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Electronic Musician

November 1995

Multimedia Speakers

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Nashville's Song Tree & Emerald Studios

San Francisco Symphony owns an 8•Bus

Writer/Producer Shep Pettibone (of NYC's Mastermix Studios) has a long list of credits including Madonna, Elton, Janet, Whitney, and Euro-dance group, Real McCoy, to name a few.

Frank Serafine was one of the first to use an 8•bus for ADR, foley and sound editing on a major motion picture. He's got Mackie 8•Bus consoles in every room of his facility.

Kyle Lehning, President of Asylum Records, Nashville, uses a 32•8 in his living room to record demo's and mix tracks for a variety of the label's top talent.

Prime-time editing at Helix Studios. Three-time Emmy Awarded David Scharf's credits include effects/sound dialog editor on the hit TV show "Cheers" and "The Untouchables."

EVER WONDER WHY OTHER 8-BUS MANUFACTURERS

Engineer/producer, Frank Heller uses his CR-1604 and 32•8 on a variety of recording projects for major label acts.

Johnny Caswell, co-owner of Center Staging in Burbank, California—rehearsal center of the stars.

Technician/engineer of Vancouver B.C.'s Warehouse Studio, Ron 'Obvious' Vermeulen custom-configured a 32•8 and 24E into Bryan Adams' Jamaica studio (pictured here).

Hooked up at all times into Capital Television Network's Mackie 24•8 are 10 VTR's, 4 satellite receivers, 2 off-line editing suites, and 8 mics, says video production editor, Gary Morgan.

Marc Ramaer is, among other things, k.d. lang's right hand man when it comes to sound. He designed her studio around a Mackie 8•Bus system and helps her track and mix her dazzling records.

Matt Rollings is THE first call session keyboardist in Nashville. His credits list more stars than exist in the three closest galaxies.

Paul Levy's Advanced Audio is one of Los Angeles' premier tech/rental firms—everything from outboard gear to custom wiring—with clientele including members of the Stones.

All of the Friends of Mackie in this ad paid for their own 8•Bus consoles (Mackie does not do paid endorsements)

This is the console that won the 1994 TEC Award for Technical Achievement in Small Format Consoles. It's also the only 8-bus mixer that's expandable into a decidedly UN-small-format console of 128 channels or more by adding 24•E Expanders.

MAYBE IT'S BECAUSE SO

Surround sound and digital post production on the independent Canadian feature film, "When Night Is Falling." 112 DAT and Protools channels mixed directly to ADAT via an 8•Bus. (L to R): Sound Designer, John Hazen, Writer/Director Patricia Rozema, Sound Effects Editor, Alan Geldart.

David Rosenberg's music pushes the creative envelope so much that MTV created a "Top 20 Countdown" visual ID from his music. He's done album gigs for Bob Dylan, Chaka Khan among others, and composed award-winning music for a slew of major network television series' and top jingles.

©1995

More 8•Bus owners: Yngwie Malmsteen, Helmet, Flock of Seagulls, the Commodores, Bobby Goldsboro*

Manny's Car Wash, Brownies New Music Cafe and The Knitting Factory

M.R. Montero uses a 32•8 to record "Live from The House of Blues" for CBS Radio

Drummer David Abbruzzese gained fame with Pearl Jam and has moved on to doing interesting sessions including work with Eddie Kramer on his latest Hendrix orchestral opus.

Creative Director/producer, Michael Frondelli, of the legendary Capitol Recording Studios, has a 32•8 installed in both his home and work studios.

Engineer Ian Parks with main man, Kirk Hammet of Metallica. Ian installed a 56-channel Mackie 8•Bus system in Kirk's home studio.

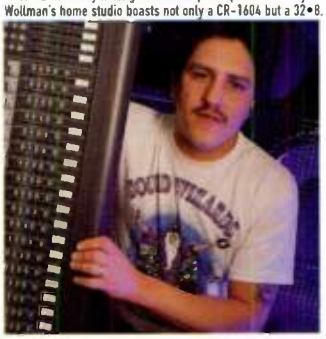
DON'T FEATURE ANY USERS IN THEIR ADS?

Steve Milo talked his boss Michael Bolton into buying one of the first 24•8s that Mackie Designs manufactured.

Billy Moss uses his 8•bus for production work with acts like Coming of Age, Sisterhood, IID Extreme and Tasha Scott.

A man of many hats, guitarist/composer/producer Terry Wollman's home studio boasts not only a CR-1604 but a 32•8.

Queensryche tracked (and partially mixed) their latest Platinum album, Promised Land, in an island cabin retreat/remote studio—Big Log—using a 32•8 and a 24•8. Two automated CR-1604s were also used at a separate ADAT station; a second 24•8 was used during playback.



Brian Van Kleeck of Sound Wizards Entertainment in Middletown, New York told us that the 32•8 is one of the best mixers he's ever used.

MANY PROS OWN MACKIE 8•BUS CONSOLES.

Paul Haslinger's Assembly Room is a cutting edge facility doing music for records and movies in Los Angeles. His latest album, Future Primitive, (Wildcat Records) was recorded, tracked, and mixed on a 32•8 and 24•8.

Having developed a reputation as one of Hollywood's top orchestrators, Hummie Mann has scored over 15 feature films including Mel Brooks' "Robin Hood: Men In Tights," and numerous TV projects.

Ricky Peterson is a producer and keyboardist of uncommon gifts. Best known for his work at Paisley Park. Check out his Mackie tracks on a series of releases on Ben Sidran's Go Jazz label, and on an upcoming album by Donny Osmond.

We once noted in print that a console is only as good as the people who use it.

This ad is our way of recognizing all of you who own and use a Mackie 32•8, 24•8 or 16•8 8•Bus console.

Thank you for trusting our promise that an affordable mixer could deliver the sound quality which used to require a $100,000+ mega-console.

As the list of 8•Bus-recorded platinum albums, feature motion picture soundtracks and TV series credits grows, we're getting pretty confident that we really HAVE delivered on that promise.

Many of you may not yet have gained as much recognition as some of the artists pictured at left. But when you own a Mackie 8•Bus console, you have the same powerful creative tool as they rely on every day.

If you don't own an 8•Bus console yet, send for our all-new 48-page brochure and learn why so many professionals own Mackie Designs mixers. Who knows? You might just wind up in our NEXT 8•Bus users ad.

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I N S I

FEATURES

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DEPARTMENTS

D E Electronic Musician®
NOVEMBER 1995 VOL. 11, NO. 11

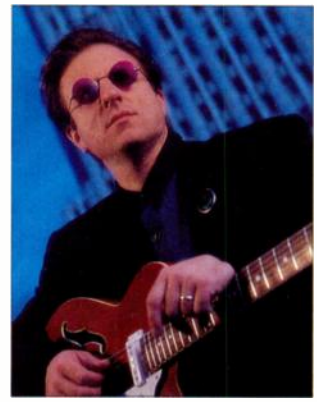
COLUMNS

REVIEWS

Cover: Photo by Barry Muniz.
Special thanks to Advent, Altec Lansing, Bose Corp., Roland Corp. US, and Yamaha Corp. of America.

Project Survival

It's no crime to put off "going pro" until you're ready.



ROBERT PERRY

Evolution can be tricky. Without foresight, it's hard to know whether future scientists will be studying your extinction or marveling at your ability to adapt to environmental pressures. Case in point: Tomorrow's top engineers and producers are bringing more and more projects back to their home studios. They're getting their chops together behind closed doors and stumbling over the bedrock of future audio innovations. They already know about gain stages, the complexities of digital audio synchronization, and the fickle fortunes of mic placement. A mixing console is no more foreign to them than a flush toilet. They'll break rules and tyrannize gear to record the sounds they hear in their heads. And more than anything, they want their personal recording domain to evolve into a project studio.

Be careful what you wish for! In the arrogance of terminology, I realize that "project studio" carries more weight than "home studio," but when it comes down to it, a project studio is simply a home studio that writes invoices. The location and gear can be exactly the same no matter what you call your facility. The only real difference is that a project studio is a *business*. Now you're making music that is making money, and that hard-won privilege drags a lot of responsibilities along for the ride: you know, mundane stuff such as billings and collections, increased tax worries, and the (ugh) glories of comprehensive business accounting. But the truly scary thing about having your personal studio evolve into a project studio is that it drops you into a brutally competitive environment that devours novices and experts alike. Are you ready for all this?

Now, don't get me wrong. I'm sure that nothing would make the **EM** staff happier than to have every reader operating a successful project studio. I'm just saying that if you're not prepared to sacrifice copious amounts of creative time to business affairs, it's no sin to keep your muse at home. The main thing is to keep producing music. When the time comes to step into the commercial realm, you'll know it. People will be hounding you for tracks. To get to that point, however, you've got to have a creative history: a body of work that someone can listen to and say, "Yeah, this person the *perfect* composer/producer for my project!" Unfortunately, running a project studio before you're ready will only doom your creative muse to a spot on the endangered species list.

I'm not crying wolf here. When I opened Sound & Vision Studios ten years ago, my songwriting output plummeted. The studio operations commanded so much of my time that I just didn't have the energy or desire to pick up my guitar. If I did succumb to a bolt of inspiration, the thrill was gone by the time I could book myself into my own studio. (Paying gigs were the priority.) It took years before I could balance the responsibilities enough to produce my own work again.

Don't let this happen to you. Read Mary Cosola's "Working Musician: Get Serious" on p. 102 to find out everything you need to know about the business side of project studios. Then, if you want to take the next step up the evolutionary ladder, at least you'll be well informed about the benefits and dangers that await you. Evolution is fine. Just make sure you're not following a woolly mammoth into the tar pits.

Michael Molenda

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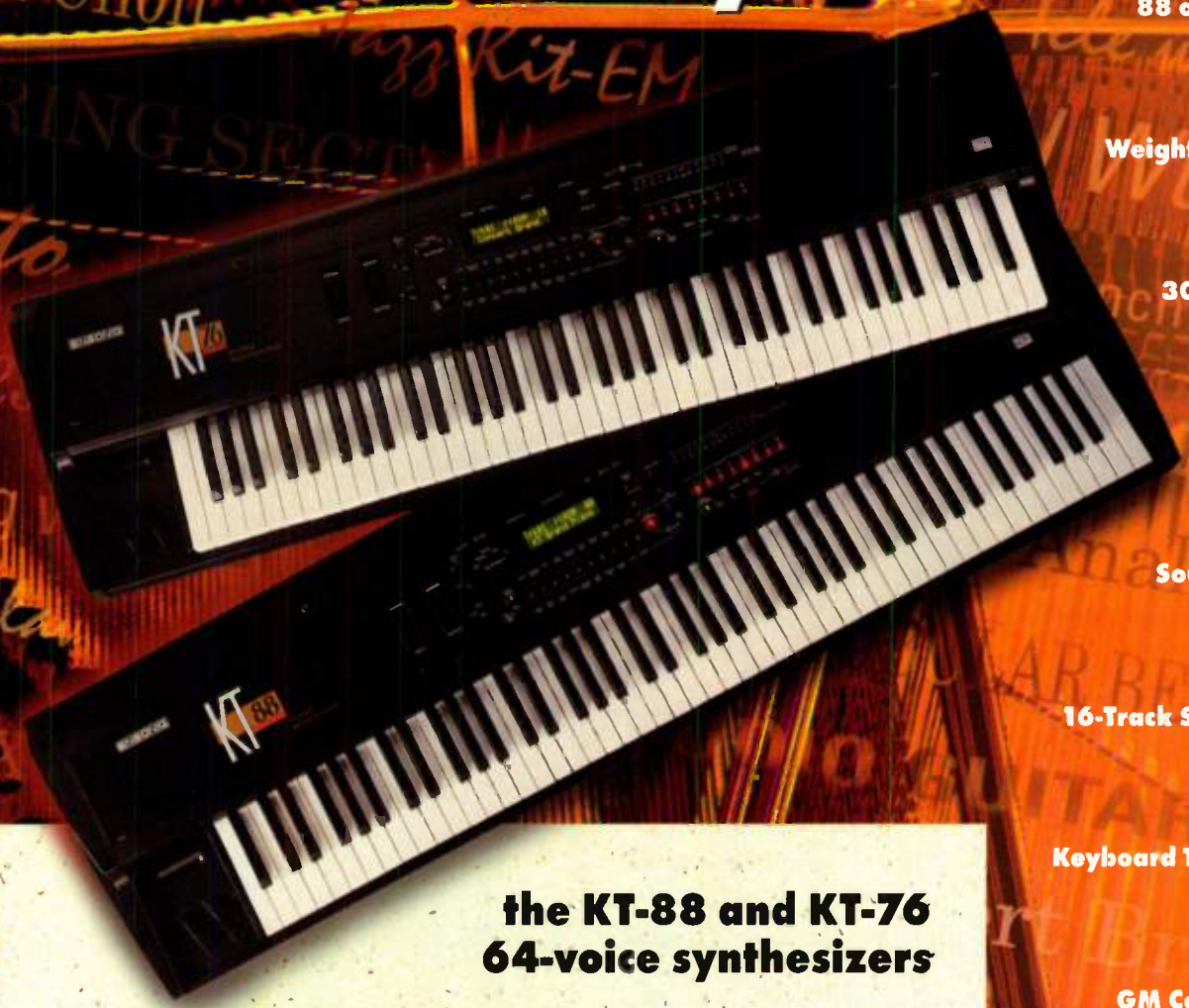

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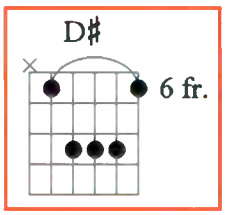

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- *76-note Trinity Pro and 88-note, weighted-action Trinity ProX coming soon!*

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LETTERS

IT'S LOGICAL

With great expectation I read the cover story "Musical Windows" (September 1995). However, I was disappointed to find EMAGIC's *Logic* not included because the Mac version had been covered in great depth in previous issues. I have no problem with that, but there are two things that bug me: First, *Cubase* was included, but its Mac version had also been reviewed in the past. Second, I expected, at the close of the article, that there would be an indication of how *Logic* stacked up against the other programs on the Windows platform—but there wasn't. Even EMAGIC's *MicroLogic* deserves mention.

Pete Bognar
peter.bognar@jci.com

Pete—Researching an in-depth sequencer "face-off" is extremely time consuming, so we limited our coverage to four programs. Our first decision was to stay with high-end products that were directly comparable. (We omitted WinJammer Pro *because it was reviewed in the previous issue.) Covering the "lites" and "micros" requires a separate article.*

Dennis Miller started researching "Musical Windows" back in April. At that time, Logic *was available for Windows, but given that we had recently covered the Macintosh version, EMAGIC preferred that we wait for their upcoming new releases. We went with the established leaders on the Windows platform, including Steinberg's* Cubase.*—Steve O.*

SAMPLE MAN

Having just finished reading "The Master's Touch" (September 1995), I find that I am puzzled. On p. 40, Jay Rando says, "When [Hank Waring] added these [sampled grand piano] ambiences during the mastering process, the piano on my track suddenly sounded richer and deeper."

Okay, it's clearly stated—a sampled acoustic piano ambience. But what does that mean? A sample of the sound a piano makes sitting in a given space? Room tone? Come on. This kind of stuff makes it hard to take an article seriously. I can imagine playing a track through a speaker into a piano and mixing the resulting "ambience" into the track. Of course, that's a dynamic and real-time process, not a sampled ambience. If the guy is adding some tasteful digital reverb, just say so. But if he is really adding the sampled ambience of one piano—along with pitch information totally unrelated to the current music being played—to another unrelated piano performance that is *already mixed in a track,* then he should be king of the world. So really, what samples did he use?

John Anthony
Sigma Sound
jtrax@aol.com

Author Gary Woods responds: *What Hank (not Fred, as mistakenly stated in the article) Waring of Quad Teck Digital does is take certain instruments into an anechoic chamber and record them digitally. He then loads that information into a mainframe computer and strips away the tonal information, leaving only the "ambience." This ambience consists of the harmonic resonant information and whatever frequencies are emphasized on a particular instrument, e.g., a Bosendorfer 9-foot grand piano. The effect, when applied to a track in real time, is somewhat akin to a digital reverb combined with an automated equalizer and can make a rather ordinary sounding instrument sound quite full and rich.*

EASY TO BE HARD

I was surprised by your evaluation in the category "Ease of Use" in your review of Fatar's Studio 1100 (September 1995). Quite possibly it is easy for someone who already knows how to program a synth. I am still a novice, and I could not make heads or tails of the manual. I ended up talking to the developer of this controller, who kindly walked me through a few basic steps, but I have retained little of what he taught me in those twenty minutes on the phone. I would like to make better use of this fancy controller. Could you suggest a manual that teaches synth programming?

Joan Atkinson
jatkin51@maine.maine.edu

Joan—The Fatar Studio 1100 is a MIDI master keyboard controller, not a synthesizer; it does not generate electronic sound. Perhaps you're having a hard time with it because you need to learn more about MIDI. I suggest you contact Mix Bookshelf (tel. 800/233-9604; fax 510/653-5142) to get some good books on MIDI and related topics. Also, we have run numerous articles on MIDI basics, including much of our January 1991 issue. You can order **EM** *back issues from Mix Bookshelf.*

I gave the Studio 1100 high marks for ease of use in part because it passed my "idiot test," meaning I figured it out quickly without referring to the manual except as a double-check. (When I did check the manual, I found the right answers, and though the manual isn't great, I've seen much worse.) True, I assumed the readers understood enough about MIDI to use the Studio 1100. After all, it is a midlevel controller, not an entry-level one. But using it is *easy; there aren't that many features, and everything is programmed with just a few dedicated buttons. There are no hidden software pages, undocumented functions, and so on.—Steve O.*

ALTERNATIVE HAND

I'd like to caution **EM** that when it ventures into the area of medical advice, it should be aware that there are many nonmedical practitioners eager to have a forum in which to advance their particular approach. These practitioners frequently borrow bits and pieces of knowledge from medical science which they blend with their own philosophy; this is then marketed as an

BUD PEEN

"alternative" approach to a particular problem or to health care in general.

Your article on Carpal Tunnel Syndrome ("Working Musician: Hand Over Hand," September 1995) was full of errant advice. The first thing one should do if he or she is having numbness, pain, or tingling in the hands is see a primary-care physician. There are serious causes of these symptoms that should be investigated. These include Carpal Tunnel Syndrome, as well as diseases originating in the nerves themselves, brain diseases and tumors, metal and toxic poisonings, and metabolic diseases.

After a firm diagnosis of CTS is made, the next step should be to diagnose the cause. CTS may be caused by diabetes, tuberculosis, rheumatoid arthritis, thyroid disease, amyloidosis, pregnancy, and other conditions. Only after these have been considered and ruled out is treatment initiated. The primary approach should be elimination of the cause, such as a change in seating or hand positioning. Streamlining practice sessions may be possible; musicians frequently practice past the point of productivity.

As a guitar player for 31 years, I take hand problems very seriously. After a diagnosis, if a player prefers a nonmedical practitioner, that is his or her choice, and good luck. But, as always, "Let the buyer beware."

Bill Zorn, M.D.
St. Simons Island, GA

Bill—You're right. We should have recommended seeing a regular physician first if you suspect you're suffering from CTS. The goal of the column was to inform musicians about possible alternative treatments because a previous article ("Working Musician: Carpal Tunnel Syndrome," September 1993) included interviews with two orthopedic surgeons and an acupuncturist. We did not want to duplicate that information, but we did include a reference to the previous column in "Hand Over Hand." However, we will endeavor to provide more balanced coverage of this subject in the future.—Diane L.

LOOK THROUGH ANY WINDOW

Although I found Charles Brannon's "Windows 95 Preview" (August 1995) informative and well written, he mentions that Windows 3.1 simply put a better interface over a DOS engine but that Windows 95 is a major rewrite from top to bottom. I have a problem with that. Windows 95 is *not* a major rewrite from top to bottom. If you want to see a product rewritten from top to bottom look to Windows NT, which has little in common with Windows 3.1 or 95 other than the old Program Manager interface. Other than virtualizing all the hardware using 32-bit Vxds, there really isn't that much difference between 3.1 and Windows 95.

However, I applaud Microsoft's interest in providing Windows 95 with a better interface for both MIDI and multimedia. Apple needs to look more closely at Microsoft's strategy and match or do better. And this is coming from a dedicated Mac user who is repulsed by anything with the Microsoft label.

Ken Rinehart
rinehart@netcom.com

Ken—It's clear that aside from the many obvious user-interface differences between Windows 3.1 and Windows 95, the new OS offers fundamental operational improvements, including protected memory and preemptive multitasking. This is not merely 32-bit Windows 3.1 with "virtualized" hardware.

However, you're correct that Windows 95 isn't a complete rewrite. Microsoft has stated that there are remnants of DOS and Windows 3.1 in the new OS to ensure backward compatibility, which is demanded by the consumer. Windows NT, on the other hand, was indeed designed from the ground up and is a far superior, true 32-bit OS. One reason Windows 95 exists is that Microsoft felt they needed to release an OS that would run in 4 to 8 MB of RAM, whereas the Windows NT 3.51 runs best with at least 16 MB of RAM.—Steve O.

VIOLIN TACKLE

Can you help me in my quest for a MIDI violin? Can I find such an instrument, or should I tackle the job of building one myself?

Douglas Hilton
doug@lab2.vacrc.ingr.com

Douglas—Fortunately, you don't have to build a MIDI violin yourself. Zeta Music Systems has been making these instruments for years. They can be reached at 2230 Livingston St., Oakland, CA 94606; tel. (510) 261-1702; fax (510) 261-1708.—Scott W.

THAT'S ENTERTAINMENT

Your magazine is great. No other publication comes even remotely close to matching the level of information **EM** puts out each month. I'm never disappointed with the quality of articles, reviews, features, and product updates that line your pages! When I see **EM** in my mailbox, I know I'm in for a great night of entertainment!

Jonathan Wright
Upland, CA

CONVERTING NOTATION

I would like to find out whether a program exists that converts (transposes?) General MIDI (GM) drum notation charts into the conventional music read by real drummers. For example, in the GM world, the Closed High Hat is F♯3 (or MIDI Note 42), and in the "real world" it is G4 with a different note head.

What comes to mind is a macro, or something like CAL in *Cakewalk*, which is currently a part of an existing notation program. For my purposes, the conversion including the different note head would be great but isn't a necessary requirement.

Every month I look forward to receiving my issue of **EM**. Keep up the excellent work.

John Alday
Nuevo, CA

John—The new Finale *3.5 for Windows upgrade adds extensive drum notation. Among other features, it allows you to map each incoming MIDI note to any position on the percussion staff you want, which solves your problem. To top it off, you can even remap the notes again for playback. A comparable Mac upgrade is on the way.—Steve O.*

ERROR LOG

September 1995, "The Master's Touch," p. 40: Hank Waring runs Quad Teck Digital mastering labs, not Fred Waring.

WE WELCOME YOUR FEEDBACK.

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

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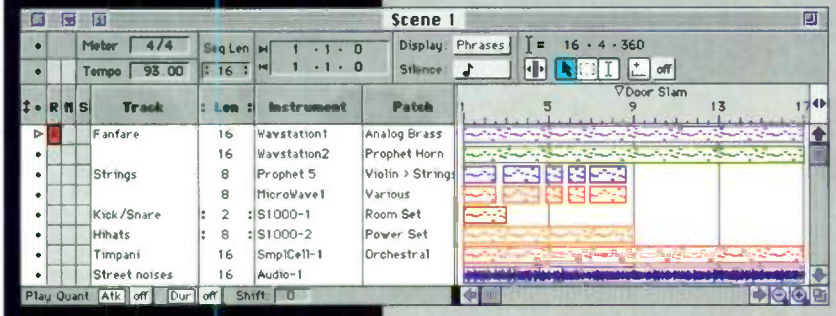

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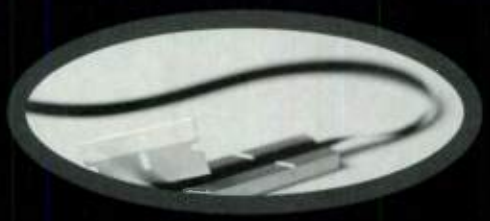

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WHAT'S NEW

By Steve Oppenheimer

AMC/WELLTRONICS DAC 8

You usually pay a premium for outboard digital-to-analog converters. But AMC/Weltronics' DAC 8 ($199.95), which was designed for home theaters, lowers the price barrier. The unit lets you select between four stereo, S/PDIF inputs (one TOSLINK optical and three RCA coax connectors). The selected input is routed through a DAC converter to a stereo pair of EIA-standard (2V RMS), RCA analog outputs. The input also is routed directly to a BNC digital output.

The DAC 8 offers low-noise conversion using Philips' latest DAC, which supports resolutions of up to 18 bits. The product detects and locks to 32, 44.1, and 48 kHz sample rates. Weltronics Corp.; tel. (818) 799-6396; fax (818) 799-6541.

Circle #401 on Reader Service Card

TECHNICS WSA1

Tired of the same old FM and sample-based synth architectures? Perhaps it's time you checked out physical-modeling technology, which reproduces real-world sounds using mathematical descriptions of the original sound source. The newest modeling-based instrument is Technics' WSA1 ($3,395.95), a keyboard workstation designed to emulate acoustic instruments. The user also can manipulate the parameters to construct hybrid instruments. A rack-mount version, the WSA1R ($2,995.95), is available, as well.

Unlike most modeling synths, the WSA1's models process PCM samples. A model, or Tone, includes a driver (the trigger that starts something vibrating, such as plucking) and a resonator (the vibrating body). A variety of drivers are included, and additional drivers can be added with the optional Wave Expansion Board (price tba). Resonators include a string, flare, plate, cylinder, cone, and membrane.

A Position parameter lets you alter the plucking position on a guitar string, pickup position on an electric guitar, mic setting for a piano, and so on. You also can alter the attack time and mute the Tone. Each Tone is routed through a resonant, time-variant filter and an amplifier. Dedicated LFOs and envelope generators modulate the oscillator, filter, and amplifier.

Up to four Tones can be layered. The combined sound is bused to three independent effects-processor blocks, each of which can produce one of 65 effects. All effects parameters can be edited, and all parameters and values are displayed on a 320 × 240-dot, backlit LCD. The WSA1 comes with a factory ROM bank and a user RAM bank, each of which holds 256 sounds and 128 combinations.

The 64-note polyphonic instrument has two sets of MIDI In/Out/Thru jacks for 32-part multitimbral operation. Its 16-track sequencer records up to approximately 40,000 notes, offers extensive editing, and reads and writes Standard MIDI Files (formats 0 and 1). A high-density floppy drive also is provided.

Technics' design emphasizes real-time performance. To begin with, its 61-note keyboard is sensitive to Velocity and Channel Pressure, and it has a pitch wheel, two modulation wheels, a foot-pedal input, and two footswitch inputs. But the main attraction is two trackball-like XY controllers, called the Realtime Creator and Realtime Controller. Each of these controllers can manipulate up to six parameters, including any two parameters at once. The difference between them is that the Realtime Creator remains in its last position, whereas the Realtime Controller is spring-loaded and returns to its neutral position.

The unit comes with two stereo pairs of audio outputs. An optional Output Expansion Board (price tba) adds another stereo pair of analog outputs and an S/PDIF (coax) digital output. Technics; tel. (201) 348-9090; fax (201) 348-7954.

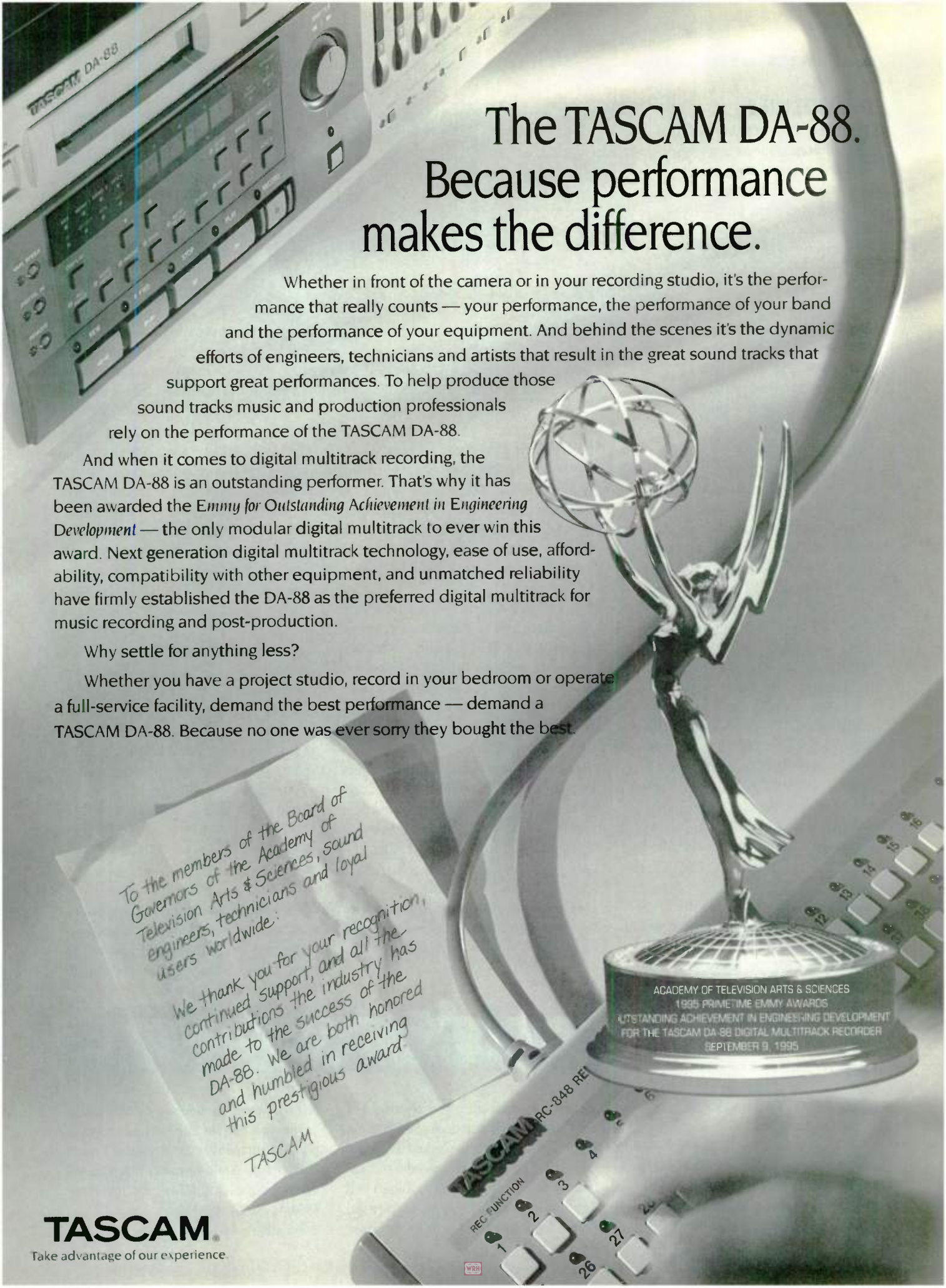
Circle #402 on Reader Service Card

ARTIC VBX SOUND FACTORY

If you program in Visual Basic, you should be familiar with Artic Software. The company's latest programming utility, *VBX Sound Factory* ($89), lets you create VBX custom controls containing your own WAV files. The program encapsulates your WAV files into a real VBX custom control that is compatible with Visual Basic, Delphi, Visual C++, and any other VBX type 1.0-compatible language.

Each VBX can include up to 64 WAV files, or 2 MB of WAV data, and it has playback and looping ability without any API calls. Each VBX control includes your own version stamp, copyright, product version, company name, and trademark. Artic Software; tel. (414) 534-4309; fax (414) 534-7809.

Circle #403 on Reader Service Card



The TASCAM DA-88. Because performance makes the difference.

Whether in front of the camera or in your recording studio, it's the performance that really counts — your performance, the performance of your band and the performance of your equipment. And behind the scenes it's the dynamic efforts of engineers, technicians and artists that result in the great sound tracks that support great performances. To help produce those sound tracks music and production professionals rely on the performance of the TASCAM DA-88.

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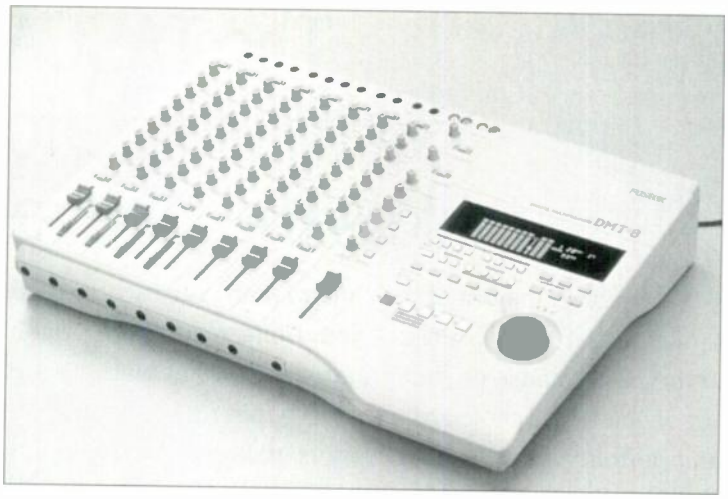
▶ FOSTEX DMT-8



Digital multitrack recorders, whether hard-disk or tape-based, are the way to go for most recordists. But many people still love the convenience of integrated multitrack cassette recorder/mixers such as the Fostex Multitracker series. In an attempt to combine the best of both worlds, Fostex has unveiled the DMT-8 ($2,795), an 8-track hard-disk recorder/editor with built-in mixer that brings the Multitracker series into the digital age.

The DMT-8 records 16-bit audio at 44.1 kHz. Its 540 MB internal hard drive allows up to 12.5 minutes of 8-track recording, which can be mastered or backed up to audio DAT via its optical S/PDIF output. (The unit does not support external SCSI drives, however.) Archiving requires approximately four times the recording length, so it takes about twelve minutes to back up a 3-minute song. A display informs you of the remaining recording time.

Up to four tracks can be recorded simultaneously. Playback begins immediately upon pressing Play, thanks to a RAM buffer. Dedicated keys implement nondestructive cut/copy/paste editing with one level of undo, and a Clipboard Play function lets you preview the selected region before editing to make sure you have selected the correct region. A special display issues a warning if you try to copy audio that exceeds the remaining disk capacity. A variable-speed jog/shuttle wheel is provided, and you can scrub all eight tracks without changing the pitch. The jog wheel also can be used to edit parameters.

The DMT-8 offers six floating memory/cue points and features auto-location and auto punch in/out with Rehearsal and Take modes and adjustable preroll (0 to 10 seconds). The Locate key has its own memory, and you can also locate to ABS 0 or ABS END, providing a total of nine cue points.

The unit responds to MIDI Machine Control and outputs MIDI Time Code (with an offset of up to six hours and support for all frame rates), MIDI Clock, and Song Position Pointer referenced to a programmable tempo map for precise location to a bar and beat. An LED display shows beat/bar, absolute time, or MTC, and 9-segment LED ladders reveal the channel and master levels.

The 8-channel, 4-bus mixer features four mic/line inputs with trim controls and four line-level inputs, all on unbalanced ¼-inch phone connectors. (Two stereo tape inputs are the only inputs on RCA connectors.) The mic/line channels include insert points for use with external processors. Each channel has 2-band, sweepable equalization (±15 dB, 60 Hz to 1 kHz and 1 kHz to 16 kHz). Two aux sends can be assigned to occur post-fader or post-group independently for each input, so you can process individual channels or submixes. There are two stereo aux returns; one can be sent to Group 1/2 or the main L/R bus, and the other can go to Group 3/4 or the L/R bus.

All outputs are on RCA connectors. The DMT-8 also features inline monitoring, which means you can switch the recorder outputs to Submix status and mix down your eight recorded tracks and eight more input signals. Fostex Corporation of America; tel. (310) 921-1112; fax (310) 802-1964.

Circle #404 on Reader Service Card

▶ DIGITECH RPM-1

Much has been written about how to achieve the "retro" sounds of the 1960s and '70s. Especially popular are tubes for smooth distortion and analog "warmth" and rotary-speaker emulation for a Leslie-like effect. DigiTech has combined these two ideas by putting a dual-triode 12AX7-based tube preamp in its RPM-1 digital rotary-speaker emulator ($569.95). A Drive knob controls the amount of distortion.

The 1U rack-mount RPM-1 emulates the sonic characteristics of a large, 1950s-vintage Leslie cabinet and horn driver with the same crossover frequency and slope. Stereo horn miking also is emulated, with a Spread control that "positions" the virtual microphones up to 180° apart (i.e., on opposite sides of the "cabinet").

Two independent pitch shifters are combined with volume control to emulate the Doppler effect caused by a horn and rotor that change speeds and rotate at different rates. Horn Speed and Rotor Acceleration controls provide the digital equivalent of choosing different drive pulleys. Speed (fast/slow), Brake, and Bypass can be triggered from backlit buttons or a 3-button footswitch. A Continuous Controller input lets you adjust the speed continuously with a pedal.

The unit has an onboard power supply and removable 3-conductor power cord. Its dynamic range is rated at >90 dB (A-weighted). DigiTech; tel. (801) 566-8800; fax (801) 566-7005.

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Phase, Leslie, Pitch Shift, 2-Band Sweep, 3&4-Band s, separate L/R input levels stuff. For more Q2 info, see trademark of NARAS.

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Alesis Corporation 3630 Holdrege Avenue Los Angeles CA 90016 310-841-2272 alesis1.usa.com

▲ CONCEPT ONE TRIGGER PADS

It seems like skin beaters who are into electronic music are perpetually on the lookout for a better-feeling, quieter trigger pad. Concept One Percussion's electronic trigger pads are an attempt to fill this need. Made from four plies of a patented synthetic compound, the pads are designed to respond and feel like acoustic drum heads. They feature practically unlimited sensitivity and work with a trigger-to-MIDI converter or any sound module with trigger inputs.

The pads fit snugly inside the rims of your acoustic drums, muffling more than 90% of their acoustic sound. Among drummers, that's considered downright reverent silence. You don't have to drill holes or attach mounts, and the kick-drum pad's mounting system can be removed without damaging the drum head. Pad sizes range from eight to sixteen inches. (Special-order sizes also are available.) The pads are available individually ($139.95) or in sets of five ($669.95). Sets of six, seven, and eight also are available.

Concept One also offers two new products that mount on cymbal stands. Concept One's electronic cymbals ($169.95) are designed to look and play like the real thing. The stand-mounted Six-Pak trigger pad system ($419.95) combines six touch-sensitive pads in one modular case.

Finally, the company has introduced the Add-A-Pad and Undercover Series Pad. The Add-A-Pad ($99) is a 4 × 5-inch trigger pad that attaches to a single lug of any drum and requires no additional hardware or stand. The Undercover Series Pad ($159) consists of a batter head and trigger pad, which are factory installed on the bottom of a regular drum head, out of the audience's sight. You simply replace your regular batter head with the Undercover head. Concept One Percussion Products; tel. (800) 369-9633 or (319) 382-3654; fax (319) 382-5261.

Circle #406 on Reader Service Card

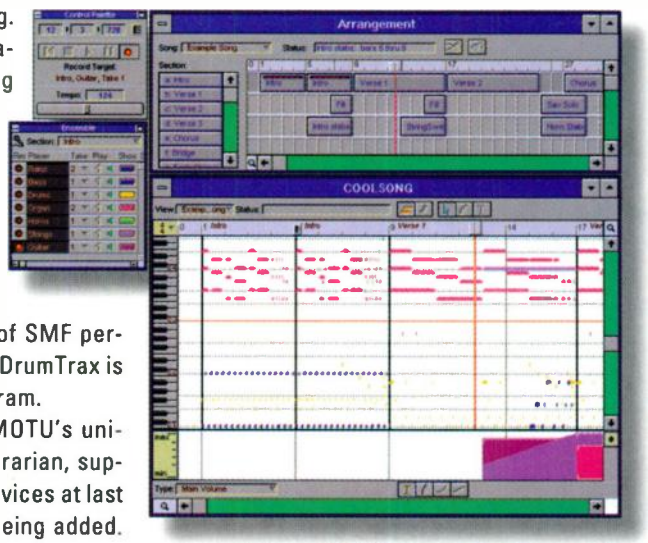
▶ MOTU FREESTYLE FOR WINDOWS

It's a sign of the times that most Mac music-software developers are porting their programs to Windows. Veteran Macintosh developer and PC interface manufacturer Mark of the Unicorn is no exception, introducing *FreeStyle* for Windows ($195) and *Unisyn Windows* ($295).

The release of *FreeStyle* for Windows brings MOTU's innovative "trackless" sequencing to the PC. Instead of using sequencer tracks, you construct Songs from Sections that contain multiple Takes of various Players (named instruments), which are grouped in Ensembles. Linear and pattern-based song construction are integrated.

The program is explicitly designed for ease of use, with automatic MIDI device and channel assignments, and it also includes piano-roll and music-notation editing. Its intelligent Auto-Loop recording does not require you to define loop length in advance, and pickup notes are automatically duplicated at the end of the loop.

FreeStyle transcribes performances into music notation in real time, with support for dynamic hand splits and auto-recognition of tuplets. The notation is displayed in a WYSIWYG page view for editing and printing. A Straighten Swing feature notates "swing eighths" with straight rhythms, as in traditional jazz notation. A Riff Metronome lets you use any single-instrument Standard MIDI File as a rhythmic pulse, and a set of SMF percussion grooves from DrumTrax is bundled with the program.



Unisyn Windows, MOTU's universal patch editor/librarian, supports over 215 MIDI devices at last count, and more are being added. Using a drag-and-drop interface with Copy, Swap, and Move modes, you can build custom banks and libraries. Performance snapshots save the entire studio configuration, so all devices can be set up at once with a single command. Up to eight window screensets can be saved and instantly recalled.

Special editing features include Randomize, which automatically generates new and hybrid sounds, and Blend & Mingle, which morphs (continuously crossfades) between the parameter settings of different patches. Parameter Masking lets you control the patch-generation process. A Duplicate feature identifies identical patches, and Patch Checking displays the differences between patches.

Unisyn Windows supports parent/child patch relationships and offers extensive, device-specific, online help. It also supports multiport MIDI interfaces such as Mark of the Unicorn's MIDI Time Piece II or any MME-compatible interface. Mark of the Unicorn; tel. (617) 576-2760; fax (617) 576-3609; e-mail motu@aol.com; Web http://www.motu.com.

Circle #407 on Reader Service Card

THE COMPRESSOR LIMITER EXPANDER/GATE THAT WILL TURN THE WORLD ON ITS EAR. AGAIN.

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OverEasy® – the choice of top professionals for soft-knee compression.

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The name that defines great compression!

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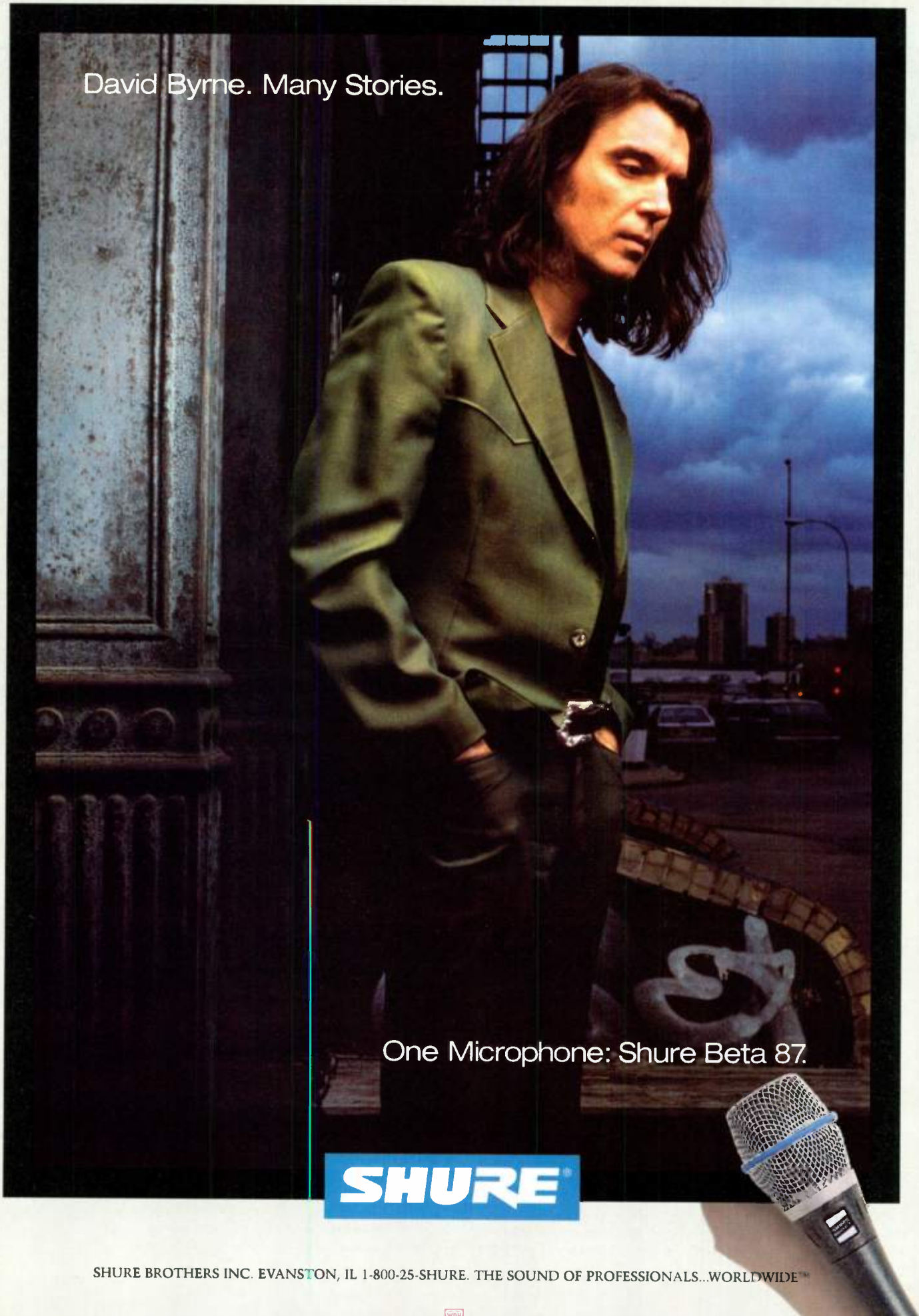

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ALESIS ADAT XT: THE NEXT GENERATION ▲ ▲ ▲ ▲

Building on the stunning success of its ADAT modular digital multitrack tape recorder, Alesis has unveiled the next generation. The new XT ($3,495) incorporates new features and functions, including improved transport control with faster locate times. The tape format—eight tracks on an S-VHS tape—is unchanged, and the XT is fully compatible with tapes recorded on any ADAT system. As with the other ADAT-format MDMs, the Alesis XT features sample-accurate syncronization of up to sixteen transports, totaling up to 128 tracks.

The front panel attaches to a heavy, 1-piece, die-cast aluminum chassis. A large, multicolored, custom vacuum fluorescent display shows the tape locator data, meters, status indicators and other session data. This display shows hours/mins/secs and hundredths of a second, indicated in absolute or relative time. Inside, XT boasts new-generation, delta-sigma A/D/A converters.

XT also increases the intelligent control of transport operations. The basic transport is the same, but its wind speeds are significantly faster: in Wrapped mode, the original ADAT shuttled at approximately ten times play speed, whereas the XT is said to shuttle at about 40 times play speed.

On the rear panel, the XT's ¼-inch, unbalanced, -10 dBV connectors have been replaced with RCA jacks, but the 56-pin Elco connector that carries eight channels of balanced, +4 dBu I/O remains. The outputs are now servo-balanced, so no level loss occurs when the balanced outs are connected to an unbalanced mixer. In another change, the remote meter bridge connector has been eliminated.

Alesis' intent five years ago was to produce a digital multitrack at an affordable $3,995. With this goal in mind, some of the ADAT's more esoteric features, such as individual track delay, digital track routing and multimachine offset, were shifted to the BRC controller. Now, with increased manufacturing efficiency, the XT includes these and twenty other new features for less than the original price.

The new machine offers ten locate points, which can be set on the fly and edited to frame or 0.01-second accuracy. The ten locate keys also double as a numeric keypad for entering locate or edit points. XT's Rehearse mode allows safe, nondestructive previewing of auto-punch recording operations.

One of the nice things about XT is how it can integrate into an existing ADAT system. If a user has one ADAT and adds an XT, not only does it provide additional tracks, but by assigning the XT as the master deck and accessing its machine-offset feature, the system becomes capable of digital assembly editing. Suddenly, multiple takes of basic tracks (or instrumental/vocal takes) can be combined into one seamless performance that incorporates the best sections of many takes. —*George Petersen*

Circle #408 on Reader Service Card

▶ SONY DPS-V77

Sony's DPS line of discrete stereo effects processors—the R7 reverb, D7 delay, F7 filter, and M7 modulation effects—have been well received for their processing power, flexibility, and sound quality. The company's new DSP-V77 ($1,695) borrows many of its predecessors' most popular features and algorithms, including reverb, delay, intelligent pitch shifting, modulation, dynamics, and filtering effects.

If that were the whole story, the V77 would be a nice box. What takes it another step forward is its ability to morph (seamlessly, continuously crossfade) between two independent effects blocks. Each of the two effects blocks can be independently controlled and can produce any of 50 effects. In addition, any six parameters can be MIDI controlled simultaneously in real time.

The 1U rack-mount unit uses 64x oversampling Delta Sigma ADCs and 20-bit DACs. It offers unbalanced, ¼-inch analog I/O; balanced, XLR analog I/O; and AES/EBU digital I/O on XLRs. Optional cables convert the AES/EBU port to S/PDIF. It has 198 factory presets and 198 user programs. Sony Corporation of America; tel. (800) 635-7665. ●

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PRO FILE

Stream of Consciousness

Nick Peck's electronic island cruise.

By Mary Cosola

Some things you have to learn the hard way. Just the other day, I learned that I should never listen to experimental electronic compositions with one of my 20-pound cats sitting on my lap. On the whole, cats don't take loud surprises very well. A couple of subtle bleeps and bloops, followed by a loud wash of sound emanating from stark silence, and I'm in a world of hurt. As my cat edged near the stereo speaker, hunting the aliens within, I nursed my wounds and turned my attention to the compositional technique and musical themes behind Nick Peck's *Islands in the Stream*.

As its title implies, the CD is a musical representation of a stream, including the rocks and other disruptions that pop up along the way. And just as a stream gathers its force from other streams, lakes, and tributaries, *Islands* bends and weaves its way through the musical landscape, drawing on a variety of musical influences.

"I had done progressive rock for a long time and wanted to do more purely synthesizer-based electronic music," says Peck. "I wanted to create a contrast between the flowing pieces that were all conceptually related and the other pieces that were larks or separate, distinct investigations that I was doing at the time."

These musical "obstructions" to Peck's stream are realized in works such as "The Rose Mirror," an acoustic piano piece, and "Imagining a Radio-Free Europe," which, with its Eastern European-influenced scales, conjures up images of a techno Turkish bazaar. Another island in Peck's musical stream, "A Fugue Made of Concrete," takes on a structure borrowed from a Bach fugue. Instead of orchestral instrumentation, however, Peck uses rattles, bangs, and grinding noises sampled with an E-mu EIII+ and manipulated in Digidesign's *Turbosynth* software. And where the theme in a Bach fugue is inverted by pitch, Peck inverts the low and high harmonics of his sonic constructions.

"Mpathy" is Peck's tribute to his progressive-rock influences. "I used *M*, an algorithmic composition program, to create themes based around performance techniques of artists I really dig," explains Peck. "I played back these themes using only FM synth sounds from a Yamaha TX816. The opening melody is sort of a reworking of a motive from King Crimson's 'Frame by Frame' off *Three of a Perfect Pair*. Also, I used a lot of motion and diatonic movement that reminds me of Rick Wakeman, particularly his soloing style."

So, has this shift from playing progressive rock to programming electronic sounds helped Peck find that elusive artistic voice? "Absolutely," responds Peck. "As Cage said, 'All sound is music.' And where that is for you depends upon your ears and nothing else. It's perfectly fine for someone to define music as something that happens in a diatonic universe with guitar, bass, and drums. That's completely wonderful, but it's just one archipelago in the musical ocean."

For more information, contact Perceptive Productions, PO Box 12, Corte Madera, CA 94976; tel. (415) 388-9735; or via e-mail at nick@episode.com. Also check out the stand-alone, interactive demo on the World Wide Web (http://www. episode.com/~nick).

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Nick Peck

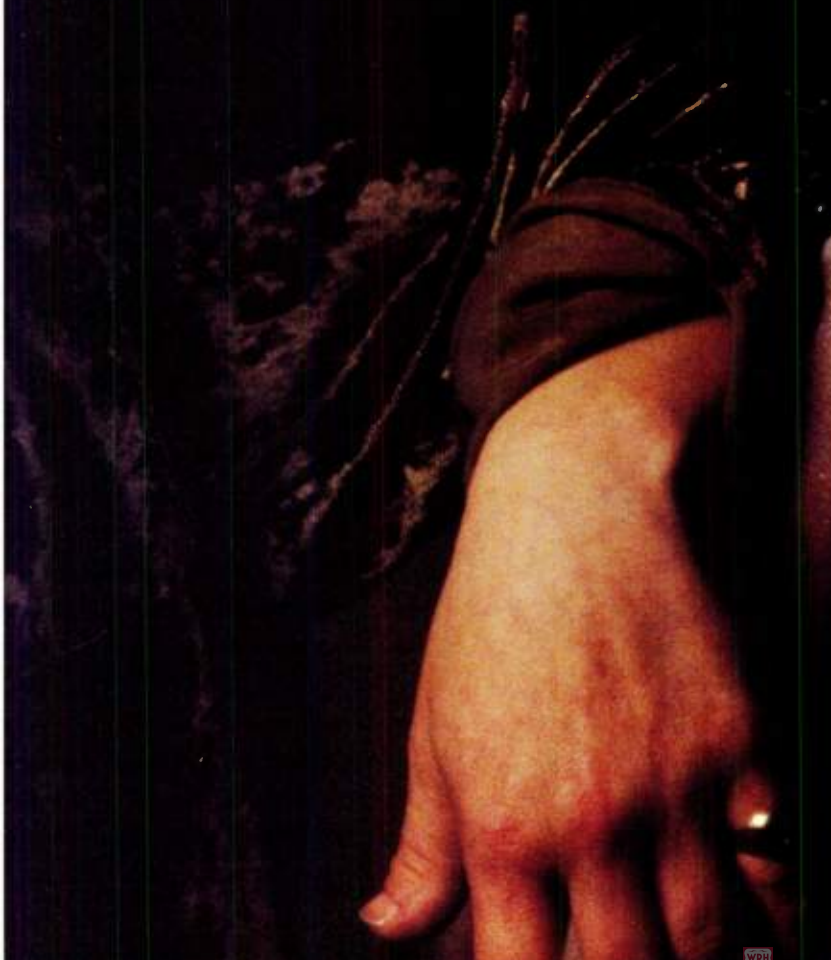
Film composer Laura Karpman

a day in the LIFE

Photograph by Pamela Springsteen

demystifies the film-scoring process.

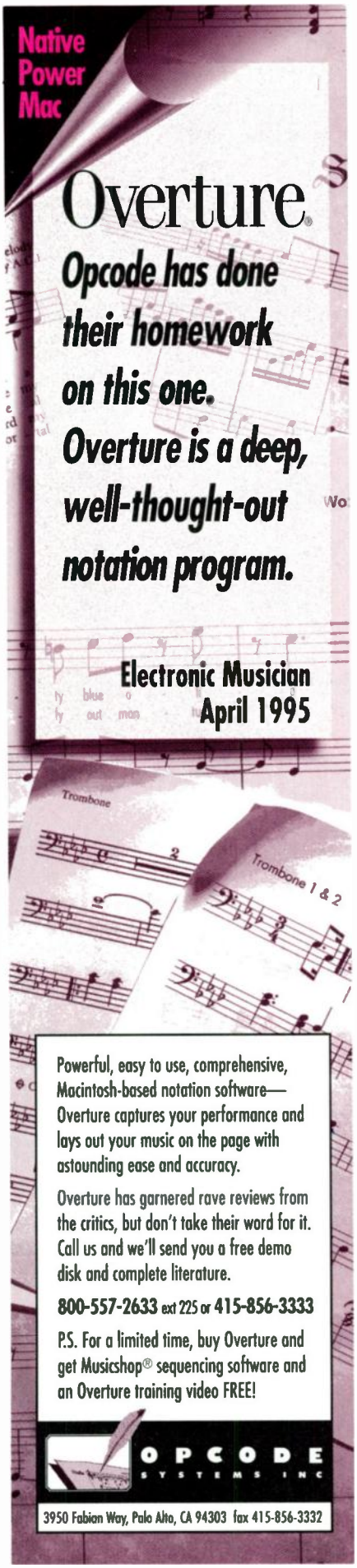
Keeping Score



Classical composers get it coming and going. It's one thing to write a symphony for an orchestra; it's quite another to get an orchestra to play it. You can find an emerging rock guitarist on every block and a hopeful jazz drummer behind the counter at every record store, but orchestras are a little scarcer. So what's a classical composer to do?

Composer Laura Karpman has found an outlet for her creative energies: film soundtracks. Not that she was doing badly before she made the switch to composing for film: her work has been performed at national events including the 1983 World's Fair, Carnegie Hall, Tanglewood, and notable festivals. Her other honors include two grants from ASCAP, a fellowship at the Sundance Institute, and the Charles E. Ives Scholarship from the American Academy and Institute of Arts and Letters. With this kind of hard-found success, why would she make a career change?

By Jennifer Seidel



films. Also, the amount of music that has to be written is often greater in film composing. Karpman's most recent project required almost three hours of music for six hours of film, and the project before that required about two and a half hours of music for four and a half hours of film. And unlike contemporary classical composers who write uncommissioned pieces, a film composer is working for someone else.

Despite the differences, Karpman doesn't leave behind all she learned about concert composing and acoustic instruments. "I've had the most success combining electronic and acoustic elements and understanding that I have an unlimited palette—in synthesizers and samplers," she says. "But I'm not a programmer. I'm not somebody who has spent my life working in electronics. I come to this with a completely musical background; I take the tools at hand and mold them to my purposes."

ACCIDENTS HAPPEN

Karpman's move from composing for symphonies to scoring for film wasn't what she would call intentional. She got her first job from a producer friend who "bamboozled" her into the job. The second job came from someone who was at the screening of the first job, and the third job came from someone who was involved in the dubbing of the second job. Karpman's most recent project was scoring a Showtime 6-hour miniseries, *Sex and the Silver Screen*. Last fall she did the music for NBC's *A Woman of Independent Means*, a miniseries that starred Sally Field. She has done work for all four major networks, the Discovery Channel, and Turner Broadcasting Systems (TBS), and she has composed for feature films.

A composer needs to make some big adjustments when moving from writing for concert to writing for film. For example, the pieces have different levels of complexity. "When I first started scoring," Karpman says, "I was writing the same kind of music that I'd been writing in the concert world, but sometimes all it needed was the subtle touch of a piano key." Another difference is in the length of the pieces. The long compositions performed in concerts are a sharp contrast to the many short 30- to 60-second pieces used in

BEGIN AT THE BEGINNING

The process usually begins when Karpman receives the edited film on videotape from the director. They sit down together and "spot" the movie, looking at the various elements—such as dialog, location sound, and sound effects—and deciding where and what type of music should be placed. For example, they may decide to use a theme for a character or to draw from a popular song from the time period represented in the film.

For *A Woman of Independent Means*, however, Karpman's work started before the movie was even filmed. "I read the script and gave the director ideas for songs to be sung on screen and used in dance sequences. Sometimes I gave the director a preexisting cue, a piece of music that I had composed for another project, to help him with the tempo for a scene he was shooting. It was a unique and exciting experience."

Most of the work videos Karpman receives have a temporary music score in place. This "temp" score is typically a collection of existing music, such as classical pieces or rock songs, that the director feels conveys the atmosphere of the

JIM STAFFORD

Karpman has a Ph.D. from Juilliard, where she studied under Martin Babbit.

scenes in the film. Listening to a temp score, however, is not a universal starting point. "Many composers don't like to listen to temp scores because they feel it influences their ultimate writing, and I think that that's true," Karpman explains. "But the good thing about temp scores is they give you a point of departure: they are a launching pad from which you can determine a director's likes and dislikes."

PACING FOR THE LONG RUN

After the spotting session—which usually takes about five hours for a 2-hour film—she calculates how much music is needed and creates a schedule. She usually has two to three weeks to compose, record, and mix a score for a 2-hour television movie. However, there are always exceptions and delays. With *A Woman of Independent Means,* which had four and a half hours of running time, Karpman only had two weeks to record and mix.

She is very methodical about composing, which may be more of a personal trait than a professional one. "I pace myself for the project," says Karpman. "I determine exactly how many minutes of music I have to write per day, depending on how long the score is going to be and how much time I have to write it. If I have to write 30 minutes of music and I have ten days in which to write, I will write three minutes of music a day. On days when I know I have an appointment, I schedule less music to be written. That way you avoid staying up all night and scrunching it at the end. You just grind it out every day. You don't have the luxury of waiting for the muse. You've got to get up, and it has to happen."

UNDER CONSTRUCTION

Once she and the director have agreed on the kind of music needed to bring the film to life, Karpman proceeds to "build an orchestra." "I work in Mark of the Unicorn's *Performer,* and my favorite tool is Digidesign's SampleCell," she says. "I begin by going through the samples I have on CD-ROM and coming up with a bank of appropriate sounds. That takes me quite a bit of time—as much as a day or two—because I'm experimenting with different sounds. You can't start over with every cue; you draw from a group of sounds, and that becomes your 'band' for the show."

At this point Karpman determines which instruments will feature prominently, which ones will remain sampled, and which ones will be recorded live. When making these decisions, she considers the director's personal musical tastes, the parts of the temp score that worked successfully, and the resources she has at hand. Some of those resources are limited. "If you don't have a good-sounding clarinet sample," she advises, "don't write a clarinet line. Realize your limitations."

Another major consideration when compiling an "orchestra" is, of course, budget. "I would certainly rather have a real oboe than a sampled oboe, and there are certain instruments that just don't sound good sampled," Karpman says. "If I don't hire real musicians, it's only because I don't have the budget."

After she has chosen her instruments, Karpman begins composing. She will focus on one theme or a variety of themes, depending upon the needs of the film. The main theme may play a significant role, weaving in and out of the film in various forms, or Karpman may reprise five or ten themes throughout a longer film, such as *Sex and the Silver Screen.*

How can she draw upon a few themes and cues without the music becoming repetitive? "Each theme or cue has its own unique sound and its own unique combination of the various instruments that I have assigned," she says. "And every time I approach one, I try to change something, whether it's changing the orchestration or changing the tempo. I'll never just cut a cue from one part of a film and paste it in somewhere else."

She usually sends a cassette with a few cues or the main title theme to the director at the first stages of composing. When she has written most of the music, she invites the director over to watch the video with the rough music in place. She locks *Performer* to SMPTE time code on the video through a MOTU MIDI Time Piece, and *Performer* is slaved to her VCR. This midway review helps her to know whether she's going in the right direction.

"Before the director comes, I go back over all the cues and look at them once again with the film by myself or perhaps with an assistant, just to get another opinion," Karpman explains. "Everything is sequenced, even when I'm going to hire musicians later on. The beauty of involving the director at this

Karpman's Cache

Mixing Console	Soundcraft Spirit Studio
Recording Media	Alesis ADAT and BRC controller; Technics SVDA10
Monitor Speakers	Auratones; JBL 4208
Microphones	AKG C414; Sony ECM56F
Keyboards/Sound Modules	E-mu Proteus/1 Pop, Proteus/2 Orchestral, and Proteus/3 World; Korg M1REX and Wavestation SR; Kurzweil 1000AX Plus and 1000PX Plus; Peavey Spectrum Bass; Roland D-50, JD-800, JD-990, MKS-20, P-55, R-8, and R-8M; Story & Clark upright piano; Yamaha DX7II and KX88
Computers/Software	Digidesign SampleCell card (with 8 MB RAM) and SampleCell II card (two; with 32 MB RAM); Mac IIci (12 MB RAM, 320 MB hard drive) and Quadra 950 (32 MB RAM, 1 GB hard drive); Mark of the Unicorn *Performer* 5.2 and *Digital Performer II* 1.4
Signal Processors	dbx 160X compressor; DigiTech DSP 128 and Vocalist VHM5; Korg DRV-3000; Lexicon LXP-1 and 200; Roland RSP-550; Tony Larkin Audio mic preamp/compressor limiter; Yamaha SPX90II
Miscellaneous	drums; flute; Panasonic AG1730 VCR; Stewart PA-100 amplifier; zither

stage is that I've never had a score thrown out. I've never gotten to the scoring stage and had someone not know where I was going musically.

"It's important," she continues, "that when you're sequencing everything at home you have good samples, because directors may not have the imagination you'd like them to. For example, even if you're planning on hiring a cellist, make sure you have a good cello sample in your rough score."

The director may make some suggestions or criticisms, but because Karpman will not have started her final recording yet, she will still have time to incorporate any changes. She may keep some of the samples from her rough score for the final recording and only use others for demo purposes, replacing them with real instruments later.

INVENTION'S DAD

If necessity is the mother of invention, budget is the father. As mentioned before, budget is the biggest determining factor in film scoring. But that doesn't necessarily mean that a score done on a small budget is going to be a lesser score. Karpman, for example, doesn't resent the challenge presented by limited funds, she embraces it.

"In *Sex and the Silver Screen*, a scene was temped with an old-fashioned version of 'Mack the Knife,' and we wanted to do something similar," relates Karpman. "My friend Michelle Murlin does a terrific vocal imitation of a trumpet and a trombone, and I'm a good scat singer, so we came up with this incredible cue that was like a 1920s-period jazz piece. Instead of having a horn player improvise the part, we sang along with some light percussion, piano, tuba, and bass. Our cue was more interesting than the temped version *because* we had to force ourselves to come up with an interesting solution. Force yourself to come up with something fresh, don't just bemoan the fact that you can't have what you think you need."

LEAVING HOME

Up to this point, Karpman has done all the composing and the initial recording in her home studio with the assistance of an engineer. ("I *never* engineer my own projects," Karpman stresses. "I'm not a recording engineer.") But if she is going to finish the project in an outside studio, this is when she will make her move.

"If I'm recording several acoustic instruments, I will book studio time and move my synths, my sampler, and my computer to another studio. If I'm only recording one or two instruments, however, I'll do it here at my home studio," Karpman says. "My home studio sounds just as good as a pro studio, but you have certain things at your disposal when you're in an outside studio that obviously you don't have when you work at home, like a soundproofed room and a second engineer."

As Karpman has already laid the foundation of the score with her samples, she's prepared for problems at the recording stage. She can replace an out-of-tune acoustic instrument with a better-sounding sample, or she can

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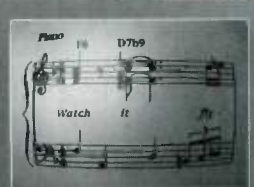

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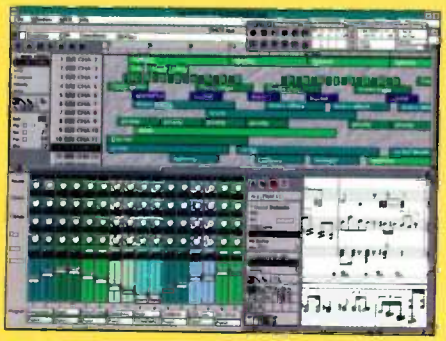

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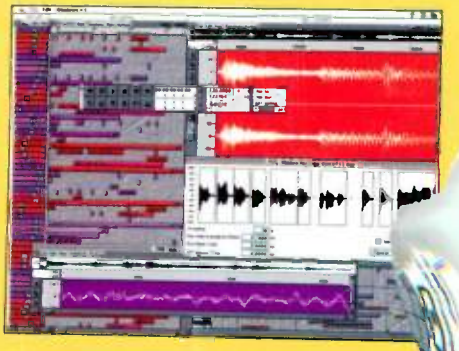

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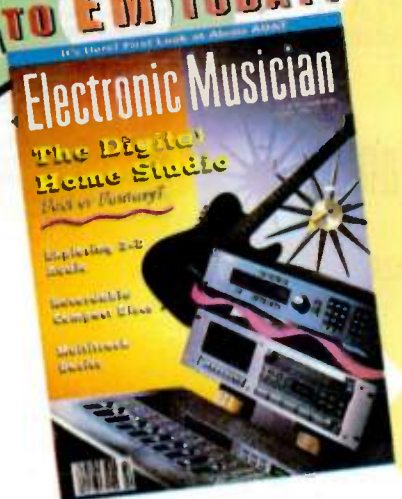

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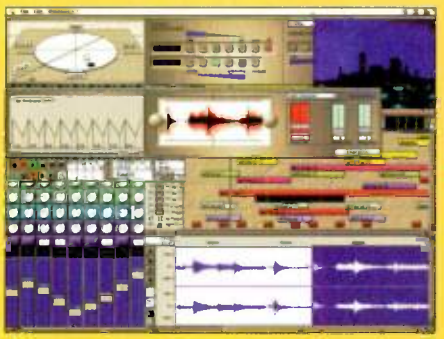

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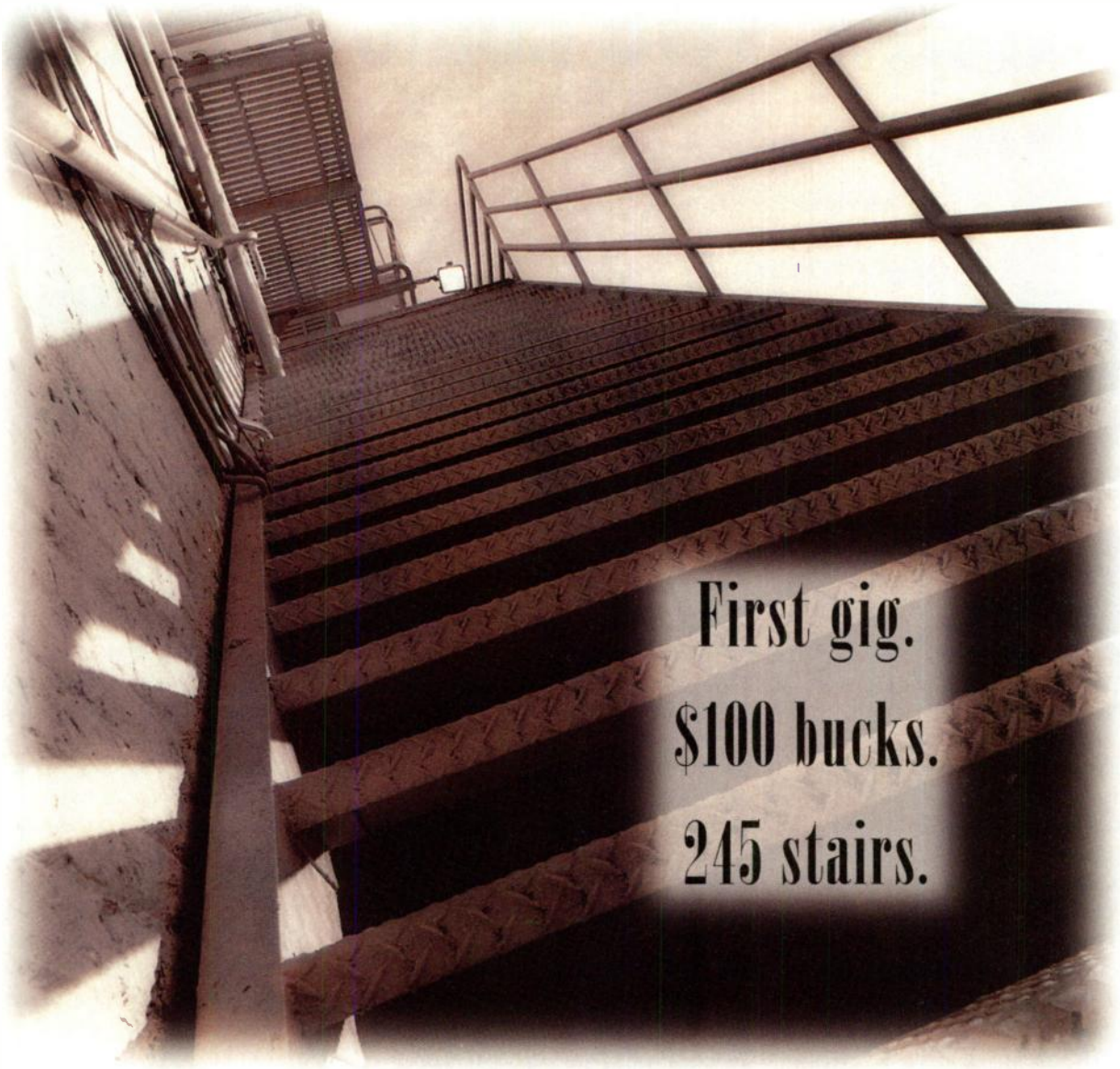

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S O U N D T H A T C A R R I E S

combine samples with the acoustic instruments if a piece needs to be filled out. "I did a gig where the violas weren't strong, so there were times we just pulled them out and used the sample," she says. "The beauty of this technology is that you've got a built-in rescue mechanism."

After final recording is complete, the music is often mixed to a TASCAM DA-88. Karpman estimates that she and the engineer can mix between 30 and 45 minutes of music in a 12-hour day. As she and the sound engineer mix, they keep in mind that the sound editors may need to make changes if there are conflicts between the different elements, such as the music and the dialog or sound effects.

"Instead of doing a stereo mix," Karpman explains, "you might mix on four or six tracks, separating out important musical elements so that the editors can bring back or pull up certain instruments. *A Woman of Independent Means* was on six tracks, so the engineers could alter elements at the dubbing stage. Delivering the mix on a DA-88 tape also allows the dubbing engineers to mix all their sound elements—Foley, sound

DEFINING TERMS

Some of these definitions were taken from *Sound for Picture: An Inside Look at Audio Production for Film and Television,* a book in the Mix Pro Audio Series. This book is available from Mix Bookshelf; tel. (800) 233-9604 or (510) 653-3307; fax (510) 653-5142.

Cue A piece of music for a specific scene or event in a film.

Dubbing The act of re-recording sound effects, location sound, music, dialog, and Foley.

Location Sound Sound recorded and/or mixed on location during the film or video shoot; also known as *production sound.*

Slave An audiotape or videotape transport or another device whose movements follow the movement of a single master transport; accomplished electronically by using SMPTE time code.

Spotting The process of identifying the specific locations on film where music cues will take place.

Temp Score Music placed by the director or music editor to get an impression of how a scene will work once it's scored.

Theme A musical idea or phrase that becomes an important motive throughout a score.

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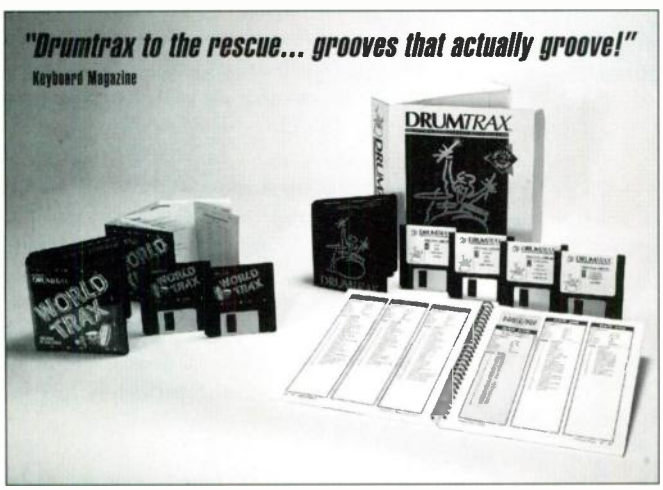

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effects, looping, location sounds—onto a single DA-88 tape. I don't think a DA-88 sounds as good as a great analog recorder, but the MDM format is so useful, it's almost worth the sacrifice."

The studio receives Karpman's finished score in time for the dubbing session, or sound mix, where all the music, sound effects, dialog, and Foley are mixed together. The composer is not always invited to the dubbing session, but Karpman makes an effort to be there. "Problems will often arise when all the sound elements are put together," she says. "Some percussion may drown out a piece of dialog, or a cello may be too soft. The music editors and I have to be prepared to come up with helpful suggestions on how to make a problematic cue work—bringing the music in later, ending earlier, or remixing a cue so an instrument gets pulled up or dropped down."

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LEARNING THE LANGUAGE

What does Karpman find most challenging about putting music to film? Surprisingly, it isn't any part of the technical process. "The hardest part—the continuing learning curve—is learning how to communicate with people who don't know much about music," says Karpman. "They don't always have the language or the understanding to say what they like and dislike. I'll often ask a director or producer what kind of music he or she listens to, because if someone doesn't like jazz, then he or she probably won't like your jazz score; if a director hates every cue you play that features an oboe, then you won't want an oboe in your orchestra. And if that person doesn't like the score I want to write, I must remember that my agenda isn't the number-one agenda. My wishes are always secondary to the director's wishes."

However, even rejected pieces find new life in Karpman's studio; she often makes use of previously rejected music in other projects. "I save everything," she says. "You never know! Just because this director doesn't like it doesn't mean that the next one won't."

ADVANTAGE KARPMAN

Having been trained to compose for symphonies, Karpman has a keen ear for realistic-sounding samples. She knows how most instruments are played and tuned, so her sequenced music sounds convincing. For example, woodwinds aren't sustained longer than someone could actually play them, and horn parts are written in their appropriate ranges. But the most important thing that she gleaned from her classical training may be her approach to each new body of work.

"It's really important to look at the score for a show, a movie, or an episode as a symphony," Karpman emphasizes. "It's a living, breathing musical piece, and it needs to have connections and interweaving themes and motives just as it would if it were a piece of concert music. Just because it's film music doesn't mean that it's any less serious or rigorous musically."

EM *Editorial Assistant* **Jennifer Seidel** *hopes she has shown that English majors* can *find gainful employment.*

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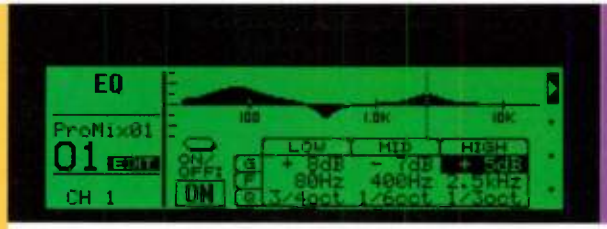

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Mixing is something like painting. Whether it's for a live audience or in the studio, equalization, or eq, is like the "palette and brushes" that let you adjust the shade and tint of each sound in your mix.

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Each sound in your mix is made up of many "colors" or frequencies. If you look closely at a shiny object, you notice it's not simply gold or silver—it displays a complex array of colors that let you know it's reflective. When you listen to a sound by itself, you mostly hear its predominant frequency—the fundamental. But like the shiny object, if you listen closely you'll hear subtle frequencies called harmonics that give the sound its character.

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

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

A different shade of blue?

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

What size brush?

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

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The cyclical nature of pop culture is an aging musician's surest defense against stylistic obsolescence. Because everything that goes around comes around, you can be assured of regaining your hipster status every fifteen years or so. The trick is sticking it out long enough to enjoy the revival. Sadly, few musicians have the stamina (or lack the stupidity) to wait for the public to have a collective *déjà vu* experience.

Songs, however, are immortal. A great tune is always and forever a great tune. It doesn't lose its hair, get fat, or unravel into a drug casualty. The benefit of a hit song's imperishable quality is that an artist can record his or her own version—which is called "covering" the song—and exploit the public's familiarity with the original work. Like a postcard from an old friend, a cover version can command the attention of a listener with far more authority than a new, untested song. In addition, an artist with a good ear can unearth a forgotten gem from the past and introduce it to a new audience, such as the Black Crowes did with Otis Redding's "Hard to Handle."

Small wonder, then, that the current music scene is awash with an epidemic of "covers" albums and tribute records to popular artists. The latest releases from Annie Lennox, Elvis Costello, and Duran Duran are totally composed of cover versions of old songs. (We can blame David Bowie for starting this madness; his *Pinups* is perhaps the seminal covers

by michael molenda & dan levitin


Illustration by Jamie Hogan

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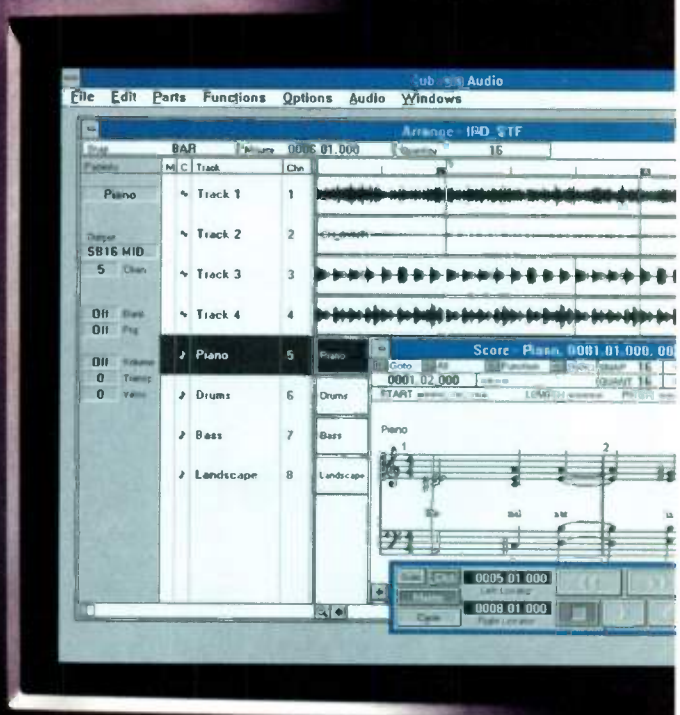

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album.) In addition, many new bands seem committed to pillaging the repertoires and styles of legendary artists from Jimi Hendrix to ABBA. The message is clear: if you can't write a great song by yourself, steal one.

HEISTING THE HITS

Unfortunately, "borrowing" someone else's song is not as easy as committing the lyrics and vocal melody to memory. You also have to snatch the chord progression and all the catchy instrumental lines, themes, and licks. These elements may not survive in *your* version, but you should figure them out so you have a solid foundation from which to develop a new arrangement.

In addition, it never hurts to become intimately familiar with the original artist's musical game plan. There are several reasons why a song becomes a hit, and you don't want to destroy "guaranteed" hooks just to reinvent a work in your own image. For example, it would be an extremely brave or foolish musician who would cover the The Who's classic "Pinball Wizard" without Pete Townshend's signature guitar line.

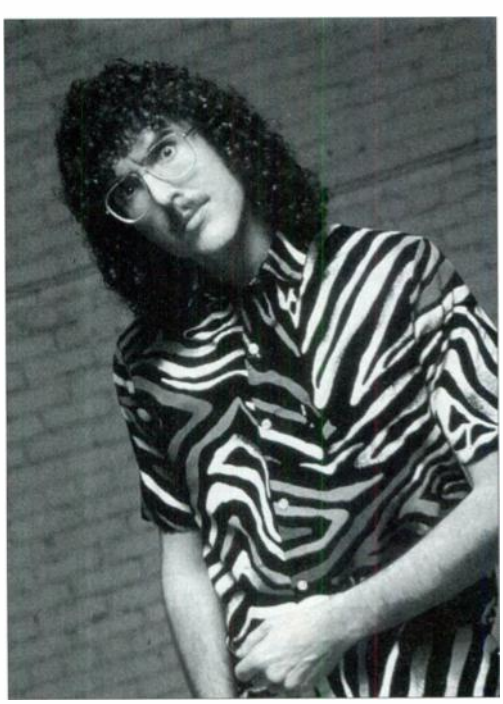
"A cover should be an appreciation of the original song," says Nick Rhodes, keyboardist for Duran Duran, whose recent album *Thank You* pays homage to the band's favorite artists. "We had no intention of going in like bulls in a china shop and smashing songs to bits. We took a lot of care to try and understand what the original artists were getting at. Then we'd figure out whether we could bring something new to each song."

But before you start plowing though old records for fertile song soil, you should address some nonmusical issues. One biggie is alerting the current publisher of any song you plan to cover. This common courtesy is often overlooked by artists who fear publishers will charge them a hefty licensing fee.

Though charging such a fee is not unheard of, it is certainly not standard procedure. I've licensed more than 50 songs for the three tribute albums I've produced for European record labels without ever being hit up for a licensing fee or an up-front payment. In fact, most publishers are more than happy to grant "free" usage of a song, because they receive mechanical royalties every time sales and airplay are generated. Legitimate publishing companies simply want to keep track of where and how their catalog is being commercially exploited. Can you blame them?

Unfortunately, there *is* a downside to your honesty. If you're releasing your own record, the publisher may expect you to report sales figures to them and send them a check for their share of the royalty pie. I'll leave it to your conscience to decide whether to report or not, but just keep in mind that whenever you start selling a lot of records, your dirty little secrets have a way of becoming very public—and publishers actively protect their copyrights.

The toughest chore for conscientious artists is locating the current publisher of a work. Song catalogs are traded faster than junk bonds, so the publishing credits on an old record are hardly reliable sources. Luckily, performance-rights societies such as BMI and ASCAP



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Got You Covered

will search their databases to match a song to its current publisher. Usually, you just fax them a list of song titles, and they'll fax back the names of the publishing companies that administer the works in question. The only catch is that BMI searches exclusively for BMI publishers, and ASCAP limits its search to ASCAP publishers. Plan to call both companies before any mysteries are solved.

STEALING SOUNDS

Once you've got your legal house in order, you're free to obsess on deconstructing the original song piece-by-piece. Many artists simply determine a song's basic chord progression and melody and then add their own musical elements. This method ensures a unique reading by freeing the artist to impose his or her personality on the foundation of the original work. It's certainly a valid production concept, and the majority of the bands on the tribute albums I've produced have chosen this road. However, this skeletal approach doesn't require a lot of instruction. You just work out the chords and go for it.

So rather than end this article right now, let's discuss the technique of developing covers by copying verbatim every chord inversion, bass line, and guitar lick. Now I know that you're going to moan that copying parts from records is totally uncreative and uncool and lowers the musician to the level of lame Top 40 bands that play Holiday Inn clubrooms on Tuesday nights. Not so. Emulating sounds on hip (or hit) records is a tradition in studio circles, and the practice can lead to some creative epiphanies.

For example, Mark Knopfler admits that he came up with the distinctive guitar tone that opens Dire Straits' "Money for Nothing" when he was *trying* to rip off ZZ Top's guitar sound on the song "Legs."

The Knopfler anecdote illustrates how difficult it can be—even for talented professionals—to cop another player's licks. "I've found that emulating a player's sound isn't as difficult as getting his or her parts right," says the master of the parody record, Weird Al Yankovic. "The musicians don't always catch the bits that get buried in the mix [of the original song]. When I did a parody of the Crash Test Dummies, one of the musicians heard a completely different part than I did. We actually started arguing about what it really was."

Sometimes, however, knowing how the sound was produced can help illuminate a part. For example, it's fairly easy to break down a guitar tone if you're familiar with the possible components. First, ask yourself whether the guitar is an acoustic or an electric. Don't laugh; the proliferation of slimline acoustic-electrics makes this identification harder than you might think. (Keith Richards has been known to

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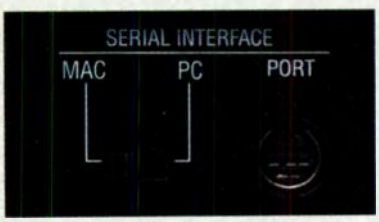

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ALESIS

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Duran Duran recently paid homage to the artists that had inspired them with *Thank You*, an album entirely composed of covers.

place a mic in front of his unamplified electric guitar!)

If you nail down the type as an electric, you still have to ascertain whether it's a solid-body, hollow-body, or semi-hollow body. Now, did the guitarist use any effects? If so, what are they? And how about the amplifier? Try and determine whether the distortion is the smooth, "chime-like" overdrive of a tube amp or the dense, transistorized sound of a solid-state amplifier or stomp box.

You should also listen for unconventional tunings (focus on the pitch of the open strings) and whether the guitar was capoed (the strings will sound tighter). It even helps to know whether the guitarist was playing with bare fingers or a pick. Finally, listen for "flams" that can give away the fact that a guitar part was doubled to thicken its timbre.

Unfortunately, a guitarist's (or producer's) effects rack can turn even these basic sound-matching tips into exercises in frustration. Compressors, modulation effects, and other signal-processing gizmos can make it very difficult to identify the source of a particular timbre or copy a guitar part. At times, you just have to make some compromises and wing it.

"It can be brutal figuring out guitar parts because everybody uses different

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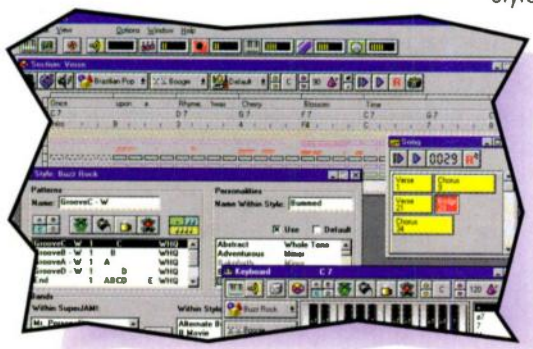

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combinations of equipment," explains Jim West, who has emulated more than his share of fret burners during his tenure as guitarist for Yankovic. "We don't get too anal about matching sounds. I won't go out and rent different amps or call a player to get his or her equipment list. I just use whatever I have and try to make it work. Luckily, I have a kind of instinct for picking out the guitar parts in a mix. Sometimes if a particular part is difficult to get, I'll run the track through a graphic equalizer and notch the frequencies that accentuate the part so it's easier to hear."

Of course, picking out riffs from a dense audio mix isn't your only option for stealing parts. The MTV/VH-1 age has prompted the release of thousands of concert videos, and just about every artist from the most obscure 1950s rockabilly band to today's superstars is

▼

Emulating sounds on hip records is a tradition in studio circles.

documented. So if you can't grab a part off an audio CD, why not check out a concert video and try to catch a shot of a musician's hands in action?

"I've found that videos are a tremendous help," says Greg George, drummer with the popular live Beatles retrospective, *1964: The Tribute*. "Every aspect you can take through your senses helps clarify what a musician played. Ringo had a million different fills, and it's tough to hear the patterns on some of the early recordings. I try and identify which drum made what sound and go from there. But I've also studied all the Ed Sullivan shows and footage of the first U.S. concerts.

"Also, it's often hard for a drummer to pick out parts, because few stereo systems are loud enough to practice with," George continues. "A portable cassette player, such as a Sony Walkman, can really make it easier to figure out drum patterns, because the sound is right in your ears as you play."

If none of these tips help you unlock a song's secret, there is a last resort. **EM** senior editor and keyboard whiz

Got You Covered

Steve Oppenheimer, who prides himself on putting bassists out of work with his mighty left hand, recommends focusing on the song's bass line. Most bass players stick pretty close to the tonic (just watch out for those thirds and fifths), so if you can grab the bass notes, the chords will follow.

Another thing that musicians often forget is ensuring that the cover version is in a key that enhances your (or your singer's) voice. The original song was obviously cut to suit that particular vocalist, and his or her range may be above or below another singer's comfort zone.

"The key of the song was an important criteria when we selected songs for *Thank You*," says Rhodes. "It was critical that a key would suit the dynamics of [Duran Duran vocalist] Simon LeBon's voice. For example, the original key of Lou Reed's 'Perfect Day' was quite low. I've always liked the expressive quality of Simon's low range, however, so we decided to cut the song in the original key. Although I didn't find out until after we recorded it, the melancholy vocal timbre actually echoed what the song was all about. Lou told me that he wrote the song about wanting a perfect day because he never had one; he never even had a perfect five minutes."

COVERED UP

Aside from being "the thing to do" in today's fickle pop-music industry, covering songs can definitely be a good thing for artists seeking to clarify their musical personalities. Freed from having to search your soul for intimate lyrics and melodies, you can just set your voice (or your instrument) loose on putting your stamp on someone else's song.

It doesn't even matter whether your version isn't very close to the original arrangement. If you can't figure out the exact chords or hook lines, don't sweat it. The attempt may inspire a new song or reveal a chord progression that you may never have considered exploring. With the right frame of mind, stealing licks can enhance your musical chops and lead you into unexplored creative territories. And even the original artists can have trouble replicating their past performances.

"When I contacted Mark Knopfler about getting permission to parody 'Money for Nothing,' he said he'd only agree if he got to play on the track," says Yankovic. "Unfortunately, we had already recorded the parody because it had taken a while to get in touch with him. But I thought, 'Well, if we have to, sure!' The funny thing is that Mark's track didn't sound as close to the original as the one my guitarist Jim [West] cut. You see, Mark had been playing the song in concert for so long that his playing had gotten kind of loose."

Dan Levitin *keeps covered by wearing a wet suit while he surfs the Internet.*

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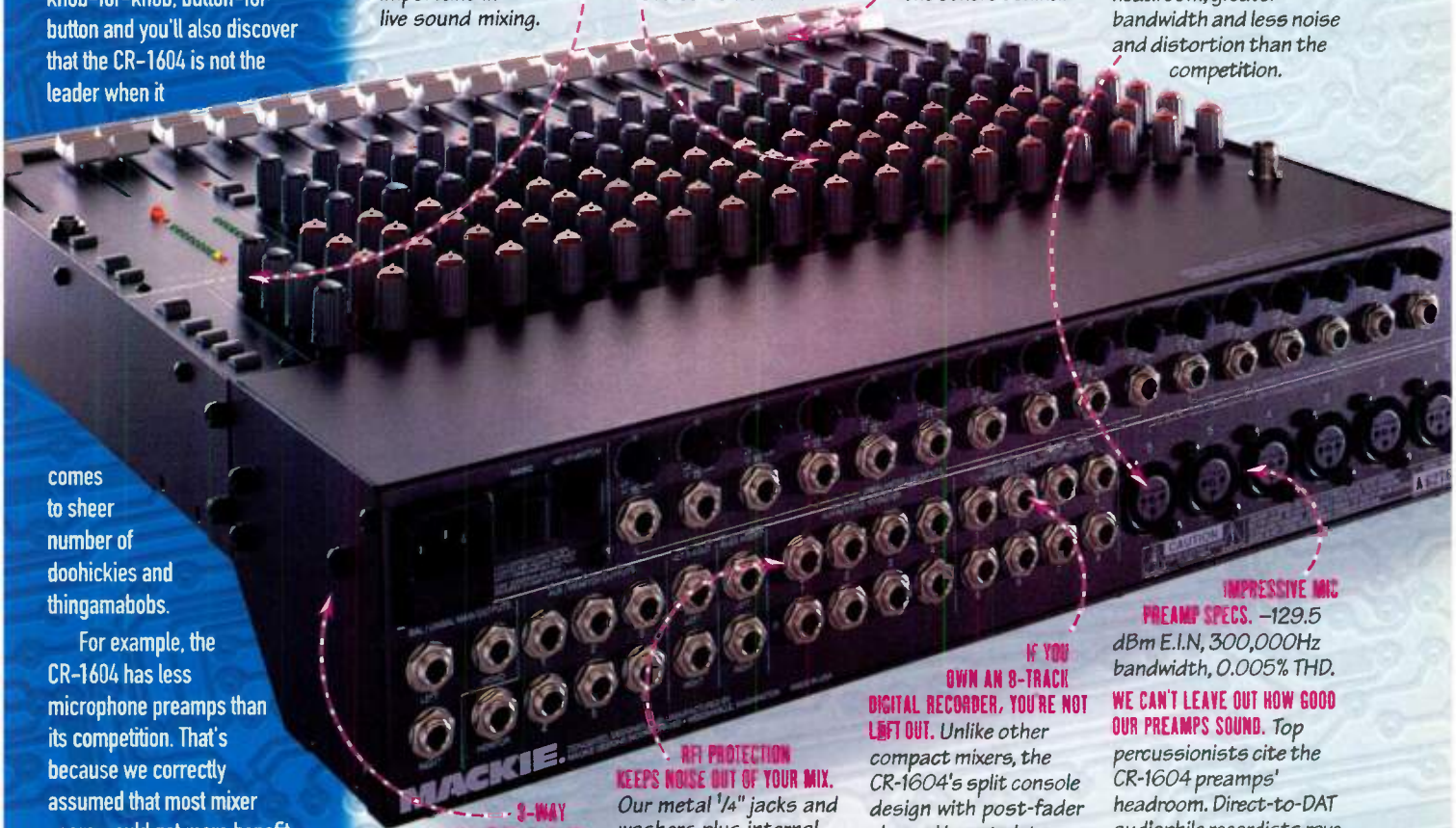

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Do multimedia speakers have the right stuff for the desktop studio?

Little monsters

By Michael Molenda

If you're ever sitting around with nothing to do and have enough headroom on your charge card to handle a $2.95-per-minute diversion, here's a quick fix for the doldrums. Call one of those psychic networks and ask the seer to predict the day that multimedia finally lives up to its colossal hype. Trust me, you'll be able to smell the smoke as the medium fries her brain wrestling with *that* query.

But it's certainly no mystery that many companies view the multimedia industry as a magic revenue machine. Manufacturers continually barrage computer-savvy consumers with peripherals designed to enhance gaming and "edutainment" experiences. Take multimedia speakers, for instance. There are bazillions of these diminutive drivers on the market. So many, in fact, that they may eclipse home-stereo speakers as the main end-user system for music-loving cyberbuffs.

Don't laugh. It's a sure bet that when most consumers play a computer game, listen to an Enhanced CD, or explore a CD-ROM, they are experiencing audio through multimedia speakers. Some people (myself included) even like to pop an audio CD into their CD-ROM drive to provide background music while they write a letter or update a spreadsheet. And here's the kicker: creating music for this less-than-ideal listening environment may be *the* critical challenge for musicians producing work for an interactive world.

Photograph by Barry Muniz


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Little monsters

Let's say you're planning to release an Enhanced CD and also want to upload sound files to a "new music" Web page. It wouldn't be a smart move to disregard the end user totally by mixing solely on studio monitors. For one thing, all the psychoacoustic layering that sounds so marvelous on professional reference monitors can turn to mush on a small, single-driver multimedia speaker. To ensure that what you hear in the studio translates to a home-computer system, it's essential that you audition your tracks on multimedia speakers.

TEST PATTERNS

The big question, of course, is, "How good *are* these things?" Are multimedia speakers trustworthy enough to use for critical recording decisions such as frequency, level, and spatial adjustments? We selected eight popular multimedia speakers from Advent, Altec Lansing, Audix, Bose, Roland, and Yamaha—four stand-alone models and four subwoofer systems—and looked for some answers. Each speaker was subjected to a frequency- and phase-response analysis and a critical listening test. The bench exam was conducted by noted recording engineer, studio tuner, and frequent *Mix* contributor Bob Hodas with a Meyer Sound Laboratories SIM System II.

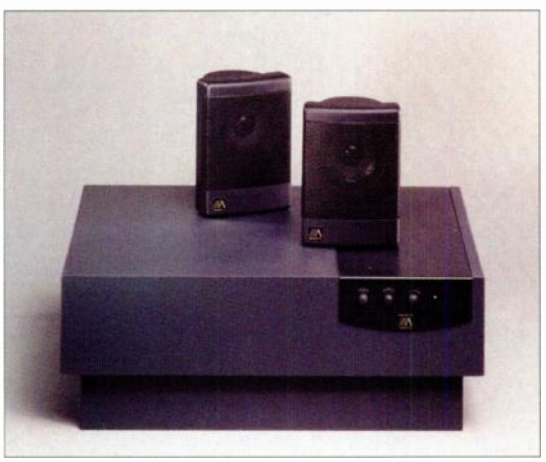
The stand-alone speakers were placed on a tabletop, right next to Hodas' PC, and all of the audio data was collected through a B&K 4006 microphone that was positioned two and a half feet from each speaker and pointed directly at the driver (or between the drivers if the speaker was a 2-way model). Because the idea was to re-create a real-world listening situation, the height of the mic was raised to approximate the head position of someone seated directly in front of his or her computer. For the subwoofer test, Hodas placed the satellite speakers in the same tabletop position as the stand-alone models and put the bass modules under the desk, slightly in front of the satellites.

The listening test was conducted in my home office on a Macintosh Performa 630CD. All of the speakers were connected directly to the Macintosh's stereo output. Selections included some audio CDs I recently produced; the soundtrack to the film *Desperado,* by Los Lobos and others; LucasArts' latest *Star Wars* battle game, *Dark Forces;* and id Software's totally over-the-top alien killfest, *DOOM II.*

Bose MediaMate

STAND-ALONES

Stand-alone multimedia speakers are the clear choice if you desire a conventional monitoring environment. For the most accurate reproduction possible—given the sonic limitations of the speaker—make sure the drivers are placed a little ahead of your monitor and CPU. This position will help diminish reflections that can skewer audio integrity. In addition, it's a good idea to place the speakers at least two inches away from your monitor—even if they are shielded—to prevent any mischief from electromagnetic gremlins.



Advent AV622

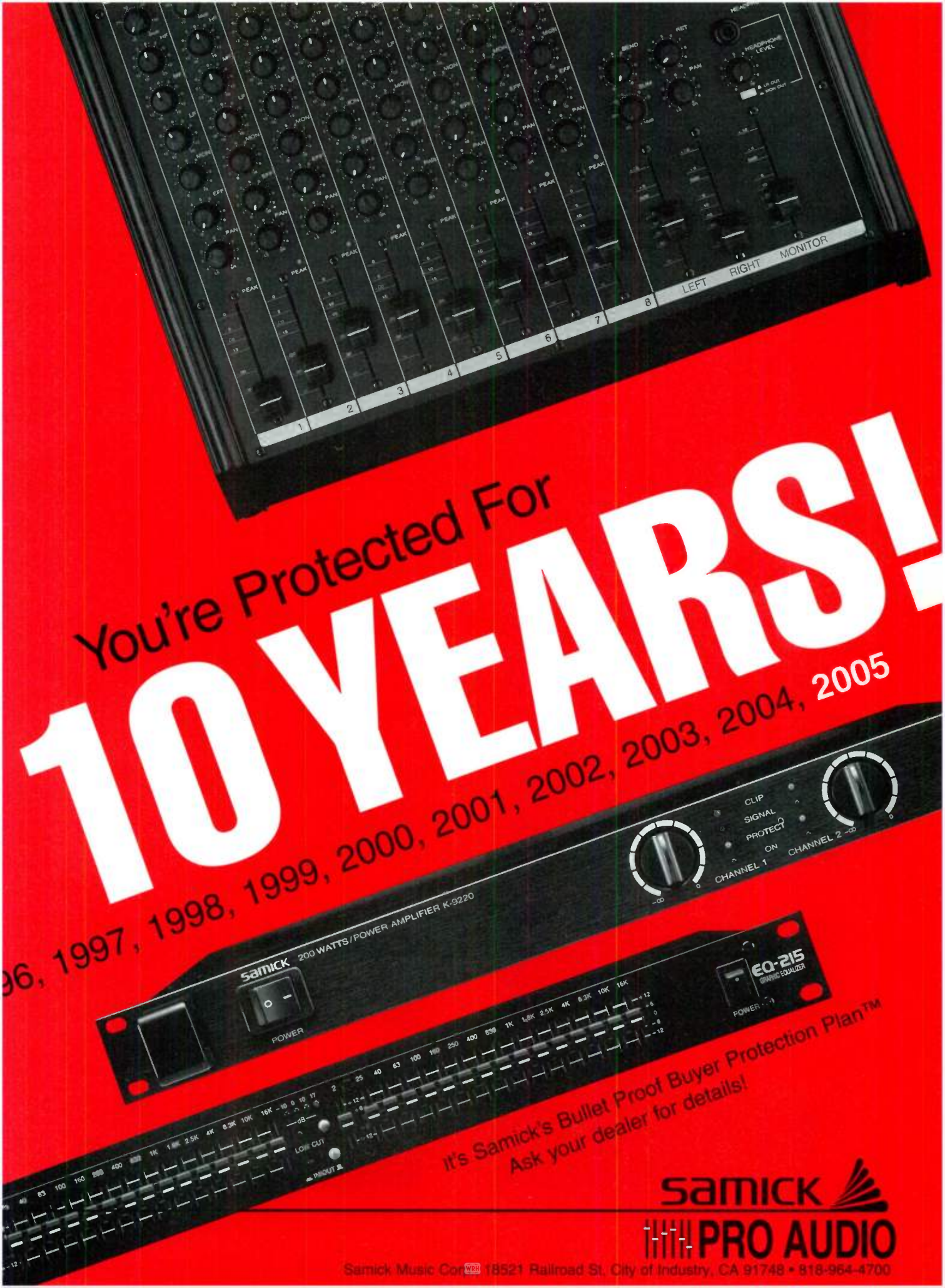
AUDIX PH-15

Of all the speakers tested, the Audix PH-15 looks the closest to a bona fide reference monitor. It's a handsome black box that imparts a pro-studio attitude, even when sitting on a desk littered with CD-ROM games, unpaid bills, and framed portraits of my astoundingly beautiful 2-year-old niece.

The PH-15 is a 2-way, ported design with a 5¼-inch woofer and a ¾-inch tweeter. This is not a speaker for a small, cluttered desk. Its 6 × 9 × 9-inch footprint is certainly not a space saver, and each enclosure weighs in at a robust fifteen pounds. The PH-15 has no tone controls, and the lone volume knob is inconveniently placed on the rear of the master speaker. Magnetic shielding isn't great, so keep these babies far away from your computer monitor to prevent interference. You don't have to worry about output levels; at 45 watts per channel, the PH-15 is the most powerful speaker we tested.

Frequency analysis. The PH-15 proved that its appearance was not the only thing that evoked professionalism. The speaker posted a relatively smooth frequency response that certainly qualifies it for monitoring duties. (See the sidebar "Super Freqs" for the actual test charts.) However, the PH-15 is biased toward the high frequencies with a boost centered at 13 kHz. This sonic orientation isn't a capital crime—the fierce high end of Yamaha's immensely popular NS10M monitors hasn't prevented top engineers and producers from using them—but it does reinforce how important it is to check your tracks on other speaker systems. In the PH-15's case, you'll want to make sure you haven't mixed "dull" to compensate for its high-end bumps.

Listening test. The PH-15 sounded extremely clean and clear on music tracks. I could even hear the subtle fret noises as the guitarist slid into each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Little monsters

chord on "Let Love Reign" from the *Desperado* soundtrack. Stereo imaging was excellent, but articulation at low volumes was a bit muted. (Those sparkling highs simply disappeared.)

This is a very accurate and trustworthy speaker for multimedia-music production. Unlike some of the other speakers tested, it is not pumped up in the bass and mid frequencies to deliver more impact for gaming experiences.

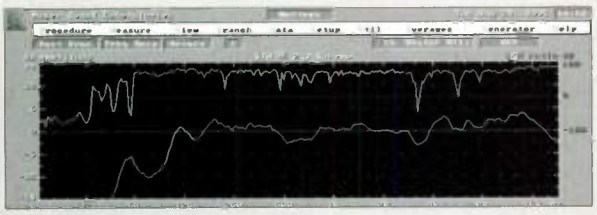
The down side of such even response is that the PH-15 is rather tame for game play. During a round of *DOOM II*, the chaingun sounded too well mannered to scare off any commandos, and the rocket-launcher blasts were rather limp. But if I were doing sound design for a battle game, I'd pick the PH-15 in a quick second. Believe me, if the explosions, door creaks, and howling demons sound scary on this monitor, they'll be fiendishly intense when played back on speakers designed to deliver wallops and rumbles.

BOSE MEDIAMATE

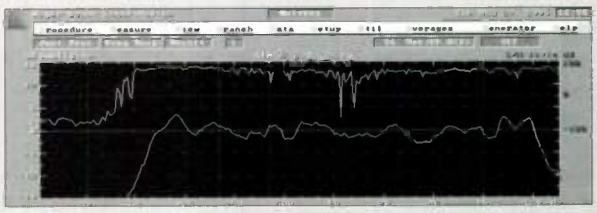
Bose's futuristic looking MediaMate is a ported, single-driver (2½-inch) design that is angled toward the listener's head to minimize signal reflections

SUPER FREQS

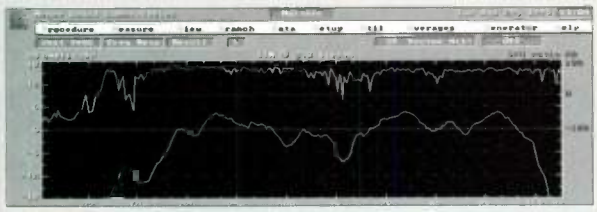
To ensure an objective, "lab tested" reference, studio tuning wizard Bob Hodas analyzed the frequency and phase response of the speakers with a Meyer Sound Laboratories SIM System II. Don't be concerned with the top line of each chart; it displays *coherence* (a comparison of the test signal with what is heard by the mic, along with all room reflections and other distortions). The bottom line (literally) is the frequency response. You can see that few of these speakers deliver flat, accurate response. A theoretically flat speaker would hug tightly to the center "0" line. Watch for the hills and valleys, and match each aberration to the frequency numbers at the bottom of the chart. This will reveal the specific frequencies where each speaker is aggressive or shy.



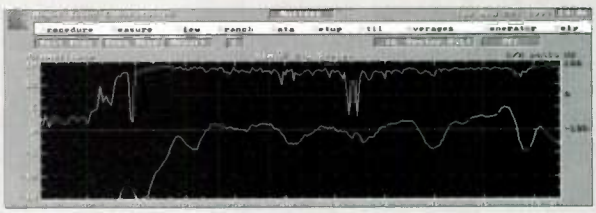
Audix PH-15



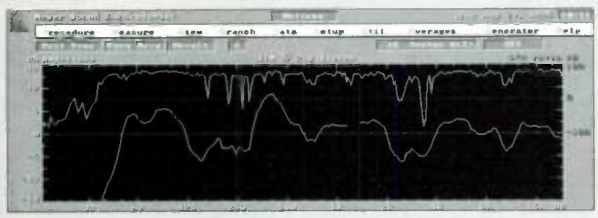
Bose MediaMate



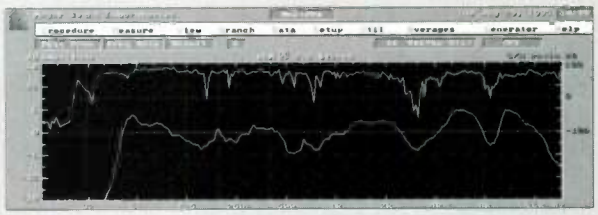
Roland MA-12C



Yamaha MS20S



Altec Lansing ACS 300.1



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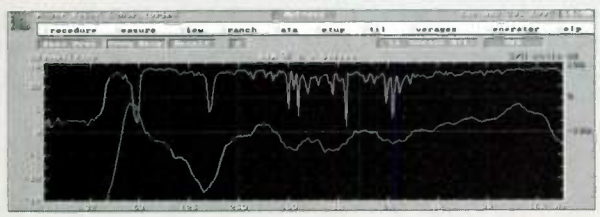
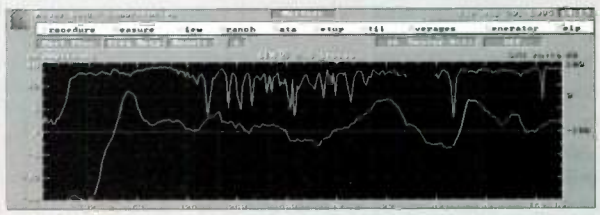


Bose Acoustimass



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novation

Little monsters

from the desk top. The cabinet is compact and light, measuring 7 × 3 × 8 inches and weighing just two pounds. As with the PH-15, you get a volume knob and no tone controls; unlike with the PH-15, the volume knob is mounted on the MediaMate's front panel to allow easy adjustments. In addition, you also get a Mix control that adjusts the balance between two separate sound sources and a headphone jack. Gain was not a problem: the MediaMate got loud enough to rattle my telephone receiver without succumbing to distortion.

Frequency analysis. Hodas was rather surprised at how well Bose's small, single-driver multimedia speaker performed. Frequency response was remarkably flat, making the MediaMate a serious contender for sound-sculpting assignments. I don't know whether I'd trust it as a primary reference because of its tiny driver, but this speaker is definitely accurate enough for music production.

Listening test. Despite its small driver, the MediaMate actually sounded a tad bass heavy on music tracks. Overall tonal articulation was excellent, even at low listening volumes. The speaker has a nice, aggressive punch that really enhances stereo imaging. I could clearly hear the finger slaps on conga parts, and I could even hear the reverb decays! On my *DOOM II* campaign, the directional imaging was so precise that I could hear the former humans breathing to the left or right of a doorway. The MediaMate also reproduced ordnance fire and screams with chilling authority and added a wonderful, blossoming rumble to cannon blasts.

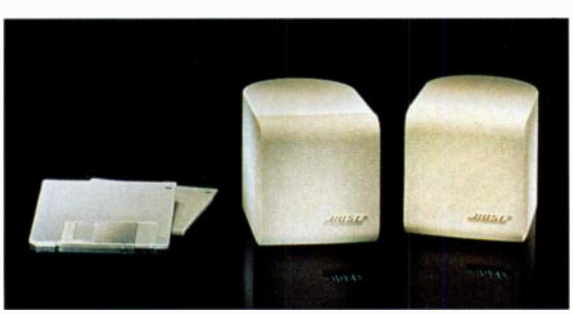
Audix PH-15

ROLAND MA-12C

The Roland MA-12C is often the powered monitor of choice at multimedia trade shows, and it's not hard to see why. The MA-12C is extremely efficient, pumps out a lot of sound, and has tone controls to tailor its frequency response to most listening environments. In addition, the power switch and volume, low-boost, and high-boost knobs are conveniently mounted on the front panel. The single-driver, sealed enclosure measures 5 × 9 × 7 inches and weighs five pounds.

Frequency analysis. We discovered that the center positions on the tone controls don't always produce flat response. Hodas adjusted the low boost to its two o'clock position and left the high-boost control centered to get the flattest possible test result. However, even at its most even reading, the MA-12C was far from flat. The midrange frequencies were rolled off and huge dips occurred at 425 Hz and 1.6 kHz. Obviously, this is not the speaker for critical listening chores.

Listening test. Well, the MA-12C may not be the world's most accurate speaker, but it definitely sounds full and robust. Articulation was very good with both tone controls centered, and the speaker maintained sonic



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11/6 Abe Music, Miami
Georgia
10/30 Jackson's Music, Riverdale
11/2 Ken Stanton, Marietta
11/14 Portanel's Music, Savannah
11/21 Atlanta Discount Music, Atlanta
Hawaii
10/17 Easy Music, Honolulu
10/18 Bounty Music, Kahului
Idaho
11/1 Deep River Music, Blackfoot
Illinois
10/16 Soundpost, LaGrange
10/17 Soundpost, Mt. Prospect
10/18 Soundpost, Skokie
10/19 Music Lab, Lansing
11/8 Syracuse Keyboards, Marion
11/9 Samond Music, Effingham
Indiana
10/24 For Ont Music, Jeffersonville
11/6 Conservatory of Music, Terre Haute
11/7 Opus 1, Evansville
Iowa
10/24 West Music, Marion
Louisiana
12/5 Be Bop Music, Baton Rouge
12/7 Sound Check, Metairie
12/12 Lafayette's Pressend, Lafayette
Maryland
11/14 Bill's Music House, Baltimore
Massachusetts
11/7 Falcetti Music, Springfield
11/28 Rick's Music World, Swansea
Michigan
10/10 Bogner Music, Flint
10/11 Evola Music, Waterford
10/12 Music Box, Clinton Township
11/1 Farrow's Music, Kalamazoo
11/2 Maxwell Music, Lansing
Mississippi
10/17 Morrison Brothers, Jackson
Missouri
11/9 Big Dude's Music City, Kansas City
11/14 McMurray Music, St. Louis
11/16 Sounds Great, Springfield
Montana
10/11 Pro Musical Sound, Missoula
Nevada
11/24 Pro Music & Drum 1, Las Vegas
New Hampshire
10/25 E.U. Wurlitzer, Newton
New Jersey
10/9 The Music Place, Berlin
10/11 Keyboard World, Ledgewood
11/2 Route Music, Union
11/2 Rocco Music, Trenton
11/6 Dave Phillips Music, Phillipsburg
11/9 Jack's Musical Instruments, Red Bank
New Mexico
10/32 Grandma's Music, Albuquerque
New York
10/17 Mollod Music, Utica
10/18 Northern Music & Video, Potsdam
10/19 Big Apple Music, New Hartford
10/24 Manny's/Audio Techniques, New York City
10/29 Manny's NYC Musical Kids Expo, New York City
11/16 McNeil Music, Vestal
11/18 Costello Music, Fredonia
12/7 Unistage Music, Buffalo
North Carolina
10/25 Music Loft, Raleigh
10/26 Reddick Music, Charlotte
11/16 Music Loft, Greensboro
Ohio
10/17 Midwest Music, Cincinnati
11/8 Moeller Music, West Chester
11/8 Marion Music, Marion
11/21 Lentino's Music, Richmond Heights
Oklahoma
10/19 Del City Music, Del City
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Oregon
11/8 Portland Music, Portland
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10/26 Sioux Falls Music, Sioux Falls
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10/26 H & H Music (Katy), Houston
10/25 Evans Music City, Houston
11/2 Brook Mays Keyboard Superstore, Dallas
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10/10 Wagstaff Music, Murray
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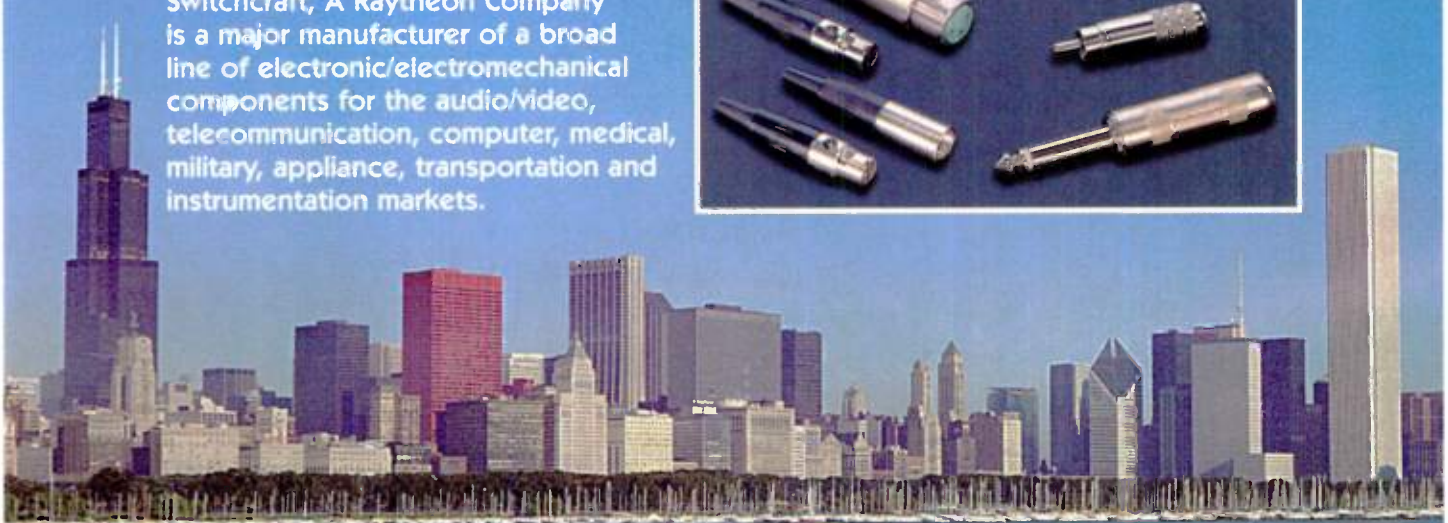

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integrity at low volumes. Stereo imaging is superb. Turning the low boost all the way up produces a rich, punchy bass that does not overpower mid and high frequencies. But if you cut the bass entirely, you transform the MA-12C into the tinny, 5 × 7-inch radio speaker that was standard in a 1964 Ford Falcon.

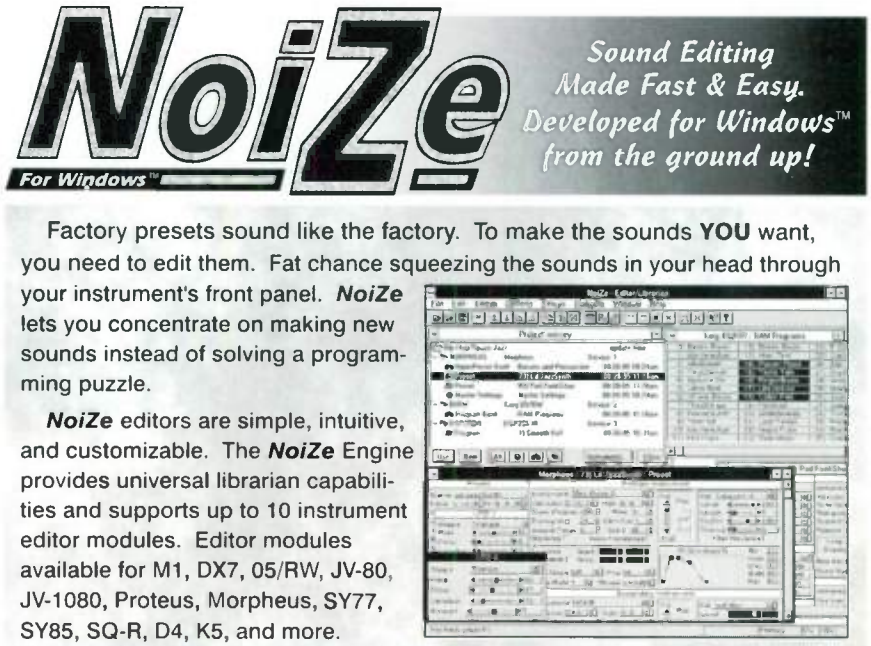
I didn't have much use for the high boost. Turning it up added a nice shimmer to cymbals, but it also made vocals painfully sibilant. Turning it down just made everything sound dull. Directional imaging for game play is good, and the low boost added the requisite "ka-room" to plasma-rifle blasts.

YAMAHA MS20S

The slim, tall MS20S is like a miniature skyscraper. The 2-way, ported enclosure stands almost twelve inches high and posts a 6-inch width and an 8-inch depth. Controls for power, tone (Lo is 100 Hz; Hi is 10 kHz), mic level, and master level are mounted on the front panel, along with separate ¼-inch inputs for mic and line signals. Shielding proved to be less than adequate, so make sure an MS20S doesn't hug your computer monitor.

Frequency analysis. This ain't no reference monitor. The high-frequency response of the MS20S spec'd out the roughest of the bunch. The speaker hangs in all the way up to 19 kHz, but it has a peak at 11 kHz and a dip at 14 kHz. In addition, the tweeter output seemed to be leading the woofer by a

Yamaha MS20S



Little monsters

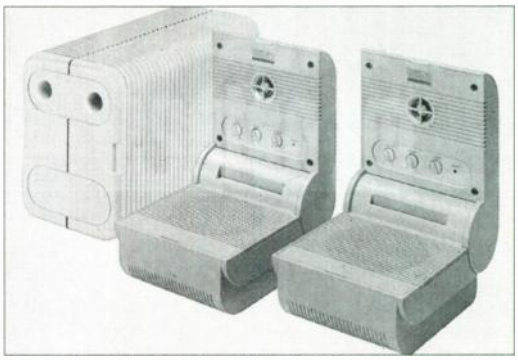
huge amount of time, which scuttled the phase response for high frequencies. To compensate, Hodas turned the bass control all the way up to offset the high-end peaks.

Listening test. Contrary to Hodas' efforts during the frequency analysis, I found that the tone control on the MS20S didn't do a heck of a lot for my ears. Turning the knob to full bass didn't exactly rock the house, and boosting the treble only served to exaggerate a hollowness in the low midrange frequencies.

On both the music tracks and the battle games, the MS20S was a tad bass shy compared to the other speakers. Overall, however, the speaker is very clear and articulate, adding a nice sheen to vocals and percussive sounds. Stereo imaging is downright righteous.

SUBWOOFER SYSTEMS

Admittedly, these subwoofer systems are designed more to intensify game play than to deliver accurate sound for critical listening. But if you want to produce music or sound design for multimedia projects, it's helpful to have a suitable reference for ultimate game systems. (The *next* big wave in multimedia audio—speakers with integrated 3-D audio processors—is already drifting toward computer stores.)



Altec Lansing ACS 300.1

ALTEC LANSING ACS 300.1

The ACS 300.1 packs three speakers into a nice, compact package that won't terrorize your desk top. Each satellite is a cute "pop top" design that opens up like a lunch pail when in use, and the subwoofer itself is small enough to leave some space for your feet when placed under a table. The magnetic shielding on the satellites is exceptional.

All controls—including a mix knob for the system's A and B inputs—are mounted on the satellites. This is very cool because you don't have to crawl under your desk to power up the subwoofer. Tonal adjustments can be made by tweaking the Hi control (± 9 dB at 12 kHz) and the Sub control,

Monstrosities

Here's a quick look at some of the features and test results of our multimedia "quiz." The treble and bass roll-off points are not manufacturer specifications; they are the lab results reported by our system tester, Bob Hodas. Another of Hodas' tests, impulse response, shows how well each speaker reproduces a test signal impulse. Ideally, the impulse looks like the same going into the speaker as it does going out. If a woofer, for example, is slow to recover from the impulse, it may mean that the speaker will reproduce a tubby low end with increased phase-shift anomalies. We spared you the tech jargon and simply posted Hodas' assessment of each speaker's "impulsive" performance. Shielding was tested by moving each speaker around a computer monitor.

Manufacturer/Model	System Type	Bass Roll-Off Point	Treble Roll-Off Point	Shielding	Impulse Response	Maximum Output	Price
Advent AV622 tel. (800) 323-1566	subwoofer	55 Hz	16 kHz	good	ragged	8 watts (sat) 30 watts (sub)	$349
Altec Lansing ACS 300.1 tel. (800) 648-6663	subwoofer	50 Hz	19 kHz	good	poor	18 watts (sat) 18 watts (sub)	$300
Audix PH-15 tel. (800) 966-8261	stand-alone	110 Hz	19 kHz	poor	good	45 watts	$429
Bose Acoustimass tel. (800) 444-2673	subwoofer	50 Hz	18 kHz	good	good	n/a	$699
Bose MediaMate	stand-alone	80 Hz	16 kHz	good	good	n/a	$339
Roland MA-12C tel. (213) 685-5141	stand-alone	100 Hz	13 kHz	good	satisfactory	10 watts	$319
Yamaha MS20S tel. (800) 301-7076	stand-alone	110 Hz	19 kHz	poor	satisfactory	20 watts	$249
Yamaha YST-SS510	subwoofer	50 Hz	22 kHz	good	good	3 watts (sat) 25 watts (sub)	$299

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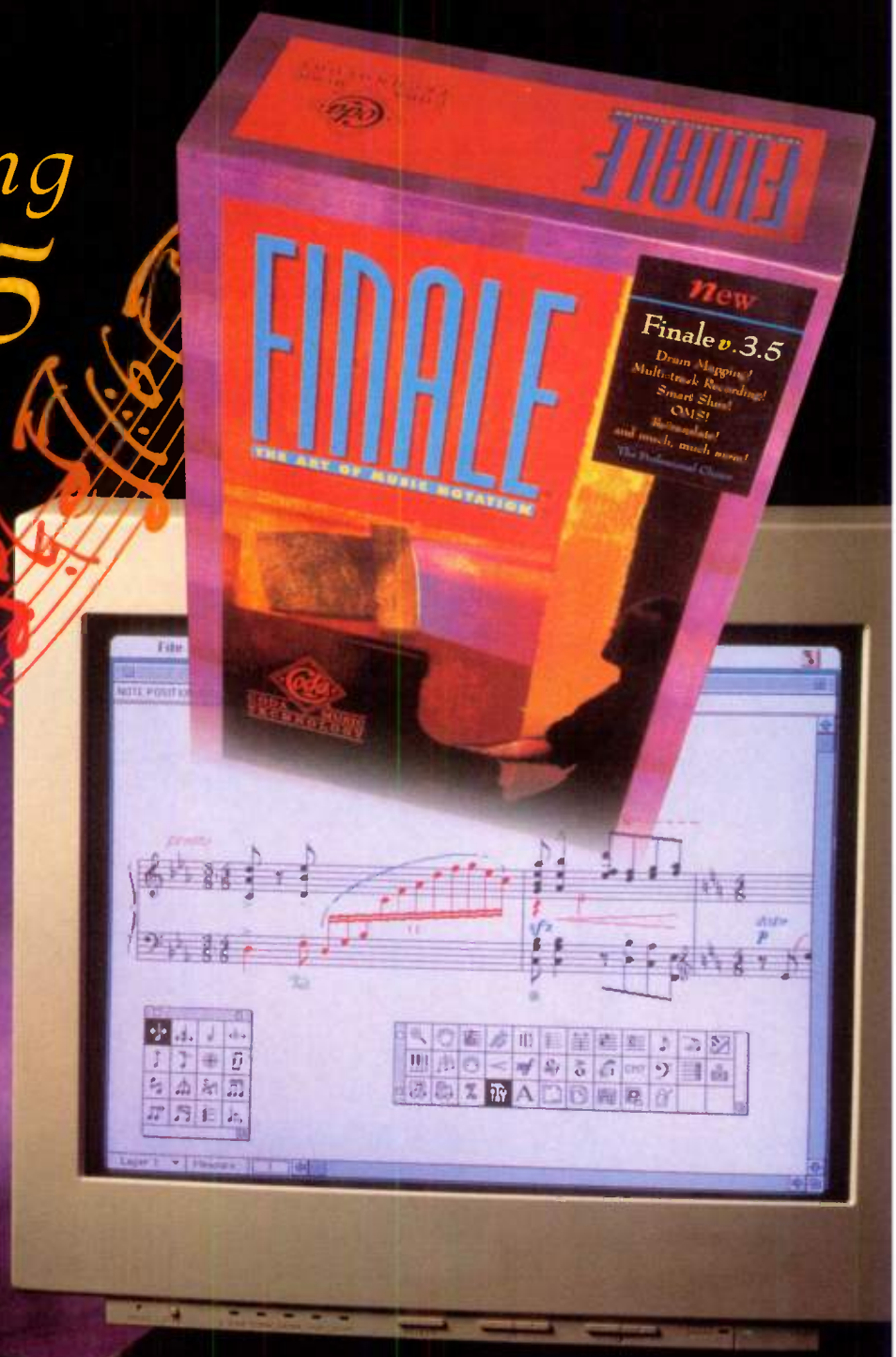

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which increases the output of the subwoofer. There is no way you can boost or cut specific bass frequencies.

Frequency analysis. To achieve the flattest response for the test, Hodas adjusted the Hi control to ten o'clock and the Sub control to two o'clock. The satellites, when tested alone, posted a very erratic response. The frequency response was far from linear and charted a huge bump at 400 Hz. When the subwoofer was put into the mix, things got even weirder. The midrange frequencies died at around 300 Hz, and the subwoofer didn't really produce any power above 125 Hz. That's a pretty big hole; the subwoofer frequency just isn't high enough to interact properly with the satellites.

Listening test. If you're thinking about using this system without the subwoofer, forget it. The satellites produce very clean, articulate sound, but the system is extremely weak in the low frequencies without the subwoofer active. I wasn't impressed with the sound of the Hi control, because it's effectively an on/off switch for treble frequencies. A full 9 dB boost is hurtful, a 9 dB cut is way dull, and not much happens between. Clarity at low volumes is passable. You can hear the vocal or lead instrument clearly, but the punch and integrity of the ensemble is lost.

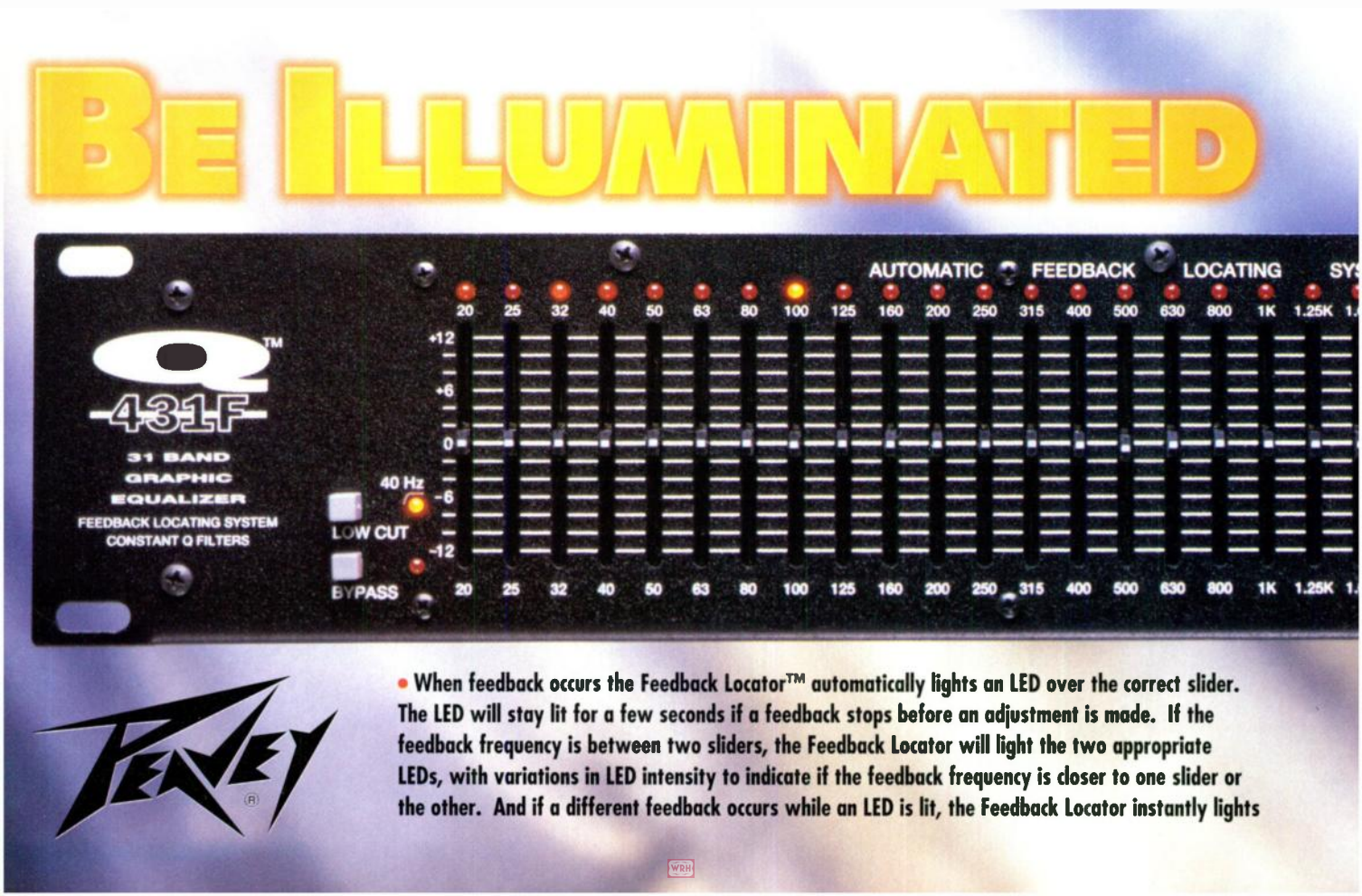
On music tracks, the ACS 300.1 produced a warm low end and shimmering highs, but midrange frequencies lacked crispness. Game play, however, was a blast. The rumble of steel doors opening could actually be *felt*, and the sounds of screams and gunfire were sharp and aggressive. The major drag about the ACS 300.1 is that it produces audible hiss at both high and low volume levels. You also have to be careful when powering down the speakers, because they pop when the system is turned off.

ADVENT AV622

Size-wise, the AV622 is a study in extremes. The satellites are so small and light that the weight of their speaker cables pulls them all over the desk top. (You may want to attach them to your monitor with Velcro to prevent "excursions.") The subwoofer, however, is a 13 × 16 × 6-inch beast that required two hands and a rather impolite grunt to shove into place under my desk.

I wasn't too happy that the AV622's power switch and bass, treble, and volume controls are located on the front panel of the massive subwoofer. After crouching beneath the desk every time I wanted to turn the system on, I seriously considered playing the games without sound.

Frequency analysis. For all its heft, the AV622 checked out as the least-efficient speaker system of the bunch. Hodas adjusted the bass control to its four o'clock position and the treble knob to ten o'clock to achieve the most level response, but it was still far from flat. Frequency dips occurred at 150 Hz, 600 Hz, and 8.5 kHz, and boosts



were posted at 5.5 kHz and 11 kHz. And like the ACS 300.1, the AV622 has rather poor interaction between its satellites and subwoofer. The satellites fall off at 300 Hz, and the subwoofer doesn't pick up the ball until approximately 150 Hz.

Listening test. When the satellites were used solo, they actually produced some pretty mean bass all by themselves. The walking bass line on Link Wray's "Six Blade Knife" (from *Desperado*) sounded tough enough to clear a barroom. Unfortunately, the highs were brittle and thin.

When the subwoofer is active, you have to be careful not to turn your music to mush. The system works better when the subwoofer is introduced subtly into the mix and the treble control is rolled all the way down. Stereo imaging is good, although the shrill highs tend to blur the left/right placement of cymbals and distorted guitars. Articulation at low volumes was on the dull side.

As with the other subwoofer systems, the AV622 really came alive during game play. The scorching mids and highs of the satellites brought a sense of menace to shotgun blasts and chain-gun fire, and the subwoofer almost pushed my chair backward with each explosion. However, there's one sound you won't want to hear: the audible snap when the system is powered down. Don't forget to lower the volume before pressing the Off button.

BOSE ACOUSTIMASS

The Acoustimass is another system that matches field mouse-sized satellites with an elephantine (8 × 19 × 9-inch) subwoofer weighing in at nineteen pounds. As with the AV622, the volume, bass, and treble controls are inconveniently located on the subwoofer. Unfortunately, the Acoustimass adds a painful twist to this ergonomic *faux pas* by putting the power switch at the rear of the enclosure.

Frequency analysis. The basic frequency response of the components checked out okay, but when the system was working as a unit, the interaction was lousy. The satellites dissipated at 250 Hz, and the sub didn't kick in until 110 Hz. Adding to the ragged response was a big dip at 150 Hz. However, the Acoustimass wins an award for being the only speaker tested that produced its flattest response with both tone controls at twelve o'clock (the standard "flat" position for EQ cut/boost knobs).

Listening test. By themselves, the

Roland MA-12C

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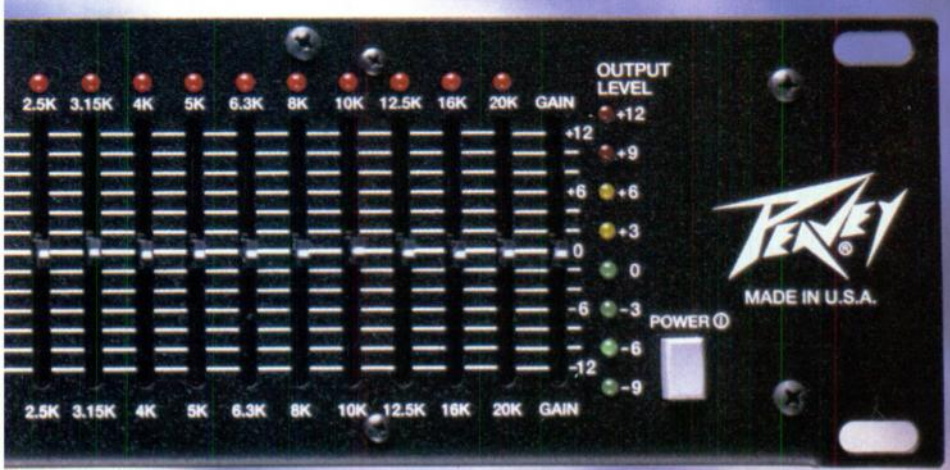

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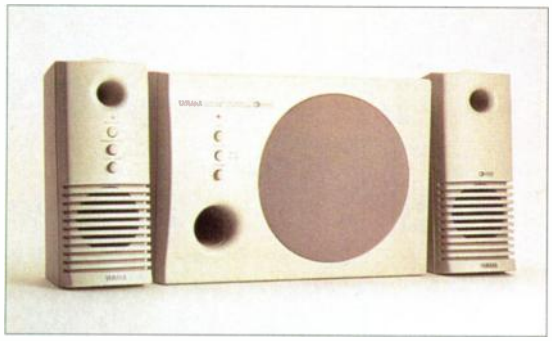
satellites delivered aggressive midrange frequencies without reaching the pain threshold or making vocals sound overly sibilant. Stereo imaging was good, but definition at low listening volumes was a little disappointing.



Yamaha YST-SS510

Although the frequency interaction between the satellites and subwoofer didn't look good on paper, the balance was actually quite pleasing when listening to music. The low end was smooth and unobtrusive until a bass run or tom roll appeared. Then, the sub lows really jumped out with a stadium-concert wallop.

The Acoustimass proved to have the highest bone-quaking rumble quotient of the bunch, so it was a total gas to play games with this speaker. Explosions sounded so real—and actually rattled my walls—that I wanted to duck under the desk every time an Arachnotron fired off her plasma gun.

But the subwoofer isn't the only fun thing about the Acoustimass. The satellites delivered enough punch and clarity to make ray-gun blasts, death screeches, and chaingun fire into spine-tingling audio experiences. It was almost too much of a good thing.

YAMAHA YST-SS510

If you care about such things, the YST-SS510 is definitely the most fashionable system tested. When the satellites are placed on each side of the subwoofer, the combination evokes the look of an art deco table radio. Unfortunately, the system isn't meant to be placed together. This is a pity, but not for aesthetic reasons. In another ergonomic miscue, the YST-SS510 splits its controls between the satellites and subwoofer. You can turn on the satellites and adjust volume and Presence from their handy front panel, but you'll be bending under the table to turn on the sub. The subwoofer also has its own volume knob and a high-frequency cut switch.

Frequency analysis. A slight tweak on the satellites—the Presence knob was positioned at four o'clock—was all that was needed for the YST-SS510 to deliver a fairly even response. The mid frequencies proved to be the most ragged, posting bumps at 2 kHz and 6.5 kHz and a dip at 4 kHz. However, the system had the best interaction between

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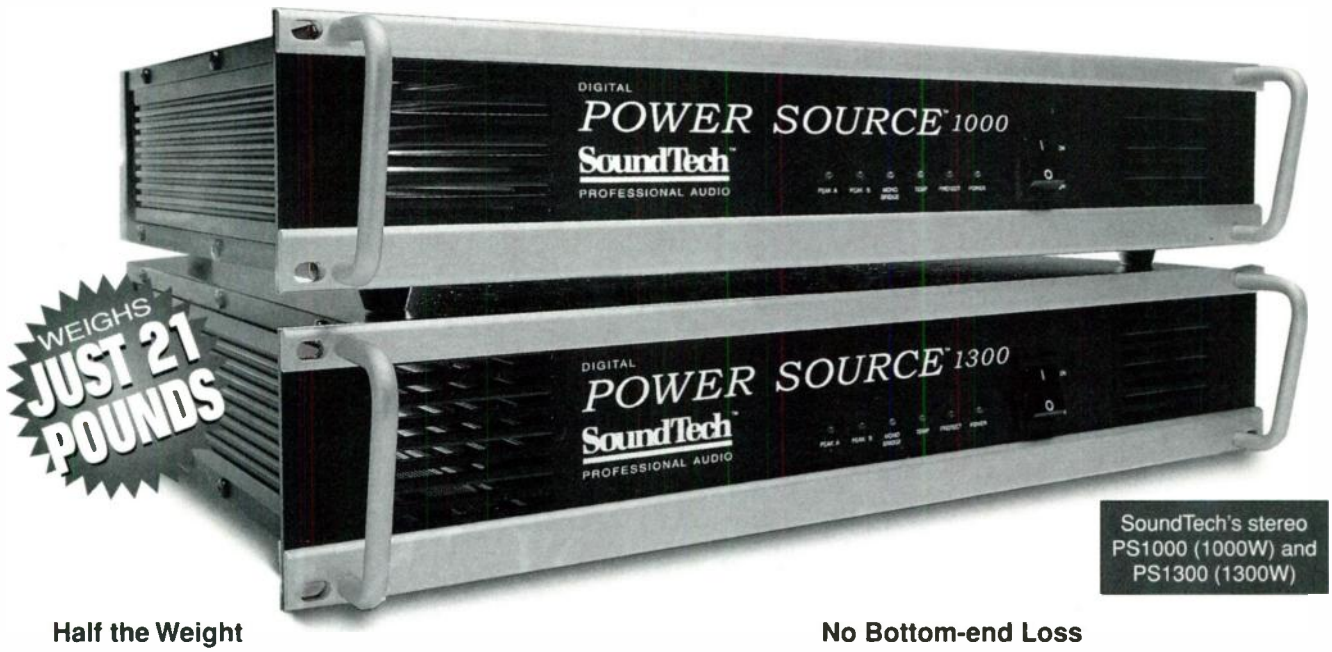

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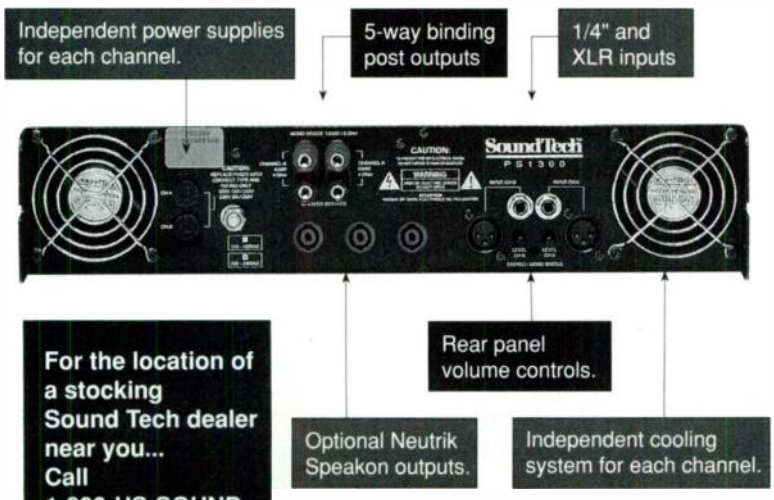

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the subwoofer and satellites. When the satellites dropped off at approximately 120 Hz, the subwoofer took right over. "Now *that's* what a well thought-out [frequency] crossover should look like," said Hodas.

Listening test. One of the hip things about the YST-SS510 system is that you can use the satellites by themselves and still get decent sound. The highs and mids were incredibly clear without being tinny, and the low end was full, tight, and punchy. I had no problem hearing the warm, resonant decay of a huge (sampled) taiko drum on the little guys.

The Yamaha subwoofer can be somewhat overpowering. On most of the music selections, the low end became flabby and muddy anytime the sub volume was raised enough to be clearly audible. I found the best results were gained by letting the satellites cover most of the frequency spectrum—which they did rather well—and sneaking the subwoofer in as an almost psychoacoustic effect. Low-volume articulation was good, but stereo imaging was somewhat muted. The subwoofer continued to deliver overpowering low frequencies during game play. Rocket explosions resonated like atomic-bomb blasts, and when the Revenant let go with a roundhouse punch, the sound of the impact was real enough to fool me into checking for broken ribs.

SPEAK OUT

So what did we prove here? Well, for one thing, a near-field reference monitor is still your best bet for critical listening. None of the multimedia speakers tested could really come close to earning a full-time gig in a pro studio. But that doesn't mean that any of these models couldn't be used as a valuable *secondary* reference. Here are the models that impressed me the most.

Production pals. The Audix PH-15 and the Bose MediaMate posted good enough test scores to be fine references for anyone making music for multimedia. Both speakers also sounded pretty hip during the listening tests.

Battle aces. Just want to have some fun? Of the subwoofer systems, the Advent AV622 and Bose Acoustimass delivered the wildest aural rides. If you can't hang with a big box hiding under your desk, the Roland MA-12C was the stand-alone speaker with the most whomp.

Best of both worlds. Bose's MediaMate proved to be accurate enough for desktop music production and exciting enough to deliver a vivid gaming experience.

So, although none of these speakers will make the woofer on a Genelec quake with envy, you *can* do decent recording work and enjoy your latest space adventure. That's not a bad deal for a multitasking desktop musician.

EM *Editor* **Michael Molenda** *is gleefully addicted to CD-ROM games.*

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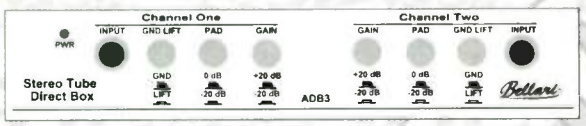
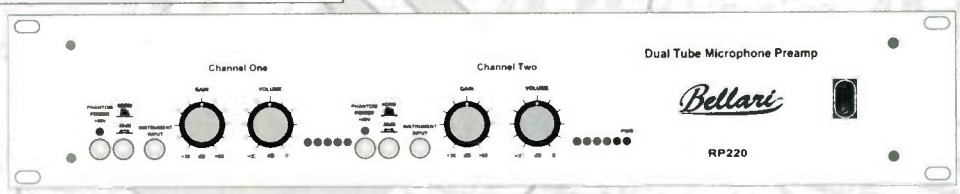
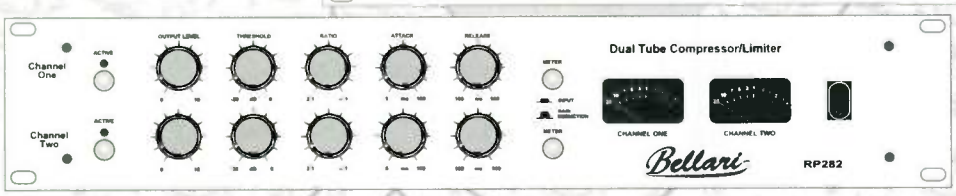


ADB3 Stereo Tube Direct Box

RP220 Dual Tube Mic Preamp





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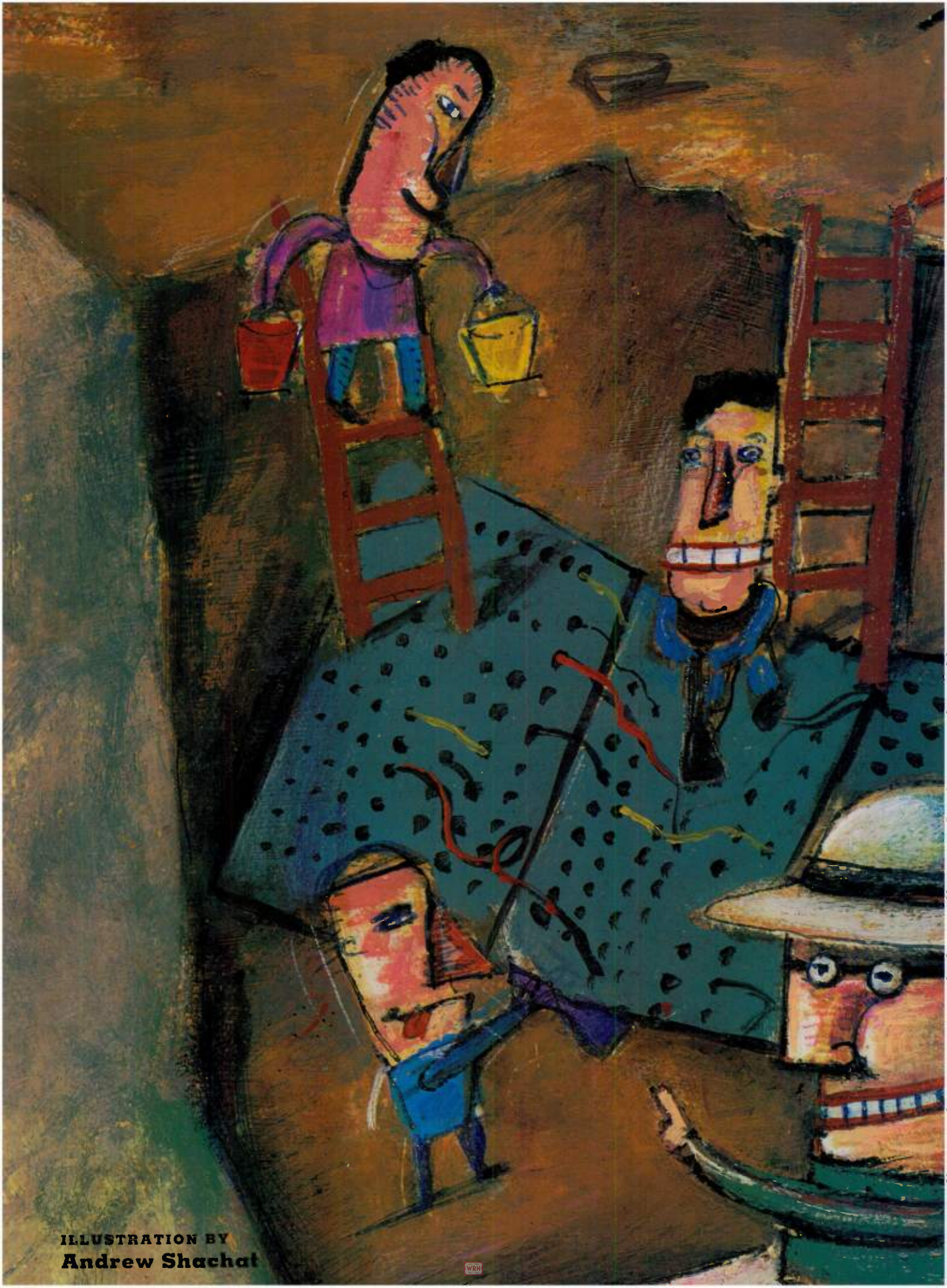
Living Fossils

By Andrew Schlesinger with Scott Wilkinson

Like the dinosaurs in *Jurassic Park*, modular analog synths are making a comeback.

At first, everything is quiet. *Suddenly, you hear a steady* thump, thump, thump *that grows louder with each passing second. A shiver winds up your spine as a raucous scream erupts nearby, followed by the buzzing of some strange, prehistoric insect. Could it be that someone has actually cloned dinosaurs as depicted in* Jurassic Park*? Is that the sound of* T. rex *stalking its prey, disturbing other primordial denizens as it lumbers through the jungle?*

No, it's another type of dinosaur: a modular analog synthesizer. These beasts of yesteryear have been resurrected by popular demand for a number of reasons. For one thing, you can usually configure such a synth any way you want, combining different modules at will. Unlike most synths these days, there is no preset signal flow in a modular synth; you can patch anything to anything. You also have real-time control over virtually all aspects of the sound. In addition, these controls exhibit no quantization, zipper noise, aliasing or other digital artifacts. Perhaps most importantly, fully analog synths produce that warm analog soun



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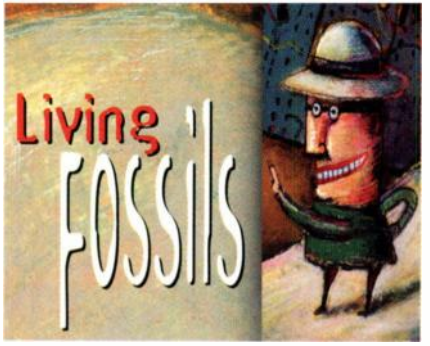

But where do you go if you want to purchase a modular analog synth? Well, you could post a want-to-buy ad in the Internet newsgroup rec.music.synth, although you might want to check out the other ads first. (There are lots of them. A recent ad offering a small Buchla Music Easel went to the highest bidder for more than $3,000.) Alternatively, you could contact some of the used analog-synth dealers in the classified ads of your favorite magazines and get on a waiting list. (Don't hold your breath, though; it could be quite a while before a particular instrument becomes available.)

Fortunately, you have a third option: you can buy a brand new unit from one of several manufacturers. At least three companies make new modular analog synthesizers: Electronic Music Studios (EMS) in England, Doepfer Musikelektronik in Germany, and Serge Modular/Sound Transform Systems in the United States.

FOSSIL TRAITS

Before we look at the current offerings, let's take a moment to recall some of the fundamental concepts behind modular analog synthesis. By definition, a modular synthesizer consists of several discrete modules (usually mounted in a case of some sort) that perform different sonic tasks. Each module includes inputs, outputs, and various controls.

The connections between modules are usually made with patch cords (hence the term "patch"), resulting in a tangle of technospaghetti on the front panel. It must also be noted that modular analog synths are typically monophonic and they have no patch memory. To document a patch, you must sketch the connections and write the module settings on a *patch chart*, which is often supplied by the manufacturer.

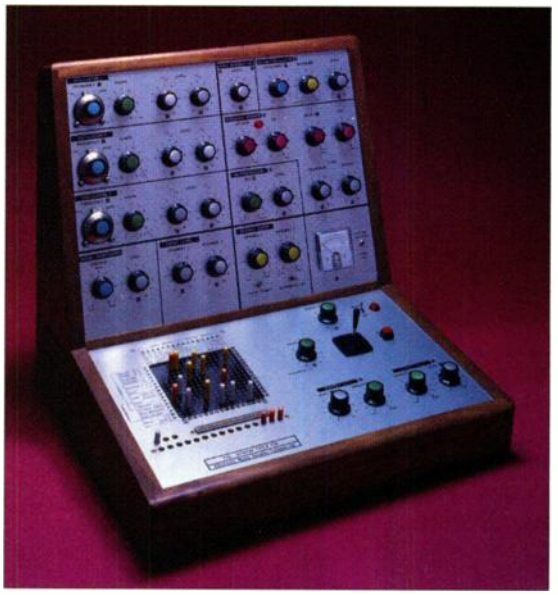

FIG. 1: The EMS VCS3 "Putney" is a classic analog synth in a cool, L-shaped case. With no keyboard, it is often used to process external signals.

At the beginning of the signal chain are *voltage-controlled oscillators* (VCOs), which produce an electrical signal with a user-selected waveform, typically sine, triangle, sawtooth, or pulse. Modular VCOs have at least one control input and one signal output. The pitch of the VCO is determined by an analog *control voltage* (CV) from a keyboard or another module. In most cases, changing the control voltage by 1V raises or lowers the pitch by one octave.

The signal from the VCO is normally passed through a *voltage-controlled filter* (VCF), which alters the harmonic spectrum of the signal. In the early days of modular synthesizers, most (but not all) VCFs were resonant lowpass filters that could be driven into self-oscillation; these days, it's common to find multimode filters, as well. VCFs have at least one signal input, one control input, and one signal output. The cutoff frequency is controlled by a control voltage from another module in the synthesizer.

After the VCF, the signal normally passes through a *voltage-controlled amplifier* (VCA), which might be more accurately called a voltage-controlled *attenuator*, because it adjusts the signal's amplitude from its nominal level

down to zero. Like VCFs, VCAs have at least one signal input, one control input, and one signal output. The amount of attenuation is determined by a control voltage from another module.

The two primary controller modules are *low-frequency oscillators* (LFOs) and *envelope generators* (EGs), which are still common components in most digital synths. In modular analog synths, however, LFOs and EGs are triggered and programmed somewhat differently. Analog LFOs produce a periodic output voltage that is typically used to control the pitch of a VCO (vibrato), the cutoff of a VCF (wah wah), and/or the attenuation of a VCA (tremolo).

Analog EGs include a gate input, which accepts a signal from a keyboard or other source. Once the gate signal is received, the EG sends an output voltage that follows a preprogrammed profile. The most common type of analog EG is known as *attack-decay-sustain-release* (ADSR). The voltage produced by an EG is often used to control the attenuation of a VCA, but it can be applied to any control input.

Most historical modular synths could be used with a standard black-and-white keyboard that generates a gate signal (and often a trigger signal) each time a key is pressed. (Note that a gate signal is a control voltage that goes to a high state when a key is depressed and remains there until the key is released. In contrast, a trigger is a brief pulse that starts an event.) However, it is important to realize that these types of synthesizers were not necessarily regarded as keyboard instruments, as the keyboard was merely one possible control-voltage source. The gate signal is routed to the gate input of an EG, which in turn sends its output voltage to the control input of another module. The keyboard also generates a control voltage of 1/12 volt per semitone, or 1 volt per octave. This voltage is normally applied to the control input of one or more VCOs to change the pitch according to the keys you play.

These days, most modular analog synths do not include a standard keyboard. To play these instruments from a keyboard or other MIDI controller, you need a MIDI-to-CV interface, which converts Note On and other messages into gate and control-voltage signals. Modular synths are also used to process external signals, which does not require a keyboard.

Other important modules include signal mixers, signal splitters (also called *mults*), noise generators, sample-and-hold processors, envelope followers, and various signal processors, such as ring modulators, spring reverbs, and analog delays. In addition, some modular synths include an analog sequencer, which generates a sequence of triggers, gates, and control voltages.

ELECTRONIC MUSIC STUDIOS

EMS is famous for creating the VCS3 (Voltage Controlled Studio 3), aka "Putney," back in the late 1960s. The VCS3 was used extensively by such artists as Pink Floyd, Jean Michelle Jarre, Tangerine Dream, and Brian Eno. Originally, there were three models: VCS3, Synthi A, and the most popular Synthi AKS.

The VCS3 was housed in a hardwood L-shaped case (see **Fig. 1**). This instrument was designed for studio use and did not come with a keyboard. (At one time, EMS manufactured a standard black-and-white keyboard that is no longer available). The Synthi A and Synthi AKS included the same synthesizer components as the VCS3 (discussed shortly), but these models were housed in a portable plastic "suitcase" that could be easily packed up and transported (see **Fig. 2**). The AKS model also included a flat, plastic, 2-octave, touch-sensitive keyboard and internal sequencer.

Until recently, EMS has been selling refurbished VCS3s, Synthi As, and Synthi AKSs on an "as available" basis for

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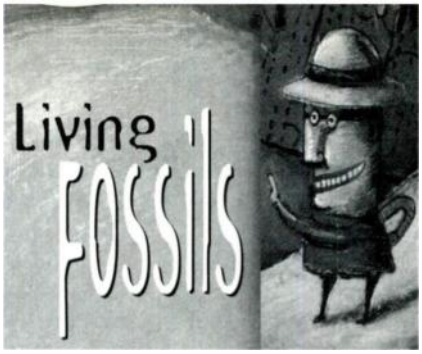

about £1,200 ($1,900). The waiting list was six months to a year due to the incredible demand for the units. A few years ago, the company was forced to stop manufacturing all new models because of a shortage of an integral component: the pin-matrix patch panel, which is used to establish the signal flow through the synth.

However, EMS is happy to announce that they are going back into limited production making new Synthi As; unfortunately, the AKS keyboard is not available. The company has procured a quantity of pin-matrix patch panels, so it can again offer the Synthi A at a reasonable—although not cheap—price. The new models will cost somewhere in the neighborhood of £1,500 ($2,400) plus shipping and duty charges.

Is it worth it? I think so. It sounds great, it's very versatile, and it's a gas to use. It is also one of the oldest unchanged synth designs still available, one that has stood the test of time and remains in high demand.

Although the synth is modular in concept—nothing is hard-wired—you cannot assemble any set of modules you want, as you can with other such systems. The specific components are fixed, which might seem somewhat limiting at first. However, this has proven to be an extremely flexible design. Here's a list of the components: two multiwaveform audio VCOs, one multiwaveform LFO, one resonant lowpass VCF, a ring modulator, an envelope shaper (which includes an envelope generator with repeat triggering and a VCA), a multiwaveform noise source, a spring reverb with voltage-controlled mix, stereo outputs with EQ, two line-level inputs, two mic inputs, stereo output VCAs, a joystick, a trigger button, an AC/DC voltmeter, a headphone output, and two small speakers. Overall, it offers a lot of sound-shaping power in a small, self-contained box.

So how do you patch the modules together? With the elusive pin-matrix patch panel, of course. This 256-hole matrix provides all audio and control outputs along the left side of the matrix and all audio and control inputs along the top. You connect the various modules by inserting little pins, each of which includes a precision resistor, into the matrix at the point where the desired output and input intersect. Any source can go to any destination, letting you create incredibly convoluted signal routing and feedback loops. In addition, any output can go to any number of inputs, and you can use audio signals as control signals and vice versa.

As a result of this flexibility, the Synthi is known for making some of the strangest, most "organic" electronic timbres available. The Synthi's flexible I/O structure makes it an incredible signal processor, as well. In fact, it has remained one of Eno's main processing tools over the years; he typically connects it to an effects send/return loop on a mixer. Listen to Peter Gabriel's voice and Steve Hackett's guitar on "In the Cage" from Genesis' *Lamb Lies Down on Broadway* to hear some of Eno's AKS processing.

While the Synthi is great for making electronic insect noises, it is not the best machine for tonal music or solo Minimoog-style leads (it has no keyboard), nor is it the most stable of beasts, thanks to its analog circuitry. Even so, the EMS Synthi remains a viable and powerful compact modular system and one that offers a great deal of sonic exploration. I have one, and I love it.

By the way, if you decide to contact EMS, ask them for a list of the various custom modifications that are available. These modifications add stability and functionality to the Synthi system.

SERGE MODULAR/STS

Serge synthesizers have been around for more than two decades, and their modular design is highly regarded among synthesists. Except for a couple of years, Serge Modular has remained in business since it was started in the late 1960s.

A few years back, Serge Tcherepnin, the creator of the Serge Modular Synthesizer, decided he wanted to get out of the synth-manufacturing business. He struck a deal with long-time associate Rex Probe, who started Sound Transform Systems to manufacture Serge's synthesizers. Today, Serge Modular/Sound Transform Systems provides custom-designed modular analog systems to happy synthesists all over the

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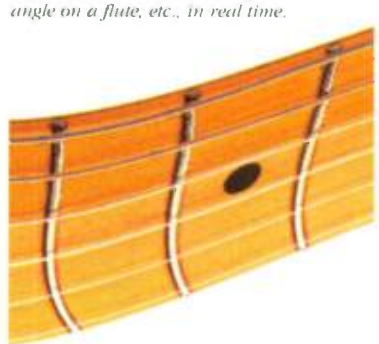

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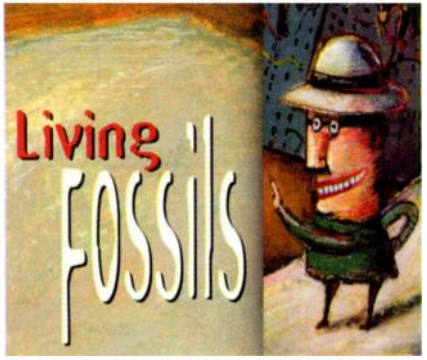

world. "We make amusement parks for electrons," says Probe.

Over the past couple of years, the company has labored long and hard to update and transform Serge's original circuit designs into high-quality audiophile components, providing state-of-the-art fidelity and stability. The essence and integrity of all Serge circuit designs have been maintained, but a number of new approaches have been implemented to increase the overall audio quality, signal integrity, and general feel of the system.

According to Probe, "All the components in the system, including wire, connectors, switches, and pots, are selected for their sonic quality, audio response, and tactile feel in an effort to provide a fully phase-coherent signal path throughout the system. The end result is excellent audio fidelity, stability, and frequency response throughout the audio and control spectrum."

Like the long-gone Buchla modular synth, the Serge system uses banana plugs and jacks (see **Fig. 3**). This is very cool, because one output can drive many inputs, and there is no need for mult modules. (Banana jacks can be stacked on top of one another.) As Probe points out, "You can plug anything into anything. You can even send multiple outputs into one input without a mixer. It's totally flexible."

The basic circuit designs have remained the same; this was important to both Probe and Tcherepnin to retain the inherent sound characteristics and functionality of the original modules. There are more than 65 modules to choose from, many of which are esoteric and unique to Serge. Each panel (in which the modules are installed) is four rackspaces high and sixteen inches wide; most modules range from one to four inches wide. Custom modifications are available, and STS can package the panels in all sorts of cases and enclosures; standard 19-inch rack-mount cases are the most popular.

STS offers no standard keyboard, but they do offer the Touch Activated Keyboard Sequencer module, which makes an excellent controller for the system. Also available after a long absence is the Wilson analog delay, which delays signals from DC through audio frequencies. STS does not manufacture MIDI modules. Instead, Probe directs his customers to the Clarity multichannel MIDI-to-CV interface (reviewed in the May 1992 **EM**).

Unlike the EMS Synthi, designing a Serge system is completely up to the buyer. You decide what modules you want and the order in which they appear in the panels. In addition, STS can provide custom jack panels for interfacing the system to the outside world; these panels can include balanced XLR, ¼-inch, TT, and other jacks.

Now the big question: how much does it cost? It's not cheap, and the adage about power having its price is applicable here. (Systems are no longer available in kit form.) A 2-panel system that I would like to buy came out in the neighborhood of $4,400. That's a lot of green for a synth with three oscillators and two filters, especially when compared with today's sample-based synths. But you get unlimited potential for electronic sound generation, the ability to design and customize your own instrument, and a piece of gear that will never become obsolete.

KEVIN BRAHENY

FIG. 3: The Mighty Serge belongs to recording artist Kevin Braheny, who prototyped many of the original Serge modules.

FIG. 2: The EMS Synthi AKS packs the modules of the VCS3 into a small suitcase along with a touch-sensitive keyboard and sequencer.

DOEPFER MUSIKELEKTRONIK

From another part of Europe comes the newest modular analog synthesizer, the Doepfer A-100 (see **Fig. 4**). Although this German manufacturer is not well known in the U.S., it has been making synthesizer equipment for more than fifteen years. Over the years, the company abandoned analog synths and dedicated their efforts to MIDI master keyboards, MIDI modifications for the Nintendo Power Glove, MIDI light controllers, MIDI mergers, and the like. Then, about two years ago, Doepfer recognized a renaissance of interest in analog synths and began designing completely analog gear again. These efforts bore fruit in the MS-404 monophonic MIDI analog synth and the A-100.

The A-100 system is designed around pairs of 3U, 19-inch racks that house the various modules and the power supply. Each module is three rackspaces high, and the width of each module is measured in units called "TE" (which stands for a phrase in German that means "part measure"; 1 TE = 5.08 mm = 0.2 inches). Each frame holds a total of 84 TE, and the modules come in widths of 4, 8, 10, and 12 TE; blank panels are available as filler for leftover space in the frame. Systems can be purchased fully assembled or in semikit form.

Like the ARP 2600 and other systems, the Doepfer system uses patch cords

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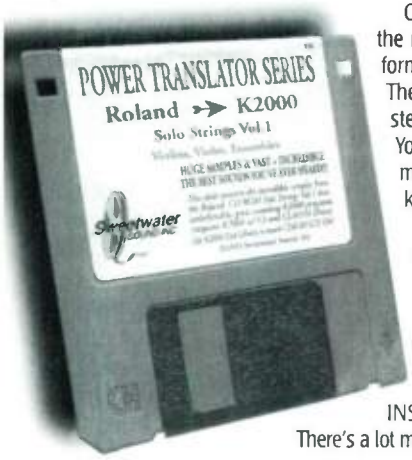

One of the great features of the Version 3-equipped K2000 (and the new 2500) is its ability to read samples in a variety of other formats. Case in point: the great Roland Sample Archives CD ROMs. They feature tons of exceptional samples, many of which are in full stereo. Problem is, the conversion process is not exactly perfect. You still have to build programs that make the Roland samples musically useful, as well as tweak loops and create accurate keymaps. But you should be making music, not programming!

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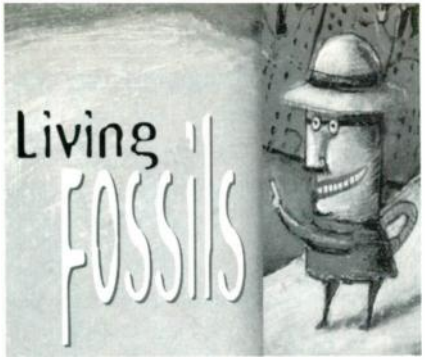

terminated with mini plugs. Most modules cost around DM 100 ($70), which makes the A-100 system one of the cheapest available, even with the duty charges from Germany. Doepfer is distributed in the U.S. by Enport.

Currently available modules include VCOs; VCAs; 24 dB/octave, Moog-style VCFs; mixers; noise generators; and ADSR envelope generators. Doepfer plans to have 25 more modules, including a ring modulator; audio divider; voltage-controlled waveform processor (which uses voltage-controlled clipping and summing to create new waveforms); phaser; Shepard generator (a special LFO that produces a filtering/phasing effect); sequence clock divider; 12 dB/octave, multimode VCF; slew limiter; trigger and voltage inverters; and resonant filter bank. In addition, Doepfer will offer a new version of the MAQ 16/3 MIDI-controlled analog sequencer and two MIDI-to-CV interfaces, one with two CV/gate outputs and one with twelve outputs. If you have enough VCOs, this lets you play polyphonically.

So how does the Doepfer system sound? I don't know; I was not able to get one in time for this article. Judging by the specs and variety of modules, it looks like you can pack a powerful, dense system into the two frames and get it for a reasonable price.

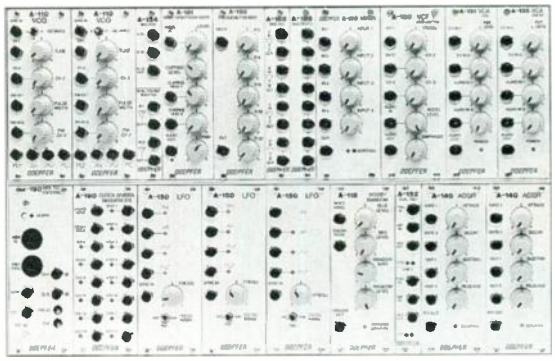

FIG. 4: This Doepfer A-100 system includes two VCOs, one VCF, two VCAs, three LFOs, two ADSR envelope generators, and a variety of other modules.

PULL THE PLUG

Although creatures like *T. rex* and friends remain extinct, the dinosaurs of electronic music are alive and well, thanks to legions of fans and dedicated manufacturers who recognize a good thing when they see one. Modular analog synths are great for learning synthesis and creating new sounds that are not possible with any other device. They also provide an entirely different experience from today's digital monsters. So try dancing with a dinosaur; you'll be glad you did.

Andrew Schlesinger *works as a professional sound designer and composer, providing sounds and music for multimedia. His e-mail address is drewsynth1@aol.com.* **EM** *Technical Editor* **Scott Wilkinson** *learned synthesis on a Moog modular analog synth.*

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Acquaint yourself with an indispensable recording tool: a pencil.

By Brian Knave

If you're like most home recordists, you're not only the studio owner, staff producer, and house engineer, you're also the bookkeeper, janitor, and person who fetches the coffee. In short, you're the only employee you've got. Running a solo operation often requires juggling myriad chores, and certainly one of the more unglamorous but essential duties of the audio engineer is documentation.

For example, let's say you've spent a few hours dialing in sounds for a local thrash band. Soon you're nodding off over the knobs and deciding it would be best to postpone the actual mix until the next evening. However, because you're booked to record a different group in the morning, you have to zero your console. When the thrashers return, you realize you didn't keep any notes on all the EQ tweaks and effects parameters you toiled over the previous evening. Oops. Did you honestly think you would remember all those settings?

The point is, it's *your* responsibility to document your work. With racks of gear on the rise in most home studios, that means a considerable amount of record keeping. Given the obvious need for documentation—especially when producing several projects at the same time—it's amazing how many home studios don't even have a pencil or scrap of paper within reach.

So do yourself (and your clients) a favor and draw up some tidy sheets to keep track of your work. These can be as simple or complex as your needs dictate. The goal is to make your work easier, not more difficult. Let's look at the range of studio documentation so you can determine what's appropriate for your operation.

PREROLL

Before you start recording, it's not a bad idea to have a written tracking plan. In a professional studio, this is called a *production schedule* or *session sheet* and is generally quite thorough. Although formats vary, a typical production schedule lists the song, artist,

DMITRY PANICH

producer, and engineer; the number of tracks, type of noise reduction, and tape speed (if applicable); and finally, the instrumentation, mic selection, and sequence of basic tracks and overdubs.

Of course, all of this documentation may be unnecessary if you are recording your own songs onto a 4-track deck using pretty much the same instrumentation from week to week. But once you graduate to doing outside projects and start rotating a half-dozen or more sessions a month, you'll find that a production schedule is essential.

Now, I'm no fan of complexity and clutter. Rather than draw up a separate production schedule, why not find a way to combine this information on the workhorse document of recording: the *track sheet*? Economy is nice, and it spares trees, too.

SHEET FEVER

Like production schedules, track sheet designs vary from studio to studio. When I was recording a project on a TASCAM 688 MIDI Studio, I developed a track sheet (see **Fig. 1**) that pretty much covered it all: song and artist, tracks and instrumentation, mics, EQ, general effects settings, compression ratios, and little reminders about pans, fades, shared tracks, and musical or engineering miscues. In some larger studios you'll also find separate *take sheets* for keeping track of individual song performances. These documents note false starts, incomplete takes, best takes, and other pertinent data. If you don't want to go this deluxe, you can simply list the number of takes on the corner of a track sheet and circle the best performance.

In addition, many professional studios utilize a *mixdown* or *EQ sheet*. These documents are like "snapshots" of the console settings and are extremely helpful when mixing. Every adjustment on the board is written down, such as EQ settings, effects parameters, channel inserts, and any other information critical to reconstructing a final mix.

EQ sheets come in handy when you're trying to figure out what combination of effects you used to get a particularly slamming snare drum sound on a previous project. This rather intensive level of documentation is admittedly tedious and is often the last thing you feel like doing after a long session. However, the added work will pay off when you have to redo a mix because your DAT master dropped beneath the wheels of a rolling Fender Twin.

Some engineers like to work more intuitively, so they keep their track sheets relatively straightforward. **EM** Editor Michael Molenda espouses a "painterly" approach to mixing. His track sheets (see **Fig. 2**), though detailed, leave the mix open-ended, with no road map back to the ranch. Allowing the muse such free reign invites the engineer to experiment with splashes of color, placement of aural ghosts, and creative explorations of the stereo spectrum.

Perhaps the most comprehensive of all studio documents is the *production grid* (see **Fig. 3**). The main advantage of a production grid is its graphic layout, which provides a visual, running "commentary" on the song as it unfolds from start to finish. The vertical boxes show which instruments are assigned to what tracks, while the horizontal timeline

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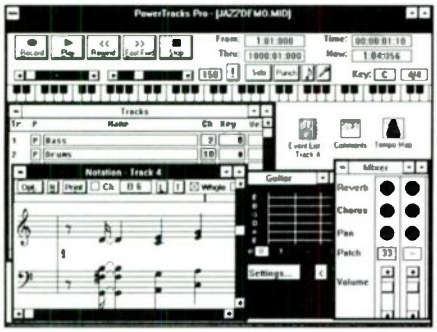

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keeps track of song sections, overdubs, and any audio gremlins you need to anticipate during mixdown. All of this information can be readily correlated to absolute times or simple tape counters. A production grid might seem like overkill, but its level of detail can save both time and brain cells when you're under deadline pressures.

Another important consideration is where the master tapes and track sheets end up after you've completed *your* part of the project. If you've been hired to record basic tracks by a client who intends to mix at a high-end facility, detailed track sheets are essential. You don't want your client to enter a big-bucks studio unprepared. Remember, he or she is paying for every minute the pro engineer must spend sorting through a poorly documented tape to find the right tracks.

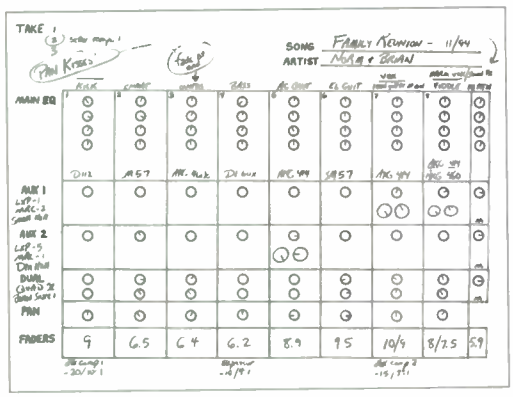

FIG. 1: An all-in-one track sheet for a children's song. Note how EQ adjustments, effects send levels, pan positions, and fader levels are clearly documented.

"Home studios and fly-by-night outfits often don't have a clue about how to document tapes," laments Nina Bombardier, studio manager at Fantasy Studios in Berkeley. "But even people who have made hit records don't always know the procedure. We get tapes all the time with no track sheets. It's a mess."

STRIPPED DOWN

Track sheets aren't the only documents that can keep a project, well, on track. Your recording and mixing sessions will run much smoother if you lay out a *designation strip* on your board. This is simply a fancy term for a strip of masking tape that you use to identify what is on each channel.

Typically affixed just below the console faders, these strips clearly point to elements such as the kick drum, lead vocal, and guitar solo. In addition, each strip can be reused whenever you resume work on a project. Some engineers use abbreviations—VOX for lead vocal, ROH for right drum overhead, and so on—because the abbreviations allow them to write with larger letters that are easier to see. Increasing visibility is not a small consideration; mixing can be nerve wracking enough without having to search for the right channel strip every time you want to change fader levels or mute signals.

It's also a good idea to keep a few rolls of colored tape nearby to use as visual console cues during a difficult mix. I've often had ten different overdubs share a single track, and it's tricky negotiating EQ tweaks, effects sends, volume-level

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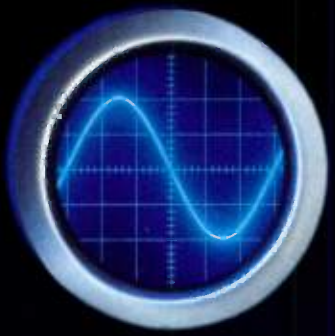

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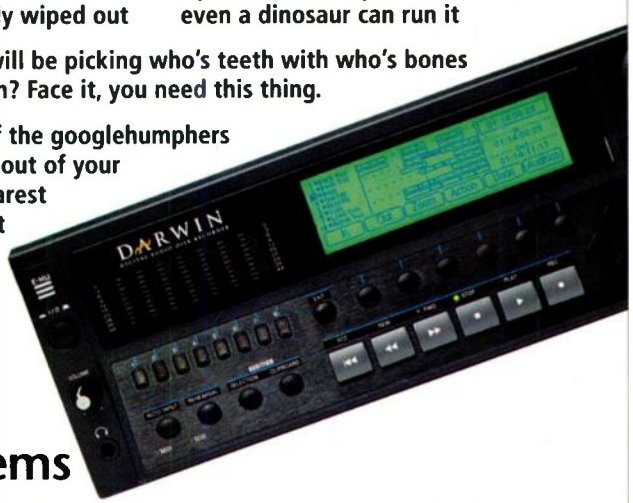

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adjustments, and stereo placement for each element as it occurs. A snippet of bright red or yellow tape on the appropriate knobs can help guide your hand during the heat of the mix.

TOWER OF LABEL

Good studio documentation involves more than just keeping clear notes about the shaping and routing of audio signals. After all, who is keeping track of all those tape boxes that are multiplying faster than the dust bunnies under your bed?

I'll wager that a good number of your multitrack masters, cassette dubs, and DAT tapes are unlabeled mysteries. At one time or another, all of us have run a quick cassette mix and put off labeling the tape until later. This scenario usually repeats itself until you've accumulated a mountain of unmarked tapes and have no clue what is on any of them. And for MDM users, a pile of unlabeled S-VHS or Hi-8 mm tapes is especially deadly. How will you find your safety copies? Or the clone tapes that carry all your overdubs? Or the work tapes you've sent to friends so they could add their ideas to your project?

If you're faced with a great pyramid of unmarked tapes, you have just two options: sweep the whole stack into the trash bin, or take the time to listen to each tape, rediscover what's on it, and *then* make the label! The first option is unconscionable, and the second takes considerably more time than had you simply labeled each tape in the first

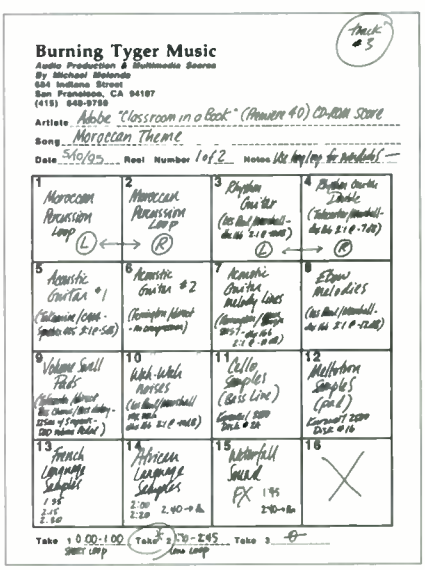

FIG. 2: Michael Molenda's track sheet for a CD-ROM score: clear, logical, and detailed.

place. So, just do it! Don't consider a session completed until you've labeled each and every tape.

FINAL NOTES

If you have outside clients, dedicate a logbook to keep track of all the multitrack and mixdown tapes they use for their projects. When a client leaves with a tape, have him or her sign it out, so there's no question as to who had it last. Until you can afford an assistant or two, you're the only one responsible for everything that comes into—and goes out of—your studio.

It's understandable why recordists often shun documentation. After all, it's certainly more fun to get right into recording rather than jotting down boring session details. But keep in mind that the point of documentation is to *simplify* the recording process. Track sheets and other records should take a load off your brain, so you can be free to explore your creativity. Believe me, the joy of tracking a blazing guitar solo will be swiftly lost if you can't find the tape you recorded it on.

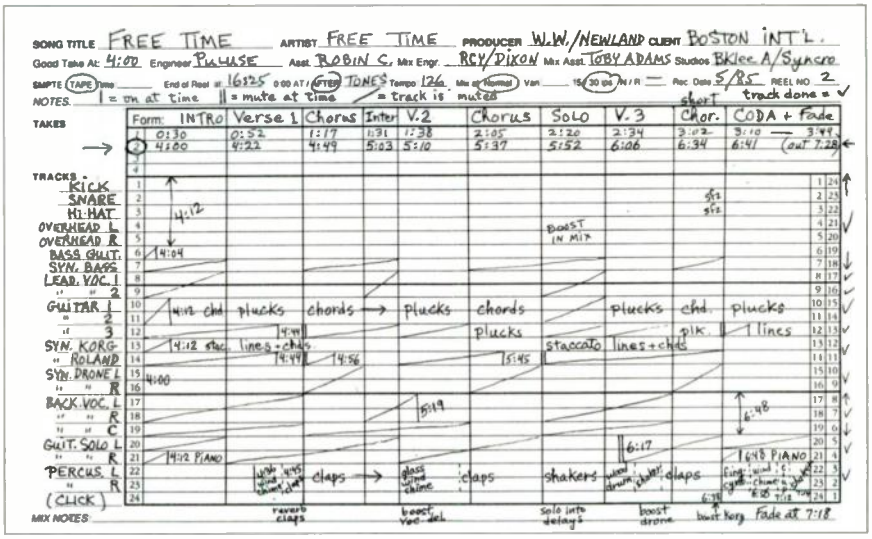

FIG. 3: A thorough production grid provides a 2-dimensional map of instrumentation, song structure, and critical mixing reminders. (By permission of Schirmer Books, from *Sound Advice: The Musician's Guide to the Recording Studio* by Wayne Wadhams, 1989.)

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So keep those pencils and pens handy. And of course, you can create these documents on your computer: the same ideas apply, and you'll spare yet another tree.

EM *Assistant Editor Brian Knave knows how to locate any track he ever recorded but still has trouble finding Bay Bridge on-ramps after late-night weekend gigs in San Francisco.*

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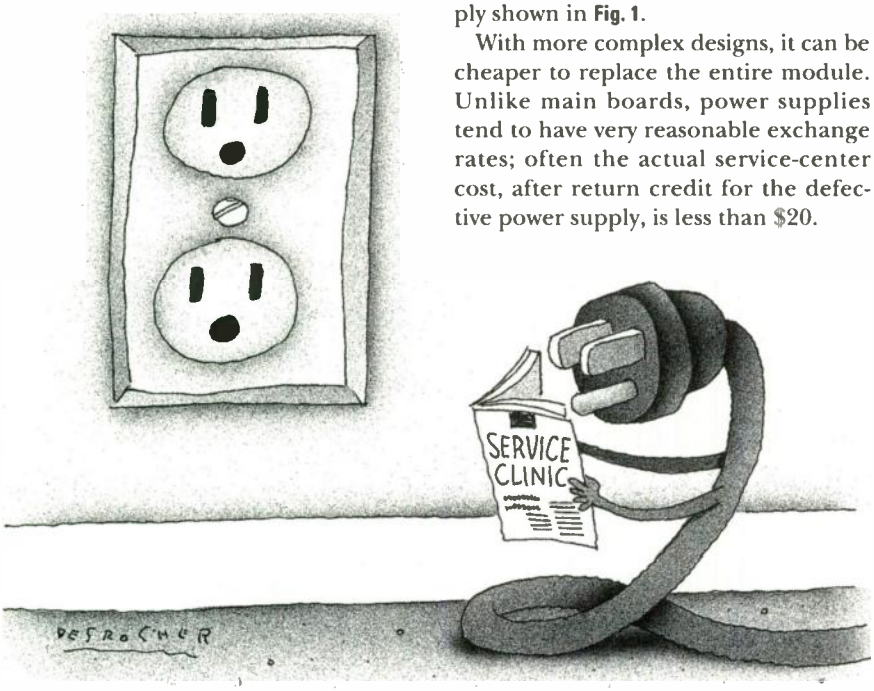
Analog Service, Part 2

We complete our overview of power-supply failure and service.

By Alan Gary Campbell

The most common source of power-supply failure is probably a bad rectifier diode caused by a line transient. As noted last month, there are often signs of physical deterioration. Unfortunately, it is not easy to determine whether associated components have been affected except in cases of severe collateral damage. It is prudent to rebuild the affected power-supply section (or sections), though this is most cost-effective with simpler circuits, such as the "generic" bipolar power supply shown in **Fig. 1**.

With more complex designs, it can be cheaper to replace the entire module. Unlike main boards, power supplies tend to have very reasonable exchange rates; often the actual service-center cost, after return credit for the defective power supply, is less than $20.



JACK DESROCHER

For supplies that use discrete diodes in the rectifier section, the specified diode current and Peak Inverse Voltage (PIV) should be questioned before replacement parts are chosen. Often, the specified current and PIV are modest, and the relatively light-duty 1N4001 diode is commonly used. Power-supply robustness can be greatly increased by substituting the heavier-duty 1N4002, 1N4003, or 1N4004. Of course, all diodes—not only the defective part—must be upgraded, which can be impractical.

With units that use encapsulated bridge rectifiers, upgrading may be impossible due to incompatibilities of lead diameter, lead spacing, package depth, and pinout. Some bridge rectifiers, though, have a center bore to facilitate attachment of a heat sink. An effective heat sink can be as simple as a U-shaped piece of aluminum, which any sheet-metal shop can form easily from scrap. It is sufficient that the width and height of the "U" are approximately equal to the longest dimension of the bridge rectifier. The heat sink can be attached via a small machine screw, lockwasher, and nut. Be careful not to overtighten these, and be sure to apply some heat-sink compound between the heat sink and rectifier. In the event of repeated failures of bridge rectifiers and no apparent defects in other circuits, a heat sink may solve the problem. In any case, it's cheap insurance.

Sometimes power-supply filter caps

are damaged when diodes fail, or they simply fail on their own. Excess ripple at the regulator input is the typical symptom. If the problem is severe, power-supply output voltages may be low, and there may be hum and distortion in audio circuits. When replacing caps, it's advisable to use the same type and rating; do not attempt to beef up the circuit by using a part with a higher capacitance and working voltage. A high capacitance can pull a charging current in excess of the circuit-design limits, and a higher-than-needed working voltage can accelerate dielectric memory defects.

When replacing active, solid-state power-supply components, such as regulators and transistors, only exact equivalents should be used. While 7800- and 7900-series 3-terminal regulators from various manufacturers are plentiful and generally interchangeable, odd-value zener diodes and tightly specified transistors can be as elusive as the proverbial honest man.

A batch of zeners can be evaluated by breadboarding a circuit mock-up and taking output measurements or by using a semiconductor curve-tracer (if you're lucky enough to have access to one). Detailed transistor parameters for both foreign and domestic types are listed in the compendious *Tower's International Transistor Selector*. Most technical libraries have a copy. (Transistor matching will be covered in a future column.) By all means, avoid generic or "house marked" components, such as the ECG line, that carry nothing more reassuring than one stamped number with no lot code, no manufacturer's logo, no nothing! Far too often I have discovered that such parts were not what they were supposed to be.

Three-terminal regulators and pass transistors that mount to heat sinks present special considerations. When such devices use heat-sink compound and must be replaced, the old compound should be wiped clean and a uniform coating of fresh compound applied to the face of the device. If a mica washer is required, it should be applied over the fresh compound, and an additional coating should be applied to the dry side of the washer. Mica washers that have been in service for a while should be replaced when an associated regulator or transistor is replaced.

Great care should be taken to make certain that mica washers, as well as the more recent "greaseless" washers (used without compound), are properly aligned. Check alignment with a magnifying glass, in bright light, and then measure resistance between the common contact and the heat sink itself. This is *not* overkill; misalignment can cause a dead short and, depending upon the design, catastrophic failure.

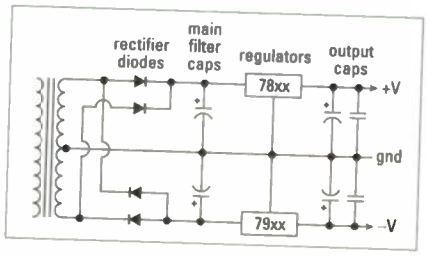


FIG. 1: In this simple, bipolar power supply, transient response is improved by the small capacitors at the output of each regulator.

Lead dress is also important with heat sink-mounted components. Considerable thermal stress occurs at operating temperatures. Strain-relief kinks and bends (typically S-shaped) observed on the leads of the original part should be exactly duplicated on the replacement.

With trimmable power supplies, replacing cheap, unstable, open-frame trimpots is preferred. But watch out: modern, commonly available, sealed trimpots often have lower wattage ratings and can not be substituted safely.

Power-supply transient response can be improved with the addition of small capacitors at the output of each regulator, as indicated in **Fig. 1**, though some older supply designs lack this feature. A 10 to 20 µF tantalum cap and a 0.1 µF ceramic-disc cap, each with a working voltage at least 20% higher than the rated supply voltage, are sufficient. With supplies that use merely a small-value electrolytic, the substitution of a tantalum type is a definite improvement.

Despite the recommendations of some databooks, the protection diode that is sometimes included between the input and output of 7800- and 7900-series regulators is not mandatory and should not be added to circuits that do not specify it.

Some apparently power supply-related symptoms, including intermittent operation, blown fuses, and hum, are caused by nothing more than loose or oxidized connections. Low-impedance ground connections are especially important, and it is not at all uncommon for the flying power-supply ground lead

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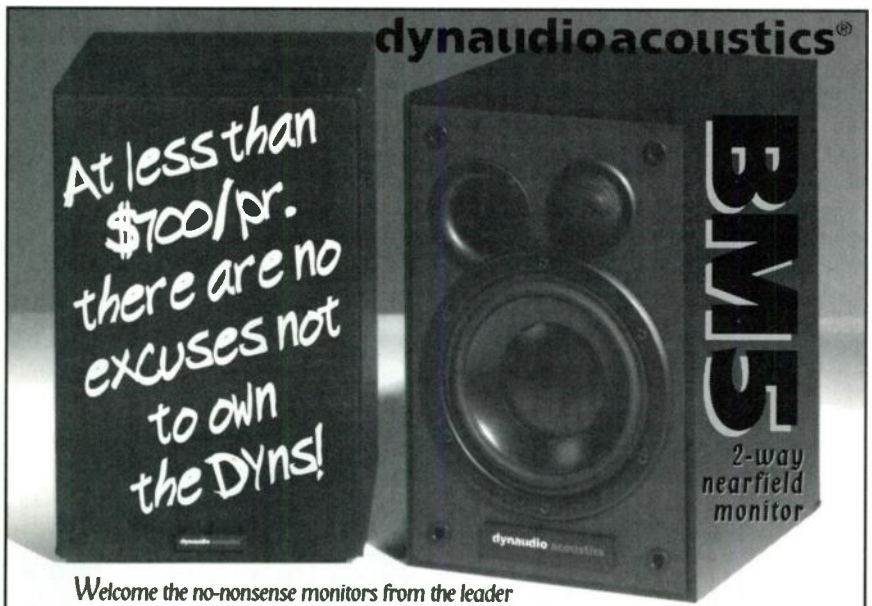

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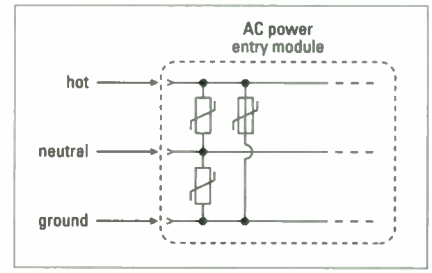

FIG. 2: To add proper surge suppression inside an older synth, a high-energy, metal-oxide varistor (MOV) should be connected across each leg of the AC line. Note that this mod is not for the beginner.

that connects to the case to become loose or disconnected entirely. Sometimes it really does pay to look for a loose wire!

Ironically, power-supply damage from line transients can, in many cases, be avoided entirely by the use of surge suppressors. Adding comprehensive surge suppression *inside* an older synth is a worthwhile modification. This is one case where keeping the circuitry "vintage" is not the preferred approach.

For proper protection, a metal-oxide varistor (MOV) should be connected across each leg of the AC line (see **Fig. 2**). It is generally possible to find a convenient mounting location at the AC entry point or on the power-supply board itself. *Danger: This modification involves hazardous AC line voltages; this is not a repair for the beginner.* Use the highest-energy (highest rating, in joules) MOVs that are readily obtainable and practical to mount. This completely supersedes older and less-effective protection schemes, such as zener diode and capacitor shunts around the rectifier diodes.

It is very important that the AC line connection provide properly wired power with a low-impedance ground, or the surge-protection circuit will not work properly. Some designers add a small, ceramic cap from the "hot" terminal to "ground" to serve as a crude lowpass filter to attenuate RFI riding on the AC line. This does work to a degree. But a special ceramic cap, designed for use with line voltage and not readily available at typical electronics suppliers, is required for safe operation. Do not substitute a normal cap in this application.

EM *Contributing Editor* **Alan Gary Campbell** *is the owner of Musitech.*

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Stop That Racket!

Tame tape hiss and other sonic bugaboos with noise reduction.

By Scott Wilkinson

Anyone who has used electronic audio equipment knows that you always get a little something extra in addition to the intended sound: noise. In general terms, noise is any unwanted audio signal that makes its way into your recordings or live sound system. Knowing how it gets there and how to reduce it will help clean up your sound in a big way.

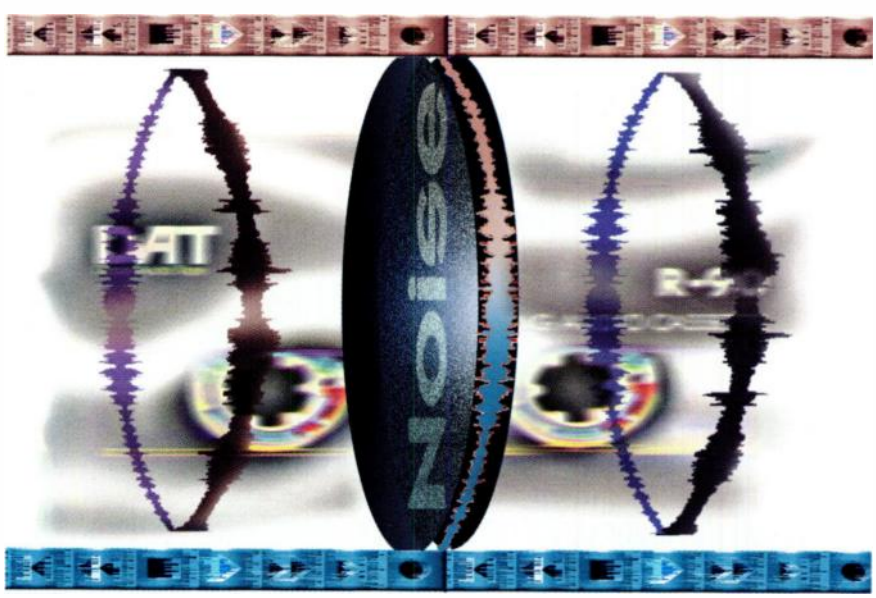
NOISY CONCEPTS

There are many types of noise, which fall into two broad categories: tape noise and source noise. Tape noise is endemic to analog tape; digital tape suffers from virtually none. Perhaps the best known type of tape noise is hiss, which arises from randomly oriented iron oxide particles on the tape. Even after a signal is recorded, a few particles are not aligned with the others to represent the signal. As a result, you hear tape hiss, which includes mostly higher frequencies.

The level of inherent noise in any audio device is called the *noise floor*, which is measured in decibels. Typical analog-tape noise-floor ratings are in the range of -45 to -65 dB with respect to the *reference operating level*, which corresponds to 0 on the meters of most tape decks. The noise floor remains relatively constant, although it might seem to fluctuate if the program material has a wide dynamic range (the difference between the softest and loudest portions of the signal), which sometimes masks the noise.

The difference between the highest undistorted signal level and the noise floor is called the *signal-to-noise ratio* (sometimes written "S/N"). If you record the hottest signals to tape at +5 dB and the noise floor is at -55 dB, you have an effective S/N ratio of 60 dB.

Other forms of tape noise include *crosstalk* and *print-through*. Crosstalk arises when the signal recorded on one track "bleeds" onto adjacent tracks. In this case, you can hear a faint copy of the offending track when you listen to an adjacent track.



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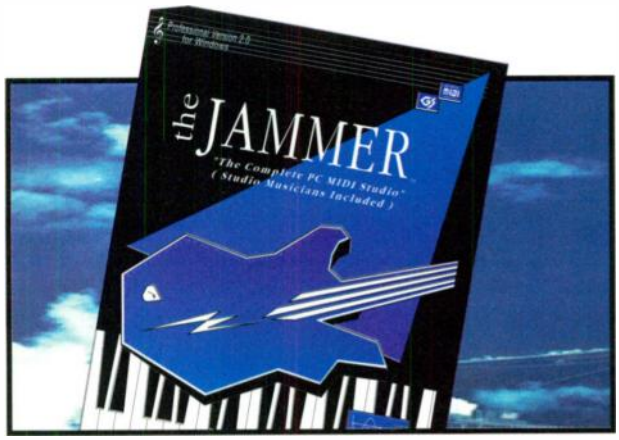

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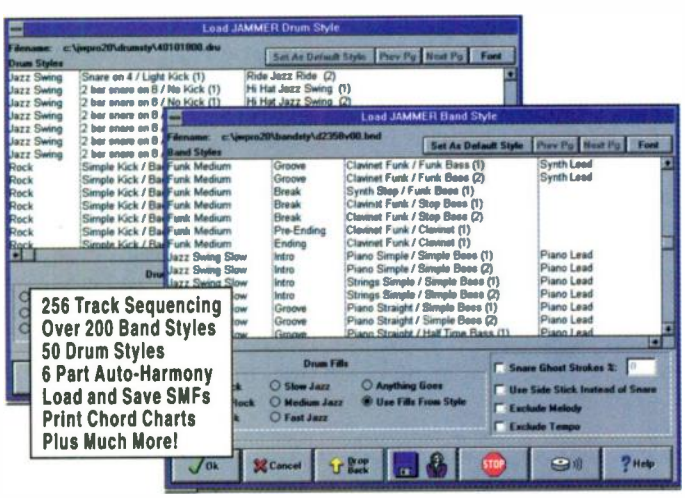

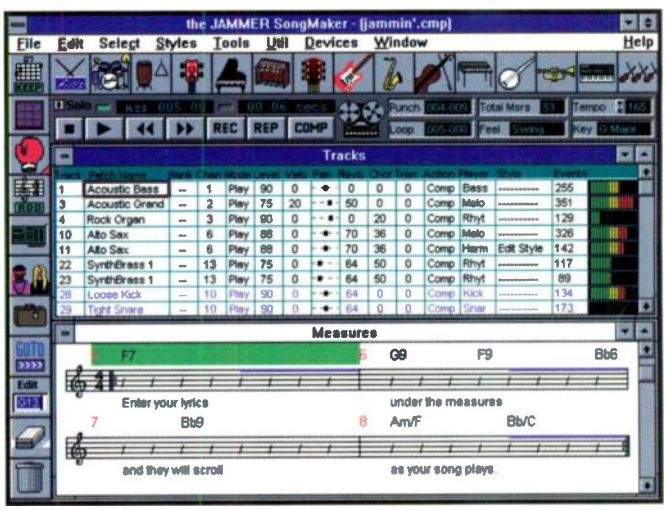

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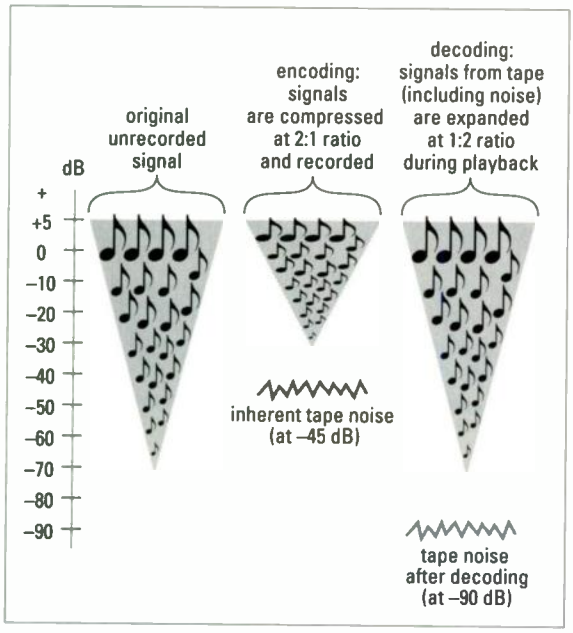

FIG. 1: Compansion squeezes the dynamic range before recording so all the program material is well above the noise floor of the tape. The original dynamic range is restored during playback, and the tape noise is reduced at the same time.

Print-through occurs when tape is stored for long periods in a tightly wound condition. The magnetic field generated by the particles on each layer of tape affects the particles on adjacent layers. This sounds like a faint "pre-echo" of the material that is about to be played as the tape unwinds. This problem can be minimized by storing your tapes *tails out* or wound at normal speed onto the take-up reel, which is essentially backward.

Source noise includes such things as noisy guitar amps, effects, and synth patches, as well as 60 Hz hum, induced radio-frequency (RF) and electromagnetic (EM) interference, and ambient noise from a microphone. Although noise-reduction systems can help fight these problems, you should also take other appropriate actions. For example, 60 Hz hum probably indicates ground loops, which can be eliminated with proper grounding (see "On Solid Ground" in the September and October 1992 **EM**). RF and EM interference can be addressed with proper cable shielding and routing.

DOUBLE-ENDED NR

Most people are familiar with Dolby and dbx noise reduction found on many cassette decks. Both of these systems are known as *double-ended* noise reduction, because they *encode* the signal as it is recorded and *decode* it during playback. The encoding stage *compresses* the signal, and the decoding stage *expands* the signal, so the term *companding* is applied to this process. (For an explanation of compression and expansion, see "Square One: Dynamic Duos" in the December 1994 and January 1995 **EM**.)

During the encoding process, the input signal is compressed by raising the level of soft sections (that is, when the input level falls below a certain threshold). In contrast, loud signals are reduced in level with normal compression. If the input to the encoder is above the threshold, it masks the noise, so no compression is applied. Note that compression is applied before the signal is recorded to tape, so companding affects tape noise only, not source noise.

During the decoding process, the taped signal is expanded, lowering the soft sections of the program material. But decoding is applied to the *taped* signal, so both the program material and the hiss are reduced. The hiss is not compressed (boosted), but it is expanded (attenuated). As a result, the difference in amplitude between the program and noise (i.e., the signal-to-noise ratio) is greater than it would have been without companding.

For example, if the compression ratio is 2:1 and the expansion ratio is 1:2, the noise floor is lowered by a factor of 2. If the original noise floor is -45 dB, the expanded noise floor is -90 dB (see **Fig. 1**). No expansion is applied to high-level signals, which are assumed to mask any inherent noise. The noise floor "follows" the signal level, rising and falling with the level of the program material.

Some companding systems also use another technique to further reduce tape hiss. During recording, the signal is slightly boosted in the high frequencies; this is called *pre-emphasis*. As with the primary compression, pre-emphasis is applied before recording, so it does not affect the level of tape noise. During playback, the same high-frequency range is cut by an equivalent amount in a process called *de-emphasis*. This brings the high end of the signal back to its original level and reduces the high-frequency tape hiss at the same time.

If you play an encoded recording without decoding, the results will vary depending on the system. Some systems, such as Dolby B and C, are designed to produce encoded signals that can be played without decoding. Others are simply intolerable; with undecoded dbx, for example, you are likely to hear a lot of noise. In both cases, the dynamic range will usually sound "squashed"; pianissimo passages will sound mezzoforte. If pre-emphasis is applied, the undecoded signal will sound very bright.

DBX AND DOLBY

One of the most popular forms of noise reduction in semipro multitrack recorders, dbx compresses low-level signals equally across the entire frequency spectrum. However, this can cause a new problem. If the input signal includes only a limited range of frequencies but it is above the threshold level, compansion is not applied. The signal masks part of the tape noise but not necessarily all of it. As a result, the noise level can appear to fluctuate with the signal level, producing a side effect called *breathing* or *noise modulation*. This is not a problem if most of your music encompasses a full range of frequencies and does not exhibit a wide dynamic range.

Another common problem with companding is *gain mistracking*, which occurs if your tape deck is not properly calibrated, causing an uneven frequency response. If tape-deck miscalibration lowers the response at certain

FIG. 2: The dbx 140X provides two channels of dbx Type II noise reduction in a half-rack unit.

FIG. 3: The BBE 362 NR combines single-ended, dynamic-filter noise reduction with the company's Sonic Maximizer technology.

frequencies, and the decoder then lowers those frequencies further, an unpleasant *pumping* effect results.

There are two types of dbx noise reduction: Type I and Type II. Type I is designed for full-frequency formats, such as open-reel tape, whereas Type II is intended for limited-frequency formats, such as cassette. Both types reduce the noise floor by about 30 dB. For the most part, Type II dbx is incorporated into cassette decks, although both types are available in outboard units (see **Fig. 2**).

Dolby noise reduction also uses companding, but it isn't applied equally to all frequencies. Instead, it compands different frequency bands independently according to the level within each band. This reduces the effect of noise modulation dramatically by companding only the low-level frequencies. The idea is that the program material will mask the remaining noise. However, the noise floor is lowered less than with dbx.

Dolby A was the first successful, commercially available companding system, and it was used primarily in professional situations. It operates in four fixed frequency bands: below 80 Hz, 80 Hz to 3 kHz, 3 to 9 kHz, and above 9 kHz. Overall, Dolby A reduces the noise floor by about 10 dB below 9 kHz and by about 15 dB above 9 kHz.

In 1986, Dolby Labs introduced another professional compansion scheme called Spectral Recording (SR), which utilizes five fixed bands and five "sliding" bands. Some of the fixed bands operate in the same frequency range but over different level ranges. The five sliding bands automatically adjust their center frequencies according to the input signal, dropping the noise floor by about 25 dB.

In the consumer electronics market, Dolby B is used in millions of cassette decks. It reduces tape hiss by about 10 dB. It uses a single sliding band that starts at 500 Hz, and it achieves maximum noise reduction from 1,500 Hz to 20 kHz. Its successor, Dolby C, uses two sliding bands that start at about 125 Hz, and it provides maximum reduction from 375 Hz on up to lower the noise floor by about 20 dB. In both cases, the processing bands slide up and down to center on the most appropriate frequency.

Dolby S is a consumer version of SR that was designed specifically for cassettes. It uses three fixed bands and two sliding bands to lower the midrange and high-frequency noise floor by about 24 dB and the low-frequency floor by about 10 dB.

Dolby B and C are available in many consumer cassette decks and semipro recorders, and Dolby S is now being incorporated into cassette decks and semipro multitracks. Dolby A and SR are available in the form of stand-alone units or circuit cards that plug into certain professional multitrack recorders.

SINGLE-ENDED NR

Unlike companding systems, single-ended noise reduction requires no encoding or decoding; it processes the entire signal in one pass. As a result, single-ended systems reduce source noise. These units are generally applied to sound sources, such as microphones, guitars, and synths. They are also applied to the main L/R signal

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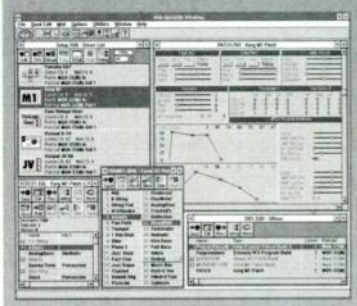

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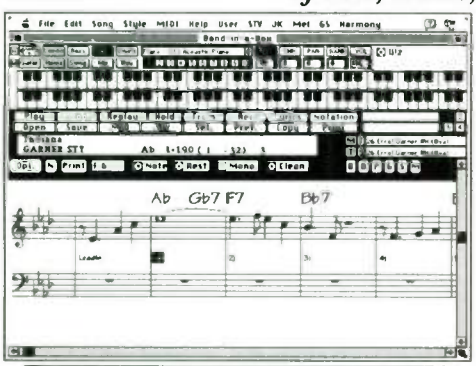

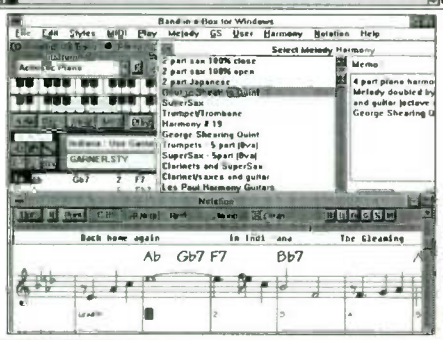

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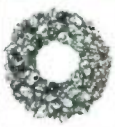

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during mixdown, especially if compansion was not used during recording. In this case, tape noise is reduced because it behaves like source noise from the multitrack.

Virtually all single-ended systems use one of two techniques to reduce source noise: *dynamic filtering* or *downward expansion*. In dynamic filtering, a variable filter is applied during quiet passages; the center frequency of the filter depends on the frequency content of the program material. This works well with noise that changes with the level of the signal, such as noisy synth patches. However, this process can produce pumping and breathing effects.

BBE's 362 NR (see **Fig. 3**) combines a dynamic-filter noise-reduction circuit and the company's Sonic Maximizer technology (see "From the Top: Spectral Enhancers" in the May 1993 **EM**). Although dbx is well known for companding noise reduction, the company also makes a single-ended dynamic-filter unit, the 929, which is installed in a card cage with other devices in the 900 series.

FIG. 4: Roland's SN-550 applies downward expansion to five frequency bands independently and includes hum cancellation.

Downward expanders work like the decoding stage of a companding system, reducing the level of any signal that drops below the threshold (which presumably includes any low-level source noise). This is most effective with ambient noise and relatively constant noise, such as the buzz from a guitar amp. If the unit is not carefully configured, however, this can do some annoying things, like cutting off the reverb tail or other low-level, intended signals.

The Roland SN-550 (see **Fig. 4**) applies downward expansion to five frequency bands independently, each with its own parameter settings, which helps alleviate this problem. It also includes a hum-cancellation circuit that reduces 60 Hz hum and other induced noise from computer monitors, light dimmers, etc.

Some noise-reduction systems incorporate both techniques. Hush Systems makes several such products: for example, the Hush Elite combines two bands of dynamic filtering with a downward expander for each stereo channel. The Pro Hush includes one band of dynamic filtering and one band of downward expansion for each stereo channel with programmable parameters and MIDI control; the Hush IICX offers one band of dynamic filtering and one band of downward expansion for each stereo channel. They even make a Hush Pedal for guitarists that includes one band of filtering and one band of expansion with two sets of controls.

Noise is a fact of life in any audio system. With careful planning, you can eliminate much of it, but there will always be some residual noise to deal with. Noise reduction can help wipe out any remaining gremlins and allow your music to shine through in all its pristine glory. ●

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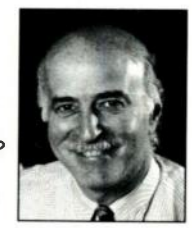
An open letter from Morris Ballen, Disc Makers Chairman



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Get Serious

Make the move from a personal studio to a project studio.

By Mary Cosola

It's finally happening. You're actually making money producing music from your home studio, and word is out on the street that you can be counted on to turn out killer demo tapes or multimedia soundtracks. Whatever your specialty, it's clear that your home studio is growing up; it's becoming a full-fledged, income-generating project studio. And that means you've lost your amateur status.

Once you decide to operate your home studio for profit, life becomes more complicated. It's not enough to be a musical genius, you have to possess a little business savvy, too. Ignoring certain business realities can lead to serious consequences, from lawsuits to (gulp) IRS audits. By checking out a few basic laws and using some common sense, you can reap the rewards of being your own boss and doing what you enjoy: making music.

Just one small corner of Jim Papoulis' musical universe, Amphion Music, where he produces film and industrial soundtracks and advertising scores.

GETTING DOWN TO BUSINESS

The first step in setting up your project studio as a business is filing a fictitious business-name statement with your city clerk. Not only does this legally establish your studio as a business entity, it gives you the credibility and perceived stability of being a "real company," rather than "Joe Blow, Musician at Large." The filing requirements vary from city to city, but you'll most likely need to publish a public notice in a local newspaper stating your business name.

You should also consider obtaining a trademark or servicemark for your company name. These may be established at the local, state, national, and international levels.

"If a studio owner is aspiring to break into the national music market, I think it's best to seek a federal trademark," advises entertainment attorney Michael Aczon. "Doing so will help prevent future heartache when the studio owner finally hits the big time and finds out that some little studio on the other side of the country has a federal trademark

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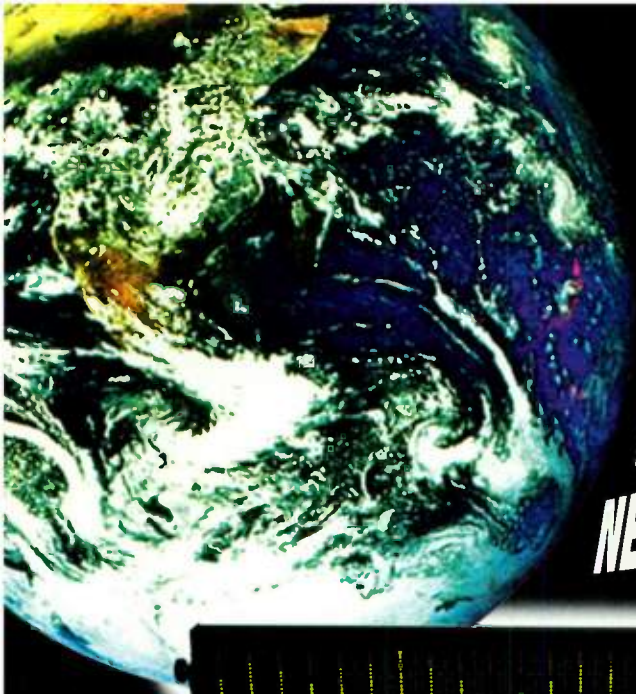

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WHEN YOU NEED TO GET SERIOUS....

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A sample client card from Northstar Production's studio management program *Digital Session Log*.

on his or her company name."

Be forewarned: if you intend to use your project studio to produce band projects, the increased flow of people may alert neighbors that a business is in operation. If your residential area is not zoned for commercial use, you could be shut down or refused a business license. Be sure to check your local zoning ordinances. But even if zoning isn't a concern, you should always consider your neighbors and your neighborhood when setting up your studio. If you have musicians and clients showing up at your door at all hours, the neighbors might not be very understanding. Avoid scheduling sessions early or late in the day, when increased noise and traffic is most annoying. Incurring the wrath of your neighbors could mean more than some social unpleasantness, they could opt to unleash the city hall hounds on you for causing a public nuisance.

However, if you plan to work strictly alone producing works for hire—such as film scores, multimedia soundtracks, or advertising jingles—you shouldn't encounter any zoning problems. Maintaining your project studio as a solo venture is no different than a graphic artist designing ads and brochures from his or her living room.

Other business basics include filing for your federal tax identification number and establishing a bank account under your business name. With this paperwork out of the way, clients can make payments directly to your business name, which makes the IRS happy when it comes time for you to declare your business income.

THE TAXMAN COMETH

One of the benefits of establishing your project studio as a business is that you can write off equipment purchases, depreciation, and "reasonable and necessary" expenses. A few misguided souls believe that they can take some of their income under the table and still write off hefty business expenses. The IRS is always on the lookout for such shenanigans, so keep it above board. Also, be sure to play fair with what you define as reasonable and necessary.

"Some creative types can get a little too creative when it comes to declaring reasonable and necessary expenses," says Aczon. "I don't think the IRS would allow a deduction for a Ferrari because you needed it for your image. Think more in terms of gear, travel, professional services, tape costs, and so on."

The IRS has recently cracked down

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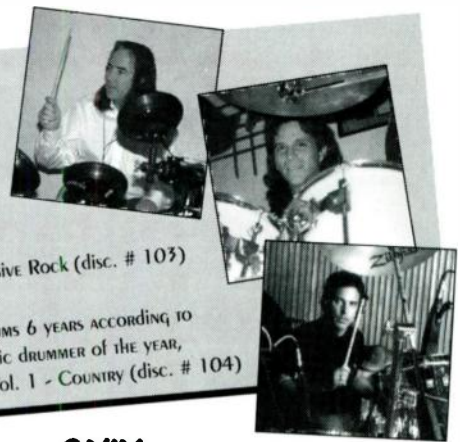

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on the home-office deduction. You are allowed a deduction for the percentage of rent/mortgage that your studio takes up in your home, but only if the space is used exclusively for that purpose. For example, if your studio takes up 25% of your living space, you can deduct 25% of your house payment as a business expense. However, if your studio is in your living room and you watch TV and eat dinner in there, you are not eligible to take the deduction.

If you're not sure what you can and cannot declare, consult a tax attorney or an accountant. He or she can also advise you on issues such as paying employees should you hire any, taking on partners, and other legal subtleties of owning a business.

PLAYING THE ODDS

Equipment insurance is a must for all musicians, even those with relatively modest setups. The "It Won't Happen to Me" attitude is for suckers; you never know when an act of nature—or human nature—will conspire against you. (For more complete information about the types of insurance coverage available for musical equipment, see "Working Musician: Insuring Your Gear" in the April 1994 **EM**.)

If session players, clients, or employees are working in your project studio, consider getting liability insurance. You want to be covered should a visitor get hurt or if a neighbor's property is damaged by someone working in your studio. Your homeowner's or renter's policy may not cover business-related claims, so check your current policy carefully and add any necessary liability riders or take out a separate policy.

MONEY MATTERS

An important part of running a successful business is handling money matters intelligently. The most basic issue is what to charge your clients. It's pretty easy to ascertain the going rate in your area for specific services, especially for things like song demos and radio jingles. Just ask your friendly competitors what *they* charge, or ask local bands and songwriters what they usually pay for these services. Keep in mind that your clients will have different budgets and, consequently, different expectations as to what their money is buying them. If you're not sure what to charge for a job, get a price range from your client before committing yourself to a rate that is

ridiculously low or prohibitively high.

One studio owner learned this technique the hard way. "When I started out, I was used to working with really small budgets," he says. "A car manufacturer contacted me about doing an advertising score. They explained what they needed and asked how much I charged. I thought I could do it for $4,000 or $5,000, but I decided to be brave and double it. I ended up asking for $9,000. They just looked at me and said, 'Well, if you can do a good job for $9,000, maybe you could do a *great* job for about $30,000.' I felt like such an idiot. From that point on, I learned to let the clients name their price ranges, and then I lay out what I can do for them based on what they can afford."

Other money issues concern keeping track of what you spend and what is owed to you by your clients. Many project studio owners rely on generating their own invoices for services rendered. If you're not confident of your accounting abilities, there are software programs available to help you out. The most basic way to track invoices is to use simple spreadsheet programs such as those in Microsoft's *Excel*, *Lotus 123* from Lotus Development Corp., or Claris' *ClarisWorks*.

If you want something that's specific to the recording industry, a few studio-management software programs are available. One such Macintosh program is *Digital Session Log* from Northstar Productions ($199; tel. 503/760-7777). This *HyperCard*-based program allows you to do everything from maintaining client billing records to calculating frequency-to-pitch conversions, as well as other studio-specific applications.

Musicians making the transition to project studio owners are often surprised at how long it can take to paid, especially when dealing with larger companies. Some advertising agencies and record companies pay vendors on a 60-, 90- or even a 120-day billing period.

"Getting paid can be a pain," notes Jim Papoulis, owner of Amphion Music in New York City. "I hadn't really expected that when I started my business. You can wait up to four months for payment. In a way, you're stuck: you don't want to pester them too much because you want to continue to get work from them, but you don't want to be a sucker either."

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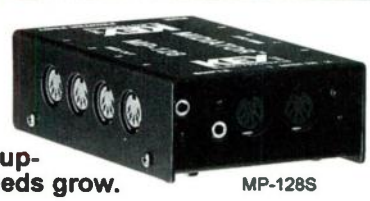
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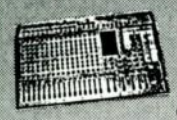


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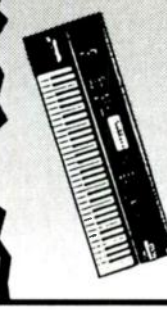
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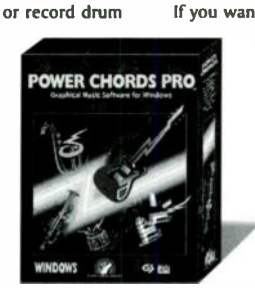

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when to call a client if payment seems to be taking a long time to arrive. It's not unreasonable to ask for a percentage of your fee up front, but don't expect it. Also, don't be shy about calling a client after 60 days to check on the status of your payment.

DETAILS, DETAILS

Don't forget about the day-to-day matters involved in running a project studio. Equipment maintenance is vital. You can't afford to have your machines breaking down when you need them most. Learn all you can about your gear and clean it regularly to prevent down time.

"The key to any successful business is keeping a low overhead, so do as much as you can yourself," advises Leon Santos, owner of Bootay Studios in San Francisco. "I always try to fix things myself. If I can't, I hire someone and learn from them. I'm still using one multitrack recorder I've had since 1988. I've kept it well maintained, and it has never gone down."

You should also pay attention to your studio's appearance. Invest in a couple of decent chairs, some end tables, and a nice lamp or two. Most ad execs will be less than pleased if they have to sit on overturned milk crates and risk soiling their Armanis. Remember, you're running a business now, so you want your studio to be comfortable and inviting, not a dirty mess. You might also find that you are more productive if your workplace is clean and organized.

Your home's appearance is important, too, especially if clients have to walk through your living room and past the kitchen to get to the studio. Smelly laundry and a bathroom that looks like a science experiment gone awry are not the best ways to impress your clients.

Make no mistake about it, running your own project studio is no picnic. Fortunately, the rewards are many. Not only do you get to make music for a living, but you can choose projects that interest you and work in the comfort of your own home. You'll save yourself a lot of tears and gray hairs by understanding the rules of the game *before* you play.

Because she's a new mom, the only game Associate Editor **Mary Cosola** *plays these days is peek-a-boo. And come to think of it, her bathroom really does look like a science experiment gone awry.*

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Reviews

Roland VG-8 V•Guitar System

By Bill Purse with Scott Wilkinson

Modeling comes to a guitar near you.

Guitarists are famous for collecting many different guitars, amps, cabinets, microphones, and effects processors to provide a wide variety of sounds. This is fine for those with unlimited funds and a trucking company at their disposal, but there must be an easier way for the rest of us.

There is. The Roland VG-8 V•Guitar System uses computer-generated modeling to re-create the sound of different guitar bodies, pickups, effects pedals, amps, speaker cabinets, and microphones using a single physical guitar. By simply touching a footpedal, you can go from a traditional electric guitar to a banjo to a fat, resonant texture to an alternate guitar tuning to a Precision bass to a classic Rickenbacker 12-string, all using the same 6-string guitar.

The Roland VG-8's main unit is housed in a sturdy metal case. The pedals let you select among three Groups of 64 Programs each, and the LED and LCD displays are bright.

FIRST GLANCE

The main unit of the VG-8 system is built like a tank with stealth tendencies. Happily, the unit has an internal power supply with a detachable (IEC)3-conductor power cord. The unit is designed to sit on the floor, but it can also be used on a tabletop.

The front panel includes six footpedals, which call up the Programs and the integrated tuner. Four editing buttons provide access to various areas of the VG-8, four cursor buttons let you move around the screen, and an alpha dial changes the value of the selected parameter. Six soft buttons change functions according to their labels in the display. A rotary volume knob completes the controls.

In Play mode, an LED display reveals the current Program number, and a large (160 × 64 dots), backlit, graphic LCD displays the Program name in large characters. The LED and LCD displays are easy to see from a distance, even on a dark stage. However, both displays are difficult to see during outside performances.

The rear panel includes the power-cable receptacle, power switch, memory-card slot, MIDI In and Out ports, external pedal jacks, headphone jack, main stereo output jacks, multipin GK interface port (discussed shortly), guitar-only output jack (no VG-8 signal), and two aux input jacks. With the exception of the MIDI and GK ports, all jacks are ¼-inch TS. You can use the aux inputs to mix the signal from a CD or tape player with the VG-8 for "music minus one" rehearsals. You can also use the aux ins as additional inputs to your guitar amp or as returns after sending the guitar-only signal to an outboard effects processor from the guitar output.

The only other required element is any guitar with a Roland GK-2A, earlier GK-2, piezo, or other divided, hex pickup that senses the vibration of each string independently. (This essentially provides six individual pickups in one.) The GK-2A can be temporarily

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or permanently mounted on any guitar, although a solid-body electric works best because there isn't much acoustic sound from the strings (which might conflict with the output of the VG-8). The GK-2A connects to the main unit with a special cable.

Once everything is connected, you must configure the VG-8 for your particular guitar. These "driver settings" include the type of divided pickup, scale length (distance from bridge to nut), distance from the bridge to each string's pickup, and input sensitivity for each string. You can even display distances in millimeters or inches. I especially appreciate the ability to store settings for up to five different guitars with different pickups. However, user-named settings would be more helpful than the A, B, C, D, and E designations provided.

WHAT'S INSIDE

The VG-8 comes with 64 Presets as well as 64 User Programs. You can also use an optional M-512E RAM card to hold 64 additional Programs. The Preset, User, and Card areas are known as Groups, and each Group includes sixteen Banks of four Programs each. The Banks are labeled A1 through A8 and B1 through B8.

This Program-numbering scheme is pretty complicated, but it's intended to reduce the number of pedals required to call up Banks and Programs. In general, I maintain that the "less is more" theory doesn't apply to patch-selection pedals for guitarists. I fondly recall the Roland GR-500 guitar synthesizer, which provided eleven pedals for patch selection and editing.

Nevertheless, the VG-8's three methods of Program selection provide plenty of flexibility. When you scroll through Banks or Groups, the default option immediately changes to Program 1 of the new Bank. However, you can set the VG-8 to respond in two additional ways: Wait Number and Same Number. When you change Banks or Groups in Wait Number mode, the VG-8 waits until you press a number pedal to change Programs. When you change Banks or Groups in Same Number mode, the Program with the same number in the new Bank is called up. For example, if the current Program is A12 (the second program in Bank 1) and you press the Bank Up pedal, you will call up Program A22.

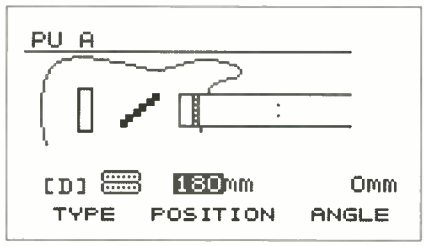

FIG. 1: The large, graphic LCD offers icon-based editing in VGM mode. In this example, you "place" the selected pickup anywhere on the "body" of the modeled guitar (even on the fingerboard through the twelfth fret!) at any angle to the strings.

The VG-8 includes models of five BOSS effects pedals, as well as regular digital effects circuits, all of which are very easy to program. The BOSS pedal models, which are only available in VGM mode, include overdrive, distortion, "metal," compressor, and limiter. These simulations can also be bypassed, if desired. Although I'm not a big fan of stomp-box effects, it's logical to include them with the VG-8, and the quality of the simulations is adequate.

The nonmodeled effects include modulation (chorus, flanging, and phasing), delay, reverb, and EQ (high, mid, and low bands). A Tap Tempo feature lets you manually establish the modulation and echo frequency. In addition, a selection of panning tricks for individual strings lets you design your own stereo imaging. Effects parameters, such as wet/dry mix or effects depth, can be controlled by an optional EV-5 expression pedal.

I like the built-in tuner, which is easy to read from a distance and lets you adjust and memorize mute values from 0 (full output) to 10 (minimal output). This affects the volume level of the Program when the tuner is active. When you're finished tuning, simply step on any pedal to return to Play mode and the most recently selected Program.

COSMIC SOUNDS

Roland's version of modeling in the VG-8 is called Composite Object Sound Modeling (COSM). This technology digitizes the signals from each string separately and applies sophisticated DSP to them. You can also adjust the balance of direct and processed sound from the pickup itself.

The DSP acts directly on the waveforms, just like any other signal processor. This requires no pitch-to-MIDI

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conversion, so there is no tracking delay (more in a moment). However, this also means the VG-8 cannot be sequenced; it is intended strictly as a live-performance and audio-recording instrument.

There are two basic modes of operation in the VG-8: Variable Guitar Modeling (VGM) and Harmonic Restructure Modeling (HRM). VGM applies models of different guitar bodies, pickups, effects pedals, amps, cabinets, and microphones to the string signals. Because it is essentially processing the original waveform from your guitar, the VG-8 responds to performance techniques such as harmonics and muting and incorporates them into the final waveform. As a result, the VG-8 is far more expressive than guitar synths. If you use a signature guitar technique, you'll get it from this instrument.

The various modeled "objects" in COSM are organized into four groups. The physical models include a Les Paul body and two Fender Stratocaster bodies; the electric models include single-coil, humbucker, and piezo pickups in various combinations, with adjustable phase relationship and position on the simulated body. The electronic models simulate tweed-style and MESA/Boogie amps in addition to Marshall cabinets with different speaker configurations. Finally, the magnetic models include dynamic and condenser microphones, which can be "positioned" (close/distant and on/off axis) with respect to the simulated amp.

You might think that creating a complete modeling chain is bound to be complicated, but you'd be wrong. The graphic LCD makes it easy, thanks to sensible icons (see **Fig. 1**). For example, when you want to "place" a pickup on the modeled body, you see a picture of the guitar and pickup in the display. You can move the pickup to any position on the body, including on the fingerboard. You can also orient the pickup at any angle to the strings.

One particularly attractive feature of VGM is its polyphonic pitch-shifting capabilities. Each string can be programmed individually to shift its pitch up or down by as much as one octave. As a result, it is a simple matter to create any tuning without turning a tuning peg. The string tension remains constant even in the most drastic tunings. In addition, two pitches can be programmed for each string, letting you design normal and altered 12-string guitars.

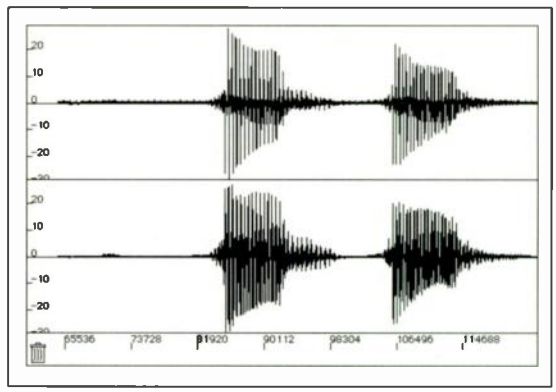

FIG. 3: The top waveform is the direct output from a Fender Stratocaster playing low G on the sixth string, and the bottom waveform is the output of the VG-8 playing its "Classic Strat" Program. Notice that there is no tracking delay and the waveforms are almost identical. In addition, the noise reduction in the VG-8 cleans up the sound.

IN HARM'S WAY

COSM's other mode of operation, HRM, augments or diminishes certain harmonics in a guitar string's waveform to such extreme degrees that it creates totally new timbres with a unique, synthesizer-like sound. The HRM algorithms do not have the imitative quality of the Roland GR-1. Rather, the VG-8 is a new instrument. It may not be long before HRM sounds are heard in recordings and films for their unique and expressive quality.

HRM includes thirteen different algorithms, each of which contains a different set of programmable parameters. Many of the parameters, such as cutoff, resonance, and touch sensitivity, will not bewilder anyone familiar with synthesis. You can easily examine each algorithm individually, because they are included consecutively from Preset A54 to A84. The HRM algorithms include Articulated, Bowed, Solo, Pipe, Dual, Resonator, Synthetic, PWM, Cavity, Filter-Bass, Crystal, Complex, and Drawbar.

My favorite HRM algorithm is the Filter-Bass, which has a rich, analog quality and a pick-activated filter. I was also impressed by the VG-8's ability to combine synthesizer-style pads with the actual electric-guitar sound. However, the HRM user interface lacks the icon-driven ease of VGM.

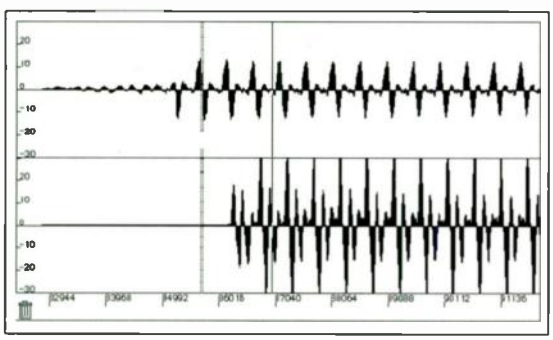

FIG. 2: The top waveform is the direct output from a Fender Stratocaster playing low G on the sixth string, and the bottom waveform is the output of a Roland GR-1 being controlled from the same guitar. Notice the single-cycle tracking delay.

TRACK RECORD

Don't think of the VG-8 as a guitar synth *per se*. Rather, it's a new generation of modeling-based DSP technology. The MIDI In and Out ports are not used to send or receive note information, which means the VG-8 is not a MIDI guitar controller, either. The MIDI ports are used to send and receive SysEx messages for Program storage and retrieval. You can also send MIDI Program Change messages to select Programs.

Because the VG-8 is a signal processor rather than a guitar synth or MIDI controller, it should exhibit no tracking delay. To verify this, I compared the tracking of the VG-8 with the Roland GR-1. First, I used Digidesign's Sound Tools to record the direct sound of the guitar to one channel and the output of the GR-1 to the other channel (see **Fig. 2**). Then the process was repeated with the VG-8 (see **Fig. 3**). I recorded a low G on the sixth string, which exhibits a greater delay in MIDI guitar synths because of its lower frequency. The results demonstrate that the VG-8 is as close to real time as you can get, with no difference from using any other type of digital signal processor.

THE SOUND

I was impressed with the VG's large variety of useful guitar sounds. The acid test was the unit's imitation of such

instruments as the Fender Stratocaster and the Les Paul. The VG-8 models passed this test with flying colors, coming extremely close to their real-life counterparts. I had no problem using these Programs with only minor effects and EQ tweaking.

I was also intrigued by the effect of different strings on the VG's sound. Lighter-gauge strings decreased the punch of the output, and heavier strings increased the punch. I prefer the sound of slightly heavier strings. Neither flatwound strings nor a Godin classical guitar with a piezo driver produced desirable results. The classical strings produced a softer, quite usable sound in some applications, but they did not work well with distortion processing. For best results with bass Programs, I recommend a wound G string. An unwound G string produced a somewhat "springier" timber that didn't blend well with the lowest three wound strings.

"Jazz/Tup" (Preset A53) is a great Program to use as a starting point; I got a very warm jazz sound with only some minor tweaking. I also got a better sound when I plugged the output of the VG-8 into my Fender Vibro King's effects return instead of the front input. It sounded great for combo gigs.

There are a number of Programs that I found to be most useful for pop tunes. These include "Claptone" (Preset B44), "Squeezer" (Preset A23), "TinyWing" (User A31), "Esquire" (User A51), and "SRV" (Preset A33).

ON THE ROAD

In addition to teaching, I enjoy playing gigs as a weekend warrior. I used the VG-8 in several different performance environments, including an arts festival, a synth duo, a stage musical, and a Top 40 band. With the vast palette of sounds in the VG-8, you must be careful to select the right patch for the type of material you're playing. It's easy to get overwhelmed at the gig with too many alternatives. Give yourself plenty of exploration time with the unit before the gig.

My first opportunity to use the VG-8 on a gig was at a summer arts festival, and it performed wonderfully when amplified through the large outdoor P.A. system. For one song, I retuned the "Delta Blues" Program to DADGAD, stored it on the memory card, and then stored the same patch with traditional guitar tuning. The front end of the song uses DADGAD tuning, followed by a vamp that I created with a sample loop in a Lexicon JamMan. I then changed to the traditional tuning for soloing and finally went back to DADGAD and faded out the loop with a volume pedal. The combination of sampling-on-the-fly and a VG-8 can create very exciting performance results.

I use the Roland GR-1 guitar synthesizer as a staple with a synthesizer duo called Aergo. However, when I wanted to play the VG-8, I had to turn off both the GR-1 and VG-8, switch cables, and then turn on the power to play. After one night of this tiresome procedure, I was thrilled to learn that Roland's US-20 Unit Selector, which is a GK-2A switch box, will ship soon at a list price of $249. This is a must for anyone who wants to use a VG-8 and a GR-1/09 with the same guitar.

Once I felt comfortable with the VG-8, I played it in the Pittsburgh Civic Light Opera's production of *Godspell*. The score calls for a full range of guitar sounds, from clean to acid rock, a task that is tailor-made for this instrument. It even calls for a banjo at one point, which the VG-8 handled with aplomb.

The GK-2A volume knob can control either the level of the pickup or the master volume. When performing with Top 40 groups and jazz bands, I found that the volume knob is most effective controlling the master volume. When the volume knob was set to control the pickup level, I had difficulty getting the volume to change from rhythm parts to lead lines without several adjustment attempts. Designating the knob as the master volume control gave the pickup output a much wider range,

Product Summary

PRODUCT:
VG-8 V•Guitar System
PRICE:
$2,895
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fax (213) 722-0911
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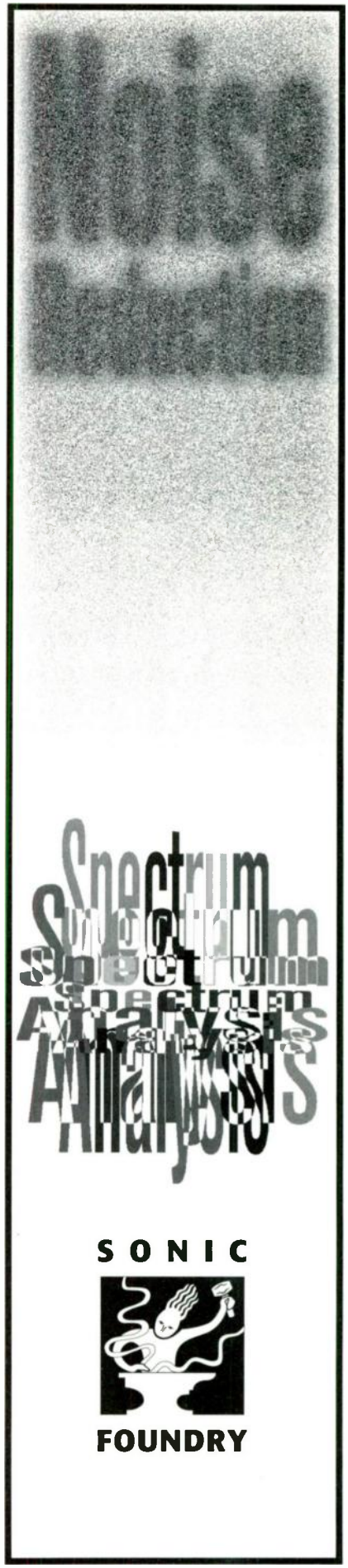
QUALITY OF SOUNDS	● ● ● ●
VALUE	● ● ● ◖



permitting very subtle volume changes. However, if you use an optional expression pedal to control the master volume, set the GK volume knob to control the pickup level.

IN THE STUDIO

Session players and project-studio owners will love the way the VG-8 sounds when plugged directly into the board. I enjoyed recording guitar solos with it for several demos I was putting together. Recording directly into my ADAT was a piece of cake, and I liked the quality without any additional signal processing.

I replaced several synth-bass parts with VG-8 bass patches. My favorites are "CompaBas" (User B24), "Jazz Bass" (User A21), and "Rubber?" (Preset A81). If you are into new age guitar like that on Craig Chaquico's *Acoustic Highway,* patches like "NashvilleNut" (User B11), "VeryEFX" (User A34), and even "CptFingers" (User A33) are right on the money. From surf to rockabilly, the VG-8 is bound to make its mark in the studio.

FINAL COMMENTS

Many first-generation products suffer from various limitations and drawbacks because the designers didn't anticipate some application or feature. However, the VG-8 is not one of them. Many first-generation products are also expensive, and the VG-8 is no exception in this case. Granted, it costs much less than the regiment of guitars, effects pedals, amps, speaker cabinets, and microphones it simulates. It also takes up much less space than these toys. Nevertheless, it represents a significant investment for most musicians.

On the other hand, it sounds great in a wide variety of musical situations, and it suffers from no tracking delay. In addition, it has an excellent icon-based user interface, which makes it easy to create your own patches. And retuning without turning a tuning peg is a real treat. I salute Roland for its commitment to groundbreaking guitar technology, and I strongly recommend you audition the VG-8.

Bill Purse *is the chair of the Department of Guitar and Music Synthesis at Duquesne University. He has authored* Mel Bay's Bach Chorales for Guitar *and developed the* Duquesne University Guitar Library *for Lyrrus' G-Vox guitar system.*

Spectral Prisma Music 1.08 (Win)

By Zack Price

A hard-disk recorder with style and horsepower to spare.

Many high-end hard-disk recording/editing systems are like a reliable family car: they'll get you where you need to go, but they're kind of boxy. But Spectral Inc.'s Prisma Music looks and handles more like a sports car. This hardware/software package has a difference you can see and feel as soon as you "get behind the wheel."

Prisma Music doesn't look like a Windows program or like any typical hard-disk recording program, for that matter. There's no menu bar across the top of the screen and no function windows to open, close, tile, cascade, maximize, or minimize. The main program functions (mixer, editor, patch bay, etc.) are full screens, and you switch between them using buttons located on an ever-present transport bar.

There are no window submenus for such features as digital signal-processing tools, waveform- and track-display resizing, and so forth. Instead, Prisma Music has replaced submenus with buttons that appear on the appropriate function screens. Occasionally, though, Prisma Music reveals its Windows heritage by displaying dialog boxes for setting system parameters, program preferences, and DSP function values.

Even so, the overall result is a work environment in which the user can move around quickly and easily. In fact, the program interface simulates a recording studio so well that you may wonder why no one designed a digital audio program this way before. To be fair, the computer power needed to efficiently operate a program in this manner has only recently become available on a wider, more affordable scale (more details in a moment).

You might be thinking, "Okay, so it looks like a studio. What's so special about that?" Well, consider how the average hard-disk recording program looks and works, whether on a Windows or Mac platform. Program functions are selected by moving the mouse to the menu bar. Each function opens onscreen as a window or box, often with submenus for initiating specific features of the active window. Although this familiar and nearly universal method of operation doesn't *seem* time consuming, the amount of time wasted accessing a program's features during a work session soon adds up.

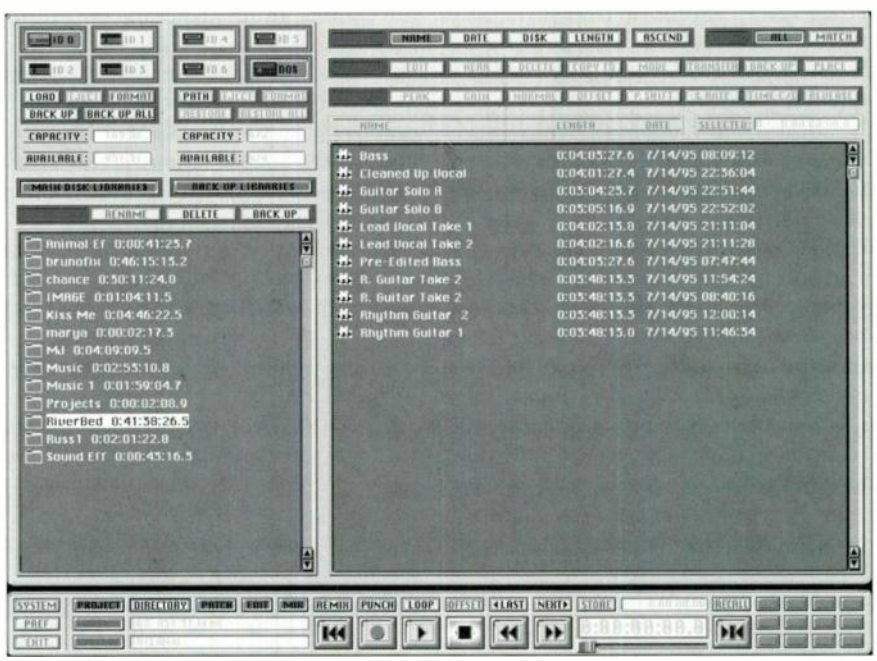


FIG. 1: The Directory screen displays segments and segment libraries on all available drives. Most housekeeping functions, including deleting and moving files, are performed from this screen.

For example, in my experience, function windows are usually opened but rarely closed. This quickly creates a cluttered screen full of tiled windows. Furthermore, users typically maximize the window for the current mode they're working in. Then they shrink that window again before activating a different function window. And what do they do to the new window once it's opened? They maximize it. Moreover, once a window is open, the next step is to pull down its submenu to select the action you wish to perform. Only then can you actually perform a task.

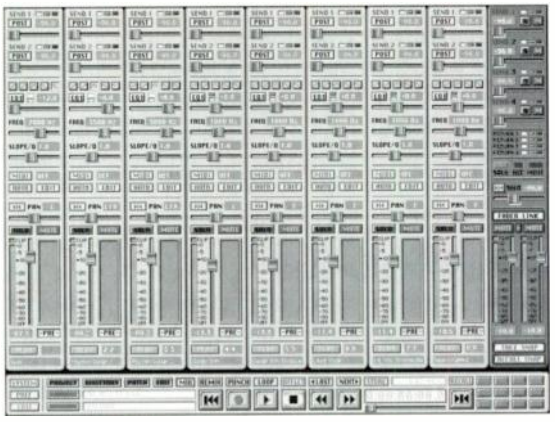


FIG. 2: The Mixer screen has a wide variety of features, including 2-band parametric EQ, four aux sends, metering, Auto-Trace fader preview, and stereo master outputs.

If you'll pardon my metaphor switch, working with these programs is like working with a messy desk. Sure, you can find everything, but you probably spend as much time shuffling papers as you do working. Prisma Music, by contrast, acts like a self-organizing desk. You see only the "papers" you need to see. When you switch to a different task, Prisma Music clears away the desk and presents you with the proper "reports." In a business where time is money, anything that increases performance and lightens the payload gives you an edge in the race. (Sorry, but we're back to the sports-car metaphor again.)

HIGH OCTANE REQUIRED

As always, you don't get something for nothing. Prisma Music's stylish, bit-mapped, full-screen graphic interface demands a high-powered computer to run efficiently. The recommended system is a Pentium 90 with 16 MB of RAM, and the minimum requirement is a 66 MHz 80486 DX2 with 16 MB of RAM. Prisma Music actually requires only 12 MB, but because that is an unusual RAM configuration, 16 MB is the practical minimum. However, this also means that you can usually run Prisma Music and sequencing software concurrently on the same computer.

In addition, your computer must have local bus capability or a PCI bus video board capable of 1,024 × 768 resolution at 256 colors (the only resolution setting at which Prisma Music runs). You need at least 1 MB of video RAM, but 2 MB of VRAM is preferred; you'll need it for fast redraws of the system's graphics-intensive screens.

Of course, you also need a monitor that operates at the aforementioned resolution. And unless you have eyes like a hawk's, I strongly recommend that you have *at least* a 17-inch monitor. There are a lot of fine details on the Prisma Music screens, and you could easily strain your eyes working with a smaller monitor. Furthermore, I found that a smaller monitor sometimes made it harder to "grab" information, which slows one down in an editing session and negates any speed advantages that Prisma Music offers.

Finally, even though Prisma Music doesn't look like a Windows program, it still requires Windows 3.1 or Windows for Workgroups. The program has run on beta versions of Windows 95, but it is incompatible with Windows NT.

UNDER THE HOOD

Prisma Music's hardware "engine block" is the AudioPrisma board, a full-length ISA card that is a combination digital-audio card and SCSI host adapter. It has two external, ¼-inch TRS jacks for AES/EBU, S/PDIF, or Word Clock Sync in and out. (Note that although the system meets the electrical specifications for these interfaces, practical space considerations prevented Spectral from using the usual XLR connectors for AES/EBU and RCA coaxial jacks for S/PDIF.) These can be connected to Spectral's AX-S 2-channel digital-audio converter ($1,115), third-party converters, or a DAT used as an analog front-end. The AX-S uses standard XLR connectors for AES/EBU I/O.

The AudioPrisma board has a SCSI port for connection to external devices

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and an internal connector for SCSI devices housed inside the computer. Although this may seem to imply that you can use a combination of internal and external SCSI devices, such is not the case: you must choose between using all internal or all external SCSI devices (discussed shortly).

This idiosyncrasy may be a factor in determining the type of computer setup you'll need. For instance, if you plan to use many internal SCSI devices, you'll want a tower system with a large power supply just to have the room and juice to accommodate the extra hardware. If you opt for rack-mounted external drives with separate housing and power supplies, your choice among tabletop, minitower, and tower designs may rest more on aesthetic or overall studio-design considerations.

More likely, however, your computer and hardware needs will be determined by the type of user you are. Those using Prisma Music as a personal recording system will probably have only one or two hard drives and a backup drive. Production suites, on the other hand, may require multiple removable hard drives to keep the work flowing.

Speaking of hard drives, Prisma Music supports four "real time" SCSI drives (device ID numbers 0, 1, 2, and 3) for recording and playback, and three backup devices (device ID numbers 4, 5, and 6) for archiving. Hard drives are the medium of choice for recording and playback, although you can also use magneto-optical (MO) drives as real-time drives. However, because MO drives have slower access times, they don't record and play back as many tracks as a hard drive. On the other hand, MO drives can also serve as backup devices if you assign them the proper device ID from the appropriate category. For large-scale archiving, it's preferable to use 4 mm (DDS) or 8 mm (Exabyte) tape drives. (Contact Spectral, Inc. for a list of SCSI devices approved for use with Prisma Music.)

OPTION PACKAGES

The standard AudioPrisma package includes a jackplate that mounts in a card-slot opening. The jackplate has separate 15-pin and 25-pin external ports that are connected internally to the AudioPrisma card by ribbon cables.

A set of "pigtailed" MIDI/SMPTE breakout cables attaches to the 15-pin port. The ¼-inch SMPTE in and out jacks receive and send Longitudinal Time Code (LTC), and the MIDI In, Out, and Thru ports transmit or receive MIDI Time Code (MTC). Although Prisma Music can be controlled via MIDI with a JLCooper CS-10, a separate MIDI interface is required. Furthermore, if you wish to run a sequencer on the same platform in sync with Prisma Music, you'll need yet another MIDI interface that accepts MTC or SMPTE for the sequencer.

Instead of the pigtail cables, video users may elect to connect Spectral's optional AuxBox ($295) to the 15-pin port. This unit provides the MIDI and SMPTE sync options just mentioned, as well as a number of video synching options. For example, it accepts black burst (Genlock) and Vertical Interval Time Code-encoded signals to lock Prisma Music's transport to VITC. The AuxBox also allows VITC and a time-code burn-in to be added to an incoming video signal, which allows you to stripe videotapes with VITC or make window dubs. Both NTSC (North American) and PAL (European) video formats are supported; the choice is set from the Configure System dialog box.

The AuxBox includes an RS-422 port, as well. This lets Spectral software control the transport functions of a professional VCR that conforms to Sony's Remote-2 (9-pin) protocol. When this is switched in for use at the AuxBox, MTC sync is not possible. Currently, this feature is not available in Prisma Music but is included in the earlier Prismatica software that comes bundled with the Prisma Music system (see sidebar "Prismatica Software").

The 25-pin port on the jackplate is the Spectral Multichannel Digital Audio Interface (SMDAI). It attaches via a proprietary cable to a variety of Spectral's audio converter boxes, including the AX-88 ($2,695), an 8-channel analog-to-digital/digital-to-analog converter. This box also has an AES/EBU clock input and a master out/slave sync connection and can accept sampling rates of 30 to 50 kHz from an external clock source.

Also available is the ADAX-8818 ($3,195). It has the same features as the AX-88 but also includes analog metering for all eight channels. In addition, it has digital audio connections assigned to channels 1 and 2, which allows direct digital transfer to and from Prisma Music. Because the outputs of channels 1 and 2 can also operate as master outs in Prisma Music, it's possible to digitally master to DAT. (According to Spectral, digital mastering is also possible using the AX-88, but the DAT machine must connect directly to the AudioPrisma board.)

Last, but not least, the SMDAI port can also be used to connect the Translator ($995), Spectral's 8-channel digital-audio format converter. The Translator (which I did not test) allows direct digital transfers between an Alesis ADAT (or compatible), TASCAM DA-88, Spectral DAW, and Yamaha digital-audio recorder.

Once you have connected the hardware and installed the Prisma Music software, you'll need to press the System button to set up the hardware parameters. These include a list of what I/O devices you have attached to the AudioPrisma card, time-code settings and options, sample-rate selection, and so on. Afterward, you may also want to select the Preferences button to determine how Prisma Music handles such features as segment naming, punch-monitor options, and meter-update speeds. Once these parameters have been set, you're ready to run.

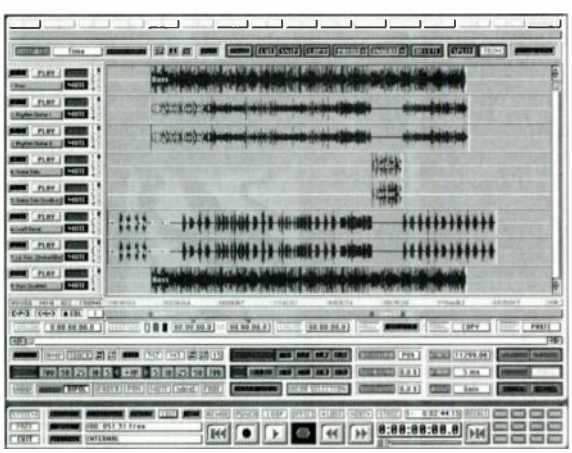

FIG 3: The Editor screen is the main work area of Prisma Music. From here, you can record, view, and edit your tracks.

TAKING A SPIN

The Project screen first appears after starting and initializing Prisma Music. A Project is a record of the different tracks

and sound files (segments) used in a recording and editing session. The program normally creates an untitled project upon startup, but you can change this. Actually, you can bestow two names on a Project: an 8-character DOS file name and a more descriptive 32-character reference.

The Project screen shows not only the Projects on file but the associated segment files for each track of an existing Project, as well. You can also get an overview of all the audio recorded in a Project by switching to the Directory screen (see **Fig. 1**). From here, you can see the total time of all segments of a Project in a library. Furthermore, you can view all segments by name, segment length in time, the date and time the segment was created, and whether a segment is a mono or stereo file.

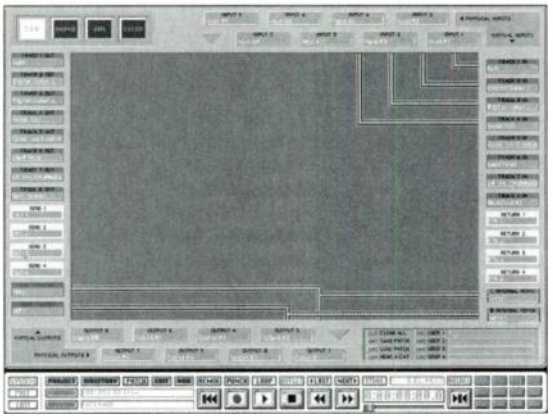

FIG. 4: The Patch Bay offers a flexible routing system that includes both virtual and physical inputs and outputs.

All "housekeeping" duties are performed from either the Project or Directory screens. For example, saving, deleting, and archiving Projects are handled from the Project screen. Backing up segment libraries, moving segments to other libraries, and deleting unwanted segments are handled in the Directory screen. You'll appreciate these features of the Directory when you're deep into a Project and you need to remove some false starts and bad takes to make more hard-drive space available.

To begin recording, you just go to the Mixer screen (see **Fig. 2**), arm a track, and hit the Record and Play buttons on the transport. There's no need to set the amount of recording time beforehand, as required by some other hard-disk recording/editing programs.

Of course, there's more to the Mixer than just recording and playing back tracks. You can name each track, set its pan position, determine whether it is MIDI controlled, group faders, and more. It also has a fully parametric 2-band EQ with highpass and lowpass, high and low shelf, and peak settings for each band. Each band has adjustable slope settings with 12 dB boost or cut. Furthermore, each mixer channel has four effects sends that can be set pre- or post-EQ. The mixer includes four returns, as well.

Although the Mixer duplicates a real recording console in many ways, it has a few extra features that aren't part of any physical mixer. For example, the gray box next to each channel fader displays Spectral's AutoTrace mix automation feature. This graphically shows recorded fader movements in advance, allowing for on-the-fly mixing or editing updates.

The gray box also changes to a recording-layer control when in Record mode. This lets you record-enable one of the four editing layers on that track (discussed shortly). In this way, you can select a specific layer on which to record, or you can let Prisma Music automatically sequence through layers for recording multiple takes. Keep in mind that you can record as many takes as hard-disk space allows, and any previous recording can be placed on any layer of any track.

Once you've recorded some tracks, press the Edit button to switch over to the Editor screen (see **Fig. 3**). Here you can view your tracks in a variety of ways. For instance, you can see as many as sixteen tracks at a time (eight playback tracks and eight virtual tracks) from the total of 99 tracks. And because each track is four layers deep, you in effect have 396 virtual tracks to play with! However, in working with the program, I found that sixteen visible tracks (64 virtual tracks) was more than sufficient for my needs.

You may choose to view each of the tracks' four editing layers either in Layer View, where each track shows a "stack" of four independent layers, or in Track View, which shows them "top down" from the first layer. In this last mode, the lower layers are exposed only when there is a gap in the layers

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above it. These options ensure that you can see or hear track data in any desired form and make it downright easy to create "doughnuts" (a hole left in a track that is used to drop in alternate material, e.g., the local advertisers' information on a television or radio commercial) or put together a perfect composite take.

You can also view segments on a track as a bipolar waveform, an amplitude-only waveform, or a solid bar that resembles a section of tape. (Note that while a segment may occupy a whole track, a track can also be made up of multiple segments.) Furthermore, you can treat a segment as an object or work with it in Linear mode. In Object mode, a segment is treated as a complete block. This is the mode for moving segments from one track to another, copying or moving a segment within the same track, and nudging or sliding segments forward or backward in time.

In Linear mode, you highlight a section of a segment to perform such operations as cut, copy, paste, and reverse playback. This is also the mode you will most likely use to join different

PRISMATICA SOFTWARE

The Prisma Music System package actually consists of two programs: Prisma Music and the earlier Prismatica software. Although it may be tempting to think of the former as a new and improved version of the latter, this is not so. Although Prisma Music draws on many of Prismatica's features, it has been designed for music production, and Prismatica is for post-production and broadcast work. However, the programs' files are compatible, so you can switch between the two applications.

The most striking difference between the two programs is that Prismatica has the "old-fashioned" look and feel of a typical hard-disk recording program, with windows, menus, and submenus. Many of the features that have been consolidated into a single work screen in Prisma Music are spread out among separate windows in Prismatica.

There are other major differences. For instance, Prismatica has twelve active tracks where Prisma Music has eight. And although Prismatica's total of 96 tracks is similar to Prisma Music's 99 tracks, its layering scheme does not allow each layer to be accessed as a fixed and independent edit list.

Also, Prismatica requires the user to set the recording length beforehand, although it's possible to get around this by using the punch-in feature at the start of recording. And when a Project is opened, Prismatica has to recalculate any fades that exist in the tracks. In contrast, Prisma Music saves fade data so it doesn't have to be recalculated upon opening. This can be a real time saver.

System requirements for Prismatica are less stringent than those for Prisma Music. Spectral states that it can run on a 25 MHz 80386 PC with 4 MB of RAM, but a more reasonable minimum requirement is a 33 MHz 80486 DX with 8 MB. Because the Prismatica system plays and records twelve tracks, two SCSI drives are recommended for transparent operation. Nevertheless, even with the potential expense of an extra hard drive, you can still run Prismatica at a reduced cost compared to Prisma Music.

This begs the question: Why include Prismatica at all? According to Spectral, although Prisma Music is a "complete production system," the earlier Prismatica software continues to shine in the post-production and broadcast applications for which it was designed. The company also insists that including Prismatica with the Prisma Music package doesn't affect price, so why not include it?

I work in music so, given my "druthers," I would use the Prisma Music system exclusively. After all, it's hard to go back to a station wagon after you've driven a sports car. On the other hand, given Prismatica's less-demanding system requirements, it would seem this program could find a sizable niche as a less-expensive DAW system in the Spectral line of products. From a musician's point of view, this makes more sense.

segment sections using a butt splice or one of six adjustable crossfade shapes.

If you need to internally mix down the active tracks, just hit the Remix button, mute the tracks you don't want to mix, and press the Record and Play buttons. Prisma Music routes the internal remix to a pair of virtual tracks using the Patch Bay (see **Fig. 4**); the Left and Right Master virtual (software) outputs go to the Left and Right Internal Remix virtual inputs.

You can use the Patch Bay to route signals in any combination. For example, you can connect the virtual inputs to the physical inputs of a device such as the AX-88 converter box. Similarly, you can patch each track's virtual output directly to the physical outputs and control the mix from an outboard mixer. Interestingly, you can route a track as part of a virtual stereo output going to physical outputs 1 and 2, directly connect the same track to a physical output, and hear both of them. Even if you shut down the virtual track

Product Summary

PRODUCT:
Prisma Music digital audio workstation

PRICE:
$4,495

SYSTEM REQUIREMENTS:
80486 DX2/66 MHz PC with 16 MB RAM (Pentium 90 system preferred); local bus capability or PCI bus video board capable of 1,024 × 768 resolution @ 256 colors with 1 MB of video RAM (2 MB preferred); color monitor; Windows 3.1 or Windows for Workgroups; one or more SCSI hard drives for recording

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NOVEMBER 1995

We want to know what you think of the articles in *Electronic Musician*! Now you can use your reader service card to give us feedback about **EM**'s editorial coverage. We have assigned a rating number to each of the main articles in this issue. Please select a rating for each article and circle the appropriate number on your reader service card:

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fader in the Mixer screen, you still receive that track's signal at the physical output. That can give you some interesting mixdown options to consider.

SPEED BUMPS AND POTHOLES

Very little went wrong with the Prisma Music system I reviewed. The only real problem I had was getting the program to sync via MTC to a sequencing program (*Cakewalk Pro for Windows* with a Music Quest MQX-32M interface) running on another computer. The two systems synched flawlessly as long as I started at the beginning of the recording. However, if I stopped and restarted in the middle of the audio file, the sequencer lagged behind by the amount of the offset time. Spectral was unable to reproduce the problem.

Spectral was also unable to reproduce a smaller problem that occurred when I tried to use the Pitch Shift DSP tool to change a track by a minute amount (25 cents). Although it apparently worked for them without a hitch, on my system a message informed me that "the amount was not within the acceptable range of values." I was able to overcome this little obstacle by routing the track directly to my mixer and setting up a Pitch Transposer effect on my Yamaha SPX-90. (Sometimes the old ways are best.)

Ironically, some of Prisma Music's best features proved vexing on occasion. For example, the program automatically names and saves every file segment, which is a cool feature. You can also rename a segment in the Editor screen. However, the version of Prisma Music I used (1.08) saved the segment under both the new and old names. That meant there were two names in the directory, even though there was still the same amount of audio on disk. According to the company, the currently shipping version 1.09 has fixed this problem; it allows you to either rename a segment or create a second name for the same audio.

THE FINAL LAP

There's much more to Prisma Music than I can cover in these pages. It has most of the features one has come to expect from a high-end digital audio workstation. The only significant features missing are support for integrated digital audio sequencers such as Steinberg's *Cubase Audio,* onboard effects processing, and a plug-in architecture *à la* Digidesign's Pro Tools.

Prisma Music's best feature, however, is its accessible user interface. It's fast, logically laid out, and a joy to use. Notwithstanding the previously noted exceptions, the only way Prisma Music would be easier to use is if it did all the session work for you. No wonder the Spectral ads tout that you can learn this program without the manual. I wouldn't go that far, but the program is quite easy to learn, even when using its preliminary manual and the Prismatica manual.

Prisma Music succeeds as a stand-alone music-production center and fits well into a post-production setting. I believe many users are going to run it as part of a hybrid MDM/DAW environment, where basic tracks reside on tape and the sweetening tracks, vocals, and solos exist on Prisma Music. If this sounds like the way you plan to produce music in the future, take a little test drive in this model. You'll like how it rides.

Zack Price *would like to thank Rene Lopez, John "Doc" Holiday, and his new feline studio assistant, Little Queenie, for their talent and time.*

Spectrasonics Supreme Beats

By Dan Phillips

This sample library brims with exotic percussion and infectious grooves.

Supreme Beats is billed as a "percussion library," and they aren't kidding about the "library" part. Producer Bashiri Johnson and developer Spectrasonics have provided a comprehensive set of loops and instruments that includes percussion from all seven continents. In fact, the only category not represented is the standard drum set. Originally, the collection came as an elegantly packaged, boxed set of four audio CDs: *African Contemporary, Dance/Hip Hop,* and *World.* Recently, the manufacturer released a fifth, separately available disc called *International.*

You can also get the complete library on two CD-ROM collections at $199 each. (If you already have the 4-disc set, you can upgrade to the CD-ROM version at a discount. Contact Spectrasonics for details.) In the CD-ROM format, *African* is paired with *Contemporary* on one set, *World* with *Dance* on another, and the material from *International* is divided between the two CD-ROMs. The CD-ROMs are available in all popular formats, including Roland S-700 series, Akai S1000, E-mu EIII, Ensoniq ASR-10, Digidesign SampleCell, and Kurzweil K2000. I auditioned the Roland version.

Supreme Beats is primarily a collection of percussion loops, though the audio CDs include a modest selection of single hits and the CD-ROMs have a large selection. The grooves are generally full and complex, with many percussion parts playing at once. Most, but not all, offer various soloed or submixed loops in addition to the main mix; in some, the amount of soloed instruments is extensive. Several *Dance/Hip Hop* and *Contemporary* selections are actually intricate and innovative minicompositions that extend traditional patterns into new territory.

BRILLIANT BEATS

Producer/percussionist/composer Bashiri Johnson is the prime mover behind *Supreme Beats.* Johnson, whose list of recording credits includes Madonna, Donald Fagen, and Whitney Houston, has taken great care with this project and is clearly proud of his efforts and those of his collaborators. The copious liner notes, sprinkled with photos of smiling percussionists, gush with appreciation for the various players. Johnson's musical commitment and personal involvement in the project are evident in the loops: these are distinctive, exuberant tracks, brimming with vitality. And as one would expect from a musician of Johnson's caliber, the audio quality and performances are consistently excellent.

As a percussionist and drum programmer, I enjoyed just listening to the tracks by themselves (especially on the *African World* and *International* discs), using the submixes to sort out the intricate interweavings of the parts. Two pieces that stand out in the *African* set are "Ju Ju" and the ultrafast (138 bpm) "Gyana HiLife." Both feature complex, layered loops, with all parts available separately. Many of the African grooves contain

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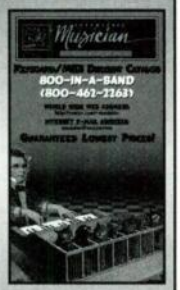
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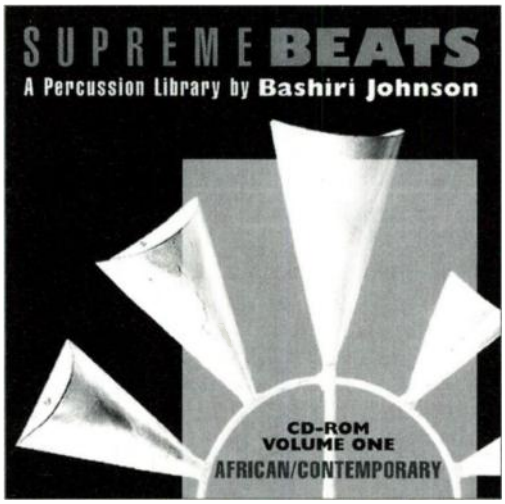

Spectrasonics' outstanding *Supreme Beats* sample library features percussion sounds and looped performances from all seven continents.

vocal chanting; my favorite of these is the driving "Yebo," which offers several different mixes with and without vocals.

"Triangle Rabbit," from the *Dance/Hip Hop* set, is a complex groove utilizing bongos, udo, patum tube, shakers, and triangle. This is topped by a solo on the "German Rabbit," a pull cord-style talking children's toy that makes some pretty demented scratch-like sounds. In addition to the full mix, there are several submixes (*sans* bongos, rabbit, etc.), and each individual part is also available separately.

"Daoud Mishabash" and "Daoud Bash French" (also from *Dance/Hip Hop*) are very cool patterns that, unfortunately, aren't as thoroughly broken down into component parts. Both feature harmonica prominently, but full mixes without the harmonica are not available. This tonally and harmonically restricts the usefulness of these loops.

"Timbale Bash," from the *International* CD and the *African/Contemporary* CD-ROM, is one of those Latin beats that absolutely forces your body to move. (My heel is still bobbing up and down as I write.) I also love the controlled chaos of the ultrafast triplets in "Two Conga Bells," although I wish it, too, were available with soloed parts.

Most of the grooves are available in two or three different tempos that have been carefully chosen to ease mixing and matching of parts between different grooves. There are only a handful of tempos in all, with most loops clocking in at 93, 108, and 120 bpm. On the Roland version, the files are named so that they can be sorted by tempo, making it simple to call up a list of all the loops at, say, 108 bpm.

While we're on the subject of file organization, kudos to Spectrasonics for arranging soloed percussion parts under instrument type (such as "Tamborine" and "Tabla"), as well as by the loops that they are used in. This means that, instead of having to remember which groove had that cool shaker part I'm looking for, I can just load up a bank of all the shakers on the disc. Because the Roland file system allows sample data to be shared by multiple patches, this uses up almost no additional space on disc.

GREATEST HITS

As mentioned previously, the CD-ROMs feature a much larger selection of single hits than the audio CDs. Also, the CD-ROMs usually offer not only a selection of different articulations and dynamic levels for each instrument but multiple hits with subtle variations on the same basic articulation. There are more than one hundred conga samples, for example, most of them in stereo. This thoroughness is highly appreciated, as it makes it much easier to create dynamic, living percussion parts, either as supplements to the loops or in their own right.

Because the single hits were culled from the loop, rather than being sampled individually, their variety and pristine audio quality are all the more impressive. They have none of the

Product Summary

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International audio CD: $99
CD-ROMs: $199 each
MANUFACTURER:
Spectrasonics
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fax (818) 955-8613
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KAWAI

Digital Magic.

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clipped ambiences or instrument leakage that mar other collections. Some, however, aren't as highly developed and expressive as they might have been in the context of a "single-hits only" collection. Only a few sounds offer Velocity switching, for instance.

GO FOR IT!

This is a knockout library. The performances and recordings are stellar, the CD-ROM organization is first-rate, and the documentation is attractive and useful.

Furthermore, the CD-ROMs are attractively priced; I'd recommend that anyone considering the 4-disc set fork over the extra $100 and buy both CD-ROMs. That way you get the sounds preformatted for your sampler—a great time saver. But regardless of your preference—audio CDs or CD-ROMs—if you're looking for a set of percussion loops, it's hard to imagine you'll go wrong here.

Dan Phillips *is a principal in Touch Productions, producing music for television, film, and album projects. He happily spends his weekdays as part of the team at Korg Research and Development.*

Novation BassStation Rack

By Julian Colbeck

A potent analog bass-synth module with knobs.

I might as well admit it: I used to be a bass player. To be exact, I played a big Hofner bass violin. I mention this only to reveal my early interest in things of a low sonic register. Later, I hankered after a gig as a synth-bass player. Of course, such a gig never came to pass, but it always struck me as a cool prospect. Roland Juno-60, Moog Minimoog, and Korg M1 have been my bass weapons of choice for the past few years until, ironically, the arrival of a Novation BassStation keyboard coincided with a distinct lack of being asked to play bass parts on sessions.

The BassStation keyboard sounds great but looks and feels budget. Those who judge an instrument by its cover (which describes most of us) will be tempted to pass right on by without stopping for a listen. And that would be unfortunate, because this analog British bulldog is replete with 2- or 4-pole resonant filters and parameters that can be edited, recorded, and played back in real time via MIDI.

A complete review of the BassStation keyboard graced these pages a year ago (see the October 1994 **EM**), and Charles Fischer's generally positive spin concluded with the hope that Novation would produce an upgraded, rack-mount version in due course. And now—Shazam!

RACKING THE BASS

Wisely, Novation has resisted the temptation to just shoehorn the innards of a BassStation keyboard into a 19-inch-wide box. There have been some sonic improvements, there are more program memories, and the panel hardware seems of a higher quality. There are also several technical changes that improve upon the BassStation keyboard. The instrument is more comprehensive yet easier to use. It just feels right.

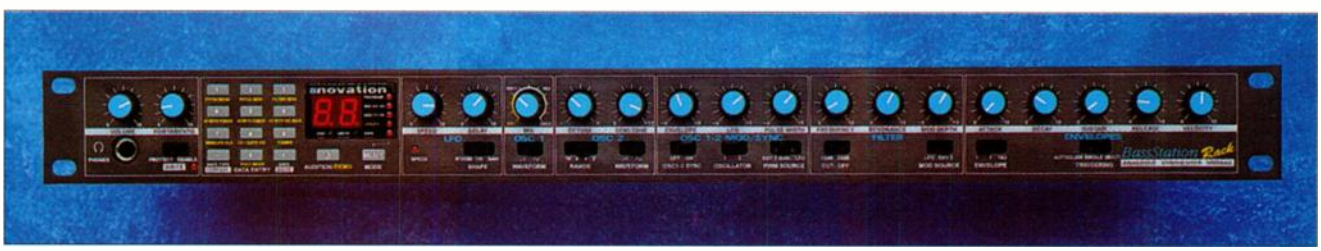
In case you missed the earlier review—and especially in case you have missed out on all the talk about this curious English import—the Novation BassStation is a dedicated, monophonic synthesizer employing digitally controlled analog oscillators. It combines the sound-creation capabilities of classic mono synthesizers such as the Minimoog and Sequential Pro-One with sounds and features of classic bass units, especially Roland's TB-303 Bassline. It does all this while remaining inexpensive.

Further motivation lies behind the creation of the BassStation Rack, namely expanding the instrument's range of applications. Sonically, you're given a lot more sizzle at the top end; half of the Rack's complement of 40 presets are now "lead line" patches, as opposed to bass patches. And this is not just a matter of tweaking octaves: oscillator sync—a function no lead synthesizer would willingly forgo—is a brand new feature here.

Another major improvement is the addition of control voltage (CV) and gate inputs and outputs. These allow users who have pre-MIDI analog gear to connect devices to the Rack directly without the hassle and expense of a CV-to-MIDI interface. There are one or two MIDI improvements, too, which I'll get to in a minute.

The 1U rack-mount BassStation Rack measures a mere 4-inches deep. This "mini" concept extends to the front-panel hardware, which consists of some eighteen small, blue-topped control knobs; twelve switches; a keypad the size of a wristwatch calculator; a 2-digit screen; and a headphone jack. Clearly, if you have paws the size of a heavyweight boxer's, you're going to have problems. That said, the controls are well spaced and clearly labeled. The screen's writing is small, though, so when you mount the BassStation Rack, carve out a niche at eye level.

Not surprisingly, with these dimensions an external power supply unit is requisite, but at least it's a "lump in the line" rather than a more obnoxious wall wart. Don't waste time looking for the power switch: there isn't one. As soon as you plug the unit in, it's on. Audio output is via one ¼-inch jack, in glorious mono.



The monophonic BassStation Rack offers real-time MIDI modulation, ample presets, and potent analog-synth bass and lead sounds.

OSCILLATORS AND MODULATION

The BassStation Rack is a 2-oscillator design. The balance between oscillators 1 and 2 is controlled from a single knob, which is not a perfect solution, but it's adequate and cost effective. Both oscillators can generate sawtooth waveforms or variable pulse waveforms and can be pitched independently. A lone 4-position switch on the oscillator 2 panel selects between octaves of 16', 8', 4', and 2'; oscillator 1 is fixed at 8'.

A rotary detune control progressively thickens a 2-oscillator sound by spreading the tuning as in a chorus effect, and a rotary control offsets one oscillator against the other by up to an octave, in semitone increments. Here's where you set up sounds that play in fourths or fifths, or, if you're King Crimson, major sevenths. The oscillator panel's relative dearth of controls limits you only in terms of programming speed; there's always a bit of flicking about between oscillator 1 and oscillator 2 positions in order to create your basic mix. But this is nothing drastic, and you quickly get used to it.

Even in the realm of bass, modulation is vital for colorful sounds. What have we here? If you're using the pulse waveform, the pulse width is fully variable, ranging from -5 (which yields a clarinet-like, 50% square wave) to +5 (where almost all you'll hear is high harmonics, with little or no fundamental). From clarinet to Clavinet, you could say. On the BassStation keyboard, I felt the "thinnest" pulse wave was not quite thin enough for really pinched, hard-edged nasal tones. On the Rack I had no such reservations.

With the PWM (Pulse Width Modulation) Source switch on manual, the pulse wave will remain static at your preset width. You can introduce some slow harmonic change within the sound by assigning envelope generator 2 to the pulse width. The shape (speed) of such changes is set up using the EG controls; the strength is governed by the Envelope Amount control. You can also control these changes in harmonic content with a fixed-speed LFO.

The variable-speed LFO (yes, these are two separate LFOs) governs classic vibratos and trills. The LFO rotary control on the modulation panel governs the amount of modulation. On the named LFO panel, you'll find a choice of three waveshapes—random, triangle, and sawtooth—plus rotary controls for speed and delay.

Delay is an essential LFO parameter, especially on bass sounds, as many parts would be unlistenable if constantly "vibratoed." (A constantly wobbling voice would probably send you screaming to the gun cabinet.) Delay allows you to program a period of calm before the storm of modulation occurs. That's all well and good, except that the delay control here is somewhat arbitrarily calibrated. From seven o'clock to twelve o'clock, it does almost nothing. Only from two o'clock does any appreciable delay occur. The maximum delay (five o'clock) is around five seconds.

The final control on the modulation panel is Sync. This feature forces oscillator 2 to start its cycle "in sync" with oscillator 1, even if differences in cycle and pitch would (thanks to how you have set the oscillators) have occurred. The result is a forced-sounding, dramatic timbral change. Sync is instant power. Instant "lead synth." Instant Emerson. It's a matter of taste, of course, but this is not a device I'd use on bass. For lead sounds, as mentioned, it is indispensable.

FILTERS AND ENVELOPES

Perhaps the BassStation's killer punch is its filter section. Over the past couple of years in the UK, the new generation of retro-synth enthusiasts has fallen totally under the spell of Roland's ancient TB-303 Bassline. Mindful of this, Novation has not only given the Rack a 2-position filter with 12 dB/octave and 24 dB/octave settings but has also configured the 12 dB setting so as to recreate the range of options available on a TB-303.

When you are in 12 dB mode, in other words, the three filter controls of frequency, resonance, and mod depth behave very much as the equivalent parameters do on a TB-303. In this mode, then, there is no negative modulation option (which there is in the 24 dB mode). Also, you still get a chink of resonance showing through even when the resonance is off. Finally, the range of movement is quite broad, providing what could be called a high "tweakability" factor.

Both envelope generators conform to standard ADSR types. The addition of Velocity control allows you to determine the strength of the EG depending

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on how hard you strike the keys. As with the oscillators, the two EGs share a single set of physical controls: a 3-position switch allows you to select between EG 1, EG 2, or both. The maximum specified attack speed of 500 µs is certainly fast enough. At their slowest attack setting, the EGs appear to delay the start of a note for up to ten seconds, even though a figure of only five seconds is listed in the manual. Decay and release both operate over a range of three milliseconds to ten seconds.

A multiposition switch governs the envelope triggering modes. When the Autoglide position is set (mimicking Slide on a TB-303), moving from one note to another while keeping the first note held down only affects the pitch and does not retrigger the envelope cycle. In the Single position, the envelope is set in motion only by the first held note. Multi is the normal, multiple-triggering mode whereby the envelope is retriggered with each note played.

A volume pot and a portamento-amount control round out the Rack's sound generating and tweaking parameters.

DRIVING FORCE

So what's it like to play the BassStation Rack? Broadly, pretty much of a dream. The original BassStation keyboard has but seven memory locations, selected via a click-stopped rotary control, and only responds to a handful of Program Changes over MIDI. By comparison, the Rack has 100 program memories (40 presets, 60 user) and a display screen. It responds to MIDI Volume and Modulation (and a lot more besides) and simply fits in well with the rest of your equipment. It has character still, to be sure, but not character as in "operates completely differently from everything else I own," which is how the BassStation keyboard tends to function.

Because there are 40 presets—editable but not overwritable—I'll run through some so you can see how applicable they are to you. Moog Bass (Preset 00) is an excellent, firm, all-purpose bass with just a hint of resonance. The Bee Gees' "Jive Talkin'" about sums it up. Wow Bass (01) is quite a nice wet bass tone; it's gruffer, with rasp as well as wow.

Jacko Bass (02) is round, smooth, but with plenty of punch. Electric Bass (04) is very direct and substantive; quite "guitary," in other words. I'd call Percussive Bass (06) "organ bass." Preset 07 is called EOW bass. That's a good description. Paul McCartney used exactly this sound on a single a decade or so ago, but I can't put a name to it.

Power Bass (08) is raspy and growly, and Preset 10 is the classic TB-303 autoglide bass: electronic, wowy, squelchy. Novation aptly describes Spit Sine Bass (11) this way: "Spit, blown speaker, heavy attack." Preset 13 is another TB-303 type, this time heavy on the portamento. Trance 1 (16) is one of those nasal, whistly types. If you're into the rave scene, I suspect you'll recognize and love it, but it's just not me. Sorry. Novation lists Preset 20 as Yazoo Lead. Vince Clarke may take issue with this, and I thought it worked far better as a Taurus bass sound.

Of course, many of the (programmed as) lead sounds also work as basses. Judged strictly as lead-line sounds, though, don't go looking for a Minimoog in full flight. The patches are good but work better as obbligato, arpeggio, or gate-effect sounds, rather than as rip-snorting solo sounds.

Presets or user programs can be called up either remotely via MIDI Program Changes or from the front-panel keypad. Alongside the display is a 5-LED strip of mode lights, running you through Program (to select presets, etc.), MIDI Receive Channel, MIDI Transmit Channel, Utility, and Save modes.

All parameters under the Utility heading can be seen (just barely), are marked, and can now be accessed on the tiny keypad. This is well presented, though, as it means there's no stabbing through endless edit pages to alter Pitch Bend range (parameter 1) or tweak Aftertouch/Breath pitch-modulation depth (parameter 4). (In the latter case, the unit responds identically to Aftertouch or Breath Control messages.) Additional items include pitch-modulation depth, filter-modulation depth, Aftertouch/Breath filter-mod depth, Aftertouch/Breath EG bias, LFO rate to MIDI Clock, CV/Gate MIDI channel/type, tuning, and Polyphonic mode. Once in Utility mode, you simply prod the relevant button and scroll to a new value with the increment and decrement keys. It's simple.

MIDI CONTROL

One of the best things about the Novation keyboard is its ability to transmit and receive certain parameter information over MIDI. You can record your bass line, and then overdub, say, some filter-cutoff tweaking on a second pass; on playback, there is your bass line with "real-time altered" filter-cutoff. To say this makes your playing spring to life is putting it mildly.

Of course, the Rack has the same capability, only more so. I quickly spotted the feature that syncs the LFO to MIDI Clock—and was immediately deflated to find that there was a bug on my unit that prevented such a switch of control from taking place. However, *you* will be able to drive the speed of LFO modulation from your sequencer, and for tight, dance-oriented bassline bubbling and burbling, this will be (boo hoo!) a rare treat. Various different "values" are offered, so the LFO will fire off at different multiples of the external clock rate.

Another aspect of the BassStation Rack I was sadly unable to investigate—this time through no fault other than not owning a CV/gate-equipped piece of old analog equipment—is the instrument's CV and gate potential. In case you're wondering why you would want these ancient interfaces, they allow you to perform tricks such as driving an unMIDIed Minimoog via the BassStation Rack's MIDI and CV/Gate connections.

Novation deserves full praise for not just drilling a couple of extra holes in the casing and wiring them up but really thinking about how—and under

Product Summary

PRODUCT:
Novation BassStation Rack analog bass-synth module
PRICE:
$799.95
DISTRIBUTOR:
Music Industries Corp.
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fax (516) 352-0754
e-mail basstation@aol.com
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QUALITY OF SOUNDS	● ● ● ●
VALUE	● ● ● ● ◖

what circumstances—these connections would be made. For instance, there are three CV/Gate types to choose from: Roland/ARP/Sequential (volts per octave, positive gate pulse); Yamaha/Korg (Hertz per octave, negative S/Trig); and Moog (volts per octave, positive S/Trig). In addition, you can assign a separate MIDI channel for your CV/gate-driven devices, which lets you drive the Rack from, say, MIDI channel 1 and a Minimoog connected to the CV/Gate jacks on MIDI channel 2.

The Rack's invitation to the outside world is not complete yet. You can even process an external audio signal through the Rack's filter and envelopes via a rear-panel audio input. In fact, the setup is quite complex here—it also involves driving the unit via MIDI—but for the serious studio hound who is constantly looking for brand new ways to process sounds, this will be a popular feature.

Perhaps the ultimate external Rack application is to hook up lots and lots of them, something you are encouraged to do via the Polyphonic option in Utility mode. Someone is bound to link up a half-dozen Racks for a 6-voice polyphonic instrument, but this is going to be an expensive proposition. (I suspect, though, that a single polyphonic instrument lurks somewhere within the bowels of Novation HQ in England.)

THINK OF EVERYTHING

With its well-implemented MIDI-controller capabilities; full set of program memories; advanced interfacing ability; and strong, rich set of internal sounds, the BassStation Rack is pretty hard to fault. It's a shame that here in America the price tag is not quite as mind-blowingly low as it is in England, but that's the price English buyers have been paying for years on Ensoniq, E-mu, Peavey, Alesis, and Oberheim instruments.

Novation really does seem to have thought of everything on the BassStation Rack. If you have been hanging about on the sidelines as several such dedicated bass synths have appeared over the past couple of years, now is definitely the time to jump in.

Julian Colbeck's *bass and keyboard work can be heard in unplugged duet form with Steve Hackett on* There Are Many Sides to the Night *(Caroline), a live album recorded in Sicily last December.*

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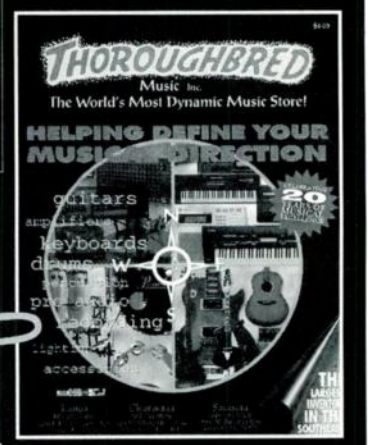

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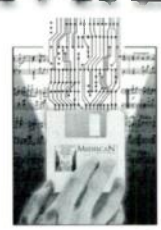

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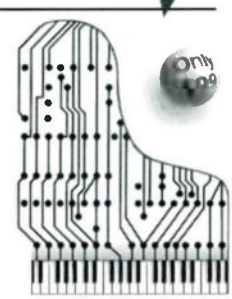

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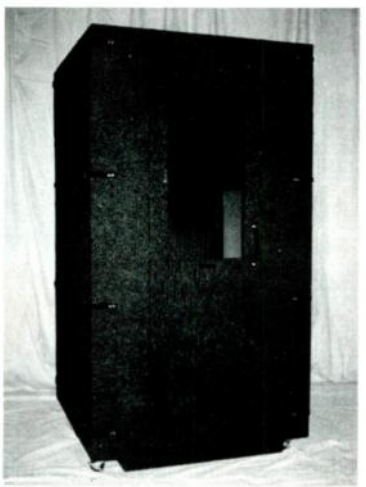

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Passport Alchemy 3.0 (Mac)

By Geary Yelton

The return of a legendary Macintosh sample editor.

Samplers are indispensable tools for many electronic musicians. However, working with a sampler from its front panel is often very frustrating. Even the largest LCDs are woefully inadequate for precision waveform editing, and navigating through myriad pages of parameters is usually a confusing chore.

The answer to these problems seems obvious: with the appropriate software, you can easily display and edit waveforms and sampler parameters. Surprisingly, however, this type of software is scarce on the Macintosh platform. Digidesign introduced *Sound Designer* almost ten years ago for the E-mu Emulator II, and subsequent "universal" versions offered sample editing for a variety of samplers. Eventually, *Sound Designer* evolved into a dedicated editor for Digidesign's audio hardware, and the company abandoned sampler support altogether.

HISTORY LESSON

Fortunately, all is not lost. In 1987, a small company called Blank Software produced a sample editor for the Mac called *Alchemy*. From the beginning, it was an impressive tool with an intuitive user interface. *Alchemy* 1.0 was the first stereo sample editor designed to control multiple samplers in a MIDI system and maintain a universal library of sounds that could be swapped among the five samplers it supported at the time.

Alchemy was acquired by Passport Designs in late 1989. By then, *Alchemy* 2.0 was capable of scaling time, shifting pitch, and exchanging samples among a whole slew of popular samplers. Passport tried to discontinue *Alchemy*, leaving electronic musicians with no universal sample editor for the Macintosh. There are other 16-bit, stereo sound editors, such as Opcode's *AudioShop* and Macromedia's *SoundEdit 16*, but they don't support multiple samplers. (Jupiter Systems' *Infinity* is a specialized sample-looping tool, not a full-fledged editor; see the review in the November 1993 **EM**.)

Because there was no other option, many Mac-based sampler users continued to use an outdated, orphaned version of *Alchemy*. However, new samplers went unsupported, and the program was not 32-bit clean, which caused problems on some Macs that were

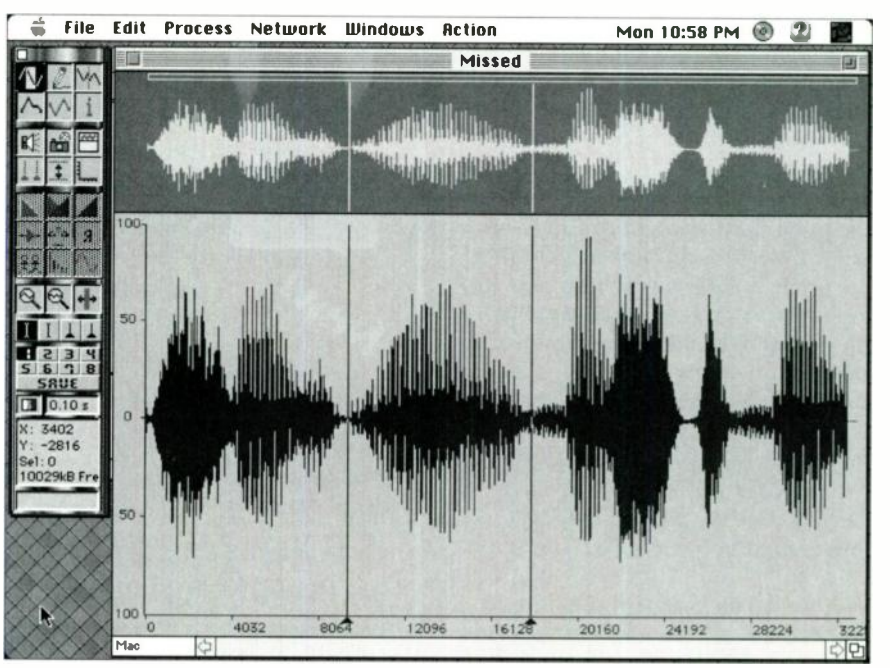


FIG. 1: *Alchemy*'s Waveform window. The palette at left contains the Mode, Display, Process, Waveform View, and Locator icons.

running System 7. Sampler manufacturers, such as Kurzweil and Ensoniq, continued to use *Alchemy*, so they pushed Passport to keep up its development to suit their specific needs.

Recognizing this continuing demand, Passport finally updated *Alchemy* to version 3.0, which is 32-bit clean. In addition to working with the samplers supported in version 2.6, the new version works with the Ensoniq ASR-10 and Korg T1/2/3 series. As with versions 2.5 and 2.6, it supports sample transfers via MIDI Sample Dump Standard (SDS) and the SCSI Musical Data Interchange (SMDI) protocol. (SMDI, which was originally developed for the Peavey DPM-SP and SX, allows SCSI transfers under MIDI control; see "Computer Musician: What is SMDI" in the June 1993 **EM** for details.) The Kurzweil K2000 can be addressed via SMDI or a K2000 driver.

In addition, version 3.0 features multitap delay, stereo playback from the Mac, the ability to save and edit WAV files, support for OMS, and more. Its support for Apple Sound Manager 3.0 allows you to record directly into *Alchemy*.

SAMPLER SUPPORT

Alchemy lets you import sounds from samplers, perform a variety of editing tasks, and then send the edited sounds back to any supported sampler. Depending on the sampler, this sound data can be exchanged via MIDI, SCSI, or RS-422. Once in the computer, sound files are stored on disk.

However, *Alchemy* doesn't save sampler-specific parameters such as envelopes and filter settings. It's strictly a tool for dealing with raw samples. If, like me, you sample lots of sounds without taking the time to process them beyond looping and normalizing, *Alchemy* may do everything you need. If, on the other hand, you have a sampler with lots of synth-like parameters, those parameters won't transfer to another sampler.

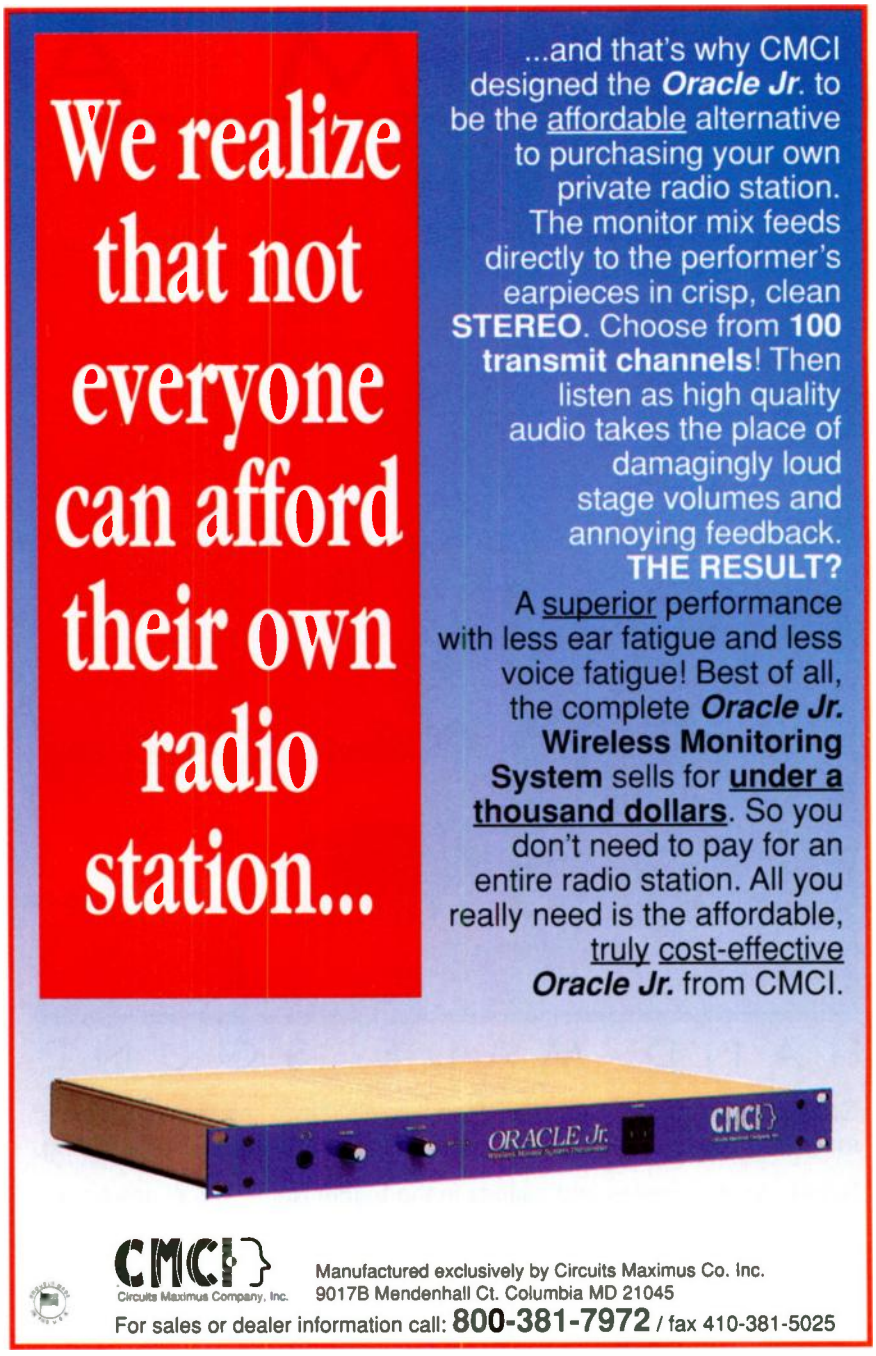
Alchemy was copy-protected in its initial versions, but copy-protection was removed in versions 2.0 to 2.5. Apparently, this was too tempting for software pirates to resist, so Passport restored copy-protection in version 2.6. Your hard drive must be "authorized" to use the program, and the floppy can't serve as a key disk if this hasn't been done. Two authorizations are included on the installation disk, which provides an extra in case of a crashed hard disk.

When you first open the program, you tell it what samplers you have and how they're connected to the computer by entering information such as base channel and SCSI ID in the Edit Instrument dialog box. The Network menu displays a list of instruments from which to choose and commands for transferring sounds to and from those instruments.

The Ensoniq Mirage and Roland's S-330, S-50, and S-550 samplers are still supported via SDS but not directly, and E-mu's Emulator II isn't supported at all. Although it's understandable (if unfortunate) that some older units are not supported, the lack of SCSI support for the newer Roland samplers (e.g., S-770 and S-760) is bad news; after all, Roland is a significant sampler manufacturer with a top-notch sample library.

INSTALLING A NETWORK

Setting up a network of instruments linked by SCSI is harder than it sounds.

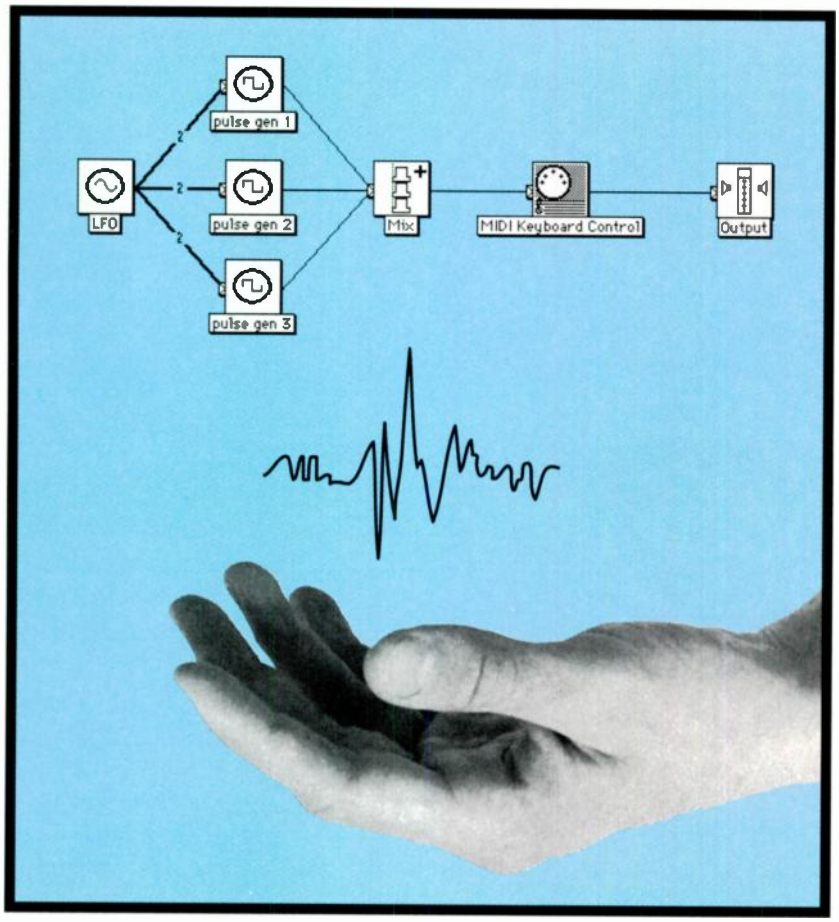


For one thing, SCSI-1 is limited to a maximum total cable length of about twelve to fifteen feet. In addition, the Mac uses SCSI IDs 0 and 7, which leaves just six IDs open for all samplers and storage devices. On many samplers, it is impossible to change the SCSI ID, but you may be able to install a SCSI switch to select between samplers with the same ID.

To make matters worse, many samplers expect to be at the end of a SCSI chain, with the Mac at the other end. These samplers have only one SCSI port, so there's no way to pass SCSI data through them. Again, the solution may be a switch. The other approach is to connect one sampler at a time, rebooting the whole system when it's time to switch samplers. While this may be inelegant, it works.

Not all samplers are connected via SCSI, but the ones that are have the fastest transfer rates by far. The Emax and Emax II can be connected directly to the Mac's serial port via RS-422, which is much faster than SDS but slower than SCSI.

K Y M A



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Of course, any sampler can be connected via MIDI. You have a choice of MIDI drivers, including OMS, MIDI Manager, MIDI Time Piece, and a standard MIDI interface. Mark of the Unicorn's FreeMIDI system extension is not supported, and there are no plans to support it in the future, which is unfortunate for *Performer* users.

EDITING WAVEFORMS

Alchemy's main display is the Waveform window (see **Fig. 1**). You can zoom in to display as little as a single cycle or zoom out to display the entire file, and any file or selected portion of a file can be played through the Mac's internal speaker. Time is measured in samples, seconds, or SMPTE. Any number of Waveform windows can be opened as memory permits.

A Windows menu lets you stack, tile, or arrange multiple windows in strips. By tiling windows, you can see dozens of waveforms at once, although they may appear very small. Any window can be instantly resized to fill most of the screen.

You can open an existing sound file, import one from a sampler, or synthesize a new sound from scratch. The Mono to Stereo command splits mono sound files into identical stereo tracks, doubling the file's size. Stereo files can also be merged into mono. You can select and process the left and right tracks in a stereo file together or separately.

To the left of the Waveform window is a palette that includes five groups of icons: Mode, Display, Process, Waveform View, and Locator icons. Five of the six Mode icons determine what appears in the Waveform display. The sixth is the Info icon, which calls up a dialog box that displays waveform length, sample rate, keymap, SMPTE offset, and other data about the current file (see **Fig. 2**).

At the bottom of the palette are the View Memories and numeric display. View Memories let you take up to eight different "snapshots" of the current waveform for editing purposes. For example, let's say you're rearranging sampled speech in a sentence. You can zoom in on each word, select it, click on Save in the View Memories box, and then assign it a number by clicking on 1 through 8. Then, anytime you want to zoom in on a particular word, click on its corresponding number, and the

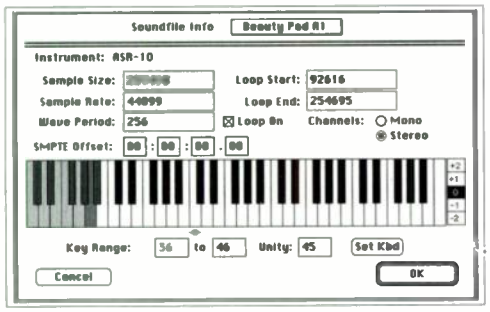

FIG. 2: The palette's Info icon calls up this Soundfile Info dialog, which shows the basic attributes of the current file.

waveform display changes to the assigned view.

Selecting portions of a file for cutting and pasting is simplified by using View Memories, but it would be more useful if you could label each view by typing text. For dialog editing, at least, I'd rather label words with words. By the way, if Blend is turned on when copying and pasting, automatic crossfades can be applied at the splice points.

When a Waveform window is active, the numeric display shows the amplitude and time coordinates of the cursor position, the size of a selection, and the amount of free memory remaining in *Alchemy*. A Help field at the bottom shows the name of any tool over which the cursor is placed.

Clicking the Overview icon places a view of the entire file above the Waveform window. Clicking and dragging in this overview changes the view in the Waveform window to reflect your selection. Likewise, the selection in the Waveform window is highlighted in the overview.

To select portions of a file for editing or processing, you click and drag or click and Shift-click within the waveform. I wish you could use the Shift and left/right arrow keys to extend a selection in the Waveform window, though. Also, discontiguous selections aren't possible.

PROCESSING

The Process menu includes most of the time-domain processing functions. These include fading, crossfading, amplitude scaling, inverting, reversing, and replicating waveforms. Time Scale, Pitch Shift, EQ, Echo, Resample, Analyze, and Resynthesize commands are also found in the Process menu.

If Threshold is turned on, scaling a selection's amplitude in the Waveform window is as simple as grabbing the threshold line, dragging it downward, and clicking on the Scale icon. Scaling when the threshold is 100% normalizes the selection, increasing its loudest part to full dynamic range.

Two especially interesting functions are amplitude and frequency enveloping. With amplitude enveloping, you can not only create envelopes graphically, you can superimpose one waveform's envelope over another. For example, the envelope of a spoken word can shape a piano tone, or you can shape a musical phase with a spoken sentence. You can even copy the contour of a single cycle to shape a sound's entire envelope. Similarly, frequency enveloping lets you modulate one sound's pitch with another sound's pitch envelope. Pitch can be modulated by as much as two octaves.

SPECTRAL MANIPULATION

Alchemy's equalizer includes one band that isn't fully parametric. You can specify center frequency, amount of cut or boost, and type of EQ (low shelf, high shelf, or peak/notch). Bandwidth is not adjustable. *Alchemy* has no envelope-controllable filters or other tools for shaping timbre in real time. That task is up to your sampler.

Product Summary

PRODUCT:
Alchemy 3.0 sample editor
PRICE:
$495
Version upgrade: $149
SYSTEM REQUIREMENTS:
Mac II or better with 8 MB RAM, System 6.0.7 or later, hard drive, supported sampler
MANUFACTURER:
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Frequency analysis and resynthesis are the keys to changing a sound's harmonic spectrum. In Frequency Analysis mode, the harmonic structure of the selected region is displayed in two dimensions as a series of vertical lines, each representing an individual partial. The region can't be more than 32,768 samples or less than a single cycle. The number of partials you can view simultaneously is limited by the size of your screen, but a scroll bar lets you shift the view. Still, I wish it were possible to see an overview of the entire spectrum.

When a Harmonic Spectrum window is active (see **Fig. 3**), selecting an individual partial reveals its frequency, channel (harmonic) number, amplitude, and phase. Groups of harmonics can be selected by clicking and dragging above them; in this case, discontiguous selections are possible. Once you select one or more partials, you can adjust their amplitude by dragging up or down, and the relative amplitudes of the selected partials are maintained. You can also insert new partials at any frequency. The Resynthesize command lets you hear your changes. If you don't like what you hear, you can undo it. If you like it, save it and transfer it to your sampler.

The problem with resynthesis is that it works on static slices of sound. What you see is an average of the harmonic content over the course of the selected region, which may actually vary more than the display indicates. To make the spectrum change over time, you must select a slice, edit the partials, resynthesize, select another slice, edit the partials, resynthesize, and so on. However, if there's an annoying buzz or another frequency you would like to eliminate, analysis and resynthesis allows you to zero in on that frequency and change it.

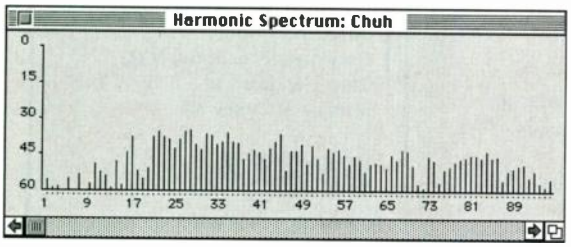

FIG. 3: In Frequency Analysis mode, a waveform is displayed as a series of lines, each representing an individual partial. Ranges of harmonics are selected for editing by clicking and dragging above their lines.

LOOPING

Alchemy makes looping a fairly painless task: just find an area that looks like it would loop well, select it, and choose Loop Selection from the Edit menu. Loop markers appear in the Waveform window, and they can be dragged to another position. Then you click on the Loop icon to zoom in on the splice point. Scroll bars let you reposition the loop points, or you can hold the Command key and press the left and right arrow keys to slightly nudge the splice. You can also play the looped section and change the loop points on the fly.

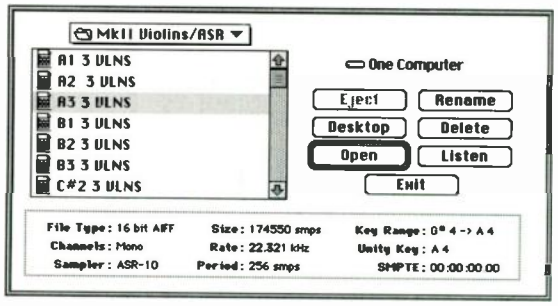

FIG. 4: In the Open Special dialog, selecting a file name displays the file's attributes. The Listen button plays a sound directly from disk without opening its file. The dialog remains until you click Exit, allowing you to open multiple files without leaving the dialog box.

Alchemy only supports one loop per file. If a file includes a sustain and release loop, only the sustain loop is recognized. When transferring samples with multiple loops into the program, only the first loop is recognized. If your music leans toward the cyclic, you lose the creative possibilities of nesting loops within loops.

As a looping tool, *Alchemy* hasn't changed much since its origins. In fact, several samplers have more flexible looping functions on board. For example, the Ensoniq ASR-10 features five types of crossfade looping; *Alchemy* offers one. However, the ASR-10 has no graphic editing, so most looping is still easier in *Alchemy*. Unless the price of Jupiter Systems' *Infinity* sample-looping program falls drastically, many sampler owners will have to rely on their one-and-only sampler editor for looping.

DELAY EFFECTS

I'm pretty impressed with the multitap digital delay. You can define parameters for up to five taps, each with delay time, initial delay (the time before the first echo; also known as predelay), decay time (the total length of the echoed portion), level, wet/dry mix, and pan (if in stereo). The maximum delay time is three seconds, and the maximum decay is 30 seconds.

Several delay presets are included. Two presets simulate reverb reasonably well by combining five short delays with close, but different, delay times. You can set up and save an unlimited number of your own delay presets and then select them from a pop-up menu. The ability to call up your own presets is like having a digital delay with unlimited storage. Compared to outboard digital delays, this is way cool.

CONVENIENCES

I really like the way *Alchemy* handles files. There are two Open commands in the File menu: Open and Open Special. In the Open Special dialog (see **Fig. 4**), selecting a file name displays its format, mono or stereo status, sampler, size, rate, period, key range, unity key (original pitch), and SMPTE offset. There are buttons to delete, rename, or play a sound directly from hard disk without opening its file. The Open Special dialog remains until you click Exit, letting you open multiple files without leaving the dialog box. The Open command brings up the basic Macintosh file dialog for opening one file.

One useful new command is Force Instrument, which causes all files to be opened with the current sampler selected, overriding the instrument assignments saved with the files. For example, let's say you want to send samples from an E-mu Emax and an Akai S1100 to an E-mu Emulator III. In previous versions of the program, you had to open each file and change its instrument individually. Now the same operation is performed automatically when Force Instrument is turned on.

Another new capability allows you to record directly into *Alchemy* from the input device (e.g., a microphone, MacRecorder, or Digidesign audio

card) selected in Sound Manager 3.0. If you have multiple input devices, you can switch between them in the Record Sound dialog box. A Monitor button lets you pass the input through the Mac's sound output as it's recording, if desired.

SUMMING IT ALL UP

My electronic musician's toolbox includes three pieces of necessary software: a sequencer, a universal synthesizer editor/librarian, and a sample editor. Although the Mac offers many choices in sequencers and editor/librarians, Passport's *Alchemy* is the only sample-editing game in town.

Fortunately, it's a likable program. Not only does it edit samples in many useful ways, it lets you link your samplers and computer into a network for transferring sounds from one device to another. It doesn't support multiple loops, but neither do most samplers. It doesn't support every sampler ever made, but it does support the majority of those in use today. Most of its effects processing functions are lackluster but functional, and the frequency analysis and resynthesis features are nicely implemented. There's definitely room for improvement, so hopefully Passport will continue its development.

I don't want to be too critical of *Alchemy*. It's a good, solid program that seldom crashes (at least in version 3.0). That's quite a feat for something that networks various hardware devices using various protocols. Although many of its processing functions are nothing to get excited about, it fulfills most of what you probably need in a computer-based sample editor. If you use samplers a lot, that's enough to make it indispensable.

At $495, *Alchemy* costs a little more than most MIDI sequencers, synth editors, and music-notation programs, and it costs nearly as much as a decent used sampler. Until more musicians start to use rack-mount and keyboard samplers, the target audience will remain smaller than for other types of music software. Therefore, if you want to play, you have to pay. Think of it this way: ten years ago people paid a lot more to do more or less the same things on a Fairlight.

Geary Yelton *is the author of past and future editions of* Music and the Macintosh. *He lives in Atlanta and has a way cool daughter named Marisa.*

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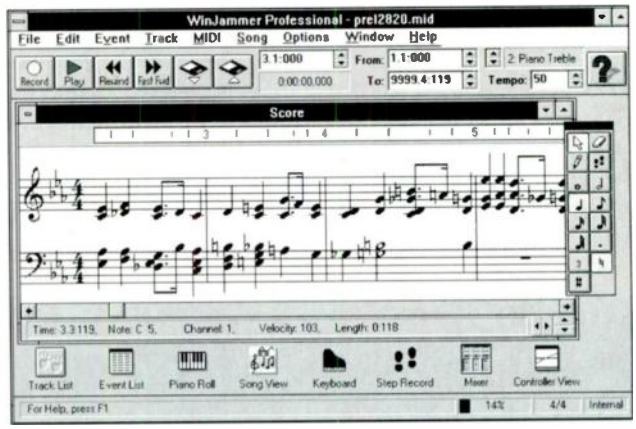

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E-mu Emulator IV

By Jeff Burger

The sampler of your dreams has arrived.

Only a year or so ago, a sampler with the E-mu Emulator IV's lofty specs and deep feature set would have been a musician's daydream. But once you get over the initial shock, it should come as no surprise that the company that popularized sampling has made it a reality.

If you think I'm exaggerating, try to remember the last time you bought a sampler that, when fully loaded with options, provided 128-voice polyphony, 128 MB RAM capacity, a maximum of 24 minutes mono sampling, up to 32-channel multitimbral addressing, and up to sixteen discrete audio outputs! Add to that discrete 18-bit output DACs and a friendly, icon-driven interface, and you'll begin to understand my excitement.

Indeed, the EIV offers possibilities that would have seemed like science fiction at the beginning of the decade. And although the list price of $5,999 is nothing to sneeze at, it's not out of line considering what you get for the money.

CHIPS AHOY

When viewed from E-mu's perspective, the EIV's architecture isn't so much revolutionary as evolutionary. The introduction of the Proteus/1 synth module several years ago was successful largely because of its excellent price/performance ratio, which was made possible by E-mu's development of two proprietary chips: the G-chip and the H-chip. (The former is a polyphonic sound engine; the latter facilitates mixing.) This technology has been amortized across most E-mu products since then and was a major impetus behind the recent purchase of E-mu by Creative Labs, makers of SoundBlaster sound cards.

E-mu's latest G-chip (rev. 2.0) produces 64 simultaneous voices and addresses 128 MB of memory. The latest H-chip (rev. 1.5) not only mixes 32 channels, but it incorporates DSP capabilities that one E-mu spokesperson claims "are equal to about eight Motorola 56000s." Although that's perhaps a bit overstated, you get the idea. In that light, an EIV is essentially two G-chips and four H-chips plus some memory, I/O, and a microprocessor running a sophisticated operating system. (To put this in perspective, the accompanying sidebar reveals that the less-expensive e-64 sampler is essentially one G-chip and two H-chips plus the ancillary hardware.)

The importance of the H-chip's DSP should not be underestimated, as it is the key to most of the EIV's real-time processing. For starters, each chip provides 32 Z-plane filters *à la* E-mu's Morpheus. The various filter types are essentially software routines carried out by the hardware. The current version ships with seventeen filter types, but future versions of the operating system are expected to expand this range. (Although the Morpheus filters are 14th-order, or 14-pole, the filters currently implemented in the EIV's software are sixth-order, or 6-pole. E-mu's representative says the company is pleased with the sound and finds no need to go further.) DSP is also the key to the EIV's noise-reduction and resampling abilities.

The EIV uses the same type of 30-pin SIMMs commonly available for Macs and PCs, although they must be 70 ns or faster. Eight internal slots are provided, and the SIMMs must be installed in pairs. The unit comes with 8 MB of RAM in the form of two 4 MB SIMMs. You can add three more pairs of 4 MB SIMMs to get up to 32 MB or three pairs of 16 MB SIMMs to get up to 104 MB. For the ultimate, 128 MB, remove the two 4 MB SIMMs and fill all eight slots with 16 MB SIMMs. A fully loaded machine could easily run you another $5,000 just in memory!

INS AND OUTS

The EIV processes 16-bit stereo audio using 24-bit DSP and plays back through 18-bit DACs. The unit's main stereo outputs appear on both XLR and balanced ¼-inch (TRS) connectors, with an output level of +4 dBm. Because each voice boosts the headroom requirement by an additional 3 dB, a headroom control is provided for situations where an excessive number of voices causes clipping. Any combination of voices or MIDI channels can be programmed to appear on any of three stereo pairs of ¼-inch submix outputs. (The submix outs have the same specs as the main outs.)

Digital I/O is provided for communicating in either direction with AES/EBU or S/PDIF devices such as DATs, although you'll need to find or make a video-grade cable to convert the unit's XLR connector to RCA for S/PDIF. An AES boost of +12 dB can be toggled on to provide better signal-to-noise ratios when a small number of output channels is being used.

The EIV has three expansion slots with backplane openings for connections, plus one DSP expansion slot. The first and only card available as of this writing is a MIDI expander that adds another 16-channel MIDI bus, boosting the number of addressable MIDI channels to 32. Obviously, this is quite useful when sequencing multitimbral parts with a 128-voice instrument.

Expected soon is an analog expander card with four more balanced outputs. Combined with the eight standard outs, two of these cards bring the total to sixteen assignable outputs, which is

E-mu's EIV sampler has specs that would have been science fiction a few years ago, including 128-voice polyphony, 128 MB RAM capacity, and 18-bit DACs.

highly desirable for sequencing. E-mu is also talking about a DSP card for time-based effects such as reverb, chorus, and delay somewhere around the beginning of 1996, to be followed by a deluxe version next summer that will also accelerate existing DSP functions. The EIV's Flash ROM socket can theoretically be used for sounds, but Flash memory is so expensive that implementation is unlikely.

SONIC ARCHITECTURE

Those familiar with other E-mu samplers will feel right at home with the EIV's sonic architecture (see **Fig. 1**). Samples are, of course, the lowest element in the food chain. New samples are automatically placed into Voices, which also have a resonant lowpass filter, dynamic amplifier, three 6-stage envelopes, and two multiwave LFOs.

These voice components are patched together via sixteen programmable modulation routings called *cords*. Although space precludes me from listing all of the modulation sources and destinations, suffice it to say that they are extensive and reflect E-mu's roots in modular synthesis. There are also modulation processors such as summing amps, digital switches, diodes, and lag processors. As you would expect, Voices can also contain multiple samples with Velocity crossfades, positional crossfades, or sample switching via a real-time controller, envelope, or LFO.

One immediately noticeable benefit of the EIV's improved voice architecture is that many common programming tasks become much less tedious. The architecture of older E-mu products require that you program progressively shorter envelopes for progressively higher pitches on traditional instrument sounds such as piano. Unfortunately, that can be a major time and memory hog when you have lots of multisamples. The EIV's extensive modulation routing allows decay to be routed to key position, thereby requiring much less memory and programming time. (E-mu is also known for it's ability to stretch fewer samples across the keyboard without much aliasing.)

A Preset is one entire keyboard setup containing keymaps of one or more Voices. Here the EIV's flexibility really shows: you can either do most of the sample-mapping portion of your sound design at the Voice level and combine them into Presets, or you can map,

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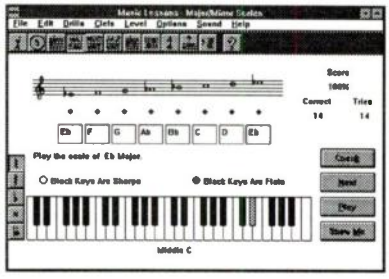

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layer, crossfade, and switch simpler single-sample voices at the Preset level. Presets can also contain links that layer in other Presets, each with its own volume, pan, transpose, fine-tune, key range, positional crossfade, and volume crossfade. These settings do not alter the original Presets. In fact, the ability to create new Presets from a series of linked Presets is in itself a powerful sound-design tool. Finally, up to 1,000 Presets can be organized into Banks.

E-mu's experience in designing samplers is apparent in many subtle editing amenities. Voices, for example, can be tagged as belonging to any of 32 groups, which can be edited as a whole. This can be a real lifesaver when you're creating the ultimate split, layered, and multisampled sound from hell. Other subtle but useful editing provisions include the ability to copy Voices between Presets, copy all Voices from a linked Preset into the current Preset, split a Voice into two Voices for independent processing, combine all Voices in a group into a single multisampled Voice, and replace the selected multisamples with those from another Preset while retaining your current processing parameters.

BEYOND A PRETTY INTERFACE

Just as E-mu has invested in developing hardware technology that can be amortized across a family of products, they've taken the same approach in system software. The core of the user interface is the new 240 × 64 pixel, backlit LCD display and a graphics library of buttons and icons designed specifically for the display. (This library is shared by E-mu's e-64 sampler and DARWIN hard-disk recorder.) Many functions, such as keymaps, are shown graphically as well as numerically.

Like its predecessors, the EIV has dedicated buttons for major function categories such as Master, Disk, Preset Manage, Preset Edit, Sample Manage, and Sample Edit. On previous models, pushing one of these buttons would cause the unit to go out to the disk to find the necessary software module. On the EIV, however, the entire operating system resides in memory for instant access.

When any of the aforementioned buttons are pressed, menus appear in the LCD. The menu items are accessed by the corresponding soft keys labeled F1 through F6 found directly under the screen. Again, this is a vast improvement over the old E-mu method of choosing parameter numbers and keying them in.

The menu structure is hierarchical, consisting of menus, submenus, and sub-submenus, similar to the system to which we've become accustomed with computers. I have yet to find any parameters nested deeper than three levels. Where there is more information than fits on a single screen at a given level, the Next Page and Previous Page buttons access the balance. When you're entering many screens such as Preset Edit, the system returns you to the last page you worked on, a nice touch.

Most of the remaining keys are expected and straightforward. A quad of arrow keys moves the cursor around the screen. The currently selected parameter can be modified using the Increment and Decrement keys, a jog

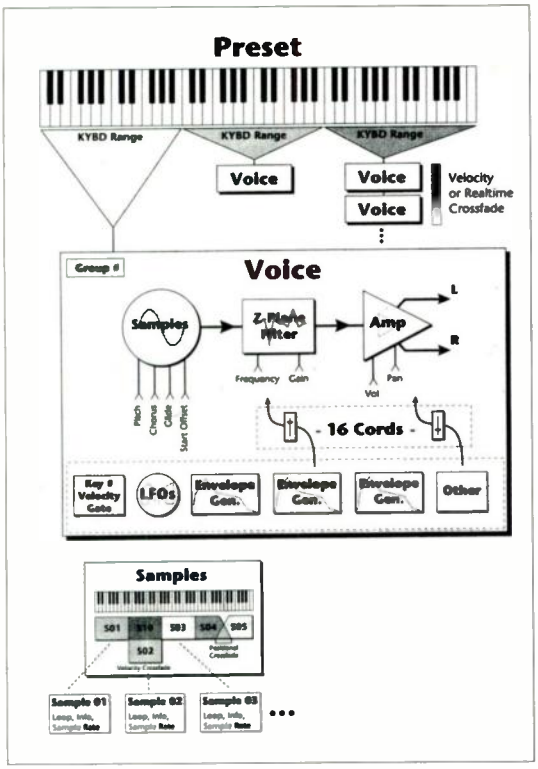

FIG. 1: The EIV's sonic architecture organizes individual samples into Voices and Voices into Presets. (Courtesy E-mu Systems.)

wheel, or a numeric keypad. You know the drill.

More unusual, however, are three assignable keys that you can program to take you instantly to screens you use most. You can make the assignments on a dedicated page in which you scroll through a list of screens for each key, or you can simply hold down the desired key for a few seconds while on the desired destination page. You can also connect a PC-style QWERTY keyboard and use it to key in names, and you can use its function keys and cursor keys, as well.

UNDER CONTROL

The EIV's operating system resides in Flash ROM, which is a form of EEPROM memory that remains live even when the power is shut down. This is a vast improvement over the days when the operating system had to be loaded from floppy each time the system was booted and we were at the mercy of potentially lost or corrupt boot disks. Floppies can still be used to update the system software in Flash ROM.

Like the user interface, the disk operating system is hierarchical; it allows you to have directories, subdirectories, and so forth. This is great for organizing material according to sounds, projects, or whatever. As with the operating systems of today's computers, directory information is displayed in the form of icons that represent disks, folders, Banks, Presets, and samples. As with a Macintosh, you can also choose whether the directories are displayed with large icons (fewer files) or small icons (more files). The Show Info soft key displays detailed information such as size, sample rate and length, and the source instrument of the original sample.

Have you lost something? The Find soft key can be used to locate a sample by name or partial name across some or all drives, folders, and Banks. If you need to find a snare sound, for example, typing in "Snare" will cause the system to find anything with that word in it: "Snare 1," "Big Hair Snare," "Ensnared," and so on.

Because E-mu has obviously taken much direction from mainstream computing, it seems curious that they have not implemented aliases (as found in the Mac) that allow multiple indirect references to the same item. This would allow you to have an item such as a Preset reside in a folder based on, say, sonic category and session usage.

Most people feel that the most frustrating thing about many samplers is the need to load a sound from disk just to audition it. The new Audition button allows you to listen to a sample on disk without loading it, which is a cool time saver. According to E-mu, it even works on Akai and Emax CD-ROMs and hard disks. The Audition button is also a handy alternative to your MIDI keyboard when you're perfecting sample loops and sound design. Now if they could just extend it to audition Presets, as well...

STORAGE AND BACKUP

The EIV is a native SCSI device, and you'll need to add at least one SCSI hard drive and one SCSI CD-ROM drive to do anything useful. Because there's room inside the unit for just

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one internal hard drive, you're going to need to connect some external devices. E-mu has provided a special SCSI mode that allows multiple master devices such as several EIVs (or e-64s as expander modules) and a Macintosh to coexist on the same SCSI bus. (PCs with SCSI cards should also be supported in this manner by the time you read this.) This allows E-mu devices to share hard drives and other storage media, although the computer can share only removable-media drives due to differences in operating systems. Although the rev. 1.1f operating system addresses up to 4 GB of storage media, the rev. 1.2 operating system will address 9 GB.

Backing up data is a critical necessity in the digital world, and the EIV provides for backing up files to a second drive, either by range or incrementally (all changes since the last backup). Unfortunately, the candidate media are pretty much limited to floppies; hard drives; and magneto-optical (MO), SyQuest, and Bernoulli cartridges. Needless to say, most files exceed a floppy's size, and the use of a second hard drive for backup isn't exactly the most cost effective solution. That leaves MO as the most logical media for backup.

There's no support for traditional computer archival media such as DAT, 8 mm Exabyte, or CD-ROM recorders that require special drivers. This problem is heightened by the fact that, like most instruments, the EIV's disk-operating system is proprietary. When it comes to samplers in general, I can't help but think of my data being marooned on a digital desert island. I'd like to see instruments using formats compatible with Mac or PC hard disks so that tools for proper archiving—not to mention disk recovery and repair—are readily available.

The ability to have multiple master devices on the SCSI bus also provides the foundation for SMDI, the industry wannabe standard for transferring MIDI sample data via SCSI, rather than the much slower MIDI protocol. However, the initial release of the EIV's software does not include any provision for transmitting or receiving sample data with the outside world at all, be it a computer-based editor or even another E-mu sampler. Although such implementation has been proprietary in past models, E-mu's engineers have opted to use SMDI on the EIV.

The original SMDI specification is pretty limited: it transfers samples and loops, but it doesn't transfer keymaps or program parameters. However, E-mu and other companies are plotting to modify the specification so it will eventually support keymaps, at least. Unfortunately, the rev. 1.2 operating system that will allegedly implement SMDI was not shipping at the time this review went to press. Even though the LCD offers a reasonable view of your samples, it doesn't obviate the need for external communication. Was SMDI really that hard to include right out of the shoot, guys?

SOUND COMPATIBILITY

The EIV can load Banks from hard disks and CD-ROMs containing E-mu ESI-32, EIIIx, EIII, Emax II, and Akai S1000/S1100 data, but it can't load from floppies. (E-64 Banks can be loaded from all media.) This provides access to one of the largest sample libraries on the planet. (E-mu alone claims to have a 30 GB sample library!) Note that ESI-32 or EIIIx Banks backed up by the EIV can no longer be read by the original instrument. I suppose we can chalk that development up to the price of progress.

The EIV does have slightly less Preset memory (as opposed to sample memory) than the EIIIx. A handful of third-party Banks, such as those found on Northstar's *Gold Piano* CD-ROM, use so much Preset memory that they won't load into the EIV's Preset memory in their entirety. You can load individual Presets into the EIV without any problems, however.

MIDI IMPLEMENTATION

The EIV's MIDIMix page will become an old friend if you're using the unit in multitimbral mode for sequencing.

E-MU E-64

If you find yourself drooling over the EIV but can't scrape up the $5,999 it takes just to get off the line, put your tongue back in your mouth! If the idea of half the polyphony and half the RAM capacity at roughly half the price appeals to you, check out E-mu's new e-64. The e-64 employs a single rev. 2.0 G-chip and two rev. 1.5 H-chips, yielding 64-voice polyphony and 64 MB maximum RAM capacity. The list price is $3,295 with 2 MB RAM and no storage media except for the floppy drive.

Ah, but there's a catch. (Isn't there always?) The e-64 lacks slots for hardware options such as onboard effects, an extra MIDI bus, extra outputs, and the like. Balanced outs are not standard either, but you can have them installed as a factory mod for $295. (The balanced outs are about 7 dB hotter than the unbalanced outs.)

As of this writing, the e-64's closest competitor appears to be the Kurzweil K2500RS ($3,495 with 2 MB RAM, plus another $695 for the sampling option). The K2500RS features less polyphony than the e-64 (48 Voices vs. 64) but includes ROM-based sounds, internal signal processing, and twice the maximum RAM capacity (128 MB). Although the Kurzweil's ROM sounds will take you a good ways without a hard disk, you'll have to add a CD-ROM drive and/or a hard drive to the e-64 to do much with it.

E-mu's e-64 is essentially a budget EIV with half the polyphony and RAM capacity.

These two competitors really come from two different approaches. The K2500RS is more of a live/studio combo, whereas the e-64 will probably have more appeal to studio types. The e-64 also makes a dandy expander for the EIV or another e-64, especially given that you can have multiple samplers and drives on the same SCSI bus.

This is where you adjust the Preset assignment, volume, pan, and output assignment for sixteen MIDI channels at a time. (When the optional MIDI expander card is installed, you can address a total of 32 channels.) The output assignments override those programmed in the Voices, whereas the Pan parameter adds to the original settings in the Voices. This display also reflects any Preset, volume, and panning changes resulting from received MIDI commands.

A total of eight MIDI controllers can be defined for use by all Presets. Six controller sources can be assigned to Control Changes 0 to 31. Pitch Bend, or Pressure. To make things easy, four of these six default to Pitch Bend, Modulation, Pressure, and "Pedal" (Foot Controller). The other two sources are switches that can be mapped to Control Changes 64 to 97.

Other nice MIDI goodies include Velocity curves, sensitivity scaling for MIDI Volume, and global footpedal override for master volume. There's also a Magic Load Preset function that tells the unit that the next Program Change command received via MIDI is actually to be used as a Bank Load command.

Unfortunately, E-mu has simply ignored the implementation of MIDI SysEx on the EIV; they aren't even talking about a target date for it. As a result, there's no prospect of support from a computer-based patch editor such as Opcode's *Galaxy Plus Editors* or MOTU's *Unisyn* in the near future. Although the unit's user interface is intuitive and the LCD is adequate, the sheer number of functions would make

Product Summary

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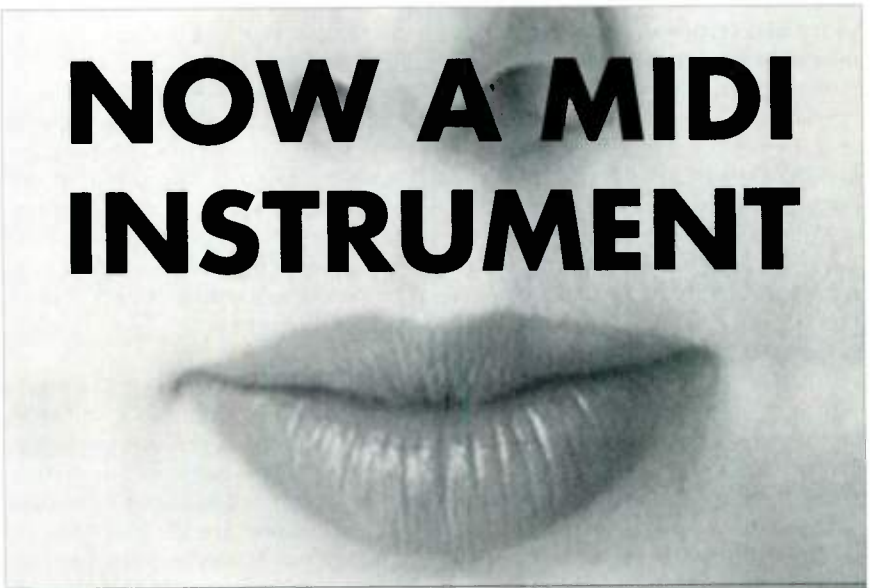

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simultaneous arrangement on a large screen attractive. Implementing SysEx would also allow more extensive parameter control from a sequencer. Is anybody listening?

SAMPLE THE WORLD

In a world where you can buy a perfected sample of just about any sound on CD-ROM, you still may need to sample a few things yourself. (The crowd gasps!) You can sample from the analog stereo inputs at 22.05 kHz, 24 kHz, 44.1 kHz, and 48 kHz or from the digital inputs at 32 kHz, 44.1 kHz, or 48 kHz to match a source such as DAT. You can also resample the signal that appears at the main outs; this is very useful for transforming complex multisample Presets into a new sample or capturing a performance for single-key retriggering.

E-mu has made many inroads toward making sampling a no-brainer process. The Auto Placement setting automatically assigns each new sample to a new voice with a user-specified number of keys, which can be anywhere from a single key to the entire keyboard. Let's say you've set it to twelve keys; all you have to do is press the original key on your MIDI keyboard, and the new sample will be placed there and stretched a half-octave in each direction.

The Auto Multisample variation is even better for sampling things such as other synthesizers. The first sample is initially assigned across the entire keyboard based on the original key depressed. When subsequent samples are taken, the low and high keys of all samples are automatically adjusted to accommodate the new sample. No more setting low and high key ranges! The White Keys variation is designed for sample triggering rather than performances that rely on keyboard dexterity.

Monitoring of the main outputs can be switched on and off while sampling, and the display lets you know whether clipping has occurred during sampling. The Auto Normalize option boosts the sample amplitude after recording to the maximum before clipping, using either Absolute or Relative mode. The former boosts the left and right channels independently, and the latter boosts both channels uniformly until the louder one has reached full amplitude.

The Auto Truncate feature saves time by lopping off unwanted silence at the beginning and end of a fresh sample according to the zero-crossing threshold you have set. The zero-crossing threshold can be set to accept only the start points of individual samples that reach a minimum amplitude threshold. This is handy when the source signal contains excessive noise or low-level, high-frequency harmonics.

Auto Loop automatically loops and autocorrelates the sample at a selected increment of whole, ½, ⅓, ¼, and ⅛. Any loops less than whole can also employ a linear crossfade, resulting in seamless loops more times than not with legato samples.

The EIV's LCD display is big enough to make sample editing tolerable at various magnifications without a computer. You can move through a sample using the unit's cursor keys, or the pitch wheel on your MIDI controller can be used as a scrub wheel to move through a sample. As mentioned earlier, the Audition button provides a convenient way to trigger a user-defined note while editing. Once you've found a good area for a loop point, the Auto Correlate function allows you to audition loops at various zero-crossing points in the vicinity. The built-in sample calculator can also be used to adjust the sample rate to create perfect single-cycle loops.

The list of sample-editing tools is too lengthy to enumerate here, but it includes such goodies as compression, parametric equalization, digital tuning, artificial tapers at the ends of samples, time compression without pitch change, pitch change without time compression, Doppler effect, exciter effect, and more.

CONCLUSIONS

It's hard to find fault with a unit as advanced as the EIV. Perhaps the biggest overall weakness is that of any dedicated sampler: lack of instant gratification. The option of adding ROM blocks of basic waveforms would be nice. Moreover, few electronic instruments today ship without onboard effects. (As mentioned earlier, E-mu is working on a card option to add effects processing.) The most glaring issues are the lack of MIDI SysEx and delayed implementation of SMDI.

At $5,999 retail, the EIV's only real competitor is the musician's budget. After all, you could easily spend more than the cost of the base unit on memory, hard drives, and CD-ROM readers. Then again, it's a steal compared to the price/performance ratio of most other units not to mention that of its venerable predecessors. The operating system and user interface are a breeze. The sound quality is impeccable, even when sampling fat, low Moog bass sounds. With 128-voice polyphony, enormous RAM capacity, an existing sample library, the Voice/Preset architecture, modulation routings, and options for outputs and multitimbral addressing, the EIV is the compact all-in-one instrument many of us have dreamed about.

Jeff Burger's *latest books include* Multimedia Studio for Windows, Multimedia for Decision Makers, *and* The Desktop Multimedia Bible.

DigiTech GSP-2101

By Rob Shrock

Why choose between analog and digital effects when you can have both?

The DigiTech GSP-2101 is no newcomer to the world of signal processing. Primarily aimed at guitarists, it was originally released almost two years ago. Having gone through a significant facelift, however, it is now a strong candidate for musicians seeking an all-in-one multi-effects processor for studio and stage.

DigiTech has taken advantage of the different strengths of analog and digital processing in the GSP-2101. In addition to a programmable, discrete-stereo digital-effects processor (essentially a TSR-24), the 2U rack-mount unit houses two 12AX7 tubes for its analog distortion stage. Solid-state distortion is also provided. Throw in a couple of analog effects and almost complete control of digital effects, a cabinet simulator, balanced and unbalanced outputs, and an optional foot controller, and you have a serious warehouse of guitar tones.

ARCHITECTURE

The processing center of the GSP-2101 is the same S-DISC DSP chip found in the DigiTech TSR-24 (reviewed in the

April 1994 **EM**), TSR-12, and RP-10. As in the TSR-24, preset and user algorithms allow you to construct the type and order of digital effects based on the GSP-2101's number of available CPU and RAM blocks. The manual shows the approximate requirements of each effect, which is helpful; however, keep in mind that sometimes a particular module won't quite fit into a big program even if there appears to be enough available memory.

The user algorithms allow redundancy, which is great for setting up complex effects such as multiple delays. Just be sure to stay within the limits of available memory. There are 100 factory presets and 100 user program locations. (The user memory initially contains copies of the factory presets.)

DigiTech's GSP-2101 Limited Edition contains a second S-DISC DSP chip and sports-colored faceplates in red, gold, maroon, or purple. The second chip doubles the processing power of the unit, allowing much larger programs. Reverbs and delays can be longer, and program changes become seamless, with no gap or abrupt cutoff between patches. This means a program with a long delay and reverb can continue its complete cycle, being processed by one S-DISC chip, while the second chip begins processing the sound in the new program after the patch change. Hold Time and Ramp Time parameters in each program allow you to further tweak the transition between patches. This works extremely well and is a great feature for both live and studio players.

If you own an original GSP-2101, a user-installable PPC-210 Expansion Card ($249.95) provides the second S-DISC chip and additional memory needed to upgrade the unit to the Limited Edition level. The card also provides the four additional effects algorithms required to take advantage of both S-DISC processors simultaneously. Of course, if both processors are active in the same patch, seamless Program Changes are not possible.

ANALOG PROCESSING

Preceding the digital S-DISC stage is a mono, all-analog section, which really helps create pleasing guitar tones. The analog effects ordering is fixed: compression, distortion, and 7-band graphic EQ.

The compressor's threshold can be set at -30, -35, -40, and -45, and the ratio can be set at 1.5:1, 2:1, 3:1, 4:1, 5:1, 7:1, 10:1, and ∞:1. For most programs these settings worked fine, but I would have liked more threshold resolution. The distortion module offers three tube sounds (Saturated Tube, Distorted Tube, Clean Tube) and three solid-state distortions (Overdrive, Heavy Sustain, and Grunge). Gain 1 and Gain 2 parameters are provided for Saturated and Distorted Tube; the others only have a Gain 1 control.

The solid-state distortion is the same as in the GSP-21 and RP-10, and the GSP-2101 does it well. Slam the compressor, notch the graphic EQ, crank up both gains, knock your guitar out of tune a little, and you have a great grunge tone.

A fairly wide range of tube distortion sounds can be dialed in by changing the interaction of the two Gain parameters. The tone of my review unit was punchy and dynamic, although I have heard through online Internet discussions that there is an inconsistency in the quality of tubes used in the GSP-2101. I guess I was lucky: my tubes sounded great. I didn't have the opportunity to try other tubes, so you might want to investigate this.

The GSP-2101 offers a lot of EQ in the analog and digital stages, which was helpful in finding the right distortion for my recording applications. The analog EQ is fixed at 80 Hz, 160 Hz,

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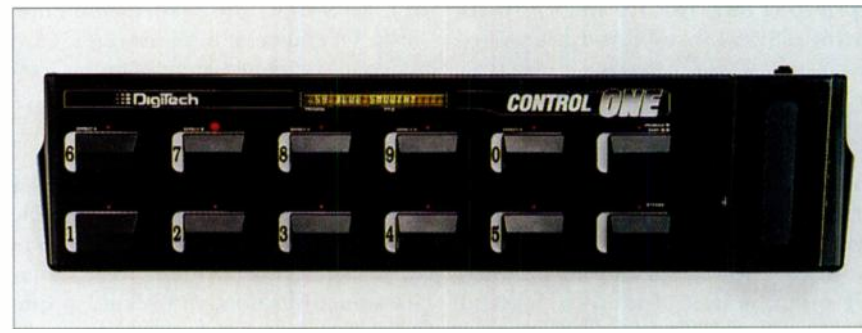
320 Hz, 640 Hz, 1.28 kHz, 2.56 kHz, and 5.12 kHz, with boost/cut amounts of ±12 dB in 2 dB increments, similar to the EQ on a typical stomp box. Judicious tweaking of the analog and digital EQ allowed me to almost—but not quite—duplicate the sound of my beloved MESA/Boogie TriAxis. Overall, I was impressed by the GSP-2101's broad tonal spectrum.

The unit also offers a global preoutput EQ that is useful for adjusting the overall sound to specific amp and cabinet configurations. The center frequencies are identical to those on the analog EQ, which helps remedy patches that have either been overequalized in certain ranges or tend to ring in a particular cabinet.



The optional Control One Foot Controller offers an assignable continuous pedal, ten Program switches, a Bypass switch, and a switch that toggles between modes. A ¼-inch jack accepts another control pedal.

CABINET SIMULATOR

I wish there were more to say about the cabinet simulator. The on/off switch on the back of the unit affects only the balanced XLR outputs and rear-panel headphone output. The unbalanced ¼-inch outputs are not affected, as they are intended for a real amp and cabinet. This is understandable, but I have obtained some great sounds from the TriAxis by patching the simulator output into a miked amp and cabinet running at low levels. Too bad that's not an option on the GSP-2101, especially for home studios that operate at -10 dB. There, the ability to access the simulated cabinet tone through the ¼-inch outputs could make all the difference.

In addition, there are no cabinet-simulator parameters. I'd like to have a choice of at least open or sealed cabinet, speaker size and number, and mic type and location. With the GSP-2101's simulator, the only choice is on or off.

PROCESSING POWER

The internal digital effects cover an impressive range of processing demands: EQ, delay, reverb, chorus, flange, phase, short sampling (up to five seconds), wah, pitch shift, noise reduction, gate, tremolo, autopanner, Whammy, and a multitude of mixer modules for manipulating the amount of signal going in and out of effect modules (see table "Digital Effects"). The digital effects section can stand alone as a stereo multi-effects processor by using the effects returns as a stereo or mono input. As with the TSR-24, the quality of effects is high.

There are 33 available factory algorithms that can be edited and stored as user algorithms. If you edit an effects algorithm used in more than one patch, the smart interface will prompt you to save the algorithm as a new patch to avoid messing up other programs using the same algorithm. Slick.

The depth of programmability in the digital effects section is stunning. The quality and flexibility of the modules are high and could be put to great use in a compact guitar rig or as an all-around audio processor.

A very useful feature is the ability to insert separate mixer modules between effects to control the levels of different signals going into an effect. Rather than just "patching" the effects in order, the mixers also allow you to optimize signal-to-noise ratio by gain-staging effects chains. The flexibility of the mixers also opens the door to myriad creative applications, such as taking a distortion signal and splitting

Digital Effects Algorithms

Equalizers	Highpass filter, lowpass filter, bandpass filter, notch filter, 6-band graphic, 10-band graphic, 15-band graphic, 1-band parametric, 3-band parametric, 5-band parametric
Reverbs	GigaVerb, BigVerb, Multi-FX Reverb, Stereo GigaVerb, Stereo Big Reverb, Gated Reverb, Stereo Gated Reverb
Delays/Samplers	Mono delay, 2-tap delay, 4-tap delay, stereo delay, modulated delay, stereo modulated delay, sampler 1.0 sec., sampler 2.5 sec., sampler 5.0 sec., stereo sampler 1.0 sec., stereo sampler 2.5 sec.
Choruses/Flangers	Mono chorus, dual chorus, 4-phase chorus, stereo chorus, stereo dual chorus, mono flange, dual flange, 4-phase flange, stereo flange
Pitch Shifters	Pitch shifter, dual pitch shifter, stereo pitch shifter, mono detuner, dual detuner, stereo detuner, stereo dual detuner, 4-voice detuner, arpeggiator, stereo arpeggiator, Whammy, programmable Whammy
Noise Gates	Noise gate, stereo noise gate, S-DISC silencer, stereo S-DISC silencer
More	Mono tremolo, stereo tremolo, auto panner, 4-way auto panner, mono phaser, dual phaser, 4-voice phaser, stereo phaser, traditional wah, automatic wah, mono ducker, stereo ducker, phase inverter, tuning reference

it into separate phaser, chorus, and auto-wah modules and then remixing the outputs into a delay. The mixer modules are configured in mono, stereo, or 3-out, each with half a dozen or more input "channels." They utilize memory in the same way the effects modules do.

MIDI IMPLEMENTATION

The GSP-2101's MIDI implementation, like that of the TSR-24, is extensive. It remaps and responds to incoming Program Changes and can map and send Program Changes for up to four other units. Incoming MIDI data can be merged with the internally generated data and sent to the MIDI Out port.

All effects parameters are MIDI-controllable in real time. You can assign Control Change messages for up to ten parameters per program and can define the range of values that will be modulated. All program data can be dumped and loaded via SysEx.

FOOT CONTROLLER

DigiTech also offers the optional Control One Foot Controller ($299). The controller doesn't have a MIDI In or Out, though it does connect with a 5-pin DIN plug, allowing the use of a standard MIDI cable. But be careful: you'll damage the controller if you mistake the FC connector for the real MIDI connectors. (The large warning label over the FC jack should discourage costly mistakes.)

The foot controller receives its power from the GSP-2101 and contains ten Program switches; a switch that toggles between Bank, Program, and Tuner mode; and a dedicated Bypass switch.

Product Summary

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FEATURES	●●●●◖
EASE OF USE	●●●●●
QUALITY OF PRESETS	●●●◖
VALUE	●●●●

An assignable volume-style pedal is built into the unit, and an additional ¼-inch jack is provided for another control pedal. I didn't care for the feel of the continuous pedal—it's a bit small for my taste—and the footswitches feel delicate.

The 1 × 20-character, green LCD displays the program name and number. It's adequate and fairly easy to read, though when it comes to foot controllers, the larger the display the better. I wish there were a separate, larger program-number display, as well, for those times when you want to just go by the big numbers for quick verification. One cool undocumented feature is that after a program has been selected, pressing the program's switch again takes you back to the previous program. (This might prove a problem for the not-so-sure-footed.)

▼

The processing covers just about all the needs of the average player.

The first review unit I received had to be swapped for another because the display had shaken loose during shipping. Though I think the controller would hold up fine in the studio, I'm not sure how long it would last under extremely rowdy playing conditions. This is another case of personal preference, but you may want to look into a more substantial MIDI foot controller if you play live gigs.

All programming of the foot controller is done on the front panel of the GSP-2101. Controller assignments, patch parameters, and so on are not editable from the foot controller but, once programmed, are accessible. While controlling program volume with the pedal, you can't fade to silence, but this is easily enough remedied by mapping the pedal to the mixer's output level.

Another nice feature of the recent firmware revision (version 2.0) is a built-in tuner, available on the front-panel display and in the FC display simultaneously. A note name and a rotating set of strobe-like bars appear in the GSP-2101 display; on the Control One Foot Controller display, tuning is indicated by a star that moves to either side of a centered, stationary "O." DigiTech includes the tuner in several of their latest processors, and it is much appreciated, as it eliminates the need for a stand-alone tuner.

CONCLUSION

It is conceivable that some electric guitar players will find all the tone control they need in the GSP-2101. It sounds great through amp rigs and records like a charm, excelling at heavy processing. Add a couple of your favorite stomp boxes or rack-mount processors through the effects loop, and you have a killer rig. The processing covers just about all the needs of the average player: analog compression, tube and solid-state distortion, analog and digital EQ, a ton of user-configurable digital effects, speaker emulation, and foot-controller capabilities.

The unit is fairly well built and can survive average day-to-day demands, although the data wheel and output knob could be more substantial. The GSP-2101 also suffers a somewhat limited palette for certain analog applications, particularly in the cabinet simulator and analog compressor.

Nevertheless, the GSP-2101 is one of the most versatile all-in-one guitar processors I've come across. Furthermore, it can be used as a stereo multi-effects processor for those who need a unit to do double-duty in the studio. The quality and depth of programmability are amazing. (If you want to exchange tips and applications ideas, contact the GSP-2101 user's group at gsp-users@portal.com. It's not an official DigiTech group, but company staff members often log on to help out.)

If you need a versatile, functional, great-sounding guitar multi-effects processor, check out the GSP-2101. And try to spring for the second S-DISC processor; the additional processing power is immense, and it's great to be able to change patches without a break in the sound. You know the modern-day studio rule: No gaps allowed!

Composer/producer **Rob Shrock** *is the keyboardist/arranger for Dionne Warwick and Burt Bacharach.*

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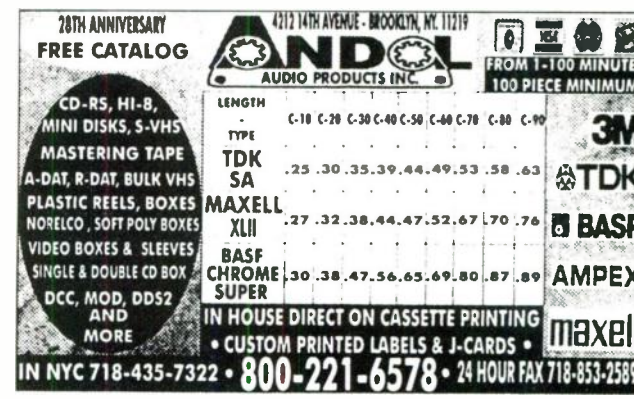

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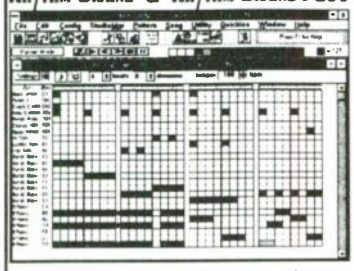
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TECH PAGE

AudioActivity

Preparing music for Windows multimedia projects.

By Scott Wilkinson

Creating music for interactive multimedia projects is not easy. The music must accommodate many different and unpredictable routes through the material. In addition, it must not take up too much precious storage space, and it should respond to the onscreen action while remaining fresh with repeated playings.

The Blue Ribbon SoundWorks (tel. 404/315-0212; fax 404/315-0213; e-mail audioactive@blueribbon.com; BBS 404/315-0211) has developed a unique software technology to address this problem. AudioActive is a Windows application programming interface (API) that spontaneously generates original music on the fly according to requests from the primary application (game, encyclopedia, etc.).

These requests, which are based on the current onscreen activity, specify the required style, mood, intensity, and other high-level musical attributes. AudioActive then generates MIDI messages for a sound card or other device. The software can also play pre-recorded MIDI sequences in conjunction with its own output, which is especially important for title screens.

The foundation of AudioActive is its Knowledge Base, which is an expert system of musical knowledge compiled by Blue Ribbon from various composers and performers. You can also add your own musical experience using *SuperJAM!,* Blue Ribbon's composition software. To use AudioActive in an interactive project, you prepare the Knowledge Base with the musical elements you want to use and tell the primary application how and when to request these elements.

The Knowledge Base consists of several specific musical constructs. For example, Sections are linear chunks of music that typically correspond to different scenes in the primary application. Various musical aspects of each Section can be changed dynamically as the onscreen activity changes. AudioActive can also create appropriate transitions from one Section to another at any point.

Styles describe musical genres, such as bossa nova, funk, hip hop, etc. If you specify variable "slop" ranges for rhythm, Velocity, duration, and so on, any Section in a given Style can sound subtly different each time it is played. The factory library includes over 100 Styles, and you can create your own Styles with *SuperJAM!.*

Personalities define the mood you wish to establish, such as upbeat, miserable, tense, majestic, etc. You can even switch Personalities in midstream. Templates describe the overall shape of a Section in a given scene: when it should be calm, when it should get active, etc. You can create your own Templates with a special version of *SuperJAM!,* which is included with the AudioActive Developer's Kit (see **Fig. 1**). This kit also includes tools and libraries for programmers and content developers.

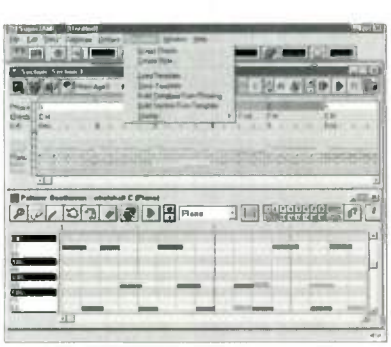

FIG. 1: The AudioActive Developer's Kit includes a special version of *SuperJAM!* with an additional Developer menu of options.

Motifs are small melodic fragments that normally accompany the appearance of specific characters, button pushes, etc. Finally, the Band describes the instrumental "ensemble" that plays the music, including instruments, volume, and pan settings.

According to Blue Ribbon, AudioActive requires only 1 to 3% more CPU overhead than playing straight MIDI files on a 80486DX2/66 running Windows 95. In addition, there is little need to preload music clips, and storage requirements are greatly reduced compared with other approaches. Best of all, AudioActive automatically configures to your sound card, eliminating one of the biggest headaches of Windows multimedia.

Many people might worry that the music generated by AudioActive must be dull and uninteresting; after all, computers don't have the imagination of human composers. But this technology is based on the high-level knowledge of human composers, not rigid algorithms, and it requires musically sensible input to do its job. AudioActive represents an elegant solution to the problems of preparing music for interactive multimedia, and it should soon find its way into many titles.

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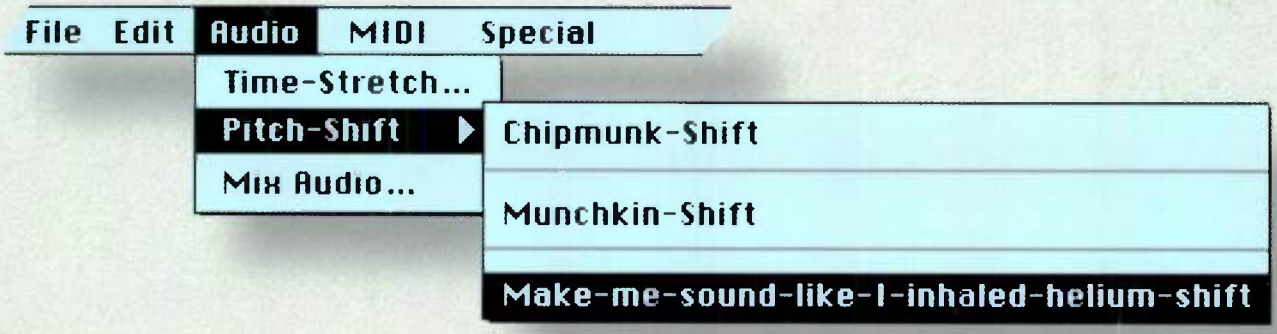
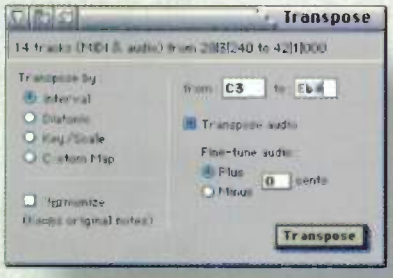
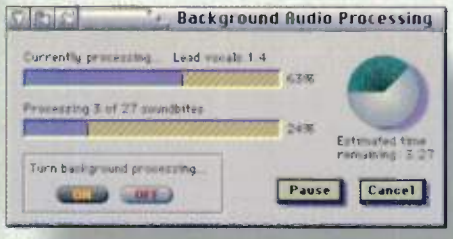


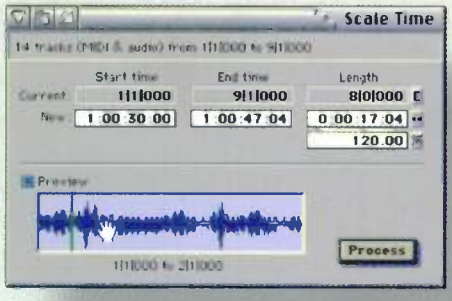
Lots of audio sequencers have pitch-shifting these days. But try shifting a vocal track up a major third. The result? Chipmunk city. The vocals you worked so hard to record sound like Alvin and his buddies. Now pitch-shift your audio with Digital Performer®. What you get is clean, transposed audio that sounds just like the original. Get Digital Performer and try it yourself. You'll be impressed by the results.

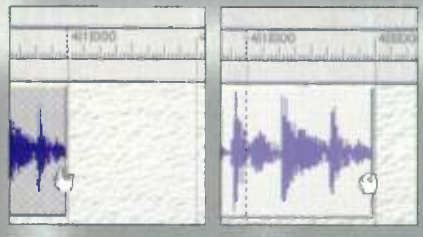


In Digital Performer, you can transpose audio and MIDI data at the same time so that you don't have to waste time doing it twice. After all, that's what MIDI sequencing software with integrated digital audio is for.



Digital Performer provides background audio processing so that you can get on with your work while the computer processes your effect.





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