda, the software synth is tweaked for each piece to maximize sound quality and expressiveness. It still sounds pretty electronic to me, but that doesn't matter in this application as much as it does in a serious recording environment. More problematic is the overall volume level, which is relatively low, even at the highest settings. I had to turn up my sound system quite a bit to balance the sound of my horn. I thought I might run into some feedback problems when using Vivace with speakers, but I didn't.

I also have some concerns about the overall build quality of the cartridge reader itself, which seems rather flimsy. For example, one of the two DB15-connector thumbscrews doesn't seat, and inserting a cartridge feels very wobbly and insecure. And as mentioned earlier, a loud buzz is evident when Mic Play Thru is active, which makes headphone use difficult.

Despite these problems, Vivace Practice Studio performs very well (at least over speakers), making practice time much more fun than it would otherwise be. The Vivace system offers something unique to music students and educators: an infinitely patient, flexible, and sensitive accompanist or ensemble with which to practice at any time, which beats the heck out of those old Music Minus One records.

EM *Contributing Editor* **Scott Wilkinson** *teaches at the University of Northern Colorado's Rocky Mountain Music Technology Seminar for music educators each summer.*

CODA MUSIC TECHNOLOGY
Vivace Practice Studio practice system
Cartridge Reader: $199
Modular System: $1,698

FEATURES ■■■■■
EASE OF USE ■■■■
DOCUMENTATION ■■■■■
VALUE ■■■■■
1 2 3 4 5

PROS: Intelligent Accompaniment helps foster musical expression. Makes practicing fun. Provides a very flexible practice environment.

CONS: Poor build quality. Low maximum volume. Loud buzz when mixing mic input with accompaniment.

CIRCLE #442 ON READER SERVICE CARD

RØDE

NT1

A great-sounding large-diaphragm condenser mic for a song.

By Brian Knave

You may have noticed that, in our January 1998 issue, we awarded the Røde NT1 **EM**'s 1998 Editors' Choice award for best new microphone. I had just begun testing the NT1 at that time, and my initial enthusiasm for the mic played a big part in its being selected for the prize. Since then, I've used the NT1 in dozens of applications and carefully compared it with other, more expensive mics. My enthusiasm hasn't waned.

The Røde NT1 is distinctive because it provides the clarity, detail, and presence that large-diaphragm condenser mics are known for but at a price well below what a microphone of this quality typically costs. Indeed, to our knowledge the NT1 is the least expensive large-diaphragm condenser mic currently available. That alone makes it especially attractive for the budget-conscious personal-studio owner seeking a professional sound.

NO FRILLS

As condenser mics go, the Røde NT1 is about as basic as they get. It has a fixed polar pattern—cardioid—and the mic itself is devoid of extras: no pad, no bass roll-off filter, no adjustments of any sort. Nor does the NT1 come packaged with accessories, such as a cable, elastic suspension mount, or foam windscreen. All you get is the mic and a simple mic clip (with adapter) in a foam-lined, hard-plastic case. To mount the NT1, you simply remove the knurled nut attached to the bottom of the mic, slip the mic through the clip, and then reattach and tighten the nut. The clip, which allows for a fairly complete range of secure positioning, is small but very sturdy.

The elimination of extras, of course, is one of the main ways Røde got the NT1's price down so low, allowing the designers to focus on quality audio

components rather than cosmetics and amenities. To wit, the NT1 features transformerless, FET circuitry; a 1-inch, gold-sputtered diaphragm (the capsule is housed in a proprietary, internal shock mount); and gold-plated XLR connectors. The mic operates on standard 48V phantom power.

Despite its plain build, however, the NT1 is solidly constructed and handsome in an understated way. The body is machine lathed from light-gauge steel and has a smooth, glossy, light gray enamel finish. The mic's grille is made of two layers of stainless-steel mesh: a heavy open weave over a fine, internal layer.

Like most large-diaphragm condenser mics, the Røde NT1 is a side-address microphone, which of course means that you sing or play into the side of the mic rather than the top. An inset, brass "button" identifies the capsule side. Just beneath the brass button, engraved into the body and painted black, are the Røde logo and NT1 designation.

The Røde NT1 is the personal-studio owner's dream come true: a very affordable, superb-sounding, large-diaphragm condenser mic.

MANY THRILLS

I used the NT1 during numerous sessions, recording various male and female vocals, acoustic guitar, harmonica, recorder, flute, saxophone, and hand percussion. I also used it as an overhead, both for drum set and upright bass (with a second mic aimed at the bridge) and as a room mic. I tested it with different mic preamps, too, including the Millennia Media HV-3 as well as the stock preamps in my Mackie 8•Bus board.

The NT1 sounded surprisingly good on just about everything, but I especially liked it on vocals, on acoustic guitar, and as a drum overhead. This mic has a very open and detailed sound with lots of presence. Though its overall tonal "flavor" might best be described as transparent with a bright finish, the NT1 is not nearly as bright and glassy sounding as the NT2, its immediate predecessor (and Røde's first entry into the world of condenser mics). Yet it does have that nice, crisp high-end response or "presence boost" that puts vocal tracks right in your face with startling clarity.

Of course, this might render the NT1 not the best choice for singers who tend to produce a lot of sibilance. But I've never been terribly squeamish about sibilance, so the NT1 didn't prove a problem for me in that regard. However, the mic's extreme sensitivity makes it a shade more vulnerable to plosives than other condenser mics I've worked with. Therefore, for close-up vocal recording especially, I would recommend using a nylon-mesh pop filter with the NT1. (I use this type of pop filter on most critical vocal recordings anyway.)

SHY BASS

It was only on deep bass sources that the NT1 fell slightly short of the mark in terms of accurate response. This was noticeable, for example, when I used the mic as a drum overhead. Although cymbals and hi-hats were reproduced exceptionally well, the low toms and especially the kick drum came out sounding a tad deficient in body and low end. Of course, this would present no problem in most drum-set recording applications because there is almost always a separate mic on the kick drum and often one for each tom, as well. Indeed, depending on the recording style and the sound of the drums, this type of response can be advantageous in a drum overhead because it promotes the cymbal sounds without overwhelming the mix with low-end information.

Likewise, though the NT1 did a nice job of capturing string detail and overall image when employed as an upright bass overhead, it didn't have the right stuff to fully translate that instrument's low frequencies and warm, complex timbres. Of course, not many mics do. Yet it was precisely the NT1's crisp high end and slightly shy low-end response that made it work so nicely on acoustic guitar. For example, it really helped a dark-sounding acoustic guitar cut through in a busy rock mix, and on a gut-string classical guitar, it captured the warmth of the instrument while detailing the high end and minimizing boominess.

LOW NOISE, BIG EARS

No mic is ideal for every source sound, of course. But considering its fixed polar pattern and lack of amenities, the NT1 is a quite versatile microphone. Its cardioid pattern is relatively broad, and off-axis response is impressively smooth and consistent sounding. This is important if you're miking a big instrument, such as a piano, relatively closely so that the strings at either extreme of the mic's polar pattern do not

For manufacturer information, please see Contact Sheet, p. 163.

NT1 Specs

Capsule Type	1" pressure-gradient transducer with gold-sputtered diaphragm
Polar Pattern	cardioid
Frequency Response	20 Hz–20 kHz
Self-Noise	17 dB (A weighted)
Sensitivity	18 mV/PA
Maximum SPL	135 dB
Weight	11 oz.

sound timbrally inconsistent with those in the center of the pattern.

I was also impressed by how quiet the NT1 is. And along with the low self-noise (17 dB, A weighted), its maximum SPL is quite high, at 135 dB, leaving a very big dynamic range (well beyond the limit circumscribed by 16-bit digital audio). On top of this, the NT1 has a surprisingly hot output. When I compared it to other condenser mics (including the two mentioned below), the NT1 required much less juice from the mic preamps to reach equivalent levels.

UNFAIR COMPARISONS

Of course, we never know a thing except in its relation to something else. You can listen all day long to a particular mic, but until you compare it to another one, you'll have a hard time pinpointing its sonic characteristics. In fact, the more you listen to just one mic (or mic preamp, sound source, whatever), the more acclimated and "tuned out" your ear becomes. All too soon, fatigue sets in and discernment goes out the window (which is why it's so important to take frequent breaks when tracking and mixing).

If all of this sounds like an excuse, well, that's because it is. After all, one of my tests was, by most anyone's accounting, inexcusable. I was so impressed by the NT1 that I wanted to make sure I wasn't just hearing things. So I did a careful comparison of the NT1 with two well-known (and much more expensive) "celebrity mics": an AKG C 414 B/ULS and a Neumann U 87.

Talk about unfair! Considering that the price of the Røde NT1 is less than one-third that of the AKG C 414—and not even a seventh of the Neumann U 87's—that's like comparing a Ford Festiva to a Lexus or Mercedes. And yet, as mainstays in most pro studios, the 414 and U 87 serve well as touchstones—examples of just how good a superior microphone can sound.

I compared the three mics on vocals, harmonica, shakers (wood, metal, and plastic), triangle, tambourine, and claves. Naturally, I set the AKG and Neumann mics to cardioid patterns and didn't engage any of the filters or pads. And to further "objectify" my findings, I solicited some help from our new associate editor, Jeff Casey, who has extensive major-studio recording experience.

Now, I'm not going to shock anyone by reporting that the Røde NT1 sounded better than the AKG and Neumann mics; it didn't. But it did compare quite favorably. Compared to the 414, it had noticeably more presence and high-end brightness but not nearly as much low-end oomph. For this reason, I could imagine choosing the NT1 over the 414 B/ULS for many applications. (Note, however, that I did not compare the AKG C 414 TLII, which uses the same capsule as the classic AKG C 12 tube mic and has a distinctive "presence boost." The 414 B/ULS, in fact, is known to have a flatter, more accurate—ergo, less seductive—response than the TLII.)

On the top end, the NT1 sounded more like the U 87 than like the 414, albeit with a slightly more "glassy" quality (and tendency to exaggerate sibilance). It was also less warm and open sounding than the U 87, and again, it didn't produce as much low-end response.

To get an idea of what the NT1 was "missing" as compared to the U 87, I dialed in EQ on some of the NT1 tracks in an effort to replicate the tonal balance of the U 87 tracks. Depending on the instrument (and using my Mackie mixer), it took 2 to 3 dB of 4 kHz, about 4 or 5 dB of 280 to 300 Hz, and maybe 1 dB of 80 Hz. (Note how these figures correlate to my initial impressions of the NT1's slightly deficient bass response. It's that critical range around 250 to 300 Hz that really adds fullness to the low end.)

Of course, even with the added EQ, the sound of the NT1's tracks lacked the U 87's unique "dimensionality"—one of the qualities that makes that mic so magical (and hard to beat). But again, considering the price differences, the NT1 compared very favorably to both the AKG C 414 and the Neumann U 87—and that's saying a lot!

FINAL TESTAMENT

The Røde NT1 is a great-sounding yet inexpensive large-diaphragm condenser microphone. At $349, it's not only an exceptional bargain for anyone, but it could very well end up as the condenser mic of choice for cash-challenged personal-studio owners. But don't let the low price fool you. The NT1 has a rich, stunning sound—very transparent, present, and brightly detailed—that would prove a valuable addition to any mic cabinet.

Of course, the NT1's lack of amenities (pads, filters, etc.) makes it less versatile than a full-featured, multipattern mic. But if what you need is the sound alone—the clarity, sensitivity, detail, and presence that only a large-diaphragm condenser can provide—and you can get by with a fixed polar pattern, I heartily recommend that you audition the Røde NT1. It's a real gem.

RØDE
NT1 condenser microphone
$349

AUDIO QUALITY
VALUE
1 2 3 4 5

PROS: Transparent, open, detailed sound. Great presence. Quiet. Big dynamic range. Very affordable.

CONS: Mildly deficient low-end response. No pad, filter, or alternate polar patterns.

CIRCLE #443 ON READER SERVICE CARD

QUICK PICKS

Q UP ARTS

Latin Groove Factory, vol. 1

By Paul Potyen

Q Up Arts strives to provide unique, enduring, state-of-the-art audio content, and its latest release, *Latin Groove Factory (LGF)*, vol. 1, fits the bill. Available in Roland, Akai, and SampleCell CD-ROM formats ($299) and in audio-CD format ($99), *LGF* includes drum and percussion samples and loops derived from three popular Cuban music styles: mambo, salsa, and songo.

Documentation

Sample-CD reviewers are typically forced to go into a barrage over the lack of documentation provided with these products. I want to say right up front that the wealth of documentation included with *Latin Groove Factory* should be a benchmark for other manufacturers. It could be argued that the booklet alone is worth the price of this CD!

The insert contains comprehensive, accurate information comparing and contrasting various Latin music styles and illustrating how they relate to *LGF*. For the uninitiated, it helps demystify the Afro-Cuban clave rhythm, which is the basis for all of this music. The organization and cataloging is easily explained in a way that would make sense to anyone (from beginners to experts). I wholeheartedly applaud this extra effort from Q Up.

Loops

Several percussion loops are available in three different tempi for each of the covered Cuban music styles. (All 2-bar loops use a 2–3 clave that can be modified as needed.)

LGF uses two kinds of loops: a "mix" loop, in which two or more instruments have been blended together, and a "single instrument" loop. Intelligently combining mix and single instrument loops gives you quite a bit of flexibility in creating bridges, choruses, and breaks.

The loops are mapped so that all 2-bar patterns appear on the white keys of your sampler and all start bars on the black keys. In some cases, all you may need for your composition is a sequence of loops triggered from your sampler. More often though, you may want to add fills, breaks, and other goodies. Again, *LGF* makes this easy by mapping single percussion/drum hits directly to your MIDI keyboard.

Sonic Quality

All of the sounds on *LGF* are multisampled; that is, recorded at different dynamic levels rather than simply scaled in MIDI Volume. This produces extremely authentic-sounding tracks.

The loops are all seamless, with no audible pops or other discrepancies at starts and ends. *LGF* was produced using only high-end audio equipment (e.g., Digidesign, Neumann, AKG, Focusrite, and Neve), and the result is a clean, professional recording.

Recorded by experts in the Latin-music field, this CD offers the maximum amount of feel and groove you can get from a sampler today. Look out for future volumes of *Latin Groove Factory* featuring bolero, sambas, cruzado, funk, partito alto, batucada, bossa nova, baio, and calypso.

Mambo, salsa, and songo beats are featured on Q Up Arts' *Latin Groove Factory*, vol. 1.

Overall EM Rating (1 through 5): 4

CIRCLE #444 ON READER SERVICE CARD

SPECTRASONICS

Burning Grooves

By Dan Phillips

As the name implies, *Burning Grooves* ($199, CD-ROM; $99, audio CD), the latest offering from perennial soundware heavyweight Spectrasonics, is a collection of aggressive, live drum kit samples, with both multisampled hits and loops. The CD-ROM comes with a complementary audio CD and is available in Roland S-700, Kurzweil K2000, Akai S1000 (also compatible with the E-mu EIIIx and the Ensoniq ASR series), and Digidesign SampleCell formats.

If you're looking for fiery intensity, you'll find it in Spectrasonics' *Burning Grooves*.

In the Groove

Featuring drummer Abe Laboriel Jr., *Burning Grooves* shines in both performance and production. The CD covers a wide range of styles—you'll find straight-ahead rock 'n' roll, fat funk, heavily compressed modern rock, predestroyed hip-hop/electronica, tight hip-hop shuffles, and smatterings of reggae and Cajun grooves. The tracks are laden with heavy compression, EQ, distortion, effects, and sheer performance intensity. Very little on this disc comes near to being bland.

There are 157 grooves in all, with an assortment of 52 fills. Most of the grooves are in 4/4 (some straight, some shuffles), with a dozen or so in other time signatures, including 3/4, 5/4, 6/8, 7/8, and 12/8. Tempos range from 56 to 178 bpm. Each groove usually includes a "no snare" mix, and a "no kick" mix, in addition to several

For manufacturer information, please see Contact Sheet, p. 163.

other variations (e.g., intros, accents, and breaks).

In some cases, patterns are available with a choice of processing. For instance, the Soul Slam patch is offered in both an Edge (aggressive hi-mid EQ) and a Verb (lots of ambiance) variation. Certain patches also offer a Lo-Fi (downsampled) version. But loops are only half of what *Burning Grooves* has to offer.

Smokin' Kits

The CD-ROM versions of *Burning Grooves* include 58 "Smokin' Kits," assembled from a library of 121 different drum and cymbal sounds. The kits are solid and useful, yet they still supply a good dose of unique character. Most of the patches are offered in both dry and wet versions.

The snares are the highlights, ranging from massive and ambient to dry and intimate. Each patch offers left- and right-handed hits in addition to flams and buzz samples. Most of the snares are recorded in stereo with high and low velocity switching, although some are served-up in mono with 4-way switching.

The hi-hats provide a number of expressive options, offering closed, very tightly closed, open, and semi-open positions (each with two-way velocity switching). The 16-inch hats offer a choice between a tip-played hat and a slightly looser, edge-played hat. Although some of the patches have obvious jumps in amplitude when the forte sample kicks in, a quick adjustment to the sample volume took care of this minor problem.

As with the snares, the tom samples range from aggressive ("Impact Toms") to mild ("Soft Toms"). There are also a couple of lo-fi tom sets included to match the lo-fi snares. And while the kick-drum samples may not be as exciting as the others, they still cover a decent range of likable timbres.

The Verdict

As we've come to expect from Spectrasonics, *Burning Grooves* is full of good sounds. The CD is impeccably organized. The names are easy to read, and a loop tempo is listed for every track. Anyone looking for terrifically performed, aggressive drum loops full of vibe (for rock, hip-hop, alternative, etc.) or for an impressive collection of multisampled hits should check out this CD—it's definitely money well spent!

Overall EM Rating (1 through 5): 5

CIRCLE #445 ON READER SERVICE CARD

AMG

Guitarras Atomicas

By Geary Yelton

Sounds are to the electronic musician what pigments are to the painter, so you can be sure that some sample fanatics are looking for guitar licks to add to their palettes. One of the latest sample CDs of guitar work is *Guitarras Atomicas* ($99), a fine collection of rock 'n' roll guitar riffs, chords, and tones from the accomplished player Sagat Guirey.

My first impression of this audio-only CD was that it's a monument to musical self-indulgence (which isn't a bad thing!), with a wealth of useful ideas from a man who has very talented hands. The variety of electric and acoustic guitar tones is impressive, and Guirey knows how to explore the rock-guitar vocabulary.

What You Want

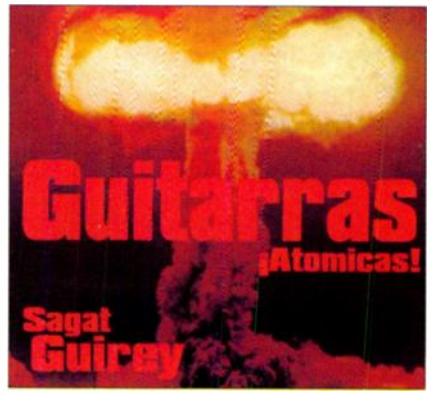
Guitarras Atomicas runs the gamut from tones appropriate for tribal space music to pure garage grunge. But for the most part, it's straight-ahead rock 'n' roll. I distinctly hear shades of Jeff Beck, David Torn, and Jimi Hendrix, and with a wah-wah pedal, Guirey even does a pretty good Stevie Ray Vaughn!

Each riff is played just once, usually in the key of E. Overall, the CD avoids using reverb except when it's an integral part of the sound, and then you'll find it at just the right depth. Sounds are placed throughout the stereo image, which could be a problem if you want successive licks to stay in the same location.

One of the challenges in producing a CD like this is to organize everything in a logical order. With *Guitarras Atomicas,* parts are divided by tone and style, beginning with electric riffs and progressing to acoustic chords. Although the track listing provides a pretty good guide to finding the part you need, I still wish more time had been spent on organization.

The Fine Print

So once you've bought the disc, is the music yours to use however you please? Well, that's the sticky issue. The license agreement specifies that, in order to use the tracks on commercially released recordings, you must give written credit to "Sagat Guirey's *Guitarras Atomicas,* The AMG Sample CD." You also have to notify AMG before your recording is released and send a final copy when it's ready. If you fail to adhere to these demands, it's considered a breach of the license agreement. All of this may seem pretty harsh, but if that's the only way to get great guitar tracks for $99, I think it's worth it.



***Guitarras Atomicas* is an impressive (and useful) audio sample CD of guitar licks by Sagat Guirey.**

The Bottom Line

Sagat Guirey is a fine guitarist with a good ear for tone and a talent for playing individual licks. Finding what you need—when

HARD DISK RECORDING

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A Division of Avid Technology, Inc.

ProTools Project™
Digital Audio Workstation for Macintosh

With Pro Tools Project you get 8 tracks of digital audio &, on some Power Mac systems, up to 16 tracks of playback & 64 virtual tracks! The Pro Tools Project system includes an audio card as well as award winning Pro Tools software. You choose either an 888 or an 882 I/O to complete the package. Project also features MIDI recording and playback as well as Quickpunch™ punch-in-on-the-fly & when your ready to ugrade, its ready too.

REQUIRES–
- Qualified NuBus or PCI Macintosh CPU
- Hard Drive, system software 7.1 or greater
- 24MB RAM minimum
- 14" monitor (17" recommended)

ProTools 4.0 Software
Digital Audio Software for Macintosh

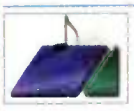
Pro Tools version 4.0 software provides the next step in the evolution of Digidesign's award-winning digital audio production software for the Mac. Fully Power Mac native, 4.0 features noticable improvements in every major area. ProControl™ support, improved automation features, realtive fader groupings & group nesting, plug in MIDI personality files, multiple edit play lists, Sound Designer II™ functionality, Finder-style searching & sorting, and I'm out of breath.

WINDOWS

Session 8™
Digital Audio Workstation for Windows

Session 8 is a professional quality digital audio recording, editing, & mixing system created specifically for personal and project recording studios. Designed to operate with Windows 95 or Windows 3.1, Session 8 offers professional recording features, powerful random access editing, automated digital mixing, & unparalleled integration with most popular MIDI sequencers.

FEATURES–
- 8-channel direct to disk digital recording
- Random access, non-destructive editing
- Automated, intuitive digital mixing environment
- Built-in volume & pan automation
- Complete SMPTE frame rate support
- Frame accurate syncwith built in .AVI video playback window
- Digital parametric EQ
- Support for multiple hard drive partitions
- Auto sample rate coavert to 44.1 or 48 kHz mono .WAV file format
- Choice of audio interface options



SOUNDSCAPE
DIGITAL TECHNOLOGY LTD.

SSHRD-1
Hard Disk Recorder/Editor

A professional Multitrack Digital Audio Workstation, the SSHDR1 combines the highest quality processing hardware with easy-to-use Windows-based software. The most complete and affordable solution for high quality digital audio on the PC, the SSHDR1 has over 50 powerful editing tools and is expandable from 8 to 128 tracks, with up to 32 inputs and 64 outputs. Ideal for a wide range of applications ranging from project studios, to multi-unit 32, 48 and 64 track systems for major TV and film studios needing audio post-production linked to video.

Version 2.0

SSAC-1
Accelerator Card

The new SSAC-1 is a DSP card that can be added to any existing SSHDR-1 system for faster processing as well as an additional 8 channels of I/O in the form of a TDIF port. This card is needed by anyone who wants to upgrade an existing system to V2.0.

SS810-1
8 Channel I/O

This rack mount unit connects to the SSAC-1 card via the expansion port to give you 8 XLR ins & outs with superb A/D-D/A conversion. It also features an ADAT Optical interface. The **SS810-D** comes without the analog converters for connecting an ADAT without additional channels.

CD & CASSETTE DUPLICATION

marantz
CDR615 / CDR620
Compact Disc Recorder

Both next-generation stand-alone write-once CD recorders, the CDR615 & 620 offer built-in sample rate conversion, CD/DAT/MD/DCC subcode conversion, and adjustable dB level sensing. Additional features include adjustable fade in/fade out, record mute time, & analog level automatic track incrementing. A 9-pin parallel (GPI) port and headphone output with level control are also included.

CDR620 Additional Features–
- SCSI-II Port • XLR (AES/EBU) Digital In/Out and Digital cascading
- 2x speed recording • Index Recording and playing*
- Defeatable copy prohibit and emphasis • 24 key, 2-way wired remote (RC620)

*Available on CDR615 w/optional Wired Remote (RC620)

Telex
ACC2000/ACC4000
Cassette Duplicators

Designed for high performance & high production, Telex duplicators offer easy maintenance and operation. The **ACC2000** is a 2-channel mono duplicator while the **ACC4000** is stereo. Each produces 3 copies from a cassette master at 16x normal speed & by linking additional copy modules, you can duplicate up to 27 copies of a 60 minute original ***in under two minutes.***

ACC2000XL/ ACC4000XL

The XL Series feature "Extended Life" cassette heads for increased performance and wear characteristics. They also offer improvements in wow and flutter, frequency response, S/N ratio & bias.

STUDIO DAT RECORDERS

SONY
PCM-R500

NEW PRODUCT!

Incorporating Sony's legendary high-reliability 4D.D. Mechanism, the PCM-R500 sets a new standard for professional DAT recorders. The Jog/Shuttle wheel offers outstanding operational ease while extensive interface options and multiple menu modes meet a wide range of application needs.

FEATURES–
- Set-up menu for preference selection. Use this menu for setting ID3, level sync threshold, date & more. Also selects error indicator.
- Includes 8-pin parallel & wireless remote controls
- SBM recording for improved S/N *(Sounds like 20bit)*
- Independent L/R recording levels
- Equipped with auto head cleaning for improved sound quality.

TASCAM
DA-20/DA-30mkII

- Multiple sampling rates (48, 44.1, and 32kHz).
- Extended (4-hour) play at 32kHz.
- S/PDIF Digital I/O, RCA Unbalanced In/Out.
- SCMS-free recording. Full function wireless remote.

DA-30mkII Additional Features–
- Variable speed shuttle wheel.
- Digital I/O featuring both AES/EBU and S/PDIF.
- XLR balanced and RCA unbalanced connections.
- SCMS-free recording with selectable ID.
- Parallel port for control I/O from external equipment.

Panasonic
SV-3800/SV-4100

The SV-3800 & SV-4100 feature highly accurate and reliable transport mechanisms with search speeds of up to 400X normal. Both use 20-bit D/A converters to satisfy even the highest professional expectations. The **SV-4100** adds features such as instant start, program & cue assignment, enhanced system diagnostics, multiple digital interfaces and more.

FOSTEX
D-15

The new Fostex D-15 is the least expensive timecode DAT on the market. It has a host of new features aimed at audio post production and recording studio environments.

FEATURES–
- Chase mode functions built in
- Hold the peak reading on the digital bargraphs with a choice of 5 different settings
- Set cue levels and cue times
- Supports all frame rates including 30df
- Newly designed transport is faster and more efficient utilizing a 4-motor design. 120 minute tape shuttles in about 60 seconds.
- Parallel interface
- Front panel trim pots in addition to the level inputs

VIDEO and PRO AUDIO

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MICROPHONES

AKG — JUST IN

C414B/ULS

A reputation for flawless performance & uncommon flexibility in the most demanding studio & concert sound applications.
- Dual 1" Gold-sputtered diaphrams.
- Flat on axis response. • 126dB dynamic range.
- Switchable 10dB and 20dB pad. • 20Hz–20kHz

CAD — E-300

Studio Condenser Microphone

A multi-patterned side address mic that combines vintage capsule design with advanced head-amp electronics, the E-300 has an unusually wide frequency response of 10Hz to 20kHz & an exceptional dynamic range of 137 dB. It also features extremely low self noise of 11dB. Ideal for even the most critical studio applications.

Shown with optional ZM-1 Shockmount

Unique powering of all Equitek Series microphones is accomplished with a pair of rechargeable nicad 9-volt batteries in combination with 48V phantom power. This overcomes inherent current limiting associated with most phantom power supplies & can supply 10x the current.

audio-technica.

AT4050/CM5

Cardioid Capacitor Microphone

The AT4050 multi-pattern condenser expands upon the AT4033 to set the standard for studio performance mics.
- 2 capacitor elements.
- Cardioid, Omnidirectional, & Figure 8 polar pattern settings.
- Vapor-deposits of pure gold on specially-contoured large diaphragms are aged through 5 steps to ensure optimum characteristics over years of use.
- Transformerless circuitry results in exceptional transient response and clean output even under extremely high SPL conditions.

AZDEN

UHF Performance Series

Breaking new ground: Azden's new UHF receiver and microphone transmitters offer superb performance and features at prices far below anything you've ever seen.

411UDR UHF Receiver

- Crystal-controlled, PLL synthesized UHF receiver with 63 user-selectable channels in the 794-806 MHz band. Up to 9 systems may be used simultaneously. Features both 1/4-inch and XLR output jacks, volume adjustment and can be rack mounted.

41HT Handheld Microphone Transmitter

- Newly designed handheld with supercardioid uni-directional mic element and 63 user-selectable channels. Uses 2 AA alkaline batteries or Azden ni-cads with the AMC-2A Charging Station.

41BT Bodypack Transmitter

- 63 user-selectable channels, input level control, standby switch, locking mini-plug connector and metal clip. Ideal for use with lavalier and headset microphones or as an instrument transmitter.

AMC Ni-cad Battery Charging Station

- Turns the 41HT into the only rechargeable UHF microphone available. (Uses Azden AN-1A nicad batteries only). Fully charged, the 41HT will run for 4 hours. Charging time is approximately 12 hours.

SENNHEISER

ME66/K6P

Short Shotgun Microphone

This road ready mic system is perfect for camera mount and other short gun applications. It's professional sound quality and affordable price combined with the flexibility of a modular setup make it a hard choice to beat.

MIXING BOARDS

MACKIE

SR24x4 • SR32x4

Sound Reinforcement Consoles

These consolses do for live sound what the acclaimed 8-bus series has done for studio recording. Both professional grade mixing consoles, the SR32-4 and SR24-4 were built to deliver the same kind of useful features found on "bigger boards" while standing up to 24-hr-a-day use.
- Fast, accurate, easy level setting via "solo".
- 4 submix buses.
- 3 band EQ w/ sweepable mids.
- 6 Aux sends.
- Globally switchable AFL/PFL.
- Mackies "VLZ" technology for low noise.
- Tape return to main mix, mono but w/level control.

The new MS-1202, 1402, 1604 & SR Series all include VLZ (Very Low Impedance) circuitry at critical signal path points. Developed for Mackie's acclaimed 8•Bus console series, VLZ effectively reduces thermal noise and minimizes crosstalk by raising current and decreasing resistance.

TASCAM M-1600

16 & 24 Channel 8-bus Consoles

Great for modular Digital Multitrack setups and hard disk recording, the M-1600 is part of Tascam's next generation series of recording consoles. It features multiple options for inputs and outputs and uses the same, easy to install D-sub connectors as Tascam's more expensive consoles, all in "a compact design.

- XLR Mic inputs w/phantom power on 8 channels.
- Signal present/overload indicators on each channel.
- Balanced & Unbalanced tape returns & Balanced Group/Direct outputs using D-sub connectors.
- TRS Balanced Line Inputs on all channels.
- 3-band EQ with sweepable mids.
- 5 Aux sends (1 stereo).
- 4 assingable aux returns. Perfect for use with DA-88 and ADAT setups.

MINIDISC MULTITRACKS

TASCAM 564 Digital Portastudio

The Tascam 564 Digital Portastudio combines the flexibility and superior sound quality of digital recording with the simplicity and versitility of a portable multi-track. Using MiniDisc technology, the 564 has many powerful recording and editing features never before found in a portable 4-track machine.

JUST IN

FEATURES–
- Self-contained digital recorder/mixer.
- Uses low-cost, removable MiniDiscs.
- 2 AUX sends / 2 Stereo returns.
- 4 XLR mic inputs.
- Channel inserts on inputs 1 & 2.
- 5 takes per track, 20 patterns, 20 indexes per song.
- Random access and instant locate.
- Non-destructive editing features with undo capability include: bounce forward, cut, copy, move.
- Full-range EQ with mid-range sweep.
- S/PDIF digital output for archiving.
- MIDI clock and MTC.

SONY MDM-X4 MD Multi-Track Recorder

MD recorders are here! Offering up to 37 minutes of high-quality 4-track digital recording, the MDM-X4 is truely the next generation of personal multi-tracks. With a built-in mixer, exclusive Track Edit system, and a Jog/Shuttle wheel for sophisticated editing with ease, the MDM-X4 will encourage you to flex your creativity.

FEATURES–
- Records on high quality, removable MD data discs • 3.5-gen. ATRAC LSI for wide dynamic range.
- 10 Input / 4Bus mixer.
- 2 AUX sends, 3-band EQ. • 11-point locator.
- Random access memory for quick playback and record from anywhere on the disk.
- Editing features include Undo, Redo, & Section/Song editing for flying material between different tracks.

STUDIO MONITORS

ALESIS

NEW PRODUCT

Point Seven

DESIGNED FOR MULTI-MEDIA!

- Shielded reference monitor.
- Front ported venting system for great bass response.
- 50 watts RMS–100 watts peak @ 4Ω.
- 85Hz–27kHz, ±3dB.
- 2kHz crossover for accurate phase and a wide "sweet spot" for mixing.
- Accurate flat sound reproduction.
- Great for studio and multi-media applications.

TANNOY

PBM 6.5II

Studio Reference Monitors

The PBM 6.5 II is the industry standard for studio reference monitors. They provide true dynamic capability and real world accuracy.

- 6.5" lowfrequency driver and 3/4" tweeter
- Fully radiused and ported cabinet design reduces resonance and diffraction while providing deep linear extended bass.

SONY — NEW PRODUCT

SMS-1P Powered Studio Reference Monitors

The new SMS-1P monitors are perfect for post production environments. They feature 2 types of inputs with independent volume adjustment, 15 watts of power, bass/treble control and shielding for use near computer monitors.

JBL

4206 & 4208

Studio Reference Monitors

The 4206 & 4208 studio reference monitors are 6" and 8" respectively. Both offer exceptional sonic performance, setting the standard for today's multi-purpose studio environments.

- Multi-Radial baffle ABS baffle virtually eliminates baffle distortion.
- Superb imaging & reduced phase distortion.
- Pure titanium diaphragm high frequency transducer provides smooth, extended response.
- ***Magnetically shielded for use near video monitors.***

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PORTABLE DAT RECORDERS

TASCAM DA-P1

- Rotary 2 head design, 2 direct drive motors.
- XLR mic/ line inputs (w/phantom power)
- Analog and S/PDIF (RCA) digital I/O.
- 32/44.1/48kHz sample rates & SCMS-free recording.
- Built in MIC limiter and 20dB pad.
- TRS jack w/ level control for monitoring.
- Includes shoulder belt, AC adapter, & battery.

HHB PDR1000/PDR1000TC

- 4 head Direct Drive Transport
- XLR mic & line analog ins, 2 RCA line outs. Digital I/O includes S/PDIF (RCA) and AES/EBU (XLR).
- L/R channel mic input attenuation selector(0dB/-30dB)
- 48V phantom power, limiter & internal speaker.
- Illuminated LCD display shows clock and counter, peak level metering, margin display, battery status, ID number, tape source status and machine status.
- Nickel Metal Hydride battery powers the PDR1000 for 2 hours. AC Adapter/charger included.

PDR1000TC Additional Features–

- All standard SMPTE/EBU time codes are supported, including 24, 25, 29.97, 29.97DF, & 30 fps.
- External sync to video, field sync and word sync.

- **MS1000 Master Sync module** ensures drift will be no more than 1 frame in 10 hrs.
- **HM1000 Headphone Matrix** provides a rotary switch for selection of Stereo, Mono Left, Mono Sum, & M/S (mid-side) Stereo modes.

JUST IN

SONY TCD-D8

This is the least expensive portable DAT machine available. It features 48kHz, 16-bit sampling, automatic and manual recording level, a long play mode for 4 hours of recording on a 120 minute tape, & an anti-shock mechanism. It includes a carrying case, DT-10CLA cleaning cassette and an AC-E60HG AC adaptor.

KEYBOARDS & SOUND MODULES

Roland A-90EX Master Keyboard Controller

The A-90EX is an 88-note, weighted master controller with one of the best keyboard actions currently on the market. It offers incredibly realistic piano sounds, powerful controller capabilities and 'virtual' programmable buttons which can be configured to operate your software and other devices. The A-90EX combines the majestic sound of a concert grand, the expressive action of a fine acoustic keyboard and the comprehensive MIDI functions of a master controller—all in a portable stage unit.

Roland JV-2080 64-Voice Synthesizer Module

Roland resets the standard with the incredibly expandable JV-2080 64-Voice Synthesizer Module. This amazingly powerful package offers unprecedented expandability, digital signal processing, and remarkable operational ease, all housed in a 2-unit rack-mount design.

FEATURES

- 64-Voice polyphony / 16-part multitimbral capability.
- 8 slots for SR-JV80 series expansion boards.
- 3 independant effects sets plus independant reverb/delay and chorus.
- 6 outputs. Main Stereo and 4 assingable.
- **NEW** patch finder and Phrase Preview functions for easy access to the huge selection of patches.
- Large backlit graphic display.
- Compatable with the JV-1080, XP-50, and XP-80.

Roland JP-8000 Analog Modeling Synthesizer

Analog is back- FOR REAL! This synth delivers a killer array of real-time control. Roland's revolutionary new analog modeling technology, and FAT, FAT SOUNDS! The assingable ribbon controller, 4 octave keyboard, built in arpeggiator w/ external sync capability, and RPS function will make this little gem a must have for DJs and re-mixers as well as that funk musician looking for some new inspiration.

NEW PRODUCT

FEATURES–

- 8 note polyphonic, 49-key velocity sensitive keyboard.
- Newly developed DSP oscillator.
- 'Motion Control' recalls parameter changes in real time.
- Single, Dual, & Split mode, assingable 'on-the-fly'.
- 128 user/ 128 preset patches. 64 user/64 preset performances.

Tone control, 12 chorus, & 5 delay effects. *Play of soul.*

PORTABLE HARD DISK RECORDING

Roland VS-880 V2

This new version of the popular VS880 incorporates powerful additional software functions that allow you to get the most out of this baby's incredible creative potential.

FEATURES–

- Auto Mixing Fuction records and plays back your mix in realtime.
- Easy recording with an inserted effect in "INPUT-TRACK" mode.*
- Process the master output with a specific inserted effect such as total compression.*
- Scene change by MIDI program change message.
- Simultaneous playback of 6 tracks in MASTER MODE recording.
- Digital output with copy protection.
- 10 additional effect algorithms (30 total) including Voice Transformer, Mic Simulator, 19-band Vocoder, Hum Cancelor, Lo-Fi Sound Processor, Space Chorus, Reverb 2, 4-band Parametric EQ, 10-band Graphic EQ, and Vocal Canceller.
- 100 additional preset effects patches.
- Use MIDI program & control change messages to edit and change effects.
- In total, over 20 powerful and convenient features in editing/sync sections have been added. Some require the optional effects expansion board.

Fostex DMT-8 VL

The latest in the Fostex HD recording family, the DMT-8 VL truely brings the familiarity of the personal multi-track to the digital domain.

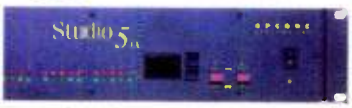
FEATURES–

- 18 bit A/D, 20 bit D/A conversion.
- Built in 8 channel mixer, Ch 1&2 feature mic & line level.
- 2 band EQ and 2 AUX sends per channel.
- Cut/Copy/Move/Paste within single or multiple tracks.
- Built-in MIDI Sync., 6 memory locations.
- Dual function Jog/Shuttle wheel provides digital "scrub" from tape or buffer without pitch change. 1/2X to 16X.
- Divide the drive into 5 seperate "virtual reels", each with it's own timing information.
- **NO COMPRESSION!**

NEW PRODUCT

MIDI

OPCODE Studio 5 LX Macintosh MIDI Interface



The Studio 5 LX is arguably the most advanced MIDI interface on the market today. It incorporates a MIDI patchbay, MIDI processor, and SMPTE synchronizer with it's interface functions, all in a 2 rack space unit.

- 15 independant MIDI ins and outs.
- SMPTE reads and writes all formats– 24, 25/29.97/29.97DF/and 30.
- Network multiple units, 240 MIDI channels each.
- 128 patches, unlimited virtual instrument controls.
- 2 assignable footswitch inputs, 1 controller input.
- 8X speed when used with OMS.
- Internal power supply.

Studio 3 & 4 MIDI interfaces, and Vision 3.5 sequncing software also available.

JUST IN

Mark of the Unicorn MIDI Time Piece AV 8x8 Mac/PC MIDI Interface

The MTP AV takes the world renowned MTP II and adds syncronization that you really need like video genlock, ADAT sync, and word clock sync, even Digidesign superclock!

- Same unit works on both Mac & PC platforms.
- 8x8 MIDI merge matrix. 128 MIDI channels.
- Fully programmable from the front panel. 128 scene, battery-backed memory.
- Fast 1x mode for hogh-speed MIDI data transfer.

Pocket Express Mac/PC MIDI Interface

With the pocket express you get a 2 in, 4 out, 32-channel interface that supports both Mac and PC. It also features a computer bypass button that allows you to use it ***EVEN WHEN THE COMPUTER IS TURNED OFF.***

Digital Performer Macintosh MIDI Sequencer w/ Integrated Digital Audio

Digital Performer contains all of the sequencing capabilities of Performer V.5 and adds Digital Audio to the picture. Apply effects such as Groove Quantize, shift, velocity scaling and more- ***All IN REALTIME.***

- MIDI Machine Control, Quicktime Video playback.
- Sample rate conversion.
- Spectral effects, pitch correction.
- Real-time editing and effects processing.
- Complete Notation.

you need it—is always the biggest challenge in working with samples, and *Guitarras Atomicas* delivers a selection that encompasses a number of different playing styles. If you're looking for rock guitar licks, it's unlikely you'll be disappointed with what you find here.

Overall EM Rating (1 through 5): 4

CIRCLE #446 ON READER SERVICE CARD

EAST-WEST COMMUNICATIONS

Hypnotica

By Jeff Obee

East-West has been producing audio-CD and CD-ROM samples for over a decade. Their latest effort, *Hypnotica* ($99.95), offers experimental electronic musicians, rave artists, composers, and other sound designers a wide array of trance and ambient sounds to sample and tweak.

Sounds

I really liked the wide variety of sounds on *Hypnotica*. Almost every track was distinct from the next and had something about it that piqued my ear. There are 180 samples on this CD, ranging from short bursts of electronica—such as theremin effects, explosions, rises and falls, and "circuitry" snippets—to loops of a minute or more.

The sounds fall into the "trance/ambient" category, but there are no prolonged pads and very few single textures. Most of the samples are aurally saturated with lots of active elements composed of different synth patches that were processed and collated digitally. Even the longer samples aren't static sounds but sculptures that mutate and shift as they play.

Favorites

After auditioning the whole disk and finding quality audio throughout, I sampled a few favorites, including "Enlightenment," a long texture built from a processed guitar. When sampled in stereo, the patch produces a really full, lush sound that especially shines when played down an octave.

I also liked "Ishtar," a whining vocal/processed-guitar sounding effect, and the 40-second "Sequential FX" loop. "H3000" offers a surreal processed-vocal blurb, as does "Deranged Voices." "Fashion Fish" produces a gurgling analog loop of a type often used in music these days.

A wide variety of electronica hits and shifting ambient sounds make up East-West's *Hypnotica*.

Design

Perry Geyer and Greg Hawkes (former keyboardist from the Cars) did a great job designing these sounds. A number of synths were employed, including the Clavia Nord Lead, Roland JP-8000 and Super Jupiter, Sequential Circuits Prophet VS and Pro One, and the Memorymoog. An Eventide H-3000 was used to process the synths and create unusual detunings and atmospherics.

The guitars were run through a Lexicon Vortex effects unit and an old Scholz Rockman. In addition, a couple of vintage vocoders were used to create vocal effects.

Documentation

Unfortunately, the documentation on *Hypnotica* is scanty. Although there is a long list of indexed tracks, there are no lengths given for each sound! I also would have liked to see individual tempi listed. It can be very difficult to map tempi accurately in a sequence, and it would have been nice to reference a close estimation so I could time-stretch samples to fit an exact tempo.

Finally, no information is given on how these sounds were programmed nor on what instruments or computer software was used to create them. Call me picky, but I want to know this stuff!

Conclusion

If you do any type of sound design, *Hypnotica* offers a terrific collection of samples for use as animation and atmosphere in your compositions. I recommend that you check it out—you get a lot of cool sounds for your buck.

Overall EM Rating (1 through 5): 3.5

CIRCLE #447 ON READER SERVICE CARD

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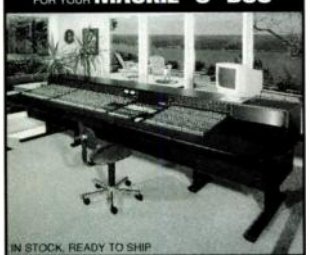
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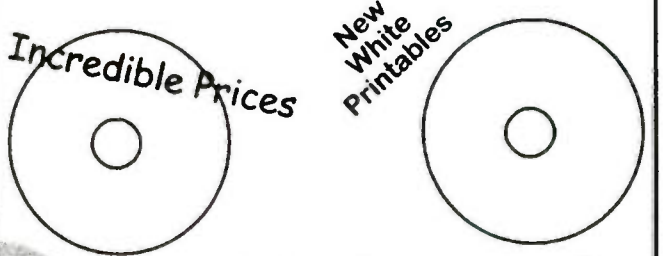

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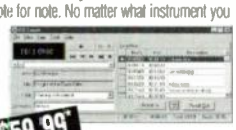

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FINAL MIX

All Studios, Great and Small

Bugs Bunny has always been amongst the most erudite of social observers. He even has the good taste to cop Louis Jordan's musical query when he posits, "Is you is or is you ain't my baby?" The universality of Bugs' inquiry is clearly illustrated in today's hectic dialectic between Little Wabbits in their Personal Studios and Big Wabbits in their Professional Facilities.

Take, for instance, Marvin Musician. If he has a day job, he can set up a bedroom studio capable of turning out recordings more sonically pristine than anything on a Jimi Hendrix album. Marv can even make audio CDs on his computer. But does access to these types of tools make him a recording engineer? A mastering engineer?

Ask Marv and you'll get back a resounding, "Yowza! Why pay megabucks to some snooty techno-nerd with his tweakhead, nose-in-the-air boxes and fancy decor to do nearly the same job I can do in my wired little home?"

Ask the accomplished, trained Mr. Wizard engineer with awards and major credits spilling onto the floor, and you'll hear, "Not! That Marv calls himself a mastering engineer, yet he can't even hear EQ or level differences of less than a few dB, and he sends out undocumented, error-ridden, horrid-sounding submasters for CD pressing. Lots of clients come in here begging me to fix Marv's botch job on their album."

"Nyahhh, dey never shoulda taken dat left toin at Albukoikee," Bugs sneers.

Where is the truth? Surprisingly, both are right. How can this contradiction be? In addition to "What's up, Doc?" we also need to know the who and the how of the situation.

"What" is the easiest part to examine. Today's personal-studio tools can sound great and even see frequent use in the Hallowed Halls of Professiana. Still, really good, top-shelf equipment costs a bloody fortune because more art, science, and materials go into it, with the result that the gear shines in critical applications.

For example, I'll take a good ol' Shure SM57 for electric guitar, even over models whose price tag brings my heart rate in line with my quantity-challenged bank balance, but that '57 won't get within mortar range of Itzhak Perlman's violin. His axe demands a Neumann, Josephson, B&K, or similarly breathtaking precision instrument.

"Who" and "how" are integral to each other and plainly are the bigger factors. I've crossed paths with Mr. Wizards who have mastered professionally for decades; not only can they hear incredibly fine gradations of sound, not only do they have really great rooms and gear, but they have a knowledge and experience of the entire mastering and replication process that drives subcode errors into 12-step programs. They're worth every penny of their intimidating rates. Marv has to understand and acknowledge this difference between him and Mr. Wizard.

Then there's Wally Whizkid, who studies and listens in ways Marv doesn't. Wally's wee bedroom studio conscientiously turns out clean, well-balanced, sweet-sounding, clearly documented masters of musicians' self-produced efforts, produced on burrito-money budgets too diminutive to reach Mr. Wizard's doorbell. Wally doesn't profess to be Mr. Wizard, but he's sure working the right way toward it. Mr. Wizard has to accept and respect the difference between Marv and Wally.

And what of Bugs? That wascally wabbit plants a sloppy kiss on my lips and disappears back down into the earth, leaving nothing but a cloud of cartoon smoke and the sound of a slide whistle.

Larry the O *is a musician, producer, and engineer whose San Francisco–based company, Toys in the Attic, provides a variety of musical and audio services. His Celtic meltdown band, Annwn, just released the CD* Anarchy and Rapture.

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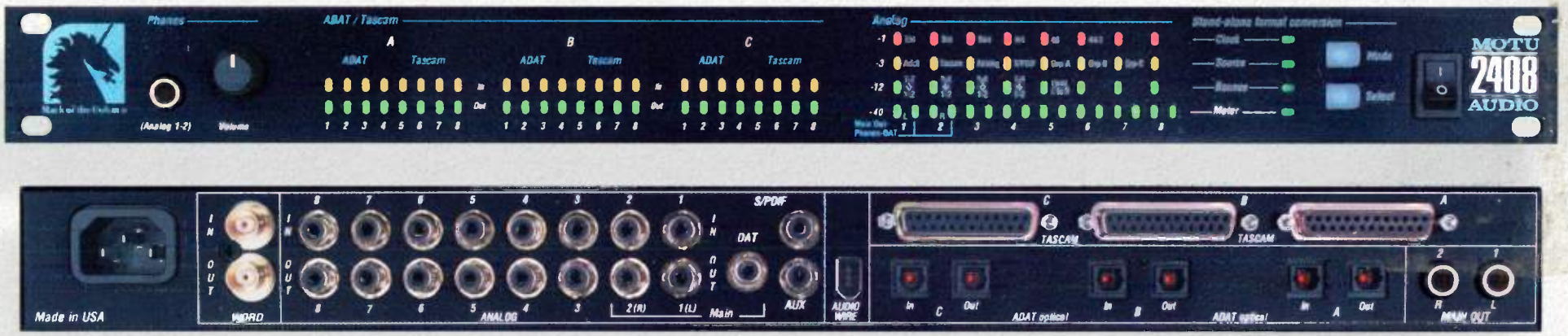

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