Special Report: What's Happening with Amiga and Atari?

Electronic Musician

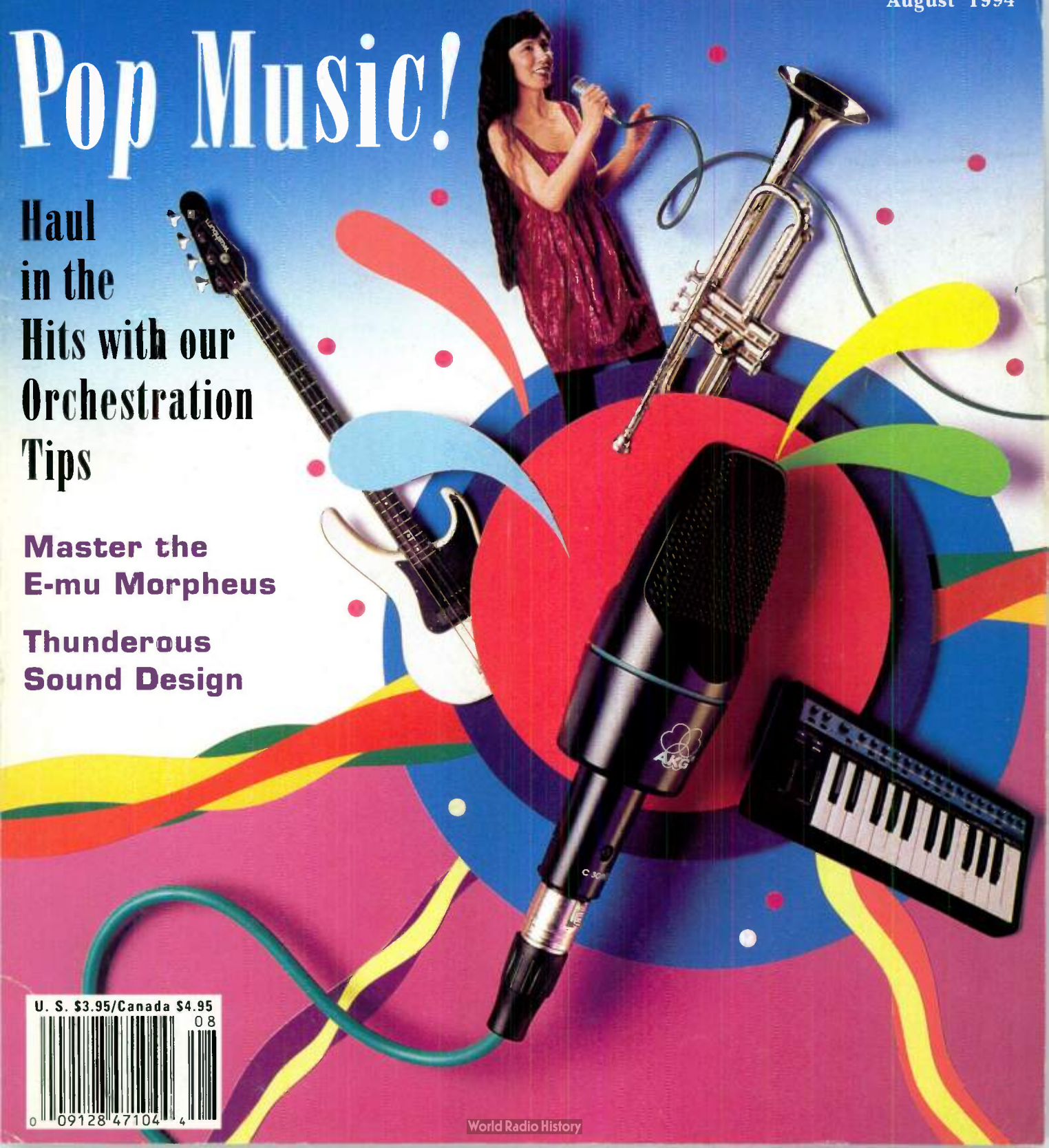
August 1994

Pop Music!

Haul in the Hits with our Orchestration Tips

Master the E-mu Morpheus

Thunderous Sound Design



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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

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

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

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 TONMEISTER TECHNOLOGY EXCHANGE 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.

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."

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.

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®
AUGUST 1994 VOL. 10, NO. 8

COLUMNS

REVIEWS

Cover: Photo by David Bishop.

Special thanks to Eva Jay Fortune (model), AKG, Novation, and Sound & Vision.

Hell's-A-Poppin'

If Faust had a Stratocaster, he could have beat the Devil.

PEGGY SUE AMISON

I confess. My descent into pop music was charted by the demon rock 'n' roll, and my Mephistopheles was Pete Townshend. The flesh was weak back in 1965, when a televised Who concert became the instrument of my fall. I was seduced by the unbelievable coolness of their clothes, their sullen arrogance, and the brutal kerrang of six amplified strings. I was lost.

But the charismatic tag team of sonic fury and fashion wasn't enough to seal my fate. Back then, I was still a good little boy who did what I was told—and asked permission to do anything I wasn't. What lead me astray were the *songs.*

Pre-Townshend, I only identified songs as the sappy guck crooned by tuxedoed smiley faces on *The Lawrence Welk Show,* or the bizarre talk-sing of musicals such as *Camelot* and *My Fair Lady.* (Warning to parents: Exposing a young child to the vocal stylings of Richard Harris and Rex Harrison can cause irreparable damage to the right brain.) Even the early Beatles hits didn't thrill me. The lyrics sounded like something out of "My First Reader," and they were singing about icky stuff like holding a girl's hand.

But comparing Who songs to what I heard on *Lawrence Welk* was like pitting Spiderman (ultracool) against The Flash (lame). For one thing, the band was *angry,* and the songs screamed their frustration at being geeky, powerless, and misunderstood. My preadolescent psychological antenna zoomed right in. It was the first time anyone had articulated my hopes and insecurities. Also, they weren't afraid to thumb their noses at authority—something a white kid born middle class in the Eisenhower era couldn't even dream about. In short, the Who—through Townshend's amazing songcraft—said everything I didn't dare say myself. And they always managed to say it in 2 minutes and 59 seconds. I didn't have a chance. I surrendered my soul by etching my name onto a 45 rpm single of "My Generation." (Sorry, Mom and Dad.)

Today, as a mature (arrgghh) adult musician, I've developed an ear for all types of music, but the 3-minute pop song remains my spiritual center. I still get tingles when an artist writes a great, *honest* song and embellishes it with an empathetic sonic environment and a passionate vocal. I don't care if the song is dressed in rock, rhythm & blues, jazz, or country & western. If the singer and the song are true, magic happens. I mean it.

Electronic musicians should keep all of this in mind when they write pop songs. A song is more than a sequenced alliance of samplers and sound modules. Like fingers brushed across a loved one's lips, or the hugs you give a child, a good song should trigger an emotional reaction. Our cover story, "Virtual Pop" (p. 58), can help you attain this goal by offering tips on how to orchestrate technology into a sonic caress. You still have to come up with an exquisite marriage of lyrics and melody, but author Marvin Sanders will help you dress your masterpiece in a nurturing audio milieu.

If you compose something brilliant, maybe you'll even get to play Mephistopheles to some future pop genius. There are worse things you could do than inspire someone to write beautiful music. I've never regretted selling my soul to rock 'n'roll. Thanks, Pete!

Electronic Musician

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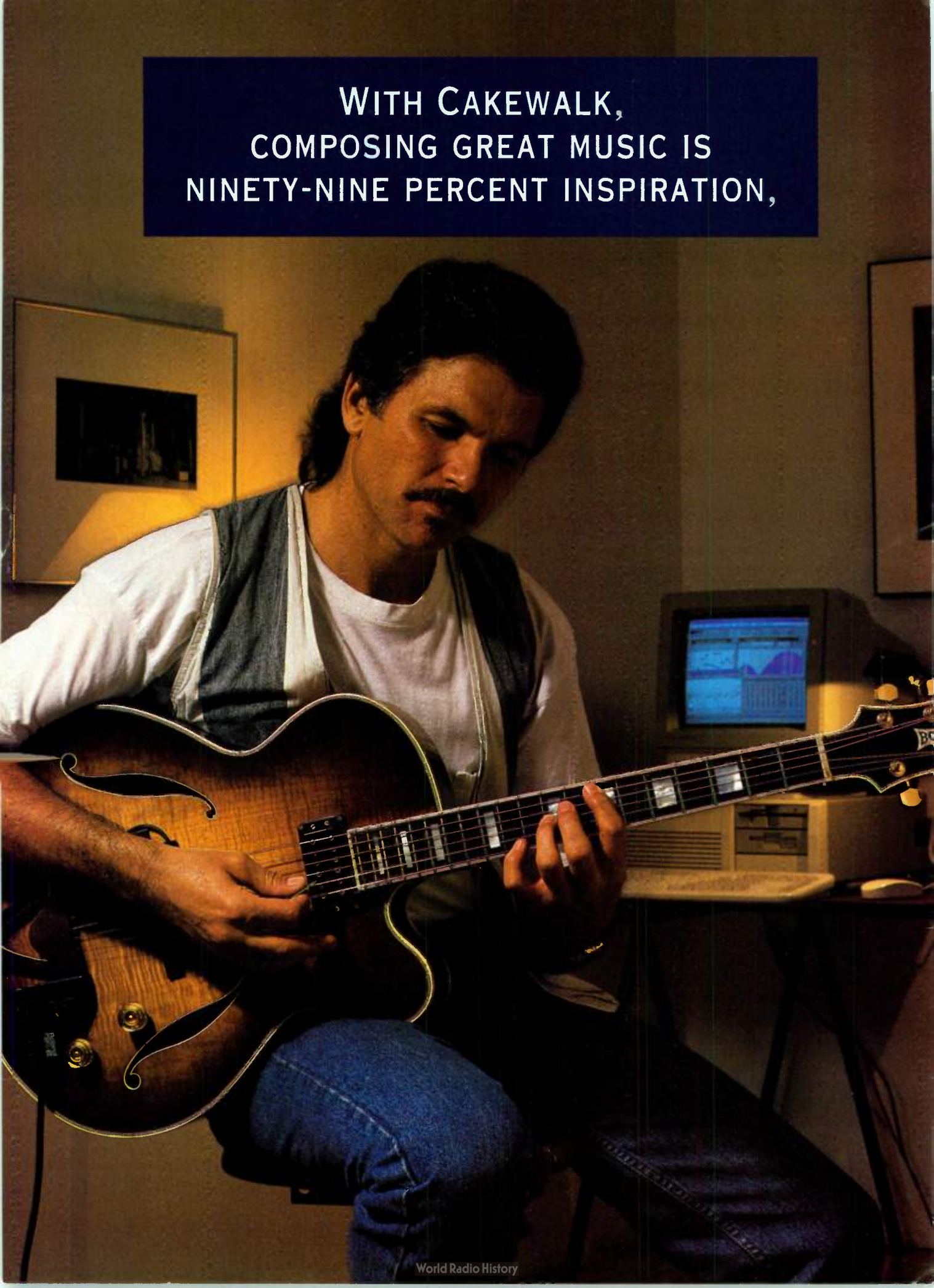

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MAKE A NOTATION OF THIS.

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YOU'LL LOVE THE VIEWS.

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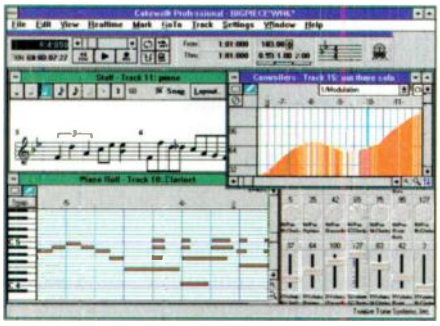

Roll view to insert, resize and move notes in a grid. The detailed Event List view lets you edit MIDI and multimedia events on multiple tracks at once. Use the Track/Measure view to assign track parameters like MIDI channels, instrument patches and key offsets, even in real-time.

Cakewalk
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Other extraordinary Cakewalk Professional features include a Controllers view, a variable timebase of up to 480 pulses per quarter note, a Markers view for creating text "hit points," an Event Filter and on-line help screens.

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- "Hot Key" macros
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- Punch record on the fly
- Big Time display

INSPIRED YET?

If you feel inspired to find out more about Cakewalk Professional for Windows 2.0, or to learn the name of the dealer nearest you, give us a call at **800-234-1171** or **617-926-2480.** Cakewalk Professional lists for just $349. If you'd like, we'll send you a demo disk for just $5 so you can see and hear Cakewalk Professional for yourself.

Twelve Tone
SYSTEMS
P.O. Box 760, Watertown, MA 02172

System Requirements: IBM PC with 10 MHz 80286 or higher, 2 MB of RAM, mouse; Microsoft Windows 3.1. Supports any combination of up to 16 MIDI ports on devices with Multimedia Extensions drivers (including Roland MPU-401 compatibles and Music Quest MQX interfaces). Cakewalk Professional for Windows is a trademark of Twelve Tone Systems. Other products mentioned are trademarks of their respective owners.

HAM WELL DONE

Having been a ham-radio operator long before synthesizers and home recording studios existed, I felt I had to respond to Ken Lee's June 1994 letter. Ham-radio operators are licensed by the FCC and are permitted by law to use linear amplifiers. On most ham frequencies, we can use up to 1,500W peak envelope power. Perhaps his neighbor is an unlicensed CB operator. Citizen's band stations are not allowed to run more than 5W.

However, I suspect that Mr. Lee's problems are caused by his own equipment and its associated wiring. Somewhere along the line, his setup is simply rectifying RF. A lot of equipment is shoddily designed and manufactured. After all, adequate shielding costs money, and everyone's concerned with the bottom line. To RF, some of this equipment looks like a sieve. A rat's nest of funky wiring, poorly shielded wire, bad solder joints, corroded connectors, and improper grounding schemes add to RFI susceptibility in a lot of home studios. Such a setup functions as a receiver of commercial radio and TV broadcasts, business-band broadcasts, police/fire/ambulance communications, cordless phones, and a host of other sources in this RFI cluttered world we live in. Let's not single out ham-radio operators as the only villains!

In this situation, a ham operator would only be at fault if she or he were transmitting out of designated ham-radio frequencies, or perhaps using too much power. I doubt this was the case.

Where should Mr. Lee turn for help? First, he should write to the manufacturers of his equipment. They sometimes furnish kits to help with RFI, often free of charge. Besides, it's good to let them know their equipment is doing a poor job of suppressing RFI. Secondly, if he's still on speaking terms with his neighbor and his neighbor is in fact a ham-radio operator, she or he might be willing to help find and correct the problem with his faulty equipment. Most ham operators are extremely courteous, and many are quite knowledgable in electronics. The ARRL (American Radio Relay League, 225 Main Street, Newington, CT 06111) has many publications that could help him deal with all types of RFI. Finally, Industrial Communication Engineers, Ltd. (PO Box 18495, Indianapolis, IN 46218-0495), has a large catalog of devices that can help suppress any kind of EMI or RFI.

Lee Blaske
Excelsior, MN

MASTER PLANS

I have produced my debut CD in much the same manner as you described in your recent article, "Masters From Ministudios" (June 1994). I used computer virtual tracks for all synth- and drum-machine parts, and I recorded all vocals and analog synths on an aging Tascam 244 Portastudio. By using a compressor/limiter and aural exciting, I was able to get pretty decent sound out of a recorder that isn't worth $100 on the used market today. Using SMPTE time code to lock up the recorder and the computer tracks, I was able to master to DAT with essentially first-generation sound.

Although it took me six months to master the CD, I am very proud of the outcome and am enjoying good sales on a project that is as low budget as it gets. This route is not for everyone, though I will continue to work in this manner for a few more years (or for as long as I am footing the bills).

Thanks for writing an article that doesn't concentrate on the high end of project studios with digital recording, hard-disk recording, and all of the latest technology I simply cannot afford.

Kevin C. Brislin
Tallahassee, FL

I enjoyed the "Masters From Ministudios" article. I wish you had expanded it a little more to discuss a few good ministudios. I need your advice in overcoming a problem I always face in mixdown.

I use a Tascam 688 (synchronized with a Korg 01/WFD and *Cakewalk*), an Alesis QuadraVerb, and a Technics tapedeck. As advised in the Tascam manual, I keep my mixdown levels between -3 dB and 0 dB. Even though all my meters read correctly on levels, my final tape volume is always lower than professional tapes. What am I doing wrong?

Amrik Khatra
Silver Spring, MD

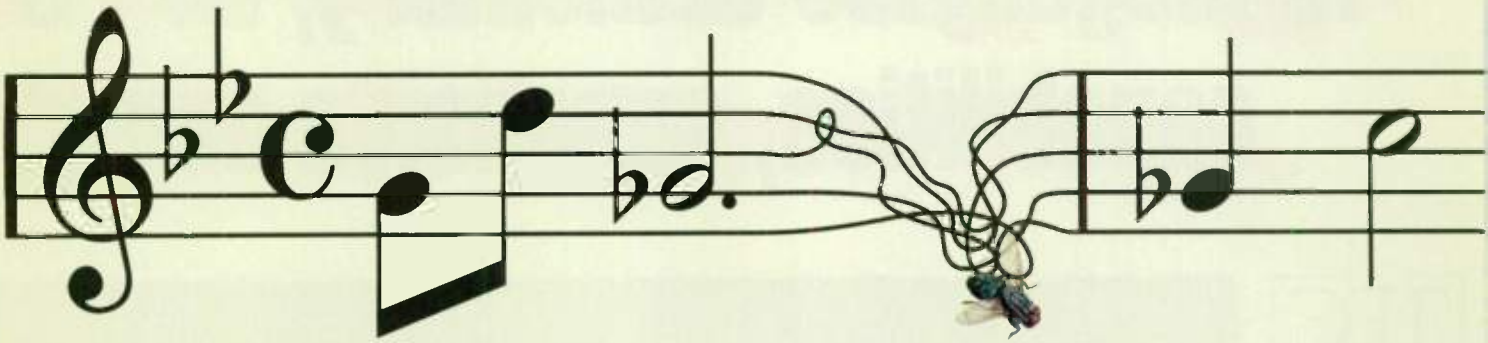
*Amrik—I'm glad you liked the article. I decided not to rate or compare specific ministudios, because the article was an applications feature, not a product face-off. And, as stated in the article, our June 1993 ministudio buyer's guide is still pretty current. (***EM** *back issues can be ordered through Mix Bookshelf at [800] 233-9604 or [510] 653-3307.)*

Regarding your question about mixdown levels, you're not doing anything wrong. Commercial cassettes and CDs are professionally mastered to maximize sound quality and signal levels. The mastering process is an additional stage of audio preparation that occurs after the final mix, but before duplication. A basic mastering session involves fine-tuning the EQ of the stereo master, compressing the program material for more punch, and diminishing audible hiss and other sonic anomalies.

If you want to attempt a little mastering magic yourself, try compressing your mixes so that you can record hotter levels during mixdown. Borrow or rent a good quality stereo compressor, and insert it between your ministudio's left/right outputs and your cassette deck's left/right inputs. Make sure that Dual or Stereo mode is active, so that each channel is processed equally. For cassette mixes, I typically set the compression ratio at 2:1 with a threshold of -10 dB. Be sure to watch for any unwanted timbral changes—compression often accentuates low end, for example—and revise your EQ settings if necessary.

Now, you can hammer your cassette deck's input levels until distortion is evident, then

ROBERT PRINCE



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

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

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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.

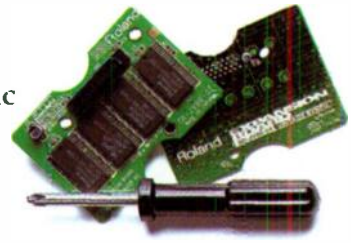
And don't forget that the JV-90 comes standard with 4 Mbytes of

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

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back the levels down until they are as hot as you can get them without risking sonic sizzle. This process takes a few run-throughs before the signal is burning hot and *uncompromised, but it's worth it. Depending on your deck"s input meter calibration, you should be able to lay down mixes at a "jumping out of the speakers" level of between +3 dB and +6 dB. Good luck and have fun!—Michael M.*

LIVE MIKING

On page 128 of the May 1994 issue of **EM** ("Recording Musician: Staying Alive in the Clubs") is an error I have seen in your magazine at least once before. In Fig. 1, you illustrate a stereo microphone pair set up in front of two P.A. speakers in a stereo recording configuration. The mics should not be positioned this way because of how humans perceive sound-localization cues. Human ears are most sensitive to two characteristics of an incoming sound-pressure wave: the intensity of the wave at each ear and the time of the wave's arrival at each ear. A sound originating from your left sounds like it is on the left because it is louder in your left ear, and the sound arrives a fraction of a second sooner at the left ear than at the right ear. Your brain decodes these and other factors to give the impression the sound is coming from a specific direction.

The problem with your illustration is that the microphone pointing to the left is actually the right mic in the pair. Thus, a sound coming from the left is louder in the right mic, which is pointed left, but arrives sooner in the left mic, which is pointed right. The intensity and time relationships are actually working against each other to produce an inaccurate stereo image. Assuming the use of cardioid mics, the angle between the mics should be between 90 and 110 degrees, which means the mics may not be pointed directly at the speakers but at a point just outside the speaker pair. Thus, the use of a right triangle rather than an equilateral triangle will probably sound better.

Michael Schulze
Audio Director
Oberlin College
Oberlin, OH

I AM READER HEAR ME ROAR

I have been a subscriber to **EM** since the days of yore but, sadly, I no longer feel comfortable reading your publication. As a person with a technical background and a love of music and playing (but not *professionally*), I am deeply offended by letters expressing a scathing disdain of people like myself. That you saw fit to publish Shawn R. Curtis' letter of March 1994 indicates, I think, a tacit empathy with such opinions.

I came to MIDI through the purchase of an instrument from the Yamaha Clavinova group that had an "interesting little DIN plug" in the back. This led to sound modules, a Commodore 64, software, more modules, mixers, more keyboards, a P.A. system, more computers, more modules, and a band, all of which allowed me to get up in front of people I didn't know and perform. I have spent more than $10,000 of income from my *real job* to support my MIDI activities.

The people who disdain this level of musical ability by denigrating the use of software tools are missing the reason

SERIOUS FUN.

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

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

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.

we do this. We create what we can with the tools, talent, and knowledge we are given. It is in the act of creating that we receive pleasure and satisfaction, not in the receipt of a paycheck for a "pro" gig. We should be encouraged, not discouraged; praised for the attempt, not criticized for the result. It may be difficult for someone with talent to treat those without the same level of talent as a peer, but they should try.

Tom Gentry
Lucas, TX

Tom—I'm confused and a bit hurt by your letter. Believe me, we are *on your side. Most of our readers are at exactly the same hobbyist or "semipro" level as yourself. In addition, the very foundation of* EM *is MIDI, music software, computers, keyboards, and all the tools needed for home recording. We have expanded our editorial coverage to become an even more essential guide to music-making, not to abandon our roots. For instance, our proactive stance on multimedia is obviously fueled by the medium's dependence on computers, software tools, and MIDI.*

Please understand that our "Letters" column is open to everyone. As such, it is a forum for opposing views, queries, criticism, and compliments. Your feedback is as important as any other reader's. I can see why you were hurt by Mr. Curtis' letter, but he was not speaking for EM. *The only editorial stance in our "Letters" column is the right to voice an opinion.—Michael M.*

DIGITAL NO CAN DO

I have a Mac 840AV, and I am considering doing digital recording. Stereo in/out is fine with me, but I would like to have digital stereo in/out. Is there a plug-in product, possibly a DAC (digital audio chip), that I could do this with?

Daniel B. Hendricks
Westminster, CO

Daniel—I know of no practical way to bypass the 840AV's built-in digital-to-analog converters, which would be necessary to add digital I/O or better DACs. To get these features, you have to add a third-party DSP card, such as Digidesign's Audiomedia II. For more information, see my response to Andy Brewer in the April 1994 "Letters" column (p. 138).—Steve O.

A HELPING HAND

In the past year my home studio has gone from all analog to hybrid analog/digital. Your magazine has been extremely helpful with the learning curve and helps me make the right purchases. Now I know more ways to get better sound out of the equipment I have. Thanks for all the help!

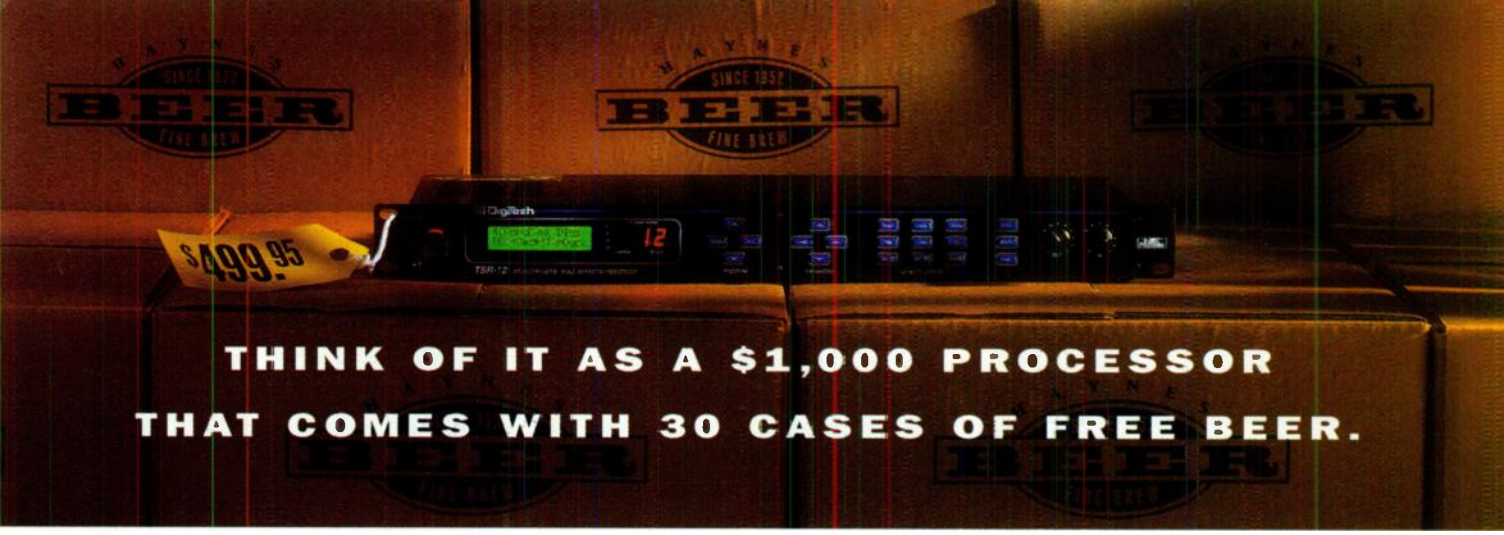
Rick Gadbois
Beverly, MA

ERROR LOG

June 1994, "Share and Share Alike," p. 64: MIDImaze's correct phone number is (615) 896-6240. They are based in Nashville, Tennesee.

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.*



Let's talk about technology. The TSR-12 uses DigiTech's proprietary S-DISC, the most powerful digital signal processor chip designed specifically for audio applications. So it offers unheard-of specs that always deliver clean, crisp sound. Even the most

TSR-12 FEATURES

- Full bandwidth effects (20 Hz to 20 kHz)
- 32 algorithms
- 24-bit signal path, 48-bit internal data transmission
- Digital noise reduction
- Instant module and parameter access
- Integrated MIDI processor
- Built-in MIDI merging
- MIDI controlled "morphing" effects

they can't guarantee digital black.

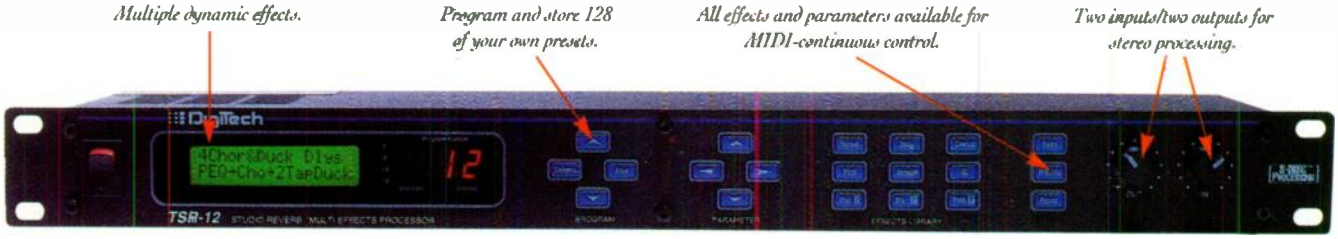
And now a word about effects, since that's probably why you're reading this. The TSR-12 includes 128 factory-fresh presets and 32 effect algorithms. Built-in memory lets you program 128 of your own multi-effect sounds. And one of

expensive processors use your basic off-the-shelf chip. Which gives them your basic off-the-shelf performance.

How about noise? If you don't hear any, it's because the TSR-12 has the exclusive Silencer™ digital noise reduction system. The Silencer is so intelligent, it closes and writes digital zeros when there's no analog signal present. Higher-priced processors may offer noise gates, but those more expensive processors? Just 100 presets and 9 algorithms. If you're lucky.

At $499,* the DigiTech TSR-12 isn't some watered-down version of a $1,000 sound processor. So try an A-B test with anything else out there. You'll find the TSR-12 gives you everything you want from a processor. For less. Try one at your local DigiTech dealer today. Or call or write for more information.

DigiTech
A Harman International Company



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*U.S. price only

WHAT'S NEW

By Steve Oppenheimer

▲ ARX SYSTEMS DI-2

ARX Systems introduced the DI-2 stereo direct box ($219). The unit features a switchable, -20 dB pad; switchable, +10 dB gain; an audio ground-lift switch; and a battery-check switch with status LED. It has dual XLR outputs on the rear and two pair of ¼-inch I/O jacks on the front. Phantom power is included. The DI-2 uses a 9V battery or optional, power supply.

Also new from ARX is the MSX 4 active microphone-splitting system. The system consists of a 1U rack-mount splitter unit ($999) and a 1U rack-mount external power supply ($899). Each of the MSX 4's four channels has rear-panel main and monitor outputs and two front-panel splits, all of which use XLR connectors. Each channel has a switchable -20 dB pad and switchable +48V phantom power. The MPS 1 power module contains two electrically separate power supplies. Even the IEC-standard AC sockets are separate. ARX Systems; tel. (800) 279-7978; fax (707) 766-8431.

Circle #401 on Reader Service Card

▶ DIGITECH MC2

DigiTech released the MC^2 MIDI Continuous Controller Pedal ($169.95). The pedal sends one MIDI continuous controller stream (Control Change 1 to 16) on a selectable channel. The message can be sent alone, or merged with an incoming MIDI data stream. A pair of knobs select among the sixteen message types and sixteen MIDI channels. DigiTech; tel. (801) 566-8800; fax (801) 566-7005.

Circle #402 on Reader Service Card

▼ GENERALMUSIC POWERCASE

Generalmusic introduced the Powercase series of powered mixers. The Powercase 12 ($1,395) offers four mono and four stereo input channels and a 150W/side (8Ω) stereo power amp. The Powercase 16 ($1,795) has eight mono and four stereo channels. Its power amp produces 150W/side into 8Ω, or 250W/side into 4Ω. Otherwise, the two models have identical features. The mixers include a reinforced carrying handle and metal cover, and the side panels can be replaced with optional metal flanges for 8U rack-mounting.

Powercase mixers include the DSP Plus dual-stereo, MIDI-controllable, multi-effects processor. The DSP Plus has two independent sections that are fed by aux buses 1 and 2. The Reverb section produces hall, room, vocal, plate, and early reflections effects. The Multi-Effect section provides echo, delay, chorus, flanger, and phaser. A 2-line by 16-character LCD display shows the effects presets and parameters.

The mono mixer channels have balanced XLR and ¼-inch inputs, with input trim. The stereo channels have two balanced, ¼-inch inputs, with trim. The 3-band, channel EQ is fixed at 70 Hz (shelf), 1 kHz (peak), and 10 kHz (shelf). There are three aux buses, one of which is prefader for monitors. The other two auxes are postfader and are internally routed to the onboard effects processor, but also have ¼-inch outputs for external processors. All channels have pan pots, peak LEDs, and faders.

The master section includes two sets of three stereo returns, one set for the monitor output and one set for the L/R mix. Each set includes a hard-wired return for the onboard effects processor and returns for external devices on auxes 1 and 2. A defeatable, 7-band graphic EQ is provided for the main bus. Separate faders are provided for the monitor, left, and right buses. The two LED level meters can be switched between the monitors and mains. A pair of ¼-inch, TRS insert jacks are provided for the L/R buses. The L/R and monitor line outs are on balanced, ¼-inch jacks.

Additional features include +48V phantom power, defeatable per channel via DIP switches; a ¼-inch TRS headphone jack with level knob; and an RCA tape input and output. Frequency response is rated at 20 Hz to 20 kHz (±1 dB), THD+N at less than 0.04% (1 kHz), EIN at -130 dB, and residual noise (line out) at -94 dB. Generalmusic; tel. (708) 766-8230; fax (708) 766-8281.

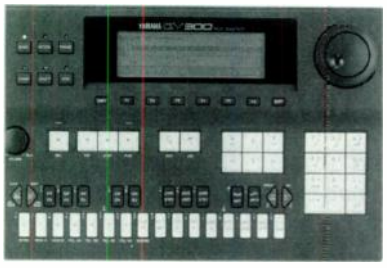
Circle #403 on Reader Service Card

▼ YAMAHA QY300

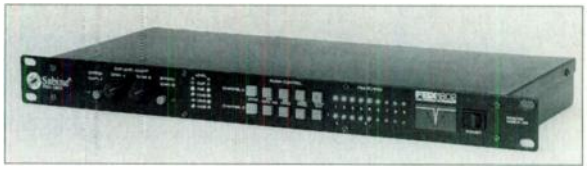
The QY300 ($1,295) is the newest member of Yamaha's QY family of portable MIDI workstations. It offers a 3.5-inch floppy-disk drive; large, 240 × 64-dot, graphic LCD; data/controller wheel; numeric keypad; and mini keyboard. The 28-note polyphonic synth section supplies 128 GM-compatible, AWM sounds and eight drum kits. The sounds can be routed through an onboard reverb/delay processor.

The onboard sequencer has a capacity of 53,000 notes and ten songs. In addition to sixteen recording tracks, the sequencer has a Conductor track for arranging the order of the Intro, Body, Ending, and Fill parts. You can use any of 27 preset chord types and the Conductor track to harmonize a bass line with the Auto Bass Chord auto-accompaniment system. Yamaha Corporation; tel. (714) 522-9011; fax (714) 739-2680.

Circle #404 on Reader Service Card



▶ SABINE FBX-1802



Sabine has expanded its FBX Feedback Exterminator line to include the FBX-901 ($649.95) and FBX-1802 ($1,299.95). The FBX-901 is a single-channel signal processor with nine filters, while the FBX-1802 is a 2-channel model with nine filters per channel. The units sense feedback and apply a digital notch filter, with the minimum required depth, at each resonating frequency. The filters' 1/10-octave width allows precision feedback control without affecting other frequency content.

The FBX devices use a combination of fixed filters you set up before the performance and DSP-controlled, dynamic filters that respond to changes in real time. You can select how many of the filters are active (per channel, with the dual-channel FBX-1802), in case you don't need all nine. You can set how many active filters are fixed and how many are dynamic. LEDs show which filters are active, and master level LEDs help avoid clipping. The units include a hard-wire Bypass button. Inputs and outputs use both balanced XLR and unbalanced 1/4-inch connectors.

The new units respond faster (approximately 0.4 seconds at 1 kHz) than the FBX-900 and discriminate better between music and feedback. A new Filter Lock feature lets you freeze the fixed filters, so they don't cut deeper than your original setting. RF shielding has been improved, and the design is more efficient, using fewer parts.

In addition to offering all the FBX-901's features, the FBX-1802 lets you switch the filter widths from 1/10-octave for applications where signal quality is critical (e.g., music), to 1/5-octave for less critical program content (such as speech). The FBX-901 filters are 1/10-octave wide.

The FBX-901's filters respond between 55 Hz and 13.25 kHz, and the filter depth varies up to -50 dB. Signal-to-noise ratio is rated at >86 dB (balanced), THD at <0.02%, and dynamic range >92 dB. The FBX-1802's filters respond between 20 Hz and 20 kHz, and filter depth varies to -30 dB. S/N ratio is rated at >100 dB, THD is <0.02% (at 1 kHz), and dynamic range >100 dB. Sabine; tel. (904) 371-3829; fax (904) 371-7441.

Circle #405 on Reader Service Card

▶ KAWAI KC20

Kawai is shipping the KC20 GM Sound Keyboard ($699), a portable (9 lbs.) synth with a full-size, Velocity-sensitive (but not Pressure-sensitive), 61-key keyboard. The synth is 28-voice polyphonic and offers 128 General MIDI-compatible sounds, seven drum kits, and 32 supplemental sounds in ROM.

Global parameters include reverb time, predelay, master tuning, and a choice of ten velocity curves. A 2-line by 16-character LCD not only displays the current patch and parameter information, but serves as a MIDI In data monitor. Kawai's Quick MIDI feature lets the KC20 send MIDI Volume, Pan, Control Change (0-127), and Program Change messages to external devices only, i.e., the messages do not affect the KC20's sound source.

In Compose mode, the KC20 is 16-part multitimbral. Voices can be allocated independently for each Section (part) to avoid voice-stealing. You can edit the level, pan, reverb level, transposition, tuning, pitch-bend range, and modulation depth for each Setting (patch assigned to a Section). These can be saved in sixteen user memory locations. You also can save all data, Section data, or System data via SysEx.

In Performance mode, the unit offers eight user RAM banks of eight patches each, which can be used in two splits or layers. The two control wheels are assignable (per patch) to any MIDI Control Change message, but default to Pitch Bend and Modulation. The level, pan, transpose, tuning, pitch-bend range, modulation depth, zone mapping, Velocity-switching, reverb select and level, and sustain-switch parameters also can be saved for each patch.

In addition to its MIDI In and Out (no Thru) ports, the unit also has a serial interface that connects directly to a PC, NEC, or Mac computer. The headphone out, L/R audio outs, and sustain-pedal jack use 1/4-inch connectors. The KC20 uses an external power supply. Kawai; tel. (310) 631-1771; fax (310) 604-6913.

Circle #406 on Reader Service Card

▲ RSP REANIMATOR

RSP Technologies introduced the Reanimator ($599), a stereo/dual-mono compressor. To replace high frequencies lost during compression, the product features dynamic spectral enhancement, in which enhancement is only added when compression is being applied.

The unit offers short signal chains and low-noise VCAs to minimize noise. The two channels can be individually bypassed. In addition to the usual threshold (-40 to +20 dB), ratio (1:1 to infinity), attack (1s to 500 ms), release (.05s to 4s), and output controls, the device features Auto mode. In this mode, the attack and release times vary depending on the input-signal level.

The Reanimator provides a sidechain that includes a de-esser. The de-esser can be hardwire-bypassed per channel so you can access the sidechain for other purposes, such as EQ.

The device also has HUSH single-ended noise-reduction, which utilizes the company's latest Variable Integrated Release (V.I.R.) circuit for up to 60 dB of NR. The HUSH system can be hardwire-bypassed for each channel.

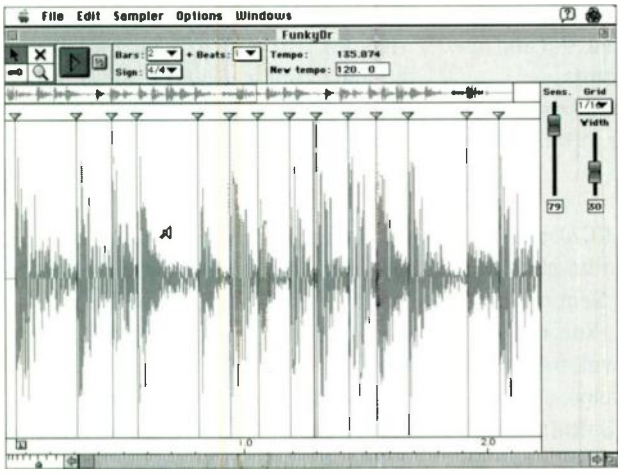
Operating levels are +4 dB to -10 dB. RSP claims a frequency response of 10 Hz to 30 kHz (+1 dB) and distortion is .007% (0 dBu @ 1 kHz typical). The unit has balanced, ¼-inch and XLR inputs and outputs. RSP Technologies; tel. (810) 853-3055; fax (810) 853-5937.

Circle #407 on Reader Service Card

▼ MAS/WEST TEST 1-2-3

MAS/West claims that its TEST 1-2-3 signal tracer ($89.95) is the fastest way to troubleshoot complex audio systems. It tests for the presence of high-impedance (30 mV RMS), line-level (150 mV RMS), and speaker-level (1V RMS) signals, displayed on three separate LEDs. The slender (4.5 × 0.75-inch) unit uses a CMOS op amp and connects via a ¼-inch plug. With XLR adapters, use them to check phantom power, mics, etc.; with BNC and RCA adapters, test video gear. The body is anodized aluminum. Expected lithium battery life is 200 hours of operation. The input impedance is 20 kΩ and overload voltage is 100V RMS. MAS/West; tel. (310) 544-0464; fax (310) 544-2584.

Circle #408 on Reader Service Card



▲ STEINBERG RECYCLE

Steinberg unveiled *ReCycle* ($199), an audio file-processing application for the Macintosh. The program lets you import rhythmic samples, such as drum patterns and loops. Then it automatically analyzes the sample and breaks it up into its rhythmic components, called Slices. The number and "thickness" of the Slices is user-defined. *ReCycle* automatically assigns each Slice a MIDI note number, creates a key map, and sends the results back to the sampler as separate sound files with a program file. Each Slice can then be triggered from a MIDI controller.

In addition, *ReCycle* creates a Standard MIDI File from the original sound file. The SMF can be imported into a sequencer and used to trigger the sample Slices within the original file, playing the original rhythm under MIDI control. You can then manipulate the rhythm within the sequencer and trigger the Slices via MIDI Note On messages.

The program supports *Sound Designer I/II* and AIFF sound file formats. Support is also provided for the Akai S2800 and S3000-series samplers and Digidesign SampleCell I/II. Sixteen-bit playback also is supported with AV Macs or Digidesign Audiomedia II or better hard-disk recording cards. *ReCycle* requires a Mac SE/30 or better with 4 MB of RAM and System 6.0.7 or later. (System 7.1 or later with *Sound Manager* 3.0 recommended.)

Also new from Steinberg is the Cubase Music Starter Pac for *Windows* and Macintosh ($199) featuring *Cubase Lite*, a simplified version of the company's sequencing software that includes an Arrange window with an unlimited number of parts. The Score Editor has step-time and real-time note entry, printing, and the ability to revert to the most recently saved version of the file. The General MIDI/GS Editor controls volume, pan, and effects of GM/ GS instruments, with sound-selection by name. All editors operate in real time, and the program offers online help.

The Starter Pac also contains the *Song Gallery*, a disk containing ten popular songs, supplied in GM/GS-compatible, *Cubase Lite* file format. Finally, the package includes *MIDI Explained* (a hypertext MIDI tutorial) and a 1-in, 1-out MIDI interface for PC or Mac. Steinberg/Jones; tel. (818) 993-4091; fax (818) 701-7452.

Circle #409 on Reader Service Card

(continued on p. 25)

It Doesn't Get Any Better Than This!

No other sampler can match the ASR-10 in features, fidelity, and fun.

Samplers offer the creative musician so many possibilities — from playing realistic instrument sounds to creating loops and sounds recorded from any source imaginable. And no other sampler offers the range of possibilities found in the ENSONIQ ASR-10:

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- expressive voice architecture
- exclusive performance features
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- available as a keyboard or rack

The ASR-10's excellent fidelity and features haven't gone unnoticed. It was awarded EQ's "Blue Ribbon Award" *('93 AES)*, nominated as the *Music & Sound Awards* "Most Innovative Keyboard" and "Product of the Year" *('94 Winter NAMM)*, and tested #1 in frequency response and distortion in the August 1994 issue of *Keyboard*.

The ASR-10 has a *huge* library of sounds on diskette and CD-ROM *(including our acclaimed Signature Series artist collections)*. And this fall we're premiering CD-ROMs created for ENSONIQ by *Hollywood Edge, Sounds Good, InVision, Sonic Arts,* and *Q Up Arts;* as well as new volumes available from *Eye and I, Greytsounds, Pro-Rec,* and *East-West.*

Isn't it a great time to be alive and making music? ASR-10 owners certainly think so. So can you.

Call 1-800-553-5151 to find out more.

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Announcing a much

Encore's new user-defineable expressions palette lets you give your music the exact coloring you desire.

Not just another pretty face, our new Anastasia font is loaded with symbols and is easily the most powerful and flexible anywhere.

Playback of dynamics and repeats gives students a sound lesson in the nuances and subtleties of music.

Avant garde musicians take note. Encore now supports cross staff beaming.

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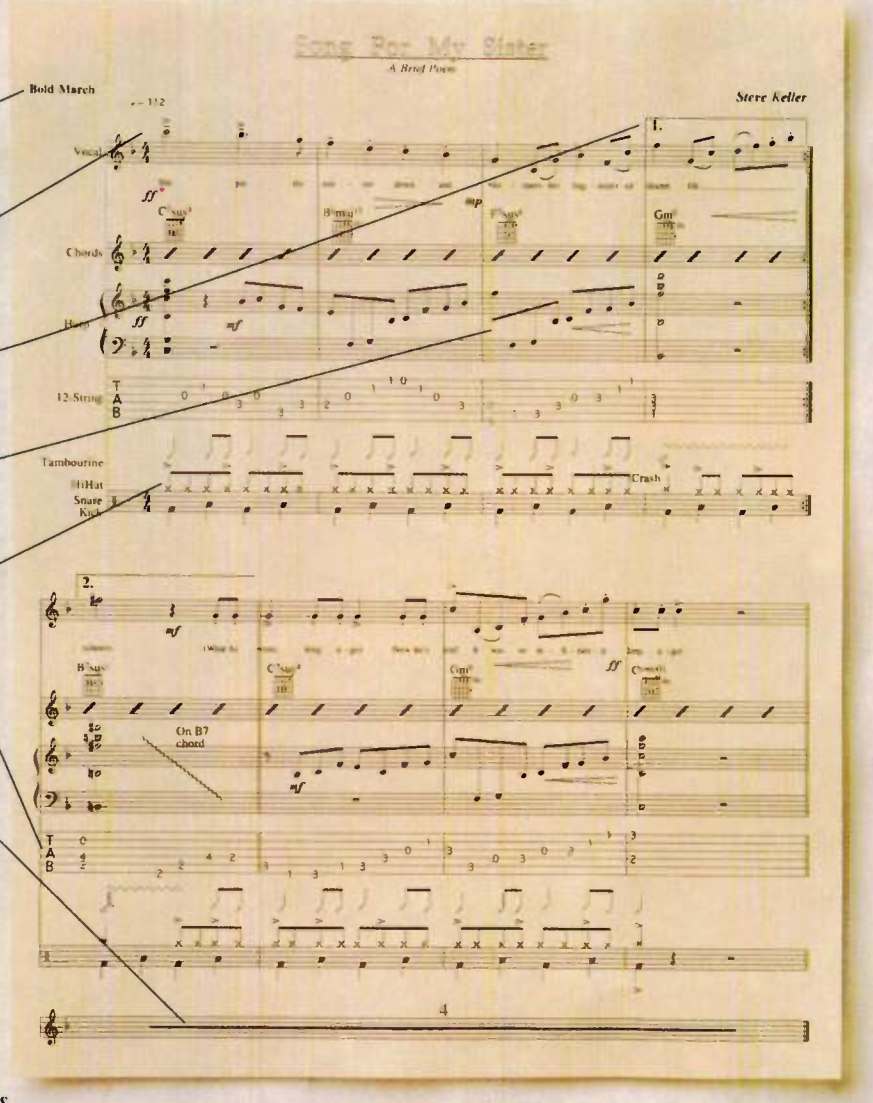
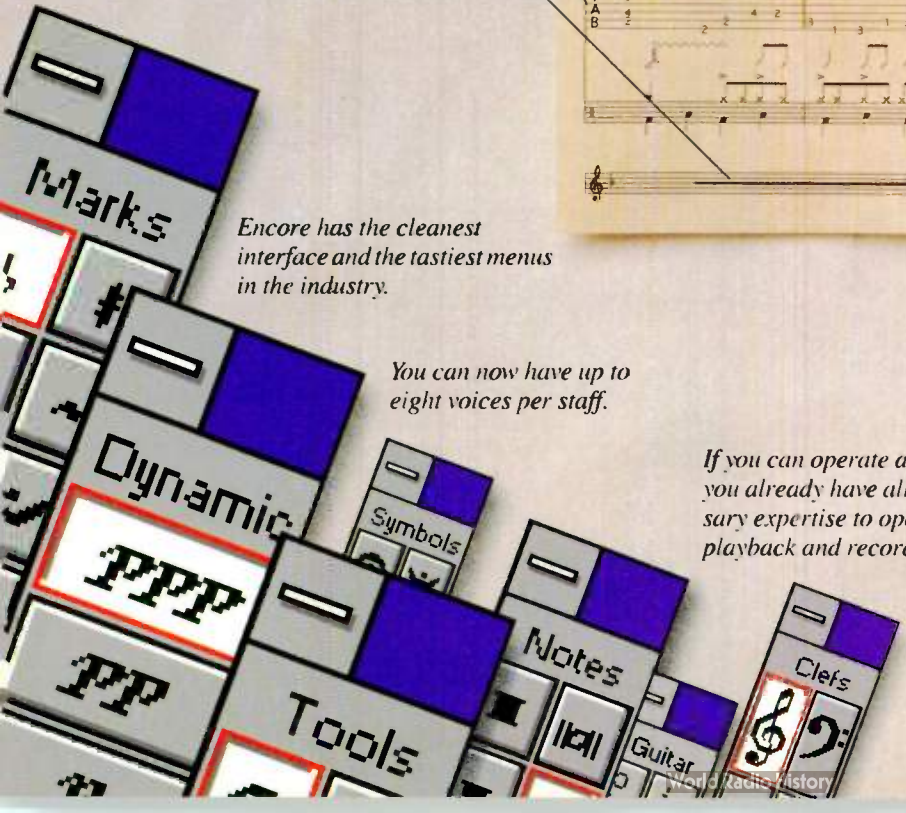
Here's something to please even the pickiest guitarist: Any music can be instantly turned into guitar tablature.

Finally there's a simple way to include compressed rests for groups playing from one piece of music.



With EPS support, you can now place your compositions into other applications.



Encore has the cleanest interface and the tastiest menus in the industry.

You can now have up to eight voices per staff.

If you can operate a tapedeck, you already have all the necessary expertise to operate our playback and record.

better arrangement.

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When you create music, the last thing you need is notation software that doesn't work in harmony with you.

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Encore captures note for note anything you play on any MIDI instrument or sequencer, turning it instantly into beautiful sheet music on your computer screen.

We could go on and on. But compare notes yourself. Call 1-800-545-0775, Dept. P21 for a $9.95 demo disk for Macintosh or Windows.

Whether your music leans toward Bartok or barbershop quartets, Encore's not only a much better arrangement, it's easily the best notation software by any measure.

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YOU COULD BUY ANOTHER MIXER, BUT IT WOULDN'T BE SMART.

You don't have to be some kind of genius to figure out that analog mixers don't have a lot going for them in the brains department.

But the fact is, if you want a mixer that's intelligent, you have to be willing to shell out a load of money.

Well not anymore.

Thanks to Yamaha, you can now get a 16-channel, 18-input digital mixer with instant recall of all settings and motorized faders, for about the same cost as the analog variety.

We call this technological leap forward, the ProMix 01. The most irresistible combination of digital technology ever assembled.

Irresistible because whether you're working in a project studio or performing live, you can always push a button and instantly recall all settings of your last mix -- no guesswork involved.

ProMix 01 not only has snapshot memory, it's also capable of dynamic automation. Which is another way of saying all your moves can be recorded in real time and played back in conjunction with any outboard MIDI sequencer.

And so you don't have to haul around an external rack of gear, ProMix 01 also has two internal digital effect processors. Three assignable stereo compressors. And three-band parametric EQ on every channel.

All parameters (including fader position, EQ, channel on/off and send levels) can be stored and recalled at the push of a button.

There's also a stereo "pair" function that allows changes in the left channel (such as EQ and gain) to be automatically mirrored in the right channel. And if you like, the fader grouping feature lets you control multiple channel levels with a single fader.

Sounds 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.

In short, Yamaha has packed more into this little digital mixer than we can pack into an ad.

To fully appreciate ProMix 01, you owe it to yourself to stop by your nearest Yamaha dealer.

Getting ProMix 01 won't be the smartest mixing decision you'll ever make. It'll be sheer genius.

For more information, call 1-800-937-7171 Ext. 350 today.

YAMAHA
Programmable Mixing

SYNTH PATCHES AND SAMPLES ▲ ▲ ▲ ▲ ▲

▲ OSC

OSC presents two new CD-ROM sample libraries containing AIFF files. *A Poke in the Ear with a Sharp Stick, Vol. III* ($199) contains 1,700 unusual sounds, effects, loops, and clip tunes from five different sound designers. Tracks include such fare as Fried Tooth Fairy, Mantis Like Position, Ncizalator, Charred Radio, Resonant Dog Meat, and Tiny Robot Hairball.

Textural Ambience ($149) is a collection of long, evolving atmospheres, soundtracks, and beds. Designed by Charles Maynes, its tone is described as "dark, moody, dramatic, and menacing." OSC; tel. (415) 252-0460; fax (415) 252-0560.

Circle #410 on Reader Service Card

▶ Q UP ARTS

Q Up Arts is shipping an assortment of new sample CDs and CD-ROMs, all of which are sampled at 44.1 kHz, with 16-bit resolution. From composer and keyboardist Jason Miles comes *Psychic Horns* (CD/Akai CD-ROM $129), a collection of brass-section loops, riffs, and samples. The collection includes large and small trumpet, tenor, and trombone sections performing stabs, falls, and swells. Drum grooves also are included. Styles include pop, funk, R&B, and jazz. The stellar horn section includes John Allmark (trumpet), Dan Moretti (tenor sax), and John Wheeler (trombone). The CD-ROM part of the disk supports Akai-compatible samplers.

Also from Q Up Arts is guitarist David Torn's *Tonal Textures* (audio CD/CD-ROM $399; CD only $129), which features 540 MB (54 minutes) of samples. The emphasis in this set is evolving "soundscape" textures and loops. Torn created most of the loops by playing his Klien electric guitar through various effects pedals, a Lexicon PCM42 delay, and a DigiTech IPS 33B. The CD-ROM version is multiplatform, supporting Akai S-series, Kurzweil K2000, E-mu EIIIx, and Roland SP-700 and S-760 samplers.

Q Up Combo Vol. 2 "The World" (Akai-compatible CD-ROM $199) features world instruments, including percussion. Featured are Native American, Hawaiian, Japanese, Korean, and Cameroon percussion; chinj and kwen gwari; daf and darabuka; Flamenco guitar; ivory horn; Appalachian dulcimer; talking drum; Tibetan meditation bowl; and struck chimes.

Q Up Arts also is distributing composer/sound designer Alan Howarth's *Famous Film Effects* ($595), a 3-D sound-effects library on Macintosh CD-ROM. All files are in Macintosh AIFF format. The sounds were enhanced with the B.A.S.E. 3-D processing system. Sounds include space ships, nature backgrounds, weather, lasers, and machinery. Q Up Arts; tel. (408) 688-9524; fax (408) 662-8172.

Circle #411 on Reader Service Card

◀ ENSONIQ

Ensoniq announced three new TSD-series sound/sequence disks ($19.95 ea.) for the TS-10 and TS-12 synths. *TSD-1002: Rhythm Construction Set* offers 540 drum and percussion sequences that use both the Ensoniq and General MIDI drum maps. The collection includes odd time signatures, jazz, rock, hip-hop, and assorted Latin styles.

TSD-1003: Pop Rock Orchestral for the Pro provides a bank of 60 pop and synth sounds and a bank of 60 orchestral instrument sounds. *TSD-1004: Synth Thesaurus* offers emulations of 120 pre-MIDI synths and keyboards. Each set also includes twenty 6-Program files, organized by related sound types, for creating custom banks. Ensoniq; tel. (610) 647-3930; fax (610) 647-8908.

Circle #412 on Reader Service Card

PATCHMAN MUSIC

Patchman Music is offering a new sound bank ($39.95 + $2 s/h) featuring breath-controlled sounds for the Yamaha WT11. The new bank offers 32 Performances and 32 Voices, each with custom-programmed effects. Vol. 1 sounds are varied, but most are horn-like. Examples include: EVI Trumpet, Dragnet, Acoustic Guitar, Brecker-y, Baroque Ensemble, Piccolo Trumpet, English Horn, and Mallet Flute. The bank is available as a WT11 data cassette, Opcode *Galaxy* bulk dump, or Standard MIDI File. The company also offers breath-controlled patches for the Akai EWV2000; Ensoniq ESQ/SQ-80; Kurzweil K2000; Oberheim Matrix 6/1000; and Yamaha SY/TG77, SY99, TX802, and TX81Z. Patchman Music; 2043 Mars Ave.; Lakewood, OH 44107; tel. (216) 221-8887.

Circle #413 on Reader Service Card

SYNTH PATCHES AND SAMPLES ▲ ▲ ▲ ▲ ▲

▲ INVISION

InVision is shipping Miroslav Vitous' *Virtual Symphony Orchestra* ($3,495), a 4-disc collection of symphonic instrument samples on CD-ROM. The discs are available for the E-mu EIIIx, Akai S-series (compatible with the Kurzweil K2000), Roland S-770/760/750/SP-700, and Digidesign SampleCell I/II.

The instruments are sampled with detailed performance articulations, such as legato, staccato, portamento, and pizzicato. The instruments were recorded with 20-bit resolution in a European concert hall. The stereo imaging is in an actual symphonic configuration, presenting the instruments in their proper relative soundstage positions.

The *String Ensembles* disc ($1,495) includes eleven violins, four violas, ten cellos, and nine basses. The eleven *Ensemble Violins* are also available separately ($695). *Wind and Brass Ensembles* ($795) fill one disc, with three oboes, three clarinets, three flutes, four French horns, three trumpets, three trombones, and three bassoons. *Solo Instruments 1* ($795) includes bass clarinet, clarinet, bassoon, contrabassoon, bass trombone, trombone, trumpet, viola, and cello. The *Solo Instruments 2* disc ($795) contains flute, alto flute, English horn, contrabass, French Horn, oboe, piccolo, and tuba. A smaller version of this library is being developed ($1,195).

The company also is offering *Mike Pinder Mellotron* ($495), the ex-Moody Blues keyboardist's CD-ROM archive of Mellotron samples. The discs are available for the EIIIx, Akai S-series, and Kurzweil K2000. The collection has no loops, and every note was sampled. Also included are ten sounds from the Chamberlin, a predecessor of the Mellotron. Sound banks average 16 MB each.

InVision is distributing the *Sabian Cymbal Sample Library* on audio CD ($99). The 2-disc library contains over 150 samples (1.2 GB), including ride, Chinese, splash, crash, and orchestral/symphonic cymbals. The set also provides hi-hats, gongs, and assorted electronic percussion and special effects. The performers include Carmine Appice, Mike Baird, Richie Hayward, Reek Havok, Mitchell Peters, and Chester Thompson.

Finally, InVision introduced the first two SoundCard-series PCMCIA sample cards ($129 ea.; with program card $159) for the Korg 01/W, X-series, and Wavestation SR synths. Each card contains 2 MB of samples. One hundred Programs and 100 Combis are provided on a floppy disk.

As its name suggests, Vol. 1 is the *Acoustic Card,* featuring acoustic guitar, concert harp, zither, marimba, glockenspiel, solo ebony flute, violin, and rainstick. Vol. 2, the *Pop Card,* includes electric piano; rock organ, with and without Leslie; Les Paul; Strat; rap drums; and assorted bells, pads, and drums. Acoustic Piano, Vintage Synth, and Horn and Wind Instruments cards are expected soon. InVision Interactive; tel. (800) 468-5530 or (415) 812-7380; fax (415) 812-7386.

Circle #414 on Reader Service Card

PRO-REC

Pro-Rec released its *Analogue Collection,* which includes 650 sampled hits, leads, pads, basses, effects, and percussive sounds from 25 classic analog synths. The samples are available on audio CD ($89) and CD-ROM for SampleCell, K2000, and S1000 ($299). Featured dinosaurs include APR Odyssey; Chroma Polaris; Korg MS20; Memorymoog and Minimoog; Oberheim Matrix-12, OB-1, and SEM; Roland Juno 106 and Jupiter 8; and Sequential Prophet 5, Prophet 600, and SixTrak.

Pro-Rec also offers a CD-ROM containing its entire sample library for the S1000, ASR-10/EPS-16+, SampleCell (Macintosh or PC), K2000, and Roland S-series samplers ($299). There are over 1,000 multisampled instruments, with over 300 synths, 300 basses, ten drum kits, and assorted vox and chiff sounds, pianos, acoustic strings, pads, organs, flutes, effects, and more. The disc also includes samples of Pro-Rec patches for well-known digital synths, such as the 01/W, M1, Wavestation, JV-80, Vintage Keys, and SY85. Pro-Rec; tel. (212) 675-5606; fax (212) 627-3148.

Circle #415 on Reader Service Card

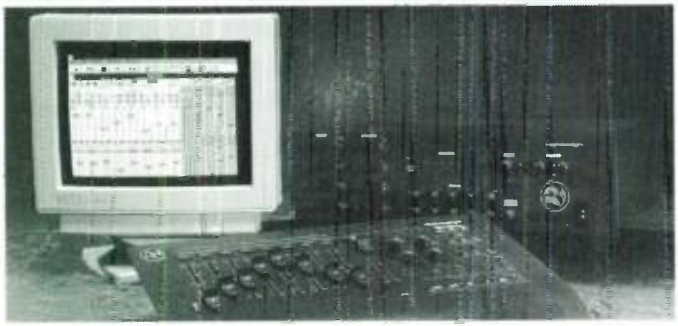
SYNTAUR PRODUCTIONS

Syntaur's TS Set 1 ($39.95 + $4 s/h) supplies 60 programs for the Ensoniq TS-10/12, including Hyper-Wave patches, pads, basses, and drum loops. Much of the set focuses on huge, complex, soundtrack-type timbres. Special attention has been given to Hyper-Waves, many of which continue to evolve when sustained for as long as two minutes. In some patches, the user can radically alter the loops using the controllers. Complete Patch Select and controller-routing documentation is included. Syntaur Productions; tel. (800) 334-1288 or (713) 965-9041; fax (713) 963-9206.

Circle #416 on Reader Service Card

(continued on p. 28)

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.

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Tannoy • Crown • BBE • KAT • Carver • Passport • Rane • Shure
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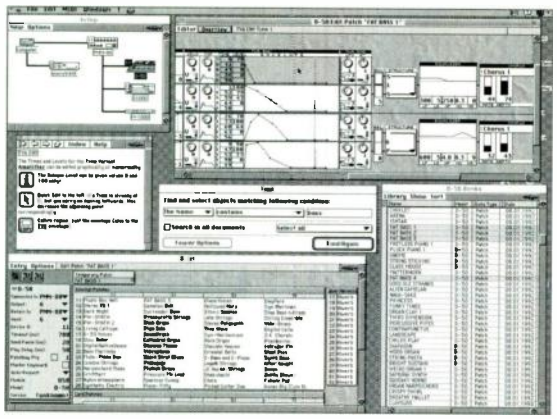
▶ EMAGIC SOUNDDIVER

EMAGIC released *SoundSurfer* 1.5 universal patch librarian ($149) and *SoundDiver* 1.5 ($249) universal editor/librarian for Macintosh and Atari. The programs integrate with *Logic* 2.0; *Logic* displays the patch names from *Diver/Surfer* in its Arrange window, and the programs can exchange MIDI data and share the computer ports.



SoundDiver offers user-definable, universal device templates, support for MIDI patch bays, and overview and landscape display views for complex editors. With the Window Link function, an Edit window always shows the contents of the active edit buffer, and multiple windows of the same edit buffer can be open simultaneously, displaying different sections of the patch.

Overview Macro provides simple, global parameter editing. Parameter types can be can be cut, copied, and pasted via the clip board or drag-and-drop between windows, edit buffers, or data types. A Snapshot function automatically saves an interim version of the patch. Editing windows are updated when edits affect other sounds. EMAGIC; tel. (916) 477-1051; fax (916) 477-1052.

Circle #417 on Reader Service Card

▼ ERATO MUSIC MANUSCRIPTOR

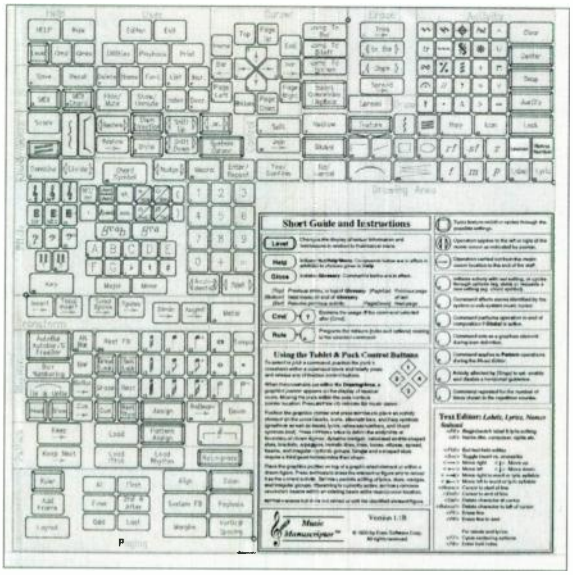
Music Manuscriptor 2.0 ($750), from Erato Software, is an engraver-quality, music-notation program for MS-DOS computers that features a unique user interface. The program uses a digitizer tablet (not included) with a command overlay for data entry. The overlay is organized into command groups such as Help, Cursor, Pitch, Rhythm, Chord, Transform, and more, eliminating the need for nested menus.

Music can be entered in several ways. Step-time MIDI input is supported, with chord recognition; you can either use the tablet to assign pitches to a performed rhythm, or play in MIDI notes and apply a rhythm. Bars can be placed automatically. Although the current version does not support real-time MIDI entry, Standard MIDI Files can be imported, with quantization and interpretation of articulation and phrasing. Editing can be in Insert, Overstrike, or Replace mode. You place the elements with a graphics pointer and the tablet's 4-button mouse.

Twenty clefs are available, including 1-line and 5-line percussion staves. There are thirty key signatures. Time-signature numerators can go up to 255, and denominators range from 1 to 128. Complex (alternating) meters can have up to six elements. The program offers common-time and cut-time symbols and above-staff placement. Symbols include regular and grace notes with optional noteheads and stems, measure repeats, multiple-measure rests, and much more. Beams include cross-staff, broken secondaries, and nested grace-note beams. A huge number of dynamics marks is provided. The program also supports chord symbols, rehearsal numbers, and tempo marks.

Up to 100 named staves are permitted per system (grand staff). Transpositions can be performed on a single staff, or an entire passage. Key transpositions change the key signature and affect notes, chord symbols, articulation marks, etc.

The program includes a text editor for entering labels and lyrics. Lyrics can be also be entered from a word-processing file. They are placed in a "flow" mode, or individually by word and syllable, and aligned on a user-definable, horizontal guideline. Hyphens between syllables and an underscore extension at the end of words can be applied.



A separate WYSIWYG Layout Editor provides detailed page-layout specs, which can be saved as a style sheet. The music-symbol font comes in five printer sizes and three video sizes. There are 53 text fonts, which have been enhanced to support accidentals, jazz symbols, and several European languages.

Scores can be played back on up to 64 MIDI channels, with interpretation of slurs, articulation marks, etc. MIDI Program Changes and tempo changes can be attached to text labels and sent during playback. Dynamics are controlled via MIDI Velocity and Volume.

Music Manuscriptor produces 300 dpi and 600 dpi output on printers that support the Hewlett-Packard PCL 4 and 5 control language. An anti-aliasing feature reduces "jaggies" on low-resolution printers. The program handles portrait and landscape orientation and a variety of paper sizes up to 11 × 17.

An 80286 or better PC with a math coprocessor, 640 KB of on-board RAM, 4 MB of extended memory, SVGA video, a digitizer tablet, and an MPU-401-compatible interface are required. Erato Software Corp.; tel. (801) 328-0500; fax (801) 487-9254.

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SOUNDSCAPE

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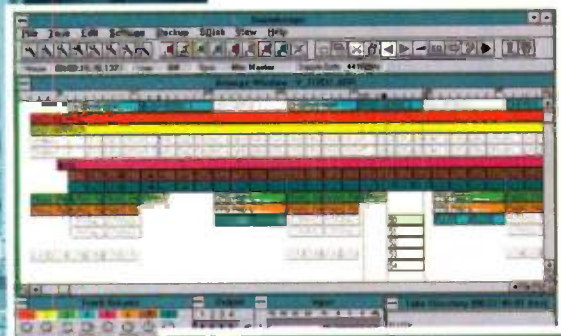
MULTI-TRACK HARD DISK RECORDER

The Soundscape SSHDR-1 is a high quality 16 bit digital audio recording and editing system, and is capable of expanding your studio with 8/16/24 or up to 128 tracks. The system can be used in a recording/composing environment and has extensive non-destructive audio editing facilities.



Operation is from an IBM PC™ or compatible and runs under Windows 3.1™. Software allows up to 64 virtual tracks to be recorded in stereo, edited (non-destructive) and digitally mixed down to four outputs. As the system is modular, several Soundscape units can be synchronised with full sample rate accuracy and used together giving up to a maximum of 32 inputs and 64 outputs.

If you are looking for a Hard Disk recorder/editor with "Open" architecture that can be totally integrated with any Windows™ sequencer or editing package, is random access to the disk, expandable beyond 8 tracks and offers full "chase lock" synchronisation to analog/video or digital tape machines then the next stage of the digital revolution starts here.

2U 19" rackmounted unit.

Physical tracks: 8

Sampling rate: 22.050/32.0000/44.056/ 44.100/47.952/48.000KHz

Data format: 16 bit linear

Signal processing: 24-bit internal

Data storage: IDE hard disk , fitted in the rack unit (not supplied), size depends upon recording time required, e.g. 250MB gives 47min 14sec total @ 44.1KHz, 1GB gives 3 hrs 9 min

2nd internal IDE drive can be fitted giving upwards of 3.4GB allowing 10hrs 42min recording time.

A/D conversion: 16 bit sigma-delta 64 x oversampled

D/A conversion: 18 bit sigma-delta 64 x oversampled

Synchronisation: Master or Slave, MTC with full chase lock, MIDI song pos.pointer + clock

Analog in: 2 x RCA/cinch, unbalanced – 10dBv/+4dBv (2 tracks in)

Analog out: 4 x RCA/cinch, unbalanced + 4dBv (4 tracks out)

Digital in: 1 x RCA/cinch, S/PDIF format (2 tracks in)

Digital out: 2 x RCA/cinch, S/PDIF format (4 tracks out)

Input S/N Ratio: > 93dB un-weighted

Output S/N Ratio: > 113dB un-weighted

Wow and Flutter: Un-measurable

Pro-Audio Option: XLR balanced Analog inputs and outputs, AES/EBU Digital inputs and outputs (XLR)

Host Interface: IBM-AT: parallel via PC expansion plug-in card (ISA). Supports 2 x 4 track rack units.

MIDI: in, thru, out

Back-up medium: DAT-recorder with digital i/o, or via the PC (e.g. to a SCSI optical drive or any logical PC drive)

SOUNDSCAPE DIGITAL TECHNOLOGY

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PRO FILE

Boingo Sing-Along

Danny Elfman composes by croon, not computer.

By Ellen Snell Adams

Too many electronic musicians, pen and paper are passé. Therefore, it's no surprise that Danny Elfman, a Grammy Award-winning film composer and leader of the rock band Boingo, doesn't use these archaic writing tools. The twist is that for all the high-tech tools at his disposal, Elfman prefers a decidedly low-tech approach to composing: He sings his arrangements into a cassette recorder, composing by feel.

"Between starting Boingo and getting into film composing, I almost forgot how to write music," says Elfman. "There's never a reason to write down anything in a rock band. How do you notate a feel for a song? My songwriting process involves playing an instrument until I find something I like, then singing the parts into a tape recorder. For the past fifteen years, my tiny cassette player has been my main songwriting tool."

Elfman's simple technique for documenting musical ideas is surprising, considering that Boingo's music is more complex than typical pop fare. Boingo's eclectic sound is a multilayered, polyrhythmic stew, with impish horns and tsunami-like swells. A fair amount of sequencing is usually required to flesh out the dense arrangements. However, for the band's tenth album, *Boingo,* Elfman's organic work method was complemented by a more visceral, live approach to recording.

"It was the first time that the band's jam sessions in the studio actually wound up on an album," reveals Steve Bartek, Boingo's lead guitarist. "With this record, we finally escaped from MIDI hell."

Bartek usually transcribes Elfman's "sing-along" tapes into chord charts and musical notation, but on *Boingo,* the arrangement-by-voice method made it to the album sessions. The casual documentation produced a few interesting moments, such as when Maxine and Julia Waters were brought in to sing background vocals on the song "Pedestrian Wolves."

"They had no idea what they were getting into," laughs Elfman. "They thought they were just coming in to do a few vocal parts, and here's this 12-minute musical improvisation. Nothing was written out, and the background vocal track we wanted almost never repeats the same melody line. It almost killed them."

Elfman and Boingo bassist John Avila roughed out the vocal parts for "Pedestrian Wolves" by singing the parts on the multitrack master. The sisters had to listen to the song one line at a time to learn their parts.

"Fortunately, they're amazingly talented," says Elfman. "There aren't many incredible 'ear' musicians out there, who can listen to something, hear the line in their heads, sing it, then sing it again for the tape."

Although Elfman has a well-equipped home studio—complete with a Sony JH24 24-track recorder, a Mac II running MOTU's *Performer,* an E-mu E-IIIxp, and a Roland SP-700—he is not a slave to technology. At one point, the band was so frustrated with the quick obsolescence of a certain sampler that it put a $1,000 limit on new equipment purchases. That suited Elfman just fine. As long as his tiny tape recorder had batteries and a fresh cassette, he was in business.

Ellen Snell Adams *is a freelance journalist based in Austin, Texas.*

Danny Elfman (foreground) and Boingo.

When it comes to making music, two brains are better than one.

The first brain belongs to Greg Phillinganes: keyboardist, songwriter and producer. Seen and heard with some of the most influential names in music, from Stevie Wonder to Eric Clapton.

The second is that of the Korg i3 keyboard, the world's first Interactive Music Workstation™.

Beyond its trademark Korg sounds and full-strength sequencing power, the Korg i3 has the intelligence to accompany and interact, offering some provocative musical thought of its own.

As Greg himself has been heard to say, "It's the best idea-generating tool out there."

Judging by the music they make together, the Korg i3 thinks rather highly of Greg, too.

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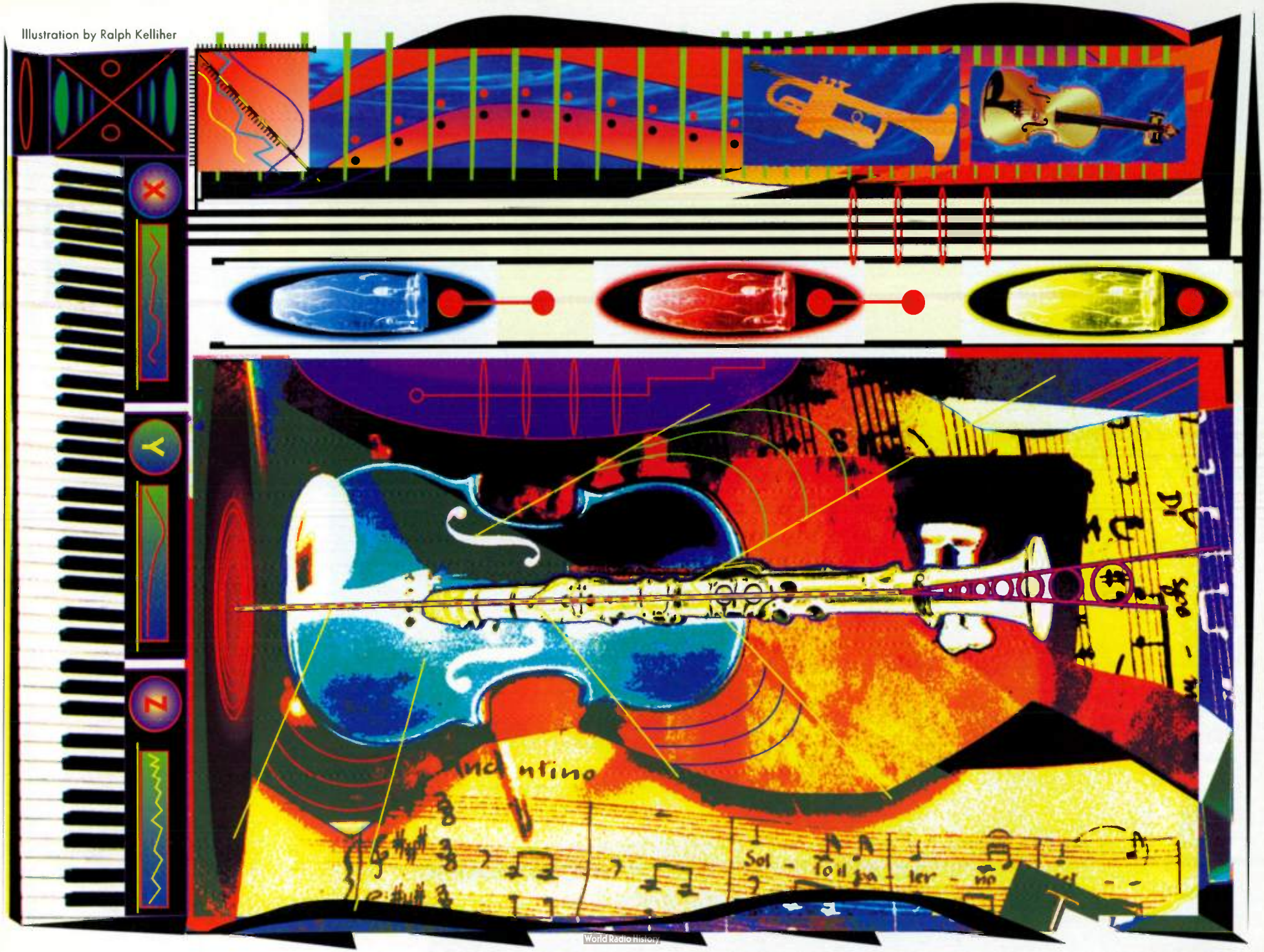
Illustration by Ralph Kelliher



Morphology

Secrets of the E-mu Morpheus.

By Clark Salisbury

How many times have you heard someone complain that a new synthesizer is just a rehash of the previous model? For several years, it has been tough to find something really different, especially in the world of sample-playback synths.

Times have changed for the better, though. Several synth manufacturers have responded to musicians' demands by developing groundbreaking technologies that create fresh sounds. Some of the freshest emanate from E-mu's remarkable Morpheus Z-Plane Synthesizer.

VIVA LA DIFFERENCE

Many programming functions in the Morpheus will be familiar to Proteus users. In fact, Morpheus owners can apply many of the programming tips offered in Charles R. Fischer's "The Art and Craft of Using E-mu's Proteus" (March 1990 **EM**). But the Morpheus is far from being just a fancy Proteus. It's a unique device with features that are bound to leave new users scratching their heads. The biggest potential for confusion springs from the same component that provides the E-mu Morpheus with its unusual sounds and capabilities: the morphing filters.

The Morpheus sends sampled waveforms through a series of multiband filters that are far more complex than the filters found in the average

synthesizer. But its real power is its ability to perform smooth, continuous transitions between different sets of filter parameter values, a process called *morphing*. The synth's architecture is described in Larry the O's Morpheus review (May 1994 **EM**) and, of course, in the unit's manual. I'll refresh your memory on a few filter fundamentals, then focus on ways to take advantage of the unit's unique timbral talents.

EXPLORING THE LABYRINTH

It's not hard to understand why newcomers to the Morpheus can become confused. To start with, each factory-programmed Morpheus "filter" is really a complex device constructed of several simpler, more familiar filters, such as lowpass, highpass, bandpass, and band-reject. For example, one typical filter construction contains a standard lowpass filter with adjustable cutoff frequency and "Q" (or resonance), in addition to seven parametric filters, each with adjustable center frequency, bandwidth, and gain.

Each of the Morpheus' 197 filters can

A GIFT OF THE GODS

Morpheus was the ancient Greek god of dreams. Here's a new patch to play with as you investigate the fantastic dream world of the Morpheus synthesizer. This preset morphs a single wave between a good electric piano and harmonica sound. Note that the patch does not use a secondary Instrument.

Program #125: E Pno>Harp

INSTRUMENT	pri: I111 Wind Cyc 4
VOLUME	pri:127
PAN	pri: +0
KEY RANGE	C-2 -> G8
KEY RANGE	pri: C-2 -> G8
TRANSPOSE	pri: +00
PITCH TUNE (coarse)	pri: +00
PITCH TUNE (fine)	pri: +00
ALT VOL ENVELOPE	pri: On

P:	A	H	D	S	R
	00	00	66	00	10
S:	n/a				

DOUBLE + DETUNE	pri: 5
SOUND DELAY	pri: 000
SOUND START	pri: 111
SOUND REVERSE	pri: Off
NONTRANSPOSE	pri: Off
LOOP ENABLE	pri: On
LOOP OFFSET	StartP: +000,000
	SizeP: +000,000
SOLO MODE	pri: Off
SOLO PRIORITY	pri: n/a
PORTAMENTO RATE	pri: Off
PORTAMENTO SHAPE	pri: n/a
PORTAMENTO MODE	pri: n/a
XFADE MODE	pri: Off
XFADE DIRECTION	pri:
XFADE	BAL: n/a; AMT: n/a
XSWITCH POINT	n/a
FILTER TYPE	pri: F083 WA WA.4
FILTER LEVEL	pri: 220
MORPH OFFSET	pri: 200
FILT FREQ TRACK	pri: 255
FILT TRANSFORM 2	pri: n/a
FILTER REVERSE	pri: Off
AUX ENV	AMT: n/a; DLY: n/a
	A: n/a

LFO1	SHAPE: SINE	AMT: +000	
LFO1	RT: 007	DLY: 000	VAR: 000
LFO2	SHAPE: n/a	AMT: n/a	
LFO2	RT: n/a	DLY: n/a	VAR: n/a

FUNC GEN: parameters n/a

NOTE-ON CTRL	MOD SOURCE	DESTINATION	VALUE
#0	Vel	Volume	+064
#1	Vel	Morph	+127
#2	CtlA	Attack	+008
#3	CtlA	Release	-006
#4	CtlA	Decay	+127
#5	Key	Off	+064
#6	Key	Off	+064
#7	Key	Off	+064
#8	Key	Off	+064
#9	Key	Off	+064

REALTIME CTRL	MOD SOURCE	DESTINATION	VALUE
#0	PWhl	Pitch	+127
#1	CtlA	Morph	-128
#2	Lfo1	Morph	+080
#3	MPr	Lfo1Amt	+127 *
#4	Lfo1	Volume	-026
#5	CtlA	Lfo1Rt	+068
#6	CtlA	Lfo1Amt	-006
#7	PWhl	Off	+064
#8	PWhl	Off	+064
#9	PWhl	Off	+064

FOOTSWITCH CTRL	user preference
PITCH BEND RANGE	user preference
PRESSURE AMOUNT	user preference (max range at +127)
CONTROLLER AMT	A +127; B n/a; C n/a; D n/a
VELOCITY CURVE	user preference
KEYBOARD CENTER	C3
KEYBOARD TUNING	user preference
MIX SELECT	user preference

*This assigns Channel Pressure to control LFO 1 amount. If your keyboard supports Poly Pressure, change this source from MPr to PPr.

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SOFTWARE

Now get it together so you can use it.

Ergonomical — a cool way of saying you can see everything, you can touch everything and you don't have to contort yourself to do it.

No more crossed wires, tangled cables, or cords to trip on. In the back, you'll find a cord management system and a 15 outlet power strip.

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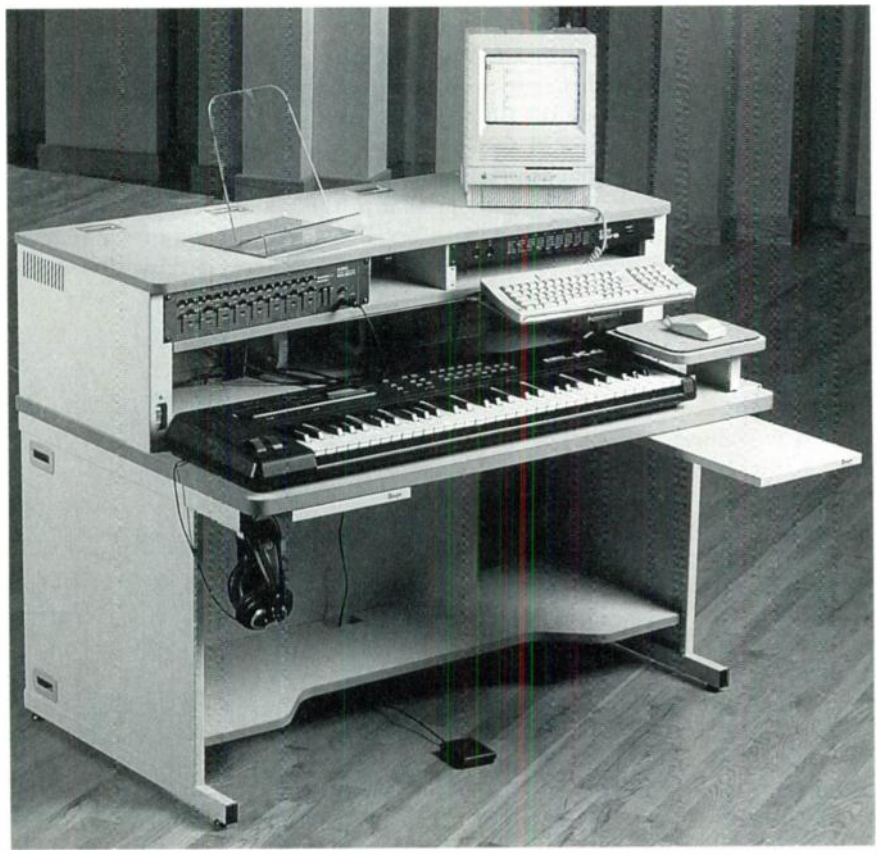

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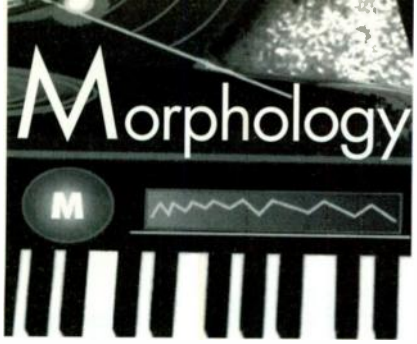

be modulated to create thousands or millions of variations, and all filter parameters can be placed under expressive control. Does this mean it's impossible to get a handle on the Morpheus filters? Not if you know how to approach them.

Of course, any number of sounds can be stumbled across simply by selecting a Morpheus preset, entering edit mode, and scrolling through the filters to see what you come up with. However, a more systematic approach requires that you familiarize yourself with the Morpheus filters.

GETTING FRAMED

Although the Morpheus filters are not user-definable, they may be a little easier to understand from the filter designer's viewpoint. Suppose you are designing a filter for the Morpheus; a simple, lowpass filter with resonance, for example. Let's assume you want to be able to sweep the cutoff frequency of the filter from 20 Hz to 20 kHz.

The Morpheus lets you "sweep" the entire set of a filter's parameter values through 256 steps along a filter *axis*. Fortunately, you don't have to design a filter response for each of these 256 steps; you can simply design the response at the first and last steps, and let the Morpheus interpolate the intermediate steps. These initial and final parameter values (i.e., the steps at either end of a filter axis) are called *Frames*.

In this example, you would set up a lowpass filter with a cutoff of 20 Hz at one end of the filter axis (Frame 1) and a cutoff of 20 kHz at the other end (Frame 2). The Morpheus then uses the filter parameter values in Frames 1 and 2 to calculate the filter response at any point along the axis. Generically, this axis is called the X axis; in the Morpheus, it's called *Frequency Track*.

Now, let's say you want to add another variable to the filter: an adjustable Q, or resonance amount. You can do this by adding two more Frames, numbered 3 and 4. In Frames 1 and 2, you designed a lowpass filter with a cutoff range from 20 Hz to 20 kHz. Set the Q fairly low in both Frames. In Frame 3, set up the filter with a cutoff of 20 Hz, but with a high Q setting. In Frame 4, set the cutoff point to 20 kHz, also with a high Q setting. Now, you can increase the filter Q by moving the filter Offset point away from Frames 1 and 2, and toward Frames 3 and 4. This corresponds to movement along the Y (or *Morph*) axis (see **Fig. 1**).

Cutoff can still be controlled by moving the filter along the Frequency Track axis between Frames 1 and 3 and Frames 2 and 4. In fact, both axes can be controlled simultaneously. This construct is known as a *Square*, or 4-frame, filter.

Here's where the real fun begins. You can also create a 3-dimensional, 8-Frame *Cube* filter by adding four more Frames to the Square filter. The new axis is called the Z (or *Transform 2*) axis, which has its own Offset control for moving the filter from one end to the other.

If that's not enough filter complexity for you, remember that in this filter, we could also have seven sets of parameters being pushed along the three filter axes, in addition to our simple, lowpass filter. Alternatively, we could have a 14-band, "all-pole" filter, which includes fourteen frequency-sweepable bands, of variable gain (no cut); a 14-band, "pole/zero" filter, which includes fourteen *pairs* of sweepable bands, with one band providing gain and the other band providing cut in each pair; or a variety of other exotic hybrid filters that have been created by the Morpheus filter developers.

In a 4-Frame model, the overall response of the filter is determined by the combination of Offsets for two axes: Frequency Track and Morph. (The Transform 2 axis has no effect in a 4-Frame filter.) There are 65,536 (256^2) possible filter responses in a 4-Frame model. Add a third axis, and you have a staggering 16,777,216 (256^3) possible filter responses!

Fortunately, you can put the filter axes under MIDI control and vary them with Velocity, mod wheels, and the like. There are limitations to this, of course, the most noteworthy being that only the Y axis—Morph—can be modulated in real time.

How do you know if a filter uses four

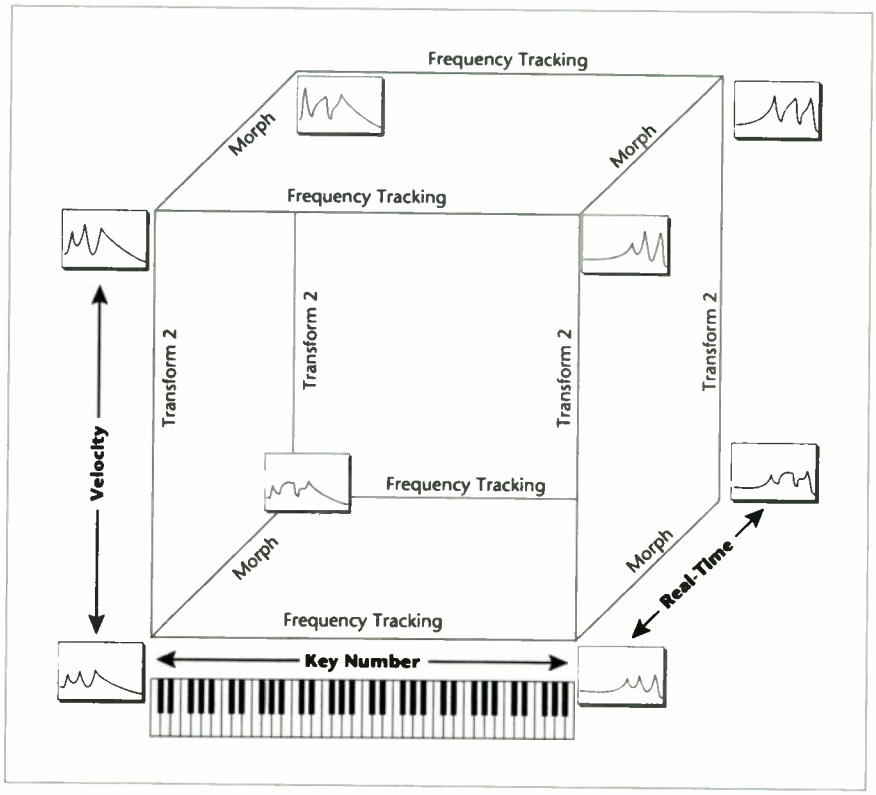

FIG. 1: Cube, or 8-Frame, Morpheus filters can be modulated along three axes: Frequency Tracking (X), Morph (Y), and Transform 2 (Z). Square, or 4-Frame, filters permit modulation only on the X and Y axes. (Courtesy of E-mu Systems.)

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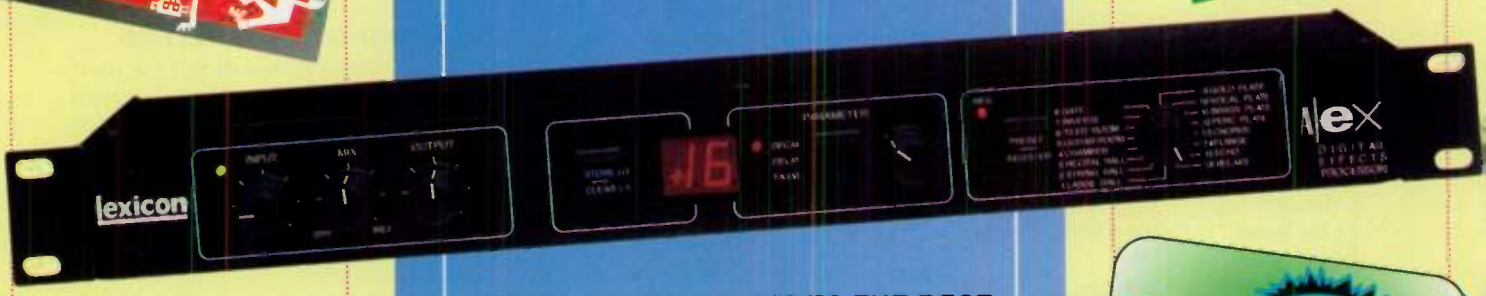

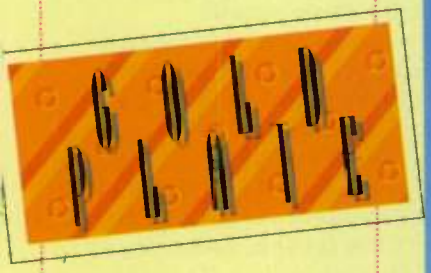

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or eight Frames? Simply look at the name of the filter on the front-panel display. If ".4" appears at the end of the name, it's a 4-Frame filter; otherwise, it's an 8-Frame filter. You will also find detailed descriptions of the filters on pp. 174-210 of the Morpheus manual, including the effect of modulation along the three axes.

As mentioned earlier, you can select any point along any axis with the appropriate Offset parameter. You can also select a point with a wide variety of MIDI controllers (e.g., Modulation, Velocity, note number, etc.), which are assigned as Note-On Ctrls or (for the Morph axis only) Realtime Ctrls. When you assign a controller to the filter axes in the Note-On Ctrl section, the Morpheus reads the position of the controller and calculates the filter response at the time you initiate a note. It ignores subsequent controller moves while the note is sounding. This provides some interesting possibilities, which we'll explore shortly. The Morph axis can also be controlled in real time by MIDI controllers assigned in the Realtime Ctrls section.

STARTING WITH VANILLA

Although the filters can be simultaneously altered along two or three axes, it makes sense to experiment with one axis at a time. The best way to do this is to create a plain-vanilla starter program, so you know which controllers affect each filter axis and when.

Start by selecting a simple sound. A sound with a steady, organ-like sustain is a good choice, as you won't have to retrigger a note every time you want to hear a change along the Morph axis. Make sure the preset uses only one Instrument, so you don't become confused about what you hear. You can turn off the secondary instrument by pressing the Preset button, scrolling to the Instrument Sec page, and setting the instrument to 1000 None.

To get the clearest picture of what each filter does, be certain you are only modulating the filter parameters. Check the Note-On Ctrl and Realtime Ctrl pages, and turn off any modulators you find. Modulators can be turned off by either zeroing out the amount of modulation or setting the modulation destination to Off.

ASSIGNING CONTROLLERS

The Morpheus responds to four user-definable MIDI controllers, assigned within a Preset as controllers A, B, C, and D. With the factory default settings, they respond to MIDI Control Change numbers 1 (Modulation), 2 (Breath Controller), 3 (Undefined), and 4 (Foot Controller), respectively. However, these assignments can be overridden in the Master section.

Define a specific controller for each of the three possible filter axes: Filt Freq Track (the X axis), Morph (the Y axis), and Transform 2 (the Z axis). Because the Morph axis is the only one that can be modulated in real time, assign a controller to it through the Realtime Ctrls section, rather than the Note-On Ctrls section. The other two filter axes can be controlled only through the Note-On Ctrls section, which I'll discuss later.

To assign a controller to a filter axis, select a controller (e.g., Pressure), assign it to a destination (such as Morph), and give it a modulation amount. Start with a value of +127 to sweep the filter axis by the maximum amount, so you can clearly hear the effect. If you use

E-mu's Morpheus Z-Plane Synthesizer is the first commercial instrument that can create complex, dynamic filters using morphing, in which modulators produce a smooth, continuous transition between different sets of filter parameter values.

Pressure, check the Pressure Amount page in the Preset menu. If it's set to less than +127, the entire range of Pressure modulation won't be available.

If your master keyboard has sliders that can send a user-defined Control Change message, try dedicating a separate slider to each of the three filter axes. This also is a great application for a MIDI fader box or the virtual faders in a sequencer. Alternatively, try using Pressure to control the Morph axis through the Realtime Ctrls, the mod wheel (CtlA) to control the FrqTrk axis in the Note-On Ctrls, and a footpedal—MIDI Control Change 4, assigned by default to CtlD—to control the Transform 2 axis in the Note-On Ctrls. Don't despair if you lack enough MIDI controllers; you can vary the Offset parameters for each of the axes directly from the Morpheus front panel to get an idea of what they do.

CONTROLLERS OF NOTE

Note-On Ctrls present extraordinary possibilities. For example, you can simulate hitting a drum or cymbal in different areas using the mod wheel to control the filter response from the Note-On Ctrls. Once you play the cymbal sound, moving the mod wheel has no effect on the sound until you play it again. After you reposition the wheel, the next strike sounds different.

Try using a footpedal to control envelope release time. (Assign CtlD to Release in the Note-On Ctrls.) Simply push the pedal forward, play a chord, then pull it back. As the initial chord is decaying, you could play a lead line of staccato, clipped notes.

Consider using Velocity and Key Number to control envelope attack, decay, and release times, as well as sample start time. Even the simplest sounds become much more expressive when you put these parameters under performance control.

Keep in mind that if you are using a Realtime controller, such as the mod wheel, to control one of the filter axes through the Note-On Ctrl section, you must position the controller before playing a note.

FILTER BLEND

Once you've set up the modulators for your "vanilla" patch, move to the filter pages. Set Filter Level to 255 (full value) and set Morph Offset, Filt Freq Track, and Filt Transform 2 to a value of 000.

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Next, select an Instrument. Something with a lot of harmonic content is desirable, as different filters are designed to affect different frequency ranges. A sawtooth or square wave can be a good start, as you are probably familiar with their unfiltered sounds, but other waves work well, too.

Scroll back to the Filter Type Pri page and select a filter for experimentation. The first thing to do is test the effect of changing the Morph Offset, so either move the controller you have assigned to drive the Morph axis, or simply change the Morph Offset manually from the front panel, and listen to the results.

The Morph Offset parameter was designed to produce the greatest range of effects in a given filter, but this is not always the case. Sometimes, other filter axes can provide more sonic shred than the Morph axis, depending on what waveform is being filtered. Don't conclude that something's wrong if you vary the Morph parameter and not much happens. The filter designers have taken a measure of latitude in determining what each of the three axes in a filter might do. For example, while the Filt Freq Track parameter can typically be used to tune the filter, this isn't true in every case.

The only way to determine what each axis does is to try them out. After you've spent some time working with the Morph Offset, change the setting for Filt Freq Track, then try varying Morph Offset again. As you'll discover, these two parameters are interrelated. The effect of changing the Morph Offset may be markedly different depending on what Filt Freq Track is set to, and vice-versa.

Once you've begun to grasp some of the effects available by changing these two parameters, move to the Transform 2 parameter, change it, and repeat your experiments with the Morph Offset and Filt Freq Track parameters. (Of course, this assumes that you are working with an 8-Frame filter.) You've now added the third (and final) filter variable, and you'll find that changing any axis or combination of axes can affect the others. In fact, it's possible for settings on one axis to negate the effect of changes to other axes. Consider this possibility if you change a setting and get no audible results.

Another major point is that the filters can differ radically from one another. Don't take anything for granted; if you run across a filter that seems to have little effect, or even mutes the sound altogether, try different combinations of the Morph, Filt Freq Track, and (where applicable) Transform 2 Offsets. In addition, all filters don't work equally well with every ROM waveform. A filter designed to pass only high frequencies may not be the best choice when working with bass waves, for example.

TRACKLESS WILDERNESS

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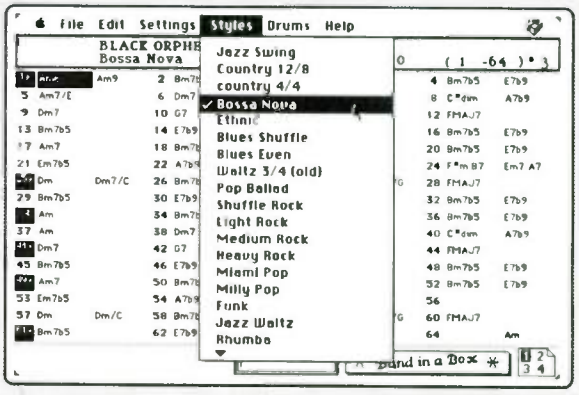

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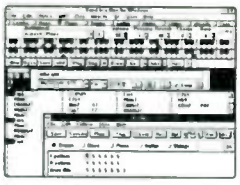

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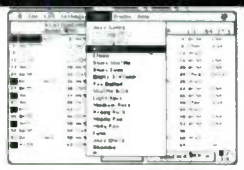

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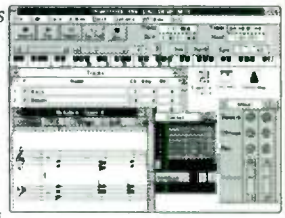

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resonances, or *formants*, which don't normally change when you play different notes. In fact, this is one of the major difficulties in creating convincing acoustic-instrument sounds in samplers and traditional sample-playback instruments: As the sample is pitch-shifted, so are the formants. Therefore, some filters are not designed to track the keyboard (i.e., the settings aren't necessarily modulated as a function of MIDI note number).

In the Morpheus, one of the main ideas is to let you combine the resonant characteristics of one type of sound with those of another. For example, by using the appropriate combination of filter and waveform ROM, you can check out what a flute might sound like if you could play it through the body of a guitar.

▼ The Morph Offset and Filt Freq Track parameters are interrelated.

You might think this wouldn't work, because a filter only subtracts harmonics from a sound. But a number of the Morpheus filters have been designed with enough gain at specific frequencies that they appear to add overtones to a wave by amplifying subtle harmonics (and noise) that would otherwise be imperceptible.

This blade can swing both ways, though. When using highly resonant filters of this type, it's possible to create uneven responses across a sound's range. If you're having trouble taming "peaky" spots in a sound, check out the setting for the various filter offsets. Pay particular attention to the Transform 2 offset, which is often used to control filter resonance.

If problems do arise, they are often in a specific area. If a sound becomes completely unmanageable, try lowering the value for Filter Level. This controls the level of sound into the filter. For example, if you're having a problem with distortion, lowering the Filter Level will almost certainly correct it. You can even put this parameter under the control of Velocity or key position (MIDI note number).

However, avoid using the Filter Level parameter to control the overall volume of the instrument you're working with. It's usually better to use the Volume parameter for this. You'll generally get the best performance out of the filters with the Filter Level set as high as possible.

Of course, many of the Morpheus filters *do* track the keyboard. If you want to use key position to control filter tracking or one of the other filter axes, don't forget to adjust the Keyboard Center parameter. In my experience, the greatest tracking range is obtained by setting Keyboard Center to a value that corresponds to the lowest note a sound is designed to play (for example, C1 on a 5-octave keyboard). If you have problems getting a filter to track the keyboard to your satisfaction, try assigning key position to control the Morph or Transform 2 Offsets, rather than (or even in addition to) the Frequency Tracking Offset.

THE PAYOFF

The Morpheus provides a wonderful new set of tools for shaping sounds, many of which are found in no other device (except E-mu's new UltraProteus). I've concentrated primarily on the filters, because they are at the heart of the Morpheus' unique sound and present the greatest potential for confusion. But many additional rewards await the persistent explorer.

It's easy to get lost in a sonic labyrinth when learning to use the Morpheus, and patience is a vital virtue. Getting a handle on any technology this new and different requires an investment of time and brain cells. But there's no other instrument like the Morpheus, and the return on your investment can be tremendous.

Clark Salisbury *works with Music & Sound Associates, a company that specializes in sound design, sequencing, consultation, and technical writing. He designed several of the Morpheus filters.*

"The ultimate choice!" *Electronic Musician* 12/93
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WHAT DO

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Malcolm X, *The Chicago Symphony,* **Frank Zappa,**
The Tonight Show, Sesame Street Songbook,
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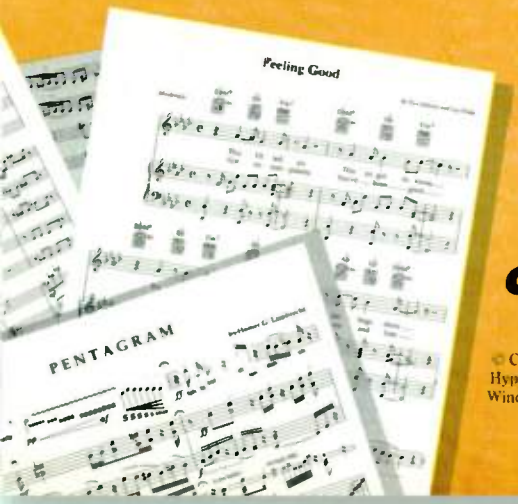

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the Handwriting on the Wall

By Michael Brown

"Let me tell ya, sonny," wheezed the crotchety geezer as he rocked back in his chair, "You kids have it too easy. Back in the '70s, you couldn't just walk into a store and buy a computer. You had to build 'em yourself. When we needed tools, we programmed or built 'em ourselves. Hell's fire, as long as you could program and wield a solderin' iron, there wasn't nothin' gonna go obsolete on you. But not your generation, no siree Bob. You don't wanna get your hands dirty. You expect somebody else to do it all. And look what's happened! The handwritin's on the wall. What if you end up with an orphan on your hands?"

Orphan. The expression strikes terror in the hearts of power users. Orphan means the computer platform at the center of your studio

Illustration by Dave Ember

has hit a technological dead-end. Orphan means that while your compatriots and competitors using other platforms enjoy the benefits of advancing technology, you're stranded in a backwater. Orphan means you'll have to replace not only your computer but all your software, just to keep up with the times.

Amiga and Atari users face an uncertain future.

Few of us really pine for the days when people had to build their own computers and program their own applications. Given the choice between creating music and sweating over a circuit board, few would choose the latter. But depending on someone else to do that work has its price, as evidenced by the wavering fortunes of Amiga and Atari users.

"SOUNDS A BIT MUFFLED, PETE"

Judging by the staggering response to this course so far, it would seem that the world has been waiting for this product, so we thought maybe you'd all appreciate more information.

Created by Dave Moulton—formerly Head of Music Production & Engineering at Berklee College of Music—the GOLDEN EARS Audio Eartraining Course is the ultimate learning tool for the recording musician and engineer. The lessons it contains represent twenty years of Dave's extensive studio and teaching experience.

As you work your way through the hundreds of exercises, you'll find yourself hearing recordings (and not just your own) in a completely new light. The intention of the course is to teach you how to understand and interpret the frequency spectrum and processing that you hear everyday.

Why bother? You ask.

Well, where the musician with perfect pitch can say "That note is an E-flat," you will be able to say, "The treble is boosted by 3 dB at 2.5 kHz." Which then means you know where to go when you reach for the EQ.

One hell of a skill.

A pro has golden ears as a result of years of ears-on training and experience. These four CDs and manual condense those years and that knowledge into a single, user-friendly, home-tuition course that you can run through at your own speed.

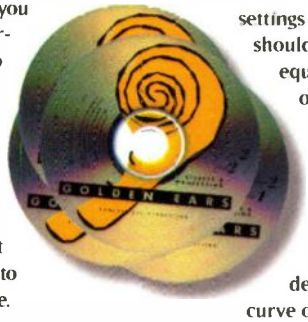
In essence, the Golden Ears course gives you the skills that enable you to 'tune' your recording set-up—to really start thinking of it as a musical instrument in its own right, over which you have real control.

The A/B drills. Each A/B drill set consists of five examples. Each example is a pair of recorded excerpts of music. The first recording (A) is the "reference" and the second (B) is a clone of the first with an applied amount of anonymous signal processing or audio anomaly added. Your task is to identify the signal processing applied to the B recording.

To assist you, we have limited the number of possibilities to a menu of 31 possible signal processing changes, grouped into six families: amplitude change, distortion, compression, equalization, stereophony, and time-delay/ reverberation.

To get ahead in this craft you have to know what your hearing. You really don't want to be the one to explain that you didn't notice that the reverb return on the right channel dropped out in the middle of the third song and that you went ahead and OK'd it for a production run of 5,000 CDs.

Hearing Amplitude. The ability to hear a signal as being louder or softer seems obvious, but given that the louder sound usually seems to sound better, it is essential to know when loudness is the only difference between two signals. So, not only do we train you to hear these differences, but we've also included gradual changes in level, where the B version starts out identically to the A version, but gradually changes level during the example. You just have to try these tests to see how effective they are.



Hearing distortion. You will learn to recognize THD (Total Harmonic Distortion) in recorded music, in the 10-30% range (pretty gross) and in the 1-10% range (mild). You will probably be surprised to find out that perception of distortion is significantly affected by the music being played...

Hearing compression. We'll teach you to recognize the effect of compression on a variety of different signals, and to identify fast and slow compressor release times.

Hearing equalization. Golden Ears will teach you to recognize equalization problems, on either or both channels. This is closely related to the spectrum analysis drills you'll have been doing earlier in the CD course. We only apply musically relevant equalization and all the details of the individual settings are given in the supplied answer sheets.

Hearing the stereo field. You will learn to recognize anomalies in the stereo image consistently (reverse image, mono summation, polarity reversal, and pseudo-stereo).

Hearing time domain. You will learn to recognize channel-to-channel time differences over the 1—50 ms. range, and to recognize gated and ungated reverb.

So how good can you get? Well, we want to see you able to hear and identify complete equalization settings by ear. That's right, you should be able to listen to an equalizer switched in and out on a recording and describe how the equalizer is set, in terms of frequencies and the amount of boost or cut, by ear alone!

You should be able to describe the response curve of any given system, as well as the amount of delay on a time-delay line, and the settings on a compressor or noise gate.

All you really need is a CD player and moderately decent speakers or headphones.

As your experience develops, your confidence in recording, mixing, production, and listening sessions will go way up. That's because you can not only hear, but also describe what you hear in physical quantities, saying "the toms are boosted 6 dB at 250 Hertz" instead of "the toms sound tubby," or "the vocal is down 3 dB at 500 Hertz," instead of "I think the vocal sounds thin"

The ability to articulate audio issues effectively is priceless in our field. The clumsy conversation that takes place among musicians, engineers, and producers, such as "Can you like, make the guitar a little fluffier, y'know what I mean?" seriously interferes with their creative efforts.

So, you've got this far. No doubt you've invested a great deal of time and money in your music. Don't let your ears be the weakest link in the audio chain. Clean them out, get them down the audio gym, and lick 'em into some sort of shape. Your music will benefit from the experience.

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The Handwriting on the Wall

THREE ORPHANS

Orphans can be divided into three different categories. An "orphan by design" is created when a manufacturer officially decides to discontinue one model in favor of another. For example, Apple orphaned the Apple II in favor of the Macintosh. These are generally the least painful orphan experiences, because you can see them coming from a long way off. Also, you have much to gain by migrating to the other platform.

An "orphan by default" is created when a company changes direction and focuses its efforts on a different type of product. Atari begs to differ, but this seems to be the case with the Falcon030. The 16 MHz Motorola 68030 at the heart of the Falcon has been eclipsed by the faster 68040 and 68060 (not to mention the PowerPC). Atari says they're still producing, selling, and supporting the Falcon, as well as committing R&D resources to it, but they are concentrating all of their marketing efforts on their Jaguar game machine.

An "orphan by demise" comes about when the manufacturer goes belly-up. Orphans by demise are the most tragic form, because there may be little warning and little hope that owners will get any further support. Such is the case with the Amiga. Its manufacturer, Commodore Business Machines, announced in April 1994 that it would cease operations and liquidate its assets. Barring the emergence of a white knight, the Amiga is history.

NO VISIBLE MEANS OF SUPPORT

"The Falcon030 is currently in production and supported by Atari," says Director of Atari Music James Grunke. Falcon users can take comfort in that statement, but should musicians in the market for a new computer consider buying one powered by a Motorola 68030 running at 16 MHz, even if it includes a built-in Motorola DSP56001?

Imagine the reaction if IBM announced that they planned to sell only machines based on the slowest version of the Intel 80486, while the rest of the PC-compatible industry moved on to the Intel Pentium. What if Apple decided to only sell computers equipped with the 68030 and '040, despite the fact that the more robust PowerPC and 68060 chips were readily available?

Yes, the Falcon has powerful built-in DSP. Yes, two of the major players in the music-software market, EMAGIC and Steinberg, have pledged to support and develop new products for the Falcon. Yes, third-party hardware manufacturer Wizztronics has announced a new 68040-based accelerator (the Barracuda040), a rack-mount chassis, and several other exciting new tools for the Falcon. However, the question remains: Will *Atari* continue to develop the Falcon?

"We haven't made any public announcement about future development plans for the Falcon, and we probably won't until we have something firm to say," says Grunke. "Our marketing efforts are definitely focused on our 64-bit Jaguar game machine."

Many of the companies that produce software and add-on products for the Falcon are committed to the platform and its users. However, it should come as no surprise that they are less enthusiastic about Atari's *laissez faire* attitude toward developing and marketing the computer.

"They've missed the boat," says Mikail Graham, EMAGIC's chief operating officer. "They haven't gone forward, and now they're going back to where they came from, which is the video-game business. More power to them, but let's get it straight, so the users know where they stand. It's difficult for us to essentially advertise their machine and spend money on it when half the time you can't even find it in the store. The whole visibility factor really leaves you kind of cold."

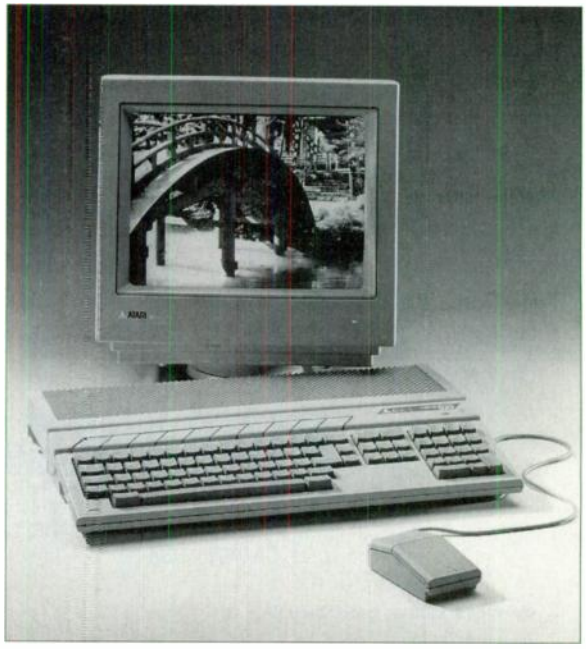
Wizztronics President Steven Cohen is also dissatisfied with Atari's approach to marketing the Falcon. "Atari has a nice machine," he says. "Unfortunately, they don't support it the way they should. They rely on third parties to support it for them. They just need to get a little advertising out there to let people know they support their own machine."

IT AIN'T OVER 'TIL IT'S OVER

As we went to press, rumors were rife that another manufacturer would swoop down on Commodore's remains and snatch up the rights to the Amiga technology. After all, the Amiga and the NewTek Video Toaster virtually kick-started the field of desktop video. Not since the Mac and the laser printer launched desktop publishing has one product spawned so many changes in an industry.

"We're cautiously optimistic that someone will pick up the Amiga," says Donetta Colboch, NewTek's director of marketing. "There's too much money to be made in the technology." NewTek announced its Video Flyer, a new Amiga-based, nonlinear, digital, video-editing system at the NAB Show in March 1994, three weeks before Commodore announced its liquidation plans.

"We're totally on track as far as the Flyer's development goes," says Colboch, "as well as the development of other things we're not yet ready to talk about. We're pretty confident that the Amiga technology will survive."



Retailers and developers alike question Atari's commitment to its Falcon030 personal computer.

The Handwriting on the Wall

WE'LL BE THERE

Third-party developers on both the Amiga and Falcon platforms have reaffirmed their commitment to these machines, even as many of them were in the process of porting their products to the more lucrative Macintosh and *Windows* platforms.

For example, EMAGIC has built on its success in the Atari market by expanding to Macintosh and *Windows*. The company now offers a wide range of products for all three platforms. "EMAGIC is definitely going to support its user base on the Atari," says Graham. "We're certainly coming out with updates. We'll always upgrade *Logic* and *Logic Audio Falcon*. If there's new hardware, we'll consider supporting it. We're trying to support the platform for as long as we can. There isn't any intention to stop supporting it."

Steinberg, developer of *Cubase* and *Cubase Audio* for the Falcon, as well as several other products for the Atari, Macintosh, and *Windows* platforms, also appears committed to Atari users. "We're currently in the midst of releasing two new products," says Steinberg/Jones Product Specialist Bill Black. "*Cubase Audio 16* is a 16-track, direct-to-disk recording system that uses the Falcon's onboard DSP hardware. Our other new Falcon product, *Audio Spectre*, is a software-based graphic correlator, analyzer, calibrator, and level meter. We have also just released *Cubase Score* for the Atari, which is the most advanced version of *Cubase Score* available."

Atari is focusing its entire marketing effort on the Jaguar 64-bit game machine.

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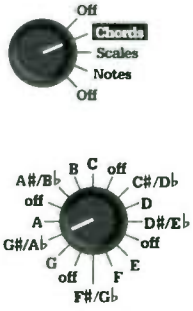

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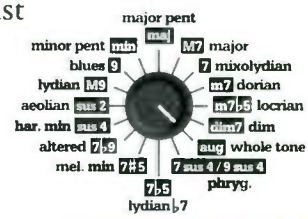

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The Handwriting on the Wall

Wizztronics has announced a series of new products for the Falcon, including a video switcher that could compete with the NewTek Video Toaster. "The VE3000 is a full A/B/C video editing system that we will ship in September," says Cohen. "It lets you take up to nine different video inputs and produce a tape from it. We're still coming out with complete product lines. The Falcon is definitely not on its way out. There's a future in Atari. You've got to believe."

WE'LL BE THERE, TOO

The Blue Ribbon SoundWorks President Melissa Jordan Gray promises Amiga users that her company will continue to support and develop its flagship sequencer product, *Bars and Pipes Professional*, for the foreseeable future. "We have tens of thousands of customers on the Amiga, and they count on us," she says. "We just came out with *Bars and Pipes* 2.5, and version 3.0 is planned. We also have new country and blues disks for *Super JAM!* in the works."

Like the Atari developers, Gray intends to grow her company by reaching out to the larger community of *Windows* users with products like *Audio Architect*, a *Bars and Pipes*-like sequencer for *Windows* that will ship this fall. But Gray says Blue Ribbon's growth won't come at the expense of their Amiga users. "It would be wrong to say that we're just going to stay on the Amiga and not do anything else. With the number of inquiries we get from *Windows* users, that would be dumb. We switched to *Windows* more than a year ago, but our decision to pursue music on that platform was never a decision to throw the Amiga out the door."

Amiga users can also rely on SunRize Industries to remain in the Amiga market, at least for now. SunRize is the only Amiga developer to have consistently pursued the development of professional audio hardware for the Amiga. The company demonstrated its latest product, SoundSwitch, at the 1994 NAB Show. SoundSwitch is a $349 audio-follow video switcher that works with the

The Handwriting on the Wall

Video Toaster. "We will be on this platform for as long as it is one," says SunRize Marketing Manager Dean Tucker. "All of our research and development is done, so we'll continue on."

Not surprisingly, none of the third-party Amiga developers we spoke to mourned the demise of Commodore, only the possible loss of the Amiga. "The Amiga community has always survived and succeeded despite Commodore, never because of it," says Blue Ribbon's Gray. "We're confident someone will come along and take over the Amiga."

WHAT NOW?

According to the 1994 **EM** reader survey, 92% of our readers own a computer. Of those, 10% own an Atari and 7% own an Amiga. Many of you may be wondering what to do next. Has the time come to switch platforms?

First, don't panic. Even if your platform is in danger of becoming an orphan, it doesn't mean the computer is no longer functional. If it's meeting your needs today, chances are it will for some time to come. Properly cared for, most computers just don't break down very often. Furthermore, the third-party music-product developers with whom we spoke—from both the Atari and Amiga camps—expressed commitments not only to their existing products, but to new product development on these machines.

On the other hand, if your Atari or Amiga no longer meets your needs and you've decided to migrate to another platform, there are several ways to survive the transition.

ROCK STEADY

Many will decide to stick with "old faithful" because the computer still meets their needs, and they don't think the future looks all that bleak. Atari is still a going concern, and there is a distinct possibility that another company will pick up the Amiga technology. Even if you decide to stick with your computer, the future of these platforms seems tenuous enough to warrant protecting yourself from getting stranded.

Pick up those peripherals you always wanted but put off buying, such as CPU accelerators, hard-drive controllers, and video genlocks. If Atari does withdraw the Falcon from the market and the Amiga remains submerged, these types of peripherals may become difficult to find in the normal distribution channels.

You should also consider replacing any proprietary components that appear in danger of failing. Generally speaking, devices with moving parts, e.g., disk drives, keyboards, and mice, are the most susceptible to failure. If your keyboard has a sticky or dead key, or if the mouse arrow moves across the screen erratically, you should heed the warning signs and buy a replacement unit while they're still available.

Keyboards and mice are the most problematic parts of these computers, especially because the keyboard is integrated into the system unit of the Falcon and several models of the Amiga (specifically, the A500, A600, and A1200). One of the best sources of replacement keyboards for the Amiga (at least the A2000, A3000, and A4000 series) is PC-compatible manufacturer Northgate Computer ([800] 447-1631). Their excellent Ultra F PC keyboard ($129) can be converted into an Amiga keyboard with a $15 kit. Wizztronics ([516] 473-2507) will soon offer a PC keyboard interface kit for the Falcon. Problematic mice often just need cleaning (dust and lint build up inside the housing). If that doesn't work, try replacing the rubber ball inside the mouse.

A computer's power supply is another potential troublemaker. The custom power-supply bricks used by the compact Amigas may be difficult to replace, but those in the other Amiga models should present less of a problem. Atari should be able to provide replacement power supplies for the Falcon for some time to come, even if it does withdraw the machine from the market. Use a high-quality surge protector to prolong the life of your computer's power supply and its other components.

GARBAGE IN, GARBAGE OUT

If your hard disk sounds more like a garbage disposal than a high-tech mass-storage device, it's a prime candidate for imminent failure. Disk drives are among the most likely devices to fail; they're also one of the most expensive components to replace. On the bright side, disk drives are the least proprietary components in these computers. You don't have to install a Commodore-brand disk drive in an Amiga, and you don't need an Atari-brand disk drive for a Falcon. Most importantly, protect the valuable data on your hard drive by performing backups on a regular basis.

The Falcon has an internal IDE hard-drive controller and a SCSI-2 controller for external devices, both of which are common interfaces. Some Amiga models didn't come with a hard-drive controller, some had IDE controllers, and others had SCSI controllers. IDE hard

The A4000 marks the end of the line for the Amiga, at least under the Commodore banner.

drives and SCSI devices (fixed- and removable-media hard drives, tape backup drives, and so on) should remain widely available for the foreseeable future. The same should hold true for the floppy drives in these machines, which can be replaced by any standard PC-compatible drive. However, if no one picks up the Amiga, hard-drive *controllers* will become rare commodities relatively soon.

Both the Amiga and the Falcon work with third-party VGA and Super VGA multifrequency video monitors, but the Falcon and Amiga models prior to the A4000 require a custom cable adapter. If you're using an Atari- or Commodore-brand monitor, make sure you have the appropriate adapter on hand anyway, in case you need to buy a new monitor down the road.

Cables are a different matter. They don't contain moving parts, but we've all worked with cables enough to know that they can fail at any time, often for no apparent reason. Both machines use commonly available cables for things like MIDI interfaces, printers, modems, and hard-disk drives, so those types of cables are not a concern. If you can't find a local source for your cable needs, try Redmond Cable ([206] 882-2009). They keep many odd computer cables in stock; they custom-build cables, too.

If you're worried about the longevity of one of your computer's proprietary components, pick up one from a local dealer, test it to make sure it works, then store it away until it's needed. Shop at swap meets, and scan the classifieds and local BBSs, too. Chances are that less-frugal users will try to dump their orphans (and potential orphans) before they lose too much market value. A cheap, used computer is an ideal source of spare parts.

MIXED SIGNALS FROM DEALERS

As Commodore went belly-up, Amiga dealers were reporting a slight surge in sales of Amiga 4000 systems, mainly to clients who still want to get into the Video Toaster. Regarding sales of the Falcon, the two major retailers we contacted (at Atari's suggestion) offered differing accounts.

Manny's Music, in New York City, sells Ataris, Macintoshes, and PC-compatibles. "Our Atari sales are going pretty well," says Pete Levin of Manny's. "We do a significant amount of business with them, but that's probably not indicative of the rest of the world, since the rest of the world probably doesn't even sell Atari."

Goodman Music, in Universal City, California, sells Ataris, Macintoshes, and PC-compatibles, plus Amigas and NewTek Video Toasters. "Atari sales? They've virtually died," says Jim Mona, Goodman Music sales manager. "I hate to say that, because a couple of years ago we were one of the largest Atari dealers in the country. Now, it's not even a thought. Atari sales comprise less than five percent of our total sales." Mona also said that Amiga sales consisted of one or two computers per month, configured as Video Toasters.

LET THE MIGRATION BEGIN

Amiga and Falcon users who decide to migrate to a PC-compatible can take most of their peripherals with them. Devices such as printers and modems and the cables that connect them are interchangeable between the three platforms. External mass-storage devices with SCSI interfaces can also be used with PC-compatibles that have SCSI controllers. The media, however, will have to be reformatted before it can be used on the PC. If the PC-compatible you buy doesn't have a SCSI controller—and many don't—the cards are relatively inexpensive and easy to install. On the other hand, most Atari and Commodore monitors cannot be used with PC-compatibles. Check the monitor's specifications to be sure.

If you decide to move to a Macintosh, you'll have to leave your printer and monitor behind, but you'll need only a new cable for your modem. All current Macs have built-in SCSI controllers, so you can use your SCSI-based external mass-storage drives with them. However, you'll first have to reformat the media. Also, you'll need a new MIDI interface no matter which platform you adopt.

If you anticipate needing repairs on your machine, and you don't feel comfortable poking around inside your computer, have the work done while there is still a dealer in your area. Falcon owners can contact Atari to find the nearest factory-authorized service center. Amiga users will have to rely on the phone book.

Three of the best sources of information and support for owners of orphaned computers are local user's

The Handwriting on the Wall

groups, BBSs, and special interest groups (SIGs) on commercial online services (e.g., PAN, CompuServe, America Online, etc.). If you need to know where you can obtain parts and repairs, or if you want to pick up free and low-cost software, these are the first places to look.

FROM HERE TO THERE

If you've decided that the time has come to move on, you'll want to take your data with you. Although that task is getting easier all the time, there are still a few roadblocks to overcome. This topic has already been discussed extensively (see "Crossing Platforms" in the October 1993 **EM**), so we'll just cover the most salient points here.

Because there are more IBM PC-compatibles than any other type of personal computer, utilities have emerged for the Amiga, Falcon, and Macintosh that enable each of those machines to read from and write to disks formatted with MS-DOS. With an MS-DOS diskette, transferring files between Falcons, Amigas, Macs, and PC-compatibles is an easy task. *CrossDOS*, a utility included with the Amiga's operating system, lets you format PC disks. Macs can also format disks for MS-DOS. You'll need preformatted PC disks for the Falcon, though.

On the Mac, *Apple File Exchange* converts files from MS-DOS format to Mac format. This utility, which is included with the Mac's operating system, must be launched before an MS-DOS disk is inserted into the Mac's drive. Apple also offers a system extension, called *PC Exchange*, that runs in the background and automatically recognizes MS-DOS disks inserted into its drive. If you get a Mac, *PC Exchange* is definitely worth having. (It's included with System 7 Pro and the consumer Macintosh models, or you can buy it separately.)

Save all the MIDI files you intend to export to your new computer as Type 1 Standard MIDI Files. Type 1 files maintain your sequences in multiple, separate tracks. Type 0 files combine all the data from each sequence into a single track; this is not particularly desirable if you anticipate editing the song down the road.

All the major third-party software developers for the Falcon and Amiga are porting their products to the Macintosh or *Windows* or both. If you like the software you are using on your Falcon or Amiga, you'll be able to switch over to the Mac or *Windows* and experience little or no culture shock. Most of the developers with whom we spoke are offering attractive discounts to their Amiga and Falcon users who have decided to switch platforms but want to stick with a familiar sequencer.

There are a number of freeware and shareware utilities available from commercial online services and local BBSs that enable you to translate audio samples between PCs, Macs, Falcons, and Amigas. For the Amiga, look for *MASC;* for the Falcon, look for *SOX;* for the Mac, look for *SoundBuilder.*

R.I.P. OR RESURRECTION?

Journalists tread dangerous waters when discussing the possible demise of a computer platform, potentially creating a self-fulfilling prophecy. On the other hand, it would be irresponsible to stand idly by, ignoring the warning signs until it is too late.

It is certainly not too late for Atari to reestablish its presence in the music market. Hundreds of thousands of musicians around the world use Atari computers. The Falcon is a good machine, but it is badly in need of an immediate facelift. Atari enjoys excellent third-party support, but it seems to take its developers—and its users—for granted.

It probably *is* too late for the Amiga to become a major player in the music industry. If the technology is acquired by another manufacturer, that company will undoubtedly zero in on the Amiga's video and multimedia prowess and exploit those facets of its technology. However, there remains a small but loyal group of musicians who would like nothing better than to see the Amiga survive.

If you are among those who have an Atari or Amiga in your studio, take heart. There are many reasons not to despair, not the least of which is the fact that these computers still do what they did when you bought them. Third-party support and development is likely to continue for some time, and other loyal users offer a kind of orphan support group. On the other hand, if your needs have outgrown the capabilities of your computer, it might be time to move into the mainstream as you upgrade. That way, you're more likely to survive the slings and arrows of outrageous computer fortune.

EM *Associate Editor* **Michael Brown** *owns five computers on four different platforms, but swears allegiance to none.*

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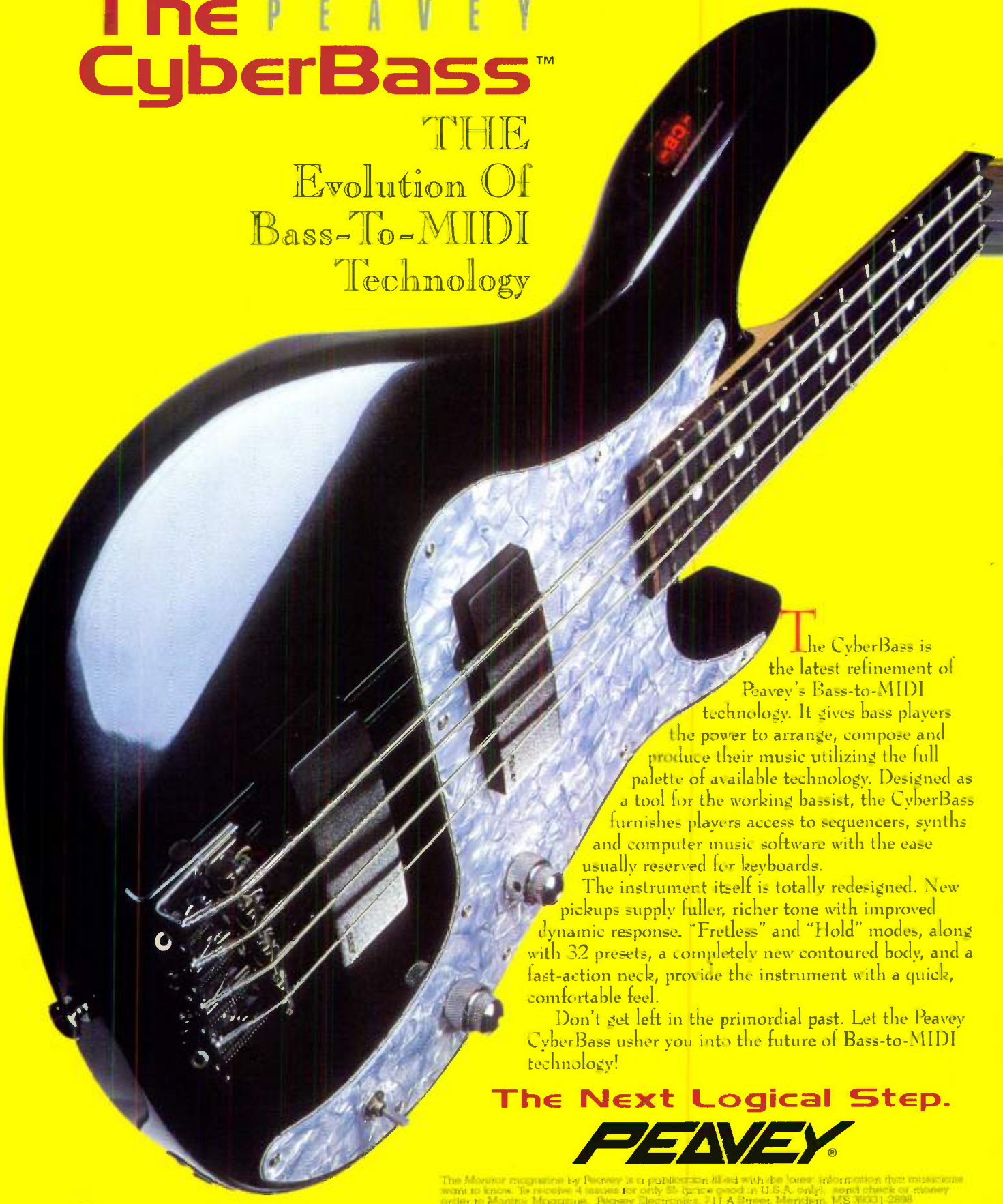

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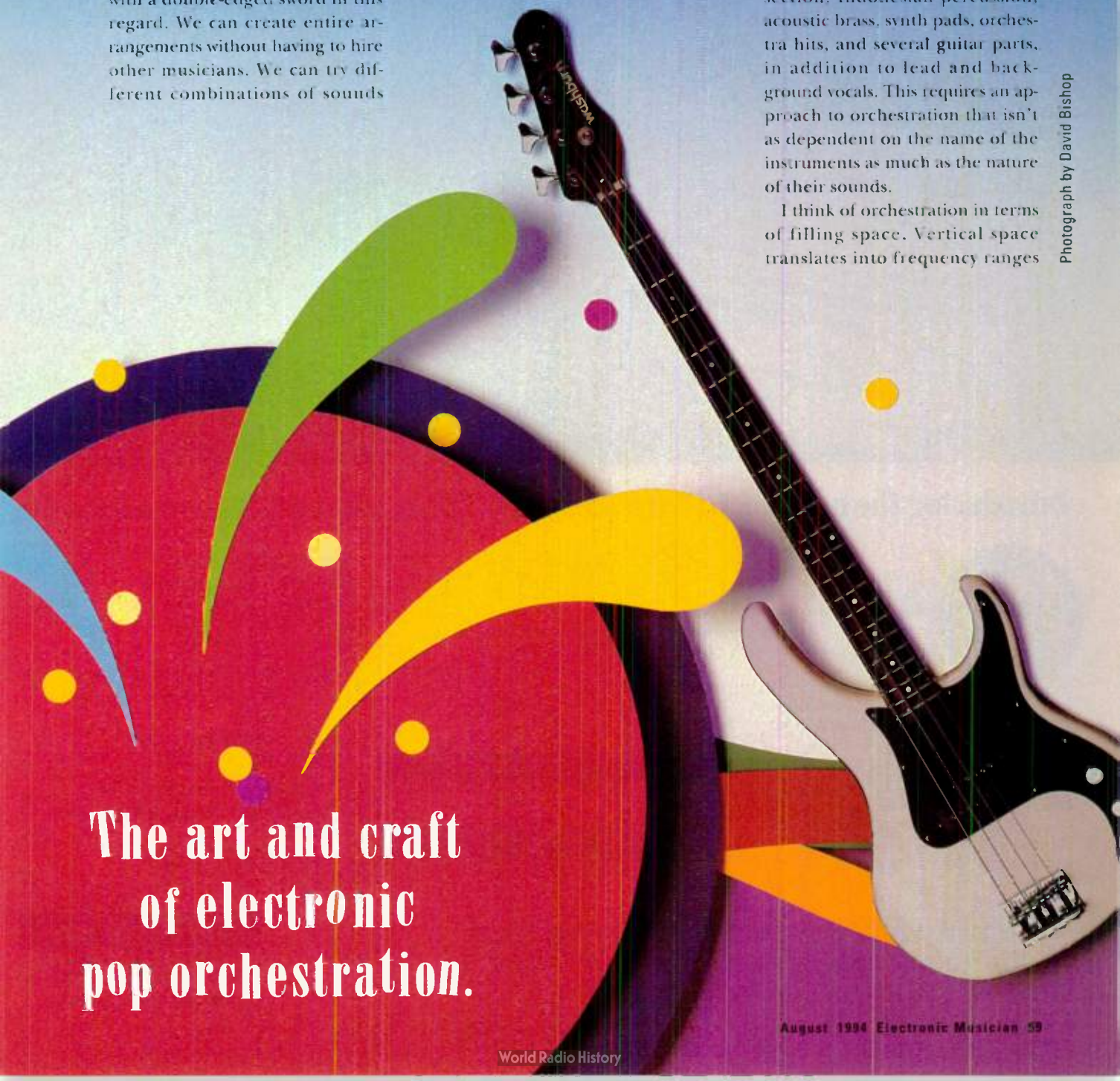
Virtual POP

By Marvin Sanders

During the process of writing music, it's best to start with the fundamentals of melody, harmony, and rhythm. These elements form a foundation from which the piece communicates ideas and emotions and hopefully elicits some response from the listener. Once these three elements are

The art and craft of electronic pop orchestration.



Photograph by David Bishop

under control, however, it's time to think about presenting them in the best possible light.

This is the essence of orchestration: the *presentation* of musical ideas. What sounds do you use, and how do you combine them at different points in the tune? It isn't always easy to make these decisions, because—fortunately for the creative vanguard—there's no secret code book that tells you how all the sounds fit together.

Electronic musicians are faced with a double-edged sword in this regard. We can create entire arrangements without having to hire other musicians. We can try different combinations of sounds until we find the ones that work for each song. However, pop music has a long tradition of acoustic and electric (e.g., electric guitar, piano, and organ) orchestration. As a result, in the pop genre, the electronic musician's job includes using sampled and synthesized sounds to create a convincing illusion of an acoustic and electric ensemble. (For classical orchestration applications and techniques, see the two-part feature "The Electronic Orchestra" in the September and October 1993 EM.) Ultimately, the more you know about the standard performance practices of these instruments, the more accurate your emulation will be.

SPACE ODYSSEY

Although pop music certainly has accepted norms, especially in form and harmony, the instrumentation is fairly diverse. In any one piece, you might find a standard rhythm section, Indonesian percussion, acoustic brass, synth pads, orchestra hits, and several guitar parts, in addition to lead and background vocals. This requires an approach to orchestration that isn't as dependent on the name of the instruments as much as the nature of their sounds.

I think of orchestration in terms of filling space. Vertical space translates into frequency ranges

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and basic timbral characteristics. Although we can throw out the idea of hard and fast rules right away (they don't exist), a little aural common sense works wonders. Here are some general rules of thumb:

- Keep each sound in its own frequency range and out of the ranges of other sounds, especially the lead vocal.
- Organize the notes in chords so the voicing is open in lower pitch ranges, becoming closer as you ascend in pitch. This reflects the basic nature of all musical timbres, which follow the pattern of the harmonic series, and keeps the overall sound from becoming muddy.
- Combine sounds to form a composite texture, such as a string/synth layer.
- Establish a foundation, such as an arpeggiated marimba ostinato to form a harmonic base, or several percussion instruments to create rhythmic drive.
- Strive to increase the momentum toward a key point, such as a drum fill into the chorus.
- Punctuate specific parts of a song, such as using horn stabs to draw attention to an important musical hook.

These concepts work hand in hand with specific considerations. What general range does the sound occupy? Is it more flute-like or brass-like? What function is it serving? For instance, is it a countermelody, or some type of background rhythmic texture thickener?

You have a limited amount of space in which to present your ideas. How are you going to use it? It's your decision whether to go for a sparse texture in which every voice is sparkling clear and distinct or a driving wall of sound. These are broad concepts, to be sure, but they start to make sense when you consider some of the common orchestration techniques of the pop medium.

DRUMS AND PERCUSSION

A standard, pop drum kit typically consists of a kick drum, snare, closed and open hi-hat, three toms (high to low), ride cymbal, and crash cymbal. Most sound modules with drum samples include several choices for each of these instruments. Additional sounds include more toms; rim shots; specialty cymbals, such as china and sizzle; and cowbell. Of course, this doesn't mean that they'll all fit the style of your song.

I'd be a fool to jump into the whole "what makes a good drum sound" fray, except to say that finding the perfect kick and snare is usually not as important as Joe Studio would have you believe. It's much more important that your drum kit sound like one instrument, rather than a bunch of separate, killer samples.

Here are some specific orchestration tips for the drums:

- Although some kick and snare sounds have an attack that sounds a little too sharp when played alone, this tends to smooth out in the context of an entire kit.
- Using lots of cymbals definitely helps in the variety department. Try to use at least a separate ride and bell sound, along with a couple of crashes,

even if it's the same crash sample with slightly different tunings.

• If your cymbals have a Mono/Poly assignment parameter, they tend to sound more realistic in Poly. In this mode, each cymbal hit can ring naturally without being cut off by the next strike. Be careful, though; this will use a lot more polyphony than Mono mode.

One of the beauties of pop music is that practically anything can be used as a percussion instrument, from congas and tambourines to trash-can lids and monkey farts. Unless there are no drums at all, percussion is generally used to augment the arrangement and provide extra drive. It's also a unique way to "build" a song. For instance, you might consider adding some exotic percussion rather than a new synth part.

BASS

The bass, whether acoustic, electric, or synthesized, provides the harmonic foundation for your tunes, so it's usually best to keep it in the lower part of its range (see **Fig. 1**). However, don't hang around the very bottom of the range, because the sound can get boomy (especially fretless basses). Careful use of EQ can make a big difference here. Fills can be heard better if they're a little higher in pitch, but if you go too high, you get into banjo territory.

• Bass lines are mostly monophonic, so be careful about overlapping notes, which can tend to muddy up the mix. Most modern sequencer programs have some type of "No Overlap" or "100% Legato" command.

• Listen for conflicts between the bass and kick-drum rhythms. The bass and kick drum are usually as "locked" together as possible; they tend to hit strong beats, syncopations, and accents together.

• A little pitch bend goes a long way. Too much is a common MIDI giveaway.

If you have a bass "slide" sample available, it sounds great when placed correctly. One standard place for this sound is on the beat before the downbeat of a new section. Synth bass slides are easy if your synth has some type of Mono Legato mode. Just play a downward gliss on the keys with this function turned on. Some people use portamento for this effect, but I find it sounds too much like a big pitch bend.

GUITAR

Rhythm guitar usually takes the form of a chordal picking pattern, muted single notes, or strumming. The first two performance techniques are relatively easy to emulate, but the last one is difficult. "Strumming" on a keyboard can sound pretty cheesy, unless you use a great sound and play it just right. If you decide to give it a try, don't choose a sound with an attack that's too sharp. Although you want to quickly roll the chords, a strum "reads" as a single sound, not an arpeggio. Some sample libraries now include sampled strums (both up and down) in different keys, which work well. Finally, you should keep in mind that the rhythm guitar and keyboards work together as a musical unit in the same way that bass and kick drums are locked together.

Pedal steel is a crucial element of country pop and is used for pads, rhythms, and leads. However, it is extremely difficult to emulate, as the real instrument is capable of smoothly integrating many different sounds, including complex slides, harmonics, and pitch bends. With careful listening analysis, you can learn to cop the style well enough to fill at least part of the steel player's basic role. But unless you plan to dedicate considerable labor to the task, you'll only be able emulate a few of these sounds and performance techniques.

Lead guitar is a different animal altogether. Standard options include nylon-string, steel-string, clean electric guitar, and distorted electric guitar. Good nylon-string and steel-string sounds are common these days. Clean electrics are available on synths, and your choices expand greatly if you have a sampler. Personally, I dislike distorted-guitar samples, especially the kind you find in a preset sound module with limited effects. This type of sample sounds very electronic because you hear only a brief "snapshot" of what should be a dynamic, evolving sound.

If your module doesn't have a real distortion or overdrive effect onboard (as some of the Korg and Roland products do), I suggest copping Jan Hammer and running a clean sound through an outboard signal processor, such as a tube preamp designed for guitar. Even cheap effects pedals can sound great, and they are more convenient for direct recording than an amp. Use a distortion effect for harder rock or metal, and an overdrive setting for mellower leads. Mono Legato mode is a lifesaver when it comes to emulating hammer-ons (plus a little portamento with a very fast rate setting).

As with bass programming, be ever watchful that the pitch-bend monster doesn't overpower your excellent solo. And don't forget touches such as picked, muted notes and tapped harmonics. (If you have an 88-key controller, map these sounds at the top, above the normal guitar range.)

KEYBOARDS

Keyboard sounds fall into six basic food groups: acoustic piano; electric piano (e.g., the Yamaha CP70 or Roland MKS-20); classic, Fender-style Rhodes; FM-type Rhodes (first immortalized on the Yamaha DX7); organs; and everything else, including clavs and weird synth sounds.

Any of these sounds can be layered to great effect. Some common combinations include acoustic or electric piano and FM Rhodes; Fender Rhodes and FM Rhodes; and Rhodes with either strings or a synth pad. Watch the sustain pedal on the Rhodes/strings combination, or you'll have a muddy part,

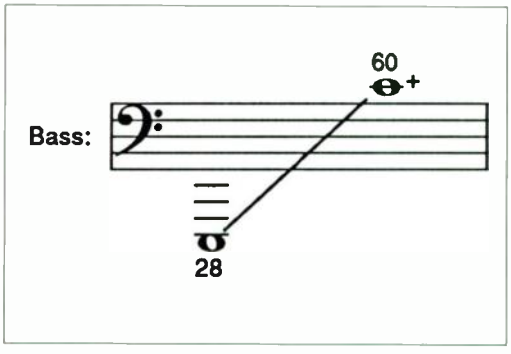

FIG. 1: The practical pitch range of a normal bass, along with the corresponding MIDI note numbers. All notes are written one octave higher than they sound. The "+" indicates that the instrument can play higher when necessary.

as Rhodes sounds decay much more quickly than string sounds. If you're vigilant with the sustain pedal and still don't like the results, turn off the pad sound's sustain-pedal response, then lengthen its release just a bit.

Many organ sounds have a lot of key-click noise, which can help comping parts cut through. When the organ is playing lead, too much key click can sound contrived, so you may want to choose a different patch, or lower the volume on the noise component. Hammond B3 patches abound, some with sampled Leslie, and others with modulation or internal effects that emulate the dynamic quality of a Leslie rotor accelerating and decelerating. You can also apply an external effects processor with a rotary-speaker program.

As mentioned earlier, voicings should be more open as you move lower in pitch, especially when you layer several sounds. In particular, avoid close chord voicings below middle C (no intervals closer than fourths, fifths, and octaves). Although some instruments sound great together, they also take up a lot of your frequency space, so err on the side of clarity and simplicity.

Many people sequence keyboard parts at a slow tempo and then speed them up to performance tempo. If you do this and find that the part is not quite as tight as you'd like, try shortening all the durations by about 10% rather than quantizing more strictly. Many players have a tendency, when playing slowly, toward heavy hands and holding notes too long.

STRINGS

A complete string orchestra includes five separate sections consisting of several players each: first and second violins, violas, cellos, and contrabasses (see **Fig. 2**). If you want accurate sounding orchestral strings, use a separate ensemble patch (violin section, viola section, etc.) on different tracks.

On the surface, it may seem logical to use sixteen channels of solo violin sounds to create a section, but this takes a long time and doesn't work well. First of all, it monopolizes one or two multitimbral modules. But more important, many solo string patches (with the exception of very large samples) sound tinny and thin; by extension, so will your group imitation. Judicious use of EQ can ameliorate this somewhat.

String vibratos are more like those of vocalists than any other instrument, because they vary quite a bit from player to player. This is another good reason to use several different ensemble patches. Violins played low don't sound like cellos, and cellos played high don't sound like violins. If your string parts cover a wide range, it's even more important to use separate ensemble patches. Full string-ensemble sounds are fine, but you can benefit from dividing your music into high and low parts on two different MIDI channels at the very least, even if they're in the same general range. This makes it easier to pay close attention to the phrasing of different lines.

There are several additional techniques to consider, depending on the nature of the string patches you have at your disposal:

• I often like the attack of one patch, the timbre of another, and the gritty sound of a third. If you have the channels and voices available, try a layer. For best results, don't just copy the first part to the others. Play and record

each sound separately on its own track according to its own characteristics.

• For legato parts, use a string sound with a long release time, or leave slight overlaps of 5% to 10% from note to note. The first method works at slower tempos, but overlaps tend to play more naturally as you speed up.

• When using string sounds with slow attacks, be careful that the meat of the sound doesn't "speak" too much later than the rest of the instruments in your ensemble. Shifting the entire part earlier by a few clock pulses is helpful, but if you shift too much, you'll have the opposite problem.

Although they're not exactly standard fare in pop music, you may find occasional use for a pizzicato sound, in which the string is plucked rather than bowed, or a tremolo sound, which is a quick succession of up and down bows, usually on a single pitch. Good pizz sounds are relatively common fare, but sampled tremolo varies from one module to another. In a pinch, you can assign the same pitch to two different keys and slightly reduce the lowpass filter cutoff on one of them to simulate the different directions of the bow as you play a trill on the two keys. This method also gives you complete control over the speed of the tremolo at any pitch, as opposed to a sampled loop, which will speed up or slow down for different pitches.

As with wind instruments, strings don't require separate attacks to sound each note; arpeggios or scale-wise passages after a single, initial attack is characteristic. This can usually be achieved by choosing a sound with velocity mapped to attack time (low velocity equals slower attack), making the beginning of each phrase stronger than the notes to follow. For single note lines, Mono mode can be very effective in this regard.

BRASS

Pop brass sections run the gamut from trumpets alone to trumpets, trombones, saxes (technically a woodwind), and maybe even a couple of French horns (see Fig. 3). Brass instruments present a particular challenge because all performance elements—dynamics, phrasing, articulation, style, and sound—are equally important in their presentation. If even one element is out of whack, it can instantly make a part sound fake. The timbral qualities are also virtually endless through the use of mutes, which are devices placed in the bell of a brass instrument to change the sound in some way.

As with strings, it's generally better to use a section sound, rather than try to combine many solo patches. However, doubling the top part of the brass section with a solo trumpet patch works quite well. Try to layer several ensemble patches with different timbres. You can also *slightly* detune several copies of the same patch. Again, don't just copy one part to the other section sounds, play them in separately for a looser feel.

• When the brass part encompasses a wide pitch range, try to find a trombone patch for the lower voices.

• The brasses have distinctly different timbres from soft to loud. Using a fortissimo sample at a soft volume for a mellow part doesn't cut it. If you can't find a dedicated soft sound either alone or in a Velocity-switched patch, take the same patch and adjust the lowpass filter to remove some of the higher harmonics.

• If you don't have fall-off samples, try a downward gliss after the chord hit. Then, adjust all of the durations to 100% and decrease velocities as you go down. After you do this, overdub a *little* pitch bend on the gliss to intensify the effect.

• To give that extra fire to horn stabs or fall-offs, support them with a sharp snare-drum crack.

To understand phrasing and articulation, it's important to know that brass players don't just blow hot air when attacking a note. They are actually saying a syllable like "ta" or "da." Every note doesn't necessarily start with the same syllable, however. Often, a musical phrase of several notes starts with a single attack. The following notes are produced by a continuous airstream and changing the lip tension and valve or slide positions to produce different pitches. Then there is double and triple tonguing, which involves syllable combinations such as "ta-ka-ta-ka" or "ta-ta-ka" to articulate very quick groups of notes, as in a fanfare.

One of the most direct ways to emulate brass articulation is with a breath controller. If you don't have a synth with a breath controller input, check out the Anatek Wind Machine, which accepts an input from Yamaha breath controllers and sends MIDI Breath Controller messages to any MIDI instrument. (If your synth doesn't recognize Breath Controller messages, the Wind Machine can remap information to other messages, such as Pressure.)

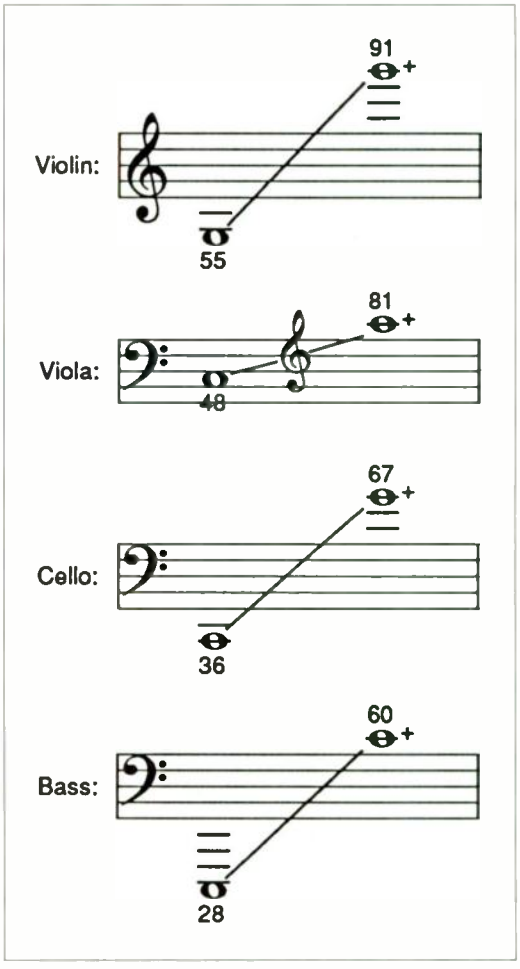

FIG. 2: The practical range of each member of the string family, including the corresponding MIDI note numbers. The "+" indicates that the instrument can play higher when necessary. All contrabass notes are written one octave higher than they sound.

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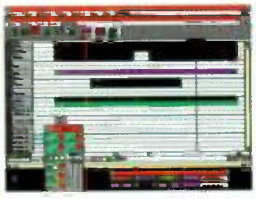

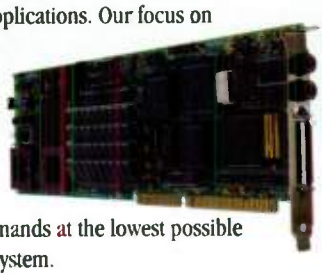

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If you play from keyboard without a breath controller, try to be conscious of the ways in which you get from one note to the next. Instead of thinking "note-note-note-note," try thinking "long-short-long-short" or "long-long-short-short," depending on the phrase you are playing.

On long, sustained notes, try to add dynamic movement with crescendos and sforzandos (a loud attack, followed by an immediate drop to soft, and then crescendo). You can also use Pressure applied to volume and the filter, with harder pressure raising the volume and slightly opening the lowpass filter.

Pay close attention to note durations, making sure any pitches in a legato phrase are at 100%. Then, trim the Velocities of those notes that aren't rearticulated. You can also use Mono mode to great effect, if your module has it.

WOODWINDS

This versatile instrument family includes the flutes, oboes, bassoons, clarinets, and saxophones (see **Fig. 4**). Although some of these instruments are not especially common in pop music, they can add a special twist to arrangements as either leads or layers. They are extremely sensitive to range and timbral considerations and can easily disappear in a mix. Sometimes this is good for adding fullness without being obtrusive, but if you want solo lines to be heard, you must frame the lead instrument properly with respect to the range of the sounds around it.

Most of the phrasing and articulation ideas mentioned for the brass apply, at least conceptually, to the woodwinds. The only exception is that double or triple tonguing, while possible on all winds, is common only for the flute. Sensitive use of vibrato can make or break your woodwind emulations. Much like singers, you often hear woodwind players add vibrato quite gradually over longer notes. Also remember that, as with brass instruments, these players depend on air flow to induce sound. In order to be convincing, the phrases should have spaces for breaths just as if you were writing for a live performer.

- Flutes are incredibly agile, so it's easy to use them in any context. They can't play loudly in the lower part of their range, but they have few problems being heard as you move higher. For extra emphasis, double flute lines with piccolo an octave higher.
- Oboes are also capable of playing just about anything; however, their dynamic curve is unusual. In the lower range, it's *difficult* to play softly, and they get a little thin in the upper ranges. For electronic musicians, these patches are best used in the middle range anyway, for that classic oboe character.
- The dynamic range of bassoons is similar to that of oboes, so it's hard to play softly in the lower registers. Because they tend to blend so well in any part of their range, bassoons must be handled delicately as a solo voice, supported by sparse textures in nonconflicting ranges.
- Clarinets have a wide dynamic range at almost any pitch, but the timbre is significantly different in the lower, middle, and upper parts of their range. In particular, clarinets are known for the ability to crescendo out of nowhere and decrescendo to silence with equal smoothness.
- Saxes make great chord fillers in brass sections, but many sax sounds are programmed with a sharp, growly attack more suited to solo playing. Try slowing the attack down a bit to take some of the electronic edge off. There are lots of great soprano sax sounds out there for leads, but if you're thinking of using a sample instead of a live alto or tenor player, please, just say no.
- Although technically brass instruments, French horns are commonly used at softer dynamics in woodwind sections due to their mellow timbre.

Because all these instruments layer so well together, don't feel compelled to use just one at a time for harmonic parts. Many times a flute on the high voice, oboe below that, clarinet next note down, and bassoon on the low voice sounds much richer than, say, just flutes on the whole chord.

VOCALS

Most pop music includes lead and backup vocals. Even though vocals are not electronically generated, you must keep them in mind when building your orchestration. There are two approaches to clear vocals: Keep other parts out of the vocalist's range, or turn the whole mix down until the vocal is "sitting" on top. The first technique is a little more elegant.

Background vocals function much like strings and brass, as harmonic pads or rhythmic punctuation. If you want each part of your arrangement to be heard clearly, make sure that your background vocals don't rhythmically conflict with these instrumental groups or occupy the same range.

Think about pumping up simple "ooh" and "aah" parts with synth vox pads, in addition to the usual double or triple tracking. This can add a kind of silky fantasy element to the timbre.

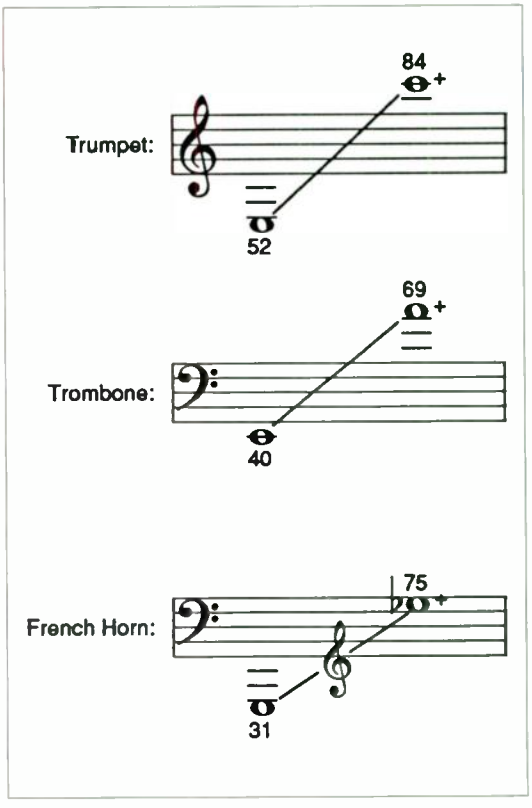

FIG. 3: The practical ranges of typical instruments used in a brass section, including the corresponding MIDI note numbers. The "+" indicates that the instrument can play higher when necessary.

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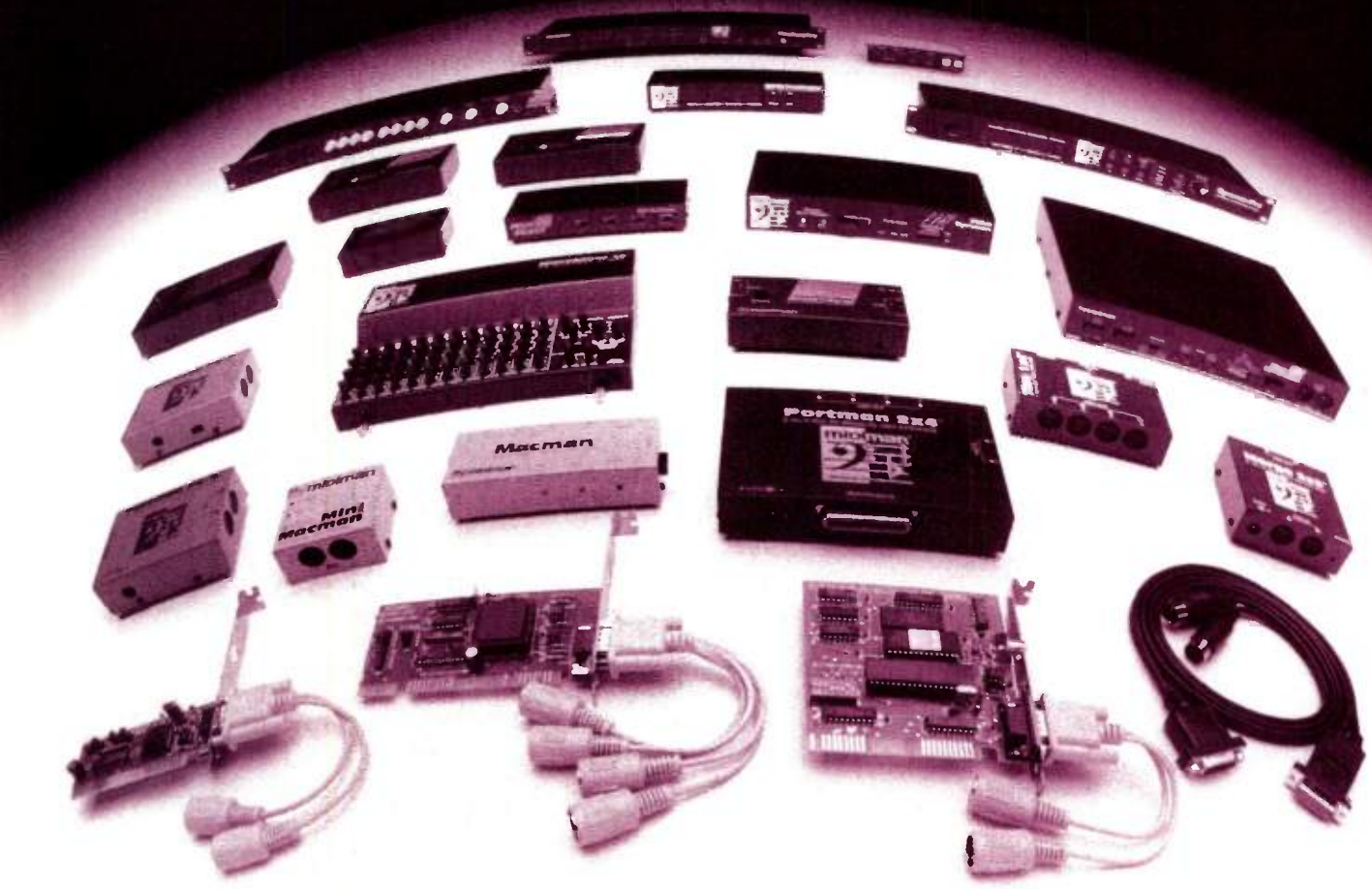

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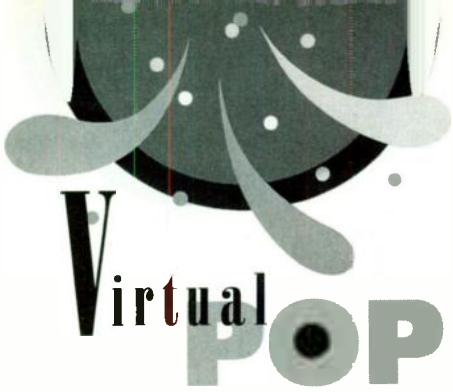

REALITY DOESN'T BITE

Fortunately for MIDI musicians, the human ear tends to group things together. Instead of hearing each sixteenth note as a separate entity, we hear a groove. Rather than notice each of the individual violin and cello players, we hear a string section. In other words, instrument emulation doesn't have to be an all-or-nothing proposition. Adding just one live trumpet player to a sampled brass section can sound amazing. Acoustic hi-hat and cymbals can add a new dimension to programmed drums. Better yet, I think we could all survive without hearing a synthesized sax solo ever again. If you have the budget to work in a couple of good, live players, it can exponentially improve your final product.

It's also important to keep an open mind about layering *between* different instrument families. In jazz charts, for example, I love the lead sound of soprano sax, muted trumpet, and flute together in unison. If your string pad doesn't have quite enough bite, but a strong bow attack isn't right for the song, try adding some mellow French horns. If your ballad guitar picking isn't magical enough, you might double the track with a soft, airy, bell-like patch. There are infinite permutations of this technique, but just remember that the strengths of one instrument family can balance the weaknesses or augment the sound of another.

It would be nice to offer some timbre-matching guidelines for pop music, but there are as many considerations as there are applications. I try to follow one rule: Trust the sound of a patch, rather than its name. Don't let your brain fool your ears. (I met one guy who never even looks at patch names when going through a new module, so his ideas won't be limited by preconceived notions.) A good, straight-forward guide through the acoustic world is *Instrumentation/Orchestration,* by Alfred Blatter, published by Longman Inc., New York. There are certainly more famous books than this, but few are as up-to-date and accessible.

In addition to instrument samples, electronic musicians have infinitely more sounds available in the form of purely synthetic patches. Warm pads can work instead of, or in combination with, strings, synth brass, and any number of percussive "ear candy" to augment an arrangement. There are too many variables to construct an orchestration approach for these sounds in one article, but try to keep asking yourself pertinent questions. Is the synth

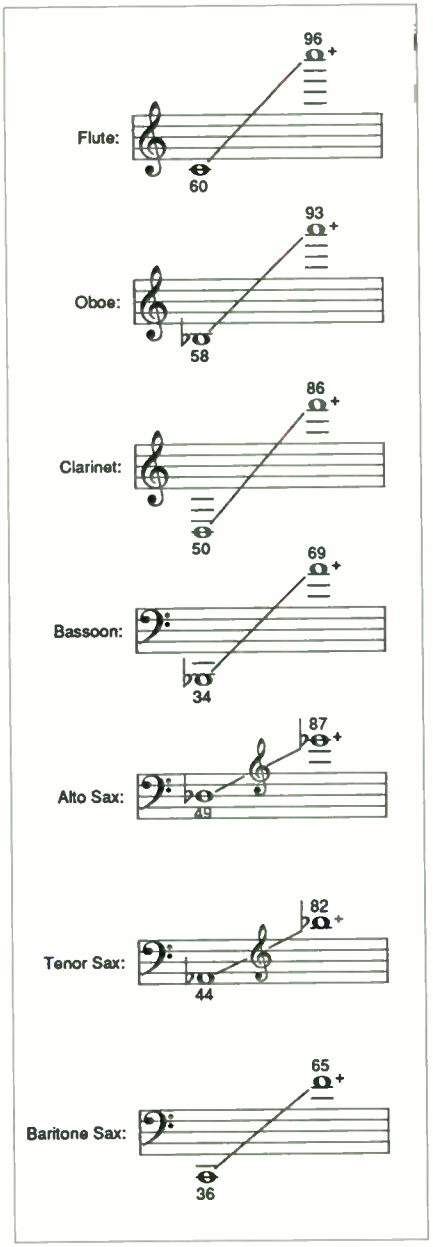

FIG. 4: The practical ranges of instruments in the woodwind family, including the corresponding MIDI note numbers. The "+" indicates that the instrument can play higher when necessary.

sound adding to the overall feel, or making it too busy? Is it obscuring other instruments that are important to your arrangement?

Of course, no article can take the place of extensive and focused listening. The next time you're about to do a bass part, try listening to some Marcus Miller first, or check out Jerry Hey horn arrangements on an Al Jarreau album instead of just jumping into brass programming. There's nothing like trying to get "inside" an instrumental playing style before trying to sequence it.

▼

The essence of good orchestration is the presentation of musical ideas.

As hard as it is to remember sometimes, "high" does not mean the right-hand side of the keyboard, and "low" is far more than simply the left-hand side. Everything is relative, and each sound or instrument works within a certain set of limitations. "Low" for a piccolo is "high" for a trombone. However, if you remember a few simple concepts about the use of space and what you're trying to accomplish with each part, you can achieve startling results. As for coloring outside of the lines and coming up with something completely new, well, that's where the fun really begins.

(Thanks to Steve Fisher of Roland Corp. US.)

Marvin Sanders *is a freelance composer and sound designer in Los Angeles. Formerly Keyboard Product Manager for Roland Corp. US, he still does ROM demos and international clinics.*

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By Michael Molenda

The press kit is one of the most amazing promotional tools I have ever seen. A full-color, triple-fold cover with blazing logos and action shots holds at least four pounds of biographies and production information. (It's all printed on real nice paper, too!) And let's not forget the collection of color slides *and* black-and-white glossies. Obviously, this is not the unveiling of a hot piece of electronic gear. Nope. This is real important stuff, kids: a prime-time, big-budget, network-television action series. This is *Thunder in Paradise*.

Illustration by David Peters

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Thunder in Paradise stars former World Wrestling Federation champion Terry "Hulk" Hogan as Hurricane Spencer, a commando-for-hire (and single father) who cruises the oceans in a souped-up Scarab speedboat called—you guessed it—*Thunder*. Chris Lemmon, super-model Carol Alt, and ex-Avenger Patrick Macnee join the adventures from *Thunder*'s base of operations on a Florida beach resort. The same crew who brought *Baywatch* to the tube produces *Thunder in Paradise*, so viewers are treated to mucho sun and minimal clothing.

Even if your aesthetic sensibilities can't handle the show's silly (and somewhat violent) plot conventions, *Thunder in Paradise* is a hoot as far as sound design is concerned. The explosions, fisticuffs, and careening speedboats practically leap out of the television set. The person responsible for all this auditory mayhem is renowned sound designer—and former **EM** cover personality—Frank Serafine. Armed with a DAT recorder, a few microphones, and a sampler, Serafine puts the wham in Hogan's punches and the roar in *Thunder*'s engines. It's not easy.

BICOASTAL BOOGIE

All the Foley (live recording cued to onscreen action) and sound effects for *Thunder in Paradise* are recorded at Serafine's Venice, California studios. Four independent editing rooms and a virtual army of sound editors and support personnel are needed to meet the grueling production deadlines of a weekly series.

Although each episode is scheduled for completion well ahead of its air date, Serafine has just seven days to finish the sound design before the tapes must be shipped to Disney's Florida-based Post Group for final mixing.

"A big part of my job as post-production sound supervisor is devising a structure that not only ensures we make our deadlines, but also provides everyone with a clear picture," he says. "Because we're bicoastal, it's essential that one team knows what the other is doing. We had to learn how to best communicate simple little things like track assignments."

To facilitate harmonious collaboration, Serafine even goes so far as printing thousands of gigantic five-foot sheets that line up printed columns with the mixing console's channel strips. Each column denotes time-code events for a specific track, so the mixers can simply lay the sheets over the console and see where the time code falls for each and every sound effect.

"We consider ourselves architects," states Serafine, "because the sound design process often involves laying everything out like a floor plan."

The California team—under Serafine's direction—includes music editor Zamp Nicall; sound editors L Mo Weber, Karen Basset, and Francois Blaignan; Foley recordist Peggy McAffee; and Foley artist John Post. The Florida squad at Disney's Post Group is led by sound supervisor Rob Hill, and includes re-recording mixers Dorrie Batten, Fred Venaglia, and Kurt James Wagner.

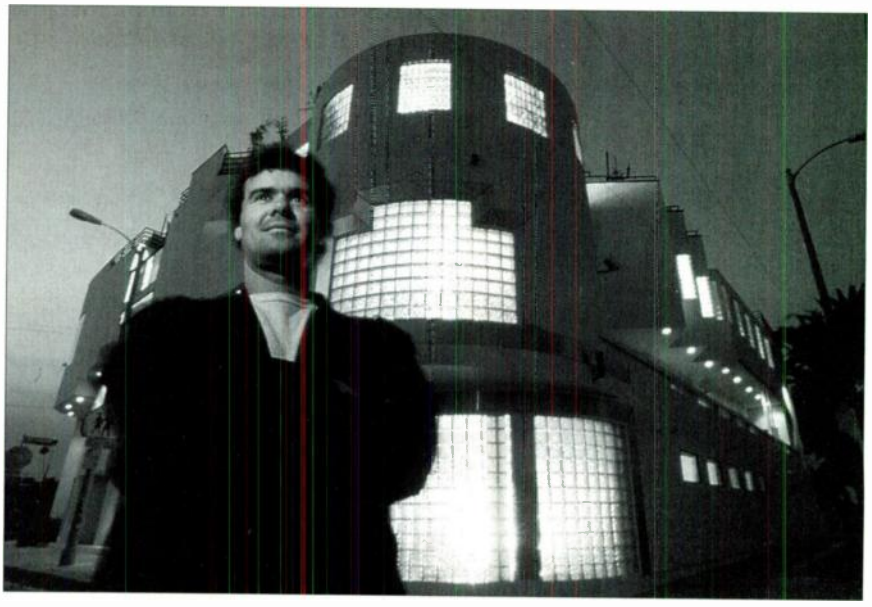
GETTING THE GOODS

But before anything can be done in the studio, the raw audio data for the sound effects must be assembled. Serafine personally records every effect so he can customize his sound design to the needs of the production. Currently, his library consists of more than 50,000 digitally recorded sound effects. Some are extremely specialized, such as the huge selection of beeps that have voiced the computers and electronic gizmos for *Star Trek: The Motion Picture*, *Tron*, and other futuristic films.

"I make fresh sounds from scratch," maintains Serafine. "That's what I'm about, and that's why people come to me for sound design. I seldom use commercial libraries, although occasionally I find some jewels and use them. My favorites are the *Sound Ideas 6000 Series*, *File Effects*, *Network*, and *Creative Sound Design* (magneto-optical disks for the E-mu E-III). Of course, everything comes out of my library first."

Recording custom sound effects is not a task for the weak-hearted. Sometimes the gig can be as dangerous as facing a riled up Hulk Hogan in the ring. Don't believe me? Well, how do you document the sound of *Thunder* screaming over the waves at speeds of more than 80 miles per hour? (Answer: You get in the boat and hold on for dear life.)

"A stunt man was strapped into *Thunder*, and he held me by my belt buckle as I leaned over the side of the boat," says Serafine. "From that position, I recorded some different perspectives



Famed sound designer and "king of the beeps," Frank Serafine in front of his production studios in Venice, California.

of the engine noises and water coming off the bow while traveling at incredibly fast speeds. Oh, man! Those boats can reach 80 miles per hour and turn on a dime. It was wild. I love thrills, but that was about as scary as I'd ever want to get."

Serafine's heart rate wasn't the only thing affected by the violent thrust of *Thunder*'s three MerCruiser, 415 horsepower V8 engines. At first, no microphone could handle the intense wind noise produced by a craft traveling at such high speeds. A number of different mic and windscreen combinations were tried to no avail. The gusts blotted out the engine and water sounds Serafine was attempting to record. Finally, a Crown SASS that was brought along as an afterthought saved the day. The stereo PZM microphone—which is shaped like a loaf of bread—successfully battled the wind to record some uncompromised sound effects.

Fortunately, not all the sound effects were so difficult to capture. Serafine completed his library of boat sounds from the relative safety of a raft. Wind noise was no longer a problem, so a more diverse selection of mics (including Electro-Voice N/D 308s and a DL-42 shotgun mic) were used to record the boats whizzing by, circling the raft, revving up, and revving down. Tropical ambiences, miscellaneous water effects (lapping to splashing), room sounds (for interior shots), and even the frogs that inhabit the marshes around the Grand Floridian Hotel were recorded. All the sounds were tracked direct-to-digital on a Sony TCD-D7 portable DAT deck.

A few effects, however, eluded capture on location in Florida. These sounds were recorded back home in California—some, literally, in Serafine's home.

"I needed the sound of a boat cutting the water, and I just didn't get the actual 'chops' when I was out on location recording the boat runs," he relates. "*Thunder* is supposed to be made of this high-tech alloy, so I really wanted the sound of metal slapping against the waves. I went to a junkyard, bought an old car hood, and simply tossed it into my hot tub. I threw the hood around the water and recorded the splashes. The 'car hood in the hot tub' is now a major effect that you hear everytime you see the boat onscreen."

Serafine also had to improvise for an episode in which a boy turns into a wolf. The scenes required whining, growling, and hissing, but the only dog libraries available were limited to mis-

The *Thunder in Paradise* cast includes (left to right) Heidi Mark, Chris Lemmon, Ashely Gorrell, Hulk Hogan, Carol Alt, and Kiki Shepard.

cellaneous barks. Again, Serafine's home life came in handy. He took his new puppy into the Foley studio and played with her, recording every sound she made. The play session was sampled into an E-mu E-IIIxp for further manipulation.

"She did her parts brilliantly," brags Serafine. "Real first-take stuff. She makes all these wonderful sounds when she plays that really helped bring the wolf-boy to life."

SOUND EDITING

Serafine's sound-effect recordings are dumped straight from DAT—keeping in the digital domain—to an E-mu E-IIIxp. All cutting, looping, and other audio manipulations are done in the E-III, which is the obvious workhorse of Serafine's production house.

"The cool thing about the E-IIIxp is that it has a clock-rate locking system that latches right onto SMPTE," he says. "Usually, only hard-disk recorders have that locking ability. But the limitation of hard-disk systems is that you don't have all the morphing capabilities of a sampler. With the E-III locked to the time code on the ¾-inch video, I have the best of both worlds. I'm locked to videotape, so I can do multiple passes and 'play' the sound effects to the picture, laying a different audio element down on each pass. That's where the sampler is supreme. I can pitch sounds, filter the audio, manipulate sound with the modulation wheel, and cluster notes together to make things sound super thick."

▼

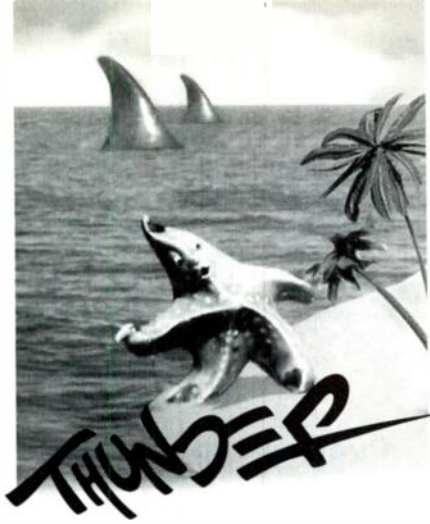
Every single frame of film is spotted to map out where the sound effects should go.

The E-IIIxp has also helped Serafine refine certain aspects of sound design. For example, background ambiences tend to be problematic because of repeating elements. If a dog barks every two seconds into a sample, listeners may pick up on the effect's pattern, ruining the auditory illusion.

"It was obvious that we needed variations on our ambiences," admits Serafine. "So we started using the E-III's velocity parameters to control the onset of the sample. Say, I have a 3-minute loop. When I hit the key firmly, the sample starts four to eight seconds into the loop. The next time, I hit the key even harder, and the sample begins twenty seconds into the loop. By using dynamics, you can make sure the loop never starts in the same spot and identifying elements—such as bird tweets or whatever—don't always occur at the same time. This is just one of the little tricks we've discovered that really helps speed up the sound-design process."

SPOT CHECKS

Speeding up the process is good, especially when proper sound design requires that every single frame of film be



"spotted" to determine placement for each sound effect, background ambience, and Foley recording. The sound designer receives a video copy of the show—usually on the ¾-inch format—with a window dub that shows the SMPTE reading for each frame. These time-code numbers provide an exact "map" for every single audio event in the film.

The spotting process involves writing the necessary sound effects next to their appropriate SMPTE timings (an explosion at 00:15:10:27, for example), as they appear on a printed edit decision list. You can imagine how exhaustive this operation is, especially when explosions, dialog, background noises, and other audio effects can occur simultaneously.

Serafine's team splits up the massive work load. Typically, Weber oversees the entire feature, McAffie spots for Foley, Basset marks all the computer-screen sound effects (such as laser-gun blasts), and Blaignan lists all the boat effects. To avoid confusion when multiple, simultaneous sound elements are needed, every editor writes their "spots" on the list with a different color pen. It usually takes a day and a half to finish spotting a one-hour episode.

Because the video dub, tape decks, samplers, and sequencers are locked to picture, the completed edit decision list simplifies the preliminary sound-effects assembly onto Opcode's *Vision*. An editor just selects a sound effect, types the appropriate time-code number into *Vision*, and the effect is automatically time-locked to picture. If the cue is a bit off, the editor can go into the sequencer and adjust the effect frame-by-frame.

"The edit-decision list makes a lot of the work just fly by," says Serafine. "For example, the backgrounds (wind, water lapping, etc.), dialog, and Foley are cut on an AMS/Neve Audiofile hard-disk system. We just type in the time-code numbers the editor gives us, and the backgrounds are automatically placed where they belong."

Getting everything spotted, edited, and recorded on schedule keeps all four of Serafine's audio production rooms working simultaneously. The Foley and ADR room uses a Tascam DA-88 modular digital multitrack, which is locked to ¾-inch video with a Lynx controller. A Mackie 32 × 8 console handles the mixing chores.

The main sound-editing room is equipped with an E-mu E-IIIxp, a Hill Concept Series 8400 mixer, and a Mac II running *Vision*. The Audiofile system resides in the music/sound-design room, along with a Tascam MTR24 24-track recorder and another of Mackie's 32 × 8 consoles.

Sound design isn't limited to the film and television industries. Here, Serafine and Peter Gabriel discuss the sound effects used to enhance Gabriel's "Kiss That Frog" music video.

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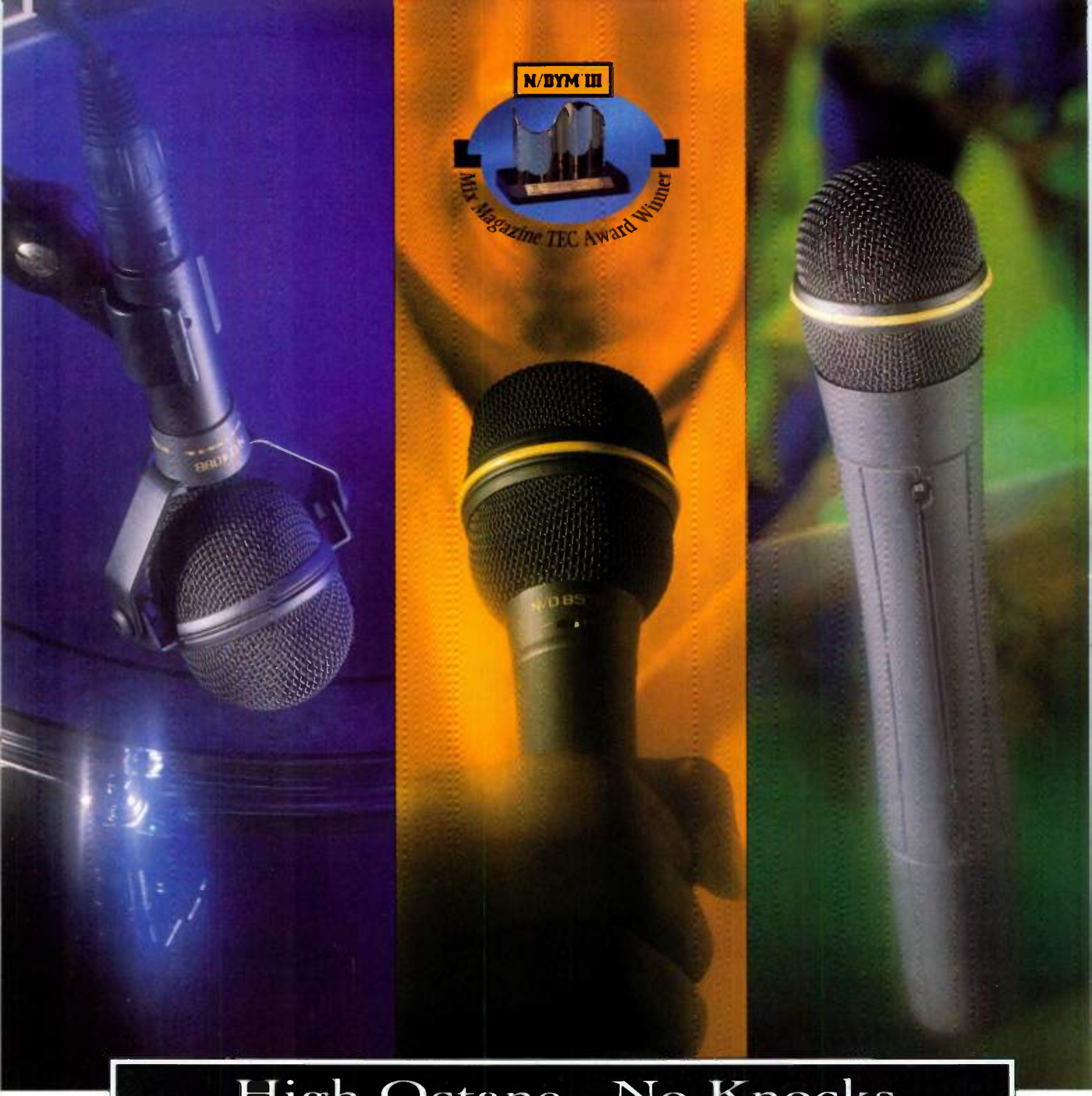

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Finally, the dub stage is outfitted with a customized Otari 54-P console and Otari MX-80 and Sony APR-24 24-track recorders. All the rooms are connected to the dub stage, so the various audio elements can be easily transfered to the final 24-track master sent to the Disney Post Group in Florida. But that's not all!

A rolling rack in every room ensures minimal downtime by providing an additional E-IIIxp, Macintosh II, videotape player and monitor, sequencing and audio editing software, and a DAT machine.

To produce underscores and other musical elements, Serafine's studio has collected an arsenal of keyboards and sound modules. The electronic armada currently includes the E-mu Proteus 1, 2, and 3; an E-mu Vintage Keys; an Ensoniq VFX; Kawai's K3, K4r, and K5; and a Korg DW-8000, M1R, 01W, and Wavestation. Kurzweil is represented

HULK HOGAN'S MIDI MUSCLES

After a hard day of kaboshing evil and jet-boating across Florida's water wonderland, Terry "Hulk" Hogan doesn't relax at Disney World, he lays down tracks in a hotel room MIDI studio. Yes, it's true. Hulk Hogan is not just a World Wrestling Federation champion, action-movie hero, and certified big bad dude, he's also an electronic musician.

Along with his manager Jimmy Hart and multi-instrumentalist J.J. Maguire, Hogan composed the lilting reggae track that became the end-title theme for *Thunder in Paradise*. (The song plays during the final credits.) The trio also collaborates on the environmental music used for scenes in the show's Scuttlebutt Bar.

"We're a team," says Maguire. We get together and bounce ideas around until we get a 'Yea.'"

Happily, this is not the story of a star using his clout to pull some buddies into an easy payday. Maguire and Hart are far from amateurs. Both were members of the Memphis-based rock band The Gentrys, who reached number four on the Billboard charts in 1965 with the song "Keep On Dancing." In recent years, Maguire maintained a songwriting and production career, while Hart managed "heels" (the bad guys) and heroes in the World Wrestling Federation. Not surprisingly, the Hogan-Hart-Maguire musical collaboration began with some theme music produced for the WWF telecasts.

"The *Thunder in Paradise* people are also the producers of *Baywatch*, and they wanted us to come up with something that sounded a little different," explains Maguire. "The *Baywatch* team—Corey Lerios and John DeAndrea—are still the main music guys, however, and everything we do goes to them for approval. But there's room for a lot of music on this show, so there's a place for everybody. Our music for the Scuttlebutt scenes even led to some guest spots on the show as Jammin' Jimmy [Hart] and Tone Deaf [Maguire]. We're the 'bar band' and occassionally the Hulkster jumps in and plays some bass."

Maguire records music sketches in his room at the Disney Grand Floridian Beach Resort. His "Rolling Thunder Hotel/ Motel Portable Demo Studio" consists of an Akai MG1214 14-track recorder; a Vestax MR66S 6-track cassette recorder; a Mackie CR-1604 mixer; an old Akai X7000 sampling keyboard ("It's great for bass, voices, and orchestra hits," he says); a Yamaha RY30 drum machine; and a Korg 05R/W.

"All the technical people were completely bamboozled by the Vestax," laughs Maguire. "They just couldn't believe the sound quality. Some of the early instrumental music we put on the show was cut completely on that machine."

Although the broadcast versions of the trio's music are now recorded on 24-track analog at Greg Rike Productions in nearby Altamont Springs, tracks from the Vestax and Akai MG1214 are sometimes transferred to 24-track for inclusion on the final mix. Bouncing hot demo tracks to the "professional" multitrack not only preserves sizzling performances that may be hard to re-create, it saves time—and speed is everything when composing music for a weekly television series.

"Man, they want these tracks, like, *yesterday*," says Maguire. "On album projects, you usually have time to fiddle-faddle away and worry over everything until the music is almost perfect. You can even bring your friends over and cart in some cheese and beer. But there's no time for that in television. What normally happens is, we get a call at two in the morning asking for some music. By 6 p.m., we've got to have something hammered out and recorded that they can lay SMPTE on and put into the show. It's wild!"

The Akai MG1214 that Maguire, Hall, and Hogan use to demo music for *Thunder in Paradise* is an integrated 12-channel mixer/14-track recorder that uses custom 1/2-inch cassette tapes. The MG1214 was manufactured from 1986 to 1989, and yes, Akai still stocks the tape.

by a K1200 and a K2000, while Roland posts its SVC-350 Vocoder, and Yamaha checks in with a DX7IIFD and a SY77. Signal processors include Lexicon's Model 224, LXP-1, and PCM70, and an Eventide H3000 Ultra Harmonizer.

"We mix all the elements to 24-track analog with Dolby SR noise reduction," explains Serafine. "To save tape we run the recorder at 15 ips. We premix everything and calibrate the master tape with tones recorded at 0 VU. If the Post Group sets *their* levels at zero, the entire audio production is mixed and ready to go. However, we lay all the audio tracks independently, so they can bring something up or down if they want to."

OVER AND OUT

Once the Post Group receives the master reel from Serafine, the final mix of sound effects, music, and dialog usually takes four days. From there, it's on to TV land, where the Hulkster and crew step into your home (if you let them) for a hour of fun and fantasy each week.

"The great thing about *Thunder in Paradise*, from a sound designer's viewpoint, is that it's really a live-action cartoon," explains Serafine. "You can go right over the edge with sound effects. Everything on screen is operating within a heightened sense of reality, so the sounds can really be exaggerated until they jump right out at you. Also, every week the show has a new theme that requires new sounds. One week, it's an episode on voodoo; the next week some Predator-type monster leaps out of the water to give Hulk some trouble. There's never a dull moment working on this show."

Although he's not exactly proud of it, **EM** *editor* **Michael Molenda** *is often accused of being a live-action cartoon.*

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In the Hall of the Reverb King

Ascending to audio royalty requires an understanding of reverb.

By Scott Wilkinson

As you walk slowly down the massive hall to meet the Reverb King, you hear your footfalls on the polished marble floor. Each step is followed by an echo that seems to hang in the air forever. The echo is not a clear repeat of each footfall, but a smear of sound that dies away very slowly.

That lingering sound is called *reverberation*, or *reverb*, and it is a vital part of virtually every sound you hear. Your brain uses it to determine the size, shape, and other characteristics of the space in which the original sound was produced. It occurs naturally almost everywhere, and it is artificially simulated in the recording studio. In fact, reverb is probably the most common signal processing effect of them all.

DMITRY PANICH

ACOUSTIC ORIGINS

Almost all enclosed and semi-enclosed spaces exhibit some reverberation. The process starts with a sound wave that emanates in a spherical pattern from a sound source and expands toward any listeners in the room, as well as nearby surfaces (walls, ceilings, windows, furniture, etc.). Once the sound wave reaches a surface, it is reflected back into the room (see **Fig. 1**), where it is reflected again and again by various surfaces. These multiple reflections also reach the listener. However, the initial sound waves always reach the listener first, because the path between the source sound and listener is shorter than any of the reflections.

Each reflection is generally lower in amplitude than the preceding one, because the sound wave loses some energy each time it is reflected. In addition to being more or less reflective, most materials are also more or less absorptive, which means they absorb some of the sound's energy rather than reflecting it. As a result, the reverberation dies away over time.

Normally, you can't hear these reflections individually, because they happen in such quick succession. Most rooms are no more than a few feet long

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in any direction, and sound travels at about 1,000 feet per second. Therefore, the sound waves are reflected many times per second in every direction (up/down, right/left, front/back). Our brain tends to smear all these rapid reflections into a continuous sound, which we call reverb. This sound has a haunting, ringing quality that lingers for some period of time after the original sound stops.

Several factors contribute to the specific reverberation of a particular space. For example, the larger the space, the longer it takes sound waves to reach the walls and reflect back to your ears. Heavy drapes and thick pile carpeting absorb much more sound than marble walls and hardwood floors. In addition, people tend to absorb a fair amount of sound energy (unless they're wearing suits of armor), so an empty room has different reverb characteristics than the same space when crowded with people.

▼

Plate reverbs produce a sharp timbre that enhances the punch of drum tracks.

The phenomenon of reverb can be distilled into several distinct parts. The most obvious component is the time it takes the reverberation to become inaudible. This *decay* time depends primarily on the reflective properties of the room—as determined by the texture of the walls, ceiling, floor, and furnishings—and the amplitude of the original sound. Also, high frequencies tend to fade away more quickly than low frequencies. In very large spaces, such as enclosed stadiums, there may be a perceptible delay between the original sound and the onset of reverberation.

PARAMETERS

One problem with acoustic reverberation is that you can't easily control it. The physical size of the space limits what you can do, so studio recordings

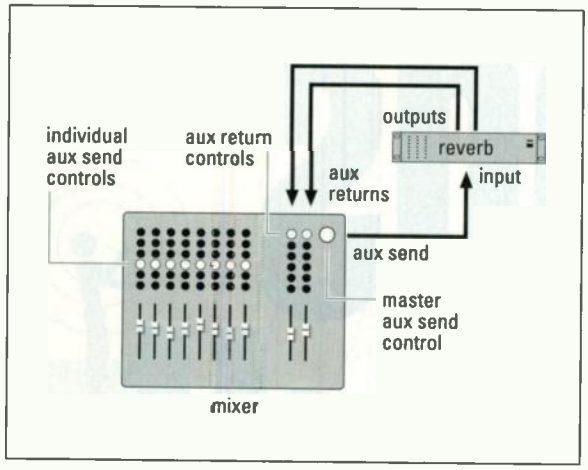


FIG. 3: A reverb unit is connected to a mixer via the mixer's aux sends and returns.

sound, because the reflections are more widely spaced in time. This parameter lets you determine the complexity of the simulated acoustical space. When programming, keep in mind that many reflective surfaces in a room result in a thicker, denser reverb.

One of the characteristics of acoustic reverberation is that high frequencies typically die away faster than low frequencies. As a result, most reverb units include a *high-frequency damping* parameter, which allows you to control the decay rate of high frequencies separately from the main reverb decay time. Some reverb units even include a *low-frequency damping* parameter. Both of these parameters provide additional control over the size and reflective characteristics of the simulated acoustical space. For example, softer surfaces cause high frequencies to decay more rapidly, while smaller rooms cause low frequencies to decay more rapidly.

CONNECTIONS AND LEVELS

The parameters of reverb are important, but they mean nothing if you don't connect the reverb unit properly and adjust the various signal levels therein. In most recording studios, the reverb or multi-effects unit is connected to a mixer's *aux send* and *aux return* (see **Fig. 3**).

This routing is possible because the input signal in each channel of the mixer is split in two. One signal proceeds through the mixer's controls and is sent on to its final output. The other signal is routed to the aux-send, which is a special "auxillary" output. The level of this signal is determined by an individual aux send control for each input channel and a master aux-send control for all signals. Most mixers include several aux sends and associated controls to accommodate several signal processors

An audio cable carries this signal to the input of the reverb unit, which processes the signal according to the parameter settings. Once the signal leaves the reverb's output, it is carried by audio cables to the aux returns, which also have their own level controls. (Normally, a reverb unit accepts a mono signal and produces a simulated stereo signal, which is sent to a pair of aux returns.) Once again, most mixers include several pairs of aux returns to accommodate several processors. The signal from the reverb is then mixed, or blended, with the unprocessed signals in the mixer and sent to the final output.

Once the reverb unit is connected to the mixer, it's time to set some levels. Most reverb units include an *input* control, which determines the level of the input signal, and an *output* control, which determines the level of the output signal. Setting the input and output level controls is part of a larger process called *gain structuring* (see "Recording Musician: Gain Stages" in the November 1993 **EM**).

Virtually all reverb units split the input signal from the mixer's aux send, processing one signal while passing the other signal with no processing. The *balance* or *wet/dry* control determines the relative balance between the affected and unaffected signals. These two signals are then mixed within the unit and sent back to the mixer's aux returns.

Keep the balance control on the reverb unit at 100 percent wet (no dry signal gets through at all) and control the balance between the affected and unaffected signal with the mixer's aux-send and -return controls. If you want one of the mixer's inputs to have more reverb, turn up its individual aux-send control. If you want all the signals in the mixer to have more reverb, turn up the master aux-send control or master aux-return control.

APPLICATIONS

As mentioned earlier, one of the primary applications of artificial reverb is to simulate an acoustical space in which your recorded ensemble "performs." To accomplish this, send the entire mix through the same reverb unit programmed to re-create the type of space you wish to simulate. All the individual aux-send controls for each instrument in the band should be set to the same value.

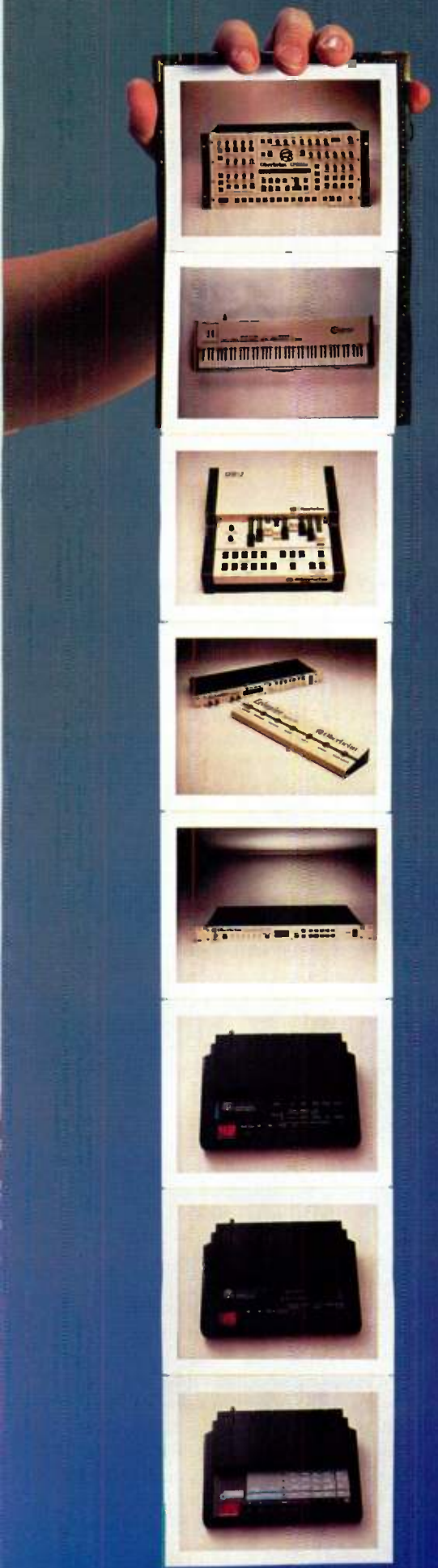
You can also apply different reverbs to individual instruments for special effects. In many pop drum mixes, for example, the snare is heavily reverbed (often with a gated and/or reverse reverb), while the kick drum is relatively dry. This approach lends an air of drama to the snare backbeat, without washing the kick drum in confusing reflections that would diminish its cohesiveness with the bass performance. Many guitar players like to apply liberal amounts of reverb to enhance their solo sounds.

Another interesting application is playing in a highly reverberant environment à la Paul Horn's *Inside the Taj Mahal.* Use a hall or cathedral reverb type with a long decay time and high aux-send and -return levels.

In most synthesizers with onboard multi-effects units, the effects are an integral part of each patch. Unfortunately, most such synths can produce only one combination of effects at a time. If the synthesizer is multitimbral (which most are these days), all parts are passed through the same effects. If you're not careful, the overall effect will be the one assigned to the last patch you called up, which may or may not serve the other parts well. Instead, you should set the synth's effect mode to "master," which allows you to select the effects you want for all the parts from that synth.

Reverb is inescapable. You hear it everywhere, and rightly so. Almost all music sounds better with reverb, which is why church choirs generally sound better than they should (given the singing skills of most choir members). Your music will sound better with reverb, too. All you need to do is experiment a bit with a digital reverb unit to discover just how much better.

Scott Wilkinson, EM *technical editor, loves playing brass music in a church that has good reverberation.*



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Strummer — Your keyboard may have a great guitar sound, but can you play a great guitar part? Yes. The Oberheim Strummer will transform you keyboard playing into a stunning and convincing performance featuring realistic guitar articulation. In addition to control over strum direction and speed, the Strummer also features Chord capture for real time single finger chords. MIDI Data can be sent on multiple channels, and can also be delayed, echoed, harmonized and trasposed. You can even control the number of "strings" being strummed via keyboard velocity.

Cyclone — Back by popular demand, the most amazing, intelligent MIDI arpeggiator the world has ever known. Create a flurry of notes or a simple arpeggio. Clone, transpose, randomize, invert and enhance any part of your keyboard performance. The Oberheim Cyclone can actually play three separate arpeggios at once. Real time MIDI commands can alter an arpeggio that is already being played.

Still hungry ? Oberheim has a couple more buns in the oven, due out this year.

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One From the Heart

CD-ROM gets up close and personal with Ann and Nancy Wilson.

By Michael Brown

Musicians such as Todd Rundgren, Peter Gabriel, and Prince have approached the interactive CD-ROM as a new means of artistic expression. But *Heart: 20 Years of Rock & Roll* is something altogether different. Produced by veteran disc jockey and author Bob Hamilton, this CD-ROM is an "interactive documentary" that tells the life stories of sisters Ann and Nancy Wilson, the heart of Heart.

WILLIAM HAMES

Ann Wilson, Nancy Wilson, and Howard Leese (from left to right) of Heart are the subjects of an interactive CD-ROM documentary.

NONLINEAR BIOGRAPHY

The story of Heart unfolds (on *Windows* PCs) through more than three hours of interviews with the Wilson sisters; their mother; the band's long-time guitarist, Howard Leese; their friends; and many of the songwriters who have collaborated with the band over the years. Some of the interviews are on video, but most are audio-only. The latter are accompanied by nearly 500 family photographs.

"We worked with Bob for about a year, doing the interviews and providing him with box loads of stuff to scan into his computer," says Nancy Wilson.

The CD also features more than 100 60-second audio clips—two full hours of music—from the band's thirteen albums. Amazingly, Hamilton secured the rights to all but five of the songs Heart has recorded over the band's long career. Clicking on screen images of the album covers yields access to the audio clips, which are presented in the same order that the songs appear on the original albums.

In addition, the disc contains lyrics and extensive liner notes for each album, including songwriting, production, engineering, and guest-artist credits. There are even a few audio and video clips in which the songwriters discuss the events and emotions that inspired them to write particular songs.

"I was kind of worried when Bob said he was only going to put 60 seconds of

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each song on the CD," admits Wilson. "I didn't think that one minute would be enough time to get the gist of each song, but it worked out really well.

"It was incredible to hear sound bites from our entire history—including some stuff we hadn't thought about in years—arranged as a body of work," she continues. "Suddenly, my life made sense to me. It was a weird and enlightening experience."

The database capabilities of Asymetrix's *Multimedia Toolbook*, the primary authoring software Hamilton used on the project, enables the user to search the entire CD—lyric sheets, song titles, and other text entries—using key words. You can browse through the CD's contents in a linear fashion, or jump between the different elements by clicking on screen gadgets.

The comprehensive nature of this CD-ROM presented Hamilton with a tremendous logistical headache: More than 300 copyrights had to be cleared before the project could be published.

"We did all the clearances ourselves," says Hamilton. "That way, the process didn't take a big bite out of the budget, but it sure took a lot of time. In fact, we spent 50 percent of our time doing noncreative things. We had to convince all the music publishers that inclusion on this CD-ROM was worthwhile for their writers. I don't think most of the publishers really understood what we were doing. Of course, once the songwriters found out about the project, they jumped on it immediately. It was just a matter of getting past the people between us and them."

Heart fans with extensive album collections will appreciate the CD-ROM's Player feature. If you replace the interactive CD-ROM with one of your favorite Heart CDs, the program plays the audio CD while it displays the liner notes from its database.

AUDIO/VIDEO PRODUCTION

Hamilton digitized all the audio for *Heart: 20 Years of Rock & Roll* using a Media Vision Pro Audio Spectrum 16 card. The 16-bit samples were recorded at 32 kHz, and the data was compressed using a proprietary algorithm. Employing data compression and a low sampling rate was the only way that Hamilton could squeeze five hours of audio onto the CD. Luckily, the audio compromise does not mar the finished product; the sound is surprisingly good.

"Ann and Nancy have always taken pains to produce great-sounding records, so it would be almost criminal to release *Heart: 20 Years of Rock & Roll* with bad sound," says Hamilton. "We worked very closely with Media Vision and went through 31 versions of the compression algorithm before we were satisfied. Ensuring quality audio reproduction was one of the trickiest aspects of the production."

As good as the music sounds, however, many of the interviews are plagued by intrusive mic-handling noise. "I think only extreme perfectionists will care about the mic noise," maintains Wilson. "You see, when we did the interviews, we didn't go into a professional studio. We were just sitting in our living rooms with kids and dogs running all around us. We were very relaxed and probably revealed more interesting things than we would have in a formal interview, where you tend to pay attention to every little thing you say."

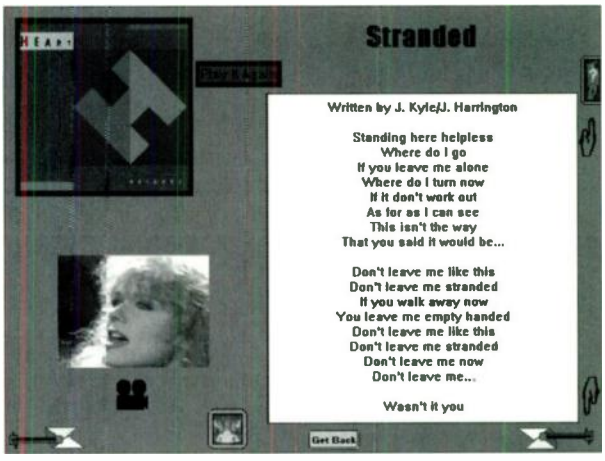
Hamilton gathered the original video material for *Heart: 20 Years of Rock & Roll* using a Sony CCD-V801 Hi-8 mm Handycam (a prosumer camcorder with time code). Of course, the Wilsons' early home movies had to be transferred from film to video tape. Once all the material was in the video domain, Hamilton digitized it using an Intel Smart Video Recorder and Microsoft's *Video for Windows*. Hamilton's development platform was an 80486 DX2 CPU running at 66 MHz with 16 MB of RAM and 2 GB of hard-disk storage.

"We edited all the clips using nothing more than the *VidEdit* utility in *Video for Windows*," says Hamilton. "We also used Adobe *Premiere for Windows* to edit some movies and *Picture Publisher* to tweak photos and other graphics."

Due to the limitations of current PC technology, the videos on the CD are of the 15-frames-per-second (fps), postage-stamp variety: 160 pixels high by 120 pixels wide. For the sake of comparison, conventional full-screen video runs at 30 fps and is 640 pixels high by 480 pixels wide.

Because Apple's *QuickTime* 2.0 for the Macintosh (scheduled to ship this summer) is capable of displaying 320 × 240 video at 30 fps second and 640 × 480 video at 15 fps, why did Hamilton stick with the PC?

"Looking at the installed base of PCs versus Macs, the PC wins hands down," explains Hamilton. "I'm into this for fun and profit. It's a fifty-fifty proposition. I want to keep doing CD-ROM projects, but I have to earn enough money to keep going. But, artistically speaking, I didn't compromise the product to increase potential sales. If an installed base was all I cared about, I would have downgraded the project to 256 colors and 8-bit sound."



The video clips (this one features Nancy Wilson in performance) are small, so they are couched among other elements.

Indeed, it takes more than a run-of-the-mill PC-compatible to play *Heart: 20 Years of Rock & Roll*. The title's memory requirement (8 MB required, 16 MB recommended) outstrips the MPC Level 2 standard, which calls for only 4 MB of RAM. Its other requirements are a blend of MPC Level 1 and MPC Level 2 standards, including an 80386 CPU (80486 recommended), 16-bit sound card, and a video card capable of displaying 32,000 colors. (The MPC specifications are formulated by the Multimedia PC Marketing Council, a nonprofit trade group that establishes standards for multimedia PC-compatible computers.)

▼

Hamilton was able to squeeze five hours of audio onto the CD.

A TRUE PREMIERE

Although Hamilton has extensive business and media experience, *Heart: 20 Years of Rock & Roll* marks his first foray into multimedia authoring. However, his knowledge about the medium and his enthusiasm for the project was such that the Wilsons were unaware that this was his first authoring project until after the title was completed. Now, as a "self-made" multimedia producer, Hamilton scoffs at those who claim that you must be prepared to spend millions of dollars to develop titles that will have any impact on the marketplace.

"That's like saying it costs a million dollars to produce a hit record," says Hamilton. "All of this is very do-able for someone who wants to get into multimedia. I don't own a $20,000 Sun workstation, and I had to really worry about spending $300 or $400 for a piece of equipment or software. But I was able to do all this myself. No one financed it, I financed it."

And while Heart uses extensive MIDI gear on stage and in the studio, Wilson says she had always been intimidated by computers. With Hamilton's guidance, however, she recently bought a PC-compatible (complete with CD-ROM drive, of course).

"Having finally put a toe into the world of computers and CD-ROM, it blows my mind that you can get so personal with high technology," enthuses Wilson. "It's kind of the opposite of what we were afraid technology would do to us. I mean, this CD-ROM practically eavesdrops on our private lives. Some people may think the CD is embarrassingly personal, but I'm proud of it. If there's anything wrong with the media and the way the media uses technology, it's that they approach everything with too much cynicism. I think our fans will get a million thrills from this project."

The only thing about *Heart: 20 Years of Rock & Roll* that the newly computer-literate Wilson *isn't* happy with is the slow access time and data transfer rates of CD-ROM. "It is frustrating looking at that little hour glass all the time," she says.

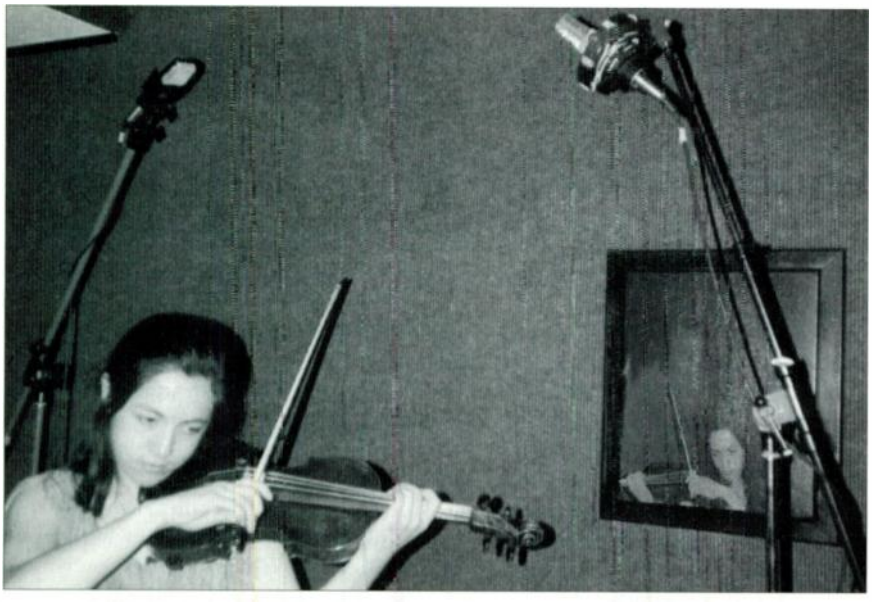
RECORDING MUSICIAN

How to Catch String Fever

Proper mic placement lends a classical touch to your recordings.

By Buddy Saleman

Who says that strings belong in a conservatory? Hey, a violin is just a funny looking guitar, and a cello is merely a violin on steroids. Don't deprive your productions of these wonderful-sounding instruments by thinking that recording them is out of your league. The fact is, if you own (or can borrow) a few good mics and have enough room in your studio to set up a few chairs, you're in business.



Renowned international violinist Aenea Keyes during the recording of her improvised solo violin album. Two AKG C414s were positioned to capture an ambient blend of room reflections and source sound.

COCTEAU CORNELL

If you have recorded vocals or an acoustic guitar, you can adapt your mic technique to record violins, cellos, and even small string sections. The only real trick is challenging your critical listening skills in determining the optimum spots for your mics. Still don't believe me? Well, let's start out slow by recording a single violin player.

SOLO VIOLIN

The player's technique and style of music usually determines my miking method. If the artist is playing classical music, I try to capture some room reflections along with the source sound to evoke the ambience of a recital hall. A nice blend can be recorded by positioning a large diaphragm condenser—my favorite is an AKG C414—approximately four feet above the instrument, pointing toward the spot where the neck meets the body.

If your microphone has multiple polar patterns, experiment until you find a pattern that offers the best-sounding balance between the violin and the room tone. A cardioid pattern is a good start, but if the room sounds especially good, try switching the pattern to omnidirectional to take better advantage of the acoustic environment. To smooth out inconsistencies in bowing technique, such as the player moving from a strong bow sound to a light pizzicato, I typically compress the signal at a 1:5 ratio with a threshold setting of -5 dB.

FIG. 1: Placing a condenser mic off-axis from the cello soundhole can reproduce full low frequencies.

In most pop and country music, the violin often fights for space in a dense mix of drums, guitars, bass, and keyboards. In these cases, ambient timbres tend to get lost in the roar of the track. Clarity is the key to breaking out of the mix, so try close-miking the instrument to enhance the source sound and minimize reflections. One of my favorite close-mic positions for violin is approximately one foot above the instrument, where the neck meets the bridge. (Leave ample room for the player's bowing.) Again, a large diaphragm condenser is the mic of choice, this time set to a hypercardioid pattern to diminish room tone. Heavier compression settings can add more sonic punch. Try a 3:1 ratio with a -10 dB threshold. If necessary, cut a few dB from the low end (100 Hz or so) to ensure the violin stands out against the guitar and bass tones.

A common problem with miking strings is the intrusion of breath sounds and clothes rustling. Careful mic positioning can minimize some of these sounds, but if you want a more pristine track, insert an expander into the signal chain. An expander reduces background noise by gradually attenuating signals that fall below a user-defined threshold. Experimenting with the threshold setting can diminish annoying environmental noises without adversely affecting the source sound.

Some players like to incorporate the sound of a piezo crystal pickup, such as Zeta's hot new VS-104, with their miked signal. I'm not a huge fan of this method. Don't get me wrong, these pickups sound great live, but they tend to produce thin timbres in the studio. I'll usually mix in a little of the pickup signal for bite and clarity, but the majority of the combined sound will be the miked signal. This article will not discuss electric violins, because the use of signal processing is more critical than mic placement when recording solid body instruments. (For a good insight on recording electric strings, see "Pro/File: The Electric Cello" in the August 1993 **EM**.)

SOLO CELLO

Cellos are sweet puppies indeed, and enhancing their full, sexy timbre is best captured with two mics. Place a quality condenser mic (set to a cardioid pattern) about two feet away from the body and between one inch to one foot above the bridge. This position should capture the full frequency spectrum of the instrument without accentuating flabby or muddy tones.

Next, take a large diaphragm dynamic mic, such as an AKG D112 or an Electro-Voice RE20, and place it 30

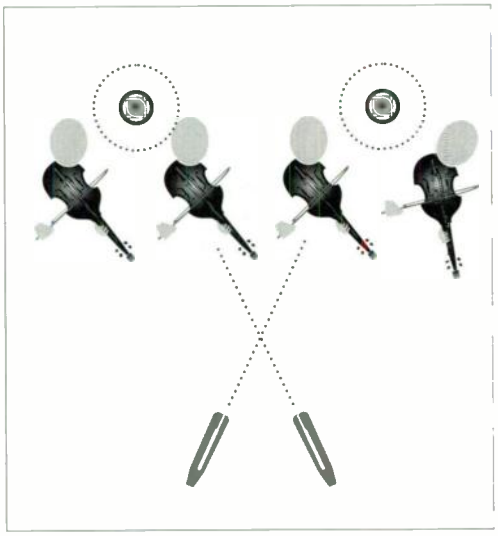


FIG. 2: Careful positioning of multiple microphones can produce a lush blend of room acoustics and the source sound.

degrees off-axis from one of the sound holes (see **Fig. 1**). Be sure to position the mic so it doesn't interfere with the player's bowing. This mic position delivers a lush bottom end that should negate any reason to pump the lows with equalization. I always prefer getting great acoustic timbres with careful mic placement, rather than playing leap frog with the console EQ. The typical ratio I use to submix the two mics is 80 percent of the condenser versus 20 percent of the dynamic. Light compression—start with a 1:5 ratio at a threshold of -5 dB—helps tighten up the blend. You can insert the compressor into the appropriate console group during the submix, or simply compress the combined track when you mix.

SECTIONS

Only a few home recordists get the opportunity to track string sections, but it pays to be prepared. Occasionally, I get calls to do children's music or theatrical scoring sessions that involve multiple strings. It's conceivable that these projects could be recorded in a typical living room. (As long as street and neighbor noises aren't obtrusive.)

When recording a violin section, I usually start by arranging the musicians in a live-performance configuration. A single row is a common setup, although it helps to move the end players inward so they can keep the ensemble easily in view. Then, I position a pair of matched, large-diaphragm condenser microphones (both set to an omnidirectional pattern) approximately four feet above seats 1 and 2 and seats 3 and 4. The mic stands should be set up behind the players, so the area directly in front of them can be reserved for music stands.

Next, I position another pair of matched condensers into an XY pattern and place them approximately ten feet in front of the players at chest height (see **Fig. 2**). These front mic stands should be facing seats 2 and 3. The four inputs (two front mics and two overhead mics) are panned and submixed to two tracks for a wide stereo perspective. The submix ratio that usually works for me is 60 percent of the overhead mics versus 40 percent of the front mics. Using compression during the submix produces a thick, robust sound. Try a 4:1 ratio with a -2 dB threshold for starters.

The key to a well-recorded string section is the blend of source sound and room environment. That's the reason I don't close-mic each instrument, or use any direct signals from pickups. I love the sound of the entire section resonating in the air. Creating a "section mix" by moving individual faders at the console doesn't produce the same expansive quality.

FINALE

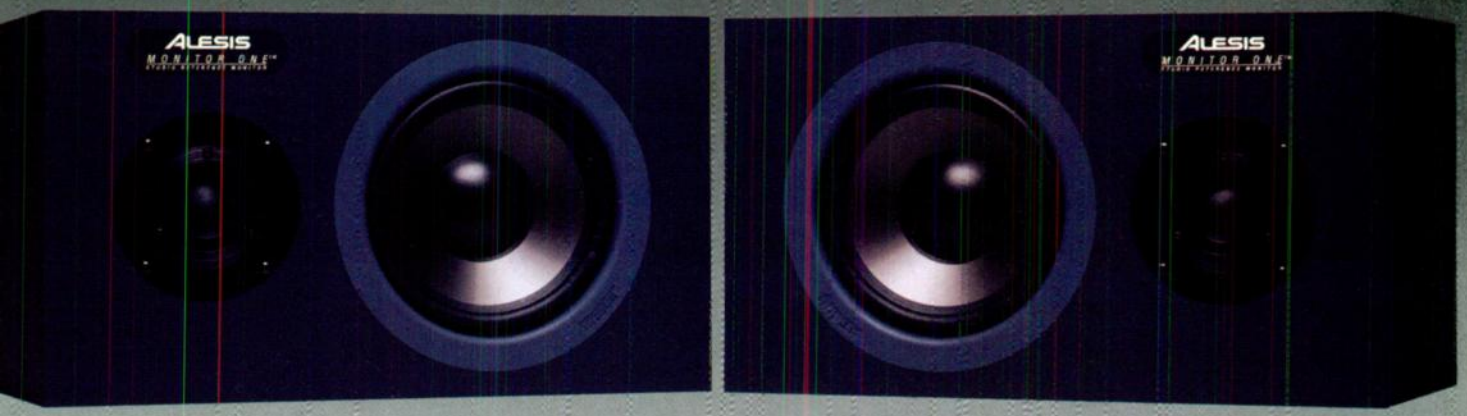
Sometimes engineers grow weary of doing the normal everyday schtick and blast off into the ridiculous. For example, George Martin allegedly used headphones as microphones while recording "Sgt. Pepper."

My personal battles against sonic boredom have produced frustration and joy, and even a few miking schemes that sounded wonderful. Once I miked a solo violin with two condensers: one in a conventional position and the other tilted off-axis to the neck. I routed the signal of the off-axis mic into a slow, dreamy chorus effect and recorded it onto a separate track. At mixdown, I tossed the chorused track into a medium plate reverb *and* a slow autopan. The resulting sound was very spooky—especially after I cut 10 kHz by a few dB—and added an atmospheric quality when mixed in with the uneffected violin track.

Another audio trick worked nicely when I recorded a cello that was outfitted with a pickup. I routed the pickup signal—using a direct box, of course—to a pitch shifter and shifted the signal down an octave. When I boosted 100 Hz by about 10 dB, the cello sounded like a contra bass after a visit to a health spa!

Needless to say, there are a "bazillion" ways to mic and process strings (that's a lot). As there are probably a few tricks yet to be discovered, always trust your ears and imagination when auditioning mic positions. If something sounds great, go with it. Creative engineers don't worry about convention. Remember, just because certain miking standards are revered in recording books doesn't mean you can't scratch them out and write in your own ideas.

Buddy Saleman *is head engineer at Sound & Vision studios in San Francisco. He just produced and engineered one of the year's breakout* a cappella *records,* Naked Noise *by the House Jacks.*



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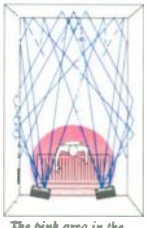

The pink area in the illustration shows where direct sound energy overpowers reflected waves in a typical mixing room. The Monitor One helps eliminate such complex acoustic problems by focusing direct sound energy toward the mixing position.

The Truth From Top To Bottom

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The result? A fully integrated speaker *system* that has no competition in its class. You'll get mixes that sound punchier and translate better no matter what speakers are used for playback. The Monitor One's top-to-bottom design philosophy is a true breakthrough for the serious recording engineer.

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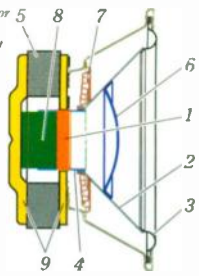

A cross section of the Monitor One's proprietary Alesis-designed 6.5" low frequency driver.

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2. *Mineral-filled polypropylene cone.*
3. *Damped linear rubber surround.*
4. *Kapton former.*
5. *Ceramic magnet.*
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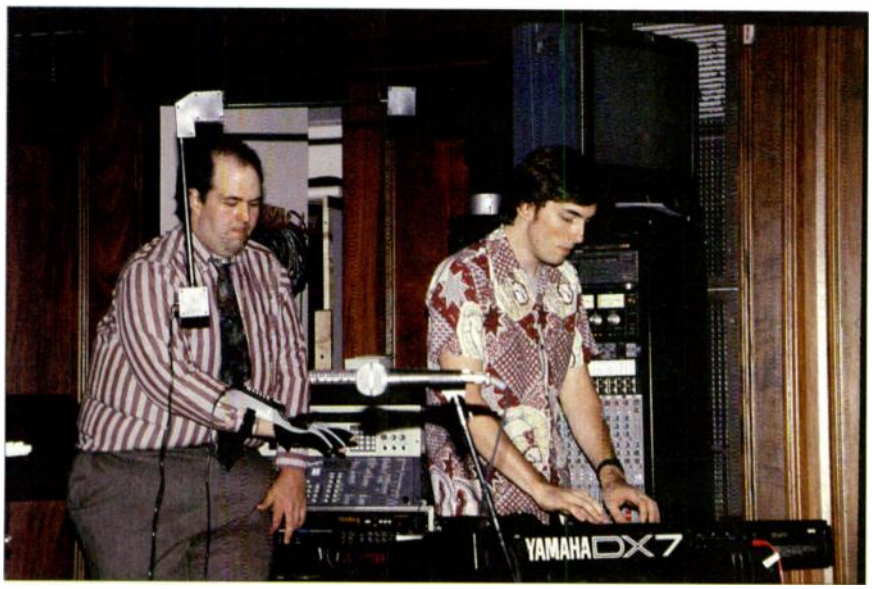
The Sound of One Hand Clapping

An inexpensive data glove slaps some life into solo performances.

By Josh Wilson

This is no ordinary synthesizer recital. Clad in formal attire, except for a peculiar, cybernetic-looking glove on his right hand, John Lamar stands before the audience and allows silence to fill the chamber. Slowly, purposefully, he begins to move his arms and body as if in the throes of a minimalist ballet.

Suddenly he is summoning sighs and windstorms, ghostly organs and violins, the sound of bottles breaking and bells ringing, all from thin air. The performance, entitled *Breaking Solitudes*, is spontaneous, improvised, and practically supernatural. But there are no real ghosts involved, just imagination and affordable high-technology.



Using a Nintendo PowerGlove, John Lamar (left) steps into his virtual-reality performance space, accompanied by keyboardist John Burkhardt of the Berklee College of Music.

To perform the music for *Breaking Solitudes*, Lamar steps into an interactive virtual-reality environment—a "virtual performance space"—where an invisible orchestra hangs in the air, awaiting his command. Using a Nintendo PowerGlove interfaced with his Macintosh and synthesizer array, Lamar moves his hand and fingers in a series of specific gestures, touching certain points in space, causing particular musical events to occur. Themes, melodies, notes, and sound effects can be produced, modified, and rearranged according to his direction.

"The PowerGlove transmits ultrasonic signals to a sensor-array about six feet away," Lamar explains, "which is interfaced with the Macintosh. The signals are translated into coordinates describing the glove's location in space, as well as whether any of the fingers are bent. I use the glove to move my hand in the virtual environment, where I can control what happens musically."

VIRTUAL MUSICALITY

In the 1980s, virtual reality was first explored as a means of making music. This pioneering work required expensive hardware, software, and VR interfaces, such as the specially designed,

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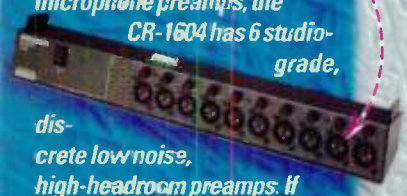

ROTATE IT: $25* Not shown: The RotoPod bracket. It rotates the CR-1604's jack panel onto the same plane as the mixer's controls. Cool huh?

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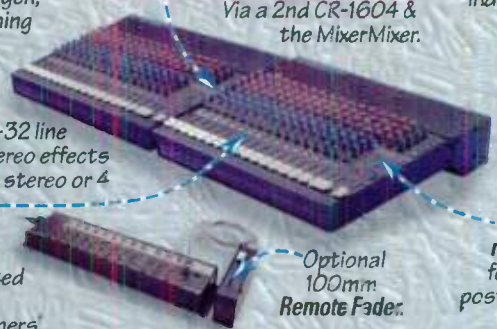
Individual **channel signal metering** via Solo lets you initially set levels via trim controls, then forget 'em thanks to forgiving **UnityPlus gain structure**.

32 CHANNELS! Via a 2nd CR-1604 & the MixerMixer.

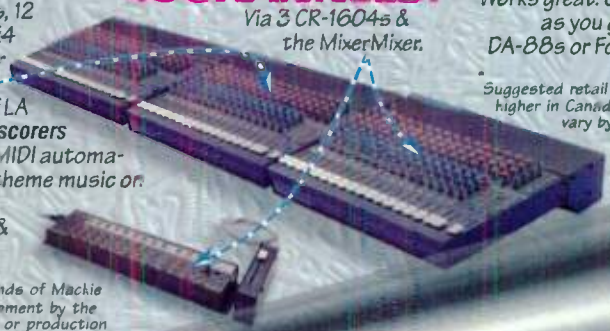


Two CR-1604s give you 20-32 line inputs, 12 mic inputs, 8 stereo effects returns, 16 direct outs & 2 stereo or 4 mono submasters. This is the set-up that remix wizard **Bonzai Jim Caruso** uses to produce top-charted dance mixes for Madonna, George Michael & many others†.

Optional 100mm **Remote Fader**.

While we make a world-class 8•Bus recording console, Greg wanted us to point out just how nice a match the CR-1604 is with **8-track digital recorders**. Use Channels 1-8 to feed your 8-track via post-EQ/post-fader Channel Access jacks; run the tape outputs into Channels 9-16 (**split monitoring**). Works great. Costs less. Expands as you get more ADAT™s or DA-88s or Fostex™s or whatever.

48 CHANNELS! Via 3 CR-1604s & the MixerMixer.



Three CR-1604s give you 30-48 line inputs, 18 mic inputs, 12 stereo effects returns, 24 direct outs & 3 stereo or 6 mono submasters. A favorite configuration of LA "power-user" **film and TV scorers** (often with OTTO-1604 MIDI automation) for incidental and theme music on programs such as "The Simpsons," "Baywatch" & "Days of Our Lives."†

*Suggested retail price. Price is slightly higher in Canada. Price anywhere may vary by the phase of the moon or the price of cattle futures.

†Mention indicates use by Friends of Mackie endorsee, NOT specific endorsement by the artist, program, manufacturer or production company mentioned. An impressive list of famous Mackie users is included with your kit when you call toll-free.

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Hard Disk Recording Doesn't Have To Be Hard On Your Wallet.

"...in a price/performance comparison, the DR4d would be hard to beat. Thumbs up on this one."
George Petersen, MIX Magazine

TEC 1994 NOMINEE

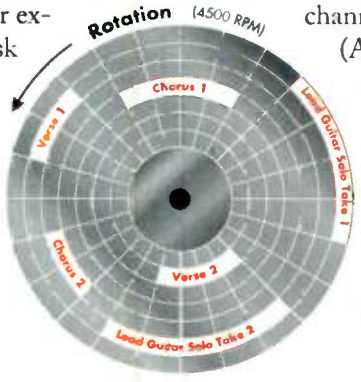
"...great sound, useful features, and friendly operation... technology that is sure to set a new standard in affordable recording"
David Frangioni, EQ Magazine

Ah, decisions, decisions. You want to buy a new multitrack recorder, and you want to go digital so that you'll get the best possible sound quality. And you'd like to buy a hard disk recorder, rather than tape, so you can get random access editing power. And finally, it's got to be something you can really afford. But there's a problem.... don't all hard disk systems require expensive add-in hardware and software, to already expensive computers? Not anymore!

The DR4d is the solution for those looking for an alternative to expensive, complex computer-based systems, or the limitations and mechanical uncertainty of tape recorders. It offers a perfect combination of hard disk recording benefits with an easy-to-use interface.

The DR4d can record up to four tracks simultaneously to standard SCSI hard disks, either internal or external drives. An optional 213MB internal disk offers 40 track minutes of recording (44.1k-Hz) right out of the box. To expand your recording time, simply connect external drives to the DR4d's supplied SCSI port.

With standard tape machine-style controls the DR4d is by far the easiest hard disk recorder to operate, which means that you can get to work immediately creating music rather than setting up and operating a computer system. Punch ins/outs can be performed manually or automatically from the front panel, or by footswitch, naturally.



On a spinning hard disk, the sections of music can be accessed almost instantaneously by the moving heads of the drive mechanism. This allows you to seamlessly output parts regardless of their location on the disk. Also, music can be easily rearranged in ways not possible with tape.

Now you can start to take advantage of random access editing. You can cut, copy, and paste sections of audio with ease. Our Jog/Shuttle wheel lets you scrub through the audio at various speeds, forwards or backwards. Try out different arrangements. Create perfect tracks by combining the best sections from multiple takes. And you can edit with confidence, because if you change your mind you can instantly Undo your last edit - even after the power is turned off and on again! Imagine it. Do it. It's that simple.

You can instantly move to 108 memorized locations at the touch of a button, and these locate points may be entered manually or on-the-fly. It's also simple to set up **seamlessly looping** repeat sections, so it's easy to jam over tracks. No more wasting time on rewinding tape!

Of course, how the DR4d sounds is as important as how it works. Advanced 18-bit oversampling A/D and D/A converters insure crystal clear sound, and with a full 96dB dynamic range, the DR4d offers no-compromise specs. The four balanced 1/4" input and output jacks are switchable between -10 and +4 operation, and 2-channel digital I/O is included standard (AES-EBU and SPDIF) with two additional digital ports optional.

Need more than four tracks? Four DR4d's can be linked to create a 16-track system. And for synchronization to other gear, just add the optional MIDI or SMPTE interfaces.

And best of all, the DR4d is an **affordable** reality: suggested list is only $2495.00 (or $1995.00 w/o hard disk)! Multitrack disk recording *is* within your reach, so see your Akai dealer today for a complete demo!

Now Available - Version 3.0 Release: Track Merging, Midi Machine Control, and Midi Time Code support!!

On tape, the sections of music are physically located far from each other, separated by many feet of the tape itself. Since you have to move all that tape past the heads to get where you want to go, it's impossible to jump instantly from one section to another. It wastes time, and limits creativity!

Intro Verse 1 Chorus 1 Verse 2 Lead Solo

DR4d

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high-priced VPL Data Glove. Obviously, virtual-reality technology was too costly for small studios and independent composers, so most of the experimentation was done by composers and programmers working in corporate or academic institutions, such as the Massachusetts Institute of Technology's Media Lab. The promise of cyberspace remained just that, distant, tempting, and out of reach financially and technically.

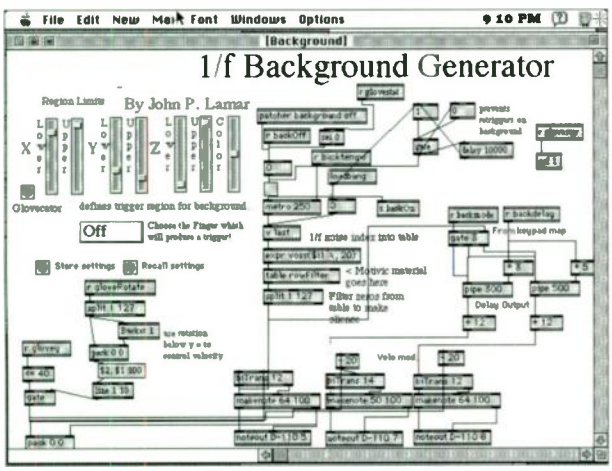
For Lamar, a musician and composer living in Boston, that reality changed in the spring of 1992, when he purchased a $20 Nintendo PowerGlove (manufactured by Mattel). Originally designed for use with arcade games such as *Mike Tyson's Punchout,* the PowerGlove can be hooked up to a Mac using a $170 Goldbrick, a Nintendo/Macintosh interface (available from Transfinite Systems, 318 Acton St., Carlisle, MA 01741; tel. and fax (508) 371-7148). For less than $200, Lamar transformed his ordinary home studio into a cutting-edge hyper-instrument.

The basic studio—which represents an overall investment of about $8,000—includes two Roland D-110 synths, a Yamaha DX7 keyboard, a Yamaha TX802 FM tone generator and TX7 FM expander, a Peavey SP sample/playback module, and an Opcode Studio 4 MIDI interface. Effects processors include two Alesis QuadraVerbs, an A.R.T. ER1 digital reverb, and a Lexicon LXP-5. Two mixing boards, a Mackie 1202 and a Yamaha MV-802, handle the signal routing. A Macintosh PowerBook 160, with 10 MB of RAM and a 160 MB hard drive, is used to drive the music software and coordinate the various components.

The glue that allows the various elements to work together is *MAX,* Opcode's object-oriented programming language. Named after Max Matthews, a founding father of computer music, *MAX* is a powerful and flexible tool that allows advanced control of sound production interfaces and peripherals, including CD-ROM drives, MIDI, synthesizers, effects processors, and the PowerGlove.

Programs are constructed in *MAX* by connecting fundamental building blocks, or *objects,* together. The programmer creates objects that perform different tasks, from creating graphic displays and controlling peripherals, to manipulating and transforming sound and data generated by synthesizers. Objects appear on the computer screen as boxes with identifying labels. For example, an object called "Glove" is used to get incoming data from the PowerGlove. Each object has input and output ports and is connected to the other objects by lines drawn on the computer screen, which are called "patch cords."

▼ Lamar was unhappy with the performance limitations of electronic music.



The portion of *MAX* code shown above uses a 1/f noise generator to select notes from the musical theme on which *Breaking Solitudes* is based.

TESTING THE LIMITS

Lamar developed his virtual performance space after running up against the limitations of traditional, live, electronic music. In the recording studio, an artist can compose and record multiple tracks of melodies, harmonies, percussion, and other sounds. But it's incredibly difficult for a solo artist to re-create such multilayered productions in live performance. Many musicians don't even try, opting to bring prerecorded tapes or sequences into the performance arena.

"Performing to 'canned' background music doesn't have much appeal to an audience, because there's nothing happening on stage to involve them," remarks Lamar. "Ideally, electronic music should be produced live, on stage, in real time."

Another limitation that bothers Lamar is the keyboard itself. "There's no reason a synth needs a traditional keyboard, except that it makes it easier to sell to rock musicians," he says. "The keyboard has three hundred and some-odd years of bias built around it, in terms of the scales and keys you can use. These things are only useful for keyboard music; they are not necessary to create music. The freedom offered by alternative controllers such as the PowerGlove may forge the musical language of the future."

In addition to his solo efforts, Lamar is looking for other ways to work with VR and music synthesis, including the addition of other musicians to form a "Virtual Ensemble." He recruits most of his co-conspirators from his alma mater, Boston's Berklee College of Music, where he works as the Computer Systems Coordinator for the Music Synthesis Department. So far, Lamar's virtual ensemble includes a keyboard player and a saxophonist. In this live "band" context, Lamar extends the use of the PowerGlove to modify the sounds produced by the other instrumentalists as they interact and improvise. A bit further down the road, Lamar plans to develop an interactive multimedia piece, using a larger ensemble and more sophisticated VR manipulations.

"I want to have new ways of expressing things that have been expressed before," says Lamar. "For me, music and composition is about creating a new voice, and *that's* what an artist should be doing."

(Contact John Lamar via e-mail at jlamar@it.berklee.edu.)

Josh Wilson *is a freelance writer and mountain biker based in San Francisco but currently in transit.*

Questions and Answers

When you can't tell the ACs from the DCs, learn to adapt.

By Alan Gary Campbell

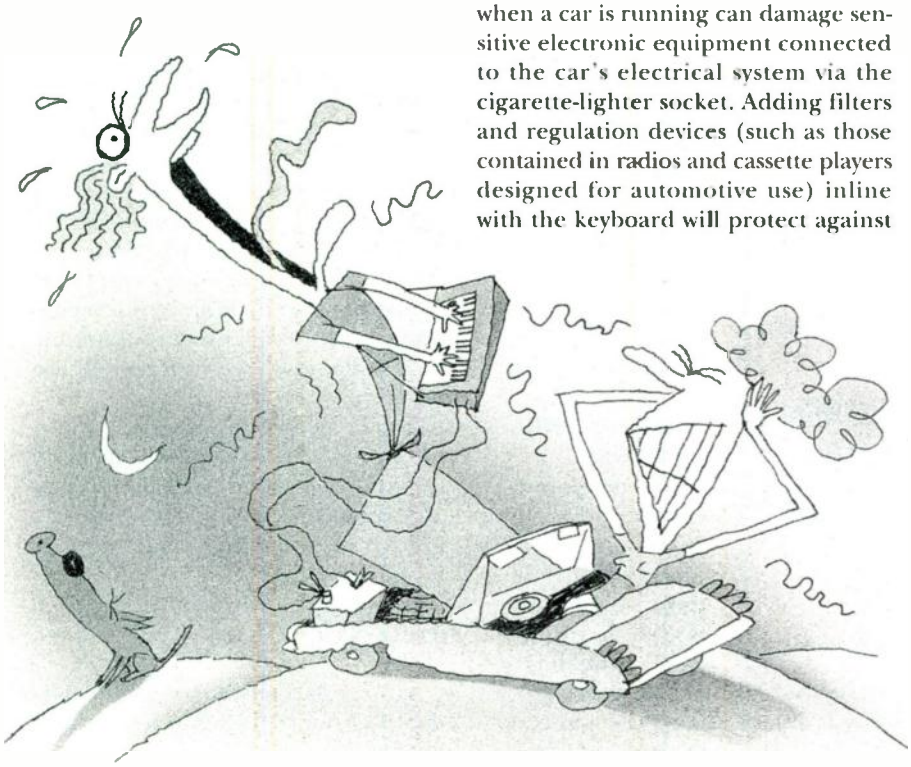
Q. Is it possible to run a portable synth from the cigarette-lighter connection in a car? I've heard that this can damage some equipment.

Q. I have a couple of small keyboards that run off similarly small AC adapters, but not off batteries. Is there any way to connect a battery pack to the adapter input?

A. Voltage fluctuations that occur when a car is running can damage sensitive electronic equipment connected to the car's electrical system via the cigarette-lighter socket. Adding filters and regulation devices (such as those contained in radios and cassette players designed for automotive use) inline with the keyboard will protect against most of the RFI and overvoltage. In theory, the best course of action is to use automotive electrical power only when the car is not running. Unfortunately, power-hungry keyboards—even small ones—can drain a car battery in a hurry. Unless you're serenading your date and want to get stuck in the woods, this could be considered a disadvantage.

In addition, the voltage from the battery may prove to be too much for some keyboards, causing damage. The requirements vary too widely to give specific recommendations here. You had better stick to internal batteries (or take an accordion).

You can plug a battery pack into the DC input of a portable keyboard, if you are careful not to apply a battery voltage in excess of the input rating *and* you get the polarity right. Mouser Electronics carries a 6-cell, D-size holder that is a good choice for use with units that require 9 volts DC. Fair warning: This applications *devours* batteries. Batteries deplete nonrenewable resources, and their disposal is a potential source of environmental contamination. Look for alternative methods of power first. (Solar cells for portable keyboards were discussed in the July 1992 "Service Clinic.") Consider rechargeable alkaline batteries, at the least. Note that nickel-cadmium batteries have lower terminal voltages and are not a good choice in this application.



JACK DESROCHER

Q. I need to replace a hard-to-find AC adapter that provides a low-voltage AC output. A friend of mine says I can use an adapter that puts out a DC voltage, instead. Is this correct?

A. Rarely can a DC-output adapter replace an AC-output type. You should proceed with caution.

Generally, when the use of an AC-output adapter is specified, the device in question contains a bipolar power supply that requires full-wave AC. **Figure 1** shows a generalized representation of such an AC-driven, bipolar power-supply circuit. The illustrated circuit is typical of sound modules and effects devices, though it is simplified for clarity. (An additional, parallel, +5V regulator to drive digital circuitry is common.) The upper diode rectifies the positive half-cycle of the AC input in order to drive the associated positive-voltage regulator. The lower diode rectifies the negative half-cycle in order to drive the associated negative-voltage regulator. If the input is driven by a DC-output adapter, only the positive portion of the circuit will be activated, and damage may result.

In contrast, **Fig. 2** shows an AC-driven, unipolar power-supply circuit, typical of those found in some MIDI and other nonaudio accessories. The sole input diode rectifies only the positive half-cycle of the input waveform; the negative half-cycle is blocked. From an engineering standpoint, this is the preferred design for a unipolar power supply driven by a "wall wart." (Some designs use a full-wave rectifier to reduce ripple.) An AC-output adapter (in tech jargon referred to as a "wall-mount transformer") is simpler in construction, more reliable, and cooler in operation than a DC-output device, which must squeeze AC-to-DC conversion into an impossible space.

However, DC-output adapters are produced in quantity to power toys, games, and other devices that often have little or no internal voltage regulation. Such adapters are readily available and cheap, so they are commonly used for music products.

The differences between unipolar power-supply circuits designed for use with AC sources and those designed for use with DC are few. Both resemble **Fig. 2**, though a circuit designed for use with DC will generally have a smaller-value filter capacitor. In addition, some

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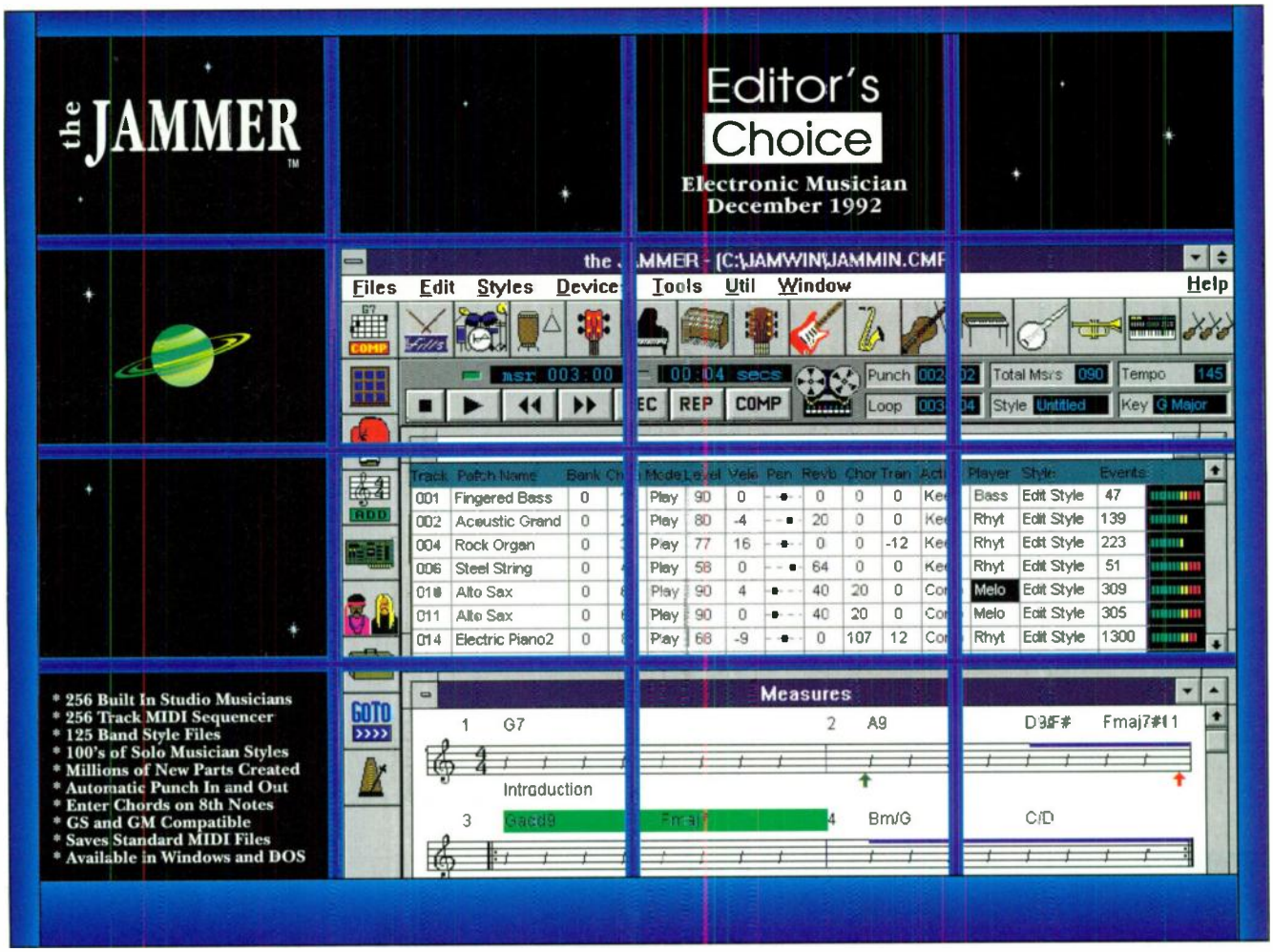

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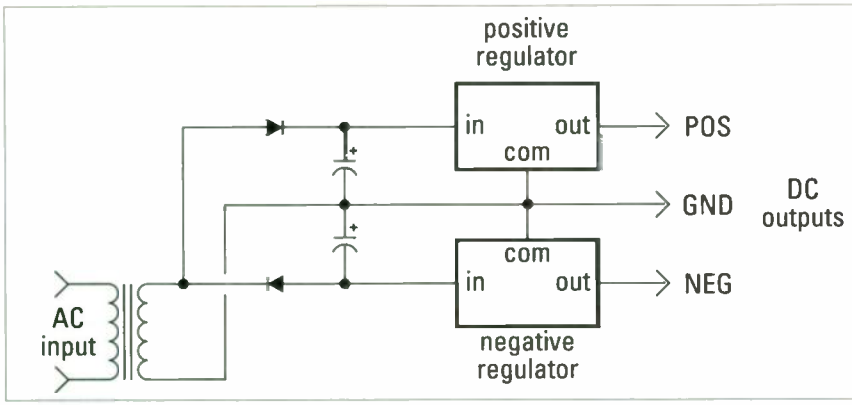

FIG. 1: Generalized AC-input, bipolar power supply.

designers foolishly omit the diode. (In the DC-input version, the diode is not used as a rectifier, but serves "merely" as reverse-polarity protection.)

Clearly, a DC-output adapter can be used to drive a unipolar, AC-input circuit. The rectifier diode is no impediment, and the extra filtering supplied by the larger-value filter capacitor is useful. But if the DC-output adapter selected as a substitute has too high of an output voltage, the current capacity of the diode and the heat-dissipation capability of the regulator may be exceeded, with disastrous results. For example, if the original AC-output adapter is rated at 9 VAC, is that 9V peak-to-peak, peak, or RMS? Assume it's RMS. Then you can safely apply a 9-volt DC adapter. Or can you? Adapters vary greatly with regard to internal regulation. It's possible that, with a light load, a "9-volt" adapter might deliver almost twice as much.

The best choice is to stick with an original-equipment adapter, though these can be almost impossible to obtain for older gear. Failing that, both Digi-Key and Mouser Electronics carry numerous substitute adapters. Digi-Key even has an equivalent for the hard-to-find 24 VAC adapter used with the vintage Moog Rogue and Taurus II synths. (Ask for Digi-Key part number T620-ND. It comes with stripped/tinned leads and requires a miniature phone plug, part number SC1055-ND or equivalent.) Both companies sell to the consumer, neither has a minimum-order requirement, and both companies have provided good service to **EM** readers through the years. For catalogs and ordering information, call or write:

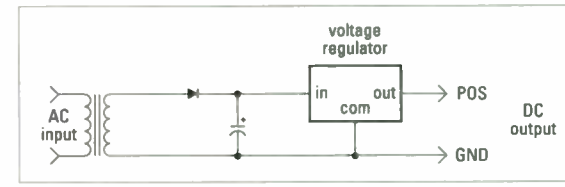

FIG. 2: Generalized AC-input, unipolar power supply.

Digi-Key, 701 Brooks Ave. South, PO Box 677, Thief River Falls, MN 56701-0677; tel. (800) DIGI-KEY. Mouser Electronics can be reached at 2401 Highway 287 North, Mansfield, TX 76063-4827; tel. (800) 992-9943. (Use this number for catalog requests only.)

Q. My Ensoniq KS-32 won't power up reliably. Sometimes I have to turn it off and on two or three times before it wakes up. The salesman says there is a fix for this. Is there?

A. A few KS-32 units with operating system 3.00 display this annoying, but harmless, symptom. Version 3.01, a simple ROM upgrade, fixes this. Replacement EPROMs are available to Ensoniq Authorized Repair Stations at no charge, though most repair stations charge a nominal fee for installation.

DINOSAURUS EXTREMIS

While perusing a recent issue of the industry publication *Musical Merchandise Review*, I happened upon a blurb for Seymour Duncan's new Antiquity line of replacement pickups: humbuckers, Strats, Telecasters, and Jaguars, to name a few. The specs and attention to detail were obvious and impressive enough, but when I read that "dust particles and grime have been imbedded deep into the pickup, the magnets have been discolored and slightly demagnetized, nickel covers have been aged, and the wiring...tempered to duplicate the surge of thousands of hours of electricity," I thought they might be kidding. (It was the April issue.) Hey, these guys are *serious*. Duncan relates, "I wanted to create vintage replacement pickups that look, sound, smell, and taste like the originals." I haven't tasted any, but I can almost smell 'em from the picture. Kudos.

LYRICON IN LIMBO

A reader desperately needs a schematic and any available service data for his Computone Lyricon Wind Driver. The pitch-bend function is kaput. If you have a schematic you can photocopy for him, send a note (or the photocopied material) to my attention, c/o **EM**, 6400 Hollis St. #12, Emeryville, CA 94608.

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

FEELING IS BELIEVING.

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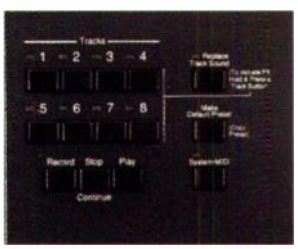

With the KS-32, you can combine the sound you're playing with up to 16 internal or external sounds – all at the touch of a button.

Once you get the feel of the KS-32, you won't want to lay a finger on any other keyboard. Touch one today at your Authorized ENSONIQ Dealer. For the one nearest you, call 1-800-553-5151.

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Reviews

Arboretum Systems Hyperprism (Mac)

By Peter Freeman

A unique DSP program lets you create audio effects in real time.

Thanks to the impressive speed of the latest Macintosh computers (Quadra and Power Mac), the prospect of real-time, digital-audio effects processing has finally become a reality. Arboretum Systems' *Hyperprism* is one of the first commercially available programs to provide a wide range of high-quality, real-time, DSP effects on the Macintosh.

Hyperprism 1.1 runs under System 7.0 on a Mac IIci or better. It also runs on a Power Mac in 68040 emulation mode, but a native Power Macintosh version is later this year. The program requires any of Digidesign's hard-disk recording cards for playback. I started testing the program with a Mac IIci and an Audiomedia II card, then upgraded to a Quadra 650, also with the Audiomedia II.

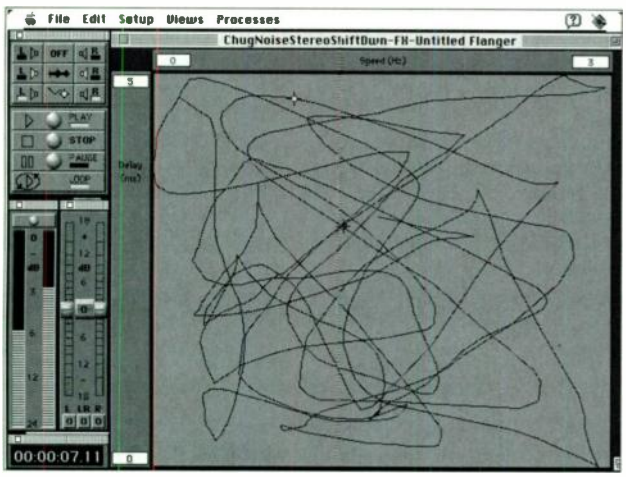

FIG. 1: Arboretum Systems' *Hyperprism* uses DSP algorithms to create a broad range of effects. You can control two sets of effects parameters in real time by drawing with the mouse in a Blue Window.

The program requires a minimum of 2 MB of RAM, but this doesn't provide much delay time. I normally allocated the program an admittedly excessive amount (8 MB), which worked fine.

The software operates in either File mode or Direct mode. In File mode, the program processes preexisting *Sound Designer II* or AIFF files. This is always done nondestructively, that is, the original sound file is never altered. In Direct mode, *Hyperprism*'s processes are applied in real time to audio that is routed through the Digidesign hardware.

Hyperprism's power lies primarily in its multipass principle, in which multiple effects processes can be applied to a file in succession. When the desired effect is obtained, you can save the results as a new file, then apply further effects and repeat the operation.

THE BLUE WINDOW

Hyperprism sports a slick, aesthetically pleasing, graphic user interface. One of the most unusual aspects of the program is the way its various effects processes are controlled. *Hyperprism* uses a Blue Window, which is (surprise!) a blue, resizable Macintosh window. The top and left edges of the window are labeled with the two parameters relevant to the current effect (see **Fig. 1**). Dragging the mouse anywhere inside the blue area specifies X and Y coordinates that simultaneously control both parameters.

As soon as you start dragging, the sound file being processed starts to play, and you hear the effect being applied. If the Loop button is enabled, the sound file loops back to its start, while the program records all parameter changes drawn in the Blue Window. In this way, you perform effects changes in real time. This performance can be immediately played back and auditioned.

Hyperprism records not only the sonic changes made in the Blue Window, but also the exact mouse position from moment to moment, generating a black line against the window's blue background. During playback, the momentary position of the cursor is represented by a dot traveling along this line, exactly as recorded. The program provides a continuous numerical update of the cursor position, expressed as a set of coordinates hovering next to the current mouse position.

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AUGUST 1994

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This is a novel and fun method for controlling effects. The parameters available in the Blue Window for each effect are fixed, rather than user-definable. However, some control is provided over the parameters' ranges, in the form of two text fields at either end of the left and top edges of the window. Here, the user can specify upper and lower limits for both parameters, which is helpful.

Besides the Blue Window, the only other controls include a set of onscreen buttons for specifying the behavior of the audio outputs (called Listening Mode controls), tape-machine-style Transport controls, and a stereo master-level fader. A large, VU meter features green onscreen LEDs with yellow peak indicators, and the unit also has a large, green time display.

CREATIVE EFFECTS

Hyperprism offers a variety of filters, including lowpass, bandpass, highpass, and band-reject. You can also create single and multitap delays and echo (quasi reverb). As expected, you get a phaser, flanger, and chorus, but you also get a ring modulator and ring shifter. There are many pitch-related effects, such as frequency shifter, pitch follower, Doppler, pitch-time changer, and vibrato. To top it off, you can create tremolo, envelope follower, stereo dynamics, and balance algorithms. Space doesn't permit a discussion of all these possibilities, so I'll concentrate on the most interesting and unusual ones.

Ring shifting is a combination of conventional ring modulation and frequency shifting. In practice, this sounds like a more complex version of ring modulation, which typically produces a clangorous timbre by itself. Even if the pitch-shifting aspects of this algorithm produced aliasing, you wouldn't notice it. I like creative effects that let me twist and torture the dry sound, so I had a lot of fun with this feature.

The pitch follower works differently than *Hyperprism*'s other effects. It performs an analysis on a selected sound file in order to determine its pitch envelope. This envelope can then be superimposed on another sound file. This reminds me somewhat of Digidesign's *Turbosynth* program in that, to a degree, one sound can be assigned the pitch contour of another sound. (*Turbosynth* was first reviewed in the November 1988 **EM**. The latest version, *Turbosynth SC*, was reviewed in the January 1994 issue.)

Rather than providing the MuTronesque effects its name suggests, the envelope follower performs a similar analysis of the amplitude envelope, which can then be used on another sound file.

Hyperprism's Doppler effect varies the pitch and stereo position of a sound to simulate real-life Doppler effects. Although this has somewhat limited practical applications, it's useful for specialized effects. Sound designers will love this one.

The pitch-time changer varies the pitch and playback speed of a sound file, resulting in real-time time-compression/expansion (in File mode). Again, it's not something most people are likely to use all the time, but it's good for wild and wonderful special effects.

Finally, the stereo dynamics effect provides a unique way of controlling the perceived spatial position of a sound file in the stereo field. The X (horizontal) axis controls the level of the right channel, from 0 to 100%, while the Y (vertical) axis controls the level of the left channel. Thus, if you click the mouse at the top left edge of the Blue Window, you hear full-volume left channel only. As you move from left to right across the top, you fade in the right channel, while the left channel stays at 100%. If you move the cursor down toward the bottom, the left channel amplitude decreases. Moving the mouse around the window yields many interesting placement effects that

HYPERPRISM: THE NEXT GENERATION

Arboretum Systems has been working diligently to release the next major upgrade to *Hyperprism*. Version 1.5, which should be shipping by the end of June, will include real-time MIDI control, the most important feature missing from version 1.1. Version 1.5 can also run in the background or foreground in Direct or File mode. As of this writing, the beta version has been successfully tested with a variety of major Macintosh sequencers. The developer also plans to support *OMS*, which will allow *Hyperprism* to run simultaneously with *OMS*-compatible Macintosh sequencers. This will greatly increase the program's potential as a real-world tool, particularly in a mixing situation.

In version 1.5, the MIDI Mapping dialog box (see **Fig. A**) is opened from the Setup menu, at which point the program immediately starts sensing incoming MIDI data. You send the program whatever MIDI message you wish to use as a controller, and its name is displayed next to the currently selected *Hyperprism* command. This lets you easily map any MIDI Control Change or note message to the Play, Record, Stop, Pause, Horizontal, and Vertical commands. The shipping version will also support MIDI control of the Select Window and New Effect commands. As soon as you configure the setup and click "OK," the program actively responds to the specified MIDI commands. Custom mappings can be saved in a Preferences file.

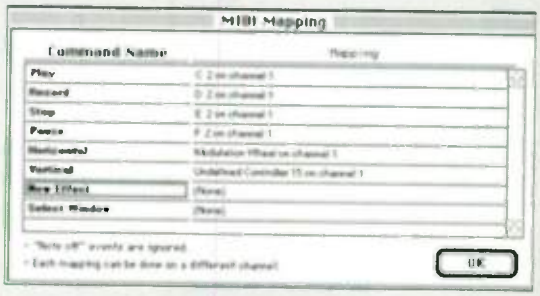

FIG. A: In the MIDI Mapping dialog box, you can assign MIDI note and Control Change messages to trigger the Play, Record, Stop, Pause, Horizontal, and Vertical functions. At press time, Arboretum was adding MIDI control of the New Effect and Select Window commands.

Arboretum Systems is currently conducting experiments using *MAX* patches to control most of the effects. If this venture proves successful, it will allow very sophisticated, detailed control of *Hyperprism*'s effects algorithms.

—Steve Oppenheimer

would be difficult to accomplish otherwise. It's simple, but effective.

APPRAISING THE SOUND

Overall, I found *Hyperprism*'s effects to be of high quality and very useful. On the conventional end of the spectrum, the program's chorusing, phasing, and flanging sound good, although the phasing and flanging are a bit too similar for my tastes.

The delay effects are more problematic, particularly on complex and lengthy stereo sound files. Unless you are very careful, the delay processor frequently generates audible artifacts. A plethora of clicks, pops, and general unpleasantness provided an eloquent testimonial to the sheer DSP calculation horsepower required to produce this effect in real time. The delays were totally unusable on the IIci; even on a Quadra 650, they rarely were clean. I don't think this is a big deal, as it seems inefficient to use a computer to create an effect that can be obtained more easily and flexibly with a $300 DDL.

Often, the clicks occur due to clipping when the delay time is very short and the original sound has extreme dynamics. In these cases, the program's Pre Attenuation parameter can reduce the problem. The Parameter Speed Change parameter is also useful for click control.

Hyperprism's manual states that the program can produce multiple effects simultaneously, using the Additional Process menu option. However, the effects that can be layered on top are the single and multitap delays and the echo program, and I was unable to achieve satisfactory results with any of them. Once again, in both File and Direct mode, it was click-and-pop city. I wasn't surprised to find this, knowing the Herculean computing task it represents, and it doesn't change the fact that *Hyperprism* can produce wonderful single effects.

Although *Hyperprism*'s multipass processing may seem a somewhat long-winded and time-consuming way to apply multiple effects to a sound file, the method works, and it allows highly complex and unusual sounds to be created. The alternative way to accomplish this—performing many simultaneous effects in real time—just isn't viable on the Macintosh at this point, so the multipass approach was the obvious solution. I was able to achieve many interesting effects in this manner.

I tested *Hyperprism* on a variety of sounds and sound sources, from drum loops to live guitar performances, and I achieved a wide range of conventional and bizarre effects. Processing a live guitar signal that was already going through several stomp boxes was particularly fun. The guitarist changed his playing as I manipulated *Hyperprism*'s effects, and we recorded the results to DAT. Later, we took snippets of these recordings and processed them further, as sound files, with other *Hyperprism* algorithms. It was a blast.

Some of the most interesting results were obtained after multiple passes of different effects, layered onto a single sound file. Using this method, most sounds quickly left the realm of the familiar.

COMPLAINTS DEPARTMENT

Gripes? Yes, I have a few. First of all, the number of parameters available in real time for each effect is too limited. In the real world, you can grab a bunch of knobs on an effects device (particularly old analog stomp-boxes) and twiddle as fast as you want. In *Hyperprism*, you have quick access to the controls, but the mouse/Blue-Window method of data entry is inherently limiting. Using the mouse as the only means of control for such a wide and powerful range of effects is a shame, to say the

Product Summary

PRODUCT:
Hyperprism 1.1
PRICE:
$495
SYSTEM REQUIREMENTS:
Macintosh IIci, Quadra, or Power Mac with 2 MB of RAM; System 7.0 or later; Digidesign Audiomedia I/II, Sound Tools I/II, or Pro Tools
MANUFACTURER:
Arboretum Systems
PO Box 470580
San Francisco, CA 94147
tel. (415) 931-7720
fax (415) 931-7725

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least. The Blue Window, while interesting, should be one way of controlling *Hyperprism*'s effects, not the only way.

The other obvious omission, which will be addressed in version 1.5 of *Hyperprism*, is MIDI control. In version 1.1, there is no way to control *Hyperprism*'s effects via MIDI, which limits the practical usefulness of the program. Fortunately, Arboretum expects to ship version 1.5 by the time you read this (see sidebar, "Hyperprism: The Next Generation").

Due to the complex and demanding nature of real-time DSP, don't bother running *Hyperprism* unless you have at least a Centris or Quadra. Otherwise, you won't be happy with the results. I had a few crashes when I ran *Hyperprism* on the IIci, but they vanished when I upgraded to the Quadra. The moral of the story? Horsepower, horsepower, horsepower.

Hyperprism's manual, while informative, could use a bit of help in the organizational department. For example, the section covering installation—*Hyperprism* uses authorization-based copy-protection—was at the back of the manual, *after* the descriptions of the effects. Still, after some page-flipping, I found the information I needed.

THUMBS UP

What's the final verdict on *Hyperprism*? Thumbs up, definitely. Arboretum has taken a bold and exciting step with this program. In addition to being one of the first of its kind, it is a unique and powerful weapon for your arsenal.

This program, although in its early stages, is extremely promising, and I had great fun using it. *Hyperprism* immediately proved itself musically useful for processing live instruments in Direct mode and working with sound files on a hard drive in File mode. The program let me create added dimensions to samples I'd long since grown tired of. If you are a Mac and Digidesign user who is into sound processing and experimenting with cool and unusual effects, go buy it.

Peter Freeman *is a freelance bassist/synthesist and composer living in New York City. 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

Midi Mark Dance Construction Set

By Al Eaton

Technical flaws mar an otherwise useful collection.

Dance Construction Set, Vol. 1, from Midi Mark Productions, is an audio CD containing 72 minutes and more than 1,200 samples of loops and snips of rhythm-instrument sounds; synth bass, lead, and pad sounds; and other sound effects. These audio building blocks—98 in all—can be used by themselves, or as the foundation for dance-music rhythm tracks.

The looped patterns include a wide variety of styles, ranging from Industrial House to ethnic percussion. The selections come in 1-bar to 4-bar phrases, with tempos ranging from 102 bpm to 147 bpm. There is only one loop at each of the extreme tempos, though; the average tempo is around 125 bpm.

The drum and percussion samples are an assortment of stock sounds from various drum machines and multitimbral synths, including the Korg S3 and M1, Ensoniq SQ-R, Alesis SR-16 and HR-16B, Roland S-50, and Akai S900. A few recordings of live drum sounds round out the offering.

Tracks 1 through 81 can be used freely, without worrying about copyright issues or use fees. Tracks 83 through 99, however, are copyrighted licks produced by Darin Black and Victor Concepcion and cannot be used without obtaining their permission and paying use fees. Track 82 contains an audible disclaimer to notify the listener of this condition. This information is also printed in the documentation that accompanies the CD. In my opinion, such notification should also be placed on the outer jacket, so potential purchasers are informed of these conditions *before* they plunk down their $75.

The documentation is pretty weak. On some tracks, for example, the documentation indicates that a particular track has only one hit, when in fact there might be two hits on the track.

WHAT'S YOUR BEEF?

Regarding the looped phrases on this CD, I have the same criticism that I've had of many similar products: the technique the producers used to record them. For example, a 2-bar, 4/4 loop is exactly two bars long and does not repeat the downbeat of the first bar. Ideally, you set the loop points at the zero crossings of the repeated and original

Product Summary

PRODUCT:
Dance Construction Set, Vol. 1
PRICE:
$75
MANUFACTURER:
Midi Mark Productions
PO Box 217
Whittier, CA 90608
tel. (310) 699-0095
fax (310) 699-0864

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EASE OF USE	● ●
AUDIO QUALITY	● ●
VALUE	● ● ●

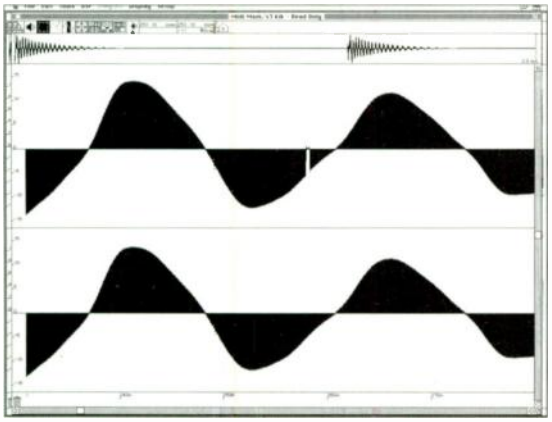


FIG. 1: This magnified view of a kick-drum waveform reveals a sonic anomaly indicative of the pops and clicks present on many *Dance Construction Set, Vol. 1* tracks.

downbeats. That way, you know exactly where to put the loop points, with no guesswork. Without that crucial, repeated downbeat, it's difficult to set the loop point for the phrase after sampling it.

There are a couple of ways to get around this problem, neither of which is very simple. The least desirable approach calls for manually retriggering the sample as it plays. But unless you have the timing of an atomic clock, you won't be accurate.

Alternatively, you could set the tempo of your sequencer to match the tempo of the loop, which is printed in the CD's documentation, and have the sequencer retrigger the sample. This solution is a problem because not all sequencers play at exactly the same speed, so you might find it necessary to fine-adjust the tempo within the sampler. This method would probably put you in between exact tempos (e.g., 110.5 bpm or 122.35 bpm), which some sequencers do not support. In that case, you'd have to tweak the sample loop in order to get it all tight.

A better idea is to set the tempo of the loop to match the sequencer tempo. As you listen to the sequencer's click, adjust the tempo of the loop by retuning the sample until it fits. When sampling loops such as these, it's a good idea to leave a little air in front of the sample, so that the start time can be adjusted to get the best feel from the loop.

TAKE A LISTEN

Listening to this CD, I discovered that many of the samples contain clicks, pops, and other noises that I can't imagine were part of the original sounds. These sonic anomalies are particularly apparent on some of the samples that are offered with more than one hit. There are audible glitches in one hit—or even between hits—but not in the other hit.

Beyond the noise problem, I also discovered that the first hit on some samples sounded markedly different than the second hit. The different sonic qualities of the two hits negates the ostensible purpose of providing them, which is to allow you set the level on your sampler with the first and trigger the sampler on the second.

When I loaded a few of the offending samples into *Sound Designer II* and examined their waveforms, I found that my ears had not deceived me. **Figure 1** shows the magnified waveform of a kick-drum sample that contains a pop distinctly uncharacteristic of any kick drum I've ever heard.

Figure 2 shows what are supposed to be two identical snare-drum hits. Note, however, that the amplitude of the second hit is noticeably higher than that of the first hit.

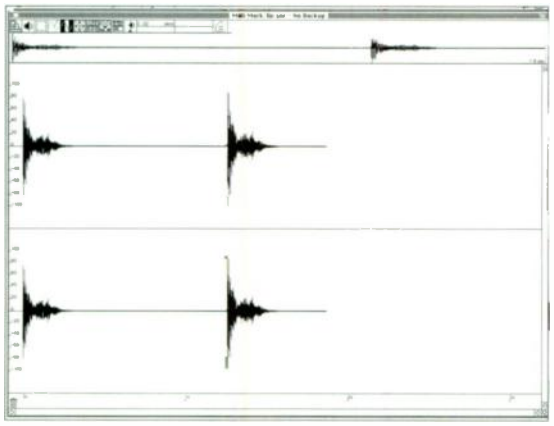


FIG. 2: These two snare-drum hits are supposed to be identical, but the amplitude of the second hit is noticeably higher.

A DECENT BUY

Although I liked many of the sounds on this CD, it would be a much better buy if the noise problems were eliminated, the documentation more comprehensive, and the rhythmic phrases made more suitable for sampling and looping. Putting the same material on CD-ROM, with the rhythmic patterns prelooped and preformatted for popular sampler platforms, would also be a good idea.

Criticisms aside, *Dance Construction Set, Vol. 1* is a decent buy for those who don't relish the thought of spending the time and money to collect all these sounds on their own.

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 #438 on Reader Service Card

Roland SDE-330 and SRV-330

By Darius Taghavy

Take a roller coaster ride in Roland's Sound Space.

What a dream! I move a pitch wheel, and a crash cymbal swirls around my head. I strum a chord, and it flies up toward the ceiling and disappears. Suddenly, I'm recording all these wacky spatial fly-bys into my sequencer to create the ultimate animated mix. But when I wake up, my monitor speakers seem to be winking at me. Is all this really possible?

Roland answers in the affirmative, with two new processors aimed at recordists who don't want just another multi-effects box. The SDE-330 Dimensional Space Delay and SRV-330 Dimensional Space Reverb employ Roland Sound Space (RSS) surround sound technology to combine conventional signal-processing effects with 3-D sound placement.

Unfortunately, the documentation does not explain how phase, amplitude, and frequency are manipulated to make this spatial wizardry happen. For the curious, RSS technology was explained in "3-D Audio," in the October 1992 **EM**. Technical curiosity aside, can the SDE-330 and SRV-330 really bring my dream to life?

TWIN BOXES

Before answering that question, let's look at the physical layout of these wonder boxes. The units share an identical industrial design: a black, 1U rack-mount casing eleven inches deep, with an internal power supply. Backpanel, 1/4-inch jacks are used for the L/R inputs and outputs (switchable +4/-20 dBm), assignable expression pedal, bypass switch, and an assignable footswitch (which also can be used for the SDE-330's tap tempo). MIDI In, Out, and Thru jacks complete the rear panel.

On the front panel, dual-concentric input trims are complemented by a master wet/dry control. Two 7-segment level indicators monitor the stereo input signals. An LED indicates when MIDI data is received.

USER INTERFACE

The window into the world of 3-dimensional space consists of a green, 2-line by 17-character, backlit LCD. A larger, 3-character LCD displays preset numbers. A system parameter allows adjustable contrast, but visibility is limited to roughly 35 degrees above or below the display.

The interface is intuitive enough to figure out without the manual, and there's context-sensitive, online help. (How often do you get *that* on hardware products?) You can even program the order in which you see the parameters and can display any one editable parameter in the same screen as the preset name.

Data is entered using twelve buttons and a knob. The Program button dials

▼

The SRV-330's algorithms offer amazing capabilities.

up presets and lets you compare an edited preset with the original (or even another) preset. An Edit button allows tweaking of presets, with three parameters visible on each line of the LCD display. Dedicated Select buttons access each parameter for editing. Other controls include Page, which toggles the operation of the data-entry knob between parameters and parameter

The SRV-330 Dimensional Space Reverb uses RSS 3-D audio technology for some truly outrageous spatial effects. The early reflections get extremely high marks, especially for mixdown.

values; Memory; System; Exit; and Bypass, which can also be programmed as a mute button.

The continuous-dial, data-entry knob is convenient, jumping through values and pages in increments of ten. Increment/decrement buttons offer more precise access to the parameters and accelerate to high speed when they are held down.

The effects algorithms in both devices are preset chains of specific effects. You can't change the effects in a chain, or the order in which they occur. (Of course, you can disable an effect within a chain by zeroing its value.) Because you can't customize the algorithms, the focus of editing is customizing the units' parameters. Fortunately, Roland provides an intelligent selection of parameters, with adequate ranges for editing.

SHARED AUDIO FEATURES

The SDE-330 and SRV-330 have many audio features in common. The sampling rate for both units is 44.1 kHz. They use 16-bit, Sigma Delta converters, while internal processing is 30-bit. Roland claims a frequency response of 20 Hz to 20 kHz, with Total Harmonic Distortion at 0.02%.

Both units feature a fully parametric, 3-band equalizer (±12 dB) that is available in all algorithms. I would have liked more attenuation to support static or sweeping comb filtering (via controller modulation), but what you get is powerful and useful. The EQ is especially handy in the SRV-330, where it can be used to substantially alter reverb timbres to produce a wider range of effects than you might expect from the unit's basic reverb algorithms.

The EQ is always first in the chain in the SRV-330, so it can be applied to the entire mix before adding reverb. This is the conventional way to get a realistic room sound; the only EQ you normally add after the reverb is to compensate for a live-performance space. For delay effects, on the other hand, you usually want to shape the processed signal on individual tracks, either for tracking, or at mixdown. For this reason, the EQ is always last in the chain in the SDE-330.

MIDI IMPLEMENTATION

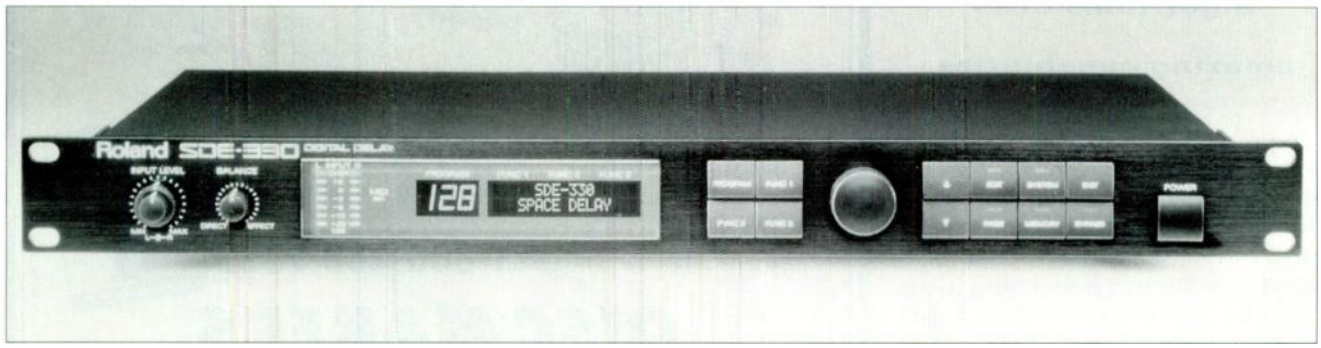
The MIDI power of the SDE-330 and SRV-330 is pretty much Roland's standard fare, which is good, but not exceptional. Virtually all editable parameters can be controlled using Velocity, Pressure, Pitch Bend, MIDI Control Change messages, or a Note-On. Of course, you also can use the optional footswitch and continuous expression pedal.

As with many Roland devices, however, you can only modulate three parameters simultaneously in real time on the SDE. The SRV is more generous, allowing up to five simultaneous MIDI parameter changes. You can even assign one MIDI source to control multiple destinations. The parameter changes can be viewed on the LCD, as well as heard, as they occur. Another nice touch is that you can set a minimum and maximum parameter value, which allows range limiting and inversion and lets you switch between two user-programmed values.

You can do SysEx dumps, and all parameters can be accessed via SysEx for control from editing software. There's only one Program Change map and no support for Bank Select.

SDE-330 SPECIFICS

The SDE-330 is no ordinary delay. Almost every conceivable delay-based ef-



Roland's SDE-330 Dimensional Space Delay combines RSS technology with a well-conceived set of digital delay parameters. The 3-D section is subtle, but lets you produce amazing animated delay effects.

fect can be achieved, which is aptly demonstrated by its 200 RAM and 100 ROM presets. The nineteen algorithms range from a simple Precision Delay to a mind-boggling Stereo 3D Non-Linear. You get reverse delay, ducking delay, true reverse, and lots more. Five algorithms use discrete stereo processing, while the others sum the input signals and generate a synthesized stereo output. Applying 3-D processing to delay effects produces amazing animation of the stereo image.

All but five algorithms allow you to set delay times as a function of tempo and note duration. Tempo can be set manually, via MIDI Clock (very cool), or by tapping a footpedal. You specify the note value (quarter, eighth and sixteenth notes, including dotted values and triplets); the SDE-330 automatically calculates tempo and delay times and faithfully follows tempo changes.

The downside? The longest delay time is 2.9 seconds, and you can't design your own algorithms. I wish it were less expensive, too. (Just wishing!) But when it comes to special effects, the SDE-330 is right up there with the best. As a guitarist, I haven't had so much fun with a delay box in a long time.

SRV-330 SPECIFICS

The SRV-330's reverbs range from warm and silky to rude and bizarre. Enough usable presets are available among the staggering 400 selections (100 RAM/300 ROM) to get you started

Product Summary

PRODUCT:
SDE-330 Dimensional Space Delay
SRV-330 Dimensional Space Reverb

PRICE:
SDE-330 $1,195
SRV-330 $1,195

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	● ● ● ◖

right away. Of the 22 algorithms, nine are discrete stereo. However, you are limited to factory-set arrangements.

All the SRV-330's algorithms offer amazing sonic capabilities. The Plate Section has a slight metallic character and can easily create a nice sizzle for snare and cymbals. The early reflections are simply outstanding.

The most intense algorithm is 3D Non-Linear, with 28 parameters, including spatial control of Azimuth and Elevation. From reverse reverbs to downright weird effects, this algorithm almost makes the impossible possible. Running an entire drum submix through it can yield dramatic results and breathe new life into old rhythms or samples.

Unlike the SDE-330 presets, the SRV presets mostly are straightforward configurations of rooms, halls, plates, and early reflections. (Roland offers a demo CD, so you can hear them for yourself.) I experienced good to excellent results

▼

The 3-D early reflections let you put instruments in a common space, yet keep them well defined.

with every application I tried, although I missed a pitch shifter for fattening up vocals.

Thanks to the excellent EQ, I easily tailored reverb timbres to kick drums and electric basses, without risking a "too wet" effect that messed with the rhythmic groove. The noise gate works unobtrusively and helps tame audible hiss and other unwanted artifacts.

The SRV-330 absolutely shines during mixdown. Unlike many reverb units that work well on individual instruments but create audio soup when processing a busy mix, the SRV-330's 3-D early reflections algorithms are well suited to putting instruments in a common space, yet maintaining enough "air" to keep them defined and separated.

THE SCOOP ON 3-D

Although Roland claims the RSS spatial processing offers 360 degree placement on a horizontal plane, in practice the effect is subtle, especially on the SRV-330. Even after positioning myself in the sweet spot between speakers and concentrating intensely, I couldn't hear much more than a wide pan. Elevation (60 degrees up or down) was even less perceptible.

On the other hand, when animating a multitap delay, such as the SDE-330's 8Tap 3D Delay, the 3-D processing produces a nice "roundabout" effect that places the taps all over the sound spectrum. Unfortunately, such animation is handicapped when enacting real-time parameter changes, because crackling and signal dropouts are often audible if the changes are too severe.

In all fairness, simulating surround sound with just two moving coils is not a trivial challenge. I commend Roland for their continued commitment to 3-D sound development and for lowering the entry fee to their RSS technology.

SWOOPING OUT

Although the SDE-330 and SRV-330 offer unusual spatial-placement parameters, their 3-D capabilities sometimes are disappointing. Fortunately, they are good delay and reverb units, so you can simply regard the 3-D stuff as icing on the cake.

As a bread-and-butter delay processor, the SDE-330 may be overkill. However, if you are looking for an extremely versatile delay box, and can live with a 2.9 second maximum delay time, take a good look at it. It's fun, clean, and features excellent animated panning.

The SRV-330 has really grown on me. Special effects aside, it earns its keep as a dedicated reverb processor. Parameters can be tweaked to your heart's content, and the unit's 3-D early reflections provide exceptional room simulations. Overall, the SDE-330 and SRV-330 are powerful signal processors that should delight preset users and parameter tweakers alike.

Darius Taghavy, *a technical consultant, worked as a software engineer for Commodore and Ensoniq. He communicates in English, German, C, Assembly, and his favorite language, Music.*

Circle #439 on Reader Service Card

Yamaha TG300 Tone Generator

By Jim Pierson-Perry

Yamaha offers a kinder, gentler GM synth.

Wavetable-based, General MIDI synths are increasingly popular, offering easy access to synth sounds and decent sound quality. Of course, values like "easy" and "decent" are relative. Last year, Yamaha entered the General MIDI synth market with the TG100, which provided decent sounds as GM sample-playback modules go, but didn't impress synth veterans. As for ease of use, editing was difficult, and it had no battery-backed memory, so it lost its settings when powered down.

One year later, it's a new ball game. The TG300 represents a major overhaul, with an improved user interface and beefed-up synthesis capabilities. It has three times its predecessor's sample memory and improved effects processing. MIDI Control Change messages allow real-time alteration of synth and effects parameters. The sounds are noticeably improved, too. It appears Yamaha is making their strongest bid yet to grab a big share of the GM sound-module market. (For more on General MIDI, see "MIDI for the Masses" in the August 1991 EM.)

FIRST APPEARANCES

Roughly the size of a thick, hardback book, the TG300 is attractively styled and fits comfortably on a desktop with other computer peripherals. (One difference between General MIDI modules and previous MIDI synths is that the modules often are as much computer peripherals as musical instruments.) Its front panel is dominated by a large, backlit, 8-line by 21-character LCD and a rotary data-entry dial. Four comfortably sized cursor keys help you navigate through the display screen, in concert with seven other editing buttons, a master volume knob, and an on/off button.

A pair of front-panel RCA jacks admit an external stereo audio source (such as a CD-ROM player), which is merged

with the TG300's audio output. The external signal is trimmed with an input-level knob and monitored by a clipping indicator. A ¼-inch, stereo headphone jack is controlled with the main output level.

The unit's rear panel has a set of MIDI In, Out, and Thru jacks; a pair of stereo ¼-inch audio outs; the LCD contrast control; and an 8-pin, mini-DIN, serial connector for the onboard Macintosh or PC MIDI interface. The power adapter is a cursed, space-eating wall-wart.

The computer interface, introduced in the TG100 (reviewed in the February 1993 **EM**), is sweet. A slide switch determines whether the unit responds through its MIDI ports or the built-in computer interface. When using the onboard computer interface, data received at the MIDI In port passes directly to the computer.

Mac users can connect directly; all software I tested worked fine using a 1 MHz data rate. PC users need to ensure that they have the appropriate drivers or that their software is compatible. Unfortunately, as of this writing, Yamaha has not released information on how to obtain the required *Windows* drivers.

IN THE MODE

The TG300 is 32-note polyphonic, split across the number of active Parts. In Multitimbral mode, it provides sixteen independent Parts, following the General MIDI guidelines. In Single mode, one Part responds on a selectable MIDI channel. The mode is set from the front panel only.

Product Summary

PRODUCT:
TG300 Tone Generator
PRICE:
$895
MANUFACTURER:
Yamaha Corporation of America
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	● ● ● ● ◖
SOUND QUALITY	● ● ● ◖
VALUE	● ● ● ●

Altogether, the TG300 has 456 preset Voices (instruments) and 128 editable internal Voices, which can be saved to an external device via System Exclusive. In Single mode, the unit provides 32 preset and 128 editable Voices. There are separate Multitimbral modes for compatibility with three common sound-module "standards." Yamaha treats each as a separate "sound module." Each "module" includes a set of Voice banks (128 Voices each) and Drum kits (61 to 67 sounds.

Multitimbral module GM-A is designed for General MIDI Level 1 and has six preset Voice banks, one user bank, and six Drum kits. GM-B follows the Roland GS standard, with sixteen preset banks, one user bank, and nine Drum kits. Despite the large number of banks, most share a common set of Voices with some variations. The C/M module emulates the older C/M music standard (e.g., Roland MT-32), with a single Voice bank and Drum kit.

VOICE ARCHITECTURE

Sounds are created using Yamaha's AWM2 sample-playback (wavetable) synthesis. There are 195 waveforms stored in the 6 MB of ROM sample memory. Unfortunately, there are no slots for waveform or program cards, as in the SY55 or TG500. A big improvement over the TG100 is that edited Parts, Voices, and effects programs are retained in memory when the TG300 is turned off.

The capabilities of the TG300's components have been significantly expanded over the TG100, as well. Elements, which correspond to a single oscillator, are made from a ROM sample waveform with settings for the synthesis parameters. A Voice is composed of one or two Elements.

Each Part includes a specified Voice or drum kit and a MIDI channel, with control over output level, mono/polyphonic play, Velocity sensitivity, microtonal scaling, pitch-bend range, portamento time, and effects-send levels. The microtonal feature lets you adjust the pitch of each note in the chromatic scale by +63/-64 cents. The tuning assignments are created within one standard octave, and the other octaves follow the same settings.

Different drum kits are available depending on the current multitimbral mode. Each Part has a drum-setup configuration, which lets you tailor level, pan, pitch, filter resonance and cutoff, EG, and effect-send levels for the individual drum sounds. You can define up to 127 multiple-instrument groups that determine whether playing a new Note-On cuts off an earlier note (e.g., for open and closed high-hats).

While Elements are dynamically assigned during play, you can reserve a number of them for a Part to ensure that critical Parts are fully voiced. Several Element parameters are doubled at the Part level for secondary control. This lets you create a basic Voice, then use it in different Parts, with independent variations. This is handy for quickly creating ensembles.

Panning, which can be set for Parts and Voices, deserves special mention. In addition to normal left/right positioning, the TG300 includes a special panning feature at each level. When a Part is set to Random, the pan position ping-pongs. If a Voice is set to Scaling, its pan position depends on the MIDI note number.

The TG300 allows considerable customization in how Parts respond to MIDI messages. Each Part can be individually set to respond to Pitch Bend, Modulation, Channel or Poly Pressure, and two assignable Control Change messages. The controllers can affect pitch, filter cutoff frequency, amplitude, and LFO.

PRESET SOUNDS

The TG300's preset sounds are of higher quality than most General MIDI modules I've auditioned. The unit is also extremely quiet, which is quite noticeable when compared to the Sound Canvas. In general, most sounds have a lot of presence and readily cut through a mix. The ability to use MIDI controllers to manipulate timbral parameters and effects levels also helps spice up performances.

On an individual basis, some of the acoustic instrument sounds are too bright and resonant, especially the acoustic pianos, strings, and woodwinds. In ensemble, this disappears, and the sounds mesh nicely.

On the other hand, pads and synth leads are noticeably better than competing General MIDI modules I've heard in terms of timbral depth and animation. Good examples of this are Choir Pad, Bowed Pad, Halo Pad, and SoundTrk. Drums and sound effects are good, with a lot of punch in the toms and snares.

Some of the 32 Single presets provide creative examples of TG300 programming. Particularly good were EP Pad, Nu-Age, and Fat Saw. Countering this are several that sound like mildly reworked General MIDI sounds (organs, piano) and two that are just ugly: Java (bad gamelans) and Ice Cream (the latest Jungle Loop clone). Despite the General MIDI emphasis and the lack of card slots, a lot of potential remains for third-party sound sculptors.

EFFECTS PROCESSOR

Effects processing in the TG300 is far better than in the TG100, both in variety and quality. There are 32 preset and 16 user-programmable effects programs. Each program can use up to five processing stages: pre-reverb (effects that go before reverb), reverb, chorus, Pre-Variation, and Variation. The latter two are simply groups of effects; the term "Variation" has no apparent significance.

Yamaha's TG300 offers better sounds, more programming power, and more MIDI control than the company's previous GM modules, yet is easy to use. Its built-in PC/Mac interface is a nice bonus.

Each stage offers a different, though overlapping, selection of algorithms. These algorithms include distortion, 3-band EQ, chorus, flanger, delay, reverb (eleven flavors), Symphonic (Yamaha's custom stereo chorus), rotary speaker, tremolo, autopan, phaser, pitch change, auto-wah, exciter, compressor, early reflections, gated and reverse gated reverb, echo, and cross-delay. Each algorithm has six to ten adjustable parameters to customize the overall effects programs.

In Single mode, you can assign any effects program to a Voice. It's a one-step operation to change effect programs. In the Multitimbral modes, all Parts go through a common effects program. Unfortunately, you can't save the effects program with the Multi or quickly change it without SysEx or manual entry.

In general, the effects algorithms are quiet and come off well. I especially liked the differentiation between reverb settings. The other effects, while not outstanding, are of good quality for the money.

The effects section benefits greatly from real-time MIDI control that goes beyond the GM Level 1 specification. This lets you modulate many effects parameters, such as effects-send level. In addition, other parameters can be controlled in real time. Control Change (CC) 71 is mapped to filter resonance, CC 72 is assigned to envelope release time, CC73 affects envelope attack time, and CC 74 alters the filter cutoff frequency. The Control Change messages perform relative adjustments to the programmed Voice/Part parameter values.

USER INTERFACE

The user interface deserves special mention. It serves three functions: displaying incoming MIDI data; editing system, Part, and Voice parameters; and providing a software mixer. All functions are controlled with intuitive combinations of cursor buttons and the data dial, with good visual feedback. This represents a major improvement over the obscure button combinations used by such competitors as the Roland Sound Canvas.

In normal play, the display shows note Velocity for eight Parts. The cursor buttons scroll the display horizontally through the Parts and vertically through graphic representations of

MIDI controllers for each Part: Volume, Expression, Program Change, Pan, Modulation, and send levels for the reverb, chorus, and variation effects. Each controller is graphically displayed, e.g., faders for Volume and dials for Pan. You can view current values, or select a controller and change its value in real-time by rotating the data dial.

Pressing the Edit button calls up the Parameter Edit mode, where cursor buttons quickly navigate through hierarchical menus and scrolling parameter lists. If you scroll while holding another cursor key, it really zips through the pages. After selecting the desired parameter, you rotate the data dial to change its value.

You can page through other Parts without leaving the Parameter Edit mode, which is handy if you're setting up common parameters across multiple Parts. The Util button works the same way, accessing the screens for the master system parameters, Sound Module mode, SysEx dumps, system reinitialization, and playing the dynamite demo songs. From the Play screen, you can mute or solo a given Part by repeatedly pressing the OK/Yes button.

If your sequencer includes a MIDI Thru or Echo function (and most do), you can take advantage of the nifty MIDI Slider function. After selecting a particular type of Control Change message in the display and any Parts to which you wish to apply this message, turning the data dial sends the selected messages to the computer. The sequencer records the messages and echos them back to all selected Parts in the TG300. Unfortunately, this can't be done without a computer echoing the messages back to the TG300, although the data dial can apply the selected message to a single Part internally. Nevertheless, this feature is very cool, with many uses for setting group levels, panning, effects settings, and so on .

In Play mode, the Show feature displays incoming MIDI data. That's fine, but it's just the beginning. In any edit mode (including effects), if you select a parameter and hit the Show button, it displays the SysEx for that parameter. This online SysEx lookup reference is extremely handy, especially for things like controlling the TG300's parameters from a sequencer or other programmable SysEx source (such as a Peavey PC 1600 fader box). It definitely beats wading through any MIDI implementation documentation I've encountered.

Overall, the Yamaha TG300 gets high marks for sensible user-interface design, general capability, and ease of use. An accompanying booklet provides handy lists of the preset Voices, drum kits and effects. It should, but doesn't, include the number of Elements per Voice.

WRAP-UP

It looks like the TG300 synthesizer will be another winner for Yamaha. The unit is extremely well suited to computer musicians, multimedia developers, General MIDI composers, educators, and performers who use MIDI files for accompaniment.

Although it is priced toward the higher end of General MIDI synths, the TG300's host-computer connectivity, facile user interface, and retention of internal edits when powered down provide extra value. Prospective buyers, especially those tired of fighting with their existing General MIDI synth, should definitely put the TG300 on their short list.

Jim Pierson-Perry *is a clinical chemist, musician, and semiregular* **EM** *contributor. He sometimes gets confused and mistakes DNA sequences for MIDI files.*

Circle #440 on Reader Service Card

FREE INSIDE SPECIALLY MARKED BOXES

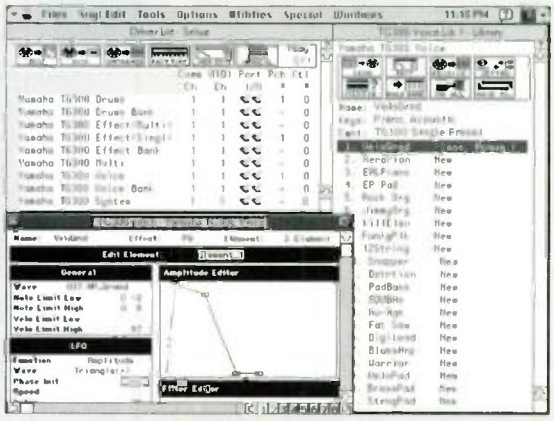
The TG300 graphic user interface sets a new standard of excellence for General MIDI synths, but Yamaha has gone one better. Included with the TG300 is a coupon redeemable for a free copy of Sound Quest's *TG300 Quest* editor/librarian program to help you squeeze every bit of value from your synth.

Sound Quest's program is available for Macintosh, *Windows*, and Atari ST. Users specify the desired format when they send in their coupon. The program disk includes a complete, detailed manual in a text file.

Sound Quest has spent years creating the *Solo Quest* dedicated patch-editing programs and its *MIDI Quest* universal patch editor/librarian (reviewed in the September 1990 **EM**). So it's not surprising that despite its freeware status, *TG300 Quest* is every bit a top-of-the-line program and fully supports all capabilities of the TG300.

Perhaps you expect interactive graphic patch-editing and bank-librarian capabilities, which you get. But the program also supports automated MIDI patch-bay operation; database libraries for Voices, Multis, effects, and drum kits; a built-in MIDI file player; and several algorithms to create new patches by combining existing ones. And those are just the high points.

In my tests using a Macintosh IIci running System 7.1, both through MIDI and the host-computer interface, the program booted and worked flawlessly in concert with the TG300. Yamaha and Sound Quest deserve high praise for eliminating the customary wait after a new synthesizer is introduced before patch-editing software becomes available. *TG300 Quest* could easily have been sold as a commercial product; instead, Yamaha chose to bundle it with the synthesizer and substantially enhance its value.



Sound Quest *TG300 Quest*

Twelve Tone Systems Cakewalk Home Studio

By Bob Lindstrom

This scaled-down Cakewalk remains a heavyweight.

Although Twelve Tone Systems calls *Cakewalk Home Studio* a "scaled-down edition of *Cakewalk Professional*," you may wonder if someone had their thumb on those scales when the program was shipped. With features such as multiple ways to display musical information and graphic controller editing, *Cakewalk Home Studio* feels considerably more heavyweight than you'd expect a "scaled-down" program to be.

A few significant *Cakewalk Pro* capabilities have been omitted. Overall, however, *Home Studio* has enough brawn to pull a musician from MIDI beginner to journeyman status without bashing their chops against a wall of software limitations.

SMALLER BUT FEISTY

Cakewalk Home Studio is a 256-track MIDI sequencer for *Windows* that supports real- and step-time MIDI recording. It exploits the multiwindowed, graphic *Windows* interface by providing multiple ways to view and change MIDI data, including several graphic and event-list editing environments.

Because many of the music hobbyists at whom *Home Studio* is targeted might not have external MIDI devices, the program incorporates all of *Cakewalk Pro*'s support for *Windows* device drivers and *MIDI Mapper*. Within *Home Studio*, you can open up to sixteen audio ports. These ports can be internal sound cards, external MIDI ports, or any audio device that connects directly to the PC.

Each musical track can be assigned to a different output port. For instance, although the FM sound of my Sound Blaster 16 is fine for many purposes, great-sounding percussion isn't among them. So I send some musical tracks to the Blaster, but port the percussion track to my MPU-401 MIDI interface to access the more satisfying percussion of an external sampler.

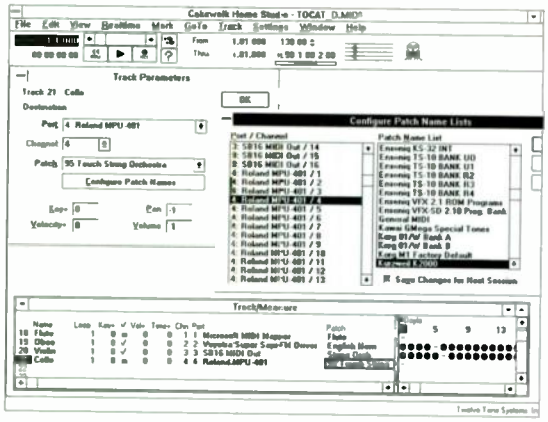


FIG. 1: The Track/Measure View (below) offers access to a number of track parameters and provides cut-and-paste track and measure editing. Double-clicking on the Patch column displays individual track parameters (upper left). You can also assign factory patch names for synths in the Configure Patch Names Lists (upper right).

Similarly, for musical input, I can identify my external keyboard as the input device and patch the output to the internal Blaster. This lets me play my Blaster directly from the controller keyboard, a true convenience when writing game scores to be heard mainly on the Blaster or another PC-compatible, internal audio device.

Another agreeable *Home Studio* feature that grows out of *Windows* and MPC (Multimedia Personal Computer) support is the ability to playback WAV-format digital samples within a MIDI sequence. This is a poor person's way to simulate direct-to-disk digital recording and get sound effects or voice into a sequence.

To fine-tune those samples and sweeten the deal for potential *Home Studio* buyers, Twelve Tone includes *Wave Lite for Windows*, a "mini" version of Turtle Beach Systems' *Wave* digital audio recording and editing software. (*Wave* was reviewed in the February 1994 **EM**.) As an additional bonus, you also get a trial version of *CanvasMan*, a *Windows*-based patch editor for Roland GS-compatible synthesizers, such as the Sound Canvas. *CanvasMan* offers its documentation in online help files, but *Wave Lite* includes a 66-page instructional brochure that details its ability to cut, paste, and otherwise manipulate digital sounds.

Home Studio boasts a spiral-bound, 244-page book with tutorials and reference sections designed to get you sprinting with the software in record time. The extensive manual's only fault is that it assumes some MIDI knowledge on the part of the reader. Rank MIDI beginners who purchase *Home Studio* will also need to buy a separate MIDI primer to hip them to terms, techniques, and technology.

FIVE LITTLE WINDOWS

The basic interface and functionality of *Home Studio* is identical to *Cakewalk Professional for Windows* 2.0 (reviewed in the March 1994 **EM**). The overriding merit of the *Cakewalk* design philosophy is its clarity. There are no gimmicks or oddball proprietary features that add up to confusion and lost time. *Home Studio* is "mainstream" in the best sense of the word.

MIDI data can be displayed and altered in one of five main editing Views: Track/Measure, Piano Roll, Controller, Staff (notation), Event List, and mixer-like Fader. Thanks to the straightforward design of *Home Studio*, if you have a basic knowledge of MIDI sequencers, chances are excellent that you'll be immediately productive with any of the *Home Studio* Views. If you're a beginner, *Home Studio* will introduce you to features and user-interface concepts that will be useful no matter what other software or computer platform you work with.

The Track/Measure View (see **Fig. 1**) is the basic environment for MIDI sequencing and changing track parameters such as MIDI channel, Volume, synth patch (with patch names displayed for many popular synths), and output port. You also use this environment to cut and paste measures in one or more musical tracks.

The Piano Roll View (see **Fig. 2**) offers a typical graphic layout with colored bars representing pitch and duration. The view can be split to show Velocity values in a graphic display. In the Piano Roll windows, note and controller data can be easily inserted, drawn, or moved using the mouse to select individual or multiple MIDI events.

Similar to the Velocity window, the Controller View graphically displays and lets you edit the values of any MIDI controller from Volume and Effects Depth to Sustain and Pitch Bend.

The Event List (see **Fig. 2**) takes the mathematical approach to MIDI editing, providing a chart of the numerical data associated with each MIDI event. Although most musicians will probably prefer graphic editing in most situations, Event List editing truly lets you get down and manipulate the gnarly details.

The 16-channel mixer design of the Faders View lets you change and record Pan, Volume, and Effects Depth in real time. However, the faders in *Home Studio* are hard-wired to MIDI Control Changes 7 (Volume), 10 (Pan), and 91 (Effects Depth). They cannot be reassigned as in *Cakewalk Pro*.

A BRIEF NOTATION

The Staff View (see **Fig. 3**) displays MIDI data as standard musical notation. By selecting tracks from the Tracks/Measure View, you can include from one to sixteen tracks in a Staff View, with each track notated in its own staff. You can then use the mouse to insert, move, or delete notes.

As well as letting you change display options such as clef, Staff View coordinates with *Home Studio* quantization to refine the visual accuracy of the notation. However, *Home Studio* does not maintain two sets of MIDI data—one audible and one visible—as do full-

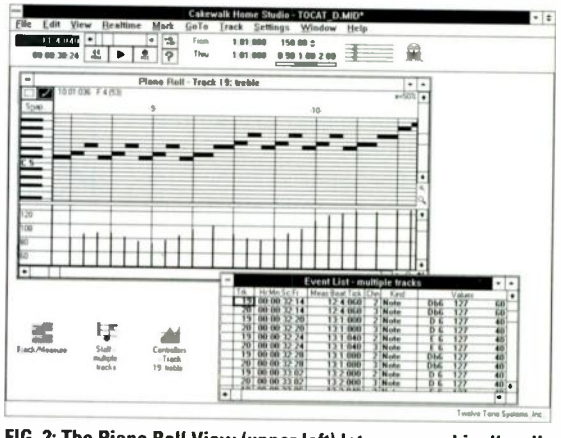


FIG. 2: The Piano Roll View (upper left) lets you graphically edit note duration and pitch in the upper portion of the window and Velocity in the lower portion. The Event List View (lower right) lets you edit each MIDI event as a series of numbers. To avoid screen clutter, other Views have been reduced to icons.

blown notation programs such as Passport Designs' *Encore* and Midisoft's *Midisoft Studio*. To clarify the notation, you must modify the MIDI data. If you want to have clear notation and nonquantized MIDI data, you must work with two versions of your file, one for the ears and one for the eyes.

Notation appears swiftly on an 33 MHz 80386 DX. Typically, I was able to start MIDI playback and move to a Staff View, which would notate the first page of score just as the file began to play. During playback, the display can track along with the music, but it was not quite as fast as necessary on a '386. Screen updates between pages typically ran two to three measures behind the music.

Staff View also provides the environment for printing scores and parts. Here, *Home Studio* shares a "gotcha" with *Cakewalk Pro*. Both programs are at the mercy of *Windows* printer drivers when previewing and printing manuscripts. As a result, you may uncover eccentric behavior that's really a printer-driver problem. For instance, when I used *Home Studio* with a Panasonic dot-matrix printer driver, the portrait and landscape configurations were reversed: select one and get the other. (The same thing happened in *Cakewalk Pro.*) With an Epson driver, the page-orientation problem was solved, but the driver would not arrange the staves to fill up a standard page.

These are not Twelve Tone's problems; they are shortcomings inherent in *Windows* printing support. Your only option is to use the most recent printer driver available from your printer manufacturer or from Microsoft.

When printing, you can specify nine different staff sizes. When you choose one that doesn't fit a full score arrangement on a single page, a warning box appears suggesting that you select a smaller staff size. You can also zoom in on the print preview for a closer look, but you cannot edit or reformat the manuscript in the preview. *Home Studio* isn't an ideal choice for printing complex scores, but for many situations, the quality of the output will be more than satisfactory for individual parts or scores.

SMALL LOSS

If you rarely record in a studio and don't have a multitrack cassette deck, you'll hardly miss *Home Studio*'s inability to

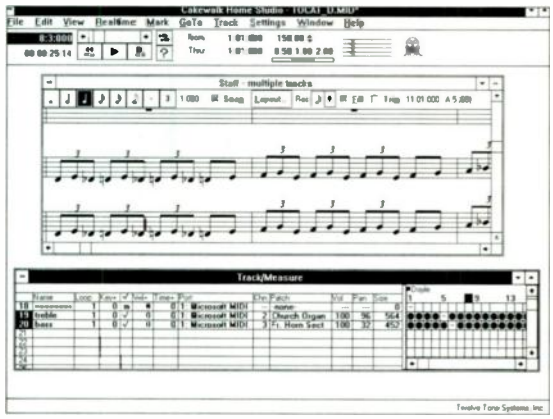


FIG. 3: The Staff View lets you edit your music in standard notation.

receive external MIDI Clock or SMPTE/MTC sync. Both features are found in *Cakewalk Pro*. Also, *Home Studio* has no Big Time display, a studio-oriented *Cakewalk Pro* feature that shows a large time display on the computer monitor.

Only multimedia developers will mourn the inability to place *Windows* MCI (Media Control Interface) commands in a MIDI sequence. Similarly, most musicians will be able to live without Twelve Tone's proprietary CAL (Cakewalk Application Language) custom scripting and *Windows* DDE (Dynamic Data Exchange), which allows you to activate *Cakewalk Pro* from another *Windows* application.

If you clog the MIDI datastream with excessive controller events, you must thin the events manually, because *Home Studio* can't thin controller events, as *Cakewalk Pro* can. In addition, you can record multiple MIDI channels at once in *Home Studio*, but they are all recorded on a single track; *Cakewalk Pro* can record multiple channels and assign each one to its own track. After recording several channels on one track in *Cakewalk Home Studio*, you can use the Event Filter to cut the notes on a particular channel and paste them into their own track.

Don't look for the System Exclusive (SysEx) librarian of *Cakewalk Pro* or the ability to sort tracks by any track parameter; *Home Studio* doesn't have them. However, owners of Roland GS-compatible devices can use the trial shareware version of *CanvasMan* included with *Home Studio* to create and store patches in *MIDIEX* format. This shareware utility has become somewhat standard in the PC world for saving and loading SysEx bulk dumps, which makes it easy to share these files with friends and on BBSs.

You may miss some excluded *Cakewalk Pro* features fairly quickly as you become more comfortable using MIDI software. For example, *Home Studio* has no punch in/out. You can record new takes on separate tracks, then paste them in, but you cannot automate the process. *Cakewalk Pro* does preset and on-the-fly punch in/out.

Home Studio lacks *Cakewalk Pro*'s loop (or pattern) recording, which lets you record several separate takes without interruption. (Don't confuse this feature with the ability to loop tracks during playback; *Cakewalk Home Studio* does that fine.)

Finally, *Home Studio* records at a fixed resolution of 120 ppqn (pulses per quarter note), compared to *Cakewalk Pro*'s variable resolution up to 480 ppqn. In addition, the *LIVE!* playlist module that allows you to preprogram the playback of up to 128 songs in *Cakewalk Pro* is not included in *Home Studio*.

Product Summary

PRODUCT:
Cakewalk Home Studio
PRICE:
$169
SYSTEM REQUIREMENTS:
80286 or better PC-compatible, 2 MB RAM, hard drive, *Windows* 3.1, audio card or MIDI interface, 3.5-inch floppy-disk drive (5.25-inch disks available on request).
MANUFACTURER:
Twelve Tone Systems
PO Box 760
Watertown, MA 02272
tel. (800) 234-1171
or (617) 926-2480
fax (617) 924-6657

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

A SHORT SUMMARY

After trying to place myself back in the role of a beginning MIDI user, I believe I could have lived with the *Home Studio* compromises. The only exceptions to this are the lack of punch in/out and, possibly, the fixed resolution. Perhaps Twelve Tone will reconsider excluding punch in/out as they did when they left out preset punch in/out from *Cakewalk Pro for Windows* 2.0. Following some user outcry, they rapidly reinstated it in version 2.01. The same thing could happen here. The inability to sync to MIDI Clock is also significant.

The fixed resolution of 120 ppqn will be controversial, because some entry-level sequencers, such as Big Noise's *MIDI MaxPak*, have resolutions up to 480 ppqn. This could compromise the accuracy of *Home Studio*-recorded performances and may result in a noticeable

▼

The 120 ppqn resolution will be controversial.

lack of recorded nuance, particularly when playing fast solos.

Otherwise, on the merits of its solid design and performance, *Home Studio* is an excellent choice for musicians who want affordable MIDI sequencing software that has plenty of features to grow with. Besides, registered owners can upgrade to *Cakewalk Pro* for $129.

If printing is a priority, you may have to look for a specialized notation program. Like *Cakewalk Pro, Home Studio* is capable, but not definitive, when it comes to cranking out manuscripts, especially if you need the more esoteric notation of contemporary music.

However, for intense, day-to-day sequencing that facilitates maximum musical inspiration with minimal computer frustration, *Cakewalk Home Studio* is a fine way for beginners or budget-minded semipros to leap into MIDI.

Bob Lindstrom *is a writer, composer, and conductor who has a weakness for buying keen techno-toys. His articles have appeared in* MacUser, Computer Shopper, Byte, *and* HomePC.

Circle #441 on Reader Service Card

Jump! ConcertWare Pro (Mac)

By Lawrence Ullman

A classic notation program is upgraded for the '90s.

In the ten years since the introduction of the Macintosh, a steady stream of music-notation programs have made their debut. Each has laid claim to the three cardinal virtues that *any* software product, and particularly a music-notation program, should offer: ease of use, flexibility, and power.

Pardon my skepticism, but I've long since grown weary of software that talks the talk but fails to walk the walk. All of the currently available notation programs fall short in one or more crucial areas. Some are easy to use, but not powerful enough. Others are powerful enough, but too difficult to use. Some offer inflexible automatic formatting; others offer no automatic formatting at all. Some make note entry easy, but lack the page layout tools necessary to massage the music into readable parts.

Call me Don Quixote, but I refuse to give up searching for a program that lives up to its hype. The latest windmill at which I've been tilting is *ConcertWare Pro,* formerly by Great Wave Software and recently acquired by Jump! Software. Veteran Macophiles may remember the original *ConcertWare* as one of the first Mac music programs. Essentially a musical toy, it let you enter music notation on the screen and play it back using the Mac's 4-voice internal synthesizer.

Since that first version, the program has undergone several major upgrades, becoming *ConcertWare+, ConcertWare+ MIDI,* and now, *ConcertWare Pro* 1.0.4. (At press time, Jump! announced version 1.5). Along the way, it has grown in strength and gained many new features, to the point where it now claims to provide "easy music notation for professionals, amateurs, and educators." Onward, Sancho Panza!

TAKE A NOTE

As the music director of a chamber ensemble specializing in music of the

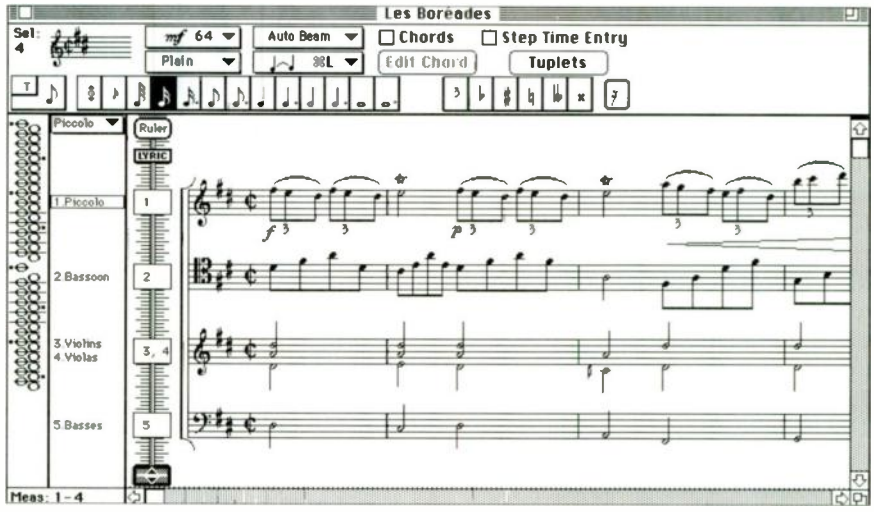


FIG. 1: *ConcertWare Pro's* Note Entry screen. The Pitch Palette on the left side of the window does not line up with the active staff, making note entry awkward. The spacing of the eighth notes in the second bar can be fixed with the Expand command; the uneven triplet spacing cannot be.

Renaissance and Baroque, I often need to produce readable scores and parts from textbooks, manuscripts, and other sources that are ill-suited to performance situations. One of the first projects I attempted with *ConcertWare Pro* was a transcription of a 5-part dance from an opera by the French baroque composer Jean-Philippe Rameau (see **Fig. 1**). Although relatively simple musically, it nevertheless provided ample opportunity to check out the program's note-entry and page-layout functions.

ConcertWare Pro's main music-entry window is divided into three sections. In the center is a large music section that can contain a single scrolling system of up to 32 staves. The number is reduced if you assign multiple parts (up to four) to a single stave, as I did for the violins and violas in the example. Each part may consist of chords or a single line. Parts can be named and assigned a MIDI channel and Program Change number.

The left side of the music window contains the Ruler, which operates much like a ruler in a word processor. The Ruler sets the number of staves per system, determines which parts are assigned to which staves, and controls the spacing between staves and systems. A Lyric Alignment box determines the vertical positioning of lyrics and other text (discussed shortly).

Additional Rulers can be inserted anywhere in a score, allowing you to change the number of staves, or reassign parts. Inserting a new Ruler also calls forth a dialog box that can be used to force a line or page break. Although this is a useful page-layout device, it is the program's only one; there's no way to specify a certain number of bars per system, for example.

A variety of other items can be inserted at any point in the score from the Insert menu, including clefs (a percussion clef on a single-line staff is one option), time and key signatures, and tempo changes, along with the usual repeats, endings, and bar lines. The clef dialog box also contains a pop-up menu that is used to specify instrument transpositions.

PITCHED BATTLE

To the left of the music window are the part names. Clicking on a part name selects a part for editing, while double-clicking allows the name to be edited. (Parts can also be selected from a pop-up list of names by double-clicking, or with the arrow keys.) To the left of the part names is a feature unique to *ConcertWare,* and one I consider to be a major drawback: the Pitch Palette.

I was dismayed to find that pitches cannot be simply clicked onto a staff, as is the case with virtually every other notation program. Instead, pitches must be selected by clicking on the "note buttons" in the Pitch Palette! Although the palette is centered around a grand staff, and dots help indicate the Cs, this is still a highly nonintuitive method.

Because middle C on the Pitch Palette does not move to align with the current staff, you are constantly forced to take your eyes from the music, look

over at the palette, think about what octave you are in, and then click on the (hopefully) right pitch. Even worse, because the palette does not change to reflect the clef you are in, you must be able to read the clef to enter notes. You can't simply click the notes onto the staff and let the computer sort out the transposition. If you work with lots of string parts, this gets old in a hurry.

Durations, accidentals, and rests are entered more conventionally, from a row of icons at the top of the window. They can also be selected using the number keys on the Mac keyboard. Any group of from two to fifteen notes can be specified as a tuplet using the Tuplet button, and chords can be entered by clicking the Chord button. Four pop-up menus insert dynamic markings, add articulations and accents to notes, and control beaming and slurs. The large icon to the left of the duration icons toggles between *ConcertWare Pro*'s two main operating modes: note entry and text entry.

GETTING REAL

Fortunately, *ConcertWare Pro* provides the user with three much more satisfactory methods of note entry: step entry, real-time MIDI transcription, and transcription of MIDI Files created in another program.

Step entry works in the time-honored fashion: Durations are selected from the duration icons or from the Mac keyboard; pitches are entered from the MIDI keyboard or Mac keyboard. Unlike the Pitch Palette, this method is straightforward and easy to use.

Great Wave claimed to have put a great deal of effort into the real-time transcription portion of the program, and it shows. Choosing Record on the Sound menu calls up a large dialog box (see **Fig. 2**). The metronome can be played through the Mac's internal speaker, or sent out over MIDI. Recording can be set to begin immediately, with the first note, or after one or two bars of count-in.

The Input From MIDI Via item accommodates MIDI drum pads by creating notation based only on the start times of notes, with minimal rests, and operates with MIDI guitars by changing chord-selection rules to work with strummed chords and finger-picked notes. Unfortunately, I was unable to test these options.

Once a passage has been recorded, it can be played back, re-recorded, or inserted into the score. Performances are quantized based on a set of transcription settings found in the right side of the dialog box. Values can be set for the smallest note and rest durations you wish to have appear. The values are modified by a Triplets item, which can be set to recognize no triplets, only even triplets (three notes of the same value), or all triplets.

If your performance contains note values shorter than the minimum value you have set, and you have unchecked Record Grace Notes, a dialog box appears. You can then elect to have the program use grace notes as necessary, attempt to score without grace notes, or omit grace notes entirely. A default setting can be stored as a preference. Rests smaller than those you have selected are omitted, and the surrounding note values are adjusted to compensate.

Two additional choices affect how the performance is transcribed. Used in conjunction with the note durations and triplets settings, Optimize Playback sacrifices a clean score by creating notation that matches the played rhythm as closely as possible, while Optimize Notation analyzes each measure to provide simplified notation.

Normally, transcribed performances are inserted into the active part. However, complex keyboard passages can be broken down and sent to as many as four parts using the Secondary Part and Split Point options. In essence, the

Product Summary

PRODUCT:
ConcertWare Pro 1.0.4
PRICE:
$159
SYSTEM REQUIREMENTS:
Macintosh with 2 MB RAM, hard disk, System 6 or later
MANUFACTURER:
Jump! Software
800 El Camino Real
Suite 180
Mountain View, CA 94040
tel. (415) 903-2295
fax (415) 903-2289

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

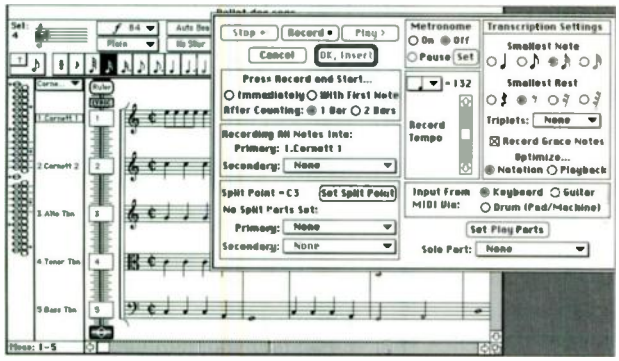


FIG. 2: The program's real-time MIDI transcription capabilities are well designed, as evidenced by this dialog box.

Secondary Part option routes held notes to the primary part and moves passages to the secondary part. It works quite effectively for chords suspended over a moving bass line. Primary and secondary parts can be set for each side of a user-selectable split point. Pitches are selected from the MIDI keyboard, or by clicking on an onscreen keyboard.

Recorded performances remain intact in a memory buffer until you edit something onscreen. Therefore, if you don't like the results of your transcription, you can use the Re-Transcribe function to try, try again, setting new minimum durations, split points, etc. A Multi-Transcribe function is also available and can be used to recombine parts split in earlier passes, which makes them available for further retranscriptions. (Essentially, Re-Transcribe is a shortcut for doing a Multi-Transcribe on things you just recorded.)

ConcertWare Pro has one final music-entry option: It can import Standard MIDI Files created in another music program, such as a sequencer. Imported MIDI files are treated to the same transcription parameters as real-time MIDI performances. Standard MIDI Files can also be exported for use in other MIDI programs.

LYRIC OPERA

As mentioned previously, *ConcertWare Pro* has two main operating modes. Lyrics, free-form text, and musical symbols are entered in Text mode, which has its own set of tools and a rotating palette of symbols. To test them out, I entered a variety of songs from lead sheets, as well as a 4-part chorale by J.S. Bach (see **Fig. 3**).

All text entered into a score is linked to a note. If the note is deleted or moved, the text goes with it. In addition to the usual text styles, the program's Style menu has two items that affect how text is placed relative to the note: Centered positions text directly above or below the notehead; Gap Text opens up the note spacing to accommodate the text. Both styles can be applied simultaneously.

Lyrics automatically align to the nearest Lyric line on the Ruler (scores can contain up to 32 Lyric lines). *ConcertWare Pro* has no provision for importing text from a word processor, except through the Clipboard. Entering lyrics is a laborious task involving typing syllables one at a time and hitting the tab key to move to the next note. Hyphens to separate syllables must be entered and centered manually.

A wide variety of musical symbols can be selected from a rotating palette and placed anywhere on the score. (Symbols and other free-form text can be aligned vertically or horizontally to keep things neat and tidy.) A button to the left of the palette toggles between musical symbols and a large library of chord symbols. Chord symbols can also contain guitar or mandolin (4-string) tablature. Symbols and tablature can be quickly and easily edited.

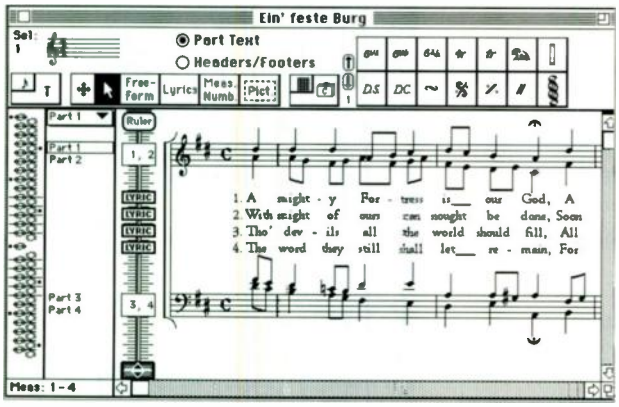


FIG. 3: Lyrics and free-form text are entered in Text Entry mode. Scores can have as many as 32 Lyric Alignment lines; four are shown here. The palette of musical symbols rotates and can be toggled to display chord symbols.

EDITING SUITE

ConcertWare Pro provides a reasonable variety of editing tools and functions. Although there's a mover tool in Note Entry mode, it can only be used to drag individual notes vertically, changing their pitch. Larger groups of notes must be selected for editing. Selection is accomplished in the conventional Mac fashion, by clicking and dragging; discontiguous selection is not supported.

Although only one part can be selected at a time, Multi-Cut, Multi-Copy, and Multi-Paste commands allow music to be moved to and from multiple parts. A Merge-Paste function can be used to graft the pitches from one part as chords onto the rhythm of another. A Repeat-Paste function means you can vamp until ready. Finally, an Extract Notes function can be used to cut or copy notes from chords, either by order within the chord, or by specifying a range between pitches.

A number of additional editing functions are found on the Change menu. Selected notes can be transposed up or down by half-step or by octave; a separate function allows entire parts to be transposed. A Combine Notes and Rests function can be used to clean up parts played staccato by consolidating notes followed by rests into a single, longer note value. Durations can be halved, doubled, or multiplied by two-thirds (to make triplets) or 1.5 (to remove triplets). Velocities can be modified by adding or subtracting a fixed number or by percentage; minimum and maximum values can also be specified.

The Harmony dialog allows you to harmonize a melody line by specifying intervals. A Scale for Harmony box indicates the root and type of scale the harmony will be based on (major, harmonic minor, or melodic minor), while a separate box is filled with radio buttons that indicate where the currently selected pitch falls in the selected scale. Intervals above or below the selected note are then selected from yet more radio buttons to build a chord. You can hear the harmony played and apply it to only the selected note, or to all the notes in a selection. It's cute, but I

could find no use for this feature, except in a music-theory course.

The remaining few editing functions are found in the Notate menu. Stem directions can be flipped up or down, or can be mixed. (There's no way, however, to set a new stem-direction split point.) Extra rests, necessary to make parts line up when two or more share a staff, can be hidden. Repeated rests can be shown as slashes, note heads can be changed to X or diamond shapes, and notes can be marked an octave up or down. Finally, the program's proportional note spacing can be overridden using the Expand or Compress items. (For an example of how this is used, see **Fig. 1.**)

PLAYING AROUND

Although it certainly won't replace a sequencer, *ConcertWare Pro* does have some interesting playback capabilities. Dynamic markings can selected from a pop-up menu and inserted anywhere in the score; each has an associated MIDI Velocity value that takes effect for notes inserted from that point on. In addition, any group of notes can be selected and tagged with a dynamic marking, which overrides Velocities recorded during step- or real-time entry.

The program also interprets crescendo and decrescendo markings. The beginning and ending dynamics (Velocities) are set from a dialog box. These settings also establish the size of the "hairpin" opening.

As previously mentioned, each part can be assigned a MIDI channel and Program Change number during initial score setup. A Controllers window can also be used to select any three Control Change messages to be sent on any or all MIDI channels at the beginning of playback.

Other MIDI events can be entered at any point in any part. Program changes can be entered conventionally (as a number between 1 and 127), or a General MIDI option can be checked to allow sounds to be selected from a dialog box of Instrument groups and names. Other Control Change commands can be inserted from a scrolling list of MIDI Macros. Thirty-six standard commands—Volume, Pan, Portamento, and so forth—are included; the list can contain up to 127. The hexadecimally inclined can have a field day editing the existing commands, or can fill out the list with new ones of their own.

SOUNDS TO GO

Those who lack MIDI capabilities (PowerBook users on the go, perhaps?) will be relieved to know that *ConcertWare Pro* has retained the ability to play scores using the Mac's internal music synthesizer. As I am running System 7.1 on my Mac II, I was able to take advantage of Apple's new *Sound Manager* 3.0, which is included with *ConcertWare Pro*. *Sound Manager* 3.0 improves the quality of the Mac's internal sounds and expands the number of voices from four to eight.

ConcertWare Pro comes with a library of Instruments created using a separate program called *InstrumentMaker*. I'm afraid I didn't take time to audition them all, but let me describe them this way: Even the lowliest General MIDI sound module is a Synclavier in comparison. In fairness, the sounds are only provided for use if you're working away from your synth.

Each *ConcertWare Pro* score opens with a "orchestra" of eight instruments that is used automatically if MIDI is not selected. Each instrument is also mapped to a corresponding General MIDI sound to create a default orchestra for use when MIDI *is* selected. The default orchestra can be rearranged to suit, or instruments can be assigned to a score part by part.

Because the *InstrumentMaker* application is included, you can edit the existing instruments or create new ones. Sounds are created graphically and consist of a simple additive-synthesis waveform and a single ADSR envelope; both can be drawn freehand, if desired. Various forms of vibrato can then be applied. In an educational environment, this could be quite useful to teach basic synthesis concepts.

EXCEPTIONS RULE

In the centuries-old language of music notation, exceptions *are* the rule. This presents programmers with a conundrum. For ease of use, they want the program to automatically handle as many things as possible. On the other hand, they must allow the user to override the automatic selections to deal with the myriad exceptions that can crop up in even relatively simple compositions. But for every exception allowed, there's a price paid in ease of use. Witness *Finale*, which allows you to handle almost any notational device—if you can figure out how.

The programmers opted for simplicity. For example, beam angles, slurs, and note-stem lengths are not adjustable. The only grace notes supported are individual (not beamed) eighth notes. Automatic or manual beaming can be selected from a pop-up menu. With automatic beaming, the program was unable to reproduce the complex beaming pattern in certain orchestral excerpts containing triplets. As a result, sometimes the final printed product has an amateurish look, and many passages are simply off limits.

FINALE

ConcertWare Pro lacks certain features that I consider *de rigueur* in *any* modern Macintosh program. For example, there's no WYSIWYG editing. The music display is limited to a single scrolling system arrayed in a continuous, horizontal strip. To see what your score will look like on the page, you must resort to a Preview option from the Print command. Unfortunately, the Preview does not allow editing. If you don't like what you see, you must cancel the Preview, return to the score, make your changes, and Preview again. And again, and again....

The program also lags behind the competition in the critical area of overall speed. There are noticeable—and annoying—delays before many actions take place. For example, notes don't immediately appear when you click on the Pitch Palette. Changing from part to part also involves considerable delay. But the worst offenders are the pop-up menus in the music-entry mode. In all Mac programs, selecting a menu item causes it to flash three times. Until now, this has always taken place in the blink of an eye. Select any of the beam or slur options in *ConcertWare Pro*, however, and you'll see it flaaasssh, flaaasssh, flaaasssh in slow motion.

Jump! is currently shipping version 1.0.5, a minor update to the version I reviewed. The company has announced version 1.5, due in the third quarter of this year. The update adds transport controls, lets you enter music with the mouse and an onscreen keyboard, and offers the ability to trigger an AIFF audio file from a separate track. Jump! also will bundle score templates for string quartet, full ensemble, and so on. In addition, the company is planning a *Windows* version for release in the fourth quarter of this year. A Power Mac version is scheduled for early 1995.

At the risk of sounding like Scott Hamilton commenting on figure skaters at the Olympics, what the program does, it does well. I didn't really expect a program in this relatively modest price range to roll ease of use, flexibility, and power into a tidy package, especially not when programs costing many times more have fallen short. Nevertheless, the competition in the increasingly crowded notation arena has grown intense since the days of the original *ConcertWare*, and the current *Pro* version simply doesn't have the moves to take the gold.

As a musician, editor, and new parent, **Lawrence E. Ullman** *makes a specialty of tilting at windmills of diverse kinds.*

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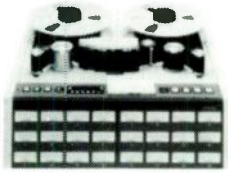

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TECH PAGE

Multilevel Marketing

Increasing the storage capacity of compact discs.

By Scott Wilkinson

Remember when 640 KB of RAM was more than enough memory for almost anything? How about those brand-new, full-height, 20 MB hard disks? Who would ever need that much storage? Well, to paraphrase a Tower of Power hit, what's hip today *will* become passé.

The need for data storage grows exponentially as computers become more sophisticated, particularly in the fields of audio and video. Current 5-inch optical discs—commonly called CDs or CD-ROMs—can hold 650 MB of digital data, which seemed like a humongous amount of space when they were first introduced. Now, that 650 MB feels a bit cramped.

You might think a new format is required to make the next quantum leap in storage capacity. However, scientists at IBM's Almaden Research Center in San Jose, California, have devised a seemingly simple means by which the capacity of optical discs can be increased by a factor of ten or more with minimal changes to current drive mechanisms.

The secret is to stack several layers of recording material on top of each other, not unlike a stack of pancakes. Each layer can hold up to 650 MB of digital data in the form of tiny pits in the surface of the material, which is the standard format for CDs. The focusing lens of the laser is then moved up or down to read the data on any of the layers (see **Fig. 1**).

In their initial experiments, the IBM team has read data from discs with two, four, and six layers and written data on discs with two and four layers. The signal-to-noise ratio was just as good as with single-layer discs. This process can be extended to include ten or more layers, although the layers must be thin to prevent the disc from becoming too thick.

Current drive mechanisms require only minor modifications to accommodate the multilayer design. In fact, most optical disc drives already include movable lenses to maintain focus on warped discs. In one experiment, the IBM team doubled the capacity of a currently available, but slightly modified, CD-ROM drive. The modified drive was able to play video and audio tracks from a 2-layer disc.

Not only can existing drives be modified to read multilayer discs, but future multilayer drives will also be able to read single-layer discs. (Unmodified single-layer drives cannot read multilayer discs.) This backward compatibility bodes well for the future of multilayer discs and drives.

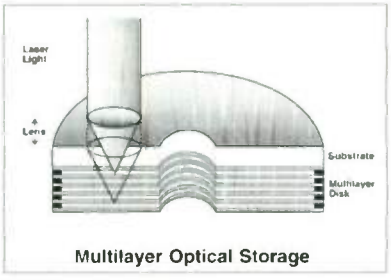

FIG. 1: This cross-sectional diagram of IBM's new multilayer optical disc illustrates how the laser is focused on different layers by moving the lens up and down. (Courtesy of IBM Corporation, Research Division, Almaden Research Center.)

Each layer must be partially transparent to let the laser beam penetrate all layers in the stack. However, they must also be reflective enough to allow the drive's detector to read the data accurately. The maximum number of layers is determined by the power of the laser, the transparency of the layers, and the cost of making the discs. This number is lower for writable discs than it is for read-only discs, because writable layers must be able to absorb some of the laser's energy, which requires reduced transparency.

These remarkable gains in optical-disc storage capacity can be increased even further using other techniques, such as short-wavelength blue lasers (see "Tech Page: Big Blue Laser" in the January 1994 **EM**). The IBM team envisions multilayer discs that can hold 30 gigabytes or more using these techniques. Such discs could include the entire contents of several thousand 200-page books, or a feature-length, high-resolution, full-motion movie. Multimedia and video-game authors could use the capacity to add more high-quality audio and video content to their products.

Up to now, increasing the storage capacity of optical discs meant increasing the density of data on a single layer. By using several layers in one disc, this process has been extended into the third dimension. This is good news for the computer and media industries, whose voracious appetites for data will continue to grow unabated.

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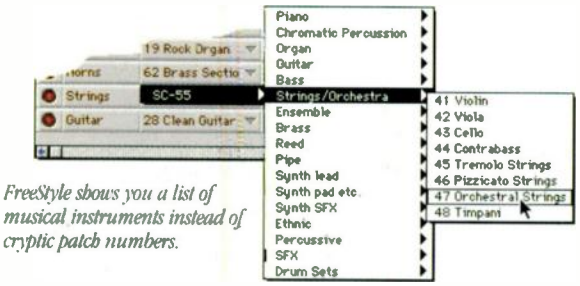
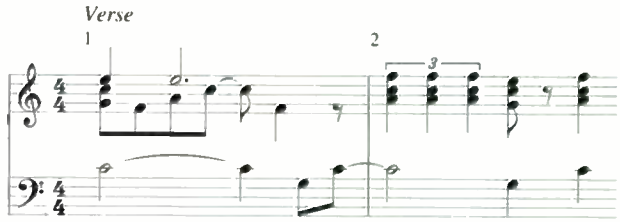


FreeStyle shows you a list of musical instruments instead of cryptic patch numbers.

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.

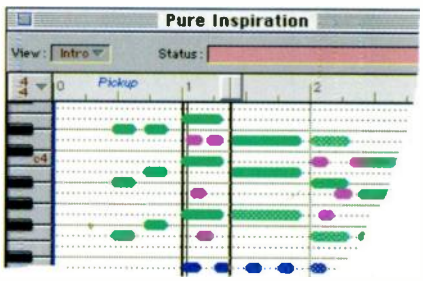
But if you do glance at your computer, you'll see full-color graphic editing and impeccable music notation. And when you're ready to put it all together, FreeStyle's arrangement window lets you easily assemble sections into a song.



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.

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