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Electronic Musician®

December 1997

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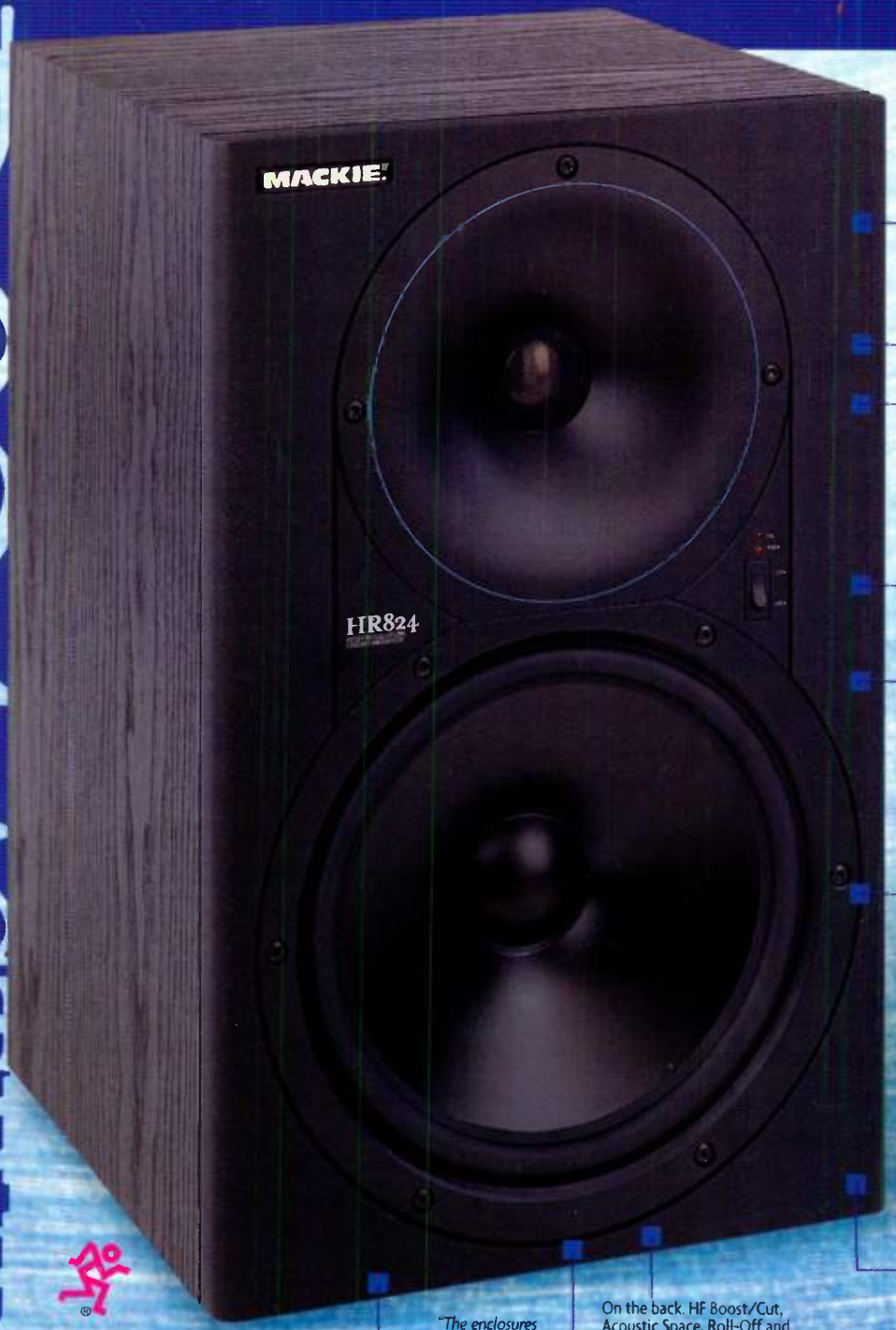
"Overall frequency was almost hard

HR824 ACTIVE MONITOR



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

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

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

Signal present and overload LEDs.

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

"This allows the HR824 to move a large volume of air with minimal low frequency distortion & power compression."
EM Magazine*

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

But all you have to do to become a believer is to visit your nearest Mackie dealer. When you compare HR824s to the competition, you're going to hear some dramatic differences.

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

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

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

Next, you'll notice low frequency output so accurate that you might look around for the hidden subwoofer (some of the world's most experienced recording engineers have done this, so don't be embarrassed). The HR824 really IS capable of flat response to 39Hz. Moreover, it's capable of **accurate, articulated** response that low. Rather than a loudspeaker's "interpretation" of bass, you can finally hear through to the actual instrument's bass quality, texture and nuances.

Each HR824 ships with its own signed Certificate of Calibration attesting to its ±1.5dB 35Hz-22kHz frequency response.

Next, if you can "unlock" yourself from the traditional, narrow "sweet spot" directly between the monitors, you'll discover that the HR824s really DO live up to our claim of wide, dispersion.

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

Their sweet **zone** is so broad that several people can sit next to each other — or if you work solo, you can move from side to side in front of large consoles — and still hear a coherent, detailed stereo panorama.

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

Finally, let the salesperson go wait on somebody else and enjoy an extended session with one of your favorite CDs. When you're through, you'll discover that when distortion and peaky frequency response are minimized, so is ear fatigue: You can listen to HR824s for hours on end.

> "Stereo imaging and depth were fabulous."

One final point... your monitors are the only part of all your studio equipment that you actually **hear**. Along with good microphones, HR824s are the best investment you can make, no matter what your studio budget. And, like premium mics, HR824 monitors cost more than less accurate transducers.

But if you're committed to hearing **exactly** how your creative product sounds, we know you'll find owning HR824s well worth it.

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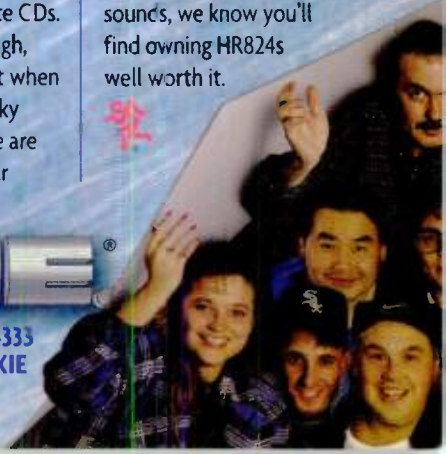

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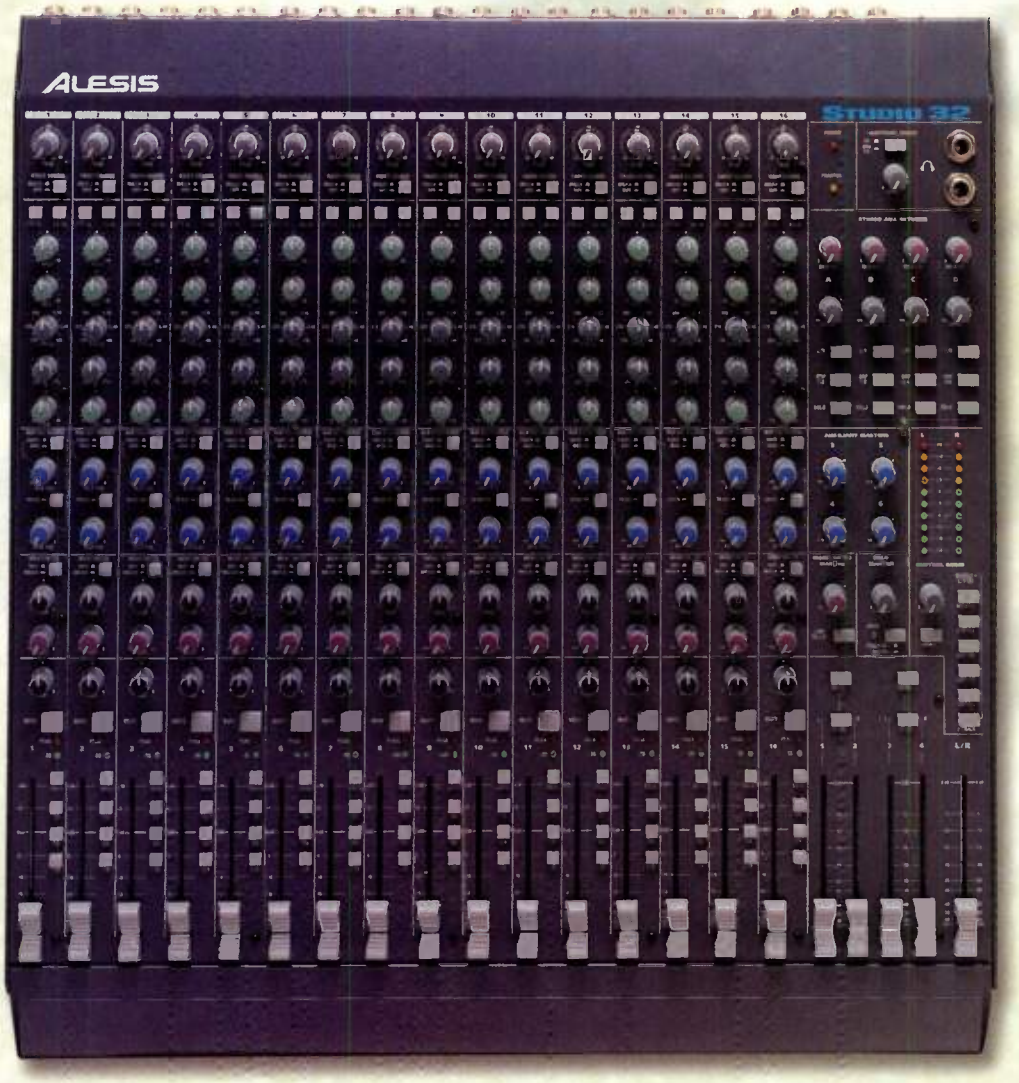
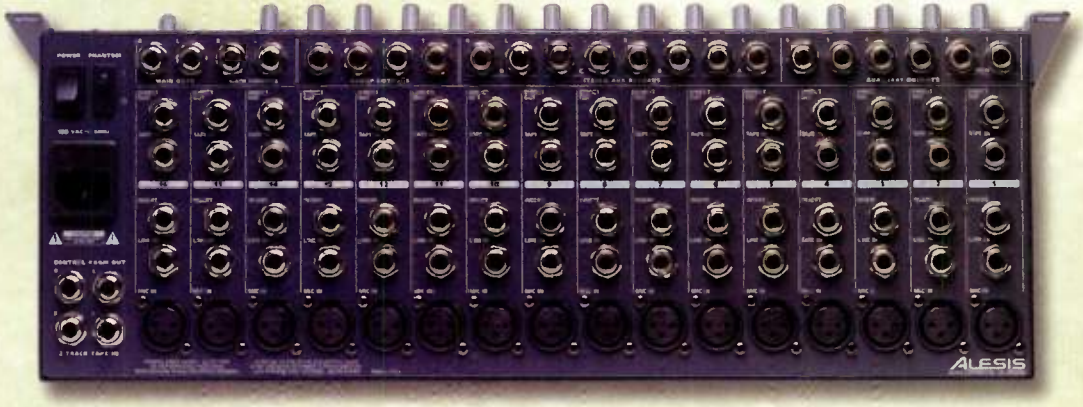
The Recording Console That



The Studio 32's inline design gives you balanced XLR mic inputs and balanced 1/4" TRS line inputs, channel inserts, tape inputs and direct outputs on each channel. Four group outputs, six aux sends (four pre-fader and two post-fader), phantom power for every channel and separate control room outputs are also provided. And since all of these connections are on the rear panel, your studio stays neat and professional-looking.



World Radio History

Looks Sixteen but Acts Thirty-two

The world of small-format consoles seems to be suffering an identity crisis. After all, most of them look alike...and also act alike.

Where can you turn to get the advantages you need?

Introducing the Alesis Studio 32™ Recording Console with Inline Monitoring

The Studio 32 offers 16 hybrid/discrete mic preamps that combine extremely low-noise performance (-129dB E.I.N.) with a wide 60dB range, making them perfect for driving digital recorders. In fact, the Studio 32 offers a wider dynamic range than all of the currently-available "affordable" digital consoles (and it's a whole lot less expensive).

Audio sources in your studio multiply quickly. Instruments, miked drums, vocals, and stereo signals from synth modules keep adding up. Fortunately, the Studio 32 has twice as many inputs as an average 16-channel mixer, so simultaneous recording or mixdown of multiple sources–live or in the studio–is no problem.

It's the world's most affordable 16-channel console that offers inline monitoring capability. Inline monitoring means that each channel can send signals to a recorder and receive signals coming back from tape...*at the same time.* So, unlike your average mixer, the Studio 32 can hook up with sixteen tracks of ADAT® (or any other recorder), instead of just eight. That's *double* the tracks you can access.

Other stuff that makes the Studio 32 stand out from the crowd: fully-parametric midrange EQ and super high-quality mic preamps that are more comparable with the consoles you see on magazine covers than on other compact mixers. 40 inputs available at mixdown...again, twice as many as most other small consoles. All at a price so low that you can afford to get that second ADAT (now that you can use it).

▲ *Above, a 16-track digital recording studio that can fit into a corner of your living room. Centered around the Studio 32 and a pair of ADATs, this setup is a professional-quality, low-cost solution for serious recording.*

The Studio 32's EQ section provides more than just high- and low-shelving EQ. You'll also find a fully-parametric midrange EQ with individual gain, frequency sweep and bandwidth (Q) controls.

The Alesis Studio 32. The console that acts a lot bigger than it looks. At your Alesis Dealer now.

STUDIO 32™
RECORDING CONSOLE W/INLINE MONITOR

For more information on the Studio 32, see your Authorized Alesis Dealer or call 800-5-ALESIS.

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I N S I

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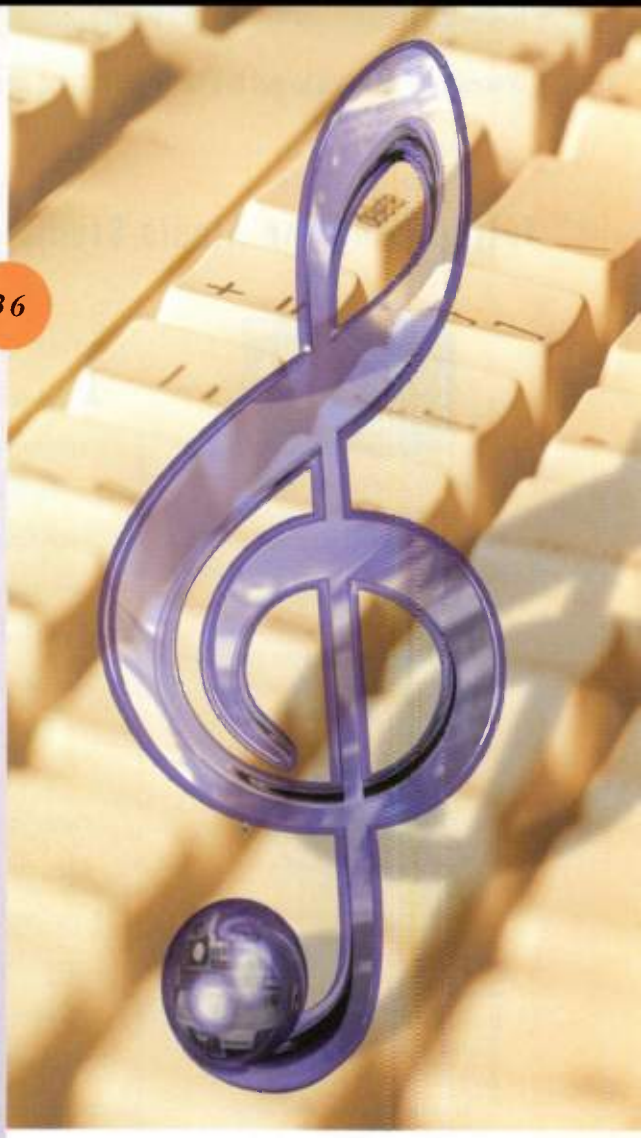

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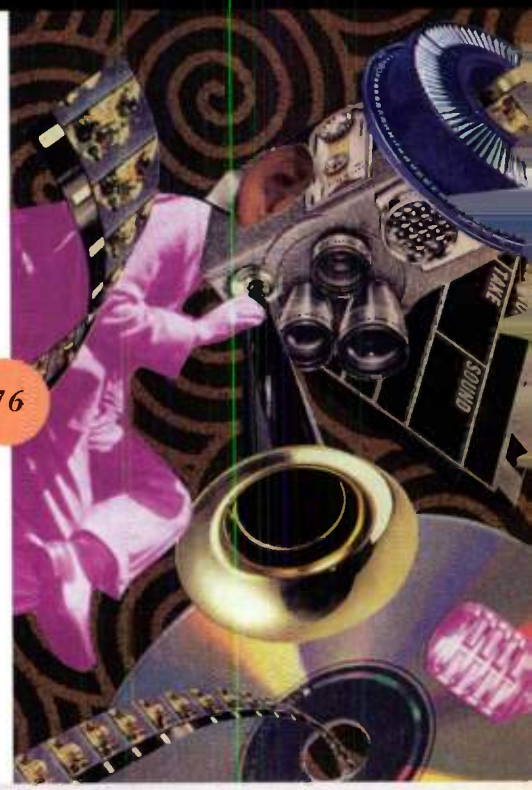

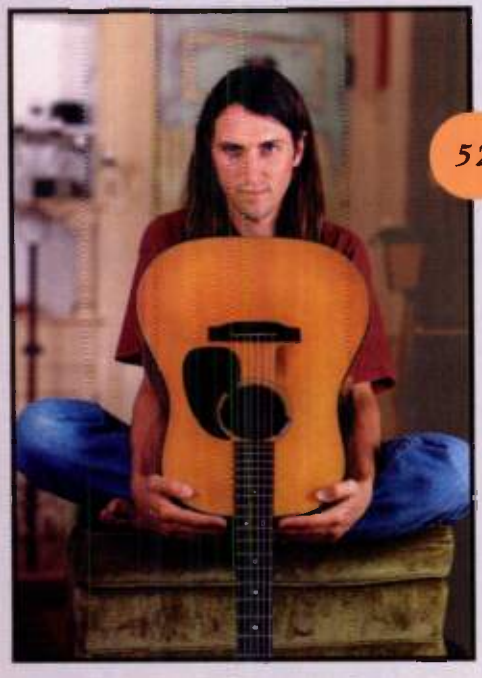

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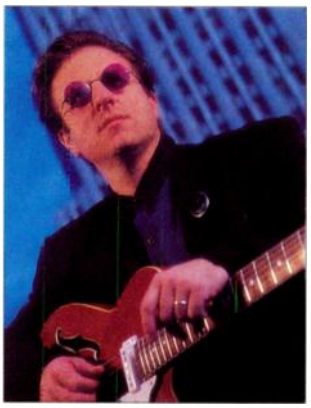
The Eternal Return

The flesh fades, but the spirit happily lingers...



ROBERT PERRY

I've penned a lot of "Front Page" pieces in my four-year stint as editor of **EM**, and not one of them has been easy. I've struggled to find interesting topics, wrestled with writer's block, and driven myself nuts searching for the perfect word or phrase. I have written these columns on airplanes, in cars, and even in the shower (where I've made some dripping-wet dashes for pen and paper to jot down an idea before it went "poof"). But this particular month's column has been the most difficult to write because I'm saying good-bye.

Next month, I'll be editor in chief of *Guitar Player* magazine, and Senior Editor Steve Oppenheimer will begin his reign as Grand Pooh-bah of **EM**. Obviously, our readers are intimately aware of Steve's talents as a product specialist and overall tech whiz. I believe that Steve has the right stuff to direct this magazine into the millennium; after all, he has been an integral part of the staff since 1988. On a personal note, Steve has been a great friend, a loyal supporter, and someone I could always depend on to lay sumptuous keyboard parts on my various recording projects.

Although I'm leaving **EM** in good hands, that doesn't mean I'm leaving without some heartache. While I've sat in the editorial hot seat, I've been truly blessed with an extremely talented staff that has always exceeded expectations. The collaborative process has been absolutely delightful—it's a real gas to call a meeting and get a major buzz from all the creative energy surging in the room. In addition, I've been fortunate to learn volumes from two wonderful publishers (Peter Hirschfeld and John Pledger) and an industry legend (*Mix* editor George Petersen). As I said on the internal memo I posted to the staff, I can't review my six years of employment at **EM** without smiling at least 17,000,000 times.

But the accomplishment I'll treasure most from my **EM** years is that we've helped so many readers achieve their artistic goals. Our mandate has been to teach musicians how to maximize their tools, enhance their creativity, and get those jewels of inspiration out where people can hear them. So it was a marvelous send-off—as my last days here ticked away—to receive a demo package from James Goupill, a 69-year-old **EM** subscriber. Challenged by some serious health problems, James was nonetheless inspired to assemble a modest personal studio and start making tracks. The fact that we could encourage, nurture, and guide someone like James to make music validates our editorial mission. I'm proud of James—he produced a fine suite of songs—and I'm proud of every **EM** reader who has struggled to put their music into a tangible form.

Not everything we create can be a hit. There are no guarantees that the music we produce will find even a small public. But if you just have the guts to *say something*, you're still my hero. It's people like you who have made my tenure here so rewarding. I salute you, I thank you, and I'll miss you. **EM** readers rock! Please take care of yourselves.

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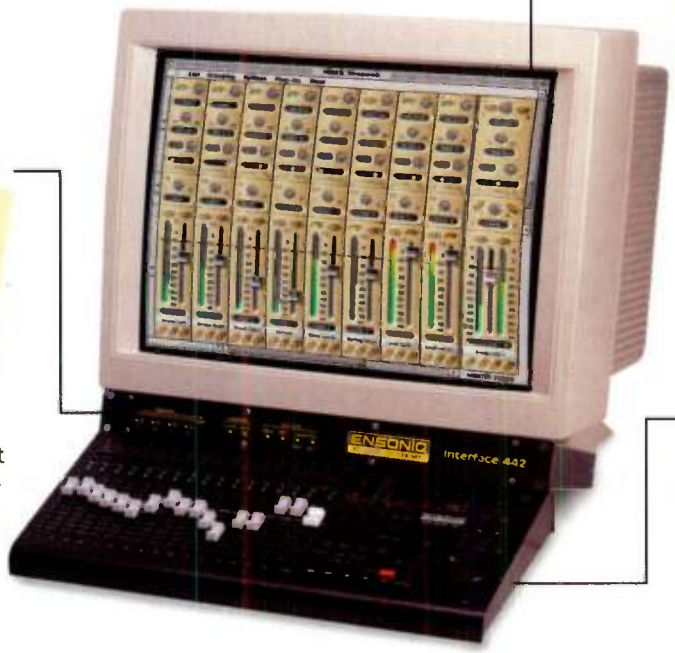

Integrated Software

Take one look at the PARIS software ... every pixel has a purpose ... every color has been carefully chosen ... every function instantly available ... its integration with the powerful DSP and Control Surface is truly magical.

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Finally... there's a powerful and totally integrated digital audio recording solution - PARIS from Ensoniq Digital Systems. It includes all the hardware and software you need to start making tracks on your PC or Mac. It's fast, simple and totally compatible. Plus, it has a flexible open architecture for both hardware modules and software plug-ins. Visit the Ensoniq Web site for complete details and the name of your authorized PARIS dealer.

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B-SIDE FUN

Although I thoroughly enjoyed the piece "Extreme Recording Feats" (October 1997), I feel that I must point out a previous example of the multigroove technique used by David Singleton. On their 1975 recording *Matching Tie and Handkerchief,* the British comedy group Monty Python's Flying Circus ran two sets of concentric grooves on one side of the album (I couldn't tell you which side, as they were both labeled Side B), so that random needle drops produced one of two sets of material. Naturally, the Pythons didn't tell anyone, causing some consternation among unsuspecting (and, being the '70s, likely psychotropically enhanced) listeners.

Rich Bozza
Brooklyn, NY

LET'S GROOVE

I really thought I would never see the day when **EM** would spotlight a person that I admired and idolized ("Creative Space: Shining Star," October 1997). Since my early childhood, I listened to the records by Maurice White and Earth, Wind & Fire. In my teen years, I bought the band's albums wherever I could. I would analyze the arrangements with amazement. And today, the only reason I am a musician is because of Earth, Wind & Fire. From one of your many African American subscribers, I thank you. I have a completeness to my life now that I have had a glimpse into the world of Maurice White. Please spotlight more R&B, jazz, funk, and gospel producers and artists.

S. B. Hooks
skooh@aol.com

THANKS, GANG

Congratulations on another great issue of **EM** (September 1997). As a veteran pro musician and "solderhead," I'd like to take a moment and offer up some positive feedback and encouragement.

First off, I really enjoyed Jeff Silver's feature article, "Songwriters' Summit." This is a difficult subject to articulate, but each of the interviewed writers left me with practical solutions, insights, and inspiration I can apply to my own songwriting. In addition, the sidebar "Save Your Songs from the Big, Bad Producer!" was right on target (although maybe it should have been entitled "Save Your *Royalty Checks* from the Big, Bad Producer!").

I also applaud your trend toward more live-performance coverage with the *JAM* supplements. I was especially gratified to read Glenn Letsch's myth-debunking article, "Speakers of the House." Finally, a logical, well-researched plea for sanity that really tells it like it should be regarding bass tone. This article should be tattooed on every young bass player's forehead!

Fred Sampson
San Pablo, CA

CHOOSE ME

I've used a Mac since 1988 and now have a Digidesign Audiomedia II card inside my Power Mac 7100 for digital audio and MIDI. All of this links together with my sixteen ADAT tracks, and the system works well for me. But in light of the Mac's probable and sad demise, I'm feeling the need to start learning about the PC platform so that I'll know what I'm doing if I must replace my Mac gear with PC gear.

Do you have any recommendations as to magazines, books, and how-to guides that will provide the kind of information I need about MIDI and digital audio on the PC format? I need to know all about the basics, such as what kind of slots are available and how many I might need. I looked on the Web site of a major music hardware manufacturer, but it looks like it's geared more for kids than pros: it has very little crucial, basic information. I want the important stuff without the kiddy cartoons. Thanks for what you might suggest.

Douglas Thompson
thom0611@tc.umn.edu

Douglas—First of all, I suggest that it's premature to assume the Mac's demise. Obviously, Apple is in trouble, but the company has many strengths, including great technology, a new alliance with Microsoft, and a willingness to change. Sales appear to be increasing, albeit overall marketshare is not. I, for one, am keeping and upgrading my Power Mac and am buying new software both for business and for music.

But learning how the other half lives is a good idea in any event, so I suggest you read your **EM** *back issues! To get an overview, check out "The Windows Studio" in the July 1996 issue (which mostly discusses hardware issues, including card slots) and "The Budget Desktop Studio" (which focuses primarily on music software for Mac and Windows) in the September 1996* **EM.** *If you are curious about music applications for Windows, read "The Fab Five" (digital audio sequencer face-off) in the March 1997 issue, and "Noteworthy Deals" (entry-level notation) in this issue. We've published a lot more, but these articles are a good start. Of course, we have also published a great many reviews.*

As for PC operating systems, there are only two you have to be concerned with right now: Windows 95, which is the PC musician's current OS of choice, and Windows NT, which we discussed in the October 1997 "Desktop Musician" column. Of course, there are lots of PC magazines on the newsstand and the Web that will bring you up to speed on more general issues of Windows computing.—Steve O.

DAVID BALL

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NOSTALGIA WOES

I started buying **EM** about 1991, when I was thrilled to own a '386 PC, a DX7, and *Finale* 1.0. I considered that a very elaborate setup, and back then, your magazine seemed like a godsend. I am more completely equipped now, but your magazine seems to cover issues that are progressively more technical, less musical, and geared to the management of recording projects from the standpoint of a nonperformer.

Back when I was getting my master's degree in music education, the standing joke was that "music" was "only the adjective." The same quip might apply to the title of your publication. In between writing about DSP, SMPTE, EPROM, EQ, and AES/EBU, you might consider articles about People That Can Actually Play (PTCAP). PTCAPs are inclined to be concerned about actual pieces of music, musical aesthetics, performance practice, and general presentation. Don't be afraid to address the interests of the arrangers, publishers, editors, composers, conductors, and PTCAPs among us.

jdklatt@ix.netcom.com

jd—I'm very confused by your letter, so it's hard for me to comment. Obviously, **EM** *must cover the tools that musicians need to perform their work, hence all the "writing about DSP, SMPTE, and so on." But it should be painfully obvious that every feature is designed to help musicians—that is, "People That Can Actually Play"—perform better, record better, and understand more about essential music technologies. Our "Creative Space," "Production Values," and "A Day in the Life" features blatantly discuss the people behind the process, as do our frequent articles on arranging. And, hey, we just published a fine piece on songwriting ("Songwriters' Summit" in the September issue).*

I really do not *mean to sound rude, here, but I just don't know what you're talking about. However, we're always happy to hear specific suggestions for how we can better help our readers.—Michael M.*

I just resubscribed to your magazine after a 3-year hiatus and was disappointed to see that there is no longer any column for do-it-yourself projects and repairs for older gear. I realize that we live in a high-tech, disposable society, but it would be nice if those of us who still use older technology had a resource for repairing, maintaining, and upgrading our tools rather than spending money on the never-ending cycle of new gear. Maybe I'm just too sentimental (or too cheap) to abandon some of my older technology, but after working with a piece of gear and developing a musical relationship with it, I find it very hard to just abandon it to the scrap heap of junk-bin nostalgia.

I realize that I may be in the minority of your readership, but I also know that there are others who have invested large amounts of time and money exploring the deeper possibilities of their equipment. We all hate the fact that parts and information are near impossible to find. Please don't abandon those of us wallowing in a technology time warp.

t.g.noyes@juno.com

t.g.—Fear not; we're not abandoning you! However, you are correct in stating that do-it-yourself and repair projects interest a small percentage of our current readership. Because of this fact, we have concentrated much of our efforts on presenting applications and other features that appeal to the masses. However, we are well aware that we must invigorate our DIY coverage, and the staff is working on some ideas that should debut in these pages very soon. Hang on!—Michael M.

AES/EBU MYSTERY

I may have uncovered a hoax, or maybe I'm just confused. TASCAM boasts that the new DA-302 dual DAT machine has the ability to output program material in either S/PDIF or AES/EBU formats, but there are no AES/EBU inputs or outputs on the machine. The technical support person at TASCAM is as perplexed as I am! When he asked the higher-power folks about this, he received only the vague answer, "Yeah, it's unbalanced AES/EBU." Neither one of us has heard of this. In fact, isn't that S/PDIF? What form of AES/EBU is TASCAM talking about?

Jay Peele
jpeele@opsrey.unf.edu

Jay—The great powers at TASCAM gave you an accurate, if incomplete, answer. The DA-302 (which is not yet available as of this writing) will offer both AES/EBU and S/PDIF digital I/O; the data format is selectable.

The connectors are coax (RCA), which is one of the two connectors that meets the S/PDIF specification. (The other acceptable connector is optical.) These connectors do not meet the AES/EBU spec, which calls for balanced XLR connections.

RCA connectors are unbalanced; they have only two conductors, the tip and ring. So if you select AES/EBU format on the DA-302, the interface could be described as "unbalanced AES/EBU." It doesn't exactly meet the AES/EBU specification, and you will need an XLR-to-RCA adapter to interface with standard AES/EBU gear, but it probably *will work. There are no guarantees.*

Although the most obvious difference between AES/EBU and S/PDIF formats is the connector, that is not the only difference. The digital audio data and the auxiliary information are encoded slightly differently. This difference is relatively minor, and in some cases you can successfully interface unconverted S/PDIF and AES/EBU digital audio directly with a simple XLR-to-RCA adapter. However, this method is unreliable, and it isn't recommended. In general, you should use a format converter, such as the Digital Domain FCN-1, to interface between the two formats. TASCAM has saved you this expense by allowing you to switch data formats on the unit; you just need the far-less-expensive XLR-to-RCA adapter.

But you might not be out of the woods yet; I did say the TASCAM approach probably *would work, but you can't be sure. Some manufacturers implement AES/EBU or S/PDIF only partially or incorrectly. In such cases, your gear might not be able to accept a converted format or even the same format from another device. Hopefully, the only aspect of the DA-302's interface that does not comply with the AES/EBU spec will be the connector.—Steve O.*

ERROR LOG

October 1997, "Kurzweil Take 6," p. 178: In the Product Summary sidebar, the EM Meter rating for "Programming" should be four.

WE WELCOME YOUR FEEDBACK.

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

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WHAT'S NEW

By Joe Humphreys and Brian Knave

NEUMANN TLM 103

Slated for release in January 1998, the TLM 103 large-diaphragm, cardioid condenser mic ($995) features a new capsule based on the one used in the U 67 and U 87. According to Neumann, the mic's transformerless design exhibits only 7 dB self noise (A-weighted) and a dynamic range of 131 dB. Its frequency response is flat to 5 kHz, with a wide 4 dB presence boost above that. The frequency range is rated at 20 Hz to 20 kHz and S/N at 87 dB.

The mic comes complete with a swivel mount and wooden box. Optional accessories include an elastic suspension mount ($175), a pop screen ($55), a battery supply ($475), a power supply ($490), and a foam wind screen ($30).

Neumann USA; tel. (860) 434-5220; fax (860) 434-3148; e-mail neumlit@neumannusa.com; Web www.neumannusa.com.

Circle #401 on Reader Service Card

GENERALMUSIC PRO EXPANDER

The keyboard sounds of Generalmusic's RealPiano Pro series digital pianos are now available in a half-rackspace module, the Pro Piano Expander ($665). The 2-part multitimbral, 64-voice polyphonic tone generator features the same 32 preset sounds found in the company's Pro 1 keyboard, including acoustic and electric pianos, vibes, harpsichords, and jazz and pipe organs as well as choirs, strings, pads, and basses.

The sounds are sample based, but the piano programs use physical modeling to simulate natural string resonance and release characteristics. When used with the company's 3-pedal pedal board ($199), the Pro Piano Expander recognizes sixteen damper pedal positions and uses a physical-modeling algorithm to create partial-damping effects. Two editable effects processors supply reverb (room, stage, and hall), chorus, phaser, and tremolo. There's also a separate auto-wah effect. Sixty-four onboard memory locations store performance parameters.

The main outs are on ¼-inch L/R jacks, and there is a ¼-inch stereo headphone jack. There are also ¼-inch inputs for a damper footpedal and two programmable footpedals. MIDI In, Out, and Thru ports are included, along with a serial port for connecting directly to a Mac or PC (cables and drivers are available in the $42 multimedia kit). The unit's lump-in-the-line power adapter can be hidden inside the optional pedal board. Generalmusic; tel. (800) 323-0280 or (630) 766-8230; fax (630) 766-8281; e-mail gmail@generalmusicus.com; Web www.generalmusic.com.

Circle #402 on Reader Service Card

KORG SGPROX

Korg's new SGproX digital piano and master keyboard controller ($2,600) features an 88-key, Velocity- and Channel Pressure-sensitive, weighted-action keyboard with eight programmable controllers. In addition to controlling the 64-voice polyphonic, 2-part multitimbral internal sound engine, the keyboard can control eight external parts.

The SGproX's 64 onboard sounds include two new sets of stereo piano samples as well as the mono piano samples from Korg's SGX-1D. In addition, there are electric pianos, Clavinet, combo and pipe organs, vibes, strings, bells, electric and acoustic bass, and synth pads. Each sound has several editable parameters: attack, decay, release, brightness, Velocity curve, and scale type. There are also two stereo multi-effects processors, with twelve types of effects, and a 5-band graphic EQ.

You can define up to ten keyboard zones for splits and layers. Two wheels, four sliders, six switches, a footpedal input, and a footswitch input can all be assigned to control a variety of MIDI functions. Setups for all ten parts can be saved to 64 Performance memories, which come factory-loaded with layered programs.

The SGproX has one MIDI In port and two pairs of MIDI Outs; both of the Outs in each pair carry the same signal. Audio outs are on L/R ¼-inch jacks, and there's a headphone out on the keyboard. The display is a backlit, 40-character LCD. A music stand is also included. Korg USA, Inc.; tel. (516) 333-9100; fax (516) 333-9108; Web www.korg.com.

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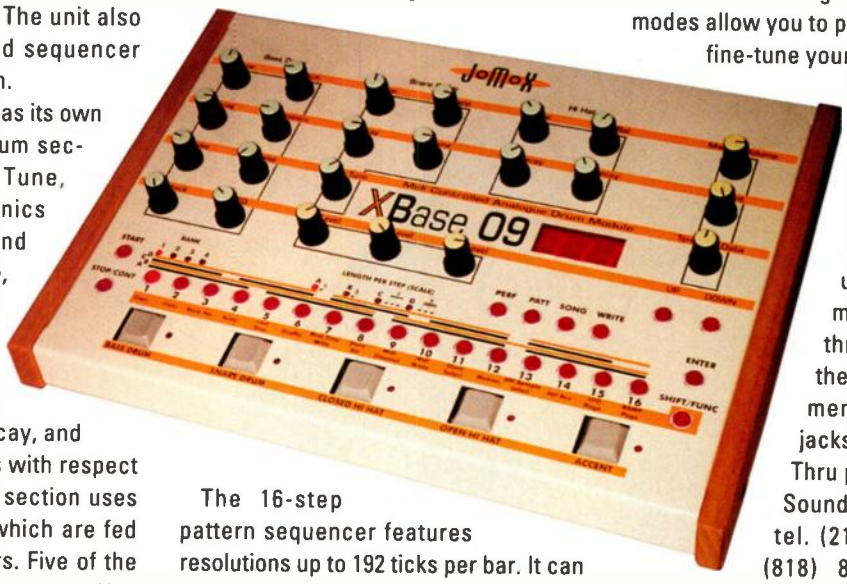
▼ JOMOX XBASE 09

Conceived as a modernized and expanded version of the Roland TR-909, the Jomox Xbase 09 ($995) is a digitally controlled analog drum module with three monophonic sound generators: bass drum, snare drum, and hi-hat (which also includes clap, rim, crash, and ride sounds). The unit also includes a pattern-based sequencer and MIDI implementation.

Each sound parameter has its own rotary knob. The bass drum section has controls for Tune, Decay, Pitch and Harmonics (which alter the lower and upper tones, respectively), Pulse, Noise, Attack, and EQ (lowpass filter). You can tune the snare sound and add noise to it, tune the noise filter, set the decay, and detune the two oscillators with respect to each other. The hi-hat section uses six short, 6-bit samples, which are fed through analog processors. Five of the samples can be played in reverse. You can tune the hi-hat and set the open- and closed-hat decay and balance.

Two LFOs can each be routed to one of five sound parameters, and LFO 1 can be set to modulate LFO 2. These can be set to retrigger on every instrument trigger, and they can also be synched to MIDI. There are 100 memory locations for storing drum kits.



The 16-step pattern sequencer features resolutions up to 192 ticks per bar. It can hold up to 64 patterns and ten songs; songs comprise up to 100 steps, each with as many as 255 repetitions of a pattern. Programming is done on the illuminated front-panel buttons. The sequencer can record changes to sound parameters, either continuously or at each step, and these can also be sent and received via MIDI Continuous Controller messages. Various shuffle modes allow you to pull or drag steps to fine-tune your groove.

The Xbase 09 syncs to MIDI Clock and also has a 5-pin DIN sync-out jack for slaving older modules. There are one mono mix out and three mono outs for the individual instruments, all on ¼-inch jacks. MIDI In, Out, and Thru ports are provided. SoundBox (distributor); tel. (213) 769-5510; fax (818) 822-0110; e-mail soundboxla@aol.com.

Circle #404 on Reader Service Card

▼ ENCORE EXPRESSIONIST

If you've been aching to control your vintage analog synthesizers from a sequencer or MIDI controller, check out the Expressionist ($599) from Encore Electronics. This 1U rackmount, MIDI-to-control-voltage (CV) converter provides eight CV outputs and eight corresponding triggers that can be programmed as positive gates (for triggering pre-MIDI synths from Roland, ARP, Oberheim, and others) or S-triggers (for triggering Moog synths). The Expressionist supports control voltages as volts per octave for use with Oberheim, Moog, and Korg instruments and as volts per hertz for use with early Korg and Yamaha synths. Each CV output can range from -3 to +10 volts.

The Expressionist supports both exponential and linear oscillator control. Each CV output can be programmed to respond to a unique MIDI channel, and multiple CV outputs can be grouped polyphonically. Any channel can be used for any control function, and note information can be disregarded altogether so that the CV serves purely as a modulation source.

Each of the Expressionist's eight channels offers pitch bend, four modulators, three LFOs, 6-octave transpose, two types of portamento, voltage offset and tracking, and trigger polarity. The three global LFOs can be modulated by different sources on different MIDI channels and then mixed in various ways. LFO waveshapes include sine, triangle, square, sawtooth, reverse sawtooth, and sample-and-hold. The four modulation sources can be note position, Velocity, Aftertouch, or any standard MIDI Control Change message. A 16-bit D/A converter is used for the output section.

The front panel provides a power switch, 2-line LCD, and buttons for increment, decrement, parameter, page, and enter. Up to 100 user setups can be saved in flash ROM. In addition to MIDI In and Out ports, the unit's rear panel provides a ¼-inch footswitch jack and a Roland-compatible DIN Sync output connector that allows MIDI Clock control over pre-MIDI drum machines and other devices. Power is provided by a wall-wart adapter. Encore Electronics; tel. and fax (510) 229-8875; e-mail encore@value.net; Web pwp.value.net/encore.

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World Radio History

I will play music

Nothing but music

Way back then it was cool
to play the blues
When hip-hop was be-bop
you know, straight ahead.
When a young musician
had visions of Oscar an' McCoy
settin' it out so smoothly-
kind of like Jordan taking flight,
but in the key of B flat.
Dreaming of being a student
in the Miles Davis
"turn my back to you"
original school of funk
Having knowledge of the old
keeps you prepared for the new.
Get ready for the DA-38

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STOP THE PRESSES! ▲ ▲ ▲ ▲

▼ RAMSA WR-DA7

Just before we went to the AES convention in New York City, we learned that Ramsa expects to release in January the WR-DA7 ($5,000). This unit is a 32-channel, 38-input, 8-bus digital console with moving faders, instantaneous parameter recall, and 24-bit converters. The board offers sixteen analog mic/line inputs and individual access to channels 17 through 32 via channel-flip buttons. Twenty 100 mm faders do triple duty, serving as level controls for channels 1 to 16 or 17 to 32 or as aux sends and returns 1 to 6 and buses 1 to 8.

The console's 320 x 240-dot, backlit LCD screen shows Master L/R levels on dual 20-step LED ladders as well as numerical display of the snapshot memory (200 memories provided). Channel strips provide a peak/signal light and buttons for Solo, fader Flip, Select, and channel On.

When you access a channel by pushing its Select button, all channel parameters are displayed onscreen. To access individual parameters, you touch the appropriate knob in the console's master section, which automatically calls up the screen for that function. The master section provides four control areas: EQ, Pan/Assign, Dynamics/Delay, and Aux.

The EQ section offers four parametric bands on each channel, with the top and bottom bands switchable to peak/shelving or low- or highpass filters. Each aux return provides two bands of parametric EQ. The dynamics section offers variable attack, release, threshold, and ratio on each channel. Delay is adjustable up to a maximum of 300 ms (48 kHz sampling rate). Library storage is provided for 50 different EQ and dynamics settings.

The up, down, left, and right cursor keys can be switched to output MIDI Machine Control commands. Data entry is accomplished by means of a large Parameter dial or an alphanumeric keypad. Other features include an Undo/Redo button, a solo-mode set, and a talkback mic.

The WR-DA7 is equipped to mix 5.1 surround sound out of the buses, meaning you don't have to tie up auxes. You can place sounds using the six knobs in the EQ and dynamics/delay section, or with an *xy* plot controlled by the master fader and parameter knob, or by drawing a graphical representation on the LCD with the parameter knob. An optional MIDI joystick will provide a fourth means of controlling 5.1. Panning can be dynamically controlled and can be automated, synched time code.

The unit's rear panel provides sixteen analog mic/line inputs: the first eight provide XLR connectors and individually switchable phantom power; the second eight are TRS. There are sixteen channel inserts (pre-A/D converter) and six auxiliary send/return jacks. (Auxes 1/2 have S/PDIF I/O on coax jacks; auxes 3/4 and 5/6 use ¼-inch unbalanced connectors.)

All analog outputs are +4 dB and include balanced/unbalanced master outs on XLR connectors, balanced record outs on TRS ¼-inch jacks, and two sets of monitor outs on TRS ¼-inch jacks. The unit offers two channels of digital I/O (AES/EBU or S/PDIF, switchable) on XLRs; the outputs carry the master L/R mix, and the inputs can be routed to channels fifteen and sixteen. You also get MIDI In and Out, wordclock I/O, a 9-pin RS422/485 serial port, a computer interface (Mac or PC), a ¼-inch footswitch jack, and a 15-pin D-sub connector for the optional meter bridge.

Three expansion-card slots accept ADAT Lightpipe, TASCAM TDIF, or AES/EBU (individually switchable to S/PDIF) interfaces. A fourth card provides eight additional analog inputs/outputs via a 25-pin D-sub connector. The console's third expansion-card slot can be configured to connect two boards together (full bidirectionality); to replace analog inputs 9 through 16 with digital inputs (globally switchable between digital and analog operation); or to provide digital inserts across the eight buses, six auxes, and L/R stereo out. Another card provides inputs for SMPTE, Video Sync, and MTC. Panasonic/Ramsa; tel. (714) 373-7277; fax (714) 373-7903.—*Brian Knave*

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NT1 $499 U.S. MSRP

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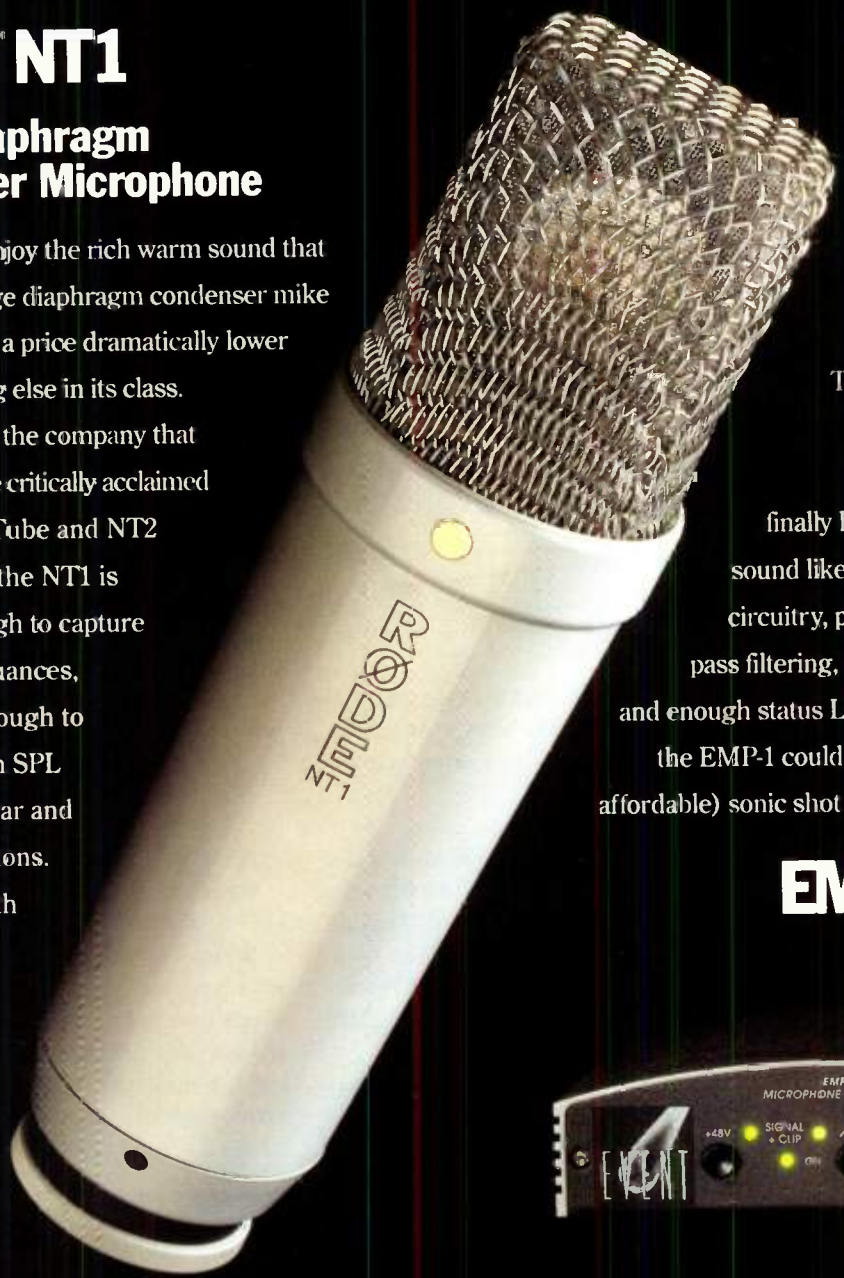

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Microphone Preamplifier

Want to spruce up the sound of your current microphone collection (or even your NT1)? Then plug them into the new Event EMP-1—a world class preamp so acoustically transparent that you'll finally hear what your microphones *really* sound like. With features like ultra low noise circuitry, phantom power, phase reverse, low pass filtering, continuously variable gain control, and enough status LEDs to light up your control room, the EMP-1 could be the single most important (and affordable) sonic shot in the arm you give to your studio.

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World Radio History

▶ PRESONUS ACP-22

Following up on its 8-channel ACP-8, PreSonus has released the ACP-22 ($349.95), a 1U rackmount, 2-channel compressor/limiter/gate. The compressor has controls on each channel for threshold (-40 to +20 dBu), ratio (1:1 to ∞:1), attack time (0.1 to 200 ms), release time (0.05 to 3s) and switchable hard/soft knee. Auto mode offers program-dependent attack and release times.

The channels can be individually bypassed and can be linked for stereo operation. Each channel has 8-segment LED meters for gain reduction and I/O levels and LEDs for soft or hard knee, auto or manual mode, and channel bypass. There is also a sidechain insert for each channel.

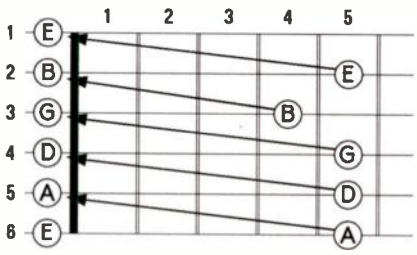
The ACP-22's gates have adjustable attack time (0.01 to 100 ms) and release time (0.02 to 2s), lowpass filters for frequency-dependent gating, and sidechains. The threshold can be set from -60 to +20 dBu, and the attenuation is switchable between -60 and -6 dB. LEDs indicate the gate's attenuation setting, filter in/out, and whether the gate is open or closed.

I/O is on balanced XLR and unbalanced ¼-inch jacks, and sidechain connections are on ¼-inch TRS jacks. Each channel's operating level can be switched between +4 dBu and -10 dBV. The unit's power supply is internal. PreSonus rates the unit's dynamic range at >115 dB, S/N ratio at >95 dB, frequency response at 10 Hz to 50 kHz, and crosstalk at <82 dB @ 10 kHz. PreSonus Audio Electronics; tel. (800) 750-0323 or (504) 344-7887; fax (504) 344-8881; e-mail presonus@presonus.com; Web www.presonus.com.

Circle #407 on Reader Service Card

▶ PAGE STUDIO GRAPHICS

If you are looking for an easier way to create guitar fingering charts and chord diagrams, Page Studio Graphics' GuitarTeach font package ($50) may be just what you need. The package contains PostScript and TrueType fonts for Mac and Windows that can be used in a layout program (such as Quark *QuarkXPress* or Adobe *PageMaker*).



Four fonts are included in the package: GuitarNotes and the 3-part GuitarChords. GuitarNotes lets you make simple music notation as a reference; it's not a full-fledged notation package, but it lets you make modular fingering and chord diagrams in vertical or horizontal formats as well as small-scale grids for use next to notation. There are also PostScript and TIFF illustrations, including a generic guitar, guitar head, and two tuning charts. Page Studio Graphics; tel. and fax (602) 839-2763; e-mail pixymbol@primenet.com; Web www.primenet.com/~pixymbol.

Circle #408 on Reader Service Card

▶ MAGIX MUSIC STUDIO 3.0

German company Magix Entertainment has now made their low-cost hard-disk recording and digital audio sequencer package, Magix *Music Studio* 3.0 (Win; $49.99; *deLuxe* version, $89.99), available in the U.S. The package contains two separate programs: *Audio Studio* and *MIDI Studio*.

Audio Studio is an 8-track (16-track for the *deLuxe* version) hard-disk recording program that supports 16-bit audio files with sampling rates of 11.025, 22.05, 32, 44.1, and 48 kHz. VU meters let you monitor input levels, and you can set markers while recording. A waveform display with zoom allows cut/copy/paste editing. Reverb and echo effects are available, and the single, sweepable EQ band works in real time. Other features include loop playback, crossfading, normalization, and 100 levels of Undo.

MIDI Studio is a digital audio sequencer that supports 128 MIDI and 8 audio tracks (256 and 16, respectively, for *deLuxe*). You can record MIDI via multiple ports in real and step time. Audio can be recorded in 16-bit resolution with sampling rates of 11.025, 22.05, or 44.1 kHz.

The program's Track window includes a Pattern Display where MIDI and audio clips can be manipulated with drag-and-drop and cut/copy/paste editing. There are also piano-roll, event-list, and drum-grid editors as well as a mixer window that lets you record mixer movements and snapshots. *MIDI Studio* also includes a notation window. You can edit the notation without affecting the MIDI data, add lyrics, and print your scores. *Music Studio* 3.0 allows only single-staff scores, but the *deLuxe* version allows multiple parts and grand staves.

Music Studio requires an 80486 or better PC, Windows 3.1 with 8 MB of RAM or Windows 95 with 16 MB of RAM, a 16-bit sound card, and a MIDI interface. Magix Entertainment Corp.; tel. (888) TO-MAGIX or (310) 656-0644; fax (310) 656-0234; e-mail magix@magix.net; Web www.magix.net. ●

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World Radio History

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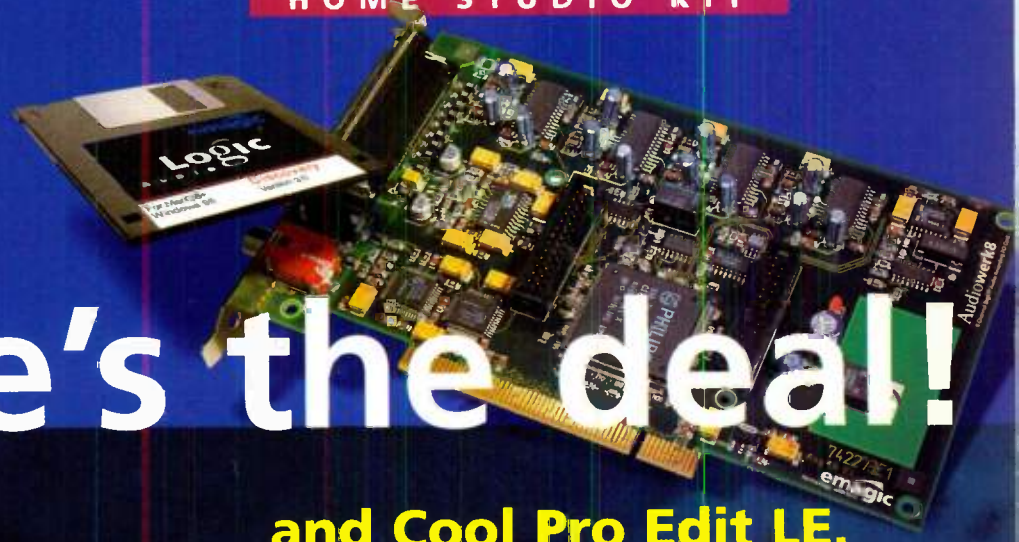

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PRO FILE

Fingertip Finesse

Tom Roady keeps it organic with digital control.

By Brian Knave

Many musicians dig digital recording because it accommodates change. Samplers let you refine source sounds, sequencers let you change and quantize sounds after tracks are recorded, and digital audio workstations allow alteration of virtually any aspect of a performance. But for Nashville studio percussionist Tom Roady, whose rhythmic contributions can be heard on releases by Reba McEntire, Vince Gill, Wynonna, and a host of other country-music stars, the ability to edit is the least appealing element of digitally generated music.

"I'm a player first and foremost," explains Roady, "and I strive to play parts that work from the get-go. They shouldn't require manipulation after the fact. For me, it's the human element that makes music musical."

Although Roady has been into electronic percussion for years, it wasn't until he happened upon the Zendrum MIDI percussion controller that he found an electronic instrument perfectly suited to his playing style. "The Zendrum allows a percussionist to play the way he knows best—with his hands and fingers," he says, "and the dynamic response is amazing!"

On his debut solo release, *Zendrum: One Tribe,* which features the Zendrum almost exclusively, Roady played all his parts direct to 24 tracks of ADAT. "I'm proud that I didn't use any sequencers or drum machines. For me, going straight to tape was the best way to capture the musical feelings I wanted to convey. It allowed me to keep the music's feel organic and earthy."

The ten instrumentals that comprise *Zendrum: One Tribe* are "world beat" inflected. They showcase not only Roady's command of funk, Latin, African, and other drumming styles but also his considerable songwriting chops. Sound sources included an Alesis D-4, E-mu Proteus/3 World, and Yamaha TX81Z as well as samples triggered from Roady's Dynacord Add-One and E-mu Emax SE and e-64 samplers. Several songs also feature guest performances by fellow studio musicians, including an inspired harmonica solo by Pat Bergeson, superlative fretless bass by Gary Lunn, and horns by the world-class Rush Hour horn section.

Roady typically recorded a click track first and then erased the click after laying down some basic rhythm tracks. Next, he overdubbed the other instruments, striving to maintain a live feel. When possible, guest musicians performed as Roady laid down more tracks. This ensured a modicum of musical interaction—something Roady was loathe to lose. "The danger of doing every instrument yourself is that the finished piece can end up sounding lifeless. Bringing in just one other player can make a world of difference."

As for performing on the Zendrum, Roady learned a trick from Roy "Future Man" Wooten, the pioneering electronic drummer of Béla Fleck and the Flecktones. "The problem was that the original Zendrum had neither a sustain pedal nor MIDI Note Off, so you would play a note, and it would just keep sustaining. Later models offer both features, of course, but I had to use a workaround that Roy showed me: you lightly retrigger the note by just barely tapping the pad. That way, the newly sustaining note is all but inaudible."

For more information contact Rancho Roady Productions, 105 Mockingbird Lane, Lebanon, TN 37087; tel. (615) 444-2534; e-mail tomroady@telalink.net; Web www.nashville.net/~tomroady; or call Muse Line (617) 497-5786, ext. 9363.

Tom Roady

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Toy Story

Children's instruments offer new sounds for the personal studio.

It's no coincidence that we speak of "playing" music. Making music with any instrument should bring you joy. Even if music becomes your business, performing is supposed to be *fun*. If you lose the playfulness, if you lose the joy of music, you might as well dig ditches for a living; it probably pays better, anyway.

Upon reading a magazine story about concert artists who performed on toy pianos—including classical works written specifically for these diminutive instruments—I decided I had to have one. I finally found it at a holiday sale at HearthSong, a specialty toy-store chain. The same day, I took the toy piano to a friend's eightieth birthday party at a restaurant. Perching the instrument on a table, I performed for 40 appreciative partygoers, many of whom were movers and shakers of the local Wagner Society. Indeed, you *can* play real music with these things! Best of all, it was more fun than I'd had on stage in years.

That inspired EM Editor in Chief Mike Molenda, Managing Editor Mary Cosola, and me to play hooky from the office and venture to HearthSong and Mr. Mopp's (an old-fashioned toy store in Berkeley, California) in search of inexpensive musical toys that could also be used in the studio to add new and different colors to your music. (If you must get serious about it, you can even sample the instruments and sequence the sounds.) We came home with an interesting and colorful collection of musical toys that might be just what you need to add a fresh twist to your tunes.

By Steve Oppenheimer

World Radio History

This Schoenhut toy grand piano ($99) is my favorite toy. It uses struck bars, not strings, so you must play with a clean staccato touch. It's great as a substitute for steel drums, adding a calypso-like flavor. I also have employed the toy grand instead of a harpsichord and to add a feeling of childlike innocence to overly serious music.

All photography by Leslie Hirsch. Special thanks to model Katya Dratva.

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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.

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Proll's ChimeTone 3-D Xylo ($29.95) is not exactly a xylophone. Its twelve hollow metal tubes resemble wind chimes and produce a round, bell-like sound when struck with its two plastic mallets. If you play vibes, you can probably use some of the same mallets and playing techniques. It is tuned as a major scale with a range of an octave and a fifth, and you can play lovely glissandi by sliding a mallet across its chimes.

Toy stores are a great source of small percussion instruments. I never learned to play castanets well, but they are still worth having around: if you need that clicky-clacky sound just once, you get a bargain at 98 cents each. We also found a lovely triangle and a variety of shakers and bells.

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We found Antonelli's Musicolor-series wind instruments at several stores. Not only can you play a full major scale on the Musicolor clarinet ($14.25), you can play chords! It sounds sort of like a melodica, which is admittedly pretty hokey, but hey, this is only a plastic toy. It provides surprisingly good lung exercise, too!

Wally Bear's toy marching drum, from Noble & Cooley ($11.95), was a pleasant surprise. It doesn't come with a strap for marching, which is just as well, considering such a strap would be midget-sized. But it comes with a pair of small drum sticks that I could comfortably hold, and it turned out to be a pretty smooth-sounding 8-inch minitom.

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I never quite got the hang of playing the Hero Midget accordion ($21), in part because my hands are a bit large for it. But I like its sound, and I managed to play some nice chordal pads with it for short passages. If you have smaller hands and more patience, you can surely do better than I.

The mouthpiece of this 4-hole ocarina ($12.95) is the gila lizard's nose! By partially covering the holes, you can play microtones on the flute-like, ceramic instrument. Theoretically, you can even produce a full 12-tone scale, but this takes lots of practice.

The kalimba, or thumb piano, evokes images of African music, even when used on more Western tunes. The eleven tines on this kalimba ($25) can be tuned by loosening the bridge screws and pushing the tines in or out. They cover a full octave (G to G), with two instances of A, B, and C. You can also find 8-tine versions.

THE END

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NOTEWORTHY Deals

By David M. Rubin

A *bargain hunter's guide to entry-level notation software*

During the past decade, computers and MIDI have provided us with a panoply of new ways to view musical content. But track overviews, event lists, piano rolls, and other such displays are designed primarily for editing music. They were never intended as a medium for communicating performance instructions to players. That task is still best handled by traditional staffs, clefs, notes, and beams.

Because of this, most sequencers now include a section that allows you to see and print your music in manuscript form. But with only a few exceptions (notably *Logic* and *Cubase*), sequencers typically offer limited resources for arranging musical elements on the page, adding different kinds of text and symbols, adjusting measure spacing, and altering staff placement. In most cases, you'll get greater flexibility for page layout and more versatility in note and symbol placement with a dedicated notation program.

Notation programs range in price from thousands of dollars to less than fifty dollars. How much program is enough? That depends, of course, on your needs. High-end programs (starting at around $400) enable you to create scores with dozens of staves, and they offer maximum flexibility for note and symbol placement. Furthermore, they enable you to do exotic things like produce your own symbols; import graphics; create nonstandard clefs, key signatures, and time signatures; make microscopic adjustments to notes, slurs, and other musical elements; and customize the look of the page in many ways.

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3-D imaging by Michael Morrow
Background illustration by Laura Williams

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But not everyone needs to notate large, Stravinsky-like orchestral scores. And not everyone requires true publisher-quality output. Perhaps you're producing scores for the local church choir or you're a bandleader and you need to create some marching-band scores with parts. Maybe you just want to print some lead sheets with lyrics and chord symbols. If your notation needs are modest and you're not inclined toward bizarre experimental music, an inexpensive, entry-level notation program may well serve your purposes and save you hundreds of dollars in the process.

To that end, we'll compare four notation programs that cost less than $130—in some cases much less: Midisoft's *Desktop Sheet Music* ($129), Sion Software's *QuickScore Elite* ($79.95), Passport Designs' *MusicTime Deluxe* ($79), and Jump! Music's *ConcertWare* ($39.99). All of these programs work on the PC, and *MusicTime Deluxe* and *ConcertWare* also come in Mac versions.

Don't let the low-end prices fool you. Many powerful features from high-end notation programs have trickled down to these entry-level programs. The result, in some cases, is a cost/benefit ratio that's nearly impossible to beat. Naturally, some corners had to be cut, and each program's complement of features is different. Here are some areas to consider when shopping.

Staff Meeting

The staves in a notation program are roughly equivalent to the tracks in a sequencer program. In fact, you can import a multitrack Standard MIDI File into all of these programs, and the tracks will appear on different staves. You can also assign different MIDI channels to each staff for multitimbral playback. Entry-level programs typically offer a maximum of sixteen staves per score, which is enough for a chamber orchestra or stage band but not quite enough for a large orchestra. *ConcertWare* offers 32 staves, which should be adequate for most projects; few orchestral scores demand more than about 25 staves.

To accommodate polyphonic writing, each staff must be able to display (and play back) several independent "voices," each with its own stem direction. In most cases, each voice is also assignable to a different MIDI channel. *QuickScore Elite* allows three voices per staff; the other programs are a bit more generous. *ConcertWare* allows four voices per staff whereas *MusicTime* and *Desktop Sheet Music* allow eight, although the latter only lets you assign one MIDI channel per staff.

Percussion parts are frequently notated on a single-line staff, and that can be important for the appearance of some scores. All of the programs in this group except *MusicTime* provide a single-line percussion staff, and all of the programs, including *MusicTime*, provide a percussion (drum) clef so you can notate drum parts on a standard 5-line staff. Aside from the rhythm staff, none of these programs offer alternate staffs, such as those used for guitar tablature. They do, however, all provide guitar chord symbols and fretboard grids. *QuickScore* even offers figured bass symbols for those who need to recreate Baroque scores and keyboard accompaniment parts.

Clef Notes

At a bare minimum, all notation programs must supply the essential clefs: treble, bass, alto, tenor, and percussion. All the programs in this group do so and also include the treble 8vb (octave lower) clef. *MusicTime* and *Desktop Sheet Music* expand the choices further with treble 8va (octave higher) and bass 8vb clefs. *QuickScore* and *Desktop Sheet Music* offer a bass 8va clef.

Most notation programs let you insert a clef in any measure, but *ConcertWare* and *QuickScore* also support small "reminder" clefs. (*QuickScore* inserts them automatically; *ConcertWare* offers them as an option.) That helps make the scores and parts more professional looking and easier to follow.

Alternate note heads are another important feature, especially for percussion parts but also for indicating idiomatic techniques, such as harmonics or nonpitched sounds (see **Fig. 1**). *ConcertWare* only offers four alternate note-head styles. *Sheet Music* and *MusicTime* do much better with six and seven alternates, respectively. (They both include an option for stems without note heads—handy for indicating rhythm patterns.) *QuickScore* offers a collection of five alternate note heads, but they're only available when using a percussion clef.

Time after Time

When shopping for notation software, it's important to consider the range of note values that a program offers. It can be quite frustrating to find yourself in the middle of a score and suddenly realize that you can't notate a musical passage because you don't have the necessary note values at your disposal. All of the programs in this group can display notes as long as a dotted whole note, but only *MusicTime* offers a double whole note. That can come in especially handy for those who transcribe early music. On the other end of the spectrum, *ConcertWare* offers the least range of note values with a 32nd note as its smallest increment. *QuickScore* offers a quite-acceptable 64th note as its limit; *Sheet Music* and *MusicTime* both extend the range to a 128th-note value.

When it comes to choosing a time signature, all the programs offer similar options. A dialog box typically presents you with an assortment of common duple and triple meters, such as 2/4, 3/4, and 6/8. All of the programs also provide an option for creating less-common time signatures, such as 6/2 or 4/16, and mixed meters such as 5/4 and 7/8. Only *Sheet Music*, however, will let you insert meters such as 4+1/8 or 2+3/16 (see **Fig. 2**). That's an uncommon feature in a low-end program.

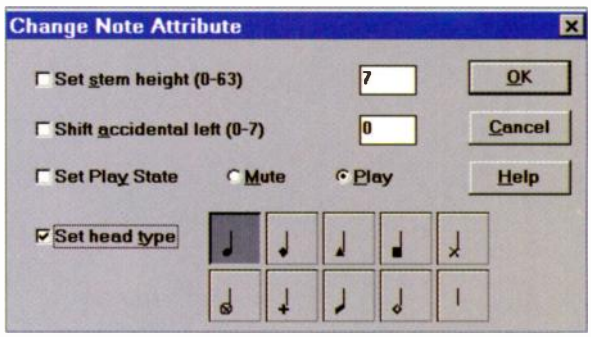

FIG. 1: Alternate note heads, such as those shown in this *MusicTime* dialog box, are important for percussion parts but also for indicating special playing techniques.

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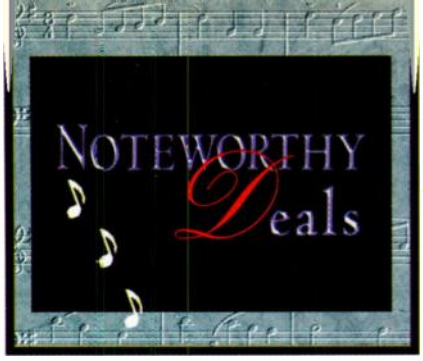

Aside from the usual time signatures, *ConcertWare* offers a Free Time option that allows you to enter notes without a time signature or bar lines.

Key signatures are handled in a similar way to time signatures. In *QuickScore* you specify a number of sharps or flats, in *MusicTime* and *ConcertWare* you select a key signature by name (major or minor), and in *Sheet Music* you can use either method. In all cases, only the standard key signatures in the circle of fifths are available (see **Fig. 3**). You can't create nonstandard key signatures nor can you mix sharps and flats. In *ConcertWare* and *QuickScore,* however, you can show natural signs to cancel a previous key signature—an important feature that's often overlooked.

Import Business

All of these programs can import Standard MIDI Files, but each uses its own transcription algorithms to interpret the data. The results vary significantly from piece to piece and from program to program. *Desktop Sheet Music* simply imports MIDI files and leaves it up to you to clean up unnecessary notes, rests, and ties. *MusicTime* and *QuickScore* let you specify a display quantization value in advance, which prevents the appearance of undesirable short notes. *ConcertWare* provides separate settings for notes and rests; notes shorter than specified appear as grace notes.

All of the programs allow you to record music in real time or in step time from a MIDI keyboard. You can, of course, also enter notes with the mouse. Only *ConcertWare* and *MusicTime,* however, let you enter notes (pitches and durations) from the computer's QWERTY keyboard. Both programs also provide onscreen piano keyboards for entering pitches, in case you don't have a MIDI keyboard handy.

Room with a View

There are typically two ways to view your music in a notation program: score view and scroll view. In score view the music appears onscreen as if on separate sheets of paper—approximately the way it would appear if printed. In scroll view, the staves scroll off to the right indefinitely, without page breaks.

Score view has the advantage of letting you see how your page layout is shaping up as you work, but it's not always the best environment for inserting notes. That's especially true when more than one system appears on each page. Scroll view is often preferred for note entry because each staff remains in the same position throughout the score. And it provides a better sense of continuity for many types of music. Ideally, a program should provide both views so you can derive the benefits of each.

Now let's take a closer look at each program.

Desktop Sheet Music (Win)

The most expensive program in this group, Midisoft's *Desktop Sheet Music* (see **Fig. 4**), is a study in contrast. The program offers an odd combination of several high-end features combined with some surprisingly low-end limitations. On the plus side, the program records at a respectable 480 ppqn resolution; it offers an unlimited number of staves (accomplished by reducing the font size); it can display durations down to 128th notes with up to eight voices per staff; and it offers hundreds of symbols, markings, and other notational elements, including nine clefs and support for irregular meters. The program comes with twenty ready-made templates for various ensembles, such as brass trio, SATB choir, and woodwind quartet, which make it easy to get started creating a score. And the program's OLE support means you can import text, graphics, and even WAV files from other programs and link them to, or embed them in, your onscreen scores.

But *Desktop Sheet Music*'s high-end offerings are hobbled by the program's decidedly low-end mindset. For example, although you can have eight voices per staff, you can't assign different MIDI channels to each voice. (All voices in a staff must share the same channel.) And during MIDI playback, the program recognizes notes, accents, and dynamics but, amazingly, not repeat signs.

On one hand, the program provides a generous assortment of markings and symbols, but on the other hand, it doesn't let you adjust their shapes. You can only move them up or down and left or right in small increments (by clicking on little arrows in a dialog box called the Inspector). You can't, for instance, change the shape of a slur or tie nor can you open, close, or stretch a crescendo wedge.

Much more serious, however, is the fact that you can't insert rests into the score. The program automatically fills the spaces between notes with what it considers to be the appropriate rests. If the program chooses a quarter rest and you prefer two eighth rests (for whatever reason), you're simply out of luck. But there's another, equally egregious omission in this software: the program has no Undo command. Notating music on a computer is so fraught with opportunities for mistakes and second thoughts that a universal Undo command is an absolutely essential tool. Without it, you must change to an Eraser tool or choose one of several other dedicated commands to remove staffs, measures, clefs, and other elements that are mistakenly entered. That makes the program much less intuitive and more unwieldy than necessary.

All of *Sheet Music*'s operations take place in a single window. The colorful graphics are appealing to look at, but the design of the window makes it hard to see enough of the music. Zooming out helps, but then the music becomes too small to clearly see what's going on. Seventeen buttons along the top of the window form toolbars for editing, playing, and recording music. The icons on the buttons, unfortunately, are often confusing; labels would help

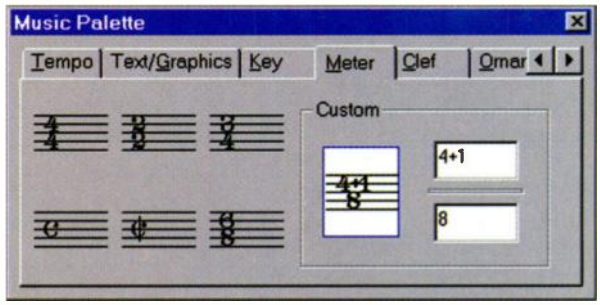

FIG. 2: All notation programs offer an assortment of time signatures. *Desktop Sheet Music*'s offerings include custom meters, as well.

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a lot. A Mixer window provides VU-style playback meters and volume sliders (one for each staff), but it overlaps the score too much and can't be vertically resized.

To enter notes and other markings with the mouse, you make selections from the Music Palette window, which provides ten tabs for selecting groups of symbols, such as notes, accents, dynamics, text, meters, and clefs. It's handy to have a single window for all musical elements, but it doesn't let you see more than one group at a time. That adds unnecessary mouse clicks to the selection process.

A ruler above each staff helps you locate the appropriate place to deposit notes, which must be done precisely because the program will fill in rests between misplaced notes (and there's no Undo command). As notes are added, the measures expand, and the spaces between the ruler markings change to reflect the positions of the notes in the score. That soon becomes confusing in a large score because each ruler applies to an entire system (bracketed set) of staves and all of its notes.

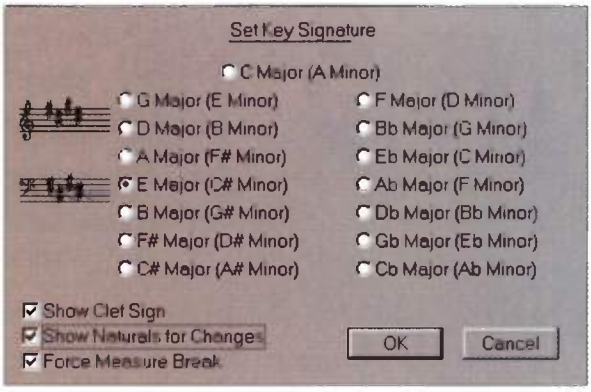

FIG. 3: Entry-level notation programs offer only standard major and minor key signatures. *ConcertWare* includes an option for showing natural signs to cancel a previous key signature.

Desktop Sheet Music has several attractive features, but it was clearly not designed for serious manuscript preparation—at least not without some level of frustration. The user interface obscures the music with oversized dialog boxes, palettes, and other windows, and the software lacks a number of vital functions. Furthermore, the documentation frequently omits specific details about the functions that do exist. In short, this program will most likely appeal to hobbyists and is best reserved for small projects, such as lead sheets, simple piano music, and small ensembles.

ConcertWare (Win/Mac)

In spite of a price tag well below the $50 mark, Jump! Music's *ConcertWare* (see **Fig. 5**) still boasts a good number of powerful features. The graphic interface is certainly not going to win any beauty contests, and the program has a few awkward spots, but in general, this

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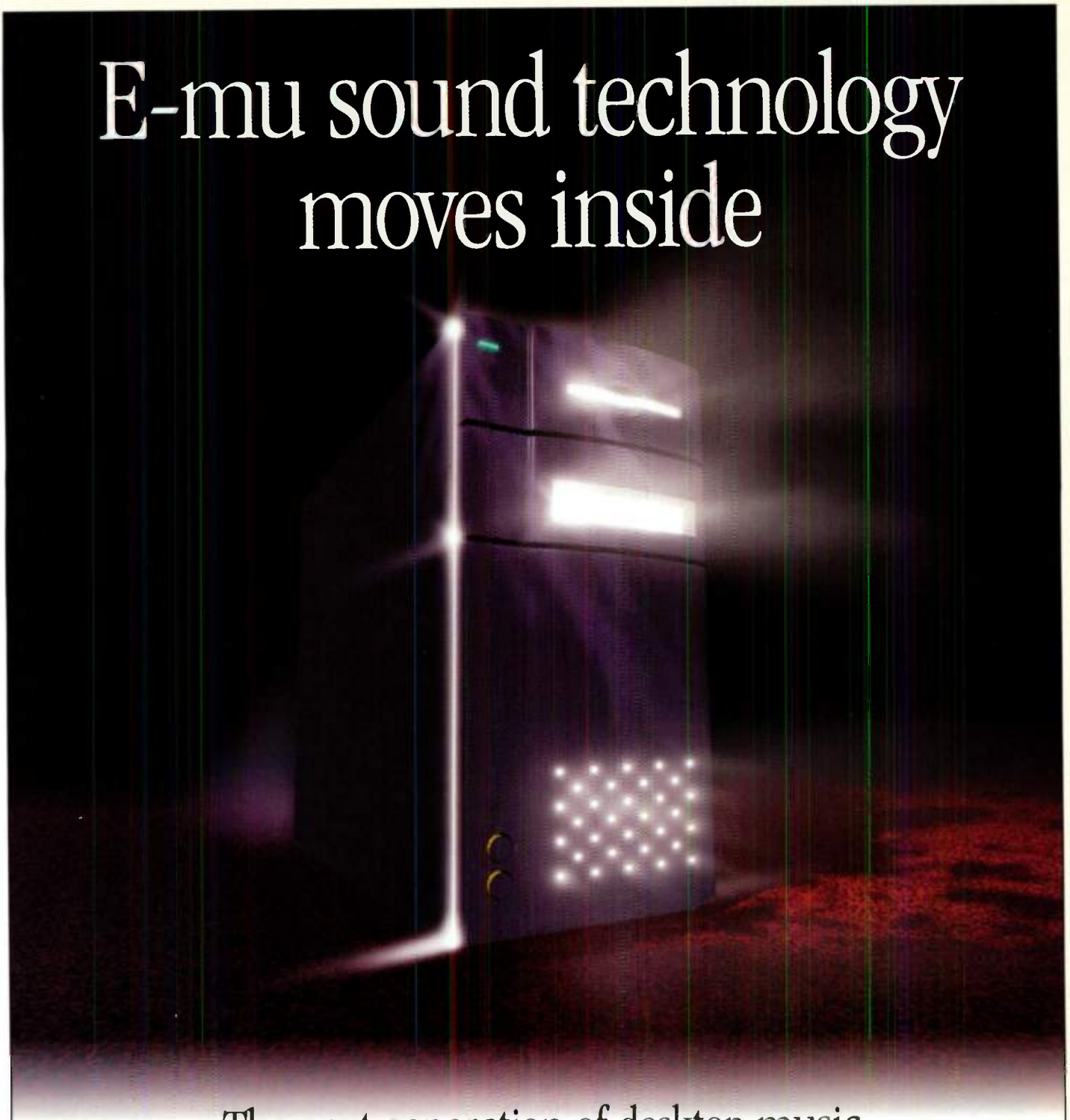

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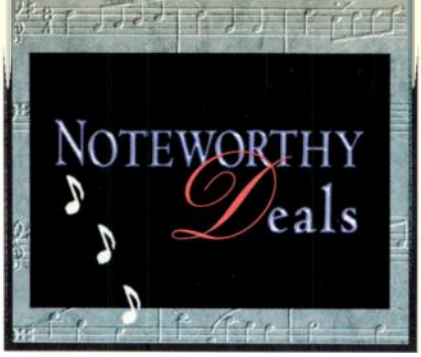

software does a lot for its paltry price. *ConcertWare* supports MIDI playback of dynamics, tempo changes (both gradual and abrupt), and repeat signs. It allows you to have as many as 32 staves with up to four voices per staff—each with its own MIDI channel—but only up to a total of 32 voices per score (distributed however you like).

The program supports real-time, step-time, and punch-in recording (with a 96-ppqn resolution), and it provides a Merge-Paste command that adds a selected group of notes to the notes already on the staff. In addition, a Repeat-Paste command lets you paste a selection several times in a row at the insertion point. A Harmony dialog box enables you to harmonize a melody line by specifying intervals above and/or below the melody. And you can design your own guitar (and mandolin) chord grids to indicate special chords and fingerings.

To enter notes in *ConcertWare*, you first select a staff (you can only enter notes on one staff at a time) and click with the mouse to position the insertion point. Next you choose a note (or rest) value from a row of options above the staff display. Finally, you select a pitch from a stack of whole notes, called the Pitch Palette, that appears to the left of the score. Each time you select a pitch, a note of the specified duration appears at the insertion point.

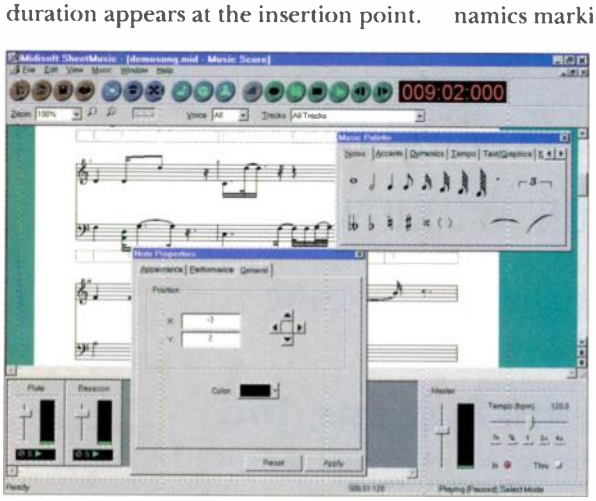

FIG. 4: *Desktop Sheet Music*'s colorful graphics and overly large dialog boxes tend to crowd the score.

The row of note values at the top of the window includes dotted notes (instead of a separate dot button) so you don't have to first select a note value and then select a dot as you do in most of the notation programs. That speeds up the selection process. Unfortunately, the note values only go to 32nd notes, which some users may find too limiting.

When working with the mouse, I prefer entering notes directly on the staff; it's easy to lose track of the insertion point. And it's awkward selecting pitches from one place and having them appear in another. The whole process seems a bit cumbersome, but *ConcertWare* does provide several options to help things along. You can use an external MIDI keyboard to select pitches (as with all notation programs), or you can click the keys of an onscreen piano-style keyboard. You can also enter pitches and durations from the computer's keyboard. Many people will appreciate that option.

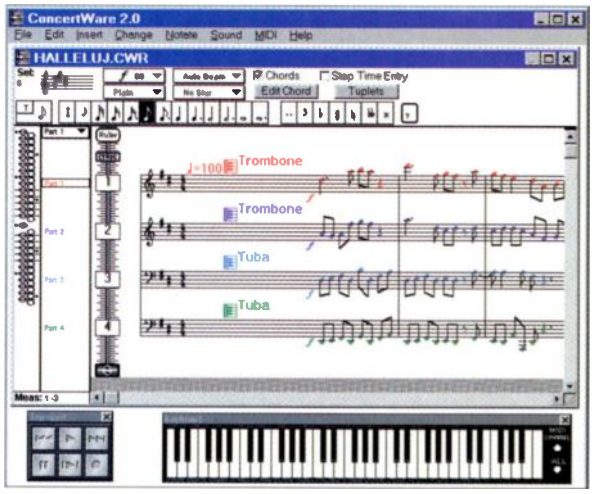

FIG. 5: *ConcertWare*'s main window is a bit awkward to use but quite functional nonetheless. It packs a lot of features into an inexpensive program.

Above the row of note durations, four drop-down menus provide additional options. I especially like the Markings menu, which allows you to attach any of seven types of accent marks (including staccato) above or below the notes as they're entered. You can also select a group of notes after they're entered and add the marks to all the notes at once. Another menu provides eight dynamics markings (from *ppp* to *fff*). Each appears in the menu with a user-definable MIDI Velocity value for playback.

To adjust the positioning of notational elements, *ConcertWare* provides a Note Mover tool. You can use it to adjust the vertical positions of notes, rests, dynamics marks, staves, and lyrics. *ConcertWare* also lets you extend the spaces between notes by using the spacebar on your computer keyboard. Unfortunately, you can't adjust the position or shape of ties and slurs. You can, however, adjust the position, shape, and length of dynamics wedges.

In *ConcertWare*, music entry is always done in scroll view. The program uses two versions of the main window: one for note entry and one for entering text, chords, and symbols. In Text Entry mode, the note-related buttons are replaced with a Symbol Library. To see all of the symbols, however, you must click on a set of arrows to flip through twelve palettes of chord grids or fourteen palettes of symbols. That's even more awkward than the tab system used in *Desktop Sheet Music*, although *ConcertWare* is much more flexible in how it lets you use markings and symbols. Finally, you can preview your music in score view before printing, but you can't make changes or add notes in that view.

In general, *ConcertWare* has a few limitations that clearly mark it as an entry-level program. Overall, though, this program offers lots of useful features and a bang for the buck that's really hard to beat. Furthermore, both the Mac and Windows versions come on the same CD-ROM.

MusicTime Deluxe (Win/Mac)

Passport Designs' *MusicTime Deluxe* (see **Fig. 6**) is an entry-level version of *Encore*, the company's pro-level notation program prized for its intuitive user interface and accessible feature set. *MusicTime* has clearly inherited many important qualities from its parent program (they're both based on the same

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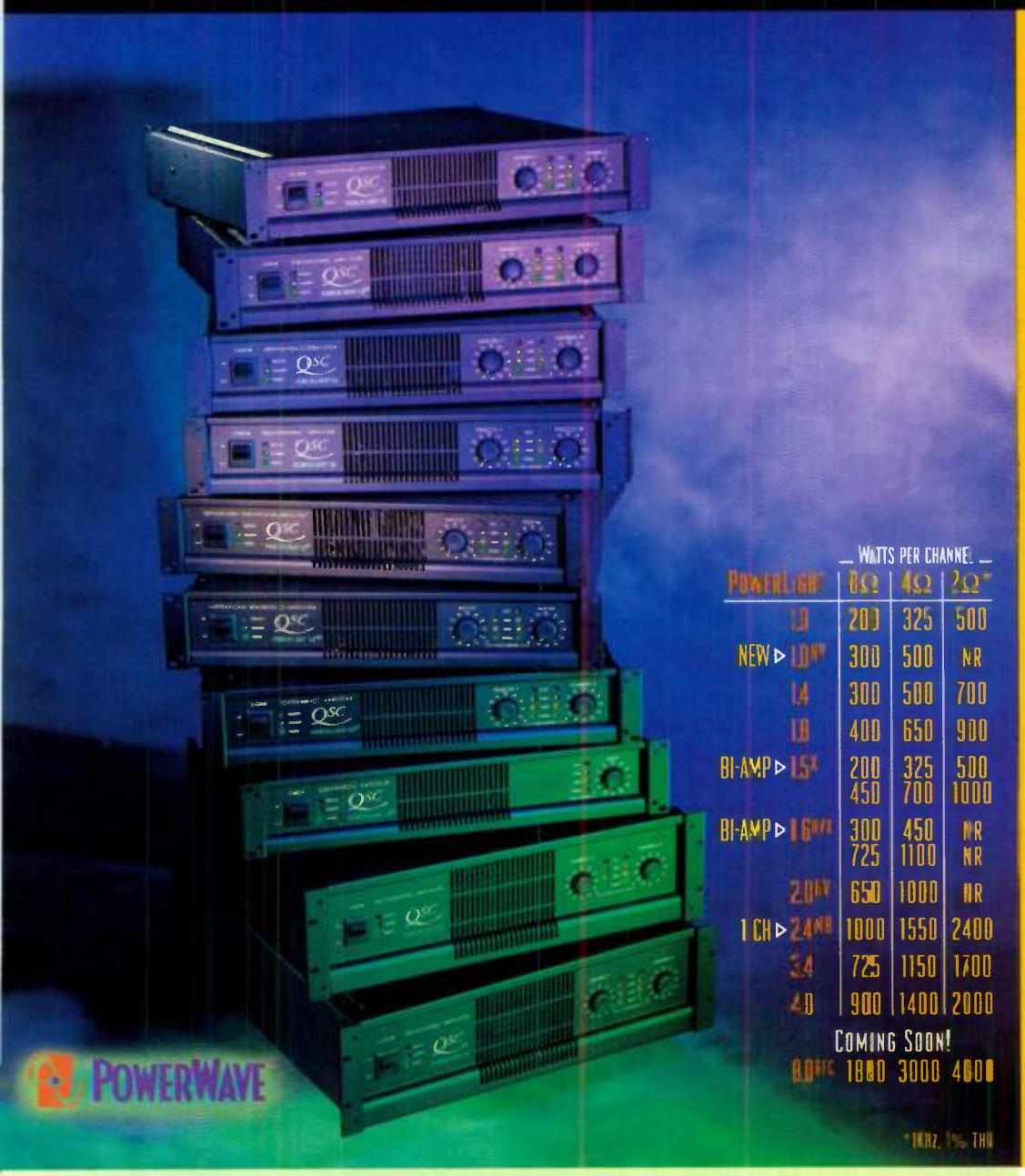

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1.4	300	500	700
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BI-AMP ▷ 1.5X	200 450	325 700	500 1000
BI-AMP ▷ 1.6HVX	300 725	450 1100	NR NR
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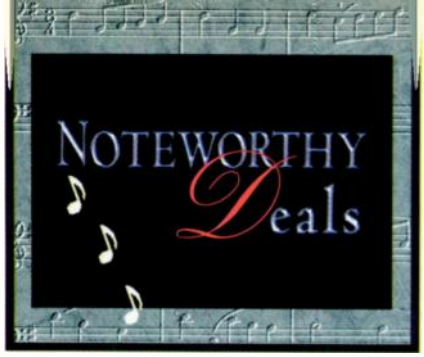

underlying code), and the result is a well-designed program with many powerful features and a robust look and feel. Passport offers an upgrade path from *MusicTime Deluxe* to *Encore*, and *Encore* can directly read *MusicTime* files, so your scores won't become obsolete if you do upgrade. Furthermore, *MusicTime* can open files from Passport's popular *Master Tracks Pro* sequencer, which makes sequencer-to-notation file sharing easy.

MusicTime offers a single score-view display for entering and editing notation. Unlike some programs, however, *MusicTime*'s main window is designed to optimize the viewing area while still making the necessary tools available. Along the top of the window there are small transport buttons for playing and recording. Other buttons allow you to change the cursor for selecting, inserting, or erasing notes and symbols. Small page icons let you move from any page in the score directly to any other page without scrolling or typing a number.

All notes, rests, accidentals, clefs, symbols, and other markings appear on one of nine floating palettes. You can have them all open at once or display only the ones you're currently using. *MusicTime* allows you to insert almost any notational element into a score by simply selecting it from the appropriate palette and depositing it in the score where you want it to appear. It's about as close to using a real pencil and paper as you're likely to get with software. But *MusicTime* expands the metaphor with several powerful features.

Once a note, rest, symbol, or marking appears in the score, you can adjust its position—and sometimes its shape—by simply dragging with the mouse. As with most programs, you can change the pitch of a note by dragging up or down in the staff. But *MusicTime* also allows you to reposition notes, rests, and other elements horizontally with the mouse. That provides a great deal of control over the final appearance of the score.

You can easily move ties and slurs to avoid collisions with other marks. And you can change the arc of any tie or slur by dragging up or down on small grab handles. Dynamics wedges are similarly adjustable, and *MusicTime* enables you to reposition bar lines, chord symbols, and lyrics and change the height and angle of note beams and "tuplet" brackets by dragging with the mouse. (Some markings, such as accidentals and accents, are "nudged" in small increments by clicking on them.) You can select noncontiguous notes, and you can even drag-copy notes, symbols, and slurs by holding down the Control key when dragging.

Aside from real-time note entry (with a 240 ppqn resolution), *MusicTime* supports step-time entry of notes from a MIDI keyboard, an onscreen keyboard, or the computer's QWERTY keyboard. A dialog box lets you specify whether repeat signs are recognized or ignored during playback. Although *MusicTime* does not respond to tempo-change indications and dynamics markings, it does provide a workaround with dialog boxes for MIDI playback. The dialogs allow you to specify tempo and volume changes (by measure number), so you can parallel what appears in the score during playback. Nonetheless, that's more cumbersome than allowing you to preassign settings for various symbols.

In other respects, setting up MIDI channels and assigning instrument sounds is easy in *MusicTime*. The program's Staff Sheet window provides columns for Staff names, Play and Solo status, MIDI channels, and patch names. Pop-up menus for General MIDI and several popular MIDI devices allow you to choose patches by name rather than number. Volume sliders are provided for each staff or for each of the voices (up to eight are possible) within a staff. And you can change the order of the staves in the score by simply dragging any staff field to a new position on the Staff Sheet.

MusicTime is a well-designed program, but it's not without its shortcomings. For example, it doesn't offer a single-line percussion staff, you can't create custom guitar fingerboard symbols (the program provides blank grids that you can fill in after printing), there's no scroll view, and MIDI playback of symbols is limited.

On balance, however, *MusicTime* has much to offer. Its page-layout capabilities are excellent, especially for an entry-level program, and it uses the same Anastasia music font that *Encore* uses, so its scores look quite professional. *MusicTime* is available for both the PC and the Macintosh, and the versions are cross-platform compatible. You can also save *MusicTime* scores as EPS files for export to programs that support graphics. In summary, if producing professional-looking scores is important to you and you're on a modest budget, *MusicTime Deluxe* is well worth considering.

QuickScore Elite (Win)

As I mentioned earlier, most sequencers now include at least a rudimentary notation window, even though the software's emphasis typically remains on sequencing and editing MIDI data. Sion Software's *QuickScore Elite* (see **Fig. 7**) has taken the opposite tack, however, by offering a notation program with several windows for editing MIDI data. In fact, *QuickScore Elite* (the newest incarnation of *QuickScore Professional*) provides eight different windows for viewing and editing music. The Score Editor window includes a button for switching between Score View mode and Print Preview mode (although you can only enter notes and

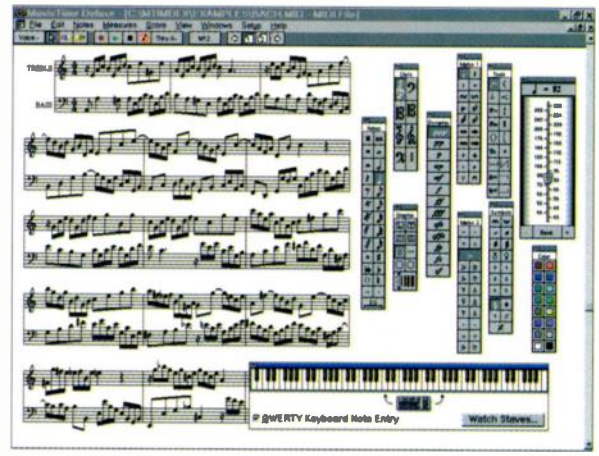

FIG. 6: *MusicTime Deluxe* offers many features from *Encore*, its parent program, including a well-designed, intuitive user interface. All of its many palettes can be open at once if necessary.

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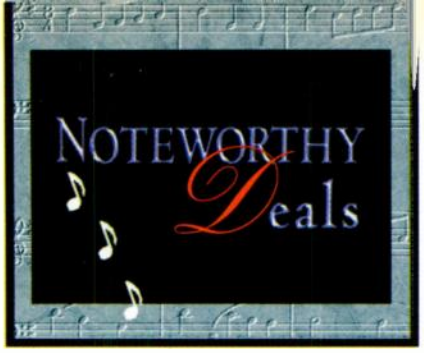

edit in Score View). Another button lets you switch between viewing a complete system or any one staff.

QuickScore supports looping, step entry (with MIDI keyboard or mouse), punch-in recording, and tap-tempo recording. The program provides seven buttons for selecting note durations (up to 64th notes) when entering music. A separate "qualifier" button changes the durations to triplet or dotted values. That's a less-than-elegant arrangement, which adds unnecessary mouse clicks to the note-selection process. Even worse, the program doesn't support "tuplets" greater than a triplet. (You can create other tuplets using graphic elements, but they won't play back correctly, and the process is rather kludgy.)

To enter notes in the Score Editor window, you simply select a note duration with the Pencil tool and place it on a staff. Key equivalents for the different durations make it possible to enter notes without constantly moving the mouse between the palette and the staff. *QuickScore* provides four tools for repositioning notes after they're entered. One tool allows you to move notes in a vertical-only direction to change pitches. Another tool allows you to move notes horizontally, causing them to snap to new note (metric) positions—without changing pitch. A third tool allows you to move notes both vertically and horizontally at once. These same tools also work for moving symbols, markings, and other notational elements.

The last tool is a spacing tool that can move notes and bar lines horizontally without affecting their positions in time. That can help improve score appearance and legibility. I like having separate tools for different types of movement. It makes it easy to change several pitches, for example, without worrying about moving notes out of position.

For entering symbols, markings, guitar chords, and other graphic elements, *QuickScore Elite* provides ten Symbol palettes. As in *Desktop Sheet Music*, you can only have one palette open at a time, which makes the selection process more awkward than necessary. Even worse, the palette closes as soon as you insert the symbol so that you have to reopen it to choose a different marking.

QuickScore's handling of slurs is excellent. To insert a slur you first select the slur icon in the Adjustable Symbol palette. With the Pencil tool you simply click and drag to deposit the slur over the desired area. A slur then appears with three drag handles, which let you completely reshape and reposition the slur. When you're happy with the results, hit the Return key to set the slur, or hit Esc to cancel. The process is fast and offers lots of control. Dynamics wedges are entered in a similar way. Triplet brackets, trill markings, and 8va indications also appear on the Adjustable Symbol palette.

QuickScore has a number of features, such as the Adjustable Symbol palette and the note-moving tools, that allow direct control over notational elements.

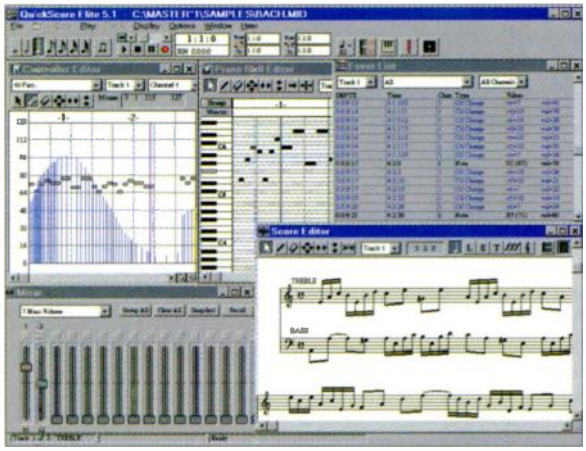

FIG. 7: *QuickScore Elite*'s notation capabilities are combined with an entry-level sequencer that offers graphic editing of notes and controller data.

But it also has some features that are strangely convoluted in their implementation—at least from the standpoint of manuscript preparation. Perhaps the worst of these is the way in which the program handles rests. In *QuickScore*, as in *Desktop Sheet Music*, rests are inserted automatically between notes. And, unfortunately, you can't edit the rests that the program puts in. None of the tools that let you move notes and symbols will work on the automatically generated rests. If a rest overlaps another notational element, your only recourse is to raise or lower the rest. That must be done one measure at a time with the Display Bar dialog box. It allows you to raise or lower all of a measure's rests (in a given voice) in increments by selecting a number from a drop-down menu. The process is not very intuitive. Ties are also generated automatically, and the same process applies to them.

Fortunately, *QuickScore* provides a workaround for this problem, although it's far from an ideal solution. In the Display Bar and Display Track dialog boxes you can choose to hide the rests in a single measure or for an entire staff. Then you can use the Symbol palette to insert rests as graphic elements. These rests can be moved around and deleted just like other symbols, although they won't affect MIDI playback. I would prefer having notes, rests, and symbols handled in a more uniform way without resorting to dialog boxes.

The remaining windows in *QuickScore* comprise a typical entry-level sequencer—with a few extras thrown in.

NOTATION SOFTWARE COMPANIES

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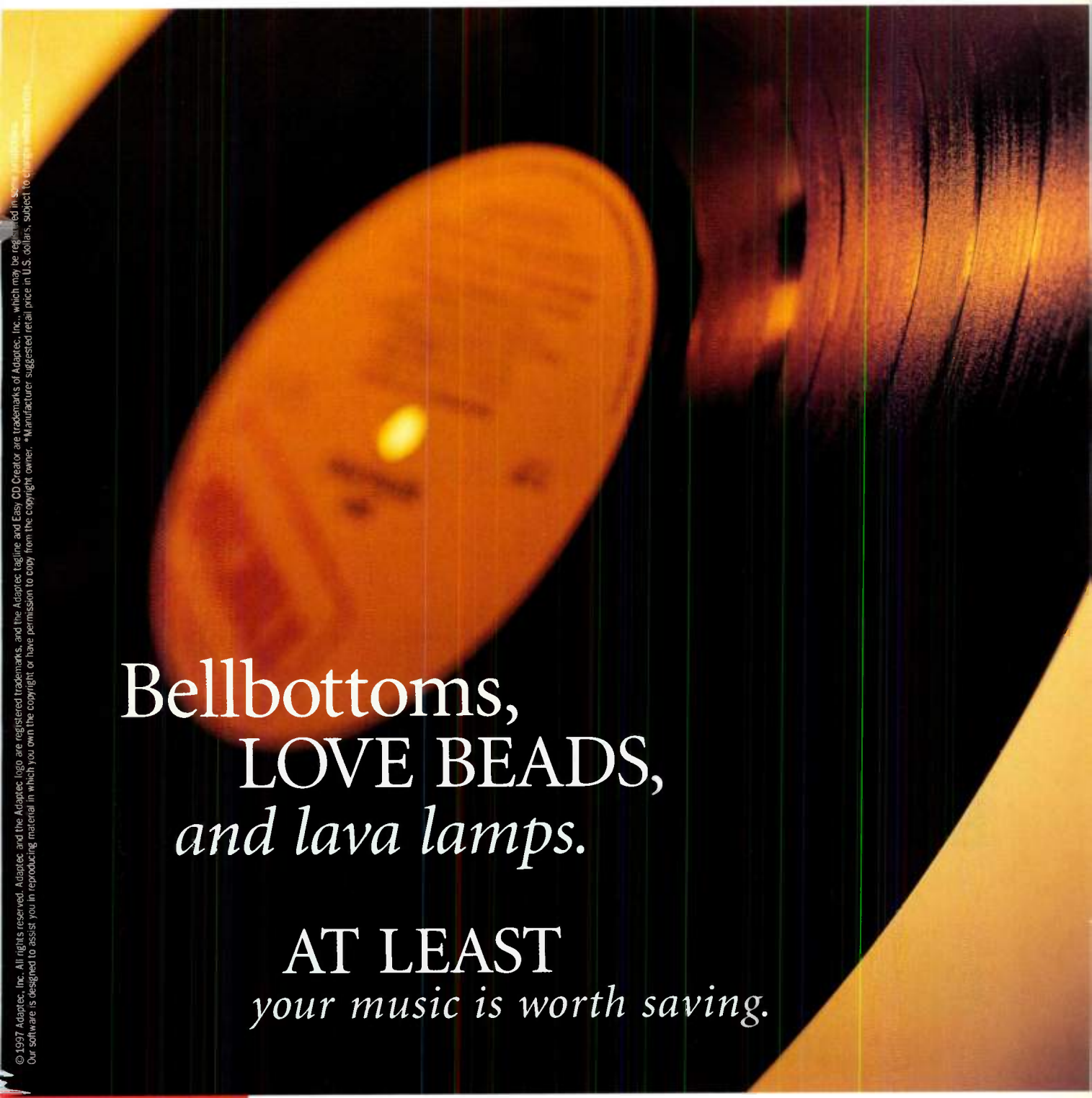

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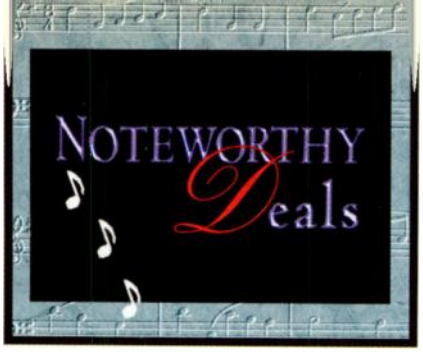

The Piano Roll window, for example, includes the usual set of tools for recording and editing notes, but it also allows you to attach a WAV file to the sequence. The Event List shows note and controller data, but it also displays the appearance of clefs, text, symbols, and WAV files—all in different colors. Other windows enable you to view and graphically edit Velocity and continuous controller data, set track parameters, and mix your music with onscreen faders and knobs.

QuickScore is the jack-of-all-trades in this group of products. Its scoring and page-layout capabilities place it in the ranks of notation programs, yet its sequencing tools (with a resolution of up to 960 ppqn) make it suitable for many composing tasks.

QuickScore's user interface still has some rough spots, but overall this program delivers a lot of capability for a reasonable price. Furthermore, *QuickScore* includes several features not available in the other programs, including support for external SMPTE time code, a function that checks your instrumental parts for out-of-range notes, and the ability to export scores as BMP or TIFF files. Sion Software also offers an upgrade path to its *QuickScore Elite Level II*, which provides 48 staves/tracks, guitar tablature, and other advanced features.

Few orchestral scores demand more than about 25 staves.

Final Notes

Shopping for notation software is a tricky process. Product claims listing dozens of features seldom provide insight into how awkward it is to use those features. Tools are only as useful as they are usable, and usefulness depends largely on the kind of music that you're notating and your particular work style. For example, many people prefer the automatic rest-generation approach used in *Desktop Sheet Music* and *QuickScore Elite* because it reduces the number of elements that must be added per measure. Other people find that approach too restrictive; they prefer the greater control and flexibility offered by programs such as *MusicTime Deluxe*.

Finally, all of the programs in this article are capable (with sufficient editing) of printing out a good-looking score. But there are noticeable differences in the output appearance. Whenever possible, get a sample printout or try a demo version of the program before purchasing.

Associate Editor **David M. Rubin** *has written many scores with pens, paper, ink, rulers, erasers, rubber stamps, and correction strips. He thinks notation software is a lot better.*

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CREATIVE Space

Curve of the GROOVE

Guitarist Jack West makes good on the promise of the personal studio with a brilliant DIY production.

BY BRIAN KNAVE

It's no longer news that the personal-studio revolution has put the power to make records within practically every musician's reach. Nor is it a big surprise that hordes of players have bitten the hook, holing up in their makeshift studios to produce the glistening discs they have entrusted to spread their musical message. But what may not be readily apparent—unless you work in a part of the music industry that affords you the opportunity to actually *hear* the numerous homemade CDs that hit the street each week—is that there's precious little gold in them thar hills.

Does this mean that the personal-studio revolution is a bunch of bunkum? Not at all. In fact, a recent self-released CD by finger-style guitarist Jack West is ample proof that personal studios can deliver the goods. Entitled *Continuum*, the 11-song disc of acoustic instrumentals was recorded mostly live by West and his group, Curvature, with a single ADAT in West's rented digs in Oakland, California. Though sometimes musically complex, the record is not overly ambitious from a technical standpoint—and yet, three key elements distinguish it from other homebrew efforts: strong compositions, first-rate performances, and exceptional mixes. A close look at how West managed to produce this superlative disc with a bare minimum of gear is not only instructive but also beautifully illustrates the do-it-yourself credo of the personal recordist.

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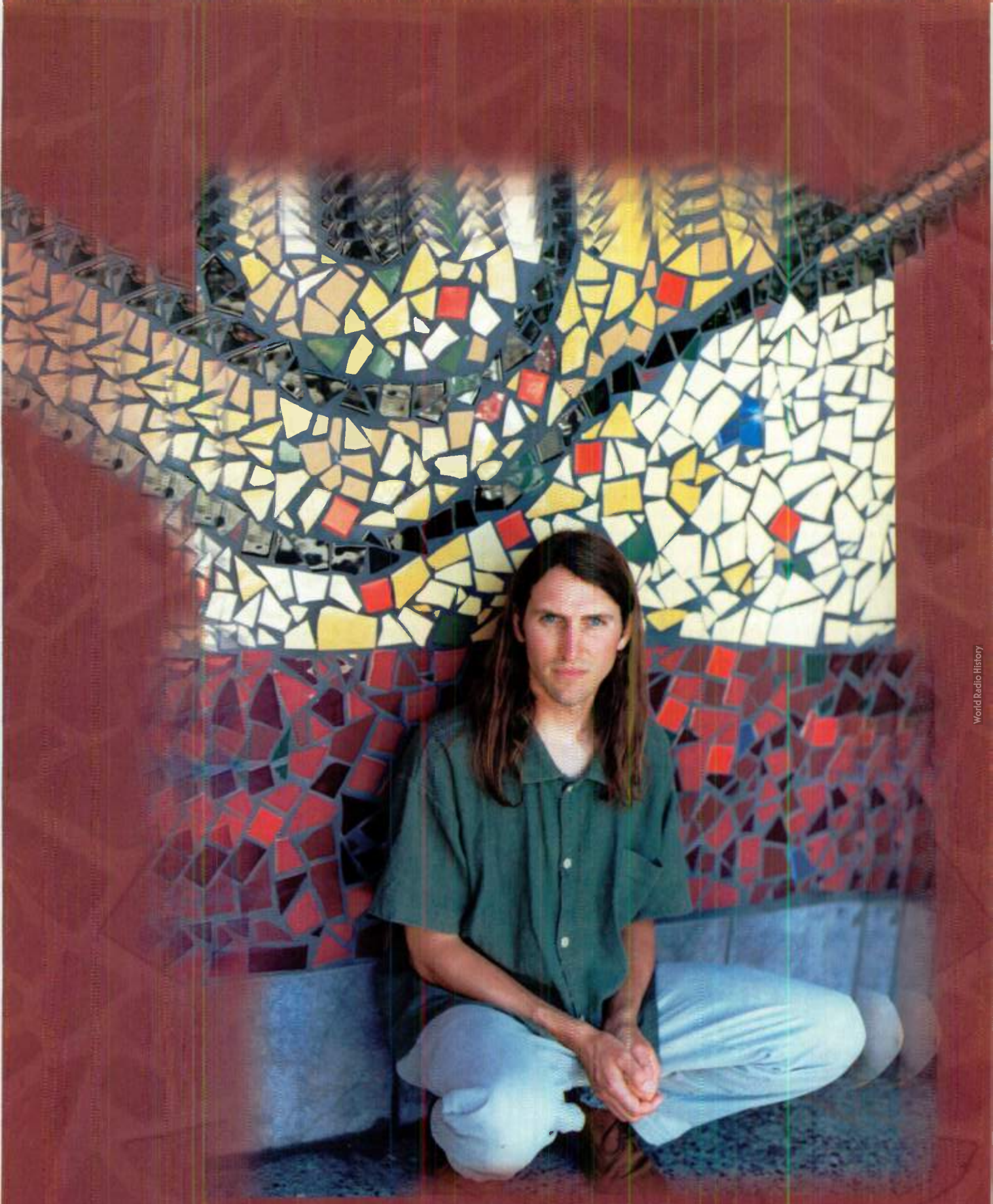

PHOTO BY KEN GOSSET

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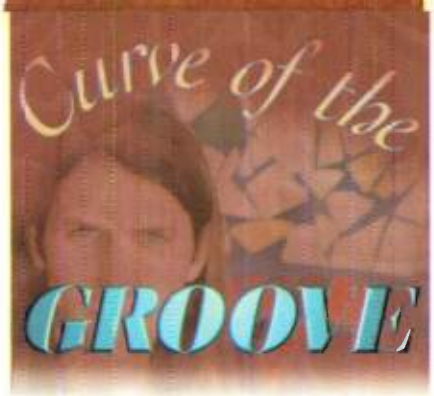

the album was tracked and mixed, consists of West's bedroom, an adjacent room, and the washroom. West hung sleeping bags in strategic locations to reduce unwanted reflections. To get isolation between the rooms, he tacked up heavy cardboard around the doorways and then filled the space between the cardboard and doors with sleeping bags and blankets. "The isolation between rooms was pretty amazing," says West, "except for one thing: the kick drum had a tendency to vibrate the whole house. Fortunately, the environmental rumbles were low enough on the guitar track that I was able to EQ most of them out during the mix."

To keep the ADAT's transport noise from compromising critical—and lower-level—tracks, West set up the main recording gear in the same room as the drums. "We figured we'd rather have the whir of the ADAT on the drum tracks than on the guitar tracks," says West. "After all, it's my project, and it *is* a guitar record, so I made a few executive decisions!"

JACKI LAPOINTE

To create an iso booth for the saxophonist, West threw out the washing machine and set up a Neumann U 89 in the washroom.

West took a somewhat more *laissez-faire* attitude about environmental sounds—traffic noise, etc.—coming in from the outside of the house. "On my first record, which was guitar only, avoiding outside noise mattered much

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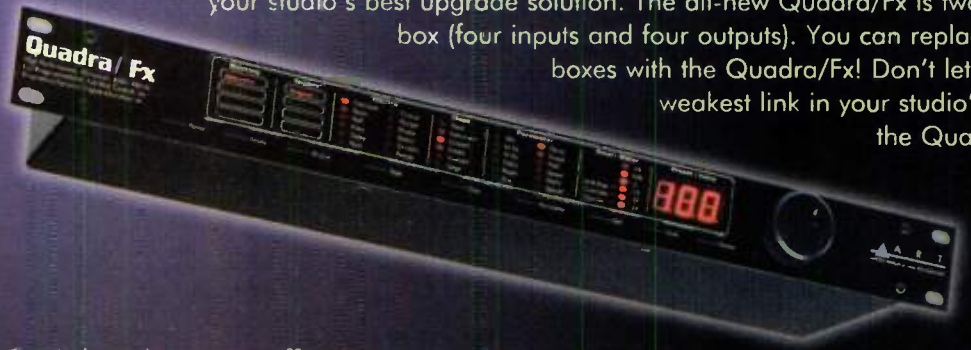

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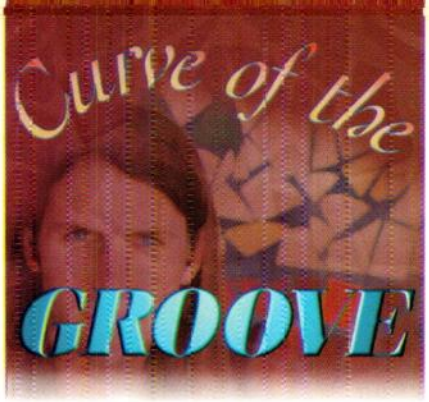

kick drums used on the album were double-headed, so they produced a fair amount of sustain. One of them, played by Steve Robertson on "True South" and "Tango Hips," was a vintage tackhead drum from Asia.)

The ProMix proved its mettle with the onboard digital EQ. "I love the snapshot capabilities," says West, "and the sound of the EQ is astounding." West dialed in nearly opposite EQ settings for the direct and miked tracks (see the sidebar "Guitar EQ Curves"), emphasizing bass on the direct signal and cutting bass on the miked signal. "Of course, I had to vary the settings depending on the tune," West explains. "I play in a lot of different tunings, and that really changes the tone of the guitar and thus the EQ curves."

Equalization was also necessary on the kick drum because the drum conflicted tonally with the acoustic guitar. "The trick was to get them into different places in the sound spectrum so each would fill out its own niche rather than fight for the same frequencies," says West. "That took more work than I expected."

Although West loved the ProMix 01's EQ, he was less enthralled by its reverbs. "The reverbs in the ProMix are from the Yamaha SPX990 series. They're very bright and metallic sounding—which is typically *not* what you want for acoustic guitar. Basically, I had to EQ the heck out of the effects returns. I ended up cutting about 15 dB off of the high end of the spectrum from 1 kHz up. That's what it took to get a reasonably warm reverb. If the reverb had sounded any brighter to start with, I would have been screwed."

SOUNDS FAMILIAR

For monitors, West relied on his ADS M9 home stereo speakers (which have 8-inch woofers, 1½-inch midrange drivers, and 1-inch tweeters). "I've been listening to them extensively for seven years, and I'm very accustomed to the way they sound," says West. "It just didn't make sense to suddenly switch to a new set of monitors. The ADS M9s are pretty high-end speakers. The only problem is that they have a hump in the low end. But I knew just where it was—right around a low D—so it was easy to compensate for the added bass I was hearing."

As for panning, West kept it simple. He put the drum overheads hard left and right for every tune. Because the signal from the guitar pickup was equalized to simulate a bass, he panned that track dead center. The miked guitar and saxophone tracks were panned to opposite sides of center, at roughly nine and three o'clock. For songs that used the looping guitar, West opted to pan those tracks to the same—or almost the same—positions as the live guitar. "I wanted to make the transitions from live guitar to looped guitar as seamless as possible," he explains. "If I had panned them to different places, it would have seemed like another instrument suddenly appearing, only to disappear again."

DIGITAL DOMAIN

A big advantage to using the ProMix 01, of course, is that West was able to stay in the digital domain for mixdown and editing. In addition, he was keeping his fingers crossed that Korg's 1212 I/O would come to market in time for his mix. The 1212 (which is now available) allows ADAT users to input tracks directly into PCI-card Macs using the ADAT's optical digital output.

"With the 1212," says West, "I could have flown all eight tracks into Macromedia's *Deck II*, cleaned up a few audio glitches and song arrangements, and then flown the edited tracks back to the ADAT for the mix. Unfortunately, that option wasn't available, so I had to do my stereo mixes first, then fly the tracks into the computer, and make the edits on the 2-track versions. Of course, I would inevitably realize that a mix was screwed up, so I would have to go back and remix, then reedit, remix, reedit, and so on. It was a learning experience, but I sure wasted a lot of time, and I certainly don't recommend working that way!"

West ended up using Digital Expressions' *SoftSplice* for his edits and then printed the final, edited mixes to DAT using the digital inputs on his Panasonic SV-3500. To save money, he had the mixes mastered at a "project" mastering house rather than an established, pro mastering suite—a decision he now somewhat regrets. The mastering job sounds good except that the overall levels are a bit low and the normalizing between songs is not as good as it might have been. "I definitely learned that mastering is not a place to cut corners," says West.

BUDGET BUNDLE

One place West managed to save money and still maintain high quality was in packaging. Rather than use an all-in-one CD manufacturer—one that handles graphic design and CD replication and delivers the product shrinkwrapped and ready to go—West pieced out the work to friends. "Not only was it cheaper that way," he says, "but it allowed me to maintain control at each stage of the process."

West's housemate, Ken Gossett, did the cover art. The saxophonist's wife,

Minimalist Gear List

Recording Console	Mackie CR-1604
Mixing Console	Yamaha ProMix 01
Recording Media	Alesis ADAT; Panasonic SV-3500 DAT
Monitor Speakers	ADS M9
Microphones	AKG C 414; AKG C 460 (2); Electro-Voice RE20; Neumann U 89
Signal Processors	dbx 160X compressor; Oberheim Echoplex Digital Pro (2); TL Audio PA2 tube preamp; Yamaha ProMix 01 onboard effects
Computer/Software	Power Mac 8500 with 32 MB RAM and 1GB HD; Digital Expressions *SoftSplice*
Power Amp	BGW 5000
Guitar	Martin D-18S with Sunrise pickup and preamp

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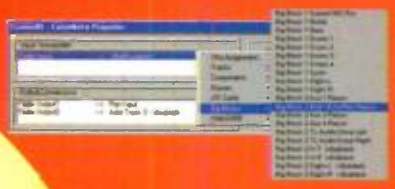

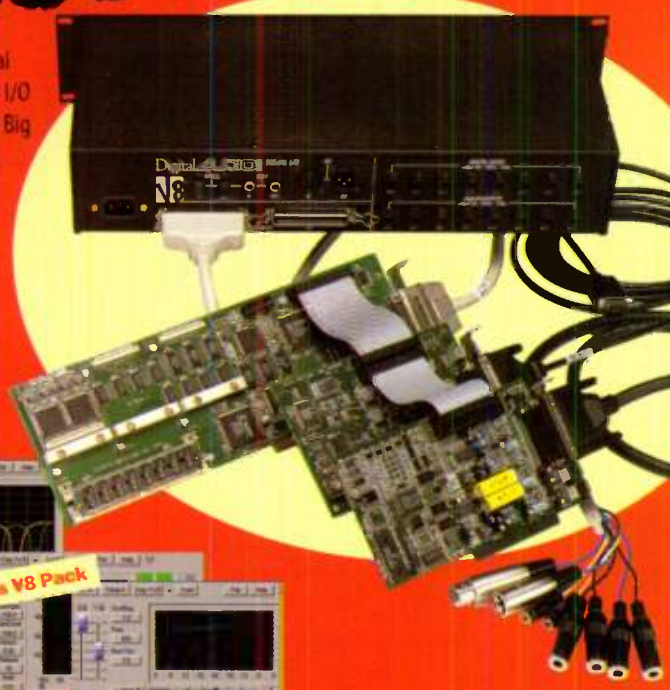

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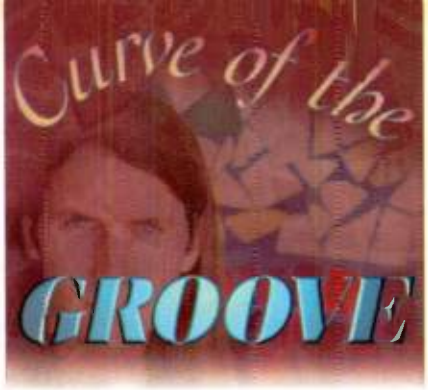

Madeleine Banks, provided graphics assistance (using Adobe *Photoshop*), and another of West's colleagues, Paul Manousos, did the printing. West had the discs replicated at Northwestern and stuffed the empty jewel boxes himself.

PERSISTENCE OF VISION

For his next album, West will be playing a custom, fan-fret, 8-string acoustic guitar made by Jeff Traugott of Santa Cruz, California. "The extra low string—an A below the low E—will really extend the bass and add some low end to the band," says West. "The extra high string—an A above the high E—offers more chording options and lets you hit some screaming high notes without going way up the neck. It makes the instrument sound almost mandolinesque."

CONTACT INFORMATION

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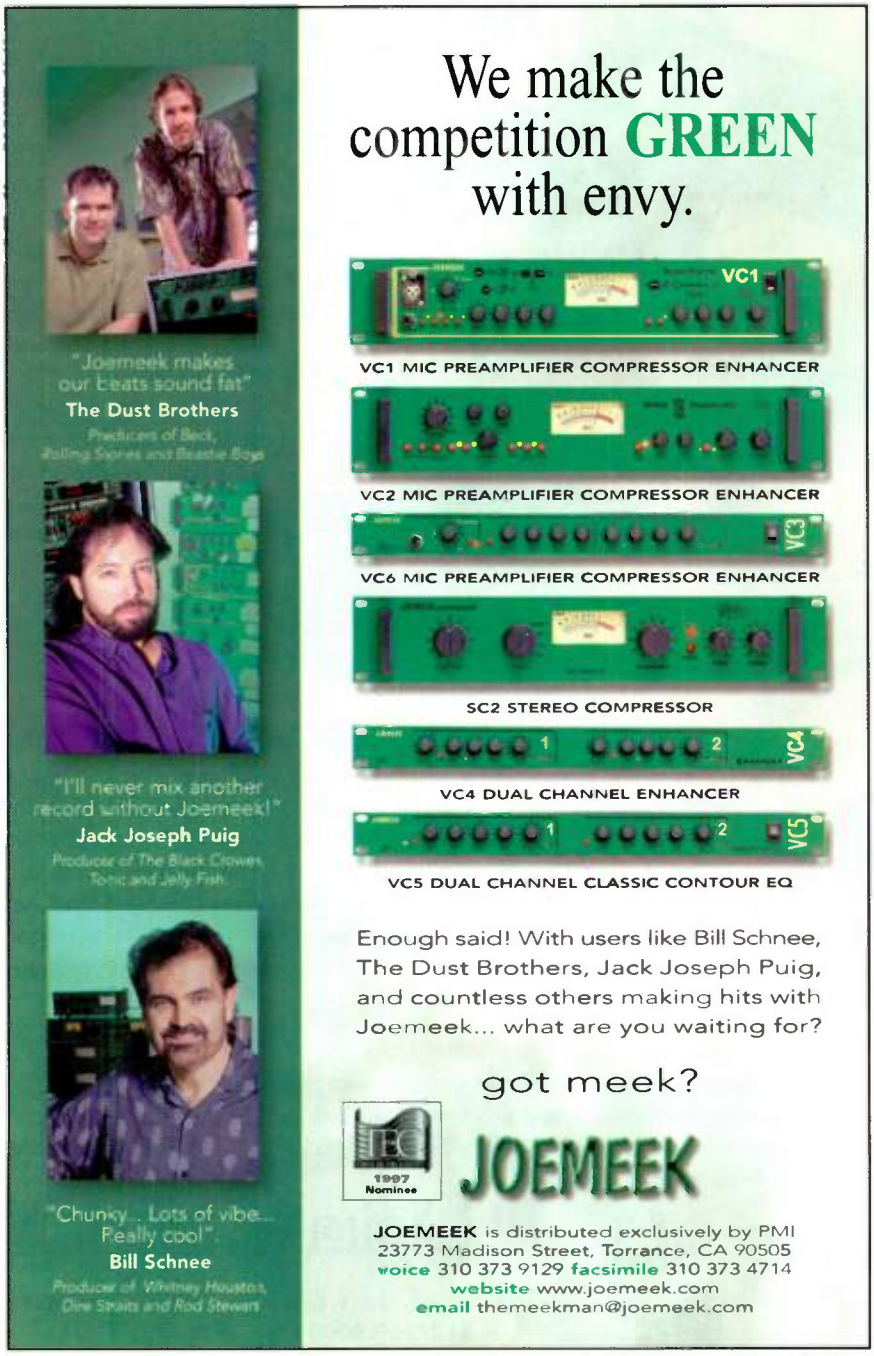
Asked what he intends to do differently in terms of recording, West emphasizes that he will spend even more time experimenting with mic placement. "My goal is to get the sound right going to tape so I don't have to use much—if any—EQ. For example, I'm finding that every guitar tuning requires a different mic positioning. Drum tuning is critical, too. I really want the recorded sound to be as close to the final mix as possible."

As for the direction of Curvature, West intends to continue writing and developing ensemble music for his current quartet, which includes 8-string acoustic guitar, sax, marimba, and percussion. "I like to push the envelope," he says, "to see what can be done with a groove polyrhythmically but without getting so intellectual that people can't enjoy it. It has to be something the listener can latch onto."

But even while catering somewhat to the audience, West's strongest creative emphasis is on originality. He lived in Athens, Georgia, during REM's heyday, when literally hundreds of bands were vying for a piece of the action. "That experience inspired me to steer away from being derivative," says West, "and to try to come up with ideas that haven't been done before. I'm really trying to forge my own way. I want to define myself as unique in the world of music."

Assistant Editor **Brian Knave** *has a few curves up his groove, as well.*



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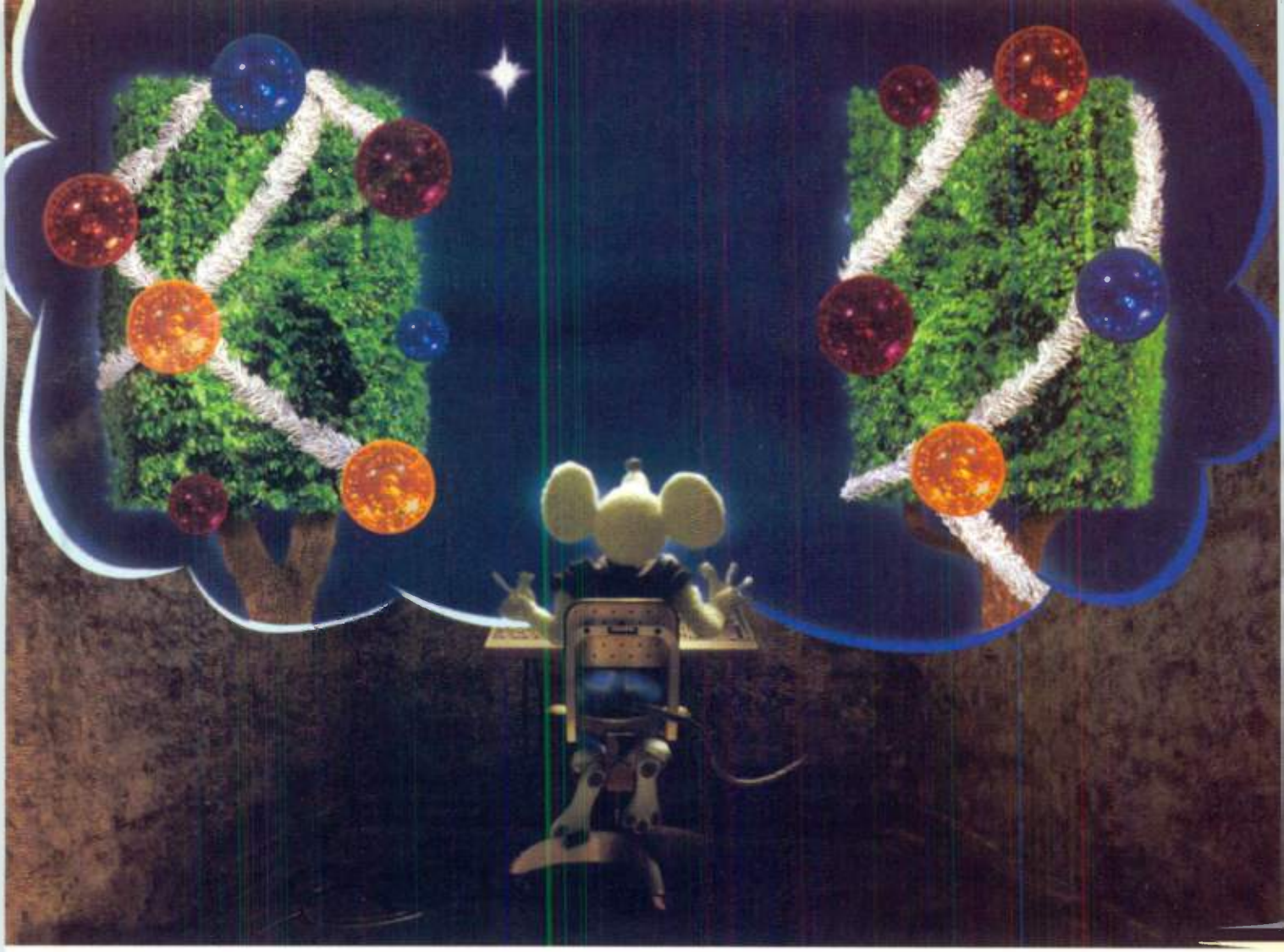

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RECORDING MUSICIAN

Recording Upright Bass

Capture the delicious tones of a classic instrument.

By Brian Knave

I may be an electronic musician, but for my money the acoustic double bass is one of the coolest-sounding instruments on the planet. I just love its round, warm, woody tone. And as a drummer, there's little I enjoy more than gigging with a good upright player, whether it's jazz, blues, or rockabilly.

But when it comes to studio recording, capturing an accurate sonic portrait of this behemoth is a challenge. Low notes are difficult to record well in the first place, and the bass, when plucked strenuously, can produce low-frequency transients nearly as steep as those of a kick drum. In other words, these babies move a lot of air! On top of that, the plucked notes, unlike those on electric bass, have a very quick decay. Other difficulties stem from the instrument's unique physicality. Because of its big, irregular shape and carved body (composed of multiple curves and varying thicknesses of wood), the vibrations put out are very complex, causing the sound to vary considerably from one surface area to the next. This makes mic placement supercritical.

BRIAN KNAVE

Considered by many pro engineers the ultimate in veracity for miking upright bass, the RCA 44-BX ribbon microphone captures a luscious, silky-smooth tone with fat low end, great transient detail, and startling depth.

I recently recorded some solo tracks of Bay Area bassist George Cremaschi and took advantage of the occasion to experiment with mics and other parameters of acoustic-bass recording. Cremaschi, who has worked with Marshall Allen, Eugene Chadbourne, Henry Kaiser, Leo Smith, Cecil Taylor, and Mike Watt, plays a 1932 Juzek bass, made in Czechoslovakia. Lending additional expertise on the project was improvisational guitarist Myles Boisen, a vintage-gear devotee who owns and operates Guerrilla Recording and the Headless Buddha Mastering Lab in Oakland, California. Boisen was kind enough to bring along some of his favorite mics for recording acoustic bass, including two ribbon mics: a Coles 4038 (reissue) and a 1940s RCA 44-BX.

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We also used Boisen's Focusrite Green Series mic preamp, recording directly to my ADAT XT.

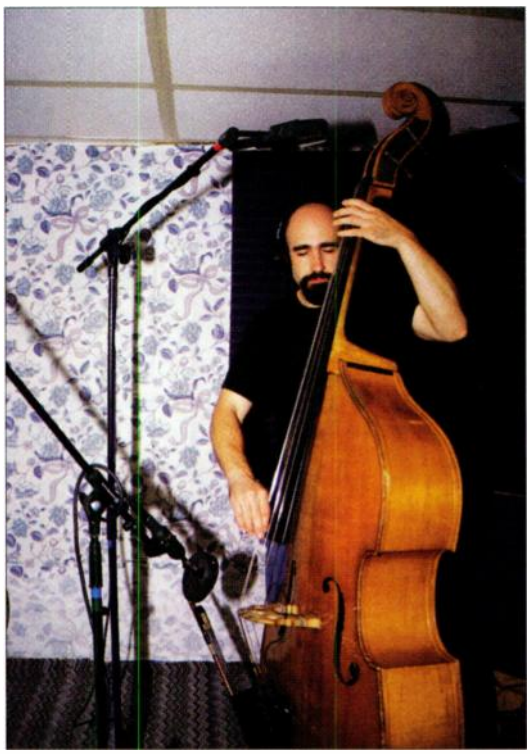
SOURCE AND VARIABLES

As is true when recording any acoustic instrument, the quality of the recorded sound depends on numerous variables. These include the sound of the instrument, the player's musicianship, the sound of the room, and the coloration imposed by the microphone and its position.

When recording upright bass, bear in mind that the whole instrument works as an acoustic amplifier. The sound is produced when the plucked or bowed string transfers vibrations through the bridge to the front surface (plate) of the bass, which in turn disperses the vibrations to the entire wooden body. From there, the vibrations are coupled with the surrounding air. That's why, for studio recording, miking the bass is almost always preferable to using a contact pickup or even a lavaliere mic taped under the bridge: the true sound of the instrument simply *requires* the air surrounding it.

Generally speaking, the better constructed the bass, the more evenly it amplifies the full range of tones. Even the finest basses, however, can exhibit a 3 to 6 dB difference among various notes during continuous bowing—and a lesser-quality bass may exhibit a 12 dB difference. Therefore, as every bass has different output peaks and dips, it's important to approach each session from scratch, listening intently to the instrument's unique response. The goal is to find the "sweet spot," a mic position (or mic positions) where the response is dynamically consistent for all strings and notes and where the body and air resonances are well balanced.

FIG. 1: This diagram shows a good starting point for stereo miking an upright bass. But the real trick is finding two separate and complementary sweet spots—which requires careful listening, each and every session.



BRIAN KNAVE

In this stereo-miking configuration, the Coles 4038 ribbon mic captured so much low end and midrange "body" that the AKG C 414 (in omni pattern) was positioned further back and looking down at the bass to add a spacious sound with plenty of high end and string tone. However, it picked up a fair amount of jazz bassist George Cremaschi's breathing, so it was next lowered a bit and switched to the cardioid pattern.

THE SWEET SPOT

Start with your ears, not the mics. By pressing a finger over one ear and listening with the other, you can simulate the response of a mono mic. Have the bassist play a steady, medium tempo bass line or scale that uses open strings (particularly the low E) and that incorporates midrange and high notes, as well. As he or she plays, move your head around in front of the instrument from a distance of about a foot or two. Make mental notes of where the instrument sounds loudest, quietest, warmest, harshest, most dynamically consistent, and so on.

For example, does one side sound better than the other? Often, the left side of the bass—left from where the player is standing—will resonate more intensely because the soundpost is usually positioned on that side of the bridge. (The soundpost is a piece of wood wedged inside the bass between the front and back plates of the instrument and held in place by the tension of the strings. Its purpose is to translate vibrations between the plates.) The front plate might be carved thinner on that side, as well, which will further increase resonance.

Also, listen from top to bottom. You should hear subtle differences between the lower and upper chambers, or lobes, of the bass, with more lows emanating from the lower lobe and more highs from the upper (duh!). When mono miking, it's usually best to focus more on the lower lobe, in keeping with the role of the instrument in the mix. When stereo miking, a combination of the two lobes (see **Fig. 1**) tends to provide the fullest sound. Remember, though, that these are general guidelines only: every bass is different, and each of the other factors plays its part, too. The only surefire rule when recording acoustic bass is listen, listen, listen!

That said, it remains true that the lower-lobe sweet spot is typically somewhere near the bridge and left F hole. (Another duh!) The upper-lobe sweet spot is usually above the F hole and provides more wood and string sound. After getting the general idea with your ears, put up the mic or mics and repeat the process, listening again for the same characteristics. Also, when stereo-miking, remember to listen for phase problems, checking the blend in mono as you go.

Finding the sweet spot also involves moving the mic in and out from the

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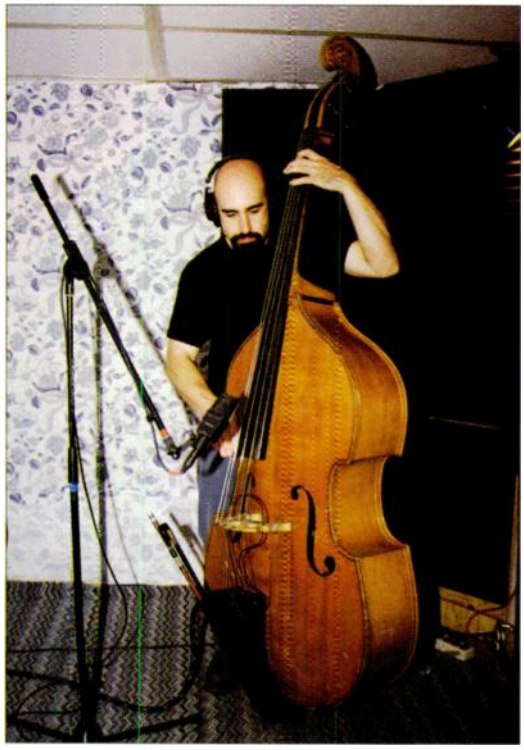

BRIAN KNAVE

A single large-diaphragm condenser mic can capture a fairly faithful picture of the bass when positioned in front of the instrument. To fill out the low end, Cremaschi plays through an Underwood pickup and Gallien Krueger MB-200 amp, which is miked "off stage" with an AKG D 112.

bass, not just vertically and laterally. To best facilitate the operation, remove the mic from the stand and move it with your hand. Note that if the mic is positioned too closely, it won't have sufficient space (or time) to hear the overall reverberation of the body. On the other hand, if the mic is too far back, the sound loses presence and "oomph" and may even pick up unwanted room reflections.

DISTANCE AND ENVIRONMENT

Ideally, you should make the final determination of the sweet spot while listening on the control-room monitors (which, obviously, requires an assistant to position the mic). Unfortunately, many home studios don't have the luxury of a control room, in which case you're forced to audition mics and listen for the sweet spot using headphones. The problem here, though, is that headphones cannot be relied upon to reveal boominess caused by the force of air shooting out of the F holes—an element of the upright bass's low end that definitely needs to be controlled. In this case, you should do test recordings and listen back through the monitors before settling upon the microphone's final resting place.

Of course, for certain styles of music (e.g., rockabilly), some boominess may be desirable in the mix. It's the recordist's job to determine the amount of boom going to tape, and this is done via mic selection, mic positioning, and the mic's polar pattern. For example, the cardioid pattern, due to its proximity effect, enhances bass response (and boominess) the closer you position the mic to the instrument. However, a moderate off-axis tilt can help compensate, because it positions the diaphragm at an angle to the rush of air. On the other hand, the omnidirectional pattern is mostly free of proximity effect and so won't exaggerate bass boom.

The distance of the mic from the bass also affects the amount of boominess going to tape: the closer you get, the boomier the sound. (Duh number three!) A good distance is somewhere between 8 to 30 inches, depending on the sound of the room and the sound you're going for.

Although string players are typically happiest in a reverberant, wood room, this may not prove the best environment for tracking acoustic bass. Generally, a fairly good-sized but acoustically controlled room is more desirable. The smaller the room, the deader it usually needs to be, again to minimize reflections. If the room has a wood floor and is too reflective, try putting a rug or blanket beneath the bass for absorption.

MIC SELECTION

For verisimilitude—that is, to capture a *true* image of the upright bass—a premium microphone is essential. However, verisimilitude is not always the point, and ultimately mic selection should be based on the sound of the

CLOSE-UP ON RIBBON MICS

In a ribbon mic, the active element is a very thin, corrugated metal (or metal-coated) strip suspended between two poles of a magnet. This strip, or ribbon, vibrates in response to sounds and, in turn, induces a current that is sent to the mic preamp. Because of the ribbon's shape, it responds only to signals coming from the front or back—so the polar pattern, unless modified, is bidirectional (figure-eight).

Being very low mass, the ribbon responds extremely quickly. This provides ribbon mics with excellent frequency and transient response and a very smooth sound. However, they tend to suffer from proximity effect and are quite sensitive to air currents and wind.

The ribbon mic was invented in 1931 by Harry F. Olson of RCA research laboratories. It was the first commercially successful directional mic and quickly became the standard in the radio-broadcasting and motion-picture industries.

RCA manufactured ribbon microphones from the mid-1930s through the 1960s. There were two popular series. The 44 series included the 44-A, 44-B, and 44-BX, all of which were bidirectional. The 77 series included the 77-A and 77-B, which were unidirectional (cardioid pattern), and the later, "polydirectional" (switchable pattern) models, including the 77-C, 77-D, and 77-DX. Because RCA ribbon mics were so widely used for radio, television, and the stage, there are still plenty of them around, though not always in good—or even working—condition. Generally, expect to pay from $1,000 to $1,500, depending on the mic's condition.

The British-made Coles 4038 ribbon mic, a BBC design, was England's answer to RCA's ribbon mics. It was used at Abbey Road and can often be seen in studio shots as the overhead on Ringo's drum kit. Previously discontinued, the 4038 was recently reissued and is available at most pro-audio stores. Retail price is $1,098.

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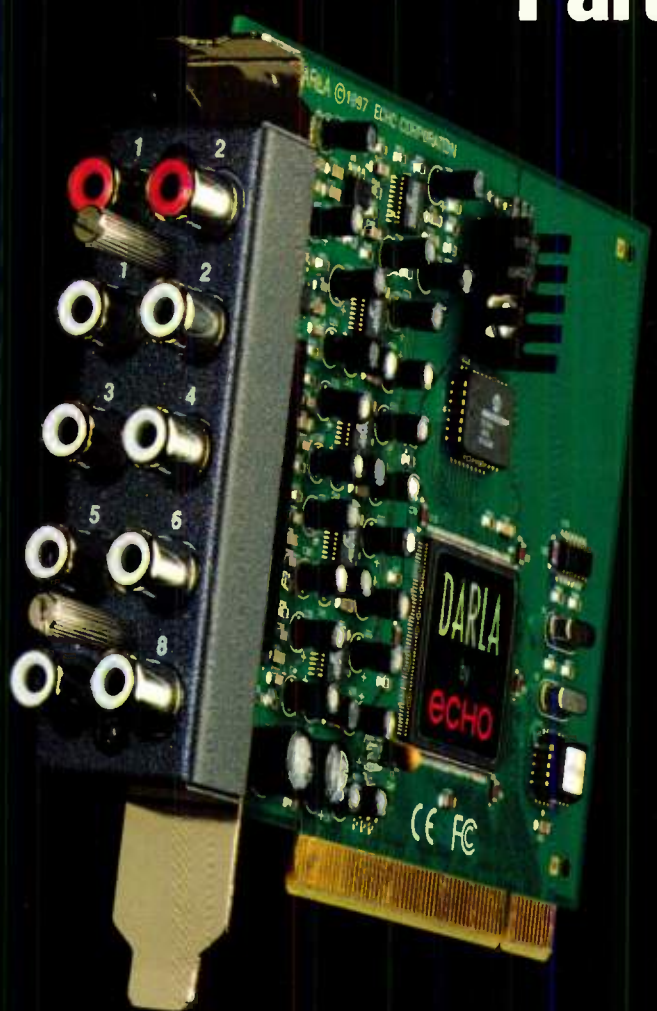

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particular instrument, the acoustics of the room, the recording strategy (i.e., are there other instruments being recorded in the room simultaneously?), and most importantly, the desired sound for the track. In general, upright-bass recording is not a job for your trusty hand-held dynamic. From the tracks I recorded with Cremaschi and Boisen, I can attest that a good ribbon mic is probably the ultimate for recording true-to-life acoustic-bass tracks.

Of the Coles and RCA mics we used, both of which did a superior job, the vintage RCA sounded the best. It captured a gorgeous tone, smooth and full bodied, with remarkable detail, depth, and air. As Boisen put it, the RCA 44-BX "seemed to get inside the instrument." The Coles 4038 sounded very similar in the mid and high registers but didn't handle the low notes as well, possibly due to its smaller ribbon. The lows came out slightly muddled, with less definition and more boom.

A large-diaphragm condenser mic is the next best choice for capturing realistic sound from the upright bass. Condenser mics offer excellent transient response, good low end, and a crisp high-end response that can help the bass cut through dense instrumentation. Traditional favorites are the Neumann U 47, U 87, and KM 89 and AKG C 414. Fortunately, most personal studios are equipped with at least one large-diaphragm condenser—and if they're not, they should be. If it's a critical recording and you don't have an appropriate microphone, by all means rent one.

For some applications—particularly tunes where the bass needs a tighter, more pop-oriented sound—a condenser mic may prove too crisp sounding. To get a rounder, less intimate sound, try using an Electro-Voice RE20, Sennheiser 441, or other dynamic microphone known to work well on low-frequency material (for example, a kick-drum mic). Better yet, use the dynamic in conjunction with a condenser, with the dynamic positioned to capture the lows and the condenser the highs. At mixdown, you can then blend in the necessary amount of each track.

TRACKING STRATEGIES

My preference is to record the upright bass in a stereo perspective. Two mics simply do a better job of capturing the full scope of the instrument's sound. On the other hand, I was knocked out by the amount of sound the RCA 44-BX captured, and certainly a single condenser mic can do an excellent job when it's well positioned.

A pickup can provide a useful extra signal when recording upright bass. In fact, if the bass is outfitted with a pickup and you have tracks to spare, by all means record the direct signal, as well. You can then blend in the track to taste during the mix or use it for adding an effect. Just be sure to use a good, low-noise, low-distortion DI box. A contact pickup gets its signal from wood-transmitted vibrations only (i.e., not via the air), so it provides more definition and sustain than a microphone. That extra definition can come in handy if the band starts rocking out.

Engineer Jay Newland employed a direct signal for just that purpose on *Now Is the Hour*, the latest release from jazz bassist Charlie Haden's group Quartet West. He captured the bass sound with an RCA 44-BX near the bridge, a Neumann U 87 above the F holes, and a DI signal from Haden's contact pickup.

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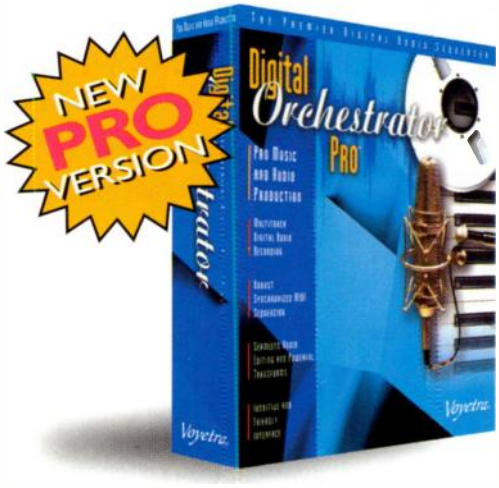

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Newland then varied the blend of the three elements according to the needs of the song. "If Charlie was playing something up tempo and the band was kicking, then I brought in more of the DI and the 87. Both the DI and the 87 provided some point to the attack."

Using a direct signal is also helpful when there are other instruments being recorded simultaneously in the same room. In that situation, use gobos to maximize isolation. It may also help to position the mic closer to the bass, use a tighter polar pattern (cardioid or hypercardioid), and position the other instruments directly opposite the null point of the bass mic.

ARCO BELLO

Arco is the Italian term for bowing, *bello* means beautiful, and bowed bass can indeed be a beautiful thing. However, the tone is considerably brighter than plucked bass, and this should be taken into account when recording. For one thing, the scraping action of the bow generates a group of nonharmonic upper partials—that familiar "edgy" sound—that can extend above 10 kHz. Bowing also forces the string to vibrate mostly in one direction (as opposed to back and forth as when plucked), which in turn causes the bridge to transmit less low-frequency energy.

For a piece that uses bowing extensively, select a warmer-sounding mic at the outset. If the sound is still grating, position the mic to downplay string tone and enhance the warmth of the body resonance. You can also use equalization to cut offensive frequencies. It's wise, though, to save corrective EQ for mixdown, because you may find that the high-frequency content is masked sufficiently by other instruments or that, in the context of the mix, it lends a desirable edge to the sound.

For a composition that alternates between bowed and plucked bass, finding a happy medium that enhances both tones can be difficult. In that case, set up to record the optimal plucked tone and then use EQ during the mix for the bowed sections only. It usually takes the player a second or two to pick up or put down the bow, during which time you can click the EQ section "on" or "off" as needed. ❁

Special thanks to Myles Boisen, George Cremaschi, and David Hinson.

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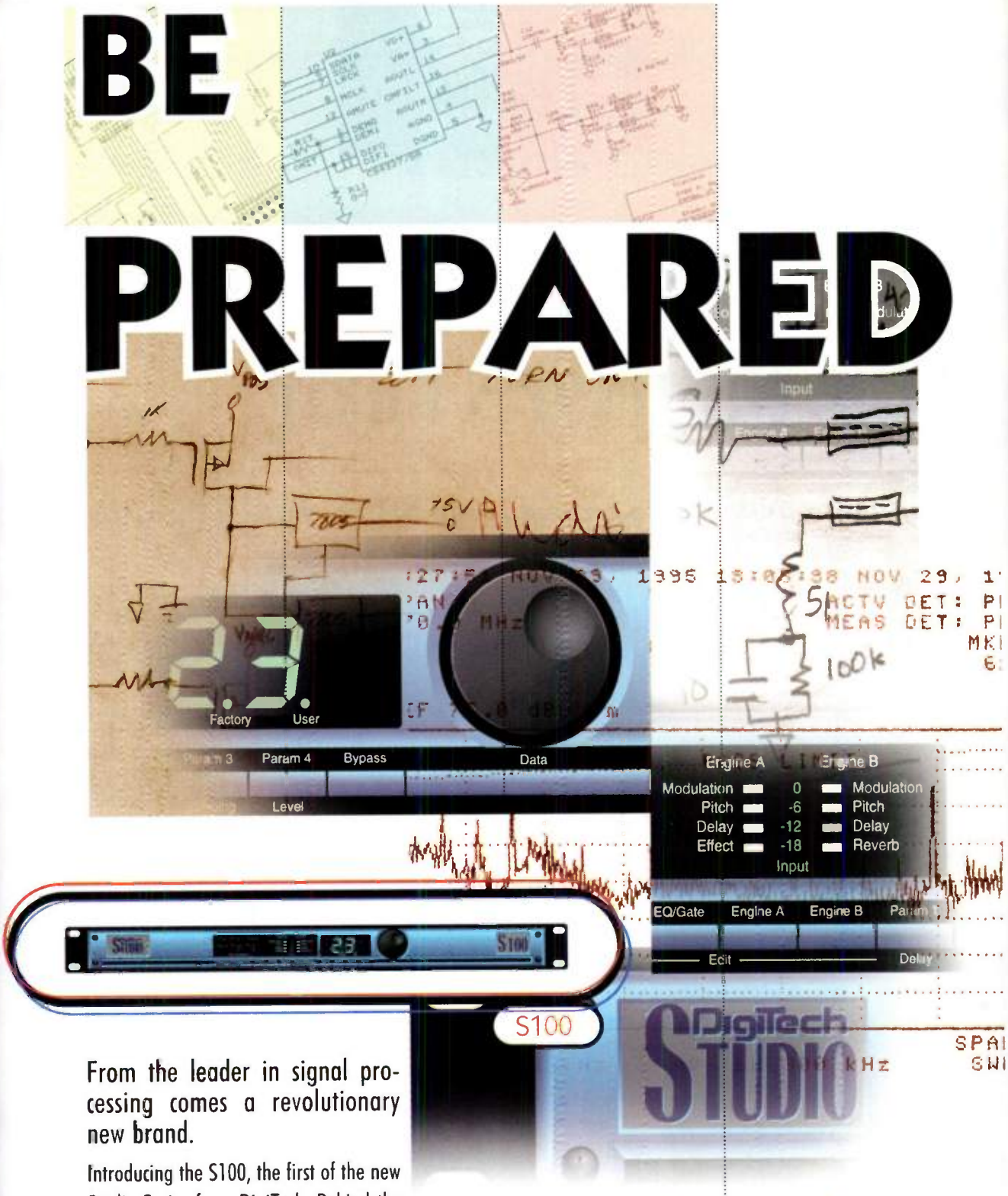

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In the Director's Chair

Add sound to multimedia projects with Macromedia's Director.

By Neil Leonard III

For many years now, Macromedia's *Director* has stood at the forefront of authoring tools for multimedia presentations. It was the first authoring tool that could create highly sophisticated presentations for both the Windows and Macintosh platforms. And recently, features such as Shockwave have made *Director* a popular tool for Web-site development and the delivery of streaming audio over the Internet.

The newly released *Director 6 Multimedia Studio* extends the program's strong audio features even further. This package includes Macromedia's *Extreme 3D* 2, *xRes* 3, and *SoundEdit 16* v. 2 for the Mac. The Windows bundle substitutes Sonic Foundry's *Sound Forge XP* for *SoundEdit 16*. Whether you are producing music for Web sites, kiosks, or entertainment and educational CD-ROMs, it's clearly to your advantage to be familiar with the concepts involved in authoring interactive presentations using *Director*. Audio producers are often called upon to install their music in projects developed with *Director*.

JAMIE HOGAN

ARRANGING THE SET

Director displays three primary windows when it is launched (see **Fig. 1**). The Cast window holds your collection of media elements, the Score window is a multitrack paste-up environment, and the Stage window displays the work in progress. This database/paste-up/preview paradigm is used in other multimedia programs, including Adobe *Premiere* and Avid *Video Shop*. Creating a presentation in *Director* is largely a process of defining which Cast members are used, when and where they appear on the Stage, and how a person can interact with them.

In *Director* parlance, a presentation is called a "movie." This is often a point of confusion because a *Director* movie is not a linear digital video. *Director* can be used to create digital videos in the Digital Video for Windows (AVI) and QuickTime formats. The program's real

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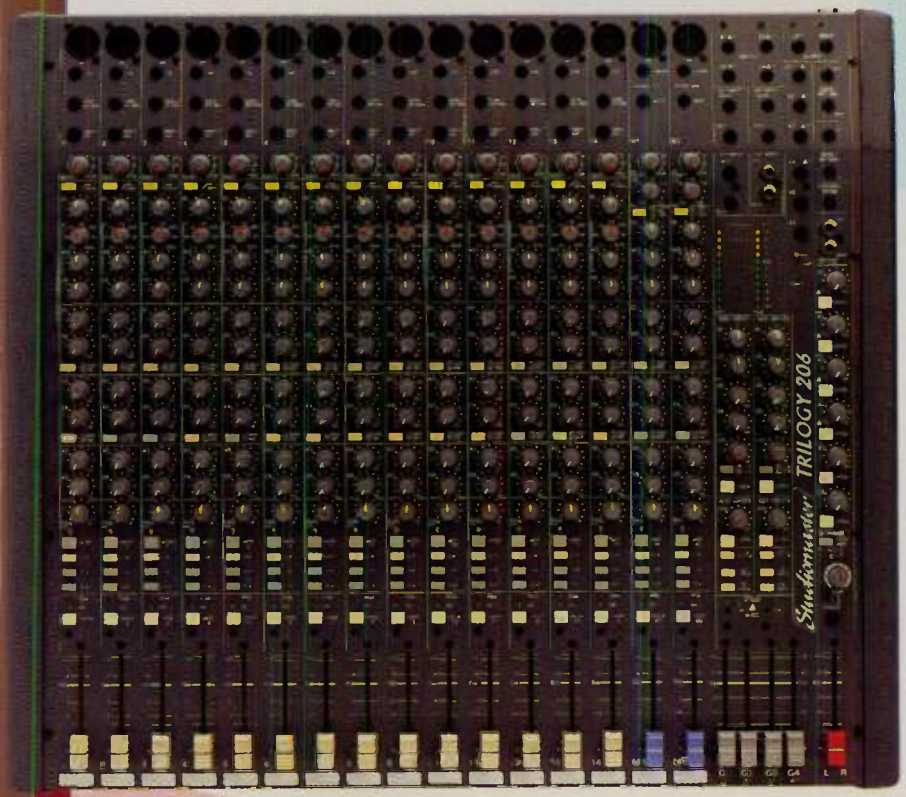

The new TRILOGY series establishes new and exciting standards in mixing console design. While most mixing consoles are created with only one purpose in mind, the TRILOGY has been designed to easily handle a variety of professional applications with a stunning array of features and superior audio performance. Whether you are mixing live sound, multi-track projects, audio for video, electronic keyboards, or even a dedicated stage monitor mix, the TRILOGY provides all the tools you'll ever need to create a perfect mix from start to finish. Up until now, this kind of flexibility and performance could only be found with mixers costing thousands of dollars more. Backed by Studiomaster's legendary reputation for quality, the TRILOGY is the ultimate workhorse for even the most demanding and ever changing professional applications.

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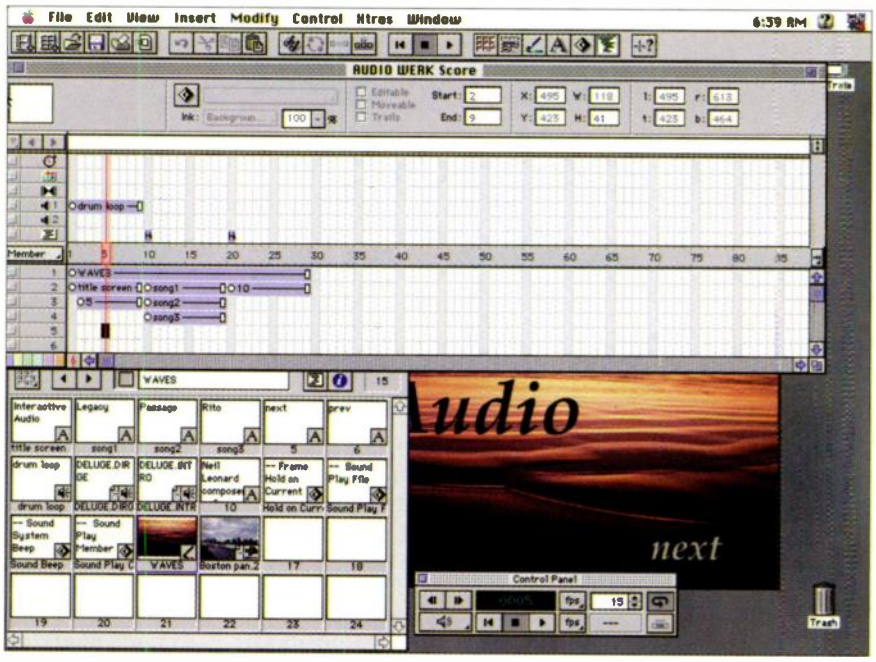

FIG. 1: *Director* displays three primary work areas when it is launched: the Score, Cast, and Stage. The Stage is not a standard window but rather a work area where the placement of graphics is specified. Also visible are the Toolbar along the top of the screen and the Control Panel.

strength, however, is for developing interactive presentations, in which each viewer can navigate the movie in a truly nonlinear fashion.

MEMBERS OF THE CAST

To create a *Director* movie, you first import the necessary files into the Cast or use *Director*'s media editors to create new data. You can import a wide range of media types, including bitmapped images, color palettes, formatted text, film strips, and digital videos (see **Fig. 2**). *Director* can read audio stored in a variety of file formats, including AIFF, WAV, Shockwave Audio (SWA), SoundEdit 16, Macintosh System 7, Red Book Audio, and audio-only QuickTime and AVI digital videos. If the computer is connected to the Internet, *Director* can even import an audio file from a specified URL, at authoring or run time. For best results, use 8-bit or 16-bit sounds with a sampling rate of 44.1, 22.050, or 11.025 kHz.

When you import an audio file, you can save the data in the movie or save only the file's location on disk. Saving the data in the movie creates a nonlinked Cast member; saving the file's location creates a linked Cast member. With nonlinked audio, *Director* loads the sound into RAM before it is needed, making playback instantaneous when the sound is triggered. Because these sounds are embedded in the movie, it is best to import only short sounds, such as button clicks or very small background loops, using this method.

If you wish to use longer files, choose the Link to External File option, which creates a record of where the file is stored on disk. This approach offers better performance for long sound files because the entire file does not have to be in RAM to be played. *Director* streams linked sounds, starting playback while the next portion of the file loads. There can be small delays when triggering linked files, so you will want to use this method to play long audio clips but not sounds for button clicks. Linked Cast members have the added advantage of being available for several movies on the same disk.

It is impossible to manage memory on disk or in RAM without clearly understanding the distinction between linked and nonlinked Cast members. It is just as essential that you know which Cast members are linked and which are nonlinked. For example, importing a one-minute, stereo, CD-quality sound file as a nonlinked Cast member will cause the size of your movie to increase by 10 MB. A movie of that size might not be loadable on many systems. When a *Director* movie loads on a machine with insufficient RAM, the movie might still run, but playback problems will probably occur.

Once imported, each file becomes an element in the Cast window, with its own thumbnail image and a small icon in the lower right corner indicating its data type. Internal audio Cast members have a speaker icon. External audio Cast members have an icon depicting a speaker connected to an adjacent box. All Cast elements are numbered, and sound Cast members are also labeled with their names.

A Cast can contain up to 32,000 Cast members, but because *Director 6* supports multiple Casts, you can have a virtually unlimited number of Cast members per movie. Double-clicking on an audio Cast member or clicking on the Open Cast Member Properties button opens a dialog box, which displays the sound's number, name, Cast, sample rate, bit resolution, number of channels, and size. If the sound is a nonlinked file, a Loop option can be set.

The Sound command in the Insert/Media Element menu can be used to record short sounds and save them as Cast members without leaving *Director*. The program provides elaborate built-in editors for graphics and text but provides no way to edit sound. Instead, *Director* uses Macromedia Information Exchange (MIX), which allows you to specify an external editor for editing audio Cast members. You can even specify separate editors for AIFF, WAV, and SND files. As mentioned earlier, *Director 6 Multimedia Studio* includes *SoundEdit 16* in the Mac version and *Sound Forge XP* on the PC, which are both excellent programs for editing audio in various formats.

Once you have specified an editor, double-clicking on an audio element in the Cast window will launch the appropriate program and automatically import your Cast data. When you finish editing the sound and close the file, *Director* imports the new data back to the Cast member that stored it.

THE BIG SCORE

The Score is a large multitrack work area. It controls when, where, and how Cast members are heard and seen in a movie (see **Fig. 3**). You create a movie by assembling the Cast members in the horizontal rows of the central editing grid. Vertical columns represent time increments, called Frames. A row/Frame intersection is called a Cell. A

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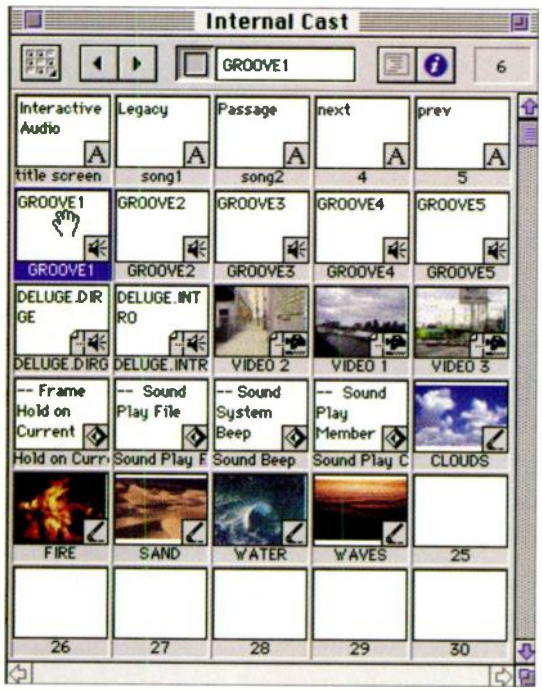

FIG. 2: The Cast window contains all imported media elements. The icon in the lower right corner of each thumbnail describes the media type: text, nonlinked sound, linked sound, digital video, and graphics.

horizontal time line marks Frame numbers and divides rows into two groups. Rows below the time line are placeholders for graphic-oriented elements such as digital video, film strips, bitmaps, and text. These are called Sprites. There are 120 rows for placing Sprites in the Score. Rows above the time line are placeholders for digital audio, tempo settings, scripts, color palettes, and visual transitions. These rows are called Effects Channels.

When the movie plays, a cursor called the Playback Head moves across the Score from left to right. Cast members are heard and appear on the Stage when the Playback Head passes over the Frames that they occupy. Playback of audio and video files terminates when the Playback Head leaves those Frames. A nonlinked sound with the Loop option set will loop for as long as the Playback Head passes through the Frames assigned to that sound.

The Playback Head can be repositioned with the mouse to view the state of the movie at any particular Frame. While editing the movie, graphic elements can be dragged directly from the Cast to the Stage, and *Director* will automatically place them in the Score. Conversely, graphic elements can be dragged directly onto the Score, and *Director* positions them at the center of the Stage during the specified Frames.

There are two ways to control movie playback. For general transport control, the Toolbar at the top of the screen has Play, Stop, and Rewind buttons. For finer control, a floating window called the Control Panel allows you to play, stop, and move forward or backward one Frame at a time. This window has a pop-up menu to control the computer's volume level and another pop-up menu for setting the Frame rate. Other buttons allow you to loop the movie continuously or play only selected Frames.

The Score allows you to play sounds in several ways. There are two rows for stereo audio in the Effects Channels section of the Score. To place an audio clip in the Score, first select the clip from the Cast, and then drag it to the Cell in the audio channel where you would like it to begin. A horizontal bar appears in the Score displaying the name of the audio element and the Frames that it occupies. Click and drag on the circle at the beginning of the horizontal bar to change the start frame of the element. Move the square at the end of the bar to change the duration of the element. The default frame duration for all Cast members is 28 frames, although you can change the default setting.

Double-clicking on a Cell in the Tempo channel opens the Tempo dialog box. Here you can update the frames-per-second rate or pause the movie. Playback can be paused for a fixed number of seconds, until a mouse click or key press occurs, or until a specific point has been reached in a sound or digital video. *Director 6* introduces Cue points for synchronizing *Director* animation and sounds. For example, you can have bullet points in a graphic presentation appear at the same time as a voice-over reads text. *SoundEdit 16* can be used to define cue points in AIFF, Shockwave Audio, and QuickTime files. The Wait for Cue Point option in the Tempo dialog box causes the Playback Head to pause until a specified Cue point in a sound (or digital video) is reached. The Playback Head can also be paused until the end of a sound (or video) is reached. Keep in mind that some interactive buttons might not work while the movie is paused.

Audio-only QuickTime movies provide added flexibility in working with sound. They can be placed in the Sprite rows, allowing you to play more than two audio files simultaneously on the Macintosh. *Director* does not support MIDI directly, but QuickTime does. You can use a simple utility, such as MoviePlayer on the Macintosh, to import a Standard MIDI File and save it as a QuickTime file containing only MIDI events. This file can then be imported to a *Director* movie and placed in the Score. Depending on the settings in the QuickTime control panel, the data can then be played by QuickTime Musical Instruments or an external General MIDI synth. (Yamaha's *MIDXTRA*, a commercial plug-in, provides similar

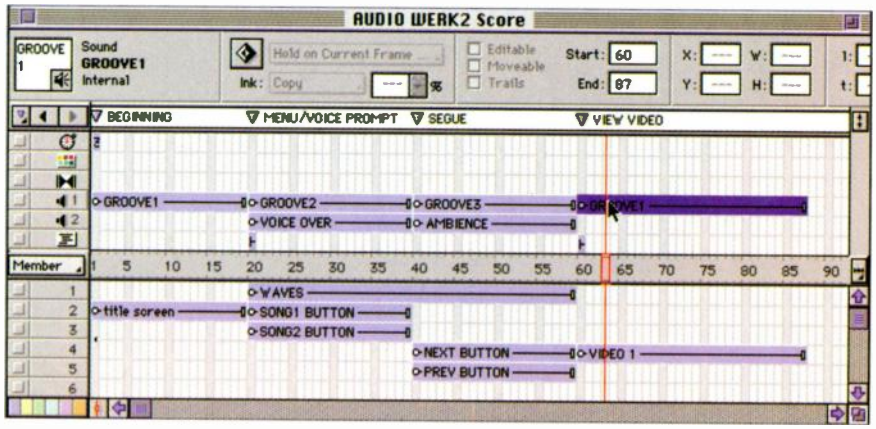

FIG. 3: The Score window is a large multitrack work area for determining when, where, and how Cast members are heard and seen. The rows with speaker icons are audio channels.

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capabilities using Yamaha's Soft Synthesizer on the PC.)

BEHAVIOR MODIFICATION

One of the key distinctions between *Director* and audio/video editing programs is interactivity. *Director*'s scripting language, Lingo, is at the heart of all interactivity. Although it is advisable for *Director* users to be familiar with some of the basic Lingo concepts and commands, a new feature called Behaviors makes it possible to create interactive presentations without actually knowing Lingo. Behaviors are ready-made Lingo scripts that can be dragged onto Sprites. Perhaps the most common usage of a Behavior is for navigation. A number of Behaviors respond to a simple event such as a button click and cause the Playback Head to jump to a new Frame.

Behaviors are accessed by opening the Behavior Library Cast window. The Behavior Library holds a collection of Lingo scripts. This collection can be modified, and you can create your own library of Behaviors to manipulate audio. To assign a Behavior to a Cast member, drag the Behavior to a Frame in the Script channel or onto a Sprite.

The default library provides three Behaviors for triggering sounds. The simplest is Sound Beep. When this Behavior is attached to a Sprite or Cell in the Script channel, *Director* prompts you to select (from a pop-up menu) the type of event that initializes the action. Initializing events include mouseUp, mouseDown, mouseWithin, mouseEnter, mouseLeave, enterFrame, and exitFrame. Sound Play Cast Member initiates playback of a Cast member and is ideal for triggering button-click sounds. Attaching this Behavior to a Sprite causes a similar dialog box to appear. In addition to selecting the initializing action, you are prompted to enter the Cast member's name and the number of a sound channel for playback. The Sound Play File Behavior streams AIFF, WAV, and SWA audio files from disk. This Behavior's dialog box prompts you for the name of the file and a sound channel.

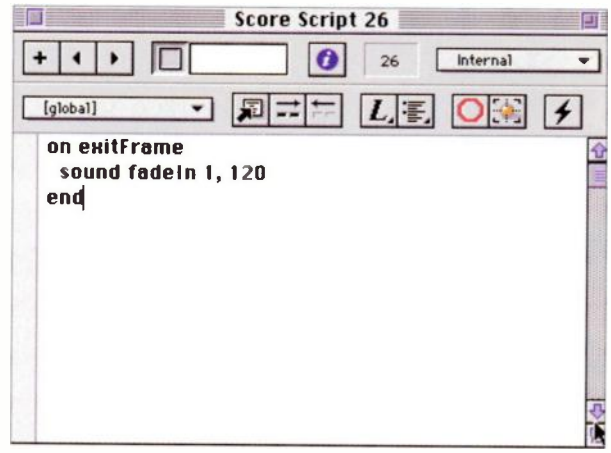

FIG. 4: Pop-up menus in the Script window make it easy to use Lingo. This simple 3-line script produces a 2-second fade in.

Branching is a fundamental concept in the authoring of interactive presentations and provides yet another way to initiate the playback of sound. An interactive multimedia jukebox interface might use the Hold on Current Frame Behavior in the Score's script channel to cause the Playback Head to loop on the Frame displaying the menu. The Go to Frame Behavior is placed on buttons that cause the Playback Head to branch to different Frames where an audio or video clip is presented. You can drag several Behaviors onto a single Sprite to build more complex actions.

LEARNING THE LINGO

Lingo is one of *Director*'s most powerful features, and its audio commands are

QUICK TIPS

Once you start to work with *Director*, you will often need to make decisions about the most effective way to handle audio in specific projects. Here are a few suggestions.

Nonlinked files that are saved with a movie are usually the best method for button clicks and short sample loops. Audio playback is instantaneous, and sample loops are as seamless as can be. However, because this method increases the RAM size of Projector files, it should be used sparingly for small sounds that are going to occur frequently.

At Berklee, students often create interactive interfaces for their audio portfolios. The audio files they wish to use can be 50 MB or larger. In this case, using linked files is recommended. The movie size increases minimally, and files can be modified after making the *Director* movie. (Just be careful not to change the name or path of an audio file, or *Director* won't be able to locate it.) This is not a good method for playing sound while other disk activities are taking place, however, because the disk-drive head can only be in one place at a time.

There are times when students need more than two audio clips to play simultaneously in a project. Rather than confronting Lingo's programming functions for this task, I have them create separate audio-only QuickTime movies for each clip.

If you recall that a Score has room for 120 Sprites, any one of which can be an audio-only digital video, you can see the potential this provides for overlapping audio files. However, this approach requires a few extra steps to ensure that only one of the files is streaming and that the others are loaded into RAM.

Director has been used in the design of numerous computer games, an application that places high demands on a system's capabilities. When I produce music for games, I often turn to Lingo or Behaviors because these can perform all the tasks necessary to manipulate sound in the Score and then some. For example, you can use it to play Red Book Audio off a CD-ROM drive or access third-party software for handling MIDI data. Understanding the audio features of Lingo is essential for creating a game that pushes sound to the cutting edge. Of course, it also helps to have a detailed knowledge of exactly what your target computing platform can do with sound as well as how to communicate with the programmers.

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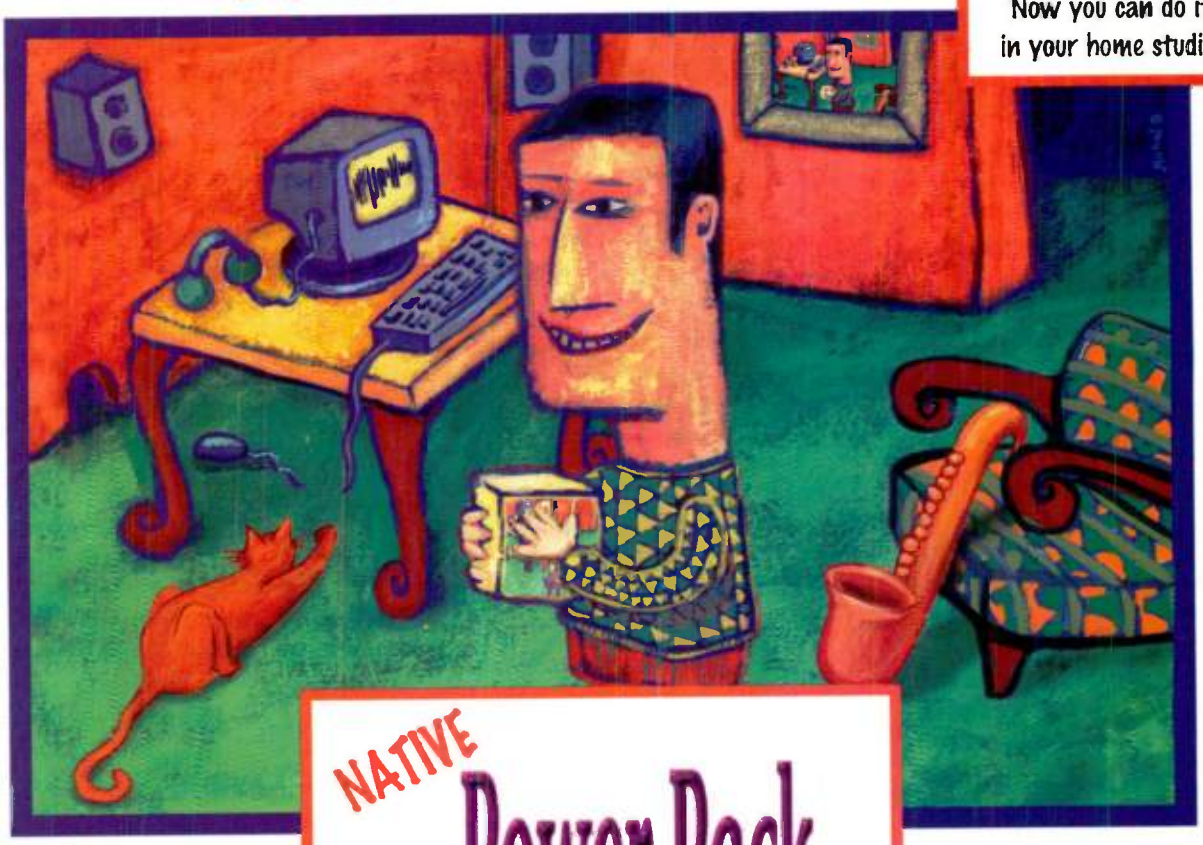

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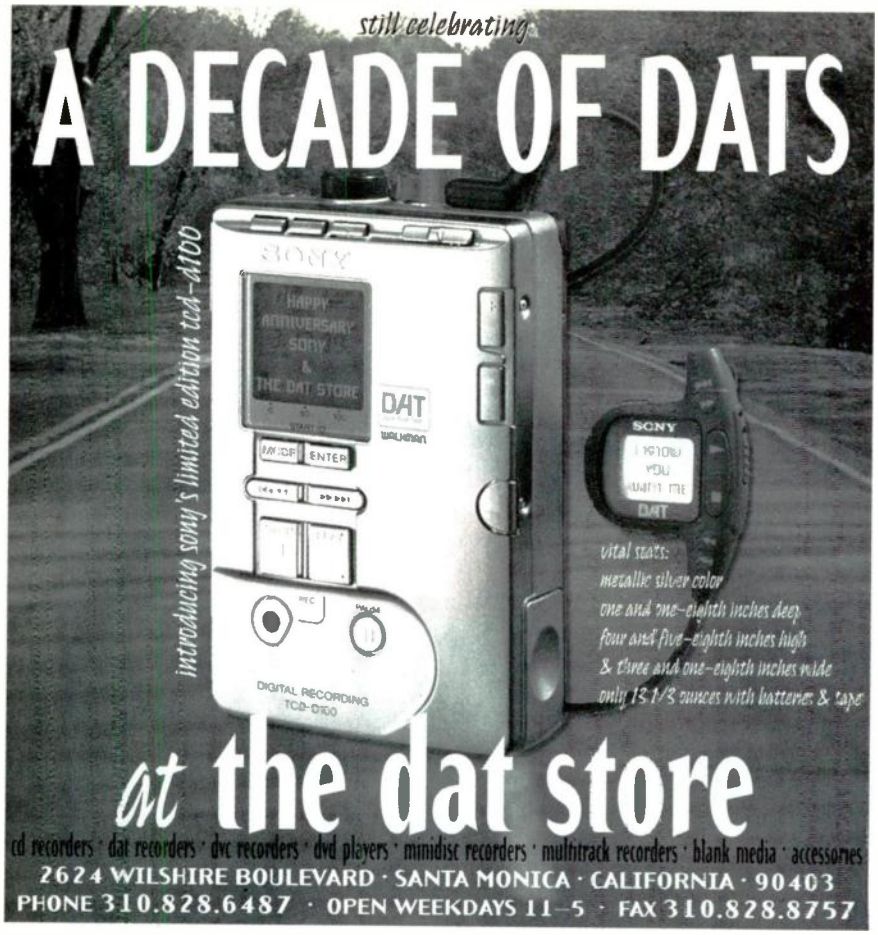
used heavily in commercial titles. Lingo provides the only way to create volume changes and audio fades at run time. *Director*'s pop-up menus of commands make it quite easy to get started using Lingo (see **Fig. 4**). Simply click on an empty Cell in the Script channel, and use the Script pop-up menu in the Score to select New Script. *Director* will open the Script Editor and even write two-thirds of the script for you. It supplies the lines "on exitFrame" and "end" and positions a flashing cursor between them. You can create a simple fade-in by adding only one more command line. Two pop-up menus list the available commands alphabetically and by function.

There are many ways to use Lingo to manipulate audio. With equally short scripts, you can close an audio channel, fade a sound out, stream an AIFF file, stop a sound in a particular channel, test to see if a sound channel is being used, or change the sound level of the computer. Advanced Lingo programmers can trigger and synchronize as many as eight sample loops on the fly. It is even possible to read Cue points in a digital video and trigger a different sound effect each time the soundtrack is played.

PROJECTING YOUR IDEAS

After you have created a movie, it can be turned into a stand-alone application called a Projector. A Projector is a play-only version of the movie that includes the software required to present the movie without launching *Director*. The Create Projector command in the file menu is used to specify which movies and Casts are included in the Projector. You will also have to include Xtras. Xtras are software components (plug-ins) that extend *Director*'s functionality. *Director* automatically accesses the necessary Xtras for use while authoring. However, they will not automatically be included in the final presentation. Select only required Xtras when the Projector is created to keep the movie's size as small as possible.

If your movie uses linked audio, SWA decompression and streaming, or QuickTime, you will need to include an Xtra to help perform each task. If you turn on the Check Movie for Xtras option, *Director* will determine which Xtras are needed for your movie and include them in the Projector file. *Director* will not find the Xtras for tasks performed only by



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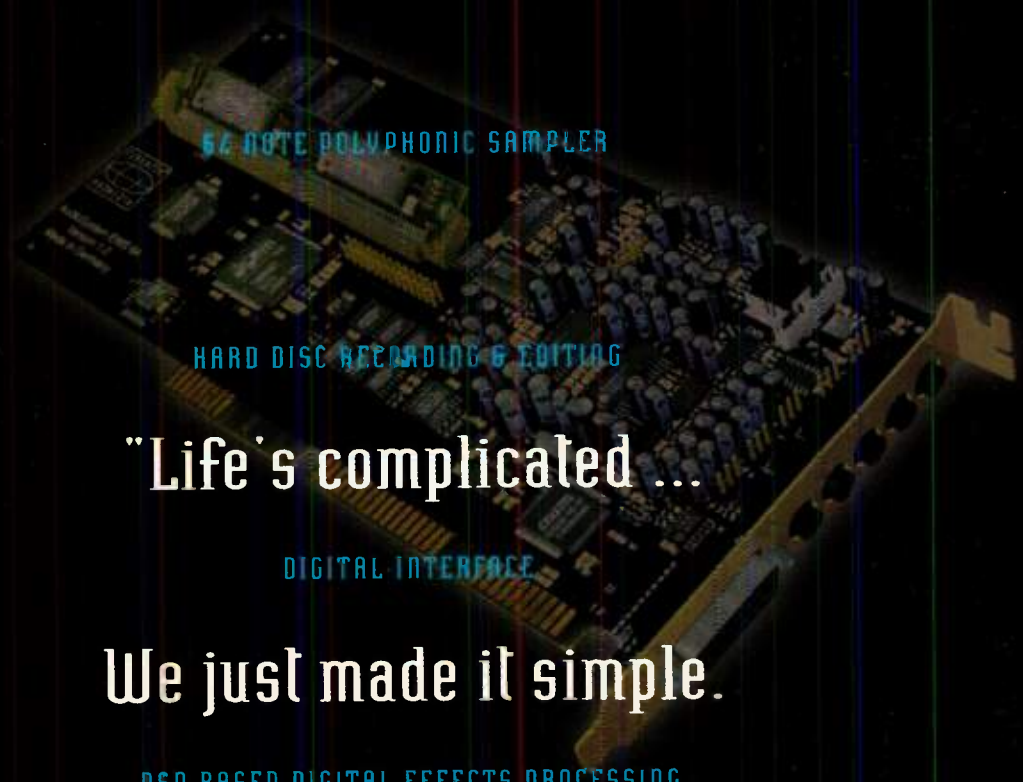

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Lingo. For example, if your presentation only plays AIFF sounds using Lingo's "sound playFile" command, you will have to add the Sound Import Export Xtra manually.

Linked audio files and QuickTime movies that are used by your presentation will have to be distributed along with the Projector file. If they were stored in the same directory as your movie or a subdirectory of it, at development time you will experience a minimum of complications in creating a Projector file for distribution.

FILES AND PLATFORMS

Because sound files can be very large, many developers use compression to cut down on the size of *Director* movies and Projectors. *Director* for the Macintosh supports compressed AIFF files encoded with MACE 3:1 and MACE 6:1 compression. To import MACE compressed sounds directly into *Director*, they must be saved as System 7 resources. MACE compressed sounds that are saved as AIFF or QuickTime files must be imported as linked files. IMA compression at 4:1 must also be imported as System 7 resources or as linked files. The Microsoft and Apple implementations of the IMA specification are incompatible, and it is inadvisable to use IMA compression for cross-platform development.

Shockwave Audio can compress nonlinked sounds imported to *Director*. Although internal sounds will not stream, compressing them with Shockwave can dramatically decrease the size of the movie. You can choose only one compression setting for all the internal sounds, however, and Shockwave Audio will not compress IMA-compressed sounds.

Working with audio on Windows machines presents a number of additional challenges. The Windows 3.1 architecture only delivers one channel of stereo audio. In order to play up to eight simultaneous sound channels, *Director* uses a real-time audio mixing program called Macromix.dll under Windows 3.1. Delays in the start time of a sound file can be up to half a second as the mixing software combines multiple sound channels. Lingo commands that change the volume of a sound or create a fade may also cause delays when more than one sound is playing. In addition, Macromix.dll cannot start the sound in a digital video if an AIFF or WAV file is being played.

Windows 95 and Windows NT use DirectSound for real-time audio mixing. This combination increases the total number of audio channels and greatly reduces the possibilities of delays when more than one sound file is started simultaneously. (You can also avoid delays by ensuring that overlapping sounds have the same bit depth and resolution). Still, you may want to budget extra time to verify that *Director* movies will run as expected when developing a movie for multiple Windows platforms. The *Director* Developers Center on the Macromedia Web site (www.macromedia.com/support/director) is an excellent resource for audio tips and has detailed information on the limits of audio performance on both Windows and Macintosh platforms.

Neil Leonard III *is a composer and performer who teaches in the Music Synthesis Department at Berklee College of Music. He recently performed a concert of his interactive pieces at the Alternativa Festival in Moscow. He frequently composes music for film, video, and multimedia.*

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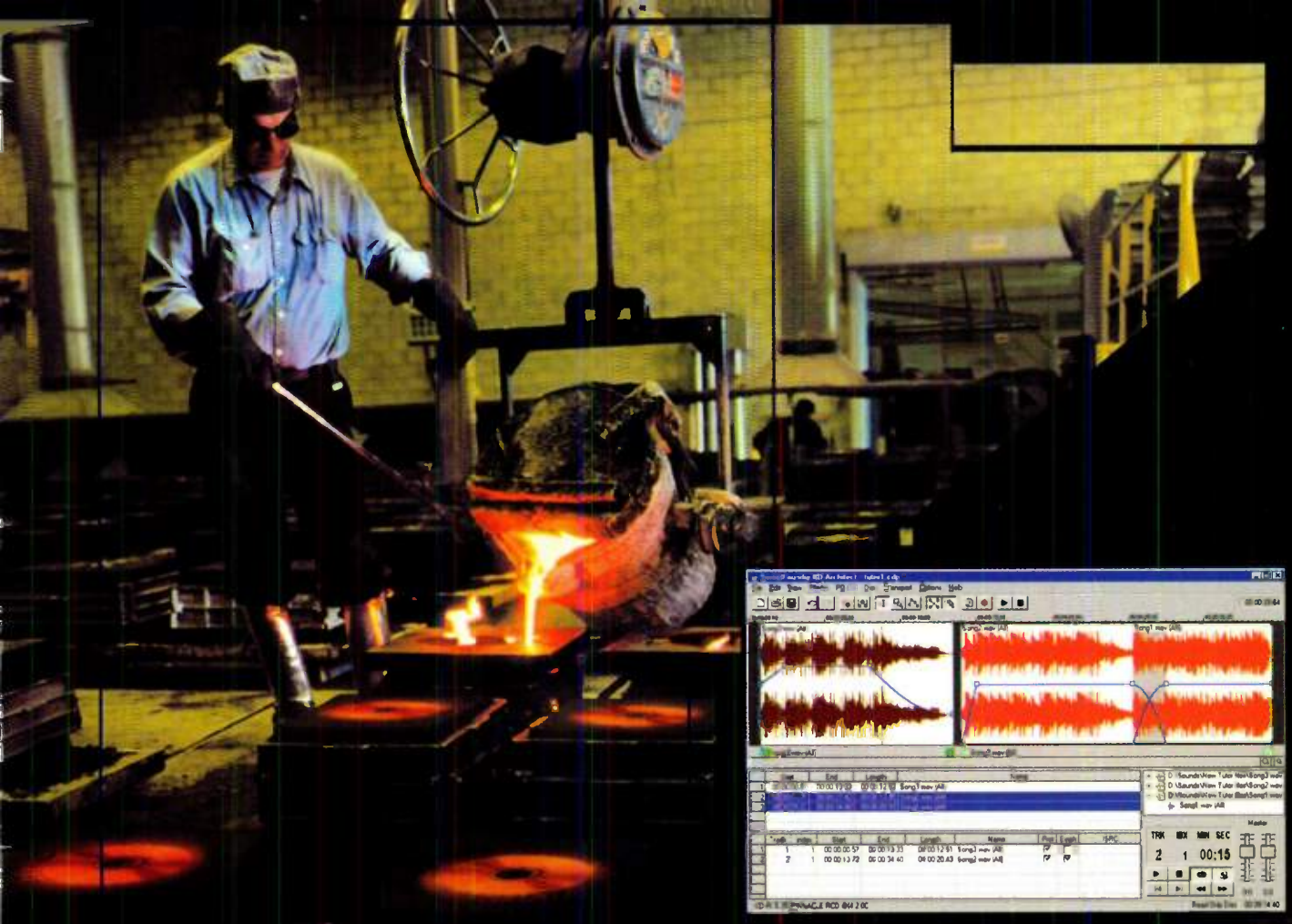

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Yamaha A3000

By Geary Yelton

A major player reenters the sampler market with a winner.

New ideas in sampling are few and far between. The greatest strides in sampler design in the last few years are a result of memory becoming more affordable and sampler manufacturers making less expensive, more compact instruments that are capable of addressing larger amounts of RAM. Another big change has been the inclusion of sophisticated, built-in effects processing like reverb and time-stretching. Many of the current crop of samplers can import samples and programs from sound libraries made for other samplers by. Sampling ease of use has changed little in the last eight years.

After a lengthy absence, Yamaha has returned to the sampler market with its A3000. This easy-to-use sampler offers innovative effects and impressive sound quality and includes features directly aimed at dance-music producers.

Yamaha's A3000 is the world's leading musical instrument manufacturer's formidable bid at making a sampler that competes with other top-of-the-line studio samplers. The new instrument can address up to 128 MB of memory, contains three unusual effects processors, and offers outstanding ease of use. The A3000 is also one of a handful of samplers that can play 64 notes at the same time. In addition, it has a few unique tricks up its sleeve that make it a pleasure to use.

GROWTH POTENTIAL

In its basic configuration, this 2-rack-space module comes with a SCSI port, floppy drive, stereo outputs, a pair of assignable outputs, and 2 MB of RAM. The first thing you'll want to do when you get an A3000 is to add RAM. The unit has four 72-pin SIMM slots and can be expanded to a maximum of 128 MB of sample RAM.

It's a good thing a SCSI port is standard, because there's no internal hard drive unless you install one yourself. There isn't space on the front panel for an internal CD-ROM drive, and to add a removable drive, you'd have to remove the floppy drive. The A3000 can accomodate drives up to 4 GB, but the drives must be divided into partitions of up to 512 MB each. You can specify the number of partitions but not their size; all are equal. Though the floppy disk format is DOS, the SCSI drive format is proprietary, so you can't mount the same drive in a shared setup with a computer.

Although the A3000 does not come with digital I/O, you can add the optional AIEB1 I/O expansion board ($249.95), which gives you six assignable analog outputs on ¼-inch TRS jacks and S/PDIF digital I/O on both coaxial (RCA) and optical ports. (The two S/PDIF pairs are not simultaneously available, nor is either digital I/O available simultaneously with the analog I/O.)

To install RAM on the I/O board, you have to remove eighteen screws to

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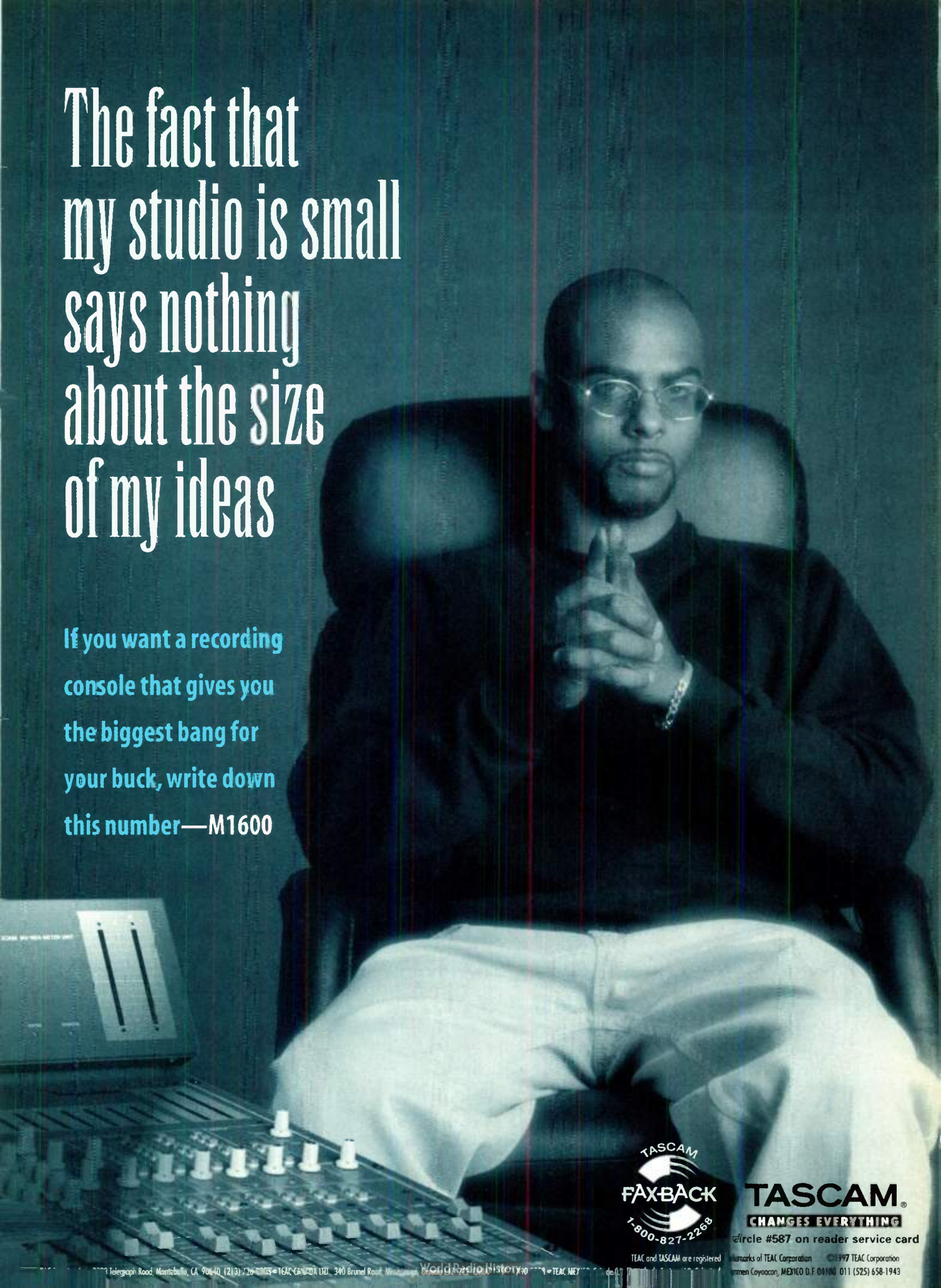
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take off the top of the housing. Once you've done that, installation is quite simple.

TRY, TRY AGAIN

The last sampler from Yamaha was the TX16W, released almost a decade ago. This unit was plagued by an operating system so obtuse it never caught on with most musicians. Yamaha has apparently learned from the mistakes of that instrument: the A3000 has one of the most straightforward operating systems around.

At the heart of its user interface is a matrix of buttons on the right side of the front panel. A column of five small buttons with green LEDs allows you to select among five operating modes. For each mode button there is a row of six function keys with red LEDs, which select the six functions in that mode. The names of all 30 functions are silkscreened onto the front panel; you press a mode button and then select one of its six functions by pressing the key above its name. You can see at a glance which function is selected by which mode button and function key are lit. There are no buttons that mark a function location and jump to it, but the matrix makes such buttons unnecessary. Almost any command is no more than two button pushes and a knob twist away.

On the left side of the panel is a brightly lit, 40-character display that's easy to read from any angle. The function selected in the matrix determines what you see in the display. Below the display are five "soft" knobs whose tasks change depending on which mode and function buttons you have selected. The function of each knob is shown above the knob in the display. Between the knob and the display is a red LED. If the LED is lit, you can press the knob like a button to execute the command that appears above it. On occasion, two or three adjacent knobs change the same parameter. Certain parameter values, such as Key Range, can also be changed from a remote MIDI keyboard.

It would be ideal if there were enough knobs and buttons that you didn't have to scroll through different screens, but the A3000 isn't quite that simple: you can scroll through additional pages for most functions by twisting the first knob on the left or by repeatedly pressing either the Mode button or the Function key. The other four knobs are used to change parameter values.

In addition to the matrix of buttons, there are three keys labeled Command, Assignable, and Audition. The Command key gives you access to additional commands pertaining to the selected mode and function. It's used most often to save to disk, but it may also be used to format disks, delete and copy objects, perform time stretching and pitch conversion, crossfade loops, and more. This is much better than having to navigate your way to the Save page every time you want to save changes. The Assignable key serves as a toggle switch for a handful of utility functions.

By pressing the Audition key, you can play any selected sample that is loaded in memory or directly from a SCSI disk without having to load it into memory. When you're trying to decide which sound to use, it's nice to be able to preview a few different samples before loading, even though there may be a quite lengthy delay before the sample plays.

Don't you hate it when a MIDI module doesn't give you visual feedback when it receives MIDI data? The LEDs in the A3000's five Mode buttons flash in response to different kinds of MIDI data. The Play button flashes when receiving note data, and the Edit button flashes when receiving Mod Wheel (CC 1) data. The other three buttons flash in response to Pitch Bend, Channel Pressure, and Program Change commands.

The A3000 lets you play six notes from the Function keys and use the knobs to change assignable parameters in real time. To play notes from the Function keys, you must first set the Assignable key to FKey Play On. Using the Panel Play function, you assign a MIDI transmit channel, note number, and Velocity for each Function key. Pressing the Assignable key then lets you trigger samples from the front panel, which is most useful if you're a DJ who doesn't need to trigger more than half a dozen samples at a time. You can even use Panel Play to control external MIDI instruments.

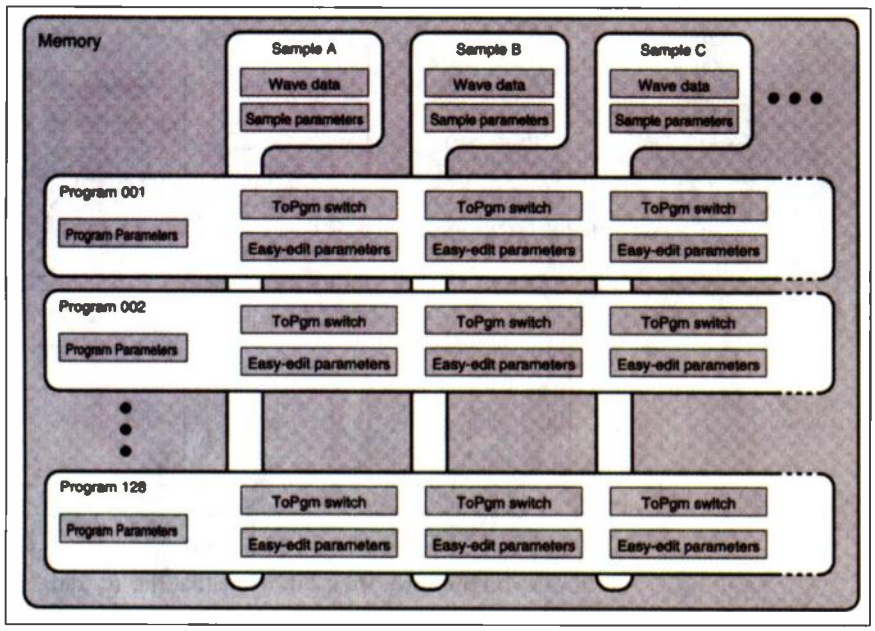

FIG. 1: A3000 Programs contain samples, program parameters, and Easy-edit parameters, which temporarily readjust the sample parameters. The example shows several Programs in a multitimbral setup. (Courtesy Yamaha Corporation of America)

SIMPLICITY: WHAT A CONCEPT!

The program hierarchy of the A3000 is refreshingly simple. Programs contain samples; program parameters, such as effects selection and output level; and Easy-edit parameters, which temporarily readjust the sample parameters (see **Fig. 1**). On a SCSI disk, Programs are organized in Volumes. This architecture greatly contributes to the A3000's ease of use.

It's often desirable to load samples as a group, especially a multisampled instrument or a drum set. For this reason, the A3000 can load Sample Banks,

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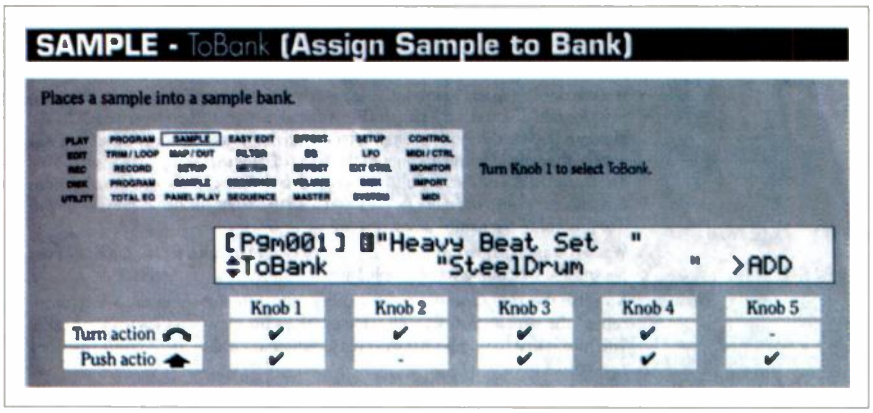

FIG. 2: To load multisampled instruments, drum sets, and other groups of samples, you assign the samples to Sample Banks. Here, the Steel Drum sample is being assigned to the "Heavy Beat Set" Sample Bank, which is indicated by the small "B" beside its name. (Courtesy Yamaha Corporation of America)

groups of samples that share the same set of parameters. A Sample Bank is indicated by a small "B" beside its name in the display (see **Fig. 2**). You can assign the same sample to as many Sample Banks as you wish.

When you play the A3000 from a MIDI keyboard, you play Programs. Because each sample and Sample Bank has its own parameter settings, assembling Programs can be as simple as turning samples on and off. Each Program has an off-on switch (labeled "ToPgm") for each sample resident in memory.

There are always 128 Programs from which to choose, although some may contain no data. Loading a Volume replaces all 128 programs in memory. It may take some getting used to that you can select Programs that don't contain data. You can also load Programs one at a time from any Volume.

DIGGING DEEPER

Unlike the samples in other samplers, those in the A3000 are more than just recorded bits of sound. Instead of shaping sound at the Program level, as most samplers do, the A3000 stores sample data that also includes most of the significant sound-shaping parameters. Sample parameters include start and end points, loop type, original key and range, filter settings, envelopes, LFO, and MIDI receive channel.

At the Program level, you can change or temporarily override these parameters in Play mode using the Easy-edit function. Easy-edit parameters include pan, level, output assignment, tuning and range, amplitude envelope attack and release rates, filter cutoff and resonance, minimum and maximum Velocity, portamento, and so on.

There are three envelopes per sample for the amplitude, filter cutoff, and pitch. There's only one LFO per sample, which is rather surprising on an instrument this sophisticated. LFO waveforms include sawtooth, triangle, square, and sample-and-hold. The LFO can't be synched to an external source, which may be bad news for certain styles of dance-oriented music.

There are six filter types from which to choose: two lowpass, two highpass, bandpass, and band-eliminate (better known as "band-reject"). The bandpass and band-reject filters offer a wide range of bandwidth control. The second versions of the lowpass and highpass filters are much more resonant than the first versions, though they fall just short of self-oscillation.

Yes, these fat-sounding filters are resonant, and they make the most of it. Filter sensitivity can be adjusted to determine not only how the cutoff rate responds but how the depth of resonance responds to Velocity. The Filter function is also where you can set equalization frequency, depth, and width.

GETTING DOWN TO BUSINESS

You prepare for sampling by going to the Setup function. The first of five pages, RecData, lets you specify the sampling rate, whether the sample is mono or stereo, and the length of the pretrigger (which is like a preroll in multitrack recording). Sampling rates range from 44.1 kHz down to 5.5125 kHz, which is not quite as nice as some competing samplers that go out to 48

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kHz. However, if you add the AIEB1 I/O expansion board, you can sample 48 kHz and 32 kHz sources at their original sampling rate via the digital inputs.

If you manually trigger recording and you're a moment late, no problem. When pretrigger is enabled, recording begins up to half a second before sampling is triggered. (This works because, like many samplers, the A3000 is always "listening" to incoming audio, which is passing through a buffer. When you trigger sampling, the machine simply looks a half-second "backward" into the buffer.) You can also trigger sampling automatically when the input signal reaches a selected threshold; in this context, pretriggering is especially useful for sampling slow attacks even before the level threshold is achieved.

Other pages let you specify the sample's original pitch and key range and automatically apply normalization. One command assigns samples to the currently selected program as soon as they're recorded, allocating each new sample to the next adjacent note number. This allows you to immediately play a new sample from your MIDI keyboard. The maximum length of a single stereo sample is 64 MB, or more than six minutes at the 44.1 kHz sampling rate.

A metronome is available that can match the tempo of a musical phrase you're sampling. It doesn't use a real click but a pitched tone that plays an octave higher on the first beat of each measure. When the metronome is on, the tempo data is recorded as one of the sample parameters. This is useful for editing the start and end points of a sample or its loop points. Turning the Tempo knob changes the tempo in 0.1-second increments, so it takes quite a bit of knob turning to go from, say, 80 bpm to 150 bpm. Due to the danger of leakage, it's not a good idea to use the metronome when recording from a mic.

With the External Control function and a CD-ROM drive, you can record samples directly from audio CDs through the analog inputs. The process is straightforward enough: you begin by turning on the Monitor function so you can hear what you're recording, select the CD track number and the index location you want to record, switch to the Record screen, press Go, and then press Record. CD playback begins when you press Go.

The one thing to watch out for is that it takes a moment to switch from Go to Record, so you may miss the beginning of the track if you manually trigger recording. It makes a lot more sense to let the audio signal trigger recording automatically. Either way, this is a situation where Pretrigger is handy, allowing you to begin recording just ahead of the part you really want to sample.

If Automatic Normalization is turned on, the CD continues to play until normalization is complete, which may take a while. This is a bit distracting; you'll want to turn down your monitors or headphones while the sampler is normalizing.

The A3000 can also record its own output. You can record a single note or a series of notes with or without effects, but polyphony is limited to four mono voices or two stereo voices.

One of the most useful capabilities of the A3000 is serial recording. This lets you record a series of separate samples from successive sounds on a CD or any other source. If you set recording to trigger automatically and specify New Sample+ as the sample type, recording begins and ends at the beginning and end of each sound in succession. All the samples are given the same name plus a sequential number. I have a lot of samples on audio CD, so I found this feature to be extremely beneficial. On the other hand, there's no way to loop a track during playback, which I prefer to do when sampling from CD to allow me to set levels and manually trigger recording.

FOREIGN EXCHANGE

An alternate means of getting samples into the A3000 is to import samples that are in non-native formats. The A3000 can import Akai S1000 and S3000 samples, and both AIFF and WAV files are easily read from DOS-formatted floppies or SCSI volumes. You can also import Yamaha A7000 files and TX16W sampler files, but the A7000 isn't being exported to the United States and TX16W files are less than plentiful.

SMDI transfers are partially supported; Yamaha does not claim 100 percent compatibility. (SMDI is a fast SCSI sample-transfer protocol that is supported by E-mu, Peavey, and Kurzweil as well as certain sample-editing programs.)

I would like to see Yamaha add a few

A3000 Specifications

Audio Inputs	(L and R) stereo, ¼" TRS
Audio Outputs	(L and R) stereo main, ¼" TRS; (L and R) assignable, ¼" TRS; ¼" TRS headphone out
Other Ports	SCSI (50-pin Centronics); MIDI In, Out, Thru; 3.5" floppy-disk drive (HD)
Polyphony	64-note, dynamic voice allocation
Multitimbral Parts	16
Sample RAM (standard/maximum)	2 MB/128 MB (four 72-pin SIMM socket)
Max. Sampling Time @ 44.1 kHz	6 minutes 20 seconds
Filters	Dynamic filters for each sample (highpass and lowpass with resonance, bandpass, band-reject)
Effects	3 effects blocks, 54 effects types, 4-band global EQ
MIDI Sequencer	1-track, real-time record/play, import Type 0 Standard MIDI File from floppy disk
ADCs	16-bit, 16x oversampling
DACs	18-bit, 4x oversampling
Sampling Frequencies	44.1, 22.05, 11.025, and 5.5125 kHz
Floppy Disk Format	MS-DOS
Expansion Slots	1 (for optional AIEB1 I/O board)
Weight	15 lbs. 3 oz.
Dimensions	2 rackspaces x 15⅝" (D)

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M•1400	4Ω bridge	8Ω bridge	2Ω load	4Ω load	8Ω load
at 1% THD	1400 W	960 W	700•700 W	480•480 W	280•280 W
at rated power*	1260 W	850 W	630•630 W	425•425 W	250•250 W
THD at rated power*	0.05%	0.025%	0.05%	0.025%	0.012%

FR means Fast Recovery. Fast Recovery means that the M•1400 can be driven right out past the edge of clipping... into nastily low impedances... and still sound good. Minimal negative feedback and special circuitry we shamelessly borrowed from digital switching technology are used to accelerate transient recovery when the M•1400 is running "at red line." It makes a difference that you can hear.

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Right out of the box, the M•1400 is ready to improve your sound reinforcement system with tighter bass and better constant directivity horn performance. Because we've built in THREE critical electronic system enhancements that others leave out or charge extra for. And, signal processing aside, the M•1400 is also the gutsiest, no-compromise power amp in its price range. Call today for full information.

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T-Design cooling for enhanced reliability. Unlike amps that just waft air through their entire chassis, the M•1400 delivers massive air flow only where it's needed — on the output devices — keeping dust, smoke, and other contamination out of the amp's main electronics. Via a huge front manifold 1, the M•1400's demand-sensitive fan 2 concentrates cool air into two highly efficient heat sink tunnels 3 and out the SIDES of the amp. The short air path maintains **constant gradient cooling.**

Male AND female XLR inputs let you use either gender of plug on the cable from the mixer — and they allow one input to power multiple amps so you don't have to wire up special "splitter" cables.

Built-in low-cut filters for tighter bass and more system output. PA cabinets can only reproduce bass down to what's called their **tuned frequency.** Below that, you just get distortion and potential woofer damage. The solution is to chop off everything below the tuned frequency with a low-cut filter (equalizers — even ⅓-octave equalizers —can't do the job). We're not the only amp maker to advocate low-cut filters. But we ARE the only ones who don't charge extra or force you into a couple of pre-set cut-off frequencies. Our low cut filter's variable from 5Hz to 170Hz to fit your system's size.

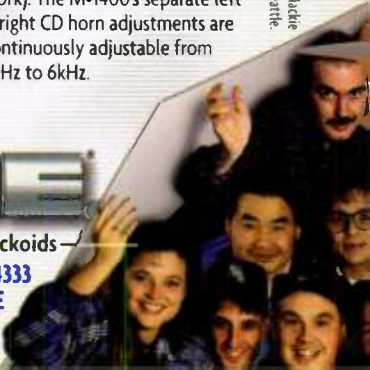
Built-in subwoofer filter. Power your subwoofer with an M•1400 and you've saved the $250 to $400 cost of an outboard electronic crossover (or the expense and hassle of "optional" plug-in cards). You get an 18dB per octave, linear-phase, uniform-time-delay design that's switchable between 63Hz and 125Hz. Since clipping elimination is undesirable when driving a subwoofer, that M•1400 feature is automatically disengaged when you switch to subwoofer mode (a critical detail not found on many comparably-priced amps with inconvenient plug-in subwoofer cards).

Both ¼" TRS & XLR inputs.

Constant directivity HF horn compensation. "CD" horns dramatically improve high-end dispersion. But to make them work right, you have to add special equalization. Until now, that's meant hard-to-find, harder-to-adjust speaker modules (or using a graphic equalizer...which simply doesn't work). The M•1400's separate left & right CD horn adjustments are continuously adjustable from 2kHz to 6kHz.

Inside: expensive, state-of-the-art TO-3PBL-case power transistors with perforated emitters for maximum gain linearity. (Some amps use cheap, 20-year-old-technology metal TO-2 transistors... possibly due to lack of robust cooling resources.)

*20Hz to 20kHz



Below: a few of the 400+ folks who work at Mackie Designs in Woodinville, WA, 20 miles northeast of Seattle.

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more sample file formats to the list; there are a lot of great libraries for Kurzweil K2000/K2500, Digidesign SampleCell, Ensoniq ASR series, Roland S series, and E-mu EIIIx/EIV series.

There are a few limitations to keep in mind here. Foreign sample files are imported as Sample Banks, and you can't play Sample Banks until they're assigned to a Program. Also, keep in mind that you are importing only the sample data contained in an Akai program, not the program data itself; Akai program parameters aren't retained. This means that sounds are imported with no Velocity sensitivity, no filter, and an organlike amplitude envelope, so quite a bit of tweaking is usually required to make imported samples useful. Loops, key ranges, and other parameters of the samples themselves are transferred intact.

For the most part, I was able to import Akai S1000 and S3000 samples from floppy disks and CD-ROMs with no problems. However, whenever I imported a drum set or sound-effects program in which each sample is assigned to a different key, they were all transposed up several octaves. I never encountered this problem with a sample that was assigned to several keys; in fact, if a percussion sample in a problematic program was assigned to just two keys, the pitch played back correctly.

▼

These fat-sounding filters are resonant and make the most of it.

SLICING AND DICING

Samples and Sample Banks are modified in Edit mode. The Trim/Loop function is used to set the start and end points of sample playback and to set the loop points. This is where you set MIDI Velocity to modulate the playback start point.

At the top of the Edit Waveform and Loop displays, there's a wavy line that represents the waveform being edited. You'll see markers for the start and end points, letting you see these points' positions relative to the length of the entire sample. Because changing parameter values with large numbers might otherwise involve endless knob-twisting, you can multiply the effect of your knob twists by a factor of 10, 100, 1,000, or 10,000.

There are five kinds of loops available—six if you count Forward, No Loop. Forward Loop, No Exit is a standard loop that plays until a key is released and repeats during the release phase of the envelope. I especially like Forward Loop, Exit at Note-Off, which plays the looped portion until a key is released and then plays the rest of the sample. I've never understood why this kind of loop isn't the standard. One-Shot plays the loop just once and continues. Reverse, No Loop plays the sample backward once, and Reverse One-Shot plays it backward with a single loop. Like the playback start point, the loop start point can dynamically respond to MIDI Velocity.

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You can listen to a sample as you adjust its loop points, a feature that's always appreciated in samplers and sample-editing software. Once you set a sample's tempo, the A3000 can calculate the number of beats between the loop start and end points. Conversely, once you set a loop, it can calculate the tempo, assuming that the loop is four beats long.

Most samplers let you find loop points that fall at zero crossings, but the A3000 does one better. Enabling Snap finds loop points with the same instantaneous value. Whichever loop point you're setting will always have the same level as the other loop point, which helps avoid nasty pops and other glitches in your loop. The Snap feature also works when setting sample playback start and end points.

IT'S TWISTED!

Each sample in a Program can be routed through three independent, stereo effects processors that can be arranged in series or parallel. There are a total of 54 effects algorithms, each with as many as sixteen user-programmable parameters. Unfortunately, the manual provides very little detail on how to program these parameters. To my knowledge, many of these effects are new in a hardware device. In an interesting twist, the more radical effects are listed first, and old standards such as reverb are listed last.

At least a dozen effects are dedicated to distorting the sound in one way or another. Some effects, like "Radio" and "Low Resolution," just add noise. "Digital Turntable" adds the continuous popping of a scratchy LP. It's more a sound effect you can superimpose on a sample than a signal-processing effect. "Scratch" superimposes the panning sound of scratching on a turntable, rap music–style. Clearly, all of the aforementioned effects are intended to appeal to the DJ and dance-music crowd.

"Auto Synth" processes a sample through heavy pitch and amplitude modulation, filtering, panning, and delay effects. Changing the parameter values wildly alters the resulting sound. "Distortion," "Overdrive," and "Amp Simulator" work well with vocals as well as electric guitar.

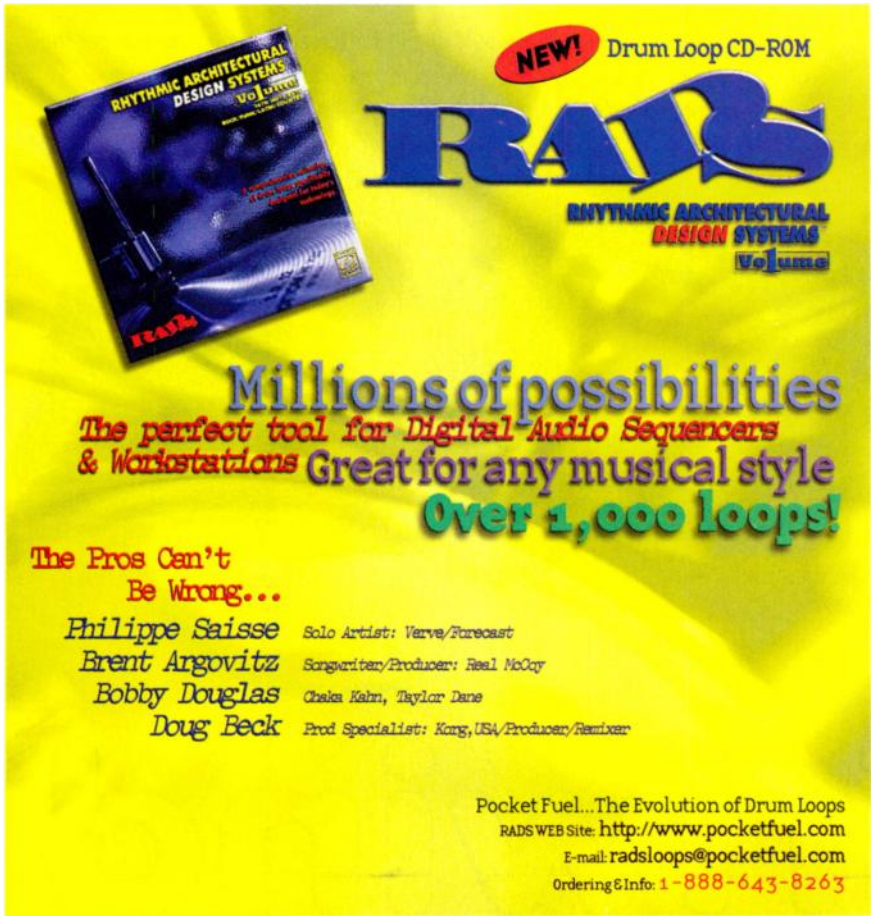
"Beat Change" actually performs low-resolution time stretching and pitch shifting in real time. Its extreme ranges either half or double the sample's length. "Jump" rips the sound into tiny pieces and then imparts random pitch shift and delay to those pieces. The result is different every time the algorithm is applied. The "Voice Cancel" effect works like a vocal eliminator: when you process a recorded song through it, it attenuates midrange material that is panned in the center of the stereo soundstage. The algorithm's purpose is to remove vocal parts from recordings as an aid to karaoke aficionados.

More standard effects include compression, noise gate, chorus, flanger, phaser, pitch shift, rotary speaker, echo, aural exciter, autopan, and a 3-band equalizer. Reverbs range from "Basement" to "Canyon," and all are smooth and warm.

In addition to playing sounds back through the effects, it's possible to route sounds through the processors as they're being sampled. In fact, if you leave Monitor turned on, you can route sounds through the effects without even sampling them, turning the A3000 into a 3-stage, stand-alone effects processor.

SCRATCH THAT PAD!

The A3000 has a bare-bones sequencer that imports Type 0 Standard MIDI Files (the kind that save as a single multichannel track) from a DOS floppy. Actually, calling the sequencer "bare



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Product Summary

PRODUCT:
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PRICE:
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MANUFACTURER:
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tel. (800) 932-0001
or (714) 522-9011
fax (714) 739-2680
e-mail info@yamaha.com
Web www.yamaha.com
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EASE OF USE	● ● ● ●
AUDIO QUALITY	● ● ● ●
VALUE	● ● ● ◖

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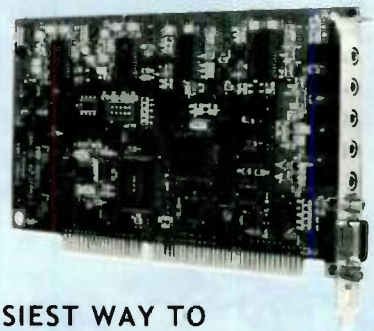

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bones" is generous. There is neither sequence editing nor any kind of synchronization or metronome, and you can only record one track. In fact, it only has three commands: Record, Play, and Speed.

I definitely got the feeling that the sequencer was added as an afterthought. You would never want to use it as your primary sequencer, but it's more or less sufficient as a music scratch pad if nothing else is available. For a company that has created myriad hardware sequencers, including the handy QY Music Sequencer series, this is surprisingly weak.

BUNDLED GOODIES

The A3000 ships with a CD-ROM called the *Professional Sound Library,* which contains fifteen volumes of A3000 programs and samples and around 45 minutes of audio data. I'm impressed with the consistently high quality of these sounds. The volumes of A3000 data cover most of the basics of a traditional sampler library: piano, strings, brass, choir, guitar, bass, percussion, sound effects, and so on.

The audio data is anything but traditional. It's geared very much toward rave and techno music. Its content reinforces the impression that the A3000 is aimed squarely at musicians pursuing the new wave of electronica. Most of the audio tracks are synthesizer phrases custom-made for this genre, and most of them are excellent and original. In addition, there are five floppy disks containing sampler data and some pretty impressive demo sequences, also oriented toward electronic dance music. Actually, it's amazing that so much music fits on each floppy disk.

So why are there audio tracks on the sampler CD-ROM? My guess is that Yamaha wanted to get these sounds out while they were fresh, and the company simply didn't take the time to turn them into complete programs. Yamaha could have at least converted them to sample data so you could create programs by turning samples on and off with ToPgm commands. As audio data, the sounds provide a good opportunity to demonstrate the A3000's serial-recording capabilities.

I had one problem with the CD-ROM: I never succeeded in loading the 16 MB "Symphonic" volume. At each attempt, the loading process got hung up or the sampler returned a message that read, "ERROR: Disk read/write error." Afterward, the A3000 got hung up when I tried to load anything else, and I had to reboot both the sampler and the CD-ROM drive.

Yamaha publishes *TWE* 2.0, a Windows 95–based sample editor for the A3000. Data exchange between a computer and the A3000 is via SCSI. The sample-editing software's user interface is much like that of other sample editors, with tape transport–type controls for playing and recording. Because the A3000 has no cut, copy, and paste capabilities, samples must be transferred to *TWE* to perform these operations. You can do most of what *TWE* does directly on the A3000, but sometimes it's preferable to see the waveform you're editing.

UP FRONT AND PERSONAL

The front panel of the A3000 presents its user interface in a well-organized

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AUDIX

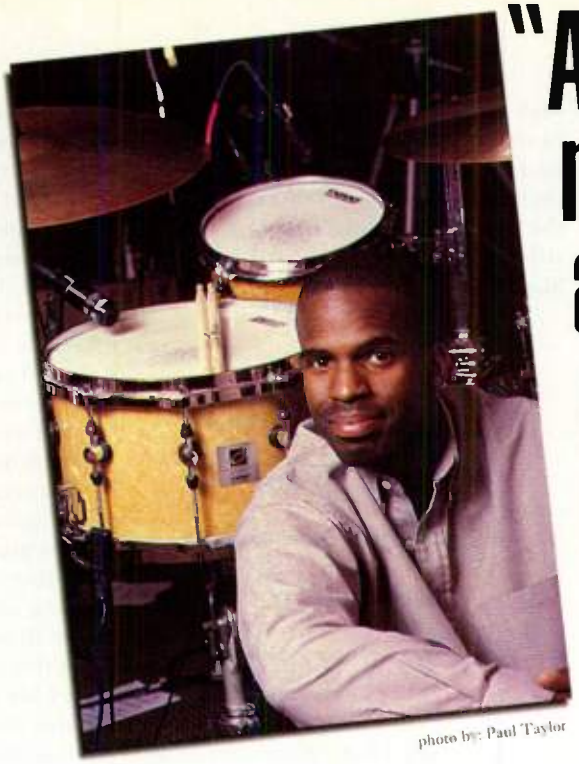

photo by: Paul Taylor

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—Will Kennedy, The Yellowjackets

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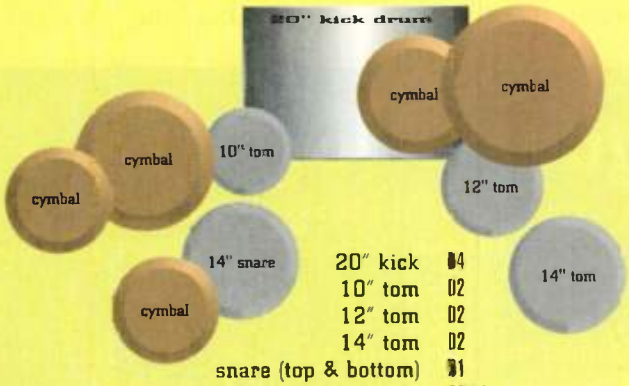

20" kick	D4
10" tom	D2
12" tom	D2
14" tom	D2
snare (top & bottom)	D1
left & right overheads	SCX-1

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fashion. If you're comfortable with samplers, you'll quickly find your way around and feel at home in no time. Its program architecture is just as clear and logical as its front-panel layout. I get the feeling that after a few weeks of using the Yamaha A3000 every day I could almost work it with my eyes closed.

The owner's manual does a commendable job of explaining concepts and presenting material in a hands-on, top-down fashion. Basic descriptions are peppered with cross-references to more detailed explanations. At just over 350 pages, the manual is more concise than a lot of sampler manuals I've waded through. It has a detailed table of contents and an index as well as appendixes containing lists of effects and effects parameters, controllers, error messages, and other useful information.

The operating system is in ROM, so upgrades will require swapping a ROM chip rather than just loading a new operating system from disk. Upgrades will be necessary, too, if only to fix the bug that occurs when you import a program with a different sample on each key. In time, perhaps Yamaha will develop a more substantial sequencer as well, especially because the A3000 may fall into the hands of people who don't consider themselves keyboard players. Maybe Yamaha will even respond to the desire for more LFOs. While they're at it, the ability to cut, copy, and paste selected portions of samples would be useful. Obviously, any of these system enhancements would require a ROM upgrade.

▼

The A3000 has one of the most straightforward operating systems around.

At first, I was skeptical about the A3000. I was surprised that it has 16-bit A/D converters when Yamaha's competitors are moving to 18- and 20-bit audio, but using it quickly convinced me that specs don't matter as much as discovering new ways of doing things. Right off the bat, I thought the effects were pretty cool, and I quickly recognized the logic of the interface layout. I've used samplers for years that never made as much sense as this one made the first week.

User friendliness and innovative effects wouldn't matter much if it didn't sound good. To my ears, the A3000 sounds great. Serial recording, audio recording from the CD-ROM drive, importing sounds from floppies, and other thoughtful details add up to make this unit something special. The most I ask from any sampler is that it inspires me, and the A3000 delivers. If this instrument is any indication, Yamaha is on its way to becoming one of the big names in sampling.

Geary Yelton *lives in Atlanta, Georgia, where he's adored by few and despised by even fewer.*

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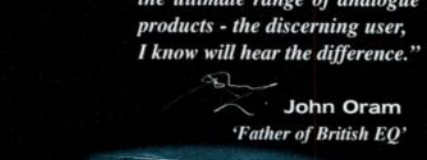

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PG Music Band-in-a-Box 7.0 (Win/Mac)

By Allan Metts

The perennial favorite backup band gets a new soloist.

In case you haven't heard, *Band-in-a-Box* is the ever-popular accompaniment program that produces background tracks from your chord changes. You simply type in the chords to a song using standard chord symbols (C, Fm7, G9, etc.), pick a musical style, and click the Play button. *Band-in-a-Box* then generates a multipart arrangement that plays back through your sound card or MIDI synthesizer.

Over the years, many people have scoffed at auto-accompaniment programs as not being creative or challenging enough for "real musicians." So when *Band-in-a-Box* introduced its new automatic soloing feature, I figured that PG Music had finally succeeded in removing the last remnants of creativity from electronic music-making. No longer does this program simply provide you with a backup band. Now it takes care of your *leads*, as well.

But there's more to this program than first meets the eye. I've found that *Band-in-a-Box* is excellent at forcing me to change my playing style so all my songs don't start to sound the same. And the new Soloist feature is a great tool for education and practice: when you hear something you like, you can print it out, practice it, and play it yourself! In fact, this new version of *Band-in-a-Box* has great potential for encouraging creativity, developing new musical ideas, and learning different playing styles. There's a lot to learn from *Band-in-a-Box*.

I reviewed *Band-in-a-Box* 6.0 in the March 1995 issue of **EM**, so rather than cover the basics again, I'm going to focus on the new and improved features of version 7.0. The biggest new feature is automatic soloing, but there are several other enhancements, as well. (I examined the Windows version of the program for this review. The Macintosh version adds support for QuickTime Musical Instruments; otherwise, it is essentially the same as the Windows version except for a few minor, cosmetic differences.)

DÉJÀ VU

The program's main screen is largely unchanged from Version 6.0 (see **Fig. 1**). You still use the upper part of the screen to pick your band's instruments, the middle part to select Style and playback parameters, and the lower part to enter chords. The lower part can also be replaced with a notation view at the click of a button.

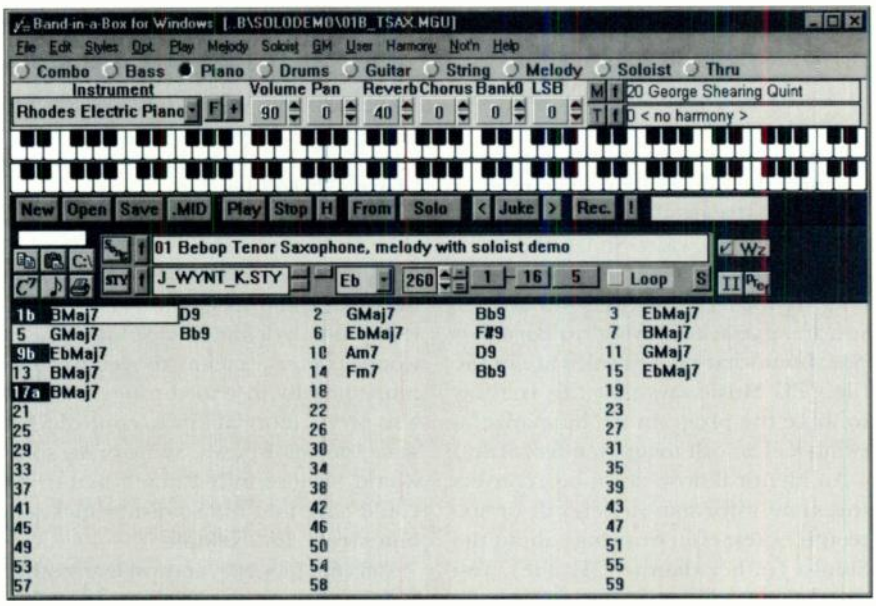

FIG. 1: *Band-in-a-Box*'s main screen is largely unchanged from the previous version. The biggest addition is the Soloist Part, which can also operate as a second melody track.

The upgrade adds several convenient features. You can open lists of favorite Songs or Styles, and you can add, remove, and rearrange the list items. Furthermore, you can save lists to disk for later retrieval, which allows you to have multiple sets of favorite Styles and Songs (perhaps country one day and jazz the next). *Band-in-a-Box* can also build these lists automatically by adding Styles and Songs each time you use them.

Band-in-a-Box now supports patches on multiple synthesizer banks as long as you have a specially formatted patch-name file for your synth. The program ships with a few of these, including Roland GS and Yamaha XG formats. I easily made a patch-name file for my Alesis S4+. Unfortunately, the Instrument Name drop-down menu on the main screen only supports General MIDI patch names. So when I select "MixedChoir" (patch number 59) from one of the higher numbered banks in my Alesis, the instrument shows up as "Muted Trumpet" (GM patch number 59) in *Band-in-a-Box*. Sheesh! If I can't have "MixedChoir," I would rather have it just say "59."

Version 6.0 of *Band-in-a-Box* let you send five accompaniment Parts (Bass, Piano, Drums, Guitar, and Strings) to your sound devices. You could also use a Melody Part as a single-track sequencer and play along with the program using a Thru Part. Version 7.0 adds a Soloist Part, which you can also use as a second melody track. But the Soloist Part is primarily intended for use by the program's biggest new feature: automatic solo generation.

200 SOLOISTS CAN'T BE WRONG

Band-in-a-Box now comes with more than 200 Soloists that can perform solos over any chord changes. The Soloists have descriptive names, such as "Coltrane 8th Notes" and "Charlie P Swing 16ths," that give you some idea of what to expect.

How do these Soloists sound? Quite good, actually. It's obvious to me that the folks at PG Music spent quite a bit of time studying the playing styles of various musicians and musical genres. The blues and jazz-swing Soloists are definitely my favorites. I felt that the offerings were a bit weak, though, in the rock and pop genres. (Add-on Soloist disks for specialty jazz, rock, and bluegrass are available from PG Music.) You can hear the program's soloing

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capabilities for yourself by checking out PG Music's Web site.

The *Band-in-a-Box* ads claim that you can create your own Soloists, but that's a bit misleading. True, you can play with some of the Soloist parameters and save them using any name you choose. But most of the information that determines how a Soloist will play is stored in a special "ST2" file, which you can't create or edit.

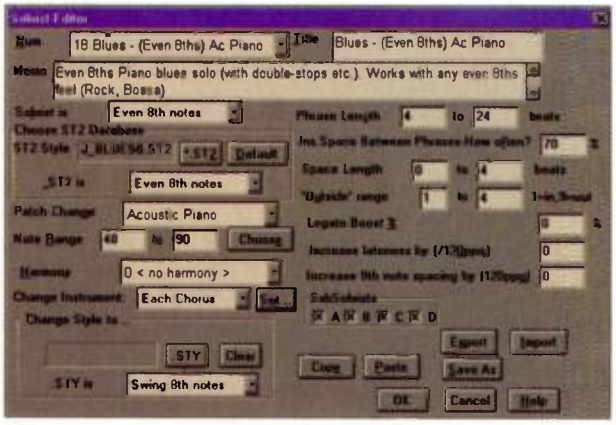

FIG. 2: *Band-in-a-Box*'s Soloist Editor enables you to change how a Soloist will play, although most of the Soloist's behavior is determined by its database file.

A Soloist, then, consists of your choice of an ST2 "database" file, in addition to some other settings that tailor your Soloist's performance. There are six ST2 files provided with the program: c_swing, j_swing, j_blues, j_blues8, j_waltz, and p_16th. There are no descriptions of these files anywhere in the program or its documentation, but I'm guessing that "c" stands for country, "j" for jazz, and "p" for pop.

When you choose an ST2 file, a drop-down box tells you whether this Soloist will use eighth or sixteenth notes and whether the notes will have an even or swing feel. (It also lets you know if the solo will use a waltz Style.) You can change these settings, but you're not altering the ST2 file when you do this; you are, in essence, "lying" to *Band-in-a-Box* about what kind of solos are in the file. (PG Music says that this is a way to force the program to "humanize" a swing-feel Soloist to an even-feel Style.)

An identical drop-down box conveys the same information (eighth or sixteenth notes, even or swing) about the Soloist (rather than its ST2 file). You can change settings in this box, as well. Confused? So was I. I thought I was telling the Soloist how to play its notes, but it turns out that settings in this box only control when the Soloist appears in the list of available Soloists. If you're looking for an eighth-note swing Soloist, you want to be able to filter the list to show only those entries. Whatever the case, I'm baffled by PG Music's decision to make these settings user editable (and risk confusing people like me).

▼

Automatic chord recognition is one of my favorite new features.

ON THE OUTSIDE

Once you've entered the chords to your Song and specified your Soloist database file, there is an additional setting that controls what notes your Soloist will play. An Outside range parameter can be set with a value from 1 to 9. I was not able to achieve predictable results with this. According to PG Music, a range of 1 to 1 will cause the Soloist to stick to chord and scale notes, hitting other notes only briefly as passing tones. A range of 1 to 9 will cause the Soloist to include more "outside" notes in its solos. (In my experience, a range of 1 to 9 caused the Soloist to pretty much stop playing altogether.)

I felt that I needed more control than this. Sometimes *Band-in-a-Box* landed on "sour" scale tones when playing relatively basic chords. I could achieve better results by changing Soloists, but I would prefer a means to weight solos more heavily to chord tones. I would also prefer more ability to control what scale the Soloist uses. Some of my solos would have sounded much better if I could have told the Soloist to stick to a blues scale, for example.

You can, however, control many other Soloist attributes. You can specify a range to indicate how long or short (in beats) the phrases should be, how often

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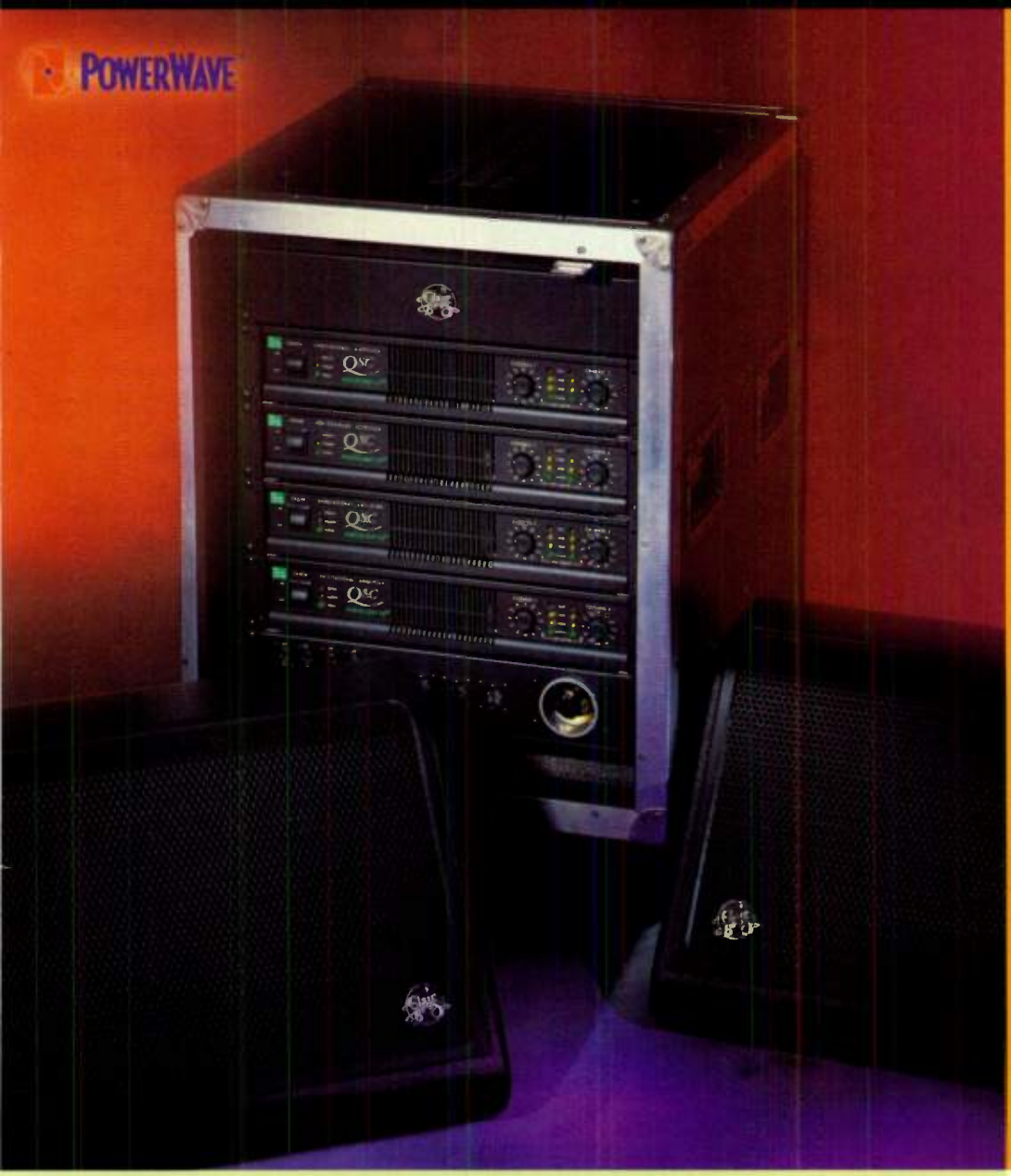

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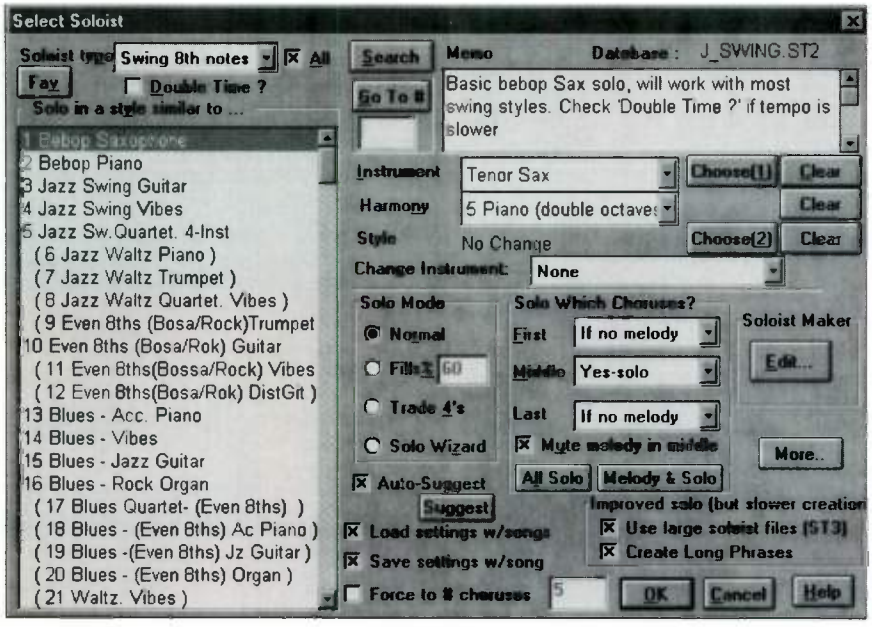

FIG. 3: The Select Soloist window allows you to choose your Soloist and to specify when and how it should play.

(as a probability) the Soloist should rest, and how long (as a range of beats) this rest should be. You can alter the Soloist's note durations to achieve legato or staccato effects, offset the solo to play ahead of or behind the beat, and change the amount of eighth-note swing. Unfortunately, you cannot control how many notes the Soloist will play. Some of the Soloists are polyphonic, which is bothersome when you're trying to set up a solo alto sax line.

Most of what I've described so far appears in the Soloist Editor window (see Fig. 2). The Soloist Editor is opened from the Select Soloist window (see Fig. 3). The Select Soloist window presents you with all available Soloists, lets you choose between them for playback or editing, and allows you to change several playback parameters (described shortly).

CHOICES FOR THE CHOOSY

Band-in-a-Box provides several tools to help you choose a Soloist. Aside from filtering the available Soloist list, you can retrieve a recently used Soloist and search the Solo names (but, unfortunately, not their memo fields) for a string of characters.

There is also an Auto-Suggest feature, but the suggestions are hard-coded to the Soloist list as it appears when you first install the program. If you take a Soloist suggestion for a modern jazz Style and edit it to completely

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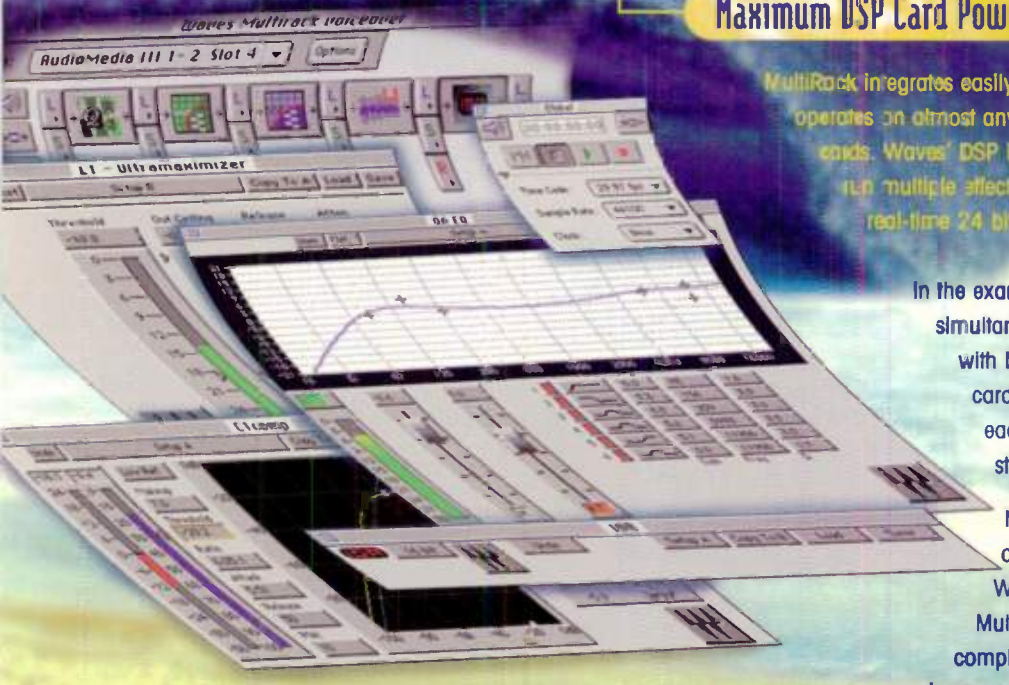

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change its character—I renamed it and changed it to a waltz swing Soloist—*Band-in-a-Box* will still blithely suggest it as a good choice for modern jazz.

There are several settings that appear in both the Select Soloist and Soloist Editor windows: you can change the instruments that the Soloist uses, specify how often the Soloist should change instruments, choose a multipart harmony to use (harmonies were described in the version 6.0 review), and select a Style change to occur when you use this Soloist.

Seeing these settings in the Select Soloist window is handy because you get a feel for what the Soloist will sound like. But the program's ability to edit these settings in two places leads to confusion. What's worse, changes made to some of these settings in the Select Soloist window are reflected in the Soloist Editor when you open it, and changes made to other settings are not.

Several settings in the Select Soloist window apply to all Soloists. For example, you can decide in which choruses the Soloist will play. You can also choose from several Solo Modes: Normal mode generates a solo that plays throughout your Song, Fill mode tells the Soloist to occasionally noodle around in your Song (you decide how often), Trade 4 mode lets you swap solo licks with your Soloist, and Solo Wizard mode lets you play the Soloist's notes with your computer keyboard. I had quite a bit of fun with each of these.

AT THE BAR

Band-in-a-Box's automatic soloing is definitely the biggest addition to this version of the program, but there are other improvements, as well. You can now change Styles, Harmonies, and patch settings at any bar. You can also transpose a portion of your Song, which allows you to easily create key changes in mid-Song.

Some of *Band-in-a-Box*'s soloing features have spilled over into other parts of the program. You can convert your melody tracks from a swing to an even feel and back again. You can boost or cut note durations, shift the melody

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Product Summary

PRODUCT:
Band-in-a-Box 7.0 auto-accompaniment software
PRICE:
$88
upgrades $49
SYSTEM REQUIREMENTS:
PC: 80386 or better CPU; Windows 3.1 or Windows 95; 8 MB RAM; Windows-compatible sound card or MIDI interface
Mac: 68030 (or higher) or Power Mac CPU; System 6.0 or higher; 8 MB RAM; MIDI interface or QuickTime 2.5 (to use QuickTime Musical Instruments)
MANUFACTURER:
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EASE OF USE	● ● ◖
DOCUMENTATION	● ● ●
VALUE	● ● ● ● ◖

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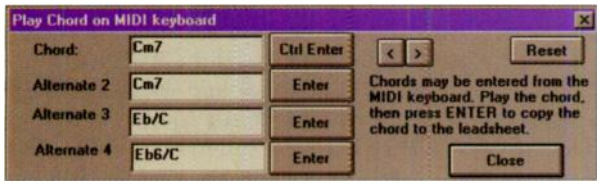

FIG. 4: I really like *Band-in-a-Box*'s automatic chord detection. The program can provide up to four interpretations of the chords you play.

ahead of or behind the beat, and vary the amount of eighth-note swing.

One of my favorite new features is the program's automatic chord recognition. You can press Control-Enter after playing a chord on your MIDI keyboard, and *Band-in-a-Box* will insert that chord into your current editing position. And because the same set of notes can have several different chord symbols, the program provides a handy dialog box with up to four different interpretations of what you played (see **Fig. 4**).

There are many more improvements, most of which enhance existing features, provide easier ways to get things done, or provide additional control over how your parts are played. Most notable among these are improved notation and lead-sheet formatting, tap-tempo (tap-in entry of the Song tempo), and an easier method of setting instrument Velocities in the StyleMaker. The Notation window now highlights the notes as the program plays, and you can have the window scroll ahead of the current Song position by up to two measures.

OOOEY GUI

One of the biggest complaints that I had with version 6.0 was *Band-in-a-Box*'s poorly designed user interface. Unfortunately, the situation hasn't improved much with version 7.0. There are settings, options, and preferences all over the place, and it takes time to learn where to go to change a particular item. There are almost 200 first-level selections on the main menu alone, and most of these are multiword phrases such as "Allow Soloist Harmony (on Thru Harmony)."

Band-in-a-Box is long overdue for a face-lift that will bring it up to current Macintosh/Windows 95 standards. There are no context-sensitive pop-up menus. The dialog boxes need to be redesigned to make them less crowded and easier to use. And a program that has this many parameters is just begging for some kind of hierarchical "tree view" display to help the user navigate the various settings. The program's documentation and online help do ease the learning curve. However, some of the program's features and settings aren't described well enough for my tastes.

In spite of its warts, though, *Band-in-a-Box* makes good music. The program is an excellent tool for learning and practicing, especially if you're a jazz musician. I believe that the program is worth the price simply for the anthology of solo and accompaniment Styles it provides. What's more, *Band-in-a-Box* never gets tired, never cops an attitude, and never tells you to turn it down.

Allan Metts *is an Atlanta-based musician, consultant, and software/systems designer.*

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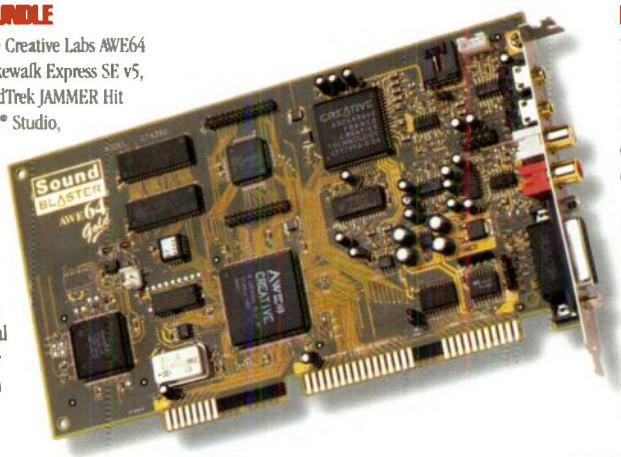

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World Radio History

Alesis Wedge

By Barry Cleveland

Sweet, full-featured reverb for an equally sweet price.

Rather than introducing yet another all-purpose multi-effects unit with scores of simultaneously available effects, Alesis chose to focus on *reverb* when creating the Wedge Desktop Master Reverb. Indeed, the manufacturer bills the Wedge as its best reverb processor. However, the unit is, in fact, a multi-effects processor that can handle chorusing, flanging, rotary-speaker simulation, autopanning, and pitch shifting and provides up to 5.5 seconds of high-quality delay.

Still, the reverbs are clearly the stars of this show, including halls, plates, and rooms. You also get effects designed for post-production usage (such as "Shower Stall" and "Kitchen") and some extraordinary—even unique—reverbs such as the various "Stereo Rooms." The latter simulate stereo-pair miking in a room, with control over the relationship of the microphones to each other and to the sound source. The degree of control is amazing. (I'll discuss these reverbs in more detail later.)

The most obvious difference between the Wedge and other effects processors is its appearance. The user can interact with this tabletop device in a different way than with a rack-mount device. It was designed to be light and compact enough to sit on top of a mixer, making it unnecessary to leave the sweet spot while using it. In fact, it might easily be mistaken for a remote controller like the Lexicon MRC, to which it bears more than a passing resemblance. And the Wedge continues the company's trend toward packing more processing power in less space at a lower price.

CONTROLLING INTEREST

The Wedge's control surface is ingeniously simple. Along the top is a relatively large LCD and a Value wheel. Just below the LCD are four buttons labeled A, B, C, and D and four corresponding 45 mm sliders, the functions of which depend on the mode and software page.

To the left of the sliders is a turquoise-colored, oval-shaped Tap/Audition pad that does double duty: it provides delay tap-tempo and triggers the Impulse Audition feature (a useful sound-testing feature discussed later).

Above the Tap/Audition is the Edit button, which puts the Wedge in (Program) Edit mode and selects Edit page 1 for the currently loaded Program. Each Program can have up to five Edit pages; repeatedly pressing the Edit button steps you through the pages. The LCD displays which Program is being edited, the number of available Edit pages for that Program, which page is currently being viewed, and the four adjustable parameters for that page (see **Fig. 1**). Parameter values are displayed numerically and on bar graphs, and edited/unedited status is indicated for each parameter. Values can be adjusted using the Value wheel or the slider associated with the parameter.

To the right of the sliders are two rows of three small buttons each, which access the remaining functions of the unit. The bottom three buttons are very straightforward: a Compare button that toggles between edited and unedited Programs, a Store button that saves an edited Program, and a Bypass button.

The top three buttons access Program, Utility, and I/O modes. Program mode is simply a Program-select mode. In this mode, the LCD shows the Program number, bank (Preset/User), Program name, Configuration type (discussed in a moment), and input-level meters (see **Fig. 2**). Once you are in Program mode, the Program button toggles between the two Program banks, which are arranged in parallel so that you can toggle between, say, Preset 35 and User 35.

The Utility and I/O buttons access global parameter pages. As with Edit mode, Utility and I/O mode each contain up to four parameters (A to D) that can be adjusted using a slider or the Value wheel. In Utility mode, you see the MIDI and internal modulation settings and Dry Defeat status. (Dry Defeat mutes the unprocessed output signal, giving you a 100 percent wet output.) In I/O mode, input and output levels are displayed in both numeric and graphic form.

The onboard Help function is only available in Edit mode and is accessed by pushing and holding for more than a second any of the A to D parameter buttons. Help provides the full, unabbreviated name of the selected parameter but does not explain terms or provide applications ideas for the novice.

Alesis' maiden product in 1986 was the low-cost, tabletop Midiverb reverb. Eleven years later, the company has come full circle with the Wedge, an affordable, high-quality, tabletop reverb processor.

World Radio History

The Wedge's 128 user Program slots contain 100 factory presets in RAM that are just as useful as the 128 ROM presets, so you would be wise to save them all as a SysEx dump before you start editing. The remaining user slots contain the 28 basic Configurations that are used in all of the unit's Programs.

GO CONFIGURE

Effects Programs are created using one of 28 possible Configurations. For experienced effects-processor lovers, Alesis' terminology may be a bit confusing here; in most effects devices, one edits effects, and a configuration is the order in which effects are placed. In the Wedge, you never actually deal with the underlying effects algorithms; what you have are 28 preconfigured building blocks—the Configurations. To create a Program, you select a Configuration and edit the parameters to taste.

There are four basic types of Configurations. Single Configuration names do not contain special characters. A plus sign ("+") indicates Parallel Configurations, a colon (":") distinguishes Dual Mono (except for the "Chorus/Flange" Program), and an arrow indicates Multi Chain.

Single Configurations consist of one effect, with the two inputs usually being internally summed before processing. (The "Stereo Room" and "Quad Chorus" Single Configurations are exceptions; they process the left and right inputs separately.) Single Configurations use complex effects algorithms that require lots of processing power. All of the reverbs are available in Single versions, which have a wider variety of adjustable parameters and tend to be more dense than those available in combination with other effects. The other Single Configurations are "Quad Chorus," "Quad Pitch," "Mono Delay," "Ping Pong Delay," and "Multi Tap Delay."

Parallel Configurations consist of two discrete effects, each with its own mono input. The two effects have synthesized stereo outputs, which are combined and sent to the unit's left and right main outputs. The left and right dry signals are kept discrete all the way to the left and right outputs, so you end up with input 1 dry and the combined effects on the left and input 2 dry and the combined effects on the right. You can change the output level of each effect, but you cannot pan the effects. This is a very unusual Configuration, to say the least.

Dual Mono Configurations consist of two discrete effects, each with its own mono input and output. "Chorus/Flange" is unusual in that it has two separate mono signal paths controlled by synchronized parameters. Dual Mono Configurations with a colon (":") in their name have independent control of the two effects.

Multi Chain Configurations link two or three stereo effects together in series. There are five of these Configurations: "Delay->Room," "Chorus->Room," "Room->Flange," "Flange->Delay->Room," and "Lezlie->Room."

REFLECTING ON REFLECTIONS

The Wedge reverbs are uniformly outstanding. All of the Single Configuration reverbs are rich and smooth. Also, each has enough adjustable parameters to make it adaptable to a wide variety of applications.

"Large Hall" is an all-purpose concert hall reverb with up to 250 ms of predelay and up to 229 seconds of decay time. Yes, you read correctly, that's nearly four minutes of decay time! It also has a bass boost, which adds bass to the signal before applying the reverb, resulting in a warmer

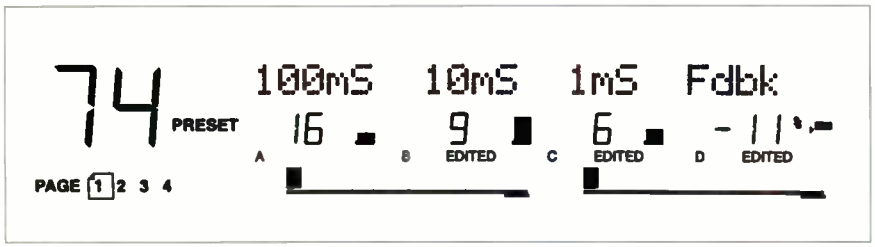

FIG. 1: In Edit mode, the LCD displays the Program number, whether it is a preset or user Program, the Edit page number, and four adjustable parameters. In the Delay Time page (shown here for the "Mono Delay"), the delay time is the total value of parameters A, B, and C, which in this case is 1,696 ms. (Parameter D is Feedback value.) Parameter values are also displayed on bar graphs. (Courtesy Alesis Corporation)

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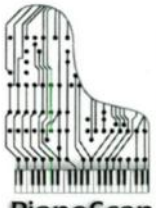

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sound. With a few adjustments, I found "Large Hall" useful on just about everything, and it was usually my first choice when looking for a good overall reverb.

"Hall Reverb" is similar to "Large Hall," but it has three early-reflection parameters (Spread, Shape, and Level), up to 500 ms of predelay, and a decay time of up to 135 seconds. It has a slightly thinner sound but worked well in most of the same applications as "Large Hall"—particularly with strings—and was useful as an overall ambience reverb.

"Room Reverb" was designed to simulate a medium-sized studio room. It is used in all but one of the Parallel Configurations (e.g., "Room+Delay" and "Room+Chorus") but in only two of the Single rooms. It sounds best with shorter decay times and works really well on instruments with quick attacks, such as drums and rhythm guitars.

"Chamber" is similar to "Room Reverb," has identical parameters, and is often used in room Programs. But it has a smoother and lighter sound than "Room Reverb," and I found it to be capable of simulating a wider variety of acoustic spaces. For automatic dialog replacement and other post-production applications, I suggest trying the "Ambiance" Configuration, which simulates various types of very small rooms.

"Stereo Room" was designed for use with stereo sources and simulates two microphones placed in a large room. A Width control adjusts the space between the mics, ranging from a tight stereo spread (actually, mono in/stereo out) to two discrete mono rooms. This is one of the Wedge's most interesting Programs. I found it very effective on drum kits and for adding depth to electric guitars.

The "Large Plate" Configuration seeks to emulate 1970s-era echo plates, and it does a remarkably good job. This

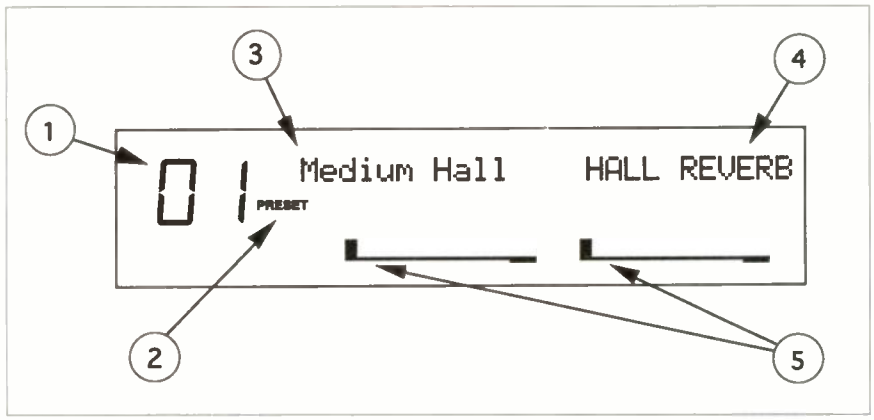
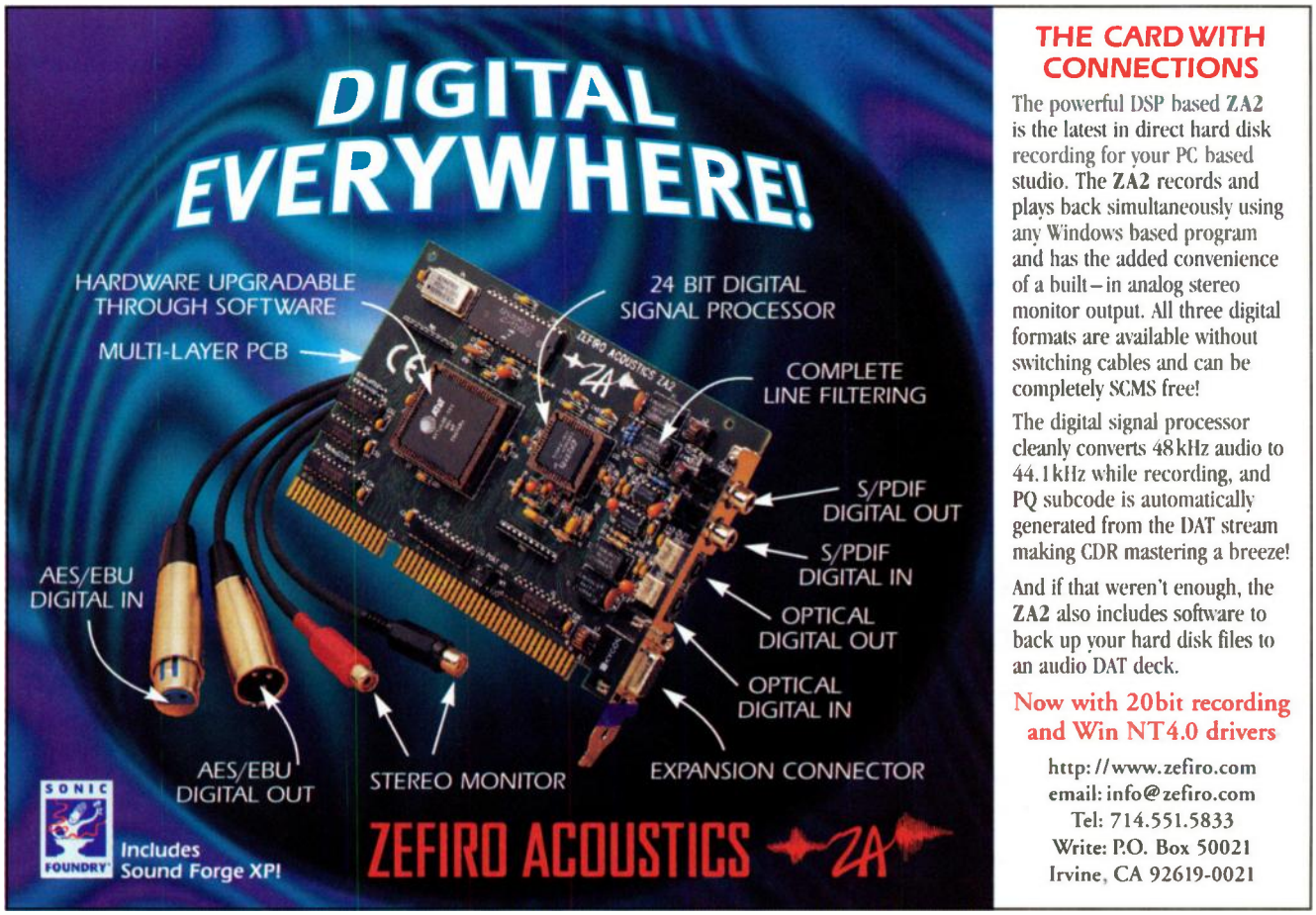


FIG. 2: In Program mode, you see the Program number (1), bank (2), Program name (3), and Configuration name (4). Left- and right-channel bar-graph input meters (5) appear at the bottom. (Courtesy Alesis Corporation)



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Wedge Specifications

Presets (ROM)	128
User Programs (RAM)	128
Inputs/Outputs	(2) ¼" balanced TRS/(2) ¼" balanced TRS
Frequency Response	20 Hz–20 kHz, ±1 dB
Dynamic Range	>90 dB
THD+N	0.009% typical (@1 kHz, 0 dBV)
DACs	18-bit, 8x oversampling Sigma-Delta
ADCs	18-bit, 128x oversampling Sigma-Delta
Sampling Frequency	48 kHz
Power Supply	9 VAC external "lump in the line"
Dimensions	9.5" (W) x 2" (H) x 6.75" D)
Weight	3 lbs.

is one of the richest and most aesthetically pleasing plate-reverb simulations that I have heard anywhere, and it works well on almost anything, particularly lead vocals, solo strings, and reeds. "Plate" is very similar to "Large Plate," but it has a thinner (some might say a more "classic") sound; I liked it a lot on hand drums and other percussion instruments.

The "Nonlinear" Configuration is quite versatile. It can have up to 250 ms of predelay and 600 ms of decay and can be either "forward" or "backward." In the forward setting it is a classic gated reverb and works well on drums and percussion. In the backward setting, it can be used to create some nice tape-reverse effects, such as Hendrix-esque guitar sounds.

PROCRASTINATION

The Wedge is capable of producing several different types of delays. Delay times can be set using the parameter controls, the Tap pad, or incoming audio signals. In the latter feature, the Wedge senses pulses (such as drum beats or plucked guitar notes) in the incoming audio, presumably sensing when the signal exceeds an internal threshold. (This feature obviously depends on program material with distinct pulses.) Unfortunately, you cannot sync the tempo to MIDI Clock. Delay times are adjusted using a combination of three parameter sliders (i.e., one slider controls 100 ms increments, another slider 10 ms increments, and the third slider 1 ms increments; see **Fig. 1**).

The Single Configuration "Mono Delay" has a maximum delay time of 5.49 seconds, making it ideal for looping. The delays can be identical to the original signal, or you can damp the high and/or low frequencies to simulate vintage tape-echo devices. The Wedge is worth its cost for the delay section alone.

The "Delay:Delay" Configuration is also a Single Configuration type, and it provides discrete right- and left-channel delays, each of which has up to 2.49 seconds of delay time. The "Ping Pong Delay" also provides 2.49 seconds of delay, but it bounces the echoes back and forth between the right and left channels. The "Multi Tap Delay" combines five individual delay lines, each with their own level, pan, and feedback controls. It can be used to create complex rhythmic patterns or thickening effects.

The "Mono," "Ping Pong," and "Multi-Tap" delays also have Tremolo and Autopan parameters, making it possible to modulate the delayed signals and move them around in the stereo field. I found these last two features extremely useful when trying to add movement to a track—say, a guitar solo or a background vocal.

ALL THINGS IN MODULATION

Alesis effects processors have long been known for their thick chorus and flange Programs, and the Wedge continues the tradition. Simply put, these are some of the best-sounding modulation effects available anywhere. The "Chorus/Flange" Program splits the signal into three parts, with a dry signal and two separate detuning sections for each channel. The detuning sections are modulated by two LFOs, each with their own depth, speed, and feedback controls.

"Quad Chorus" is similar to "Chorus/Flange," but it modulates four delayed signals instead of two, allowing for more complex processing. It also allows you to change the wave shape of the LFOs from the usual sine wave to a square wave, making for more dramatic and abrupt modulation effects. The "Quad Pitch Shifter" provides four independent pitch shifters, each with its own pan control and a range of ±12 semitones. It has stereo I/O routing, like the "Quad Chorus."

"Chorus:Chorus" is a Dual Mono Program with two independent mono chorus/flangers. One of its parameters, Thru 0, emulates the sound of manual flanging, which is very cool indeed.

"Lezlie" is, you guessed it, a Leslie speaker simulator, and not a bad one at that. The effect is combined with a room reverb in a Multi Chain Configuration. "Lezlie" has three parameters: Motor turns the speaker rotation on and off; Speed toggles between slow and fast speaker rotation, with a realistic, Leslie-like acceleration/deceleration; and High Rotor Level uses EQ to change the apparent proportion between the high-rotor and low-rotor sounds.

LISTEN AND LEARN

To my knowledge, the Impulse Audition feature is unique to the Wedge. When the Tap/Impulse Audition pad is pushed, a full-spectrum audio impulse is emitted, making it easy to detect

Product Summary

PRODUCT:
Wedge digital reverb
PRICE:
$499
MANUFACTURER:
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shifts in reverb parameters, even subtle ones such as Diffusion and Swirl. Besides making the Wedge easier to program, the Impulse Audition function can also serve as an educational tool. By using it to thoroughly explore all of the various reverb parameters, it is possible to arrive at a much clearer idea of how the parameters function, both individually and in combinations. This is useful not only for programming the Wedge, but for programming other reverb processors and for understanding acoustic-space simulation in general.

Another nice feature is the Automatic Input Level function. If you press and hold the I/O button and then press Tap/Audition, the Wedge "listens" to the input signals for about five seconds and then automatically sets the input levels to match. This might come in handy in lots of situations, especially in sound-reinforcement and onstage applications.

EXCLUSIVE CONTROL

The Wedge responds to Program Change messages and facilitates real-time MIDI control using SysEx or assignable Continuous Controllers. All parameter adjustments are transmitted to the MIDI out as SysEx, which means they can be recorded to a sequencer and automated.

Two Continuous Controllers (CCs) can be assigned to Modulators (X and Y), which control two predetermined effects parameters per Configuration. For example, the nine Single Configuration reverbs allow control of Decay (X) and Wet/Dry Mix (Y), and the Parallel Configuration "Plate+Hall" allows control of Plate Decay (X) and Hall Decay (Y).

The degree of real-time CC control is unimpressive compared to that of some effects processors, but the ability to control everything via SysEx makes this a minor quibble. SysEx is less user friendly than CCs when it comes to editing values, but it's equally effective.

A WEDGE IN THE BUDGET

Once again, Alesis has identified a need and created an innovative new product to fill it. The Wedge is well designed, easy to use, and sounds *really* good. I did not encounter any design flaws or operational problems in a month of steady use. The few limitations I noticed (mainly the MIDI CC implementation and inability to sync to MIDI Clock) were minor and caused no practical difficulties.

▼

The Wedge reverbs are uniformly outstanding.

The Wedge is bound to be a hit with personal-studio owners, performing musicians, sound-reinforcement engineers, and multimedia producers. It's always great to find a reverb of such quality and depth, but in this case it's downright exciting because you can easily fit a Wedge into your budget without knocking too big of a hole in your bank account.

Barry Cleveland *is a San Francisco–based composer, engineer, and producer. He also plays guitar in the improvisational group Cloud Chamber.*

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- Edit audio in Wave window using cut, copy, paste, merge, de-glitch, etc.
- Import/export Wave files.
- Supports audio plug-ins from PG Music, 3rd parties, or program your own!
- We include sample source code for audio plug-ins that you can use as a template for your own.

Professional MIDI Sequencing

- Real/step/punch record, sound-on-sound
- MIDI file support (Type 0 & 1)
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- up to 960 ppq timebase
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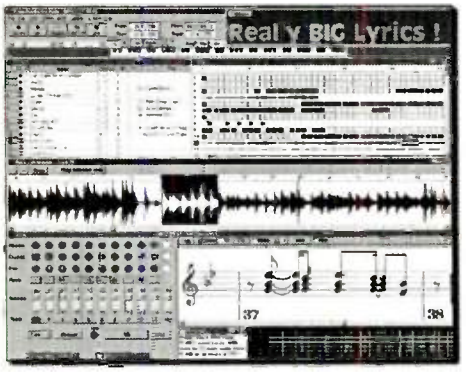
- patch names, banks & much more.



Deluxe Windows interface

Multiple Windows: notation, audio, tracks, bars, staff roll, event, meter, tempo, guitar fretboard, piano keyboard, Big Lyrics & more.

Programmable

Programmers can extend the audio or MIDI features of PowerTracks using the language of their choice (C, Visual Basic, Delphi) using EXE or DLL files. Customize PowerTracks to your needs, or purchase 3rd party add-ons.

Music notation & printout

- Enter, edit, display music in standard music notation.
- Chord symbols, lyrics & Karaoke style 'Big Lyrics window.'
- Intelligent/automatic features such as: correct beaming, tying of notes, minimize rests option, "Jazz" eighth notes option (this automatically allows jazz swing eighth notes & triplets to be notated properly – jazz musicians love our notation!)
- Notation scroll-ahead. Intelligent accidentals.
- Reads in any MIDI file & display any track as notation!

Exciting Features not found in other sequencers

- On-screen piano keyboard & guitar fretboard shows notes as they are played. Notes highlight on notation as played.
- Enter/print out chord symbols in notation. Reads in chord symbols from Band-in-a-Box MIDI files.
- Comprehensive support for guitar (on-screen guitar, fretboard, tab display & printout, display & MIDI track on guitar fretboard)
- Karaoke Style Lyrics window.
- Automatic drum tracks (100 drum styles included).
- Built-in Roland Sound Canvas Editor.
- Juke box playback. Play a set of songs, either by simply specifying a "wildcard" like c:\songs*.* or specify a specific set of songs. Option for random or sequential playback.

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SYSTEM REQUIREMENTS: Windows 95, 98, NT or 3.1. 8mb RAM. Digital Audio features require fast 486 or Pentium, any Windows compatible 16 bit soundcard (e.g. SoundBlaster 16, AWE32, AWE64, Ensoniq, Yamaha, etc.), and 20 mb free hard drive space. MIDI and other features require 386, MIDI interface or sound card, CD-ROM drive and printer (optional).

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BAND-IN-A-BOX™

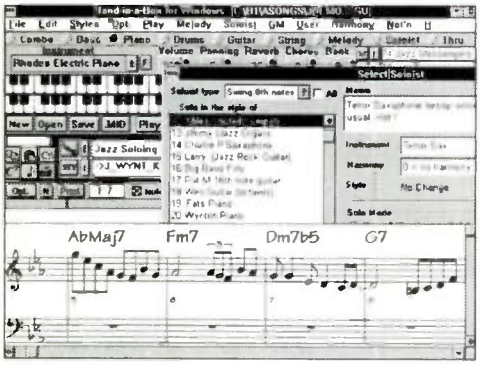
VERSION 7.0 FOR WINDOWS & MACINTOSH

Intelligent software for IBM (Windows/DOS) & Macintosh*

(NOTE: ATARI Band-in-a-Box available only in Ver. 5)*

Version 7 for Windows & Macintosh is here. Automatic Accompaniment has arrived!

Type in the chords to any song, using standard chord symbols like C or Fm7b5, choose the style you'd like and Band-in-a-Box does the rest... Automatically generating professional quality five instrument accompaniment of bass, drums, piano, guitar & strings in a wide variety of styles.



Windows version shown above

100 STYLES INCLUDED WITH PRO VERSION. *Jazz Swing • Bossa • Country • Ethnic • Blues Shuffle Blues Straight • Waltz • Pop Ballad • Reggae • Shuffle Rock • Light Rock • Medium Rock Heavy Rock • Miami Sound • Milly Pop • Funk • Jazz Waltz • Rhumba • Cha Cha • Bouncy 12/8 Irish • Pop Ballad 12/8 • Country (triplet) • and 75 more!*

BUILT-IN SEQUENCER ALLOWS YOU TO RECORD OR EDIT MELODIES.

BUILT-IN STYLEMAKER™. *You can create your own 5 instrument styles using the* ***StyleMaker*** *section of the program.*

SUPPORT FOR OVER 70 SYNTHS BUILT-IN. *Drum & patch maps included for over 70 popular synths. General MIDI, Roland GS & SoundBlaster soundcard support included.*

STANDARD MUSIC NOTATION *and leadsheet printout of chords, melody and lyrics. Enter your songs in standard notation & print out a standard lead sheet of chords, melody and lyrics.*

AUTOMATIC HARMONIZATION. *You can select from over 100 harmonies to harmonize the melody track, or harmonize what you play along in real time. Play along in "SuperSax" harmony, or harmonize the melody with "Shearing Quintet". Create your own harmonies or edit our harmonies.*

NEW! Additional features in Version 7.0

Band-in-a-Box 7.0 for Windows & Macintosh breaks new ground with over 60 new features!

Band-in-a-Box 7.0 is here! This major upgrade includes over 60 new features. We've added a an amazing new feature called "Automatic Soloing". Choose the type of soloist you'd like (from 100 available) and the program creates and plays a solo in that style, along to any song! Or create your own soloists. This is hot! These solos are of the highest professional quality, rivaling solos played by great musicians! And there's lots more in 7.0 – improved notation, step time/notation edit of StyleMaker patterns, scroll ahead option for notation, improved synth support, over 60 new features in all!

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

NEW! Add-ons for Band-in-a-Box Version 7.0! Jazz, Rock & Bluegrass Soloist Disk Sets

- **Soloist Disk Set #2: "Killer" Jazz Swing Soloing $29**
- **Soloist Disk Set #3: Specialty Jazz Soloing $29**
- **Soloist Disk Set #4: Rock Soloing $29**
- **Soloist Disk Set #5: Bluegrass Soloing $29**
- **Bluegrass MIDI-FakeBook (50 songs) $29**

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

SOLOIST PAK ALL 4 Soloist Disks + Bluegrass MIDI-FakeBook on disks or CD-ROM $99

Bluegrass MIDI-FakeBook 50 Bluegrass standards with chords & melodies performed on MIDI guitar by Bluegrass virtuoso **Marty Cutler**

NOTE: Soloist Disk Set #1 is included with Band-in-a-Box 7.0 and upgrade, so is not offered as an add-on.

Mac OS

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Band-In-A-Box Pro *(first time purchase)* $88
Version 7, Styles Disks 1-3, Harmonies Disk 1 + Soloists Disk 1

ULTRAPAK *(first time purchase. Also available on CD-ROM)* $189
*The UltraPAK includes Pro version 7, Styles Disks 1-8, Harmonies Disk 1 + Soloists Disk 1 (*ATARI available only in Version 5)*

ADD-ONS

Styles Disk #4 ..... $29
Styles Disk #5 ..... $29
Styles Disk #6 ..... $29
Styles Disk #7 ..... $29
Styles Disk #8 *(included with Version 7 upgrade)* $29
MIDI-FakeBook *(100 songs on disk)* $29
Bluegrass MIDI-FakeBook (50 Bluegrass standards on disk $29
Soloist Disk Set #2 - "Killer" Jazz Swing Soloing $29
Soloist Disk Set #3 - Specialty Jazz Soloing $29
Soloist Disk Set #4 - Rock Soloing $29
Soloist Disk Set #5 - Bluegrass Soloing $29
Soloist Pak - All 4 Soloist Disk Sets + Bluegrass MIDI-FakeBook $99
NOTE: Soloist Pak available on disks or CD-ROM. Soloist Disk Set #1 included with Version 7 upgrade

UPGRADES

Regular Upgrade to Version 7 *(for Windows & Macintosh)* $49
Includes Styles Disk 8 + Soloists Disk 1. Upgrade from Version 6

Complete Upgrade to ULTRAPAK *(also available on CD-ROM)* $89
Includes Styles 1-8 (these are all the Styles Disks we have made for Band-in-a-Box!)

MEMORY REQUIREMENTS: DOS (640K), Windows (8 mb), Macintosh (8 mb), Atari (1040)

HELP! *I Forgot to send in the Registration Card, but I want to upgrade now!! No problem. Since the upgrade checks for any previous version of Band-in-a-Box, you can order the upgrade even if you forgot to register! Or register & order online at http://www.pgmusic.com*

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Each program contains piano music performed by world-class pianists, **PLUS** memos, trivia questions, biographies, Guess the Song games & more. They are ideal for learning to play piano, or for background music while you use other programs. Windows versions also display & print standard music notation & chord symbols for pieces. They are available for WINDOWS, MAC & ATARI, & are also available in Yamaha Disklavier & Roland SoundBrush format.

NEW! The Modern Jazz Pianist™ $49

Top Modern Jazz Pianists play over 50 tunes in Modern Jazz styles! Jazz/studio pianists Renee Rosnes, Miles Black, Ron Johnston and Brad Turner play over 50 tunes in a wide variety of Modern Jazz Piano Styles. Emulating styles made famous by Herbie Hancock, Fred Hersch, Cedar Walton, Mulgrew Miller and more. Full of info on the masters of Modern Jazz Piano! Includes player program to see/study the music using notation and on-screen piano.

NEW! The Latin Pianist™ $49

Over 50 "Latin" and "Salsa" piano and trio pieces by famed Latin pianist Rebeca Mauleon-Santana (editor of Other Musics Latin Real Book). Including authentic Latin/Salsa piano songs and styles including Conga, Cumbia, Merengue, Son, Mambo, Cha-cha-cha, Guaracha, Samba, Partido Alto, and more. Includes player program, song memos, descriptions/analysis of styles and real-time piano score.

NEW! The Irish Pianist™ $49

Great Piano Performances of over 50 old and new Irish piano styles by top Irish pianist, Pat Crowley. Including traditional styles like jigs, reels, etc. and newer styles popularized in "RiverDance." Includes pictures of Ireland, song memos, biographies and information on Irish music. Over 3 hours of music.

Nearly 900 of the world's most popular classical piano pieces, performed by world-class concert pianists! *per volume* **$49**

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PLUS... *Music Trivia Game, "Guess the Song", program notes, biographies, music dictionary (on disk) & more!*

OUR CUSTOMERS LOVE THE PIANIST...
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NEW! The Pianist Volume 4

We've added 200 fabulous selections to The Pianist program. Along with the companion volumes, there are nearly 900 of the world's classical masterpieces available in The Pianist series! More music by your favorite composers includes Haydn, Mozart, Liszt, Debussy, Fauré, Schumann & Schubert. Now listen to the complete Mozart Piano Sonatas, Chopin Etudes, Preludes, Ballades & Scherzi, Schumann Carnaval & Album for the Young (complete), Debussy Preludes (complete) & much more! **INCLUDES** ALL NEW Program Notes!

NEW! The Pianist Vol. 5 • Beethoven Sonatas

For the first time **ALL 32 Beethoven Piano Sonatas** are available on **NEW** "must have" MIDI performances for The Pianist program. The greatest sonatas ever composed for the piano have been performed by world-class pianists for your study & enjoyment. **INCLUDES** program notes about the sonatas!

Volume 1 (215 selections) • Volume 2 (200 selections) • Volume 3 (170 selections)
Volume 4 (200 selections) • Volume 5 (complete Beethoven Piano Sonatas)
Each volume $49 • Volumes 1-3, $99 • Volumes 1-5, $149

The Jazz Pianist™ $49

This program makes it "too easy" to learn to be a great jazz PIANO player!

Top jazz/studio pianists play 60 jazz standards in a wide variety of styles.

Hear the music with CD-quality through your sound card or MIDI system. Most pieces have bass/drums as well as piano so you get a full sounding jazz trio for the tunes! Jazz Trivia game & Guess the Song game, program notes, biographies & music dictionary (all on disk).

The Jazz Pianist Volume 2

Volume II upgrade - $49 (requires The Jazz Pianist) • first time purchase: Volume 1 & 2 - $98
60 more fabulous jazz standards for Volume 2, complete with new program notes and biographies!

The Ragtime Pianist™ $49

Over 90 ragtime & early jazz piano standards, played on MIDI keyboard by top Ragtime Pianists... and featuring world-renowned Ragtime performer JOHN ARPIN!

Hear virtuoso performances of every Joplin rag in this program, as well as many other rags, CakeWalks, waltzes & other Ragtime Era tunes by Eubie Blake, Joseph Lamb, Daniels and, of course, Scott Joplin.

The New Orleans Pianist™ $49

Over 60 "New Orleans Style" piano music standards, played on MIDI keyboard by top New Orleans pianists Henry Butler, Jon Cleary, Tom McDermott, Joel Simpson & David Torkanowsky playing a wide variety of New Orleans, R & B, Blues & Ragtime piano music.

The Gospel Pianist™ $49

Over 50 Gospel style piano pieces played on MIDI keyboard by top Gospel pianists Louise Rose, Davell Crawford, Henry Butler, Sam Berfect, Derrick Bethune, Joel Simpson & Jon Cleary. The "Gospel Piano" style underlies much of the blues, jazz & popular music played today.

The Christmas Pianist™ $49

This software includes great piano performances of over 50 all-time favorite Christmas songs and carols – ideal for listening or singalong! On-screen lyrics, notation & piano keyboard, piano notation printout, background playback, Music Trivia & Guess the Song games & more!

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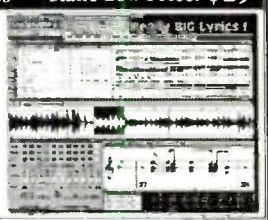
PowerTracks Pro Audio 4.0 is a professional, fully featured digital and MIDI workstation, packed with features for musicians, students and songwriters. With seamlessly integrated digital audio/MIDI recording, and built-in music notation, PowerTracks turns a typical soundcard equipped Windows PC into a music production powerhouse! Comes with CD-ROM based video training.

MultiTracks CD-ROMs! Jazz, Blues & Rock MultiTracks Play along CD-ROMs available, each with over one hour of multi-track digital audio music on CD-ROM for play along or use in PowerTracks.

Pricing: PowerTracks Pro Audio $29; Upgrade $19; PowerPAK (program & all 3 MultiTracks CD-ROMs) $49; Upgrade to PowerPAK $39



NEW! The Blues Pianist™ $49

Volume 1 (50 pieces - older styles) $49 • Volume 2 (50 pieces - newer styles) $49

Each volume contains over 50 great down home blues piano stylings by top professionals! Playing in a wide variety of blues piano styles - Boogie Woogie, Slow/fast boogies, jazz blues, New Orleans style, Chicago blues & more. These are the styles made famous by Pete Johnson, Albert Ammons, Jelly Roll Morton, etc. Hours of listening pleasure! Full of info & trivia on the great masters of piano blues. Slow them down & learn the licks! The perfect gift for any blues lover.

The New Age Pianist™ $49

Over 70 "New Age" & "New Age-Jazz" style piano pieces, played on MIDI keyboard by top performers.

A beautiful collection of solo piano compositions which draw their inspiration from the natural world. Full range of "New Age" piano techniques are presented: "ambient" performances in the style of George Winston & "New Age-Jazz" performances in styles of Chick Corea / Keith Jarrett. Includes song memos, biographies & information on important New Age musicians. Includes photo album of stirring nature scenes & real time piano score *(notation in Windows version only)*. Over 3 hours of music!

The Children's Pianist™ $49

Over 70 of the best loved children's songs for listening & singalong!

Lyrics to all songs displayed on screen in large type. Chords, Lyrics & music notation. On-screen lessons explain the techniques of piano accompaniment. Examples of alberti bass, embellishments, syncopation, stride style & many more techniques! Over 4 hours of music! Includes words & music for 70 songs: London Bridge, Camptown Racetrack, Home on the Range, My Bonnie Lies Over the Ocean, and many more!

The Bluegrass Band™ $49

Virtuoso live performances of 50 Bluegrass standards!

These MIDI files are great! As you listen to the tunes, you can single out any of the instruments using the on-screen fretboard display, tablature or notation. **PLUS**... Lots of Bluegrass pictures, bios, & trivia (all on disk) & much more. Our most "feel good all over" program so far. Includes: Wildwood Flower, Sally Goodin, Cripple Creek, Fire on the Mountain, Pigtown Fling, Red Haired Boy, Jesse James & many more!

NEW! The Jazz Soloist™ Vol. 3 $49

Vol. 1 (50 pieces) $49 • Vol. 2 (50 pieces) $49 • Vol. 3 (60 pieces) $49

The Jazz Soloist is a music program with professional jazz quartet arrangements. Each song features a great jazz solo played by top jazz musicians, as well as piano comping, bass & drums. Vol. 3 of the Soloist series features Latin, Blues, & Jazz Waltz stylings. Includes Jazz Soloist program with MIDI files, & also files in Band-in-a-Box format. Sight-reading was NEVER so much fun before the Jazz Soloist series! (NOTE: Mac users get on-screen notation only when running the files in Band-in-a-Box. Volumes work together or as standalone programs.)

The Jazz Guitarist™ (Windows, Mac, Atari) $49

Over 60 jazz standards played on MIDI guitar by top jazz/studio guitarist Oliver Gannon

Hear the music with CD-quality through your sound card or MIDI system. Most pieces have bass/drums plus guitar so you get a full sounding jazz trio for the tunes! On-screen fretboard shows you exactly what notes & chords are being played on the guitar. Slow down the performance or, better still, step through the music chord by chord, so you can learn every note as it's played!

PLUS MANY MORE FEATURES... *Jazz Trivia game & Guess that Song game, memos, biographies (all on disk) • Over 60 Top jazz standards with complete guitar arrangements • Background playback so you can listen while working in other programs • Special support for Roland GS or General MIDI modules • Standard MIDI files can be used in other programs or for presentations • Use your existing sound card or MIDI synthesizer*

Other products...

Multi MPU401 Driver for Windows 3.1/95 $19
Windows driver that allows 10 programs to use the MPU401 at the same time.

SC-PRO Editor for Windows & Macintosh $29
mixing/editing of every feature of the Sound Canvas and other Roland GS cards/modules.

"INSIDE BAND-IN-A-BOX" Video Instruction Tapes for Version 7
Over 3-1/2 hours of video instructions, narrated by program creator Peter Gannon. Vol. 1 Basics, creating & entering songs, solos & entering notation $29; Vol. 2 Advanced, creating harmonies, new soloists & new Styles $29; Both volumes $49. Available in VHS or PAL format. NOTE: Video tapes demonstrate Windows version of Band-in-a-Box. Macintosh version contains similar features.

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BIAS SFX Machine 1.02 (Mac)

By Mikail Graham

The Veg-O-Matic of audio plug-ins.

Are you looking for cool audio treatments, such as chorus, multitap delay, flanging, granular synthesis, FM synth effects, ring modulation, tremolo, pitch shifting, and sound effects galore? How about a preset that makes any audio file sound like a theremin? If this sounds like the right stuff for you, look no further than Berkley Integrated Audio Systems' *SFX Machine*. Except for true reverb or dynamics algorithms, it has just about every multi-effects processor you could want, all in one affordable plug-in.

SFX Machine is an Adobe Premiere plug-in that runs on the Power Macintosh. Apple's Sound Manager is used for audio output through the Mac's stereo minijacks. You can also use a custom sound driver to route audio through an optional audio card, such as Digidesign's Audiomedia III.

My tests were done using an Apple 9500/150 Power Mac with 96 MB of RAM. The host programs were BIAS' *Peak* 1.6, MOTU's *Digital Performer* 2.1, and Gallery Software's *TurboMorph* 1.61. The amount of RAM allocated to each application depended on which host program I was using. Although I mostly used Mac OS 7.6.1, I ran a few quick tests using a prerelease version of Mac OS 8, and all seemed to work well.

GETTING STARTED

Working with the *SFX Machine* is lots of fun. True, the program is deep, but once you get familiar with its user interface, accessing all of this raw horsepower is as easy as clicking your mouse.

The program opens to the Slider screen, which is divided into four main sections (see **Fig. 1**). The Category section is where you choose what type of effect you'd like to work with (delay, for example). Having selected a category, you choose a specific version of the selected effects type (say, "Slow Echoes") in the Preset section. The program ships with 180 presets, and if you have Internet access, you can download another twenty presets free from BIAS' Web site.

To the right of the Preset column is a section that contains the six definable sliders, A through F, with which you set parameter values. Each slider can have a minimum, maximum, and null value (the initial value, which won't change until you move the slider). A clip indicator helps you keep your output levels in check.

To the left of the sliders are two Preview buttons, which are useful for speeding up the preview process. The Mono Preview button causes the right channel to be ignored and is only displayed when you are working with a stereo sound file.

Clicking the Fast Preview button speeds up the preview process by playing back the current audio file at half of its original sample rate. As a result, you may hear aliasing distortion with audio that has a lot of high frequencies or was originally sampled at a very low rate. But these artifacts are only heard when previewing and do not become part of the processed files.

When not in Fast mode, depending on the size of the selected audio, the computer can take quite a while to finish its preview processing, even with a Power Mac 9500/150. In order to speed things up, Fast Preview defaults to On when the plug-in is opened. However, I think it would be more convenient if the software retained the last setting. Fortunately, the Fast setting is fine for most previews.

Below the sliders and value fields is a comment field for the preset, where you can enter about 100 characters. You have to scroll down, using the Mac keyboard's up/down arrow keys, if you input a third line of text. Currently, this Global Text feature does not support the Mac's Cut/Copy/Paste commands, which would be handy for importing text from a word processor. (According to BIAS, this will probably be added in the next update.) Just the same, the Global Text feature is a welcome user-interface addition in the world of plug-ins.

At the bottom of the Slider screen is a fourth section containing buttons for loading and saving presets, previewing, and bypassing the current audio effect. Other buttons allow you to switch to the Edit Patch screen, cancel, and begin processing.

MACHINE TOOLS

If you are ready to get into the guts of a preset or create new ones, it's time to work with the Edit screen (see **Fig. 2**), where you access the real power of the *SFX Machine*. To start from scratch, just call up the Reset All Modules preset from the Utilities category and switch to the Edit screen.

The first thing you notice when you get into this program is how big the windows are. The Edit screen is so large

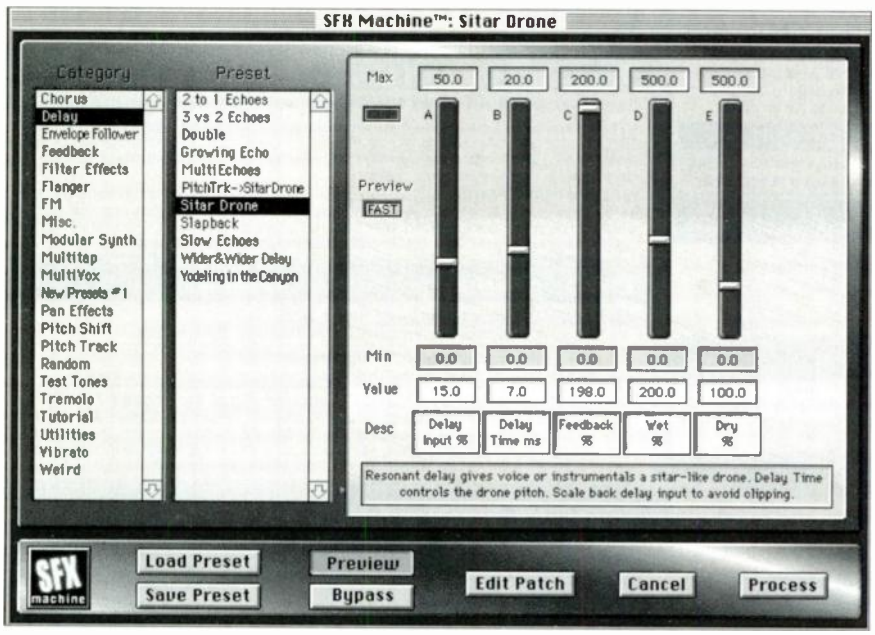

FIG. 1: The Slider Screen is the main working view for the *SFX Machine*.

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that if you use a 13-inch monitor, you must scroll left and right between the outer modules to see everything. Because of this, I suggest using at least a 17-inch monitor.

The Edit screen overview makes it easy to see at a glance all the parameters that make up an *SFX Machine* preset patch. But with so many choices, where does one begin? Fortunately, BIAS has included a brief tutorial in the manual that takes you through the Edit Screen basics. I highly recommend reading this section a few times if you're planning to create your own presets.

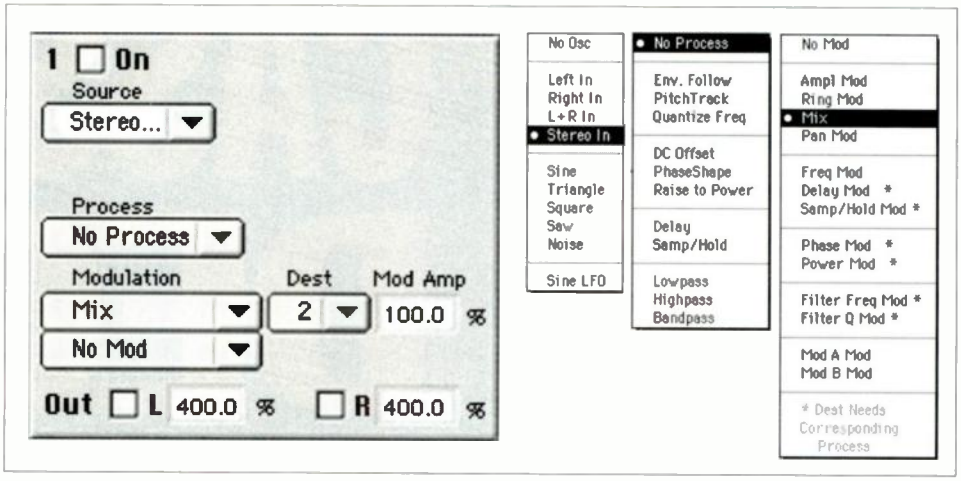

FIG. 2: A look at one of eight possible modules in the Edit Screen (left) and an expanded view of the three pop-up menus from this module (right).

You can have up to eight modules open in any preset patch. Each module is identical in every aspect, so once you learn one, you've learned them all. A module's signal path runs from top to bottom and consists of one signal source, one DSP process, up to two modulators, and an output. You can choose one of eleven different signal sources, including simple audio waveforms (sine, triangle, square, or sawtooth), noise, an audio input (mono or stereo), or an LFO.

The signal source is routed to one of eleven DSP processes: Envelope Follower; Pitch Tracker; Quantize Frequency; DC Offset; Phase Shape; Raise to Power; Delay; Sample/Hold; and Low Pass, High Pass, and Band Pass filtering. The output of the DSP processor can then modulate another module or the same module. You get over a dozen types of modulators, including Amplitude Mod, Ring Mod, Mix, Panning, Filter Frequency, and Delay. The final audio output of the module can be left channel, right channel, or both, depending on whether you have a mono or stereo file.

The software does its magic by using what the developer refers to as a "parallel processing model." Its flexible signal path allows you to create complex feedback loops where one module's modulation output can be routed to another module. Any parameter within a preset can affect almost any other parameter or group of parameters, and all of them can interact simultaneously. The power at your fingertips is overwhelming.

Though at first this screen may seem a bit daunting to the untrained eye, the Edit screen overview lets you quickly see just where you are when editing or creating a preset. For example, it's easy to add noise to an audio file by simply choosing Noise as the source for one or more modules. One preset that does this, "78 Record" from the Miscellaneous category, is shown in **Figure 3.** True to form, it adds an amazing ambience that closely resembles the sound of an old 78 rpm record. You really have to hear a pristine 44.1 kHz audio file processed through this algorithm to appreciate the unique power of the *SFX Machine.* (Rappers and hip-hop DJs take note!)

▼

Accessing all of this raw horsepower is as easy as clicking your mouse.

At the bottom of the Edit screen are all the same buttons as in the Slider screen plus two new ones: Sliders, which simply returns you to the Sliders view, and Randomize, which allows you to instantly create presets. Curiously, I found no way to randomize only one or two modules, though you can simply turn off the modules you don't like.

The Randomize feature is lots of fun. I recommend it as a quick way of getting familiar with many of the possibilities the *SFX Machine* has to offer. However, the Randomize function ignores the current preset and simply starts from scratch. Of more use would be a Smart Randomize function that could look at the current preset and allow varying levels of randomization to be applied.

One of the most powerful functions is Slider Mapping. With this simple feature, you can set the parameters to be controlled by each slider, with up to sixteen assignments per slider. Relative changes are supported, with just about any combination of values you might imagine. This lets you make powerful, useful edits with just a few tweaks of a single slider. A good example of the Slider Mapping feature is the Master Volume slider that can be found in many of the factory presets.

A welcome feature of the Edit screen is that unused parameters, pop-up menus, and so on are automatically hidden. This helps keep each module's signal path clear at all times. Also handy are the module On/Off buttons and Output buttons, which also function as Input/Output overflow detectors.

STRANGE BUT TRUE

The logo in the bottom left corner of both screens actually has a couple of cool functions. As you make edits, the logo animates at various rates to give you an approximation of the relative speed at which the current edit is being processed. When it stops, the edit is complete, and the preview will reflect the change.

I don't know whether this is a planned feature or an accident, but

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whenever you pull a slider beyond the actual slider area, the parameter switches back to its last value before you grabbed the slider. The trick is to not let go of the slider once you've dragged it to the spot you want while in Preview mode. In a few seconds, the current edit will be added to the preview output. Then, while still holding the slider, you can listen to the preview, try another edit, and so on. To get back to the last edit you had, you just drag the slider outside of its actual screen area, and the value reverts.

This is not the most useful feature I've ever run across, but it's the closest thing the *SFX Machine* has to an Undo feature. Sure, you can press Cancel to go back to your host program, but the state of the settings when you cancel or otherwise leave the plug-in are remembered next time. As a result, you lose your previous settings.

▼ *SFX Machine's* creative effects presets make it a must-have plug-in.

IF I WERE A MECHANIC

The *SFX Machine* is amazing, but there are a few things I'd like to see added or changed. The maximum delay time I could produce was 1,114 ms in stereo or 2,228 ms in mono. This is fine for chorus, flanging, and reasonable 2-second echoes, but a longer delay time would be really great for more complex multitap and loop effects.

In addition, the sliders used in the Edit Screen are not very easy to grab for quick adjustments. I'd also like to see slider grouping allowed in the Edit Screen and at least two more sliders added so that each module could be controlled by its own master slider.

I would really like to see a more expanded manual section that would break down four or five of the presets to show how they were created. I believe that this would really help users learn how to create better presets.

The user interface works overall, but I think BIAS should consider giving the *SFX Machine* a bit of a face-lift, especially in the Edit Screen. Life can become pretty tedious after a while when you have only a numeric display for every editing point. And speaking of numeric input, instead of only direct keyboard input for edit values, I'd like to be able to quickly tweak values by clicking and dragging with the mouse.

Unfortunately, the *SFX Machine* uses key-disk copy protection, but at least it is a new type of protection that allows for a Challenge/Response authorization. This means that if you lose your authorization installs due to a hard-drive error or some other glitch, you can restore them via e-mail or a phone call to the BIAS tech-support staff, who will provide you with a new authorization code.

My biggest complaint is the lack of support for any of the current real-time

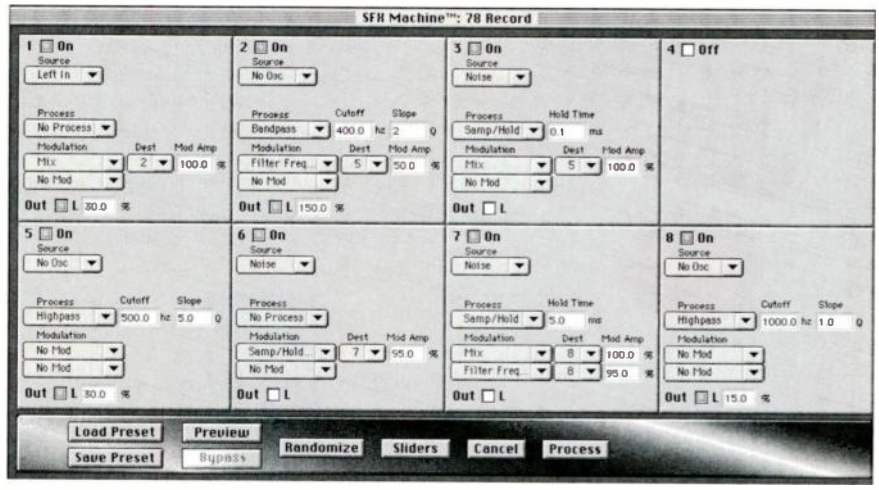

FIG. 3: In the unique "78 Record" preset, modules 3 through 6 and 7 use noise as a source, which combines with Highpass/Bandpass filters to help create a classic 78 rpm record ambience.

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plug-in formats. Having to wait while the Macintosh crunches away, processing the current selection, is a total waste of the user's time. After working with Digidesign's Pro Tools III TDM, Steinberg's VST, and Mark of the Unicorn's new MAS real-time plug-ins, I feel it's a must for this plug-in to be adapted to one or more of these formats. BIAS allegedly is considering porting to several real-time formats, but company representatives would not comment as to which or when. Let's hope it's soon.

THE DSP CONSTRUCTION SET

The effects the *SFX Machine* creates sound great! I work daily with a Pro Tools III system, including just about every TDM plug-in known. Yet even with all these powerful plug-ins, I find myself turning to the *SFX Machine* for its unique delay and pitch-modulation effects. "Alternate Octaves," "Pitch Track->Sitar Drone," and such Miscellaneous-category presets as the "Backward Fragments" series really add a nice rhythmic touch to dance tracks.

Some of the Filter effects (e.g., the four "Velvet Chimes" presets, each of which is tuned to a series of chords) are the kind of thing you used to find only in high-end hardware from Lexicon or Eventide. These kinds of creative presets make the *SFX Machine* a must-have plug-in. If your work includes the rather odd effects used in much of today's sound-design work, the *SFX Machine* will obviously be valuable, but there are also many useful presets for basic chorus, delay, and pitch effects. All are covered extremely

PREMIERE, BUT NOT PARAMOUNT

Currently, the *SFX Machine* is only available for the Adobe Premiere plug-in format, which is a file-based specification. That means you cannot use these effects in real time. Also, all operations are destructive, which means that any processing done after the first process cannot be undone unless you are using a host program such as BIAS' *Peak*, which supports multiple undos. For this reason, if you are in doubt about your current edit, make a backup file before going further.

Premiere plug-ins have a Preview mode that lets you hear what the effect will sound like before you actually process the file. As a rule, the amount of RAM you have allocated to, or within, your host program limits how much of the current audio file you will be able to preview. Some programs, such as *Peak* and Gallery Software's *TurboMorph*, allow users to manually adjust the preview time beyond the standard 3- to 4-second limit, a useful feature.

If you are working with multiple applications (such as *Peak* for waveform editing and *Digital Performer* for tracking and songwriting), be aware that many Premiere plug-in host programs do not allow you to use an alias of a plug-in. This means you have to copy every plug-in you want to use into the plug-in folder of each host program that doesn't support using an alias. This can add up to a lot of wasted disk space—I use 12 MB per plug-in folder—not to mention ignoring the beauty of the Mac OS' alias feature.

Happily, Macromedia's *Deck II* and Adobe's *Premiere* do allow you to use an alias. Big points also go to Gallery Software's *TurboMorph*: the first time you choose an Adobe Premiere plug-in, it asks which folder you want to use. That's an excellent solution.

My biggest complaint is that the Premiere specification does not allow for automatically adding data to a file when needed, say, to allow effects to trail off properly when using a long delay or reverb. (Macromedia's file-based *SoundEdit Pro* audio editor has allowed it for years.) This severely limits the professional use of Premiere plug-ins, making many basic effect edits a two- or three-step process involving inserting silence, mixing or merging data, and/or lots of cut/copy/paste editing. (The exact steps depend on how your host application handles this type of editing; see **Fig. A.**) It's unfortunate that the Premiere specification overlooks something so basic.

In contrast to the Premiere architecture, Digidesign's AudioSuite, the newest file-based plug-in architecture, does include this kind of functionality. Unfortunately, none of the plug-ins currently available for it make use of this powerful feature.

Fortunately, BIAS has found ways around some of these limitations. Besides offering unlimited Undo/Redo levels, *Peak* 1.52 or later allows for real-time playback of up to four Premiere plug-in effects per playlist event. This makes *Peak* unique in that, unlike any other Premiere plug-in host program, it allows all effects to be used in real time. Hey, digital audio sequencer developers, when are we going to see these features in your programs?

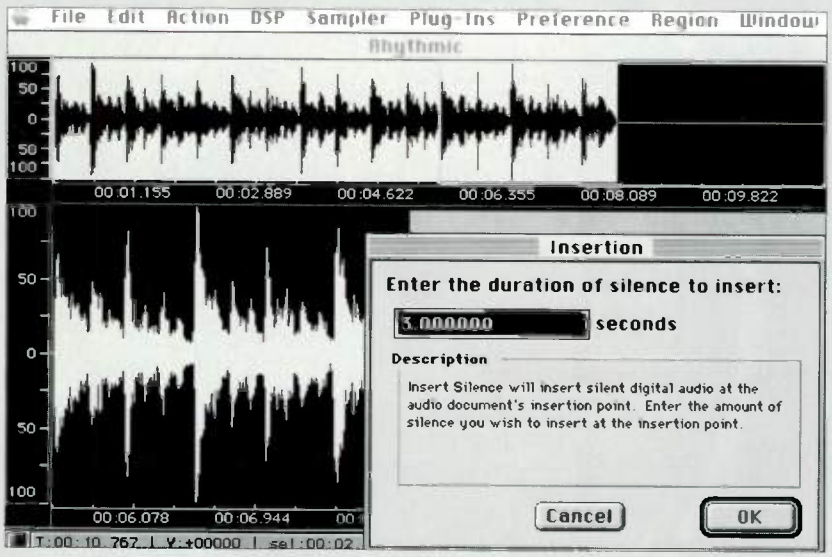

FIG. A: The Premiere specification does not automatically add data at the end of a file to allow for effects tails when using delays and reverbs. As a result, you must first insert or merge a desired amount of silence into an audio file to compensate for this.

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• SFX MACHINE

Product Summary

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well. Now if I could just automate all these parameters and assign different presets to play back in real time—well, maybe in version 2.0.

Amazingly, I could not find another plug-in on any platform that compares with the *SFX Machine*. True, there are similar plug-in effects within the DirectX, MAS, Premiere, TDM, and VST worlds, but all of them require several plug-ins to do the same job. And none of them are as user configurable.

I simply don't have enough room to go into detail about all of the useful effects this plug-in has to offer, but I can tell you that if you are seriously looking for one tool that can do a bit of almost everything, from basic processing to producing other-worldly sci-fi effects, the *SFX Machine* is the only plug-in that will deliver. Moreover, the program provides all of this at a price that's hard to beat.

Mikail Graham *wants a neural-net plug-in to help satisfy his DSP addiction. His newest recording is with Rites of Passage, featuring Roger Hodgson, formerly of Supertramp. Check it out at www.unichord.com.*

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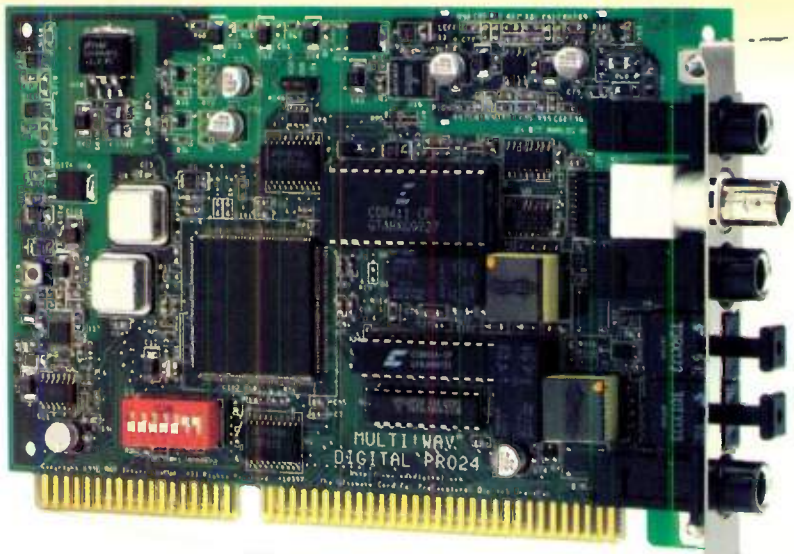

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Sweetwater Sound Grand Piano Collection

By Rob Shrock

Excellent sampled grands for the Kurzweil K2000/K2500.

A realistic-sounding grand piano sample is a treasure worth spending time and money on. Who wouldn't love to carry around a gorgeous-sounding acoustic piano on a disc? No microphones, large recording spaces, or piano tuner—and no truck-sized dent in your assets.

Unfortunately, with the convenience comes the down side: minimal sonic flexibility, limited tonal control, and that lack of connectedness you always feel when playing a piano sound from a MIDI controller. Some of these challenges are inherent in playing anything other than a real piano; I doubt simulations will ever be as aesthetically pleasing as the real thing.

That said, if you still want the sound of an electronically processed acoustic piano (i.e., miked and played back over speakers), the folks at Sweetwater Sound have one of the best available for Kurzweil users.

THE BILL OF PLAYERS

Sweetwater Sound is well known as a musical-instrument retailer located in Fort Wayne, Indiana, and is also one of the leading sound developers for the Kurzweil K2000/K2500. As a longtime advocate of Kurzweil products, Sweetwater Sound expanded into the role of K2000 software provider and eventually recruited Daniel Fisher to head its sound-development facility. Fisher is a former member of Kurzweil's Research and Development Institute, which was responsible for the original K2000 and K2500, and he knows these units inside and out. Many of the pianos in the *Grand Piano Collection* were sampled by frequent **EM** contributor Jim Miller, but they benefit greatly from Fisher's personal expertise with Kurzweil's overwhelmingly flexible V.A.S.T. technology.

The compact disc contains a variety of piano samples with both large and small memory requirements, organized primarily by brand: Baldwin, Bösendorfer, Steinway, Yamaha, and Young Chang samples are featured alongside an assortment of smaller novelty piano and sound-effects samples. Practically all of the piano banks contain several programs that also include internal Kurzweil waveforms (e.g., piano/strings, piano/electric piano, and so on) as well as mono and "wide" stereo versions modified internally with the K2000/K2500 engine.

Sweetwater Sound's *Grand Piano Collection* provides a variety of well-programmed piano banks for Kurzweil's K2000/K2500 synths, including the awesome Young Chang Virtual Grand.

Overall, the programming on the disc is excellent. Fisher has expertly programmed natural soundboard resonance into several of the disc's pianos through a clever combination of multiple envelopes and FUNs, eliminating the abrupt cutoff that most piano samples suffer from. There is a certain amount of ambient ring that fills out the tone with a natural decay, which helps suppress the desire to slather reverb on every piano. The effect is convincing and satisfying to the ear.

As an added programming bonus, most patches respond to Mod Wheel messages with complex timbre changes (more than just simple filtering). If a piano is too bright, move the wheel forward until the sound is to your liking.

OPENING ACTS

The 8 MB Baldwin piano bank is a single-strike (i.e., not Velocity cross-switched) sample with an intentionally bright, hard sound, suitable for rock, pop, and Bruce Hornsby–like playing. The loops are short, but they are well done, and there are no weird jumps in timbre between adjacent keys. The Baldwin can also be loaded as a separate 8 MB version with one side of the stereo image phase-inverted. The imaging is more narrow on this inverted version, but the original Baldwin sample suffers considerably when summed to mono. (A note on mono compatibility is included on the CD insert documentation.) Both versions can be loaded together as a 12 MB bank. The Baldwin is not my first choice from the collection, but practically *all* of the pianos on the CD-ROM are better than those found in most synth modules and workstations.

A Bösendorfer sample is available as both an 8 MB single-strike and a 12 MB double-strike (2-tier, Velocity cross-switched) bank. The basic tone of this piano, especially when played softly, is beautiful. However, it suffers from the same mono incompatibility problem as the Baldwin. A phase-inverted version is available, as is a 4-layer "wide" version (that is, each note uses four voices of polyphony) that is very musical. There is a thud in the sound when played loudly, but it is still a very useful piano when a darker tone is required.

Fisher went to great pains to make the two or three dozen Bösendorfer and Baldwin patches very musical through creative programming, admirably improving what appears to be a questionable job of sampling. A lot of these samples suffer from small size, phasing problems, and generally inadequate recording quality. I would like to hear what Fisher could do with a custom set of samples.

HEADLINER

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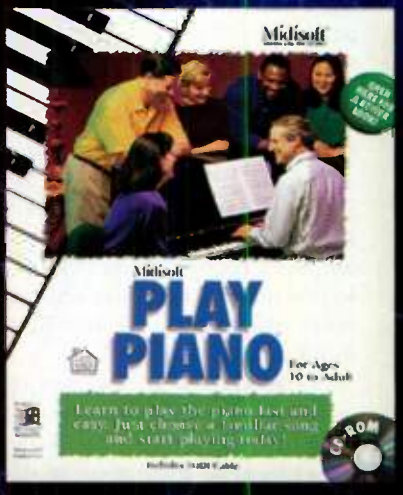

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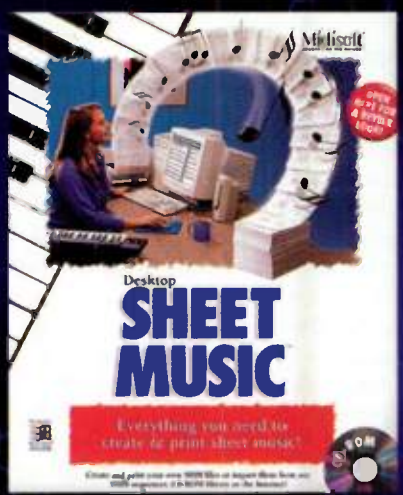

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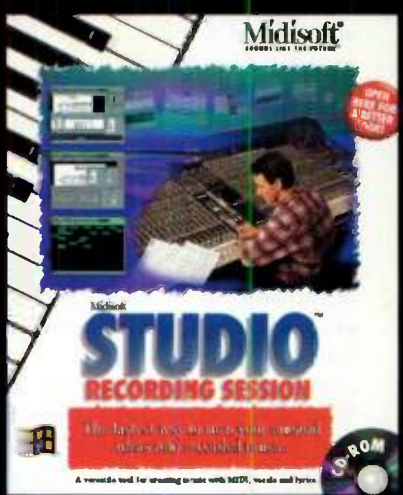

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the Young Chang 9-foot grand piano housed in Sweetwater Sound's 24-track digital recording studio. I am intimately familiar with this particular piano sound, because I bought it (on sixteen floppies) over a year ago and have used it extensively. Using 88 multisamples, the Young Chang Virtual Grand is the most musical and playable sampled piano I have heard—period. I almost always gravitate toward this particular piano sample in the studio, even though I own or have access to practically every other serious piano collection available for Kurzweil, Roland, and Akai.

The Young Chang tone is superb, the mono compatibility is very good, crossfades between velocity strikes are smooth, and the timbre is uniform across the entire keyboard. The soundboard resonance simulation is especially convincing on this bank. The Mod Wheel timbre changes allow an incredible tonal range to be had from any single program. Sweetwater also provides several dozen variations (dark, bright, wide, rock, etc.) as well as some useful blends with the internal waveforms of the K2000/K2500.

Some of the programs in the Young Chang Virtual Grand bank also come with a layer of "wood knocks"—a stereo sample reminiscent of the sound produced when the key cover or lid is closed—that can be blended in with Mod Wheel. (However, this cuts the polyphony in half.) A small amount of wood knock is premixed in several other programs. The effect adds another dimension of realism to the piano sound. After experiencing how much the wood and soundboard resonance add life to the timbre, it is difficult to once again play most other piano samples.

Probably the most remarkable aspect of this piano sound is how well it responds to player touch. It is actually possible to play with a wide range of dynamics and create a controllable, natural sound. In most other piano samples, one end of the dynamics spectrum suffers on behalf of the other (or doesn't even exist). This is not the case with the Virtual Grand. It is not perfect—I wish there were one more timbre switch between the middle strike and hard strike—but the overall consistency and playability really make this sampled piano the one to beat.

CONTENDERS

Running a distant second in grandeur to the Young Chang is a 16 MB Yamaha C7 triple-strike instrument using 39 multisamples. Although the sound is bright and clear, mono compatible, and playable at a variety of velocities, the overall impression is lackluster. The loops sound painfully short, there is some phasing weirdness in the lower registers of the keymap, and there are noticeable jumps in timbre between a few keys. Sweetwater has also provided versions with the wood knocks, and the soundboard resonance is programmed into the envelope, but the result fails to convince. I own a real 6-foot Yamaha grand and am intensely aware of how much is missing from this sample. As a MIDI piano sound, it's okay but not close to the Young Chang.

▼

Most patches respond to Mod Wheel with complex timbre changes.

One very interesting and usable piano is a programming hybrid, created by Fisher, called the Yama-Chang Stereo Piano. It is a 15 MB triple-strike piano blended with parts of both the Young Chang 9-foot and Yamaha C7. It is very animated due to the tuning and timbre differences between the two pianos, but the result is exciting in a musically pleasing way. It is also dynamically sensitive to player touch. This is my second favorite piano on the disc. For some reason, the Yamaha C7 characteristics work in this particular application, and the result is a unique piano sound.

There are a few other pianos on the disc. Worth mentioning are a very good 4 MB upright saloon piano (with an alternate program that plays in octaves); a cool, percussive 3 MB hammer grand (struck with a screwdriver); and a 6 MB New Orleans–style fat, detuned piano. A bank of stereo effects includes pedal presses, page turns, hammer knocks, damper motion, and bench motion. A little effect goes a long way, but they're fun and sound convincing when added with taste.

CLOSING NUMBER

The Young Chang Virtual Grand really makes the *Grand Piano Collection* shine. The dynamic playability, excellent programming, and wonderfully sampled instrument make this one of the best sampled pianos available. Although a lot of the other pianos are useful—due mostly to great programming by Sweetwater—the Young Chang alone is worth the price of the disc. Given that it is available on floppies for only $99, there's no reason that any K2000/K2500 user shouldn't own this piano sample in one form or the other.

Although better than what's typically available in synths, a lot of the piano programs suffer from not starting with great samples. It is difficult to rate the disc's quality of sounds: I would give the Virtual Grand near-perfect marks, but some of the pianos pull the overall rating down. I would have a hard time recommending this CD-ROM over some of its competitors if it weren't for the Young Chang instrument. Unless you are short on variety of pianos, a good option may be just to buy the Virtual Grand on floppies. In this case, it's affordable to own the best.

Product Summary

PRODUCT:
Grand Piano Collection
sample CD-ROM
PRICE:
$329
MANUFACTURER:
Sweetwater Sound, Inc.
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fax (219) 432-1758
e-mail sales@sweetwater.com
Web www.sweetwater.com
CIRCLE #441 ON READER SERVICE CARD

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QUALITY OF SOUNDS	● ● ●
PROGRAMMING	● ● ● ● ●
DOCUMENTATION	● ● ● ●
VALUE	● ● ●

Composer-producer **Rob Shrock** *has worked with Burt Bacharach, Dionne Warwick, LeAnn Rimes, Al Jarreau, Stevie Wonder, and a host of others. He can be reached through Avatar Productions at avatarprod@aol.com.*

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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.

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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–
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- Random access, non-destructive editing
- Automated, intuitive digital mixing environment
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- Complete SMPTE frame rate support
- Frame accurate syncwith built in .AVI video playback window
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SSHRD-1
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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 standalone 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 • 34 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 15x 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 ID6, level sync threshold, date & more. Also selects error indicator.
- Includes 8-pin parallel & wireless remote controls
- SBM recording for improved S/N *(Sounds like 20bit)*
- Independent L/R recording levels
- Equipped with auto head cleaning for improved sound quality.

TASCAM
DA-20/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
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CAD

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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 127 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

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AT4050/CM5
Cardioid Capacitor Microphone

The AT4050 multi-pattern condenser expands upon the AT4033 to set the standard for studio performance mics.
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UHF Performance Series

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- Crystal-controlled, PLL synthesized UHF receiver with 53 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 out 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 versatility of a portable multitrack. 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.
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- 2 AUX sends, 3-band EQ. • 11-point locator.
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- 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" low/frequency 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 incependent 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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PRO CASSETTE DECKS

TASCAM
202 MKIII / 302

These decks provide high-fidelity sound reproduction and a wide frequency response, as well as a host of editing & play back features.
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- "Dolby HX Pro" extends high frequency performance and minimizes distortion.
- Auto sensing for Normal, Metal & CrO2 tape.
- Intro Check, Computerized Program Search, Blank Scan and One Program quickly find the beginning of tracks.

302 *Advanced Features–*

The 302 is 2 independent decks, each with their own set of RCA connectors, transport control keys, auto-reverse, and noise reducing functions. Cascade and Control I/O let you link up to 10 additional machines for multiple dubbing or long rec & playback.

112MKII/112RMKII

A classic "no frills" production workhorse, the 112MKII is a 2-head, cost effective deck for musicians and production studios. It features a parallel port for external control and an optional balanced connector kit for integration into any production studio. The **112RMKII** features a 3-head transport with separate high performance record and playback heads as well as precision FG servo direct drive capstan motors.

SIGNAL PROCESSING

BEHRINGER
MDX 2100 Composer

- Integrated Auto/Manual Compressor, Expander & Peak Limiter.
- Interactive Gain Control (IGC) combines a clipper and peak limiter for distortion-free limitation on signal peaks.
- Servo-balanced inputs & outputs are switchable between +4dB & -10dB. ***NEW LOW PRICE!***

APHEX
107 Tubessence
2 Channel Mic Preamp

The 107 delivers outstanding sonic performance, as well as a great degree of presence, detail, & image.
- Up to 64dB of gain available
- 20dB pad with red LED indicator, 2 LED input meter
- Full 48V phantom power with red LED indicator
- Low cut filter at 80Hz, 12dB/octave
- Polarity inversion switch with LED indicator
- Switchable +4dB/-10dB output, 1/4" Balanced.

109 Tubessence
Parametric EQ

The Aphex 109 is an extremely versatile, high performance parametric vacuum tube EQ with professional flexibility and sound quality.

Great for "warming up" digital signals.

EFFECTS PROCESSING

JUST IN

Lexicon
PCM-80 & PCM-90
Digital Signal Processors

A great combination for any studio owner with an ear for the best. The **PCM-80** delivers high quality multi-effects based on the legendary PCM 70, maintaining Lexicon's high standards for sonic clarity and extraordinary processing power. The **PCM 90** is a digital reverb with its roots stemming from the studio standard 480L and 300L effects systems. Reverbs from telephone booths to the grand canyon, the PCM 90 is incredibly realistic. Together, they make an excellent addition to any rack mount arsenal.

Lexicon MPX-1
Multi-Effects Processor

Lexicon's latest addition to thier Digital effects family, the MPX-1 features top-quality effects in an easy to use, 1 rack space unit. With 56 Pitch, Chorus, EQ, Modulation, Delay, and world-class reverb effects accessable from the front panel, as well as TRS and XLR balanced I/O and complete MIDI implementation, the MPX-1 creates a new standard for cost and quality in a multi-effects device.

t.c.electronic
Wizard M2000 Studio Effects Processor

The M2000 features a "Dual Engine" architecture that permits multiple effects and 6 different routing modes making it a great choice for high-end studio effects processing.

FEATURES–
- 250 factory programs including reverb, pitch delay, chorus, flange, phase, EQ, de-essing, compression, limiting, expansion, gating and stereo-enhancement
- 20-bit A/D conversion, AES/EBU and S/PDIF digital I/O
- "Wizard" help menus, 16-bit dithering tools,
- Tap and MIDI tempo modes.
- Single page parameter editing, 1 rack space

SONY
DPS-V77 2 Ch. Master Effects Processor

Sony's latest effects processor, the DPS-V77 yields excellent sonic quality combined with realtime control, a digital I/O and many more features that will put a smile on the face of any discerning studio engineer.

FEATURES–
- 198 preset & 198 user-definable programs.
- Control up to 6 parameters in realtime via MIDI information and an optional foot pedal.
- Use the AES/EBU & SPDIF digital I/O to link multiple V 77s together & when working with digital mixers.
- 10-key pad input
- Shuttle-ring equipped rotary encoder allows for quick patch changing.
- A noise gate circuit is provided ahead of the input for guitar players and other instrumentalists who want top quality effects without sacrificing tone.

ALESIS
QuadraVerb 2 2 Ch. Master Effects Processor

Alesis' most powerful signal processor, the Q2 offers amazing audio fidelity in a versatile multi-effects unit. Great for professional & project studio owners. Its large backlit display making parameter editing intuitive and quick.

FEATURES–
- 100 preset & 200 user-editable programs.
- Octal Processing allows use of up to 8 effects simultaneously in any order.
- Choose between over 50 different effects types for each block, including reverb, delay, chorus, flange, rotary speaker, pitch shift, graphic and parametric EQ, overdriver and more.
- 5 seconds sampling, triggerd pan, and surround sound encoding are built in.
- Selectable -10 dB and +4dB levels, servo-balanced TRS inputs and outputs.
- ADAT Digital Interface allows you to work entirely in the digital between the Q2 and an ADAT XT.

PRO HEADPHONES

AKG
K240M

The first headphone of choice in the recording industry. A highly accurate dynamic transducer and an acoustically tuned venting structure produce a naturally open sound.
- Integrated semi-open air design
- Circumaural pads for long sessions.
- Steel cable, self-adjusting headband
- 15Hz–20kHz, 60Ω

SONY
MDR 7506

The Sony **7506's** have been proven in the most trying studio situations. Their rugged, closed-ear design makes them great for keyboard players and home studio owners.
- Folding construction
- Frequency Response 10Hz to 20k Hz
- 1/4" & 1/8" Gold connectors
- Soft carrying case
- Plug directly into keyboards

beyerdynamic
DT 770 Pro

These comfortable closed headphones are designed for professionals who require full bass response to compliment accurate high and mid-range reproduction.
- Wide frequency response
- Durable lightweight construction
- Equalized to meet diffused field requirements
- Padded headband ensures long term comfort

SENNHEISER
HD 265/HD580

The **HD-265** is a closed dynamic stereo HiFi/professional headphone offering high level background noise attenuation for domestic listening and professional monitoring applications. The **HD 580** is a top class open dynamic stereo HiFi/professional headphone that can be connected directly to DAT, DCC, CD and other pro players. The advanced design of the diaphragm avoids resonant frequencies making it an ideal choice for the professional recording engineer.

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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.

- **RS1000 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, a 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 assignable.
- **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 assignable ribbon controller, 4 octave keyboard, built in arppegiator 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 incredilbe creative potential

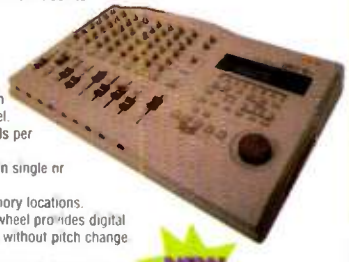
FEATURES–

- 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 Canceler, Lo-Fi Sound Processor, Space Chorus, Reverb 2, 4-band Parametric EQ, 10-band Graphic EQ, and Vocal Canceller.
- 140 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

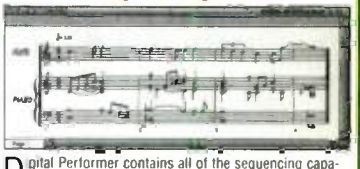
The MTP AV takes the world renowned MTP II and adds syncronization that you really need like video genlock, ADAT sync, and word clock sync, even Digidesign superclock!

- 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 Conrol, Quicktime Video playback.
- Sample rate conversion.
- Spectral effects, pitch correction.
- Real-time editing and effects processing.
- Complete Notation.

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December 1997

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Cakewalk Pro Audio 6.0

By Allan Metts

A longtime favorite digital audio sequencer continues to improve.

Technology has a way of removing excuses. In the past, I'd often complain about not having enough polyphony, or the latest synth sounds, or high-quality effects. But times have changed, and now I have all the voices, patches, and effects I need, but my new problem is how to keep everything organized? I'm happy to report that version 6.0 of *Cakewalk Pro Audio* serves quite well as the coordinator of my MIDI and audio activities and takes me far down the road toward total studio management.

EM has reviewed *Cakewalk* several times (*Cakewalk Pro Audio* 4.0 was reviewed in the April 1996 **EM**, and the April 1997 feature story "A Piece of Cake" discussed some of the key features in version 5.0), so we'll just cover the new features here. And plenty of new features there are: *Cakewalk* has become a true 32-bit application with many additional audio-processing capabilities. Several MIDI operations have been added or improved, such as the powerful StudioWare MIDI control feature, and more musical symbols can now appear in the Notation View. Version 6.0 also adds support for Microsoft's DirectX (formerly called ActiveMovie) plug-in standard. This allows *Cakewalk* to use DSP plug-ins from a variety of third parties.

PIECE O' CAKE

Although my Pentium 120 is fairly loaded, *Cakewalk* installed with no trouble whatsoever. The program recognized both my Turtle Beach Pinnacle and DAL Digital Only CardD sound cards, giving me four audio ports to work with.

In theory, *Cakewalk* will support as many audio cards as you can cram into your system, but you'll have to choose one as the timing master. In practice, however, there's no guarantee that your audio cards will stay in sync, or that you'll have enough free IRQs and I/O addresses to use more than one or two cards. But even with my network adapter and an internal MIDI interface, everything ran smoothly on my computer.

BASIC INGREDIENTS

Not much of *Cakewalk*'s interface has changed. The Track View still retains its two-part division, with tracks and their properties displayed along the left and the clips that represent audio and MIDI data on the right. One new touch is the ability to save multiple Window Layouts and share them among different files. Window Layouts comprise all currently open window positions and the tracks (if any) that each window contains. If you always like your Event List on the left and your Track View across the top, you can make that layout a default for all your sequences. Or if you prefer, the program will load a file-specific layout each time you reopen that song.

Another new feature is the appearance of MIDI-controller editing tools in the Piano Roll View. Using *Cakewalk*'s familiar drawing and erasing tools, you can enter controller data that will line up with the notes in your track. This is a big improvement over the previous approach, in which there was no easy way to align different types of data. You can't enter or edit patch changes in the Piano Roll, however, which is a feature I'd like to see added.

The company has improved its support for pattern-based sequencing by allowing you to "link" clips. Highlight an existing clip (or create a new one for the selection you wish to use), and then Control-drag the clip to copy it at the new location. A dialog will appear asking whether you want to link the new clip with the original one; if you choose "yes," then changes made in any clip will be reflected in all the others. You can use the Edit/Paste command to create numerous linked copies in a single pass, and you can color-code all the links to help you see which ones are related. An Unlink command not only unlinks all selected clips but allows you to create a new link between the unlinked clips.

IN THE STUDIO

Cakewalk helps manage your studio in many ways. Its Instrument Definition feature allowed me to represent my entire setup in its settings window (see **Fig. 1**). Most sequencers let you specify patch names, but *Cakewalk* goes one step further. For every device, you can specify drum-note names, controller names, Bank Select types, and Registered Parameter names. Once these are configured, *Cakewalk* uses the appropriate names and methods everywhere in the program. Defining your studio isn't nearly as work intensive as it could be because *Cakewalk* provides templates for dozens of instruments, and many more can be found at the company's Web site.

Another studio aid comes in the form of StudioWare, one of the biggest additions in version 6.0. This feature replaces the Faders View and is far more

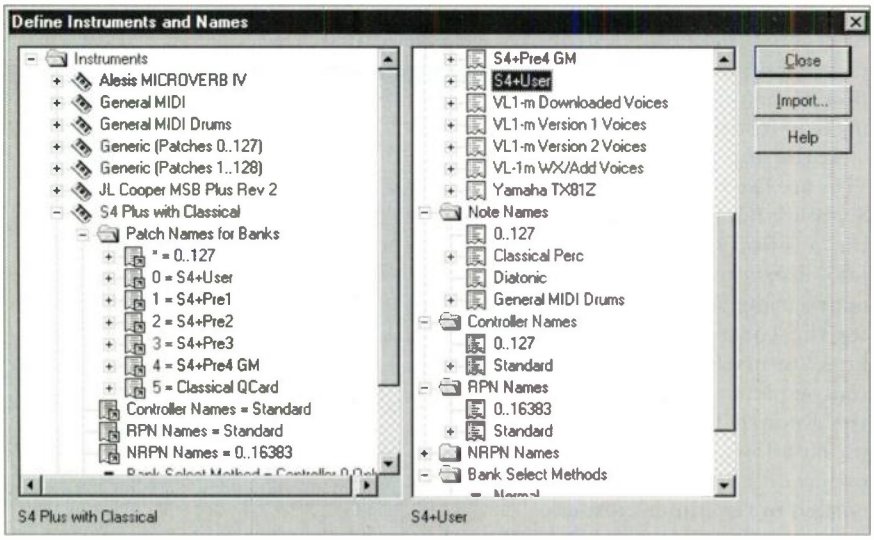

FIG. 1: *Cakewalk*'s Instrument Definition feature supports patch names, note names, Bank Select methods, bank names, Registered Parameter Numbers, and controller names for many common devices.

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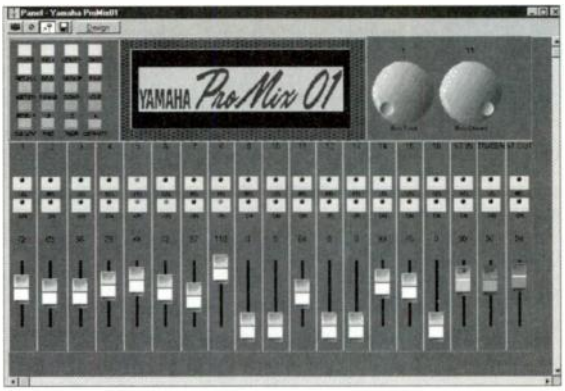

FIG. 2: *Cakewalk*'s StudioWare is used to create some impressive-looking screens, including the bundled Yamaha ProMix 01 shown here. Excellent third-party panels are also available on the Web.

powerful and comprehensive. Using StudioWare, you can create highly graphical screens to control anything that speaks MIDI. What's more, *Cakewalk* ships with several prebuilt screens, including panels for the Roland GS, MIDI Machine Control, Mackie OTTO 1604, Digidesign Session 8, and Yamaha ProMix 01.

StudioWare provides a quick and easy way to achieve the same mixing functionality found in other sequencers. But instead of providing you with a screen full of faders and knobs, *Cakewalk* dynamically builds a screen with only the tracks that you want to work with. For example, select View New Panel, and the program will provide a default panel with volume, pan, reverb, chorus, and mute controls for each selected track. You can open as many Panel Views as you like, and I found it helpful to create a panel for all the instruments in my rhythm section and another for each of my lead instruments.

At the top of every Panel View are five buttons. First is a Snapshot button that captures the position of each control and inserts an event into the appropriate sequencer track for the control's value. (Events are inserted at the current sequencer time). Next is the Record toggle button, which allows changes to the onscreen controls to be recorded in real time. This feature didn't work the way I thought it would. I switched it on and tried to record using the Record button on *Cakewalk*'s main Control bar. It turns out that you can only record changes in the Panel View during playback. This is because *Cakewalk* automatically pushes its own Record button down if you move a control while it's playing back. Once I figured this out, I was fine; I even like it. But I'd like the option to store events during playback and recording.

An Update toggle button allows you to specify whether the controls move along with their corresponding MIDI events, and a Save button lets you save your Panel for later retrieval. Panels are saved as globally available Layouts, which means they can be retrieved from any *Cakewalk* song file. *Cakewalk* even gives Panels a different icon in the list of Layouts, so you can easily tell them apart from the window-position layouts.

MAKE A CAKE

The final button at the top of every Panel View is labeled "Design," and when you press it, you realize that you're not dealing with any ordinary fader view. This button puts you into the Panel's Design mode, where you can configure your own faders, knobs, buttons, and indicators. The company calls these controls "Widgets" (their name, not mine!), and you can use any of eight available controls in your design. Widgets can generate and respond to anything MIDI

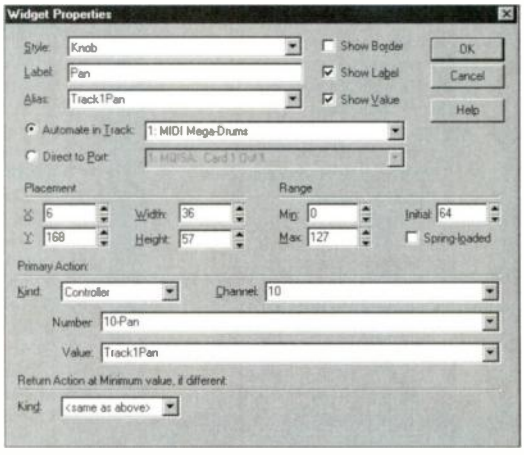

FIG. 3: The Widget Properties dialog from the Panel View is used to specify the behavior of an individual Widget. A Widget can send MIDI events, issue Windows messages, or start *Cakewalk* operations.

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(and then some). Patch changes, Note On messages, continuous controllers, System Exclusive messages, Windows Media Control Interface (MCI) commands, CAL programs, *Cakewalk* operations, and track parameters are all fair game. Oddly, MIDI Note Off messages aren't supported.

Cakewalk allows you to create designs with enormous flexibility. There are faders and knobs to generate events of a continuous nature, buttons to toggle controls, meters to display a spectrum of values, and virtual LEDs to indicate whether something is on or off. You can also place images and text on your panels or even nest Widgets using the Clusters control. A "Cluster" is a class of Widgets that can contain other Widgets, and they're handy for creating pop-up panels that appear and disappear at will. A "snap to" grid is also available to help you get things lined up.

Once you place a Widget, you can reposition and resize it with ease. You can specify colors or bitmaps for the Widget's foreground and background and decide which Widgets are on top of or underneath other Widgets. Widgets can also be grouped so that each one moves when any of them do (relative fader and knob positions are maintained). All in all, *Cakewalk*'s StudioWare gives you the tools to create some impressive-looking virtual control surfaces (see **Fig. 2**).

Good looks alone can't control a MIDI synth, so you'll have to open each Widget's Properties window to tell it how it should behave (see **Fig. 3**). Because Widgets can perform both MIDI and non-MIDI tasks, you choose what kind of action you want and then see a set of fields appropriate for that action. For example, choosing a controller action causes fields for MIDI channel, controller number, and value to appear.

Among the various controls you can assign are a minimum and maximum value, an initial value, and a Spring-Loaded setting that causes the Widget to snap back to its initial value as soon as it is released. (You can specify an alternate action that takes place at the Widget's minimum value.) Each Widget can have a Label, which is the name you'll see on the screen, and an Alias, which acts as a surrogate for the current value of the Widget. Widget Aliases are the key to StudioWare's power; they allow you to link different types of controls. For example, if a fader and

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a meter have the same Alias, the meter will show the current value of the fader. Or if a Cluster and a button have the same Alias, the Cluster will become visible when the button is down.

Aliases can appear in many of the Widget Properties and provide a versatile and flexible means to control the transmission of MIDI data. You can easily create one fader that can send

MUSICIAN'S TOOLBOX

The Deluxe version of *Cakewalk Pro Audio* comes with the *Musician's Toolbox II*, a 2-disc set that is full of Standard MIDI Files, audio clips, tutorials, and utilities that work hand in hand with the *Cakewalk* software. The *Toolbox* installs as a separate application that gives you a graphic front end to select and audition the files on the CD-ROMs.

The *Toolbox* allows you to import each of the MIDI and audio files into *Cakewalk* with ease: simply drag and drop them. You can also obtain additional information about each selection or connect to the Web site of the company that produced it.

The MIDI files include *DNA Beat Blocks* from WC Music Research, *Drum Sequences* from Beatboy, and *Classical Piano Performances* by Jordan Rudess and James Kometani. The *DNA Beat Blocks* feature simultaneously recorded MIDI and WAV files using a variety of styles. Most of these grooves are two bars long and consist solely of a percussion beat. (The "Sly and Robbie" selections feature bass, as well.) Each of five artists recorded between six and eight grooves.

The *Drum Sequences* from Beatboy are longer and feature a greater variety of styles. Most of these are 18 or 22 bars long, although I did find one in 7/8 time that lasted 134 measures! There are seven categories, each of which contains between two and five sequences. The sequences represent many genres, including country, pop, power rock, Latin, and hip-hop.

The Rudess/Kometani section features entire piano performances from Chopin, Bach, and Joplin. Several of these pieces have separate tracks for the left and right hands, making them ideal for notation printing and self-study.

There are four groups of audio files. The John Entwistle/Steve Luongo selections contain a variety of bass and drum grooves for a solid rock sound. There are 24 grooves in all, in four different keys and a variety of tempos ("shuffle" grooves are also present). Most of the grooves are four bars long.

Big Fish Audio contributed over 100 samples. Many of these are full band grooves, with each instrument in the groove provided as a separate sample. The techno/industrial and hip-hop genres are well represented. Also present are drum loops, samples for complete drum kits, and a few highly specialized Asian instrument samples.

The George Clinton *Sample Some of Disc* collection contains over 100 fully arranged grooves with durations of four measures and up. There is a tremendous variety here, including grooves containing vocals, horns, and piano.

I particularly like the *Route 66 Jams Again* selections. There are 42 entries in a variety of styles that include rock, funk, country, alternative, and easy listening. You will find grooves as long as 24 bars that contain entire chord progressions. The grooves are fully arranged, so all you add is vocals or a lead instrument.

The *Toolbox* also contains the G-Vox *Riffs* application, which lets you study and rehearse guitar riffs. The application shows the riff in music notation, guitar tablature, and on a fretboard image. Fifteen guitar riffs are included, which can be played back at any speed on your MIDI synthesizer.

Rounding out the *Toolbox* are twelve *Cakewalk* tutorials and the *CAL Tutor*. All in all, the *Musician's Toolbox II* represents a significant addition to the *Cakewalk* package. If you make heavy use of sampled or MIDI grooves in your recording process, I definitely recommend spending the extra $100 to get it.

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any controller message on any track, or you can use calculated expressions to control how different Widgets interact. Much of the power of *Cakewalk*'s CAL programming extensions is available by using Aliases, but StudioWare's graphic interface is easier to manage than CAL's text-only screens.

Normally, Widgets are linked to a *Cakewalk* track, and you'll use that track to record events and automate the Widget's movements. But you can also link the Widget directly to a MIDI port, which allows it to behave somewhat like a controller on a synth. Widgets linked to ports respond to incoming events, but data that they send or receive is not recorded into a track.

At this point, you might be asking, "Is there anything MIDI that StudioWare can't do?" Yes, there is. After first reading about StudioWare, I pictured myself building full-featured editors for each of my synthesizers. I quickly realized that this wouldn't be possible. StudioWare doesn't have tools to parse or interpret complex System Exclusive messages, nor does it have Widgets for every type of control you'd need. (One that comes to mind is a tool to select patches or parameters from a list.) But StudioWare is extremely powerful nonetheless, so get those imaginations in gear!

AUDIO ASSIMILATION

Cakewalk contains some pretty hefty audio processing, and support for Microsoft's DirectX lets you add even more features using third-party plug-in modules. Many of the audio operations can be used as real-time effects, but let's cover the non-real-time options first.

Audio processing features are accessed by right-clicking a wave display in the Audio View or from *Cakewalk*'s main menu. This allows you to apply these features in any window that contains audio events. With only a few mouse clicks you can boost or cut your audio by 3 dB, normalize it to 0 dB, or reverse it. You can draw crossfades, fade-ins, and fade-outs (or any envelope shape, for that matter) and apply them to your audio. In case you don't like to draw, *Cakewalk* provides linear and exponential curves for you.

There's a 10-band graphic EQ and a parametric EQ that can act as a lowpass, highpass, peak, or notch filter. And if you need a noise gate, look no further. *Cakewalk* can also remove "silence" from your audio, using any settings for threshold, attack time, release time, hold time, and granularity, which is a measure of how long audio must be over the threshold to avoid being interpreted as silence.

Like many recent-vintage sequencers, *Cakewalk Pro Audio* can perform a pulse analysis on your audio to extract its timing. When it does, the program will either put a stream of MIDI notes onto the clipboard or insert tempo changes into your song. The pulse analysis seems to work pretty well. With relative ease, I was able to get a series of MIDI notes with Velocities that corresponded to the pulses in my audio. But I had less success with the Find a Steady Beat option in the Extract Timing feature. I tried several different settings with several different audio tracks, and *Cakewalk* always told me that it couldn't find a steady beat. The feature is dependent on the type of audio material you use, however, so you might have more luck than I did.

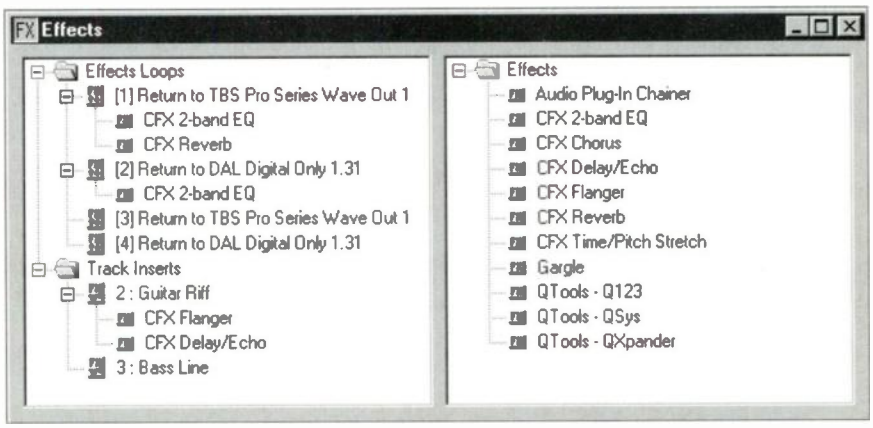

FIG. 4: *Cakewalk* can use DirectX effects in real time and can chain multiple effects together in any order. Effects can be configured as track inserts or effects loops.

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Cakewalk Pro Audio can also convert audio to MIDI pitch data with reasonable success, provided your audio contains only one note at a time. The program inserts note and pitch bend events into any track you choose. I wasn't expecting perfection here, but *Cakewalk* performed well enough to get me in the ballpark. With a legato horn part, the program hit most of the notes, but it also inserted extra notes on the longer, sustained passages. Additionally, the program was a little off the mark with its Pitch Bend events, which made the MIDI track sound warbley and out of tune.

I knew the pitches in the audio track were dead-on (they were recorded from a synth in the first place), so it would have been useful to have some way to prevent Pitch Bend messages from being generated altogether. I would also have liked some presets with built-in parameters for popular conversions (e.g., female vocal, solo horn, etc.). Though all of the audio-processing operations can store multiple presets, there was nothing in the preset drop-down list for the pitch-detection feature.

▼

Not much of *Cakewalk*'s interface has changed.

REAL-TIME AUDIO

Cakewalk Pro Audio comes with six of its own DirectX effects, which can be accessed from the same menu as the other audio-processing operations. (Any third-party effects installed in your system appear here, as well.) These effects, which have the file-name extension CFX, can be used by *Cakewalk* and any other program that supports DirectX plug-ins. Included are a 2-band EQ, chorus, flanger, delay, reverb, and time/pitch stretcher.

The DirectX effects can be used in real time by accessing the Effects View (see **Fig. 4**). Here you can create up to four effects loops or add effects as inserts to any track. To create an effects configuration, simply drag an effect from the right windowpane to the left one and chain them in any order. Then set the properties for each effect by

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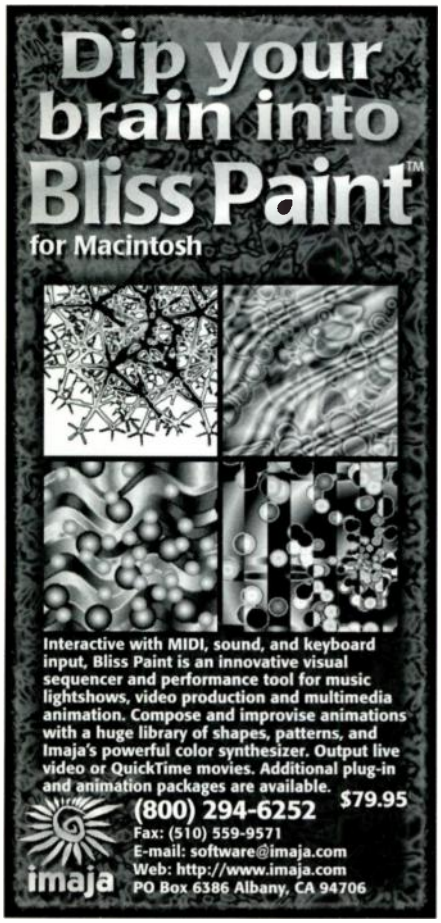
double-clicking it. Track inserts are mono-in, mono-out; the effects loops are mono-in, stereo-out.

Setting up the effects as track inserts was pretty straightforward, but I found the effects loops to be quite confusing. Even though they are audio effects, the effects sends and returns are controlled with MIDI channel and controller messages. To use them, you have to set up your tracks and a StudioWare panel with just the right parameters. Later on, I found a couple of excellent StudioWare panels on the Web (built by several adventuresome *Cakewalk* users) that properly implement all four effects loops. The company should have included something like this with the program.

Most of the effects sounded fine to my ears, although I did notice a "fluttering" on one of the longer reverb algorithms. Also, I got some really nasty artifacts when I tried to shift a horn part up a fifth. I tried the same stunt in Sonic Foundry's *Sound Forge* and got much better results. (*Sound Forge* offers an anti-aliasing filter, which does not appear to be present in *Cakewalk*.)



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Speaking of *Sound Forge*, *Cakewalk* can launch this program or Steinberg's *WaveLab*, export to it the audio you're currently working on, and then import the processed audio.

THE LATEST AND GREATEST

As this review went to press, Cakewalk Music Software released version 6.01 of *Cakewalk Pro Audio*. This free maintenance upgrade adds several enhancements, in spite of its designation as a minor ".01" release.

First of all, the program now provides native support for Windows NT 4.0. Cakewalk Music Software's willingness to push the NT envelope should increase the demand for NT sound-card and MIDI-interface drivers, which are currently difficult to come by. Let's hope that the hardware manufacturers heed the call and open up another computing platform for the electronic musician.

Also added is support for RealAudio and RealMedia Meta Files. RealAudio files can be created from any audio event using *Cakewalk*'s Export Audio command. RealMedia Meta Files combine audio and MIDI into one format that is ready for any Web site. (This format will soon be supported as a plug-in to major Web browsers.) Meta Files contain three smaller files: a MIDI file, a RealAudio file, and a third file that references the other two. You can specify several settings for both RealAudio formats.

Several audio processing features were added in 6.01. A new Mixdown Audio command creates a stereo submix from several audio tracks. Unlike the program's Export Audio command, this feature preserves the volume and pan settings that are present in each audio track. In addition, the mix will contain any real-time effects that you have configured in the program's Effects View.

Speaking of the Effects View, the program's effects sends now operate in stereo, complete with independent pan controls. If you use the audio effects offline, you now have three mixing options. You can choose to process each mono audio event in place (replacing what's there) or create a new pair of stereo tracks for each selected track (keeping or replacing what's there). You can also create a submix prior to effects processing and then send the whole submix through the effect. The processed audio can either replace the original audio events or occupy a pair of separate, "wet only" tracks.

Rounding out the version 6.01 features are a snap-to-zero-crossing feature in the Audio View, support for Creative Technologies' SoundFonts format, a few user conveniences, and improved background processing. All in all, Cakewalk continues to keep the music world hopping with more and more cool technology.

HAVE YOUR CAKE

Some of the other improvements to the program include the ability to insert markers "on the fly" during playback or recording and enhanced control over notehead types and articulation markings for percussion parts. In addition, *Cakewalk* adds support for 48 kHz audio, SMPTE synchronization of audio, and inclusion of audio events in Groove Quantize operations.

Version 6.0 of *Cakewalk Pro Audio* is a feature-laden, solid upgrade. There are major enhancements to many important areas, and this powerful program becomes an even better-integrated workhorse. If you're already a *Cakewalk* user—or even if you aren't—I highly recommend it. ●

Product Summary

PRODUCT:
Cakewalk Pro Audio 6.0
digital audio sequencer
PRICE:
$429 standard version
$529 deluxe version
SYSTEM REQUIREMENTS:
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Emagic Audiowerk8

By Rick DiFonzo

A fine-sounding, cost-effective audio card with plenty of outputs.

In general, most audio cards allow you to use a wide variety of software. Some cards are restricted to software from licensed developers, as in the case of Digidesign's Pro Tools system for Macintosh. A few are part of closed systems in which you must use the card manufacturer's software, such as CreamWare's *tripleDAT* for Windows and, at least until recently, the Sonic Solutions system for Mac.

The Audiowerk8 is a 2-in, 8-out audio card for PCI-equipped Macintosh or PC. During the review period, the card was fully supported only by *Logic Audio* 2.6.6 for Mac, *Logic Audio* 2.6.9 for Windows, and *Logic Audio Discovery* (a junior version of *Logic Audio*), though most features are supported by the bundled *VMR* software (see sidebar, "Worth Every Penny"). However, as I was finishing the review, Emagic was in the process of releasing drivers that will allow Mac users to use Audiowerk8 as a 2-in, 2-out card with any digital audio program that supports Sound Manager. Similarly, Windows users can download a file from the Emagic Web site that allows the Audiowerk8 to function as a 2-in, 2-out card with any program that supports a standard Windows audio driver.

PLUGGING IN

The 7-inch PCI card fit easily into my Power Mac 8600; installation was a snap (literally). The card's face has one S/PDIF digital I/O pair on RCA (coax) connectors. A DB24 multipin connector accepts a sturdy and well-labeled breakout cable containing the analog I/O. The breakout cable attaches securely via two screws. There are two unbalanced analog inputs and eight unbalanced analog outs. The analog and S/PDIF inputs are not simultaneously available; you can record only two tracks at a time.

For users who want to use this card to add live tracks to MIDI sequences, being limited to two record tracks at a time is no big deal. However, having eight separate outputs *is* a big deal. *Logic Audio* 2.6 allows you to play sixteen tracks of audio with Audiowerk8, which are mixed to the eight outs. (*Logic Audio* 3.0 will increase the number of tracks to 24 and can address two cards simultaneously for a total of sixteen discrete outputs.) Very cool. *Logic Audio Discovery* 1.2 gives you twelve tracks, and the new version 3.0 will increase the number of tracks to sixteen. It will only support a single card, however.

Logic Audio supports multiple simultaneous audio interfaces, so you can use Emagic's digital audio sequencer with the Audiowerk8 and a Digidesign card such as Audiomedia III (see **Fig. 1**). When used in this combination, for instance, *Logic Audio* 2.6 can play up to 24 tracks of digital audio mixed down to ten outputs (eight outs on the Audiowerk8, plus two analog or two S/PDIF outs on the Audiomedia III).

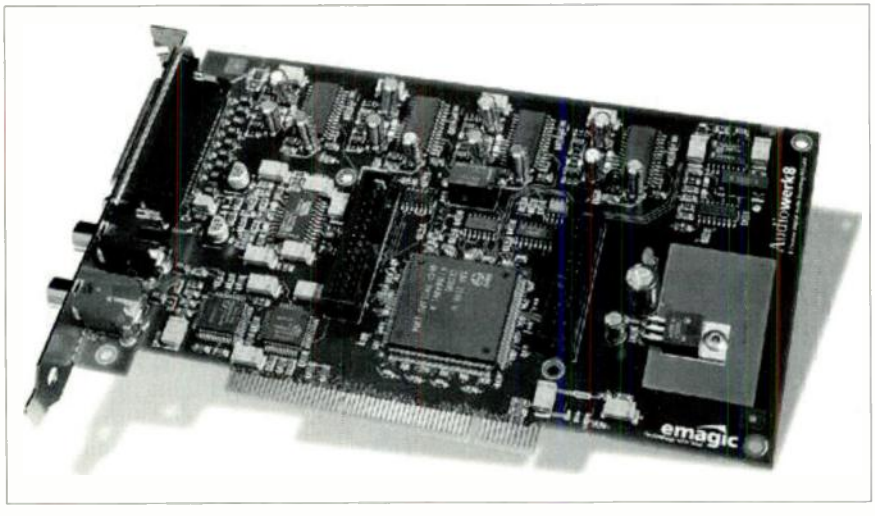
I synched *Logic Audio* with Audiowerk8 and Audiomedia III to a TASCAM DA-88, and the lockup ran smoothly with no problems. (According to Emagic, the sync will be even better with *Logic Audio* 3.0, which implements continuous sample-rate calibration to external time code. That should allow for perfect synchronization, even when using long audio files.) This gave me 32 digital tracks. It was extremely cool to have as many tracks as I wanted and to work without worrying about bouncing. Want to quadruple that 8-note guitar part instead of doubling it? Go for it! I actually ran out of ideas before I ran out of tracks.

No manual was included in my early production unit, but you will find one in the shipping version. There's also an electronic manual in PDF format available on Emagic's Web site. The bundled CD-ROM contained only *Logic* updaters and the *VMR* installer for Mac and PC machines.

REVENGE OF THE GREMLINS

I was excited and eager to get down to business when Audiowerk8 arrived. But some of that excitement faded when I booted *Logic Audio* and got to work. I tried to record a bass track and discovered that there is no input monitoring. This is incredibly annoying and inconvenient, but it's a shortcoming of *Logic Audio*, not the card, and the upcoming *Logic Audio* 3.0 will address it.

After I laid down the track, however, gremlins came out of the woodwork. I saw levels on all the software meters and saw the waveform displayed in the audio windows, but I heard nothing. After checking connections, removing extensions and preference files, reseating the card, disconnecting the SCSI chain—in short, everything I could think of—the track played back twice; then the outputs failed again. After a lengthy break, I found that the track inexplicably played back without a hitch. However, problems arose when I began to overdub. After recording two rhythm guitar tracks, I discovered tracks cutting



Emagic's Audiowerk8 PCI card has two analog inputs, eight analog outputs, and stereo S/PDIF digital I/O (not simultaneously available). With the company's *Logic Audio*–series software, you can use all eight of its outputs; otherwise, you are currently limited to two outputs, though this is expected to change soon.

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out. Soloing a guitar track, I found that the bass was jumping tracks and replacing the guitar intermittently and randomly (not always in the same place). I called the Emagic tech-support people, who were patient and friendly, but they were as baffled as I.

After a week, I went back to *Logic* and the Audiowerk8 and experienced no problems of any kind. I recorded eight audio tracks with a bunch of MIDI tracks and *tried* to get it to screw up! Nope. With the exception of one crash, and a mandolin track cutting out a few times, it has been perfect ever since.

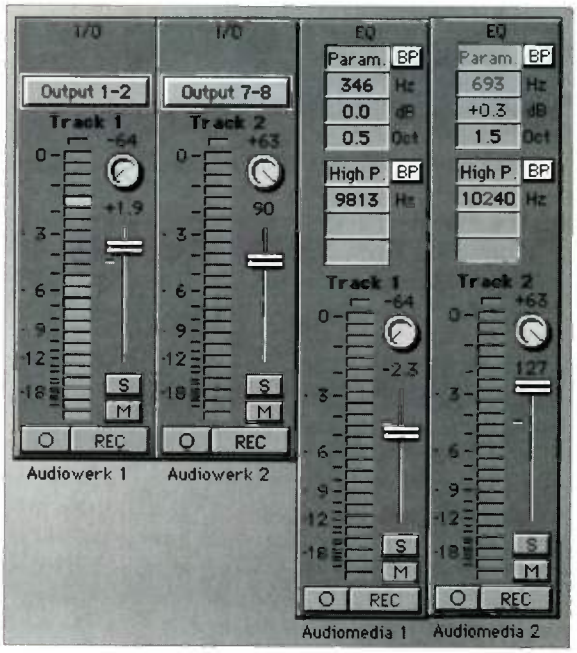

FIG. 1: The Audio Object (faders) for the Audiowerk8 card (left) in *Logic Audio* 2.66 for Mac includes an Output Select feature whereas the Audio Object for Digidesign's Audiomedia III card has two bands of EQ.

Why did all this happen? I haven't a clue. I can't say for sure it was caused by problems in the Emagic software or hardware; one of the headaches of a computer-based system is that problems can be caused by a variety of apparently unrelated things, or there could be a combination of causes. But the fact is that they happened only when I was using Audiowerk8 and *Logic Audio*. I had no such problems using MOTU's *Digital Performer* and a Digidesign Audiomedia III card.

To add to the mystery, I have not been able to duplicate these problems, even after reinstalling all my extensions! It seems unlikely you will have the problems I had, but I would not feel right about this review if I didn't report them.

THE AUDITIONS

To test the sound of the Audiowerk8, I recorded excerpts from a commercially released CD into *Logic Audio* using both the Audiowerk8 and Audiomedia III analog inputs. I chose a few tracks from Sting's *Ten Summoner's Tales* because it is a pristine recording, and you can hear "every little thing" clearly. After carefully matching the playback levels of both cards to ensure a fair comparison, I switched between the Audiowerk8 and the Audiomedia III. First, I had each card play back the tracks it had recorded, and then I switched them (had the Audiowerk8 play the tracks recorded into the Audiomedia III and vice versa).

The results were surprising. There was a slight difference in the reproduction, and the Audiowerk8 was the winner by a hair. I felt that the Audiomedia III sounded the tiniest bit harsh in the upper mids and lacked some of the definition in the kick drum. Now don't get me wrong, it was a barely audible difference, but the Audiowerk8 simply sounded better. I found that in all combinations, the Audiowerk8 edged out the Audiomedia III. This leads me to believe that both A/D and D/A converters in the Audiowerk8 are slightly better. I repeated the test with some of my recent mixes, obtaining the same results each time.

When recording some tracks for my current project, I multed the signals to the Audiowerk8 and my DA-88. The DA-88 won this battle but not by much. Bass tracks on the Audiowerk8 tended to sound smaller and a bit thinner, and power guitars lost some of their growl. This was easily fixed with a judicious bit of EQ, but I preferred the sound of the DA-88. Again, the difference was subtle.

COMING UP

This is not a review of *Logic Audio*, but that software is the front end of choice

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for the Audiowerk8 (assuming you want to be able to mix to all eight outputs), so I feel I must at least touch on some of the major and minor annoyances when using the card with Emagic's flagship program. After editing MIDI tracks, I found that I had to disable and reenable the Audio Object to achieve input. As mentioned earlier, audio tracks behaved erratically. But all of this was probably part of the mysterious voodoo I discussed earlier. More important, the absence of input monitoring is a colossal oversight.

The release of *Logic Audio* 3.0 will presumably fix these operational quirks and will add real-time DSP functions. This will allow individual audio tracks to have separate EQ, chorus, delay, reverb settings, and much more. *Logic Audio* 3.0 will also support Digidesign AudioSuite and Adobe Premiere plug-ins for Mac. (A PC update should appear simultaneously, but support for DirectX plug-ins is not expected.)

It should be noted that unlike some competing audio cards, Audiowerk8 does not have an onboard DSP chip for effects, so *Logic Audio* 3.0's DSP functions will put an increased burden on the host-computer CPU. On the other hand, unlike most audio cards, the Audiowerk8 has an onboard Philips chip that takes care of data transfers to disk, which means you can add more audio tracks without significantly increasing the hit on computer CPU time. You win some, you lose some.

When it unveiled the Audiowerk8, Emagic announced it would develop daughtercards that would provide S/PDIF and ADAT Lightpipe I/O options. Those plans have changed; the manufacturer is currently developing new technology and expects to announce its revised plans at the upcoming 1998 Winter NAMM show. So far, there is no word on a TASCAM TDIF interface; I'd sure like to see that happen.

A new package will be shipping by the time you read this that includes the Audiowerk8 card and a CD-ROM containing a full-blown version of *Logic Audio Discovery* 3.0 for Windows and Macintosh (with real-time DSP), *VMR* 1.1, Emagic's *Zap* lossless audio-file compression for Mac (reviewed in the September 1997 **EM**), and *Cool Edit Pro LE* for Windows, a 2-track version of Syntrillium Software's *Cool Edit Pro* multitrack audio editor. One very cool feature in *Cool Edit Pro LE* is DirectX DSP plug-in support, which is not provided in *Logic Audio Discovery*. This new package will cost the same as the current Audiowerk8 system.

Finally, as we go to press, Emagic is preparing to release its API for Audiowerk8 to other software developers. Of course, it's an open question who will support the card, given that these other developers' products compete with *Logic Audio*. But such direct support might not be necessary because Emagic is also currently developing new, more robust drivers that will let all Mac and Windows users access all eight Audiowerk8 outputs with any program that supports generic Sound Manager or Windows audio drivers.

Audiowerk8 Specifications

Card Type	PCI
Analog Inputs	2 (-10 dBV, unbalanced RCA)
Analog Outputs	8 (-10 dBV, unbalanced RCA)
Digital I/O	stereo S/PDIF (RCA)
D/A Converters	18-bit, 128x oversampling
A/D Converters	18-bit, 128x oversampling
Sample Rate	variable to 50 kHz, resolution 1 Hz
Frequency Response	20 Hz–20 kHz, ± 0.5 dB
THD	0.006% (@1 kHz, 0 dB)
Dynamic Range	92 dB (A-weighted)

A HAPPY ENDING

Now that it's "werking," I love this card. I still don't know why I had all the early problems or how I inadvertently fixed them. Hopefully it's a software issue and not my computer, but you never know.

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WORTH EVERY PENNY

The Audiowerk8 card comes bundled with Emagic's new *Virtual Multitrack Recorder (VMR)*, a very spiffy-looking, 8-track audio-recording program that uses a familiar tape-recorder interface. Written for use with the Audiowerk8, the program records two tracks at a time.

The top of the screen contains the Track window, where the waveforms for individual tracks are displayed (see **Fig. A**). Tracks can be named, and Control-clicking a track name brings up a menu from which you can move, rename, copy, normalize, or delete the selected track. To the right of this are buttons for creating and mounting a virtual Tape (which is a metaphor for a folder of audio files) and selecting analog or digital input. A pitch-control (varispeed) button that wasn't working in my version is also available and looks cool when it opens. [This feature is operational in the shipping version. *Ed.*] The bottom half of the display features level meters, Solo, Record, and Mute buttons, function buttons, locators, main locators (explained shortly), a tape-position counter, and transport controls.

You begin your session by creating a Tape. The length of the Tape is limited only by the size of your hard drive. There are 24 locator points used for navigating a file and two main locators that can be used for defining regions for editing or autodrop recording. You can set the main locators by pressing function buttons while the tape rolls or by dragging a value from another locator.

A large Cycle button allows looped playback between main locator points. You can't yet combine Autodrop and Cycle to record many takes of a difficult passage, but according to Emagic, that will be implemented in the future. [The current shipping version provides this feature.] Tracks can be armed individually or linked for stereo recording. You also get solo and mute for each track. The Tape Counter displays hours:minutes:seconds:hundredths of a second.

Virtual Multitrack Recorder has been described as a "virtual ADAT," but that's probably not a fair comparison. You can lock an ADAT to anything that reads or writes time code, including video, a sequencer, another ADAT, or a modular HDR. *VMR* can't sync to time code. However, Emagic has promised an upgrade that will add the ability to generate MIDI Time Code, allowing *VMR* to act as a master. I would like to see the ability to read code, as well, or at least to respond to MIDI Machine Control so that *VMR* can slave to sequencers and other devices. You cannot bounce tracks together internally, but that, too, is on the way.

The editing functions are unwieldy and unintuitive. You select the regions to be edited by setting the in and out points via the two main locators. This can be done by capturing the locations on the fly (pressing the locator buttons or function keys). That doesn't sound so bad, but you'd better be right on the money, or you'll need to fudge around with the locator numbers until the edit points are exact. Source tracks are selected by soloing them, and destination tracks are selected by enabling Record. The beginning of the destination region (if it's different than the source region) is selected with the Tape Position Display. You can then access to the editing functions by pressing the Edit button. This gives you a menu from which you can copy, move, exchange, silence, or bounce regions.

I would much rather be able to select regions by dragging over them and using Cut, Copy, Paste, or Clear in the traditional way. Drag-selecting is not available right now, but it is one of the promised future enhancements.

FIG. A: The graphically striking *VMR* will eventually be a nice little low-end production tool, but many features are not yet functional.

Another problem is that the key commands are not well implemented. Most programs use the space bar to trigger playback, but *VMR* uses it for Record. You cannot customize these commands, so it takes a little getting used to. The manual is sparse, and the included Read Me files simply tell you which features described in the manual don't work yet. The fact that there were several such features indicates that Emagic served up this program before it was ready.

Emagic has promised to make a lot of improvements in *VMR*, and the company's track record for upgrades engenders confidence that this will be done. Until then, the software remains more eye candy than useful recording tool. But it's free, and it's worth every penny.

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Product Summary

PRODUCT:
Audiowerk8 PCI audio card
PRICE:
$799
MANUFACTURER:
Emagic, Inc. USA
tel. (906) 477-1051
fax (906) 477-1052
e-mail info@emagic.de
Web www.emagic.de
CIRCLE #443 ON READER SERVICE CARD

EM METERS	RATING PRODUCTS FROM 1 TO 5
FEATURES	● ● ● ●
AUDIO QUALITY	● ● ● ● ◖
VALUE	● ● ●

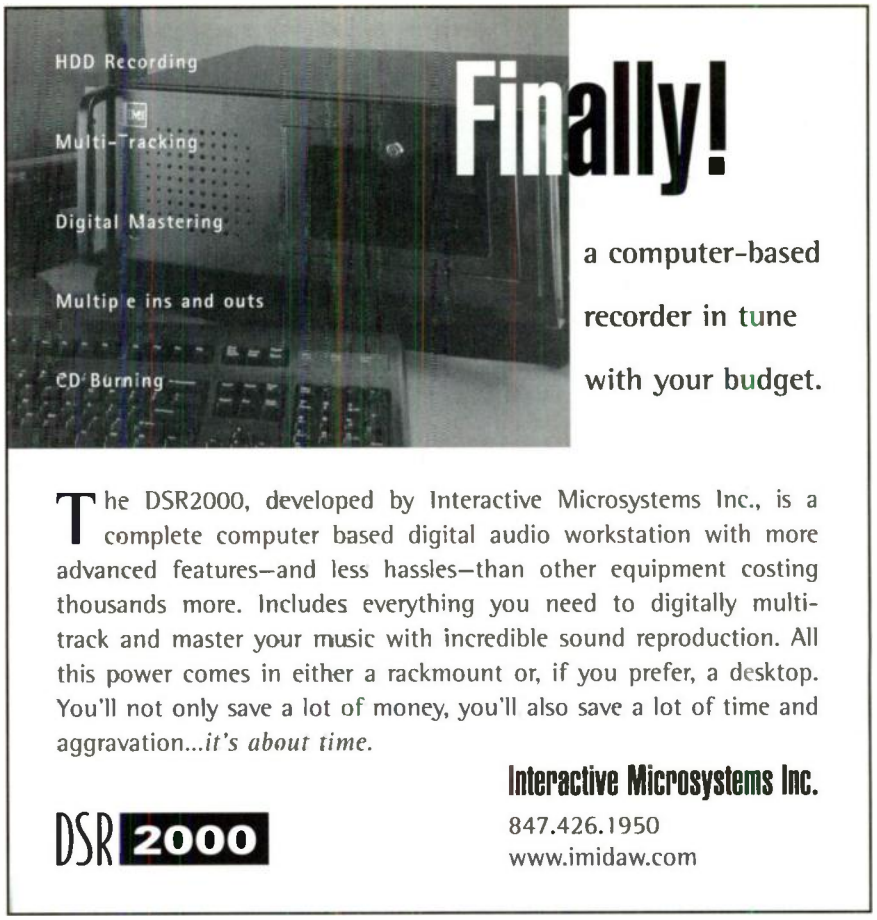
For that matter, other than the mysterious gremlins, all but one of my reservations about Audiowerk8 were *Logic Audio* issues, which apparently will be resolved in version 3. My biggest reservation, of course, was that as of this writing you need *Logic Audio* or *Logic Audio Discovery* to use all of the card's outputs. That apparently will no longer be an issue when Emagic releases the aforementioned "robust" drivers for 2 × 8 operation.

I advise that if you want to use non-Emagic multitrack audio software, you should wait to buy the Audiowerk8 audio card until Emagic delivers these drivers. The idea of using a multitrack audio program with Audiowerk8 functioning as a 2-in, 2-out card is not particularly enticing.

On the other hand, you could just switch to *Logic Audio* from your current sequencer to take advantage of Audiowerk8's eight outputs right away. If you don't mind completely relearning (and I mean *completely*) all you've learned about sequencing, it's worth considering, especially given the new bundled software. *VMR* isn't a professional package (see sidebar, "Worth Every Penny"), but it is a nice extra. The focus has shifted to *Logic Audio Discovery*, which *is* powerful software, if not quite as versatile as *Logic Audio*, and you can always upgrade to the top-of-the-line program if you wish.

Regardless of your software preference, the Audiowerk8's audio quality is excellent, and the price is right.

Rick DiFonzo *has worked with Roger Waters, Joan Osborne, and Belinda Carlisle and is considered by many to be a legend that will last a lunch time.*



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Benson Audio Labs StudioStat 8.2

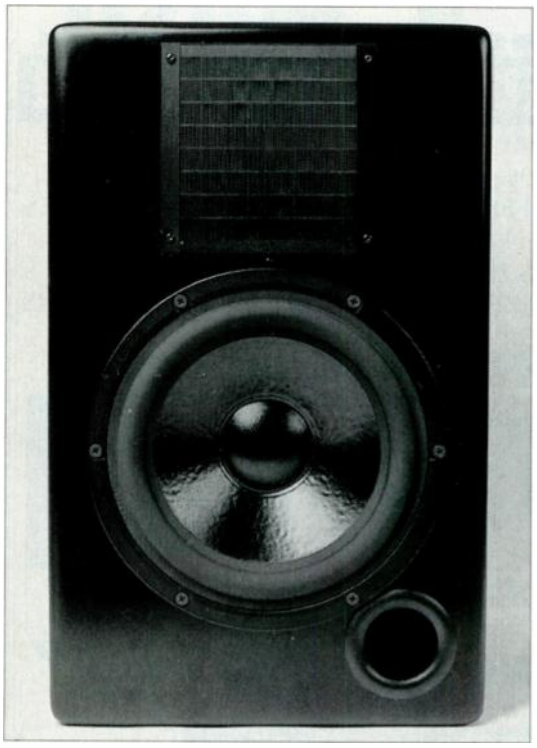
By Rob Shrock

A hybrid design brings electrostatic technology to personal-studio monitors.

Here's something new in affordable close-field monitoring: Benson Audio Labs' StudioStat 8.2 electrostatic/dynamic monitors. Until now, electrostatic monitors employed electrostatic elements exclusively and were prohibitively expensive for the average personal-studio owner. But by combining a conventional dynamic woofer with an electrostatic high/mid-frequency element (in place of the standard dome tweeter), Benson created an affordable hybrid monitor that sounds great.

Just as dynamic (cone) speakers work using the same principles as dynamic microphones but in reverse, electrostatic elements work using the same principles as condenser microphones in reverse. Like condenser mics, they do a superior job of reproducing high and midrange frequencies, maintaining stunning transient accuracy. Indeed, it is these characteristics of electrostatic elements that have led many audiophiles to prefer them to conventional speaker designs.

Now, thanks to the economics of trickle-down technology, the advantages of electrostatic sound reproduction are within reach of the personal studio. I mixed on the StudioStat 8.2s for several weeks, and after getting used to them, I was able to turn out some great mixes.



The Benson Audio Labs StudioStat 8.2 close-field monitors combine an electrostatic tweeter with a conventional woofer. The result is stellar high and high/midrange reproduction, excellent imaging, and stunning bass.

ELECTROSTATIC ATTACK

Like the diaphragm of most condenser mics, the diaphragm of the StudioStat 8.2's electrostatic panel is made of a treated, 0.1 mil Mylar film that has extremely low mass. It doesn't take much to move film that's only one ten-thousandth of an inch thick, which is precisely why the electrostatic panel is so faithful in reproducing high and midrange frequencies along with transients.

The 5 × 5-inch electrostatic panel creates a tightly controlled high-frequency dispersion, which minimizes smearing from off-axis reflections. This makes the "sweet spot" more narrow than you may be accustomed to, but in return, you get less frequency interaction between the source and rebounding reflections—resulting, again, in more accurate highs and mids.

Another advantage of the electrostatic panel's tight dispersion is that stereo imaging is extremely defined and stable. For example, I noticed that an *a cappella* vocal track panned to the center remained practically dead-on between the speakers whether I moved my head from side to side or up and down. This is typically *not* the case with most close- and mid-field monitors.

BLUE LIGHT SPECIAL

To help you work within such a narrow sweet spot, Benson has fitted the StudioStats with a unique and clever aid for maintaining the optimal listening position. Positioned equidistantly between each woofer and tweeter is a silicon-carbide, blue light-emitting diode housed within a custom light pipe. These distinctive LEDs optically guide you to the ideal monitoring position; if you move out of the listening plane either vertically or horizontally, they fade from view. It's a cinch to see the lights peripherally when in the proper position, and I found them extremely helpful and accurately placed. Good job, Benson.

Each LED also serves as a power indicator for the electronically regulated high-frequency bias supply, which is powered by an external wall-wart DC adapter that connects to the back panel of each speaker. Admittedly, it's a bit of a pain to have to connect wall-warts to each speaker, but then, that's part of the design that makes the electrostatic panel sound so good.

The StudioStat's rear panel provides a 3-way High Frequency Contour switch that affects the overall level output of the electrostatic panel. The switch can be set to flat, -2 dB, or +2 dB. All frequencies above the monitor's crossover point, which is fixed at 1.6 kHz, are affected equally (i.e., not sloped) by the switch. This is a nice feature that lets you tailor the monitors' frequency response to your room and taste.

BASS CONVENTION

Although the electrostatic element is particularly impressive, the StudioStat's low-frequency driver is nothing to sneeze at, either. The 8-inch, moving-coil woofer is composed of a treated composite-fiber cone with a 2-inch, round-wire, copper voice coil bonded onto a high heat-dissipation aluminum former. The surround is made of low-damping butyl rubber mounted in a long-stroke, low-reflection, cast-magnesium frame. (The StudioStat 6.2 uses a 6.5-inch woofer but is otherwise identical to the 8.2.)

A cylindrical bass port beneath the woofer, coupled with a tight cabinet design, allows the StudioStat to produce a very strong and well-defined low end. In fact, it sometimes felt as if a subwoofer had been connected to the system! Very impressive.

The StudioStat cabinets are larger and heavier than most close-field monitors, weighing in at 34 pounds each. All internal joints are glued and braced, and the cabinet has an overall sturdiness that reflects fine craftsmanship.

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StudioStat 8.2 Specs

Woofer	8" treated composite fiber cone
Tweeter	5" x 5" electrostatic element (0.1 mil, treated DuPont Mylar film)
Frequency Response	48 Hz–19 kHz (±3 dB)
Crossover Frequency/Slope	1.6 kHz/18 dB per octave
Power Handling	200 watts (EIA)
Inputs	gold-plated, 5-way binding post
Enclosure Material	medium-density fiberboard with hardwood front panel
Dimensions	17.75" (H) x 11" (W) x 12" (D)
Weight	34 lbs. ea.

It's a good-looking cabinet, too: completely black except for the blue LEDs, with a hand-rubbed satin finish on the hardwood front baffle.

Due to their size and weight, it would be a chore lugging the StudioStats from studio to studio. However, they are durably built, and the electrostatic panel is well protected by a vented shield, so if you're up to the task, the monitors should be, too.

HIGHS AND LOWS

When I first listened to CDs on the StudioStats, my attention was immediately drawn to the clarity of the high and upper-mid frequencies as well as the solid bass reproduction. The top end is very focused—as long as you keep your head in the proper listening position—and sounds as if it has been adjusted by a special "lens" designed for audio.

The overall character of the speakers, however, struck me as slightly edgy and carved out in the midrange. I'm thankful that Benson provided the High Frequency Contour for the electrostatic panel, which allowed me to tailor the response a bit. Initially, I found the Flat setting a bit bright, and the +2 dB setting added entirely too much top end. (A spokesperson for Benson explained that the +2 dB setting was provided primarily for trade shows, where the extra "edge" is needed to cut through the din.) However, the -2 dB setting, though only subtly different from the Flat setting, diminished a bit too much high end for my tastes. Eventually, after switching between the three settings during the evaluation period, I settled on the Flat setting as my favorite. Of course, the setting you choose should be determined by your room's acoustics and your personal preferences.

Another factor that adds to the perceived brightness of the electrostatic panels is that their tight dispersion increases the phase accuracy of high frequencies. (Spectral enhancers typically employ phase manipulation to attain similar results.) But after spending time with the StudioStats, experimenting with the High Frequency Contour while listening to a familiar, well-recorded classical CD, I quickly came to like them. The recorded orchestra sounded very natural and focused.

The StudioStats provide a distinct soundstage: I was able to hear forward (close) and back (far) localization in recordings, in addition to left and right imaging, better than I can with a lot of other speakers. This added to the three-dimensionality of recordings, especially of acoustic music. I also noticed that ambience, whether natural or electronic, was less smeared sounding on the StudioStats.

These would be great monitors for those who work a lot with jazz, classical, and other predominantly acoustic music. Although I didn't do much tracking with them, I'm sure the StudioStats could really assist fine-tuning of microphone positioning during recording, thanks to their phase coherence, accurate imaging, and smooth frequency response.

TIGHT SPOT

As you've probably ascertained by now, one of the main problems with using

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the StudioStats is that you're forced to stay within the narrowly defined sweet spot. If you drift just a little outside the "sight lines" of the blue LED guides, the top end begins to roll off noticeably due to the directivity of the electrostatic panel. I'm not particularly fond of narrow-dispersion monitors in general, and when other people are in the studio with me, they can present a tangible problem, especially when clients don't know what a sweet spot is in the first place.

I prefer monitors with a good high-frequency spread that gives everyone in the room a working sense of what's going on, regardless of their listening position. On the other hand, the further you are outside the sweet spot on *any* close-field monitoring system, the more you get off-axis reflections polluting the overall frequency spectrum, which is precisely the problem the StudioStat design averts.

The dilemma is that the StudioStats are phenomenal sounding when you're perfectly positioned in the sweet spot; the very solid low end, coupled with the focused, phase-accurate high frequencies, provides a clarity and precision that is hard to find in other monitors. However, staying in the sweet spot requires vigilance, and it's uncomfortable, if not impossible, for more than one person to inhabit it simultaneously. You'll have to decide for yourself how this would affect your way of working.

▼

It sometimes felt as if a subwoofer had been connected to the system.

I also have reservations about the accuracy of the StudioStats' midrange reproduction. The lows are tight and the highs are clear, but my lasting impression is that the sound is not warm and full in the middle frequencies. Crossovers are always potential problem spots, of course, and the 1.6 kHz crossover could be the culprit. Then again, this is a fairly subjective point, midrange content being another "preference issue" that varies from person to person.

DOUBLING UP

I found that using both the StudioStats and my more conventional close-field monitors provided a near-perfect monitoring setup. (My monitor of choice these days is the Event Electronics 20/20bas, which has a nice dispersion of high frequencies and sounds great from many listening locations.) I like listening on a variety of speakers when I work, and the StudioStats proved an excellent second monitoring system.

I was able to pump out a few quick mixes using the StudioStats. Not only was I able to work quickly without a lot of guesswork, but the resulting rough mixes translated well to other systems. They even sounded good in the old car-stereo "lab."

I particularly appreciated the solid low end while making decisions on bass content. But here's a suggestion: don't let the StudioStat's extended bass reproduction make you shy with the bass. Just listen to a few things you're familiar with, get comfortable, and enjoy the extra low-end resolution. Any monitoring system requires getting used to, and some great mixes can be made with the StudioStats once you've spent a little time with them.

AUDIOPHILE PERSPECTIVE

The StudioStat 8.2 is a fine monitoring system worthy of professional mix and mastering rooms, tracking dates, and project studios. The phase accuracy and stable imaging—attributable to the electrostatic elements—are especially noteworthy, as is the excellent bass reproduction. Although the electrostatic approach will be new to many readers, it clearly has its advantages, and the hybrid design of the StudioStats—combining an electrostatic tweeter with a conventional, dynamic woofer—is both successful and unique.

For those concerned about the narrow dispersion and resulting tight sweet spot, the StudioStats offer precision assistance with their unique LED "sight guides." For those who don't mind the restraints of working within a super-defined sweet spot, the payoff in phase accuracy and imaging is considerable. Moreover, if you're looking for an adjunct monitoring system, I highly recommend the StudioStats because they can provide a different and very useful "second opinion" on your mixes. Thanks to Benson Audio Labs, the audiophile perspective is now an affordable option.

Product Summary

PRODUCT:
StudioStat 8.2 hybrid close-field monitors

PRICE:
StudioStat 8.2 $1,399/pair
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Composer-producer **Rob Shrock** *has worked with Burt Bacharach, Dionne Warwick, LeAnn Rimes, Al Jarreau, Stevie Wonder, and a host of others. He can be reached through Avatar Productions at avatarprod @aol.com.*

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World Radio History

ADA Ampulator

By Don Washington

Emulate classic tube-amp and speaker-cabinet combinations.

When it comes to electric guitar, nothing beats the tone of a tube amp cranked to 11. However, due to lack of space, excessive sound transmission, or inadequate instrument isolation, many personal studios simply can't accommodate a cranked-up stack of Marshalls or a screaming Fender Twin. That's too bad because guitar amps played at low levels rarely cut it, and line-level guitar signals typically result in thin, sterile-sounding tones.

To address this problem, ADA has introduced the Ampulator, a combination tube power amp and speaker-cabinet emulator designed to produce a miked-amp sound from a line-level signal. (The line-level signal can come from the output of a guitar preamp, a mixer send, or a guitar-amp effects send.) The 1U rack-mount unit lets engineers and guitarists dial in an assortment of power-amp and speaker-cabinet tonal characteristics, plus mic selection and positioning, while monitoring comfortably through control-room monitors or headphones.

Unlike systems that include a vacuum tube but configure the remainder of the signal path using digital signal processing, the Ampulator uses a 12AX7A configured as a real power amp with a real output transformer, which in turn is connected to a real reactive (speaker) load—all on a micropower level. This provides authenticity of sound and a great deal of flexibility and allows control over a number of amp and cabinet characteristics, including maximum power, amount of crossover distortion, presence of artifacts such as hum and transformer notch distortion, triode or pentode output-tube behavior, and output-stage symmetry or matching. The design proved very effective: I was able to create guitar tones remarkably similar to those that can be achieved with various Marshall, Fender, and other rigs. (The manual offers seven detailed settings, including Marshall Clean, Vox AC30 Class A, and Champ Class A.)

FIRST UP

The unit's rear panel offers one balanced/unbalanced ¼-inch TRS input jack and both unbalanced ¼-inch and balanced XLR outputs. The dual-output design allows users to send two signals simultaneously, making it possible to send one output to a speaker and the other directly to a mixer during a live performance. A button switches the XLR output jack between line-level (0 dB) and mic-level (-30 dB) operation. The balanced output jack also provides a ground-lift switch for eliminating some types of ground loops.

The front panel is divided into three sections: Output Level, Push-Pull Tube Amp & Power Emulator, and Mixed Cabinet Emulator. A large power button is located to the right of the three sections.

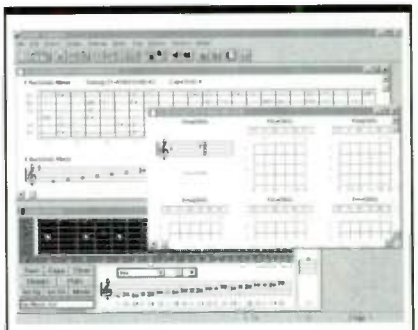
The Output Level section consists of a system-bypass button, output clip LED, and output-level knob. The latter control is essential for matching output and input levels to avoid clipping when you change the power, input, or drive level. The maximum power output setting is 200 simulated watts RMS.

The Push-Pull Tube Amp & Power Emulator section provides rotary controls for Drive Level, Presence, Tube Matching, Hum Injection, Tube Bias, and Power Level. It also provides a push-button Character control (Triode or Pentode) and two sets of 3-segment LEDs: a vertical row showing tube-amp signal status (Clean, Compress, or Overdrive) and a horizontal row indicating Bias Setting (A, AB, or B).

The Drive Level and Power Level controls work together like typical guitar-amp volume and master-volume stages, with resultant tonal ranges indicated by the vertical, "traffic-signal" LEDs. Green means clean: when this LED is lit, the input signal is not sufficient to cause tube compression or clipping. Increasing the Drive Level and reducing the Power Level triggers the Compression (yellow) light and indicates the onset of tube distortion. Further increasing Drive and reducing Power Level increases the distortion, activating the Overdrive (red) indicator light.

The Presence control, adjustable from 0 to +9 dB, regulates the amount of negative feedback in the power stage. (Negative feedback is a component of amplifier design that reduces unwanted distortion and improves control of the speaker-damping factor, resulting in a flatter frequency response.) When it's set at 0 (minimum), the flattest frequency response is obtained. When advanced clockwise, the Presence control reduces negative feedback on the high end, appearing to boost high

The ADA Ampulator gives home recordists a quick and easy way to record a variety of realistic-sounding amp and speaker combinations without disturbing the neighbors.



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Tube Bias Variations

Class	Distortion	Output Power	Efficiency	Damping Factor
A	least	least	about 25%	high
AB	medium	slightly less than Class B	about 60%	medium
B	excessive	highest	about 75%	low

frequencies and giving an edgier sound to the distortion—at least until the amp clips, at which point the apparent high-frequency boost disappears. Of course, tonal changes resulting from different Presence control settings depend on the combined settings of the various other controls, as well.

Mismatched tubes in tube amps can lead to excessive distortion, increased hum, and a loss of power and efficiency. The Tube Matching control is used to match the tube with the amplifier and help eliminate hum and excessive distortion. The Tube Matching control works interdependently with the Hum Injection control; to match the tube, you turn the Hum Injection to maximum and listen to the output signal. If this causes an audible increase in hum, the Tube Matching control must be adjusted until the hum is minimized; if there's no increase in hum, then the Tube Matching control is properly adjusted. Once the tube is properly matched (or matched to taste), the Hum Injection control can be returned to the desired position. Tube Matching adjustments must typically be made after significant changes in the Tube Bias, Power Level, and/or Tube Character controls.

Hum Injection, when set at high levels, adds a hum or "ripple" to the signal from the power supply. This ripple is the output signal modulated at twice the AC power-line modulation, a subtle but essential component of the sound created by a "real" amp-and-speaker combination. The results from adjusting this control are most pronounced when changing from the Class A to AB settings—in effect, switching amp rigs at the turn of the dial.

Tube Bias is one of the Ampulator's core controls. In tandem with Hum Injection, it lets you adjust the tube settings to emulate Class A, AB, or B amplifiers, significantly altering amplifier characteristics. The AB setting is probably the most recognizable, producing a variety of high-power amp sounds. The subtleties of the tonal variations are impressive: by changing the Tube Bias control, I was able to effectively imitate many of my favorite amp-and-speaker combos. (See the table, "Tube Bias Variations," for a look at results of the various settings.) The settings in the Class A section didn't have enough bite for my tastes, but if you need a drier, line-level type sound, the Class A section could come in handy.

▼

In effect, you can switch amp rigs at the turn of a dial.

Power Level settings are adjustable between 0.2 to 200 simulated watts RMS. This control acts like the master volume control found on many tube amps. Its range allows simulation of low- and high-power amplifiers or anything in between. The Maximum setting is recommended for increased headroom. Any setting below that effectively switches the unit from Class AB to Class A, allowing most signals that pass through to remain free of unwanted coloration. As the level is increased, so is the compression level. This type of compression is most effective for adding transients without unwanted distortion. It causes the signal to break up at the high end, allowing control over a more subtle type of tube distortion.

As mentioned previously, the Character adjustment is a push-button control that switches between the Triode and Pentode tube setting. It sets the limit for the current or voltage level of the push-pull amp's output. The names *triode* and *pentode* refer to the number

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of electrical elements inside a vacuum tube. Triodes were pretty much abandoned in the 1950s with the advent of pentode tubes, which are more efficient and undistorted over a wide range. However, triodes tend to have a better damping factor and offer a larger range of compression before clipping occurs. Therefore, high-input signal levels may sound better in the Triode setting whereas the Pentode setting offers a more accurate representation of most "modern" amps.

CABINET DECISIONS

The Miked Cabinet Emulator section provides buttons for Cabinet Bypass, Speaker Array (three buttons for 1-, 2-, or 4-speaker arrays), speaker size (10-inch or 12-inch), Driver (bright or dark; dark is "vintage"), and cabinet style (open or closed). Knobs control the Lo Resonance and Hi Balance equalization for the Miked Cabinet Emulator.

The Speaker Array effects are very realistic. I was able to re-create a tone very similar to the one I get with my Boogie 60/100 head and closed-back Fender cabinet (circa 1968) with two 12-inch Altec speakers. The Cabinet Bypass button lets you bypass the Speaker Array function altogether, resulting in a tone that closely resembles a direct-box guitar signal fed into a mixer.

The Lo Resonance and Hi Balance controls offer an adjustment range from -6 to +12 dB. These let you mimic variations in mic placement. For instance, with a +6 dB boost on both controls, the Ampulator emulates a mic pointed on-axis (at a 90-degree angle) toward a single speaker in the cabinet. Other settings result in varying degrees of off-axis mic placement.

HOT STUFF

I'm very impressed by the Ampulator. The unit is capable of duplicating the sounds of many amp and speaker combinations, including classics from Marshall, Fender, and Vox. I A/B'd it with a 60-watt Fender Twin, feeding a signal from the line output of the Twin (with the speaker output attenuated all the way and the bass, treble, and mid controls set flat) into the Ampulator's amp section, with the output muted, and then to the studio monitors. I then dialed up a Fender setting on the Ampulator and compared the two. The Ampulator's Fender Twin sound really smoked and was virtually indistinguishable from the real Twin.

The Ampulator is fun and reasonably easy to use, though you have to expect to do some tweaking. The owner's manual provides a useful chart of recommended settings, but anyone familiar with guitar amps will have no problem adjusting the unit's parameters by ear. I readily dialed in a number of guitar tones that provided natural-sounding tube distortion and enough high-frequency crackle and low-frequency resonance to satisfy almost any guitarist.

I have only two complaints. The first has to do with layout: it would make better sense for the Ampulator's front-panel controls to be arranged more like those on a tube amplifier, with the output section on the left side, the Push-Pull Amp & Power Emulator section in the middle, and the Mixed Cabinet Emulator section last. My other gripe is that the price of the Ampulator puts it in the same range as an amp/speaker combo. That's a stiff tariff for a single-rackspace box when the same amount of money could buy a real guitar amp and speaker cabinet.

Then again, when recording in a home studio, using a real guitar amp and speaker stack can be a problem. After all, your neighbors might be less enthusiastic about your six-string pyrotechnics than you are, especially late at night. The Ampulator offers a great-sounding, easy-to-use alternative.

Product Summary

PRODUCT:
Ampulator tube preamp/speaker emulator
PRICE:
$699
MANUFACTURER:
ADA Signal Processors
tel. (510) 532-1152
fax (510) 532-1641
e-mail ada@signal.com
Web www.adasignal.com
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EM METERS	RATING PRODUCTS FROM 1 TO 5
FEATURES	● ● ● ◖
EASE OF USE	● ● ● ◖
AUDIO QUALITY	● ● ● ●
VALUE	● ● ●

Don Washington *is a musician, songwriter, personal-studio owner, and devout gearhead who daylights as operations coordinator for Mix Bookshelf and Mix Books.*

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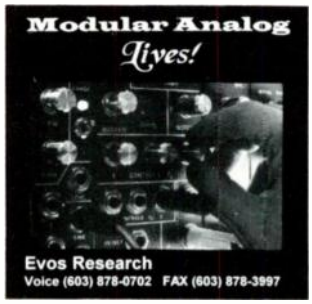

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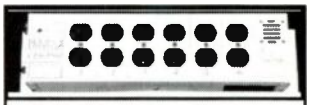

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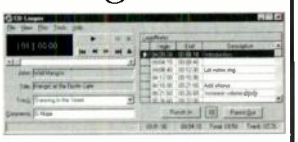

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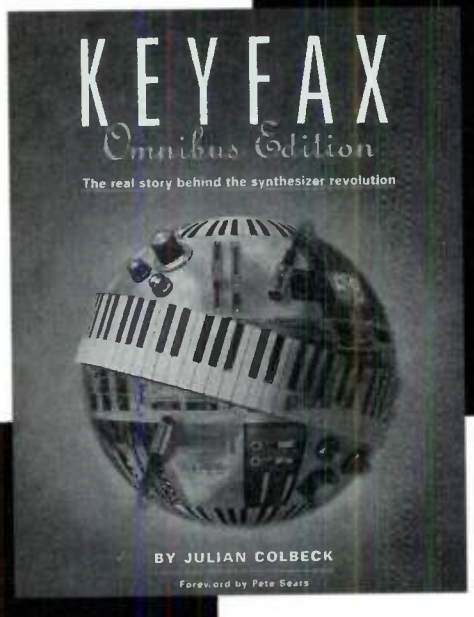

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World Radio History

TECH PAGE

O Solero Mio

Sunhawk soars with online sheet music.

By Scott Wilkinson

During my college years, I made many pilgrimages to Byron Hoyt Sheet Music Co. in San Francisco to buy study scores, solo pieces, and brass-ensemble works. I spent hours poring over reams of music, trying to hear it in my head as I looked for good pieces to play.

These days, there's a much easier way to shop for sheet music: on the Internet. Sunhawk Corp. (tel. 888/786-4295 or 206/528-0876; fax 206/528-0942; e-mail sunhawk@sunhawk.com; Web www.sunhawk.com) is at the forefront of online sheet-music distribution. Started by two former Microsoft engineers, the company has developed a technology called Solero that facilitates the sale and copyright protection of sheet music on the Web.

The process begins by bringing musical data into the *Solero Music Editor*. This can be accomplished by scanning and optical character recognition (OCR), by importing Standard MIDI Files or *Finale* files, or by direct entry via mouse and computer keyboard. The OCR software can be trained to recognize new fonts, sizes, and formats, and it's easy to add new file converters as needed.

The data is stored in a relational database. All objects (such as note heads, stems, flags, and clefs) are stored separately and linked as necessary, and new objects can be easily added. Similar objects are stored consecutively in the physical file, improving the efficiency of the Lempel/Ziv compression used to reduce storage requirements and download times. The score objects can also be linked and synchronized to a MIDI file, which lets you hear the music as you look at the score. Solero files can then be stored on CD-ROM, Enhanced CD, or a file server for Internet access.

Handel's *Messiah* is one of the current CD-ROM products. As you play the associated MIDI file (which defaults to the General MIDI standard), the score scrolls along and highlights the currently playing notes, which is great for educational purposes.

Windows-based Internet customers can download the *Solero Music Viewer* (see **Fig. 1**) free from Sunhawk's Web site. Once you have the viewer, you can request any piece in the Solero catalog; the piece is then encrypted and downloaded to your computer. The viewer displays the first page of the score and lets you play the music on that page (assuming you have a MIDI sound module or sound card), which gives you an opportunity to decide whether you want to buy it.

If you decide to purchase the score (which typically costs about half as much as the traditional printed version), a decryption key is sent to your computer to unlock the entire file. You can then print the music on your printer and extract the MIDI data that corresponds to the music.

Unlike traditional sheet music, Solero files can also be tweaked in a number of useful ways. For example, you can disable a part in order to play along *à la* music-minus-one, change the instrumentation and/or tempo, alter the size and other graphic attributes of the score, etc.

One of the most important aspects of this technology is its built-in security for online customer transactions. In addition, Sunhawk's proprietary encryption technology helps protect copyrights. After purchase, the music retains some encryption that allows it to be printed and played only on the computer to which it was originally downloaded. In addition, each file contains a digital "watermark" that includes copyright information. Other protections, such as limiting the number of printouts and disabling the extraction of MIDI data, are available, as well.

The age of online commerce is fast approaching, and sheet music is a natural type of product to sell in this manner. The only thing missing is the backache that comes from standing over sheet-music bins for hours.

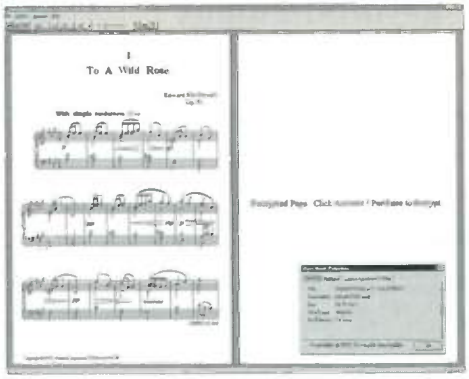

FIG. 1: The *Solero Music Viewer* displays the first page of a score and provides the means of ordering the entire piece online.

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