Drum Samples that Slam ■ Multimedia Authoring on PCs

Electronic Musician

September 1994

The British Invasion

4 Mixers with English EQ Storm the Home Studio

COOL DAY GIGS

DELAY TACTICS

OUR 8•BUS REALLY

We get a lot of calls from folks asking about who's using Mackie 8•Bus Recording/PA consoles.

Good question. After all, a board's only as good as its users.

So we grabbed the latest stack of 8•Bus Warranty Registration cards and hit the phones.

The names in this ad represent a cross section of current 8•Bus users. They range from platinum supergroups tracking new albums to high school choirs, from bar bands to sound designers working on network TV series and feature films. There'd probably be more names but we didn't want to make the type any smaller than it already is — or keep tying up our already clogged phone system.

As our production of 8•Bus boards increases, so does this list.

In a way, it's confirmation of the raves that magazine reviewers have heaped upon the console. Above all, it's proof that the Mackie 8•Bus is a serious tool for professionals. A tool that's getting used day-in and day-out for major projects.

Call our toll-free literature line 8AM-5PM PST and talk to a genuine Mackoid (no voice mail!). We'll send our obsessively-detailed 24-page color brochure on the 8•Bus Series.

Then become a part of this list by visiting your nearest 8•Bus dealer.

Currently in Spain tracking new album on multiple Mackie 24•8 consoles.
Def Leppard

Sound design & mixing of commercials for G.I. Joe, Kenner Toys, Hasbro Toys, Transformers ½-hour show, infomercials.
Lawrence Wakin • Tapestry Productions Inc. • New York, NY

Tracking for Madonna.
Shep Pettibone • Mastermix Productions Ltd. • New York, NY

Recorded Grammy-Nominated "Sunday Morning" off of the album Millenium on 24•8, currently working on new album exclusively on console. "The 24•8 survived the 7.1 San Fernando Valley earthquake. It's definitely built for rock 'n' roll."
Sheldon Reynolds • Earth Wind & Fire • Los Angeles, CA

Music scoring for Pepsi Cola and McDonalds and Six Flags TV & radio commercials.
The Listening Chair • Dallas, TX

Recording and mixing of acoustic music & sounds from the American West. Recent albums include "Charlie Russell's Old Montana Yarns" by Raphael Cristy and "Where the Red-Winged Blackbirds Sing" by Jim Schulz.
Bruce Anfinson • Last Chance Recordings • Helena, MT

Pizza Hut commercial scored to film, scoring of theme presentation for The BaseBall Network, self-produced album "Rick DePofi and the Mels," currently producing NY Noise's 1st solo artist, Aaron Heick (Chaka Kahn's alto player).
Rick DePofi & Craig Bishop New York Noise • New York, NY

[1] *Former posts include quality assurance with Warner Brothers, Sheffield Labs. Rainbow Records, Chief Mastering Engineer at JVC. Quote: "It's a great board, dude. Buy it!"*

Concert sound reinforcement at the Showcase Theater.
Bob O'Neill, Manager of Entertainment • Six Flags Great Adventure Theme Park • Jackson NJ

Used by students for learning recording and sound design.
The School of The Art Institute of Chicago, Sound Department Chicago, IL

Tracking for R&B and rap groups including vocals for Polydor artist T. Max.
Brad Young & Dow Brain Underground Productions Boston, MA

Dialog editing for Untouchables, TV series and Movies of the Week. "I work out of my home now. It's quite an achievement to be able to get a higher sound quality than most of the other sound houses in town."
3-time Emmy winner David Scharf Helix Sound • Los Angeles, CA

Wide range of multimedia projects including major motion pictures (the names of which can't be divulged).
John Acoca[1] • Oracular Multimedia San Francisco, CA

Jazz choir sound reinforcement and recording.
Dwayne Pedigo • Plano East Senior High School • Plano, TX

Sound effects, music and voice for Atari arcade games.
Brad Fuller • Atari Games Corporation • Milpitas, CA

Albums for alternative groups Twenty-Two Brides and The Cucumbers, demo for Freedomland.
John Williams • Ground Zero Studios • New York, NY

"Praise Songs" contemporary Christian album/CD, "Body Builders" children's album/CD.
Peter Episcopo • Bridge Song Media • Old Bridge NJ

Sound design for Pepsi Cola TV spot aired during last January mondo-bowl.
Hans ten Broeke[2] • Buzz, Inc. New York, NY

Sound reinforcement for theater presentations and concerts in a 300-seat theater.
Centre Culturel Franco - Manitobain • Winnipeg, MB, Canada

[2] *Quote: "It's the only analog component in my room. You hardly know it's there, it's so transparent."*

CONSOLES WORK.

TEC TECHNICAL EXCELLENCE & CREATIVITY 1994 NOMINEE

In studios...in clubs...in video and film production facilities... on the road: A sample of what satisfied 32•8, 24•8 and 16•8 owners are doing with their consoles (as of late April, 1994).

Frank Serafine, feature movie sound designer/SFX wizard in the Foley Room at his Venice, CA production complex.

Scoring for two Fox Televison NFL promos, theme & scoring for PBS children's series Storytime, song demos & album tracking, TV commercials, infomercials & demos.
John E. Nordstrom II
Love Den Productions
Pacific Palisades, CA

Album/CD tracking and mixing for the groups Mean Solar Day and Product.
Ramsey Gouda • Onion Head Studio of Chicago • Chicago, IL

Worship service and in-house concert sound reinforcement, recording of sermons.
New Life Assembly of God
Lancaster, PA

Sound reinforcement in a live blues club showcasing live, regional & national acts such as Savoy Brown, Jr. Wells, etc.
Manny's Car Wash
New York, NY

Rental for film mixing projects and home studios. "We love them because we never see them. They're great for our business."
Chris Dunn • Dreamhire
New York, NY

[4] *Suggested retail price. Slightly higher in Canada.*

MB•E Meter Bridge $695[4]

The Side-car $395[4]

Skittles TV commercial, demo for new artist Nita Whitaker, original music for Terpsicorps modern dance company.
Lincoln Adler
Are We Famous Yet? Productions
Los Angeles, CA

DNA sampling CD with mega-drummer Bernard Purdie (3000+ album credits)!
Frank Heller[3] • Weasel Boy Recording • Brooklyn, NY

[3] *Quote: "This job had extremely unusual and demanding monitoring & effects require-ments. I honestly couldn't have done it without the 32•8."*

OTHER PROFESSIONALS WHO OWN AND USE MACKIE DESIGNS 8•BUS CONSOLES*

Dave Abbruzzese, *drummer for Pearl Jam*

Slash, *guitarist/songwriter, Guns 'N Roses*

Steve Brown, *guitarist/producer for Trixter*

Natalie Cole, *solo artist*

Greg Droman, *Grammy-nominated engineer for Linsey Buckingham*

Gregg Field, *drummer for Frank Sinatra*

Michael Frondelli, *Engineer-Producer (Eric Johnson, Crowded House, etc.), Creative Director for Capitol Records*

Bill Gould, *bassist for Faith No More*

Bashiri Johnson, *percussionist for Whitney Houston, Madonna*

Mick Jones, *producer for Van Halen, guitarist for Foreigner*

Art Neville, *producer, The Meters, keyboardist, Neville Bros.*

David Frangioni, *MIDI specialist/Engineer Aerosmith, Elton John, and Extreme*

Danny Kortchmar, *producer for James Taylor, Billy Joel, Rod Stewart*

Bruce Kulick, *guitarist for Kiss*

Kyle Lenning, *President Asylum Records, Nashville*

Clair Marlo, *Artist, Producer*

Queensryche

Dave "Snake" Sabo, *guitarist for Skid Row*

Ben Sidran, *producer*

Leo Sidran, *songwriter for Steve Miller*

Steven Tyler, *singer for Aerosmith*

**Mention in this list is intended to indicate ownership only and does not in any way denote official endorsement.*

Producer Ricky Peterson's Pre/Post Production Room with Mackie Designs 24•8 at Paisley Park.

R&B radio remix of Boz Scaggs' "I'll Be The One" for Virgin Records, recording solo album for the Japanese Go Jazz label.
Ricky Peterson, producer, Paisley Park
Minneapolis, MN

MACKIE.

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I N S I

FEATURES

DEPARTMENTS

Electronic Musician®
SEPTEMBER 1994 VOL. 10, NO. 9

COLUMNS

REVIEWS

Cover: Photo by Robert Perry.

Special thanks to Allen & Heath, Soundcraft, SoundTech, and Studiomaster.

Fixing It In The Mix

Or, why we must keep those master faders away from Dr. Strangelove.

PEGGY SUE AMISON

I've spent almost twenty years sitting behind mixing consoles, and I have to face facts: I'm a control freak. A lofty artistic goal, such as making beautiful music, isn't the reason I've logged thousands of hours in studios. You see, it never seems to matter whether I'm constructing a masterpiece or making a mess. (And believe me, I've herded my share of doggies into a 2-track.) Nope. It's the feeling of absolute *power* that keeps pulling me back to the mixing board. I can do whatever I please, and the faders and knobs obey my every whim, without protest or moral conflict. If I want a guitar riff LOUDER, it happens. No questions asked. Dumb melodic ideas and cheesy instrumental parts simply disappear, and no detectives knock on my door asking what I did with them.

This aural omnipotence is so seductive that I often daydream about mixing every aspect of real life. Think about it! No more bad hair days; a few tweaks of an aux send routed to a hair processor would turn an embarrassing "Alfalfa sprout" into a happening coif. You could even submix all your personality dysfunctions to a group output and mute the bunch. Voila! A kinder, healthier you, without resorting to 12-step programs or expensive therapy. And think how great life would be if you could "delay" the inevitable and fade out anything that bugs you.

Yeah, dream on. No amount of faders and knobs can help us sort out our existence, but a crackerjack mixer *does* provide unbelievable control over the audio domain. In fact, affordable mixers developed for the home market are getting *so* good that some commercial studio owners are nervous. My buddy, Dave Wellhausen says, "Don't tell me how great a $4,000 Mackie board sounds when I spent 50 thousand bucks for my console!" (Wellhausen owns one of San Francisco's premier 24-track studios; it's practically been a second home to pop star Chris Isaak.)

Sorry, Dave. Like it or not, the quality line between home studios and professional commercial facilities is crumbling. More and more artists are bringing their music "home" and recording brilliant works in the comfort of familiar surroundings. And they're doing it with equipment any of us can buy. (Incidentally, two of my current fave albums were recorded in home studios: *Here* by Adrian Belew and *Jollification* by the Lightning Seeds.)

But to take full advantage of your personal recording environment, you've got to have a crack command center. Our cover story, "The British Invasion" (p. 52) is a critical evaluation of four mixers with British EQ that cost under $4,500. If you're serious about putting together a home studio, or improving your current setup, read about how much mixer a few bucks can buy these days.

And despite the empowering benefits of technology, don't forget that knowledge is power, too. Read your **EM** back issues to review all those truly excellent recording features and study your favorite CDs until you can instinctively recognize what constitutes a good mix. If you need to brush up on your signal-processing chops, Scott Wilkinson's excellent "Square One" series on basic effects applications continues with "Delayed Gratification" on p. 102. Surrounding yourself with technology makes little sense if you don't know how to exploit it. *That's* an irresponsible use of power. Happy mixing...

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ENSONIQ™

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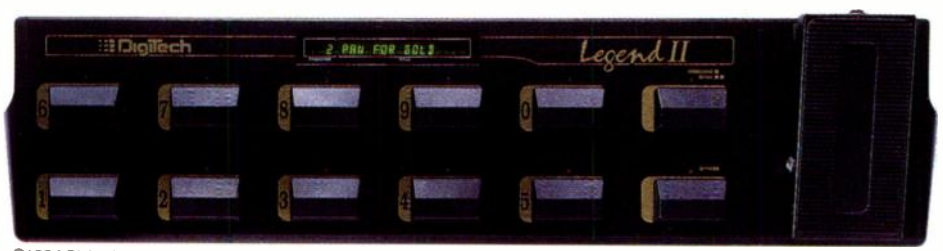
When we developed the revolutionary S-DISC,™ we weren't trying to make other sound processors obsolete. It just worked out that way. The S-DISC (Static/Dynamic Instruction Set Computer) is a proprietary technology of DigiTech. It's the most powerful digital signal processor chip designed for audio applications exclusively, so it has inherent sound capabilities that give it a leg up on the competition.

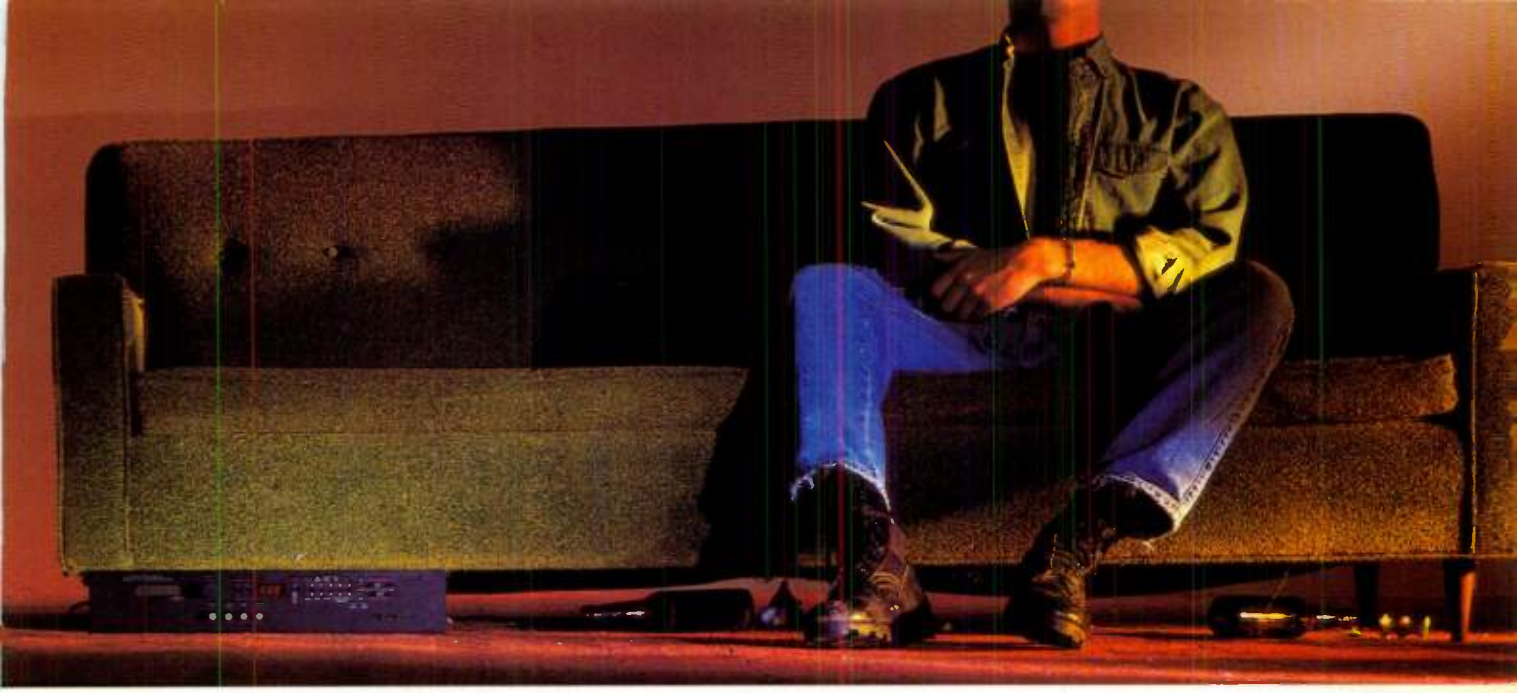
For starters, S-DISC features DigiTech's innovative Silencer,™ a fully integrated digital noise reduction system. Unlike any other system, Silencer writes digital zeros when there's no analog signal. So while the GSP 2101 cranks out big tube sound when you're playing, the Silencer guarantees digital black when you're not.

S-DISC's unmatched performance specs also deliver extra processing power for smooth effect changes in algorithms. You'll appreciate that when you're running multiple effects in the Legend II—the S-DISC easily morphs effects, without producing harsh zip or chatter that intrudes on the music.



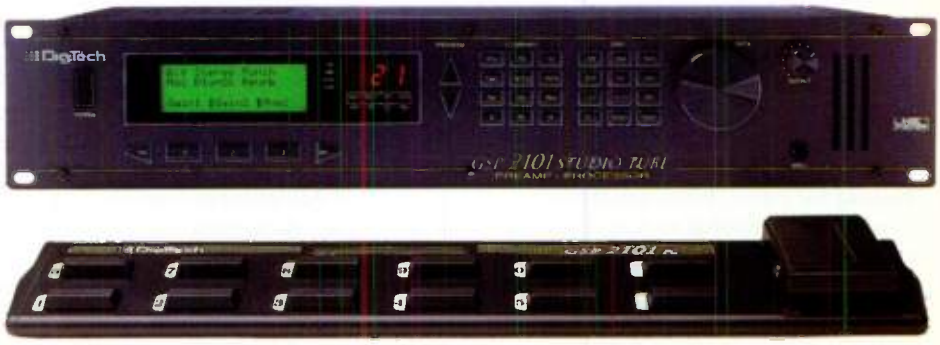
LEGEND II

All the sounds made famous by its predecessors, plus real-time expressive control and a new analog distortion section. Cabinet emulator, 4-band parametric EQ with fully adjustable Q, 3 distortion modules including grunge, Silencer noise reduction, 40 effects– 13 simultaneous including Auto Wah.



G S P 2 1 0 1

The only processor that combines the full sound of tubes with exciting digital effects. 24-bit signal path, 18 bit/128x oversampling, multiple dynamic effects, true stereo digital reverb, programmable algorithms, switchable speaker cabinet, 6 distortions including 3 tube voicings and grunge, optional foot controller.



Of course, the S-DISC's raw horsepower doesn't just mean smooth effects. It also lets our engineer-musicians create more effects for plenty of factory presets. That explains why the RP-10 offers over 30 studio effects and 200 presets in a compact floor controller you can easily carry from gig to gig.

R P - 1 0

Based on the award-winning RP-1 design, the RP-10 incorporates the unlimited power of S-DISC processing. Full bandwidth effects, 24-bit signal path, instant parameter access, programmable cabinet emulation, MIDI mapping, 3 distortions including grunge, built-in whammy effects.

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LETTERS

NEAT NICHE

Hey, the July 1994 **EM** was a great issue! I liked reading about dance companies and children's music offering more opportunities for a musician's work. From my own experience, as long as you don't expect high pay, there are many small, modern dance companies looking for music. Your career-oriented stories, multimedia articles, and arrangement and mixing features have been useful and revealing. Nice work.

"The Grand Illusion" was helpful not only for computer-music ravers with digital synths who want those old-time analog sounds, but also keyboardists who want to better understand analog synthesis. "Open Borders," Michael Brown's feature on the Open Media Framework, was another example of how **EM** continues to keep computer hacks informed. Thanks.

Mark H. Jansen
College Station, TX

SIX STRING STING

In response to R. Wilson's letter from June 1994 concerning the tracking performance of guitar synthesizers, I offer the following advice. If the guitar is to be used only as a synth controller, it may be advisable to fit the instrument with six identical .013 strings. Many units allow each string to be transposed independently, so the strings can all be tuned to a B and transposed to standard guitar tuning. Of course, this may be unacceptable if you want to combine the sounds of the guitar and the synth module. If the intent is to use the unit as a controller for sequencing, try time shifting the track(s) backward 20 milliseconds or so before any quantizing is done. The exact amount to offset the time can be determined by recording a pattern of evenly spaced notes and comparing the actual event time to the theoretical time. If the guitar is set up with a regular set of strings, try recording each string on a different MIDI channel. Because of the difference in tracking response for different gauge strings, a different time offset may be necessary for each of the six sequencer channels.

On the subject of strings, I recommend a set of medium gauge flatwounds. They are less prone to finger noise and false triggering. Also, tracking will improve when the strings are picked close to the bridge. Finally, technique is critical. A guitar synth isn't just a guitar; it is a different instrument and should be treated as such. To improve articulation, monitor yourself through another synth module, if one is available. Try using a patch with a percussive attack, which will be less forgiving than the guitar-optimized presets found in many guitar-synth units.

Eric T. Green
Hummelstown, PA

Eric—Great suggestions! According to guitar-synth expert Paul Youngblood of Roland, you know your stuff, especially regarding sequencing. However, he warns that installing six B strings on a Roland MIDI guitar controller won't work well, because the system includes a very steep filter for each string that removes everything but the fundamental. These filters are set for standard strings that vibrate at different frequencies.—Scott W.

THE JINGLE JUNGLE

As an owner/creative director of a Minneapolis ad agency and after-hours, die-hard MIDI devotee, I found your article "Working Musician: Going Commercial" (June 1994) intriguing. After eighteen years in the ad biz, I've got scores (pun intended) of jingles under my belt. Some were written and recorded entirely by me, some were collaborations with jingle houses around the country, and some were penned entirely by jingle writers under my direction. I thought it may be helpful to shed a little light from my side of the desk on the single sentence in your article that reads, "You'll need these samples to put together a demo."

I get an average of two jingle demos a week. Some are great, some aren't. And what makes demos fall into the latter category isn't the quality of the music or the professionalism of the packaging, it's the subject matter itself.

The first thing I listen for on a demo is an intangible I'd call *a trust factor.* Does it sound like I could trust my client, my commercial, and my reputation with this writer? You'll never convince me by telling me, "Hey don't worry, I can do it," even though you probably can. I've got to hear and feel that trust on the demo myself.

Therefore, I don't really care about your 4-minute ballad, beautiful as it is. I don't care about a symphonic piece you wrote for a friend's documentary film. I don't care about an instrumental that could be use for a commercial. I care about commercials, plain and simple. I'm selling hot dogs or breakfast cereal or gasoline. And I want to hear how you've created music that does what my next commercial needs to do: deliver a message.

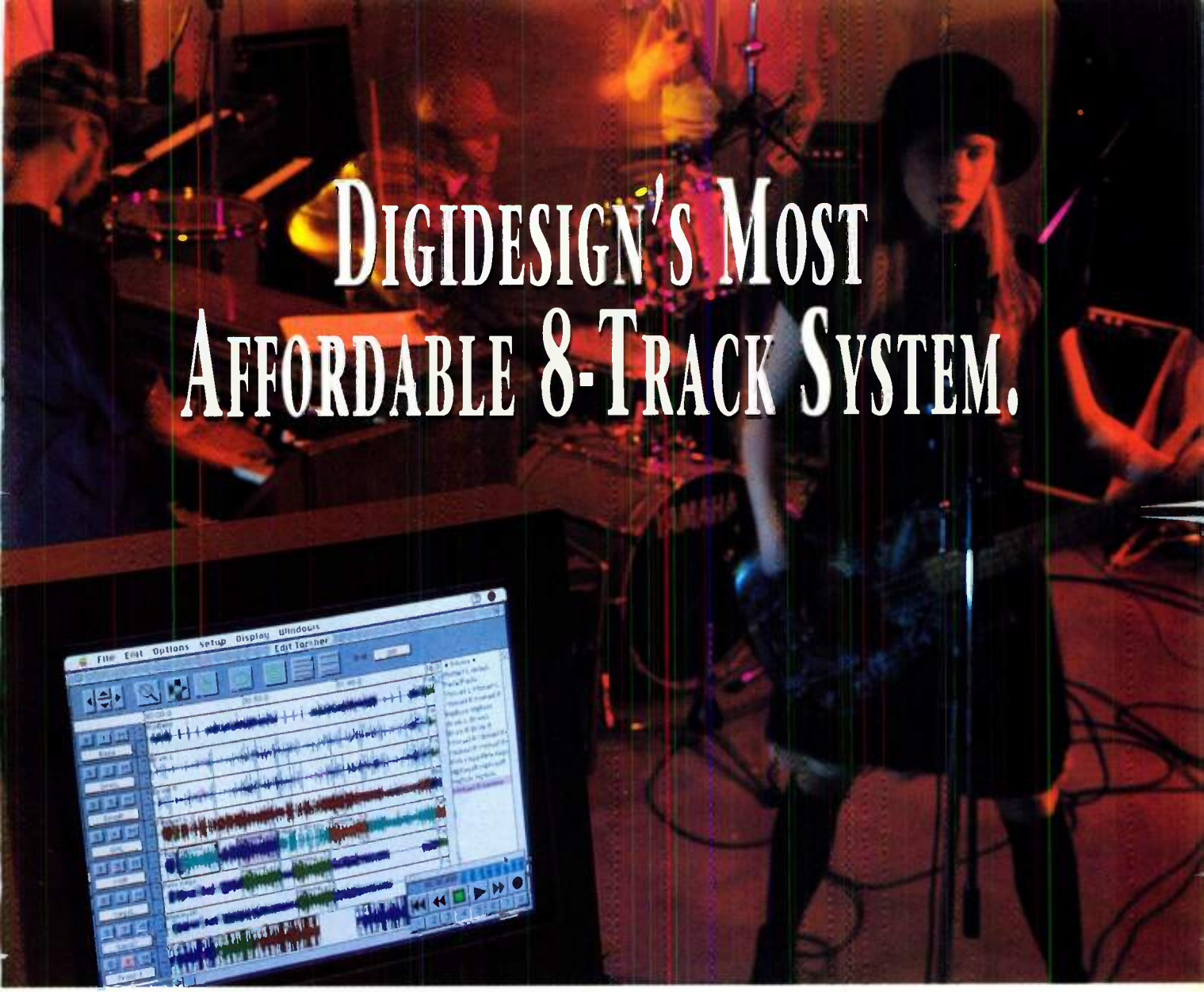
Play me your jingles, whether they're real or just demos. Show me you can write for canned peas and discount stores and toys and spaghetti and shampoo. Show me you can write warm-and-fuzzy and cutting-edge and MOR. Show me sad, show me upbeat, show me funny. Show me how you can entertain, yet sell something.

Don't try to do the announcer stuff yourself. Nothing is as unprofessional as poorly written copy and an amateur announcer. Stick to what you know: music. I'll handle the rest.

Before you talk to me about a job, give me a reason to trust you with my reputation and my client's money. And be assured, if you hit a home run for me, you'll be up to bat again.

Gerry Leone
Minneapolis, MN

ROBERT PRINCE



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Imagine: 8 tracks of crystal clear digital audio. Random access digital editing. Digital track bouncing and stacking. And unparalleled MIDI compatibility. All for a price that compares very favorably to tape.

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882I/O front panel

882I/O back panel

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Great Sound Ru

The Affordable Proteus FX

You know Proteus.® The family of MIDI sound modules from E-mu.® The superb 16-bit digital samples. The unsurpassed collection of pop/rock, orchestral, percussion and world-beat sounds. The industry's clearest, most straightforward user interface. Well, meet the new kid on the rack: Proteus FX. It's not another Proteus sound set—it's a dream-come-true for home musicians and performers held captive by a limited budget.

The idea is simple. Start with a stunning 8MB set of 16-bit, CD-quality digital samples based on the Proteus/1 Pop/Rock and Proteus/2 Orchestral sound sets and add an incredible grand piano sample. Add built-in effects processors for tailoring those sounds to meet your own musical needs. Allow for extensive programmability to customize or create entirely new sounds. Harness this incredible power with the industry's most straightforward, easy-to-use interface. Streamline the feature set—maximize functionality. And house it all in a rugged, road-worthy metal package. What you've just created is a great sounding, powerful MIDI sound module that fits into everyone's budget. What you've just created is the Proteus FX.

But don't be mistaken. If you thought we were talking about a stripped-down model with just a handful of sounds, you don't know E-mu. Only the best features merit the Proteus name. Proteus FX features 512 great preset sounds coupled with a variety of built-in digital effects for you to choose from including reverb, chorus and delays. And of course, you can count on 32-voice polyphony, 16-MIDI channel multi-timbral operation and stereo outputs to keep you at the forefront of musical capabilities whether you're composing, sequencing or performing live.

So, if you thought you were going to have to wait a long time before you could upgrade your system with a professional-quality sound module, think again. Proteus FX is here today—and it's lean and mean.

ProteusFX

ns in the Family.

The Incredible UltraProteus

If you're serious about getting great Proteus sounds and want the benefit of advanced synthesis and expandability, take a look at UltraProteus. It's every Proteus you've ever dreamed of—in a single rack-space module. 16MB of 16-bit samples based on the sound sets from Proteus/1 Pop/Rock to Proteus/2 Orchestral to Proteus/3 World. It even includes hot new drum sounds and wave forms as well as the superb Proformance® grand piano sample. You simply can't buy another MIDI instrument that has a larger variety of digital samples.

Sure, UltraProteus is packed with fantastic sounds, but it's much more than just sounds—it's what you can do with them!

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Z-Plane Technology

While traditional synthesis technology offers a single 4-pole lowpass filter, Z-Plane technology allows you to interpolate sounds through multi-dimensional 14-pole filters in real time.

Of course, we didn't forget essentials like 32-voice polyphony, 16-MIDI channel multi-timbral operation and 6 audio outputs, but when you stand in awe of its 384 built-in presets (up to 640 using an optional RAM/ROM card), you'll know this Proteus is master of the house.

UltraProteus

The Proteus FX and UltraProteus. Two new members of the esteemed Proteus family. Run down to your dealer for a formal introduction.

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E-MU

SOUNDS OF SILENCE

I have encountered the same difficulties with noise in the studio as John Melcher ("Letters," June 1994) when recording around computers and other machines. What works best for us is to totally remove the machine from the room. By placing the computer outside the room—or better, in the closet—most of the sound from the hard drive and power supply disappears.

By using an extended serial cable (15 feet for $8), you can extend your mouse. With a remote MIDI interface intended for notebooks (Music Quest makes a great one, called the 2-Port/SE) and an extended parallel cable (15 feet for $10), you'll have a remote and noiseless system.

As for the computer keyboard, use what you know best: An extended MIDI cable with a female coupler is the best solution.

John Johnson
Sound Ranch Studios
Bellevue, WA

KUDOS

I received a lot of helpful information in Michael Molenda's article, "Masters from Ministudios," in the June 1994 issue of *Electronic Musician*.

Margie E. Diggs
Spring, TX

CLASSICAL ACT

I want to congratulate you on the May 1994 issue of **EM**, which contained a lot of useful material. This time you really exceeded yourself! In particular, the article "Recording Musician: Staying Alive in the Clubs" was of great value. The ratio in **EM** between advanced and beginner materials is well balanced. Also, the DIY projects are highly appreciated.

On the other hand, there has not been a lot of material lately on how to record classical performances. Admittedly, some articles have contained some references to classical music, but not comprehensively. I would like to see an article on how to do decent quality, direct-to-DAT recordings of "unplugged" orchestra and choir performances. Perhaps some interviews with classical, hit-recording producers would be of interest.

Rolf Bäckström
Espoo, Finland

SYNC TONE

I use *Cakewalk for Windows* and sync with a cassette ministudio using SMPTE (the sync tone was recorded on Track 4). After recording all the tracks, I played back the whole song and found out that the song in *Cakewalk* sometimes missed a beat or even stopped, because the recorded sync tone was too weak.

Is there a way to rerecord the sync tone without having to record all the tracks again? I guess if there is a way to do this, it would resolve the sync tone drop-out problem on old recordings.

I greatly appreciate your help.

Dennis Ly
Houston, TX

Dennis—From the sound of things, your time code is okay at the beginning; that's good. You're using a 4-track ministudio; that's not so good.

As far as replacing the bad code, all is not lost, assuming you have a time-code generator/reader capable of time-code reshaping

WARNING: these devices produce some very serious side effects.

Once you experience EV/Dynacord DRP 10 and DRP 15's lush reverbs, accurate room simulations, and beautifully layered multi-effects, you'll be hooked. The DRP 10 and DRP 15 high-quality reverb and multi-effects units with 24-bit digital processing are awe inspiring. The reverbs and room simulations are extremely natural. The effects are smooth, plentiful and simultaneously usable. Program and parameter changes are immediate and absolutely transparent. Editing is a snap, with full, real-time MIDI implementation. And for all those times you thought to yourself, "If only they'd make a 'rotary speaker cabinet' that could fit in my rack", say hello to EV/Dynacord's DLS 223 digital rotary cabinet simulator. It's studio-quality, rack-mountable, and the answer to your prayers. ARS-10 24-bit signal processing ensures perfect simulations with real room acoustics, in stereo. Every parameter is fully editable and programmable via MIDI. And like the DRP 10 and DRP 15, it's backed by a rock-solid, three-year warranty. What more could you ask for? How about a hands-on demonstration at your EV/Dynacord dealer! Call 800/234-6831 for detailed specs, a slick brochure and as much helpful information as you need.

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or regeneration. With reshaping, the incoming time code is electrically processed to restore the waveform. That is cool if all the code is still there but has become distorted.

With regeneration, which is what you probably need, the original time code is read, and new code with the same addresses is generated. A well-known family of code-regeneration techniques is jam synching. *In the most common form of jam synching, regeneration is performed up to where the incoming code disappears. The generator/reader then generates new time code, starting from the last valid address.*

Your ministudio probably won't let you read the old code and write the new code on the same track at the same time, so the refreshed/regenerated code must be recorded on a new tape track. That's a problem, because you only have four tracks, and it appears you already have filled them. (Ideally you also should leave an open "guard" track, so the time code doesn't bleed through to adjacent tracks. Time code sounds truly awful.)

At worst, if you don't have an open tape track, you can simply stripe new code on the existing sync track, replacing the old code completely. Let your sequencer chase it, figure out how far the sequencer is "off" via trial and error, and set an offset in your sequencer. The offset tells the sequencer to wait until the incoming time code reaches a certain address and then start playing. This lets you roughly compensate for differences between the new and old code. It isn't a great solution, and it risks ruining the adjacent track, but it might be your best bet.—Steve O.

HISS BLISS

I wanted to let you know of the wonderful success I've had with my new JVC HR-600U Hi-fi VCR as a mix-down deck. With all my money invested in an Ensoniq SD-1 for sequencing and a Marantz PMD-740 (ministudio) for audio recording, there was no money left for a DAT recorder. The Hi-fi VCR seems to produce almost no tape hiss, which makes it wonderful for duplicating cassette tapes. If you can't afford an $800 DAT recorder, Hi-fi VCRs can be purchased for approximately $350 and are a great alternative to hiss-compromised cassette mixes. Be sure to get a model with an absolute time counter (hours/minutes/seconds), which is more useful than a generic numbered counter.

Skip Eavers
St. Augustine, FL

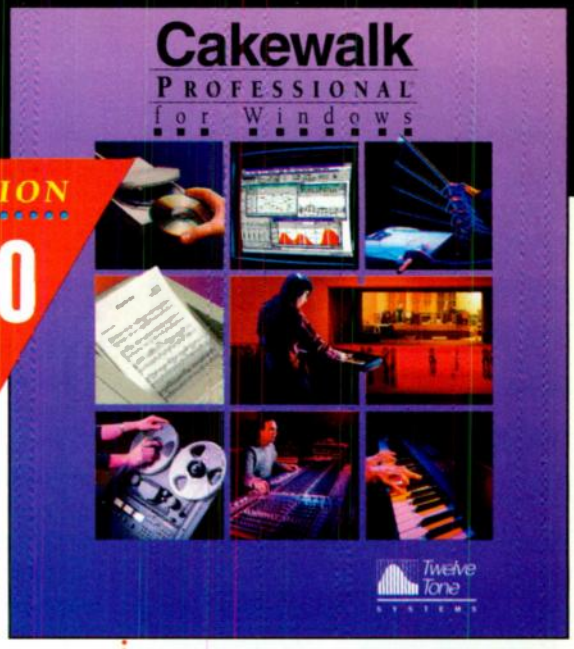
ERROR LOG

July 1994, "Letters," p. 12: We printed incorrect information regarding MIDI data from a PianoSoft disk on a Yamaha Clavinova. Yamaha protects the material on PianoSoft disks from being copied by completely disabling the MIDI Out port during playback. In addition, as far as we know, there is no MIDI hardware or software available for the Brother PN-4400 computer.

July 1994, "Coming Out to Play" sidebar, p. 82: The correct fax number for the Children's Entertainment Association is (212) 275-3835. Also, "Halfway Down the Stairs with Uncle Ruthie Buell" airs Saturdays from 10:30 to 11:30 a.m. on KPFK 90.7 FM.

WE WELCOME YOUR FEEDBACK.
Address correspondence to "Letters," Electronic Musician, *6400 Hollis St. #12, Emeryville, CA 94608. Published letters may be edited for space and clarity.*

PLAY HARD.



WORK EASY.

Tired of music software that's hard to work with? Spending more time making tech support calls than you are making music?

Then bring in the Professional.

Cakewalk Professional remains the leading MIDI sequencer for Windows today. It's powerful, fast, stable, and yes — extremely usable.

And while other music software companies scramble to release something on the Windows platform, Twelve Tone Systems is now shipping the third major release of its award-winning sequencer.

Here are some of the new 3.0 features:

GRAB A GROOVE

The new Groove Quantize option lets you "steal the feel" of one track, and use it to quantize another. Cakewalk's own groove format supports note start-times, durations and velocities. Also works with DNA Grooves.

WHAT'S THE WORD

Add lyrics directly into the Staff view, and print in your notation. For on-stage performances, use the Lyrics view to see scrolling lyrics or stage cues in large fonts.

MASTER MIXES

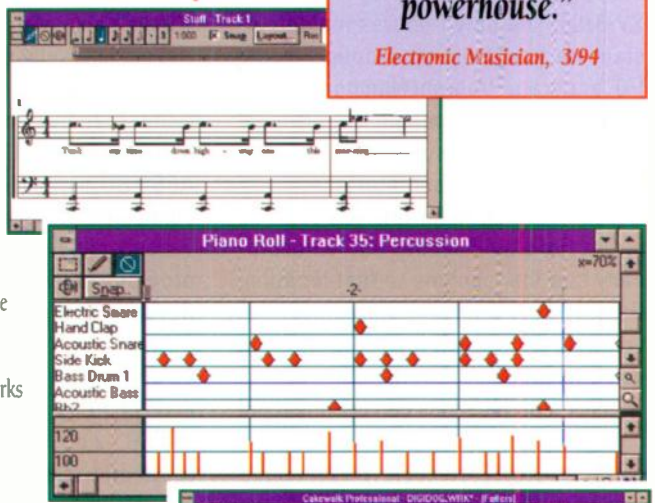
Mix volume, pan and other controllers using 96 assignable faders and 32 Note On buttons. Create fader groups for automated cross-fades and mix-downs. And the Faders view now fully supports the Mackie CTTO 1604 MIDI automation package.

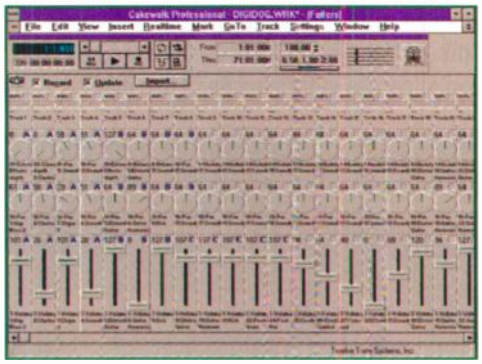
BANG ON THIS

So what else is new in 3.0? Plenty.

- Percussion Editing
- MIDI Machine Control
- Enhanced Swing Quantizing
- Printing Up to 24 Staves per Page
- Expanded Instrument Definitions
- Bank Select
- Way More

> *"Simply put, it's a professional powerhouse."*
> Electronic Musician, 3/94





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GENERAL MIDI

MPC Multimedia PC

WHAT'S NEW

By Steve Oppenheimer

▲ TURTLE BEACH QUAD STUDIO

Turtle Beach Systems has announced Quad Studio, a digital-audio recording system for *Windows* ($499; *Quad* software $299). The package includes a Tahiti sound card, *Wave Tools* sound-editing software, and *Quad* 4-track recording software. *Quad* records directly to disk, and unlike most *Windows* digital-audio programs, you can hear previously recorded tracks while overdubbing. It lets you merge and mix tracks, as well.

Quad's Turtle Recall feature records mixer level, pan, and mute moves in real time and automatically re-creates them during playback. The program generates MIDI Time Code for synching with sequencers. It is compatible with the company's MultiSound, MultiSound Monterey, and Tahiti sound cards. The system requires a 33 MHz, 80486SX-based PC and a hard drive with 16 ms or faster access time. Turtle Beach Systems; tel. (717) 767-0200; fax (717) 767-6033.

Circle #401 on Reader Service Card

▲ DIGITECH LEGEND II

DigiTech's Legend II ($849.95) is the latest in the GSP-21 series of 1U rack-mount, guitar preamp/effects processors. The new unit offers all the sounds from previous GSP-21 models and adds expressive control of up to ten parameters per program with a volume-style footpedal. You can set the range and polarity of each parameter.

The digital processing, which includes 4-band parametric equalization, is achieved with the company's S-DISC chip technology. Other features include continuous control over Whammy effects and programmable speaker cabinet emulation. The Legend II also has analog compression and three types of analog distortion, including DOD's Grunge distortion. DigiTech; tel. (801) 566-8800; fax (801) 566-7005.

Circle #402 on Reader Service Card

▼ PANASONIC SV-4100

Panasonic is offering the SV-4100 Pro-DAT ($2,695), which provides many new features not available in the company's previous top-of-the-line SV-3700. The new features include instant start, external sync, optical digital I/O, accurate Program Number/Cue assignment, programmable output-level control, enhanced system diagnostics, and an enhanced user interface.

A remote controller lets you select a target Program Number and automatically cue the machine to that location. Other remote controllers are under development that will let you enter and use absolute time locations.

Quick-start locations can be rehearsed using the machine's 3-second RAM buffer (±50 DAT frames). The cue point can be moved forward or backward from the current location. The selected cue point can be stored in one of five memory locations, or converted into a Program Number/Index point for precise cueing.

The external-sync mode supports 25 Hz PAL video, 30 Hz NTSC video/film, word clock, and AES/EBU and S/PDIF. The unit also offers internal clock sync.

Digital I/O selection and error-rate displays are implemented in software, rather than by a rear-panel switch. You can select IEC 958 coaxial/optical or AES/EBU digital I/O, with independent connector and format selection. A-head, B-head, and A+B error-rate displays are provided, as is a SCMS ID6 setting in Record mode.

Analog and digital output levels can be continuously adjusted between 0 dB and -14 dB, or you can preprogram them to 0 dB, -2 dB, -4 dB, or -6 dB. All parameters and cue locations are stored in nonvolatile RAM. Ramsa/Panasonic; tel. (714) 373-7277; fax (714) 373-7903.

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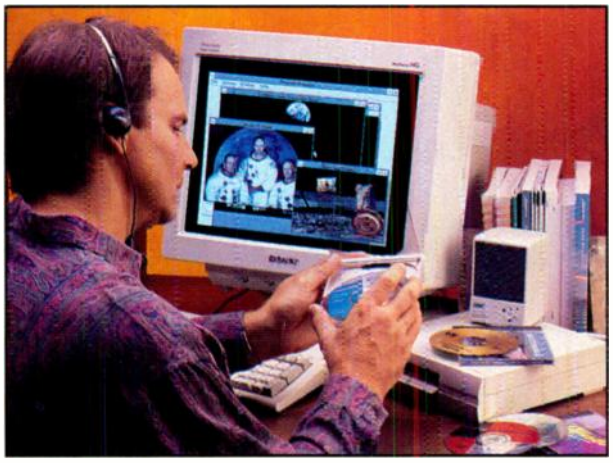
Multimedia. It's cutting edge technology that's being talked about everywhere — in magazines, on TV, even at your office. Perhaps you've used a multimedia application yourself at an airport kiosk or in a retail store. Now you can be a part of this fascinating new technology that's given the PC voice, sound, animation, and even full-motion video!



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Your very first lesson has you and your computer up and running. Using your own 386 or higher model computer with 3.5" drive and Windows 3.1, you get hands-on experience evaluating your equipment for a better understanding of how it works. You go on to examine how today's most sought-after peripherals — CD-ROM drive and sound card — work together with multimedia software to give sensory qualities to your PC.

What's more, you install, train with, and keep a Mitsumi CD-ROM drive, 16-bit SoundBlaster® Pro II-compatible sound interface card, Autodesk Animator®, and Asymetrix ToolBook® software — all included in your course!

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You move on to examine the components that combine to make your multimedia program visually engaging: text, graphics, and animation. You install Autodesk Animator software on your computer and then use its paintbrush features to create objects, then move them across the screen, rotate, or change perspective.

Next you go on to the elements of multimedia that make it multisensory: audio and video. Your lessons cover the breakthrough technology of CD-ROM and new digital data storage devices on the horizon. Then you get first-hand experience with the very equipment that enables your computer to speak, play music, and generate a host of sound effects — Mitsumi CD-ROM, 16-bit SoundBlaster Pro-II-compatible sound card, speakers, headphone, microphone, and software — all yours to train with and keep.

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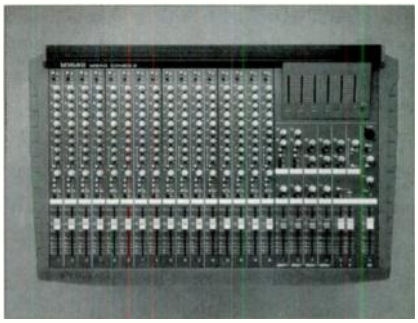
▶ PHONIC M-SERIES

Phonic is shipping its 16-channel M-1642 ($1,999) and 24-channel M-2442 ($2,399) mixers. The boards feature four subgroups, with individual faders, inserts, and outputs, in addition to the L/R master buses. The Master Mix bus (with fader) provides a separate mono mix.

Each channel has switchable, balanced XLR and unbalanced, ¼-inch inputs; a -20 dB pad; 3-band EQ with sweepable mids; pan; cue; and TRS insert points. Each channel mute sends the channel to Alternate Bus outputs 8 and 9, which are independent of the main stereo mix. The +48V phantom power can be globally defeated.

There are six aux sends; a button selects between auxes 3/4 and 5/6. Aux 1 is pre/post-fader, switchable from the front panel. Auxes 2 through 5 are post-fader, but can be set pre-fader with internal jumpers.

The stereo headphone output includes a level pot and features cueing circuitry that lets you monitor selected channels without changing the main stereo mix. LEDs indicate the channels' cue status. There are two sets of stereo tape inputs and two stereo aux returns, which have individual level pots and can be routed to the subs, cue mix, or stereo mix. The front-panel, XLR, talkback-mic input can be assigned to Aux 1, Aux 2, or all buses. Group, aux, cue,



Master Mix (mono), and master L/R levels are monitored on six LED ladders.

Frequency response is rated at 20 Hz to 20 kHz; THD at <0.01%; EIN -128 dB; and crosstalk -60 dB (@ 1 kHz). Phonic; tel. (714) 253-4000; fax (714) 752-1000.

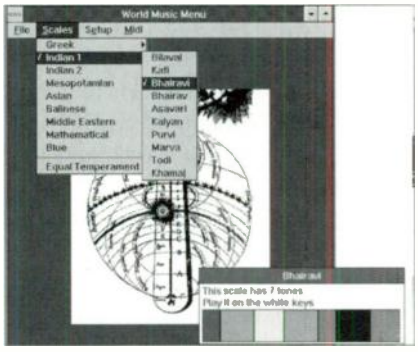
Circle #404 on Reader Service Card

▶ FREE PLAY WORLD MUSIC MENU

Free Play Productions has announced *The World Music Menu* 2.0 ($99), an innovative program for *Windows* 3.1 and the Macintosh that lets you tune compatible synthesizers to a wide variety of scales and temperaments. The program can run concurrently with sequencers and other MIDI programs.

The software uses System Exclusive messages to adjust your synthesizer's onboard tuning tables. Using pull-down menus, you can tune the synth to any of 106 exotic microtonal scales, such as those used for Balinese gamelans, Japanese kotos, Indian ragas, and other Asian, Middle Eastern, Mesopotamian, Greek, Indian, and blues music. All tunings are preprogrammed and octave-based.

Computations are done in real time; for example, this lets you use Just intonations and modulate or transpose the instrument for each scale degree (key) on the fly. Hitting "2" on the computer



keyboard modulates the scale to the second degree, "3" retunes for the third degree, etc.

If your multitimbral synth has multiple tuning tables, you can simultaneously set up each internal (virtual) instrument for a different, or the same, tuning. The program supports a instruments.

Because *The World Music Menu* relies on SysEx to address the internal synth tuning tables, synths that lack this capability are not supported. At present, support is confirmed for the Kurzweil K2000 and K150; all E-mu Proteus models (including sound-card versions); Yamaha DX7II, TX802, TX81Z, SY77/TG77, SY99, and VL1. Support for Peavey synths is expected, and support for Ensoniq synths is possible, but Korg and Roland synths are not compatible.

The program comes with two manuals, the *User's Guide* and *Tuning*, and introduction to scales and intonation. Free Play Productions; tel. (310) 459-8614; fax (310) 459-8801.

Circle #405 on Reader Service Card

▼ HUGHES & KETTNER TUBEMAN PLUS

Hughes & Kettner's TubeMan Plus ($449) is a 1U rack-mount, MIDI-controlled version of the company's TubeMan instrument preamp. The unit has Clean, Crunch, and Lead channels, with individual level knobs.

When using the Lead channel, a Lead switch tweaks the EQ (scooping the mids and bumping up the highs and lows) and adds more compression and slightly more high-frequency gain. There are two Lead modes: One emulates a bright, raw Marshall-type amp, and the other emulates a high-gain, MESA/ Boogie amp.

The TubeMan Plus offers a Presence control, three bands of EQ, a mid-boost switch, and footswitched channel-selection (metal footswitch included), including Bypass. All switching functions can also be controlled via MIDI.

The instrument input is on the front panel. The rear panel holds a H&K Red Box cabinet-simulator output, a guitar-level output, and a line-level output, all on ¼-inch jacks. Hughes & Kettner; tel. (800) 452-6771 or (610) 859-0101; fax (610) 859-0123.

Circle #406 on Reader Service Card

▼ DIGIDESIGN 882 I/O

Digidesign has announced the 882 I/O audio interface for the Session 8 PC and Mac hard-disk recording systems. The new interface does not include the integrated mixing capabilities of the original Session 8 interface (which has been renamed the 882 Studio), requiring the use of an external mixer.

The 1U rack-mount 882 I/O provides eight channels of analog-to-digital and digital-to-analog conversion, with 128× oversampling and 16-bit resolution. Its eight analog inputs and eight outputs use balanced, ¼-inch TRS connectors. You can switch between +4 dBm and -10 dBV levels. The two digital outputs are S/PDIF. Word clock output also is provided.

The Session 8 system is now available in several combinations. You start with the Session 8 Core System for PC or Macintosh ($1,995), which includes the software, audio-processing card, manuals, and cables. The Core System works with either the 882 Studio ($1,995) or the 882 I/O ($995).

The 882 I/O hardware is supported by Digidesign's Session 8 PC and Mac software, Video Slave Driver, and SMPTE Slave Driver. In addition, Digidesign announced its intention to add Session 8 Mac support for *Sound Designer II*, *DINR*, and *Masterlist CD*.

Digidesign has also announced version 2.0 of its *Session 8* software for *Windows*. The new version adds the ability to scroll after playback (insertion and screen chase), audition audio from the region bin, and cause an audio selection to snap to a grid based on locators or time code. Other new features include shuttle and positional scrubbing, a Shuffle mode that lets you append and shuffle regions with no breaks in between, Strip Silence, support for the Digidesign ADAT interface, new menu commands for the SMPTE Slave Driver, and up to 100 named markers.

The ADAT interface ($995), available for the PC, provides up to eight channels of simultaneous digital-audio transfer between Digidesign audio workstations and an Alesis ADAT. The ADAT interface requires an accessory kit ($169), which includes software and cables.

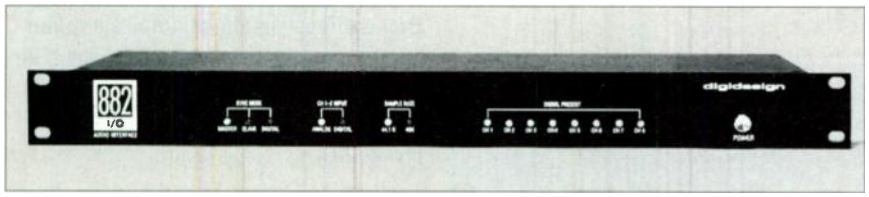
In other Session 8 news, several third parties have announced software support via the *Digidesign Audio Engine* (*DAE*), including Emagic's *Logic Audio* 2.0, Mark of the Unicorn's *Digital Performer*, Opcode's *Studio Vision Pro*, and Steinberg's *Cubase Audio* 2.0.

Digidesign is also shipping its long-awaited Time Domain Multiplexing (TDM), a high-speed, 256-channel, 24-bit, digital-audio bus for Pro Tools. The TDM Starter Kit ($2,495) includes everything you need to run TDM with a 4-channel Pro Tools system, including a Digidesign DSP Farm card, which provides a multichip DSP engine for processing and mixing; a TDM module; a ribbon cable; a *Pro Tools* 2.5 software update; and TDM enabling software. Three Digidesign DSP Plug-Ins are also included: a 4-band and 1-band EQ, a dynamics processor, and a modulation delay. A TDM module ($495) is required for each Pro Tools audio card in the system. Additional DSP Farm cards list for $1,995.

TDM gives Pro Tools users an integrated mixing environment with multiple sends, inserts, buses, subgroups, and masters. It also enables third-party hardware and software Plug-Ins that run on one or more DSP Farm cards.

Finally, Digidesign is shipping *Pro Tools* 2.5 for the Mac (upgrades $249). The software update adds access meters, sends, EQ, level, and voice assignment in the Edit window; 100 autolocation points that store any combination of Name, Current Time/ Selection, and Zoom level; Scroll during Playback; *OMS* support that lets a sequencer run concurrently in the foreground or background; and more. Digidesign; tel. (415) 688-0614; fax (415) 327-0777.

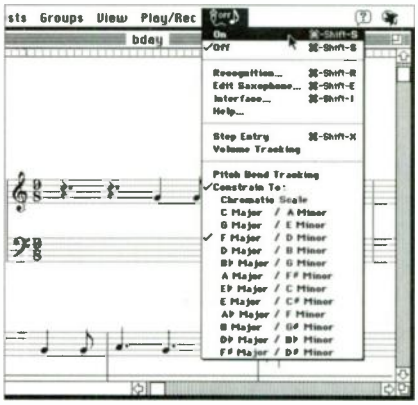
Circle #407 on Reader Service Card



▼ WILDCAT CANYON AUTOSCORE

Wildcat Canyon Software has unveiled *Autoscore* ($150), a pitch-to-MIDI conversion program for the Macintosh that places the MIDI data directly into a compatible host program. The software automatically connects to the host via Apple's *MIDI Manager*, and the results appear on the host program's screen, in real time. *Autoscore* can also be turned on and off under MIDI control.

Monophonic source material is routed into the Mac's onboard audio input



jack, or digitized with a MacRecorder or Digidesign audio card for older Macs that lack audio inputs. The program uses custom input filters to maximize pitch recognition with specific types of instruments, e.g., a filter for voice input, one for brass, and so on. *Autoscore* can also constrain the input to a specified key and scale, reducing the effect of performance errors. It tracks and records volume and pitch bend.

The user interface is accessible from a menu within the host program. Before recording, you can trigger arpeggiated reference tones in the selected major or minor key. The program features user-definable keyboard equivalents and online help.

Compatible programs include Temporal Acuity Products, *Nightingale*, Coda *Finale*, ARS Nova *Practica Musica* and *Songworks*, Jump! Software *Concert-Ware Pro*, and Opcode *Musicshop* and *Vision* (before version 2.0). Compatibility with additional sequencing and notation programs is promised. Wildcat Canyon Software; tel. (510) 527-5155.

Circle #408 on Reader Service Card

PG Music announces...

PowerTracks Pro™

SEQUENCER/NOTATION/PRINTING FOR WINDOWS (IBM)

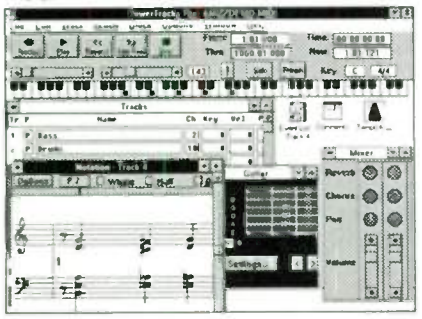
...at the incredible price of $29

"Solid sequencing at an unbelievable price" *Electronic Musician - Sept.93*

NEW! Music Printout

PowerTracks is a professional, fully featured MIDI sequencing/notation/printing program, and is so easy to use! And we include versions for Windows 3.1 AND DOS so you'll be able to use PowerTracks on all of your machines!

NEW PowerTracks Pro 2.2 for Windows



POWERTRACKS FOR DOS VERSION INCLUDED FREE
Yes! We include the DOS version for free in the same package. NOTE: The DOS version doesn't support music notation, or other graphical features.

EXISTING POWERTRACKS USERS CAN UPGRADE TO POWERTRACKS PRO 2.2 FOR ONLY $10

For starters... PowerTracks has all the Pro features found in sequencers costing hundreds of $$ more.

Pro Recording, Playback, Synch, Edit & Sys-Ex Options: *48 tracks, real/step/punch record, sound-on-sound, MIDI File support, sync (SMPTE, Midi Time Code, MIDI) edit (quantize/ cut/ copy/ paste/undo/ data filters/transpose), multi-port support, 480 ppq timebase, sys-ex editor librarian, patch names, banks & much more.*

MUSIC NOTATION: *Enter/edit/display music in standard music notation. Intelligent/automatic features such as: correct beaming/tying of notes/minimize rests option/ "Jazz eighth notes" option (this automatically allows jazz swing eighth notes & triplets to be notated properly!!). Reads in any MIDI file & displays it as notation!!*

MUSIC PRINTOUT (ON ANY PRINTER!!): *Print any track in standard music notation. Selectable staves per page and bars per line. Selectable margins and paper size. Portrait or landscape (sideways) printing. Titles, composer, style, copyright information. Make your own lead sheets! You can also print the piano roll window for even more detailed analysis of a track!*

Deluxe Windows Interface: *Multiple Windows – Staff Roll, Event List, Tracks, Bars, Meter, Tempo, Piano keyboard, Guitar fretboard.*

BUT POWERTRACKS GOES MUCH FURTHER... WITH EXCITING FEATURES NOT FOUND IN OTHER SEQUENCERS!

✔ *Enter/ print out Chord symbols in Notation* ✔ *Automatic Drum tracks (100 drum styles included)* ✔ *Reads in Chord Symbols from Band-in-a-Box 6.0 MIDI files* ✔ *Patch caching for Gravis Ultrasound* ✔ *Comprehensive support for Guitar (on-screen guitar, tab printout)* ✔ *Built-in Roland Sound Canvas Editor* ✔ *On-screen piano and guitar show notes as they're played* ✔ *Pro MIDI files included*

Our customers love PowerTracks!! Here are some actual comments from customers...
"Killer software" "Unbelievable" "Intuitive and powerful" "Best MIDI program on the market" "I love the notation" "Incredible features & easy to use" "Other packages just don't compare" "Totally unbelievable – I love it!"

REQUIREMENTS: *PowerTracks for Windows - Windows 3.1, IBM Compatible AT, 386 or higher, 2mb RAM, Supports any device compatible with Windows 3.1 including Roland MPU401, Music Quest MQX interfaces, Key Electronics MIDIATOR, SoundBlaster, AdLib, TurtleBeach, etc. PowerTracks for DOS - DOS 3.3 or higher, 640K, XT/286/386 or better. MIDI interface (Roland MPU401, Music Quest MQX series, SoundBlaster MIDI and FM sounds, Midiator, Roland SC7, Yamaha TG100) or AdLib/SoundBlaster compatible sound card.*

For your PC Soundcard or MIDI system
All for the amazing price of... $29
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30 DAY Unconditional MBG

From PG Music... *The makers of The Jazz Guitarist, Band-in-a-Box, The Pianist, The Jazz Pianist*
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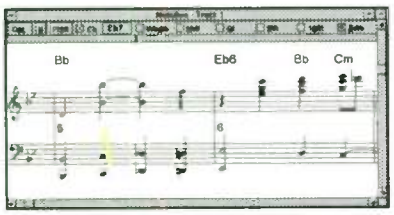
e-mail address – Internet: 75300.2750@Compuserve.Com
PG Music Inc. *266 Elmwood Avenue Suite 111 Buffalo NY 14222*

PG Music announces... An Exciting New Music program for Windows, Macintosh & Atari!

The New Orleans Pianist™

This software makes it "too easy" to be a great New Orleans pianist!



UNCONDITIONAL 30 DAY MONEY BACK GUARANTEE

The New Orleans Pianist is a music program with a huge library of over 65 "New Orleans Style" piano music standards, played on MIDI keyboard by top New Orleans pianists Henry Butler, Jon Cleary, Tom McDermott, Joel Simpson & David Torkanowsky playing a wide variety of New Orleans, R & B, Blues & Ragtime piano music.

INCLUDES: music trivia questions, "Guess the Song" game, program notes, pianist biographies (all on disk) & much more!

LEARN HOW TO PLAY THE MUSIC: *An on-screen piano keyboard shows you exactly what the pianist is playing. Slow down the piece, or step through it chord by chord. Learn the music "note-for-note" by watching the notes on screen. Load the MIDI files into your favorite programs for future study!*

PROFESSIONAL PERFORMANCES & CD-QUALITY: *All pieces are complete performances professionally performed, recorded & saved as Standard MIDI files. All the pieces have been recorded in "real time" by top pianists on an 88 note weighted keyboard. They are never quantized or step recorded. You'll hear the music playing with CD quality through your sound card or MIDI system, just as if the pianist was in your home.*

ON-SCREEN MUSIC NOTATION, CHORD SYMBOLS & MUSIC PRINTOUT OF THE PIANO PARTS (WINDOWS VERSION ONLY!)

OVER 65 FAMOUS NEW ORLEANS PIECES INCLUDING... *St. James Infirmary, When the Saints Go Marching In, Down by the Riverside, Burnt Mouth Boogie, Creole Lament, King Porter Stomp, The Pearls, Bogalusa Strut, My Bucket's Got a Hole In It, John Brown's Body, Margie, Charleston Rag, Maple Leaf Rag, The Entertainer, Raise the Rafters, Dirge for James Black and many more.*

BACKGROUND PLAYBACK: *Listen to the music while you work in other programs. The built-in Juke Box plays the music one song after another. Use the program for great background music, music for presentations, telephone on-hold, etc.*

SPECIAL SUPPORT FOR SOUNDCARDS & MIDI SYSTEMS: *Includes a built-in mixer to change instruments, channels, transposition, volumes, panning, tuning or other MIDI information.*

TRIVIA & GUESS THE SONG GAMES: *Have some fun while you learn about New Orleans piano music. Test your knowledge with the Music Trivia Game (over 200 questions about the music, famous New Orleans performers & composers). In the "Guess The Song" game, the program plays songs at random for you to guess. Read memos about the pieces, or composer biographies as you listen.*

For your PC Soundcard or MIDI system

All for the amazing price of... $49 *+ $5 S/H ($10 outside USA/Canada)*

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e-mail address – Internet: 75300.2750@Compuserve.Com
PG Music Inc. *266 Elmwood Avenue Suite 111 Buffalo NY 14222*

REQUIREMENTS: MACINTOSH *2mb memory, system 6 or 7, MIDI interface + synthesizer/ module with guitar, bass, drums sound, 2mb hard drive space required.* ***WINDOWS (IBM)*** *2mb RAM memory, Windows 3.1, SoundCard (Roland, SoundBlaster, etc.) or MIDI system with guitar, bass, drums sound, 3.5" or 5.25" high density floppy disk, 2mb hard drive space required.* ***ATARI*** *1040ST/TT/Falcon with floppy disk drive, mono or color.*

▲ BLUE ROOM HOUSE POD

Blue Room Loudspeakers' Pod speaker systems use fiberglass enclosures sculpted into unusual, smoothly curved shapes. The design is intended to ensure superior surface rigidity, minimize enclosure resonance and radiation, and reduce waveform refraction and diffraction. According to Blue Room, the result is superior imaging and an extended soundstage: Dispersion is rated at ±2 dB, up to 20 kHz, through ±30° horizontal and ±20° vertical.

The House Pod ($1,900/pair) is a surface-mounted, 2-way, system in a fourth-order, bass-reflex enclosure. It handles from 10 to 120W (peak) into 8Ω. Sensitivity is rated at 89 dB SPL (1W/1m). Speaker cables hook up via Neutrik 4-way Speakon connectors.

The B&W 6-inch, Kevlar bass/mid driver is complemented by a 1-inch, gold-plated, aluminum-dome tweeter with a rare-earth magnet. The crossover point is 3 kHz, and the drivers have separate crossovers for biamping. All Pod drivers are magnetically shielded.

The enclosure is made of hand-laminated, layered fiberglass, with 2-pack, acrylic paint. The 21 × 19 × 14-inch House Pod can be wall-mounted, but it is intended for mounting on either of two floor stands. (Shown: the Sputnik stand.) The House Pod's frequency response is rated at 45 Hz to 20 kHz (±3 dB); distortion is <2%.

The Techno Pod ($2,500/pair) is a biampable, 3-way system. It uses a B&W 6-inch woofer, 6-inch mid/bass driver, and 1-inch tweeter in a closed cabinet. Its frequency response is rated at 45 Hz to 20 kHz and sensitivity is 94 dB SPL (1W/m). The crossover points are 900 Hz and 3 kHz.

The 23 × 19 × 14-inch Techno Pod enclosure uses the same materials and basic design concept as the House Pod. However, the Techno Pod is optimized for wall-mounting, with a U-shaped bracket that acoustically decouples the loudspeaker from the wall.

Blue Room recommends the Techno Pod for sound-reinforcement and high-power, midfield, studio applications. It handles from 30W to 250W (peak) into 4Ω. The House Pod is recommended for studio applications, such as close-field monitoring. The Pods are available in black, blue, red, or white. Equity International (distributors); tel. (508) 664-2712; fax (508) 664-4109.

Circle #409 on Reader Service Card

▼ LYRRUS G-VOX BRIDGE

In conjunction with Lyrrus' G-VOX Pickup and Belt Pack, the company's G-VOX *Bridge* for *Windows* (software $129; complete system $499) provides a direct guitar-to-computer MIDI link. The G-VOX Pickup attaches to your guitar with suction cups and senses string vibrations. The Belt Pack translates the vibrations into a datastream and routes it to the PC serial port. The *Bridge* software then sends the corresponding MIDI data to your sequencer. According to the manufacturer, the system detects "exactly when notes are played," responding more quickly and accurately than conventional MIDI guitars.

Bridge is guitar-specific; for example, it registers the string and position in which you play each note and shows it to you in a graphic window. It also tracks dynamics. The graphic sensitivity and detection controls can be operated in real time. The program comes bundled with Midisoft's *Recording Session* and Howling Dog's *Power Chords for G-VOX*. Lyrrus Inc.; tel. (215) 922-0880; fax (215) 922-7230.

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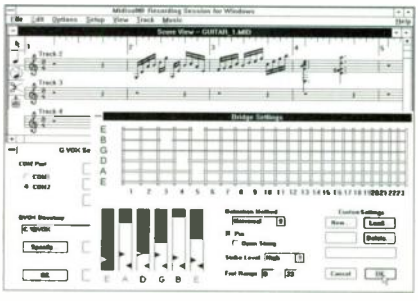


▶ ASHLY AUDIO

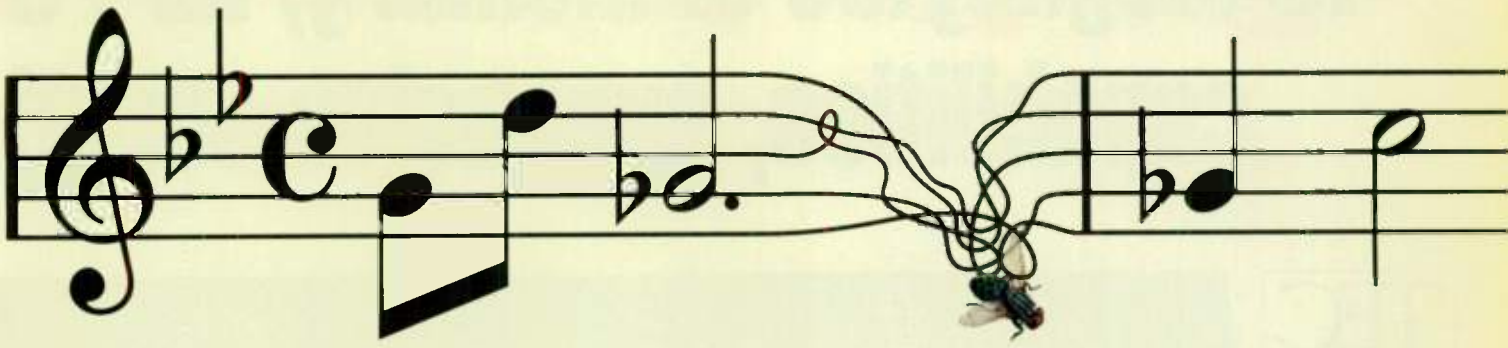
Ashly Audio's FTX Series II power amps come in three models. The FTX-1001 ($699) delivers 120W RMS/ channel into 8Ω and 190W into 4Ω. The FTX-1501 ($799) puts out 200W into 8Ω and 300W into 4Ω. The top-of-the-line FTX-2001 ($999) provides 300W into 8Ω, 500W into 4Ω, and 700W into 2Ω. All models can be bridged to mono, doubling the power rating.

The FTX Series II amps are compatible with the company's Power-Card input options. Current Power-Cards include a compressor, electronic crossover, and mixer, and more input cards are planned. The amps use Ashly's output stage, which features paralleled power MOSFETs for current gain. According to the manufacturer, these devices have smooth transconductance curves and run at a relatively high idle current, preventing crossover notch distortion.

The power amps require no heat-dissipation protective circuitry and include protection against DC or ultrasonic signals appearing at the outputs. Output relays provide delayed speaker turn-on. Ashly Audio; tel. (716) 544-5191; fax (716) 266-4589.

Circle #411 on Reader Service Card

(continued on p. 28)



If it's in the room, it's on the tape.

3M™966 and 3M 996 Audio Mastering Tapes are so accurate they capture every nuance in the studio—from the emotion in a blues note, down to the fly on the wall. 3M 966 tape lifts technological barriers by allowing you to record more signal with less print, so you get less print-through without higher noise. It's all you need to record every note, every beat, and every whisper in the music with crystal clarity. But if you do want more, there's 3M 996 tape. The industry standard in high-output audio mastering tapes. So for true sound reproduction, demand 3M 966 and 3M 996 tapes. And as a precaution, you might want to invest in a little bug spray. For more information, call 1-800-752-0732.

3M *Reliability*

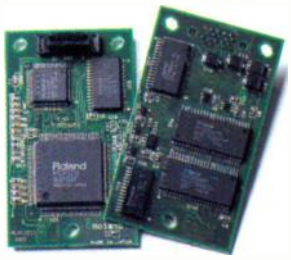
You'll love the Roland JV-90 expandability to 56 voice poly 18 megabytes of memory, its 76 capabilities, expansive sound

TEC
TECHNICAL EXCELLENCE & CREATIVITY
1994 NOMINEE

Okay, okay. We put enough technology and features into the JV-90 to make it the synthesizer equivalent of the space shuttle. But you don't have to understand the technology.

All you have to do is listen.

Nor does it matter that the JV-90 has an open-ended architecture, voice and wave expansion boards, enormous sound library, PCM and data cards. Or the fact that you can have a massive 18 Mbytes of memory with 56-voice polyphony and up to 24 multitimbral parts.



Expanding with the VE-GS1 Voice Expansion Board adds an entire GS synthesizer that doubles the JV-90's polyphony to 56 voices, adds another effects processor and makes the JV-90 24 part multitimbral.

The VE-JV1 Voice Expansion Board contains a JV Series sound engine, doubles polyphony to 56 voices, adds new patches, another effects processor and makes the JV-90 16 part multitimbral.

Instead, just remember that the JV-90 can expand when you're ready.

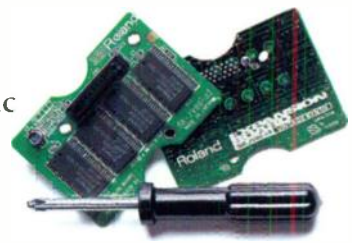
And don't forget that the JV-90 comes standard with 4 Mbytes of

synthesizer because of its phony, 24 multitimbral parts, note keyboard, MIDI controller library and incredible sound.

memory holding 256 preset patches and 64 user patches, including realistic acoustic sounds, dynamic percussion, and fat synth textures.

Which, in less technical terms, means you get a lot for your money from the very start.

To hear how great the JV-90 and the other JV Series keyboards sound, call us at (800) 386-7575 to get our Roland *'94 New Product Video* (Vol. I) for only $9.95. Call now. Because once you hear the JV-90's sounds, you'll cross every other synthesizer off your list.



The SR-JV80 Wave Expansion Board Series *contain an abundance of high-quality waveforms and patches. Each board contains 8 Mbytes of wave memory. Currently* ***available are Pop, Orchestra, Piano and the new Vintage Synth board containing*** *legendary synth sounds from the Minimoog,® Oberheim,® Sequential Circuit's Prophet,™ Mellotron® and Roland's classic synths such as the Jupiter,® Juno,® and D-50®. All expansion boards are user installable and we've even included the screwdriver.*

Roland

Roland Corporation U.S., 7200 Dominion Circle, Los Angeles, CA 90040 (213) 685-5141
Roland Canada Music Ltd., 5480 Parkwood Way, Richmond, B.C. V6V 2M4 (604)270-6626. COMPUSERVE®: GO ROLAND; 72662,376
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REV UP ▲ ▲ ▲ ▲ ▲

▲ KRK

KRK has announced optional video shielding for its Model 6000 and 7000B close-field monitors. The drivers in the Model 6000S ($850/pr.) and 7000BS ($1,350/pr.) are shielded with a mu/metal alloy that isolates magnetic flux, preventing RFI problems with video and computer monitors. Group One Ltd. (distributors); tel. (516) 249-1399; fax (516) 753-1020.

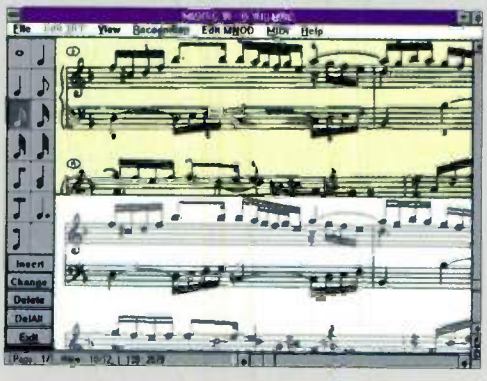
Circle #412 on Reader Service Card

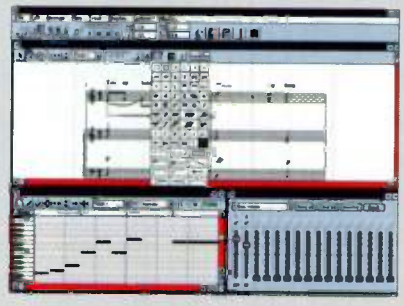
▼ MUSITEK

Musitek is shipping version 2.0 of its *MIDISCAN for Windows* music OCR software ($379; upgrade free). New recognition features include 25% to 50% more accurate recognition; an automatic, hands-off processing option; automatic recognition of music containing irregular staves and staves of varying widths; and improved stave localization and structure checking. Higher image resolutions are supported (up to 1,400 KB image-file size), and the image-rotation routine has been improved. TIF and MNOD files can be moved with their associative links retained.

The MIDI conversion routines have also been upgraded, with support for pickup and close-out measures. The MNOD Editor has an improved user interface; auto save; and quick-editing features, such as click-to-select. Functions and notation objects are mapped to the PC keyboard as *QuicKeys*. Musitek; tel. (805) 646-8051; fax (805) 646-8099.

Circle #413 on Reader Service Card



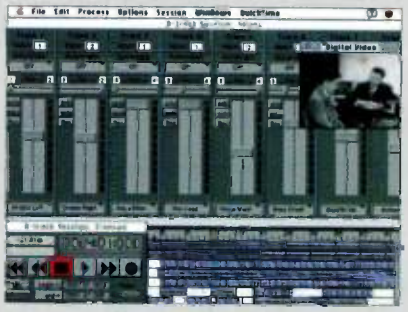


▲ DR. T'S MUSIC SOFTWARE

Dr. T's has announced *QuickScore Professional* ($69.95; upgrades $49.95), a major upgrade to the company's *QuickScore Deluxe* music notation program for *Windows*. *QuickScore Professional* offers sixteen tracks/staves and supports any *Windows*-compatible printer and sound card.

New features include real-time, "on the fly" score entry and editing, piano-roll, graphic note-editing; graphic controller-editing; and a MIDI mixer that sends any Control Change message. Many musical symbols have been added, and you can now enter two voices per stave. Also new is punch in/out and global song-arranging. Dr. T's Music Software; tel. (617) 455-1454; fax (617) 455-1460.

Circle #414 on Reader Service Card

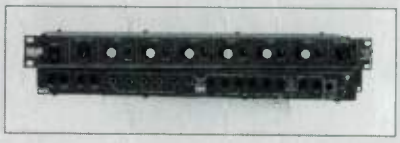


▲ OSC

OSC is shipping its *8-Track Tool* ($129) for *Deck II* 2.1 and Digidesign Pro Tools. The new software extension lets users play back eight tracks of digital audio simultaneously with a single Pro Tools card. Once it is dragged to the same folder as *Deck II*, the new program automatically places eight faders in the program's mixing window.

The program requires a Mac Quadra or better, Pro Tools, and a hard drive with at least 15 ms access time and 1 MB/second throughput. OSC; tel. (415) 252-0460; fax (415) 252-0560.

Circle #415 on Reader Service Card

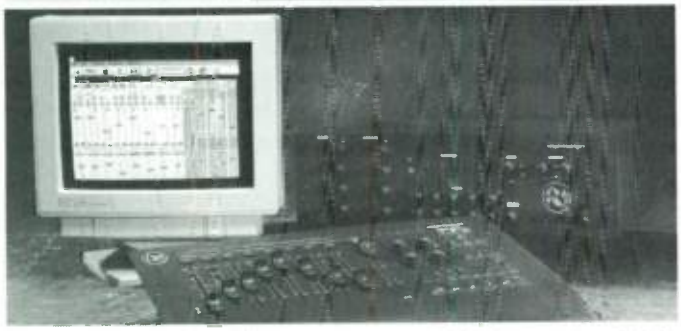


▲ RANE

Rane has announced the SM 26B ($379), a new version of the SM 26 splitter/mixer with active, balanced, ¼-inch TRS inputs and outputs. The 1U rack-mount device has six mono and two master inputs and six mono and two master outputs, all operating at line level. Each mono input has level and pan controls. The SM 26B can be used as an 8-to-2 mixer, a 2-to-6 splitter, a 6-to-6 balanced line driver, or any combination. It can also be configured to mix four stereo inputs or split four stereo outputs. Rane Corporation; tel. (206) 355-6000; fax (206) 347-7757. ●

Circle #416 on Reader Service Card

AMERICA'S FASTEST GROWING MUSIC RETAILER*



*Source: Music Trades (8/93), Inc. Magazine (10/93), Music Inc. (5/94)

There's a simple reason for Sweetwater Sound's success. Not only do we have the equipment you want in stock at affordable prices, but we also offer outstanding value: one-on-one customer service and quality after-the-sale support other dealers can only dream about.

Our sales engineers all have real-world MIDI and recording studio experience, so they can direct you to the perfect product for your particular needs.

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Digitech • Summit • Sennheiser • Lexicon • JBL • Fatar • Furman
Tannoy • Crown • BBE • KAT • Carver • Passport • Rane • Shure
Coda • TOA • JLCooper • Dynatek • TAC/Amek • Soundcraft
3M, Ampex & Denon Tape • Macintosh & IBM Software & MIDI Interfaces

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OUR EXCLUSIVE GUARANTEE:
"If you don't like it, we'll take it back — with no hassles!"

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NEW! **Version 6 for Windows is here.**
Automatic Accompaniment has arrived!

NEW! UPGRADE TODAY!

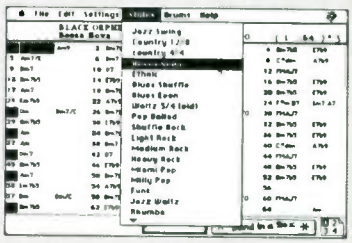
BAND-IN-A-BOX™

INTELLIGENT SOFTWARE FOR IBM (DOS/WINDOWS), MAC & ATARI

Type in the chords to any song, using standard chord symbols like C or Fm7b5, choose the style you'd like and Band-in-a-Box does the rest...

Automatically generating professional quality five instrument accompaniment of bass, drums, piano, guitar & strings in a wide variety of styles.

100 styles included with PRO Version. *Jazz Swing • Bossa • Country • Ethnic Blues Shuffle • Blues Straight Waltz • Pop Ballad • Reggae • Shuffle Rock • Light Rock Medium Rock • Heavy Rock • Miami Sound • Milly Pop • Funk • Jazz Waltz • Rhumba • Cha Cha Bouncy 12/8 • Irish Pop Ballad 12/8 • Country (triplet) • AND 75 MORE!*

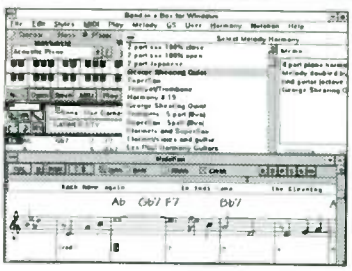


Built-in sequencer allows you to record or edit melodies.

Built-in StyleMaker™. *You can create your own 5 instrument styles using the StyleMaker section of the program.*

Support for over 70 synths built-in. *Drum & patch maps included for over 70 popular synths. General MIDI, Roland GS & SoundBlaster soundcard support included.*

NEW! Additional features in Windows version 6.0



Band-in-a-Box 6.0 for Windows breaks new ground with over 50 new features...

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PC Magazine Jan. 15, 1991
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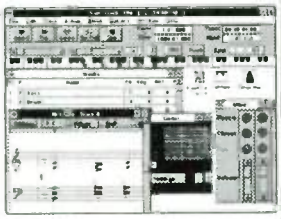

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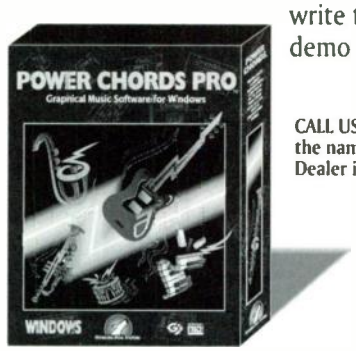

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by Ron Wodaski

EM METERS	Rating Products From 1 to 5
FEATURES	● ● ● ●
EASE OF USE	● ● ● ●
DOCUMENTATION	● ● ● ● ◐
VALUE	● ● ● ● ◐

Electronic Musician, June 1994

PRO FILE

Back in The Groove

Booker T. revs up the Hammond again.

By Daniel Levitin

Pedestrians sauntering by a certain warehouse district in San Rafael, California, are accustomed to hearing all kinds of music waft through the warm Marin County air. Huey Lewis, The Grateful Dead, and numerous Narada Michael Walden projects call this part of the world home. But last summer, the locals were treated to the Memphis sound by the band that defined it, Booker T. and the MGs.

Organist Booker T. Jones, guitarist Steve Cropper, and bassist Donald "Duck" Dunn (accompanied by ace drummer Steve Jordan, sitting in for the late Al Jackson) spent several months in Marin writing tunes for their first album in seventeen years, *That's The Way It Should Be.*

Most Booker T. and the MGs fans regard Jones' fat, sonorous melodies, typified by the legendary track "Green Onions," as the ultimate cool Hammond sound. His trademark timbre, which was crucial in creating the famous Stax sound, is virtually unchanged on *That's The Way It Is,* because Jones used the same organs he played in the 1960s—the Hammond B-3 and M-3.

However, his techniques for miking Hammonds have evolved with time. He now goes for a greater stereo spread of the sound. "We used to put a microphone on either side of the B-3's Leslie speaker cabinet, but now I've started using three or four mics," says Jones. "I learned this from [engineer] Chris Shaw in New York. He explained that when the Leslie's speakers rotate, if you're using two mics you get the sound on one side or the other. By using three or four mics, we can record the complete cycle of the speakers turning."

Hammond's M-3 was designed for home users, so it doesn't use the external Leslie cabinets. It has an onboard amplification system located under the keyboard. Jones has his own special miking technique for this instrument. "With the M-3, I just stick a single mic in between my legs," he explains, "because the speaker is down there."

Jones recently moved into a room at The Plant Studios in Sausalito, California, where he has set up a MIDI room for writing and recording demos. "I've gotten away from my DX7 lately, so I'm using a Roland controller with an E-mu Proteus and various other sound modules," he says. "My sequencer is Opcode's *Vision* 2.0 running on a Macintosh Quadra 840AV. I also moved in my MCI/Sony JH24 [analog] 24-track machine and four Alesis ADATs, along with a DDA console that belongs to the Plant."

As a player, Jones draws inspiration from classic jazz keyboardists, such as Ahmad Jamal, Jimmy Smith, and McCoy Tyner. "Tyner will always be a major influence on the way I voice my chords on piano," comments Jones.

"My earliest influence was Ray Charles, although he doesn't play that much organ anymore," he continues. "In fact, on his last album, he called *me* in to play some organ. I asked his producer, Richard Perry, why does Ray need me on this thing? I mean, he's *Ray Charles!* And Perry said, 'He wants you to play like Booker T.' I was flattered by that!"

Daniel Levitin *is a researcher at the Institute for Cognitive and Decision Sciences, at the University of Oregon.*

STEVE ROBERTS

Steve Cropper (left) and Booker T. Jones (right) at the former site of Stax Records.

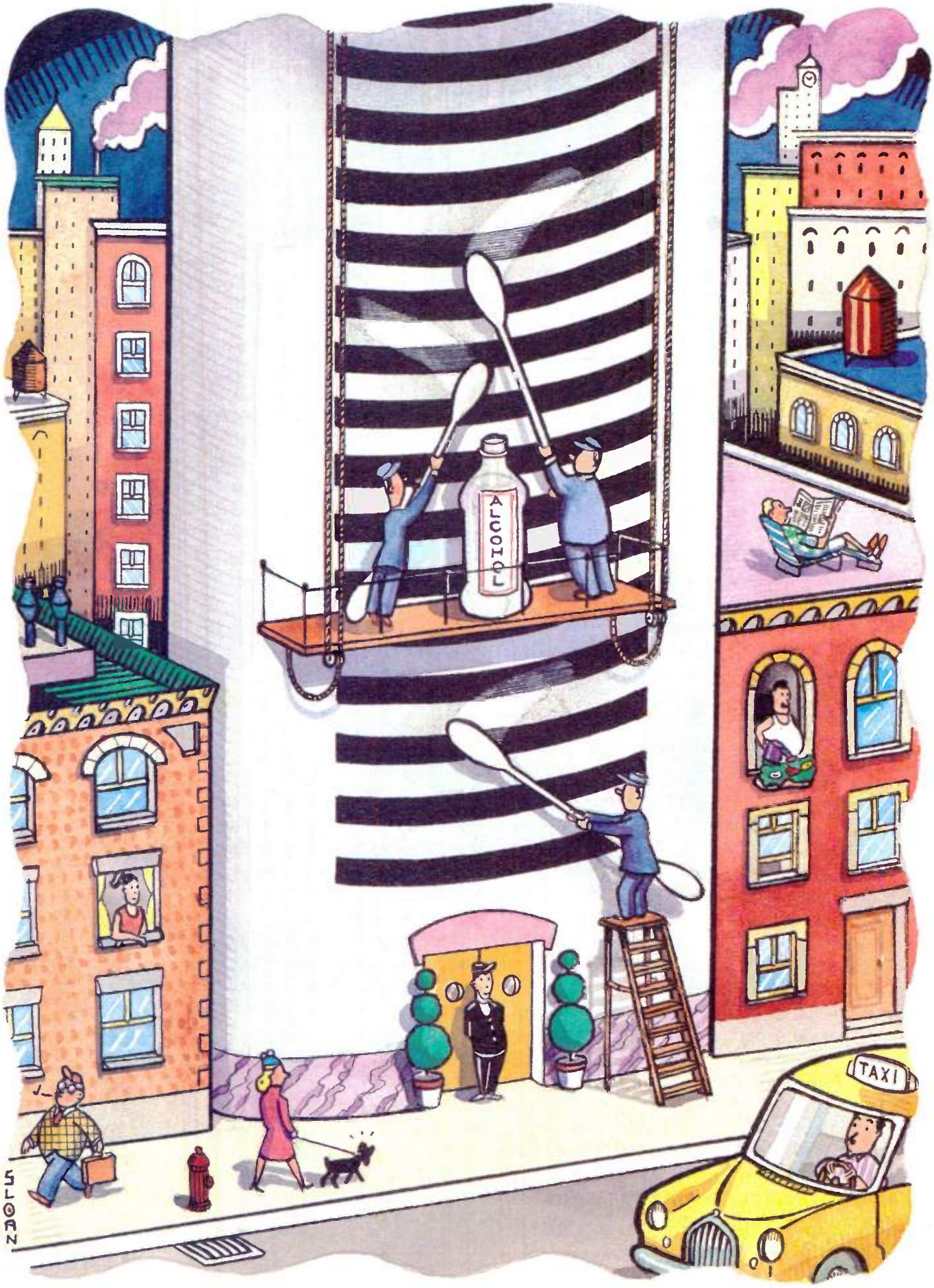

ILLUSTRATION: MICHAEL SLOAN

By Michael Gore

Swabbing the deck

Sparkling clean heads help your recorder produce sterling tracks.

Whether your personal studio is based around digital or analog tape (or both), you're using magnetic-tape technology not much removed from the 1950s. Yes, your spanking new DAT recorder is basically the same as your trusty Tascam ¼-inch, 8-track analog deck.

Think about it: Both systems record magnetic signals onto tape and convert these signals to audio signals during playback. Both systems also have their own special requirements for keeping tape-to-head contact optimal and your machine working at its best. And whether the recording medium is analog or digital, dirty heads are bad news.

On analog recorders, for example, the tape physically touches the head and must ride across the head-gap area correctly, or you have problems. If your heads are dirty, the first thing you're going to lose is high frequencies. At a tape speed of 15 ips, a 1/10,000 of an inch piece of dirt at your head gap causes a loss of .055 dB at 150 Hz, .55 dB at 1.5 kHz, and a whopping 5.5 dB at 15 kHz. Because you really can't hear a 1 dB change in level, low frequencies seem unaffected. But that 5.5 dB

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Studiomaster

Swabbing the Deck

loss at 15 kHz knocks out enough high frequencies to ensure things don't sound right on playback. And dirty heads cause dull, inefficient recordings that *never* sound good. All this trouble caused by a .0001-inch speck of dirt!

Furthermore, dirty heads and guides can also cause tape-speed problems. Remember that much of what is stuck on the heads is the emulsion that binds the finely ground iron particles to the backing of the magnetic tape. It's almost like smearing glue across your heads—a sure-fire way to impede or even stop the movement of tape. The message is clear: Keeping your heads clean isn't just a matter of neatness; it's essential to sonic survival.

ANTISEPTIC ANALOG

Luckily, the cleaning process is relatively simple, so read it, remember it, and *do* it. Let's start with analog recorders. First, get some cotton swabs and a bottle of isopropyl alcohol. These supplies are available at any corner drugstore. I've found that 99% isopropyl works better than the more common 80% solution, but the 80% mixture will still do the job. Also purchase a hand-held magnifying glass and a small flashlight. Your total supply cost should be about twelve bucks, and that's a ridiculously small investment for such gear-saving tools.

Now, set your machine on its side so you can get to the heads and see them through the magnifying glass. Dip a cotton swab into the isopropyl alcohol, straining out some of the wetness by twisting the cotton puff around the neck of the bottle. The idea is to have a damp swab, not a dripping wet one. Gently, but firmly, scrub the heads and all points that the tape travels across.

DAT ERROR TRACKING

When your DAT recorder is brand new, one of the best things you can do is grab a fresh DAT tape and record silence (no signal input) from start to finish. Label this tape "New Recorder Tape," put the date on it, and file it away. As a failsafe, be sure to move the DAT's safety tab to non-record. Later on, you can use this tape to test your current error rate against the way your DAT worked when brand new.

Professional DAT recorders often allow the user or repair technician to monitor data error rates. On the Panasonic SV-3700, for example, you simply press the Counter Mode, Counter Reset, and Pause buttons simultaneously. Once in Error Rate mode, you press the counter button to scroll through the display. The first screen is the digital-input mode (AES or IEC); the second screen reveals the error rate for both the A and B heads (maximum error rate is 9,984); and the third screen shows the error rate for the A head only (maximum error rate is 4,992).

If you go into Error Rate mode for both heads and play the tape you made when the unit was new, you should get few, if any, error counts. Obviously, zero errors is a perfect reading. Normal errors run about 100 or less, and the "Cleaning" warning should begin to flash at approximately 500 errors. System muting starts at 1,000 errors.

In a healthy DAT deck, the errors are evenly divided between both heads. You should check this by confirming that your A-head error reading is approximately half the error reading of the A and B heads together. A clear majority of errors on one head indicates that it is dirty or (yipes) going bad.

Although DAT heads—by virtue of their rotation speed and design—form a tiny air gap between tape and head, they can still wear out. In fact, one major manufacturer recommends replacing DAT heads every 2,000 hours of use. That replacement schedule can be a bit tough for home recordists, but you should be aware of it. If you judiciously clean your heads and have a qualified tech occasionally "tune up" your recorder, it should reach and exceed the 2,000 hour mark still producing marvelous audio.

Swabbing the Deck

Take care when cleaning the capstan shaft that no fluid runs down into the capstan bearings.

You'll need more than one swab to do a pristine cleanup; never, *ever* dip a dirty swab back into the clean alcohol. When you think your heads and guides are clean, look through the magnifying glass to ensure that all the dirt and tape gunk has been eradicated. The areas many engineers miss are at the very top and bottom of the head stack. Don't let any dirt gremlins survive your scrubbing. Even a small bit of missed gunk can grab bits of dirt off the tape as it flies by the heads. Soon the gunk stacks up and you're right back where you started from.

If you encounter tenacious dirt, use a wooden toothpick to gently scrape the stuff away. Wood is much softer than the metal composition of your heads, so don't worry about scratching them. Of course, use only enough pressure to remove the stubborn gunk. A toothpick also works wonders if your heads are old. The grooves that invariably get worn above and below aging heads are ideal dirt receptacles. Get into those grooves with the tip of the toothpick and knock any gunk loose.

You can also use isopropyl alcohol to clean the rubber pinch-roller, although the alcohol will eventually dry out the rubber. I highly recommend replacing your pinch roller every two years anyway, so hastening its demise by using alcohol is not a concern.

However, if you want to get more life out of the roller, special rubber cleaners exist that do not dry out rubber surfaces. (TEAC makes a popular rubber cleaner.) Again, just dampen your swab and rub the dirt off. Use a clean swab every time until all the visible brown dirt is removed. Don't use so much cleaning fluid that it washes out the lubrication in the pinch roller bearings. And don't forget to demagnetize your heads and guides from time to time. (For more information on tape-deck sanitizing and head demagnetizing, see "Home Studio Maintenance" in the December 1992 **EM**.)

Cleaning tapes provide a blissfully easy method for scrubbing up the rotary heads of DAT recorders such as the Fostex D-10.

DISINFECTED DIGITAL

Cleaning the heads on a DAT deck is usually done by inserting and running a special cleaning tape, making regular maintenance so easy a child could do it. These products can be purchased at most audio dealers if not supplied by the manufacturer of your deck.

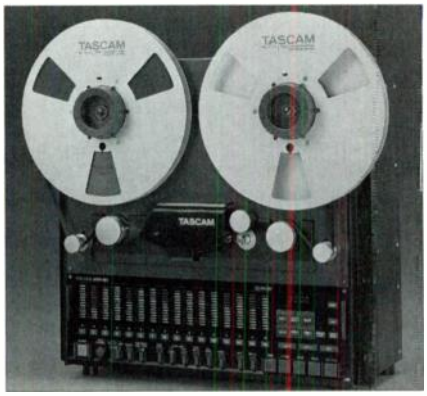
If you keep getting the "Clean the Heads" warning, and the cleaning tape doesn't clear the problem, it could mean that some gunk is caught deep in the head assembly where the cleaning tape can't reach. I recommend that you take the unit to a reputable equipment technician and pay the $25 or so to have the heads and tape path professionally cleaned. A good technician will do a better job than you can, and a tech knows when a unit requires a realignment, rather than just cleaning.

When a client brings in a DAT deck for cleaning, I do a lot more than just clean it. I test it for tracking anomalies and run it through various tests I've developed over the years. I think it's $25 well spent, but you can clean the deck yourself, so long as you do it carefully, and you understand that you can easily damage your heads. Remember that once you open up the recorder, you're also in danger of voiding your manufacturer's warranty.

If you decide on the do-it-yourself route, you'll need different cleaning tools than those used for analog decks. First, *never* use cotton swabs or isopropyl alcohol. Miniscule cotton threads from the swabs can attach themselves to the rotary DAT heads and cause utter mayhem. You must use special chamois cleaning sticks available at most electronics supply shops. These are designed specifically to clean DAT and VCR heads. Isopropyl alcohol is not a recommended cleaning solution for these types of heads, so you will also need a bottle of DAT/VCR head cleaner. Once again, a magnifying glass helps you see what you're doing. The total cost for these supplies should be approximately $30.

Before you do any cleaning, turn off your DAT deck and unplug it from the AC line. Now, open up your DAT recorder, locate the rotary head assembly, and use the magnifying glass to find the heads. These are typically the two small units housed in the cut-out center of the head assembly. Very carefully, without touching anything else, use the tip of the chamois stick to gently move the upper drum of the rotating head until you have a clear path to the first head. The drum can be moved by gently touching the outer part of the upper drum (just above the head path) and moving it slightly until you see the head. Dip your chamois stick into the cleaning fluid and gently brush the head sideways a few times. These heads are *extremely* fragile; if you apply too much pressure you'll snap the head right off. Be careful. Don't try to save $25 and end up spending $300 to replace a butchered head.

To get to the second head, you'll again move the upper drum assembly until you see the next head. Repeat the cleaning operation. Next, gently clean the entire head assembly and tape guides. A sensitive hand is critical, because too much pressure can knock the assembly out of alignment. Give the unit a few minutes to dry, then replace the cover, plug in the AC, turn the unit on, and play a prerecorded DAT tape. If the "Cleaning" warning comes on again, repeat the cleaning



Keeping analog decks, such as Tascam's MSR-16S, sonically happy requires constant cleaning of the record, erase, and playback heads.

Swabbing the Deck

process. If a second cleaning does not clear up the problem, you have worn heads or a unit that is severely out of alignment. Either way, it's time for a visit to your local technician.

Most of the time, a DAT deck responds to a simple run of the cleaning tape, so always try this first. If your deck eats a tape, open the unit up and remove the tape from the guides and rotary head assembly. A DAT deck (or modular digital multitrack) is far more fragile than its analog counterpart, so be careful. Never use metal tools to pry a tape from a digital recorder. If a tape is really stuck, cut one side of the tape and try to gently pull the other side through the unit and out of the deck before you open it up. But above all, do *not* get angry and yank out the tape!

CLEAN UP YOUR ACT!

By now, it should be apparent that one of the most important things you can do to improve the quality of your recordings (and the lifespan of your recorder) is amazingly simple: Clean the heads and tape path! Everyone knows this, but I'm constantly shocked by how few people actually do it.

Many talented engineers have brought machines to my shop complaining about speed fluctuations and insisting that they need new motors. All I usually find is gunk caked all over the heads and tape guides. Without fail, once I scrub and scrub to clean the gunk off, the speed problems disappear. This irritates me, because these are professionals who know they should clean their heads and guides, but are just too lazy to do it. Please, do not fall into the dirty habits of these offenders. Keep your heads shining clean, and your music will reap the benefits of pristine, uncompromised sound. That's not a bad return for a few swipes of a cotton or chamois swab!

Michael Gore *is owner and chief technician of Bay Area Studio Engineering (BASE) in San Francisco.*

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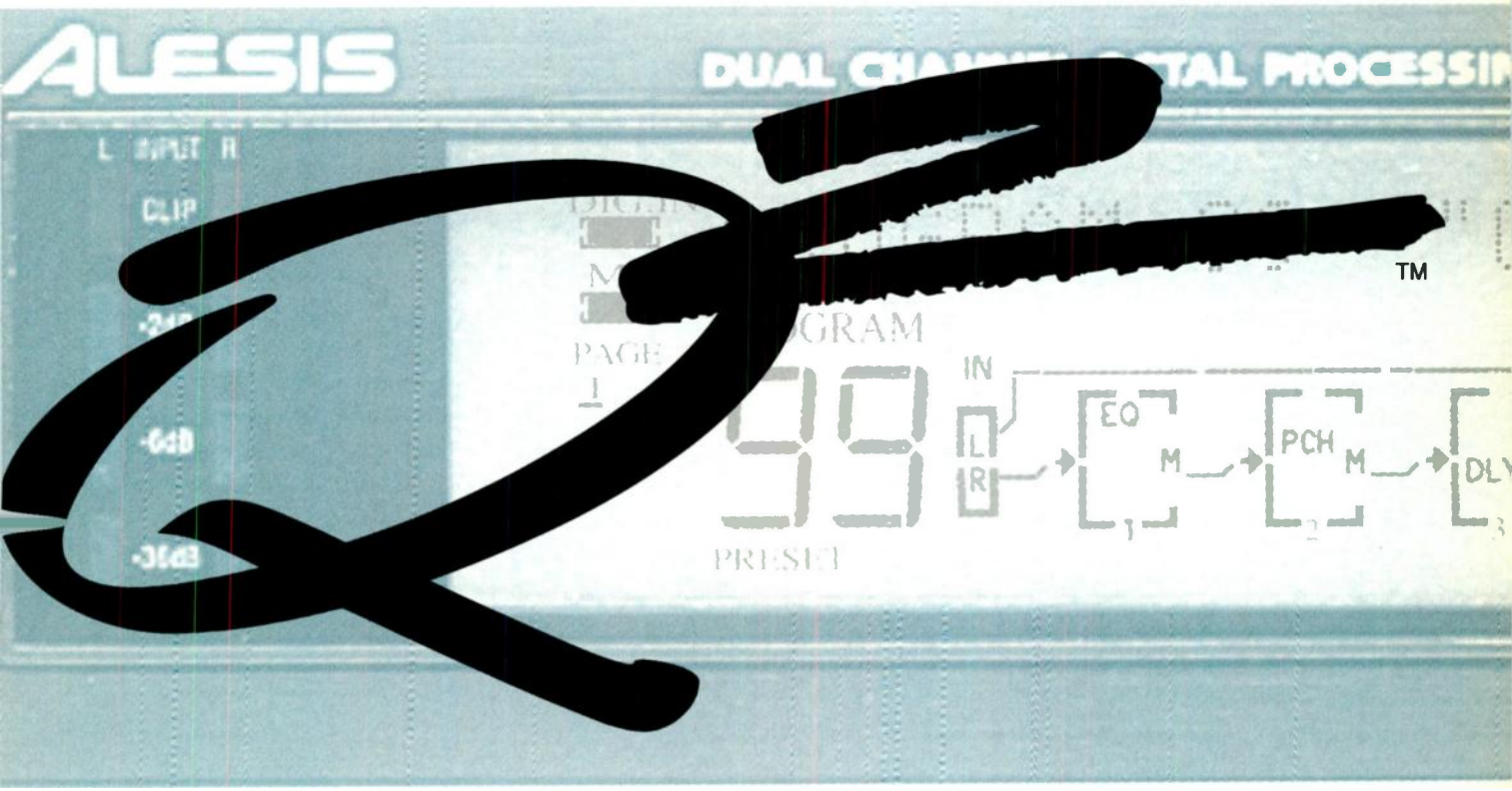
IN 1994,
ALESIS ANNIHILATES IT.



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The Beat

LET'S FACE IT, YOU CAN'T RECORD A successful pop, rock, or dance record without some beefy, in-your-face snares, kicks, and toms. Nobody's toe taps along with a set of wimpy, cheesy drums. In fact, many top producers made their reputations because they delivered killer drum sounds.

Unfortunately, most of us don't have session drummers at our beck and call, or a soundproof room where we can record drum tracks at all hours. Drum machines and sample-playback synths are obvious solutions to these problems, but the manufacturer's sounds might not be *your* dream drum kit. So it's time to fire up your tape deck and sampler and get to work.

THE RIGHT STUFF

Sampling percussion instruments seems such a simple matter. You stick a mic in front of a drum, and you hit it. What could be easier? Alas, like many things in life, sampling drums is a lot harder than it appears.

Let's start at the beginning. Just because you have a sampler and a sequencer doesn't mean that drummers are left out of the sampling equation. When you need drum sounds, it makes sense to consult a drummer. Good percussionists think a lot about which drums and tunings suit their needs and tastes. They've probably tried out lots of kits before settling on the one they own. Describe a particular snare

By Jim Miller and Eric Chun

Photograph by Leslie Hirsch

Photo Stylist: Kathleen Blake; Drummer: Phil Christ of The Nines; Models: Erica Peterson and Quinn Aguirre.

Generation

Hip Samples Make Cool Beats, Daddy-O

TO MAKE OUR MIXER SOUND JUST LIKE THE COMPETITIONS' WE'D HAVE TO GET RID OF ALL THIS!

INTRODUCING THE

SPIRIT FOLIO RAC PAC

CHANNEL INPUTS

The Spirit Rac Pac offers mic and line inputs on all mono channels with gain adjustments from -50 to +8. Also included are two stereo channels (4 line level inputs) for single fader control of your stereo keyboards or drum machine.

MID SWEEPABLE EQ

With the Spirit Rac Pac we let you select the frequency points from 250Hz to 6kHz. Our competitors select your mid frequency points for you. (We think you're intelligent enough to decide what's best for your music!)

TRUE DIRECT OUTPUTS

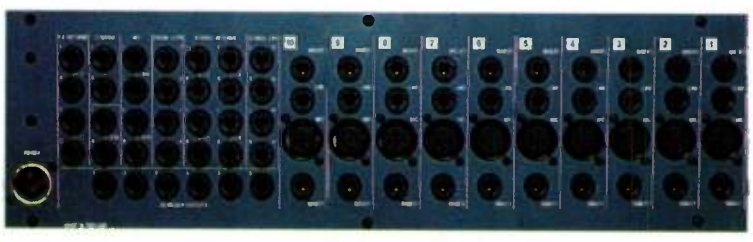
The Spirit Rac Pac features individual inserts **and** true post fade equalized direct outputs. The competition makes you choose one or the other. And, if you choose direct outputs, your signal bypasses the EQ.

AUXILIARY LOOPS

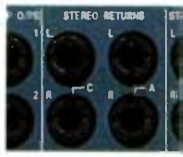
The Spirit Rac Pac gives you 6 auxiliary outputs, and the ability to solo all 6, not just the first 4, like other

HOW WE RACK UP AGAINST THE COMPETITION

	SPIRIT FOLIO RAC PAC (RP 28)	MACKIE 1604	SAMSON 2242
TOTAL NUMBER OF INPUTS	28, including 6 returns & tape returns routed to mix.	24, including stereo returns	30, including 4 stereo returns
EQ	3 Band with sweepable mid on Mono inputs 3 Band fixed on stereo inputs	3 Band fixed only	4 Band fixed
AUX SENDS	6 (Aux 1 - always pre-fade, Aux 2 - Pre/post switchable globally)	6	6
STEREO RETURNS	6 (4 stereo returns, 2 stereo FX returns)	4	4
HIGH PASS FILTER	Yes (at 100Hz)	No	No
SUB GROUPS	4 discrete	No (2 separate stereo buses)	No (2 separate stereo buses)
TWO TRACK RETURN	Yes	No	No

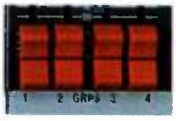


mixers! Plus, the Rac Pac provides a return for all 6 with stereo returns. That's 12 additional inputs



4 SUB GROUPS

The Spirit Rac Pac provides 4 discrete sub groups which are assignable to separate left and right stereo outputs. Other mixers require you to sacrifice your channel mute function to achieve 4 sub groups



EXTERNAL POWER SUPPLY

The Rac Pac provides an external power supply, which eliminates any chance of that annoying 60 cycle hum!

With built-in features like a high-pass "rumble" filter, direct outputs on all mono channels, true sub groups, and a full master section with control room outputs and two track returns, why would you settle for anything but the Spirit Folio Rac Pac?

SPIRIT
By Soundcraft

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sound, and they might point you toward a 3 × 13 brass piccolo snare, or a 6 × 14 mahogany model. Many serious drummers own several sets of drums and more snares than they can count.

Of course, you can always rent a drum set from your neighborhood music store. But if you walk in without knowing where to start, you'll never be able to choose from all the drums lining the walls. Again, a drummer can help. Odds are, they have cruised those same aisles, whacking snares and toms for hours at a time. They may even be buddies with the drum-department manager and can get you the drums you want with a minimal rental deposit. Repeat after us: "We like the drummer. The drummer is our friend."

But whether you know a drummer or not, you should develop some idea of the type of drum sound that fits your needs. First, consider your style of music. Will the percussion track compete with lots of screaming guitars and synths, or get down in the trenches with a dirty Wurlitzer electric piano and a thumping bass? The cymbals in a rock kit, for example, are usually heavy and bright in order to stand out against the guitar and bass. The snares and toms are big and deep, with thick heads, and the toms are often tuned to a wide tonal range.

The trend today is toward more resonant shell designs that create an ambient sound, projecting the tone out, rather than "canning" it. Your bass drum should be tight, with lots of attack. And the sticks you use to pound on the set should be heavy, preferably with plastic tips.

Conversely, if you're after a more intimate retro or jazz sound, the drum sizes become smaller and the toms more closely tuned, with a thick, loose, bass-drum sound. The cymbals are lighter, with more overtones. You may want some muting on the drums, which can be accomplished with duct tape, or a commercial product such as Remo's overtone strips.

You can find all sorts of woods in modern drum shells, the most common being eastern rock maple, but you'll also see birch, walnut, mahogany, and exotic woods. Some drums have three to nine plys of various thicknesses and different combinations of woods, such as ash/mahogany or mahogany/poplar. You'll also see various covers or coatings, such as a plastic cover or a lacquered shell. Generally, the more freely the wood can breathe, the more it will resonate. In most cases, look for drum shells with the least amount of coatings.

Snares come in an astounding variety of materials, from solid brass and copper to multi-ply woods. They come in all sizes, too, from 3 × 13 piccolos up to 15-inch-deep military snares. There are also hardware issues to consider, such as rims that isolate metal hardware so that it doesn't interfere with drum-shell vibrations (generally a good idea).

Finally, you have to select the drum heads. There are as many heads as there are drums, and just as the construction of the shell can influence the sound of the drum, so can the head. Today's heads are usually made from mylar, which may be rough, smooth, laminated, or sprayed with a variety of coatings.

Though they are important, don't let these details distract you. Also, you should keep in mind that anything we advise here is no more than a rough guideline. Trust your ears. We strongly advise, however, that you sample more drums than you think you'll need, particularly snares. (Does anyone ever have enough snare sounds?) A good collection of varied sounds comes in handy when the sound you *knew* would work, doesn't.

TUNING TRIBULATIONS

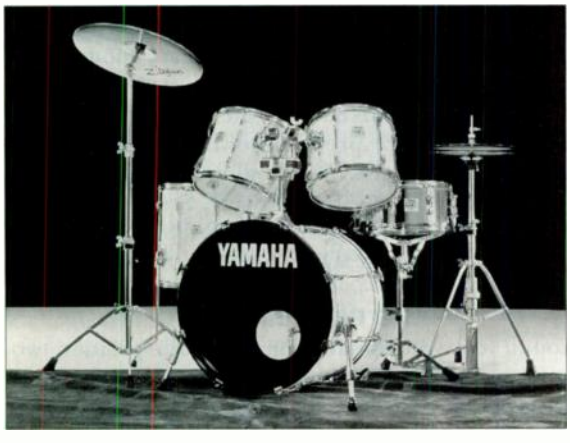
Few things can be more frustrating than tuning drums, particularly toms. Snares and kicks can be surly beasts, but nothing beats a set of toms for sheer torture. Experience is a great teacher here, so let's repeat all together now: "We like the drummer. The drummer is our friend." You might also add a humble, "The drummer will make our lives infinitely richer by simply tuning these accursed toms!"

Zildjian's chinas (top left) are brash sounding cymbals.

Finding compatible pitches can be a problem, even with new drums. It's not enough to get a tom in tune with itself, it needs to be in tune with the other toms in the kit. A large part of tuning depends upon the fundamental pitch of the shell, so it's best to use a matched set of toms. Try to keep the tunings in intervals that sound natural. A veteran drummer can hear a fundamental tone in each drum. By listening carefully, so can you.

An out-of-tune tom can create a marvelous vibrato effect, which is great if that's what you're after. If not, well, it stinks. If you're faced with this challenge, think of your ear as the microphone. Place your ear about two to four inches away from the drum head. Strike it fairly lightly and listen. If there is any wobble or vibrato, you will have to readjust the tuning lug nearest the offending tone.

You can often find bad pitches by striking the drum head close to each lug with your finger or the stick and listening carefully. Sometimes a little



The basic trap kit, ready for sampling.

the close mics if you want a dry "swack," but we like to hear the sonic space of a drummer playing in a room.

The sound of kick drums are especially enhanced by close-miking. Again, dynamic mics are a good choice. AKG D112s work well, having been designed specifically for this application. You might try putting one mic (such as an SM57) behind the drum head by the beater and another in front. Some drummers remove the front head of the kick drum, which lets you stick your mic inside for additional punch and power.

For cymbals, we recommend using just the main stereo pair. We've found that adding more mics to cymbals can muddy the sound, damage the stereo image, and even create some unusual phasing problems. Be sure to record plenty of hits, scrapes, crashes, and pings. You should also keep in mind that cymbals sound quite different depending upon where and how hard you hit them.

(For more ideas on recording drums, see "Recording Musician: Tracking Drums" in the October 1992 **EM**.)

PROCESSING YOUR SET

At this point, you should have recorded an hour or more of drum hits. Now comes the most time-consuming part of the project: choosing which recorded hits to digitize and use for your final sample set. We've found the best way to sort through the hundreds of recorded hits is to simply set the tape counter to zero, grab a pad and pencil, turn on the tape machine, and listen. In just about every case, the best hits jump out at you. When you hear one, write down its tape-counter number. At the end of two hours (or however long your tape is), you'll have a list of drum and cymbal hits that will be easy to go back to and grab for your sampler.

Because drum samples don't have to be looped, it's generally easy to digitize a whole bunch of one particular sound (such as a snare), then conduct the final cut in the sampler. A few sounds will really stand out, and you can dump the rest. (Of course, you still have them on tape.) You can then proceed to the toms and kick. Save the cymbals for last, as they eat up a lot of memory.

You may want to add EQ and effects while sampling. Parametric EQ gives you tremendous control over your final sound, but a graphic EQ will do fine. Don't expect the EQ on most semipro recording consoles to do the trick, however. Few of these mixers let you set the frequency of the low and high EQ, though they usually let you sweep the midrange within a limited bandwidth. It would be impossible for us to even begin giving guidelines for equalizing your set. Suffice it to say that almost anything goes as long as your final sound is good.

In addition, compressors, expanders, gates, and sonic enhancers can be fairly inexpensive and are a big help. Compressors are especially useful for producing beefy kick and snare drums (see **Figs. 1-5**). The effect is similar to that of analog tape saturation. Expanders help deliver more attack to your drum samples by diminishing environmental sounds below the threshold level of the actual impact.

If you have a Macintosh and a Digidesign sound card (Audiomedia II or better, plus *Sound Designer II* software) check out Jupiter Systems' *Multiband Dynamics Tool*. (*MDT* is reviewed on p. 139 of this issue). This software program allows you to do real-time dynamics processing within the *Sound Designer II* environment. You can take a snare sample, for example, dump it to your Mac, process it, choose the sounds you like best, and dump them back to your sampler. No more rewinding the tape, twiddling with knobs, and resampling! (For more tips on compression and dynamics processing, see "Recording Musician: Maximum Compression" in the December 1993 **EM**.)

Finally, you may want to add reverb or gated reverb to some of your drum sounds as you sample them. Recording samples with effects can free up a signal processor when you mix and gives you the option of using either a clean, unprocessed kit, or one with reverb. We've had particularly good results with a Zoom 9200, but just about any high-end reverb should produce excellent samples. Better yet, by recording your drum kit in a large, ambient room or hall, you'll have a lush sound that no effects processor can match.

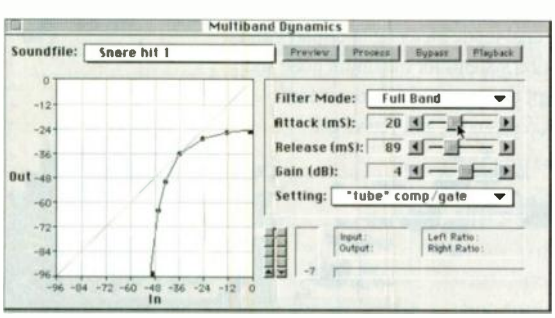


FIG. 4: Again using *MDT*, we process the same sample through a tube-like compander with gate. Anything with a value below -48 dB is gated, and the loudest portion of the sound (near 0 dB) is compressed by 3:1.

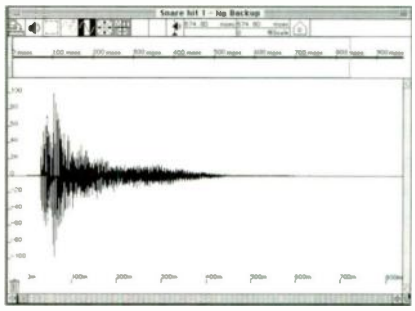


FIG. 5: The result of our processing in Fig. 4 is a more natural sound than with simple compression. It has increased saturation after the attack, then decays rapidly to silence, thanks to the gate.

NOW BEAT IT!

With all this information, we know you're dying to get started recording your own drum samples. It's certainly a lot of work, but the results are much more gratifying than using someone else's samples from a drum machine. Once you have the samples in place, not only can you trigger them yourself, but your pal the drummer can play the parts into your sequencer from a MIDI drum kit. So remember, although it's okay to beat your own drum, it really pays to be nice to your friendly local drummer.

Jim Miller *is co-owner of Stratus Sounds, a consultant to Sweetwater Sound, and author of numerous* **EM** *sampling articles.* **Eric Chun** *is a session percussionist, keyboardist, and wind player and is owner of Creative Music Services in Auburn, California.*

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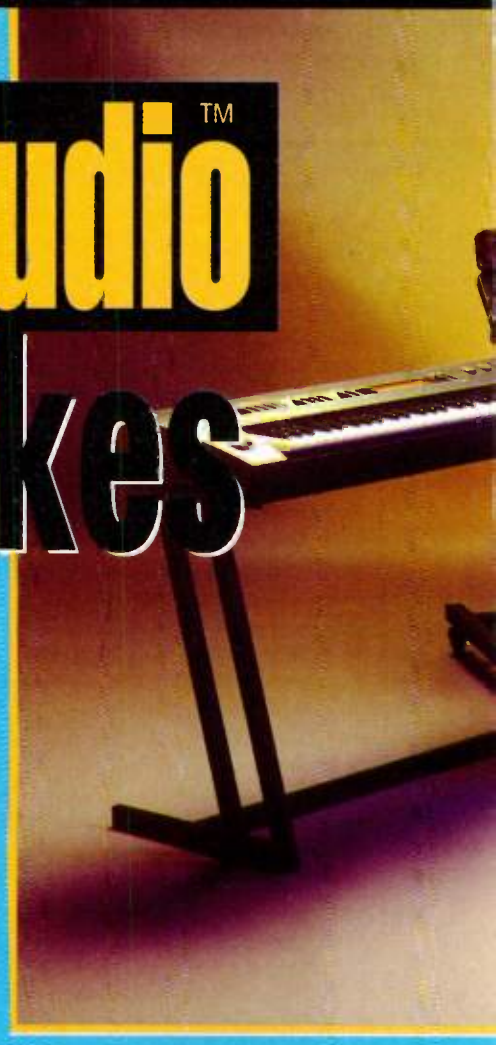

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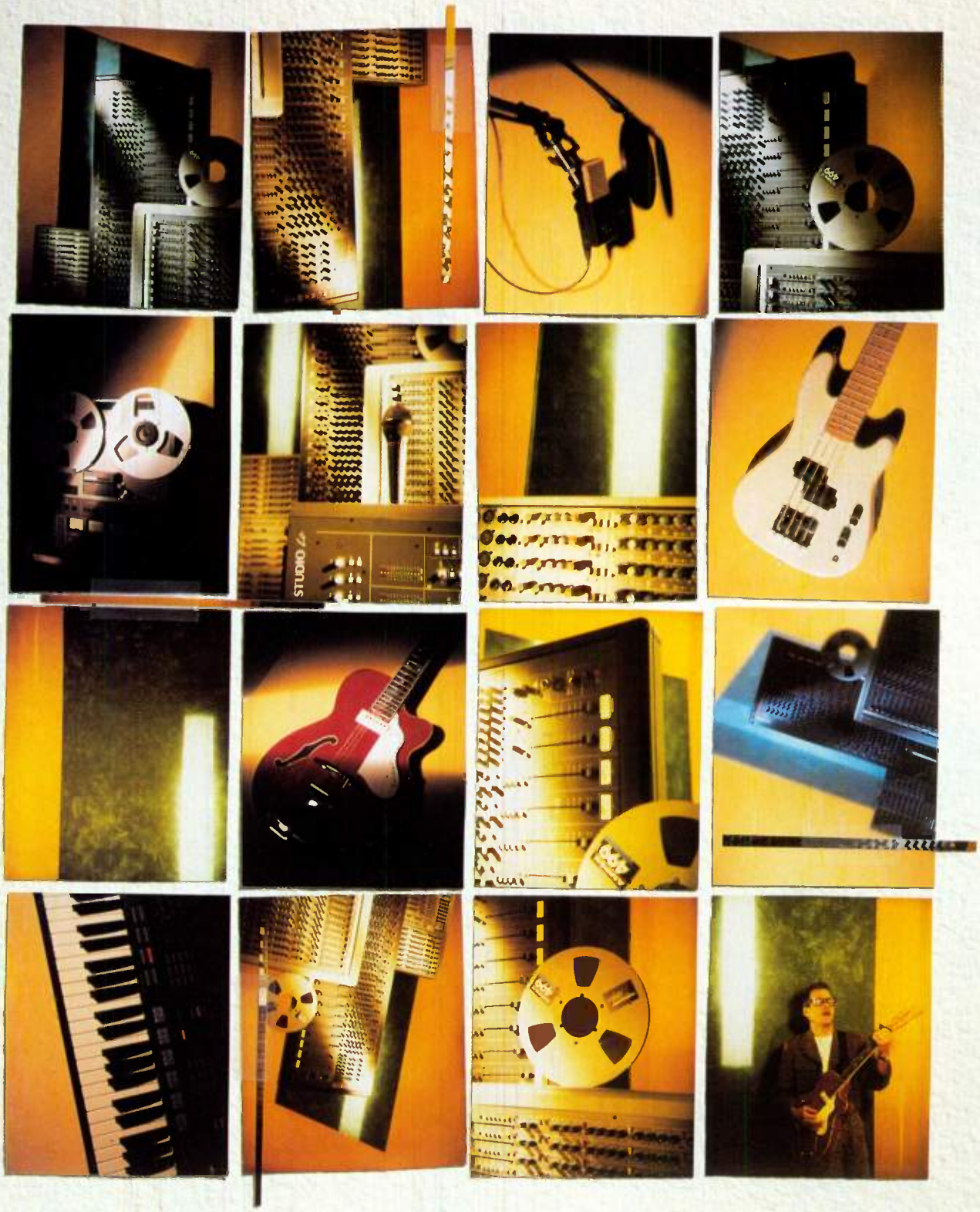

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the BRITish invasion

FOUR MIXERS WITH BRITISH EQ DUEL FOR SONIC GLORY.

■ My favorite car was also my worst nightmare. It was a beautiful British roadster, a midnight blue Triumph Spitfire that taught me the meaning of fear every time I started the engine. Fear that the little noises clacking under the hood were death rattles; fear that the temperamental electrical system would start another brush fire behind the dash; fear that the clutch and brakes would go AWOL before I was safely in my garage.

Why did I put up with all this trauma? Because, with the top down on a warm summer day, this cantankerous sprite could transform a jaunt to the grocery store into a religious experience. Top down, wind in hair...could life get any better? Even when I cursed Triumph's erratic craftsmanship, I couldn't deny the magical feeling of just sitting behind the wheel.

I get the same tingles when I plop down behind an English mixing console. To me, the audio world offers few things more spectacular than the sound of British EQ. It's quirky, aggressive, and definitely not transparent, but it puts the music right in your face. And thanks to the on-going explosion of affordable, pro-quality studio gear, recordists can now buy a *British* 8-bus mixer without marrying into the Royal Family. Is a British invasion of the personal studio imminent?

To help you decide whether to resist or surrender, we evaluated four consoles with British EQ, limiting our face-off to 8-bus models costing less than $4,500. The Allen & Heath GS3, Soundcraft's Spirit Studio LC, and the Studiomaster P7 have true British bloodlines. Sound-Tech is an American company, but its Panoramic-S mixer was designed by Britain's John Oram (who designed many classic Trident mixers) and is manufactured in England. So take up arms (and ears and hands) and rally around the British audio invasion. There's nothing to fear: These fine English mixing boards are much more reliable than my beloved Spitfire.

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ENGLISH MANNERS

Although these boards are products of the British "class system," they share traits common to other 8-bus mixers designed for personal and project studio use. For example, all four mixers have fixed top panels. Unified construction is fine, until you need repairs. Then, you'll have to ship the entire mixer to a service center, resulting in unavoidable down time. Most expensive pro consoles are modular designs that allow faulty channel strips to be removed for repairs without affecting the rest of the board. Obviously, modular construction is preferable, but cost considerations have made unified design the staple of the affordable mixer market. (However, even this situation is changing; Tascam's new M2600 consoles are semi-modular in 8-channel sections.)

Each board offers in-line monitoring, which means the monitor controls are contained within the individual channel strips. Some consoles "split" the monitor controls away from the channel strips, typically placing them above the subgroup faders. Split designs can be a drag during recording, because you're constantly looking off to the monitor section to find and adjust track volumes. On an in-line board, the monitor level controls are right in front of you.

In addition, the quartet offers dual-input capabilities. At mixdown, unused line inputs can be configured as additional signal returns, effectively doubling the capacity of the input section. A 16-channel board with this feature can be considered a 16/32-channel mixer; a 24-channel board, a 24/48-channel mixer; and so on.

Every board—except the Panoramic-S—allows you to "flip" the line input (normally controlled by the monitor section) to the main channel strip, and vice versa. This feature allows you to process critical input signals through the main channel EQ and effects sends.

Each mixer also provides inserts for channels, groups, and the main stereo bus. (The exception is the Panoramic-S, which offers everything but a stereo insert.) The GS3 has post-fader aux sends and solos configured as PFL (Pre-Fader Listen), while the other boards offer a combination of pre- and post-fader sends and true solo-in-place.

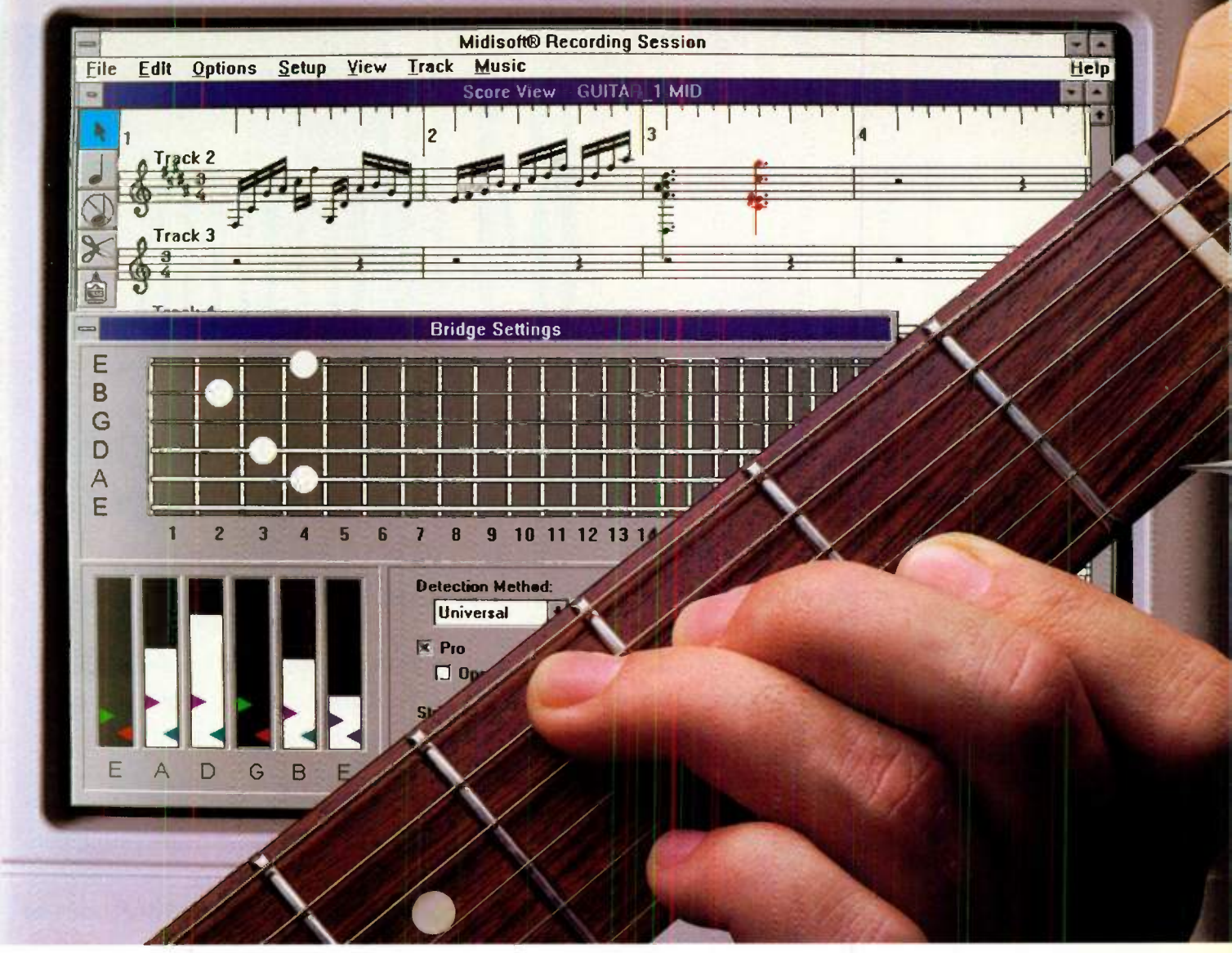
INS AND OUTS

Connections on each of the mixers are facilitated by meticulous labeling. Every input and output is sensibly arranged and marked with an easy-to-read, silk-screened description. Even novices should be able to connect power amps, monitor speakers, tape decks, and other devices with ease.

However, the accessibility of these inputs/outputs varies and is divided into two camps. The GS3 and P7 offer top-panel access, while the Spirit Studio LC and Panoramic-S have rear connections. For me, the advantage is clearly with top-mounted I/O. Rear connections are more aesthetically pleasing, because all the patch cords can be hidden in back of the console. But rear I/O also requires a patch bay for easy access, unless you enjoy climbing behind the board every time you want to insert a compressor into the signal path.

Top-mounted connections reveal

SoundTech Panoramic S824



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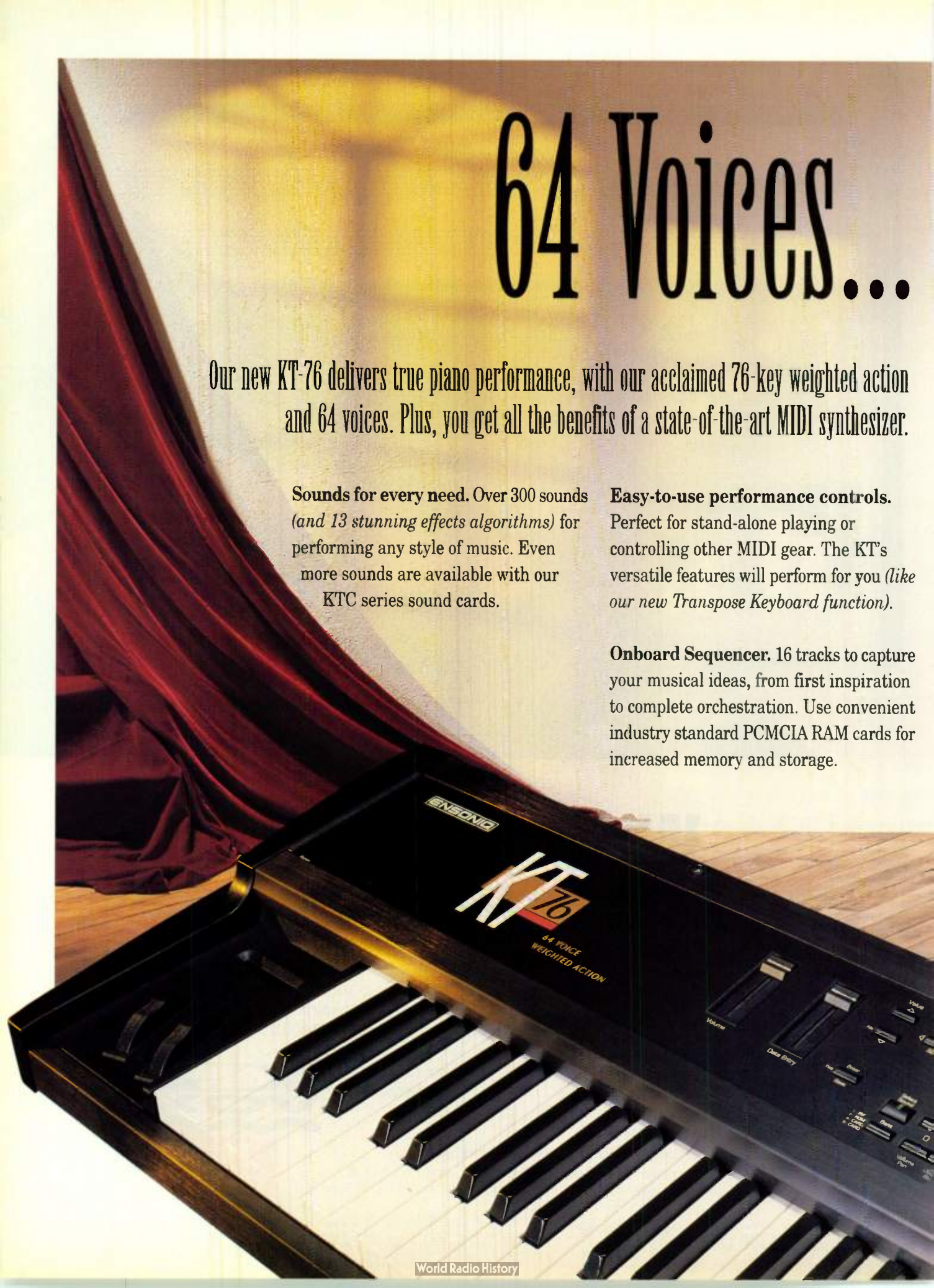

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your cord spaghetti for all to see, but also make for quick, effortless patching *sans* patch bay.

MIC PREAMPS

The affordable nature of these mixers does not seem to have saddled them with cheap mic preamps. Each model possessed an extremely clean and robust preamp that produced minimal coloration. Audible hiss was near-imperceptible, except at full gain.

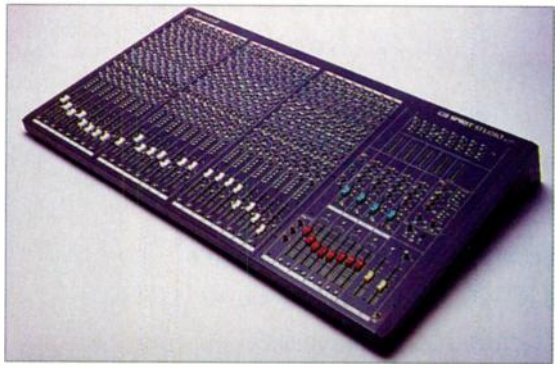
The only deviation from the pack was the P7, which lacked the headroom of its peers. I was always turning down the P7's preamp gain to avoid signal overload. The low headroom didn't affect sonic quality, but the preamp gain structure necessitated an extremely light touch when making adjustments. (A careless twist can be fatal.)

CONTROLS

Mixing on a conventional console is a tactile experience. The controls should enhance the recording process by being easy to see, easy to reach, and a pleasure to manipulate. In addition, every fader, knob, and button must be tough enough to withstand constant handling. We stroked, caressed, twisted, and banged the controls of each board to assess "touch sensitivity."

GS3. The GS3 has a big studio feel that demands respect. All buttons (mutes, solos, group assigns, etc.) are large enough to accommodate stubby fingers and lock down with a reassuring click. Visual confirmation of enabled functions is easy, because the buttons protrude quite a bit above the console surface—it's obvious when they're pressed in. Dedicated LEDs announce when a solo or mute button is depressed.

The knobs for the EQ, pan pots, and assorted volume levels have a tight, smooth feel. Center detents allow no-nonsense confirmation of centered pan pots and "zero" positions for EQ knobs. To save panel space some of the control knobs are piggy-backed with one function atop another. The dual-concentric configuration is fine for the EQ boost/cut, frequency sweep pairing, and the monitor level/monitor pan combination, because the possibility of errors is minimal. If you inadvertently turn both controls, you'll hear the result instantly, and adjust the appropriate control.



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But the aux sends are also on dual-concentric knobs—sends 1 and 2 are grouped together, as are sends 3 and 4—which means a signal could accidentally be routed to two different effects processors (or cue sends). A misrouted effect is a more insidious problem, because it's easy to miss small details in the heat of mixing. It's not a pleasant surprise to finish a mix and realize, on playback, that you've accidentally assigned a multitap delay to the snare track (which is destroying the groove) or washed your percussion in a cavern-sized reverb.

The 100 mm faders operate smoothly with minimal side-to-side rocking. The GS3's faders aren't as luxurious as those on expensive Trident and SSL consoles, but for a $4,500 board, the fader action is surprisingly good.

Spirit Studio LC. The LC's controls feel like they look: frail. In fact, the knobs are so lightweight, they seem to move when you blow on them. The gain knobs, in particular, twirl around easily. Exceptions are the frequency sweep knobs, which have a reassuringly tight feel, and the knobs with center detents (pans and EQ boost/cut controls).

The 100 mm faders are also on the flimsy side. An extremely loose top, which can be pulled of with ease, compromises smooth operation, because it rocks back and forth when touched. This rocking causes the fader to "catch" slightly at the initial movement, making it difficult to do a seamless fade. (The fader tops on the other boards were very tight, didn't rock at all, and took a healthy bit of effort to remove.) Once you get the fader moving, however, the action is smooth.

The buttons are the LC's best control feature. They are large and well-spaced and make that reassuring click when depressed. Mute switches (which are labeled "Cut") have a corresponding LED that lights when channel muting is active. There is no illuminated warning on the individual channel strips when a solo button is enabled; a single LED on the master section flashes when solo mode is active.

Panoramic-S. The Panoramic-S wins the award for coolest controls. Every button, knob, and fader feels like it is hand tooled. For example, the knobs are constructed from a warm, rubber-like material, rather than the cold plastic used on the other boards. The rubber surface gives the knobs a nice, comfortable quality that makes them a joy to touch. The feel is further enhanced by a sturdy resistance when each knob is turned. You really know when you're making an EQ adjustment, because it's a physical exercise. Pan pots and cut/boost knobs have handy center detents, and the line-trim calibration knob clicks firmly into place with every turn (a brilliant feature).

My only disappointment was that the group output buses are controlled by knobs. I'd prefer faders, because knobs—especially knobs *this* tight—make it difficult to evenly manipulate submix and effects return levels on the groups.

The mixer's durable persona is maintained by its group assign, master assign, solo, phantom power, phase reversal, and input select buttons. They are so tightly spring-loaded that they seem to push back at you and lock down with a resounding click. Although most of the buttons are black on black (the solo and phantom power buttons are red), they are raised high enough from the top panel to allow visual confirmation of enabled functions. Each channel has

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a single LED that lights when solo is active.

Like its compatriots, the Panoramic-S has inexpensive 100 mm faders, but they seem tighter and heavier than those used on the other boards. The fader action is very smooth, which made me wish again that SoundTech had used faders for the group output controls.

P7. The knobs on the P7 have a tight, even feel that compares with more expensive consoles. So I was shocked to discover that all the pan and EQ boost/cut knobs do not have center detents. Center detents may seem like a small thing, but it's comforting to confirm null settings with an obvious click. You don't have to squint to see if your midrange EQ is in the flat position, or if the pan pot is slightly off-center.

Button configurations are erratic. The buttons for EQ cut, direct assign, and similar controls are horizontal shapes. These are a generous size, easy to see, and lock down with a tight click. The controls for solo, mute, group assign, and phantom power, however, are small, square buttons that are tightly packed against other knobs and switches. Separate LEDs on each channel strip illuminate whenever a solo or mute is active.

The P7's 100 mm faders have the largest top knobs of the quartet, and the extra finger space makes them the most comfortable to operate. Overall, the fader action was very smooth, with just a little more jiggle than the GS3 and Panoramic-S.

THE EQ FACTOR

Despite all the fine features of these British consoles, the real object of desire is their EQ. To evaluate each mixer's tone-shaping power, we mixed a series of Alesis ADAT sessions that covered everything from live bands to sequenced MIDI tracks. How a board's EQ treated male and female vocals came under intense scrutiny. In my experience, if a board's tonal control is going to falter, it's the timbral and dynamic complexities of the human voice that will bring the EQ to its knees. Other acoustic instruments featured in the tests included trap drums, tablas, vibes, bells, saxophone, grand piano, various acoustic and electric guitars, and harmonium.

GS3. Several 8-bus boards allow you to assign part of the channel EQ to the monitor section during mixdown. The GS3 goes one better by giving the monitor section its own low frequency (100 Hz) and high frequency (10 kHz) controls. This dedicated monitor EQ leaves the channel EQ intact for optimum tonal control. The full channel EQ starts with a fixed 12 kHz high-frequency. Low frequencies are sweepable between 20 Hz and 600 Hz, and mids are sweepable between 300 Hz and 12 kHz. Maximum boost/cut is 14 dB for all frequencies. An EQ button activates the channel EQ so you can compare the original source sound with its equalized version. No such button is available for the monitor section; you have to return the EQ knobs to their null position to check the flat sound.

Overall, the GS3's EQ sounds very clean, bestowing a pleasing shimmer on everything it processes. The low end is warm and solid, but not particularly aggressive. I would have liked a bit more boom on electronic kick drums. Control of the mids is

Allen & Heath GS3

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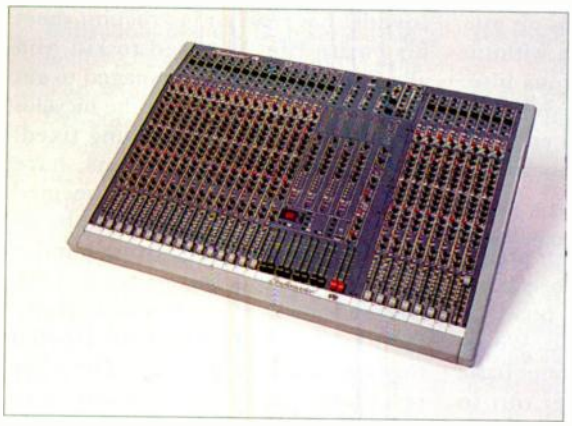
Even the input flip feature is obvious: The GS3 has a Rev[erse] Tape/Line button; the Spirit Studio LC offers a Flip switch; and the P7 provides a handy Input Swap. The only trickster was the Panoramic-S. The console has no dedicated monitor-level controls; input and monitor levels are controlled by the channel faders. So it took a fair amount of reflection and button-pushing before anyone figured out the board's dual-input capability.

The Panic Mix. Okay, basic comprehension is one thing, but how about grace under fire? Let's say the president of Hollywood Records pops in for a visit, goes nuts over your new song, and wants a rough mix before the limo whisks him away for an important meeting. (Hey, this stuff happens all the time!) Can you produce a credible mix from scratch *in less than five minutes?*

This exercise is not just a game. The ability to work swiftly has saved the careers (and *derrières*) of countless engineers and producers. Luckily, the GS3, Spirit Studio LC, Panoramic-S, and P7 can help you beat the clock without breaking a sweat. The intuitive layout of each board facilitates rapid-fire mix moves.

I simulated a panic mix using an 8-track ADAT recording of a live Pharoah Sanders session. I was only trying for a rough balance, concentrating on instrument levels and EQ adjustments only. The tracks included saxophone, acoustic piano, group vocals, drums, and assorted percussion. In an admittedly subjective exercise, I hit a stopwatch, pressed Play on the ADAT, brought the faders up, and worked until I achieved a cohesive mix. Then I stopped the timer.

The P7 was the speed demon. In just 45 seconds, I produced a full-sounding, well-articulated mix. I also burned rubber on the GS3, achieving a rich sonic blend in just one minute flat. The mix on the Panoramic-S took one minute and fifteen seconds, but I fumbled with its wide midrange sweep (100 Hz to 10 kHz) and failed to zero-in on warm timbres for the piano and sax. The slowpoke, at one-and-a-half minutes, was the Spirit Studio LC; those tricky knobs got the best of me.



Studiomaster P7

THE CHECKERED FLAG

In honor of my sporty little Spitfire, I'm rating these consoles in the style of an **EM** Grand Prix. Everyone ran a fine race, but here's how it all sorted out at the victory lap.

Winner's Wreath. The sonic personality of Studiomaster's P7 edged it across the finish line just ahead of its worthy competitors. This mixer sounds amazing, period! It was a pleasure to knock around the EQ, because every tweak introduced tonalities that were simply smashing. But the P7 doesn't just make a sexy roar as it whips around the track, it also gives you MIDI-muting, six aux sends, a 20 dB mic input pad, and solo and mute switches for each channel's monitor section.

However, the P7 didn't take the flag without some hiccups. The low headroom of its mic preamps is bothersome, and the lack of center detents on control knobs is particularly annoying. In addition, the P7 is hardly the value leader, offering only a 16×8 model within our $4,500 price cap. But all is forgiven when I sit down to work. Like my beloved Spitfire, the P7 has its maddening little quirks, but it elevates the recording process to audio euphoria.

Champagne Shower. Allen & Heath's GS3 is a mixing powerhouse, with excellent EQ and MIDI-muting as a standard feature. The GS3 really moved away from the pack with its brilliant monitor section design. Each monitor section on the GS3 has its own, *separate* high- and low-frequency EQ. This feature enhances the board's practicality, because you don't have to sacrifice part of your channel EQ to utilize the board's dual-input capability. This is a beautifully designed mixer!

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On the downside, I wasn't wild about the dual-concentric knobs, and it would be nice to have more than four post-fader aux sends. The GS3 is also one of the costlier Brits—you get a 16×8 model for $4,495.

Hero's Bouquet. Appearances can be deceiving. Because the Soundcraft Spirit Studio LC looks and feels rather toy-like, I didn't expect it to stand up to its brutish competitors. Silly me. The LC does eveything it's supposed to do and sounds great doing it. It has the smoothest EQ of the bunch and offers the most flexible aux send control. Four of the stereo returns are on short-throw faders, which makes it easy to fade effects (or virtual tracks) in and out of the mix—a nice touch!

Unfortunately, this flexibility is not shared by the tone controls. The EQ cannot be split between the channel and monitor sections during mixdown. However, the LC is the value leader of the quartet, offering a 16×8 configuration for just $2,995 and a 24×8 model for $3,995. The brutes can't touch that!

A Chorus of Hurrahs. As a mobile mixer, jockeying between the studio and the stage, the Panoramic-S could be a monster. It's built tougher than a Sherman tank with every knob, fader, and button exhibiting a tight, substantial feel. I'm a huge fan of John Oram's Trident consoles, and the EQ he designed for the Panoramic-S is absolutely brilliant. It's sharp and aggressive—almost bullish—and represents everything I love about classic British EQ.

As a dedicated home studio console, however, the Panoramic-S has a few flaws. For one thing, it's not really a practical dual-input board. There is no provision to process or EQ the signals as separate entities.

The lack of separate monitor level controls is another frustration for recordists. Because the channel fader controls the signal level (to tape or hard disk) *and* the monitor level, it's impossible to make a specific channel louder or softer without sabotaging your recording level. And lastly, the Panoramic-S provides no channel mutes or EQ on/off switches. (You already know how I feel about the group outputs being on knobs instead of faders.)

FADE OUT

Call me a traitor to the Stars and Stripes, but I'd surrender to this British invasion without a fight. Heck, I already waved the white flag for the Beatles, the Rolling Stones, and The Who. But seriously, if you're in the market for an 8-bus mixer, you should at least give the Brits a spin. They can be maddening beasts, but more often than not, the wonderful sounds they produce cure all ills.

(Special thanks to Jerry Stucker, Buddy Saleman, and Steve Metz for their assistance and ears.)

EM *Editor* **Michael Molenda** *is gleefully addicted to knobs and faders.*

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"I bet I could do better than that!"

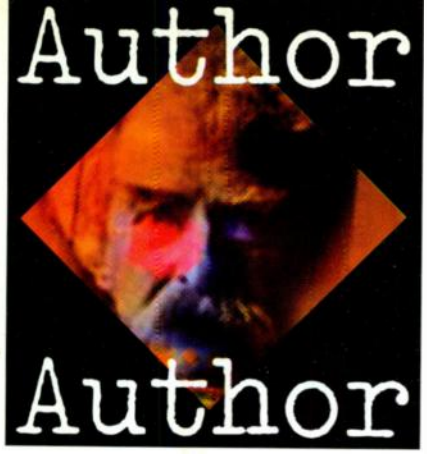
How many times have you said that after checking out someone else's multimedia production? If you've never done it before, the next question you have to ask is, how do you do that? How do you weave music, voice-over, sound effects, animation, graphics, and video into an artistic tapestry, such as Peter Gabriel's *Xplora 1*, or an interactive adventure game, such as Cyberflix's *Jump Raven*?

The answer: with an authoring system, your imagination, and several hundred hours of hard work. An authoring system is the primary tool that enables multimedia artists to bring a stirring, interactive experience into existence.

We pulled together five entry-level, *Windows*-based, multimedia authoring systems for this comparative review. (We'll examine Mac-based systems in a future issue.) Each package had to meet two simple criteria: They had to cost less than $500, and they had to support MIDI. The five entrants are *Action!* 3.0 from Macromedia ($195 on disk, $295 on CD-ROM with clip media), *Compel* 1.0 from Asymetrix ($295), *HSC InterActive* 1.0A from HSC Software ($295), *Q/Media* 2.0 from Q/Media ($199), and *Super Show & Tell* (*SST*) 1.1 from Ask Me Multimedia ($149).

Illustration by Lance Jackson

LSD @94



To test the abilities of each program, I designed a very brief, interactive multimedia magazine featuring elements of text, graphics, animation, audio, and video.

We chose to focus on entry-level products to demonstrate that getting into interactive multimedia development doesn't have to cost big bucks. Think about it. You probably already have more professional audio equipment than many established multimedia producers. And don't underestimate the value of your music composition and production experience. Combine these elements with your '486 PC-compatible, high-color video card (65,000-plus colors), 16-bit sound card, double-speed CD-ROM drive, video-capture card, and camcorder, and you have everything you need to jump-start your career as a multimedia mogul.

BEGIN AT THE BEGINNING

The concepts behind interactive multimedia development are the same regardless of how much money you spend on your development tools. Entry-level authoring systems offer three significant benefits to new multimedia producers: They're appropriate for the task of developing basic content, they're easy to learn, and they cost a fraction of what high-end packages sell for.

Of course, there's a downside to that simplicity and low cost. You can be sure that none of today's big-name interactive CD-ROMs were created with an entry-level authoring system. Titles like those are produced using high-end systems that approach the sophistication and complexity of full-fledged programming languages. For newcomers to multimedia development, however, these packages present a forbidding price tag and a steep learning curve.

If you're interested in dipping your toe into the waters of interactive multimedia development, check out one of these entry-level programs. If you get bitten by the multimedia bug, then you can take the plunge with a high-end package.

But before you don your beret and plop down in your director's chair, be prepared to wrestle with the technical beasties that crawl out of the woodwork every time you push the *Windows* envelope with multimedia. After spending several hours creating a presentation in *Action!*, for instance, a strange error message popped up and wouldn't let me save my work. A call to Macromedia's tech support department solved the problem, but there was no way to salvage the production. The culprit was the device driver for my high-color video-display card. I had to obtain an updated driver from the card's manufacturer and start from scratch.

OUT OF SYNC

Let's get something out of the way early on. It's unfortunate, but judging from the rudimentary audio support in most of these packages, it's clear that authoring-system developers still consider sound to be the least important element of multimedia production. Each of these programs support both MIDI and digital-audio files, and some even play Red Book audio from a CD-ROM, but none of them offer more than the most basic synchronization capabilities. In most cases, audio files are triggered and then left to play on until they end, are cut off, or are truncated by another event. Support for SMPTE time code and MTC is nonexistent.

At least *Action!*, *HSC InterActive*, *Compel*, *Q/Media*, and *SST* let you synchronize the appearance of a text object with the playback of an audio file. I used this capability to add "stingers" to text elements as they came into view on the screen. However, none of these programs allowed me to synchronize an entire production to a long-form score.

METAPHORICALLY SPEAKING

The screen metaphor that an authoring system presents to the viewer (i.e., the person who will be using the project you create) determines what types of projects the system is capable of producing. In that respect, the screen metaphor is even more important than the user interface the program presents to you, the content developer.

The programs I examined employ one of two metaphors: slide show or linked-screen. I structured my test project so that both types of programs were suitable for one aspect or another. The term "screen" is used in several different contexts, so a point of clarification is in order. In the literal sense, "screen" refers to the computer's video monitor. When used to describe a production's content, however, "screen" refers to a single segment of the production—one of perhaps several hundred segments—that will be displayed on the monitor during playback or development.

FIG. 1: Authoring systems that use a slide-show metaphor, like *Compel*, are appropriate for presentations to large audiences. *Compel* can also be used to produce interactive presentations.

If you plan to create multimedia presentations for live-speaker support or large audiences that won't interact with the production, a program that uses the slide-show metaphor is appropriate (see **Fig. 1**). Productions created with these programs move along in a rigidly linear fashion, with screen one followed by screen two, which is followed by screen three, and so on. The display of each screen is typically triggered by a mouse-click. Most people find this metaphor to be very familiar; just visualize someone holding a slide-projector remote control standing at a podium beside a big screen.

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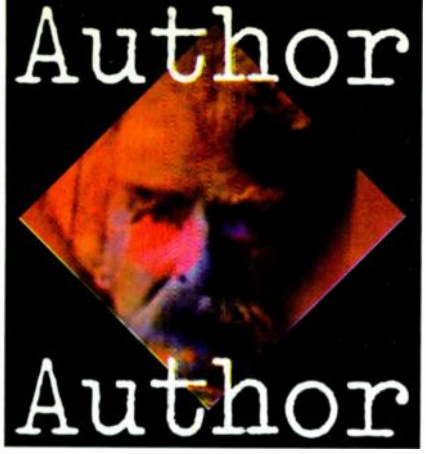

however, computer-generated productions let you embed such elements as video, animation, and audio into each screen. In my test production, I used slide-show techniques to produce articles with their content spread over several screens.

Programs employing a linked-screen metaphor are better suited to productions designed for an individual navigating through the presentation and reacting to visual cues. Linked-screen authoring systems are used to produce everything from entertainment titles to information kiosks to building directories and other nonlinear productions.

The concept of linked screens describes a production in which each screen is related to other screens. The structure may be hierarchical, where you have to go through Screen A and Screen B to get to Screen C; or it may be less structured, where Screen C can be accessed directly from Screen Y, Screen N, or Screen Z.

With a linked-screen authoring system, it's easy to create productions through which a user navigates via onscreen buttons, graphic objects placed on the screen, or hot spots (transparent rectangles drawn over different areas of the screen). The producer assigns sequences of commands to the buttons or hot spots that execute when the user clicks on them with the mouse. Buttons can cause the production to branch off, leading the user to another screen; trigger a video or animation segment; play a waveform or MIDI file; or perform other functions. In my test production, I created a table of contents with buttons that took the user to different segments of the magazine (see Fig. 2).

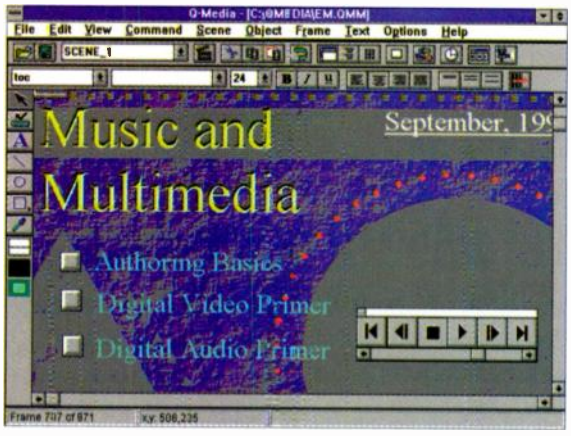

FIG. 2: The linked-screen metaphor identifies an authoring system that uses buttons as navigational tools in interactive, nonlinear productions. In this example, *Q/Media* was used to create a table of contents for an interactive magazine.

A linked-screen production can be

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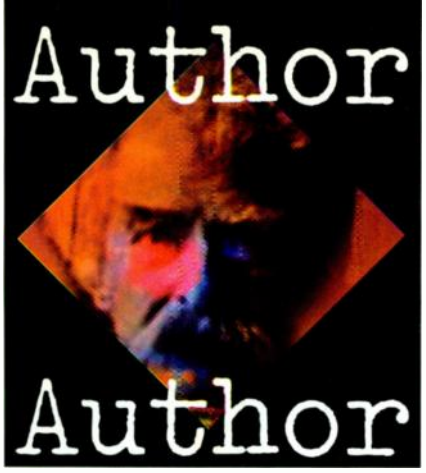

made rigidly linear, just like a slide show, simply by creating a button that displays the next screen in the sequence when the viewer clicks on it with the mouse. Typically, however, linked-screen productions are more freeform. In terms of pacing, the speed of a conventional slide-show presentation is controlled by the presenter. In a linked-screen production, the viewer moves through the production at his or her own pace.

The linked-screen type of authoring system is appropriate for multimedia kiosks, trade-show booths, and other one-on-one presentations. Developers frequently include a runtime version of the authoring program, so you can distribute copies of your presentation to people who don't own the development package.

If you're interested in producing any kind of interactive multimedia presentation, a linked-screen authoring system is the way to go. *SST*, *HSC InterActive*, *Compel*, and *Q/Media* support both the linked-screen and slide-show metaphors, so you can produce either type of presentation. *Action!* sports a linked-screen metaphor only.

USER INTERFACE

Action! and *Q/Media* divide the monitor screen into a working area, which includes tool-palette windows, control panels, timelines, and other production elements, and a preview window that presents a view of what the finished production will look like. This arrangement made it quick and easy to build, test, and debug each screen in the production. However, I soon found myself wishing for a big-screen monitor so that all those elements wouldn't obscure my view of the preview window (see **Fig. 3**).

FIG. 4: *Super Show & Tell* has a user interface that keeps all of the program's tools, as well as an unobscured view of each screen in the production, on display at the same time.

SST takes a slightly different approach by reducing the size of the preview window and framing it with a playback controller and other tools (see **Fig. 4**). This is a good approach, considering the viewable area on a 14-inch monitor, but I just couldn't get comfortable with *SST*'s user interface, for reasons I will explain in a moment. *Action!*, *Q/Media*, and *SST* can display an overview of the entire production, using miniaturized versions of each screen. In this mode, it's easy to rearrange the order and change the relationship between all the screens in the production.

With each of these three systems, productions are created one screen at a time by dragging objects into the screen and assigning properties to them. The objects might be text, geometric shapes, or buttons. The properties might include simple things such as color or a timing element (pause, stop); a link to an animation, video, or audio file; or a link to another screen.

I found *Q/Media*'s drag-and-drop method of bringing multimedia clips into the production particularly intuitive. To place a video clip in the presentation, for example, you open the clip-file requestor and click on the camcorder icon to pop up a file requestor listing video and animation files. Select the file you wish to use (a handy preview window lets you play the clip before you place it) and drag it onto the quadrant of the screen in which you want the clip to appear.

SST's approach to the same task is clumsy, because you have to access a different screen gadget for each step of the process. Select the type of object from the Media gadget, pick the file with the Selection gadget (unlike the other programs, there's no preview window, so you don't know what you're really getting until it's on the screen), assign an action to the object with the Action gadget, and so on.

I consider motion a crucial element of multimedia production, and in this respect, *Action!* stands apart from the other authoring systems. It's the only package that provides a comprehensive range of visual transitions not only for the entry and exit of each screen, but of each screen element.

Returning to the issue of synchronization, *Action!*, *Q/Media*, and *SST* went the farthest to provide tools for synchronizing the beginning of events during a production. I found *Action!*'s timeline to be the most intuitive (see **Fig. 3**). Delineated by milliseconds, the timeline displays how each object on the screen relates to another over time. If you want a waveform or MIDI file to begin playing at a particular point in the scene, perhaps to coincide with the appearance of an animation, you need only create an object (animation, video, still picture, etc.), place it on the screen, and link a sound file to it (WAV, MIDI, or CD audio). You then drag the sound file's timeline event

FIG. 3: None of the entry-level systems we looked at had much to offer in terms of synchronizing audio and visual events. *Action!*'s graphic timeline did make this important task a little easier.

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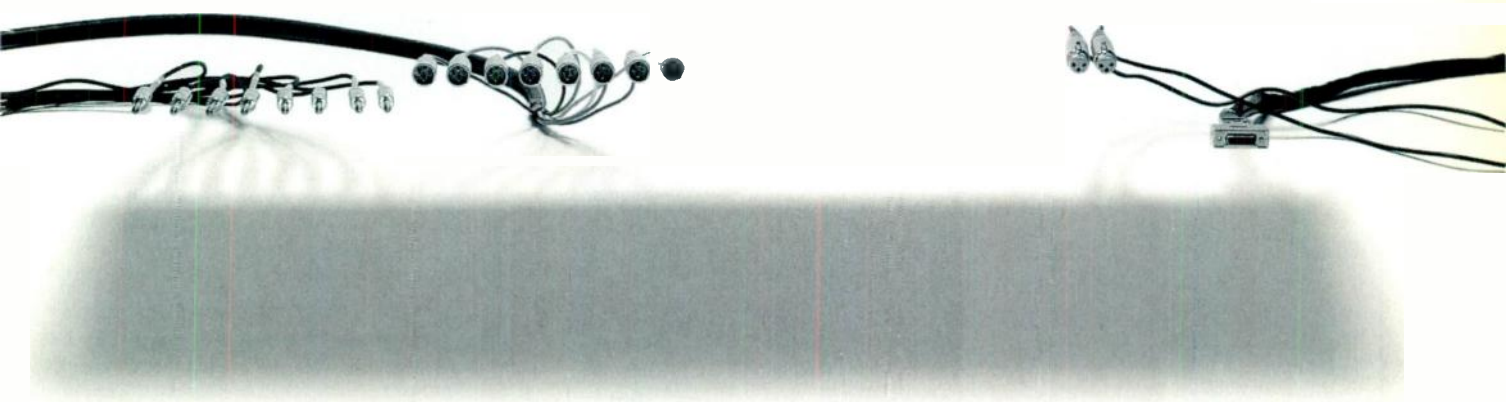

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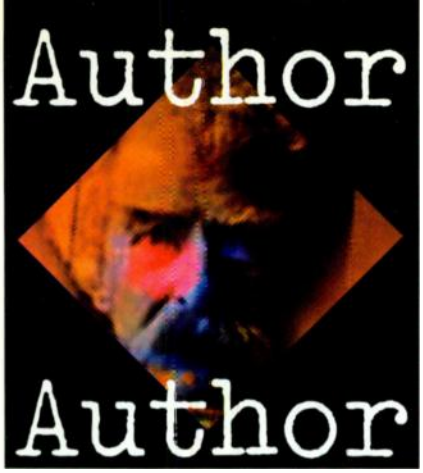

bar into position to coincide with the beginning of the animation, and you are done.

Q/Media employs a similar timeline, but it delineates time into frames, which—at 15 frames per second—is a much less precise unit of measure than milliseconds. *SST*'s playlist divides time into milliseconds, but it lacks the intuitive, graphical timeline of *Action!* and *Q/Media*. Instead, it displays the events and the duration of the events in a vertical list. In the default mode, each event in the list occurs after the preceding event is finished. Adjacent events in the playlist can be synchronized very easily, however, so that each event begins at the same time.

Both *Action!* and *Q/Media* also offer timing alternatives. *Action!* has a Synchronize Objects tool that can be used to link the start times of two objects. *Q/Media* has a requestor in which you can specify the beginning and ending frames for each media event.

You can easily change the duration of a sound object to fit a desired length (by stretching or trimming the event bar in *Action!* and *Q/Media*, or with a requestor in *SST*), but there is no provision for crossfades from one sound object to another in any of these three programs; you can't even have the sound fade in or out. If you create a sound object that lasts for 15 seconds and link to it a waveform file that lasts for 30 seconds, the waveform file will simply cut off in midstream after playing for 15 seconds. Likewise, sound files can be stretched with looping, but here again, there are no tools for setting loop points. All such audio editing tasks must be performed on the audio files themselves.

Developers consider sound to be the least important element in multimedia presentations.

Compel comes with its own built-in editors for manipulating audio, video, and animation files without having to leave the program. *Q/Media* lets you call up an external editor for working with these files. *HSC InterActive* makes no provision for editing audio or video files, but it does feature a surprisingly complete set of utilities for creating and editing graphics and animation files, plus a third utility for rudimentary image processing. Its Area Editor utility makes it easy to design entire screens or individual screen elements, such as buttons. Each of these editors can be called up from within the authoring program. With these three programs, you can edit your files however you need to and immediately return to your production session. *Action!* 3.0 is pretty weak when it comes to editor utilities, but the CD-ROM version includes Turtle Beach's excellent *Wave Tools* waveform file editor. *SST* does not have any bundled editors.

NEXT SLIDE, PLEASE

The emphasis on slide-show production is apparent in *Compel*'s user interface. Screen elements (text, video, animation, etc.) are arranged on each slide much as they are on the screens of *Action!* and *Q/Media*, but without the timeline, it's difficult to synchronize events.

HSC InterActive is the only authoring package I reviewed that featured an icon-based, flow chart user interface (see **Fig. 5**). Each icon in the flow chart represents a different program function or production event. To display a

Entry-Level Authoring Systems

Program	Screen Metaphor	Timeline	Sync Tool	Editor Utility	Transitions	Buttons	MCI	OLE	Price
Action! 3.0	LS	Yes	Yes	Audio	Screens Objects Text	Yes	No	2.0	$195 $295 on CD-ROM
Compel	LS/SS	No	No	Audio Graphic Animation	Screens Text	Yes	Yes	1.0	$295
HSC InterActive	LS/SS	No	No	Graphic Animation	Screens Objects Text	Yes	Yes	No	$295
Q/Media	LS/SS	Yes	Yes	*	Screens Objects Text	Yes	Yes	2.0	$199
SST	LS/SS	Quasi **	Yes	None	Screens	No ***	No	No	$149

Key to symbols:
LS = Linked-screen, SS = Slide-show, $ = Bundled with higher-priced CD-ROM version, * Can call up a third-party editor from within the program, ** = Uses a text-based event list, not a graphical timeline, *** = Uses hot spots, which provide functionality similar to buttons

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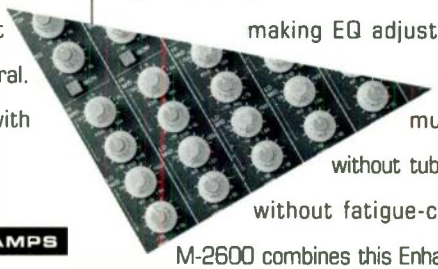

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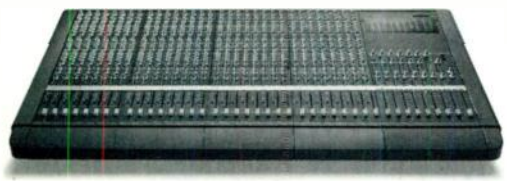

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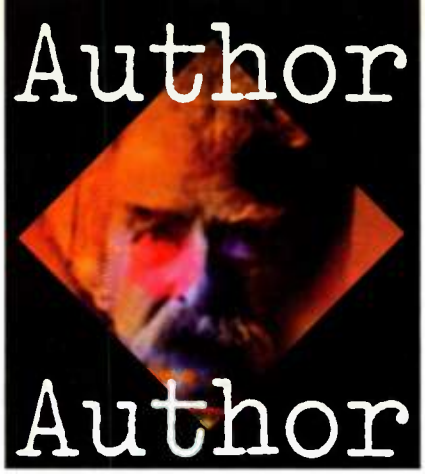

graphic, for example, you place a Display icon in the flow chart. If you want to add a set of menus to the production, use the Menu icon. Much of the functionality is already built into the icons; you merely need to double-click on them and fill out the requestors to complete the definition of each module in the production.

This is the best type of interface for complex presentations that involve lots of user interaction and for productions that require extensive branching options. Branching describes a point in the production where decisions are made and the next step depends on the outcome of those decisions.

For example, in **Fig. 5**, users can choose from four menu items to listen to three different types of audio, or they may choose to exit the program. The flow chart for this application displays a decision point for each of these menu items. After displaying the menu,

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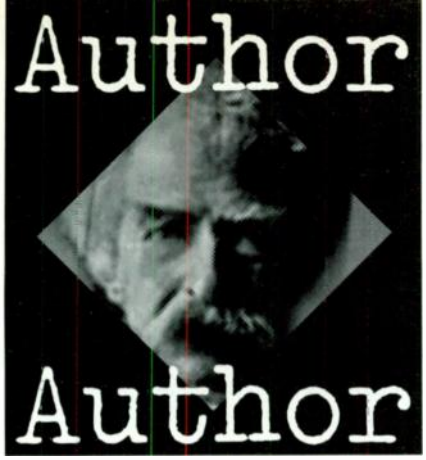


the production goes into a loop until the viewer selects one of the items on the menu. If the viewer selects the first item, CD Audio, the production plays a track from the CD-ROM drive for ten seconds, stops the CD-ROM drive, and then goes back into its loop until it receives the next instruction.

The flow chart seems intimidating at first, and I found that *HSC InterActive* had a steeper learning curve than its competitors, but this approach does offer some notable advantages. The flow chart view provides a very broad overview of the production, so I could easily see how each component related to the others. The weakness of this user interface emerged, however, when I wanted to synchronize events. For example, it was difficult to specify an animation file and a waveform file to begin playing at the same time. The flow chart was useful for illustrating the sequence of events in the production, but it didn't give me that important sense of time.

THE SIZZLE

The degree of pop and sizzle you can build into your multimedia production is determined by the audio and visual effects offered by your authoring system. In terms of visual sizzle, *Action!* is the clear leader. It has 45 very cool visual transitions that can be applied to the entry and exit of any graphic or text object, as well as to the entry and exit of entire screens. Various wipes, fades, and dissolves can be employed to make the entire production more visually appealing. Objects (text and graphics) can fly onto the screen from off the edge of the monitor; they can dissolve in place; they can be revealed in place from left to right, right to left, top to bottom, and so on.

Objects can be moved around the screen in eight different directions, and you can use the path editor and motion palette to define a pattern of movement by dragging the object across the screen with the mouse. Objects can have different states, during which different visual effects can be applied to them. During the Hold state, for example, while the object is otherwise static, an animated lighting effect can be applied that makes it look as though it's sparkling. None of the other programs has an equivalent feature that provides such visual flair.

Q/Media has only nineteen visual transitions, but they can be applied to text, object, and screen entries and exits. *Compel* has more than 30 transitions that can be applied to screen and text entries and exits. *SST*'s 30-plus effects can be used only for screen entries and exits, not text or objects. *SST* does permit text to be moved around the screen and to change color, size, and typeface, however, which can be cool effects.

In terms of audio support, the packages are pretty even. Each is capable of playing audio and video files, MIDI sequences, and audio from CD-ROM. Each is also capable of simultaneously playing a MIDI sequence and a waveform file. This is an important consideration, because it lets you use a MIDI sequence to play a long score in the background, while waveform files provide such aspects as voice-over narration, sonic hits, and other sound effects for individual screens.

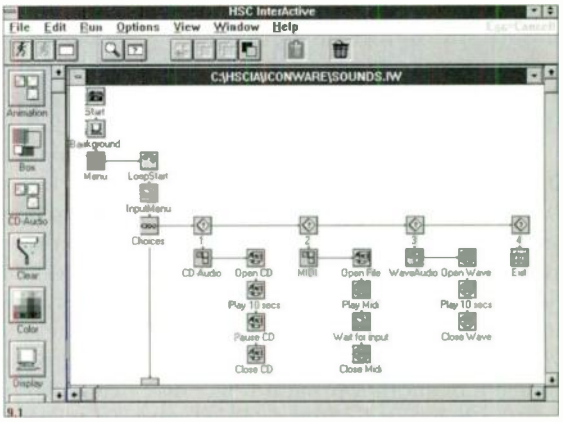


FIG. 5: *HSC InterActive* is unique among entry-level authoring systems in that it has an icon-based flow-chart user interface. Each icon has a built-in functional, such as displaying an animation, you just supply the content.

MAKE MINE REAL VIDEO

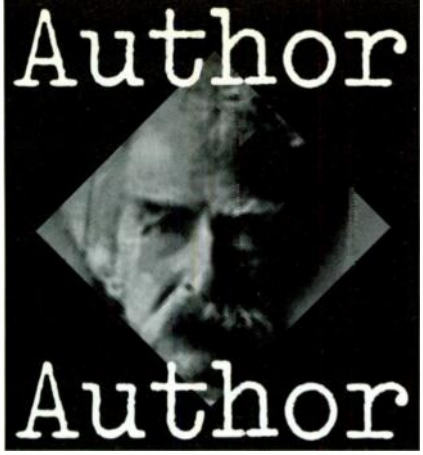
Microsoft's *Video for Windows* and Apple's *QuickTime for Windows*, with their relatively tiny windows, are currently the most cost-effective means of producing motion video for multimedia productions that will be distributed on diskette or interactive CD-ROM. This type of video can be embedded into productions created with each of the programs we reviewed. *Q/Media* goes one step further, however, by including support for MPEG video.

MPEG (Motion Picture Experts Group) is an international video compression standard that makes it possible to fit 72 minutes of VHS-quality video with interleaved audio onto CD-ROM. Provided you have a means of compressing video into MPEG form (you can use a commercial service bureau or install an MPEG encoder card in your PC), and there is an MPEG decoder card (such as Sigma Designs' ReelMagic) in the playback machine, you can include full-screen, full-motion video in your productions. As MPEG encoders and decoders become more commonplace, expect to see this feature incorporated into other authoring systems, too.

The only other means of incorporating full-screen digital video into your production is to connect a video laserdisc player to the computer's serial port. Connect the video output from the laserdisc player to a video overlay card in the computer, and the player's video signal will appear in a window on the computer's video monitor. In order to control such a device with an authoring system, the system must support MCI (Media Control Interface), a software control system built into *Windows* for devices such as VCRs, CD-ROM drives, and laserdisc players.

MCI is essentially a simple programming language, much like BASIC. In fact, each of these programs uses MCI commands to play back digital audio and video files, MIDI sequences, and audio files from CD-ROM while your multimedia production is running. With the exception of *HSC InterActive*, however, these programs hide their MCI commands within screen gadgets.

What's more, some of these authoring systems don't let you move beyond those built-in commands. For example,



Action! is one of the most powerful packages in this review, but it doesn't let you issue MCI commands directly, so you can't control a VCR or laserdisc player with it. *HSC InterActive* includes extensive support for MCI commands and provides excellent written and online documentation for them. *Q/Media* and *Compel* both support MCI commands, but neither program documents those features very well. Like *Action!*, *SST* does not support extended MCI commands at all.

OLÉ!

OLE (Object Linking and Embedding, pronounced "oh-lay") is another built-in *Windows* feature that is not used by every program. With OLE, you can create an object (e.g., a chart or graph) in one program and either link it or embed it in another program. The distinction between linking and embedding has to do with where the object is physically stored.

For example, if you create an illustration in a paint program and link it to the project you're producing with your authoring system, the file will appear in both programs, but it remains a separate paint-program file. This approach has two advantages: First, the presentation file is smaller because it stores only a pointer to the application that created the illustration. Second, if you edit the illustration in the paint program, the updated illustration will automatically appear the next time you run the production. Linking is especially useful if you're going to use the same objects in more than one presentation.

Embedding an object actually puts a copy of the object into the production file, as if you had used a copy/paste command. So why not just copy and paste? If you embed the object, you can double-click on it and launch whatever application originally created it. When you need to edit an image or waveform file, for example, you don't have to remember which tool you used to create the file and you don't have to leave the authoring system to get the job done. OLE 2.0, which is supported by *Action!* 3.0 and *Q/Media* 2.0 (*Compel* supports OLE 1.0), goes one step further by calling up only the menu and editing tools from the application that originally created the object.

Of the two OLE options, embedding is much more useful to the multimedia producer than linking. This is because both of the application programs to which an object is linked must be installed on the same computer. This effectively prevents you from widely distributing your production because you can't guarantee that every potential user will have the same tools that you do. *SST* and *HSC InterActive* do not currently support OLE.

UP AND COMING

As we were going to press, HSC Software announced an improved feature set for *HSC InterActive* 2.0. Thirteen new icons have been added to the icon library, including seven icons for controlling analog and digital video devices.

The package will also include two CD-ROMs with 1.2 GB of clip media and design templates. MCI support will be beefed up through an MCI Command Selector that will automatically construct MCI commands based on input from the producer. Upgrades from *HSC InterActive* 1.0 will cost $89.95.

Ask Me Multimedia had announced *Super Show & Tell* 1.5 at press time, but they were not yet ready to discuss the specific features that will be added to the product. A spokesperson from Asymetrix said *Compel* 2.0 is currently in the planning stages, but the product had not yet been officially announced, and the company was not ready to discuss the features of the new version as we went to press.

FINAL CURTAIN

Okay, so these programs won't enable you to join the ranks of Pete Townshend or David Bowie through your multimedia authoring efforts. After all, none of these programs are really designed to produce commercial, interactive CD-ROMs. But the basic concepts behind these inexpensive programs are the same ones that drive high-end authoring systems. They can give you a taste of what it's like to be an interactive multimedia producer, without requiring you to lay down the requisite large chunk of change.

What's more, there is a cottage industry of people who produce these projects for well-heeled, corporate clients. Even if you're not interested in joining their ranks, there is money to be made as a subcontractor, producing the sound tracks for their presentations as only a musician can.

Which program is the best? *Action!* gets the nod for its timeline user interface, abundance of transitions and visual effects, and its screen-linking metaphor. At $195 (without the waveform editor and CD-ROM clip art), *Action!* can't be beat. *Compel* runs a close second, thanks to its strong, built-in graphic and animation editors.

If you're most interested in producing interactive, one-on-one presentations, *HSC InterActive*, with its extensive support for MCI, is unparalleled among low-end authoring systems. If you want to incorporate full-screen MPEG video into your production, *Q/Media* is currently the only way to go. *SST* is the least expensive package I looked at, but this is one of those cases where just a few extra bucks buys a ton of extra features.

The demand for multimedia content is growing by leaps and bounds as more consumers upgrade their computers with sound cards and CD-ROM drives or buy computers equipped with these devices. Whether you decide to explore interactive multimedia production for fun or profit, an entry-level authoring system can unlock the door to a whole new world of artistic expression. And the sooner you step over the threshold, the sooner you can begin to help fill that demand.

EM *Associate Editor* **Michael Brown** *is coming to grips with the fact that it is far easier to acquire tools than it is to find time to use them.*

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RECORDING MUSICIAN

Resonance and Radiation

A little physics goes a long way in the recording studio.

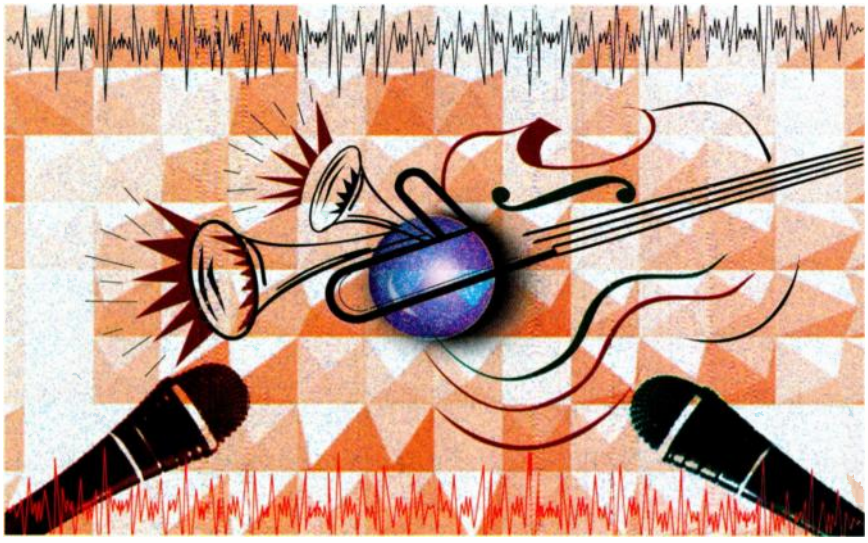
By Scott Wilkinson

Recording engineers wear many hats. To capture the best possible sound, they must be competent in operating all the studio gear (which, taken together, resembles the flight deck of a jumbo jet), be able to solve any musical problems, and coddle the artists into giving their best performances.

An understanding of physics doesn't hurt, either. For example, if an engineer knows something about the sound radiation patterns of acoustic instruments, he or she can position the microphone for optimum audio reproduction. Most engineers learn about mic placement through experience, but a little quantitative knowledge can help a great deal.

Another area of concern is the resonant characteristics of acoustic instruments. Many instruments do not emit sound at a uniform volume, even when the player maintains a consistent dynamic level. Certain notes sound louder than others because of the resonances within the instrument. However, most engineers don't know the specifics of these resonances, relying solely on their ears and experience to reveal appropriate mic placement and EQ settings.

Experience is a great teacher, but a little knowledge about sound radiation and resonance can help pave the path of experience, making it easier to attain the status of "golden ears."



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GUITAR

Like all string instruments, the acoustic guitar consists of a body, neck, and tensioned strings. Plucking the strings produces sound, but very little of this sound actually comes from the strings themselves. Instead, the vibrating strings transfer energy to the bridge and top plate of the guitar body, which in turn excites the air cavity within the instrument (as well as the sides and back). Most of the sound is radiated by the vibrating body and air moving through the sound hole.

Any enclosed space exhibits resonance, which is the tendency to vibrate easily at certain frequencies, and the

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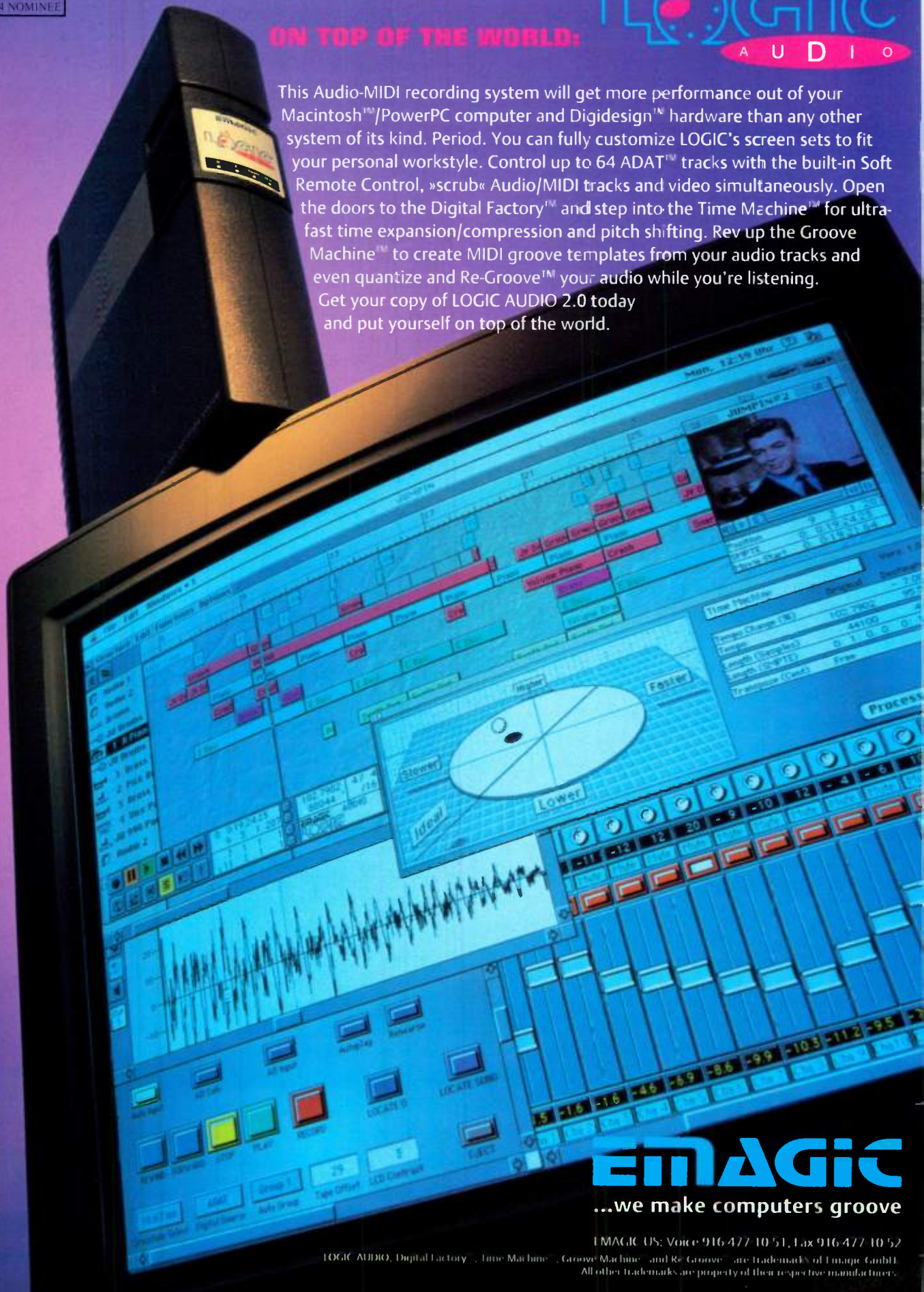

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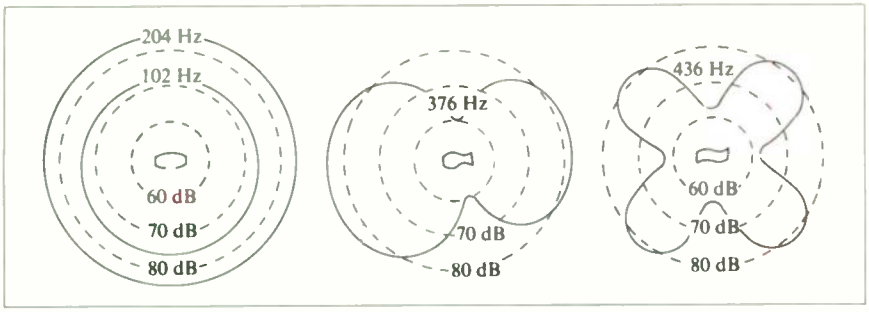

FIG. 1: Sound radiation patterns at four resonant frequencies of a Martin D-28 folk guitar. In all three patterns, the sound hole is pointing downward. (From "Sound Radiation from Classical and Folk Guitars," by J. Popp and T.D. Rossing.)

guitar body and air cavity are no exceptions. Most acoustic guitars have three strong resonances in the 100 Hz to 200 Hz range. The lowest resonance results from the soundboard (top) and back plate (bottom) vibrating in opposite directions, causing the guitar to "breathe" air in and out of the sound hole. On a Martin D-28 used in experimental measurements, this resonance occurs at 102 Hz.

The other two resonances occur slightly above and below 200 Hz. On the D-28, the resonance at 193 Hz results from the soundboard and back plate vibrating in the same direction, while the resonance at 204 Hz occurs as they vibrate in opposite directions.

Higher resonances occur as the soundboard and back plate vibrate in more complicated patterns. For example, they can vibrate in halves—that is, when the right half is bending outward, the left half is bending inward. This way, the soundboard and back plate can vibrate in-phase or out-of-phase with each other, resulting in a resonance around 300 Hz in classical guitars and around 400 Hz in folk guitars.

Although it's difficult to visualize, all these vibrations and resonances occur simultaneously and radiate from the instrument in different ways (see Fig. 1). The two lowest resonances radiate in a circular pattern, while the third resonance radiates in a figure-eight pattern. The highest resonance exhibits a more complex radiation pattern. Knowing where these patterns occur can be very useful when placing one or more mics to emphasize or reduce the higher resonances in the total sound.

STRINGS

Strings such as the violin, viola, cello, and contrabass can be plucked like a guitar (a performance technique called *pizzicato*), but most of the time, they are bowed. Most of the radiated sound comes from the body, rather than the strings.

These instruments also consist of top and bottom plates and side walls. Instead of the extensive internal bracing of acoustic guitars, however, strings have a single piece of wood (called the *bass bar*) attached to the top plate, parallel to the lowest string, in addition to a wooden peg (called the *sound post*) in the middle of the body. The bass bar and sound post help control the resonances of the instrument.

Unfortunately, the specific resonant frequencies vary widely from one instrument to the next, so it's difficult to provide hard numbers. The lowest resonance of importance is called the *air resonance*, which results from the vibration of the air within the instrument. In a violin, the best possible tone is obtained when the air resonance is about the same frequency as

Formant Regions

Instrument	Formant 1 (Hz)	Formant 2 (Hz)
Flute	800	n/a
Oboe	1,400	3,000
English Horn	930	2,300
Clarinet	1,500-1,700	3,700-4,300
Bassoon	440-500	1,220-1,280
Trumpet	1,200-1,400	2,500
Trombone	600-800	n/a
Tuba	200-400	n/a
French Horn	400-500	n/a

If all tone holes are closed, the sound from a woodwind instrument radiates from the bell. However, when as few as one or two tone holes are open, the sound no longer emanates primarily from the bell; it radiates mostly from the highest open hole. This is why many engineers mic woodwinds from the center of the instrument's length with a cardioid or omni mic. You can also mic a flute from the mouth hole, which exhibits good radiation, but often produces breath noise.

BRASS

In brass instruments, the player's lips form the reed that vibrates the air within the instrument. The player changes the effective length of the instrument by inserting lengths of tubing via valves (trumpets, French horns, tubas) or actually changing the length of the tube with a slide (trombone). Different pitches in the harmonic series of a particular tube length are played by varying breath pressure and lip tension.

Like woodwinds, most of the resonant frequencies shift up and down as different notes are played, and brass instruments also exhibit formants. However, the sound radiates from the bell, because there are no tone holes to open or close. As a result, brass instruments are always miked near the bell.

WRAP UP

When I was studying physics in college, I found that my ability to play trombone was enhanced by learning about the acoustics of the instrument. I wasn't necessarily thinking about formant frequencies and radiation patterns as I played, but that background knowledge seemed to make its way to my lungs, lips, and hands in an unconscious way, and my playing improved.

I believe the same holds true for recording engineers who have learned how to place microphones and apply EQ to different instruments. Empirical knowledge works well, but it can be greatly enhanced with some theoretical information to support it. With this in mind, I hope your skills improve as you learn more about the fundamental acoustics of the instruments you record.

EM *Technical Editor* **Scott Wilkinson** *really did improve his trombone playing by learning about the acoustics of that instrument.*

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

KAWAI

Digital Magic.

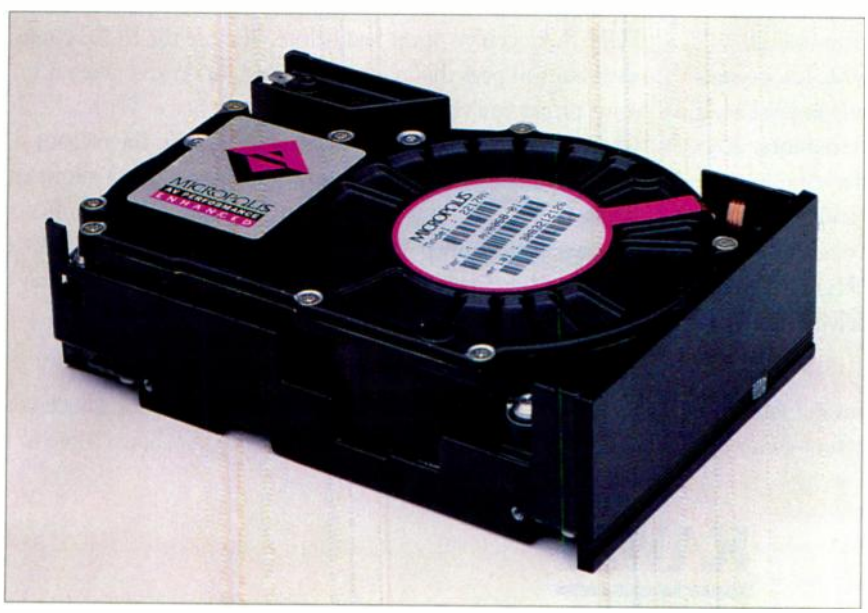
Are AV Drives for Real?

Ignore the hype, read the specs.

By Michael Brown

I wanted Keds sneakers when I was a kid. With Keds on my feet, I'd be able to "Run faster! Jump higher!" At least that's what the ads promised. But the ads didn't work on my mom. She insisted on buying me whatever happened to be on sale.

With an eye focused keenly on the prodigious storage requirements of the multimedia industry, hard-disk manufacturers are pitching "multimedia-friendly" drives that promise "superior AV performance." Do these claims have any merit, or should hard-disk drive shoppers take mom's approach and buy whatever happens to be on sale?



Hard-disk drive manufacturers are focusing their sights on the multimedia industry. Micropolis, for instance, advertises its AV series of drives (including its model 2217AV, shown here) as being optimized for audio/video applications. Is it fact, or hype?

To be suitable for audio and video recording and editing applications, a hard-disk drive must meet three basic criteria: It must provide high capacity, deliver high throughput, and be capable of uninterrupted data transfer. We'll examine the requirements of digital audio and nonlinear, digital, video-editing in general, as well as the specific claims made by two hard-drive manufacturers that are specifically targeting the multimedia market.

NEEDS AND WANTS

Claiming that its AV series of hard drives are "specifically designed for enhanced digital video and audio performance," Micropolis has waged an aggressive marketing campaign. "The needs of the audio and video market are different from people who use spreadsheets, databases, and word processors," says Rick Lucas, Micropolis' marketing programs manager. "Therefore, they need a different type of drive."

Quantum Corporation also manufactures hard-disk drives and it, too, is casting its gaze on the lucrative multimedia market. Quantum's press release for its highest capacity Empire and Grand Prix products describes the drives as "multimedia friendly." What exactly does that mean?

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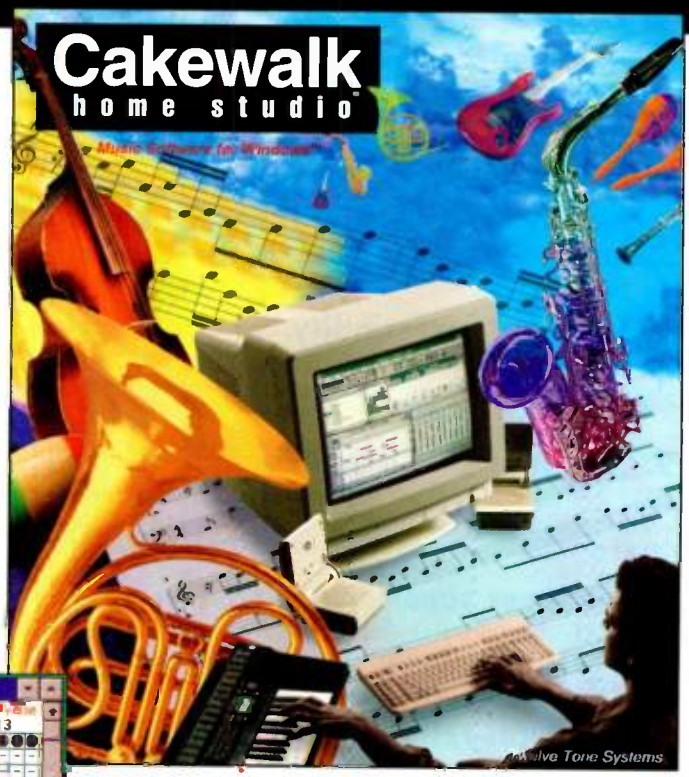

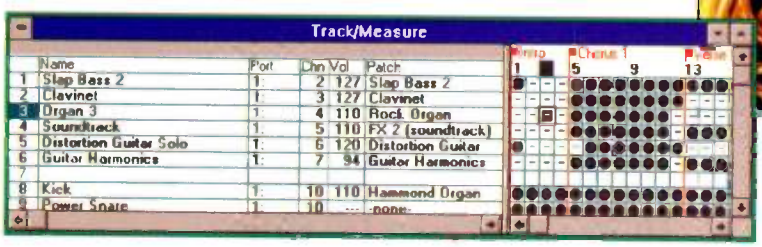

Get Started

Cakewalk Home Studio has everything you need to start creating music with your PC: 256 tracks; Staff, Piano Roll, and Event List views; a 16-track Faders view; and high-quality notation printing.

The Home Studio edition also plays back digital audio wave files on Windows-compatible sound cards. So you can add sound effects or voice directly into your MIDI sequence.

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Cakewalk Home Studio Highlights:

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- Event Filters for criteria edits
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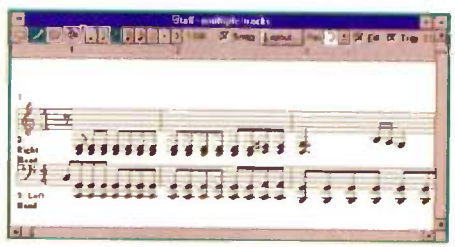

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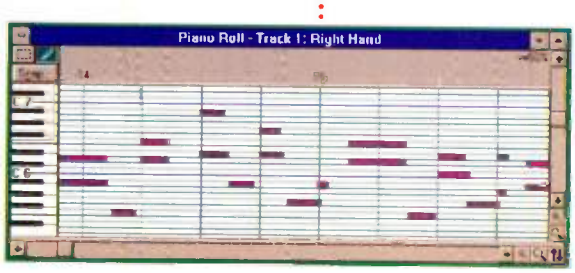

PC Multimedia PC

"We have incorporated features necessary for audio and visual applications into our standard drives," says Wendy Smith, Quantum product line manager. "We believe that multimedia will soon be on everyone's desktop and in homes. We're responding to the needs of multimedia users, whether they're enthusiasts or professionals."

Micropolis' assertion that audio and video professionals have specialized storage needs seems reasonable. Quantum's view that multimedia is becoming a mainstream application sounds just as logical. But do these drives that are advertised as being optimized for audio and video applications really fill the needs of this market?

For video editing, hard-disk recording, and multimedia applications, the simple answer is yes. But that's clearly not the whole story. Many disk drives, produced by manufacturers who don't make such claims, are equally or better suited for multimedia applications.

The best method of determining whether or not a drive is suitable for any particular application is to skip the marketing hype and study the drive's specifications, again looking at the drive's capacity, throughput, and uninterrupted data transfer rate.

CONSPICUOUS CONSUMPTION

Capacity is the easiest specification to obtain and, because it's not subject to interpretation, it is the least controversial. Recording audio to hard disk at a 44.1 kHz sample rate consumes roughly 4.5 MB per track, per minute, so you'll need a formatted capacity of at least 540 MB to record 60 minutes of 2-track audio. Get into multitrack digital audio and your storage requirements will soar.

For digital-audio applications, plan on acquiring a drive with a least 540 MB of capacity. In terms of access speed, multitrack digital-audio applications are even more demanding than video. Look for low average access speed (16 ms or less) and low average seek times (10 ms or less). Some manufacturers, including Digidesign, conduct extensive testing on different disk drives and publish lists of drives that they know to be compatible with their products.

Recording uncompressed, full-frame (640 × 480 pixels), broadcast-quality video at 30 frames per second can gobble a whopping 1.6 GB of storage per minute! Even nonlinear, digital, video-editing systems that apply a lossless compression algorithm to the video, such as Radius' VideoVision Studio, consume about 1 GB of storage for every 8 minutes of video footage. (Lossless compression implies that the video image quality is not significantly degraded as a side effect of compression.)

For nonlinear, digital, video-editing applications, you should plan on obtaining at least 1 GB of storage, but the sky's the limit. The highest capacity, single-unit 5.25-inch drives currently available provide 9 GB of storage. But

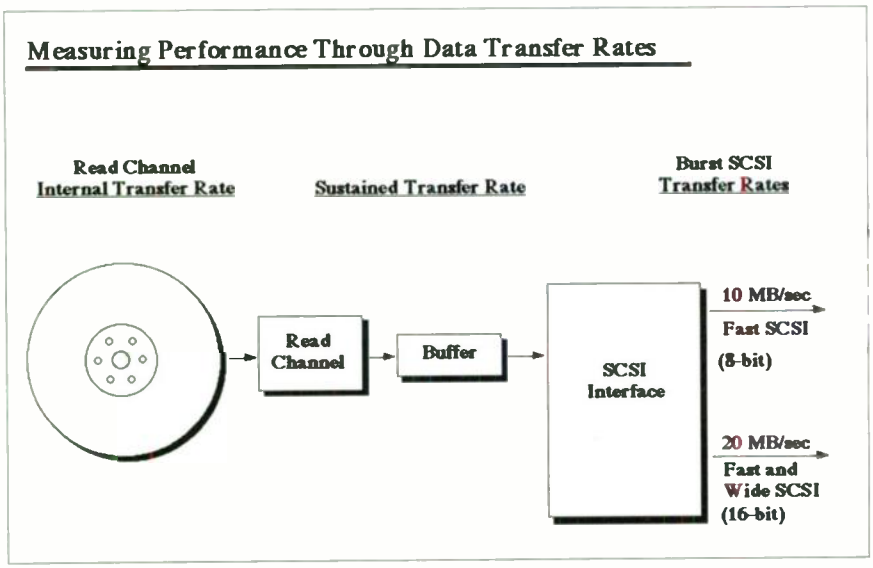

FIG. 1: Hard-disk drive performance is measured by many specifications, data transfer rates being one of the most important. (Courtesy Quantum Corp.)

recent history has shown that disk-drive storage capacity doubles every eighteen months, so this figure could double by the end of 1995. Arranging several drives into an array, commonly referred to as a RAID (Redundant Array of Independent Drives) system boosts capacity tremendously.

Throughput (measured by sustained data rate) describes the rate at which data streams off the drive and into the computer (see **Fig. 1**). In terms of throughput, nonlinear, digital, video editing is much more demanding than digital audio. Look for minimum sustained data rates of at least 3 MB per second. One factor that affects throughput is how fast the disk spins. Look for high rotational speeds (at least 5,400 RPM; some drives spin as fast as 7,200 RPM). An equally important factor is the read channel rate, or the speed at which data is transferred from the drive's disk to its buffer. In general, the faster the read channel rate, the faster the achievable sustained data rate. Today's read channels can transfer data up to nearly 10 MB per second.

High-performance hard-disk drives can achieve throughput of more than 8 MB per second. When multiple hard drives are tied together in a RAID system, throughput can go much higher. Whether or not such performance is achieved in the real world, however, depends as much on the host computer's hard-drive controller as it does on the hard drive. Buying a sophisticated hard drive and plugging it into an outdated controller is like piping a raging river through a paper straw.

CHOKE HOLD

The maximum throughput for a Mac IIci's onboard SCSI controller, for example, is about 2.0 MB per second. The Quadra 840AV's SCSI controller can handle 4.5 MB per second, and the PowerMac 8100's can handle 5.5 MB per second. Even the fastest Mac, therefore, represents a data bottleneck to a very fast hard drive. The answer to this problem is to install a third-party SCSI controller. FWB's JackHammer, for instance, is capable of achieving sustained data transfer rates as high as 8.6 MB per second when used with a single hard drive installed in a Macintosh 840AV or PowerMac 8100. Throughput can go as high as 15.9 MB per second with this controller in a RAID environment.

Unlike the Mac, nearly all PC-compatible machines come with an IDE (Integrated Device Electronics) controller as standard equipment. IDE is much less expensive to implement than SCSI, but it is also much less sophisticated. Whereas SCSI can control up to seven devices, IDE can control only two. Also, IDE hard drives are limited to a maximum capacity of 540 MB each. A new standard, Enhanced IDE, eliminates the capacity ceiling and increases the number of supported devices to four, but SCSI remains in the lead in terms of speed and capacity. Anyone interested in editing digital audio or video on a PC-compatible would be well advised to add a SCSI controller and hard-disk drive first.

Of course, it would be too easy if you only needed to decide between IDE and SCSI interfaces. Once you've settled on SCSI, you'll have to choose

▼

Capacity is the easiest specification to obtain.

from among several different versions of SCSI. The original standard, SCSI-1, can deliver a theoretical maximum sustained data transfer rate of 5 MB per second. Fast SCSI-2 can deliver 10 MB per second. Both SCSI-1 and Fast SCSI-2 use an 8-bit data path; Wide SCSI uses a 16-bit data path. Fast and Wide SCSI-2 can deliver 20 megabytes per second.

DON'T INTERRUPT

The need to write to and read from a disk without interruption might seem obvious, but it is only recently that engineers have taken the needs of audio and video producers into account when designing hard drives.

Most drives are designed to read and write data in relatively short bursts, because that's the way most software applications access them. In between handling read and write operations as directed by the host computer, some hard drives conduct important housekeeping chores—such as thermal recalibrations—that optimize their performance and reliability.

I'M A LITTLE T-CAL

Thermal recalibrations, or T-Cals, are intended to compensate for the slight physical changes that a drive's disk media experiences as it heats up and cools down. Temperature changes effect the position of the disk's tracks, so that the drive's read/write heads need to obtain a periodic navigational fix in order to remain free of read/write errors.

Some drives achieve this fix by periodically sending the heads back to track zero. This technique is perfectly adequate for such applications as word processors, databases, and spreadsheets because the drive experiences long periods of inactivity. Such a practice can wreak havoc on audio and video production applications that perform read and write operations that last for many minutes.

If the drive stops in the middle of a read or write operation—even if only for a microsecond—to perform a thermal recalibration, the audio will be

interrupted and video frames will be dropped. This may happen even if the drive has an exceptionally large buffer, which would otherwise guarantee smooth sailing. The bottom line: If the drive performs a T-Cal midstream, the perfect take you thought was in the can could end up in the trash can instead.

Some manufacturers, including Micropolis, handle the T-Cal problem by simply preventing the drive from performing a T-Cal during read and write operations. "The drive will wait for two things to happen," says Lucas. "First, a period of bus-free, which is about two-tenths of a second of disk inactivity. Second, it looks for a buffer-full condition, where there is enough information in the buffer to feed the host application in the event a request comes in. At that point, if it needs to, the drive will initiate a T-Cal.

"Any time during that procedure," continues Lucas, "if a request comes in from the application for more information, the drive will suspend the T-Cal operation, service the request until the bus-free and buffer-full conditions occur again, and pick up on the T-Cal where it left off."

Others, including Quantum, avoid T-Cals altogether by using a technology known as embedded servo. With this type of drive, the servo data that the read/write heads need for their navigational fix is interlaced with the user's data throughout the disk.

WHAT, NO SECRET DECODER RING?

So, will it be the Keds or the Blue Light Specials? When shopping for a hard drive, let your requirements—not your budget—determine the drive that you settle on. Buying a sturdy 2 GB disk drive that's on sale for just $699 might seem like a bargain, but if it ruins your sessions with drop-outs, was the money well spent?

Of course, buying a drive that fits your digital storage needs doesn't mean you'll have to mortgage your studio. First, determine your capacity, throughput, and uninterrupted data-transfer requirements. (Be sure to ask your digital-audio or nonlinear, digital, video-editing system manufacturer for a recommendation.) Next, study carefully the specifications of the drives you're interested in. Once you've settled those issues, then you can talk price. ●

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Delayed Gratification

Delay processors let you have your sound now and later, too.

By Scott Wilkinson

If you ever travel through the Swiss Alps, you might hear the haunting call of an alphorn. You may also hear an echo that exactly duplicates the initial phrase a few seconds later. This echo occurs because the sound from the 12-foot long, bugle-like instrument is reflected off nearby mountains. Of course, the nearest mountain is typically thousands of feet away, so it takes several seconds for the sound to get from the alphorn to the mountain and back to the alphorn player.

The classic "Alps echo" is probably the best acoustical example of *delay*. Like reverb, delay is produced by reflected sound waves. Unlike reverb, however, these reflections are normally separate and distinct.

In both cases, it's nearly impossible to control the acoustical phenomenon with any precision, so the effect is simulated digitally to process recordings and live performances. As we'll see, digital delay has many interesting applications.

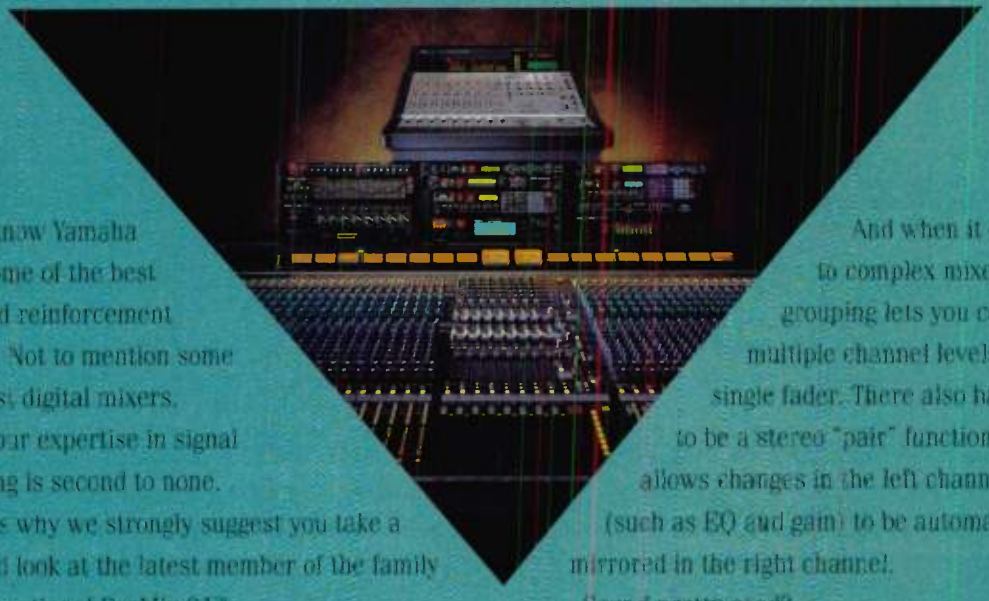
Most studio-oriented, multi-effects processors, such as DigiTech's TSR-24, include powerful delay algorithms that can be "chained" to reverbs and other effects.

SINGLE DELAY

The simplest type of delay is called a *single delay* (see **Fig. 1**). An audio signal is sent into a delay unit, which splits the signal into two copies. One copy is sent directly to the output with no modification; this is called the *dry* signal. The other copy, called the *wet* signal, is digitized in much the same way as a sampler captures audio data.

The delay unit then stores the sample in RAM for a user-specified period of time (called *delay time*, explained shortly), after which the signal is converted back into analog, mixed with the undelayed dry signal, and sent to the unit's output. In more expensive units, the dry signal is also digitized and mixed with the wet signal in the digital domain before being converted back into analog. The user can set the percentage of the wet/dry mix to produce effects that are subtle (the delayed signal is barely audible behind the original dry signal) or aggressive (the delayed signal appears at the same or greater volume than the dry signal),

WE TOOK EVERYTHING WE KNOW ABOUT MIXING



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ProMix 01 also has motorized faders and is capable of dynamic automation.

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As if that wasn't enough, ProMix also has two internal digital effect processors. Three assignable stereo compressors. Superb three-band parametric EQ on each channel.

Even an EQ Library where you can store all your favorite settings.

AND CONDENSED IT.

And when it comes to complex mixes, fader grouping lets you control multiple channel levels from a single fader. There also happens to be a stereo "pair" function that allows changes in the left channel (such as EQ and gain) to be automatically mirrored in the right channel.

Sound pretty good?

Actually it sounds pretty great. ProMix 01 boasts more than 100dB of dynamic range. All made possible by the latest 20-bit AD/DA converters. Which virtually eliminate all noise, distortion and crosstalk.

The system also features digital output for flawless audio transfers to R-DAT and other digital mediums.

And has a large backlit LCD screen to help you see all your mix parameters at a glance.

As you can see, ProMix 01 has plenty of things going for it. With its memory, automation capabilities and onboard digital effects, it completely justifies spending $20,000.

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For a demonstration of the remarkable ProMix 01, check your nearest Yamaha dealer.

For more information, call 1-800-937-7171, Ext. 370.

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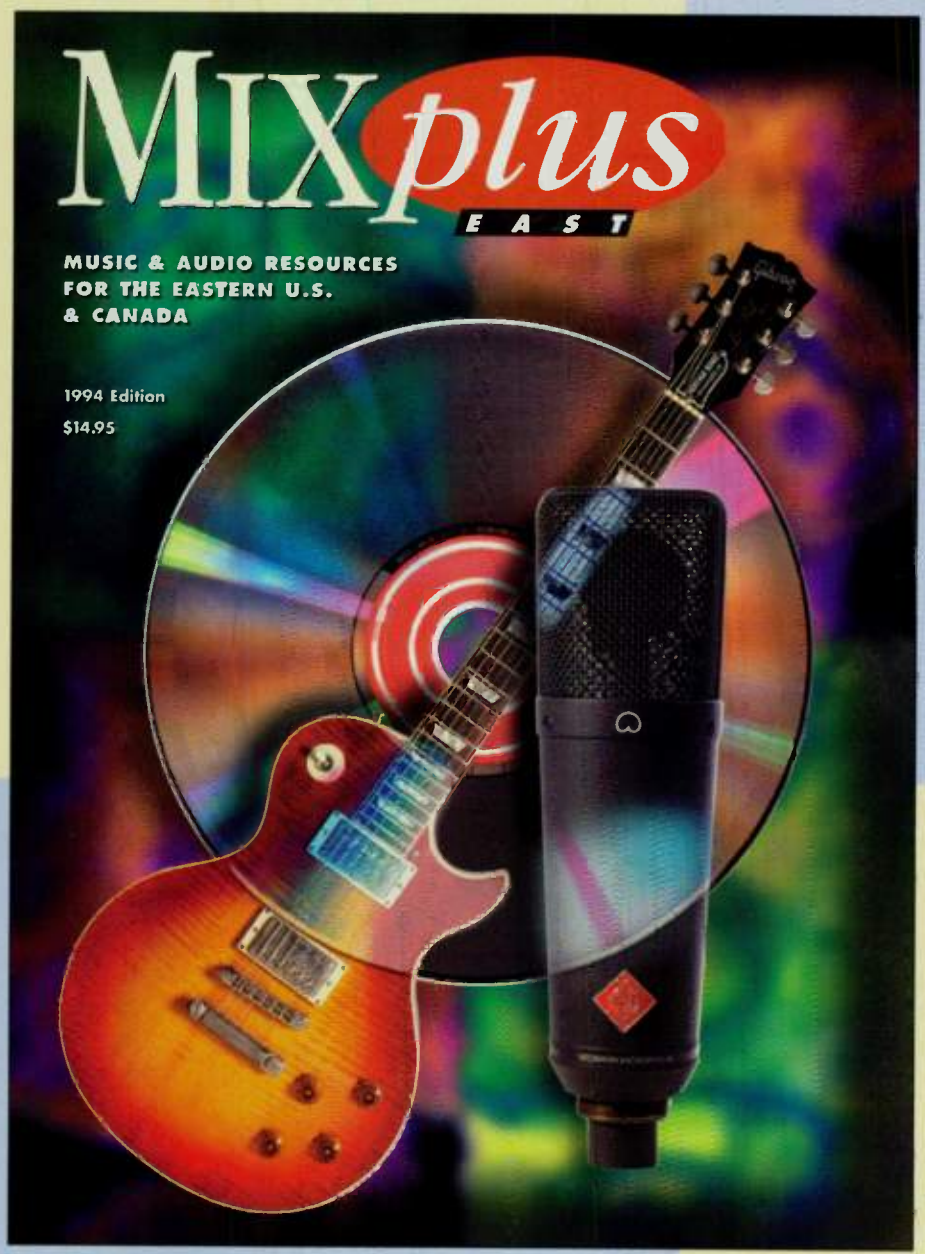

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and everything in between.

The fundamental parameter in any delay is the *delay time*, which determines how long the wet signal is held in memory before it is sent to the output. Depending on how much memory a unit has, the delay time can range from one millisecond to several seconds. The amount of available memory sets the maximum delay time, but most delay units can delay up to at least one second.

Another primary characteristic of most delays is called *regeneration* or *feedback*. In this process, the wet signal is split into two copies: One copy is sent to the output, and the other copy is sent back to the delay's input, where it is delayed again (along with any new signal that enters the delay). This causes the signal to repeat over and over at intervals determined by the delay-time setting.

The amount of feedback—how many times the original signal repeats before fading away—is controlled by a feedback parameter. Inexpensive delay units, such as guitar-oriented stomp boxes, usually have a solitary feedback knob. The more you turn the knob, the more repeats you get. (Of course, if you only leave the knob in the "off" position, you only get one repeat.)

MULTITAP DELAY

Modern digital delay lines often include programs, called *multitap delays*, that combine several single delays, called *taps*. The delayed signal is held in memory and sent out repeatedly according to user-specified settings. For example, let's say that in a 4-tap delay, you specify delay times of 250 ms, 500 ms, 750 ms, and 1 second. This would send the signal out four times after the original, once every quarter-second.

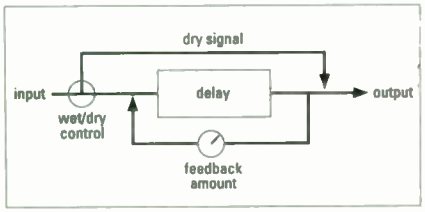

FIG. 1: In a simple, single delay, the input signal is split into two copies; one proceeds directly to the output, and the other is delayed by a certain amount of time before it is mixed with the original signal. The delayed signal can also be split into two copies, one of which is fed back into the delay's input to be delayed again.

These calculations may seem a bit daunting to mathophobes. Fortunately, there are a several ways to avoid the horrors of relearning simple divison. For one thing, you can probably find a small computer program that performs delay-time calculations, such as *Studio-Pal* (reviewed in the April 1993 **EM**) for the Macintosh. If you own a delay unit with MIDI sync, it's even easier. These devices can sync their delay time to incoming MIDI Clock messages, which keeps the delay synchronized even if the tempo changes. Some delay processors, such as the Lexicon JamMan, offer a Tap Tempo feature. You tap the tempo on a front-panel button or footswitch, and the unit automatically calculates the delay time.

With a multitap delay synchronized to the tempo of your song, you can create some wild rhythmic effects by playing nothing more complicated than whole notes, half notes, or quarter notes. Suppose you have a 3-tap delay, and the song tempo is 120 bpm. Set the first tap to 125 ms, the second to 250 ms, and the third to 375 ms. As you play quarter notes, you'll hear sixteenth notes coming from the delay.

You can also set different delay times for each tap. If you want a dotted eighth-sixteenth pattern after each quarter note you play, set the first tap to 375 ms, the second tap to 500 ms, and the third tap to 875 ms. You can also set different output levels for each tap, which lets you establish an accent pattern.

I once saw a percussionist use delay to "overdub" sounds in concert. He performed an extended solo with a wide variety of percussion instruments routed through a delay set to about ten seconds with a medium feedback level. When he played a series of short sounds on different instruments, the delay repeated the sounds over the next ten seconds as he added new sounds. The delay processor turned the solitary performer into a virtual percussion orchestra. It was a remarkable, wonderful effect.

FADING OUT

Delay is one of the most diverse and flexible effects in a musician's rack. You hear it applied to vocals and electric guitar solos in just about every pop song on the radio. So give it a try on your next recording project; you'll be glad you did glad you did glad you did glad you did....

EQ Section

A warm, pristine, musical, British sounding EQ because it is British. The four band EQ (with in-out switch!), features fixed point shelving high and low frequencies with center points of 12 khz and 70 Hz respectively. The peak/dip upper mid band sweep is continuously variable from 500 Hz to 15 khz, lower mid band from 35 Hz to 1.5 khz. All bands feature 14 db boost and cut at 18db per Octave.

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Stereo inputs featuring more EQ than most consoles have on their *mono* inputs. With two sets of inputs per channel and an A/B switch, you have the flexibility to select between 4 stereo sources (keyboards, CD etc.) For multitrack recording, used in conjunction with the 4 AUX/tape returns, you can bring in 8 tracks of tape while still tracking all of the other 10 inputs and getting a full function studio monitor feeds as well!

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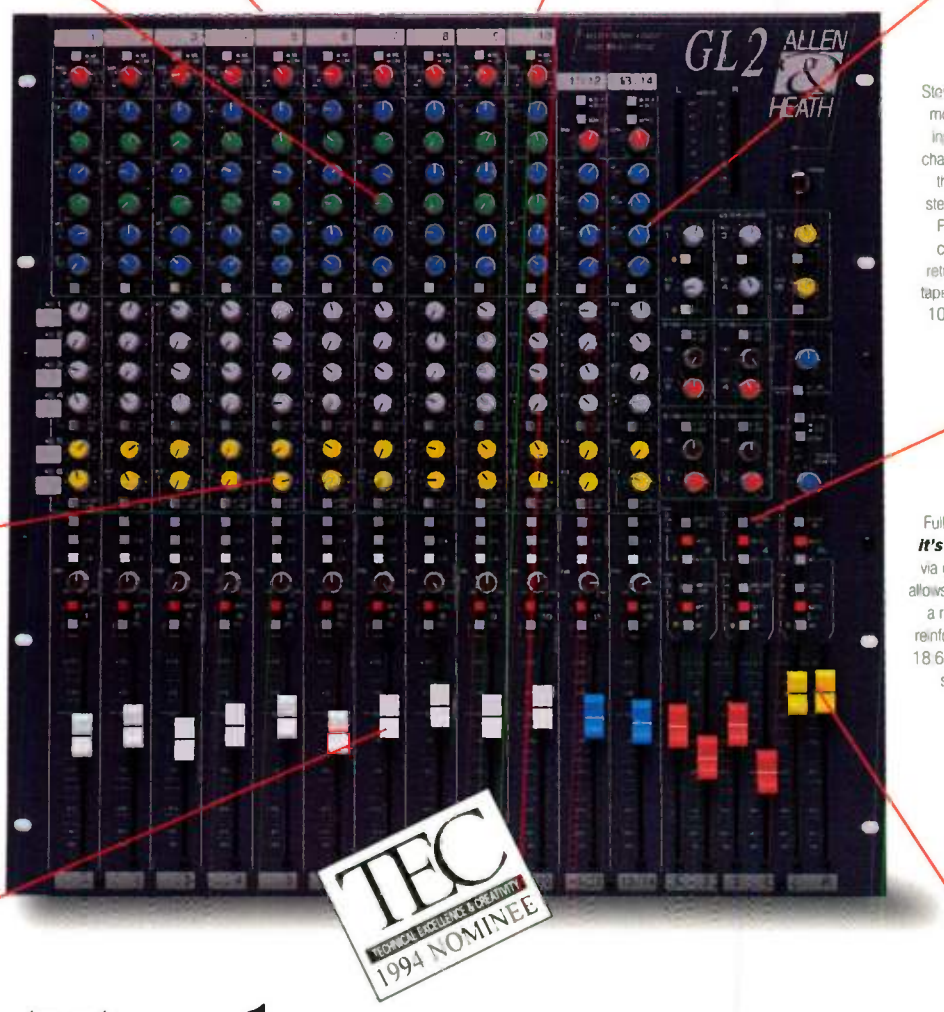

Faders

All is the standard on all professional mixers of its class, the GL2 boasts full throw 100 mm Alps™ faders for thousands of hours of smooth, seamless operation.

Tools, not toys.

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Four discrete subgroups, left and right outputs, and this AUX reverse section allow the GL2 to adapt in ways impossible on other compact mixers.

Under the Hood

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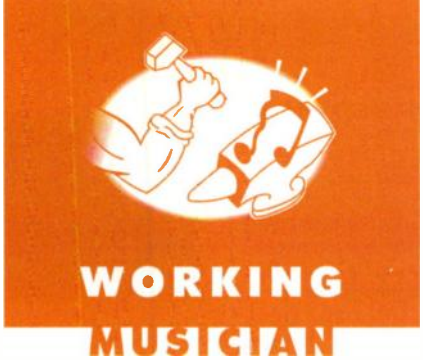

Get A (Day) Job!

Put your musical and technical skills to work in a "9-to-5" world.

By Mary Cosola

If your resume reads like the *Slacker's Almanac*—toured for a few months here and there, picked up work engineering in local studios, squeezed in other jobs to make ends meet—you might think no one would want to hire you for a career-oriented position. Or maybe you're convinced that you have to relegate your musical interests to evenings and weekends, slaving away at an unfulfilling day job. Nothing could be further from the truth. You don't have to sell out or sacrifice your creativity for the sake of a paycheck.

Digidesign's in-house studio (pictured above) is used for recording and testing new products.

The music industry is more than bands, agents, and labels. Every single item you use to create and distribute your music had to be designed, manufactured, and marketed. The people who answer your technical support questions and repair your gear are part of the music industry. **EM** was created by musicians who wanted to educate readers and report on the technical aspects of music making. The fact is, careers abound that are perfect for musicians. Wouldn't it be nice to parlay your musical talents into a new job opportunity?

WHO ARE YOU?

A little self-analysis never hurt anyone, and it's a great first step when making a career change. Aside from your obvious interest in music and technology, take a closer look at yourself. What other skills, interests, personality quirks, and neuroses are careening around your psyche?

Start by evaluating previous jobs and interests, making a list of areas where you excelled and floundered. Once you evaluate your tolerance for certain types of work, you're well on the way to choosing a new career. For instance, if you love language and putting thoughts to paper, consider technical writing or product marketing. On the other hand, if you hate dealing with people, don't even think about technical support and public relations.

Robert Scovill knows microphones. Named by his peers "Best Sound Reinforcement Engineer" worldwide for two years running, he has mixed for acts like Rush and Def Leppard. His first choice in microphones is Neumann.

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It also helps to know what kind of jobs are available for musicians. Let's take a look at some of the careers the music industry has to offer.

MANUFACTURING HAPPINESS

Equipment manufacturers are always on the lookout for technically savvy musicians. Their products endure a long process of conceptualization, design, programming, testing, marketing, and (eventually) servicing. These tasks necessitate a roster of employees possessing a wide range of skills and personalities. Musicians are perfect for all of these jobs because they actually use the equipment.

Evan Brooks, cofounder and chief technologist of Digidesign, comments on the type of employees he looks for. "The vast majority of the people here are musicians," he notes. "A musical background is especially important in marketing and sales, where you're trying to connect with other musicians. You need to be able to talk intelligently about the product. The same goes for engineering and designing products that you might use yourself. We like to think of ourselves as our own best customers."

Daniel Rose, director of marketing for Mark of the Unicorn, puts it a little differently. "I think of myself as my own *worst* customer," he says. "All I can see is what a product doesn't do. Once we get it right, I immediately start thinking about what else I want the product to do."

As Rose and Brooks point out, even seemingly nontechnical positions such as marketing require that the employees act as go-betweens for the designers and the users. Those who don't understand how a product works, or even why it exists, are of little use when it comes to refining and troubleshooting products. And if you want to dance on technology's bleeding edge, consider product design. It's a perfect area for the musically and technically creative to flourish.

In 1985, Marcus Ryle and Michel Doidic launched Fast Forward Designs, a Los Angeles firm specializing in product design and consulting. They have designed audio products and musical equipment for industry heavyweights such as Alesis, Digidesign, and Dynacord. Ryle notes that musicians bring a special intuition and perspective to product design.

"I find that the best products in this industry are the ones that were designed with a selfish motivation," says Ryle. "There's a better chance of producing a good product when a musician designs it, because an engineer who is purely a technician may misinterpret a musician's needs. There's definitely a communication barrier. It's like the difference between reading a bad translation of something written in a foreign language and being able to read it in the original language."

Craig Sibley, general manager of Goodman Music in Southern California.

DEALING THE GOODS

It can take a couple of years for a piece of equipment or software to journey from an idea to the marketplace. Once it finally arrives, it has to compete with similar products from other manufacturers. When you go to a local music dealer to make a purchase, you need help sorting out all these options. That's where a good audio and musical equipment salesperson can help. If you're a self-starter who enjoys talking with other musicians, retail sales can provide you with a great job opportunity.

Now, I know what you're thinking. Retail sales is a dead-end, a place for musicians who can't do anything else. Wrong. Any job is a dead-end if you don't take it seriously. And those in the field who don't take it seriously leave a lot of room for you to rake in the sales commissions.

Even experienced sales professionals acknowledge that a certain element has created a stigma when it comes to retail. "Some musicians look at a retail job as a way to hang out and mess around with the gear," says Craig Sibley, general manager of Goodman Music in Southern California. "If you're going to act like a used-car salesman, you won't get any respect. But there's a real hunger for salespeople who take the job seriously and approach it from a professional standpoint."

Retail is not an easy job. Salespeople must know the equipment well enough to answer questions from all types of customers, from novices to professionals. They must also have the patience to hear and answer the same questions over and over.

Kent Williams, vice president and director of sales management for Sweetwater Sound, in Fort Wayne, Indiana, works hard to hire and maintain a professional sales staff. "In this industry, there's a lack of 'professional' salespeople," notes Williams. "We're looking for musicians with a love of the technical end of the field."

Sweetwater invests time and money to ensure that its staff is well educated in both product knowledge and sales techniques. They employ a full-time specialist whose sole job is to learn new equipment and train the sales staff. Also, manufacturers send product specialists to all major retailers to demo new equipment. Sweetwater videotapes these sessions and keeps the tapes in their library for new employees. Williams also holds two sales-training sessions a week for all sales employees, not just new hires. "Everyone has to attend the sales training," says Williams. "We don't want our people to forget how to take care of customers."

Both Sibley and Williams agree that those who succeed in retail sales are concerned with more than making a quick buck. "Sales is not about cramming something down someone's throat," says Sibley. "The magic equation is the ability to build trust and back it up with product knowledge. And with the current pace of technology, there's a need for salespeople who know what they are talking about."

"If I could have just one ingredient in a salesperson, it would be a real passion for the music industry," comments Williams. "I'm talking about the person who goes home to read the trade magazines, plays in a band, and generally stays involved with music. People who have that kind of passion pass it along to the customer and can really enthuse people about making music."

WORDS OF WISDOM

If you've pursued a career as a musician, but now you're thinking of giving it up for a "straight" job, don't despair. Deciding to forgo a musical career is not an admission of failure. Many professionals I interviewed had great paying gigs as touring and studio musicians, but decided to explore other areas of the industry. None of them have any regrets.

Ryle gave up full-time work as a session musician to launch Fast Forward Designs. "I was one of the lucky ones, because I was making a living making music," says Ryle. "But I found the technical side of the industry more of a creative outlet for me than being a session musician. What I do now is more like composing rather than playing someone else's music, and I get to work with intelligent, creative people."

Of course, one allure of the musician's life is that you don't have to work for anyone else. Happily, self-starters still have career options in the music industry. Writers can pick up freelance work writing technical manuals and magazine articles. (Where do you think many of **EM**'s authors come from?) If you're great at setting up and troubleshooting equipment, consider doing custom studio design. Or if you're well connected in your local music community, use those connections to start your own public relations or artist management company.

The choices and opportunities are there; it is up to you to recognize them. If you have a true passion for music and technology, you can carve out a great career for yourself. The first priority, as in all things, is to keep your sights focused on what you enjoy, not on the dollar signs. When you're proud of what you do for a living, you can truly consider yourself a success.

Mary Cosola *is senior assistant editor of* Electronic Musician.

SERVICE CLINIC

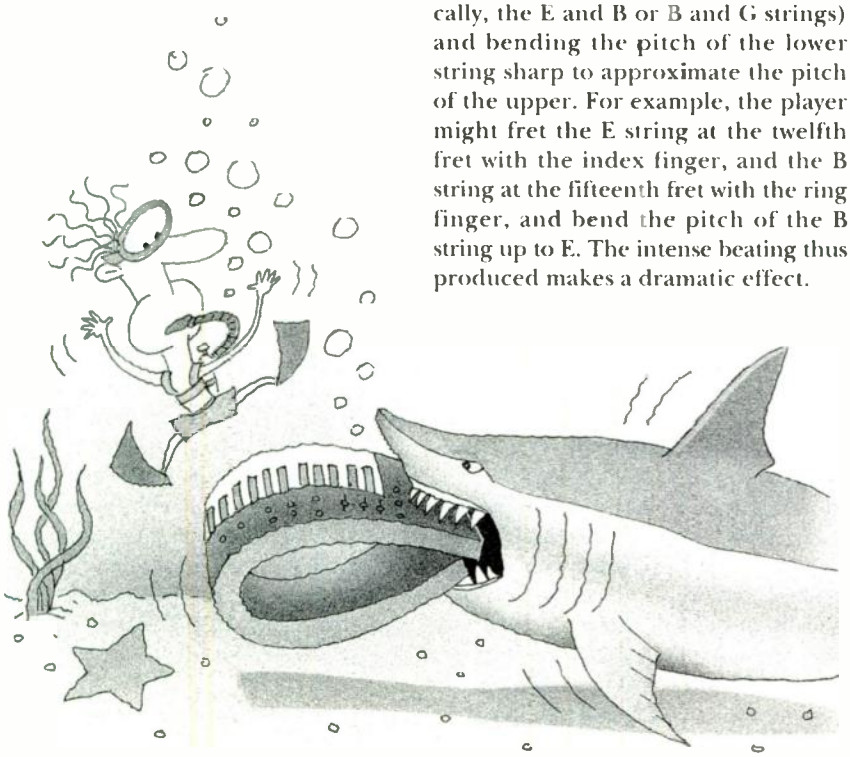
Questions and Answers

A simple circuit mod helps deep-synth divers cope with the bends.

By Alan Gary Campbell

Q Is there a way to produce "double bends," such as guitarists use, on a synthesizer? I've heard some players produce screaming, beating sounds that are similar.

A. On the guitar, a double bend (the term is somewhat of a misnomer) is produced by playing the potentially dissonant interval of a second (one whole step) on adjacent strings (typically, the E and B or B and G strings) and bending the pitch of the lower string sharp to approximate the pitch of the upper. For example, the player might fret the E string at the twelfth fret with the index finger, and the B string at the fifteenth fret with the ring finger, and bend the pitch of the B string up to E. The intense beating thus produced makes a dramatic effect.



JACK DESROCHER

A few recent keyboards, such as the Ensoniq ASR-10, feature double bends. Alternatively, many multitimbral synths allow pitch bend to be disabled on selected voices. If the same patch is assigned to two voices and the voice-assignment is set to play both from the same key, bending pitch on only one voice will produce the desired effect.

To create the typical double-bend effect, the pitch-bend wheel should be pulled back (flat) before each note is played, then allowed to return smoothly to center position after the note is struck. "Shaking" the wheel around the center position will produce considerable timbral animation. Similarly, two identical sound modules can be programmed with the same patch and pitch bend disabled on one of the modules. Regardless of the technological implementation, the performance technique is similar.

On most vintage synths you can simply turn the Oscillator 2 tuning control to approximate the effect, but this is awkward. The Moog Multimoog, however, can be configured to allow its ribbon controller to produce double bends. (The Multimoog is underrated. Among other innovations, it introduced an effective aftertouch mechanism that could control not only modulation, but pitch. It had an uncommonly flexible modulation-routing scheme, voltage-controlled waveforms, and an extensive, rear-panel interface.)

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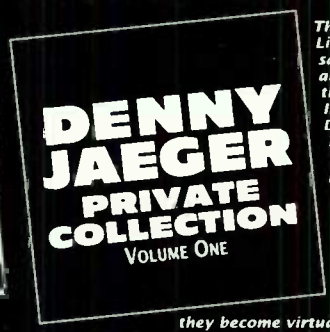

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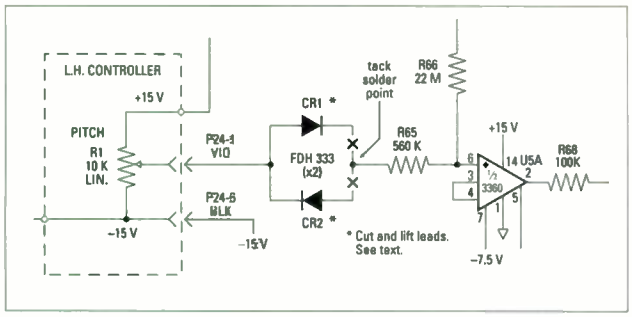

FIG. 1: Pitch-bend output.

Most analog and hybrid synths can be modified to produce double bends. Typically, this requires the installation of a switch to route the pitch-bend output control voltage to all the oscillators, or to just one. Taking the Memorymoog as an example, the pitch-bend output can be easily tapped at the deadband diodes on the Common Analog board (refer to a Memorymoog service manual) and routed to the Oscillator 2 control-voltage input on the same board. Clip the leads of CR1 and CR2 that face the front of the Common Analog board, near U5 (see **Fig. 1**). Be careful not to damage the PC pads underneath. Straighten the leads, bring them together, and tack-solder a length of 20- or 22-gauge hookup wire to their junction.

Tack-solder a second length of wire to the now-unused pads beneath. Make sure that the diode leads are not in contact with the tack-soldered wire below, and secure the wires and diode leads with a dab of silicone sealer. Tack-solder a third length of wire to the right-hand lead of R117, near U16 (see **Fig. 2**). The tack-soldered wires connect to a SPDT switch, potentiometer, and resistor (see **Fig. 3**), which can mount in a convenient location on the rear panel, wired point-to-point. The switch selects normal or double-bend mode, as indicated, and the pot adjusts the double-bend range. A technician should be able to adapt this scheme for use with other instruments.

On the Memorymoog, a simpler, programmable version is possible. In this case, do not clip the diode leads. Simply tack-solder a single wire to the junction of CR1 and CR2. Tack-solder a second wire to the lead of R1 that faces the front of the Common Analog board, near P25. Connect the first wire to the upper terminal of the pot (the SPDT switch is eliminated) and the second wire to the resistor. Note: Substitute a 20Ω resistor for the 100Ω value.

Now, a double-bend effect can be programmed. Set the normal pitch-bend amount to zero, turn on the Oscillator 2 Pitch parameter in the Foot Pedal 1 section, and set the Foot Pedal 1 amount to give the desired double-bend range. With this modification the pitch bend can selectively control all of the Foot Pedal 1 destinations. If a pedal is connected to either input, its effect is additive. An SPST switch can be installed, if desired, in series with the lead to the pot, to disconnect the mod and allow the pedal inputs to be used normally.

▼

The Ensoniq ASR-10 includes double bends in its bag of tricks.

Q. I want to use my Ensoniq TS-10 with an external SCSI drive. The salesman says the TS-10 won't work with SCSI without an update kit, but the TS-12 works with SCSI. I was thinking of trading for a TS-12, anyway. Is the SCSI kit expensive? Would it be better to trade?

A. Early TS-10s were shipped with operating-system version 1 (the final revision was 1.20), which does not support SCSI. Ensoniq reports that most TS-10s in the field have been updated to version 2.0 (or higher), which adds SCSI capability, with a SCSI board installed, as well as sample auto-load capability. To check the OS version, press and hold the Preset button, then press the System button. The display will show "ENSONIQ TS-10 SOFTWARE ROM V X.XX." Version 2.0 is a simple ROM upgrade, and the two required ROMs were provided at no charge (installation not included) to Ensoniq authorized repair centers. Your service center might have a set left over, but OS 2.0 is no longer available from Ensoniq. The current version 3.0 adds General MIDI functions, but it costs $99 (installation included) and requires some modification to the digital board.

All TS-12s were shipped with version 2.0 or higher, but they also require SCSI board installation. If your TS-10 does, in fact, contain version 2.0, or your service center can provide it, the only reason to trade for a TS-12 is the weighted 76-note keyboard action. Note that the TS-10 and TS-12 version 3.0 kits are different.

Here are some TS service tips:

● Loading and playing sequences created with version 2.0 or higher into a version 1.0 machine will cause a system crash. Upgrade the operating system to prevent this.

● Three disk-drive types have been used in the TS series. Service techs should refer to the TS service manual with regard to proper configuration-switch settings for each type. When a Panasonic drive is replaced with a Sony drive, the drive cable must be replaced, as well. (Also check the jumper configuration on the bottom of the Sony drive; refer to the service manual.) Note that HD diskettes formatted in a DD drive (EPS, EPS-16+, Mac Plus, etc.) are not readable on the TS units or ASR-10.

● Use care when disconnecting cables during service. The TS-series instruments employ high-retention-force connectors that must be unplugged gently with the aid of a scribe or screwdriver. Pulling on the cables can cause serious, long-term reliability problems. Don't even think about it!

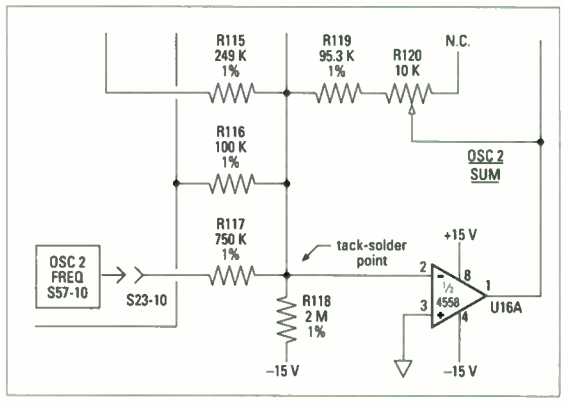

FIG. 2: Oscillator 2 control-voltage input.

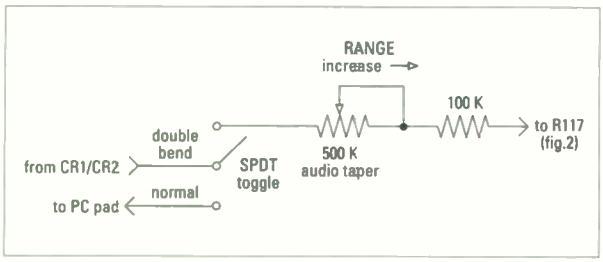

FIG. 3: Double-bend modification.

- The TS-12 employs the same membrane-switch keyboard used in the KS-32. A key that produces a clacking sound may have a broken swivel weight. When this happens, the keyboard must be replaced.
- Only Macintosh-compatible, 30-pin, 1 MB or 4 MB, nonparity SIMMs should be used in TS and ASR instruments. Rated access time should be 80 nanoseconds or less. (Page 57 of the service manual suggests 100 nanoseconds, but 80 ns is preferable.) Parity-type SIMMs and SIMMs with gate-array logic (GAL) or programmable-array logic (PAL) will not work properly and may damage the instrument. Ensoniq provides repair stations with regular updates regarding sources for compatible SIMMs. SIMM installation by an Ensoniq authorized repair center is strongly recommended—it is mandatory if the unit is still under warranty—as SIMMs are extremely static sensitive and somewhat difficult to install, and the unit must be partially disassembled to access the SIMM sockets.

ROLAND TECH TRAINING

Roland has scheduled seven intensive, one-day technical training seminars that provide hands-on training and certification for service technicians. The seminars will be held at strategic points throughout the U.S.

Each one-day seminar has four parts. The first serves as an introduction and includes a discussion of service policy and procedures. The second provides an overview of Roland instrument architecture and explores typical schematics. The third, following a lunch break, offers demonstrations of, and hands-on experience with, common disassembly and service procedures. It concludes with a discussion of known trends and symptoms, quirks, and service hints. The fourth part is an open-book exam for those seeking certification.

Seminars are scheduled for the following cities and dates: Columbus, Ohio (9/19); Des Moines, Iowa (9/21); Hartford, Conn. (9/23); Orlando, Fla. (9/27); Dallas, Texas (9/29); Portland, Oregon (10/13); and Los Angeles, Calif. (10/17).

There is no charge for attendance, and lunch is provided. Participants are responsible for lodging, if needed, and for transportation to and from the site. Technicians and others who would like to attend should contact Roland Service Coordinator Susan Chavez; tel. (213) 685-5141, ext. 234. I strongly urge those who can attend one of the seminars to do so.

EM *Contributing Editor* **Alan Gary Campbell** *is owner of Musitech, a consulting firm specializing in electronic music product design, service, and modification.*

Reviews

Oberheim OB-Mx Analog Synthesizer

By Peter Freeman

A great electronic-music technology is reborn.

Vintage-synth junkies and dance-music producers can start the party now. After a seemingly interminable wait, real analog synthesis has returned. In fact, several companies (including Studio Electronics and Novation) have almost simultaneously released analog machines. But only one of these manufacturers carries a venerable name: Oberheim (now owned by Gibson) has finally released its eagerly anticipated OB-Mx synthesizer.

Except for its stiff price, Oberheim's OB-Mx is the answer to an analog synthesist's dream. It's hard to resist, offering a huge sound, Minimoog and Oberheim filters, lots of front-panel controls, matrix modulation, and MIDI.

Completed under the direction of legendary analog-synth guru Don Buchla, the OB-Mx has a completely analog sound engine and employs discrete voice cards. With this instrument, Oberheim aims to combine the modern conveniences of contemporary synths (programmability and MIDI control, in particular) with the classic analog sound.

OVERVIEW

The new synth fits in five rackspaces and sports 31 knobs, 59 switches, and a 2-line, 40-character, backlit LCD display. In addition to the ¼-inch left and right main outputs, it has a ¼-inch TRS insert jack for each of its twelve possible voices. This lets you route individual voices to external signal processors and return them to the mix of voices within the instrument. However, you can't bring an external audio signal into the OB-Mx to be processed with its filters.

A basic OB-Mx has two voices, but in keeping with the design of the beloved Oberheim Eight-Voice synthesizer, it can be expanded with discrete voice cards. Each card contains two complete OB-Mx voices, including two oscillators, Oberheim and Minimoog filters, and envelopes. This makes it possible to add voices as desired, up to the maximum of twelve. A 12-voice unit lists for a hefty $6,000, though. Because the instrument is microprocessor-controlled, its operating system can be updated with new EPROMs.

The OB-Mx is easy to use, largely because of its decidedly nonhierarchical design. Dedicated knobs and switches govern the oscillators, LFOs, filters, and envelopes, as well as certain aspects of the unit's modulation section and multitimbral capabilities.

The LCD displays information about the section of the instrument currently being edited. Dedicated display buttons call up the data for the oscillator, filter, and LFO areas of the front panel. The LCD also displays system information (such as MIDI info), master tuning, modulation routings, and so forth. When you're editing a parameter, the entire front panel remains active, which is very convenient. Best of all, there are no hierarchical menus or hidden pages! I hope this starts (ends?) a trend; it's so much better than learning yet another convoluted menu structure and operating system.

Of the 512 memory locations, half are ROM and half are user RAM. Separate memory locations are provided for Single Instruments and Multiple Instrument setups, resulting in 128 ROM presets and 128 user memory locations for each type.

Unfortunately, the OB-Mx synth does not respond to the MIDI Bank Select message. In fact, the ROM presets

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cannot be selected directly with Program Change messages at all. To access the ROM sounds with a Program Change, you must first copy them into the user RAM. To access the user RAM locations remotely, you must select Single or Multiple Instrument Programs on the front panel, then send a Program Change message. You can also transmit and receive individual Programs, banks of 32 Single or 64 Multiple Instrument Programs, or all Programs via SysEx.

VOICE ARCHITECTURE

Although the OB-Mx is highly sophisticated, its underlying design will be familiar to analog veterans. The audio oscillators offer a choice of sawtooth, triangle, and square waves, or any combination of the three. Coarse and fine oscillator-frequency controls are provided, and their values are immediately displayed on the LCD when adjusted.

Each oscillator also has pulse-width and portamento controls, a Sync button to synchronize the two oscillators (either one can be the master), and four very useful modulation-level knobs: FM (which modulates the frequency of the currently selected VCO with the other oscillator), Envelope 1 to Pitch, LFO 1 to Pitch, and Envelope 2/LFO 2 to Pulse Width Modulation (which applies increasing amounts of Envelope 2 if you turn the knob counterclockwise from its center position or LFO 2 if you turn it clockwise from center). Buttons to the left of these controls select which oscillator is currently being edited.

The OB-Mx has three LFOs, with a choice of triangle, sawtooth, square, or random waveforms. Controls are provided for rate, delay, offset, and sample-and-hold amount. As with the oscillator section, the LFOs are selected using individual buttons.

The Filter section is one of its most noteworthy areas, largely because the instrument has two completely independent filters: Oberheim's traditional, multimode (state-variable), 12 dB/octave, SEM filter and a Minimoog-style, lowpass, 24 dB/octave filter. As a result, the OB-Mx can produce timbres that go beyond the classic Oberheim sound, reaching into Minimoog territory and then some.

Frequency and Resonance knobs control their respective parameters for the currently selected filter. The Keyboard Track 1/3 and 2/3 buttons let you instantly select keyboard tracking at a depth of one-third and two-thirds of full tracking. (This nomenclature is a holdover from the Minimoog days. These settings determine how much brighter the sound will be as you play higher notes on the keyboard.) These buttons are included for convenience; you can also set the keyboard tracking to any amount with the matrix modulation section (discussed later).

The Env 1/2 knob governs the amount of envelope modulation to the filters, and the LFO 1/2 knob controls the LFO modulation amount. (Envelope 1 and LFO 1 modulate the Minimoog filter, while Envelope 2 and LFO 2 modulate the Oberheim filter. A button by each knob selects which EG or LFO you are setting with the knob.) Also in the Filter section are VCO 1 and VCO 2 knobs, which control the percentage of each oscillator's output that passes through the currently selected filter.

The two filters are selected by (surprise!) dedicated buttons, and their levels are adjustable in the Final Mix section. A particularly nice feature is independent level control for each of the Oberheim filter modes (lowpass, bandpass, and highpass). This is a powerful feature, as it lets you blend the characteristic sounds of the three filtering modes to taste, which was impossible on the original Oberheim instruments.

ENVELOPE GENERATORS

The four envelope generators (selected by four buttons) are controlled by a set of four familiar knobs: Attack, Decay, Sustain, and Release. An Alternate button activates a secondary set of parameters for these knobs: Attack Delay, Decay Delay, Sustain Decay, and Velocity Sensitivity. Conveniently, Envelope 4 is hardwired to the VCAs, and MIDI Velocity controls the depth of each envelope generator.

Seven buttons below the envelope controls access additional options. The Freerun button causes the current envelope to run through its entire cycle, regardless of Note Off status. Reset forces each note to retrigger the current envelope from the start of its cycle. The Repeat key is similar to the envelope-looping feature on the Sequential Circuits Prophet VS: The current envelope continuously repeats its cycle as long as no Note Off is received. Keyboard Track shortens all envelope times for higher notes and lengthens all envelope times for lower notes, which is similar to the Rate Scaling feature found on many Yamaha synthesizers.

The Trigger button is equivalent to sending the OB-Mx a MIDI Note On for C3 with a Velocity of 64 to all channels with active Parts (discussed shortly). This feature allows you to trigger the unit directly from the panel while programming. The Copy feature lets you copy the parameters of the currently selected envelope to another envelope.

Finally, the Special key is primarily reserved for future expansion. However, it performs one function right now: It sets the current envelope's parameters to "plain vanilla" settings (minimum attack, decay, and release times and full sustain level).

SPECIAL FUNCTIONS

The OB-Mx's miscellaneous functions (MIDI configuration, voice allocation, global tuning, modulation routings, and multitimbral capabilities) are controlled with a group of buttons at the center of the instrument, directly below the LCD. A Program button displays the name and number of the currently selected Program, the global pan and volume settings, the voice-allocation mode, and the current tuning table.

Fourteen different polyphonic voice-allocation modes are available. In Rotate mode, each note triggers the next successive individual voice. Repeat mode assigns repetitions of the same note to the same voice until you run out of voices. Combo is a hybrid of the previous two modes; separate, individual notes are played with the Repeat algorithm, while overlapping notes are played with the Rotate algorithm. Double, Triple, Quad, Hex, and Unison modes assign each note to two, three, four, six, or all voices, respectively. You can also assign three, four, six, or all voices (slightly detuned from each other) to each new note. In the Multi page, you also get Mono mode, with last-note priority triggering, and Legato, a Minimoog-style mode in which new voices are assigned to the oscillators without retriggering.

Tunings other than equal temperament are available through the use of nineteen tuning tables, nine of which

are user-editable. This feature is well implemented: All 127 MIDI notes can be assigned to specific pitches, unlike instruments that work by applying a single octave's tunings to the entire MIDI range. Happily, individual note pitches are adjustable in cents, rather than arbitrary units.

MATRIX MODULATION

The OB-Mx is a hybrid of its Oberheim predecessors, the Eight-Voice and Matrix-series instruments, inheriting not only the original Oberheim sound, but the modulation capabilities of the Matrix-12 and Xpander. Each Single Instrument Program can include up to twelve independent modulation routings, with a multitude of sources and destinations.

The MIDI implementation is respectable, but not stunning. The available MIDI sources are Pitch Bend, Channel Pressure, Velocity, note number, Mod Wheel (Control Change 1), Breath Controller (CC 2), Expression Controller (CC 11), Volume (CC 7), and any of four user-definable, continuous Control Change messages, labeled A through D. In addition, all four EGs, all three LFOs, and a random-number generator are available as modulation sources in the matrix modulation section.

Destinations include all the OB-Mx modules: both VCOs and VCFs, all LFOs and EGs, and the Mixer section. I was particularly happy that parameters such as filter resonance can be modulated, and multiple sources can be assigned to a common destination.

Product Summary

PRODUCT:
OB-Mx Analog Synthesizer
PRICE:
$2,149 basic unit
$769 per 2-voice card
MANUFACTURER:
Oberheim, Inc.
2230 Livingston St.
Oakland, CA 94606
tel. (800) 279-4346
or (510) 536-8600
fax (510) 261-1708

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

MULTITIMBRAL OPERATION

Oberheim has given the OB-Mx multitimbral capabilities, letting you assemble combinations of up to six Single Programs; each combination is called a "MultiProgram." The Programs within a MultiProgram—called Parts—can be addressed on separate MIDI channels. They can also be layered and/or split across the keyboard, complete with independent volume and pan settings. LEDs mounted in numbered buttons reveal which Parts are currently active, which is very helpful.

The unit offers extensive flexibility in terms of allocating voices among Multi Parts. This can be done by specifying numbers of voices for each Part, or with Auto assign, which evenly distributes voices to each Part according to its assignment algorithm.

The OB-Mx's 12-voice limit could be a problem if you're accustomed to 32-voice instruments and you need multitimbral operation most of the time. But this is a traditional synthesizer, without samples or onboard effects. Because it makes no attempt to be a do-everything "workstation," its voice limit is much less of an issue.

Besides, the majority of sounds I created on this instrument tended to sound better when played polyphonically. I wouldn't sacrifice its relatively meager polyphony for the sake of multitimbral operation. I suspect that Oberheim included multitimbrality as a concession to modern expectations, not to appease hardcore synthesists.

THERE'S ALWAYS SOMETHING...

I did notice a couple of minor quirks. I had a hard time getting slow, smooth attacks out of the envelope generators; the curves they use don't seem to provide enough flexibility in this area, even when using the Attack Delay parameter. This made it difficult to get sounds such as pads to respond the way I wanted them to. According to OB-Mx product manager Malcolm Doak, the company is aware of the problem and might switch the envelope curves from linear to exponential. That would most likely solve the problem. In the meantime, there is a workaround. Although the final output of the VCA is exponential, the Mixer input level uses a linear curve. To preserve a linear curve, you can use one of the EGs to control the input level, rather than the output.

The only other problem I came across was a slight inconsistency in the triggering of the envelope generators when using very short attack and decay times. The envelopes do not always "fire" accurately if you are playing very fast, particularly with the filter envelope. This became apparent when sequencing "unplayable" material with the OB-Mx. Here again, Oberheim is looking into the problem and hopes to rectify it in a forthcoming software update.

CONCLUSIONS

After such a long wait, I was happy to find that this instrument sounds just as good as I anticipated. With the multitude of modulation possibilities, I was able to create sounds with all the richness, warmth, depth, and complexity I expect from a high-end analog synth. This box delivers the massive sound of the early Oberheims and more. The Minimoog-style filter is an interesting and useful touch. Although it didn't strike me as extremely Minimoog-like, it added another flavor to the Oberheim sound that is the core of this synthesizer.

I had little difficulty achieving the results I was after when going for a specific type of sound (basses, pads, percussive sounds, strange dissonant effects, etc.). Using the dedicated knobs and buttons in combination with the LCD makes programming the OB-Mx relatively effortless.

As I worked with the OB-Mx, I found myself thinking how unusual it is to find an analog instrument with great sound and flexible programming options, given today's preset-oriented climate. For this reason alone, Oberheim deserves a round of applause for taking the time to produce a synth that is hardware- and software-intensive and expensive to manufacture. However, it must be said that the $6,000 list price for a 12-voice unit places it firmly in high-end pro territory. I'm not even sure how many pros are willing to shell out that kind of dough, even for an instrument as glorious as this.

It is possible to purchase an OB-Mx with only two voices—which is still not cheap at $2,149—and add extra voice cards gradually. But after playing with the fully loaded 12-voice beast, I would be loath to settle for less. Extremely complex and elaborate timbres are possible, so having enough voices to let sounds completely "unfold" is critical.

This synth represents one of the only options for die-hard analog fanatics who want The Sound coupled with major programmability. To my ears, the OB-Mx is so great-sounding and flexible, I'd have no complaints if someone took away all my other gear and left me with just this box; this is definitely the "desert-island" synth for me. It's a must-hear for any serious synthesist.

Peter Freeman *is a freelance bassist/synthesist and composer. He has worked with such artists as John Cale, Jon Hassell, Chris Spedding, L. Shankar, Sussan Deihim, and Richard Horowitz.*

Circle #437 on Reader Service Card

Sony HR-MP5 Effects Processor

By David (Rudy) Trubitt with Benny Rietveld

A versatile, user-friendly price-buster.

From the ubiquitous Walkman to professional 48-track digital multitracks, there aren't many names in audio better-known than Sony. But beyond tape decks and headphones, the company has a relatively low profile in the electronic musician's niche. True, the company produces the impressive DPS-series effects processors, but these are expensive, which limits their appeal. So when Sony introduced two affordable, half-rack effects processors at last January's NAMM show, we were curious. How would Sony's new entry in the multi-effects world fare?

We looked at the HR-MP5, which is a general-purpose model. Its sibling, the guitar-oriented HR-GP5, looks similar, but functionally is a different beast.

INSIDE AND OUT

The HR-MP5 has two -10 dBm, unbalanced, ¼-inch inputs and outputs; a headphone out with level; and a hefty, 9 VDC, wall-wart power supply. Input levels are set by a dual-concentric,

input-trim knob. Direct and effects output levels are programmable. All MP5 effects use 48-bit (!) internal processing and 48 kHz sampling rates, regardless of configuration or the number of effects active. Eighteen-bit A/D and D/A converters are used for input and output.

Internally there are two effects blocks which can be connected in any of five configurations, including serial, parallel, and dual-mono signal paths. Each of these blocks has a stereo, 2-band, swept shelving EQ that can be positioned ahead or behind the effects block.

The unit has a large assortment of stereo effects to choose from, including many reverb, delay, and modulation effects, as well as compression; limiting; 4-band, parametric EQ; overdrive; distortion; speaker-cabinet simulator; and rotary speaker.

In all, Sony gives you 100 factory presets and 100 user-programmable presets. There are 40 algorithms, which utilize 51 effects, mostly drawn from Sony's DPS-series effects processors. (The Sony DPS-R7 Digital Reverb, D7 Digital Delay, and M7 Sonic Modulator were reviewed in the December 1992 **EM**. The DPS-F7 Dynamic Filter was reviewed in the January 1994 issue.)

The effects are easily accessed, thanks to a well-conceived user interface that includes a dual-concentric jog/shuttle wheel for easy scrolling though parameters. There are eleven buttons, six of which are dedicated to specific tasks. The remaining five are "soft." Lettered A to E, their function changes depending on what you're doing. The current function of each is shown in the unit's display.

GIVE IT A LOOK

Speaking of displays, the MP5's is *huge*. Preset names are displayed using a font large enough to read across a control room or small stage. Cute "serving suggestion" icons (guitar, piano, snare, etc.) remind you for which applications an effect sounds especially good.

Setting proper levels is a critical part of any audio system, but metering is an area where most low- and mid-level effects units skimp. Not this one. A single LED shows input-signal level, changing in intensity and color (green, yellow, then red) depending on signal strength. Beyond this, a button pops up a calibrated, 24-segment, stereo

input-level meter on a portion of the MP5's generous display. A second click changes the meter to an equally detailed output level meter. The only thing missing—and I'm nitpicking—is a gain-reduction meter mode for the limiter effect.

A third click of the meter button puts you in a chromatic-tuner standby mode, but you must click a soft key to engage it. Yuk! Four clicks to tune during a gig is way too many! The HR-RC5 foot controller ($249) gives you 1-step tuner access. It's too bad a MIDI message can't do the same thing. (The HR-RC5 can either address the HR-MP5 or act as a MIDI foot controller, but not both.)

Although Sony's HR-MP5 effects processor has only two effects blocks, each block has its own EQ and can produce a wide variety of good-sounding effects. Some effects algorithms include an additional delay line.

SIGNAL ROUTING

Important in any multi-effects unit are the different ways audio can be patched through the available processors. With the MP5, you can choose signal routings *between* the two effect blocks, but the internal signal flow *within* individual effects algorithms is not programmable. Five signal-routing options are available. These modes are stored as part of each preset and can be changed freely while editing.

Two serial settings feature stereo in/out, with Blocks 1 and 2 arranged in either order. Each effects block has its own wet/dry mix. These settings, plus a level-programmable dry path *around* both effects blocks provide a lot of flexibility in creating exactly the balance you want. (The dry path and effects-block wet/dry mix are available in all five routing modes.)

There are also two parallel routings. In the first, the stereo mix at the MP5's dual inputs are sent to both processors. This provides stereo in and out, but the same signals get sent to both effects blocks. Alternately, a routing mode featuring dual-mono in and stereo out lets you feed each effects block separately from a mono send on your mixer. The output of both effects is on a single stereo pair.

Finally, the unit can operate in a fully independent, dual-mono configuration. Here, you truly have two separate mono processors with independent input and output jacks. Missing are more bizarre permutations, such as placing one effect block in the feedback loop of another. However, the five provided modes cover the bases pretty thoroughly.

Although the dual-block architecture is reasonably flexible, not all effects are available in both effects blocks (as shown in the table on p. 126). This means some highly desirable combinations are impossible, such as two different reverb algorithms at the same time, or overdrive with reverb.

EDITING

Most editing procedures are easy. The editing wheel makes parameter-scrolling fast and accurate, and each soft button gives you instant access to one of five parameters. An Edit/Page button loops you through up to five different screens of options, depending on the effect. When you're not editing, the soft keys control on/off status for each of the two effects and the two EQs.

The HR-RC5 MIDI foot controller provides this effects on/off control via its eight footswitches, a useful feature that's only weakly supported by the MP5's MIDI implementation. The foot controller also can transmit Program Change and Control Change messages.

Many parameters can be edited separately for each channel. For these, clicking twice selects both sides for simultaneous editing. (A similar link is available under MIDI real-time control.) You will be loudly warned about unsaved edits, which is good, because the unit does not keep unsaved changes after power down.

Unfortunately, switching between similar effects within a block doesn't preserve parameter settings common to both. For example, if you set up a room reverb and want to hear the same settings with the hall algorithm, you'll need to re-create them after switching the algorithm. This unnecessarily slows up the editing process when you're trying to decide between similar effects.

The MP5 has a lot of depth, so plan on spending some time to get the most out of it. The manual, while packed with useful effects-block diagrams, suffers from scattered organization. On the other hand, the trilingual layout might make a great way to start learning French or German technical terminology (but why leave out Spanish?).

BRING ON THE EFFECTS!

As mentioned earlier, each of the two effects blocks has its own stereo, 2-band EQ. These can be placed in the signal path before or after the block with which they are associated. Using either or both of these EQs does not cost you any processing power; both main effects blocks can still be set to any algorithm.

These simple EQs are of the shelving type, with overlapping, sweepable, low- and high-frequency ranges; -24 to +12 dB boost/cut; and an overall output-level attenuator that has a range of 0 to -24 dB. It's unfortunate that the attenuation range isn't greater; a level control that goes to 0 would provide an easy way to get cool volume-swell effects via MIDI. Instead, this is only possible in a few limited ways.

There is also a 4-band, fully parametric, stereo EQ, with Q ranging from 0.1 to 10. This equalizer uses up one of the unit's two effect blocks, but can also be used in conjunction with the two 2-band EQs.

A CERTAIN AMBIENCE

People often focus on reverbs in multi-effects processors of this type. In

addition to the standard room, hall, plate, and gated reverbs, the MP5 also features a ducking reverb where the level of the input signal (or real-time MIDI control!) can vary the amount of signal sent to the reverb.

Overall, the subjective reverb quality is very good. Many of the presets offer nice, bright ambiences. With a little tweaking, you can get very smooth, dark or warm reverbs, without the grainy "sizzle" common to units in this price range.

There's also a hefty amount of programming flexibility built into the reverb algorithms. Depending on reverb type, you can control two sets of early reflection times (separate for each channel), cross reflections between channels, and change the reverb times separately for the low and high frequencies. You can also control a fair number of these parameters via MIDI, including the all-important room size.

This is all good, except for one annoying thing: The reverbs are noticeably noisier than most of the other algorithms. (The distortion and overdrive are noisy, but that's to be expected, and those algorithms provide you with a noise gate.) We estimate the increase in noise floor to be 3 or 4 dB. In any case, it's certainly *much* noisier than the published 92 dB S/N ratio would suggest. (More about published specs later.)

Although somewhat troubling, the noise didn't prevent us from using the reverbs with good results in a variety of situations. As part of a live guitar rig, the MP5 provided welcome clarity. In a home studio mixdown of solo

Product Summary

PRODUCT:
HR-MP5 Effects Processor
PRICE:
$695
MANUFACTURER:
Sony Electronics
3 Paragon Dr.
Montvale, NJ 07645
tel. (800) 635-SONY
or (201) 930-1000
fax (201) 930-7633

EM METERS	RATING PRODUCTS FROM 1 TO 5
FEATURES	● ● ●
EASE OF USE	● ● ● ●
QUALITY OF EFFECTS	● ● ● ●
VALUE	● ● ● ● ◖

guitar and vocal, the unit was warm and natural-sounding enough to be the only effect used for the project. In a professional studio, the MP5 turned in a good performance on keyboard tracks, with high-end Lexicons and Eventides used in the same mix. Would it be better if the unit's reverbs were quieter? Of course. Do they still sound cool? Yes.

DELAY DELAY DELAY

As you can see in the table shown below, there are a lot of delay effects, including sampling, modulation, and an extensive tapped delay. In addition, several nondelay algorithms have simple delay blocks built-in. One quibble is that the maximum delay length in any algorithm is only 682 milliseconds. You can string together two delays in series for delays longer than one second, but that ties up the whole unit.

The swept delay is especially noteworthy. It can provide LFO-driven, modulated delay effects, but you can also sweep delay times manually, under MIDI continuous control. Changing delay times always introduces artifacts into your audio. Happily, you get an attack/release-time control for the delay sweep, which allows everything from a brief, grainy, zipper noise when changing to the new time, or a longer, varispeed-like warble, reminiscent of changing speeds on an old Roland Space Echo. Much praise to Sony for giving you the tools to shape this response.

Another way to automate delay times is the Tempo Delay, which reads incoming MIDI Clock and lets you set delay time as a function of note duration (from quarter to thirty-second note). This is fine, but we would have welcomed a tap-tempo feature.

Many delay and reverb algorithms are similar in most respects, but each has unique individual features, such as low/highpass filters, LFOs, and MIDI control of various parameters. Unfortunately, we often became frustrated because some of these unique features aren't available together in a single algorithm.

SIT ON IT AND MODULATE

The chorus, flanger, and phasers include a separate delay time for the direct signal. This allows a nice double, slapback, or simple repeat, without eating up a delay program. It also makes "through-zero" flanging effects possible, as the dry signal can be delayed a few milliseconds to be exactly in sync with the shortest delay at the peak of the flange. This enhances the "turn-your-ears-inside-out" effect, which is especially intense over headphones.

The Chorus algorithm is rich and deep. Although digital flangers and phasers in general never sound quite like their analog counterparts, in the MP5, they're pretty good. You can get some pretty weird sounds. Back in the 1970s, we didn't have phase-shifter pedals that allowed changing the depth and the rate separately for each channel. (Or even one with more than one output!)

Vibrato and tremolo also have a simple delay module built into their basic algorithms, providing extra variety without wasting a delay effect. The sine, triangle, and two exponential waves offer good variety in a traditional vein. Still, we wish Sony had included a square wave, or other exotic LFO waveforms, for that "machine-gun" sound.

The ring modulator is always entertaining in an unpredictable way. It's fun for late 1970s fusion sounds, fake steel drums, and other clangorous effects. The modulator frequency doesn't have an LFO, but you can control it manually via MIDI.

The rotary-speaker simulator is convincing. The rotor rate changes gradually when you switch between fast and slow speeds and can be controlled with a pedal. The effect doesn't have the pronounced midrangy "tank" sound typical of some units.

Another popular effect making a comeback is the subharmonic generator. Until recently a hot commodity on the rental market, some manufacturers (such as dbx) now are producing new versions of this effect. The MP5's implementation is a reasonable one. With a little tweaking, we were able to approximate a dance-floor mix from a radio-ready CD track. It would be nice to further tighten the low end with even shorter release times, though.

SIGNS OF INTELLIGENCE?

The Intelligent Pitch Shifter is on the glitchy side. For example, when the unit has to decide between a minor and major third, it takes long enough to add a very obvious pitch-bend ornament to the harmony part. You definitely won't be able to play the double-guitar ride at the end of "Hotel California" by yourself.

On the other hand, if you drop the pretense of usable double-tracked harmony parts, you can get some pretty cool sounds. Using the fixed-interval

HR-MP5 Effects Algorithms

Effects available only in Block 1 or Block 2 are mutually exclusive. For example, you can't use both distortion and reverb, because both are only available in Block 2.

Block 1 Only	Block 2 Only	Blocks 1 and 2
Amp Simulator	4-band EQ	2-band EQ
Auto Pan	Distortion	Compressor
Chorus	Ducking Reverb	Double Delay
Ensemble	Dynamic Filter	Ducking Delay
Flanger	Gated Reverb	Dynamic Exciter
Freeze (Sampler)	Hall Reverb	Gate
Hold Delay	Overdrive	Limiter
Intelligent Pitch Shifter	Plate Reverb	Stereo Delay
Modulation Delay	Room Reverb	Tapped Delay
Phaser	Vocal Canceller	Tempo Delay
Reverse Shift		Wah
Ring Modulator		
Rotary Speaker		
Slow Attacker		
Sub Harmonic Generator		
Sweep Delay		
Tremolo		
Vibrato		

Reverse Shift, set to octaves and feeding into a reverb block, produced a troupe of ghostly bouzouki players strumming in a roller rink. We like it.

Although it eats up half your effects capability, the Limiter algorithm gives you full attack, release, threshold, and ratio controls. Happily, this limiter isn't prone to the fluttery pumping found on many other units. Very nice. There is also a simpler compressor with high-pass and lowpass filters before the detector block, allowing frequency-dependent, dynamic processing.

▼

The HR-MP5 has a lot of depth, so plan on spending some time to get the most out of it.

Algorithms that include a level-detector block (e.g., limiters/compressors and ducked reverb/delay) can take their control source from the signal at either input jack, or from the input to their effects block. These aren't necessarily the same: Depending on the signal-routing in use, the detector could be activated by a post-delay signal, or "look ahead" to the input signal, before the actual audio arrives through a preceding effect.

The MP5 also has overdrive, distortion, and cabinet simulator effects. Although serviceable, each occupies a full effects block, quickly tying up the unit. You probably have more practical ways to get distortion.

On paper, the sibling HR-GP5 is better suited as an all-in-one box for guitarists. It has six effect blocks with 37 different signal-routing chains and a more detailed amp simulator. Still, one of our primary uses for the MP5 was as part of a live guitar rig that included a separate compressor, preamp, and power amp. For this application, a general-purpose unit such as the MP5 proved more suitable than a dedicated guitar effects box.

MIDI CONTROL

The MP5's brochure and press release claims that "any four parameters can be controlled by MIDI in real time." However, only about half the unit's parameters are accessible via real-time MIDI controllers, falling far short of that advertised claim. Sony has hinted at software upgrades for the socketed ROM on board. Let's hope they make good on this promise soon. (Our review unit ran software revision 1.02E.)

For those parameters that *are* addressable, any MIDI controller number can be used, with positive or negative controller scaling. Sony gets back a few points for an extra front-panel input that turns any audio volume pedal into a real-time controller, either on its own, or with the other four MIDI controls. Adding the optional HR-RC5 foot controller adds another volume pedal input, for a possible six real-time inputs.

Missing is a momentary or latching toggle, which would be convenient for messages such as Sustain Pedal. But overall, the MIDI real-time implementation of the MP5 is better than many, save for the terribly underimplemented list of controller destinations. (Hint to manufacturers: The correct list of parameters that should be available for real-time control is *all* of them!)

AND THE VERDICT...

For the price, the MP5 is a good piece. With a software upgrade, it could be great. Topping the wish list are the missing MIDI real-time features and a simple reverb that would fit in Block 1, making two simultaneous reverbs possible. (Adding these would be worth another point in the Features meter.)

Still, in its current incarnation, the MP5 is well suited for mixing applications, live or in the studio. If your guitar rack doesn't require an all-in-one wonder box, it will do fine there, too. It's easy to use, sounds very good, and is reasonably priced. With a little follow-through, Sony could have a real winner on their hands.

Twelve years ahead of their time, using a Roland Drumatix and an open-reel 2-track, guitarist **David (Rudy) Trubitt** *and bassist* **Benny Rietveld** *failed to take Waikiki by storm with a homemade dance mix of the* Flintstones *theme.*

Circle #438 on Reader Service Card

Roland JV-90 Expandable Synth

By Geary Yelton

You can expand computers, so why not synthesizers?

In the world of synthesizers, innovation is the norm. It's a world that's always looking for new ideas, new sounds, new ways of doing things to make our lives as electronic musicians easier or more productive. At the least, synth manufacturers are always looking for new ways to make us spend our money on the Next Big Thing.

Recent innovations include wave sequencing, physical modeling, synthesizers that read sample data, and now the JV series of expandable synthesizers from Roland. The capabilities of the JV-90 and others of its ilk can be augmented with snap-in circuit boards, much like enhancing a computer via expansion slots. Expansion boards can increase both the polyphony (the number of voices) and the amount of waveform ROM (the variety of sounds). What an obvious idea! Why hasn't everyone done this before?

FIRST LOOK

Before we examine its expandability, let's take a look at the basic JV-90. It has 76 keys, over an octave more than the typical keyboard synth. The unweighted keyboard is sensitive to Velocity and Channel Pressure (aftertouch), but not Polyphonic Pressure. Depending on the mode, the keyboard can be split into as many as eight zones for controlling multitimbral internal sounds or external MIDI instruments.

Out of the box, the JV-90 is 28-voice polyphonic and 8-part multitimbral. Its internal memory contains 320 Patches (256 preset and 64 user-programmable) and five Rhythm Sets (four preset and one programmable). Up to seven Patches and a Rhythm Set are organized into each multitimbral Performance. There are 80 Performances, sixteen of which are user-programmable.

Four megabytes of ROM comprising 152 sampled waveforms are available for your programming and listening pleasure. Nearly half of these are percussion sounds. Onboard effects consist of reverb/delay and chorus. Eight assignable parameter sliders let you modify any parameter on the fly, affecting either the JV-90's sounds or external sound sources via MIDI Control Change commands.

The 2-line LCD is the same one that has been used in Roland synthesizers since the D-50. It requires some rather cryptic abbreviations. Most current synths use much larger LCDs, in which more information can be displayed with fewer abbreviations. I wish Roland would get on that bandwagon and enlarge their display.

The first time you listen to the JV-90, you'll probably play the onboard demo sequences. As they play, four humanoid figures dance in the LCD. One of these demos is best described as big band music, another as disco, and another as jazz fusion. To my ears, all three sound a bit dated. Although they show off some of the instrument's versatility, these sequences don't even hint at its capabilities in rock and ambient music.

EXPANSIONISM

Expanding the JV-90 is a lot like adding synth modules to your MIDI rig, combining greater convenience with savings in cost and rack space. Why buy another synthesizer when all you have

The Roland JV-90 Expandable Synthesizer produces clean, full sounds for a fair price. With the addition of voice-expansion and wave-expansion circuit boards, its polyphony and waveform ROM can be doubled and its multitimbral capability tripled.

to do is upgrade the one you have? On the synth's underside are two little trap doors for installing expansion boards. There are two kinds: wave-expansion boards for increasing the internal waveform memory and voice-expansion boards for increasing the polyphony up to 56 voices. Installing the boards yourself is a simple, 2-minute process, using a handy-dandy screwdriver that's included with every board.

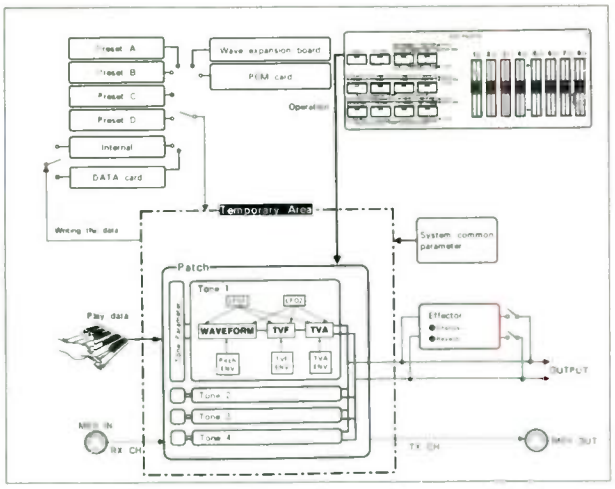

FIG. 1: A Patch consists of up to four Tones, each with its own modulated waveform oscillator, variable resonant filter, and variable amplifier. (Courtesy of Roland Corp. US)

A voice-expansion board amounts to a synth on a circuit card, providing 4 MB of additional waveforms in addition to extra Patches. The JV-90 has separate stereo output jacks and a MIDI In port dedicated to voice expansion. If you've installed a voice-expansion board and don't put plugs in the expansion out jacks, its sound is mixed with the main signal through the main stereo outputs.

Two 28-voice boards are currently available. The VE-JV1 is fundamentally equivalent to a Roland JV-1000, providing all of its internal Patches plus a few others, for a total of 512 Patches. It's 8-part multitimbral, making it possible for the JV-90 to receive data on all sixteen MIDI channels.

The VE-GS1 is a Roland Sound Canvas on a board, providing 226 General MIDI and Roland GS-compatible Patches, eight Rhythm Sets, and a bank of sound effects. Because it is 16-part multitimbral, adding a VE-GS1 to a JV-90 results in a 24-part multitimbral instrument, using both MIDI In ports. Unfortunately, it's impossible to install both voice-expansion boards in the JV-90; you're limited to one voice-expansion and one waveform-expansion board at a time.

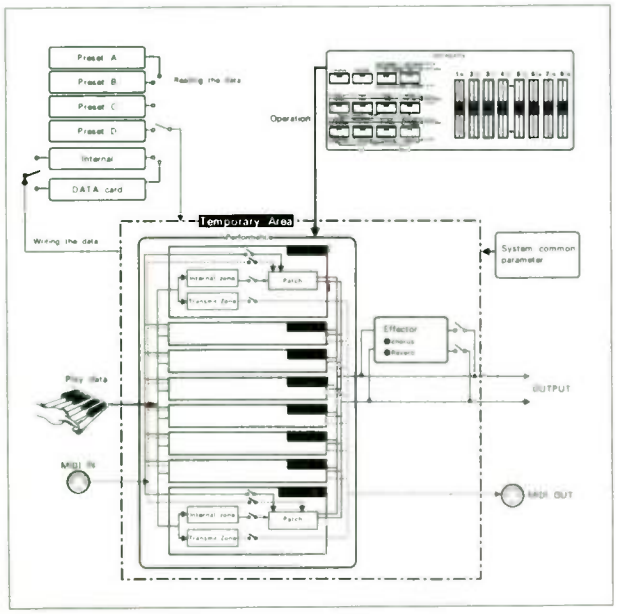

FIG. 2: A Performance consists of up to eight Patches that are assigned to Parts, one of which is a Rhythm Set. All Parts pass through the same effects processor. Each Part can have independent internal and transmit zones. (Courtesy of Roland Corp. US)

At present, Roland offers five waveform-expansion boards in the SR series. Each contains 8 MB of sampled sounds. The SR-JV80-01 is the pop expander, with lots of piano, organ, bass, guitar, synth, and percussion sounds. The SR-JV80-02 is the orchestral expander, while the SR-JV80-03 contains only acoustic and electric pianos. The SR-JV80-04 is the Vintage Synths expander, which I received for review with the JV-90. It contains samples from lots of synthesizers, as well

VINTAGE EXPANSION

The SR-JV80-04 Vintage Synths expansion board provides 8 MB of sampled waveforms from Oberheim, Moog, Prophet, ARP, Yamaha, and Roland synthesizers. There are 255 Patches fashioned from 255 waveforms. Roland sounds include practically every synth they made before 1990: Jupiters, Junos, JXs, D-50, SH-101, MKS-80, Planet-S, Pro-Mars, VK-1 Organ, GR guitar synths, and modular Systems 100 and 700. Although they're not exactly vintage synths, you also get a Hammond B-3, RMI electronic piano, and Mellotron.

Most of these sounds offer advantages over playing the original instruments. They're MIDI-addressable, touch-sensitive, and completely polyphonic. Reverb and panning effects are an integral part of many Patches, although no synthesizer prior to the D-50 had a built-in effects processor. In addition, many of the Patches are different from the originals in that the envelopes sound too, well, digital.

My favorite Patches use the Mellotron sample. "Tron Strings," "Strawberry Flute," and "Tron Choir" are faithful to the source, although the release on the choir is a bit long. Three other Mellotron Patches are either too thin, or swimming in reverb. The RMI electronic piano patch "Are Am I?" sounds like the real thing, with an organ sustain, rather than piano. The handful of D-50 sounds are good to have if you don't have them already, but the Hammond B-3 patches are nothing to write songs about. "Power B" is a bit weak, but "Dirty Purple" is better, a good interpretation of Jon Lord's classic sound. It gives you a nice panning effect when you wiggle your fingers up and down. "Solina" uses an ARP String Ensemble sample that sounds very much like the classic keyboard.

Several sounds remind me of Tangerine Dream, including "Rotary String" (a mix of "Power B" and a string pad) and the aptly named "Dark Air." "Mantrawave" sounds very much like something I used to whip up on ARPs in the 1970s. There are a couple Roland GR guitar synth patches that sound like Pat Metheny or Robert Fripp way back when. "FM Brass" is definitely not one of my favorite DX7 brass patches, but it can be improved with tweaking.

If you don't own any analog synthesizers, this might be a good place to start. If you're not crazy about old Roland synthesizers, you probably won't be crazy about the SR-JV80-04 expansion board. There are enough fine non-Roland sounds to make it worthwhile, but they're in the minority. If you are a vintage Roland analog fan, you're sure to be pleased. And if you're looking for an alternative to buying a synth module dedicated to vintage keyboards and you don't have or don't want to tie up your sampler, you may find what you're looking for in this board.

as the Mellotron and Hammond B-3 (see sidebar, "Vintage Expansion"). The most recent card is the SR-JV80-05 World expander, which includes 8 MB of ethnic-instrument samples and rhythmic loops.

In addition to the unit's expansion slots, there are two card slots in the back of the JV-90, labeled Data Card and PCM Card. These accommodate Roland's PN patch-expansion cards and SO waveform-expansion cards. A fully expanded JV-90 synth with 4 MB of internal ROM, a 4 MB VE-series voice-expansion board, an 8 MB SR-JV80 waveform-expansion board, and a 2 MB PCM card adds up to an impressive 18 MB of waveform ROM.

MODUS OPERANDI

The JV-90's architecture is pretty straightforward. A Tone consists of a waveform shaped by a resonant time-varying filter (TVF) and time-varying amplifier (TVA). Up to four Tones make up a Patch. Patches are played individually in Patch Play mode, or assembled into Performances in Performance Play mode. A Performance consists of up to seven Patches and a Rhythm Set, all of which are assigned to Parts in the Performance. Any of the eight Parts can be layered, split, or played one at a time from the keyboard. Under an external sequencer's control, each part can receive on a different MIDI channel.

In Patch Play mode, you can turn any of the four Tones on and off and change the effects assignment. You can also change the waveform and adjust levels, panning, tuning, filter, and envelopes for each Tone. In Performance Play mode, you can turn the Parts on and off and change the effects assignment, MIDI receive channel, level, panning, tuning, Patch (or Rhythm Set), and other parameters for each Part. You can also adjust MIDI transmit parameters such as channel, volume, panning, and transposition.

There are no Performances in a waveform-expansion board, only Patches. Performances using waveform-expansion sounds must be created by the user. To get the most out of these boards, you're going to have to dig in and do some programming. Don't be frightened, though; Roland makes it as painless as possible. When you're creating a Performance, you can select whether each Patch is from the user, preset, or wave-expansion section of memory. If you swap wave-expansion boards, however, any Performance containing a wave-expansion sound will substitute a different Patch in the same location.

The JV-90's chorus and reverb/delay processors apply globally to all Parts in a Performance. For example, you can't have one Patch with reverb and another with delay in the same Performance. However, you can vary the amount by which each rhythm sound or Patch is affected. You can also program whether the effects are turned on or off for each Part.

The chorus effect's editable parameters include rate, depth, feedback, and a choice of three chorus types. It can be routed directly to the output or through the reverb. There are six types of reverb and two types of delay. The maximum delay time is less than half a second for conventional delay, and less than 250 milliseconds for ping-pong delay. Buttons that turn the chorus and reverb on and off are conveniently located on the upper left of the control panel.

Although they are very useful to performers and programmers, the JV-90's controls are not as extensive as those on the JV-1000. Of course, the JV-90 is a lot less expensive than the JV-1000, and the controls are still much better than what you find on most synths. The assorted buttons and sliders are logically

arranged, well labeled, and sturdy. The layout of the controls and the logic of the operating system make the learning curve a lot easier than many synths.

WHAT ARE YOU GONNA DO?

Among the resources for creating Patches are some nice touches, including several different types of portamento and waveform cross-modulation, in which the frequency of one waveform is modulated by another waveform. In addition, up to four parameters can be simultaneously modulated with Pressure. The tutorial-style owner's manual is well organized and

▼

Roland makes programming as painless as possible.

pretty easy to understand, although it's a bit brief.

Have you ever wished Roland would make a synth with standard left-hand controllers instead of their trademark bender joystick? It's great for pitch-bending, but I've always found it hard to invoke subtle vibrato nuances with that thing. Now, there's an alternative: the C1 slider. On the JV-90, three smooth sliders are located where the fingers naturally fall when using the bender. They're labeled Volume, Presence, and C1. The C1 slider is assignable, so you can use it to control not only vibrato, but any continuous Control Change from 0 through 95, plus Pitch Bend and Program Change up or down.

Editing the user-programmable Rhythm Set is easy. In Edit mode, select a sound by pressing its key. Change the key's sound by scrolling through a list of all available waveforms (not just percussion), including waveforms on expansion boards or cards. For each waveform, you can adjust pitch, filtering, envelopes, and effects. When you have tweaked the sound to your liking, save your work and move on to the next one. In this manner, you can build exactly the Rhythm Set you require.

I recognized most of the percussion sounds from Roland's drum machines, synths, and sampler libraries. Considering that 21 rhythm sounds (nearly a third) are backward versions of other rhythm sounds, there's not a huge variety here. More than half the snares are useful, which is my measure of a good percussion palette. Just don't expect it to replace your drum machine.

With three pedal inputs and assignable sliders, the JV-90 is well suited to onstage use. Patches and Performances are easily called up on the fly. In the studio, its sound makes the JV-90 a good choice for a variety of musical styles, especially when you take the expansion boards into account. As a master keyboard, different Parts in a Performance can be assigned to control external instruments, rather than, or in addition to, internal sounds.

For sequencing, the JV-90 can receive Program Changes and other MIDI messages independently for each Part in a Performance. With a voice-expansion board, the JV-90's abundance of voices and multitimbral parts makes it ideal for sequencing applications.

One feature makes it simple to see what's going on under sequencer control. If you press the Information button in Performance mode, you can step through pages that display the values of incoming MIDI messages that control Modulation, Volume, Pan, Expression, Hold, Pressure, and Pitch Bend. You also can discover the number of voices being used. All Patches can be accessed via MIDI by sending a combination of Bank Select and Program Change messages.

As a master MIDI controller, you can adjust transmission parameters for each Part in a Performance. To select which

Product Summary

PRODUCT:
JV-90 Expandable Synthesizer
PRICE:
$1,895
MANUFACTURER:
Roland Corporation US
7200 Dominion Circle
Los Angeles, CA 90040-3696
tel. (213) 685-5141
fax (213) 722-0911

EM METERS	RATING PRODUCTS FROM 1 TO 5
FEATURES	● ● ●
EASE OF USE	● ● ●
AUDIO QUALITY	● ● ● ●
VALUE	● ● ● ●

Part is being played or edited, just press one of the eight Part switches. Editable parameters include key range, transposition, Velocity curve and sensitivity, volume level, pan position, Program Change number, and MIDI channel.

SHOULD YOU WANT ONE?

I think of an expanded JV-90 as an affordable Synthesizer Powerhouse and an unexpanded JV-90 as Powerhouse Lite. The people who created its programs obviously know a lot about synthesis, and the results are mostly quite pleasing. If you know your way around synthesizers, learning the JV-90 should be a cinch. It's a well-designed and well-implemented instrument.

I have a few minor quibbles, but nothing serious. For example, calling up a new Performance takes a full second from pushing the button to completing the operation. With the volume more than halfway up, headphones are unbearably loud. An extra pair of assignable audio outputs would be nice. There's only one lowpass or highpass filter per Tone, which precludes a bandpass or band-reject setting. There are no preset envelope templates, as there are in many recent synthesizers. I would like the ability to install more than one wave-expansion board. And while we're making a wish list, a more flexible effects processor would be a wonderful enhancement.

Overall, the JV-90's sounds are consistently clean, possessing a full-bodied tone without a hint of sterility. In other words, I really like the sound. This is a synthesist's synthesizer, in the same tradition as the Korg Wavestation and the Waldorf MicroWave. Although most of the imitative sounds are good enough, its real strength lies in the electronic timbres. Many of its luxurious, legato sounds remind me of Brian Eno. Car commercials and sci-fi TV soundtracks will no doubt bear the influence of the JV-90 and its brethren.

This is a fine instrument at a fair price. If I had to pick just one synthesizer and I had less than $2,000 to spend, I'd take a long, hard look at the Roland JV-90.

Geary Yelton *is confused and pursuing the path of the solitary heart in Atlanta, Georgia, home of Jimmy Carter, Elton John, and the 1996 Olympics.*

Circle #439 on Reader Service Card

BeBop Systems LimeLight 1.51 (DOS)

By Allan Metts

An entry-level sequencer that doesn't do Windows.

I hear that DOS is dying. Advanced operating systems like OS/2 and the upcoming version of Microsoft *Windows* (code-named "Chicago") apparently will soon take over the PC world. Although DOS may indeed be in its retirement years, plenty of PCs will still use DOS for some time to come. Some of these computers are underpowered for *Windows* or OS/2, while others are owned by users who simply don't like the new operating environments.

Nevertheless, the onslaught of graphic user interfaces has definitely upped the ante for programs that run only in DOS. Most users want a friendly, consistent interface, without the cryptic keystrokes that make programs hard to learn. To that end, BeBop Systems' *LimeLight* definitely fits the bill.

Intended for MIDI newcomers and some intermediate-level users, *LimeLight* is one of the few DOS-based programs that includes notation, onscreen faders, and graphic controller editing, features that have become common in *Windows*-based sequencers. Missing from *LimeLight,* however, are some of the features that more experienced MIDI users need. Advanced MIDI data manipulation, System Exclusive (SysEx) support, and punch in/out are not available.

LIVING IN THE LIMELIGHT

LimeLight can be installed manually or automatically from one low-density disk. The entire program consists of nine screens, one set of drop-down menus, and an assortment of "hot keys" to make things even more convenient. Almost every screen can be reached with just one keystroke. Because the program is well conceived and not overly complicated, you can be productive after only a few hours.

LimeLight supports real-time and step-time recording of up to 72 tracks, including note-entry with a mouse. Tracks are recorded with a resolution of 120 pulses per quarter note (ppqn). You can press the Record button from any screen, and *LimeLight* will give you a 1-bar count-in. Unfortunately, the count-in time is not user-definable.

Much of *LimeLight* is similar to other sequencers. A Track screen shows you all your track names at once, along with their transposition, Velocity offset, channel, Bank Select, and Program Change settings. A MIDI event counter and solo/mute buttons round out the data for each track. All the settings in the Track screen affect the song on playback only; they do not actually change the recorded MIDI data.

I spent most of my time in the Measure screen. This screen lets you manipulate one or more whole measures in your tracks. For example, you can assemble the "perfect" piano track by cutting and pasting measures from three different takes. Solo and mute buttons are also available in the Measure screen.

Users who want to manipulate individual notes can use either the Piano Roll or Note screen. The Piano Roll screen shows each measure's notes as individual bars (see **Fig. 1**). The position of the bar indicates the pitch and rhythmic placement of the note, while the length indicates the duration. You can zoom in to show just one measure on the screen, or zoom out until 88 notes are visible at once.

LimeLight provides tools in the Piano Roll screen for editing, inserting, or deleting individual notes with the mouse. You add notes by clicking on the kind of note you want (quarter, eighth, etc.), then placing that note at

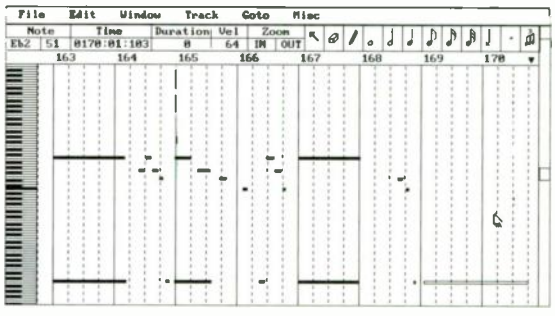

FIG 1: The Piano Roll screen lets you manipulate a track's individual notes.

the proper rhythmic location and pitch on the screen. Double-clicking on any note lets you change its Velocity or duration. "Drag-and-drop" editing is provided, but you can only move one note at a time.

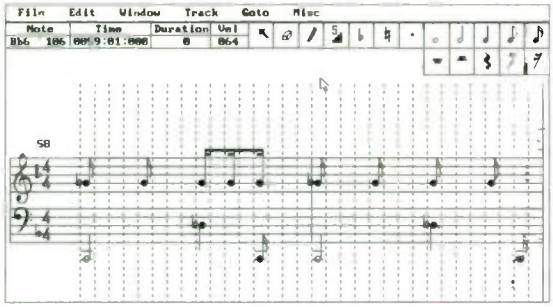

FIG 2: *LimeLight* provides rudimentary music notation in the Note screen.

NOTEWORTHY FEATURES

The Note window lets you manipulate your music using standard music notation (see Fig. 2). *LimeLight* is not intended to be a full-blown notation program, but it shows you a "rough draft" that is good enough for editing your music. All notes appear on one grand staff and are visually quantized to keep the display neat. (The actual MIDI data is not affected.) *LimeLight* creates notation reasonably well, but it doesn't rigorously enforce proper rhythms. Without much difficulty, I was able to trick the program into creating 4/4 measures with five beats.

Many of the editing features that appear in the Piano Roll screen can also be found in the Note screen, including the ability to drag-and-drop notes. You also get tools for manually or automatically placing rests. I didn't find the Note screen as useful as someone else might. My music tends to use the entire piano keyboard, and I soon grew weary of counting the ledger lines to find the right notes. The 8va annotation is not supported.

Step recording is available only in the Note screen. You select the kind of note you want to enter using the mouse or keyboard, then play your MIDI keyboard to enter it. You can also enter chords and rests in Step mode with reasonable ease. Because drum parts are often recorded in Step mode, I was surprised that step recording isn't available in the Piano Roll screen. Drum parts don't look pretty on a grand staff.

You can print each track's notation, provided your printer can emulate one of the five popular printers that *LimeLight* supports. (The program does not speak PostScript.) *LimeLight* prints two measures per line and three or four grand staffs per page. The printed notation is not gorgeous by any means, but it is usable.

The Mixer screen is a nice touch for an inexpensive, entry-level program (see Fig. 3). Each MIDI channel gets its own set of faders and knobs, which are unalterably assigned to their respective controllers. You can control MIDI Volume, Pan, Reverb, and Chorus (MIDI Control Change numbers 7, 10, 91, and 93, respectively). Advanced users will probably want the ability to remap different Control Change messages to each knob, but beginners will appreciate the fact that these controls are tailor-made for the Roland Sound Canvas.

You can record fader and knob movements in real time, or take "snapshots" that put the instantaneous values of each control into your sequence. You can also send the current position of every knob out to your MIDI gear with the click of the mouse. This feature lets you calibrate your gear with what you see on the screen. If your music moves too fast for the mouse, you can gang several sliders together and control them with one master fader.

An Event List window lets you tweak your MIDI data at the finest level of detail. You can edit each component of every color-coded MIDI message using little increment/decrement buttons or by entering new values directly.

Graphic Pitch Bend, Velocity, and Control Change editing windows round out

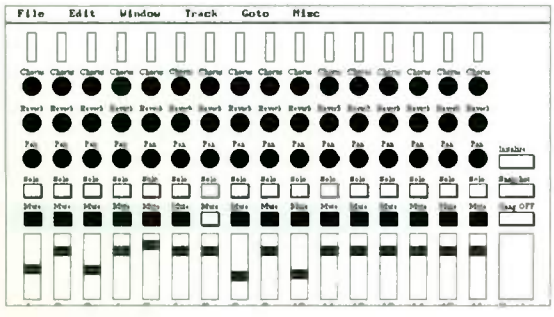

FIG 3: You can automate a mix in the Mixer screen.

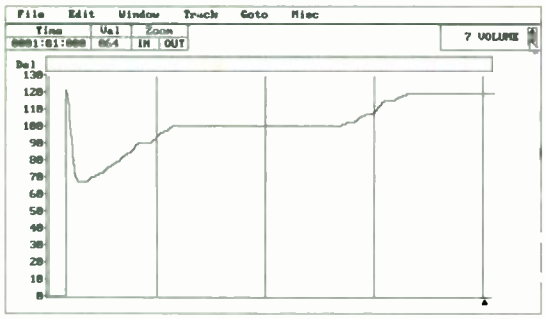

FIG 4: You can use your mouse to alter Control Change events; in this case, MIDI Volume.

LimeLight's nine screens. In these screens, you can alter the expressive elements of your song by drawing lines and curves with the mouse. Note Velocities are represented as vertical bars in the Velocity screen, while Control Changes and Pitch Bend are shown as continuous lines (see **Fig. 4**).

Unfortunately, you can't edit all MIDI Control Change messages; only fourteen of the most popular ones are supported. Also, the Control Change and Pitch Bend screens seem designed for only one MIDI channel at a time. They get confused when controllers from different channels appear in the same track. They attempt to display all channels of information, but you can't make sense of it on the screen, and you can't manipulate the data in a meaningful way.

At the bottom of all nine screens is a Transport window that displays song position (in measure:beat:tick format), title, key, tempo, time signature, and a host of other status information. The transport controls are similar to those found on a tape deck. The Transport window, drop-down menus, function keys, and hot keys are always available and never change functions when you change screens. Consequently, the program is remarkably easy to learn and use.

EDIT STAGE LEFT

LimeLight's editing methodology is so simple and intuitive that I'm surprised more sequencers haven't adopted it. The program maintains two song locations in memory called "From Time" and "Thru Time." The two pointer locations are always visible at the bottom of the screen. Editing operations affect the measures that lie between these two times. If you like, you can edit multiple tracks by "tagging" them with the mouse or keyboard, in addition to setting the From and Thru times.

There are several quick ways to set the two pointer locations. You can highlight a range with a mouse, or press a function key that sets the From or Thru time to "Now Time" (which is what *LimeLight* calls the current location in the song). Alternatively, you can specify the whole song for editing using one hot key.

The cut, copy, and paste operations are flexible and powerful. During cut and copy, you can specify a range of notes and a range of MIDI channels to be extracted into the copy buffer. When pasting, you can place the data in its original track, or the currently selected track at any location in the song. The pasted data can merge with, insert into, or replace what's already there. You can also tell *LimeLight* to paste the data multiple times, or maintain the original measure alignment (which prevents you from pasting music that's supposed to be on beat one to a different beat). The cut, copy, and paste functions are very easy to use and perform their tasks exactly as expected.

LimeLight's MIDI processing is limited to transposition, quantization, and time shifting (which the program calls "sliding"). You can quantize note start times and/or durations. However, none of the more esoteric operations, such as randomization, inversion, or partial quantization, are available.

Aside from the basics, *LimeLight* also has a respectable collection of bells and whistles. Its MIDI metronome can sound when playing, recording, or both. The program can "bump" all incoming MIDI data to a specific channel, and it can filter several types of MIDI data out of the incoming datastream. It can also synchronize to MIDI Clock for use with a drum machine, hardware sequencer, or other external time-code source, such as a MIDI tape-sync box.

A handy DOS shell, Standard MIDI File support, and a Panic Button round out *LimeLight*'s bag of goodies. The Panic Button sends Reset All Controllers, All Notes Off, and Note Off for all 128 notes, on all sixteen channels. Sending individual Note Off messages is good, but the program should also send individual Control Change messages with nominal values, because some synths (such as the Yamaha TX81Z) do not respond to Reset All Controllers.

LIGHTS OUT

I don't think I've seen a better program for the MIDI novice. *LimeLight*'s well-organized, consistent user interface and minimal hardware requirements make it perfect for anyone who is new to the world of electronic music. BeBop threw in several sample sequences that speed up a beginner's learning process considerably.

More advanced users will enjoy working in *LimeLight*'s hassle-free environment, but they will probably soon find a need that *LimeLight* can't meet. For instance, you cannot change tempo, time signature, or key signature in midsong. You cannot perform "punch-in" recording. You are limited to about 10,000 MIDI events, as *LimeLight* doesn't yet support extended memory. (According to BeBop, a new version with this capability is in the works.) In addition, *LimeLight* ignores any incoming SysEx data, and it does not run under *Windows* or OS/2.

LimeLight is perfect for laptops that don't have enough "oomph" to run *Windows*. But the original review copy only supported MPU-401 interfaces, which require an expansion slot most laptops don't have. Fortunately, a new version became available during the review that supports most of the popular MIDI interfaces, including parallel

Product Summary

PRODUCT:
LimeLight 1.51
PRICE:
$99.95
SYSTEM REQUIREMENTS:
PC-compatible with 640 KB RAM, mouse, VGA graphics, MIDI interface
MANUFACTURER:
BeBop Systems
PO Box 550363
Dallas, TX 75355-0363
tel. (800) 775-5557
or (214) 320-2723
fax (214) 328-1092

EM METERS	RATING PRODUCTS FROM 1 TO 5
FEATURES	● ● ●
EASE OF USE	● ● ● ● ◖
DOCUMENTATION	● ● ● ●
VALUE	● ● ●

and serial port devices. *LimeLight* still doesn't support more than one MIDI port, however.

LimeLight's manual is well done, although it needs a thorough proofing and some minor corrections. It contains tutorial and reference sections and plenty of introductory material on MIDI for the novice. Also present are plenty of handy appendices, an index, and a troubleshooting section. On the down side, *LimeLight*'s online help is nothing more than one screen of hot-key definitions.

BeBop Systems appears to support their products well, with an 800 number, fax line, and electronic BBS. A new version of the program was sent to me within 24 hours when I found a couple of bugs that were crippling my all-synth, jazz-rock project.

I look forward to seeing more from BeBop Systems. They were quite successful in creating an easy-to-use, productive sequencing environment for a fair price. So pull that old underpowered computer out of the closet and put it to work!

Allan Metts *is an Atlanta-based MIDI consultant, musician, and engineer. His home studio finally has the space it deserves, even if it is in the basement.*

Circle #440 on Reader Service Card

Yamaha FX770 Guitar Effects Processor

By Erik Hawkins

Soak your signals with this guitarist-friendly sound mangler.

Yamaha is a veteran of the effects-processing wars. The company's SPX-series effects processors have been around since the mid-1980s and are now a studio standard. The FX-series guitar processors, while not as omnipresent as the SPX devices, have grown steadily since emerging in 1991. (The FX900, was reviewed in the August 1991 **EM**.)

The latest addition to Yamaha's FX series is the 1U rack-mount FX770. The well-rounded signal-processor's straightforward layout, ease of use, and comprehensive set of effects make it more than just another pretty front panel.

The FX770 can produce up to nine simultaneous effects, ranging from amp simulations to compressors, modulation effects, delays, and reverbs. The order of these effects can be rearranged, within generous limits. There is a comprehensive tuner, an insert point for external signal processors, and an impressive selection of MIDI-controllable parameters. Moreover, guitarists and other pedalheads will rejoice in the processor's footswitch capabilities.

FIRST IMPRESSIONS

The processor's 100 factory preset programs are quite good, and when you're ready to create your own, they can be quickly tweaked and saved into 100 user RAM locations. The manual offers a great section suggesting playing styles and pickup selection (bridge humbucker, single coil, etc.) for each preset. The manual is good, but, alas, it has no general index, only a special troubleshooting index.

The FX770 uses 16-bit D/A and A/D converters that sample at 44.1 kHz. Yamaha rates the unit's frequency response at 20 Hz to 20 kHz, with a dynamic range of 85 dB. Specs aside, the FX770 is notably clean and does not suffer from the nasal sound quality (usually indicative of a frequency response that rolls off around 15 kHz) evident in many guitar processors. If anything, the unit is a bit on the bright side, but its multiple equalization stages let you compensate for any "overbite."

GETTING IN DEEPER

The front panel is well laid out and contains plenty of knobs and buttons for your tactile enjoyment. Guitarists will feel right at home with the four big rotary knobs, which are reminiscent of the controls on a vintage tube amp. There's one knob for data entry, one for input level, one for output level, and one for adjusting Presence (overall brightness of tone). Getting to the FX770's functions is a breeze, thanks to an assortment of dedicated buttons for editing effects and changing MIDI settings.

Information is readily available on the front panel. Virtually all programming and performance information is displayed on a modest, 2-line LCD. (It's

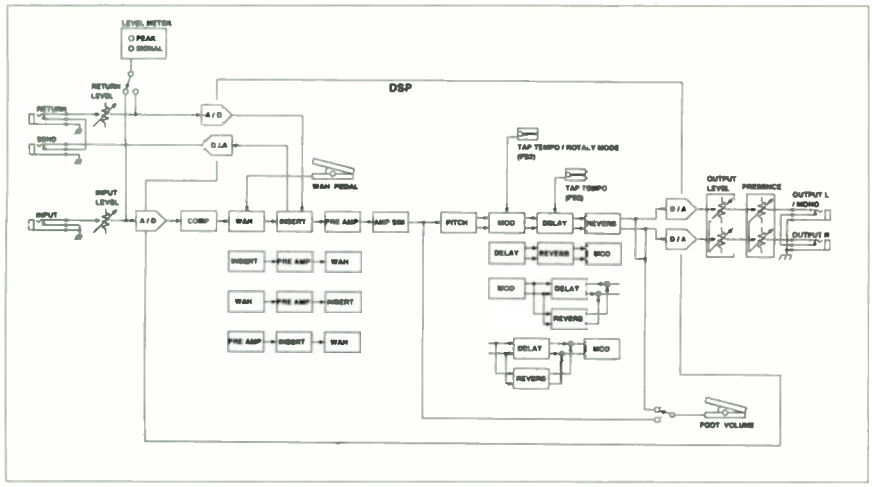

FIG. 1: The FX770's signal path. Note that the positions of the wah, insert, and preamp are interchangeable. A noise gate (not shown) precedes the Patch, which consists of four Blocks that can be configured in four ways. Bonus question: Can you find the translator's error? (Courtesy of Yamaha Corp.)

not huge, but the panel has no room for anything larger.) The current program number is clearly displayed on a separate, 2-character LED. A pair of single LEDs show peaks and the presence of input signals. Below them, a mono, ¼-inch jack (-20 dBm) provides a convenient input.

In Play mode, the Bypass button accesses an onboard chromatic tuner (discussed later). You can either pass the dry sound to the outputs, or mute the outputs for silent tuning. In Edit mode, Bypass serves as a solo button for an edited effect.

The unit has nine Effect Blocks: Compressor/Limiter, Wah Effects, Preamp, Insert Point, Amp Simulator, Pitch Effects, Delay, Modulation Effects, and Reverb. Nine discrete buttons switch each Block on or off.

The MIDI connections include one In jack and a switchable MIDI Out/Thru. The audio connections on the rear panel include one set of stereo outs (-10 dBm), an Insert Send jack, and an Insert Return jack with level control. The insert loop is an excellent way of introducing external preamps to the FX770's signal chain, but fixing it at -20 dBm is limiting. I had to forget about plugging in external effects or audio sources that are below +4 dB.

The FX770's power cord is very long and permanently attached, which seems unprofessional. It's an especially annoying feature when taking the unit in or out of a rack. An IEC standard, removable power cable would have been preferable.

STEPPING INTO CONTROL

There are two footswitch jacks and two continuous footpedal jacks on the rear panel. The footswitch jacks accept any momentary switch, regardless of polarity. (The manual neglects to mention this.)

Footswitch 1 engages the Tuner/Bypass function. Alternatively, it can turn one effect, or a combination of effects, on or off. This allows a single program to contain two separate setups. For instance, a program made up of chorus and distortion can have a delay turned on by simply stepping on Footswitch 1. Stepping on Footswitch 1 again, turns the delay off.

Footswitch 2 can step through Programs or the three Banks, or act as an effects trigger. In the latter mode, you can tap in a tempo for certain delays and change a parameter of some modulation effects, such as Rotary Speaker speed. The machine sets the tempo based on the time between two presses of the footswitch.

The stereo, ¼-inch footpedal jacks—Wah Foot Controller and Volume Foot Controller—work with any standard volume pedal, although you may need a Y cable. The Volume Foot Controller does exactly what you expect: Just plug your favorite volume pedal in and fade away. The volume pedal can be positioned either pre-effects or post-effects. The Wah Foot Controller operates the wah-wah effect with any volume pedal. But that's it; it's too bad you can't program it to affect any continuously controllable parameter.

SIGNAL PATHS

The FX770 contains four main Effects Blocks—Pitch Effects, Delay, Modulation Effects, and Reverb—each of which produces a number of effects (e.g., the Reverb Effects Block contains a large hall, medium room, small room, and spring reverb). Only one of these effects can be used in each Block.

To achieve multi-effects, you chain up to four Effects Blocks. A chain of four Blocks is called a "Patch." One Patch can be used per Program. The FX770 has four of these Patches, which allows you to chain the four Blocks in any order. By providing a wide selection of effects in each Block, Yamaha has created a flexible system that is easy to follow.

Information on the Patch and its effects is displayed on the FX770's LCD, directly under the program's title. The "at-a-glance" availability of this information is a testament to the FX770's user friendliness.

Along with the four Effect Blocks that make up the Patches, the FX770 has five additional Blocks, all of which can be active in a Program. All come before the Patch (see **Fig. 1**). The Compressor/Limiter comes first, followed by the Wah, Insert, and Preamp. (The positions of the latter three are interchangeable.) The Amp Simulator is next, then a noise gate (which is automatically included in each Program), and finally, the Patch.

AMPS AND COMPRESSION

The Preamp Block gives the FX770 its kick. There are three distortion effects, two overdrive effects, one Crunch effect (a bright, midrange distortion), and one clean setting. The Preamp is punchy, and the overdrive effects sound pretty good for digital electronics. It has enough editable parameters to get a wide variety of preamp sounds.

The Amp Simulator contains a single effect. However, the Amp Character parameter changes the sound drastically, adjusting to emulate nine different types of speaker cabinets and amplifiers. Its sound ranges from a basic, vintage tube stack to a teeny-weeny amplifier with an output of 10W or less.

The DI Filter parameter allows the Amp Character to be adjusted for different playback situations. When the FX770 is plugged directly into a mixer, it acts as a high-frequency rolloff,

simulating a close-miked speaker cabinet. The emulations are nice, though they can't replace a real tube sound, which is probably why Yamaha included the insert loop.

The Compressor/Limiter Block features two compressors and one limiter. The parameters of these three effects—attack time, sustain, and output level—are nothing spectacular, but they get the job done for guitar. The manual claims the compressors were designed especially for guitar, and indeed they are not transparent, producing a characteristic sound. Of course, the unique sound of an effect is often its strength. In this case, I even found the conspicuous nature of the FX770's compression useful for processing certain types of vocals (e.g., rap).

REVERBS AND DELAYS

As mentioned earlier, the Reverb Block contains four reverbs: large hall, medium room, small room, and spring. The parameters of these four are identical and extremely rudimentary. The reverbs sound decent overall, but a bit grainy. I found the spring reverb quite pleasing for some applications, especially on a Casio CZ-101 bass sound.

The Delay Block is much more comprehensive than the Reverb Block. It has eight different delay effects, including tempo delays, a modulation delay, a multitap delay, and a ducking delay. You can set the delay time for the tempo delays by choosing a MIDI note value, tapping on Footswitch 2, or sending the FX770 MIDI Clock messages.

The multitap delay is capable of six independent taps, but unfortunately, it has very few parameters for each tap. At the least, I'd like to see feedback and high-frequency rolloff parameters on the individual taps. The ducking delay allows the delayed signal through only when the source drops below a threshold level. This is great for processing lead guitar or vocals, because the delay won't clash with the lead instrument. The modulation delay is nothing groundbreaking, sounding basically like a delayed signal with tremolo.

MODULATION, WAH, AND PITCH

The Modulation Block is quite extensive, offering stereo chorus, stereo flanger, rotary speaker, auto pan, and tremolo. There also are two slightly more unusual effects: Symphonic and Resonator. The Stereo Chorus has plenty of tweakable parameters, including a filter and an LFO waveform that is switchable between triangle and sine wave. The Stereo Flanger is also a solid effect, with plenty of parameters.

The Rotary Speaker effect is a fair emulation of a Leslie. It can start from the Off position, or at slow or fast speed, and revs up at a user-selectable rate. You can mix between the wet and dry signal, and there is a dedicated tone control. The starting speed can be selected by Footswitch 2.

The Auto Pan and Tremolo effects are especially cool because their speed can be controlled with a MIDI note value, MIDI Clock messages, or by tapping Footswitch 2. In addition, these effects can be modulated by an LFO that can produce a triangle, sine, or square wave. The LFO waveform determines the smoothness of the pan effect: The sine wave provides the smoothest movement between speakers, the square wave is the jerkiest, and the triangle wave is somewhere in between. This kind of panning effect is great for creating movement on a drum machine's static hi-hat pattern. Nile Rodgers used this trick on Madonna's album *Material Girl*.

The Symphonic effect sounds like an improved version of the well-known, SPX-series Symphonic factory preset. The last and newest modulation effect is Resonator, a flanger-like effect whose sweep is affected by your picking technique. I couldn't figure out what to do with it. At its most offensive setting, it sounds like an out-of-control

Product Summary

PRODUCT:
FX770 Guitar Effects Processor
PRICE:
$749
MANUFACTURER:
Yamaha Corporation
6600 Orangethorpe Ave.
Buena Park, CA 90620
tel. (714) 522-9011
fax (714) 739-2680

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

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SEPTEMBER 1994

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c. "Cover Story: The British Invasion," p. 52	709	710	711	712
d. "Author! Author! ", p. 71	713	714	715	716
e. "Square One: Delayed Gratification," p. 102	717	718	719	720
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wah filter with nasal congestion. Getting good sounds from this effect apparently requires more patient experimentation than I was prepared to give it.

The Wah Effects Block contains three wah effects: two bandpass filters and one lowpass filter. You can edit the touch sensitivity, frequency, LFO speed, and position in the signal chain

▼

The FX770 responds to only two MIDI controllers at a time. Bummer.

for each of the three wahs. The FX770's wah effects are real winners because they can be controlled by any one of three sources: touch (your picking style), a volume pedal, or an LFO. Alternately, the wah effect can operate at a fixed frequency and can be placed either before or after the FX770's preamp.

The Pitch Block has two pitch effects: Stereo Pitch Change and Pitch Chorus. Stereo Pitch Change is a basic pitch effect that allows two different pitches to be generated. The note values are controlled by MIDI note numbers. The Pitch Chorus is basically a detuned doubling effect, which does not respond to MIDI notes. The overall audio quality of the Pitch Effect Block is so-so.

COOL AND UNCOOL

Real-time MIDI effects control is not essential for many guitarists, but an increasing number demand it. At the least, it is a valuable extra, especially for sequencer jockeys. Letting a sequencer change effects parameters as you play makes for a much more lucid performance. Instead of worrying about making the right effects change, you can concentrate on playing.

In all, 264 effects parameters can be manipulated via MIDI. The FX770 can respond to MIDI note number, Velocity, Channel Pressure, and Control Changes 1 through 95. Everything from overdrive to compression, reverb, and pan LFO can be MIDI controlled.

However, before you get too excited, I must warn you that the FX770 responds to only two MIDI controllers at a time, so you can only change two effects parameters at a time per program. Bummer. You can alter at least four parameters at a time in many competing processors, and that's not enough for some people.

A way cool extra is the FX770's integrated tuner. When you switch to Tuner/Bypass mode, the LED, instead of showing the current program number, displays the incoming note. The LED is big and easy to read, which is great for letting the tone deaf members of your group know exactly what note you're playing. The LCD also displays the incoming note along with a typical tuning bar showing sharps and flats. And if this isn't enough information, five out of the nine Effect Block LEDs light up to form a cross when your incoming note is in tune. This feature saves you from having to squint at the LCD's tuning bar. (Besides, it's a lot of fun getting the little LEDs to line up in a cross.)

Less cool is that turning on an effect or changing FX770 programs causes the audio to blink out for a moment. I calculated this audio blink-out to last about 120 ms. This is really annoying when it results in the loss of a sound's attack. (Whenever I changed programs, I wondered what happened to the beginning of my chord.) The Delay is the only Effect Block that this doesn't happen to, assuming the program you switch to uses the same Patch. The only apparent solution is to fade the effect in with a MIDI controller, leaving the desired effect on all the time, with its mix level set to zero. Fortunately, the FX770 is capable of doing this.

CONCLUSION

Overall, the FX770 is a solid buy, though not a superstar. True, its promising MIDI implementation is diminished by only accepting two controllers at a time, but many guitarists won't care about that. The two continuous pedal jacks handle only two tasks—volume and wah—but they're the two most important for guitar. The quality of the effects certainly is good enough for live performance and is acceptable in some studio applications. The audio blink-out during program changes is troubling, but it's common with many such units.

The biggest plus is the excellent user interface, which makes for intuitive operation and easy programming. The unit is a real joy to use. The unit's footswitch-operated effects-defeat and discrete effects buttons are sure to make guitarists feel right at home.

Although I wouldn't recommend it as a primary studio effects processor—and I tried it on drums, vocals, and keyboards, as well as guitar—the FX770's extensive selection of effects could prove a boon for those who need supplemental outboard gear. For stage use, where pristine guitar effects can be overkill, the unit is much more in its element and is a good investment.

Erik Hawkins *is a producer and musician in the San Francisco Bay Area. He is a general partner in Sound Proof Productions, a multimedia production and recording facility.*

Circle #441 on Reader Service Card

Jupiter Systems MDT (Mac)

By Paul D. Lehrman

Multiband dynamics processing plug-in for Sound Designer II.

Computers have brought a new dimension to audio signal processing: the visual dimension. Between sequencers, patch editors, sample editors, hard-disk recording editors, and virtual mixers, a lot of operations formerly performed by ear have been made visible with computer graphics. But in the area of dynamics control—compression, expansion, limiting, and gating—progress has been, well, limited.

Fortunately, progress marches onward. Jupiter Systems, the company who brought you the remarkable sample-looping program *Infinity* (reviewed in the November 1993 **EM**), has applied its expertise to dynamics. The result is *MDT*, a.k.a. *Multiband Dynamics Tool*, a visual control surface for sophisticated dynamics processing.

Unlike *Infinity*, which is a freestanding application that utilizes Digidesign hardware, *MDT* is a software Plug-In

that works within *Sound Designer II*. Although *Sound Designer* includes a fairly sophisticated compression/expansion/gate module, *MDT* adds several dimensions.

When you install the program in the "SD II Plug-Ins" folder (it is copy-protected and comes with a key disk that allows two hard-disk installs), the item "Multiband Dynamics" shows up in Sound Designer's DSP menu. Select that item, and *MDT*'s only window opens. You can now listen to the current sound file while it's processed by *MDT*.

ON YOUR KNEES

The largest and most striking feature of the window is its input/output graph, on which you can literally draw a compression/expansion/limiting curve—technically known as a *transfer function*—of great complexity. Any hardware compressor or expander lets you specify a threshold (the dynamic level at which the processor starts compressing) and a compression ratio (the amount the signal is amplified or attenuated once it passes the threshold). *MDT* lets you specify up to *30* thresholds and ratios.

Why would you need so many? Compressors differ in terms of what happens to the signal right around the threshold point. In a "soft-knee" compressor, the curve is rounded, so that the compression increases gradually as the signal level increases. In "hard-knee" compression, any signal above the threshold is immediately affected.

Soft-knee is considered more "musical," which is one reason vintage tube compressors are still in demand. Hard-knee compression is better suited for limiting and other types of corrective processing. For *MDT* to effect soft-knee compression, it must be able to specify multiple threshold/ratio points that are fairly close together (see **Fig. 1**).

In *MDT*, you can create any kind of knee, and almost any number of knees, over a 96 dB range. Each threshold is displayed as a point in the onscreen graph, and the ratios are the slopes of the lines between the points. Setting them up is just like constructing envelopes in a synthesizer-patch editor: Point and click where you want a threshold to occur, and the ratio lines automatically fill in. Move a threshold up, down, left, or right, and the ratio lines follow, like rubber bands.

A window next to the graph shows you the input and output values of a selected threshold (in dB) and the ratios of the line segments to the threshold point's immediate left and right. Slopes can be anything from unity gain (1:1), to completely horizontal (∞:1) or vertical (1:∞), to upside down (1:-1 to 1:-∞).

The flexibility is awesome. For example, you could gate everything below -60 dB, expand all sounds from -60 to-40 dB by 1:2, apply a 5-point soft knee at -40 dB, compress everything up to -20 dB by 2:1, and then impose inverse compression (1:-1) on signals above -20 dB. And you would still have another 23 threshold points available!

In addition to the transfer function, the window lets you adjust attack time (how fast the compressor reacts) from 1 to 50 milliseconds; release time (how long it continues to process the signal after it returns to a prethreshold value) from 1 to 5,000 milliseconds; and output gain (±24 dB), so the processed signal can have the same apparent level as the unprocessed signal.

A high-resolution, bar-graph meter continuously shows the level of the input signal as it "hits" the transfer function. The meter is very analog-like, making it more useful than the discrete-LED indicators on most modern compressors (or on *Sound Designer II*'s built-in compression module).

You can also attenuate the input signal relative to the processing curve without changing the *actual level* of the signal, so that the curve modifies the signal to a greater or lesser degree. It's like taking the curve in its entirety and sliding it up and down over the input signal. This "input offset" is adjustable from 0 to -96 dB of attenuation. It may not be immediately apparent why this feature is particularly cool, but I'll explain that momentarily.

BANDING TOGETHER

If that were the whole story of *MDT*, it would be a very appealing dynamics processor, allowing visual construction of transfer functions with unprecedented complexity and real-time display of the function's behavior. But there's more: The "M" stands for "Multiband," and that's where things get *really* interesting.

In addition to the single-band mode, there are also 3-band and 5-band processing modes. These use a digital filter on the input to divide up the frequency spectrum and apply the transfer function individually to each resulting band. The curve is the same for all of the bands, but the input offset of each band can be independently adjusted over a 96 dB range.

This opens up a wide variety of options. For example, an occasionally too loud bass "pumps" the rest of the mix when it hits the compressor in single-band mode. In multiband mode, however, you can set the low band's offset higher than the others, so that only the bass gets compressed, although its basic level is unchanged.

Similarly, to de-ess a vocal track, you can set the offset on the high band higher than the others, limiting the sibilants without squashing the rest of the sound. You can also increase the apparent loudness of a recording simply by applying hard limiting to multi-

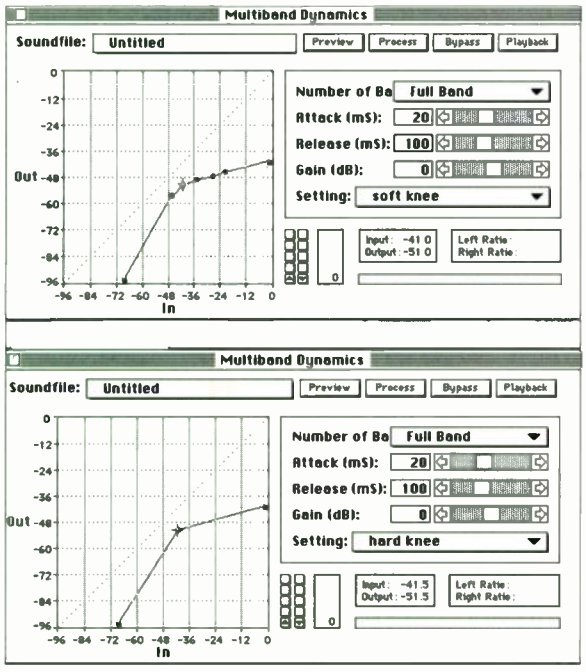

FIG. 1: The upper screen illustrates soft-knee compression with several thresholds and ratio settings. The lower screen illustrates hard-knee compression.

ple bands—radio stations do this all the time—as a peak in one band that needs to be compressed won't change the levels of the other bands. Inventive folks will soon discover other interesting uses, such as spectral enhancement and dynamic equalization.

▼

MDT's flexibility is awesome.

The multiband filters have two options, which can be used separately or together. One option is to use an all-pass filter at the input to minimize phase shifting and its resultant tonal coloration. This technique is only practical, however, if you need less than -12 dB maximum attenuation; otherwise, it makes the coloration much worse.

The other option lowers the noise floor by changing the mathematical scaling of the filters. However, it can only be used on low-level signals. It will distort if the signal level goes above -20 dB.

KEEPING IT SIMPLE

Using *MDT* is extremely simple and logical, and it will be familiar to anyone who uses *Sound Designer*'s more advanced features. To listen to what you're doing, click on Preview, and the processed sound—at least, the portion of it that fits into *Sound Designer*'s RAM partition, which may not be the entire file—starts to loop. Change the curve or any of the other parameters, and the sound changes accordingly while it's looping.

You can instantly compare what you're doing to the original signal by pressing Bypass. To modify the file permanently, so that you can use it in a playlist or other application, press Process. A few seconds later, the modified file is saved to disk.

Alternatively, you can use the Playback feature. This memorizes the current settings of *MDT*, but the file itself isn't changed. Instead, the program attaches the settings to the file so that whenever you play the file in *Sound Designer*, it is processed "on the fly" by the *MDT* module, even if the module itself is not visible. A diamond by the Multiband Dynamics item in the DSP menu tells you when this feature is enabled.

If you come up with a curve that you particularly like, you can name it, save it, and recall it at any time. The software comes with 22 preset curves. Some are used in the manual tutorials, while others are simply useful models from which to start working.

Speaking of the manual, it's quite good: relatively short, well designed and organized, and friendly when it should be and technical when it needs to be. The bulk of the pages are taken up by tutorials, because the authors understand what is, for most companies, still a revolutionary concept: "Show me" is a far more effective educational tool than "Tell me."

I wouldn't mind even more tutorials. However, tutorials need their own sound files, and the product already comes with two high-density disks chock-full of files, so I'll concede this might be impractical. (File-compression software wouldn't help, because high-resolution audio files can't be shrunk very much.)

EVALUATION

Evaluating *MDT* is easy: It works just fine. The sound is transparent and smooth. With all the options, you should be able to tailor a curve and filter setting for whatever kind of processing you want, whether it be straightforward or utterly bizarre. The program's behavior is exceptionally clean, largely because it's working entirely in RAM, so it can actually look

Product Summary

PRODUCT:
Multiband Dynamics Tool (MDT)
PRICE:
$399
MANUFACTURER:
Jupiter Systems
PO Box 697
Applegate, CA 95703
tel. (800) 446-2356
or (916) 878-6666
fax (916) 878-8577

EM METERS	RATING PRODUCTS FROM 1 TO 5
FEATURES	● ● ● ● ◖
EASE OF USE	● ● ● ● ●
DOCUMENTATION	● ● ● ● ◖
VALUE	● ● ● ● ◖

ahead to catch dynamic peaks before they occur. Nothing gets by the processor unless you want it to.

I have a few caveats, however. First, it's not difficult to design a curve that boosts the signal into serious distortion, and digital distortion doesn't have a lot of creative uses. Adjusting the output gain doesn't help the situation, so you just have to be careful. Fortunately, it's obvious when this is happening, so you should be able to catch it.

Second, if you are using older Digidesign hardware, the multiband filter modes can't be used in Preview mode. With the original Audiomedia card, the 5-band mode doesn't work, and with the original Sound Accelerator card, neither multiband mode works. You can still use the program, but you'll have to do multiband processing offline, using the Process button and Undo to hear what you're doing.

TAKE IT TO THE LIMIT

Although *MDT* is probably operating at top efficiency given the current state of the hardware and software on which it depends, I can foresee some possible improvements in future versions. The frequency bands in the multiband mode are not user-adjustable. Making them so would turn the program into an exceptional tool for equalization and single-ended noise reduction.

Also, because *Sound Designer* only handles one mono or stereo signal at a time, there's no way to use a sidechain signal, which is an important feature of hardware compressors. Sidechains let the processed audio respond an external signal for purposes of keying, ducking, and envelope-following.

Jupiter Systems says they are doing a complete rewrite of the program for Digidesign's forthcoming TDM system. Because TDM will be able to handle a large number of simultaneous inputs and outputs, sidechain capability might be in *MDT*'s future. The TDM version should also be able to process signals coming from outside the computer in real time, not just files already recorded on disk.

GREAT LEAP FORWARD

MDT's approach to dynamics processing is long overdue, and Jupiter Systems has done an admirable job making it a reality. Compression and limiting have always been done primarily by ear, with only a meter or two to show what was going on. *MDT*'s combined aural/visual approach is a great leap forward, and a logical one too.

The whole concept of visual gain-reduction might be difficult to grasp for a recordist who is used to seeing meters and numbers that go up when the sound level does. But if there is a better way than *MDT*'s to display the process of signal processing, I'd like to see it.

Paul D. Lehrman *is the co-author of* MIDI for the Professional, *published by Music Sales Corp. (available from Mix Bookshelf). He knows that* real *engineers don't need noise gates.*

Circle #442 on Reader Service Card

Aware Speed-of-Sound Vol. 1: SFX

By Dennis Miller

Sounds, sounds everywhere in this amazing CD-ROM.

Breakthroughs in the world of computing don't often impact musicians, but *Speed-of-Sound* sound-effects CD-ROM, from Aware, Inc., sets a new standard for CD-ROM storage capacity. This exciting product squeezes more than seven hours of high-quality, digital-audio files onto a single disk that can be used with Macintosh and PC-compatible computers, or with Silicon Graphics workstations.

Aware licensed more than 1,200 sounds from Sound Ideas' highly regarded sound-effects library and compressed them using a sophisticated, proprietary, psychoacoustic encoding algorithm. The algorithm analyzes the spectrum of a sound and determines which frequency components will be masked and can therefore be safely discarded without affecting the integrity of the sound. The sound files are stored on the CD-ROM in their compressed form and are "extracted" to the computer's hard drive in the form of ordinary WAV files (for *Windows* machines), AIFF files (for the Mac), or AIFC files (for SGI workstations).

Psychoacoustic encoding is a well-established method for compressing audio, but it is not a lossless compression scheme (i.e., some of the information in the original waveform is discarded when the file is compressed). To determine if the compression had any audible effect on the sounds, I compared the original recordings from a Sound Ideas audio CD to the same sounds on the *Speed-of-Sound* disk. Upon listening to the audio CD on my CD-ROM drive and the extracted file on my computer's hard disk, I was unable to discern any perceptible difference between the two, even with the output of my PC sound card driving a pair of high-quality studio monitors.

Many of the sounds were originally recorded in analog, though, and I did hear occasional hiss in several of the quieter sounds. A good waveform editor, such as Sonic Foundry's *Sound Forge*, Turtle Beach's *Wave for Windows* or Passport Designs' *Alchemy* would be useful for processing the samples.

THE CONTENT

Speed-of-Sound is organized into 27 categories, including Animals, Automobiles, Aviation, Birds, Crowds, Fire, Office, Outdoors, and Sports. Realizing that it would take a painstaking effort to find just the right sound among 1,204 files, Aware developed a powerful front-end for what is essentially an audio database. Support for conditional operators ("and" and "or") in the *BrowsFX* search program (see **Fig. 1**) makes it a snap to locate sounds that have specific characteristics.

For example, a search based on the key word "car" returns 90 entries, but a search on "car" and the second key

Aware, Inc., used a psychoacoustic encoding algorithm to squeeze more than 1,200 sound effects onto its *Speed-of-Sound* CD-ROM.

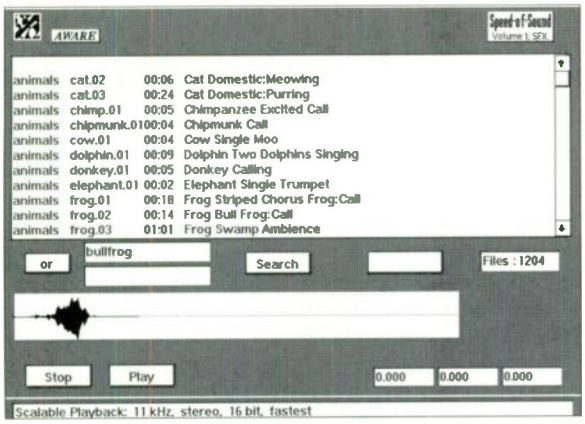

FIG. 1: Aware's *Speed-of-Sound* CD-ROM offers a database for locating sounds. A waveform display appears onscreen when a sound is selected.

word "crash" returns just eight. Searches are extremely fast because the database index is kept in the computer's RAM and doesn't require accessing the CD-ROM.

Each sound file can be previewed—without first having to extract the file to the hard disk—simply by double-clicking on the file name. *Speed-of-Sound* automatically detects the speed of your computer's CPU and plays sounds directly off the CD at the highest resolution and sampling rate the computer can handle. As the sound plays, a position cursor moves across the waveform display at the bottom of the screen.

When you're ready to transfer a sound effect to your hard drive, select Extract from the File menu and pick a file format. Most sound-effects CD-ROMs contain multiple copies of each sound to provide a variety of sampling rates and resolutions. Unfortunately, that limits the number of different sounds the manufacturer can fit on the disk. *Speed-of-Sound* contains only one copy of each sound because it performs its format conversion as the file is extracted to the hard disk.

When you select a file to extract, you specify the desired sampling rate (11.025, 22.05, or 44.1 kHz) and resolution (8- or 16-bit). You can also convert files from stereo to mono. Limited hard-disk space on your system? No problem; you can extract only as much of the file as you want by simply highlighting the desired area of the waveform. This is handy, as some of the samples run well over one minute.

Product Summary

PRODUCT:
Speed-of-Sound, Vol. I: SFX
PRICE:
$250
SYSTEM REQUIREMENTS:
PC: 25 MHz 80386SX or better with 4 MB of RAM; mouse; CD-ROM drive; Microsoft *Windows* 3.1.
Macintosh: 20 MHz 68020 or better with 4 MB of RAM; CD-ROM drive; System 6.0.7 or later.
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fax (617) 577 1710
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EM METERS	RATING PRODUCTS FROM 1 TO 5
FEATURES	● ● ● ● ●
EASE OF USE	● ● ● ● ●
AUDIO QUALITY	● ● ● ● ●
VALUE	● ● ● ● ◖

THE QUALITY

I didn't get through all 1,204 sounds, but I really liked the animal samples, particularly the beautiful, plaintive chant of the nightingale. The frog swamp ambience turned out to be just right for a demo I'm working on. I also appreciated the huge variety of high-quality car and aviation sounds.

There was one sound that I really needed and *wasn't* able to find on this disk: an unmuffled, V-8 engine holding a perfectly steady, high rev. I ended up doing that one myself by crawling underneath a friend's car; his muffler had fallen off just a few days earlier.

THE END

After using this CD-ROM for several months, I can't think of any improvements to suggest. The variety and quality of the sounds are spectacular, and *BrowsFX* is the best sound-effects library front-end I have ever seen.

All the samples come royalty-free, with one important proviso: You cannot use them to create your own commercial sound-effects disks. That shouldn't be a problem, however. With this many sounds on hand, you'll be so busy working you won't have time to think about making competing CDs. More than 1,200 sounds on a single CD-ROM—now that's a breakthrough!

Dennis Miller *is currently on leave from his teaching position at Northeastern University in Boston. For the first time in seven years, he expects to see the surface of the desk in his studio.*

Circle #443 on Reader Service Card

Sampleheads Peter Erskine Living Drums!

By Al Eaton

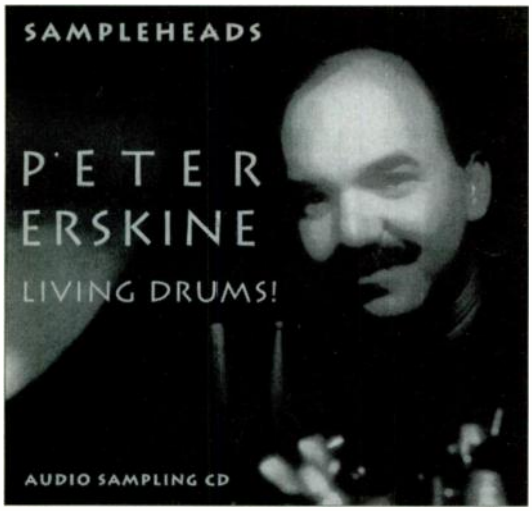
An audio sampling CD from a master drummer.

With Peter Erskine on the set, you might think you'd be in store for some hot and jazzy drum samples. You'd be absolutely right. In case you've been hiding out in a cave, Erskine's drum performance and session credits include stints with Chick Corea, Stan Getz, Joe Henderson, Jaco Pastorius, Weather Report, and Steely Dan.

This audio CD (a CD-ROM version was close to shipping at press time) contains more than 74 minutes of stereo drum samples, stereo drum loops, and a few other tidbits, none of which carries a use fee. Almost all the loops include one or more pickup/fill variations as separate events that can be coupled with any loop. There are also several drum and bass duo loops that were recorded with *Late Show with David Letterman* bassist Will Lee. (A review of Sampleheads' *Will Lee Bass Library, Vol. 1* appears in the June 1994 issue of **EM**.)

IT'S IN THERE

Attention to subtle, but important, detail is evident throughout this collection. Erskine used three different



Sampleheads' latest sampling CD features extremely well-recorded and well-documented stereo drum samples and loops by jazz drum master Peter Erskine.

custom drum sets, described as the "Steely Dan" kit, the "Yamaha Jazz" kit, and the "First Call Studio" kit. Samples include both left- and right-hand strikes; strikes made with mallets, brushes, and wooden- and nylon-tipped sticks; single- and double-stroke rolls; and more. Naturally, Erskine worked a wide range of dynamics into his drum and cymbal work.

Erskine plays in pop and R&B styles, plus a taste of funk, but it's his jazz grooves that really shine. There are a number of fine calypso, Latin, Brazilian, and Caribbean loops. You can literally hear the years of work it takes to develop the chops necessary to master these types of rhythms.

As good as Erskine's jazz work is, his funk grooves, at least for my taste, sound like a jazz player playing funk. They're not as tight as a drummer who comes from the Parliament/Funkadelic (e.g., Tyrone Lampkin) or James Brown (e.g., Clyde Stubblefield) schools would be. This may have less to do with the player than with the drums used. After all, there's no "funk kit" listed in the credits. For a real funk vibe, the drums need to sound a little more muted.

The samples themselves were recorded by master engineer Allen Sides at Ocean Way Recording, one of the top studios in Los Angeles. Little or no outboard effects were used. Analog-to-digital conversion was handled by Apogee converters. Overall, I found the quality of the recording to be clean and punchy.

However, I did find the bass volume in the Pete and Will drum and bass loops to be a little too low in the mix. It tended to get lost when I added other instruments on top. My solution was to add some synth bass, either by doubling the CD's bass line, or by playing a complementary line.

NATURAL RHYTHM

After looping a few of the drum patterns with my sequencer, I discovered that one group of patterns that is listed in the documentation as being 140 bpm is actually 104 bpm. That's a small mistake and of little consequence once you know about it. Some of the drum patterns, however, don't sit perfectly in the beat. *That* is no mistake; it's how humans perform, and it's one of things that makes these drum grooves feel so good.

Such tempo fluctuations can be a problem if you decide to quantize your other tracks. Unless you write a tempo map to account for the speed deviations, you'll end up with drum tracks that have one feel, while all your other tracks have another. Fortunately, using the tools found on most high-end sequencers, you can develop a quantize grid that will take care of the problem. And, of course, if you intend to play live against a looped drum track, none of this matters, because you'll respond naturally to the tempo fluctuations.

I was happy to find that at least a couple of the looped phrases on this CD repeat the downbeat of the first bar. Most do not, however, which makes it harder to loop the short phrases. (See the review of Midi Mark's *Dance Construction Set* in the July 1994 **EM** for an in-depth discussion of this point.) Fortunately, many of the phrases are long—some as long as 30 seconds—so you can sample what you need and loop it wherever you wish.

FOR STUDIO RATS EVERYWHERE

Sampleheads has come up with yet another audio sampling CD that goes a long way in giving the lone musician or personal-studio rat a chance to play with great, live musicians. The natural tempo fluctuations make it difficult to use some of the looped phrases within a sequencer, but there are tons of great drum and cymbal sounds you can sample and use to create your own sets.

If you're looking for a good, all-around drum disc for your pop, R&B, and jazz productions, or if you just need good sounding drums for your sampler, give this CD a listen.

Al Eaton *is a producer/engineer/musician living in the San Francisco/Oakland area and is the owner of One Little Indian Music Productions.*

Circle #444 on Reader Service Card

Product Summary

PRODUCT:
Peter Erskine Living Drums!
PRICE:
Audio CD $99.95
CD-ROM $299.95
MANUFACTURER:
Sampleheads, Inc.
276 Riverside Dr.
Suite 3B
New York, NY 10025-5206
tel. (212) 866-1533
fax (212) 678-2577

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

Golden Ears Audio Ear-Training Program

By Christopher Patton

Stop, listen, and learn about sound.

Rapid advances in audio technology have trained musicians to expect more from their equipment. However, these heightened expectations are seldom leveled at the most important gear in your studio: your ears. This "sonic slacking" is unfortunate, because squeezing optimum sound from recordings and mixes requires intensive critical listening skills.

KIQ Productions' *Golden Ears Audio Ear-Training Program* uses audio CDs and a reference manual to teach critical audio listening skills.

But there's help if you want it. The *Golden Ears Audio Ear-Training Program* can improve your audio chops by teaching you how to analyze sound. Developed by Dave Moulton, a former professor at the Berklee College of Music, recording engineer, and writer for *Recording* magazine, the course consists of a manual and four audio CDs.

The program, from KIQ Productions, is split into two volumes of two CDs each, and each volume can be purchased separately. Volume 1 trains the listener to recognize frequencies and tonal colors by cutting or boosting octave bands of pink noise. Music samples are also provided. Volume 2 consists of drills designed to help you identify signal processing.

Although the compact discs can be used without the program's manual, I recommend using them together, so you can mark your progress more efficiently. Answer-sheet templates are provided in the back of the manual, along with an octave and frequency reference guide. You can photocopy the answer-sheet templates to facilitate taking the tests with friends or for personal "brush up" reviews. The course even provides some reference tones, so you can check your monitor speakers for audible distortion.

FREQUENCY TEST

Volume 1, entitled *Frequencies*, starts off with a warm-up drill that allows you to familiarize yourself with the sound of various octaves. When the actual test begins, you are given ten examples of pink noise and musical material being cut or boosted (in 1-octave bands) by 12 dB. It's your job to determine which octave is being boosted or cut. The octaves are divided into Low (octaves 1 through 5; 31 Hz to 500 Hz), Middle (octaves 4 through 8; 250 Hz to 4 kHz), and High (octaves 6 through 10; 1 kHz to 16 kHz).

Unfortunately, listening to pink noise for more than an hour can turn your brain to mush. After a while, I couldn't discern *any* sound, much less identify subtle variations in tone. Don't try to complete this section of the course in one sitting. Tackling the drills in short sets of three can help prevent your ears from getting too tired to focus on tonal changes.

Overall, I found the drills that replaced pink noise with music material to be more beneficial. What method could be better to teach an understanding of music than analyzing *music*? I would prefer to drop the pink-noise drills altogether.

Of course, I might have been cranky because of my initial test score. A perfect score is 100 points, and I scored 65. At first I thought that wasn't so bad, but the manual states that if you *guessed* every test—without even listening—you should score at least 40 points. That was a blow to my ego!

HEARING THE SWEET STUFF

Effects And Signal Processing is the focus of Volume 2, with A/B comparisons of recorded music. The A track is the reference recording, while the B track is an altered version of the A track. You are directed to identify the type of signal processing and the specific effect used to process the A track.

This volume provides 31 examples of signal processing, grouped into six categories: amplitude (3 dB changes in level); distortion (gross or slight overloads); compression (fast or slow releases); equalization (low, mid, and high frequencies, cut or boosted by 6 dB), stereophony (stereo, mono, pseudo-stereo, and reversed polarity); and time delay/reverberation (addition or deletion of reverb and/or delay).

To ensure that you listen very closely to the signal processing examples, the program has a "no change" answer that can also be given. Boy, did that make this section hard! I found it quite difficult to discern subtle processing changes. After getting over my terrible score, I realized that the ability to identify small nuances in signal processing can help fine-tune a good mix, or even save a tough one.

CONCLUSION

After repeated listenings, I was actually able to discern which octaves were being cut or boosted in the frequency drills. Unfortunately, my test scores for the complete course show that I'm still far from having "golden ears," but I'm much better now than after my initial test. That's the beauty of this course: The more you listen, the better you become.

Will your ears become so finely attuned that you'll want to remix every demo you made prior to taking the course? Probably not. The course isn't a miracle worker. But the music business *is* about sound, and anything that can help you capture and manipulate better sounds merits a look. *Golden Ears* can help you listen to your recordings more critically, while making music production and engineering more enjoyable. To me, that alone is worth subjecting myself to a few tests.

Christopher Patton *is owner and operator of Ars Nova Productions in Oakland, California.*

Product Summary

PRODUCT:
Golden Ears Audio Ear-Training Program
PRICE:
$69.95/volume
$120/complete set
MANUFACTURER:
KIQ Productions
13351-D Riverside Dr.
Sherman Oaks, CA. 91423
tel. (818) 905-5432

EM METERS	RATING PRODUCTS FROM 1 TO 5
DOCUMENTATION	● ● ● ●
VALUE	● ● ● ◖

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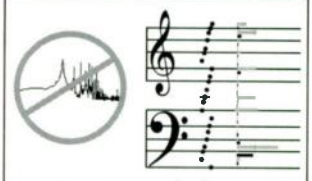
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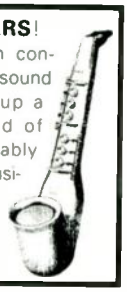

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TECH PAGE

The Ears Have It

A different approach to 3-D sound processing.

By Scott Wilkinson

Humans have the uncanny ability to identify the direction and distance of specific sounds. This ability developed in prehistory, when it was critical to know the location of a wounded, bellowing animal, or pinpoint the position of a predator's growl.

These days, the ability to localize sound sources is rarely a matter of life and death. However, it is vital to our orientation in any environment, which is a particularly important part of the live-performance experience. Unfortunately, any sense of 3-dimensional localization is normally lost when music is reproduced with two speakers or headphones.

Many companies have developed systems to simulate 3-D localization using standard audio-playback equipment. Most of these systems use data derived from models of heads and ears, which doesn't take into account that each person's head and ears are unique. In addition, these measurements can include undesirable artifacts.

One company, American Natural Sound (ANS), has taken a somewhat different approach. Although the patented ANS system is based on psychoacoustic research, it uses no head or ear models. Instead, it creates certain fundamental localization cues that are independent of specific head and ear shapes. This eliminates any undesirable artifacts and allows independent control of each cue.

These cues include the difference between the time a sound arrives at each ear (called the *interaural delay*), which helps us identify the right-to-left position (or *azimuth*) of the sound source. In addition, the harmonic spectrum of a sound is altered in a predictable way if the source is behind or in front of the head and as the source is placed at different elevations. Another important localization factor is the reverberant characteristic of the environment, including early reflections and density of the main reverb sound. These cues are also found in ear-model systems, but they are not independently controllable.

The ANS development system currently consists of a Macintosh computer and a Spectral Innovations NuMedia DSP board using the AT&T 3210 DSP chip. The DSP provides audio input and output, in addition to implementing the 3-D processing algorithms developed by ANS. The Macintosh software accepts user input specifying the azimuth and elevation of the sound source and the nature of the acoustic environment. The monophonic input signal is then simultaneously processed through three sets of algorithms (see **Fig. 1**).

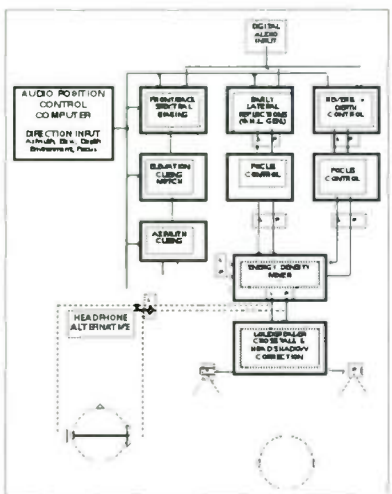


FIG. 1: The ANS 3-D sound system accepts a mono audio signal and generates a stereo signal based on positional and environmental information supplied by the user.

One set of algorithms generates the front/back and elevation spectral cueing, as well as the azimuth cueing via interaural delay. The other algorithms generate and focus early reflections and the primary reverb sound. Each set of algorithms produces a separate stereo signal, all of which are mixed before being converted back into analog form.

ANS has developed their system using headphones, which require no additional processing or decoding during playback. However, a speaker company called Audile, Inc., has expanded the system to work with normally placed stereo loudspeakers. ANS has also nonexclusively licensed their technology to Yamaha for use in a variety of audio products.

Three-dimensional sound processing is not new. However, it is difficult to accomplish with any degree of success. The ANS system does not rely on specific head and ear models, which should allow it to achieve consistent results with a variety of people. And now that Yamaha has signed on, we are likely to see some interesting audio products that will bring 3-D sound to greater numbers of musicians and consumers alike.

Are you writing a song or launching the space shuttle?

When it comes to creating music, computers are great because they give you a band at your fingertips. But they can also bog you down with annoying technical distractions.

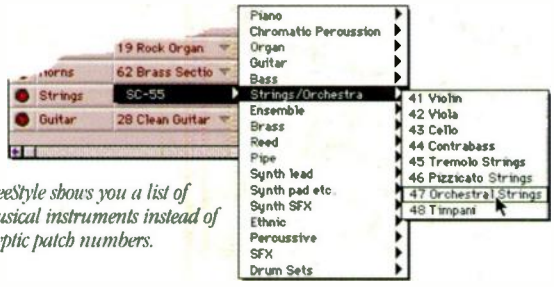
Work with players in an ensemble. FreeStyle remembers all your takes so you can easily choose your favorite parts.

The problem is that until now, nobody's made a sequencer specifically designed for those spontaneous moments when inspiration strikes.

That's why we created FreeStyle.

With its Riff Metronome™, FreeStyle lets you play to an inspiring drum riff instead of the usual boring click—instantly choose among dozens of riffs to find the one that gets you pumped.

After recording your first take, there's no need to mess with loop points. FreeStyle senses when you stop playing and automatically begins looping what you've recorded so you can try another take or add more players.

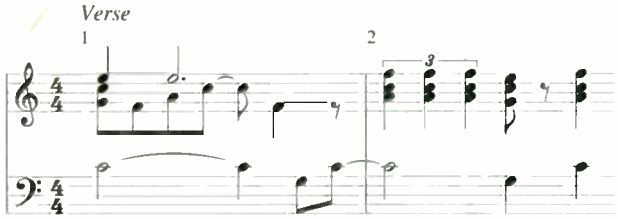


FreeStyle shows you a list of musical instruments instead of cryptic patch numbers.

With its trackless approach to sequencing, FreeStyle allows you to create an entire song without ever taking your hands off your keyboard or guitar controller. You may even forget your computer is in the room.

FreeStyle works with any MIDI interface such as the one-in three-out FastLane™ or the four-in six-out MIDI Express™, Electronic Musician Magazine's 1994 Editors' Choice Award Winner.

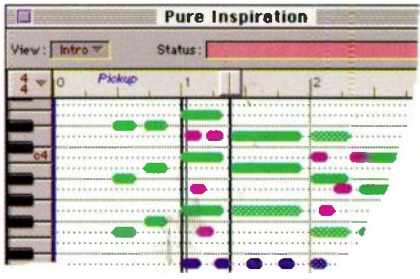
But if you do glance at your computer, you'll see full-color graphic editing and impeccable music notation. And when you're ready to put it all together, FreeStyle's arrangement window lets you easily assemble sections into a song.



Unlike those "EZ" programs, FreeStyle's notation looks great. It's automatic and intelligent with dynamic hand-splitting, multiple voices and engraver spacing.

Best of all, you're never locked into one way of working—you can switch freely between linear recording over your entire song and loop-recording within each individual section.

FreeStyle is also designed to keep MIDI complications out of your face, so it has built-in support for General MIDI sound modules and other popular devices. Just plug in your instrument, select the players you want, and start recording.



Each section of music can have a pickup bar, so you don't have to copy the pickup notes of your chorus into the last bar of every verse.

So, the next time you sit down at your computer to write a song, do it FreeStyle. It's as musical as your computer can get.

FreeStyle™

As musical as your computer can get.

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