Opcode Studio Vision Pro Master Class • Time Code Tutorial

Electronic Musician

October 1996

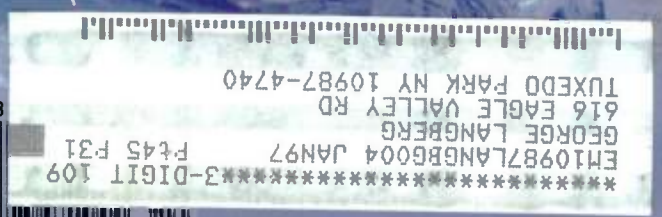
CooL TooLs

Net ski into a blizzard of hip music shareware for the Mac and PC

The whole truth about music lawyers

Everybody's talking: How to record spoken word projects

Bust into the scoring session for Escape from L.A.



REALITY FOR $1500* A PAIR. INTRODUCING

If you've been trusting the quality of your creative product to passive monitors costing $400-$600 a pair, there's an astonishing revelation waiting for you at your Mackie dealer. In our opinion, the active, biamplified HR824 is the most accurate near-field monitor available. So accurate that it essentially has no "sound" of its own. Rather, the Mackie Designs High Resolution HR824 is the first small monitor with power response so flat that it can serve as a completely neutral conductor for whatever signal you send it.

HR HIGH RESOLUTION SERIES™

You'll hear the precise attack, texture and quality of individual bass notes exactly as they're being recorded. On instrumental and vocal tracks, you'll discern details of pitch, timbre and harmonics that passive monitors simply don't resolve.

Mackie acoustic engineer David Bie uses scanning laser vibrometry to map HR824 tweeter dome vibrations. Film at 11.

SCIENCE, NOT SNAKE OIL.

Internally-biamplified, servo-controlled speakers aren't a new concept. But to keep the cost of such monitors reasonable, it's taken advances in measurement instrumentation, transducers, and electronics technology. In developing the High Resolution Monitor Series, Mackie Designs sought out the most talented acoustic engineers (being able to live in perpetual drizzle was a plus) and then made an enormous commitment to exotic technology such as scanning laser Doppler vibrometry, analyzers, time delay spectrometers and machines that go "*ping*." The High Resolution Series HR824 is the result of painstaking research and money-is-no-object components. Not to mention thousands of hours of listening tests and *tens* of thousands of dollars in tooling.

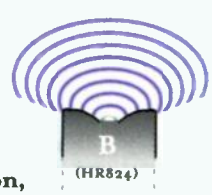
HR824 Active Monitors accept balanced or unbalanced ¼" and XLR inputs. Jacks & removeable IEC power cord face downward so that the speaker can be placed close to rear wall surfaces.

FLAT RESPONSE...ON OR OFF-AXIS.

One of the first things you notice about the HR824 is the gigantic "sweet spot." The detailed sound field stays with you as you move back and forth across the console — and extends far enough behind you that musicians, producers and your mom can hear the same accurate playback.

The reason is our proprietary exponential high frequency wave guide. Without it, a monitor speaker tends to project critical high frequencies in a narrow beam (Fig. A) — while creating undesirable edge diffraction as sound waves interact with the edges of the speaker (red lines in Fig. A). Imaging and definition are compromised. The "sweet spot" gets very small.

Like biamped speakers, wave guides aren't a new concept. But it takes optimized, internal electronics and a systems approach to make them work in near-field applications.



The HR824's wave guide (Fig. B) maximizes dispersion, time aligns the acoustic center of the HF transducer to the LF transducer's center, and avoids enclosure diffraction (notice that the face of the speaker is perfectly smooth.) The exponential guide also increases low treble sensitivity, enabling the HF transducer to handle more power and produce flat response at high SPLs.

CLEAN, ARTICULATED BASS.

When seasoned recording engineers heard the HR824 at a recent tradeshow, they couldn't believe the controlled low bass extension — several snooped around for a hidden subwoofer. They heard low frequency accuracy that simply can't be achieved with passive speakers using external amplifiers. There are many reasons.

The Mackie HR824 Active Monitor. ±1.5dB from 42 to 20kHz.

First, the HR824's FR Series 150-watt bass amplifier is directly coupled in a servo loop to the 8.75-inch mineral-filled polypropylene low frequency transducer.

It constantly monitors the LF unit's motional parameters and applies appropriate control and damping. An oversized magnet structure and extra-long voice coil lets the woofer achieve over 16 millimeters of cone excursion. Bass notes start and stop instantly, without overhang, distortion or "tubbiness."

Second, instead of relying on ports or slots, the HR824's low frequency driver is coupled to a pair of aluminum mass-loaded, acoustic-insulated 6.5-inch passive drivers. While typical, undersized ports cause vent noise, power compression and low frequency distortion, our ultra-rigid drivers eliminate these problems and couple much more

THE HR824 ACTIVE MONITOR.

effectively with the control room's air mass. They achieve the equivalent radiating area of a 12-inch woofer cone, allowing the HR824 to deliver FLAT response to 42Hz with a 38Hz, 3dB-down point.

Third, the woofer enclosure is air-displaced with high-density adiabatic foam. It damps internal midrange reflections so they can't bleed back through the LF transducer cone and reach your ears. The typical problem of small-monitor midrange "boxiness" is eliminated.

The High Resolution transitional wave guide. Film at 11 unavailable.

A TRUE PISTONIC HIGH-FREQUENCY RADIATOR.

We scoured the earth for the finest high frequency transducers and then subjected the likely candidates to rigorous evaluation. One test, *scanning laser vibrometry*, gives a true picture of surface vibration patterns. Two test results are shown in the upper right hand corner of this ad. Figure C is a conventional fabric dome tweeter in motion. You needn't be an acoustic engineer to see that the dome is NOT behaving as a true piston.

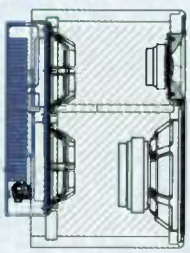


Figure D shows our High Resolution metal alloy dome at the same frequency. It acts as a rigid piston up to 22kHz, delivering pristine, uncolored treble output that reproduces *exactly* what you're recording.

INDIVIDUALLY OPTIMIZED.

You won't hear it from other manufacturers, but individual low and high frequency drivers can vary more than 10% in sensitivity due to production variations. Because our monitor is active, we can precisely match each transducer's actual output via electronic adjustments. During final assembly, each HR824 is carefully *hand-trimmed* to ±1.5dB, 42Hz-20kHz. As proof, each monitor comes certified with its own serialized, guaranteed frequency response printout.

The HR824's front board is 1-inch thick with "radiused" edges to further eliminate diffraction. An "H" brace bisects the enclosure for extra rigidity.

Mackie is the only active monitor manufacturer that also has experience building stand-alone professional power amps. The HR824 employs two smaller versions of our FR Series M•1200 power amplifier — 100 watts (with 150W bursts) for high frequencies, and 150 watts (200W peak output) for low frequencies. Both amps make use of high-speed, latch-proof Fast Recovery design using extremely low negative feedback.

HR HIGH RESOLUTION SERIES™
FR FAST RECOVERY SERIES™

TAILOR THEM TO YOUR SPACE.

Because control rooms come in all shapes, sizes and cubic volumes, each HR824 has a three-position Low Frequency Acoustic Space control. It maintains flat bass response whether you place your monitors away from walls (*whole space*), against the wall (*half space*) or in corners (*quarter space*). A low frequency Roll-Off switch at 80Hz lets you emulate small home stereo speakers or popular small studio monitors.

Fig. C: Uneven fabric dome tweeter motion distorts high frequencies.

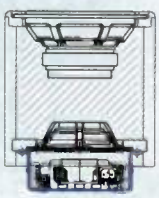
Fig. D: HR824 alloy dome's uniform, accurate pistonic motion.

Below: The HR824 Development Team. L to R, clockwise: Terry Wetherbee, Cal Perkins, Greg Mackie, David Bie, Paul Brengle, Jeff Hammerstrom, Dan Bonilla and Mats Jarlstrom holding P.D., our Over-20kHz Specialist.

CONFRONT REALITY AT YOUR MACKIE DESIGNS DEALER.

We've made some pretty audacious claims in this ad. But hearing is believing. So bring your favorite demo material and put our High Resolution Series monitors through their paces.

If you've never experienced an active monitor before, you're going to love the unflinching accuracy of Mackie Designs' HR824s.



If you've priced other 2-way active monitors, you're going to love the HR824's $1498/pair price* AND its accuracy.

*$1498 suggested U.S. retail price per pair.
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MACKIE™

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For information about distribution outside of the USA 206/487-4333 206/485-1152

FEATURES:

- 8 tk. simultaneous disk recording
- Non-destructive editing
- Multiple TAKE function
- Expand to 128 tracks
- Link up to 8 machines

You Could Always Hear What AKAI Did For Your Music . . .

In 1992 we introduced low cost disk recording with our 4-track DR4d. Thousands of DR4d's have found their way into broadcast facilities, recording studios, post production houses, and project studios. Combining our experience with input from thousands of end users, we created the DR8 and DR16. Whether you're just starting out with your first 8-track, upgrading your current tape-based MDM, or even if you're planning on a double-whammy, 128-track, multi-interfaced, graphically-based, post production facility, the new DR Series from Akai will serve your needs and grow with you in the future. It's an important fact to consider when someone tries to sell you a "budget" digital recorder that never really meets your needs. Check out these features and you'll "see" what we're talking about.

Record/Edit The new DR Series utilize our latest 24-bit internal processing technology enabling simultaneous 8-track recording with the transparent digital audio quality that has become an Akai trademark

Three dedicated LSI's (Large Scale Integrated circuit) for recording, mixing, and optional EQ provide real-time performance and stability of operation that computer based units simply cannot provide.

Real-time random-access editing features like copy, insert,copy + insert, move, move + insert, erase, delete, slip, and sliptrack inspire creative efforts that are simply unthinkable with tape based recorders. The TAKE function allows you to record up to five separate takes of a critical solo, or enables you to compare separate effects treatments of a singular passage. The jog and shuttle wheels make finding precise edit points a breeze, while the familiar tape-machine style transport controls and autolocator make operating the DR Series recorders like working with an old friend.

DR8 - $3495.00 Sugg. Retail Price
8 Track Disk Recorder

MORE FEATURES:

- 18 bit ADC • 64X oversampling
- 20 bit DAC • 8X oversampling
- 24 bit internal processing
- 16 channel digital mixer
- Dynamic MIDI mix automation
- Built-in mic preamps
- 2AUX sends
- 109 point autolocator
- AES/EBU and S/PDIF digital I/O
- 50 pin SCSI port

DR16 - $4995.00 Sugg. Retail Price
16 Track Disk Recorder

EVEN MORE FEATURES:

- Balanced 1/4" TRS in/out
- Switchable +4/-10dB line levels
- 8 in 8 out + stereo master (DR8)
- 8 in 16 out + stereo master (DR16)

Media The DR8 can be equipped with an optional internal 1 GB SCSI drive, while the DR16 is available with an optional 2 GB internal SCSI drive. The DR Series recorders are both equipped with a standard 50 pin SCSI port alowing a combination of up to seven SCSI drives with disk overflow recording capability. Lists of compatible drives are available from Akai product information.

Data backup is achieved through standard audio DAT or Exabyte.

At the time of this writing, the Iomega Company is preparing to go into production with their new 1 GB "JAZ" drive, a removable media SCSI drive which will greatly enhance the capabilities of our new DR Series recorders. Stay tuned for more info in our upcoming ads. Better yet, test drive a new DR Series recorder today at your local Akai dealer.

WRH

Now You Can See It.

OPTIONS:

- SuperView™ SVGA card - $699
- ADAT interface - $299
- MIDI interface - $299
- S.M.P.T.E. read/gen - $379
- RS422 video sync - $299
- BiPhase film sync - $299
- 2nd SCSI port - $299
- MT8 MIX controller - $799
- 8 channel 3 band parametric EQ - $550
- 16 channel 3 band parametric EQ - $699

Mixing Some of our competitors' disk recorders use a portion of their recording LSI to provide mix capability. While this saves money, it can also produce audio artifacts like "zipper" noise when adjusting such critical functions like EQ, pan, and fader level. On top of that, many disk recorders won't even let you make real-time adjustments during mix down, eliminating a critical part of the creative recording process. The heart of the DR mixer is a 16-channel, 24 bit custom LSI designed to provide real-time dynamic digital mix capability. Built-in 99 scene snap-shot automation for all functions and dynamic automation via external MIDI sequencers, combined with 8 or 16 channel 3-band parametric EQ option, ensures that the only limit in the DR Series mixer is your imagination. With its built-in 16 channel mixer, the DR8 becomes the perfect compliment to any 8-track recorder you might currently own. It can mix down its 8 tracks of internal digital audio with an additional 8 inputs from a sampler, tape machine, or a live performance, all in the digital domain. The MT8 mix controller provides a 16 track console format for dynamic remote control of all mix and EQ parameters.

(Monitor/Keyboard/Iomega Drive and Batteries not included.)

SuperView™ We sort of went into a frenzy packing new features into our DR8 and DR16. When we stepped back to take a look at what we'd done, we realized we crammed a whole roomful of equipment into a single 5U box. In order to help keep track of everything that's going on inside our "studio in a box", we developed the SuperView™ SVGA monitor board. SuperView™ mounts internally in the DR8 or DR16 and provides envelope and track information for up to 16 tracks of audio, as well as region highlighting for record, playback, and edit. SuperView™ is further enhanced by 16 track level meters with indicators for left/right master out and aux 1/2 out. The time indicator will read in the same format as the DR front panel. SuperView™ requires no external computer, simply plug your SVGA compatible monitor into a SuperView™ equipped DR Series recorder and you're ready to go. SuperView™ enables real-time video representation of audio status; no waiting for screen re-draws. What you hear is what you see.

ELECTRONIC MUSICIAN 1996 EDITORS' CHOICE

Keyboard Interface To increase the power of SuperView™ even further, we added an ASCII keyboard input to the SuperView™ card, allowing a standard ASCII keyboard to operate as a control interface for SuperView™ equipped DR Series recorders. Function keys will provide the ability to zoom in on a single track, as well as zoom in/out timewise for precise edit capability. All tracks and locate points can be named, allowing you to manipulate and track large amounts of data in a very simple manner. A unique interface has been developed to allow track arming, transport control, and edit functions directly from the keyboard, providing enhanced productivity through an intuitive human interface design.

AKAI DIGITAL

Akai Digital
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Fort Worth, TX 76102, U.S.A.
Ph. 817-336-5114
Fax 817-870-1271

I N S I

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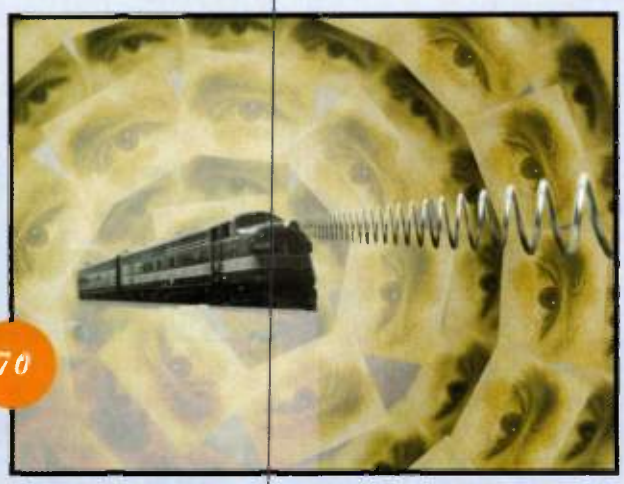

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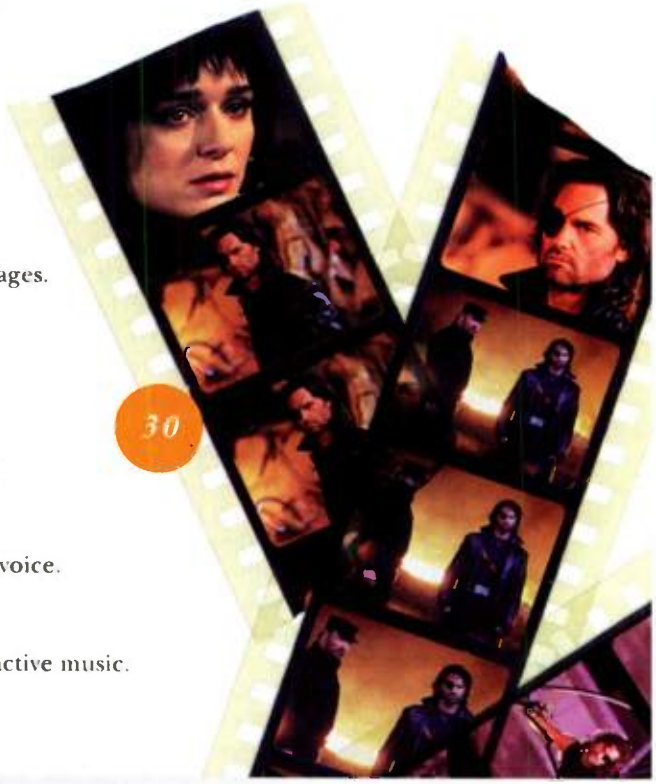

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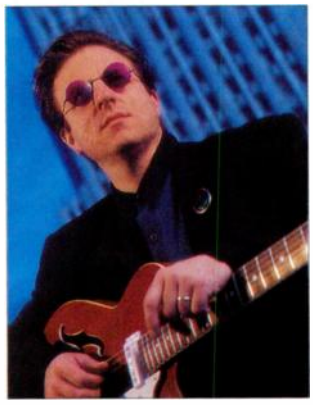
Cover: Photography by Allen Wallace.

Tape Fear

Even an old editor can relearn some studio tricks.



ROBERT PERRY

It's time for me to put up or shut up. After five years of blathering on in these pages about creating, recording, and producing musical works, I am faced with actually having to take my own advice. I recently signed with a European label for a solo album, and I start recording basic rhythm tracks this month. And, um, I'm totally petrified.

My abject fear may seem rather silly to readers who know I've logged thousands of studio hours during my tenure at **EM**. However, these sessions have been almost exclusively dedicated to producing other artists and composing instrumental scores for multimedia projects. This album is way more personal; it's a song cycle about relationships. And trust me, the recording process takes on a terrifying spin when you think about committing your voice and your lyrics to one of those shiny discs that someone can pop into a CD player and instantly gain access to precious chunks of your emotional real estate. So in the process of attempting to outrun my paranoia, I have rediscovered three "Duhs" about recording one's own work that I'd like to share with you.

Duh Number One: Collaboration is cathartic. Ultimately, music should be experienced by other people. If you compose alone in a small room, jealously hoarding the jewels of your creativity, you may be writing for an audience of one: yourself. Too many artists torpedo potentially good works by becoming egocentric control freaks—and let's face it, few musicians are brilliant enough to flourish in isolation. Your creative concept will not be diminished if you seek constructive criticism from other musicians. In fact, their counsel may actually help you forge stronger songs.

Duh Number Two: Revisions are righteous. Forget that "first thought, best thought" hooey; if you want to ensure your compositions are air-tight masterworks, you'd better pull a Hemingway and rewrite those suckers until they scream for mercy. Don't get married to lyrics, melodies, and other elements just because you're too lazy, too cocksure, or too scared to explore every path that may reveal a better way to communicate your thoughts to a listener.

Duh Number Three: Documentation is delightful. To really scrutinize whether your songs are ready to record, you need to be able to review them. So, rather than bash out instrumental parts and vocals in casual rehearsals, tape *all* of your writing and pre-production sessions. Then, at a later date, you can critically assess whether a part really enhances the song, or whether your voice truly sounds good negotiating certain phrases and melodic ranges.

Now, this may sound weird, but these three Duhs may be as critical to the success of a recording project as any high-end mics, consoles, or signal processors. You see, before the wonders of music technology can throw some righteous mojo on your tracks, the music itself has to possess a little magic of its own. Obviously, this realization scared the heck out of me until a faint recollection of these three Duhs came to my rescue. (Thank goodness for the resilience of dormant memory cells!) It's a no-brainer. Just struggle and sweat to make your songs the best they can be, and *then* let technology infuse your tracks with aural majesty. Duh!

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BPA INTERNATIONAL

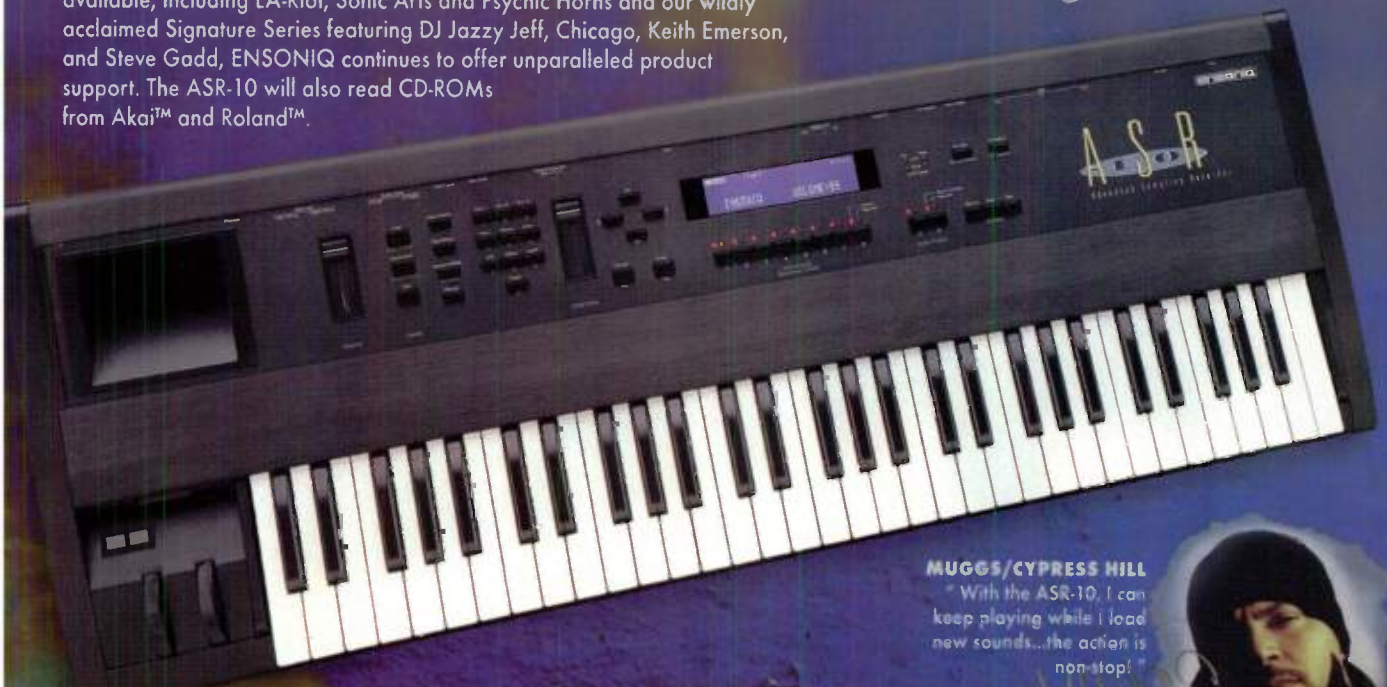
I did it on an ASR-10.

DJ JAZZY JEFF
" When I'm on it, I need to get my ideas down. The ASR-10 is quick, easy, and it's all right there! "

QDIII
" For me, sound is everything, and the ASR has the sound; plus it will import other CD-ROM libraries and give them that ENSONIQ sound...I love that! "

Do it with Sound . . .

These three artists and many more swear by the solid sound of their ASR-10. We're talking pristine stereo CD quality sound, with one of the most powerful voice architectures in the industry. The ASR library is your key to thousands of top-notch real and usable sounds. Now with over 19 CD-ROM volumes available, including LA-Riot, Sonic Arts and Psychic Horns and our wildly acclaimed Signature Series featuring DJ Jazzy Jeff, Chicago, Keith Emerson, and Steve Gadd, ENSONIQ continues to offer unparalleled product support. The ASR-10 will also read CD-ROMs from Akai™ and Roland™.



MUGGS/CYPRESS HILL
" With the ASR-10, I can keep playing while I load new sounds...the action is non-stop! "

Do it with Style . . .

Rich and fresh stereo multi-effects can be instantly added to any sound coming into or going out of the ASR-10. In fact, existing sounds or even complete grooves can be played through the effects processor and resampled, creating a new sound with effects already added. Using this powerful resampling tool, each performance can feature an endless array of independent, multiple effects!

Do it with Ease . . .

Ideas become hits instantly on the ASR-10. The on-board 16 track sequencer records in both real-time and loop modes. The ASR-10 will even perform an automated mixdown of the sequenced tracks. And with the self-prompting display, doing it on an ASR-10 is a breeze. So come on . . . Hip-Hop on over to your local ENSONIQ dealer and put an ASR-10 in your house - mix.

You can reach us at: 800-553-5151 phone, 610-647-8908 fax
http://www.ensoniq.com on the Web, GO MIENSONIQ on CompuServe
800-257-1439 documents to your fax (request document 1600)

ENSONIQ

LEADING THE WORLD IN SOUND INNOVATION

○ I wanna do it on an ASR.
Oh yeah, while you are at it, send me additional info on:
○ 1682 Series *mixing boards*
○ MR Series *64-voice rack and synths*
○ DP Series *parallel effects processors*
○ KT Series *64-voice weighted action synths*

Name _____
Address _____
City _____ State _____ Zip _____
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Mail to: ENSONIQ Corp, Dept E-64, 155 Great Valley Parkway, P.O. Box 3035
Malvern, PA 19355-0735 (610) 647-3930 fax: (610) 647-8908

48-track capability and punch-on-the-fly are only part of the many professional features which make Pro Tools the best selling digital audio workstation in the world.

Putting the Pieces Together

for a totally integrated studio...

Recording

With Pro Tools it's not just *recording. There's non-destructive recording. There's loop recording. Try it over and over until you get the take you like. And do it in the digital domain. Clean, crisp, or cutting edge.*

Editing

On-screen waveforms let you see what you've been hearing. Sophisticated editing tools let you cut with precision, without affecting the original audio. Piece together dozens of takes to create the ultimate performance. Be precise. Get creative.

Mixing

Not only will you be mixing in the digital domain, you'll have relative fader grouping and dynamic automation of virtually all parameters. Expand your mixing capabilities with powerful Plug-Ins from over 100 Digidesign Development Partners.

Mastering

With MasterList CD software, you can prepare your project for CD mastering. It's the recommended software with the necessary features for professional CD-DA creation. No need to worry about how a cassette will sound. Think about how the CD jackets will look.

If you spend enough time and enough money, you can put together a bunch of gear to do a bunch of things. But no matter how many things you piece together, they will never equal a Pro Tools system.

Pro Tools provides you with the best tools to accomplish every important task involved in music production, from concept to finish. Right here, right now, right on your desktop.

But great tools and great ideas are not the end of the story, they are the beginning. With the functionality that Pro Tools offers, you'll be able to create music in ways you've never imagined before. Experiment. Assemble a knock-out solo. Triple the vocals. Undo. Fly them in backwards. Re-do.

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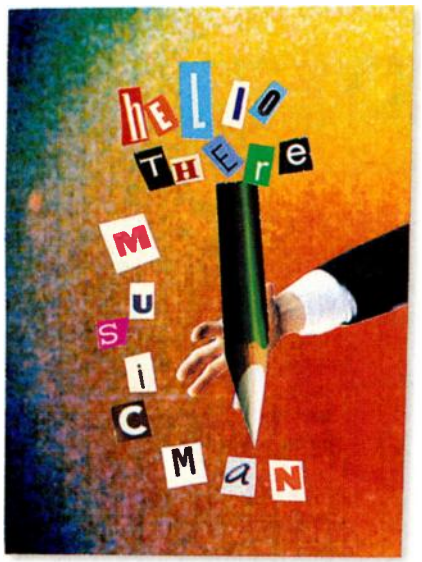

BEYOND BELIEF

I've been a subscriber to **EM** for years, and I just wanted to thank you for your article "Working Musician: Publishing Your Praise" (August 1996).

As a pastor who is a musician, I've often had to deal with two worlds when it comes to music and the church. On one hand, many people of faith have the idea that "sacred" music can have no connection to the rest of the music world. On the other, the professional music industry barely acknowledges the specific needs of church worship music.

It was refreshing to see an industry leader like **EM** publish an article bridging the gap between these two viewpoints. Thank you for your efforts.

Pastor Ed Backell
Harvey Oaks Baptist Church
backell@aol.com

I enjoyed the recent article on publishing worship tunes. For years I have written worship songs, in addition to ballads and video-scoring work, but I never put much effort into sharing them with the rest of the world. Your article gave a lot of practical advice and encouragement just when I needed it. I will be contacting the publishing companies you listed, and if some of my songs make it to release, I'll be sure to send you the CD!

The article straightforwardly communicated facts of particular concern to Christians. Many articles on contemporary music are now written by headbangers for headbangers, so it was pleasant to see one obviously written by a Christian for Christians to read. A lot of us enjoy **EM**'s musical, recording, and technical articles.

I am currently consulting a church on the purchase of a General MIDI synth, and your article on portables ("Traveling Companions") may have helped make the choice. I received this issue as a trial sample, and I think it has made me a subscriber.

Rick Dupea
rickdupea@aol.com

NET RETURNS

As a longtime subscriber to **EM**, I'm continually reminded why I like your magazine. The article "Square One: Internet Glossary" (July 1996) was timely because I've recently upgraded from an Atari computer to a Power Mac and, therefore, jumped onto the Web. Once again, you presented a useful guide for beginners, and I've always appreciated that aspect of your publication. Thanks to Scott Wilkinson, Peter Freeman, and the entire **EM** staff for continuing to improve coverage without fear of starting at the beginning.

tmcbr@aol.com

The article "Square One: Internet Glossary" was fairly complete, considering the intended audience. However, it had a few ambiguous definitions and a couple of glaring errors.

The definition of *baud rate* is incorrect. The baud rate is basically the number of cycles per second that the signal is modulated. No modems for use on American phone lines have a baud rate higher than 2,400. All higher values send multiple bits per cycle. A simple formula is "Baud rate × bits per cycle = bandwidth." A 9,600 bit-per-second modem usually runs at 2,400 baud and sends 4 bits per cycle. "Baud" is quickly becoming an archaic term—"bits per second" is the usual term now.

Cyber is an ambiguous buzzword. A better definition would be "the seamless integration of high technology into everyday life; it usually refers to computers doing something remotely." I will admit that this term is changing in its meaning, similar to how "turbo" stopped meaning "turbine" and started meaning "fast."

HTTP means HyperText "Transfer" Protocol. Hopefully, "Transport" was just a typo. The term is supposed to be a parallel to FTP.

Hyperlink and hypertext do not mean just text, but any symbol that can take you to other text, sound, video, or graphics files.

UUCP should be *uucp* (lowercase). The UNIX command for copy is "cp." uucp stands for "UNIX to UNIX cp," not "copy program."

There is no program called *UUCode*. There is "uuencode" and "uudecode."

Virtual means to treat something as if it were real. Virtual memory isn't real memory but is treated as such. It does *not* need a computer to be involved. After all, a credit card is virtual cash!

Even though the article had a few errors and a few places where I thought the wording was confusing, overall it was very information-packed.

Alan W. Kerr
National Radio Astronomy Observatory
Socorro, NM

Alan—Thanks for the input. Let me respond to your points one by one.

I checked out the definition of baud rate *with the manufacturer of Supra fax/modems, and you are quite correct (and boy, is my face red!). In the old days of 2,400-baud and slower modems, baud rate was roughly equal to bandwidth, and I assumed this to be true of faster modems, as well. With the advent of faster modems, new schemes were developed to encode several bits in each cycle of the 2,400-baud modulated signal, which yields effective bandwidths of up to 28.8 Kbps these days. As a result, baud and bandwidth are no longer roughly equal, and your formula applies. I know that baud is becoming an archaic term, so perhaps I should have omitted it from the*

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IN MEMORIUM

Long-time EM contributor Charles R. Fischer died on Sunday, July 28, 1996, at age 38. A diabetic for twenty years, Chuck's health was always uncertain, but his facetious wise-guy sense of humor rarely failed. To our knowledge, he is the first EM author to leave us for the ultimate Big Band.

Between "The Slide Pot Ribbon Controller" in February 1987 and "Build the EM Optical Theremin" in May 1995, Chuck wrote a wealth of EM reviews, applications, and especially DIYs. His "Build the EM Fingerdrum" (March 1992) and "MIDI Mods for your Minimoog" (September 1989 "dinosaur" issue) are pure, vintage EM. Chuck was in the process of reviewing Waldorf's Pulse analog synthesizer; his long-time pal and fellow analog-synth fanatic Bill Heagy has inherited the assignment.

—Steve Oppenheimer

glossary. I included it because I thought people would encounter it in their online journeys. Thanks for setting me straight.

You're right, cyber *is truly an ambiguous buzzword, but one that all netnauts (and most others) will encounter at some point. I disagree that it means "a seamless integration of high technology into everyday life." To me, it refers strictly to general-purpose computers, multimedia, and online activity. For example, I do not classify automatic teller machines (ATMs) as "cyber," even though they fit your definition.*

Regarding HTTP, *you are correct; "Transport" was a typo.*

You are correct about hyperlink *and* hypertext, *as well. I should not have been quite so narrow in these definitions.*

According to Que's Computer and Internet Dictionary *(6th Edition),* UUCP *(uppercase) stands for "UNIX-to-UNIX Copy Program." However,* The UNIX Programmer's Manual *online documentation says that uucp (lowercase) stands for "UNIX-to-UNIX Copy," which more closely matches your contention.*

With UUCode, *you are correct with respect to the specific UNIX programs you mention. However, I was referring to the coding format used by those programs, not the programs themselves. For example, in* Stuffit Deluxe, *the Translate menu includes a submenu called "UUCode." This submenu includes two items: Encode and Decode.*

When defining virtual *you are correct in a broad sense. The most appropriate definition of "virtual" from* The American Heritage Dictionary *(Standard Edition, electronic version) is "Existing or resulting in essence or effect though not in actual fact, form, or name." However, our glossary is intended to address Internet terms only, so I think it's fair to phrase the definitions in terms of computers. As to your analogy, I disagree that a credit card is virtual cash; a credit card is a method of obtaining a loan at interest on demand. However, I have heard of a type of virtual cash on the Web called* cybercash.*—Scott W.*

GOING SOFT ON SOFTWARE

I expected "The Windows Studio" (July 1996) to go head to head concerning *Samplitude Studio, SAW Plus,* audio sequencers, and so on. Instead, all we got was the old hardware overview, much of which had been covered

This **TD-5K Compact Drum System** comes with a TD-5 sound module, five PD-5 pads, a KD-5 kick trigger, an FD-7 hi-hat controller, stand and cables. With 210 dynamic, 16-bit CD-quality sounds and a digital effects processor, this kit offers the perfect combination of power and affordability.

The FD-7 hi-hat pedal gives you all the control of a real hi-hat: pedal, heel-splash, open to closed and everything in between.

Roland's PD-7 and PD-9 dual trigger pads feature rim shot and cymbal choke capability.

The **TDE-7K Compact Drum System** comes complete with a TD-7 sound module, eight TD-7 dual trigger pads, a KD-7 kick trigger, an FD-7 hi-hat controller, stand and cables. For the ultimate in flexibility, the TD-7 sound module has 512 16-bit CD-quality sounds, an onboard digital effects processor plus a built-in sequencer.

a few months ago. Of course, many will want exactly just what you published, but we have yet to see the software version of this kind of thing, and so much has happened that it is desperately needed.

Tim Snyder
tim@cs.georgetown.edu

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Congratulations on your July 1996 issue! Every month there seem to be more and more pertinent articles. (In fact, congrats overall. There are so many garbage 'zines out there!) However, I have a query. In "Working Musician: The Road to Self-Publishing," Michael Aczon states, "By filing a copyright registration form...the composition [is]...protected by the copyright law." My band recently released an album, so I did some copyright research not too long ago. Here's what I found: the University of Knoxville (sorry I don't have their e-mail address) says that "Under the present Copyright Act, copyright protection begins automatically...when it is fixed in a copy or phonorecord for the first time." Further, the *Questions and Answers on Copyright for the Campus Community,* published in 1994 by The National Association of College Stores, Inc., and The Association of American Publishers, declares that "Registration with the Copyright Office is *not* [their emphasis] required in order for a work to be protected under U.S. copyright law." Now, I trust all three of you. So what gives?

L. A. Beahm
hippieyoda@aol.com

Author Michael Aczon responds: *Yes, your other sources are correct in their statements that once a work is fixed in a tangible medium (in this case, your CD), it is protected under the copyright law. However, certain key remedies, such as the right to attorneys fees and the right to statutory damages (these are set dollar figures found in the copyright law) in cases of infringement are not available automatically unless the works have been registered.*

You may also want to read a more detailed explanation in my article "Working Musician: Comprehending Copyright" in the February 1992 **EM**.

YOU CAN DO IT, TOO

I would like to commend Scott R. Garrigus on his May 1996 article "Desktop Musician: Home, Home on the Web." Thanks to your article and a little computer knowledge, I was able to construct a pretty detailed page for my group. I used the *NaviPress* software that was available from AOL. Then I purchased a color scanner and look out: color pictures of the group and links to music sources around the country! It is amazing how many inquiries and message we receive just because our page is up. Take a look for yourself: http://members.aol.com/Mhollow/index.html.

Alan Stenger
mhollow@aol.com

WE WELCOME YOUR FEEDBACK.
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This triple bass set is geared for the player who requires more percussion and cymbal options. It includes two SPD-11s plus additional PD-9 and PD-7 dual trigger pads, a KD-5 kick trigger and an **MS-1 Digital Sampler** for unlimited sound options.

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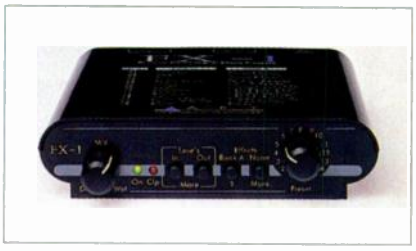
WHAT'S NEW

By the EM staff



▲ A.R.T. FX-1

Ever feel like you want to pick up your digital effects processor and take off? The FX-1 ($159) is essentially the company's FXR multi-effects processor mounted in a 1.5-pound, 5 × 5.5 × 2-inch case. Stuffed into that little package are 60 presets that access 30 digital effects algorithms, including flanger, chorus, reverb, delay, doubler, pitch shift, tremolo, and combinations of these. Stereo room and plate reverbs are included; all the other effects are dual mono. A button labeled "More" increases the value of one preprogrammed parameter (e.g., effect depth or delay time) for the current effect.

The unit has unbalanced, ¼-inch L/R ins and outs that operate at +4 or -10 dBV. The front panel has a wet/dry mix knob and power and clip LEDs. A.R.T. rates the unit's THD at <0.05% and input dynamic range at >90 dB (unweighted). Applied Research and Technology; tel. (716) 436-2720; fax (716) 436-3942; e-mail artroch@aol.com; Web http://www.artroch.com.

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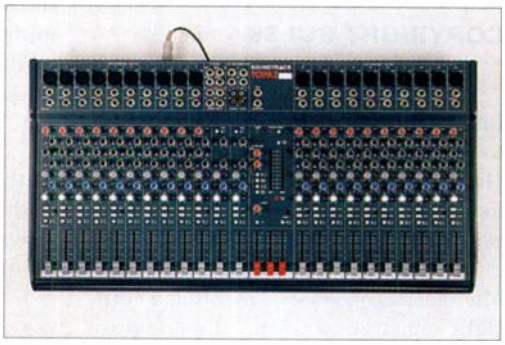
▶ SOUNDTRACS TOPAZ 24-4 MIXER

Many home- and project-studio owners find that 4-bus mixers are sufficient for their studio needs, especially when they can score extra input channels and still get the whole package for significantly less money than comparable 8-bus boards. As a bonus, of course, 4-bus mixers are usually smaller and lighter than 8-bus consoles.

A newcomer in this category is the Topaz 24-4 ($1,099) console from Soundtracs, which is a 4-bus board in the sense that it has two subgroups with dedicated faders in addition to the L/R master mix buses, which are controlled by a single stereo fader. The Topaz 24-4 has twenty mono channels and two stereo channels. Each channel has a 60 mm fader, mute, solo, and two aux sends (one post-fader and one switchable pre/post). The mono channels have balanced XLR mic and ¼-inch line inputs and fixed 3-band EQ. The four stereo-paired channels have 2-band EQ and unbalanced line inputs that can be switched between -10 and +4 dBu operating levels. Two-track tape I/O is provided on RCA jacks.

The main section includes two stereo effects returns, a mono output, balanced XLR main outputs, globally defeatable phantom power, and a headphone jack with level pot. Ten-segment LED meters allow monitoring of the main mix, individual bus, or solo levels. The power supply is a "lump-in-the-line" type. Soundtracs; tel. (516) 333-8737; fax (516) 333-9108.



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▼ KORG N264

For those of you who have been baffled by Korg's radical use of actual words ("Trinity," "Prophecy") in the names of their keyboards, the new N-series workstations should be comforting. Both the 76-key N264 ($2,400) and the 61-key N364 ($1,900) feature 64-voice polyphony using Korg's familiar AI^2 sample-based synthesis. Both keyboards are sensitive to Velocity and Channel Aftertouch. The synth has 8 MB of ROM-based samples configured as 430 multisounds and 215 drum sounds, yielding 936 programs and combinations, including a full GM sound set and eight GM drum kits. In GM mode, the unit is 16-part multitimbral; the preset combinations are 8-part multitimbral.

Each of the N-series workstations is equipped with a large, backlit LCD and a 16-track, 32,000-note sequencer that uses the Standard MIDI File format. Also included are two independent, dynamic, stereo multi-effects processors. The 47 effects types include reverbs and delays; numerous choruses, flangers, and phasers; EQ; rotary-speaker emulation; and many combination effects. Both keyboards have 4-octave arpeggiators and a Real-Time Pattern Play and Record feature.

Other features include a DOS-format disk drive, four ¼-inch outputs, and compatibility with program and sequence data from Korg X-series instruments. Korg USA; tel. (516) 333-9100; fax (516) 333-9108.

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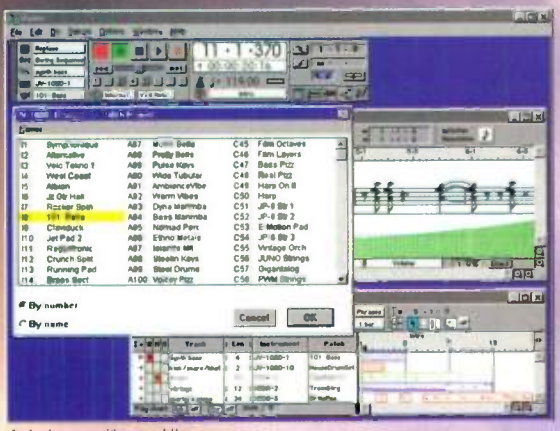

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▼ RETROSPEC JUICE BOX

If a really good direct-instrument sound has eluded you for years, maybe transistors are sabotaging your signals. A new solution is the Juice Box ($595) direct-injection (DI) box from Retrospec. The Juice Box departs from standard DI-box design in one critical way: it's an all-tube direct box without an audio transformer.

Transformers can cause phase shift, transient overshoot, ringing, and other forms of distortion, yet they're an intrinsic part of most tube technology.

The Juice Box features Class A circuitry, a ¼-inch input, ¼-inch and balanced XLR outputs, a 3-position gain switch with additional Vari knob, and a low-impedance, high-voltage power supply. The gain switch lets you choose between -20 dB, 0 dB, or +20 dB signal levels, and the Vari knob allows continuously variable gain adjustment between 0 dB and +20 dB. The specs are excellent: frequency response is rated at 10 Hz to 100 kHz, signal-to-noise at >90 dB, and distortion at a low 0.05%.

Also new from Retrospec is the Squeeze Box ($495), an electro-optical tube compressor/limiter. The mono stomp box is designed for both studio and stage. The transformerless Squeeze Box features ¼-inch, line-level I/O; a balanced XLR, mic-level output; an EQ contour control; and a bypass switch. Retrospec, Inc.; tel. (914) 688-7329; fax (914) 688-2895; e-mail 103107.2601@compuserve.com.

Circle #404 on Reader Service Card

▼ KAWAI K5000W

With their brushed aluminum casings, the new keyboards from Kawai may have no artificial color, but they're not additive-free. The K5000W ($2,395) is a 64-voice polyphonic, 32-part multitimbral synthesizer workstation with a 61-key, Velocity- and Channel Aftertouch–sensitive keyboard. Its Advanced Additive synthesis technology lets you build patches using up to 128 harmonics (sine waves with individually looping amplitude envelopes) and/or PCM samples. The sounds can be further shaped with a DCA, a 128-band, sweepable formant filter, and a 24 dB/octave, resonant DCF. A separate, GM-compatible PCM tone generator is included.

The unit offers 464 waveforms (plus 240 drum sounds) and 48 effects algorithms. Editing is done on a 240 × 64-dot LCD screen. For turning your sounds into songs, the K5000W includes a 40-track, 50,000-note sequencer with groove quantizing and event editing; an Auto Phrase Generator that creates new song parts based on recorded tracks; and a Chord Advice tool that suggests chord changes. The 3.5-inch floppy-disk drive reads and writes Standard MIDI Files.

Kawai's additive synth engine is also available in the K5000S ($1,595). This 32-voice polyphonic, 4-part multitimbral unit adds portamento and an arpeggiator but does not have the GM sound bank or a sequencer. Its sixteen preset and four assignable control knobs can send MIDI Control Change messages as you edit synth parameters. Kawai America; tel. (800) 421-2177 or (310) 631-1771; fax (310) 604-6913; e-mail 76307.2247@compuserve.com; Web http://www.kawaius.com.

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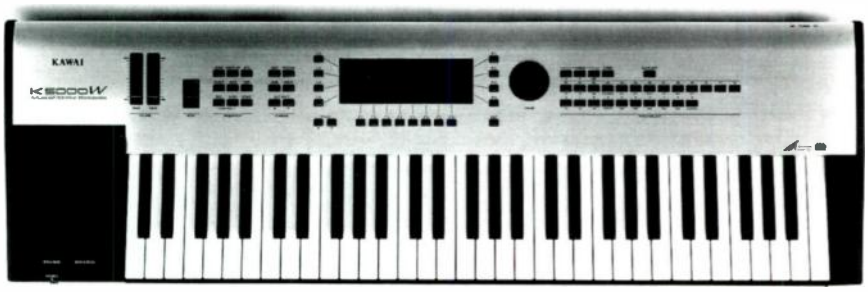

▲ EVENT ELECTRONICS 20/20

Event Electronics introduced its first original products, the unpowered 20/20 ($399/pr.) and biamplified 20/20bas ($999/pr.) 2-way close-field reference monitors. Both systems feature a recessed, 1¼-inch, silk-dome tweeter and 8-inch polypropylene woofer. The woofer is mineral-impregnated and has a highly damped, linear-rubber surround. Both 20/20 models utilize a front-mounted, cylindrical bass port and a vinyl-laminated, ⅝-inch, medium-density fiberboard cabinet. An internal pole-piece damping element aids in smoothing out the highs, and extra acoustic damping material reduces internal standing waves. The connectors are 5-way binding posts on ¾-inch centers.

The unpowered 20/20 uses a second-order (12 dB/octave) passive crossover set at 2.2 kHz. Its recommended power handling is 150W program and 200W peak into 4Ω nominal. Frequency response is rated at 50 Hz to 20 kHz.

The 20/20bas has a built-in 70-watt amp for the tweeter and a 130-watt amp for the woofer. It uses an active, asymmetrical fourth-order (24 dB/octave) crossover set at 2.6 kHz. Frequency response is rated at 45 Hz to 20 kHz.

From the front, the 20/20bas is identical to the 20/20, except for a power/clip LED. The rear panel of the powered speaker features a Neutrik combination ¼-inch/XLR input connector, input sensitivity control, and continuously variable low and high-frequency adjustments. Event Electronics, Inc.; tel. (805) 566-7777; fax (805) 566-7771.

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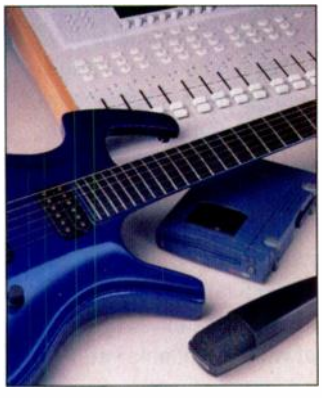

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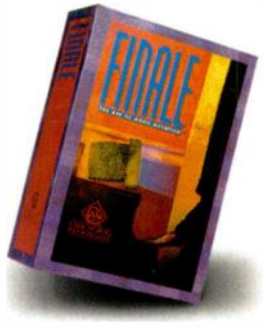

Find out what the company that invented the workstation does for an encore. Demo a Trinity DRS at your authorized Korg dealer today.

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FORMAT WARS: THE BATTLE OF NASHVILLE ▲ ▲ ▲ ▲

In late 1864, Confederate General John Bell Hood led his weary troops into Tennessee, where they were punished by Union forces in a horrific battle at Franklin, near Nashville. In desperation, Hood's Army of Tennessee advanced on Nashville in an attempt to lure Union commander George Thomas out of his defensive works for one last, decisive battle. But Thomas delayed for two weeks while he prepared his army, and when he finally came out to fight, he smashed Hood's army to pieces. Hood's overwhelming defeats at the battles of Franklin and Nashville sealed the fate of the western Confederacy.

Multitrack cassette aficionados who attended the 1996 Summer NAMM show in Nashville must have felt a lot like the Confederates did as they entered that final battle. Having taken a beating in recent years from modular digital multitrack tape and hard-disk recorders, the cassette format staggered into the Nashville NAMM show only to encounter one final, superior enemy. Yamaha, Sony, and TASCAM showed 4-track MiniDisc recorders that are clearly designed to bury the multitrack cassette format as thoroughly as Thomas destroyed Hood's army. Thanks to MD's superior audio quality and editing capabilities, the new format has an excellent chance to win this Battle of Nashville.

Each of the three machines shown at NAMM provides up to 37 minutes of 44.1 kHz, 16-bit, 4-track recording per 140 MB disc. To achieve this, they use Sony's ATRAC 5:1 data compression, which was developed for consumer MiniDisc systems. According to Sony, the second-generation ATRAC technology used in the new machines offers much better audio quality than the disappointing first-generation version we examined in **EM**'s August 1996 cover story, "The Digital Debate." But even the first-generation 2-track MiniDisc clearly offered far better audio quality, reliability, and shelf life than cassettes. For instance, wow and flutter simply don't exist with MD.

The 4-track MD machines are designed for songwriting and making demos, not for producing commercial recordings. However, several artists have recorded successful albums and film scores on multitrack cassette, so it is likely some users will produce quality commercial products with MD.

Multitrack MD Recorder Features

	TASCAM 564	Yamaha MD4	Sony MDM-4X
XLR Mic Inputs	4	0	2
1/4-inch Mic/Line Inputs	4	4	4
Stereo Inputs	2	0	1
2-track Inputs	1	0	0
Stereo Sub Inputs	0	1	0
Channel Inserts	2	0	0
EQ	3-band, sweepable mid	3-band fixed	3-band fixed
Aux Sends	2 (2 pots)	1	2 (1 pot)
Aux Returns	2 stereo	1 stereo	2 stereo
Direct Outputs	yes	yes	yes
Cue Out	yes	yes	no
Jog/Shuttle Wheel	yes	no	yes
Pitch Control	yes (±9.9%)	yes (±6%)	yes (±8.8%)
MTC	yes	yes	yes
MMC	yes	no	yes
MIDI Clock	yes	yes	yes

COMMON GROUND

The three MD machines we saw at NAMM—Yamaha's MD4 ($1,199), Sony's MDM-4X ($1,250), and TASCAM's 564 ($1,499)—utilize the same Sony recording mechanism and technology and have identical recording specs. It appears they will be mutually compatible with respect to playback. However, the machines have different methods of marking edit points and dealing with pointers and submixes, so edits from one model probably won't translate to the others. All three models include built-in analog mixers, which reinforces the focus on replacing cassette ministudios. Differences in mixer features (discussed shortly) separate the three units from each other.

Currently Sony has specified three varieties of MiniDisc. Prerecorded MD is a read-only optical format for commercial releases, similar to pre-recorded CD. Sony plans to push this format as a CD alternative in the near future, emphasizing its superior physical stability for use in car stereos and boomboxes.

MD-Audio is intended for stereo applications such as consumer recording. Think of it as an alternative to cassette. MD-Audio uses a 2.5-inch magneto-optical disc mounted in a plastic cartridge. Sony claims these MiniDiscs can be rewritten up to one million times. MD-Audio blank discs currently list for $8.99.

However, the new multitrack MD recorders use a third format, MD-Data, which was originally designed for computer data storage but has not gained acceptance in that market. Although MD-Data discs are not much different from MD-Audio discs, MD-Data blanks currently list for $22.95, a price that seems pretty stiff compared to the cassette, Hi-8 mm, and S-VHS tapes used in most home studios. In addition, MD-Data blanks are not widely available yet.

▼ YAMAHA MD4

So far, Yamaha is the only company that has actually shipped a multitrack MiniDisc recorder. The least expensive of the three MD multitrack decks, the MD4 offers a 4-channel,

MEMO

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TO: Chief Engineer
RE: Demo

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4-bus, analog mixer. Tracks are assigned to subgroups via a pair of Group Assign buttons and the pan pot. Most of the basic mixer features are listed in the table, "Multitrack MD Recorder Features." Note that there are no solo or mute functions.

One strength of the MD4 is its ability to edit and rearrange audio segments. Using markers and the Cue List function, you can repeat sections, move them around, and cut, copy, and paste them. You can divide a song into several songs for separate editing and then recombine them if you wish. The Cue List Playback function allows you to create an alternate version of a song using markers and save the new version to another place on the same disc. Program Playback plays the songs in any order you wish.

Although the MD4 is a 4-track machine, it has write-after-read capabilities that let you submix all four tracks to any combination of tracks via the analog mixer. That way, you have open tracks for additional recording. If you have open space on the disc, you can even make a safety backup first.

The MD4 outputs MIDI Time Code or MIDI Clock and includes tempo-mapping so a sequencer can chase-lock to it. However, the MiniDisc recorder does not recognize time code or MMC, so it must be the master. Time code is displayed in minutes:seconds:frames format on the unit's LED display, which also includes assorted status indicators and the level meters for the four tracks and master L/R bus.

Circle #407 on Reader Service Card

▲ SONY MDM-4X

Sony's entry into the multitrack MD sweepstakes offers a 6-channel, 4-bus mixer. Each of the first four channels has fixed 3-band EQ; the other two channels are configured as a stereo pair with shared 2-channel EQ controls but separate aux-send level pots. The MDM-4X supports MIDI Machine Control as well as MTC sync, so it can be slave or master. In addition, it sports a jog/shuttle wheel.

The editing features appear to be similar to those in the Yamaha machine, with one major addition: the MDM-4X can copy, move, and erase individual tracks whereas the Yamaha unit can only edit the four tracks as a group. Like the MD4, the MDM-4X lets you submix up to four tracks to any combination of tracks, freeing up the remaining tracks for further recording. The MDM-4X is scheduled to ship in early November.

Reader Service Card not available

TASCAM 564 DIGITAL PORTASTUDIO

TASCAM's MiniDisc promotional machine has been much quieter than those of Sony and Yamaha. Although a unit was shown at NAMM, no press releases or photographs were available. But the TASCAM model 564 Digital Portastudio is clearly similar to its two competitors, except for a few extra mixer features. The unit includes a jog/shuttle wheel like that of the Sony MDM-4X, and its analog mixer has an S/PDIF digital output.

Only a few details on the TASCAM machine's editing features were available at press time, but they appear to be comparable to those of the other two MD multitrack recorders, except that the 564 lacks the Divide and Combine functions. The product is scheduled for release sometime in mid-October.

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THE REST OF THE STORY

MiniDisc multitrack recorders were the only completely new major product category at this year's Summer NAMM show, but they certainly weren't the only cool new products shown. Among the most noteworthy newcomers were powered speakers from Spirit and Encore Electronics, and Audix showed impressive updated versions of its PH 15 and PH 25 powered speakers. But the biggest surprise in this department came from Mackie Design, it demonstrated its new speakers in a sound room off the show floor. Mackie also introduced some power amps as part of a heavily promoted diversification move.

We saw several new low- to mid-priced mixers, including the Studiomaster Trilogy, the Soundcraft Ghost LE, several new boards from Soundtracs, and a new version of the Behringer Eurodesk. Perhaps the biggest news among these companies was that Soundtracs is no longer distributed in the U.S. by Samson; the new distributor is Korg USA.

Finally, despite a keyboard market that was commonly described as "flat" or even "in the dumper," several new keyboard synths were introduced. The new Yamaha CS1x and Korg N-series synths look nice, and Yamaha's VL70m is the most affordable physical modeling synth yet. But the Kawai K5000W stood out because it introduced an improved version of the additive synthesis technology used in Kawai's classic K5.

We'll bring you details on these and other hot new goodies over the next few months.

—*Steve Oppenheimer*

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"music hit me early on,...

Lee Ritenour – Los Angeles 1996

when I was five I was stretching rubber bands across brooms and making sounds. My father was my first real inspiration. I watched him create wonderful music on piano and came to understand that you could just compose your own songs.

That composing is just another form of improv. And vice versa. It could be used as a way to reach into your soul to get the music out. I give myself some goals... it's important to define where I am trying to go. For me, writing is my alter ego. I'll sit here with Logic Audio at the center of this very sophisticated system,

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▶ SPIRIT ABSOLUTE ZERO

Just when you've completed your comparison shopping and narrowed your sights on a favored pair of studio monitors, along comes yet another contender—and this one with fire engine red drivers, no less. Make way as British console company Spirit enters the ring with their Absolute Zero closefield monitors ($399).

Aside from a color scheme that will help keep you awake during wee-hour mixes, the Absolute Zero features a 6.5-inch long-throw woofer and a 1.25-inch soft-dome tweeter driven by a ferrofluid-cooled voice coil. A proprietary waveguide helps time-align the tweeter to the bass driver and restricts the tweeter's dispersion to a 90-degree angle. The monitors are rear-ported to help assure midrange consistency. To minimize diffraction, the cabinet has contoured edges.

Frequency response is rated at 55 Hz to 18 kHz and, according to the manufacturer, is flat both on axis and up to 30 degrees off axis. This allows the monitors to be used horizontally or vertically. Power rating is 95 watts RMS into 8Ω nominal. The fourth-order Linkwitz-Riley crossover is set at 2.5 Hz. The connectors are gold-plated binding posts. Spirit/Harman; tel. (916) 888-0488; fax (916) 888-0480.

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▼ YAMAHA CS1X

If you think with your hands and are looking for a keyboard synth with a twist, you might want to check out Yamaha's new CS1x ($799.95). This 32-voice polyphonic, 16-part multitimbral PCM synth has a Velocity-sensitive, 61-key keyboard and six control knobs for hands-on sound-tweaking. Four knobs are dedicated to the amplitude envelope's attack and release and the filter cutoff and resonance. The other two knobs can be assigned to a variety of parameters, such as arpeggiator tempo and type, pitch-bend range, panning, and effects parameters. Pitch and mod wheels are included along with three inputs for an assignable footswitch, assignable footpedal, and dedicated volume footpedal.

The unit has 480 normal Voices (PCM multisamples) and eleven drum kits in XG format (Yamaha's superset of GM), but in Performance (4-part multitimbral) mode, more than 1,000 Voices are available along with 256 preset programs (including a wide array of dance/techno programs), of which 128 can be edited.

The CS1x has three simultaneously available effects blocks: reverb and chorus blocks with eleven algorithms each, and a system/insert (switchable) effects block with 43 algorithms. The effects run the gamut from reverbs and delays to amplifier and rotary-speaker simulations. A Scene Controller lets you save and restore two Scenes containing the values of all six controller knobs. You can toggle between the two Scenes or select them both, which morphs between them.

In addition to standard MIDI In, Out, and Thru, the CS1x has a serial computer interface. (Windows users will need drivers, which are available on the Internet.) An ⅛-inch stereo jack lets you mix external program material with the onboard sounds. Yamaha Corporation; tel. (714) 522-9011; fax (714) 739-2680; e-mail info@yamaha.com; Web http://www.midifarm.com/yamaha.

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"Cakewalk Pro Audio...un produit fabuleux pour les musiciens"

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"A very good choice for professionals who work on a deadline and demand top performance"

—Electronic Musician

"Excellent—and user friendly—results."

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—Music and Sound Retailer, April 1996

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▼ UBI SOFT

Two of the things that make your computer a good teacher are that it doesn't mind repeating itself and it doesn't charge by the hour. Ubi Soft's *Classic Rock Guitar,* volumes 1 and 2, ($59.95 each) are designed to let intermediate-level guitar students take advantage of these features as they learn to play some of rock's best-loved songs. Volume 1 features an 8-song sampling including "Hey Joe," "No Woman No Cry," and "Dust in the Wind." Volume 2 features eight songs by John Lennon and Paul McCartney.

In each volume, more than 80 lessons, broken up into 180 exercises, cover essential rock-guitar techniques, such as strumming and fingerpicking, bar chords, palm muting, scratching, slides, and trills. Lessons are presented as video demonstrations synched with scrolling musical notation, tablature, chord diagrams, and lyrics. Users can fast-forward, rewind, and loop lessons in order to concentrate on trouble spots and move ahead at their own pace.

In addition, each volume includes acoustic and electric tuners and a digital metronome. The Mac versions require a 25 MHz 68030 or later CPU and System 7.1, and the PC versions require an 80486DX/66 or later CPU, an SVGA monitor, a Windows sound card, and Windows 3.1 or Windows 95. Both versions require a double-speed CD-ROM drive and 4 MB memory. Ubi Soft; tel. (800) 824-7638 or (415) 547-4000; fax (415) 547-4001; e-mail ubimail@ubisoft.com; Web http://www.ubisoft.com.

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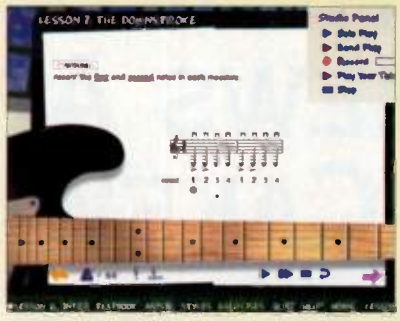
▶ LYRRUS

Although many producers of educational music software have striven to avoid the feeling of a classroom, Lyrrus attempts to re-create it with *Guitar 101, The Fender Method* ($49.95). This CD-ROM for Windows is aimed at beginners and focuses on fundamentals. It consists of 30 lessons, broken down into six "rooms." Lessons are organized in a linear manner, starting with how to sit and hold the guitar and progressing through picking and fingering to scales and simple music theory.

Each lesson includes several sections. An Introduction and a Textbook section with graphics and optional narration explain the content of the lesson. The Movie section demonstrates the main points (with Play, Pause, and Stop controls); the Styles section uses text, graphics, and studio samples to illustrate how the technique being taught is used in different musical genres.

The Exercises section uses Lyrrus' *G-VOX Riffs* to play riffs and accompaniment at any speed and display staff, tablature, and fingerboard notation. Users of the G-VOX guitar-to-computer interface ($379.95; reviewed in the February 1996 **EM**) can choose Step Play, which waits for the user to play the right note before proceeding to the next one. Each lesson also has a 10-question Quiz section.

In addition to the 30 lessons, the program includes a separate tuning section and an onscreen tuner that works either with the G-VOX hardware or with a standard adapter (not included) that plugs into the computer's sound card. A Boom Box section synthesizes chords as the user plays single notes to one of ten drum beats (requires G-VOX hardware). In the Playground area, users choose a type of notation and an area of the fingerboard to practice, and the computer selects random notes based on those settings. An interactive



history of the Fender electric guitar is included. Lyrrus; tel. (215) 922-0880; fax (215) 922-7230; e-mail info@lyrrus.com; Web http://www.lyrrus.com.

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PASSPORT

No matter what method of keyboard instruction you choose, the time you spend learning new information will be dwarfed by the time you spend practicing what you've learned. In recognition of this fact, Passport Designs has created *Play-a-Piece First Steps,* a program designed to complement beginning piano instruction by providing an interactive space for practice sessions on a Windows computer.

Play-a-Piece features fifty familiar pieces, organized into five levels with ten songs each, including "When the Saints Go Marching In," "Yankee Doodle," and "Yellow Rose of Texas." The program displays the notes in notation and on an onscreen keyboard and follows the user's performance, indicating trouble spots and allowing the user to isolate and loop them. A built-in metronome can be set to any tempo.

The program also includes a musical game that randomly chooses songs from a selected level and scores the user's performance for accuracy. It requires an 80486 or better PC with 8 MB of RAM, Windows 3.1 or later, and a sound card. Passport Designs; tel. (415) 726-0280; fax (415) 726-2254; e-mail info@passportdesigns.com; Web http://www.passportdesigns.com. ●

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Heavenly Harmonies

Miller and Love let the mic leakage fly.

By Diane Lowery

Traditional bluegrass recordings always have a certain live sound to them, a warm feeling of people jamming together in a circle, playing to one another. Jo Miller and Laura Love carry on that tradition with *Jo Miller and Laura Love Sing Bluegrass and Old-Time Music*. From the wistful harmonies of "My Native Home" to the bluegrass jam of "Blue and Lonesome," the band managed to record most of the songs in one take.

"I wanted that family, 'hoe-de-hoe' sort of thing," says Miller. "To me, having everyone in an iso booth to lay down each track takes the life out of a performance. I like it when it sounds as if everyone is playing at the same time and getting inspired by what the others are doing.

"We knew the instruments would bleed into the vocal mics," she continues. "But we decided it was worth it because bluegrass records typically don't exhibit such intense separation of sound. Ideally, all the instruments and vocals should blend together, with certain elements moving in and out dynamically at certain times."

Of course, recording the band live in a circle five feet in diameter created quite a challenge for engineer David Lange. He placed Miller and Love facing each other and recorded their vocal parts with two AKG C 414s. Miller's 1957 Martin D-28 guitar was miked with a Sennheiser MKH 50. Stand-up bassist Nancy Katz was miked with an Electro-Voice RE20, and Orville Johnson, on Dobro, lead guitar, and mandolin, was stereo-miked with a B&K 4001 and a Beyer condenser. All the mics were set on their cardioid patterns, but recording in such close proximity still caused a lot of signal leakage between microphones.

"Fortunately, I have a lot of acoustic treatment in my studio to dampen sound," explains Lange, "and I had everyone snuggle up as close to the mics as they could. But with that many things going live, it still took a lot of jockeying during the mixdown to make the instruments sound as good as possible."

The biggest difficulty for Lange was Katz's bass, because bass frequencies leaking into the other mics made the overall sound too boomy. "I had to pull the low end out of all the other mics, so I applied more EQ during recording than I normally would," says Lange. "I even cut the bass frequencies out of the vocal mics when Jo and Laura weren't singing."

What you get is a warm, fat-sounding CD that lets Miller and Love's sweet-toned vocals shine through, with highlights from the bass, accordion, and other instruments. For example, on the Bill Monroe classic "Sitting Alone in the Moonlight," Johnson performs a shimmering, extended Dobro solo.

"We sang the song through one verse and chorus," explains Miller. "Then Orville did an amazing solo. Laura and I were so moved by what he played that it inspired us to sing the second half of the song more powerfully. That give and take is what recording live is all about."

For more information contact Rockin' Octoroon, c/o McFaul Booking, PO Box 46318, Seattle, WA 98146; tel. (206) 938-5754; fax (206) 938-1045.

If you have a CD you recorded in your home studio, we would love to consider it for "Pro/File." Send your CD and background information to Pro/File Editor, Electronic Musician, *6400 Hollis St., #12, Emeryville, CA 94608.*

Laura Love and Jo Miller

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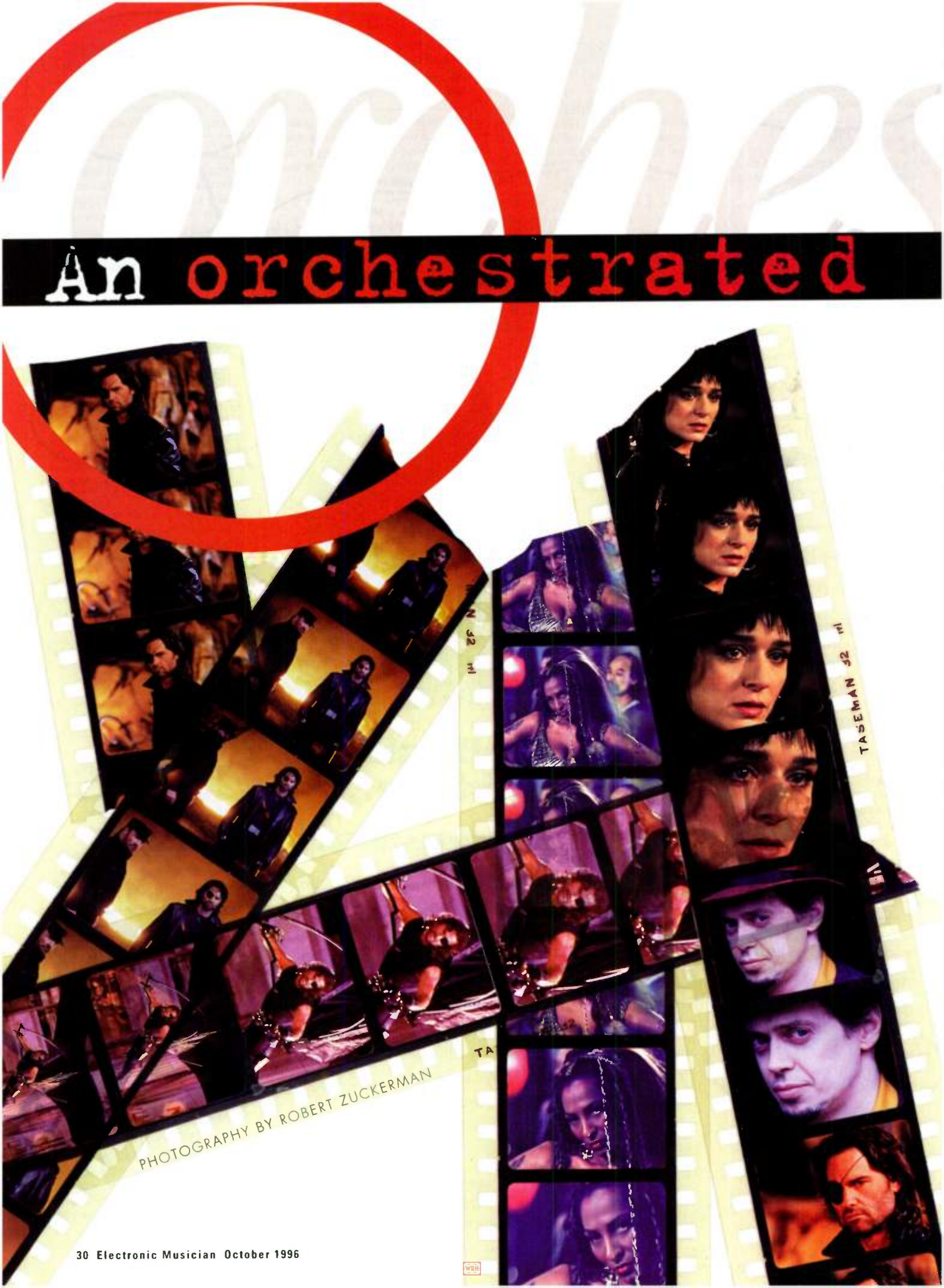


PHOTOGRAPHY BY ROBERT ZUCKERMAN

escape

BY MARK STEENSLAND

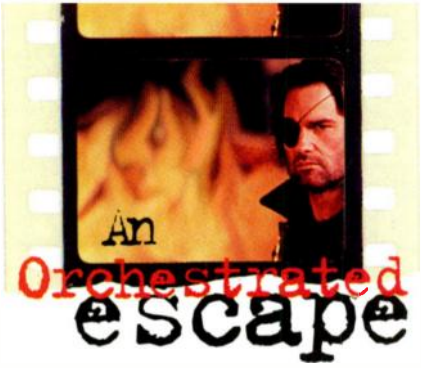
Shirley Walker and John Carpenter collaborate on the score for Escape from L.A.

From the first time she heard an orchestra, Shirley Walker has been hooked on music. Thanks to a pair of inspirational high school music teachers, a stint with the Oakland Symphony, and a move to Los Angeles, her addiction has turned into a full-time film-scoring career. Or more than full-time, as is the case with her latest project, John Carpenter's *Escape from L.A.* This sequel to Carpenter's 1981 cult classic *Escape from New York* follows the continuing exploits of one-eyed antihero Snake Plissken (played by Kurt Russell). And thanks to Hollywood's trend toward ever-shorter post-production schedules, Walker has had to pull off some superhuman stunts that would probably win the admiration of Snake himself.

"We had just one week to record 40 minutes of multi-tracked music for the film," she says. "That's an average of eight minutes per day." Walker pauses to let the figure sink in, then smiles proudly. "But we managed to track eleven minutes in one day, so we actually did all right."

a Day in the LIFe

Walker is best known as an orchestrator, conductor, and composer, having worked on the scores for such films as *Backdraft*, *True Lies*, and *Batman*. She also has the honor of being the first woman with a solo scoring credit on a major action film. That feature—the comedy *Memoirs of an Invisible Man*, starring Chevy Chase—was her first job with director John Carpenter.



The scoring process for that film, however, wasn't really the collaborative effort that Carpenter and Walker would have liked. Carpenter typically composes all or part of the music for his movies (see sidebar "The Carpet Guy"), but for *Memoirs,* he decided to stick to directing and let Walker take care of the entire soundtrack. "This time," says Walker, "it has been a completely different story."

A WALKER ON THE WILD SIDE

Finally working together as a composing team, Walker and Carpenter first viewed *Escape from L.A.* with its temp dub—a temporary soundtrack pieced together with music from various albums and preexisting film soundtracks. The temp dub is designed to give the director and the composer a sense of the musical possibilities for each scene. After the initial screening, the duo talked about general themes for the film and agreed that *Escape from L.A.* is a kind of science-fiction western. Walker wanted to ensure that the score enhanced that atmosphere.

"I told John I didn't see Snake as a brass-and-percussion guy, which was the type of music used in the temp dub," she says. "I wanted to use bass harmonica and dulcimer as his musical colors instead. John immediately took to the idea."

"Part of the adventure is that Snake has to go through sections of L.A. that are controlled by different groups," elaborates Carpenter, "so I also wanted a different musical environment for each area—different atmospheres, different grooves, and different sounds. As a fan of film and film music, that kind of empathy with each scene is what I enjoy. When *I'm* watching a film, I like to feel like I'm visiting another world. So, in addition to having a good story, a film must have a powerful environment to support my fantasy; the score is a critical part of that environment."

An interesting feature of *Escape from L.A.*'s musical environment is the way it balances the sonic elements of electronic instruments and a full acoustic orchestra. Orchestral music was always intended for the film's soundtrack, but Walker wanted to twist the score toward a more futuristic, techno feel to better play against Russell's cowboy-noir character.

"The music in the film starts off electronic," she explains. "We kept John's original theme from *Escape from New York,* but we layered it with new sounds. Then, about halfway though the movie, in reel six, it's like the music goes from black-and-white to color. All of a sudden, the orchestra starts playing and the sound builds and builds as we get into the major action sequences. Synth-oriented sonorities typically cannot compete with big sound effects, so as the action—and the orchestra—builds, there is less and less synth until the climactic explosion, and then *bam!* the conflict is over. After that, the electronic music returns for a long sequence where the action subsides, and we end the film quietly."

PLAN OF ATTACK

After the initial scoring meetings, Walker and Carpenter went their separate ways to create a series of musical sketches for the film. Walker's sketches concentrated on the groove-oriented techno material, and Carpenter focused more on atmosphere and mood music. Once they got their ideas roughed out, they sat down with the music editor of *Escape from L.A.*, Thomas Milano, and spotted the film.

"Spotting involves looking at every reel of the film and deciding where the music should go," explains Walker. "At the end of this process, the music editor produces a big book full of every detail in each scene where music is needed—when people are talking, where the visual cuts are, and so on—which becomes my main reference for the composing of the music cues."

To save precious time at the synth scoring session, Walker composed and performed the soundtrack in her home studio with Opcode's *Studio Vision Pro* and saved all her cues as Standard MIDI Files. The SMFs allowed the session musicians to download Walker's sequences into their own workstations regardless of which sequencing program they were using, effectively eliminating the time-consuming step of replaying the parts. Walker also printed screen shots of her *Vision* files, so the players would be able to see each cue as she had sequenced it (see **Fig. 1**).

"A lot of people doing synth scores start from scratch," elaborates Walker. "The cues are notated on sheet music, and the musicians sit in the studio and spend maybe a half hour on each cue, just concentrating on sequencing the parts. That means that the last thing they're doing is thinking about how each part should *sound.* But with our

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John Carpenter, Mike Watts (seated), and Shirley Walker listen back to some of the synthesizer cues for *Escape from L.A.*

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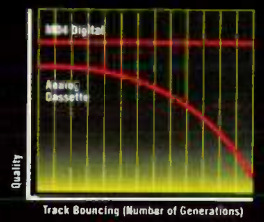

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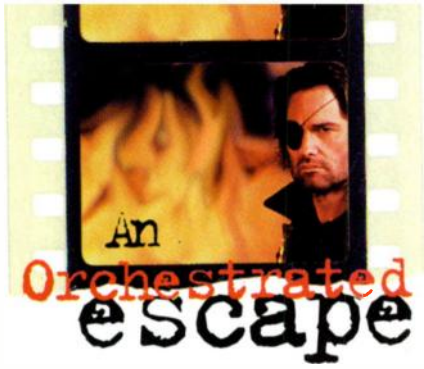

approach, because I've already sequenced the score in my home studio, the musicians are starting with a MIDI file that's already done for them. The meter changes are in there; the tempos are in there; the notes are in there, already sequenced. They simply take my performance and plug their sounds into it. So, having my MIDI files in their systems enabled us to go a lot further in developing really lush or unique synth sounds than we otherwise would have had time for. And that's what I want from them: their creativity in terms of coming up with great sounds, based upon direction from me."

SYNTH SQUAD

However, the musicians Walker chose to work with were not just "human patch librarians" or sound designers. She needed versatile players because much of the atmospheric music was performed live, direct-to-picture. In addition, most of the cues were heavily layered. On average, two or three passes (or overdubs) were recorded for each cue to achieve the sonic density that Walker and Carpenter wanted.

Now, Snake tends to work alone, but the composers could not have recorded the electronic score of *Escape from L.A.* without the aid of a talented team of synthesists. Each member was hand-picked for his specific approach to sound sculpting and brought to O'Henry Sound Studios in Burbank, California, to lay Walker's and Carpenter's music to picture.

The electronic percussionist, Mike Fisher. It was Fisher's job to study Walker's notated rhythms and sounds and then decide which patches and grooves should be kept, which should be changed, and which should be augmented with additional rhythms. In some instances, Fisher ended up replacing Walker's percussion tracks with his own—often improvised—performances because the phrasing and dynamics he achieved with his drumKAT and malletKAT would have taken an enormous amount of time to step-enter into a sequence.

"I kept demanding from Mike that he give me sounds I hadn't heard in anyone else's film score before," admits Walker. "When he heard the western flavor of the Snake Plissken character, he got out his new Trump jaw harp to play for me. It was the perfect touch that put the character over the top. It's to John Carpenter's credit that he allowed the music to carry the humor of his film with these types of extreme instrument choices."

DANA ROSS

Walker and Carpenter collaborating on the score.

The atmosphere specialist, Jamie Muhoberac. Muhoberac did the most live performing to picture because he was responsible for the majority of the score's atmospheric music and effects. He met with Walker prior to the synth-scoring dates to discuss the sonic environments she wanted. After that meeting, Muhoberac prepared some raw audio materials for the score by sampling various sounds. He also recorded some instruments on analog tape to achieve the desired tonal effect.

"Jamie had some raw, distorted guitars and rap sounds that I thought were particularly cool," says Walker. "The 'Death Chime' sound heard throughout the score was a combination of Mike Fisher's and Jamie's colors.

"I knew that sight reading wasn't Jamie's specialty, so he would be relying on the sequences more than the written music," she continues. "The *Vision* screen shots were very helpful to him. He could circle tracks on the screen shots to alert him to which parts of the music he was working with, and he could open up the list window in the sequence and see how to match the duration of a note while he generated a synthesized atmosphere."

The EVI maestro, Nyle Steiner. Steiner's breath-controlled Electronic Valve Instrument—which he designed—was the workhorse for the expressive elements of the score. On single melody lines and multipart clusters, the EVI brought a "human performance" quality to synth sounds that would have

DANA ROSS

Shirley Walker grapples with the written score for *Escape from L.A.*

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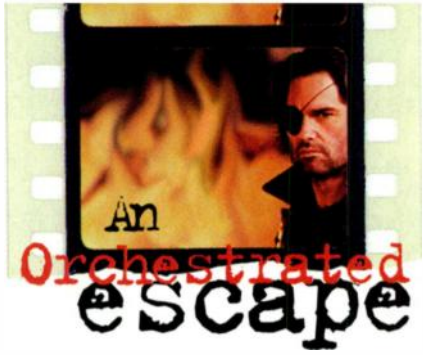

taken significant programming time to emulate via sequencing.

"Nyle was playing his brand-new prototype on this project," beams Walker. "Akai licensed his previous version, but this was his own hot-rod version of the EVI. It's like the difference between an Indy racer and a car you can buy in a showroom."

Steiner had no sequences to rely on for note information, so his parts had to be notated on sheet music. He usually had a double-stave part notating the melodies he played solo as well as the overlapping lines he played when he had to double what the keyboards were doing. Steiner also had to adapt his playing style somewhat, reducing his usual vibrato to match the techno feel that Walker envisioned for the synthesizer cues.

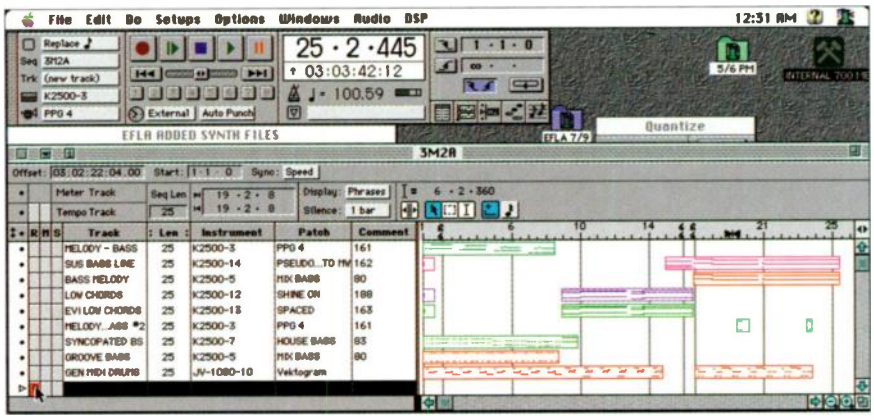

FIG. 1: Here's an example of the type of *Studio Vision Pro* screen shots the synthesists used as guidelines for their parts.

"I assigned Nyle the majority of the melodies, choirs, and strange pitch-bending types of colors," says Walker. "The 'Surgeon General of Beverly Hills' sequence has an amazing low, demented-cow kind of sound that is quintessential Steiner."

The effects master, Mike Watts. Watts was chosen as part of the team because of his ability to alter synth sounds with effects processing. "Mike can take any stock synth patch and turn it into an extraordinary sound," explains Walker. "So his parts covered everything from bass lines to human voices to atmospheres. We would route some of my sounds through Mike's workstation, where he would layer additional sounds to beef things up and then process the mixture. The resulting blend retained the characteristics of my original sound but made it appear more unique."

As the team reviewed the screen shots and keyboard parts for each cue, Watts would circle which tracks he was creating his own sounds for and which ones he would be combining with Walker's patches. On some cues, it became obvious that the new or enhanced sounds would have to be performed live to optimize their tonal effects and avoid a sequenced feel. The written music was essential in those instances in which Walker asked for changes to the sequenced cue.

TRAPPED IN THE STUDIO

Once the team was set up at O'Henry Sound Studios for the actual scoring session, a brief period of time was alotted for final tweaks, amendments, and revisions. The musicians started this process by listening to Walker's synth version of each cue as it played along with the picture and dialog. Then, Walker assigned parts to each team member, using her *Vision* screen shots and sheet music to notate which lines (or sequencer tracks) the musicians would be covering. In addition, Walker reviewed the general attitude and emotion she was going for. The musicians then spent fifteen to twenty minutes sequestered with their individual workstations to

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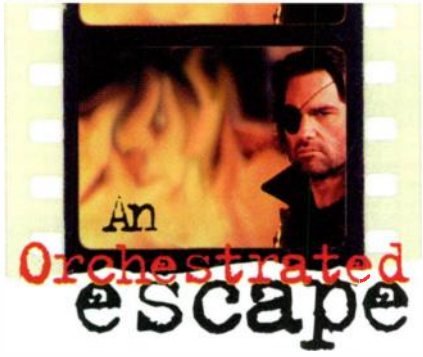


choose the patches they wanted to audition for Walker.

"I would go around to each workstation individually, listen to everyone's work, and either ask for refinements or say, 'That's great,'" she explains. "When everything seemed in order, we'd run a rehearsal pass of the complete cue. This was the first time I'd hear all the tracks running and all the sounds together. On the second day of recording, we dropped the rehearsal pass because it was too time consuming. But by then, we had a cohesive focus regarding the direction I wanted the sounds to go."

SNAKE'S TRUSTY SIDEKICK

Another key element in the production of the film score was the *Auricle*, a software program designed by L.A.-based Auricle Control Systems. Using SMPTE time code as a clock source, the program can synchronize all aspects of sound to picture. It also generates the necessary visual guides for the musicians right onto a film's work video. With *Auricle*, the music editor simply enters the time-code addresses for a specific cue and what type of guide is required; the *Auricle* does the rest. (For its contribution to the technical side of film and television music production, the *Auricle* has won both an Oscar and an Emmy for its developers, brothers Ron and Richard Grant.)

DANA ROSS

Walker and Nyle Steiner, working out his EVI parts.

"The *Auricle* is actually a time processor or tempo driver," explains Walker. "The program locks to the time code generated by the work video and then sends out MIDI beat clocks to synchronize all the sequencers. This ensures that both the music sequences and the film scenes are locked to the tempos I composed for each cue. The *Auricle* also produces an audible click, which allows someone like Nyle—who was playing live—to stay in sync with the sequences."

Another important service the *Auricle* provides is that it generates streamers. Streamers—colored lines that move across the video screen from left to

right—alert the musicians to when a cue starts and ends and are essential when atmospheric effects, such as a sound moving up and down in volume or pitch, are performed live to picture. The industry standard is a 2-second streamer (although some composers use 5-second streamers). When the first streamer appears, the musician starts to bring in the sound; when the second streamer appears, the musician knows he or she has two seconds to get out.

"For example, if Jamie [Muhoberac] needed to perform an atmosphere in the middle of a cue, the *Auricle* would put a white streamer where the effect should begin and another white streamer where the effect should end,"

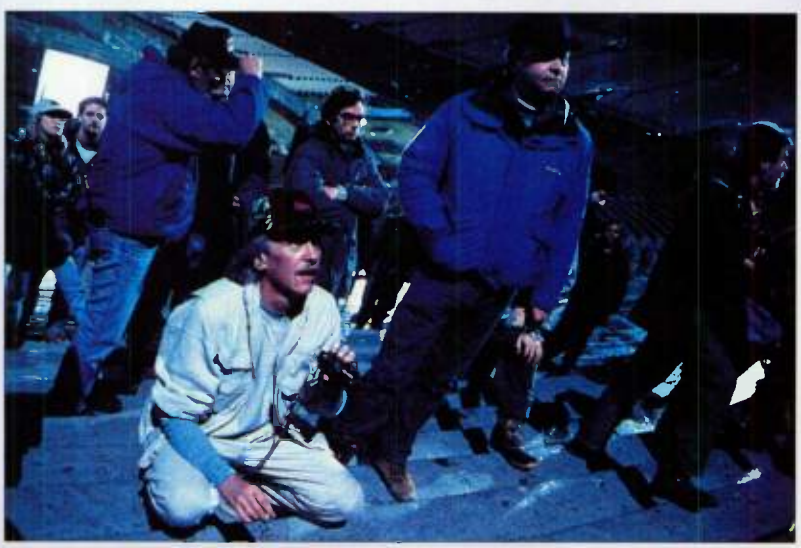
THE CARPET GUY

Because of what he calls the "childhood trauma" of being forced to learn a musical instrument, John Carpenter has never learned to read or write music. This may come as a surprise to those who know that the veteran film director is also a composer and has had some part in scoring almost all of the films he has directed or produced in his 20-year career. Carpenter plays by instinct, which is a strength when it comes to composing pieces dependent on mood and atmosphere but is a potential limitation when it comes to writing a complex film score on a tight schedule. In the case of his latest movie, *Escape from L.A.*, Carpenter needed a complex score in a hurry.

"Because of our short post-production schedule, I knew I wouldn't have time to score the film myself, so I called in [co-composer] Shirley Walker," says Carpenter. "And to be frank with you, I'm like a carpet guy—I put down a nice bed of music that will be somewhat invisible but will also enhance the scene and get across the emotion. And even though I can compose the big orchestral stuff, it takes me a lot longer to do it than it takes Shirley, and she is so very talented."

Collaborating with Walker left Carpenter free to concentrate on the mood and tone of a piece without having to worry about scoring specific scenes—a working environment he called "the way to go."

"I've got a terrific setup," says the "musical" director. "I have a home theater with a big screen and Dolby Surround Sound, and my music gear includes a bit of everything. I have all the basics, such as drums and guitar amps, but I use a Korg X3R as my primary writing instrument. I also have a very understanding family that doesn't mind hearing these weird sounds coming from the bottom of the house in the middle of the night."



ROBERT ZUCKERMAN

John Carpenter (lower left) on the set of *Escape from L.A.*

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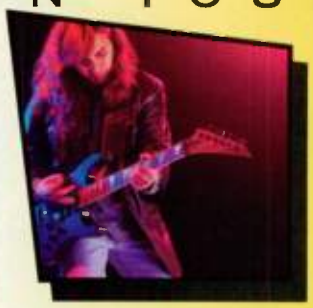

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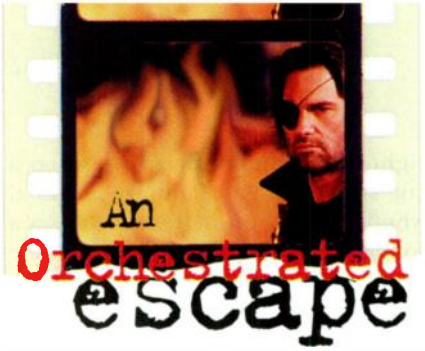

says Walker. "So he would just watch the screen and play to the streamers; he wouldn't have to count how many measures into the cue the effect starts and stops. The *Auricle* saves everyone a lot of hassle, agony, and miscounting. It is *the* precision instrument in terms of synchronizing music to film.

"I think the real interesting thing about most of the so-called 'prosumer' music software products is that they were developed outside of the professional film and television market," she continues. "Many software developers didn't really lock into the film community, so their version of what tempo is in relation to film has never really been accurate or precise."

Walker was the first woman with a solo scoring credit on a major action picture.

IT'S A WRAP!

Back at the recording session, with another cue recorded to her satisfaction, Walker asks the assistant engineer to bring up cue 4M6, known as "Snake Gets Directions." She asks the musicians to come in from the studio and watch the scene so they can discuss it, review the cue, and start the scoring process over again. It may be late in the afternoon, but this day in the life of Shirley Walker isn't even half over.

When he's not moonlighting as a freelance journalist, **Mark Steensland** *directs music videos and television commercials at TKO Productions in Sacramento, California.*

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A third generation CD-R recorder and player, the Ricoh RS-1420C is the true choice for music professionals. The RS-1420C can write a CD at double speed (2X) or single speed (1X). It sports a generous 2MB buffer to ensure reliable recording across a wide range of systems.

Making a one-off Compact Disc is easy when the RS-1420C is mated with a Digidesign® Inc. system* such as Pro Tools®, Sound Tools™, or Audiomedia™ along with Digidesign's MasterList CD™ software. Whether your application is creating a master for replication, or just burning a few demo discs to pass around, the Ricoh RS-1420C is an ideal addition to your studio.

The RS-1420C can also do double duty as a CD-ROM recorder/reader. It can read CD-ROMs at quad speed (4X) and record them at 2X/1X. Ideal for backing up sound files when a project is done, the RS-1420C frees up your hard disk for the next job. What's more, the RS-1420C can be used to digitally bounce tracks from a music CD to your hard disc in several different file formats.

The RS-1420C, an external model of the RO-1420C, is compatible with both Intel- and Macintosh- based systems. It is very easy to use and affordably priced. Internal models are also available at lower prices.

Photo shows the internal version, the RO-1420C.

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COOL TOOLS

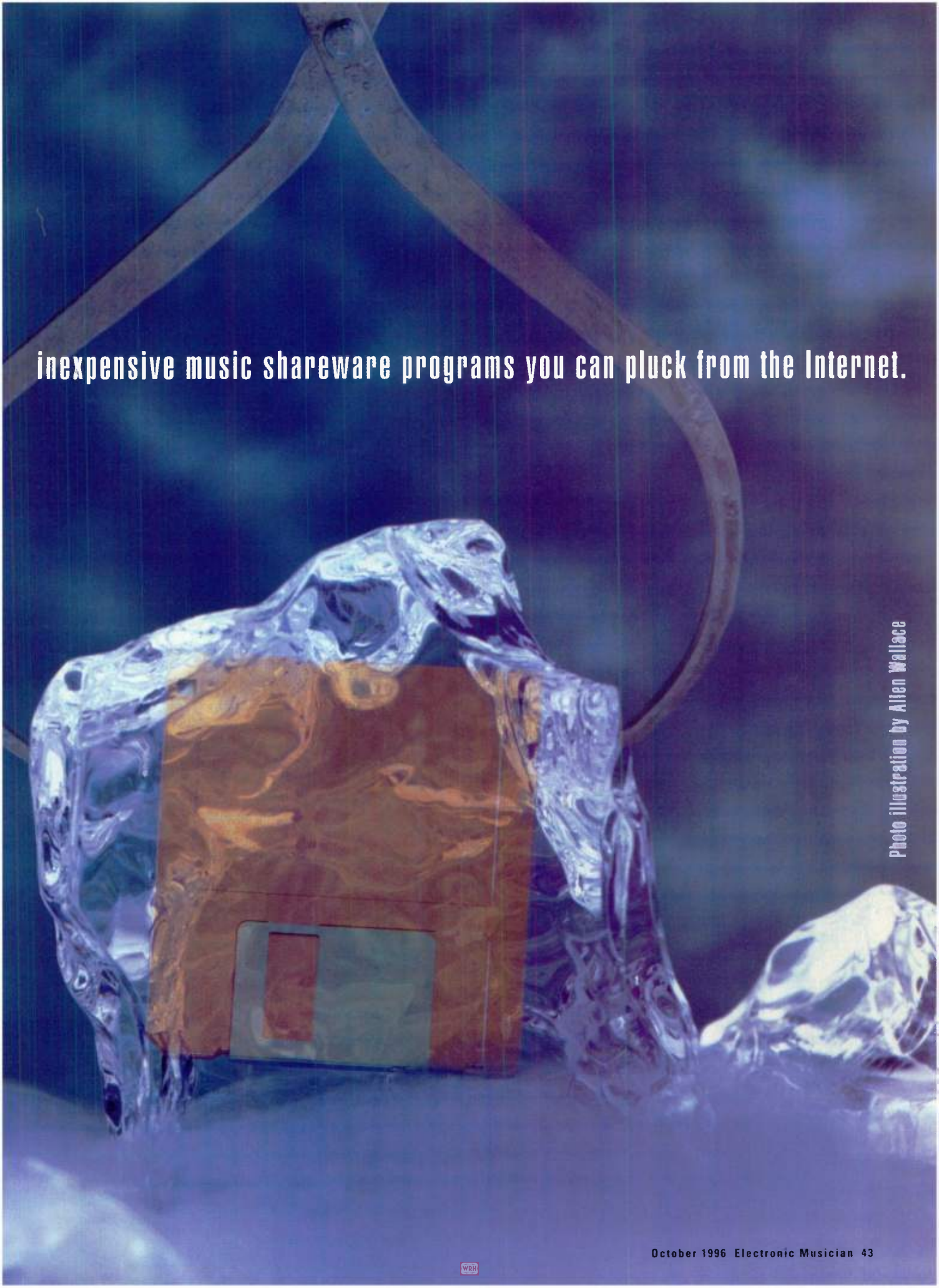
Chill out with some extremely useful, amazingly powerful, and ridiculously

The definition of "cool" constantly changes with the times, but one of the more consistent barometers of coolness is a person's ability to command preferential treatment. Can you get a table at a posh restaurant on a Saturday night without a reservation? You're cool. Can you score backstage passes to rock concerts, schmooze invitations to movie premieres, and gain immediate entry to a popular club? You're way cool.

Unfortunately, most of us *aren't* cool. The Hipster Police don't care if we pine away in mile-long movie lines or never reap the joys of a freebie. But thanks to the dynamic socialism of the Internet, plain, everyday folk can finally enjoy some perks of privilege. Right now, anyone with a computer, a modem, and a Web browser can demand and acquire tons of music shareware for—excuse the obvious cliché—a song. In short, you're in with the "in" crowd!

And to make you feel even more privileged, EM is acting as your personal shareware consultant. We've checked out a number of Mac and Windows applications, selected the best of the bunch, and served them up for your approval. We also tell you why we felt each program was so, well, *cool* and where to go to download your choices. Now, let's pass through the velvet rope so you can enjoy your new-found status.

By Jim Pierson-Perry and Dennis Miller


inexpensive music shareware programs you can pluck from the Internet.
Photo illustration by Allen Wallace

MAC TOOLS

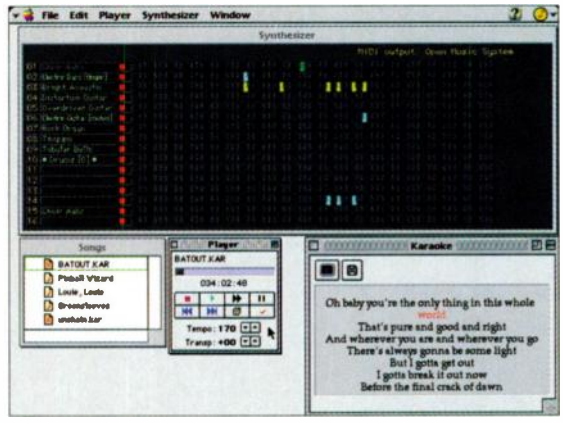
BY JIM PIERSON-PERRY

AMP

If you don't need all the power of a sequencer but want to listen to MIDI files or practice your arranging techniques, consider this fine French import. *AMP* (*Arnold's MIDI Player*) has been steadily evolving through several shareware releases and has now earned a permanent spot on my Mac.

AMP's main screen provides a color-coded view of notes for each MIDI channel along with a transport bar. You can drag and drop MIDI files on the *AMP* screen icon to play them or even set up playlists of multiple MIDI files like a jukebox. Either QuickTime's software synth or an external MIDI device (via Apple's MIDI Manager) can be used for playback. The program also supports MIDI karaoke files and can display lyrics onscreen, highlighting syllables as the song plays. If you'd like to play producer, you can change the GM instrument for each MIDI channel or modify certain controller settings, such as Pan, Volume, and Mod Wheel. Note data can be shown, but not edited, on a piano-roll display.

AMP works well and is a lot of fun to use. I often run it in the background while I'm writing or working on spreadsheets, and it operates that way without a hitch. I also find it useful for auditioning MIDI files through QuickTime when I'm away from the studio or don't feel like starting up all of my gear. The karaoke feature was an added bonus and is not yet commonly available in commercial software. The playback engine used by *AMP* has also been incorporated in a Netscape *Navigator* plug-in for playing MIDI files on the Web.



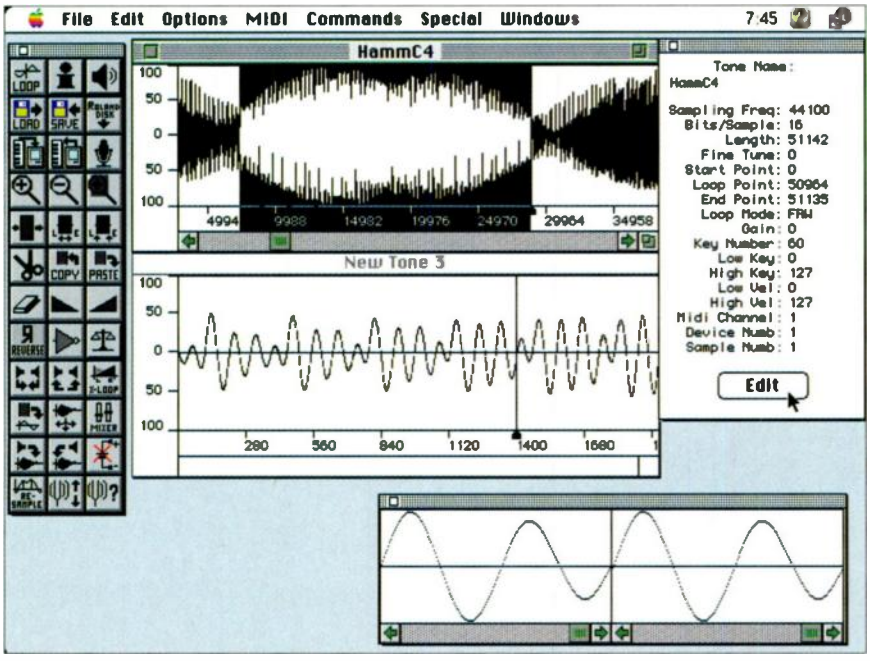
The track screen from *AMP*. The jukebox at lower left holds a playlist for MIDI files, and lyrics for MIDI karaoke files can also be displayed.

BP2 AND CALMUS

I could not find any entry-level shareware programs for algorithmic composition, but several high-end programs are available. These represent major programming efforts and come with extensive (and necessary) documentation on both program operation and underlying theory. These are not shareware programs *per se;* they are limited-distribution versions of commercial software and are priced accordingly.

BP2 is an extension of the algorithmic composition tool *Bol Processor BP1*, which was originally created in the 1980s to study the improvisation of Indian tabla drummers. Developed to work with more general music forms, *BP2* is based on user-defined rules and scripts, and it can interact in real time with MIDI input from a performer or from a MIDI file played by another sequencer. In an extreme case, two Macs running *BP2* can interact with each other!

Calmus (*Calculated Music*) is designed to yield twentieth-century music compositions suitable for solo instruments or a full orchestra. The program makes strong use of interactive graphics, and users can specify musical "objects" that contain one or more melodies. Harmony controllers can be applied to these objects independently or jointly. *Calmus* then creates a composition based on the user's input.



The main editing screen for *D-Sound Pro* is very similar to Digidesign's *Sound Designer*.

D-SOUND PRO

If you own a sampler, you really should enter the world of waveform editing. Although a variety of good commercial wave editors are available, *D-Sound Pro* is an attractive starting point at just $30. It has a clean, graphical design similar to that of *Sound Designer* and includes a toolbox stuffed full of useful functions. *D-Sound Pro* can handle mono or stereo AIFF sound files at resolutions of 8 or 16 bits and sampling rates of up to 48 kHz.

Cut/copy/paste, fade in/out, reverse, and normalize tools are provided. An automated, crossfade looping algorithm helps the user construct seamless loops. Stereo files can be merged into a mono file or vice versa. More advanced functions include Resampling, Pitch Detection, and Pitch Adjustment.

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In addition to all of these editing features, the VS-880 comes with a 14-channel digital mixer that's fully automatable via MIDI. And a VS8F-1 Effect Expansion Board can be easily user-installed, giving you two totally independent stereo multi-effects processors.

There are several ways to get to know more about the VS-880. You can try it at your Roland dealer. You can call (213) 685-5141, ext. 798 to order a free demo video. You can visit one of our online sites or use our fax-back number. But don't wait, because this is one decision you won't change your mind about.

VStudio VS-880

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With Scrub Preview, edit points are easy to find because you hear them at their original pitch. With editing resolution for finding edits at 1/3000th of a second, you can make edits precise enough to remove even the tiniest breath or guitar pop.

Measures, beats, time readouts, play lists, fader/pan positions, wave forms, EQ curves, and more can be viewed on the VS-880 display to give you a comprehensive look at your work in progress.

With 64 virtual tracks, you'll never run out of room for creative input. Record a solo multiple times, keep tracks you bounce for re-mixing later, edit several versions of vocal tracks for instant comparisons, or keep a "dry" version of your guitar part for adding different effects later.

Just a few of the effects that can be added during recording, bouncing or during final mix in realtime are reverb, 3D RSS™ stereo delay, chorus, flanging, phase shifting, Roland's COSM-based distortion/overdrive and guitar amp emulation, vocoder, pitch shifter and more.

Every mixer setting, including virtual tracks and effects, can be saved as a scene. Store a snapshot of a mix when you're bouncing tracks. When you need to re-bounce the tracks to adjust some of the levels, you still have the originals saved on virtual tracks.

Do things that are impractical with tape-based digital recorders. Move percussion parts instantly. Exchange, copy and paste multiple guitar solos. Erase and insert new endings. And just about anything else.

The locators and 1000 markers take full advantage of the VS-880's random-access capabilities. Just choose a point and you're instantly there. Every aspect of the creative process is faster and easier.

David Carson
Graphic Artist
dcarson@cts.com

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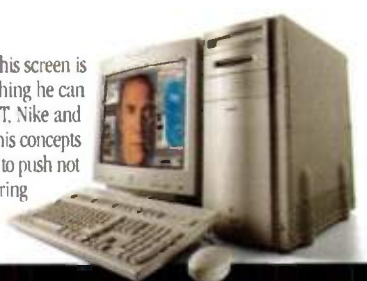

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MAC TOOLS

D-Sound Pro supports only Mac Sound Manager 3.1 for sample recording and auditioning. Happily, it can also read files directly from Roland's S-50/330/550 sample disks or from Yamaha's SY99-formatted sample files. *D-Sound Pro* supports the MIDI Sample Dump Standard, and future updates may include a native Power Mac version, support for OMS, and time stretching and other DSP functions.

MEGALOMANIA

One of my favorite programs in the bunch, *Megalomania* is billed as a MIDI processing program. It provides a wealth of real-time functions to intercept and modify incoming MIDI data before it gets to your tone generators. With MIDI processing capabilities similar to those in sequencers such as *Cubase*, *Megalomania* can be used by itself or through Apple's MIDI Manager with compatible MIDI software.

A slick graphic interface *à la* Digidesign's *Turbosynth* provides a smooth and intuitive background that encourages experimentation. You begin with a blank sketch pad and a palette of seventeen MIDI processing modules. Then point and click to drop selected modules onto the sketch pad, move them around as desired, and use the patch-cord tool to link them together with a MIDI input and output source. In no time you've hot-wired your MIDI system to a whole new level of real-time performance capability.

For example, in about five minutes, I multiplied a single note from a keyboard into a 4-note chord. Each note was then delayed by a different amount and routed through different MIDI channels. In addition to affecting real-time performance, you can also load a MIDI file into *Megalomania* and have it apply your processing to the file as it plays.

The processing modules include Delay, Note Transpose, Note Remap, Filter (notes, Velocity, or channels), and Generate Controller Data. You can also use the modules for MIDI-channel and Program Change assignments, for remapping Pitch Bend or Aftertouch to any controller message, and for rotating successive note messages through a selected group of MIDI channels (hocketing). Clicking on a module activates a dialog box that offers a set of customizable parameters for each effect (such as delay time or transpose value). Many of these parameters can be set to vary over time, either through user-drawn waveforms or by incoming MIDI controller messages. An additional module allows you to record all, or a defined part, of your *Megalomania* patch into a Standard MIDI File. Wrap all of this creative processing power together and you have an incredible tool set—and did I mention this is freeware?

MIDIGRAPHY

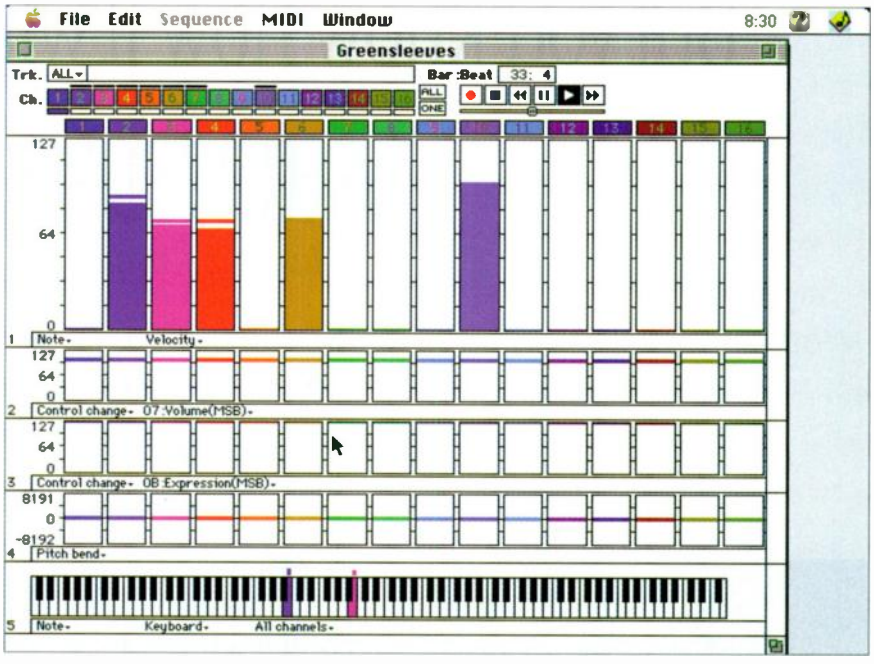
How about a full-fledged MIDI sequencer for just $20? *MIDIGraphy* is an incredible piece of software that is as powerful as some commercial sequencers costing far more. It would take a full-blown review to do it justice, so we'll just hit the highlights.

MIDIGraphy provides a completely interactive, graphical environment for recording, playback, and editing of MIDI sequences. Although suitable for any MIDI instruments, it comes with a number of built-in profiles for popular General MIDI tone generators. These provide program and drum-note names along with some specialized SysEx controls. MIDI output can be directed to QuickTime's software synth or to external synthesizers via Apple's MIDI Manager or *MIDIGraphy*'s custom serial-port driver. The program supports up to 128 tracks (each track can contain multiple MIDI channels), and its timing resolution is 480 ppqn.

Three displays are available: graphical, event list, and mixer console. The graphical display offers a fully customizable view of sequence data. Up to ten different display fields may be set up, each showing a different type of MIDI data: Velocity, Pitch, Control Changes (specified individually), Pitch Bend, Aftertouch, Program Changes, and System Exclusive. Even meta-events such as lyrics or time signatures can be displayed. Individual MIDI channels are color-coded for easy recognition and may be displayed or hidden according to user preference.

Both step- and real-time recording are supported, including features such as overdubbing and automated punch-in/out. On playback, the screen display scrolls smoothly with no redraw hitches. Note On quantization is available with resolution down to a 32nd-note pentuplet.

An impressive variety of graphical tools let you draw smooth lines, arcs, and sine waves to enter controller data. Standard editing operations such as cut/paste/merge are supported, and a



Fine-tuning arrangements is a snap with the mixer window view of *MIDIGraphy*. All controls are adjustable while the sequence plays.

Removable one-gig disks,
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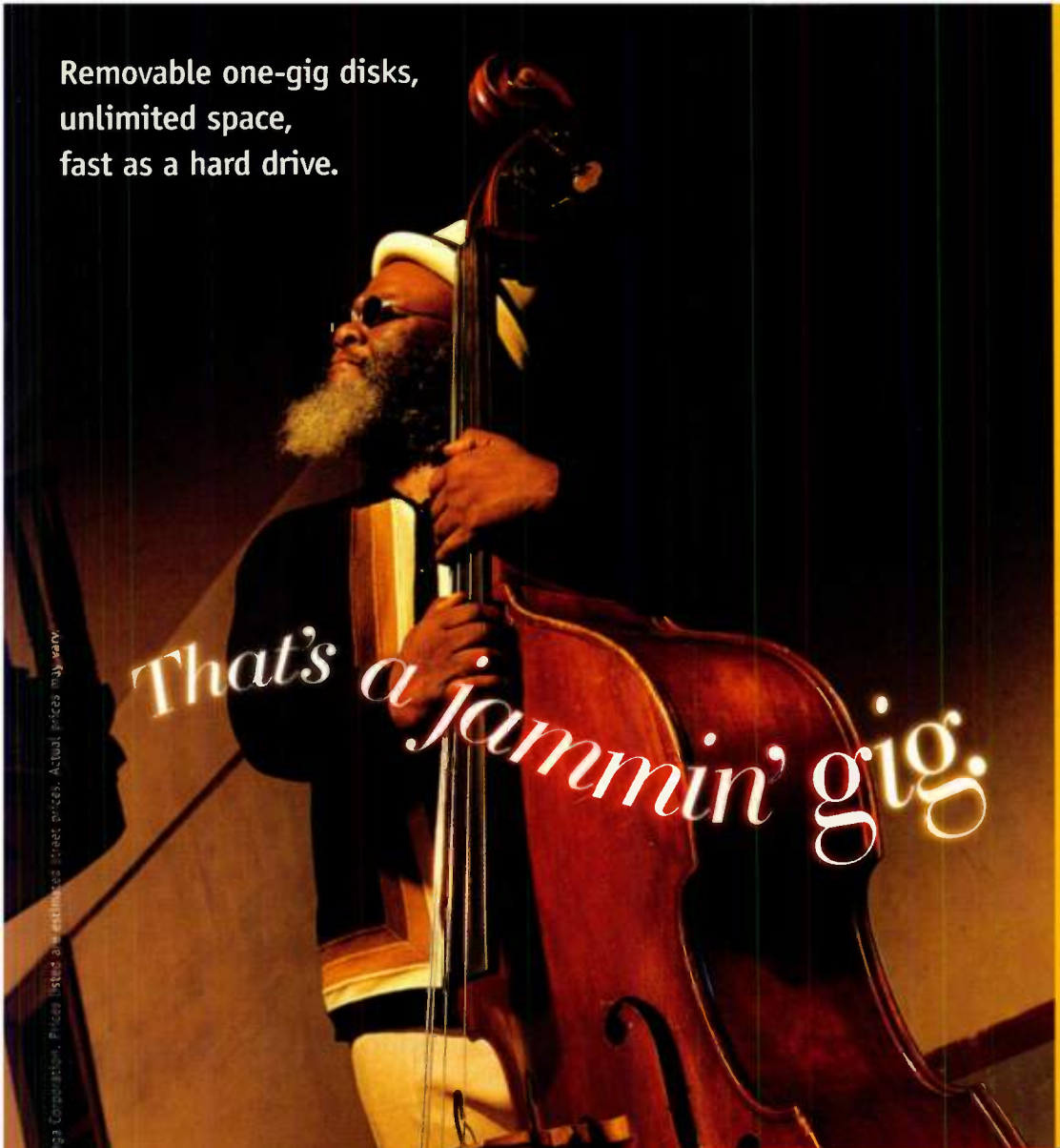

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Model Payton as photographed by Lee Crum.

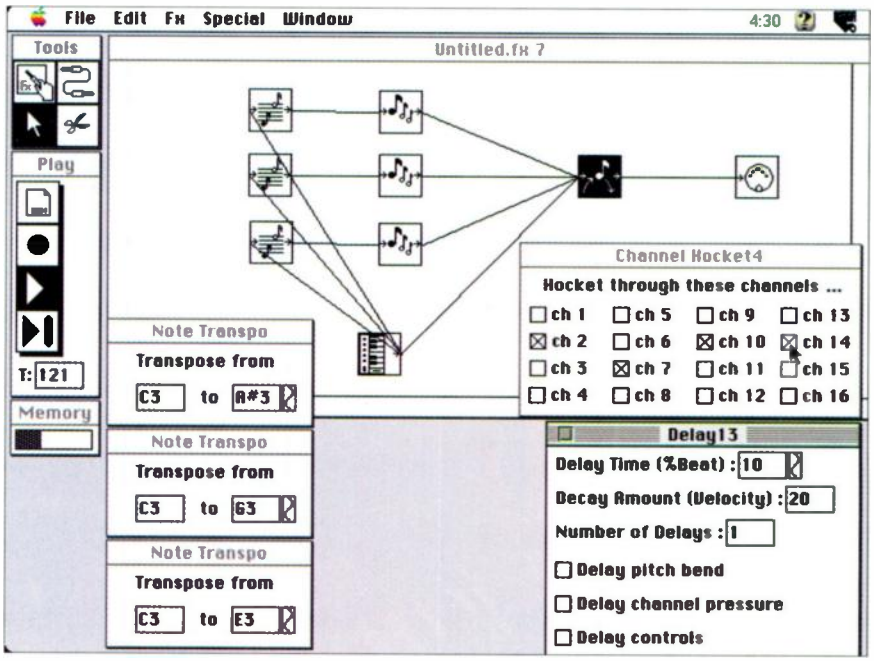
MAC TOOLS

plug-in architecture supports more specialized editing operations such as Adjust Pan by Note Number, Thin Controller Events, and Export Sequence as a QuickTime Movie.

The event-list window offers a fast way to isolate particular event types and edit them. You can list all events or just those of a particular type. MIDI channel numbers are shown with the same color coding as in the graphical window. As with the graphical window, the event list scrolls automatically as the sequence plays back, which is ideal for finding and fixing the occasional clam.

The mixing console display is similar to that of other sequencers targeted for GM use. Display fields may be set up as in the graphical window, but the mixing console adds the ability to edit the fields in real time. Note pitches may be shown and played via an on-screen keyboard.

I was continually impressed by *MIDIGraphy*'s robustness. No matter what I threw at it, the program never crashed. Its strong feature set, excellent use of graphics, and modest system requirements (only 2 MB of RAM and 1.1 MB of disk space) make *MIDIGraphy* an excellent sequencer and an absolute delight to use.



***Megalomania* is a brilliant real-time, MIDI data processor.**

MIDIPLUGIN AND MIDPLUG

Because you're already on the Internet looking for these fine shareware programs, why not enable your Web browser to play MIDI files directly? This way, you can audition MIDI files on the fly instead of wasting download time and porting them to your sequencer. For example, Netscape *Navigator* 2.0 supports a number of plug-ins that recognize MIDI files.

Based on the playback engine used in *AMP*, *MIDIPlugin* lets you audition MIDI files on the Web through QuickTime's software synth. *MIDIPlugin* is a bare-bones operation that does the job without a lot of extra window dressing. Future plans include OMS support and a frame for karaoke lyrics.

A more elegant engine is offered by Yamaha with its *MIDPlug*. *MIDPlug* plays MIDI files through a proprietary software synth based on Yamaha's XG synthesizer technology. The player provides a full set of 128 instrument voices, eight drum kits, and even reverb, with 32-note polyphony and controls for Tempo Adjust and Pitch Transpose.

Icy Cold Mac Shareware

Program	Application	Home "Shopping" Page	Registration Cost
AMP 2.7b	MIDI file player	http://hyperarchive.lcs.mit.edu/hyperarchive.html	$10
BP2 2.5.1	algorithmic composer	ftp://ftp.ircam.fr/pub/music/programs/mac/bp2	$100
Calmus 2.0.1	algorithmic composer	http://rvik.ismennt.is/~kjol/	$250
D-Sound Pro 2.2	wave editor	http://hyperarchive.lcs.mit.edu/hyperarchive.html	$30
Megalomania 1.2.3	MIDI processor	http://hyperarchive.lcs.mit.edu/hyperarchive.html	free
MIDIGraphy 1.2.3	sequencer	http://ux01.s)-net.or.jp/~nmaeda/indexe.html	$20
MIDIPlugin 1.1b	MIDI file player	http://hyperarchive.lcs.mit.edu/hyperarchive.html	free
MIDI Typer 1.0.4	MIDI utility	http://hyperarchive.lcs.mit.edu/hyperarchive.html	free
MIDPlug	synthesizer	http://www.midifarm.com/yamaha	free
SoundHack 0.868	signal processor	http://music.calarts.edu/~tre	$50
Super Collider 0.66	synthesizer/ algorithmic composer	ftp://kahless.isca.uiowa.edu/pub/algo-comp/ supercolliderdemo.sea.hqx	$250
VSamp 1.4.1	sampler	http://hyperarchive.lcs.mit.edu/hyperarchive.html	$25

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- 20dB non-capacitive pad
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MAC TOOLS

The sequences I tested sounded great.

Unlike simpler MIDI plug-ins, however, *MIDPlug* requires a Power Mac. Freeware beta versions are now available for both Mac and Windows (requiring a 75 MHz Pentium or better) and seem to be fairly stable. Yamaha plans to continue enhancing *MIDPlug*'s functions and eventually make it a commercial product.

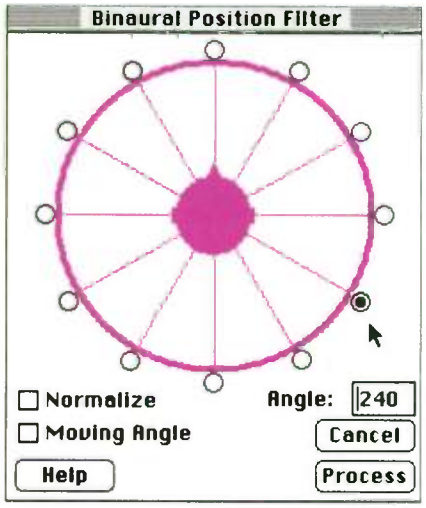
MIDI TYPER

Though just a little program, *MIDI Typer* is one of the most useful MIDI utilities you'll ever run across. For example, quite often I'll download a batch of MIDI files, only to find that they don't have the right headers to be properly recognized by my sequencer. Instead of having to change them one by one as in the bad old days, I now just drag and drop them onto *MIDI Typer*'s screen icon. The program automatically checks each file to verify that its structure looks like a MIDI file and then changes the type and creator to match. You can even drag a disk icon to process an entire collection of files—including ones buried within subfolders—while you get some coffee!

SOUNDHACK

The Mac has long been known for its outstanding audio capabilities: users can do everything from critical hard-disk recording to simply playing back a sound byte from the latest Schwarzenegger flick. To maximize the Mac's sonic wonders, a number of programs have been written for creative signal processing of audio files. *SoundHack* is one of the best. The program goes far beyond simple "add an echo" to give a toolbox of sophisticated DSP algorithms, many of which had not been available previously on a Mac. It also serves as a Rosetta Stone for audio files by translating them across platforms and formats.

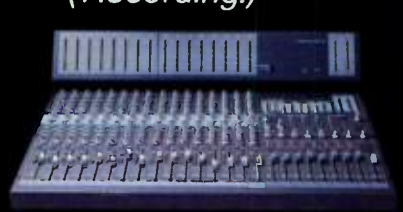
To do its magic, *SoundHack* takes an existing audio file and applies a selected DSP algorithm to it. The binaural filter, for example, converts a monaural file into a stereo file that seems to comes from a preselected position around your head. The pitch vocoder changes pitch without affecting time, and the spectral dynamics algorithm

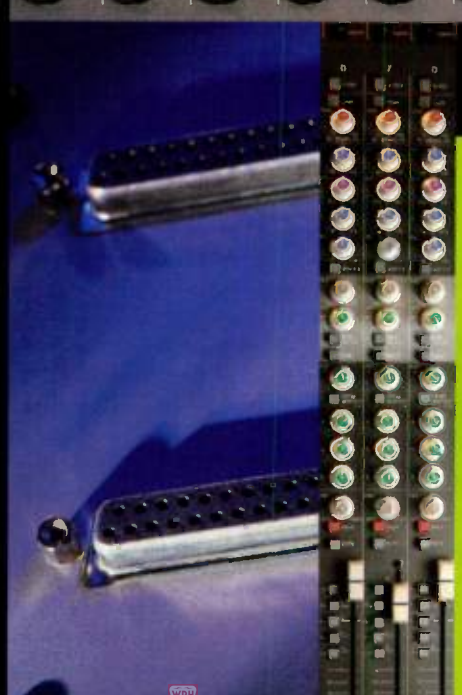


***SoundHack*'s binaural processing module lets you pick the position from which you want the sound to emanate.**

You'll love the M1600 for what it does.

(Recording.)





The M1600 represents innovation in console design. For example, next-generation MHR™ (maximum headroom) mic preamps, 48V phantom power and extremely low noise AST circuitry.

More reasons why you'll want TASCAM's M1600 8-bus recording console:

• Balanced/Unbalanced D-Subs: previously only available on consoles costing 10 times more, these threaded connectors provide a more secure connection to the M1600's Direct/Group Outputs and tape returns, not to mention less confusing to hook up and a lot less clutter in your studio.

• AUX section w/selectable monitoring: 6 AUXes (stereo pair and 4 mono). Just AUXes 1-2 do the work of four: 1) tape monitor during tracking; or 2) stereo effects sends pre fader, or 3) post fader; or 4) live input control of virtual MIDI tracks. Plus AUX summing lets you take a single effect and apply it to both channel and monitor paths.

• The EQ section: greater frequency range with 3-bands including semi-parametric mid sweep (100-10k) on each channel. Use it on either the monitor or channel path.

• Every channel includes TRS bal/unbal line inputs, stereo in-place solo/mute, insert points, long throw faders, plus signal and overload indicators.

applies preset amounts of gating, expansion, compression, and ducking to each individual spectral band in the input file. More esoteric functions provide different forms of timbral morphing between two audio files.

Registered shareware owners receive native Power Mac versions of the program. This is well worth the shareware price of $50, as the DSP algorithms are time-intensive, and you'll really want to use a Power Mac for any serious work.

SUPER COLLIDER

One of the more recent efforts in audio alchemy is *Super Collider*, a program for sound synthesis and algorithmic composition. More a programming environment than a music application, *Super Collider* provides a dedicated programming language and an associated library of functions for users to create their own algorithms. These include provisions for creating graphic objects (such as sliders, buttons, and check boxes) suitable for real-time control of the synthesis process. *Super Collider* can accept input via Sound Manager or an existing audio file. Output can be sent to Sound Manager or saved in an audio file. Due to the program's heavy processing demands, *Super Collider* should only be run on a Power Mac.

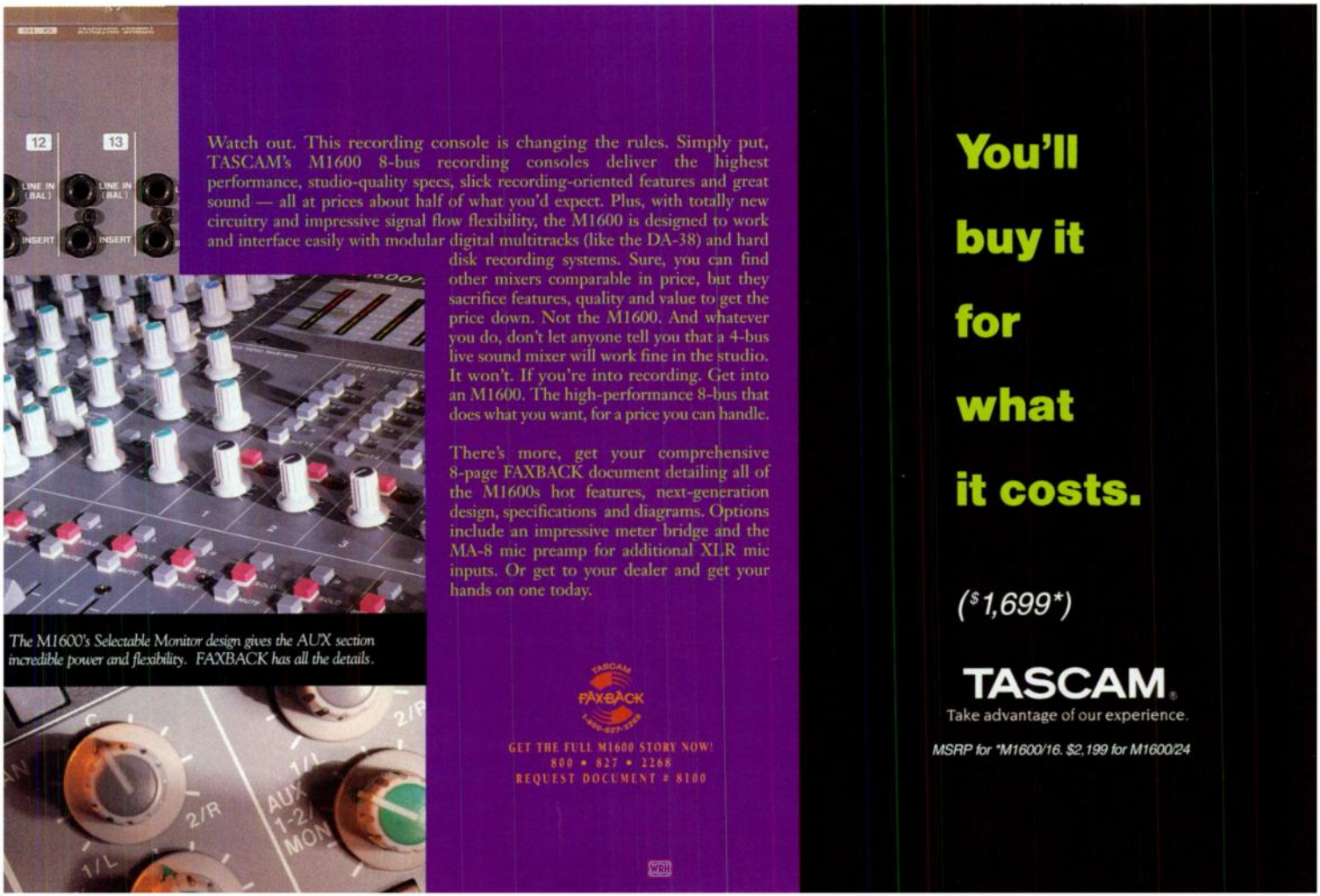
Although the complete program costs $250, a crippled demo version comes with a set of example patches that show off the software's sound synthesis and algorithmic composing applications. I was very surprised at the timbral richness and dynamics *Super Collider* produced. The results would work well on a Tangerine Dream or Pink Floyd album. There's even a provision to map *Super Collider*'s graphic controls to external MIDI Continuous Controllers. I had no problems assigning and using various controllers in real time to affect audio timbre. Although clearly geared for high-end users, the demo is easy to use, even for novices.

VSAMP

Want to buy a sampler but haven't saved the cash yet? No problem. Try *VSamp*, the virtual sampler. Just load it up with sound files, and play it through OMS with an external keyboard or compatible sequencer. *Voilà!* You have a home-brew SampleCell for only $25.

You begin by mapping a set of sample files (in Mac SND Resource format) across specified key ranges to create a new Instrument along with an ADSR envelope for it. Banks are made by assigning Instruments to MIDI channels. When you start playing, *VSamp* detects the incoming notes and MIDI channels and plays the appropriate sample files. It even supports Pitch Bend.

You can specify the sample resolution (8-bit or 16-bit), playback rate (11 kHz, 22 kHz, or 44.1 kHz), and the maximum polyphony *VSamp* will use. Up to 16-note polyphony is supported with fast Power Macs; 680X0 Mac users usually get about half of that. The program relies upon OMS to trigger playback. It comes with a simple OMS program to pipe MIDI from your external keyboard to *VSamp*. Alternatively, you could use a sequencer program that is OMS-compatible and play *VSamp* as you would SampleCell. The program documentation includes instructions for doing this with Opcode *Vision*. I was able to use Cubase *Score* on a Power Mac for simple sequences using just *VSamp*.



WINDOWS TOOLS

BY DENNIS MILLER

AUDIO COMPOSITOR

One feature that I've always wanted from a program is the ability to trigger wave files on disk with MIDI Note Ons and have the pitch of the file shifted according to the MIDI note number. In essence, this "disk-based sampler" would let me store dozens of samples on my hard drive and play them back from my MIDI controller. *Audio Compositor* is a program that does just that. As with a traditional sampler, you build patches that contain keymaps for your sample files and then create amplitude envelopes, modulation routings, and velocity crossfades between the layers in the patch. Next, you play your patches directly off the disk or load a Standard MIDI File to use as the trigger source.

Besides playing samples in real time, *Audio Compositor* lets you "render" a MIDI file into a wave file on disk. Using this technique, you can build highly complex waveforms that can contain hundreds of voices. (Unfortunately, you cannot save the performances you create when triggering samples from your keyboard.)

To turn MIDI data into an audio file, you first build a patch in the Object Editor, where you will find graphic screens that resemble a standard synth editor. There are a respectable number of MIDI features you can assign to a patch, including Velocity, Pitch Bend, Pan, Volume, and Sustain Pedal. You can also specify modulation routings, such as mapping Channel Aftertouch to amplitude, on a layer-by-layer basis.

Next, you assign global parameters, such as overall attenuation and output sample rate, in the Constants menu. If you run out of memory when compiling a large file, simply render some of the tracks on the first pass and the rest on a second. This also allows you to mix two or more different MIDI files into the same wave file.

Audio Compositor can do some basic sample editing, such as pitch shifting and setting loop points, and although it only supports 16-bit samples, it can output audio files at any of the three standard Windows rates: 11 kHz, 22 kHz, and 44.1 kHz. There are no MIDI editing functions, so you'll have to use your sequencer to alter the data you're rendering. However, *Audio Compositor* will run just fine alongside your sequencer and can accept real-time MIDI input from another program via a "virtual MIDI router," such as the shareware program *MIDIYOKE* or the virtual MIDI drivers that come with Sonic Foundry's *Sound Forge*. Neither the registered nor the unregistered version ships with many samples, so you'll need to find or create your own. But the program is freeware, so you should definitely give it a try!

COOLEDIT

The last time we looked at shareware ("Share and Share Alike," in the June 1994 EM), *CoolEdit* was one of the slickest wave-file editors around, and it's still going strong in version 1.51. The newest revision is completely Windows

For Musicians

Who Bought

The Other

Digital Multitrack

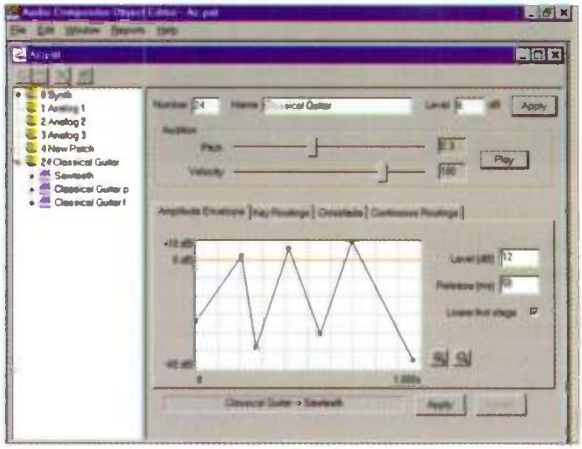
SORRY!

95–compliant and provides a huge number of processing options, including reverb, compression, decay, and flanging. The processes consistently sound good and in all cases include numerous adjustable settings. There's also excellent, context-sensitive, online help available in nearly every screen.

Though the program supports only two tracks, you can open multiple files at once and use any of numerous mix and paste options to merge them. In addition to Loop Paste, which repeatedly pastes a segment for a specified number of times, you can also merge a file from disk directly into an existing file without loading the new file into its own window. *CoolEdit* also has a versatile tone generator that can be used for creating several types of static waveforms or for building complex waves in which the amplitudes of any of the six partials change over time. And there's a batch-processing mode, in which elaborate scripts can be used to run multiple processes on a file at once, and a convenient CD player for playing audio CDs in your CD-ROM drive.

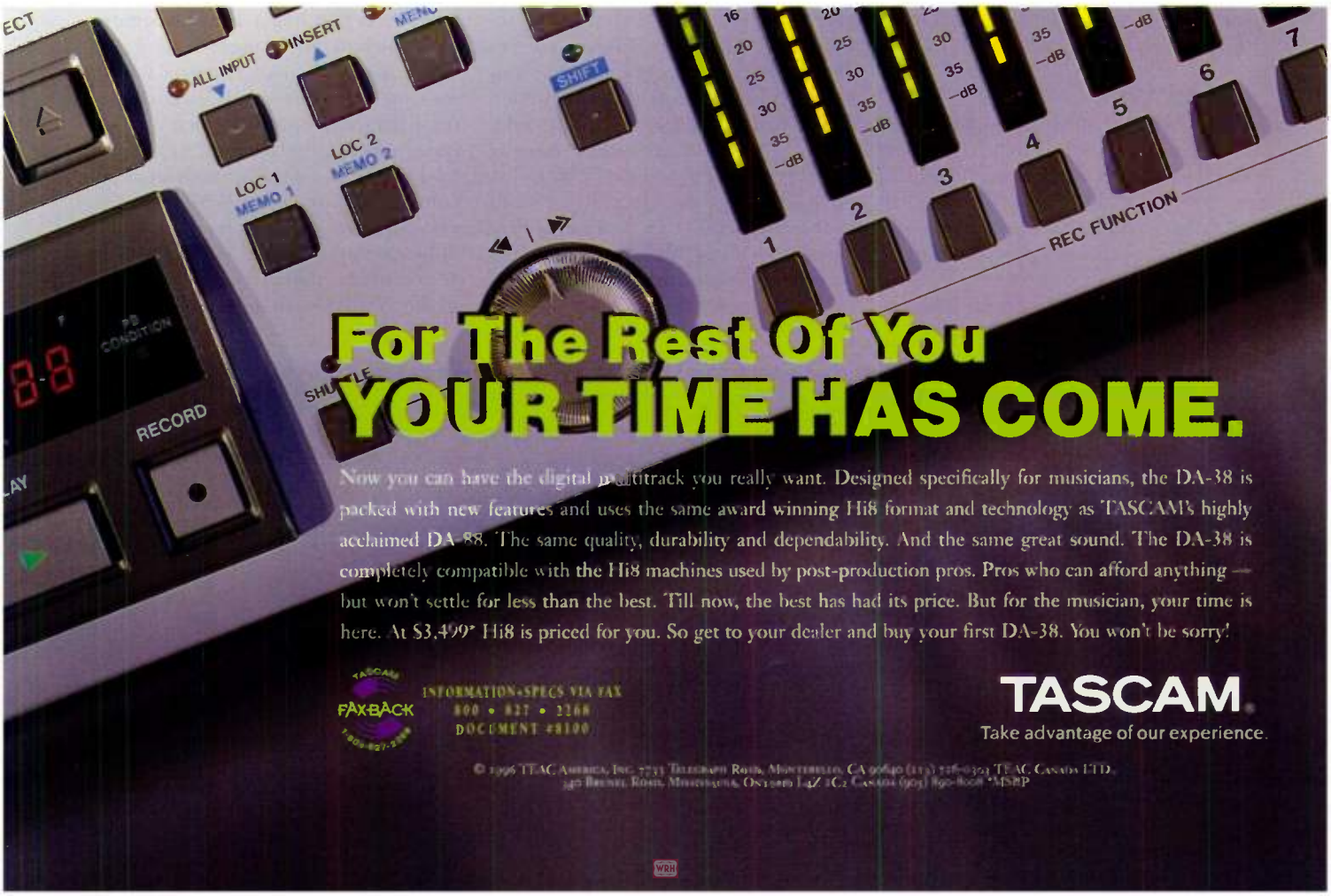
FX

There is a lot of talk these days about software synthesis, a method in which the CPU of your computer crunches all the numbers needed to create a sound file on your disk from scratch. Users of Digidesign's *Turbosynth*, a Macintosh program that takes a graphic approach to designing sounds, will be familiar with this technique. Until recently, however, few stand-alone programs for the PC were available. That has changed with the appearance of three new programs, all available on the Net, that use similar approaches to designing sounds. Each of the three uses the patch-cord model, in which a number of sound-producing or sound-altering modules are hooked together to design a sound. Once the design is finished, the program compiles it into an audio file on disk, and you can then play and save the files or return to editing mode to make additional modifications.



***Audio Compositor*'s Object Editor resembles a synth patch editor and is used to map samples to keymaps.**

One of these software synths, *FX*, is a freeware program that has several dozen tools for generating or processing sound. These tools include tone and noise generators; a time compressor and expander; echo and delay; a 4-channel, mono mixer; and a multisegment, linear envelope generator.



You can load wave files from disk and process them through many of these modules, and there's a wave sequencer, which allows you to load nine wave files and set the length and number of times you want them to play back.

FX's single screen consists of a panel on the left containing all the module icons and a workspace on the right for hooking the modules together. Click on the icons and they will appear on the workbench; then simply connect the output of one to the input of another. There are options to set your preferred sample rate and bit size, plus a slider to control overall output. One omission is the lack of a way to set the duration of certain modules individually. You can't, for example, set the duration of the wave and noise generators independently. Instead, there's only a "total duration" option that controls the overall length of your sound. Nevertheless, there are plenty of good-sounding modules to work with, and the price can't be beat!

GOLDWAVE

On the wave-editor front, *CoolEdit* has some competition this year from *GoldWave*, which has some unique features of its own. In addition to the standard cut, copy, and paste functions, *GoldWave* has an extensive processing toolkit that includes options such as an excellent-sounding "Doppler" feature. An envelope generator (for pitch-shifting a sample) and a panner are combined to create a very realistic effect.

GoldWave's Expression Evaluator is another unique option. You can use it to create waveforms by entering mathematical expressions that represent the sound you want. This approach may not be for everyone, but if your math skills are up to it, you can review the examples and make interesting modifications of your own. *GoldWave*'s filter functions also use coefficients for designing effects, but in this application, I wish more typical parameters (such as bandwidth, cutoff frequency, and slope) were available.

GoldWave uses a Device Control window for its real-time playback functions. Here you can alter a sound's volume or change its playback rate while the file is playing. There's also an oscilloscope that displays the sound's spectrum in real time, in addition to the customary waveform view. Extensive online help and a complete, printable manual make *GoldWave* one of the more user-friendly programs of its type.

NOTEWORTHY COMPOSER

Notation programs haven't received much attention from shareware authors, but *NoteWorthy Composer* aims to change that. The program offers many of the features of commercial notation software, including 100 levels of undo, scrolling playback, automatic barring and beaming, and individual or multiple part extraction. The program uses both point-and-click and keyboard-based note entry but doesn't offer any "in-place editing." In other words, you can't drag notes around once they are entered. Instead, you use key bindings to move notes up and down. You can also use keystrokes to change a note's duration, or you can highlight a note and select a new duration from the Notes palette or the Notes menu.

NoteWorthy Composer has a very handy editing option that many commercial programs should adopt. If you enter any number of notes into one or more measures before you've specified a time signature, you can then enter the time signature and select Audit Barlines, and the program will automatically reconcile the measure durations with the time signature. I especially like the program's use of the right mouse button, which pops up a menu of common commands, and a handy feature called Partition that lets you group different staves and toggle their playback and display on and off.

Expression marks, which are limited to accents, staccato, and tenuto, can be added manually or automatically when notes are entered. The program supports note durations between a whole note and a 64th note, as well as triplets, but not other tuplets. MIDI playback is very versatile, particularly the MultiPoint Controller option, which lets you build a multisegment envelope to control tempo or send controller data. Best of all, *Composer*'s printouts are very professional looking, and the page setup options, which include the ability to print notes of nearly any font size, are as good as those in many commercial programs. With the addition of some notation symbols and a full-page display mode, *NoteWorthy Composer* could become a serious contender in the Windows notation world.

Frosty Windows Shareware

Program	Application	Home "Shopping" Page	Registration Cost
Audio Compositor 1.2	MIDI renderer	http://www.eden.com/~mitchell/acdload.htm or http://www.winsite.com/win95/sounds/	free
CoolEdit 1.51	wave editor	http://www.syntrillium.com	$50
FX 1.5	synthesizer	http://www.winsite.com/	free
GoldWave 3.03	wave editor	http://web.cs.mun.ca/~chris3/goldwave/goldwave.html	$30
NoteWorthy Composer 1.3	notation	http://www.ntworthy.com	$39
Virtual Waves 1.01	synthesizer	http://www.fretless.net	$159
WaveCraft 1.0	synthesizer	http://www.audiovirtual.com/wavecrft.html	$130
WAVmaker 2.2	MIDI renderer	http://www.abc.se/~m9303/	$40

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No purchase necessary. Contest runs 9/1/96-12/1/96 at participating retailers. Open to entrants 18 or older. Winners will be selected in a random drawing on or about 1/1/97 and be notified by mail. Prizes: (1) Grand Prize: Two (2) Tickets (plus backstage passes, if available) to any concert, installation or event in which QSC Audio Products are used (a list of choices will be provided to the winner following the drawing), two (2) r/t coach airline tickets to the selected event, limousine transportation to and from the airport in the selected city, two (2) nights accommodations, plus two (2) QSC baseball-style jackets (combined a.r.v. $2,500); (5) 1st prizes: QSC USA 900 Power Amplifier (a.r.v. $785); (3) 2nd prizes: QSC Wool/Leather Baseball Jacket (a.r.v. $200); (50) 3rd prizes: QSC/USA T-Shirt (a.r.v. $15). For official entry form, contest rules, or actual odds (please specify), send self-addressed stamped envelope to: QSC Audio Products, Inc., 1675 MacArthur Blvd., Costa Mesa, CA 92626. Odds of winning depend on number of entries. A final record of actual odds will be available for a period of two years after the prize drawing date. Employees of QSC Audio Products, Inc., participating sound companies, other affiliated businesses, advertising and promotion agencies, and their immediate family members and/or those living in the same household of each are ineligible. Prize winners must execute an Avidavit: Eligibility/Publicity Release/Prize Acceptance Form within 7 days of attempted delivery of same. Noncompliance within this time period may result in disqualification. Acceptance of prizes constitutes permission to the sponsors or their agencies to use winner's name and/or likeness for purposes of advertising and trade without further compensation, unless prohibited by law. No substitution or transfer of prize permitted. All applicable Federal, State and local taxes are the responsibility of the winner. Names of prize winners available after 3/1/97. Void where prohibited.

WRH

WINDOWS TOOLS

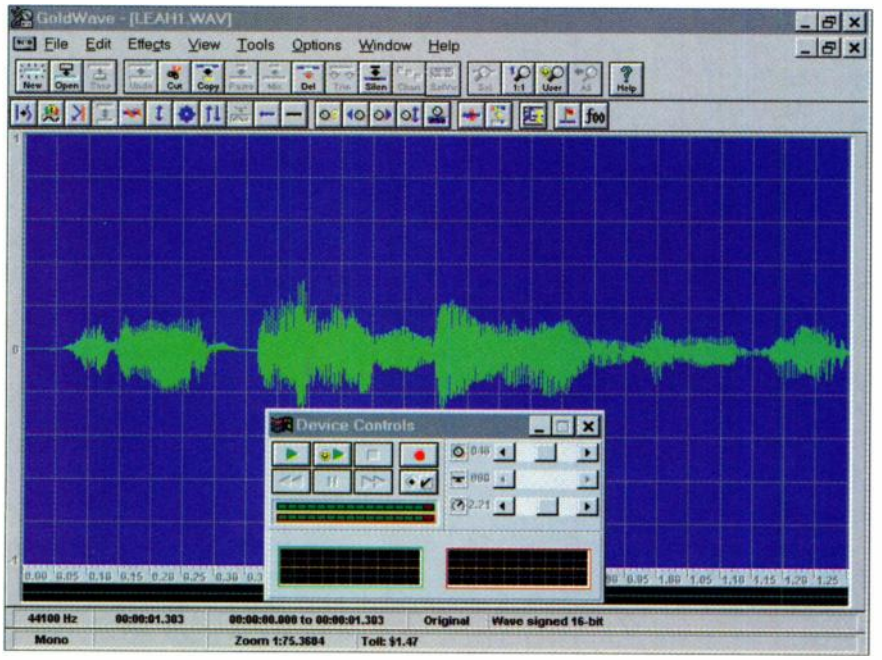
VIRTUAL WAVES

My prize for best online software this year goes to *Virtual Waves*, a synthesis program that includes a large number of modules and sound-processing options and a highly intuitive, elegant user interface. *Virtual Waves* uses the patch-cord model for building "synths." Click on a sound generator or processing icon from the window on the left of the screen and then click anywhere on the right to move the sound onto the workspace. Next, hook the modules together and make any desired changes to their parameters, and in a flash, you can hear the sound you've designed.

Virtual Waves provides numerous tools for creating sounds. Among the more interesting synthesis generators are one for modeling string sounds (the Karplus-Strong module); a 7-partial, additive-synthesis tone generator, complete with envelopes for independently controlling amplitude and frequency; and a Fixed Formant function that lets you easily create sounds with strong vocal qualities. The 6-operator FM synthesis option is also excellent, and the oscillator module includes six types of static waveforms that can be heard as audio signals or used for LFO effects.

Processing options include amplitude modulation, an arpeggiator, a harmonizer, a pitch shifter, and a ring modulator. There's also a cross synthesis module, which is useful for creating vocoder-type effects, and an excellent-sounding resonance filter. A versatile Transfer Function algorithm is available for distortion effects, and using the Concatenate module, you can have two entirely different sounds play in succession. You'll also find a sample editor that allows you to view and play back the wave file you've created and perform some basic editing functions.

Special honors must go to the reverb unit. This module has nearly as many parameters as the powerful Lexicon 300 and provides a graphic editor for defining listener position, source location, absorbent material for each of four walls, and length, width, and height parameters for the room. You can also specify whether the source will radiate omnidirectionally or not and what the angle of the principal radiations will be. Although I experimented with only a few of the settings, my initial reaction was that the reverb sounded authentic and accurately reflected the settings I defined, especially the absorbent materials. This module alone is worth the price of admission!



***GoldWave*'s main screen displays a waveform view and a Device Control window for controlling file playback.**

Though you can't trigger a sound from a MIDI keyboard, there is a feature to transfer samples directly to a sound card that has a sampling option, such as the Turtle Beach Tropez or Sound Blaster AWE32. You can also dump samples via SDS directly to your sampler. My only other complaint is that certain sounds are limited to fairly short durations. The wave generator, for example, has a limit of five seconds. But this shouldn't stop you from experimenting with some very interesting methods of sound design. Exploring the example files alone will keep you busy for many hours.

WAVECRAFT

A more elaborate software synthesis program is *WaveCraft*. This commercial program is especially well suited for building techno-style, analog synth loops. Load an oscillator by clicking on any of the open squares in the main screen, and use the 16-note sequencer to control the oscillator's frequency. Trigger the sequencer with a clock source that's set to your desired tempo, and then wire the oscillator to the File Dump icon, which represents the sound's output. If you want to vary the speed of the clock, send an LFO to its input, and it will slow down and speed up at the LFO's frequency rate. Then expand the output icon and select Generate Wave, and *WaveCraft* will create a wave file of your sound, ready to play or save for future use. Designing a sound such as this one takes just a few minutes, and dozens of useful examples are available for study and modification.

The registered version of *WaveCraft* provides both high- and lowpass filters with several parameters that can be updated in real time. It has an 8-segment envelope generator, adjustable in 1-millisecond increments, and a 4-channel, mono mixer, complete with an overall gain adjust. There's also a Glide Generator that adds a definable amount of portamento to a note when you're using the sequencer to send pitch information to an oscillator. Though the unregistered version has only four modules, it gives you an idea of the program's versatility.

WAVMAKER

Another program for rendering MIDI files is *WAVmaker*, which includes a large set of samples but only limited real-time options. *WAVmaker* offers a

wide range of audio editing features, including a very effective vocoder, which takes the spectral envelope of one sound and maps it onto another, as well as echo, reverb, chorus, flange, and filters. Although there's typically only one preset for each effect, you can easily modify any of the default parameters and save your settings for later use.

Of course, the main function of the program is to render MIDI files, and *WAVmaker* includes a huge number of GM samples, which gives you a "synth on disk," ready to play. Samples are turned into patches in the Program Editor, a single screen that includes options that match or surpass those of some of the most powerful synthesizers available. The keymapping feature, for example, is versatile enough to assign six different layers to the same key and allow Velocity or controller data to switch among them. You can also set sample start offsets and loop start and end points for any sample and vary pitch-bend response and controller sensitivity individually for every note in the patch!

WAVmaker uses a very efficient compression scheme to store wave files on disk and will automatically decompress samples as needed when you begin to render. The percussion samples are especially good sounding, and the whole set is a cut above most mainstream wavetable sound cards. With the exception of real-time capabilities—which have been enhanced with an add-on called *MIDI Express* but are still not comprehensive—the program has everything you need to transform MIDI files into great-sounding audio.

FINAL MELTDOWN

Well, this is certainly a way cool collection of music shareware! It's pretty exciting stuff—whether you're a Mac or Windows user, a world of exciting software tools is just a modem call away.

Remember that new programs pop up regularly, so use your favorite Web browser to seek out MIDI software and reap the rewards. If you find something thrilling, please e-mail the URL to us (at emeditor@aol.com), and we'll try to keep other **EM** readers in the shareware loop. Happy hunting!

Jim Pierson-Perry *is a clinical chemist, musician, and general Mac/MIDI fanatic.* **Dennis Miller** *is a composer living in the suburbs of Boston.*

Photography for Usual Suspects by Linda R. Chen, courtesy of Gramercy Pictures. Photograph of Robert Etoll by Evonne Viner.

TRAILER NUMBERS

ROBERT ETOLL REVEALS THE SECRETS OF THE 3-MINUTE SOUNDTRACK

For me, watching the trailers for coming attractions is an integral part of the movie-going experience. I've never understood people who are content to traipse into a theater five minutes after the movie starts and stumble in the dark in a lame attempt to find an empty seat. I'm always in my seat well before show time because I *hate* missing the trailers. (I also hate missing batting practice at baseball games and the symphony tuning up before a big concert; it's just a quirk of mine.)

Trailers are far more than warm-up acts for the main event; they are the primary form of advertising for the movie industry. Even bad movies have awesome trailers. As a matter of fact, when movie execs know they have a stinker on their hands, they really pump up the in-theater and television clips to attract as many consumers as possible in the first weeks of the movie's release. So if you've never given much thought to trailers, think again.

By Mary Cosola

KU 32 4565 1238•
KU 32 4565 1237•
KU 32 4565 1236•

TRAILER NUMBERS

Robert Etoll has carved out a niche for himself as one of L.A.'s premier producers of scores for movie trailers and television spots. He creates the adrenaline-pumping musical backdrop for an exciting car chase or conveys a horror film's sense of stomach-fluttering terror. His job is to set the tone for a movie in a 2- to 3-minute score, and he accomplishes all this in his home project studio in Culver City, California.

LIFE IN TRAILERLAND

You might wonder why there's even a need for Etoll's services. In Hollywood, trailer production is a sizable subset of the movie industry. There are production houses that specialize solely in the creation of trailers for coming attractions. The music for these productions is licensed or specially commissioned because, more often than not, the final score for the movie is barely underway when the trailers need to be rushed out to the movie houses.

While a film is still in production, the producer contracts the services of a trailer house to put together the trailers, teasers, and radio and television spots. The trailer editors screen the film, choosing the important elements to include in the trailers. They put together drafts, refining them with the input of the movie studio's marketing department. Once they have a final draft of the clip (which is screened by the film's producer, director, and/or editor), they need to commission music for it. That's where Etoll comes in. He gets the edited footage and starts working on his rough drafts, but he rarely has more than a day or two to turn around a first version of the score.

"Actually, the tight deadlines don't bother me; I feed off that kind of pressure," says Etoll. "The quick turnaround means I have to go with my gut instinct because I don't have time to mess around. The drawback is that I don't have the advantage of experimenting with the music as much as I would like sometimes. But in Hollywood, music is always the last thing. It's always been that way." And he adds with a laugh, "The other reason I don't mind the deadlines is that the tighter the deadline, the less time they have to make a bunch of changes."

Etoll's ability to deliver a quality score in a short time frame has helped earn him a reputation as the go-to guy in times of musical crisis. He gives a recent example: "A trailer house I work with called me about *High Incident*, a Steven Spielberg/DreamWorks television show they were working on. They had just found out that they were unable to license a piece of music they thought they'd have no trouble using. They were in a bind because they needed the music completed the next day. I had to pull an all-nighter and deliver it the next morning. The cool thing was that Spielberg was actually there waiting to hear and approve it. It was great knowing that I was coming through for them and that I could deliver something good on very short notice."

SHOP TALK

Because he's a one-stop musical shop, Etoll has to be able to work in a variety of musical styles at the drop of a hat. He credits his varied background with providing a solid musical foundation

Chills! Thrills! Gear!

Following are the tools Robert Etoll uses to produce his vast array of musical works in his home project studio, Robert Etoll Productions (e-mail retoll@aol.com). At press time, he was in the process of updating the setup given below. In addition to switching from the Atari platform to Windows, he is installing Spectral's Prisma hard-disk recording system. He has decided to stay with Steinberg's *Cubase* as his sequencer, upgrading to *Cubase Audio XT* 3.0.

Mixing Consoles	Mackie CR-1604; Soundtracs MXR 24 x 16 x 8; Yamaha MV802
Audio Recording Media	Alesis ADATs (3) with BRC; Panasonic SV-3800 DAT; Sony K677ES cassette deck; TASCAM DA-30 and DA-P20 DATs and 35-2B 2-track
Synths/Samplers	Akai S1000 sampler; E-mu Emax sampler, Proteus, and ProCussion drum module; Korg M1; Oberheim Matrix-6R; Roland JV-1080, D-50, and D-550; Yamaha Clavinova PF100 piano and controller, DX7, and TX7
Computer/Software	Atari Mega/STE; Steinberg *Cubase Score*
Signal Processors	ADL Tube Compressor (2); Alesis QuadraVerb; Aphex 661 Tube Expressor; BBE 422A Maximizer; dbx 160 and 166 compressors; Delta Lab DL-4 delay; Lexicon LXP-1 (2) and PCM-80; Neve 1272 preamp; T.C. Electronic M2000; TL Audio Dual Valve Equalizer; Yamaha SPX90, REV7, and GC2020B compressor/limiter
Monitors	Auratones; Tannoy System 8 NFMII w/ElectroVoice sub; Yamaha NS-10M
Power Amps	BGW 7500 II (2) and 500D; Ramsa WP9220
Microphones	AKG C 451 (2) and C 414B-ULS; Electro Voice N/D757B; Neumann U 87 (Steven Paul mod); Shure SM57
Video Decks	JVC BR-7700U ½-inch; Sony VO-5800 Umatic ¾-inch
Guitars and Amps	Fender Stratocaster and Telecaster guitars, Bullet bass, Super Reverb; Gibson ES-335 guitar; Ibanez Roadstar guitar; Mesa Boogie Studio preamp; MosValve MV-962 power amp; Ovation Model 167-7 guitar; SansAmp Tech 21 PSA-1 preamp; Takamine 12-string guitar; Taylor 810 acoustic guitar; Yamaha CG190S classical guitar

ALESIS

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ALESIS

TRAILER NUMBERS

from which to work. He graduated from Berklee College of Music, toured as a guitarist with jazz-rock legend Alphonse Mouzon, and has written and/or produced songs for acts ranging from Reba McEntire to the Pointer Sisters to Debbie Gibson to Steve Jones of the Sex Pistols.

"The formal training makes all the difference," he explains. "Being a rock guitarist and then going to Berklee to learn symphonic composing is an invaluable combination of experience. I get a lot of calls because I'm very eclectic. But I also know my limitations. I just did a trailer for Trimark Films in which they wanted zydeco music. The big thing about zydeco music is the accordion, so I had to find a zydeco accordion player. I wasn't about to attempt that myself because I know the limitations of synths. For instance, I won't touch a synth saxophone; it just doesn't fly. I hire live players in those instances. I listened to a couple of zydeco albums, studied the music to figure out the various elements that make it unique, and hired zydeco musicians to do the score. Trimark loved it.

"I compose symphonic scores using samples and synthesizers, but I usually ask for an additional budget to bring in three to five violin players to augment the synth samples for a more organic, live-sounding recording," he continues. "On these types of scores, I also like to bring in a French horn or a reed

EVONNE VINER

The home project studio where Robert Etoll produces movie-trailer scores as well as pop songs, industrial videos, and soundtracks for feature films and television shows.

ALESIS

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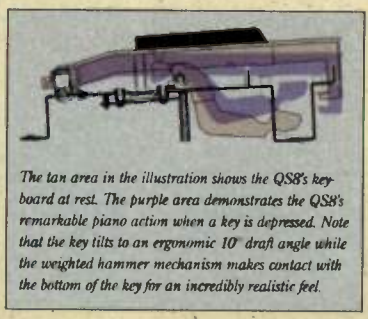

The tan area in the illustration shows the QS8's keyboard at rest. The purple area demonstrates the QS8's remarkable piano action when a key is depressed. Note that the key tilts to an ergonomic 10° draft angle while the weighted hammer mechanism makes contact with the bottom of the key for an incredibly realistic feel.

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QS8™

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player to help complete the live effect."

Even though Etoll occasionally records live instruments for his trailer scores, for the bulk of his work he uses synthesizers and samples. His workhorses are his Akai S1000 sampler with a variety of CD-ROM sounds and Roland D-50, D-550, and JV-1080 with all the cards, though he keeps a stable full of other goodies (see table "Chills! Thrills! Gear!"). "Without the tools we have now, I wouldn't be able to do this," he concedes. "Because of my background, I can crunch out a lot of guitar tracks quickly, which is another reason I get a lot of calls. I don't do just synth music."

THE WORK IN PROGRESS

Etoll's first task when he's composing a trailer score is to cull from his sampler

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(Gramercy Pictures)
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(ABC/DreamWorks)
Indecent Proposal
(Paramount Pictures)
Untamed Heart
(MGM)
Mother
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Card 52

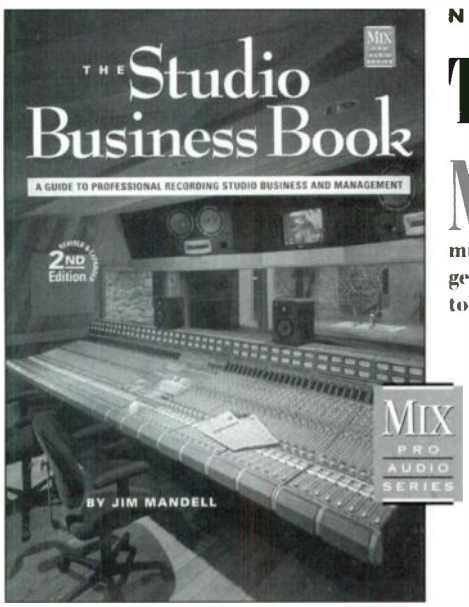
nd synths an appropriate palette of ounds for the movie's genre. He au- litions the sounds, compiling his fa- orites to hard disk.

"Once I've auditioned the sounds I hink will work, the next step is to lit- rally map it out," he explains. "I map ut the beats per minute. For exam- le, say I'm working on a 2-minute trail- r, and the first 45 seconds are going to e up-tempo. I need to figure out the xact tempo in relation to the hits [*the oints where a musical cue aligns with, or hits," an onscreen action—Ed.*]. If there's hit eight or nine seconds in, and the empo is at 120 bpm and it's just miss- ng the hit point, I need to adjust the empo. So I'll bump it up to 120.5 or lown to 119.5 bpm, until it finally hits ight on. Sometimes there's a change n the action about a minute into the railer. In those cases, I need to deter- nine the new beats-per-minute figure o adjust the score accordingly. Usually, 'm getting a rough idea of the com- osition while I'm mapping it out.

"After I've mapped out what type of nusic I need where, I start composing," ie continues. "Unless it's orchestrat- ed, I don't do much writing out of chords or anything like that. Because I use a sequencer, I just start playing. However, I will write out intricate parts. For instance, I'll write out the chords on a chord chart so that when I come back to it, I'll have the chords in front of me. Otherwise, I can remember what I've composed; the pieces aren't so long that I'll forget them."

EVONNE VINER

Robert Etoll cradles one of his babies in front of command central.



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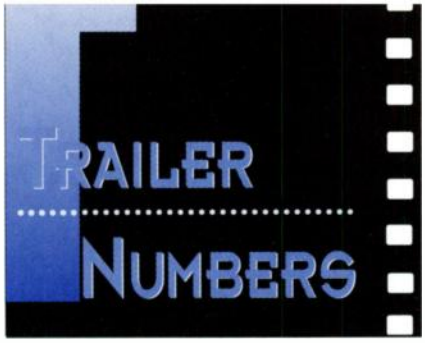

Etoll's multitrack of choice is the Alesis ADAT; he uses three for a 24-track setup. Why does he choose the ADAT over the TASCAM DA-88, the *de facto* Hollywood post-production machine? "For 99 percent of my projects I mix down to DAT, so it doesn't really matter which format I use for multitracking," he says. "Granted, the DA-88 is favored by post-production houses because of its synchronization capabilities, but I went with the ADAT because I am very active in songwriting and record production. The ADAT is the more common machine in that regard, so it's easier to trade tapes with other musicians. And when I do feature-film scores, I always ask the post-production house what master format they need for the final score. If it's a format I don't have, I just rent the proper machine."

When his first draft of the score is complete, Etoll personally delivers it to the trailer house so he can play it for the trailer editors and producer. He goes back to his studio to make any requested revisions and sends back the second version, and so on. Etoll says it can take as few as two versions or as many as ten until the final score is complete. He points out that he doesn't work with demos in these instances; each draft he presents is always as close to a master version as possible.

"Movie execs want to know what to expect from the completed score," he explains. "Again, that's the beauty of today's technology. Using my synths, samplers, and ADATs, I can give them a really good idea of what a symphonic score will sound like when it's done."

LOVE YA, BABE

When recounting the various career twists and turns that led him to this current juncture, Etoll peppers his sentences with phrases such as "lucking out" (when his first song sold was to the Pointer Sisters) and "getting a big break" (when his first trailer campaign was chosen by Francis Ford Coppola himself for *The Godfather, Part III*). After talking to him for a while, the phrases "hard-working" and "talented" emerge as a common subtext to these stories.

Some people mistakenly believe that once they get their big break in Hollywood, they've got it made. It's true that getting your foot in the door is half the battle, but you also have to prove you were worth the risk in the first place. This is a lesson that Etoll repeats time and time again to his students at UCLA Extension. (Yes, in addition to his trailer, feature-film, and pop-music work and being a single dad, Etoll teaches in his "spare time.")

"Whenever my students ask me how to break into the business," says Etoll, "I tell them you get one shot, and you have to capitalize on it. Don't slack off, don't be late, don't give any excuses as to why a project isn't done. Hollywood is full of one-hit wonders who have had a lucky break only to never be heard from again. The bottom line is you have to deliver."

Mary Cosola *is managing editor of* **EM**.

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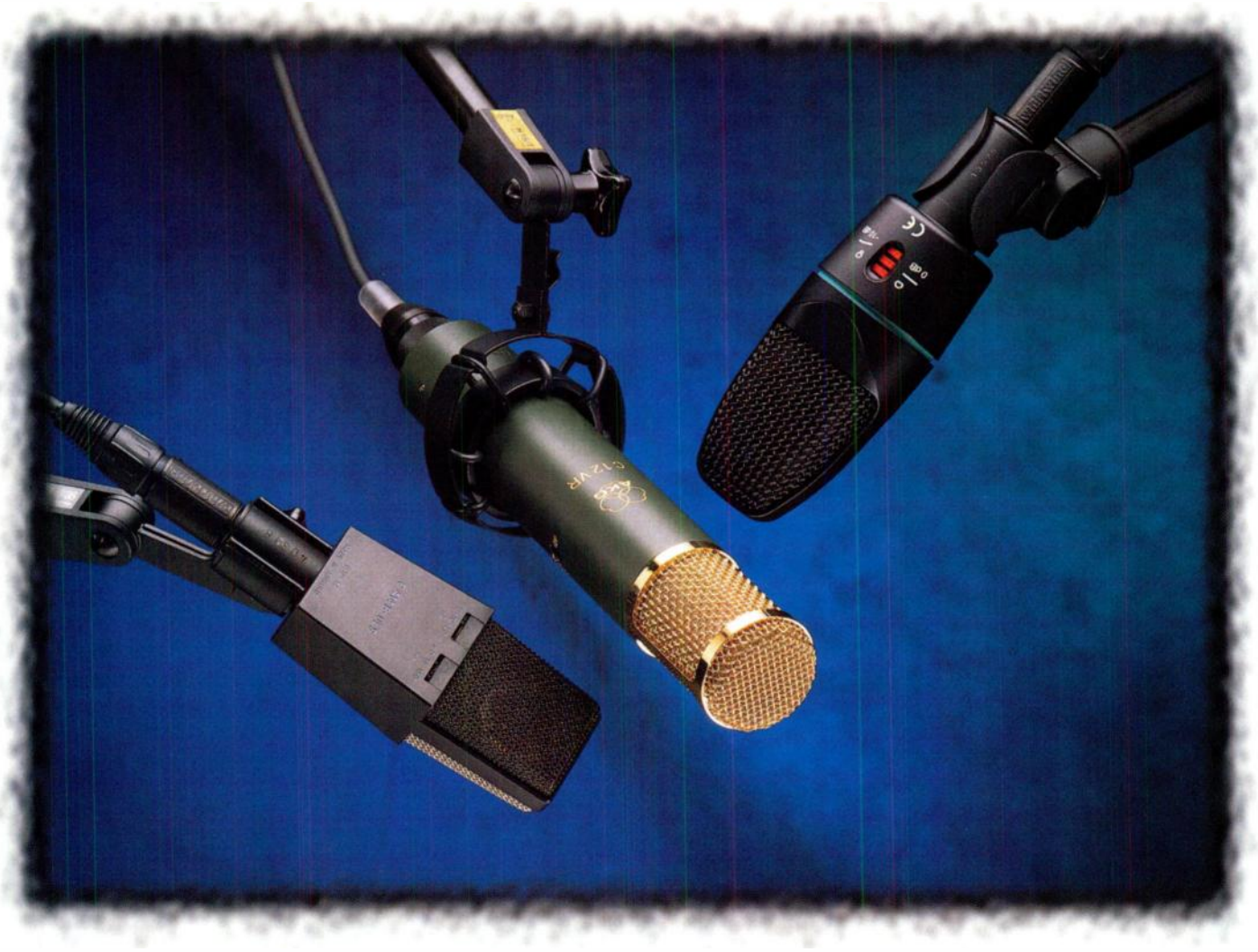

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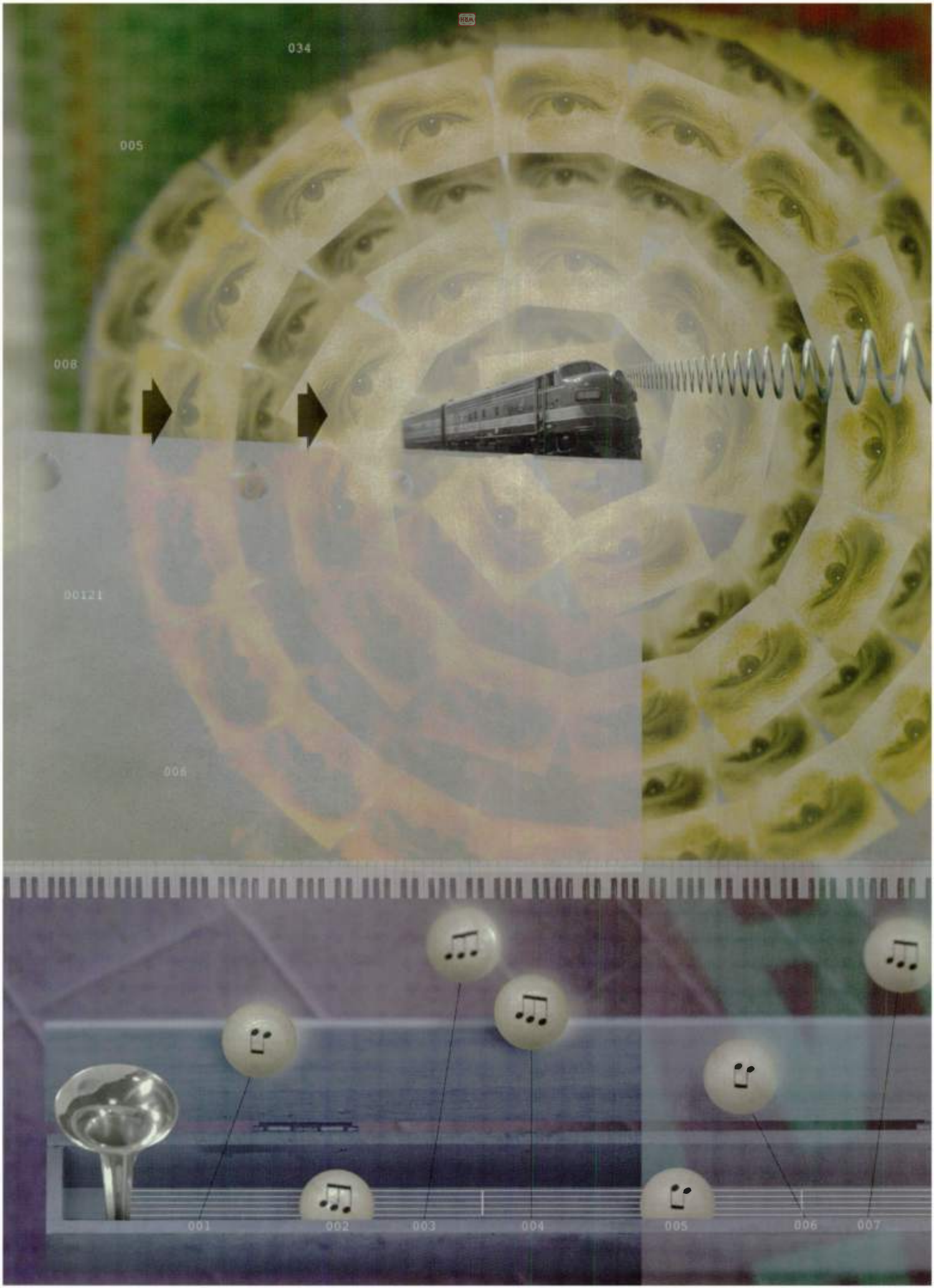
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Illustration By Stuart Bradford

Persistence of Vision

I recently took off on a little getaway to the mountains, and I thought I'd try to do some music while I was gone. So I packed a guitar, a drum, and my PowerBook. At the time, I had exactly one application installed on the laptop: Opcode's *Studio Vision Pro* 3.0. Despite my plans to interface with nature, I pretty much did the music thing, breaking off only to stir the fire.

By the end of the weekend, I'd tracked three new songs. I recorded the audio directly onto the internal hard drive using Apple Sound Manager, trimmed and looped some parts, corrected rhythms with the software's time-compression functions, and used the Audio-to-MIDI routines to generate harmonies and MIDI parts, which were played by the QuickTime Musical Instruments software synth.

I even did some sound design, creating new timbres from the simple source material available to me and shaping the dynamics and spectra with *Studio Vision Pro*'s software EQ, Reverse, and Fade In/Fade Out DSP. Then I worked on premixes, using the new Consoles feature to develop a rough, automated mix.

If at first you don't succeed, try again with these tips and techniques for Studio Vision Pro.

After arriving back home, I loaded the files into my desktop computer, which runs *Studio Vision Pro* with a Digidesign Pro Tools III system. I reassigned the MIDI tracks to trigger external sound modules, inserted some TDM effects plug-ins into the *Studio Vision Pro* console channels, sent the audio tracks to the separate outputs of the interface, and brought up the mix on the monitors. Amazingly, the same evening I came home from the trip, I was mixing to DAT and rolling a tape for my next band rehearsal.

By Gerry Bassermann

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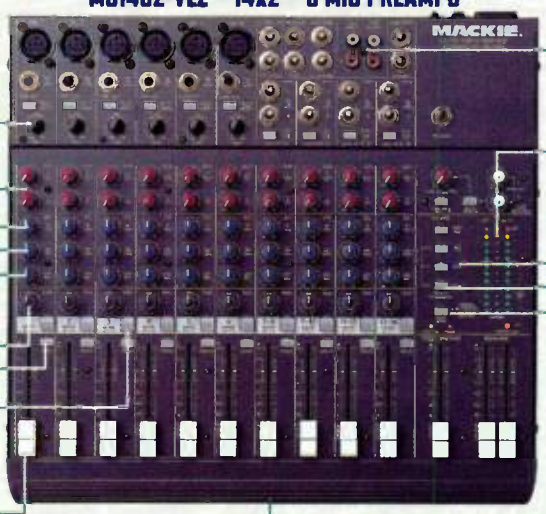

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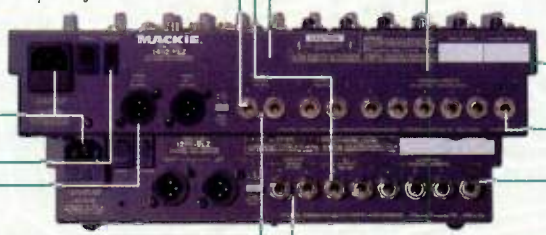

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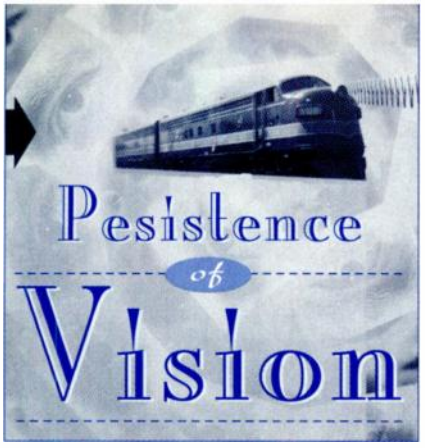

THE INTERFACE IS ALL

To a large extent, the differences between audio and MIDI data are invisible in *Studio Vision Pro.* Drawing a volume curve to shape a MIDI performance, dragging the end of a MIDI note to extend its duration, Option-dragging a MIDI event to copy it to another location—all of these functions work in the same way for audio events. Of course, there are special considerations when working with digital audio, so two menus are dedicated to the program's hard-disk recording features.

Studio Vision Pro's Track Overview window reveals all data in color-coded graphic blocks so that the form of the composition is apparent (see **Fig. 1**). In this window, you can see the phrase shapes of the MIDI parts and the waveforms of the audio parts. The Track Overview is an active editing screen; the cells representing MIDI or audio data can be moved around easily and modified with the same facility as individual events within the tracks. You can copy and paste sections of MIDI and audio data together in this window to build musical structures in a highly graphic way.

For example, you can repeat a section of a song without pulling down a single menu. To do this, quantize the cursor's movement by clicking the button in the upper-right part of the Track Overview window and then select the whole note in the pop-up menu next to it; now you can select an exact number of measures.

When you move the arrow cursor to the measure ruler at the top of the window, it becomes an I-beam tool, making it easy to grab the data in all tracks. (This also works in a single track's graphic editing screen; the Marquee tool undergoes a similar transformation when placed in the ruler or margin.)

Once you've selected the area you want to repeat, you can audition it quickly with the Option-spacebar combination (the keystroke equivalent for the Play Selection command). Hit Command-C (Copy), click the cursor on the end of the selection, and press Command-N (Insert Clipboard). If you want to repeat the section several times, select Repeat Paste from the Edit menu, check Insert Into Track in the dialog box, and enter the number of desired repeats. Editing in the Track Overview screen like this is a fast way to experiment with song forms.

IT'S ABOUT TIME

I remember reading about the process of recording Lou Reed's *New York,* a production that sounds natural to my ears. Apparently, Reed first played the tunes on electric guitar, and then he had everyone else overdub their tracks to the guitar part, following his every nuance.

Studio Vision's Reclock feature lets you do the same thing: conform the timing of an entire sequence to a control part by creating a tempo map that the sequence follows. When the sequence plays back, the counter beats in time with the control part, and the time grid of the sequencer is aligned with it. As a result, you can cut and paste digital audio with the cursor position quantized to, say, quarter notes, and the cursor will always land exactly on the beat. The entire bar/beat musical interface is in sync with the audio.

To create a simple control part, select a click-like sound (C♯1 is a sidestick sound in a General MIDI drum kit) and an audio part that you want the rest of the sequence to follow. Put *Studio Vision Pro* in Overdub mode, start recording on the selected audio track, and play C♯1 on every beat, following any tempo variations in the audio part. (If the tempo is fast or it's really late at night, you can tap only the downbeats, as long as you tell *Studio Vision Pro* to expect only downbeats in the Reclock dialog.) This can be a tedious and exacting job, but it's best to keep going even if you're a little off; you can always edit the timing of individual events later.

To visually tweak the timing of individual beats, open the track's graphic editing window and align your tapped beats with the transients of the audio waveform. After you're satisfied with the newly created click track, and the MIDI notes sound like they're following the audio track exactly, select Reclock from the Do menu and check Same Click On Every Beat or Clicks On Downbeats Only, whichever is appropriate. *Studio Vision Pro* creates a tempo map that reflects the fluctuations of the audio.

GETTING LOOPY

Studio Vision Pro provides many tools to copy, manipulate, and relocate sections of music. The program invites you to record lots of ideas freely, knowing it's easy to pan for gold later. For example, after recording a long musical jam into an audio track, you can select only the material you want to keep and then select Mix Audio from the Audio menu.

This function is typically used to combine multiple audio files and their associated controller information (such as volume and pan) into a single mono or stereo file. But in this case, with just one selected audio event, you can use Mix Audio as an export function to

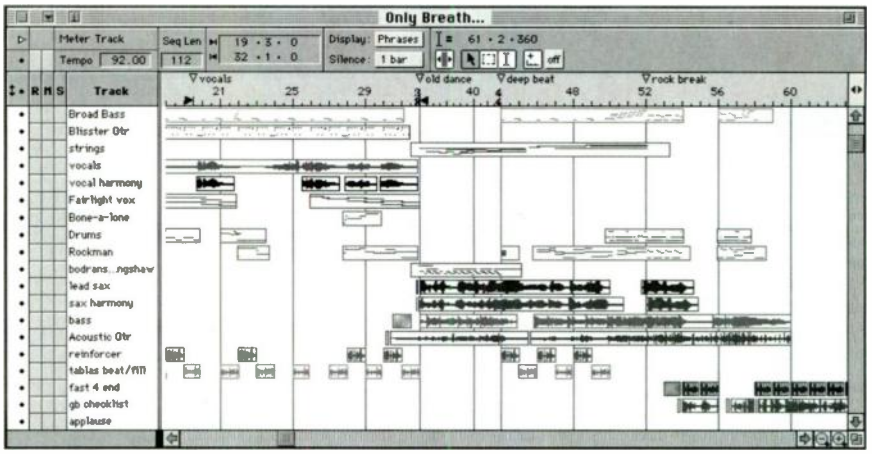

FIG. 1: The Track Overview window reveals the structure of the entire song, including all MIDI and audio segments.

plete, professional MIDI production studio. In addition to QY700's ability to take MTC (with start time offset), it boasts a 110,000 note, 480 ppq resolution sequencer with 48 tracks.

QY700 also has a database of 3,876 professionally programmed drum patterns, bass lines, guitar and keyboard riffs, chords and arpeggios. 100 preset and user programmable playback effects and "groove quantizing" templates allow anyone to change quantize, clock shift, swing, gate and velocity values to completely personalize the groove with or without changing the original data.

Friends of Yamaha MD4, though, say that it is strongly attracted to QY700 for its 480 voice, 11 drum kit XG tone generator and three independent digital effects processors. And QY700 has a micro keyboard with pitch and modulation wheels so MD4 can push its buttons and turn its knobs for only $1495.

The two seem to be a pair made in music heaven. 52 digital tracks of audio and MIDI, ready for CD mastering, for only $2694 MSRP combined. One music industry exec thinks MD4 and QY700 could be the ultimate relationship. "They're cool and hot, yin and yang, MIDI and audio, Lennon and McCartney, Rogers & Hammerstein, Anthony and Cleopatra, Bogart and Bacall, Tarzan and Jane, Starsky and Hutch..."

MUSICIAN MEETS CHERISHED MIXING CONSOLE IN THE AFTERLIFE!

Material items really do go to heaven. And we have the heartwarming story to prove it!

Blues harpist Marv McGuire has always been especially fond of his Yamaha RM800 Recording Mixer...so much, in fact, that he never found it necessary to spend thousands more on a comparable mixer. "For just $1699, this little baby gives me everything I need," crooned the smitten Marv. "It has superb sonic quality for direct compatibility with digital and analog multitrack recorders."

Last month, the 37-year old Marv found himself under the knife on an operating table following a tragic SkyFari crash at a well-known amusement park. His near-death experience gave him an unforgettable glimpse into the afterlife.

"I couldn't feel anything, but somehow I knew I was dead," recalled Marv. "I remember seeing myself floating above my body, then drifting through a long, dark tunnel towards a tiny pinpoint of light. The light got brighter and I could make out a shape coming toward me. It was my trusted RM800 mixing console!"

Even more vibrant than the original, everything was as he remembered—all 16 channels and 40 feature-packed inputs, six aux sends, eight busses and direct outputs. He even saw a FREE pair of legendary Yamaha NS10M studio speakers valued at $478!"

"I loved my mixer more than anything in the world," exclaimed Marv. "We had a wonderful time together when we were reunited in heaven, but then I felt something tugging at me, pulling me back to the realm of the living."

Back in Ohio, Marv no longer dreads death and continues to strengthen his bond with the RM800. "Now that I know you CAN take it all with you, I'm gearing up for more!" Before his next trip to heaven Marv plans to visit his Yamaha dealer to buy, for just $2399, a new RM800-24 with 24 input channels and 56 inputs and a FREE pair of NS10M speakers! "He who dies with the most toys really does win!"

Gorilla Musicians Get Mega Record Deal

Record execs from the newly formed Banana Records last week gave a family of gorillas a $10 million recording contract after hearing their demo, "Unga Rap." Gerry O' Shaunessy, director of Banana Records says: "These primates are GOOD! We are sending our best talent scout to Rwanda to find more musical apes."

Anders Olygok, an anthropologist, discovered the family's talent purely by accident. "I came to study the gorilla's mating habits. I brought some musical gear to help soothe the animals and record their mating sounds—the Yamaha SU10 hand-held sampler and CBX-K1XG controller keyboard/tone generator. Between the two I have an entire MIDI studio powered by just 12 AA batteries. Anyway, one night I awoke to this bizarre music. This family of six gorillas had gotten hold of the gear and the Silverback, the family patriarch, was crooning away."

Olygok's companion, Olga Nsygd, observed the mother gorilla working the SU10 sampler. "She took to it like a fish to water. After all, it's very easy to use. She gathered about 30 samples of the Silverback—the SU10 lets you record and replay up to 48 in stereo—and then she used the ribbon controller to scratch out all kinds of wild effects."

Nsygd and Olygok then witnessed the gorilla editing the sounds by changing the playback direction, loop type and loop points. She also utilized the scale function to play samples at incremental pitches. Banana Records mega-producer Tony Romono said, "She's a born musician. Her mastery of this device is incredible."

Romono was also impressed with the youngest member of the family, Chip. "He's quite adept at the CBX-K1XG keyboard. And he loves to explore the CBX-K1XG's 727 XG and GM voices and 11 drum kits. He has no preconceived notions of what music should be. But the drums are especially prominent in his music."

At Banana Studios, Chip demonstrated his talents for the Inquisitioner using the CBX-K1XG's built-in stereo speakers. Happy with his performance, he then saved it to disk via MIDI bulk dump using his Yamaha MDF2 MIDI data filer, much as his mother did in the jungles of Rwanda with the SU10.

The only hitch in the arrangement so far is that Banana Records just can't seem to keep enough bananas around.

CBX-K1XG

Surfing Tragedy

Reeve O'Neal, a popular local surfer, was sucked into the falls and knocked flat by the laptop on his longboard. Friends report that O'Neil had wanted to surf to the new Yamaha guitar internet site, **www.yamahaguitars.com,** which features a complete guitar "catalog," artist information, news and cutting edge graphics.

Yamaha is dedicating the site to Reeve. "He was a cool dude and he had guts, but he wasn't very bright" remembered a close friend.

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NEW REPORT: FUN WILL KILL YOU!

The Norwegian Center for Public Health dropped a bombshell yesterday, divulging exclusively to the Inquisitioner: FUN WILL KILL YOU! This supports the Center's previous reports that chocolate, air and sex are bad for you.

Björn Nsyglyd, the Center's Director, elaborated, "our laboratory tests on mice clearly illustrates that if you have too much fun in a 3 second span, you could spontaneously combust. If the fun is spread over minutes or days, the results are diminished. However, you will definitely croak."

Richard Simmons, aerobics instructor known for his obsessive optimism, was rumored to respond, "Oh HELL!"

But the news comes especially hard to Yamaha Corporation which has recently released two XG MIDI synthesizers that are actually fun to play.

The CS1x is a throwback to the 70s where people didn't have to program synths. They just dialed in the patches on rotary knobs and played away. Music was spontaneous and life was good. The CS1x features 6 realtime effects knobs for voice editing of up to 4 elements. It also includes an Arpegiator that lets the musician play around with all kinds of fun sound patterns. And the CS1x offers over 1,000 XG and GM voices and performances plus 17 drum kits. After reviewing the synth, Nsyglyd concluded, "It's a death sentence."

The Yamaha CBX-K1XG is also an XG and GM compatible synth. Because it's a self-contained XG studio (tone generator, touch sensitive mini-keyboard and speakers) and because the battery powered unit can fit in an overnight bag, a musician could make music anywhere, including a roller coaster. The CBX-K1XG has 737 voices and 22 drum kits, a huge selection by any standards, and 32-note polyphony. Nsyglyd's only advice, "run fast, run far."

Both Yamaha instruments have a TO-HOST connector for linking directly to computers. Nsyglyd's institute has not found any health problems related to computers but he promised, "We're working on it."

Sex & Rock 'n Roll

Two high profile players in the music industry have been seen by several witnesses emerging together from a tawdry hotel. The hotel's front desk clerk reported to the Inquisitioner that "a whole lot of loud music and some serious funny business" was going on in the room in question.

Inquisitioner readers may recall that the Yamaha MD4 digital four track recorder, one of the parties in question, has been in the news for bedding down with "anything related to MIDI." MD4's attraction to MIDI devices is apparently quite potent: it sends out MIDI timecode and MIDI clock with tempo mapping (without using up a track) and accepts stereo sends from MIDI systems through its sub inputs.

"MD4 itself has a lot to offer," said a jilted lover. "A beautiful voice that sounds as good as a CD, loss-less track bouncing, the ability to combine all four tracks with no open track required, precise punch in and punch out, simultaneous four track recording, song editing and instant search and locate. (MD4 doesn't use tape. It records digitally on irresistible removable MD data discs.) And I spent just $1199 romancing it. Oh, I miss MD4 so much."

Yamaha QY700, itself a virile player, is MD4's newest fling. Dubbed a "music sequencer," the QY700 is much more like a com-

NATIONAL

The Inquisitioner

Nobody Expects The Inquisitioner. Vol.11 Issue 1269

Man Wins 37 Lotteries In One Month!

In one month, Hebert Krunk became the world's richest man by winning an astonishing 37 state lotteries simultaneously. Incredible luck? "No," says Krunk, "a time machine!"

Krunk, a descendant of science fiction visionary H.G. Wells, demonstrated his invention exclusively for the Inquisitioner. "Going forward or back in time myself is no big deal. But this is really slick. Watch." Showcasing what he called "futurizing," Krunk placed a Yamaha concert grand piano in the time machine, moved it three years into the future and then returned it in the blink of this reporter's eye.

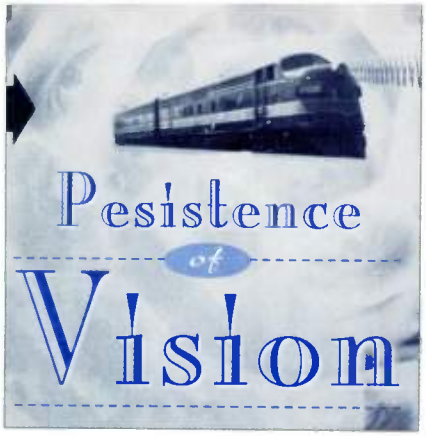
Inside, the 1500 pound acoustic piano was replaced by a sleek black 74 pound Yamaha P150 digital piano. Pianist Milos Filos, on hand for the demonstration, performed on the P150. "Beautiful, beautiful sound. Two awesome stereo and two mono grand piano voices, three electric pianos including an electric grand, vibes, programmable drawbar organs, strings and 2 electric bass voices. And it's got programmable graphic EQ, reverb and chorus. Plus 10 velocity sensitive settings. Boy, they sure know how to make pianos in the future. I can't wait."

Krunk then retrieved the grand piano from the past for another example. "Now watch this! I'll go into the future with the piano this time so you know I'm not faking it." A strong wind was the only indication that anything happened. But Krunk stepped out of his time machine with a 4 foot beard and a small box. No piano.

"Look at this," Krunk said, holding out the box. "It's a Yamaha P50m keyboard tone generator. I got it in the year 2020. It's awesome."

Filos agreed. "Same stereo grand piano sounds as the P150 had. I guess they're perfect. They didn't need to improve them. The P50m also has stretch tuned voices to make a very pleasing piano solo. And the P50m has EQ sliders right on the front; they're so easy to operate."

"I've been to the future and it's nothing really special. Nobody leaves their homes—they only communicate via the internet. But their pianos and their money," says Krunk, "are spectacular."



specify, name, and archive the selected area as a unique sound file not connected to the original recording.

When you decide to create some music based on one of these files, it's often useful to match the tempo of the original jam and then loop that material so it retains the essential "feel factor." Start with a new sequence, double-click on the first Track Selector dot (which opens the List Edit window because the track is empty), select Import Audio from the Audio menu (or press Option-H), and select one of the extracts culled from those jam sessions. If you're unsure about which one you want to work with, the audition controls in the Import Audio window let you play an audio file directly from the hard drive before loading it into *Studio Vision Pro*.

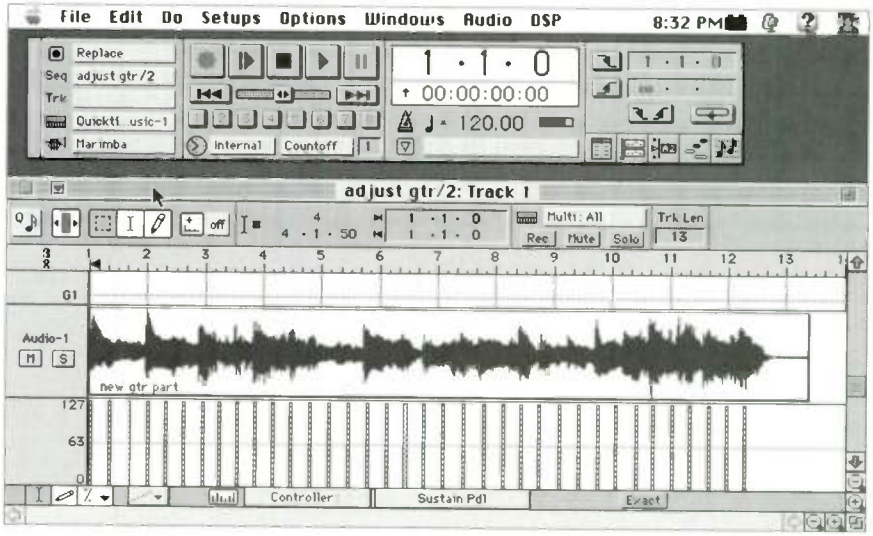


FIG. 2: Tapping your foot on a MIDI controller's sustain pedal along with an audio track establishes a tempo to which other parts can be reclocked.

Importing puts the audio into the track, starting at the point you specify by clicking or typing an edit-in point (either time code or bar/beat units), which is especially fast for sound-effects work. In our example, direct the imported file to bar 1, beat 1. (If it's not already there, click on the Edit-In field, type a "1," and hit Return.)

Now you want to tweak the audio segment so it's the correct size for looping and establish the tempo at which it will loop best. Open the graphic editing window for the audio file you have

TRENT REZNOR (NINE INCH NAILS, MARILYN MANSON)

The Downward Spiral, Trent Reznor's dark opus that has reached mega-hit status on the pop charts, was recorded using *Studio Vision Pro*. Reznor and the Nine Inch Nails recording crew use *Studio Vision Pro* as a gigantic scratch pad for improvised ideas and as an arrangement tool to put all the pieces together.

For example, Reznor records several guitar parts in the same song arrangement, and after listening to the takes, he snips only the cool parts to create final tracks. Here is how the Nine Inch Nails crew records guitar overdubs:

• First, they start with an arrangement of the song as a single sequence; if they need more parts for one section, they create a scratch sequence in which the section repeats.

• To build the scratch sequence, they use the I-Beam Tool (with Cursor Quantize set to whole notes) in the Track Overview window, select and copy all of the tracks in the section, and then paste them into a new sequence and loop it. They occasionally use Repeat Paste (in the Do menu), sometimes pasting to a length of 400 bars.

• Next, takes of the guitar parts are recorded to successive tracks. As soon as they finish recording a track, it is muted. To maximize creative flow, they turn off the Waveform Display (in the Audio menu), eliminating any wait time for waveform drawing on the screen. As an organizational method, they specify a new destination file for each of the tracks in the Record Monitor window.

• When all the takes are recorded, they copy all the tracks to new tracks, which makes it easy to get back to the original version without importing the audio file again if they cut too much during editing. Then they turn on the Waveform Display and unmute tracks to listen.

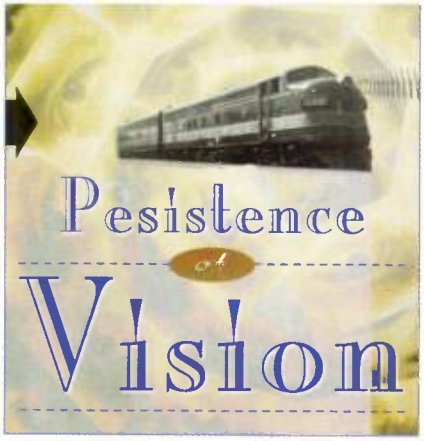
• Listening to the tracks starts with the last take recorded, and they

"ruthlessly delete all that is not brilliant" by selecting the parts they don't like and hitting the Delete key (or Command-B). This is all nondestructive editing, so it's very fast.

• As though they were double-tracking in the old analog-tape days, they sometimes assemble two final mono tracks, panned left and right, to produce a stereo sound.

—Paul de Benedictis

BASS



imported. To select a precise amount of audio material by ear in this window, drag the Marquee tool from the approximate start of the desired loop to the approximate end and listen to the selection with the Play Selection command in the Do menu (or press Option-spacebar). Then tweak the start and end points of the chosen section by holding the Shift key and clicking in the lower left or lower right of the selected area.

To audition the section as a loop, solo the track and click on the Loop button as well as the in and out points in the Control Bar. When you hit Play, the selected audio section will loop. Once you have defined the right segment, select Separate from the Audio menu. This will put the selected audio into its own region. (You can then use the Mix Audio function as described earlier to create a separate file.)

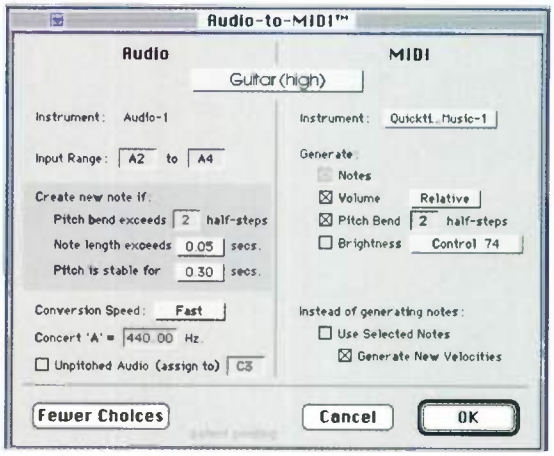


FIG. 3: The Audio-to-MIDI dialog box offers many parameters to fine-tune the conversion process.

Calculating the tempo of the loop is a snap. Delete the audio that's not in the loop, and move your looped segment to bar 1, beat 1. Select the audio segment, and choose Scale Time from the Do menu. If you know the audio segment is exactly two bars, specify two bars in the line that reads "To fill __ number of bars." Check the "Insert Tempos to maintain timing" box, which tells *Studio*

DUST BROTHERS (BEASTIE BOYS, BECK, SUGARTOOTH, WHITE ZOMBIE)

The Dust Brothers (aka John King and Michael Simpson) just finished recording and producing a new album with the Geffen artist Beck. Rather than using several tape machines and many reels of tape, they have developed a

slick system that allows them maximum improvisation (which is important to Beck) while not compromising the best musical mix. They also have developed a tried-and-true method of moving tracks from *Studio Vision Pro* to their multitrack analog machines.

In their home studio, King and Simpson record everything directly to *Studio Vision Pro* digital audio tracks while using SampleCell for looped beats and phrases. The fun begins as they edit the sound. Capturing the spontaneity of the moment is their specialty. Then they package it into the right groove and song form using the full power of a digital audio recorder within a bars-and-beats sequencer, something they could never do in the land of tape.

Finally, they transfer the finished arrangements to tape in a large, analog 24- or 48-track studio because they like the analog-tape sound. Interestingly, they use an ADAT as a master clock. Here's how they transfer digital tracks to tape:

• They use an ADAT with a JLCooper dataMaster as the master SMPTE source to control the entire system. The ADAT records no audio tracks; it's simply acting as the sync master. "The ADAT combined with the dataMaster has no drift compared to SMPTE coming off any analog deck we've tried," says John King.

• The SMPTE output from the dataMaster is connected to the SMPTE input of the Lynx, which controls the analog transport using time code recorded on the 24-track. The Lynx also sends the time code to the Mac to synchronize *Studio Vision Pro*.

• In *Studio Vision Pro*, they set the Sequence Offset by clicking on the I (Information) button in the status bar of the Tracks window, which displays various information, including the offset value.

• They put *Studio Vision Pro* into Receive Sync: MIDI Time Code (in the Options menu) and press Play so that the software will wait for the sync signal before starting playback. When the ADAT starts playing, both *Studio Vision Pro* and the 24-track chase and lock to the master time code, and tracks can be auditioned or transferred.

• Because the SMPTE connections are so clean and drift free, King and Simpson turn off Lock Audio to Tape (also in the Options menu). "This system has really worked for us on all the records we've done so far," says King, "so we keep using it."

• Finally, the Dust Brothers use the studio's monster mixing console to create the ultimate mix, having spent as much time as necessary getting the editing right before going into a costly, pressure-laden studio.

—Paul de Benedictis

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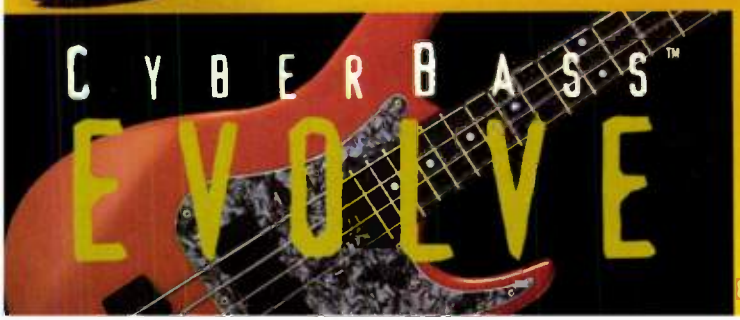

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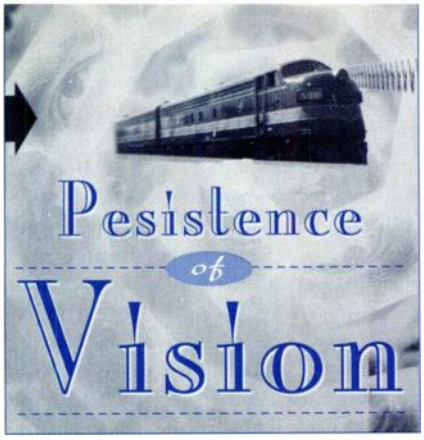


Vision Pro to automatically calculate the tempo required to make the audio segment fill exactly two bars.

CONTROLLING THE RHYTHM

The Adjust Audio Tempo function in the DSP menu goes even further to provide you with control over digital audio tracks. Here's a hypothetical case in point. A producer wants a fast new tempo of 132 bpm for an entire song. However, you've meticulously recorded the tune at 126 bpm. All you need to do is select all tracks, specify New Tempo in the Adjust Audio Tempo dialog box, and enter 132. The tempo of the entire sequence is automatically adjusted, and all digital audio is time-compressed accordingly.

I recently used this feature in conjunction with the Reclock function on a project in which the varying tempo of the percussion track didn't work for the song, which really needed a single, consistent tempo. I started by reclocking everything to the problematic audio track, as described earlier. Then I selected all parts and specified New Tempo in the Adjust Audio Tempo dialog box, which establishes a fixed tempo.

Studio Vision Pro refers to the reclocked tempo map and calculates the compression and expansion needed from moment to moment to adjust all the audio to play at a single tempo. This produced a tight, consistent 120 bpm dance tune full of exotic percussion rhythms.

This process of "ironing out" rhythmic wrinkles is even simpler if you use a technique suggested by New York drummer Joe Franco. Franco isn't into tapping along with the recorded audio to produce information for the Reclock routine. He records the tempo while improvising on the drums by simultaneously tapping his foot on a MIDI footswitch. When it's time to straighten out the playing, he just Reclocks to the MIDI foot taps and uses Adjust Audio Tempo to New Tempo, selecting whatever speed works best. Finally, emancipation from the click track; bravo, Franco!

I have found that the best way to execute Franco's Reclocking maneuver is to use a MIDI sustain pedal connected to the controller keyboard. This lets you record the foot taps as Sustain data in the Strip Chart below the audio track (see **Fig. 2**). However, the Reclock function doesn't allow you to use this data directly to reclock—it only sees the audio data—so you must copy and paste the Sustain events to another track.

The fastest way to do this is with the Select tool. (Click on the far lower-left I-beam button in the Strip Chart.) If you move the Select tool to the left margin of the Strip Chart, it becomes a horizontal I-beam, which lets you drag across a short, vertical distance to select all of the Sustain events in the track, rather than having to drag horizontally through the entire file. Of course, you could zoom out until the entire file is within the window, or you could use Select by Rule to select all Sustain messages. Copy the Sustain events and then Option-click in the title bar of the graphic editing window (which brings up a menu of all of the tracks in the sequence), select "(new track)," and paste. Then Reclock to that track and you're off.

Studio Vision Pro can also affect the tempo of audio files dynamically. Let's say you want to add a ritard to the end of a sequence with both digital audio and MIDI parts. Enter any track's graphic editing window and select Tempo in the Strip Chart. Unfortunately, drawing a tempo change graphically is difficult in this chart. The huge range of available tempos (0 to 500 bpm) renders the more usable range (60 to 160 bpm) too small to specify tempos precisely with the Set tool.

However, help is at hand in the form of Exact mode. Click the Exact button under the Strip Chart to enable it, draw the approximate ritard with the mouse, and then type in the values for the starting and ending tempos in the Exact mode dialog box. Select all tracks for the duration of the ritard, choose

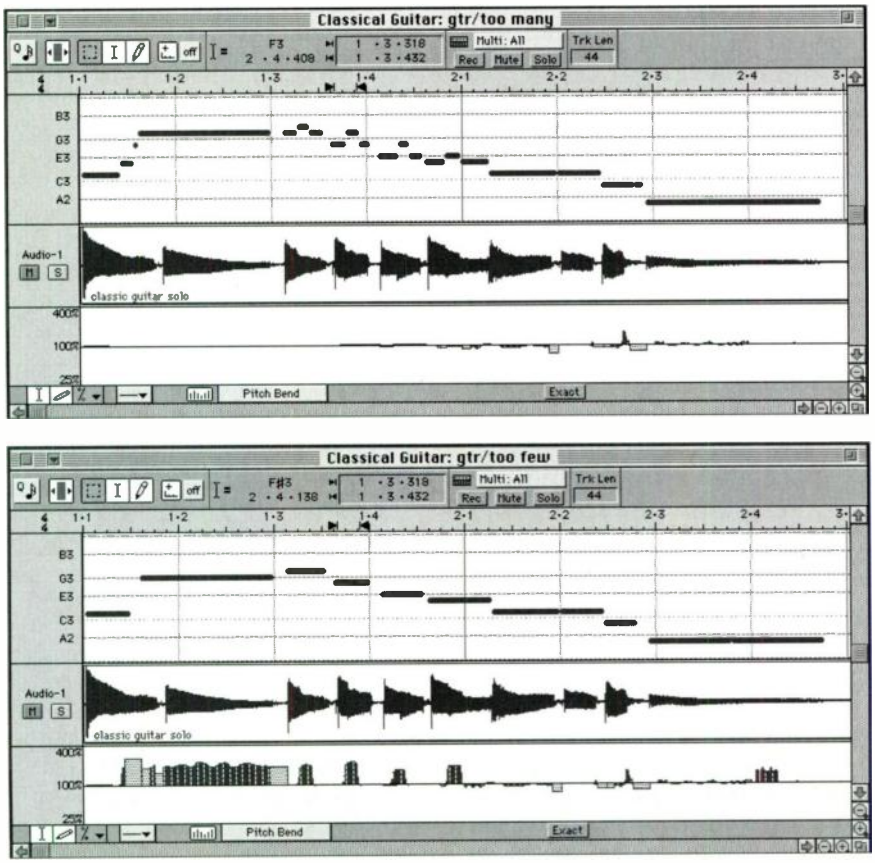
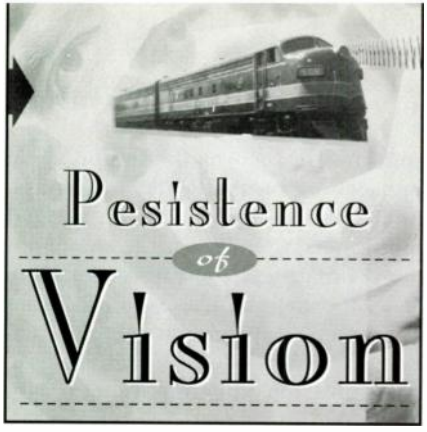


FIG. 4: After the initial Audio-to-MIDI conversion, this guitar solo produced too many separate notes and almost no Pitch Bend (top). After resetting some of the parameters in the dialog box, hammer-ons are properly interpreted as Pitch Bend (bottom).



Adjust Audio Tempo from the DSP menu, select Tempo Map in the dialog box, and *voilà:* the MIDI and audio steadily slow down together.

AUDIO-TO-MIDI

Studio Vision Pro's Audio-to-MIDI and MIDI-to-Audio DSP routines have garnered so much media attention that many users expect them to work like lucky charms. Wrong! These features work best when you tell them as much as possible about the audio they're working on.

Consider what happens when you apply Audio-to-MIDI to an audio region. The process starts with a complete analysis of a monophonic audio file; using a Fast Fourier Transform, the routine documents the energy of all partials over time. The resulting data is converted to relevant MIDI information.

For example, if the software determines that the fundamental pitch of a moment of audio is 440 Hz, it produces a MIDI note at a pitch of A3. If the fundamental pitch varies, either Pitch Bend data or another note is produced. If the volume changes, the routine produces a stream of Control Change 7 (Volume) values. If the timbre changes, CC data to control a filter is produced, and the CC number is user-selectable.

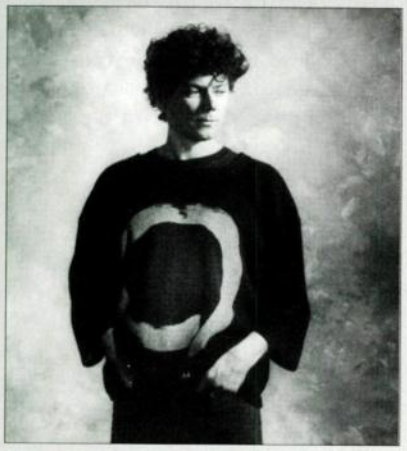
Select a region of monophonic audio in the graphic editing window, and choose Audio-to-MIDI from the DSP menu. A dialog box appears (see **Fig. 3**), offering a host of instrument templates and performance parameters. Because the harmonic structure of each instrument is different, the templates contain data that helps the computer track the fundamental pitch properly. *Studio Vision Pro* includes many templates, and you can develop and save custom settings for instruments or voices that you use a lot. These options are found by clicking on the arrow button in the left half of the Audio-to-MIDI dialog box title bar.

After selecting the template with the closest timbral match, you must furnish the computer with specific information about the selected audio data, beginning with the pitch range of the selected segment. For the best results, determine the exact notes played in the segment, and then extend this range by a semitone on each end.

Vocalists presumably sing discrete notes in their heads, but they often produce an endless stream of glissandi (sometimes called "style"), which the

JERRY HARRISON (TALKING HEADS, LIVE, CRASH TEST DUMMIES)

Jerry Harrison uses technology to the limit. He records all his projects to hard disk and 2-inch analog tape simultaneously. Any fixes or improvements can be done in the computer



and transferred back to the analog master without adding tape hiss. Harrison feels this approach takes advantage of analog tape's warmth and a hard-disk recorder's ease of manipulation. Most overdubs are done directly to the computer, after which the best parts of each take are compiled (comped) and transferred to tape.

When recording MIDI, Harrison uses *Studio Vision Pro* to tweak the performance. In the graphic editing window, he combines one or more digital audio tracks (especially rhythmic ones) and then visually aligns the MIDI track against the digital audio peaks. This gives him a "first take" feel for the MIDI tracks, keeping the energy and inventiveness that could be ruined by quantizing.

Here's how Harrison edits MIDI in reference to audio:

• After recording a MIDI track into *Studio Vision Pro* (synched to tape or to Pro Tools software), he imports the corresponding digital audio into the same track. (*Studio Vision Pro* allows both MIDI and audio in one track.)

• In the graphic editing window of the track, he sets the Cursor Quantize value to whole notes and clicks on measure 1 to set the point at which the audio will start. (He makes sure the imported audio tracks start at the beginning of the original Pro Tools session to make it easy to record the MIDI data.) Then, he chooses Import Audio (in the Audio menu) and selects the audio tracks that he wants to edit against.

• After the audio is imported (usually several tracks), he sets the audio instruments by selecting each waveform and choosing Set Instrument (in the Do menu). This assigns the audio tracks to separate audio Instruments, allowing them to be seen and heard independently within the same editing window.

• Then, he adjusts the window display so he can see the waveform and MIDI notes in several bars at a time. He listens to both audio and MIDI and watches the music scroll together. If he hears anything in the MIDI data that doesn't match up with the audio, he edits the MIDI notes, usually after zooming in to see as much detail as possible.

• To check playback, he uses Play Selection (Option-spacebar) to listen to the selected region alone and Play From Selection (Command-spacebar) to listen to the selection and what comes after it.

• Harrison ends the MIDI editing session by recording the MIDI synth's audio output to analog tape for the warmth afforded by the analog medium.

—Paul de Benedictis

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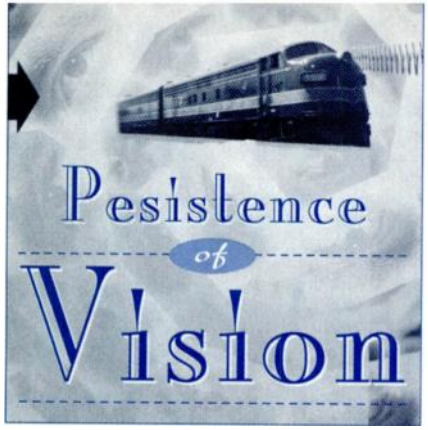


computer analyzes. The parameters under "Generate" in the MIDI side of the dialog box let you select the types of MIDI messages generated by the routine; the parameters under "Create new note if:" in the Audio side of the dialog box specify the conditions under which a new note is generated from the audio region.

If you want to apply the generated MIDI data to a marimba sound, you don't want the pitch to bend up or down, so you need to tell the routine to generate new notes if there is any Pitch Bend (i.e., "Create new notes if Pitch Bend exceeds 0 half steps"). For a bluesy tenor-sax sound, however, you might want to take a different approach. Suppose the audio includes three long, legato notes. The Audio-to-MIDI routine would typically generate three MIDI notes from this region. When these notes are played on a synth, their separate attacks might ruin the legato feeling of the line.

In this case, insert a single MIDI note into the track with a pitch that is in the middle of the audio region's pitch range and a duration that extends the entire length of the region. Then check "Use Selected Notes" in the Audio-to-MIDI dialog, which causes the routine to use the inserted note instead of creating its own note messages. The routine generates Pitch Bend, Volume, and a user-selectable Control Change message as specified in the Generate parameters, which should re-create the effect of three legato notes. In addition, it might be necessary to increase the Pitch Bend range in the synth and the Generate Pitch Bend parameter of the Audio-to-MIDI dialog.

Recently, I processed a classical guitar part with Audio-to-MIDI and found that the resulting MIDI data was a flurry of too many notes; the computer had interpreted every pitch change as a new note, including bends, glisses, and hammer-ons (see **Fig. 4**). By raising the values in the "Note length exceeds" and "Pitch is stable for" fields, I instructed the computer to generate fewer notes and more Pitch Bend, thus producing a more faithful transcription of the guitar part. Increasing the "Pitch Bend exceeds" value might help in certain cases, but it could also make things worse, so work with the other two parameters first.

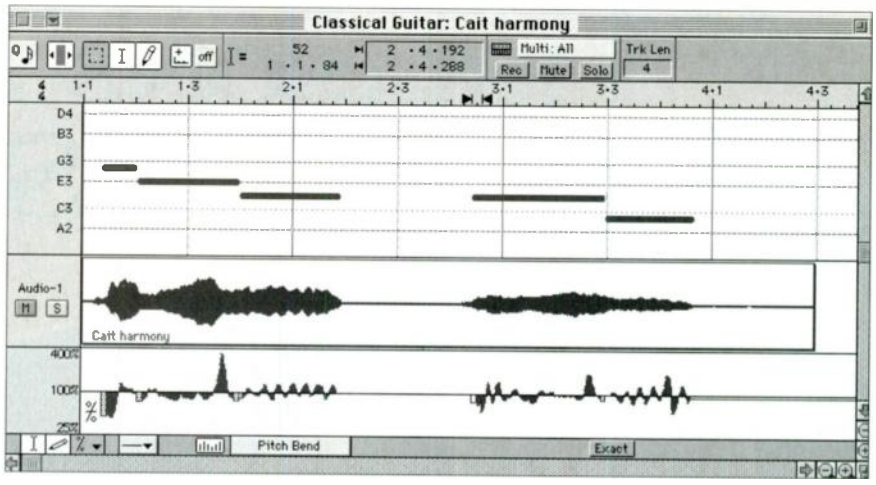
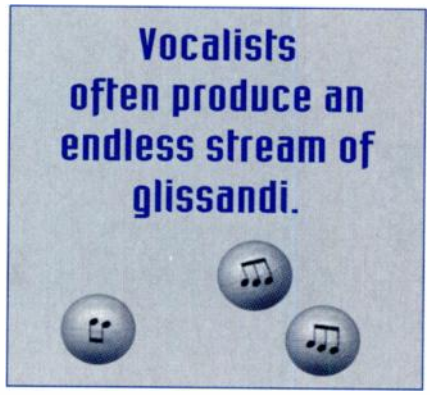


FIG. 5: Once this vocal harmony part has been converted to MIDI, the Scale tool can be used to fix intonation problems, such as the flat note at the beginning.

In some situations, I've found it useful to generate a MIDI part that includes only the main notes of an audio part (using very high values in the "Note length exceeds" and "Pitch is stable for" fields) and then assign that data to a slow synth-pad sound. The result is an instant, ambient MIDI track that supports the melodic audio. Audio-to-MIDI can also be used to transcribe a live performance part into music notation so you can print it out in a scoring program, such as Opcode's *Overture*.



MIDI-TO-AUDIO

Of course, Audio-to-MIDI is only half the trip. The MIDI-to-Audio algorithm uses MIDI editing conventions to modify elements of the audio recording; the MIDI sequencer becomes a front end for digital audio manipulation. The possible applications for this technology are boundless, but the most popular is fixing out-of-tune notes in an otherwise good performance.

Figure 5 shows part of a backing vocal track with its derived MIDI part in the graphic editing window. The first note is quite flat. Many programs let you shift the pitch of audio regions, but the pitch jumps at the end of the selected area, sounding completely unnatural. You can avoid this in *Studio Vision Pro* by softening the negative pitch bend with the Scale Tool so that the natural shape of the glissando is retained.

Focus on the errant pitch by selecting the related Pitch Bend data in the Strip Chart with the Select tool while holding the Option key. The display immediately zooms in so you can see where the Pitch Bend curve returns to zero. Then select the Scale tool (which looks like a percent sign and is located next to the Pencil tool in the lower-left corner of the Strip Chart) and the Flat shape in the pop-up menu to its immediate right. Draw a flat line directly above the Pitch Bend data in question and slightly above the 100% line to reduce the negative Pitch Bend. I do this a little bit at a time, carefully listening to the changes in the MIDI before issuing the MIDI-to-Audio command, which then alters the pitch in that part of the waveform.

You can also harmonize the line by dragging the MIDI notes individually

to new pitches or constraining the notes to a harmony in a particular key and mode. For example, say you are working in B♭ mixolydian and want your harmonies to stay in that mode. First, drag the notes up or down by the desired number of half steps. Then, choose Transpose Selection from the Do menu (Command-T) while the notes are still selected. Specify Key Transpose from B♭ mixolydian to B♭ mixolydian, and make sure the "Constrain to scale" box is checked. This last step will force all selected notes to stay in the right mode. Finally, you should audition the MIDI notes to make sure the harmony works as you expect.

To create a new harmony audio file, you must first make a copy of the original audio data by pressing Command-C (Copy) and then merge the two copies into the same track by pressing Command-M (Merge). Next, press Command-I (Set Instrument), and assign the copy to a different audio Instrument from the original. This Instrument will be shifted in pitch by the MIDI-to-Pitch routine to become the harmony part.

Select everything by pressing Command-A, and then deselect the original audio event by clicking on it in the graphic editing window while holding the Shift key. MIDI-to-Audio pitch-shifts the duplicated event according to the pitches in the harmonized MIDI part. If the two audio parts sound good together, delete the MIDI notes or copy them to another track to double the audio part with a MIDI timbre.

IT'S A WRAP

Studio Vision Pro is designed to serve many different creative processes, so there are often several ways to accomplish the same task. The tips presented here are mainly fast ways to work and techniques that are not completely self-evident.

For beginners and power users alike, my last tip concerns the online help. Even if you think you know everything about *Studio Vision Pro*, the help information almost always furnishes new details, so I highly recommend using it. Try holding down the Command-Option-Shift keys and roving the screen with the wandering question mark. Just clicking on a button, word, or graphic opens a pop-up paragraph outlining relevant operational details. While holding down Command-Option-Shift, pull down any menu and select an item, and a complete description of that item appears.

Studio Vision Pro 3.0 is a lot of things to a lot of musicians, but to me, it is musical first and everything else after. That's why I boot it up when I want to write. That's why it stays up all the way through the mix. And that's why it's the only application that goes to the mountains with me every time.

Gerry Bassermann *is a musician who lives and works in San Francisco. Among his clients is Opcode Systems, for whom he demos* Studio Vision Pro *at trade shows.*

TIPS AND TRICKS

Here are several tips and tricks that make working with *Studio Vision Pro* easier and more efficient.

• Option-click in the title bar of any edit window to open a pop-up list of tracks or sequences. For example, you can quickly switch tracks with the same zoom level and Strip Chart and without having to close and reopen windows.

• Command-Option-click in any window to open a pop-up list of all open windows. You can clutter the screen with windows and still navigate them with ease.

• Option-click a track's length in its editing window to lock it.

• The * key (in the numeric keypad) jumps to the Through Instrument pop-up in the Control Bar, which determines the instrument to which incoming MIDI data will be echoed if Keyboard Thru is enabled. Type the number of the instrument you want and hit Enter to select a different Through Instrument.

• Most dialogs can be moved by Option-clicking in any white space of the dialog window and dragging it to the desired location.

• In most dialogs with pop-up menus, you can choose an item from a pop-up list by typing its number in the list. In the Modify Notes dialog, for example, hit the right arrow key to select the first pop-up, and press 2 to change from Set to Scale.

• The + and - keys increment and decrement values in any field in dialog boxes or edit windows.

• Click on multiple selector dots in the Track Overview window and then click on the mute or solo button at the top of the track list to toggle the mute or solo status of all the selected tracks.

• In the graphic editing window, you can scale time by moving the bar lines. To do this, you simply Option-click and drag the bar lines in the ruler.

• Double-clicking on any icon in the Control Bar opens the corresponding edit window. For example, if you double-click on the metronome, the current sequence's tempo track will open.

• Option-Z zooms the current window so that the entire contents fit in the window.

• Double-clicking a block or phrase in the Track Overview opens the graphic editing window whereas Option-double-clicking opens the List Edit window.

• The Copy Patches command (in the Do menu) takes a snapshot of the current instruments and patches so that you can paste them into a track as a setup.

• The Copy Faders command (in the Do menu) takes a snapshot of the current faders so you can paste them into a setup track.

• The Cursor Quantize value can be set differently for the Track Overview and Graphic/Notation windows. (The default value is the same for both of these windows.)

• To automate mutes, solos, and other edits (e.g., transpose), turn on Real Time Capture (in the Options menu), record-enable a track in another sequence, choose Wait for Note mode in the Control Bar, hit Record, and press the letter of the sequence. When you open that sequence and edit anything, all your activities will be captured while recording.

—Tim Self

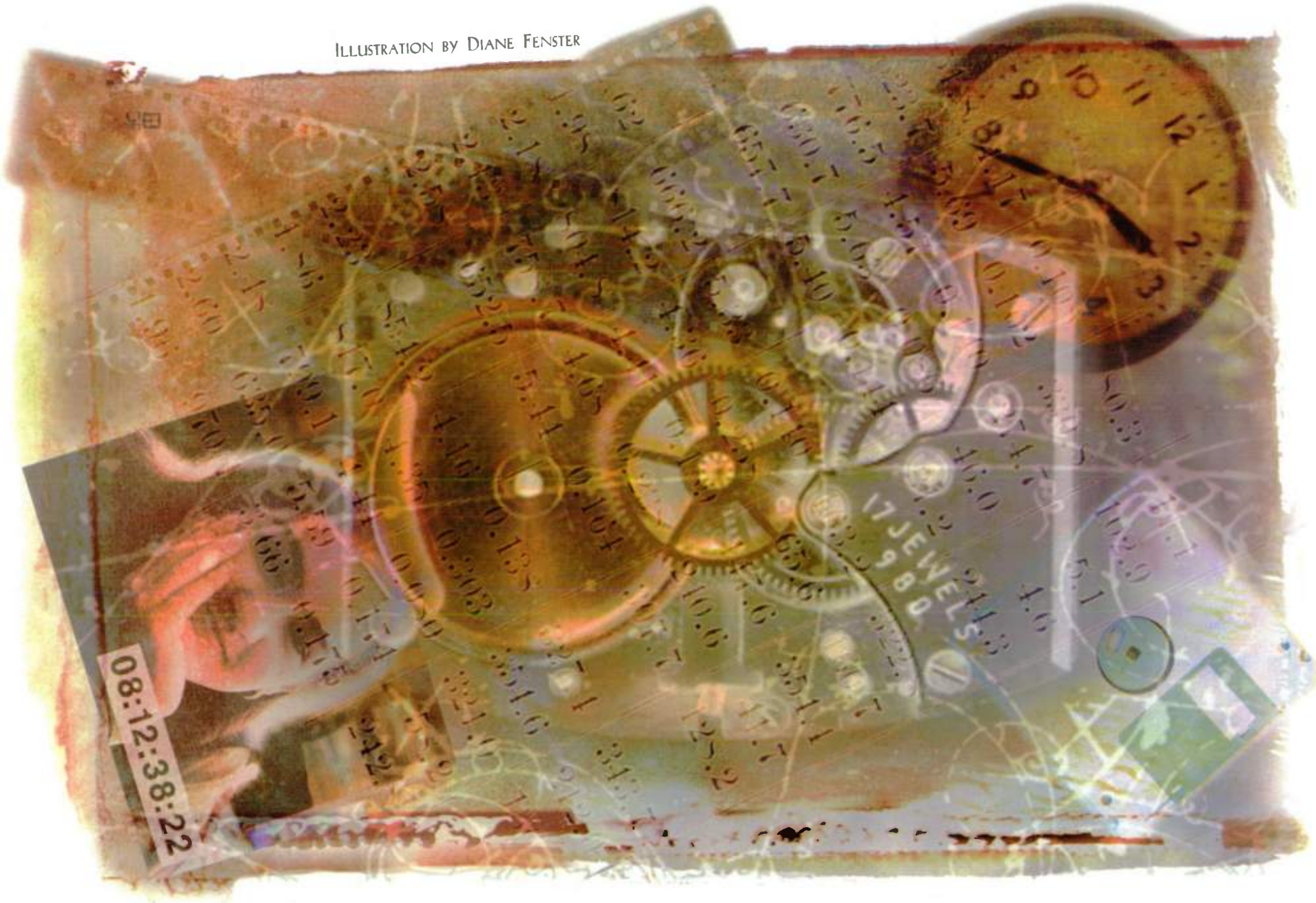
Don't let a flimsy grasp of time code scuttle your music projects.

THAT SYNCHING FEELING

You've worked day and night for the past two weeks, composing a music score for a film project that could really make your career. You've paid meticulous attention to scene transitions and sound effects while reviewing your VHS work tape, and now your music fits the picture with absolute precision. But the director has unexpectedly appeared at the editing facility to see the finished music synchronized to film. Suddenly, your music cues are a little off the mark, and the climactic explosion is two seconds early. Everyone is glaring at you. You have blown it. Big time.

Just before you run screaming out of the editing suite, you awaken and realize it was all just a bad dream. But unfortunately, the dream *could* be a prophecy. At some point in your career, a synchronization issue may arise that could determine the ultimate success or failure of a project. Luckily, a complete understanding of time code can prevent this nightmare from becoming a reality. Time code can be extremely confusing—and many manufacturers still don't fully get it, either—so let's clear the air on some common misunderstandings about synchronization and SMPTE time code.

By Rob Shrock



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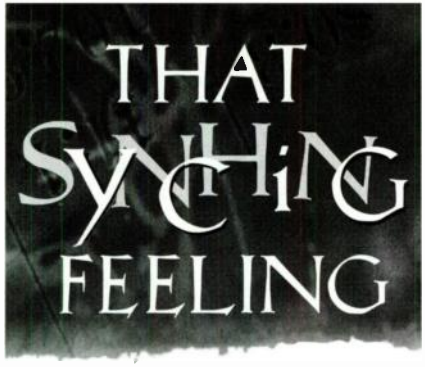

A HISTORY OF TIME CODE

Time code was originally developed by the U.S. military to synchronize missile test-firings in the early 1950s. A system was designed that divided each second into segments or frames—typically 10, 30, 60, or more per second. The code was transmitted in the form of a modulating audio tone (similar to the sound of a modem) to devices that could interpret the incoming data and trigger simultaneous launches.

Eventually, a 30 frames-per-second (fps) time-code standard emerged. This time-code standard was based on the then-current television-field rate, which was half the stable—and commonly available—U.S. wall current of 60 Hz AC. In 1981, the Society of Motion Picture and Television Engineers, or SMPTE, officially defined and adopted the 30 fps standard for synchronizing various film, television, and audio elements. A 1986 revision to the standard, now commonly referred to as SMPTE, refined the code so that each of the 30 frames includes a "digital word" containing 80 bits of data that allow information such as tape location, reel number, and session dates to be stored and recalled.

Time code provides us with a program's vital location and timing information and is expressed as hours, minutes, seconds, frames, and sometimes subframes. (Occasionally, subframes will be displayed in a computer sequencer, but video and television are synchronized only to the nearest frame.) A typical time-code location appears as 01:17:45:12 (one hour, seventeen minutes, 45 seconds, and twelve frames). If subframes are indicated, they are designated by a period and a two-digit number following the frames (01:17:45:12.67 indicates twelve frames and 67 subframes).

TIME-CODE FORMS

Time code is transformed into different forms for different applications, but each form adheres to the same basic rules of counting time. Therefore, each form is compatible with the others for synchronization purposes as long as the proper translation hardware is connected. Longitudinal Time Code (LTC) is the code that a MIDI interface or time-code generator spits out of its SMPTE output jack. It is characterized by an audible, warbling tone. LTC is used when you want to stripe a tape with time code and then feed it back into your MIDI interface for locking your sequencer to an audio or video recorder. You can also use LTC to print time code onto the linear audio portion of a videotape. However, most broadcast devices and digital multitrack decks have a dedicated address track that outputs LTC and saves you from sacrificing an audio track for time code.

If you are dealing strictly with audio recording and will not be synching to video, you will probably only need to know about LTC and MIDI Time Code (MTC). MTC is generated from a MIDI device using a selected master time base (internal reference, incoming SMPTE code, etc.) that is transformed into timing data, which can then be transmitted through a MIDI cable. (MIDI cannot transmit audio signals, so LTC is not suitable for MIDI applications.) This data carries all the same relevant information about the current hour, minute, second, and frame location that LTC does, but it does so in a form that is recognizable to a MIDI device.

A third form of code is Vertical Interval Time Code (VITC). This form of time code is actually burned into the image frames of a videotape (see the sidebar "Video Basics"). VITC must be recorded onto the videotape dub simultaneously with the video image. Unlike LTC, which can be laid to an audio track at any time, VITC cannot be dubbed in at a later date.

However, integrating time code into the video signal has several distinct advantages over LTC, because VITC does not require that you use an audio track on your recorder or VTR to store the code. Also, VITC can show—through a *window burn* time-code display recorded directly onto the videotape—the exact time-code location of a single video frame. This means that you can still read location numbers when the video is paused or when you are scrolling through a scene. Because VITC is perfectly synchronized to video images, it is the preferred source of code when scoring to picture, even though it is often converted to LTC and MTC for use by the composer or sound designer.

TIME-CODE RATES

A lot of confusion with time code originates from a lack of understanding of this fundamental rule: time-code rate and type are independent of each other. Learn this, and don't ever forget it. Go back and read it again. You must know the difference between time-code rates and types and how to effectively communicate this information when working with others.

The rate of time code refers to the speed of the code or how many frames

VIDEO BASICS

Wait a minute, how can you have time code mixed in with a video picture? Actually, it's not hard at all. A video image consists of individual frames, or pictures, strung together and played sequentially at a specific rate. A video frame in the NTSC standard (used in the U.S. and Japan) consists of 525 horizontal lines of colored dots created by an electron beam, or *cathode ray*, scanning across a picture tube. It takes two scans to create a frame. The beam draws the odd-numbered lines first and then momentarily blanks out while it moves into position to begin drawing the even-numbered lines. Each of these half-images is called a field.

The time between the two fields, as the beam is blanked out and moving back into position, is called the *vertical blanking interval*. This interval stores timing messages that keep the two interlaced video fields in sync. It also serves as a place to store the VITC (Vertical Interval Time Code) form of time code. Thus, VITC is buried between the two fields of the video frames and remains perfectly in sync with the picture.

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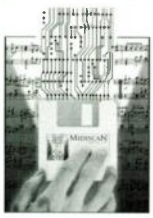

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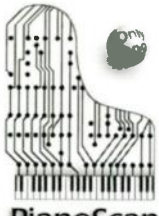

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pass within a second of real time. There are only four rates (speeds) of time code: 30, 29.97, 25, and 24 frames per second. Almost all music-only productions—as well as some film-scoring projects—in the United States and Japan employ 30 fps code.

Way back in the days of black-and-white broadcasts, North American television ran at exactly 30 fps. After color TV was introduced in the 1950s, however, 30 fps was replaced by the slightly slower 29.97 fps rate. At the risk of oversimplification, this 0.1% speed modification allowed for easier color synching of new programs as well as the reproduction of older, black-and-white programs. Today, all U.S. television and videotape equipment, without exception, runs at 29.97 fps.

The speed of time code in Europe (called EBU time code, after the European Broadcasting Union) is exactly 25 fps because European video and television runs at exactly 25 fps, making broadcast-time calculations based on time-code information very easy.

The speed of motion picture film is usually 24 fps; film shot at either 24 or 30 fps is necessarily "pulled down," or slowed, to 23.976 or 29.97 fps respectively when transferred to videotape. Most film composers work from a videotape running at 29.97. The only exception to this is if you happen to be one of the few composers who still scores to the actual film stock.

TIME-CODE TYPES

If you work primarily in North America or Japan, there are two practical time-code rates: 30 fps and 29.97 fps. So what's the difference again? Remember that 29.97 fps code runs through frames at a slightly slower speed than 30 fps code. What does that have to do with time-code type? Well, one of the advantages of having a whole number of frames pass in a second, as with 30 fps or 25 fps code, is the ability to use the SMPTE counter as a measure of actual running time (also referred to as wall-clock time).

For example, at a rate of 30 fps, if a program starts at 01:00:00:00 (one hour) and ends at 01:01:00:00 (one hour, one minute) on the SMPTE display, the duration of the program is

SMPTE DO'S AND DON'TS

- Do use the shortest, most stable signal path to and from the time-code source when you are generating or reading code.
- Do use an outside track for recording time code to analog tape and, if possible, leave an empty adjacent "guard" track between the code and your music tracks.
- Do keep the time-code recording level just hot enough to provide a stable sync source without bleeding onto the other tracks. (Between -10 and -3 on the VU meter is typically a good range for analog recorders.)
- Do stripe a tape in its entirety; don't interrupt the process.
- Do resolve all your devices to video-referenced time code when scoring to picture.
- Do provide yourself with at least ten seconds of preroll before your program starts. (Fifteen seconds is even better.)
- Do notate your SMPTE rate, type, and offset in your sequence, and clearly label all tape boxes and track sheets accordingly.
- Do regenerate code when making analog transfers. In fact, always regenerate code instead of restriping.
- Don't change code settings once you've begun a project. Stick with one setting from beginning to end.
- Don't restripe code unless you know what you are doing.
- Don't freewheel or jam-sync unless it is the only alternative.
- Don't refer to code simply as "drop" or "nondrop." Such designations can lead to confusion due to the fact that 30 fps and 29.97 fps code can exist in both forms, and all of these types are different.

also exactly one minute long by the clock on the wall. However, with a time-code speed of 29.97 fps, when the elapsed wall-clock time is exactly one minute, the SMPTE display will read 00:00:59:28 (i.e., 59 seconds and 28 frames). And after one hour of real time, the SMPTE display will read 00:59:56:12, or 108 frames short of one complete hour. Obviously, a 29.97 fps rate can be problematic for broadcasters, who require *exact* program length information for precision timing of television commercials that are billed out by the second.

To reconcile the discrepancy between 30 fps and 29.97 fps in regard to wall-clock time, drop-frame code (or compensated-mode time code) was developed. Basically, drop-frame code recounts frames to allow the 29.97 rate to "make up" the 108 frames it falls behind in every hour of real time. This feat is accomplished by skipping the two frames numbered :00 and :01 at every one-minute interval, *except* for the intervals that fall every ten minutes. (No actual video frames are omitted; the numbers used to identify each frame are simply altered.)

Using a 29.97 drop-frame rate, simply referred to as "29.97 drop" or "29.97d," means that the SMPTE display will be a near-accurate running record of the actual elapsed time. In other words, the time-code display now closely matches the wall clock, and the broadcaster won't have to refund advertising money because the last two seconds of an automobile commercial were clipped off just before the six o'clock news. At most, the 29.97d SMPTE display will be two frames, or 66.73 milliseconds, off from wall-clock time at any given point in a program. However, continuously running drop-frame code drifts two frames per day, and broadcast facilities must recalibrate every few days to maintain accuracy. (If this article were a hypertext document, this is where you would click a button and go to a related article titled "The Zen of Time: What Is a Second, Really?")

Now, here's where it starts to get a little tricky, so listen up. Technically, 30 fps code can also exist as two types: 30 nondrop (30nd) and 30 drop (30d). The easiest time code to work with is 30nd, traditionally called 30 fps with no additional letter designation. With 30 fps, the SMPTE display reflects wall-clock time, making it an industry-preferred choice for music production. However, since television and video equipment do not run at 30 fps, a music bed for video created at this speed will not be in sync with the picture. Sorry.

However, if you are working on a music-only project and will not need your track to synchronize with video at a later date, you are clear to use good old 30 fps code. Your sequencer will happily chase along to whatever code you feed it, and the SMPTE display will neatly match wall-clock time. Also, MIDI-event editing will be easier because you won't have to take into consideration that certain frame numbers are missing in the event list, as with 29.97d code.

A rare and mysterious code, not part of the SMPTE standard, is true 30d, running at exactly 30 frames every second and employing the same scheme of skipping frame numbers as 29.97d. You'll probably never encounter this type of code, as it has little use in the post-production or music worlds.

WARNING! WARNING!

A nagging problem within the time-code community is the unintentional misnaming of the various codes. For instance, the term "30 drop," or simply "drop," is sometimes used when someone is actually referring to 29.97d. Erroneous time-code designations are occasionally propagated by manufacturers who fail to fully understand the distinctions themselves—or at least don't always make the differences clear in their devices and manuals. The *MTP Console* software for Mark of the Unicorn's MIDI Time Piece II, for example, offers four choices for time-code generation: 30, Drop, 25, and 24. It is not made clear what "Drop" is in this context. A call to MOTU verified that it is 29.97d code and also revealed there is no choice between drop and nondrop generation at 29.97 fps.

The user manual for Roland's DM-800, although correctly listing the four available code versions of 30 fps and 29.97 fps (drop and nondrop), *incorrectly* names the 29.97 types as "30DF" and "30ND," which is the same identification given to the 30 fps codes. In other words, four different time-code versions are sharing two names. However, Roland does state that the 30DF version of 30 fps is "usually generated only by mistake." Thanks, Roland, for the

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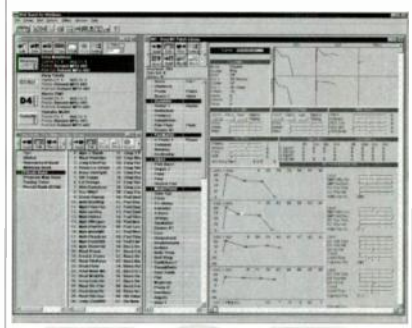

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clarification—and manufacturers wonder why users are confused!

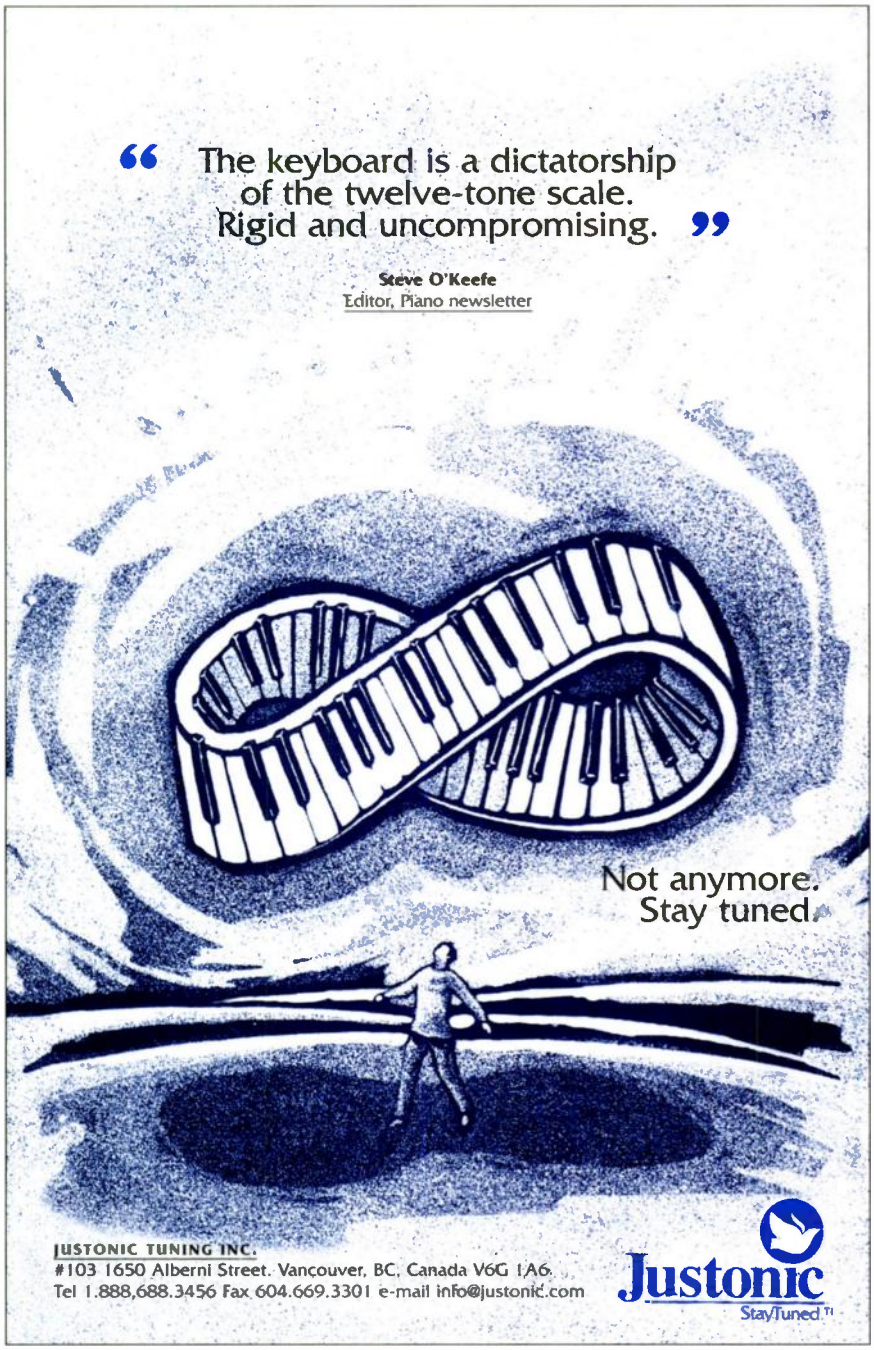
To confuse matters even further, Emagic's *Logic* offers the seemingly useless and problematic option of 30d code. After getting conflicting stories from Emagic, I was finally told that *Logic*'s European programmers, being more familiar with EBU code than SMPTE, simply made all combinations of time-code rate and type available.

In addition, *Logic* includes an auto-detection mode that attempts to identify the rate and type of incoming time code. This feature should not be trusted. On one occasion, *Logic* told me that incoming LTC from a videotape (29.97 fps, without question) was running at 30 fps. Wrong. The potential for incorrect readings is great, especially if the master device is an analog recorder (almost all analog recorders suffer from transport-speed inconsistencies). Fortunately, *Logic*'s auto-detect feature can be deactivated.

Sometimes, a timing problem can be traced to the fact that all SMPTE generators are not created equal. Some MIDI interfaces, for example, should not be relied upon as stable sources of time code. They're just not designed for it. Put your trust in video-referenced devices from companies such as Adams-Smith, TimeLine, and Horita or the code generated from MDM address tracks.

You should also be aware that there can be subtle differences between the internal clock speeds of time-code generators and computers. A case in point: if you have ever worked with drum loops, you know how tedious it can be to get a loop to retrigger smoothly and musically so that the loop grooves with the time center of the sequencer. Unfortunately, if you attempt to lock your sequence to questionable time code (from an unstable generator, playback from an analog recorder, etc.), your loop may cease to retrigger correctly. This frustrating glitch occurs because the new master time base is not the same as the internal clock of the computer that you were referenced to when you fiddled with your drum loops.

Could the internal clock of the computer be slightly unstable? That's a possiblity, too. I once had to make a change of approximately 0.4 bpm in my sequence tempo to get a loop to play correctly if I first tweaked out the



RESOURCES

SMPTE Made Simple: A Time Code Tutor
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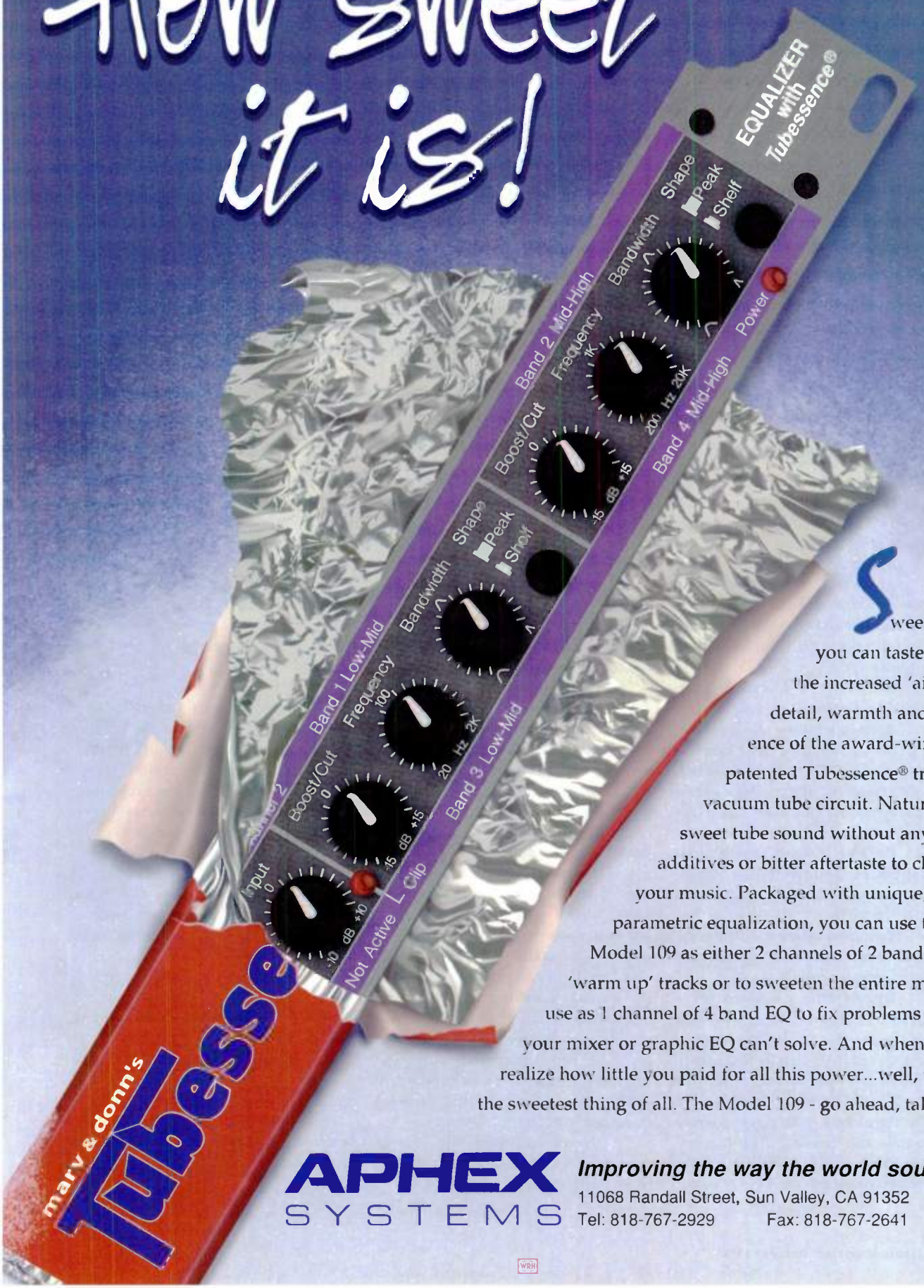

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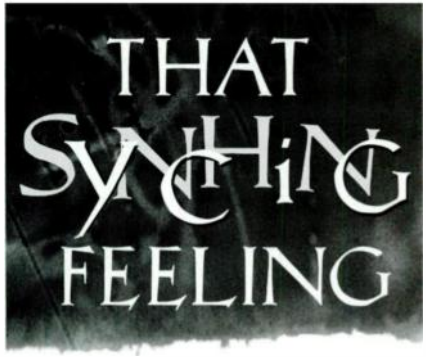

loop in my computer and later locked it to time code generated by my MTP II.

PROBLEM SOLVERS

But don't let these horror stories frighten you. Here are some guidelines that can sort out most of the potential code problems you'll encounter.

For starters, always use the originating time code as the master code for every device you want to synchronize. Remember the drum-loop problem? The work-around for that situation is to tweak your loop while the computer is chasing the time code from the recorder, VTR, or synchronizer that will be your master time base, instead of relying on the internal clock of the computer. This is called *resolving to the common reference.*

When a device is resolved, it will speed up or slow down to follow *exactly* the time code being referenced. It doesn't matter whether you are trying to get a loop to groove to tape or match a music score to the designated hit points on a video dub. If you resolve your devices to the same master time-code source, you will eliminate most synchronization problems.

For example, if you stripe a 24-track, analog tape with 30nd code from an Opcode Studio 4 interface, always use *that* code for the rest of the project. It doesn't really matter whether the MIDI interface generated code a little fast or slow or whether the multitrack recorder was running a bit faster than normal. The point is, this code is now the master reference, and every other device must be resolved to it. A slaving device will chase the code exactly as it was originally recorded, minor imperfections and all, and will always be in sync with your master.

If you are going to score music to video, you can use the master time code provided on the videotape, which is called the *house sync*, as your time base. Be sure to let the video-editing house know what type of video format you work with and any preferences you

SYNC TERMS

So confused about time-code issues that you can't even cruise through the terminology? Then use this handy glossary to help bolster your powers of comprehension.

Absolute timing reference The master time code used to indicate tape speed and position as well as to synchronize various types of recorders (see *house sync*).

Black burst A black video signal used as a house sync source.

Burn-in window A visual display of the current time-code location derived from VITC or LTC and embedded into the video image. The window typically appears as a black box in the lower portion of the video screen.

Chasing The act of a recorder or sequencer following—or "chasing"—time-code data to sync with a master machine.

Common reference The master time base; usually a video house sync generator or black burst.

Drop-frame A term for a method of "recounting" individual video frames that allows the elapsed time of the SMPTE display to approximately match elapsed real time. This process, also called *compensated-mode time code*, was developed to reconcile the speed difference between 30 fps and 29.97 fps time code, as related to actual "wall clock" time.

Frame In video or film work, "frame" refers to one of the individual still images played back sequentially between 24 and 30 times per second. In time-code parlance, a frame is a digital word interval corresponding to a single film or video image.

Frame rate The speed at which time code runs (30 fps, 29.97 fps, 25 fps, or 24 fps).

Freewheeling Used to describe a device that is running wild after synchronization is lost. This situation is usually caused by a large dropout in time code.

Genlocking The procedure of directly locking time code to the actual picture frames of a videotape for perfect synchronization.

House sync The master time-base reference, usually generated by a video facility, that is used by all slaving devices as the common time-code source. The master time base can also be called the *common reference.*

Jam synching The act of regenerating fresh time code from a synchronizer/generator when the original incoming code experiences a dropout or other damage. The new code is created independently of the original code and is not synchronous.

Nondrop frame Also called *uncompensated-mode time code*, this process numbers each video frame sequentially. However, unlike drop-frame code, the frames are not recounted to match wall-clock time.

Regeneration The act of taking incoming code and creating new time code based exactly on the timing information of the previous code. This procedure is essential when additional code is needed to match the common reference, such as when bouncing code to a new track.

Reshaping The act of regenerating time code to regain the square-wave shape necessary for proper translation of the timing information. Also called *refreshing*, the procedure is often necessary to compensate for signal deterioration when time code is re-recorded in the analog domain.

Resolving The act of controlling the speed of a slave device by continuously comparing and matching the time-code output to the common reference.

Striping The act of recording Longitudinal Time Code (LTC) onto an individual track of a tape recorder from beginning to end.

Video-referenced Refers to a device that is synchronized to the video frame rate.

Wild sync When two devices are running independently at the same time but are not locked together or synchronized.

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may have regarding time-code generation. I typically ask for a Hi-fi VHS tape with time code on the left channels of both the linear tracks *and* the Hi-fi tracks. (Any production audio is recorded onto the right channel of the Hi-fi tracks.) Of course, the type of code (drop or nondrop) being used for the project is usually decided by the director or editor. You already know what the rate will be, right? Ready for a pop quiz?

Once again, it is *critical* that you stick with the common reference to ensure your music will always be in sync with the picture. Let's say that you are given a videotape with 29.97d code on it and are asked to compose a 45-minute score. You set your sequencer to 29.97d, view the burn-in window on the videotape, and note all your hit points. You create a beautiful score, using the time code on the videotape to drive your sequencer while you watch the picture. All of your hits line up and everything is wonderful. Now it's time to record the score to tape.

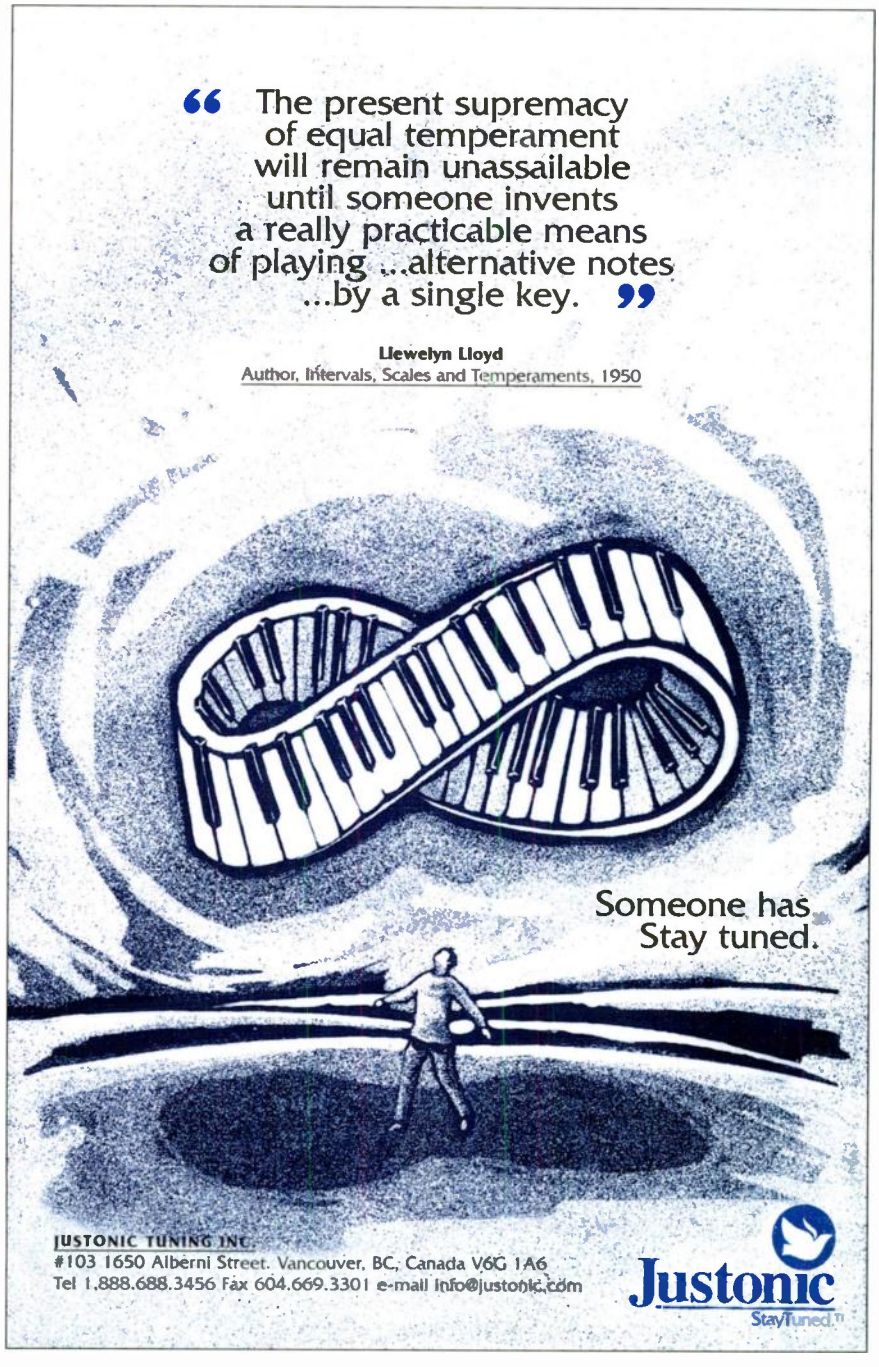
If you mix your score to a time-code DAT machine, you can generate your own code to the multitrack master (or use the address track of an MDM), record the score, and mix—the DAT machine will chase the code from the multitrack. The DAT master can then be resolved easily to the house sync of the picture, and your music will be locked (or *genlocked*) to each exact frame of the videotape.

However, if you mix to a non-time-code DAT, you must resolve the multitrack to video-referenced time code when you mix. This is necessary because your DAT mix will be *freewheeling* when laid back against the picture in the post-production studio. But as long as you are resolved, there will be little noticeable drift between score and picture once you start everything from the right spot (a job for the editing facility). Yet keep in mind that you *are* running wild. It is only the grace of the stable transports of the videotape players, MDMs, and DAT machines that keeps the sound of the slamming door in the right spot as the hero exits to catch the bad guy.

Time code generated by an MDM address track (such as an ADAT with a BRC or a DA-88 with a sync card) is rock-solid because these are video-referenced machines by design. You can use the internal time code from the MDM address track, record your score, and mix it to non-time-code DAT with excellent results.

A solid, clean source of time code is essential for keeping everything in sync throughout a project. If you wish to transfer house sync from a videotape's linear track to an analog multitrack, it is likely the code will need to be *reshaped*. This process ensures that the code will be in the best possible condition when re-recorded, and can be read properly later on down the line. Most MIDI interfaces can regenerate house sync from a videotape to provide clean code for your recorder.

So, what happens if you suspect that the time code has gone bad halfway through your project? Should you just restripe the tape with fresh code and



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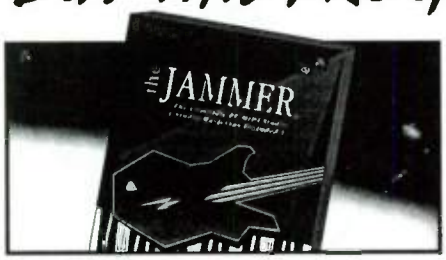

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find new offsets? No! Don't *ever* restripe tape once you have begun a project. (That is, unless you never want to be in sync with it again.)

When code is not being read properly, it is often due to playback problems with the tape deck rather than a problem with the original recording of the code. Checking cable connections and playback levels, cleaning the heads, or adjusting the tape bias usually solves the problem. Occasionally, a touch of equalization can render the code readable again. However, if equalization seems to be the only fix, it is a good idea to go ahead and regenerate fresh code to a new track. By regenerating the code, all the original timing information will remain intact and match the tracks you have already committed to tape.

If you are using an MDM (not deriving time code from the address track) and you experience a lot of dropouts, digitally clone the tape as soon as possible. During cloning, the error-correction process should restore the code to its original condition. If dropouts persist, you should try playing the tape in another machine. Swapping decks often buys you that one "perfect" playback that will produce an uncompromised clone.

LOCK IT UP

Time code can be frustrating and confusing to deal with, but it is also an immensely helpful ally. The more you understand it, the better it can serve you. If you have questions, don't hesitate to ask some accessible audio engineers or video editors for advice and insight. They are usually happy to offer assistance, as long as they know you have a grasp of the basics. So spread the knowledge around. Here's to living in sync!

Composer/producer **Rob Shrock** *'s original score for Texas Instruments recently won the Telecommunicator's Corporate Film Image award. However, his greatest joy is being in sync with his wife, Lori. Special thanks to David Crigger and John Johns.*

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3-Band "British" EQ with swept mid
3 Auxiliaries configurable 2 x Pre/1 x Post or 1 x Pre/2 x Post
Channel "ON" switch
MIX/SUB routing switch
Full 100mm fader
PFL

STEREO INPUTS

13, 14, 17 & 18: simple phono inputs with level and MIX/SUB routing

15, 16, 19 & 20: Balanced jack inputs with Gain, 2 band EQ, Aux levels, Channel "ON", MIX/SUB routing, 100mm fader and PFL

APPLICATIONS

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STUDIO RECORDING
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SUBMIXING

LOCATION SOUND

TYPICAL SPECIFICATIONS

Mic EIN	-129dBu
Crosstalk (1kHz):	
Channel Mute	<95dB
Fader Cutoff	<90dB
Frequency Response (20Hz to 30kHz)	<1dB
THD	<0.006%

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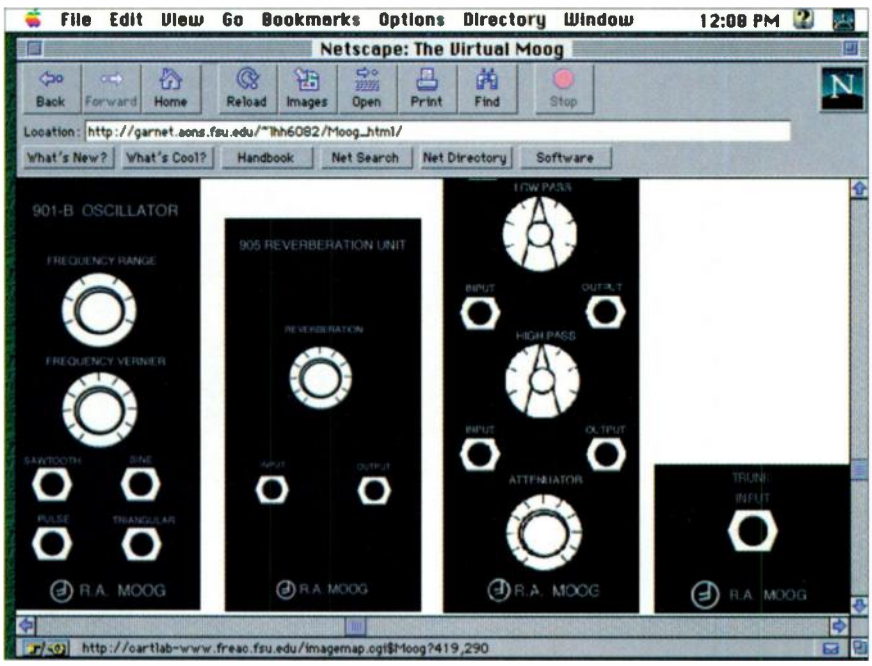
Site Seeing

Hop on EM's virtual tour bus and enjoy the view!

By Jennifer Conrad Seidel

The Web is bursting with great sites, and we've singled out a few more this month for your viewing pleasure. Skip over the hundreds of links that your search engine generates when you enter the keyword *music*, and head right to where the action is. These sites are full of practical resources for musicians and recordists. (Addresses for the sites mentioned here are given in the sidebar, "Map of the Stars' Homes.") Once you know what's out there, you'll be starting conversations with your next-door neighbor with phrases like "Seen that cool Web site?"

Many of these Web sites are user supported. For example, a few of the sites mentioned are set up for sharing price information on new and used gear. The information on these sites is contributed by people like you, so do your democratic duty and throw in your two cents. It's easier than jury duty!



Patch and play at the Virtual Moog site. Just use your mouse to make your patch connections, and enjoy your cybersounds!

BET YOUR BOTTOM DOLLAR

You already spend a lot of time swapping stories with your friends about the great deals you saw advertised for the latest piece of hip gear. (Maybe you even attend a weekly support group for gearheads.) Well, you'll be glad to hear about a few Web sites that facilitate comparison shopping for new and used gear. Buyers share information on how much they paid for a piece of equipment, and that information is posted on the Web sites for other people to see. Prices seem to vary according to region and retailer.

USA New Gear Price List. This site, which has sacrificed beauty for practicality, bills itself as "a compilation of market prices for electronic music and pro audio equipment." (Software isn't included here because it is covered by other sites.) There are literally hundreds, if not thousands, of listings given.

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GM/SMF Support

Disk Drive

4 Outputs

How often have you had a great inspiration that somehow got lost on its way to the sequencer? Meet the MR-61 and MR-76, two new keyboards designed for the songwriter in all of us.

Capture your inspiration here.

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Here's your drummer,

complete with 8 variations and 8 fills. Load in new rhythms from disk, creatively exploring how the patterns can change by trying different drum kits.

Use the Drum Machine on your live gigs, or to jam with to find your next inspiration. When you use it together with the Idea Pad, all of your Drum Machine activity is captured as well!

Send your ideas on to the 16-track sequencer to develop them further.

Arrange it here.

The Song Editor gives you a natural, easy-to-use interface for arranging your sequences into songs. Make a playlist by choosing the order of your sections. Trying a new arrangement is as easy as A, B, C, (or A, C, C, B, D, or A, D, C, B, E, ...).

Mix it here.

The FX / Mixdown strip gives you direct access to each of the effects sections – reverb, chorus, and any of the 40 insert effects. Plus control over panning, volume, solo, and muting – use it just like a mixing board.

Here are your expansion options.

The MR Series have 3 expansion slots, which can hold either wave expansion or Flash memory for loading samples. Expand your wave ROM with up to 24 MB per board, or add 4 MB of sample memory per board, in any combination you need.

We wanted these great new concepts to be easy to use, so we put all the right controls on the front panel. Arranged in sensible groups so you don't waste time searching through complex menus.

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- ☐ DP/2 effects processor

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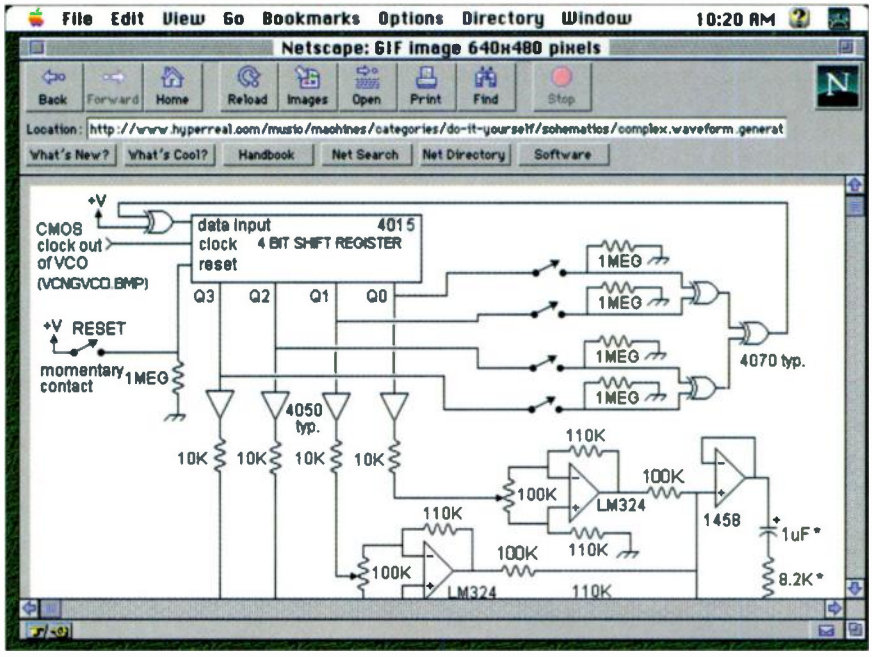

This schematic for a complex waveform generator can be found at the Music Machines Web site.

Some products have only one price posted; others have several. Contributors post prices that they have seen advertised, been quoted over the telephone, or paid themselves. Posts are submitted via e-mail.

The site is an effort to empower prospective buyers with what Casey Palowitch, the site's facilitator, calls "consumer-oriented market research." As he concedes, prices fluctuate, so keeping a list is like trying to "hit a moving target," but even having ballpark figures is better than shooting in the dark.

Entries contain the following data: brand, model, price, dealer, and date posted. (Dealers' names are coded according to a key and listed at the end of the page with their phone numbers and links, when available.) A few entries have links to product reviews or descriptions submitted by Palowitch or a contributor; there are also links to official and unofficial product pages. A link for Digidesign's Audiomedia II card brought up the correspondence between a customer and someone at Digidesign.

Neil Bradley's Used Gear Price List. The price information for this list is gleaned from the rec.music.makers.marketplace newsgroup and is organized on this site by manufacturer and product. If you don't want to do a lot of pointing and clicking, you can download the entire list via FTP. As Bradley emphasizes (with blinking type) on his site, these are not advertisements for used gear. (You can find those on other Web pages.)

When you select a link to one of the more than 200 manufacturers listed, you jump to a page that lists prices (low, high, and average) for various products. Some products have only been mentioned once, so the high and low prices are the same. Other products have been listed several times, so the price range is greater and a more accurate average price can be determined. If you want to see more than just these general prices, you can scroll down the page and look at all of the prices posted for a product. The entries also tell you the dates of the first and last post, which helps you make allowances for how dated an entry is.

SERIOUS SITES

The following two sites are model Web citizens. They do what they do comprehensively—and when you're spending time on the Web, you want it all on one plate. The first is a great place for musicians of any persuasion to hang out; the second is a special site for those with an affection for electronic music.

Harmony Central. If you're trying to find a link to a page you didn't bookmark and can't pull up on your search engine, try starting at Scott Lehman's Harmony Central site. Its greatest strength is its exhaustive collection of links, and its next greatest strength is its organization. If you start here, chances are that you'll find what you're looking for (if not something better) within minutes.

It would be faster to list the things this site *doesn't* have than to list what it does have, but I'll try to give you an idea of the variety of stuff that's here: links for downloading demo versions of shareware and commercial software; an entry to the On-Line Guitar Archive (OLGA) database, which has tablature and chords for thousands of songs; links to user forums on specific products, MIDI, effects processing, etc.; access to listings of stolen gear; and documents for registering your music with the U.S. Copyright Office. Phew!

Music Machines. Have you ever wanted images, descriptions, reviews, schematics, do-it-yourself tips, price lists, and general discussions about using electronic musical equipment? Well, here they are.

Do-it-yourselfers will love the schematics for and discussions about DIY projects. You'll also find samples, specs, and price lists for instruments like the Linn Drum and the Minimoog and more than a dozen links to theremin-related sites. And on the not-so-practical side, there are pictures of these beauties for your scrapbook or your home page.

MAP OF THE STARS' HOMES

Harmony Central
http://www.harmony-central.com
Music Machines
http://www.hyperreal.com/music/machines
Neil Bradley's Used Gear Price List
http://www.synthcom.com/cgi-bin/gear
Netscape Inline Plug-Ins
http://home.netscape.com/comprod/products/navigator/version_2.0/plugins/index.html
Real Audio Player
http://www.realaudio.com/products/player2.0.html
USA New Gear Price List
http://www.princeton.edu/~casey/newgear.html
The Virtual Moog
http://garnet.acns.fsu.edu/~lhh6082/Moog_html

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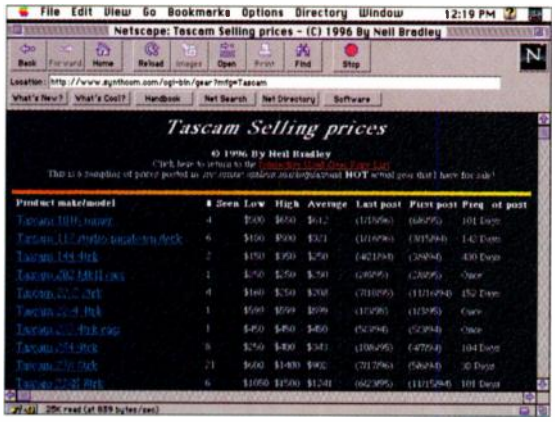
PLUGGIN' IN

If you're still looking for software to make Web surfing more of a joy and less of a chore, you may want to try out a few popular programs for real-time online audio and video. (This isn't a review of these products; we're just telling you where to get them so you can try them out.)



Here's a peek at the prices for used TASCAM gear from Neil Bradley's Used Gear Price List. Note that prices for 21 TASCAM 238s were posted, ranging from as low as $600 to as high as $1,400.

Real Audio Player. You've probably already heard or read about Progressive Networks' *RealAudio Player,* which lets you listen to RealAudio-formatted audio files at the click of your mouse. You can treat the file like a CD—rewinding, fast-forwarding, etc., as you please. *RealAudio Player* has been used to facilitate a few "cybercasts" (concerts and other live events broadcast over the Internet in real time). *RealAudio Player* is available for Windows, Mac, and UNIX operating systems.

It's very easy to download a freeware version of *RealAudio Player* from this site; *RealAudio Player Standard Edition* can be purchased for $29. *RealAudio Player* still has some bugs, which is why Progressive Networks has provided an extensive collection of FAQs (frequently asked questions) at their site. The site also has instructions for linking RealAudio files to your own Web site.

Netscape Inline Plug-Ins. A number of plug-ins that bring you real-time audio and video have been developed for use with Netscape's *Navigator* 2.0. Netscape has a page with product descriptions and links for these products at their Inline Plug-Ins page. Some companies let you download demo versions of their plug-ins from their sites.

NEXT EXIT

Before you hop back on the virtual tour bus and head for home, take a few more minutes to check out the Virtual Moog page, Lorri Hayne's patch-and-play modular Moog. All you need is a sound application to make cybermusic at this fun page. (You may want to wait until your boss is at lunch to try this, though.)

We're always looking for input from those of you who use resources you've found on the Internet. Let us know what other good sites you've seen lately: send us an e-mail at emeditorial@pan.com with your recommendations.

Jennifer Conrad Seidel, EM's *editorial assistant, loves the fact that she gets paid to browse the Web at work.*

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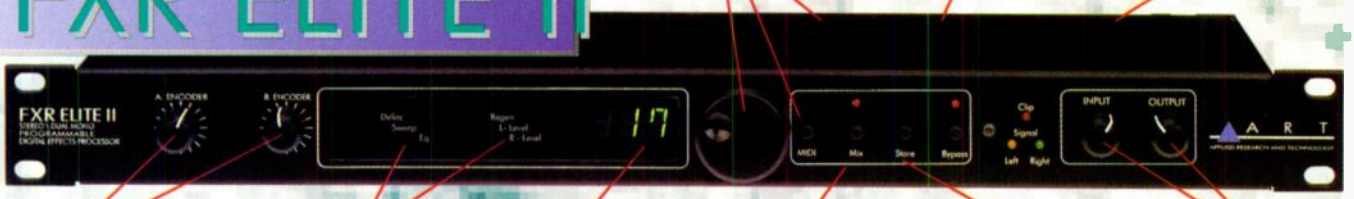

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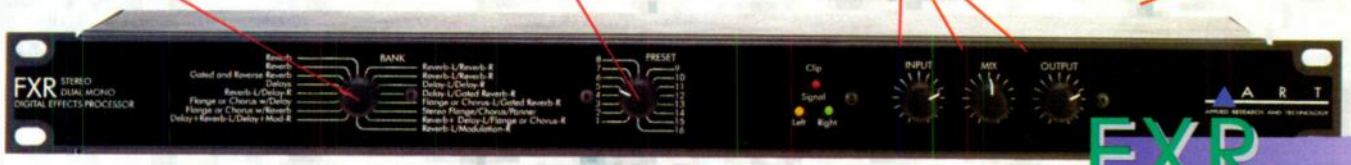
Stereo Inputs and Outputs provide for DUAL PROCESSING



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Entertainment Lawyers

It's better to have one working for you than against you.

By Michael A. Aczon

Over the years, a class of superstars has emerged in the entertainment industry. This elite group, armed with talent, drive, information, and motivation, has virtually taken over the "business" of the music business. Their names do not grace music-awards shows or make the short lists for equipment endorsements. Nevertheless, a Hall of Fame should be built to honor the good ones, and a Hall of Shame should be built to chastise the bad ones. Who are these music-industry superstars? They are entertainment lawyers, those individuals entrusted to navigate their clients—the famous and the not-yet-famous—through the maze of the music industry.

DMITRY PANICH

The role of entertainment lawyers has progressed far beyond litigating courtroom fights on behalf of battling band members. For example, ASCAP Vice Presidents Ron Sobel and Todd Brabec use their legal backgrounds in their pursuit of performance royalties on behalf of ASCAP-affiliated writers and publishers. Clive Davis started out as a lawyer advising CBS in the 1960s and '70s before working his way to his current position as head of Arista Records. Mickey Kantor, former partner of the powerhouse Los Angeles–based entertainment law firm of Manatt, Phelps and Phillips, is now making headlines in his role as U.S. Secretary of Commerce.

The aforementioned individuals might seem removed from the most basic elements of entertainment law, but their accomplishments illustrate how entertainment attorneys can have a far-reaching impact on the music business. Let's take a closer look at the variety of services entertainment lawyers can provide, specifically as they relate to the music industry.

WHAT DO THEY DO?

I consider entertainment lawyers as general practitioners with a specialized clientele: the working musician. Any lawyer representing musicians must have a working knowledge of intellectual property, which is a musician's most valuable asset. This area of expertise

When we designed the PCM 80's basic complement of effects Presets, we also provided the ability to plug in hot, new Audio Software/FX cards. Simply plug in any of our cards and you've now supercharged the effects processor everybody is talking about. New effects and algorithms. Hundreds of stunning new Presets. Sophisticated PC-Card architecture that supports our commitment to functionality and continuing upgradability.

PCM 80 FX cards offer a library of over 700 new Presets — each one tailored for a particular application - with a unique Adjust Knob that lets you quickly audition variations of the effect. We put the most useful parameters of each preset into the PCM 80's "Soft Row" so you can fine tune the Preset without having to hunt for the appropriate parameters. Engineer or musician, there's a Lexicon FX card for practically any imaginable sound. Right now, you can instantly load-up on your creative options with any of these new FX Cards:

- Dual FX — 25 Algorithms / 250 Presets deliver highest quality stereo multi-effects, unprecedented routing capabilities & a powerful new digital sub-mixer.
- Pitch FX — 6 Algorithms / 100 Presets combine Multi-Voice Pitch Shifting with PCM 80 Stereo Algorithms.
- Harmony FX (Coming 1997) — Intelligent Pitch Shift Algorithms / 100 Presets offer Diatonic Harmonization, Automatic Pitch Correction and more.
- Scott Martin Gershin Post FX — 100 superb post-production Presets featuring Surround Delays for Film & Reverbs for Orchestras.
- David Rosenthal Music FX — 100 powerful performance Presets featuring brilliant reverbs & effects for keyboards, guitars, vocals.

And don't forget, you can use any Preset as a template to create your own stunning versions of Lexicon effects - and store up to 2,000 of those Presets using standard PCMCIA SRAM cards.

So check out the PCM 80 FX cards and experience the future today, at your Lexicon dealer!

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DUAL FX - V1.0	250
PITCH FX - V1.0	100
Artist Preset Cards	
Scott Martin Gershin (*Post FX*)	100
David Rosenthal (*Music FX*)	100

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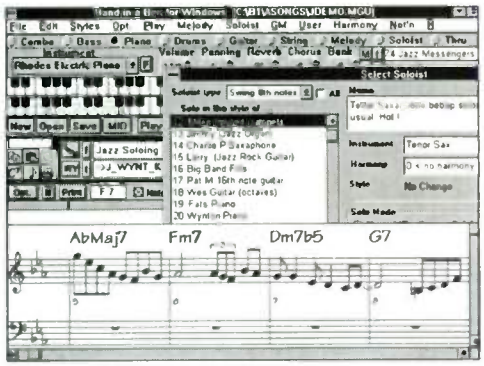
Version 7 for Windows is here. Automatic Accompaniment has arrived!

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



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

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

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"Wow! The soloing sounds amazing... how can it do that?"
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"Another winner – thanks!"
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"Band-in-a-Box is an amazing program"
Keyboard Magazine

"I am in awe. I didn't think that such an incredible program could even exist. This software is a dream come true."
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Band-in-a-Box - PG Music

DownBeat – the #1 Jazz Magazine says...
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Version 7, Styles Disks 1-3, Harmonies Disk 1 + Soloists Disk 1

SUPERPAK *(first time purchase)* $147
The SuperPAK includes Pro version 7, Styles Disks 1-5, Harmonies Disk 1 + Soloists Disk 1

ULTRAPAK *(first time purchase)* $189
The UltraPAK includes Pro version 7, Styles Disks 1-8, Harmonies Disk 1 + Soloists Disk 1

(MACINTOSH Band-in-a-Box available in Version 6; ATARI available only in Version 5)*

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Styles Disk #4 ..... $29
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Styles Disk #7 ..... $29
Styles Disk #8 *(included with Version 7 upgrade)* $29
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Regular Upgrade to Version 7 *(for Windows)* $49
Includes Styles Disk 8 + Soloists Disk 1, Upgrade from Version 6 for Windows

Complete Upgrade to SUPERPAK $69
Includes Regular Upgrade to version 7 + Styles 1-5. Order this if you have an older version of Band-in-a-Box (pre-version 5) or if you are "cross grading" to a different type of computer, or if you do not have Styles Disk 4.

Complete Upgrade to ULTRAPAK $89
Includes SuperPak (above) + Styles 1-8 (these are all the Styles Disks we have made for Band-in-a-Box!)

MEMORY REQUIREMENTS: DOS (640K), Windows (4 mb), Macintosh (4 mb), Atari (1040)

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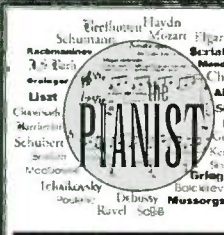

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In versions prior to 3.5, we added major features like music notation, wave files, lyrics, chord symbols & printout. Now we've added many new features. We've added a big "Karaoke" Style Window to display lyrics. The notation is enhanced with support for finer resolutions like 32nd notes. You can align a rubato piece to a click track. We've enhanced the Intelligent piano hand splitting routines. The enharmonics are intelligently chosen based on the chord symbols & more! *Powertracks for DOS included FREE (NOTE: DOS version doesn't support music notation or other graphical features).*

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ERIC SLOMANSON

Regional bar associations often host panel discussions and seminars on highly specialized areas of the law. In June 1996, the San Francisco Bar Association's Sports and Entertainment Section hosted the seminar "Music Publishing: Domestic and Foreign." Shown above (left to right) are panel members Ilene Goldberg, Jeffrey Brabec, Susan Rabin (section chair), and Robert Gordon.

includes copyright law (protecting songs and recordings), trademark law (protecting the group names and logos used by musicians), and in today's fast-moving technological superhighway, patent law (protecting new technology and/or ideas of the musician).

Because the protection and exploitation of this intellectual property requires that the musician deal with third parties (record companies, publishing companies, managers, and other musicians), most entertainment lawyers develop their expertise in the field of contract law. Entertainment lawyers also help their clients with issues involving the establishment of businesses. These issues include legal formation of a business, licensing, taxes, and so on.

An experienced entertainment lawyer told me early in my career that once you have a client with a record in the Top 10 of any *Billboard* chart, you will gain experience in litigation. He was right. Success somehow incites other individuals—sometimes justified and sometimes not—to sue artists for what they consider to be their piece of the royalties.

LESS OBVIOUS ROLES

An attorney can be a great asset during the early stages of a musician's career. For example, lawyers are often called upon to "shop" tapes on behalf of clients. Many record labels and publishers are unwilling to accept tapes unless the tapes are solicited or forwarded to them by a lawyer. (These labels like to be assured that artists or writers have been legally advised before sending off their work.)

A lawyer can also fill the role of personal manager and general "trusted industry advisor." As you work to define either of these roles with a lawyer, be aware of the boundaries each of you are setting and what the compensation should be for services above and beyond standard legal assistance.

THE RIGHT MATCH

As you can surmise, law practices that service the needs of musicians can range from solo practitioners in tiny offices to huge firms renting out entire floors of office buildings. Some companies are large enough to justify having in-house counsel. (Many major corporations, such as MCA and Warner Bros., have entire staffs of lawyers working for them.) Choosing the right attorney can be as difficult as finding the right drummer for your band, but it doesn't have to be a daunting effort if you do your homework. As with a search for a drummer, I suggest you look for a combination of skill, reputation, and desire, and don't discount

the importance of compatibility or your "gut instinct."

Prior to an initial consultation, find out as much as you can about the lawyer you're considering. Researching bar associations and professional associations (e.g., California Lawyers for the Arts, Beverly Hills Bar Association), reading articles and/or books published by the lawyer, and even attending a seminar or class where you can see the lawyer in action are all good ways to investigate a lawyer's work. The *Yellow Pages* is certainly a source for names, as well, but be advised that anyone can purchase a cool ad saying they practice entertainment law. As with anything else in the industry, the best avenue for your search is to ask around in the music community. Ask other acts and individuals you come in contact with for referrals, and get their opinions on the lawyer's style, professionalism, and fees. Remember to temper the comments with the client's results; many times artists will blame a bad deal on the lawyer who negotiated the deal. In many such cases, there was nothing the lawyer could do to rectify a bad bargaining position.

The initial meeting is your opportunity to get that valuable first impression. Use this time to express your expectations succinctly and to see whether you anticipate a personality conflict. Some lawyers use an initial consultation as a chance to learn something about your long- and short-term goals, seriousness, and business savvy. Many times, these lawyers will either conduct the initial interview for no fee or for a reduced fee. Other lawyers make it clear up front that every second spent with you—including listening to your case and getting to know you—is billable.

CAVEAT EMPTOR

Repeat this phrase three times before you read any further: Time is money. Entertainment lawyers' fees vary as much as the cost of hiring a musician or producer to do a session for you. Both lawyers' and musicians' fees are based largely on skill, reputation, and demand for their time. The three common ways lawyers charge for their services are hourly, on a retainer basis, or on a percentage basis.

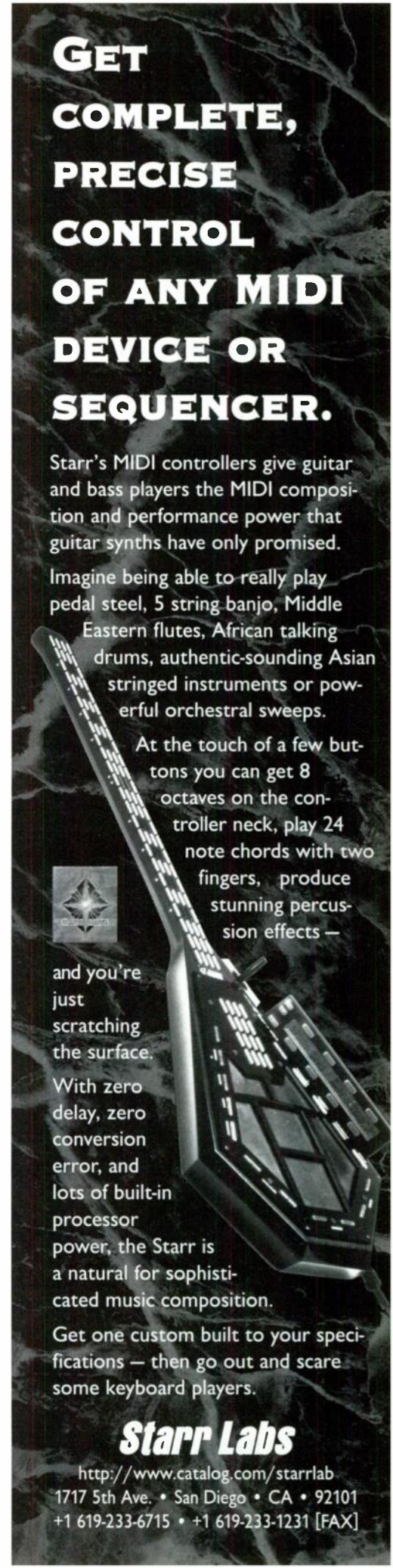
The simplest way to pay for a lawyer is by the hour. In my experience, I have encountered hourly rates ranging from $100 to $500, including telephone time, reviewing or drafting contracts, attending meetings on the artist's behalf, court time, etc. Although this fee can end up being in the thousands of dollars for certain services, the firm will usually be flexible regarding payment, either arranging for payment over time or providing the service in stages so you can control how far you wish to go into a project without getting in over your head financially. For example, in an attempt to collect back royalties owed to you, a demand letter would be one stage of fees, negotiating a settlement the next, and a full-blown lawsuit the final stage.

Hiring a firm on retainer means paying a set negotiated fee for all services

FURTHER RESEARCH

Here are some of our previous "Working Musician" columns that have detailed the various legal facets of the music industry. To order back issues, call (800) 233-9604 or (908) 417-9575; fax (908) 225-1562.

Working Musician Column	Issue Date
"Music Contracts"	June 1992
"Getting Down to Business"	January 1993
"The Management Dossier"	April 1993
"Contract Combat"	November 1993
"Musical Monopoly" (how to finance your band)	February 1995
"The Face Behind the Curtain" (personal managers)	March 1995
"Dissecting a Deal"	May 1995
"The Name Game" (trademark law)	January 1996
"The Fine Print" (legal checklist for releasing your album)	February 1996
"The Taxman"	April 1996



required by you, which is usually paid on a monthly basis. It is much like having a session player "on call" for your studio projects. Some months the lawyer will be extremely busy; other months will be very slow. In most cases, a retainer is not negotiated between attorney and client until a working relationship and idea of work flow is established.

The final version of fee structure is the percentage, or "spec," basis. In this scenario, the lawyer performs legal services in exchange for a percentage of some facet of your career. For example, the lawyer will negotiate your record deal for a percentage of the deal. Before you decide to enter into this kind of agreement and celebrate getting "something for nothing," take a step back to think about this for a moment. One of a lawyer's primary services and obligations to you is to advise you of deals or certain terms of your contract that are not in your best interest. I am not implying that lawyers working on a percentage have a conflict of interest, but remember that if the lawyer's entire fee is based on (1) your signing a deal and (2) how much of an advance you will be getting up front (an advance, by the way, that you will be paying back from royalties), it may reduce the likelihood that you will be advised to turn down a deal if it's the only one on the table.

It is important to establish with the lawyer the scope of the services to be rendered and how you will be billed for them. Many times, hybrids (e.g., part hourly, part spec, or spec with a cap on fees) are structured between the parties. Be sure that the understanding is expressed in writing. If fees are a pressing issue, try to find volunteer or low-fee lawyers providing legal services for artists. Check your local telephone listings for these services.

In the unlikely event that you have a disagreement with your lawyer and feel that a legitimate issue exists, you can file a complaint against the lawyer in question with your state's bar association. Prior to doing this, it is important that you evaluate whether the issue is between you and your lawyer or between you and the party with whom you and your lawyer are dealing. If a referral service provided you with the lawyer, you need to notify the service of any problems you have.

ERGO

Given the nature of the entertainment industry, lawyers and their clout rise with the success of their clients. Remember that hiring a law firm with major clients does not make your tape sound any better or automatically make you any more knowledgeable about the business. You will be doing yourself and your lawyer a great service by familiarizing yourself with your business dealings and by having an open enough dialog with your lawyer to let her do her job on your behalf. Before resorting to the cry "Kill all the lawyers!" get to know them a little better and realize that they can be a valuable part of your musical career.

Michael A. Aczon *is a San Francisco Bay Area entertainment lawyer and personal manager. He also teaches music-business courses for San Francisco State University and Diablo Valley College in Pleasant Hill, California.*

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WRH

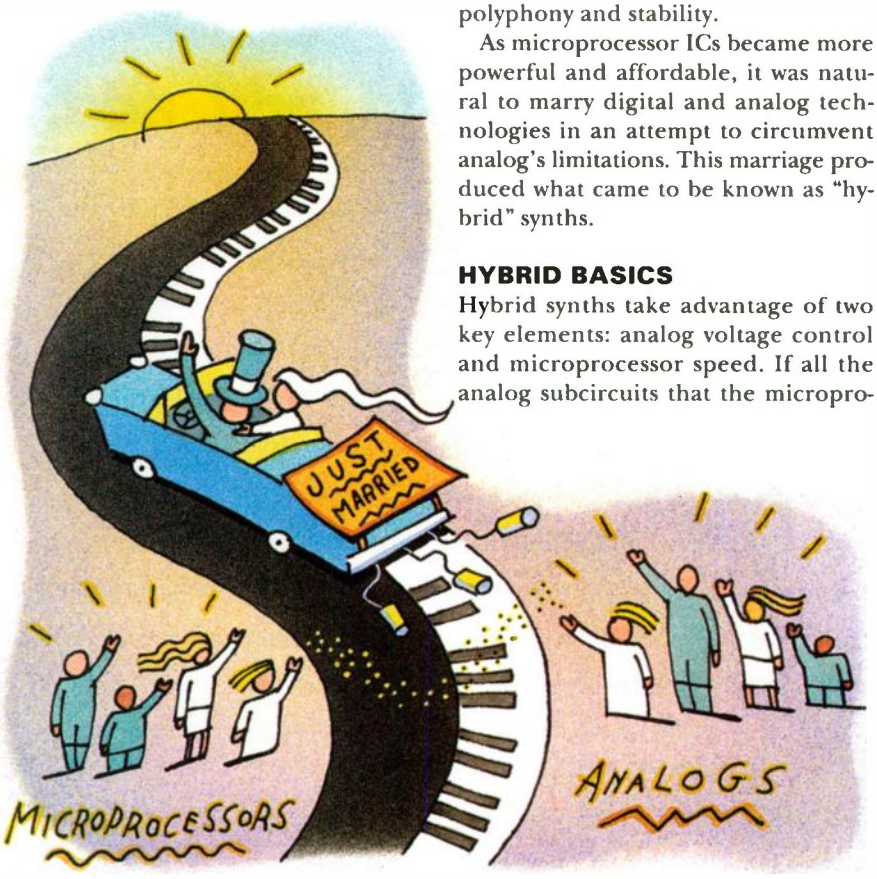
Hybrid Synth Service

The basic technology behind digitally controlled analog instruments.

By Alan Gary Campbell

Analog synths have continued to coexist—even thrive—alongside countless subsequent generations of technology that supposedly supplant them. However, the limitations of analog devices are impossible to ignore, especially their lack of polyphony and stability.

As microprocessor ICs became more powerful and affordable, it was natural to marry digital and analog technologies in an attempt to circumvent analog's limitations. This marriage produced what came to be known as "hybrid" synths.



JACK DESROCHER

HYBRID BASICS

Hybrid synths take advantage of two key elements: analog voltage control and microprocessor speed. If all the analog subcircuits that the microprocessor must control have the same control-voltage and trigger requirements, system design is greatly simplified.

If the microprocessor operates with sufficient speed and efficiency, it can perform numerous control functions in sequence but appear to perform them simultaneously. This technique, referred to as *multiplexing*, is the basis of hybrid and digital design.

For the purpose of illustration, the most intuitive implementation of multiplexing is the keyboard-scanning circuit. In this scheme, the microprocessor "sees" the keyboard contacts as a switching matrix of rows and columns similar to a telephone switchboard (see **Fig. 1**). The microprocessor sequentially scans each switch (or column position) in a given row and then proceeds to the next row, then the next, and so on until it reaches the last column in the bottom row. Then the process repeats. An 8 × 8 matrix with 64 positions is often used to scan a 5-octave, 61-note keyboard. (The three spare positions are sometimes used to scan footswitch inputs and the like.)

If an instrument is well designed, keyboard multiplexing is transparent to the player. The microprocessor scans the keyboard so quickly that it seems to monitor all the keys at once. In practice, the addition of retrofitted features (such as MIDI) tend to overtax the microprocessor, and many keyboards have a perceptible scanning delay, which

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gives the impression of playing in slow motion. Perhaps the worst of these is the Memorymoog Plus, a Memorymoog with a factory MIDI kit. Many players prefer the non-MIDI version for live performance because the keyboard response is much more positive.

Front-panel switches and footswitches can be multiplexed in much the same manner as key switches. Pots and other continuous controllers can also be multiplexed, but this requires the use of additional subcircuits. Generally, pots and controllers are configured as variable voltage dividers with the outputs steered to a multiplexed analog-to-digital converter.

To affect the sound-producing circuitry, the multiplexed data must be acted on by the microprocessor, "demultiplexed," and sent out to the oscillators, filters, envelope generators, and so on in a form they can use. Typically, the microprocessor controls CMOS switches or other 2-state devices via simple logic gates. The output of a digital-to-analog converter is steered to multiplexed, precision sample-hold circuits to drive the VCO, VCF, and EG control-voltage inputs. This is a gross oversimplification, but it serves to illustrate the concept.

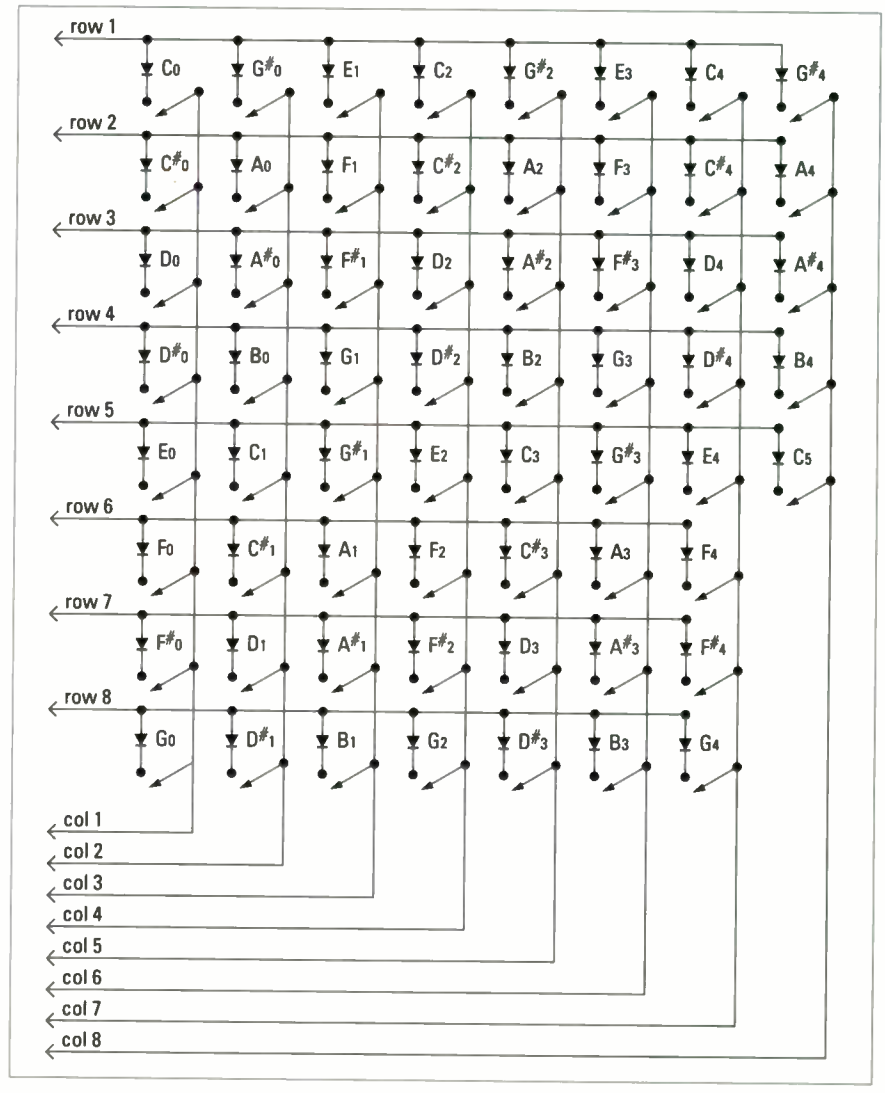

FIG. 1: The steering diodes in this keyboard switching matrix prevent unwanted interaction of the rows and columns during scanning.

INTEGRATION

Hybrid designs would be wholly impractical were it not for the use of integrated-circuit versions of the basic analog-synth modules. Even with them, the parts count of some hybrid instruments is scary.

Analog functional modules had become somewhat standardized, at least among families of compatible equipment, prior to the advent of IC versions. But integrated components assured that all functional blocks in a given instrument would have precisely equivalent control-voltage and trigger requirements. This was absolutely necessary if multiplexed control of multiple voice circuits—each the functional equivalent of a whole monophonic synth—was to work smoothly and achieve uniformity and repeatability of sound and function.

The first integrated components were envelope generators on a chip, probably because these had the most design elements in common with existing ICs. Soon, whole families of IC analog modules were developed, including EGs, single and dual VCAs, VCOs, and multimode VCFs. Two companies dominated analog IC manufacture: Solid State Microtechnology for Music (SSM) and Curtis Electromusic (CEM). Despite lively discussions at the time with regard to which manufacturer made the better chip sets, both products were still in the process of evolution, both used relatively advanced analog technology, and both had strengths and weaknesses. Eventually, CEM became better known by the nonspecialist, in part because its chips were used in do-it-yourself kits and in several of the classic hybrid instruments, including the Prophet 5 and the Memorymoog.

The pinout of a Curtis Electromusic CEM 3345 IC VCO (see **Fig. 2**) shows the complexity and sophistication that such chips achieved. Setting up the 3345 to run as a fully functional, highly stable VCO required a minimum of support components. Note the multiwaveform outputs; onboard, voltage-controlled pulse-width inputs; and inputs for both standard and linear frequency modulation. (The linear frequency-modulation circuit is capable of DX7-type FM synthesis.) Unlike some early IC VCOs, the 3345 did not require an external, temperature-compensating ("tempco") resistor to minimize drift but used "heated chip" compensation technology.

Subsequent Curtis VCO designs provided direct, digital frequency control and eliminated the drift-compensation problem entirely. In fact, very late hybrid synth designs from several manufacturers actually replaced VCOs with digital oscillators, which improved stability and uniformity to the point that

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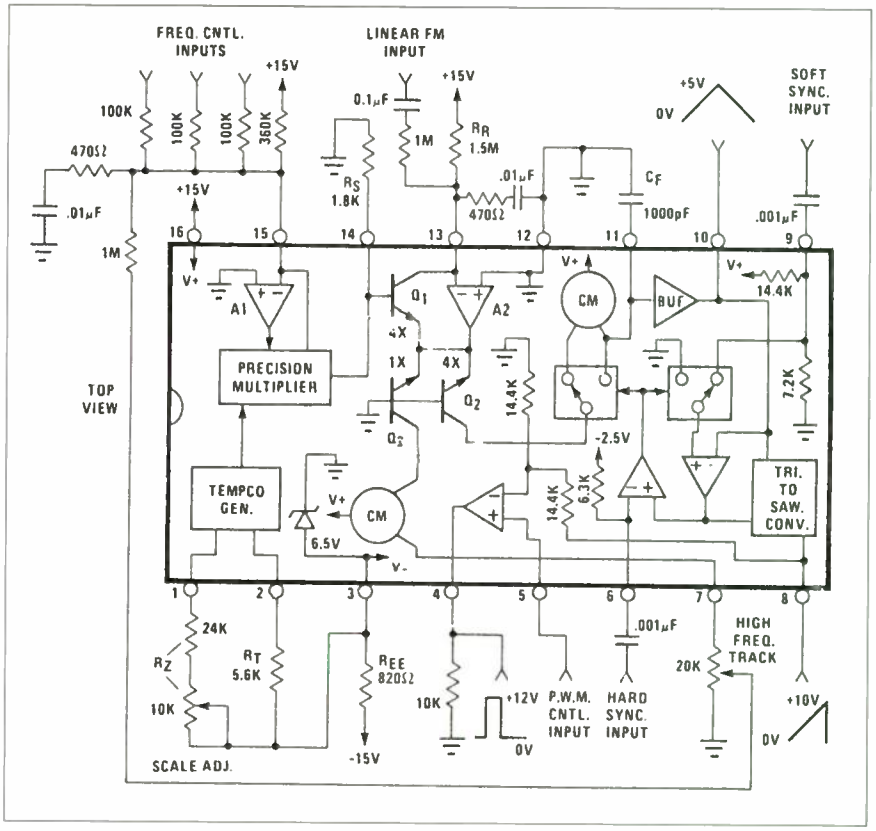

FIG. 2: The Curtis CEM 3345 IC provides an advanced VCO in chip form.

the units didn't sound quite "analog" anymore.

Analog purists insist that the mere introduction of IC analog equivalents, with their considerable electronic precision and repeatability, marked the demise of the true analog sound, which depended upon the subtle randomness of circuits made up of dozens of transistors and simple ICs. Some manufacturers have agreed with them. The Memorymoog used discrete transistors for its legendary "Moog filter," and although it incorporated Curtis dual-VCA ICs in control circuits, the final audio VCA for each voice was based on a tried-and-true RCA 3080 transconductance amp.

The use of IC analog modules both simplifies and complicates instrument service. With instrument designs that incorporate sockets, equivalent chips can sometimes be swapped to observe whether an intermittent problem follows a specific chip. This is helpful, but the sockets themselves are a source of unreliability. Conversely, unsocketed designs, although more reliable electromechanically, all but ensure damage to these complex, heat-sensitive chips during desoldering.

Either way, a bad IC requires replacement. These chips were never cheap, and today, at vintage prices, they command top dollar—when they're available at all. For this reason, vintage enthusiasts often purchase road-worn, nonfunctional instruments to scavenge for parts. Over time, one dead unit can provide replacement parts for several working units.

ROADWORTHY PCS

Readers frequently inquire about taking PCs on the road and ways to protect them. Several companies offer rack-mount computers, and a few design PCs specifically for the music market. Unfortunately, I don't have a list of them, so I suggest you check the ads in **EM** and other industry publications for more information. There is an interesting catalog, *The Industrial Computer Source-Book,* intended for the industrial computer market, that features some heavy-duty, reinforced, IBM-compatible PC components. This is *not* a catalog for the end user. However, service managers, tour managers, and equipment managers might find it helpful. Contact The Industrial Computer Source, PO Box 910557, San

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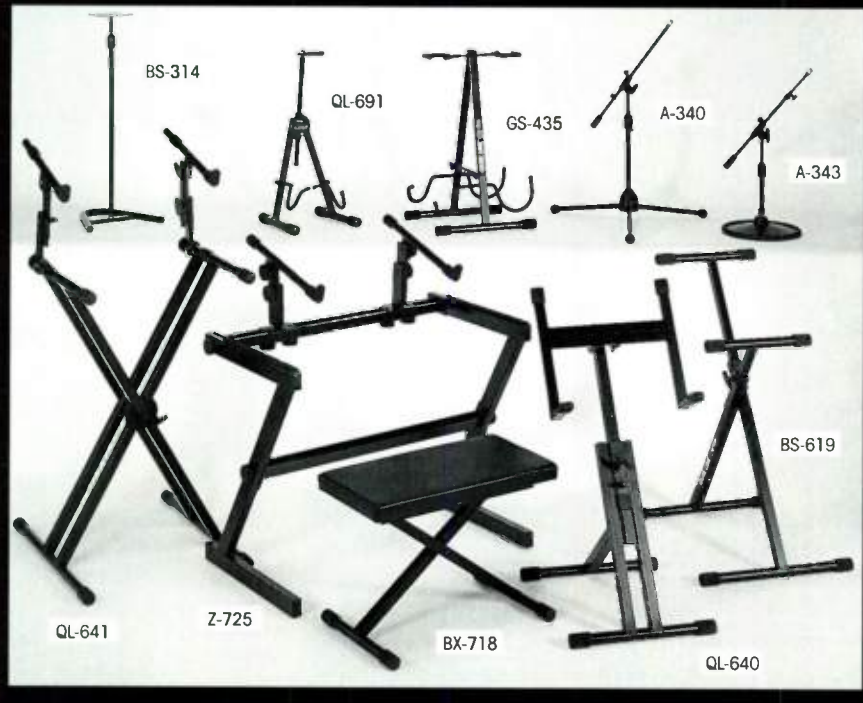

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Probably the best recommendation for those who want to take a computer on the road, and especially on stage, is to use a laptop computer. The lack of a full-size display is a disadvantage but one that is more than offset by the savings in size and weight. Many Pentium and Power Mac PowerBook laptops are as fast as desktop machines. A small GM sound module with a built-in serial MIDI interface will provide a basic synth and connections for a larger MIDI system. (For more on creating a recording studio within a computer, see "The Budget Desktop Studio" in the September 1996 **EM**.)

Some readers have asked whether disk drives should be transported with head protectors in place and whether hard-disk heads should be parked before transport. Head protectors for floppy-disk drives are usually no more than roughly diskette-shaped cardboard or plastic inserts designed to minimize shock to the heads during instances of severe impact during shipping. They are effective in this regard, but repeated instances of the head banging into the cardboard or plastic during transport can eventually cause slight head wear and/or contamination. For short trips, it is common to leave the head protector out. However, the potential for rough handling and the need for a head protector must be evaluated on a trip-by-trip basis. A really bad idea is to leave a diskette in the drive during transport. If the head crashes on the disk surface, the disk *and* the head may be damaged.

It is important to park the heads on a hard-disk drive before transport. Many current hard-disk drives, especially the 1 GB and larger varieties, autopark the heads after a certain idle period. For older drives, the user generally has to invoke a head-parking application. There are countless implementations of this; many head-parking programs are bundled with other utilities or offered as freeware or shareware.

EM *Contributing Editor* **Alan Gary Campbell** *is editor and publisher of the* New Music Journal *and owner of Musitech, a consulting firm specializing in electronic musical-instrument design, modification, and service.*

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RECORDING MUSICIAN

Recording Spoken Word

Document the moods and magic of human speech.

By Brian Knave

Although "spoken word" may seem like a buzzword, it is actually an apt phrase that means what it says: words spoken as opposed to words sung or written. In the broadest sense, spoken word could refer to voice-over for a radio spot, dialogue for a movie, narrative for a CD-ROM, or even the voice of a televangelist administering to his flock. In the current, idiomatic sense, it usually refers to poetry accompanied by music, or else music accompanied by poetry (which can be an altogether different thing).

RUTH LEITMAN

As the featured performer on two Golden Palominos records (*This Is How It Feels* and *Pure*), Lori Carson helped define a new mood in spoken word by interweaving sexy whispers, heartfelt confessions, and philosophical ruminations with her achingly beautiful singing voice.

Rap music is arguably the biggest force behind contemporary spoken word, but the genre is hardly a recent phenomenon. Comic hipster Lord Buckley, for example, had garnered an underground following by the late 1940s with his live and recorded soliloquies, and he sometimes performed over jazz saxophonist Ben Webster's improvisations. Less than a decade later, poets such as Allen Ginsberg, Jack Kerouac, Kenneth Rexroth, and Kenneth Patchen were reciting verse over jazz—a music form they credited as a central influence on their writings. Around the same time, Ken Nordine released his seminal album, *Word Jazz*.

Labels dedicated to spoken word—notably Harvey Kubernik's Freeway Records, William Ackerman's Gang of Seven, and Gregg Ginn's New Alliance Records—have made significant contributions to the art, and there is also a market for "pure" poetry recordings, as evidenced by extensive literary offerings from the Poets Audio Center, a Washington, D.C.-based mail-order house. (Where else can you get a salvaged excerpt from an 1890 wax-cylinder recording of Alfred, Lord Tennyson reading his poetry?)

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Michael Cooper, *Electronic Musician*, March 1996

Excerpted from *"Audio-Technica ATH-M40 & ATH-D40"*

"When it comes to performance, both sets of phones produce a smooth but highly detailed sound with excellent stereo imaging and good bass extension... [They] are extremely capable and nice sounding headphones."

Paul White, *Sound On Sound*, August 1995

Excerpted from *"Audio-Technica ATH Studiophones"*

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George Petersen, *Mix*, May 1996

Excerpted from *"Audio-Technica Studiophones"*

"The D40 and M40 performed well with an excellent, clean and powerful sound, with spacious and detailed stereo imaging...The headphones are rated at a maximum input power of 1,600 mW at 1 kHz, delivering up to a brain-liquidizing SPL of 132 dB."

Christopher Holder, *Audio Media*, January 1996

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have one thing in common: the need for maximum intelligibility. This is to a large extent the responsibility of the artist, but it's also an area where recording techniques play a critical role. The fact is, making first-rate recordings of human speech is no piece of cake.

GAINING ON YOU

Probably the main difference between recording spoken word and recording sung vocals is that voice artists tend to deliver less volume than singers. Recording soft speaking voices typically requires more gain from the mic preamp, which in turn leads to a magnification of the usual vocal gremlins: sibilance, plosives, lip smacks, and throat pops. In addition, you'll be confronted with environmental noises, such as the racket produced by the computer fan and hard drive in a desktop studio, rustling clothes, squeaking chairs, the sound of script pages being turned, and so on. And if you use a compressor while recording, you're likely to increase the level of these track-spoiling sounds even more.

One way to combat these unwanted background noises is to use a dynamic microphone instead of a high-quality condenser mic. Most dynamic mics are less sensitive than condensers and exhibit better off-axis rejection. Also, as many artists and engineers will attest, on some voices a dynamic mic may sound better than a condenser. Ultimately, it's not the cost or construction that should determine the mic you choose for a given task, but how good it sounds for a particular voice and application.

Whichever mic you choose to record with, be sure to have the Record button engaged at all times, even during the initial run-through. Often the first take is the best take, and if you miss it, you might be kicking yourself to sleep that night.

MOUTHING OFF

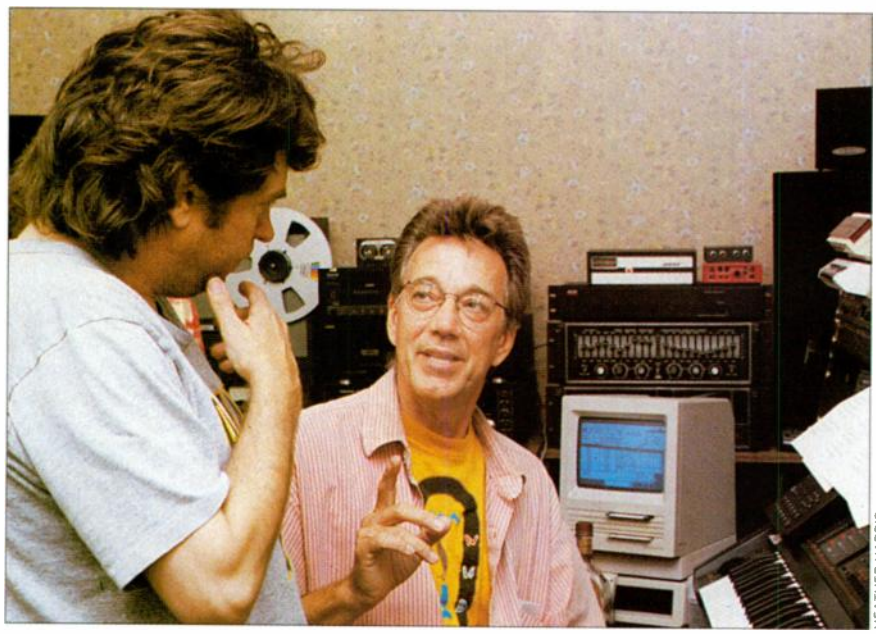
Sibilance and plosives are two common perturbations that need to be addressed while recording and mixing spoken word. Whereas a plosive may be easy to hide on a loud rock tune, it will stick out like a sore thumb amid the soothing narration of a meditation track. Of course, if you work on a hard-disk system, it's relatively easy to isolate and redraw waveforms on the screen, editing out the sounds you don't like. But it's always smartest to record the tracks clean from the start, with as little unwanted noise as possible. Fixing it in the mix is—and should remain—a last resort.

A pop filter, such as the GS Gob Stop from Middle Atlantic Products, is an indispensable tool for recording the voice.

Though reduction of sibilance and plosives is best handled by the artist, you can assist his or her efforts by providing a windscreen and/or pop filter for the mic. Some producers use both, but most prefer a pop filter because it absorbs less high-frequency content than a foam windscreen. Also, pop filters do a better job of taming plosives, thanks to a double screen of nylon with air space between. (You can easily construct a makeshift pop filter from an embroidery hoop and a nylon stocking.) Pop filters and windscreens also help reduce annoyances such as lip smacks, tongue clacks, and other mouth noises.

Mic choice can also affect sibilance. Women's voices, for example, tend to be more sibilant than men's, which is why some producers specify warmer-sounding mics for women. "I usually use a Neumann U 87 for women," says rap producer Al Eaton, "and an AKG C 414 for men."

Drummer and Golden Palominos producer Anton Fier, who produced singer and spoken-word artist Lori Carson and, most recently, poet Nicole Blackman, is partial to the sound of vintage tube microphones such as the Neumann U 47. Like many spoken-word recordists, he strives for a natural sound. "Lori Carson is naturally sibilant," he explains, "but I don't mind



HEATHER HARRIS

Veteran spoken-word producer Harvey Kubernik (left) confers in the studio with Doors cofounder and keyboardist Ray Manzarek. Monster Sounds Entertainment recently released *Ray Manzarek: The Doors: Myth and Reality*, a two-disc "word ride" featuring Manzarek's reminiscences mixed with his original piano, keyboard, and sound-design tracks.

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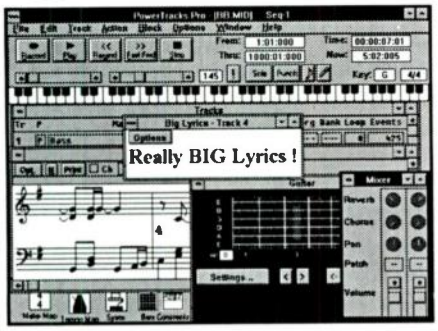

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In the past, PowerTracks has offered powerful features such as music notation, wave file support, lyrics, chord symbols and score printout. Now we've added even more! PowerTracks 3.5 has a big "Karaoke Style" window to display lyrics up to "full-screen". The notation is greatly enhanced with support for finer resolutions such as 32nd notes. You can also now align a rubato piece to a click track. We've improved the intelligent piano hand splitting routines. The enharmonics are intelligently chosen based on the chord symbols, and more – Read on for more details.

Big Lyrics window lets you view song lyrics in the font of your choice in a full-screen window. Select your own font style, size, and color. Great for singing along with the music!

Notation Scrolling Ahead. If you're sight-reading the music off of the screen, you'll be pleased to note that the music can now scroll ahead. This is how we normally read sheet music! You can set the notation to scroll 1 or 2 bars ahead of the music *without* interfering with your view of the current notation. A great feature for sight-reading practice.

Rapid Resume. PTW can now automatically save the window positions of all opened windows and restores them the next time the program is used. You can optionally store and recall setups with a ".WS" file. Have PTW start out with your favorite setup every time you run the program by simply saving a file called FAVORITE.WS to your PT directory.

Save Your Patches. The enhanced patch select dialog now lets you select the patch list from within the dialog. PowerTracks 3.5 will remember the patch list used for each track and will save the name of the patch list used for each track to a ".SEQ" file. A "must have" for people who own multiple sound modules.

SysEx Input Buffer Size setting is now adjustable within the Options | MIDI. In dialog to help the people who normally have SysEx-input problems. The Buffer Amount can also be set.

Notation Enhancements:

- supports finer resolutions which allows you to enter notes such as 32nd and 64th notes
- "bars per line" markers which allows you to adjust the bars per line on a screen by screen basis
- "hard rests" which will be in effect even if you have minimize rests set to false, as well as the option to make notes invisible.
- a special mode for autodetection of finer resolution and/or multiple chords. PowerTracks can now "clean up" the kinds of notes & chords that can otherwise look like a bunched up mess.
- the Chord Note Separation and Chord Total Separation settings are now fully adjustable
- "Clean Mode" which automatically "cleans up" grace notes and any unwanted glitch notes from the notation. Glitch Velocity and Glitch Duration settings are fully adjustable.
- transpose setting will now transpose the key signature *and* the chords.
- improved Guitar Tablature draws the note and fingering exactly like your favorite magazine.
- improved Lyrics editing makes it possible to cut and paste using the Windows clipboard.

Align Music To Click Track command will align the music you've entered or recorded to a click track. This is very useful for songs that were recorded rubato or without using a metronome.

Improved hand splitting. Instead of arbitrarily splitting the keyboard into two parts, PowerTracks can make intelligent hand-splitting decisions which results in a highly accurate depiction of how the song should be actually played on the piano. These parts are also put on separate MIDI channels so that you can play or edit them individually.

Intelligent accidentals (enharmonics). sharps(#) and flats(b) are now context sensitive to the key *and* the chord its in. For example, if you are in the key of Eb and the chord is a D7, a F# note will show up as an F#, and not a Gb. This means that the notation accidentals will automatically show up correctly.

Convert loaded files to specific PPQ. Regardless of what PPQ a song was recorded in, you can work with it at the PPQ that is most familiar to you. For example, set this to 480 and all files will be set to 480, regardless of their original PPQ.

Forced Channels. channels that you normally use for different instruments (e.g. Bass on Channel 2) can be embedded in a midi file in addition to .SEQ files.

New Tips of the day. We have added some new tips of the day to keep you informed of the new features of version 3.5.

Hot Keys. Common procedures such as "Select all" and "Run DLL" can be performed with a single keystroke.

Other Enhancements such as a new setting to prevent PowerTracks from sending an "All Notes Off" command when synched to MIDI or SMPTE. This is important if you're using a lighting controller or other device that has a tendency to 'misbehave' when receiving an All Notes Off command.

WRH

the sibilance as long as it doesn't sound like a whistle. Sibilance is a natural part of the human voice. I would only try to edit it out if it were unnaturally loud and interfered with the piece."

Producer Harvey Kubernik—who originally coined the term "spoken word"—concurs. "I've grown to like the naturalness of lip noises and breathing," he says. "I even like hearing people's nervousness. Also, I'm no big stickler on mic position. Some people eat the mic and some stay away from it. You get a natural variation in sound that way." For most spoken-word applications, Kubernik prefers an AKG C 414 because "it's sharper and does a better job of picking up the highs."

Sibilance can also be tamed with a de-esser. Although it's possible to de-ess while tracking, usually it's best to employ the de-esser during mixdown, when there's more time to focus on problematic frequencies. Take care to dial in only the offensive frequencies (these are usually in the 4 kHz to 10 kHz range), and in general use a high ratio, fast attack, and fast release so the machine gets in and out as quickly as possible. Remember, a de-esser knocks out high-end information as well as sibilants. A good rule of thumb is to employ de-essing sparingly and only as a corrective measure.

Not surprisingly, most spoken-word artists and producers agree that the emotional content of a performance is more important than technical considerations. "I try to be aware of mouth noise and sibilance," says Carson, "but the more important thing is to get to the powerful truth of what you're saying. You have to really be who you're playing and not just talk about it." As Eaton puts it, "Excluding content, delivery is pretty much everything. I mean, sometimes you just can't get rid of a popped *p*. But if the performance is there, I'm not going to throw away the track because of a pop."

DYNAMIC DUOS

Compressor/limiters and expander/gates are other signal processors that can come in handy when recording and mixing spoken-word tracks. Properly utilized, a compressor can smooth out the dynamics of an uneven performance, thereby increasing intelligibility. Remember, though, that compression brings up all low-level sounds that are above the threshold setting, including sonic blemishes. A safe way to compress during recording is to use a low ratio, say, somewhere between 1.5:1 and 2:1.

Like any signal processor, even the best compressors color the source sound. Therefore, if you're going for the most natural sound, don't automatically insert a compressor into the signal path. "I only add compression to compensate for something that's wrong," explains Fier. "If I like the sound of someone's voice, I don't try to alter it."

A downward expander is a great tool for reducing signal bleed from headphones and low-level environmental noise. An expander processes signals below a user-set threshold, diminishing the levels of unwanted sounds. You simply set the threshold below the lowest-level vocal signal and then determine the *floor* (sometimes called *depth* or *range*)—the dB level at which problematic sounds are virtually inaudible. Be careful, though, not to set the floor too low, or you might hear it "riding up" behind the signal when the voice comes back in.

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Noise gates also can be effective for cleaning up tracks. Of course, when using a gate, care must be taken to set the threshold far enough below the spoken-word signal to prevent clipping the beginnings or endings of words. A medium release time is usually most natural sounding.

DON'T TOUCH THAT DIAL

For purists, anything that alters the voice is all but forbidden. But there are ways to enhance the signal without changing the quality of the voice. For example, if low-end rumble or 60-cycle hum invades your space, engage the bass roll-off filter on your mic. (If the mic doesn't have a filter, try the low-cut shelving EQ on your mixing console.) Most voices have very little energy below 80 Hz, so it's unlikely that tonal degradation will result from rolling off bass below that point.

▼

Remember to have the record button engaged at all times.

If you're mixing spoken word with music tracks, selective EQ can help a voice cut through the mix. On a trip-hop song I recently produced for spoken-word artist Emma King, I cut the vocal track by 5 dB at around 400 Hz and boosted at 12 kHz by 2 or 3 dB. The vocal track sounded a bit thin when soloed, but it exhibited increased presence and intelligibility when auditioned against the music mix. Of course, if you *want* special effects, EQ is a deep tool bag. With a good graphic equalizer, for example, you can make an ordinary voice sound like Tiny Tim's or Hulk Hogan's. You could also dial in the sound of the voice as if heard through a tin can, ham radio, or cheap walkie-talkie.

REFLECT ON THIS

Reflections off the studio floor and walls can also alter voice quality and should be taken into account before a session begins. "You learn to hear the difference from one floor to the next," says Kubernik. "I recorded Kathi Martin on a wood floor and then did Bill Mohr on cement. Kathi had a husky voice which was complemented by the warm reflections off the wood floor. Cement gives a more crisp bounce. Sometimes I'll record in a hallway or reception room because I like the sound of the carpet and wood. Or if the artist says, 'You know, I'm really comfortable sitting on this couch going over my work,' I'll say, 'Hang for five minutes and we'll record you right there.'"

Unless you're recording someone who has memorized his or her work, it's usually necessary to position a music stand close to the mic for holding the script. Reflections from the music stand can also affect the vocal sound—and not often favorably. For this reason, I prefer to use a cheap, folding stand because it has less bulk and reflective metal than a band-style music stand. Kubernik has come up with a different solution: "We simply put a towel over the metal shelf. The only problem is,

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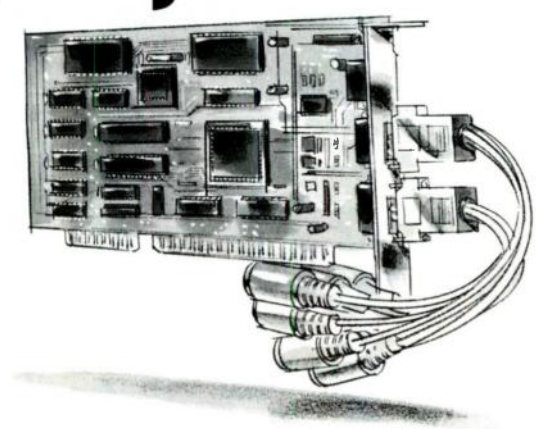

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that sometimes *dampens* the sound too much, so then we have to brighten the voice up in the mix."

IN THE CANS

Headphone feedback can be a real nuisance while trying to record quiet spoken word over music tracks. The problem is exacerbated if the artist wants a loud instrument mix in the phones. "One thing that sets a great engineer apart from a mediocre one is the ability to create a good headphone mix," says Carson. "I like as much level as possible so that I feel I'm inside the musical landscape." This, of course, requires considerable gain on the mic so the artist can hear herself perform. But if too much signal leaks from the headphones into the mic, feedback results.

For this reason, well-padded, closed-ear type headphones are the best choice for spoken-word overdubs. But beware of the vents found on some closed-ear phones: if the artist turns her head ninety degrees to one side or the other, the vent allows a clear pathway for feedback or signal leakage.

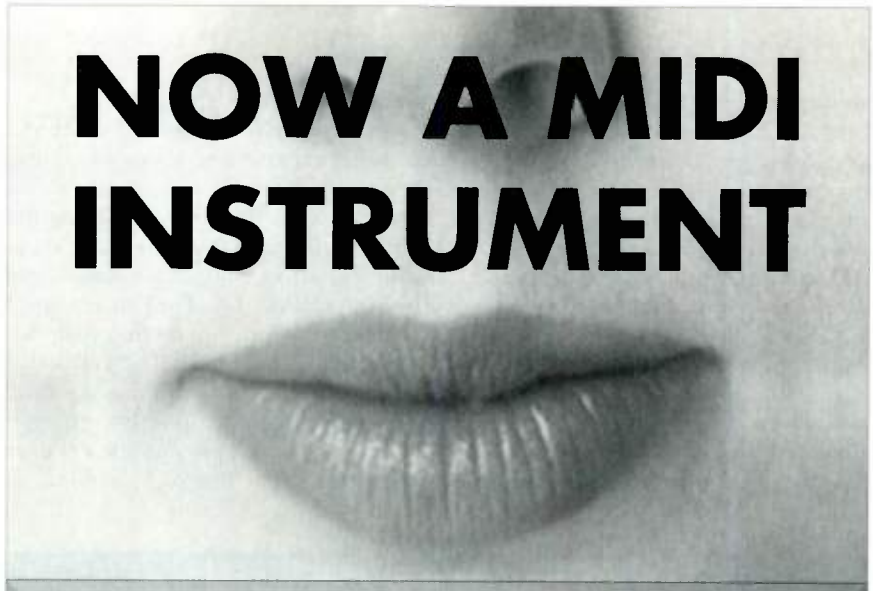
Of course, if you're recording the spoken word first and intend to add the music later or not use music at all, you can forgo headphones altogether. As most poets aren't used to working with headphones anyway, you'll probably get a less self-conscious performance.

WORD UP

Just as ten years ago some people claimed that rap was "not really music," others today consider spoken word a bastard child of singing or, worse, an alternative to singing for folks who can't carry a tune. But in truth, spoken word is heir to an ancient, venerable art that, before the printing press, was the primary means of transmitting information from one generation to the next. Call it oral history or epic poetry; it all comes down to the power of human speech to convey spirit, emotion, and information.

One of the artists Kubernik recently produced, poet and actor Harry E. Northup, remarked that the aim of the spoken-word artist is to "go private in public." A good goal for the spoken-word recordist is to help the artist get there.

Assistant Editor **Brian Knave** *has always felt that recordings of the voice are more evocative of human personality than photographs.*



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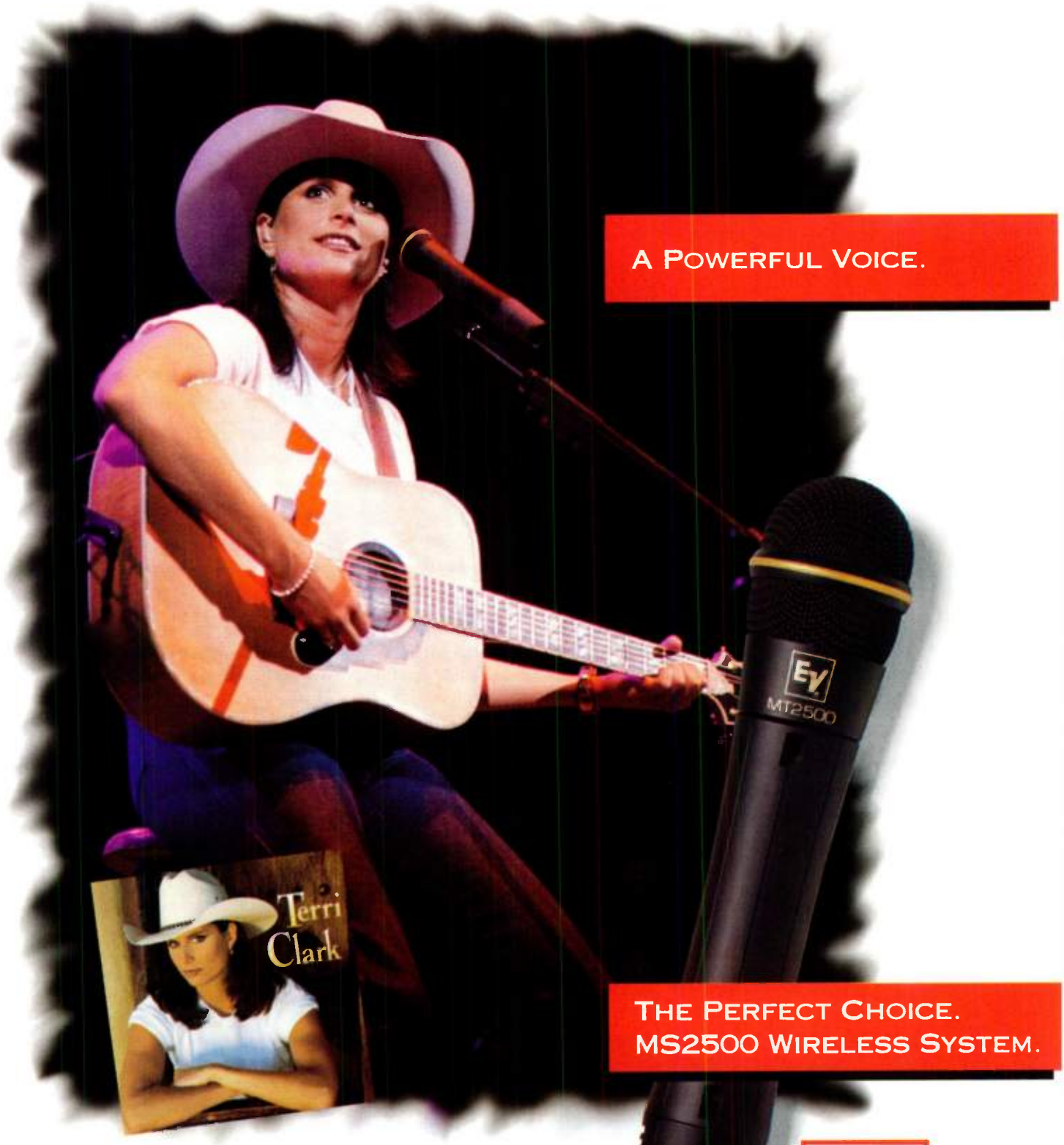

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Ensoniq MR-Rack

By Jim Pierson-Perry

Rack to the future with a next-generation synth module.

I once read a claim that more than 90 percent of musicians never go beyond the preset patches in their synths except to add new preprogrammed sounds on ROM cards or expansion boards. This would seem to explain the current state of many synth modules, which are filled with so many patches that just sorting through them is a major chore.

At the same time, musicians continue to demand more realistic timbres, more controls for real-time dynamics and expression, more and better onboard effects, and so on. In response, manufacturers have created synths of such power and complexity that the typical user interfaces are inadequate.

With the MR-Rack, Ensoniq has taken steps to avert this problem. The 1U rack-mount, sample-playback module provides a rich library of 395 ROM patches with a novel onboard database that simplifies auditioning and selection. Although you can do basic timbre and effects editing from its front panel, full access to the powerful synthesis engine requires an external computer running the appropriate editor software. Ensoniq provides a customized, MR-Rack-only version of Mark of the Unicorn's *Unisyn* MIDI device–editing software (for Mac or Windows) free to registered owners (see the sidebar "Sound Programming").

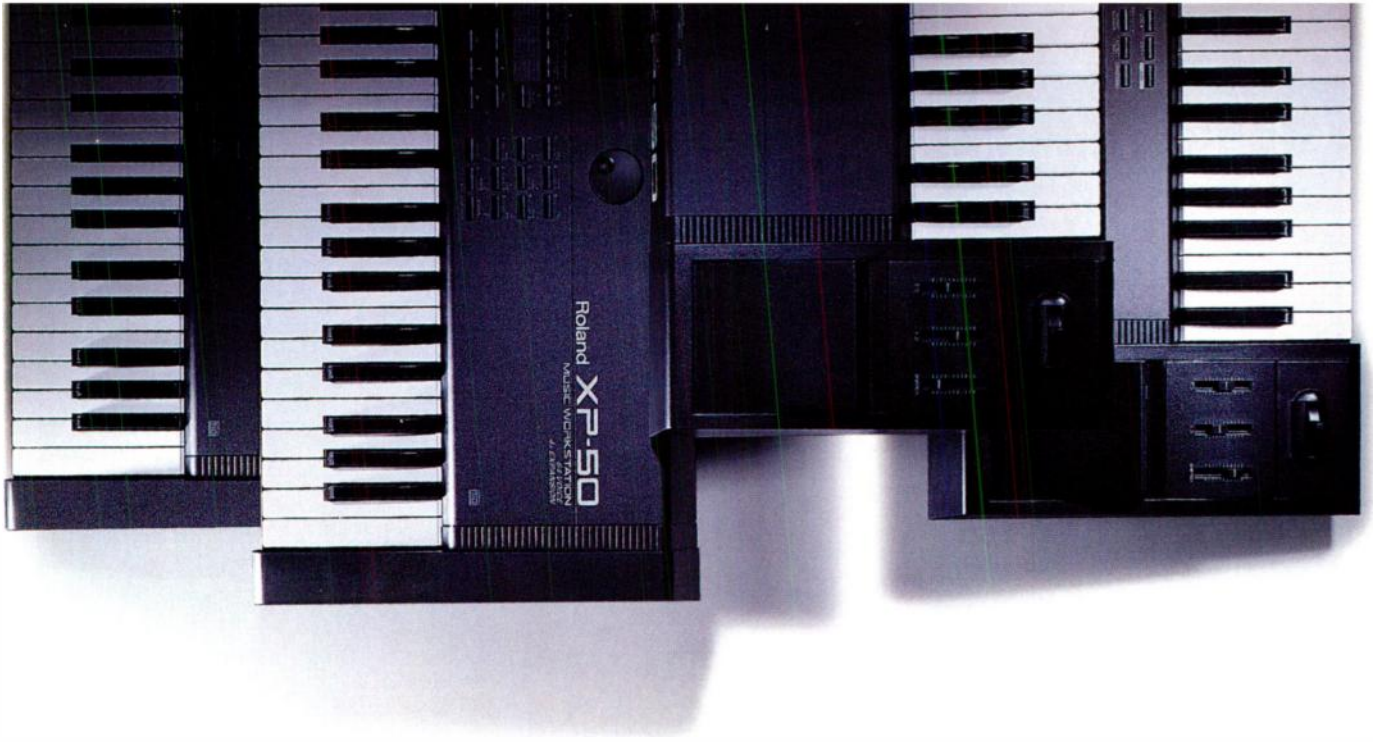
Ensoniq's MR-Rack offers 64-voice polyphony and powerful synthesis features, yet it's easy to use. The audio quality is Ensoniq's best yet, and program selection is simplified by an onboard database.

PHYSICAL FITNESS

The MR-Rack provides 64-note polyphony across sixteen multitimbral parts. The base configuration holds 320 16-bit samples (which Ensoniq calls Waves) in 12 MB of sample ROM. This can be increased to a whopping 84 MB of ROM by adding up to three internal Wave Expansion Boards (see the sidebar "ROM To Grow"). One ROM bank is dedicated to General MIDI sounds, and you can set the unit to power up in General MIDI mode.

The front panel includes a stereo headphone jack, power switch, master volume knob, MIDI activity LED, and PC (formerly known as PCMCIA) card slot. Eight buttons on the left side of the front panel let you select and edit Sounds, Parts, and Performances; edit and bypass the effects; mute or solo Parts; and adjust the global system parameters. These buttons include LEDs so you can see the MR-Rack's status at a glance, which is a nice touch. Two buttons on the right of the front panel allow you to audition sounds and access the Save functions. Some buttons serve double duty depending on whether they are pressed once or twice; for example, the Audition button doubles as an All Notes Off panic button.

A modest 2-line × 20-character, backlit LCD, flanked by two knobs, serves as the control center. Parameter editing, global settings, and sound selection (via Ensoniq's novel SoundFinder database system) are all handled through a simple user interface. You press a button to specify the operating mode, turn



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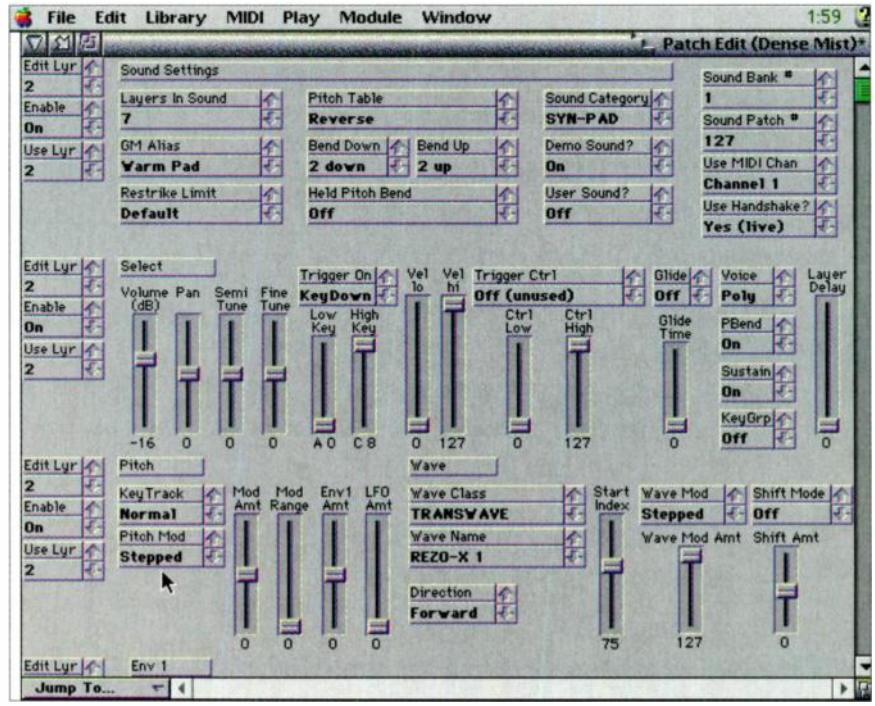

FIG. 1: You can edit Parts and Performances from the MR-Rack's front panel, but Sounds and Layers can only be edited with software. Therefore, when you return your registration card, Ensoniq sends a free copy of MOTU's *Unisyn*. Shown here is the Sound-editing screen from *Unisyn* for the Macintosh.

the left knob to select a parameter, and then turn the right knob to set a value for the designated parameter. There are no occult menu hierarchies to navigate and no scads of pads to trip up the fingers, just short, sweet, and consistent operation. The MR-Rack senses how quickly you turn the knobs and accordingly scrolls through the selections faster or slower. My only quibble is that you can't wrap around to the beginning or end of the list by continually turning the knob. Having this feature would speed up the selection process.

The back panel holds the IEC power-cord receptacle, two pairs of ¼-inch audio outs, and MIDI In, Out, and Thru ports. Thanks, Ensoniq, for using an internal power supply with a standard AC power cord rather than a wall wart.

Because the MR-Rack requires an external computer for serious programming, I was surprised to find that it lacks a built-in computer-interface port. These are fairly ubiquitous among current General MIDI tone generators and would seem a natural feature for this unit. However, Ensoniq believes that most MR-Rack users are likely to have a MIDI interface already, so an internal interface would be redundant and would only add to the unit's cost.

The manual includes more than 300 pages and gets high marks for its readability and comprehensive index. However, its focus seems mostly on simplified, step-by-step guides to working with Parts and Effects. There is virtually no information on the underlying synthesis engine, let alone Sound and Layer programming. I'd like to see a list of the various synthesis parameters, a table of the ROM Sounds (including the number of Layers and the Insert Effect used by each), diagrams of the Velocity-response curves, a definition of the Ensoniq drum keymap, and a list of which Waves are single or multisampled.

Ensoniq recently upgraded the MR-Rack's operating system to version 1.5. If you have an earlier version, take your unit to an authorized service center for a free ROM update. The new version is required to use the Wave Expansion Boards. In addition, it lets you save some front-panel Parts edits with the Sounds, which required separate editing software in earlier versions.

VOICE ARCHITECTURE

Layers are the basic editable elements of the MR-Rack's synthesis architecture.

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Each Layer starts with a selectable Wave (PCM waveform) played by a single oscillator. Up to sixteen Layers can be combined to form a Sound, which is equivalent to a program or patch on other synths. You assign each Sound to a Part within a Performance, which is a multitimbral ensemble of up to sixteen Parts with an effects setup. The unit is always in multitimbral Performance mode, even if you are using only one Sound.

You can edit Parts, effects settings, and Performances from the front panel. Access to Sound and Layer programming requires external computer editing software, such as MOTU's *Unisyn* (see **Fig. 1** and the sidebar "Sound Programming").

With all these sound elements to play with, running out of voices is an occupational hazard, even with 64-voice polyphony. A 16-Layer Sound is the equivalent of an entire multitimbral synth from just a few years ago. If you tried to use all the Layers in sixteen Parts, you would need 256 voices at once, and that's not even considering drums! Of course, most Sounds only use a few Layers except for the odd special effect or huge pad.

WAVES AND LAYERS

Waves can be single or multisampled, but there's no way to tell without testing them. I found this an annoying omission, because several Layer parameters affect only multisampled Waves. You can trigger a Wave to play forward or backward, starting at its beginning or at an offset point that can be specified as an absolute value or controlled by a modulation source.

The MR-Rack includes a number of Ensoniq's special Transwaves, along with more traditional sound samples in the Wave ROM. Transwaves consist of samples with multiple embedded loops, each having a slightly different harmonic structure. Sweeping the entire Wave from end to end causes dynamic timbral changes as the synth moves from loop to loop. The MR-Rack's Transwaves are the first fruit of Ensoniq's second-generation Transwave technology and are particularly good at emulating dynamic resonant-filter sweeps.

Each Layer is based upon its user-selected Wave plus an impressive variety of synthesis parameters. These parameters include three envelopes, volume, pan, detune, portamento, Mono/Poly play, LFO, effects-send levels, and Velocity-response curve. You also can specify whether the Layer responds to Pitch Bend or Sustain. Each Layer contains one fixed lowpass filter and a second filter that can be either lowpass or highpass. Each envelope can be set independently for single or repeat play. Add to this the ability to sync the LFO to rhythmic subdivisions of the system clock, and you have lots of options for creating funky grooves.

In addition to setting note and Velocity ranges for each Layer, you can also define a MIDI Control Change

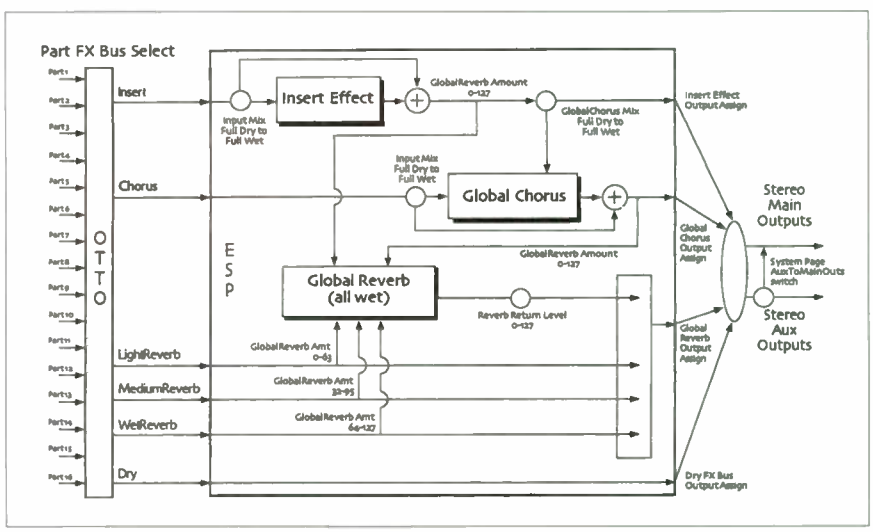

FIG. 2: In this block diagram of the effects module, arrows indicate stereo signal paths, hollow circles represent editable parameters, and circles containing "+" symbols indicate the signals are summed. OTTO is Ensoniq's voice chip, two of which are included in the MR-Rack. (Courtesy Ensoniq)

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message and value range to control whether a Layer plays. For example, this can be used to bring in additional Layers by moving the mod wheel (e.g., adding backing strings to a piano), to eliminate Layers, or to switch between different timbres in the same Sound.

This last option provides a workaround for a minor annoyance with the unit. Typically, the MR-Rack requires a full second or more to change Sounds in a Part. If you set up different Layers to respond in separate controller ranges, you can easily switch between sounds without the lag.

Several Layer parameters can be controlled in real time by a modulation source to enhance timbral dynamics or allow expressive nuances. There are 22 such sources available, including Aftertouch, Mod Wheel, the Layer's three envelopes, Velocity, note position (absolute or relative to middle C), random noise, and one of four globally defined system controllers. The same modulation source can be used to affect multiple parameters within a single Layer and/or across multiple Layers, with different amounts of modulation depth for each affected parameter.

You can use these capabilities to get around some limitations of the unit. For example, the Pan parameter for Layers can't be set to dynamically track the keyboard directly. However, you can assign the keyboard position as a Layer's Pan modulator within *Unisyn*.

A powerful sound-design feature allows one Layer in a Sound to use the parameters of another Layer in the same Sound. This is much faster than copying and pasting values, and edits to the parent Layer automatically ripple through any child Layers. Even better, you can still change parameters for volume, pan, tuning, note range, Velocity range, glide, and delay in the child Layers. Using this approach, I created a Layer based on an analog sweep, then added two child Layers, changing just the coarse tuning and portamento timing. In about one minute, I had a recognizable "Hoedown" sound.

Going further, you can have multiple parent Layers with different numbers of children in a single Sound. I hope Ensoniq extends this capability in the future so that any parameters in child Layers (e.g., filter settings, effects sends, LFO time base, etc.) can be changed while all others remain linked to the parents.

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Producers Chris Kimsey (left) and Eddie Kramer at New York's Electric Lady Studios.

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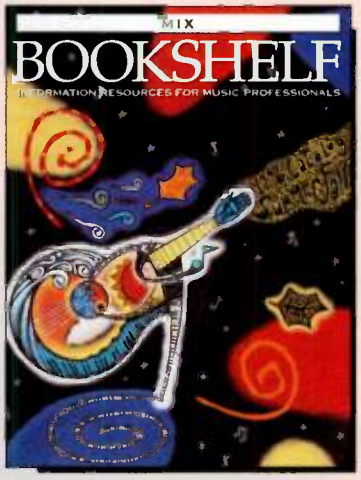

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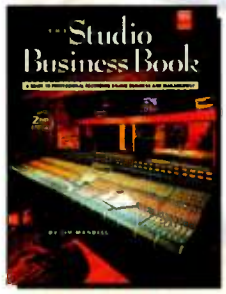

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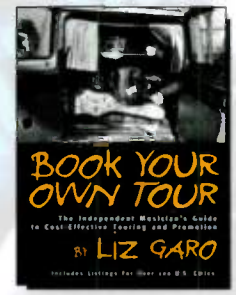
Jim Mandell
©1994, 288 pp. (P) **1319) $34.95**

Need in-depth, detailed, *specific* information on all aspects of putting together and managing a recording studio? Then this book is for you. This updated MixBooks edition of the informative, wide-ranging guide presents all you need to know about writing a business plan; getting funding; buying equipment; determining expenses and rates; bidding on projects; developing new income and contacts; advertising and PR; scheduling; managing, hiring and firing personnel and more. It also includes a reference guide to studio terms and technology, a list of industry organizations and a recommended reading list.



BOOK YOUR OWN TOUR

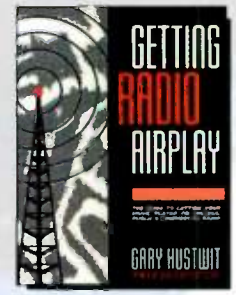
Liz Garo
©1995, 175 pp. (P) **3049) $19.95**

By far the most complete title of its kind, this book gives you city-by-city directories of clubs, promoters, record stores, radio stations, print media and other fun stuff, like where to sleep and eat for cheap. Includes sections on putting together promo packages for clubs, dealing with club owners and promoters, getting paid and using local media, as well as sample contracts and tons of interviews with folks who've been through it all. There's even a van buyer's guide and directions for building a loft! This book has it all.

NETWORKING IN THE MUSIC INDUSTRY

Clevo & Olsen
©1993, 225 pp. (P) **3052) $19.95**

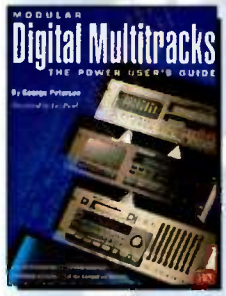
This streetwise book will show you all the ways to meet other music professionals who can help your career. You'll learn how to use music conferences, video, computer bulletin boards, music associations and the press to make valuable new contacts. It also includes candid discussions of label/artist relationships, music publishing and the indie scene.



GETTING RADIO AIRPLAY 2nd Edition

Gary Hustwit
©1993, 125 pp. (P) **3027) $19.95**

Want to get your music played on the radio (and who doesn't)? *Radio Airplay* will teach you how to get positive responses when sending out review albums. Features interviews with radio station music directors, record label promotions staff and independent artists who've done it. Includes new, updated college and commercial radio directories.



MODULAR DIGITAL MULTITRACKS: The Power User's Guide

George Petersen
©1994, 128 pp. (P) **003) $29.95**

The only book on the revolutionary new modular digital recorders! Petersen provides unbiased evaluations of the units and various peripherals; inside tips on connecting and operating them; advanced techniques for synchronization, editing and mixing; features that aren't mentioned in the manufacturers' literature and secret commands and undocumented error messages. And the book pays for itself with instructions for making your own cables and snakes!

MIX REFERENCE DISC

From Mix *magazine*
©1994, one compact disc **MRD) $14.95**

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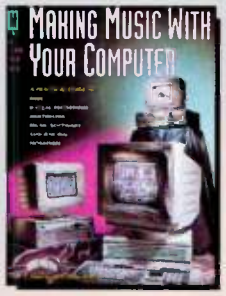
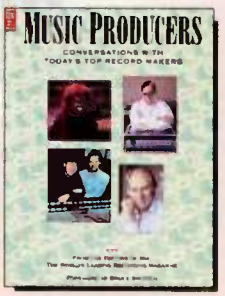


MAKING MUSIC WITH YOUR COMPUTER

David (Rudy) Trubitt, ed.
©1993, 128 pp. (P) **013) $17.95**

This book provides an invaluable introduction to the basics of computer music—whether you're a computer user just entering the world of music and sound or a musician searching for the right computer. *Making Music* will help you get the most out of today's electronic music technology by teaching you how computers contribute to the creative process; offering tips on selecting programs and gear and providing info on MIDI sequencing, music notation, hard-disk recording and desktop multimedia. It also includes a directory of manufacturers and an extensive glossary.



MUSIC PRODUCERS: Conversations With Today's Top Record Makers

The Editors of Mix
©1992, 128 pp. (P) **006) $17.95**

Twenty-four producers, including Don Dixon (R.E.M.), Bruce Fairbairn (Aerosmith), Daniel Lanois (U2), Bill Laswell (P.I.L.), Jeff Lynne (Tom Petty), George Martin (Beatles), Hugh Padgham (Sting), Phil Ramone (Billy Joel), Rick Rubin (Red Hot Chili Peppers), Don Was (Bonnie Raitt) and 13 others, discuss how they got started, how they mediate between labels and artists, what equipment they prefer, analog/digital format decisions, how they "build" a mix and much more.

MAKING THE ULTIMATE DEMO

Michael Molenda, ed.
©1993, 128 pp. (P) **017) $17.95**

This book will teach you how to record and market a demo tape—a critical step toward gaining the exposure you want for your music. You'll learn how to record killer vocal and instrumental tracks, use signal processing like the pros and make intelligent mixdown decisions. And once your ultimate demo is "in the can," you'll know how to release and promote your recording on a budget and approach record labels without wasting your time. Packed with tips from industry veterans, this book will improve both the sound of your recordings and your prospects for success.

LIVE SOUND REINFORCEMENT

Scott Hunter Stark
©1996, 310 pp. (P) **1408) $29.95**

This reprint of the classic textbook is new from MixBooks. Its simple language, detailed illustrations and concrete examples convey the fundamentals of sound reinforcement theory in an intelligent and intelligible manner, making it an invaluable resource for aspiring live sound technicians and musicians alike. Written for novice to intermediate-level users, it outlines all aspects of P.A. system operation and commonly encountered sound system design concerns, with in-depth discussions of microphones, speaker systems, equalizers, mixers, signal processors, crossovers, amplifiers, system wiring and interfaces, indoor and outdoor sound considerations and psychoacoustics.

CONCERT SOUND: Tours, Techniques & Technology

David (Rudy) Trubitt, ed.
©1993, 180 pp. (P) **004) $24.95**

Go behind the boards with today's top touring acts and learn the basic principles of live sound from the pros. *Concert Sound* combines exclusive coverage of 24 major tours, including U2, the Rolling Stones, Garth Brooks and k.d. lang, with practical chapters on live sound techniques and business, safety issues and new technologies. Special sections on monitor mixing, drum miking, noise regulations and computer control make this a unique introduction to professional sound reinforcement.

TECH TERMS: A Practical Dictionary for Audio and Music Production

Petersen & Oppenheimer
©1993, 50 pp. (P) **012) $9.95**

Keep this handy guide near your mixing console or musical instrument for precise, plain-English definitions of MIDI terminology, synth and sampler jargon, computer buzzwords and audio abbreviations. Written by the senior editors of *Mix* and *Electronic Musician* magazines, *Tech Terms* explains 300 of the most commonly misunderstood words and phrases in the field of studio recording, digital audio and electronic music.

KEYFAX OMNIBUS EDITION

Julian Colbeck
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This compendium of the previous five volumes in the *Keyfax* series includes tons of new historical information from the world's foremost expert on classic synths. Colbeck features the top 100 keyboards of all time, each with specific design history and technical information, original and current value and specs on features such as effects, storage capabilities and options. He also includes company profiles of the 13 leading synth manufacturers, plus loads of never-before-published stories about how these classic machines were conceived, designed and built and the people behind them. Finally, Colbeck provides technical specifications for hundreds of other synths, making the *Keyfax Omnibus Edition* a buyers guide like no other!

SOUND FOR PICTURE: An Inside Look at Audio Production in Film and Television

The editors of Mix
©1993, 140 pp. (P) **011) $17.95**

Sound for Picture is packed with film-scoring secrets! Take a look behind the scenes as top Hollywood sound professionals reveal how dialog, sound effects and musical scores are recorded, edited and assembled into seamless soundtracks. Exclusive case studies spotlight such blockbusters as *Terminator 2, Malcolm X, The Simpsons, The Doors, Twin Peaks* and many others, focusing on both the equipment used and the philosophical side of sound design.

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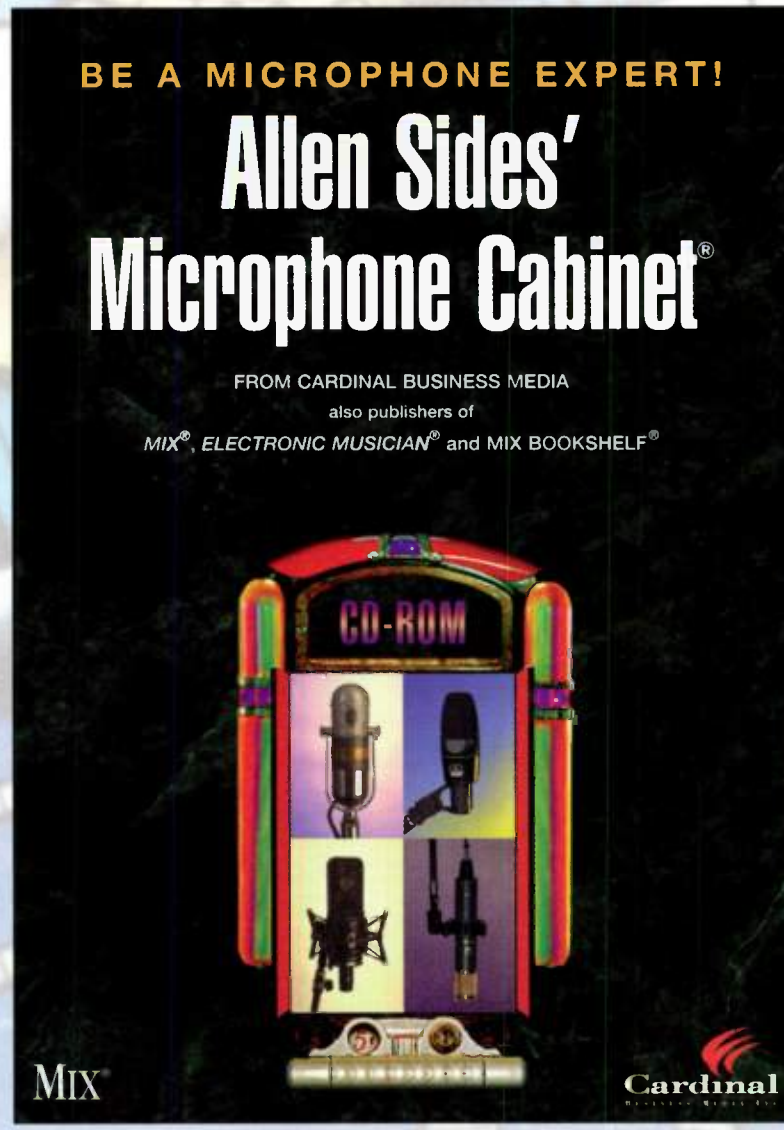

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David Schwartz, producer of this CD-ROM project, is the founder and former editor-in-chief of *Mix*.

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Founder and Chief Administrator
California Recording Institute

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Coordinator of Recording Studio Curriculum
Belmont University

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Author and musician

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- Allen Sides' "Tips" for getting the best sound from each microphone.
- A high-resolution color photograph of each microphone and the mic placement setup for each instrument.
- Complete specifications for each microphone.
- A color photograph and description of each musical instrument.
- A "Microphone Basics" section by noted author John Woram.
- A directory of the microphone manufacturers.

This amazing disc features tests of 66 mics and 33 different instruments. The microphones were chosen from the world-renowned collection at Sides' Ocean Way/Record One studios in Los Angeles. Sort by microphone to check out the best instruments for each, or sort by instrument to see which mics you should use. **Item MC) $69.95** plus $9.95 shipping and handling.

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EDITING SOUNDS

At the Sound level, you can access 45 ROM tuning tables that provide a good representation of traditional, ethnic, and modern scales. Several tables are specifically designed for certain instruments, such as bagpipes, sitar, and mbira. The manual claims that one RAM tuning table can be loaded via SysEx using the MIDI Tuning Standard, but it offers precious little information on how to accomplish this. Free Play Productions' *World Music Menu* synth-tuning software (see review in the September 1995 issue of **EM**) is being updated to support the MR-Rack. Available for both Mac and Windows, the program offers more than 120 predefined tunings and is scheduled to allow user-defined tunings in an update sometime this year.

You can define separate up and down Pitch Bend ranges (±12 semitones) for each Sound but not for each Layer. Although you can enable or disable the response to Pitch Bend for individual Layers, those that respond do so over the same range. Given the degree of synthesis control at the Layer level, I'm a bit disappointed you can't define Pitch Bend ranges for each Layer. It would be cool to bend a single Sound from unison into a chord. On the definite plus side, however, the MR-Rack lets you bend selected notes in a chord *à la* the Key Bend capability of some Kurzweil synths. This is great for classic pedal-steel guitar sounds and similar effects.

Pressing the Save button triggers the MR-Rack's storage routines for Sounds, Effect Setups, Drum Kits, and Performances to the RAM bank or PC card. However, there is a twist here: the number of Sounds stored per bank is determined by the total number of Layers used. The maximum capacity is 128 Sounds per bank, but this can decrease to 20 or 30 if each Sound uses sixteen Layers.

PARTS AND PERFORMANCES

Each of the sixteen Parts acts as an independent synth element in the multitimbral unit. Parts are directly editable from the front panel or with *Unisyn*.

Standard parameters for each Part include the selection of the Sound to be played, MIDI channel, Volume, Expression, Pan, coarse and fine tuning, tuning table, glide (portamento) on/off and time, effects bus, note range, and Velocity range. A nifty Velocity Polarity parameter determines whether the Part gets louder or softer as a function of increasing Velocity. This feature provides a simple way to create crossfades between two Parts. Multiple Parts can be set to the same MIDI channel to create splits and layers. The Mute/Solo button lets you isolate single Parts or groups of Parts from the overall mix, which is very handy when adjusting Parts that play on the same MIDI channel.

Several synthesis parameters are duplicated at the Layer and Part levels. These include Pan, Volume, Pitch Bend range, detune, glide on/off and time, note range, and Velocity range. You can force the Sound to adopt the Part settings or default to those programmed into the Sound. For example, this could be useful if you were

ROM TO GROW

ROM Sounds and Performances can be added to the MR-Rack using preloaded PC (PCMCIA) ROM cards and internal Wave Expansion Boards. Installing any of these options automatically updates the SoundFinder database with the new timbres and locations. These cards and boards will also be compatible with the forthcoming MR-61 and MR-76 keyboard models. The first ROM card is entitled *The Syn-Thesis Collection* and will contain 180 Sounds, 32 Performances, and a new demo. The card focuses on synth sounds and retails for $99.95.

Wave Expansion Boards are designed for simple user installation that does not violate the synth's warranty. Up to three boards can be installed in the MR-Rack. The boards contain different amounts of ROM memory; the synth can accommodate a maximum of 84 MB of ROM, including the stock 12 MB that comes in the unit. Planned titles in the series include "World" (24 MB, $500), "Drums" (2 MB, $119.95), and "Dance/Hip-Hop" (24 MB, price tba).

I was able to obtain the "World" board for my review unit. Installation was easy; I simply removed six screws, pushed in the board, and replaced the screws, all of which took about three minutes. The board comes with a useful, well-written manual that lists all the new Sounds and Waves and offers informative notes describing each instrument and its SoundFinder timbre category. The price of the board is about a third that of the entire MR-Rack, which may be expensive, but it doubles the number of ROM Sounds.

The EXP-1, aka "World," adds four banks of Sounds, including 442 new Waves, 523 Sounds, and nine demos but no Performances. Most of the new Sounds are of African or Asian origin, but there are representatives from Europe, the Americas, the Middle East, and Australia, as well. A large number of the new Sounds are drums, percussion, and bells. These could be incorporated into custom drum kits to mix standard Western drums with more exotic sounds. As with the regular MR-Rack Sounds, the sonic quality is high.

Several wind/reed Sounds feature unusual playing techniques and make good use of appropriate alternate tunings. Examples include "Shaku Riffs" with an explosive breath attack, "Pincuyo Phs" with a trilled phrase rather than a single note, and the drone-plus-beat of "Didjeridu 2." There are also a number of vocal phrases, many from Kabuki theater, which are great for livening up a groove, and rhythmic loops of winds and drums.

I enjoy combining unusual instruments with typical Western instruments and found a wealth of useful sounds in the "World" board. Ensoniq chose to keep these world instruments "pure," whereas I would have liked some hybrid Sounds that combine world and Western timbres. However, it's easy enough to create your own hybrids. I would recommend the World expansion board to any musician who is looking for a wider timbre palette.

auditioning a variety of string Sounds and wanted to keep a constant pan position within the overall Performance instead of changing it with each new selection.

Perhaps to compensate for requiring an external editor for Sound and Layer programming, the MR-Rack provides an extended set of Part parameters to adjust the underlying Sound. These values are added to the corresponding Sound parameter values, including the attack, decay, and release of the amplitude and filter envelopes; filter cutoff; delay time; and LFO rate, depth, and delay. These Part parameters come in handy when you just want to tweak a stock Sound or create a set of variations of a given Sound (e.g., creating a violin quartet from a single violin). Version 1.5 of the MR-Rack's software also lets you replace the Sound parameter values with these Part parameter values if you wish.

A special Velocity Mode parameter remaps all incoming Velocity messages to a defined value, which ensures that specific Velocity-sensitive timbral components are always played. In practice, I found this parameter of marginal use. After all, you already know whether such components exist in Sounds you create and what their Velocity trigger points are. However, this information is not provided in the manual for ROM presets, which means you must hunt through them with *Unisyn* to find suitable candidates.

A global parameter controls whether Part parameters remain unchanged when a new Sound is selected or adopt the parameter values of the new Sound. A number of filtering parameters let you tailor each Part's ability to respond to MIDI Bank Select, Program Change, a variety of common controllers, and the four user-definable system controllers.

INTRODUCING THE STAK

The Stak is a new construct that provides an alternate way of creating splits and layers. Rather than assigning each Part to its own MIDI channel, you can assign the Parts to a Stak, which responds on a single, assignable MIDI channel. Changing the Stak channel instantly causes all Parts in the Stak to respond on the new channel. A Stak Coherence parameter forces the MR-Rack to play all Sounds in the Stak at the same time.

Each Performance includes its own Stak. To protect you from inadvertently changing your split/layer configurations, Staks do not respond to Bank Select or Program Change messages. Depending on the number of Sounds in the Stak and their complexity, overall performance may become a bit sluggish with this feature, because the unit must line up all the Parts to fire in sync from one note to the next.

DRUM KITS

There are 24 ROM drum kits: thirteen based on Ensoniq's standard keymap and eleven based on the General MIDI map. The MR-Rack supplies 422 drum sounds in ROM. Unfortunately, these are not listed in the manual, so plan to spend some time hunting through the selections to find what you want.

Each drum kit can contain up to 64 user-selectable Sounds, which are not limited to drum or percussion hits. You can create a custom drum kit that has individual settings of Volume, Pan, detune, and effects-bus routing for each drum note. These parameters can be edited from the front panel or through *Unisyn*. The customized drum kit can be saved as a new Sound or a Drum Kit with each Performance, which is handy if you use different Performances for different song styles; the drum kit automatically changes to match the new style.

SOUNDFINDER

By far one of the MR-Rack's coolest features is the SoundFinder, an onboard database of all Sounds, Drum Kits, Performances, and demo sequences available in ROM, RAM, PC card, or Wave Expansion Boards. To use this innovative feature, you turn the left front-panel knob to select one of 44 sound categories (e.g., Acoustic Guitars), then turn the right knob to scroll through all available Sounds of that type in alphabetical order (e.g., "12 String," "Lute," and "Nylon Guitar"). As each Sound appears, the LCD reveals its name and location (bank name, Bank Select number, and Program Change number).

In addition to sorting by type of sound, you can select by location—for example, all ROM Sounds or all General MIDI Sounds—and there is a complete alphabetical listing of all the Sounds in the unit. You can even create

SOUND PROGRAMMING

You can't edit MR-Rack Sounds or Layers without a computer and external software, so it's fortunate that Ensoniq will ship you a free customized version of *Unisyn* just for returning your new MR-Rack's registration card. This program is dedicated to work only with the MR-Rack and equivalent models and is available for Mac or Windows.

Regular *Unisyn* owners can simply add the MR-Rack Profile to their system. Updated Profiles will be stored at the Ensoniq Web site as they become available. Ensoniq is working with Emagic and Sound Quest to add MR-Rack support in their patch-editing software (*Sound Diver* and *MIDI Quest*, respectively). Presumably, other editor/librarian developers will add MR-Rack support in the future.

The current *Unisyn* Profile supports Layer, Sound, Drum Kit, and Performance editing. Although functional, it is somewhat bare bones relative to Profiles for other instruments that *Unisyn* supports. In particular, the ROM banks and Sounds are identified only by Bank Select and Program Change numbers. This ought to be updated to use the actual names; cross-referencing by number is very tedious. Ensoniq and MOTU plan to release an updated Profile with the release of each new Wave Expansion Board.

The MR-Rack Profile lacks one important function: it cannot change or edit a Sound's Insert Effect. You must do this on the unit's front panel, then update the Sound parameters back into *Unisyn*. Ensoniq expects to add this capability in a future Profile update. Otherwise, the customized version of *Unisyn* works faithfully and improved my efficiency. It's also a valuable means to understand the MR-Rack's synthesis capabilities, which is especially important given the paucity of information from Ensoniq.

one Custom category of your favorite Sounds for rapid access, but this requires the *Unisyn* editor. I'd rather just add and subtract Sounds to and from the Custom category while auditioning them by double-clicking a front-panel button. You can also select the demo sequences; five come with the MR-Rack, and others can be added with ROM expansions.

Speaking of auditioning, the MR-Rack's Audition button works seamlessly with the SoundFinder to speed up the hunt for that perfect sound. Say

▼

By far one of the MR-Rack's coolest features is the SoundFinder.

you're looking for a good bass sound. You dial up the Bass category, select an offering, and press the Audition button. The MR-Rack responds with a short musical phrase that uses the Sound in an appropriate idiom. Don't like that choice? Turn the knob to the next selection and audition it.

Turning the selection knob while a Sound is auditioning immediately cuts off the Sound, so your time isn't wasted if you want to move on. Switch to a different Sound category, and the music changes to a different sequence that is appropriate for the new timbres. Changing a system-level parameter causes the Audition button to play octaves or a major chord (simultaneous or arpeggiated) instead of the sequences.

EFFECTS

The MR-Rack's onboard effects are capably handled by Ensoniq's new ESP-2 effects chip, which provides six stereo buses mixed to the Main or Aux outputs (see **Fig. 2**). One bus is dedicated to chorus, one to the dry signal, and one to an Insert Effect (a grab bag of 40 various and wonderful algorithms, which I'll discuss shortly). The other three buses are dedicated to light, medium, and wet (heavy) reverb. The send level is user definable for each bus. This arrangement makes sense in some ways, but having the three reverb buses defined by reverb depth seems pretty strange. Why not just have three parallel reverb buses with user-adjusted depth as well as amount?

Each Part is assigned to one of these six buses in a Performance setup. However, the internal routing allows you to feed the chorus into the reverb and the Insert Effect sequentially into the chorus and reverb to greatly enhance the processing capabilities. Eight reverb presets are provided along with twelve for the chorus. These can be used directly or can serve as the starting point for user programs. The reverb and chorus effects have user-adjustable parameters, but unfortunately, neither effect supports real-time control.

The Insert Effects are much more interesting both in scope and capability. These algorithms include such standards as high-quality reverb, delays, EQ, and rotary speaker; combinations such as reverb into flanger or EQ into compression into gating; and brand-new toys such as the Chatter Box and a Formant Morph for "talking synth" effects. As with the global reverb and chorus effects, each of these 40 Insert

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Effect algorithms includes several parameters. Five to 32 parameters are available, depending on the algorithm. These parameters are very well documented in the manual. Even better, you can specify any one of an Insert Effect's parameters to be controlled by the real-time modulator of your choice.

Each Sound contains an Insert Effect as a synthesis parameter. Within a Performance, a Part is selected to be the Insert-Effect master; the Insert Effect contained in its Sound is then used for all other Parts. Double-clicking on the Effect button bypasses all effect buses for fast wet/dry comparisons.

The Performance-level Effects Bypass parameter provides more selective control, allowing you to bypass the reverb, chorus, and Insert Effect individually or in any combination. This is quite useful for assessing the contributions of individual components within the entire effects scheme.

Overall, the MR-Rack's effects capabilities and sound quality are good. My only disappointment was the limited amount of real-time modulation.

SOUND QUALITY

Obviously, I can't review the individual merits of more than 400 Sounds, so I'll offer a few general comments on the various sound families and mention some standouts.

The synth's overall sonic performance is very good, as I expected from its 18-bit DACs, its 44.1 kHz sampling rate, and its claimed 103 dB signal-to-noise ratio. It's interesting, however, to hear the differences between General MIDI Sounds (which are on par with similar units) and their counterparts in the "regular" MR-Rack Sounds, which typically sound much better.

The standard instrument emulations range from average to excellent. The acoustic and electric pianos, organs, strings, and guitars are among the better sounds and offer many options. I particularly like the "StereoGrand" acoustic piano and would have no concerns about using it solo. It has a wide dynamic-response range and a good balance between dark and bright coloring. To my ears, none of the pianos have enough attitude for strong rock parts, but there are lots of good backing-part selections.

Pipe organs are well represented, as are drawbar organs. Several of the drawbar organs have neat rotary-speaker effects driven by Aftertouch. The first time you send Aftertouch messages, the rotation speed increases. It stays at this speed as you play unless you send more Aftertouch, which causes the speed to decrease.

The strings sound good and are immediately useful both as solo voices and in various combinations. The guitars are also pretty good and cover a variety of timbres, including one of the better acoustic 12-string samples I've heard. I also enjoyed "CaptCrunch," a powerful, distorted electric sound with feedback invoked by Modulation messages.

Vocals are typically a weak point in similar synths, but the MR-Rack offers several that are surprisingly good. One of the more fanciful is "Chatty Aahs," which uses the novel Chatter Box effect with real-time Aftertouch modulation to give an interesting pad or sci-fi sound. "Nutmeg" is another vocal-based pad that has nice animation and real-time panning.

The brasses and woodwinds are about average: there are no real clinkers and no special winners. Saxes are only available as solo voices; there are no sax sections. Some have "breathy" variations, which are okay with a light touch but bring in far too much breathing noise when you use Aftertouch. The French horn has nice tone but lacks any attack growl, and several of the brass sections seem too buzzy.

The synth-based Sounds let the Transwaves shine. The MR-Rack is loaded with lots of fat, analog-like sounds, recreations of classic synths, lively sweeps that belie the unit's lack of resonant

Product Summary

PRODUCT:
MR-Rack synth module
PRICE:
$1,695
MANUFACTURER:
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EM METERS	RATING PRODUCTS FROM 1 TO 5
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EASE OF USE	● ● ● ●
QUALITY OF SOUNDS	● ● ● ◖
VALUE	● ● ● ●

filters, and other patches that really show off the unit's capabilities. These Sounds are arranged in categories for comping, leads, pads, vintage instruments, and the always popular "other." Many of these patches provide great ear candy with lots of animation and real-time modulation controls.

Unfortunately, there's often so much going on with these Sounds that I can't do them justice in a few words; you really need to listen for yourself. Some cool ones to look for include "Churbles," "Real Rezz," "Atomic Lead," "Dreamwave," and "MR-orphing." You'll think you're playing a Korg Wavestation or Waldorf MicroWave.

THE WRAP-UP

Overall, I like the MR-Rack for its ease of use, sound quality, and powerful synthesis capabilities. It's a natural fit for session players who need quick access to a library of great sounds, thanks to the SoundFinder. The MR-Rack also makes a good choice for home musicians looking for their first expander synth to go with a keyboard. Much of the potential in its synthesis engine remains to be tapped; third-party programmers can keep busy cranking out new Sounds for some time to come.

Although some potential users may be turned off by the need for external editing software (especially the few surviving Atari and Amiga owners, who have no editing software for this unit), I agree with Ensoniq's logic. I'd hate to navigate the MR-Rack's Sound and Layer programming from a 2-line LCD. Computers have become an integral part of most MIDI setups, so it makes sense to take advantage of them.

If you like what the MR-Rack can do, but you need keys, Ensoniq will soon release two keyboard versions: the MR-61 ($2,595), which will feature a 61-key, synth-action keyboard; and the MR-76 ($2,995), which will have 76 keys and a weighted action. These synths will be based on the MR-Rack synth engine and also include a 16-track sequencer, floppy-disk drive, and a 4 MB flash memory expansion board that lets you import samples from Ensoniq EPS/ASR floppy disks and WAV files. In addition, the SoundFinder will be extended to handle drum patterns along with Sounds and Performances. Any way you slice it, the MR-Rack represents an excellent combination of features, ease of use, and sound quality.

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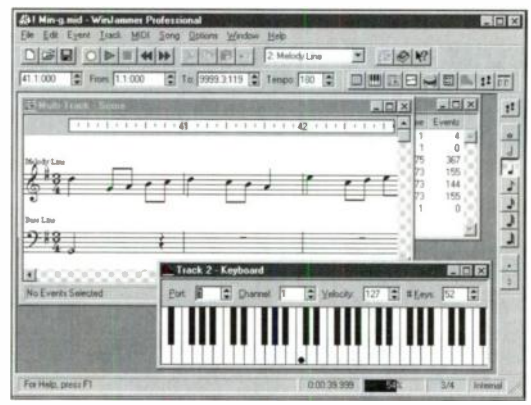

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Hohner Midia Personal Composer 1.2 (Win)

By Dennis Miller

One of the first notation programs is still among the best.

In the early days of MIDI, one program stood out for its ability to record a MIDI performance, play it back, convert it into standard music notation, and print it out as sheet music. *Personal Composer* was the first program to offer such capabilities on an IBM desktop computer, and it soon evolved into an integrated package by adding full-blown sequencing and an open-ended MIDI programming language.

Originally developed by the late Jim Miller (not the sound designer and **EM** author of that name) and marketed by Personal Composer, Inc., the program is now distributed by Hohner Midia. In its current version, *Personal Composer* 1.2 for Windows 3.1 and Windows 95, the sequencing and programming capabilities are mostly gone. What remains is one of the most powerful, easy-to-use notation programs around.

Personal Composer requires an IBM compatible running Windows 3.1 or later. The program works well under Windows 95, and it has a configuration option that assures conformity with Win 95's look and feel. The minimum configuration required is an 80386 with 4 MB of RAM, but the company recommends an 80486/33 with 8 MB or better. I ran *Personal Composer* on two machines: an 80486/66 with 16 MB of RAM running Windows 3.1 and a 133 MHz Pentium with 24 MB of RAM running Windows 95.

During this review, I used *Personal Composer* to complete several projects. First, I transcribed a complex piece for string trio that I wrote some years ago. Next, I notated a 4-horn combo arrangement in full score, playing most of the parts on a MIDI controller. Finally, I imported several long MIDI files that were created in my sequencer.

FROM THE TOP

At the top of *Personal Composer*'s main display is a set of menus and a toolbar; the rest of the screen is devoted to the score area (see **Fig. 1**). The two primary working views are Scroll View, in which your music appears as one horizontal stream of measures, and Page View, which more closely resembles a printed score page.

There are over two dozen zoom levels, and an option called Open Page lets you view two separate sections of the same file or two different files simultaneously. A handy Auto Scroll option lets you see additional areas of your score just by moving the cursor to the borders of the screen.

Personal Composer provides a huge number of parameters to control the size and spacing of various notation elements. The Musical Metrics dialog box from the program's Options menu includes controls such as beam and stem width, slur and tie size, and spacing for brackets, braces, accidentals, and clefs (see **Fig. 2**). Many of these settings can be overridden for individual elements in the score. For example, you can click on an accidental and move it closer to or farther away from a note or change the width of an individual slur or beam. However, other parameters are global and cannot be adjusted on an individual basis.

Like Passport's *Encore* and Coda's *Finale*, *Personal Composer* organizes various musical elements into palettes. For example, the Notes palette contains note and rest symbols from a breve (double whole note) to a 128th note in addition to accidental and tuplet marks (see **Fig. 3**). It also provides access to subpalettes containing numerous ornaments and accents. The other palettes are Graphics, Performance, and Text. Any number of palettes can appear on the screen at once, but you can't save a custom arrangement of palettes as a default the way you can in *Encore*.

There's also a separate Staff Tool for making adjustments to staff attributes, a Pointer for selecting and editing symbols, a Zoom tool, and individual menus for Page Layout and Page Setup. The program's editing functions are found in pull-down menus, and many of them can also be invoked with keyboard shortcuts called QuickKeys. Overall, the features are well organized and easy to access.

ENTERING NOTES

When you select a note or rest from the Notes palette and click in a staff, *Personal Composer* automatically aligns the symbol according to the spacing option you've specified. Auto mode gives extra space to short notes, which makes the music easier to read, and Proportional mode spaces notes relative to their length. (For example, quarter notes receive twice as much space as eighth notes do.)

By default, the cursor moves to the next beat position after you enter a

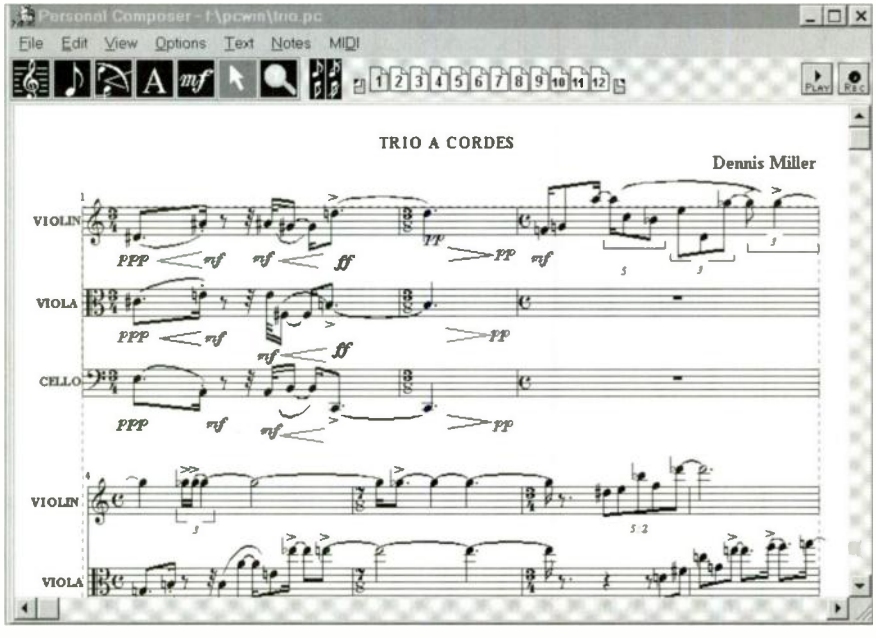

FIG. 1: *Personal Composer*'s main screen is devoted primarily to the score area. It also includes menus and tool icons to access the major functions.

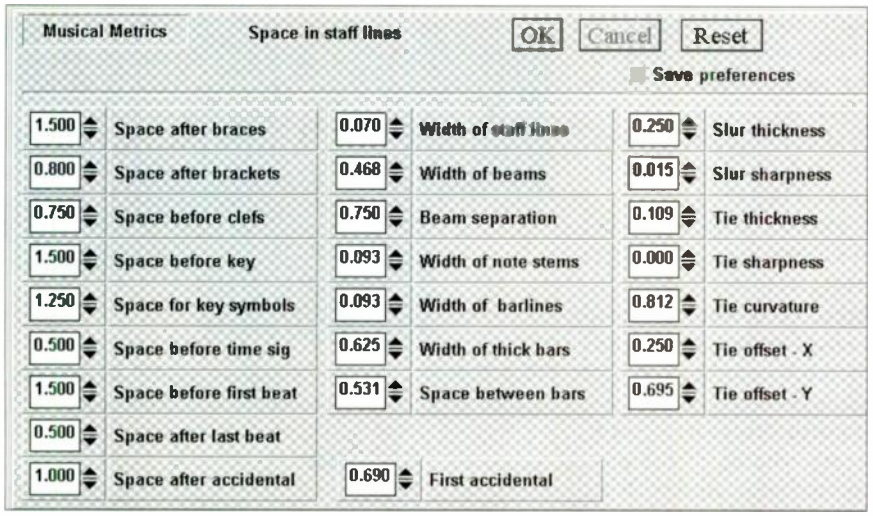

FIG. 2: Numerous aspects of a score's appearance can be specified in the Musical Metrics menu. Many of these parameters can be overridden directly in the score.

note, although you can turn this feature off when entering shorter note values or building chords. A similar option, called Quantize Mouse, changes the way that the cursor behaves as you move vertically. In addition, it is easy to "override" the time signature in any measure so you can continue to enter notes beyond the measure's specified duration.

Using the program's Spread Changes function, any horizontal adjustments you make to notes in one staff will be reflected in all of the staves, which is a huge time saver. This type of flexibility is common throughout *Personal Composer* and reflects its designers' attention to detail. The program also supports many modern notation conventions, such as fanning beams and cross-staff beaming.

Ornaments and articulation marks can be added to notes automatically, and nearly any note symbol (including more than a dozen alternate note heads) can be selected from the computer keyboard. If you hold down the Shift key when entering a note, you get a rest of the same duration. In addition, you can change the duration of an existing note by highlighting it and pressing the square bracket keys to increment or decrement the note's value.

I found that the best way to move around the score for note entry was to use my left hand to select durations on the computer keyboard and my right hand to specify pitches with the mouse. This also worked well when editing, because you can move from one note to the next using the Tab key.

My only complaint about note entry involves tying two notes together. Rather than following the usual convention of tying from the second note back to the first, *Personal Composer* only supports tying forward; after entering the second note, you must go back to the first note to tie them together. You can use Shift-Tab to backtrack, but you waste a lot of keystrokes. (The manufacturer claims this will be remedied in a future version.)

PRESS ENTER NOW

Personal Composer lets you include up to four voices on a single staff in addition to an "auxiliary" voice that you can use for grace notes or trills. Specifying voice parts is simple, but I wish the icons for the different voices were just numbers rather than small note icons, which are easy to confuse.

Notes can also be entered from a MIDI controller in step time or real time, and a Punch In/Out function lets you begin and end recording anywhere in the score. *Personal Composer* can split notes into two staves (even noncontiguous staves) while recording, and its quantization options are as advanced as those in many sequencers. These options include separate settings for Note On and Note Off and the ability to modify note durations to fill gaps and remove overlaps. You can even retranscribe a recording by capturing the performance and then experimenting with

different transcription options, such as quantization. I haven't seen this feature elsewhere. It uses considerable additional memory, but it's a valuable feature nonetheless.

Personal Composer handles text and lyrics as well as any program I've seen. Most useful is the ability to create lyrics in another Windows application and paste them into your score. As with direct lyric entry, every syllable of the pasted lyrics remains associated with a note; if that note is moved or deleted, the lyric goes with it. In addition, up to four lyric lines can appear under any part. In other programs, text pasted from the Clipboard would simply appear as a text block with no connection to individual notes. The program also includes a versatile text-entry mode for adding any other type of text anywhere in the score, and you can even associate a text block (e.g., an entire line of text) with an individual note.

An option called QuickFonts lets you set up "font macros." For example, if you want to use the same font and typeface for all of a performer's notes, you can create a QuickFont with the desired attributes and name it. Then you can select it in a single step from the QuickFonts menu.

Personal Composer also offers a separate mode for creating and preformatting text blocks that includes some sophisticated desktop-publishing options, such as adjustable letter spacing and leading. It will also display nonprinting guidelines on the screen to help position text or graphics more easily on the page.

FIG. 3: *Personal Composer* organizes musical symbols into palettes and groups them according to their function.

EDITING

Personal Composer's editing approach lets the user define how certain functions behave. One of the basic options is a feature that determines how some system-editing functions work. For example, if you set the formatting to Absolute mode in Scroll View and change the spacing of staves in one system, the change will be applied throughout the entire score. If you use this mode in Page View, only the current page is altered. Relative formatting provides even more options. If you've already formatted your score so that the staves on different pages are spaced differently and you decide you'd like them all to be just a bit wider, Relative mode will do the job.

Other types of edits use the common practice of highlighting a region and either selecting an edit function from a menu or using keyboard shortcuts. For example, changing note size, adding staccato or legato marks, transposing, and making enharmonic changes can be accomplished with little effort. Copy options include copying all or part of individual measures, one or more staves in a system, entire systems, or entire pages. In addition, you can quickly copy a single measure or column of measures in a system using keyboard shortcuts, and you can move data between two open files.

There are several useful paste options, such as transposing notes up or down an octave when pasting and specifying whether notes will retain their original pitch or their staff position when pasting to a new clef. Unfortunately, there's no paste option that lets you

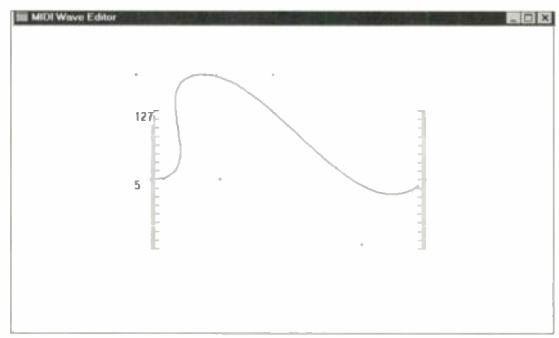

FIG. 4: The MIDI Wave Editor provides a graphic way to control time-varying events, such as tempo changes and crescendos.

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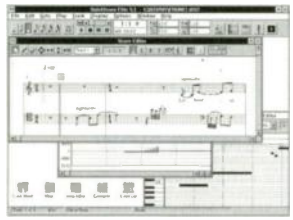

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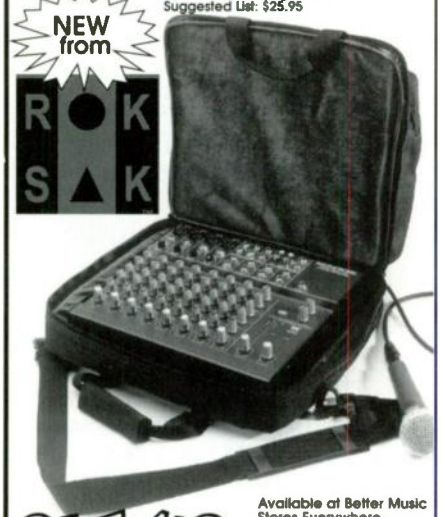

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replace the existing music in a measure, which is a major omission.

I'd also like to see more ways to select specific areas for editing, such as the ability to double-click within a measure to select it or the ability to click to the left of a staff to highlight the entire line. (Both of these features are found in *Encore.*) A Select All function would also be useful.

PLAYBACK

Personal Composer's versatile MIDI options let you specify the performance attributes of your music on many different levels. You can alter specific parameters of a single note, such as its attack, release, and Velocity offsets. For example, if you have a 4-note chord that you want to arpeggiate, double-click on each note using the Pointer Tool and increase its attack offset by ten or twenty ticks from the previous note. (The resolution is 1,024 ticks per quarter note.) If you want the last note of the chord to occur right on the beat, you can use negative attack offsets for the other notes. If you really want to fine-tune the sound, you can even set a positive or negative release offset so the chord will end exactly where you want it to.

Adding a MIDI event anywhere in a part is also simple: just select the MIDI icon from the Performance palette, specify the desired event in the MIDI subpalette, and click at the point where you want the event to occur. Like *Finale, Personal Composer* provides dozens of symbols to represent arbitrary MIDI events, and it's quite easy to change the characteristics of these symbols. For example, you can define the range of a crescendo so it moves from a value of 10 to 37 over six measures. Unlike *Finale,* however, *Personal Composer* does not let you design your own arbitrary shapes.

Performance attributes for an entire staff are specified with the Staff Tool, which lets you select default Program Changes for each of the four voices on a staff as well as a global Velocity offset. In addition, an envelope generator lets you shape accelerandos and ritards or scale other MIDI controller data. This feature, called the MIDI Wave Editor, resembles the graphic-controller editors found in many sequencers (see **Fig. 4**). Other performance options include swing eighth and sixteenth notes and a configurable Looseness feature; both of these features are available in the 44-staff version only.

Personal Composer provides yet another nice touch I haven't seen before in a notation program: a mixer that can send Velocity or any Control Change data in real time. The mixer also includes a slider for changing the tempo during playback, which can be adjusted with the Control-Plus/Minus keys on your computer keyboard. Individual channel-solo buttons and a master volume fader round out the mixer controls. The only thing missing is the ability to record fader movements.

PRINTING

Personal Composer offers many printing options, including the ability to print to the Windows Clipboard, which lets you use your notation in other Windows programs, such as a word processor. There are ten preset staff sizes (eight standard engraver's sizes plus two larger ones), and you can specify custom heights from ⅛-inch to four inches per staff. Several standard page sizes are also supported, and you can easily configure your own. An option to select single- or doubled-sided printing is especially useful if your music will be bound.

Overall, the printout on my aging LaserJet II was excellent, marred only by slightly jagged diagonal beams. All other symbols and text were very sharp and suitable for nearly any professional purpose. The only other problem I have with the printing function is the fact that *Personal Composer* prints MIDI performance symbols by default, and you can only hide them one at a time. I would prefer if these symbols were not printed by default because in most cases these symbols are irrelevant to a live performer.

SUMMARY

It has been a while since *Personal Composer* figured as a key player in the MIDI world, but it's clear that the program has regained much of its lost momentum. Throughout the review period, the software was completely stable and bug free.

The program's best traits are its transcription and performance features. Whether you're doing lead sheets, small combo arrangements, or large ensemble scores, it has many features that make the job less of a chore. With few exceptions, the print quality is excellent, and you have exacting control over the appearance and playback of your score. *Personal Composer* is also highly configurable, and it provides the quickest and easiest part extraction I've seen.

Personal Composer offers a unique approach to pricing. An 8-staff version of the program sells for $69, a 16-staff version is $139, and the maximum 44-staff version lists for a very reasonable $199. Most aspects of these versions are identical, except that the smaller versions support fewer MIDI ports and include fewer playback options. A demo version of the program is available, which includes a bound manual.

Having worked with nearly all the major notation programs for DOS and Windows, I rank *Personal Composer* very near the top of the pack in ease of use, print quality, and editing features, and its performance options are second to none. Despite the current trend toward integrating professional notation capabilities into sequencers such as Steinberg's *Cubase* and Emagic's *Logic Audio, Personal Composer* is worth considering if you have serious notation needs, and it's certainly worth looking at if you're doing less complex work.

On a personal note, it's great to see the return of a program that was such an innovator in the MIDI world. Welcome back! ❦

Product Summary

PRODUCT:
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Mackie UltraMix

By Rob Shrock

It's easier than ever to automate your mixes.

Some recordists long for their mixes to sound as detailed as those on their favorite CD produced by Mr. Bigshot. Others wish they could push the clock back three days and seven mixes ago, really shake their hair, and crank that lead guitar solo to twelve because the amp only went to eleven. And practically all of us want tracks so squeaky clean that clients will believe they were recorded at a "real" professional studio and will call us again with more work.

Well, no more excuses—automation is the answer, and it's here for everyone. And it's from Mackie. The UltraMix Universal Automation System is designed to provide flexible, affordable automation for any mixing console with up to 128 channels and master outputs. It is easily integrated into the signal flow of an existing studio setup and can be readily bypassed at any time. The system runs in both Macintosh and Windows 95 environments, and files between the platforms are easily interchanged.

UltraMix is not a total-recall system such as you might find on expensive megaconsoles (e.g., SSL, Neve, or Euphonix) or even the Yamaha 02R. It automates levels and muting only; you'll have to document the other parameters (equalization, effects sends, pan settings, etc.). Control of levels and mutes, however, is the primary allure of automation, and here Mackie really delivers the goods.

STURDY HARDWARE

The heart of the UltraMix is the Ultra-34 Universal Automation Interface, a 2U rack-mount box that houses VCA-based gain cells for 34 channels of audio control. The Ultra-34 is solidly built and sports 68 ¼-inch jacks on the back panel and 68 more on the front. Each of the 32 channels and the master left and right buses have ¼-inch Insert/In and Out jacks on the back. The Insert/In jack (TRS) can function as an in-and-out audio path, or it can serve as an input if the separate Out jack is used in an unbalanced TS wiring scheme.

Also located on the back panel are MIDI In and Out jacks, which are the proprietary connections to the interface unit, and a standard IEC 3-prong power connector. (Kudos to Mackie for continuing to build internal power supplies into their products.) The audio connections on the front are labeled SND and RTN (rather than Insert/In and Out). The front jacks can also be used to patch in auxiliary effects units for a channel. The UltraMix manual provides an extensive set of signal-flow diagrams that show different ways of patching the Ultra-34 into your studio setup.

Mackie recommends locating the Ultra-34 near your patch bay for convenient patching to external equipment. My only complaint is that the jacks are so tight it's difficult to insert and remove patch cables. That's okay for permanent connections, but it's an annoyance when patching in other devices. A Mackie rep said the jacks should loosen up over time, but I noticed no difference over the weeks I used the unit (although I didn't exactly give the front panel a thorough workout). A bypass switch, when engaged, leaves your original setup virtually untouched.

Accompanying the Ultra-34 is the UltraPilot Control Interface, an elegant control box providing sixteen 100 mm faders and various control buttons for use while automating your mixes. Although all UltraPilot functions are also available in the software, the hands-on control with buttons and faders really makes this system sing. Similar in appearance to the Mackie 8•Bus consoles but with a more sturdy feel, the UltraPilot has smooth faders that are a pleasure to use. However, the blue-on-white silk-screened function names above the faders aren't as easy to read as the rest of the labels on the UltraPilot. (At first I overlooked the feature that allows you to view channel banks because I didn't see the writing on the face plate.)

The UltraPilot connects to the Ultra-34 by means of a special 10 BASE-T (Ethernet) cable that looks like an oversized phone cord. Although these cables are not readily available, Mackie can supply you with a backup cable. Fortunately, the cable is very sturdy. It's also quite long (25 feet), which allows you to locate the UltraPilot wherever you want. If you need more than 32 channels of automation, just add more Ultra-34s to the setup. Up to 128 channels can be controlled from one UltraPilot.

SOFTWARE

Mackie is now shipping the UltraMix System with *UltraMix Pro* 1.11 software for Macintosh and Windows 95. If you plan on running other applications alongside *UltraMix Pro,* you will need to have a fast computer with lots of RAM. (The software consumes 3 to 5 MB of RAM.) I ran it on a Macintosh

Mackie Designs' UltraMix Universal Automation System offers affordable level and mute automation for practically any mixer.

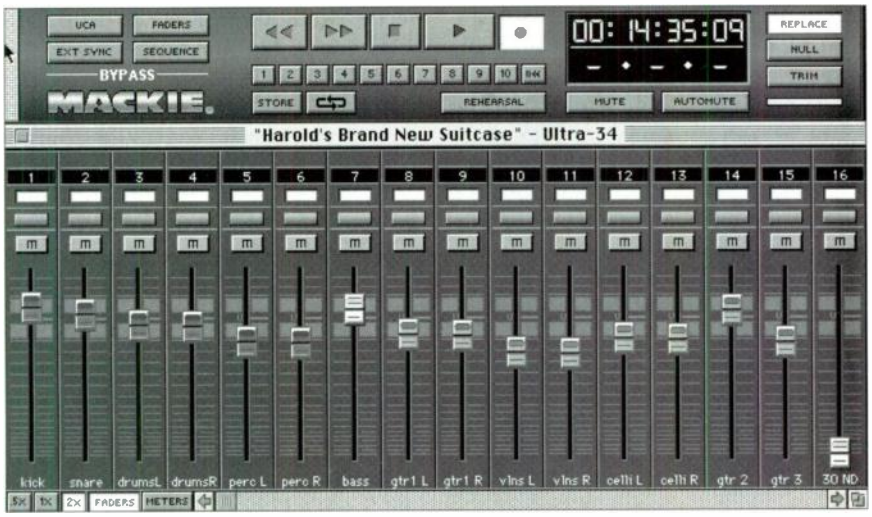

FIG. 1: All recording functions are available from *UltraMix Pro*'s Transport window and from the UltraPilot Control Interface. Fader resolution can be changed by clicking on the buttons in the lower-left corner of the Fader window. Subgroups are designated by the different colors of the individual faders.

Duo 280c (33 MHz 68040LC) with 12 MB of RAM and could barely launch both *UltraMix Pro* and *Logic* 2.5.2.

The latest version of *UltraMix Pro* has done away with key-encryption copy-protection and needs no authorization. However, it will not launch unless the hardware is connected and correctly recognized through the computer's MIDI interface. Mackie claims that this protects against copyright infringement of the stand-alone software; however, it also means you can't edit parameters when your computer isn't connected to the hardware. On the upside, Mackie now provides free software upgrades via electronic bulletin board.

UltraMix Pro also requires the Opcode OMS or MOTU FreeMIDI system extensions to run properly. The system ships with OMS 2.1 and provides for custom installation for those who are already running OMS and don't want to disturb their current setup. I was not able to boot version 1.11 of the software when running OMS 2.02, although Mackie claims it works. But *UltraMix Pro* started flawlessly with OMS 2.1. I did not test *UltraMix Pro* with FreeMIDI; nor did I test the Windows version of the system. According to Mackie, however, the Windows 95 version looks and performs the same as the Mac version.

GETTING CONNECTED

Making the physical connections between UltraMix and your current setup is a snap as long as you have all the necessary cabling. The concise but humorous Mackie manual provides several flowcharts that show how to

FIG. 2: Clicking on the Meters button in the Fader window (left) changes the faders to peak meters that display audio activity for each channel. The Master window (right) contains controls for each of the eight subgroups and the master bus.

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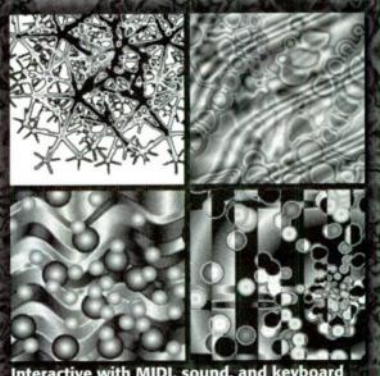

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integrate the hardware into your studio. (A new 200-page set of manuals should be available by the time you read this.) It's simple: you patch the Ultra-34 into your mixer's TRS channel inserts, if it has them. Alternatively, you can simply patch the unit into the line-level inputs of a line mixer or full-featured mixer (if you prefer a balanced-connection setup).

If your mixer has TRS channel inserts, a single cable is all you need to connect each channel to the Ultra-34. And you can still use the insert points; they've simply been rerouted to the front panel of the Ultra-34. If your mixer's TRS insert jacks are wired tip-return and ring-send, you simply use Y-cables and reverse the in and out plugs going into the rear panel of the Ultra-34. There's an advantage to the Y-cable setup: it helps reduce the possibility of crosstalk when using long unbalanced cables.

Of course, a balanced connection is the better choice for long cable runs anyway, as it does the best job of minimizing crosstalk and external noise. A balanced setup can be accomplished by patching TRS cables from the output jacks on the rear panel of the Ultra-34 into your mixer's balanced channel inputs, stereo buses, and/or auxiliary returns (in case you want to automate those, as well). You can also hard-wire the outputs of your recorder directly to the Ultra-34 before passing them on to your console tape returns.

As you can see, Mackie has configured UltraMix to accommodate a number of arrangements with practically any gear you have. I used the Ultra-34 to automate two Mackie CR-1604-VLZs patched together through the TRS inserts, which allowed me to automate 32 channels plus the stereo mix of the primary mixer.

Before beginning a mix session, you must define a synchronization source. If you are mixing MIDI instruments only, you can use the time-code output from the MIDI interface to lock up with *UltraMix Pro*. If you're using audio or video decks or a DAW, you must patch in the time-code output from the recorder's address track (or spare track, depending on how the time-code source is accessed) to the MIDI interface. Be sure the time-code source is defined in your OMS or FreeMIDI setup so *UltraMix Pro* can recognize it. (The Sync Source is defined in the Preferences section of the software.) If your recorder is capable of responding to MIDI Machine Control messages, you can completely control your session from the UltraPilot or computer screen and store up to eleven autolocate points for quick access.

NOT FADE AWAY

UltraMix Pro opens to a master transport and a bank of faders. Each channel can be named individually. When viewing at 2× resolution on a 14-inch monitor, sixteen faders are visible, and the individual track names appear at the bottom of each fader (see **Fig. 1**). Two more screen sizes are available; you select them by clicking on buttons in the lower left of the faders screen. When at 1× or 0.5× resolution, the fader names are simply replaced by the appropriate fader numbers.

In addition to giving you a view of the channel faders, a click on the Meters button displays the channel activity with bar meters (see **Fig. 2**). A Meter

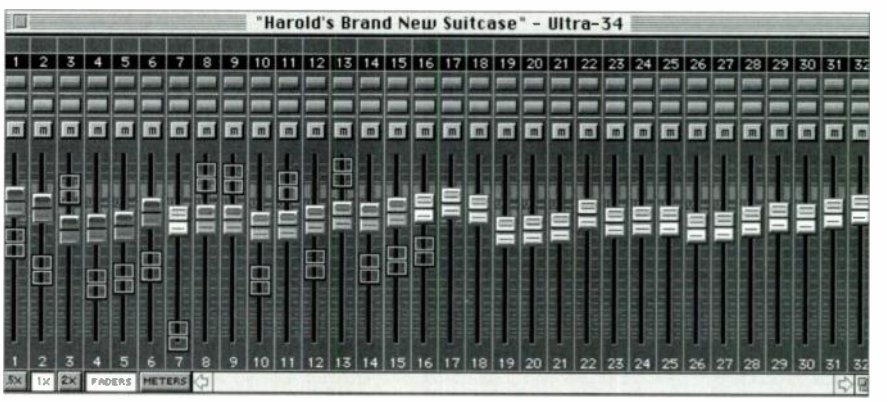

FIG. 3: With fader resolution set at 1x, 32 channels are visible on a 14-inch monitor. The clear "glass" faders show the actual positions of the UltraPilot faders in relation to the recorded fader locations.

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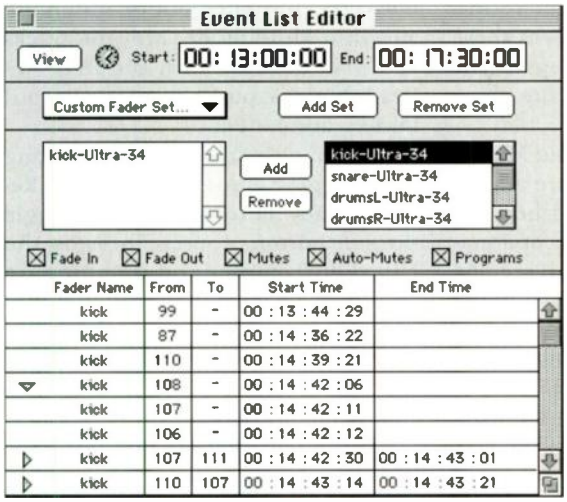

FIG. 4: The Event List Editor contains all of the fader, mute, automute, and Program Change data recorded in your current session. Clicking on check boxes determines what events are displayed, and custom Fader Sets can be created when editing selected channel groups.

Trim is available in the Preferences folder, in case the level display is not to your liking. Globally boosting or trimming the meter level affects only the level indicators, not the signal. There is also a separate window for the Master section that contains each of the eight Group faders and the Master fader. Like the other window, this one offers three resolutions.

Mackie has always been serious about the unity-gain concept in their mixers, and UltraMix follows the same philosophy. The idea is to set each of the console channel faders to a common neutral setting and let *UltraMix Pro* handle subsequent level changes. (If you make trim adjustments, be sure to write them down so you can reproduce the relative levels.) To automate effects returns, patch them in and set the levels to unity, as well.

STANDARD MIDI FILES

Here's where things get a little tricky. Conceptually, *UltraMix Pro* is designed to work as a closed system, not in conjunction with other programs. It is capable of running simultaneously with your sequencer program, but the two must compete for processor time to access crucial timing information. Of course, this heavily taxes your computer and is unreliable unless you have a powerful computer with a lot of memory.

If you don't have computer speed and memory to burn but you still need to play back virtual MIDI tracks while you mix, Mackie strongly recommends importing any Standard MIDI Files through their integrated 480 ppqn MIDI player in *UltraMix Pro*. There are two problems with this approach. First, because you're just using a MIDI-file player, you can't do last-minute MIDI edits as you work. In addition, the MIDI player doesn't transmit SysEx information.

A separate Program Change section in the software lets you switch effects-processor patches that aren't already embedded in the SMF, but short of reverting back to your sequencer application for edits and then exporting the updated MIDI file into *UltraMix Pro*, that's about all the parameter access you get. Therefore, if you regularly run complicated MIDI tracks simultaneously with audio tracks during final mixdown, keep in mind that your MIDI file should be tweaked out and ready to go. It's a real pain to do the export/import shuffle every few minutes when you want to, say, edit Velocity values in a piano part at the last minute.

While trying to import some Standard MIDI Files from *Logic* 2.5.2 into *UltraMix Pro*'s MIDI player, I experienced several system crashes. However, the trouble occurred only with certain files. I successfully imported SMFs created on Steinberg's *Cubase* for Windows and several from Emagic's *Logic* for Mac, but again, certain *Logic* files just wouldn't take. Trashing the problem SMFs and creating new ones solved the problem most of the time but not always. One *Logic* song, in particular, never exported correctly into *UltraMix Pro*. This could be related to *Logic*'s higher internal resolution (960 ppqn), but I was unable to confirm that, as my attempts to contact Emagic produced no results.

Although the individual track name and device channel are imported with the Type 1 Standard MIDI File information, the assigned OMS device for each track did not come through. (A Mackie support rep claims that the company has had no problem with this, but *Logic* was not tested.) This meant

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that every time I imported an SMF, I had to manually assign the appropriate module to each channel. This proved to be a big waste of time when switching between *UltraMix Pro* and *Logic* to make MIDI edits.

As mentioned previously, I was barely able to launch both *UltraMix Pro* and *Logic* at the same time on my computer, much less count on them to run together reliably. I was told that *UltraMix Pro* mainly uses MIDI commands to control the hardware: Control Change messages are responsible for fader moves, Note Numbers control the buttons, and there is also some use of Poly Aftertouch and SysEx info.

Why not just ditch the *UltraMix Pro* software and create a custom interface control for the hardware within *Logic* or any other sophisticated MIDI-sequencing program? I would rather integrate the studio environment under one roof, so to speak. But according to Mackie, even though the MIDI cable is being used to transmit automation data, the code is esoteric and nonstandard. In addition, time algorithms are employed in the *UltraMix Pro* software for the Automute and Fade functions. Features such as Meter viewing, Trim Mode, and Null Mode would be lost. If the MIDI data were analyzed, it would be an overwhelming mess. So it would be almost impossible to create a good home-grown control interface.

FIRST MIX SESSION

After launching your default file (along with your Preferences settings), importing your Standard MIDI File, and making sure you are receiving MTC either from the recorder or from your interface, you are ready to begin a mix session. One of the most important features of automation is the ability to mute channels while no signal is present, so a good place to begin a mix is with the Automute function.

Three levels of sensitivity (threshold) are available: low, medium, and high. Each is global for a particular pass. If certain tracks require different sensitivity settings, you must perform multiple passes with the desired tracks armed each time. After setting all faders to unity gain (using the Set Default Levels command) and activating the Automute and Record buttons in the transport window, run the tape and take a bathroom break. Then come back and see whether the resulting mutes are satisfactory. The software analyzes when there is signal present above the threshold setting and opens the fader. If there is no signal, the channel is muted.

When it works, it's great. But Mackie admits the feature is no cure-all. Indeed, there are times when none of the settings work and the only option is to manually write the mutes. It seemed to me that the low setting often was too high, which forced me to write mutes. Also, I had trouble getting Automute to work properly when material with a wide dynamic range was coming from an ADAT's -10 dBV outputs. For kick drums, bass, and heavily compressed background vocals, Automute mostly worked fine; but on cymbals, toms, strings, and organ swells, the Automutes sometimes triggered too soon and choked the sounds. At the low setting, the Automute even insisted on momentarily muting between individual hi-hat hits on an up-tempo tune. This created an obnoxious chattering sound.

I later experimented with the +4 dBu outputs of the ADAT and got much better results with Automute. But my project studio, like many others, is set up for -10 dBV operation. Therefore, I would prefer a much wider range of threshold sensitivities as well as user-variable release settings.

There is one very cool Automute feature: After a pass is finished, the software marks each location where signal is present. Then it moves the Unmute command forward 60 milliseconds to preserve the attack transient and moves the mute command back 200 milliseconds after the threshold is crossed. Unlike traditional gates, which open only after a signal is present (sometimes chopping off the first few milliseconds), the UltraMix preserves the crucially important beginning of the sound. Hopefully, this feature will also be user-variable in future software revisions; however, mute and unmute locations can be moved in the event editor.

Rewriting mutes is simple to do with the UltraPilot or on the computer screen. In addition to the dedicated Record/Ready buttons for each channel and a master Record button, the UltraPilot allows control of all other *UltraMix Pro* functions via soft-key combinations. There is also a dedicated Play/Stop button that transmits MMC messages. Just click out of Automute and into Mute mode, arm the tracks you wish to mute with the Record/Ready buttons, push the master Record button, and hit Play.

You can also arm tracks by clicking and dragging across the onscreen Record/Ready buttons. While you toggle the soft buttons (onscreen or on the UltraPilot), mutes and unmutes are recorded. That's it. Any written mutes override the fader settings; however, the fader data is always intact underneath, in case you decide to unmute a channel later. Cool.

Writing level data is fun and easy, and it's really helpful to have the onscreen, visual representation of ongoing channel levels. Current gain-cell levels are represented by solid faders whereas the positions of the UltraPilot faders are shown as clear "glass" faders (see **Fig. 3**). There are three modes of fader recording: Replace, Null, and

Product Summary

PRODUCT:
UltraMix automation system
PRICE:
Complete system: $2,797
Each additional Ultra-34: $1,799
SYSTEM REQUIREMENTS:
Macintosh: Mac IIci or better with Color QuickDraw, 8 MB of RAM, System 7 or later, color monitor, MIDI interface with MTC generator
PC: 80486/66 with 8 MB of RAM, Windows 95, color monitor, MIDI interface with MTC generator
MANUFACTURER:
Mackie Designs
tel. (800) 898-3211
or (206) 487-4333
fax (206) 487-4337
e-mail mackie@mackie.com
Web http://www.mackie.com
CIRCLE #439 ON READER SERVICE CARD

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

Trim. Replace mode completely overwrites any data in the section when you record or punch in. If Null mode is active, a punch-in occurs when the glass UltraPilot fader crosses the position of the solid, previous fader setting. Recording continues until you punch out with the master Record button. Trim mode does not replace any fader moves but superimposes new fader data on top of old data. This is great for making overall changes to a level while still maintaining the preexisting fader moves.

▼

UltraMix adds almost no VCA coloration.

Fader-level recording works like a charm. The fader algorithm Mackie uses to make gain changes is as smooth as the lid on a Steinway grand. Don't even ask about zipper noise; there is none. The excellent visual display coupled with the wonderful faders and the intuitive record modes make the UltraMix the best-sounding and easiest level automating I've worked with, short of moving-fader automation on half-million-dollar consoles. In fact, I work a lot on automated consoles and still get confused trying to keep up with the various modes and fader settings. Frankly, the UltraMix blows most of them away for ease of use when automating levels. More remarkably, the UltraMix adds practically no VCA coloration to the sound.

A Rehearse mode lets you audition changes before committing to them. To use Rehearse mode, you must first be in Record. If you click off the Rehearse button while the pass is still running, the moves will be saved. If you press Stop instead, the original data will remain intact. Fortunately, there is always one level of undo available for the last recorded activity.

A GROUP THING

UltraMix Pro allows several channel faders to be grouped together and controlled by one of eight Group masters in the Master window. Each Group master has a specific color, and fader channels display this color assignment accordingly (see **Fig. 2**). For example, you can group all the drum faders together and control the overall level or their mutes with a single Group fader while individual fader moves within the group remain intact. This excellent feature is also great for riding several tracks of strings or background vocals.

With most consoles that offer grouping, the group signal must go through an additional gain-cell stage. But with the UltraMix, the software simply recalculates individual channel-fader data against the Group data to create the resulting channel output. This smart idea helps keep things quiet.

Completing the fader controls for the UltraMix is an individual fader for the Master left and right outputs.

CURRENT EVENTS

All recorded data is easily edited in the Event List Editor (see **Fig. 4**). In this window, data is viewed in a linear fashion, and you can specify what you wish to view. The counter can display SMPTE time code or bars:beats:ticks. You can also create custom fader sets for viewing specific groups of faders. For instance, if all the guitars are on tracks 8,

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9, 14, and 15, a fader set can be created to view just the data from these channels. If you change a fade-in or fade-out position, the data is interpolated between the points to proportionally match the previous fade curve. Nifty.

UltraMix Pro also has an Edit Fade Curve Window for creating specialized fade curves. You can define the length of the curve (in seconds) and specify a preset or custom curve. Up to fifteen points can be created and stretched within the window to form whacked-out curves that can be saved and used to torment any or all of your tracks.

AUTO OFF

Mackie Designs' UltraMix is a great automation system for those who want to maximize the audio capabilities of an existing console or even a new one right off the shelf. Though limited to control of levels and mutes, it does what it does extremely well. The system is simple to use and sports an elegant control interface, both onscreen and with the UltraPilot. The sonic integrity is impeccable, and the hardware is sturdy and well designed. Armed with the UltraMix, ordinary studios can now turn out extraordinary mixes.

UltraMix is not perfect, though. My wish list includes a MIDI player with some MIDI-editing capabilities. Perhaps an integrated, downsized version of one of the popular sequencing applications could be offered as an option. The current implementation of importing/exporting Standard MIDI Files is clunky at best for those who don't have cutting-edge computers.

I would also like a greater range of sensitivity in the Automute function, specifically, variable release time and user-definable unmute-start points. Another nice feature would be a pop-up window to show a fader's current level setting, possibly accessible with an Option- or Shift-click.

My wish list aside, the UltraMix definitely is a winner. The faders are smooth and a pleasure to use, there is absolutely no zipper noise, and the UltraPilot is a first-rate hardware controller for the system. Having front-panel access to each automation channel on the Ultra-34 is just another of those smart Mackie designs that makes other manufacturers smack their heads and then follow suit six months later. If your mixes are getting too hard to handle, let Mackie give you 34 hands. ❀

Alesis MicroVerb 4

By Don Washington

A sweet dual-channel effects processor for a song.

The proliferation of home and project studios has spawned a need for inexpensive, flexible, and easy-to-use signal processing. Alesis' MicroVerb 4 dual-channel effects processor fulfills that need and may be one of the best bargains in its class. Retailing for under $300, it offers a lot of processing power at a low price.

The 1U rack-mount unit is equipped with a dual-function footswitch jack on the rear panel that provides both bypass and program-change functions—a great feature for live performance. The rear panel also has two ¼-inch inputs and two ¼-inch outputs, all unbalanced. This gives you four options for audio connections: mono in/out, mono in/stereo out, stereo in/out, or discrete dual mono. This last feature distinguishes the MicroVerb 4 from most effects processors in its price range.

The rear panel also includes MIDI In and Out/Thru jacks. The unit's modest MIDI implementation supports Program Changes and two simultaneous MIDI controllers for real-time control over effects parameters. Modulation functions are "hard-wired" in each program, with MIDI Controller 1 (Modulation) and Controller 11 (Foot Controller) always active. The unit can also transmit and receive program information via SysEx dumps.

The MicroVerb 4 can operate with signal levels from +4 dBV to guitar levels, which makes it suitable for both professional and project studios. The A/D converters are 18-bit, 128-times oversampling Sigma-Delta, and the D/A converters are 18-bit, 8-times oversampling.

UP FRONT

The front panel of the MicroVerb 4 is a study in simplicity and user friendliness. To the left of the display window are three standard knobs for controlling input, mix, and output levels. Input levels are monitored on two LED peak meters (one for each input, with the two working together for a mono signal), which are located on the left side of the LED display window.

The easy-to-read display usually shows the currently selected program, but it shows the MIDI channel when the Bank/MIDI button is held down, the destination program when the Store button is pressed, or the parameter values when one of the edit knobs is adjusted. A quick press of the Bank/MIDI button switches the unit from one bank of programs to the other.

To the right of the window is a handy value-encoder wheel that allows you to quickly change programs or, when the Bank/MIDI button is depressed, MIDI channels. Two other control knobs, Edit A and Edit B, offer two parameter adjustments per program.

A tidy edit-parameter menu is conveniently silk-screened to the right of the Edit buttons, along with an equally orderly chart of preset program groups and group-effect names. This means less time spent flipping through pages of the manual.

PEEK INSIDE

The MicroVerb's memory is logically organized into a bank of 100 preset programs and a bank of 100 user programs. Each bank contains groups of ten hall reverb, room reverb, plate reverb, delay, pitch shift, and dual send programs plus twenty chorus/flange programs and twenty multi-effects programs. Multi-effects programs contain up to three simultaneous preset effects. Maximum delay time is 1,270 milliseconds in mono or 635 milliseconds in stereo, adjustable in increments of ten milliseconds.

The MicroVerb 4 offers autopan and numerous multi-effect configurations in addition to a range of single effects.

The Alesis MicroVerb 4 dual-channel effects processor features 18-bit converters, a small but tasty selection of effects, and a user interface that's as friendly as they come.

Pitch-shifting effects include stereo chorus, quad chorus, stereo flange, and stereo pitch shifter. You also get hall, room, ambience, plate, and nonlinear reverbs as well as mono, stereo, ping-pong, and multitap delays.

The MicroVerb's three dual-send effects setups allow you to place reverb on the left channel and delay, chorus, or flange on the right channel. The dual effects are possible because of the unit's discrete stereo architecture; it's great to find this in a budget processor.

In addition, there are seven stereo multi-effects chains. Five of these are double effects: delay into reverb, chorus into reverb, flange into reverb, "Lezlie" (rotating speaker simulation) into reverb, and reverb into flange. The other two chains use three effects: chorus into delay into reverb and flange into delay into reverb.

The delays are top-notch, and it's quite simple to modify tempo and feedback. Reverb parameters include a high-cut filter that can be set between 59 Hz and 36.2 kHz or bypassed completely. All decay times are adjustable in second and millisecond increments.

STAGE AND STUDIO FUN

I was very pleased with the results I got from the MicroVerb 4. For example, I dialed in a delay and pitch shift on the final snare hit of a 4-bar reggae groove and achieved a descending, cascading effect that lent a very cool "dub" sound to the mix. I also got great results using the multi-effects on percussion and one-shot samples. And the stereo tremolo used on an electric piano patch gave me a classic Fender Rhodes sound that was hard to beat.

The delay programs are especially good for guitar and vocals. Although there aren't a lot of parameters, I was able to control patch changes, modulate effects, and tap in a delay tempo with only a MIDI foot controller and a momentary footswitch.

Compared to the MicroVerb 3 (the MicroVerb 4's predecessor), the reverb selection has been greatly improved and boasts a depth and clarity matching units that cost much more. I found that the reverb patches in all of the "rooms"—from Small Club to Concert Hall—were very effective on percussion. However, the MicroVerb 4's reverbs would not be my first choice for vocal tracks, as the decay and EQ parameters are insufficient for my tastes.

As a guitar effects processor, the MicroVerb 4 is superb. I played an overdriven guitar signal through the quad chorus and flange effects and got a tone I loved. The experience was truly psychedelic. And using a MIDI control pedal, I was able to maneuver through the programs with ease.

Another effect that I had a blast with is the "Lezlie" patch, which allows you to control the speed of the rotary speaker by toggling between two programs using a footswitch. And the stereo chorus/flange and pitch shifter sound great on guitars and other solo instruments.

In a live situation, the MicroVerb 4 more than holds its own. Thanks to the dual-mono output and dual-send effects, you can feed separate patches to two different amps or two mixer auxiliary returns, which effectively gives you two mono effects processors. Not bad for less than three bills.

HAPPENIN' BOX

It's clear from the MicroVerb 4's improvements over the MicroVerb 3 that Alesis has been listening to its customers. As a long-time Alesis user, I applaud these changes heartily.

With its user-friendly front panel, easy patch-editing capabilities, foolproof input LED meters, and versatile I/O, the MicroVerb 4 is sure to help Alesis retain its reputation as a manufacturer that produces quality products for budget-conscious people.

Product Summary

PRODUCT:
MicroVerb 4 effects processor
PRICE:
$299
MANUFACTURER:
Alesis Corporation
tel. (800) 525-3747
or (310) 841-2272
fax (310) 836-9192
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EM METERS	RATING PRODUCTS FROM 1 TO 5
FEATURES	●●●
EASE OF USE	●●●●◖
AUDIO QUALITY	●●●●
VALUE	●●●●●

Don Washington *is a musician, writer, performer, and project-studio owner. Oh yes—and in his spare time he's the Operations Coordinator for Mix Bookshelf.*

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Musitek PianoScan 2.5 (Win)

By Geary Yelton

Turn sheet music into MIDI files with minimum effort.

Electronic musicians have always longed to convert printed music into MIDI files without having to play the music into a computer. After all, this capability has been available for the printed word for years. Optical character recognition (OCR) software converts printed words into text files that can be opened by a word processor. Recent OCR software is more than 90 percent accurate, which almost matches a typist working at full speed.

Optical character recognition for music has been commercially available since Musitek released *MIDISCAN* for Windows in 1993. (*MIDISCAN* was reviewed in the February 1994 **EM**.) This program can convert scores or up to sixteen staves per system into MIDI tracks. More recently, the company released an entry-level version called *PianoScan* for less than $100. *PianoScan* is limited to only two staves per system, which is sufficient for instrumental solos, duets, and piano music.

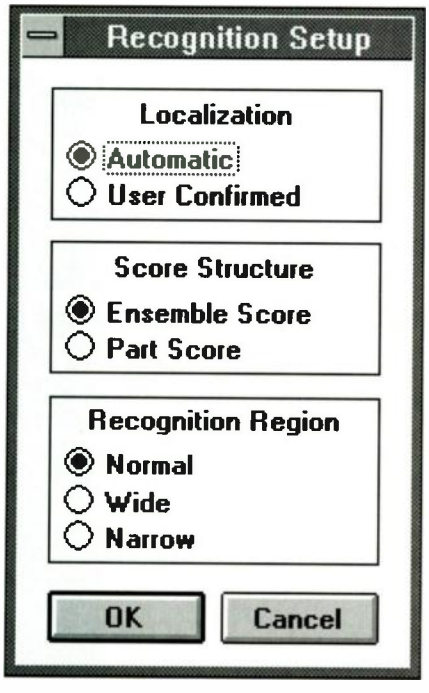

FIG. 1: The Recognition Setup window lets you specify one staff (Part Score) or two staves (Ensemble Score) and compensate for irregularities in the scanned image.

Up to 24 pages of music can be translated into a single *PianoScan* file, which can then be converted into a Standard MIDI File (SMF) for sequencer playback or a Notation Interchange File Format (NIFF) file for printing from a music notation program. (For more on NIFF, see "Tech Page: Nifty Notation" in the June 1995 **EM**.) MIDI files can also be played from within *PianoScan* using its integrated sequencer.

PianoScan runs under Windows on a PC-compatible computer, but it also runs quite well under SoftWindows on a Macintosh. For the purposes of this review, I started out on a Pentium machine running Windows 3.1 and Windows 95, and I completed most of the work on a Power Mac running SoftWindows. I used a Macintosh and an Epson ScanJet to scan in pages of music, and I cleaned up the resulting image files in Adobe *Photoshop* on both platforms.

SCANNING THE HORIZON

If your scanner is compatible with the TWAIN universal driver, clicking on the Scan icon opens your scanning software and makes a preview pass. Otherwise, you must open your scanning software the old-fashioned way. Scans should be made as black-and-white line art rather than grayscale or color images. This is fortunate because monochrome images consume the smallest amount of memory.

Files can be imported from any scanning or image-editing program if they're TIFF (Tagged Image File Format, the most popular file type for scanned images), BMP, or PCX files. Flatbed scanners are much more accurate than handheld scanners. If you don't have a scanner, certain fax machines can be connected to your computer, but this might not provide satisfactory results.

Recommended resolution is 300 dots per inch (dpi), though fax machines are typically limited to 200 dpi. Oddly enough, the accuracy of music recognition decreases as the resolution rises above 400 dpi, which also significantly increases file size. Only printed music is recognized, not hand-written manuscripts. This should come as no surprise because handwriting-recognition software is still a long way from reaching maturity.

Most flatbed scanners are set up to scan in portrait (vertical) orientation. *PianoScan* can rotate a page by 90 degrees if the printed score is in landscape (horizontal) orientation. Make sure to position the page as straight as possible, even though *PianoScan* can compensate for images skewed as much as 8 degrees. In addition, leave at least a ¼-inch margin of white space around the staves. If the score is physically larger than the imaging area of your scanner, reduce it with a photocopier and scan the copy.

In case you don't own *Photoshop* or another image editor, *PianoScan* includes rudimentary image-editing capabilities. The View Image command allows you to open a TIFF, BMP, or PCX file. You can delete areas, rotate images 90 degrees left or right, and use the Line Draw tool to repair faint or missing lines. The only other image-editing operations are Cut, Copy, and Paste. For the purposes of editing scanned music, however, these are all the functions you need.

It's possible to scan and convert music with more than two staves, but this requires much more effort. You must copy and paste staves from a multiple-staff score to create separate image files with only two staves per system. Once each file has been completely converted by *PianoScan*, you can open the separate MIDI files, copy the tracks two at a time, and paste them into a single, multitrack sequencer file. Complicated, yes, but it can be done. On second thought, maybe you should just buy *MIDISCAN* if you have a need to do this.

MUSIC RECOGNITION

I began by scanning a few of Bach's Two-Part Inventions, a simple instrumental by Pink Floyd, and a piano reduction of a complex Frank Zappa composition. At 300 dpi, the resulting uncompressed TIFF files consume about 1 MB per page. The program can also open compressed image files, which reduce memory requirements by up to 90 percent.

After importing the image files, *PianoScan*'s next step is music recognition, which converts the image files into Music Notation Object Description (MNOD) files. MNOD is Musitek's

proprietary representation of scanned music as a collection of music-notation objects.

To begin recognition, either press the Recognition icon or select Begin Recognition from the Recognition menu. The Recognition Setup window appears (see **Fig. 1**), which lets you specify the number of staves per system (one or two) and compensate for irregularities in the scanned score, if necessary. You are then asked to select the image files that contain the individual pages of music. The order of the pages can be rearranged before you engage the conversion process. All pages are then processed together to yield a single MNOD file.

You can watch the recognition process as it occurs, with the scanned score displayed onscreen (see **Fig. 2**). First, the computer counts the number of staves and pages, marking the beginning and end of each staff. Then it steps through each staff, displaying each step by name: preprocessing, feature extraction, reasoning, analyzing, MNOD conversion, postprocessing, and postprocessing the entire score. On average, each staff takes between half a minute and a full minute. Immediately after processing, an MNOD version of the score appears in the bottom half of the screen (see **Fig. 3**), allowing you to check the accuracy of *PianoScan*'s interpretation and make corrections as needed.

Not all musical symbols are recognized, and unrecognized symbols are generally ignored. *PianoScan* recognizes note and chord pitches and durations, rest durations, ties, bar lines, clefs, meters, and key signatures. I was especially pleased to see that clef changes are recognized. The program does not recognize dynamic markings such as crescendos and mezzofortes, fingerings, accents, slurs, lyrics, guitar-chord symbols, and so on.

▼ The program's biggest flaw is the lack of an Undo command.

Sometimes unrecognized symbols are misinterpreted as notes or rests. For example, I've seen fermatas and fingering numbers interpreted as whole notes and forte symbols as eighth rests. Guitar-chord symbols may become notes or rests above the staff. Although *PianoScan* seldom gets the pitches wrong, notes are sometimes skipped, and I once saw a dotted quarter rest turned into a 2-note interval (A and C) with a dotted half-note value.

There is no guarantee that the sum of the rhythmic values within a measure will equal the duration of the measure. If only two quarter notes are recognized within a measure in 4/4 time, only two notes appear in the MNOD file, and the resulting MIDI file will include a half-note rest. Likewise, if a dynamic marking is mistakenly interpreted as an eighth note, an extra eighth note is inserted in the MNOD file, and the final quarter note in the measure becomes an eighth note in the MIDI file. When you're editing an MNOD file, it's your responsibility to make sure that the rhythms add up correctly.

What happens if you try to translate music with more than two staves? You're presented with a dialog that reads, "Number of Staves per System Exceeds Limit. Please check that your source does not exceed two staves per system." Then the file closes.

EDITING MNOD FILES

Immediately after the recognition process, the image file appears in the top half of the screen, with the MNOD interpretation in the bottom half (see **Fig. 3**). You can scroll the display up or down to select any staff for editing. The image and MNOD displays scroll simultaneously, allowing you to visually compare the two and make corrections as necessary. It's also possible to view either image by itself and display a full-page view of the scanned image.

An Edit Toolbox on the left side of the screen includes eight icons representing notes, rest, clefs, accidentals, meters, bar lines, triplets, and dots. Clicking on one of the items in this palette opens its Display Toolbox. For example, when you click on the note icon, a palette of note values, ties, beams, and a chord tool appears, any one of which can be selected at a time. You can open as many of these palettes as will fit onscreen simultaneously.

A toolbar across the top of the screen displays icons to access editing functions, such as zooming in and out, converting file formats, and inserting, deleting, and changing symbols. The Insert icon turns the cursor into the selected symbol, which is placed wherever you click in the MNOD score. When you click on a symbol with the Change icon, it turns into the symbol that's selected in the Edit Toolbox. Clicking on the Delete icon lets you

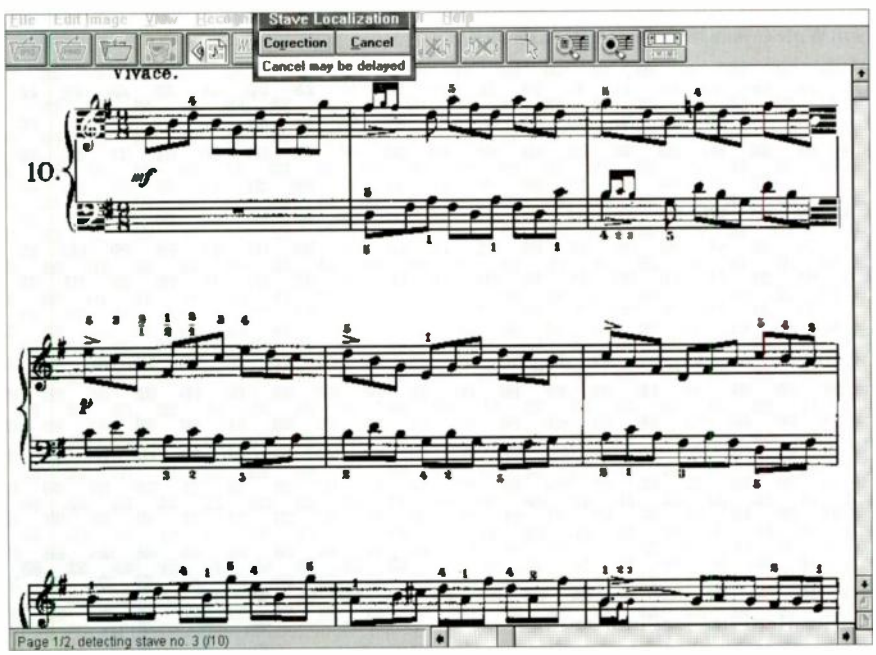

FIG. 2: During recognition, *PianoScan* steps through each staff one symbol at a time.

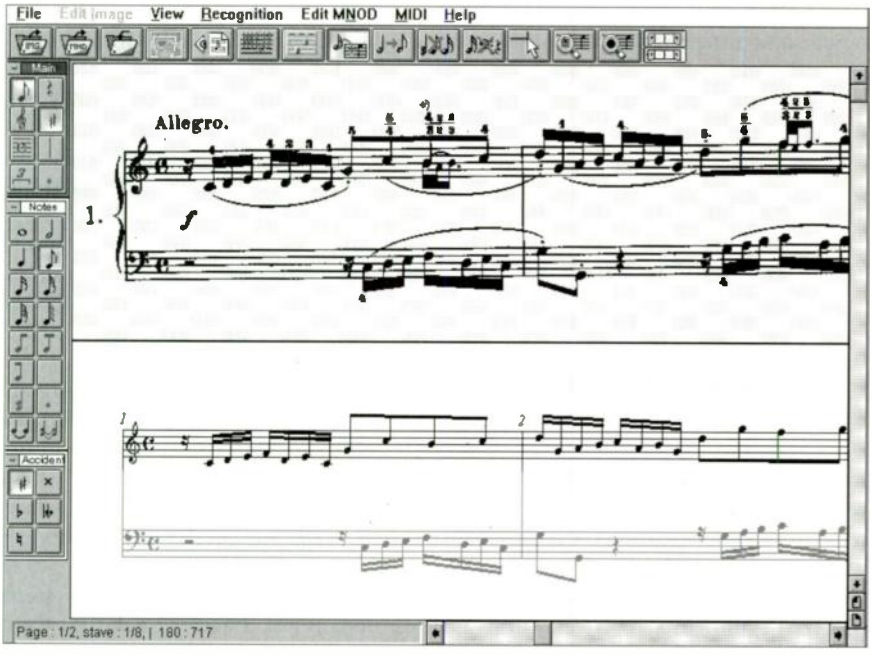

FIG. 3: The original scanned image appears in the top window, allowing you to make comparisons as you edit the MNOD file in the bottom window.

delete only selected objects and entire chords, and clicking on the Delete Any icon lets you remove any object or single note from chords.

Most commands can be issued by clicking on an icon, selecting from the menu bar, or pressing the equivalent Quick Key. These useful keyboard shortcuts include the D key, which toggles between inserting and deleting a dot; the S key, which changes stem direction; and the B key, which beams flagged notes. The C key toggles between the tools that insert and change symbols. The first eight number keys specify note durations (but not rest durations) and open the Note Display Toolbox if necessary. Pressing the Shift key along with the first three number keys selects accidentals. Once you get to know the Quick Keys, they are the fastest way to make changes by far.

Other keys work in conjunction with the mouse. Holding the Shift key and dragging a note up or down changes its pitch. The cursor becomes whatever symbol you click on while holding the Control key, allowing you to insert that symbol without constantly moving the cursor to the Edit Toolbox.

When editing MNOD files while running version 2.5 under SoftWindows, my biggest headaches occurred when portions of the image disappeared from the screen. For example, entire systems occasionally vanished, especially when I displayed the MNOD window by itself. If I toggled between the TIFF and MNOD windows, the problem usually went away.

In addition, the computer didn't react as quickly as I would have liked. If I clicked to insert a note and nothing happened, I sometimes clicked it again. A moment later, both insertions appeared, and I'd have to delete one. To be fair, these problems only occurred when running version 2.5 (but not version 2.1) on the Power Mac running SoftWindows, which is notoriously slow. Musitek claims to have received no such user complaints. However, I was unable to test version 2.5 on the Pentium, so it could be a bug in that version.

CONVERSIONS

Once the MNOD file matches the original score as closely as possible, it's time to convert it to a Standard MIDI File or NIFF notation file. Clicking on the MIDI Setup icon opens a dialog box to select a MIDI device driver and specify the stereo balance of the two tracks. There are three choices for balance: Soft, Middle, and Hard. Hard pans the tracks hard left and right, Soft pans them 75% to each side, and Medium pans them 50% to each side. I was surprised that the Soft setting panned harder than the Medium setting.

The dialog includes a check box that tells *PianoScan* to open its sequencer as soon as the conversion is complete. Clicking on the MIDI Conversion button in the MIDI Setup window very quickly converts MNOD to MIDI and then opens the Save dialog to name the file.

When converting a score to MIDI with the latest version of the program (version 2.5), there were occasional problems associated with measure numbers and barlines. Once, I had an MNOD file that skipped from measure 8 to measure 10, essentially ignoring a barline. When I tried to convert to MIDI, I received an error message that read, "Barline expected at measure 9!" The barline was there, but the program refused to recognize it.

As it happens, this is a rare bug that occasionally inserts a single barline underneath a double barline. To solve the problem, you must delete both barlines and reinsert the double barline. Musitek is aware of this problem and has promised to correct it in a future update.

The built-in MIDI sequencer is designed to be used during the editing process. That is, you can convert the file to MIDI at any point, listen for problems, and then continue making corrections to the MNOD file. When you click on the Sequencer icon, it automatically loads the MIDI file associated with the open MNOD file.

The 2-track sequencer is simple, of course, with MIDI channel, Program Change assignment, mute and solo buttons, volume slider, and pan slider for

Product Summary

PRODUCT:
PianoScan 2.5 OCR software
PRICE:
$99
SYSTEM REQUIREMENTS:
80386 or better PC, Windows 3.1 or later, 4 MB of RAM
MANUFACTURER:
Musitek Corporation
tel. (805) 646-8051
fax (805) 646-8099
e-mail chrisn@fishnet.net
Web http://www.musitek.com
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FEATURES	● ● ●
EASE OF USE	● ● ●
DOCUMENTATION	● ● ●
VALUE	● ● ● ●

each track. Two more sliders let you change the tempo and general volume of playback. In addition, one or both tracks can be transposed. Transport controls include Play, Stop, Rewind, and Fast Forward, and a counter keeps track of the measure and beat.

The Save As command includes a Save NIFF File option, which opens a separate *MNOD-to-NIFF Converter* application. The application itself has only three commands: Open, Save, and Exit. Once saved, the converted file can be opened by any program that supports NIFF. I converted several MNOD files to NIFF and opened them in TAP's *Nightingale*, which worked fine in most cases. However, the conversion failed occasionally, opening a dialog that read, "Unrecognized MNOD format," even with files that successfully converted to MIDI.

CONCLUSIONS

PianoScan does the job it sets out to do with speed and finesse. However, the pieces I tried fell short of the 90 to 98 percent accuracy that Musitek claims; with these pieces, I estimate the program's accuracy at more like 75 to 80 percent. In any case, correcting the software's interpretation of the scanned image is the most time-consuming task when using *PianoScan*. Memorizing the Quick Keys greatly speeds up the editing process.

Perhaps the program's biggest flaw is the lack of an Undo command. For some reason, most music-notation programs seem to have limited or no undo capability, and there are many situations in which Undo is sorely needed. It is easy to make a mistake, and the only recourse is to save your work frequently.

PianoScan costs $99, but Hohner Midia markets it by mail order under the name *MusicScan* for just $69. Musitek says its buyers will receive upgrades more quickly than those who purchase *MusicScan*. They also claim you should be able to find *PianoScan* with a street price about the same as *MusicScan*. If you need this kind of software and you don't mind the two-staff limitation and a few, mostly minor bugs, that sounds like a bargain to me.

Although **Geary Yelton** *recognizes the inevitability of Microsoft conquering the world, he's still glad to be living in an age when so many musicians embrace the Macintosh.*

Korg ih

By Julian Colbeck

Meet the world's smallest harmony processor.

As Shakespeare might have said, "If gadgets be the food of today's musician, everyone will soon be *singing* on with this tasty morsel from Korg." The ih is a vocal-performance enhancer: with a microphone plumbed in, your feeble, croakey old voice can be joined by up to four harmony parts, or it can be sweetened by various chorus effects.

Harmonies that are instantly sympathetic to your instrumental parts can be generated by linking the ih to a MIDI keyboard and playing the desired chord. When used with an i-series keyboard (see the review of the i4S in the April 1996 **EM**), the ih reads the keyboard's SysEx and performs its magic based *interactively* on chords played on the keyboard or automatically generated by it.

Boy, these people from Korg. Where do they get their ideas?

Well, in this case, they get them from Canada. In fact, the ih is based on a design from IVL Technologies, the Canadian company that brought you the IVL Pitchrider pitch-to-MIDI converter (reviewed in the May 1986 **EM**) and developed the technology for DigiTech's Vocalist and Studio Vocalist (reviewed in the April 1992 and October 1995 issues, respectively).

The ih is *not* a pitch-to-MIDI converter, however; it has much more in common with the Vocalist than with the Pitchrider. In fact, the ih and the Vocalist have several basic functions in common, which are described using similar terminology.

The ih is aimed mainly at solo musicians who wish to avail themselves of realistic-sounding vocal harmonies. Solo lounge acts will love it, of course, but I can also see applications for the MIDI home recordist as an invaluable track saver. And with its simple, vocoding-like capabilities, it could prove to be a must-have toy for live and studio dance music. The ih is one of those gadgets you don't know you need until you see it in action.

GETTING STARTED

Speaking of action, I expected a steep learning curve and was most pleasantly surprised not to find one. The most cursory examination of this Walkman-sized unit reveals all you need to know about inserting it into your rig. Having done so, it's a fair bet your first early-morning *sqwark* will be instantly harmonized, just like that, with no scrabbling through the manual. *Yes!*

The key external device, without which the ih is simply a little black box, is a microphone. The ih accepts any low-impedance mic with an XLR connector, which is reassuringly professional. However, no mic is supplied with the package.

A pair of unbalanced ¼-inch outputs let you route your vocals to a mixer. It would be nice if the unit also had a line-level input for routing vocals from a mixer or recorder. Korg suggests you also add a momentary footswitch (optional) for the Mute function. Power is supplied by a small, 12 VDC wall wart. You can use the ih just like this, without any MIDI connection. But to dip into its complete basket of features, you must connect a MIDI controller to the ih's MIDI In. Thus connected, the ih resembles a flattened porcupine with no less than six cords sprouting from it. Careful with that flex, Eugene.

My first worry with any new signal-processing device is what it does to the quality of the original, dry signal. I'm pleased to report that the ih does not appear to color the signal in any way; I can discern no loss of quality. In Mute mode, my voice sounded as much like me as when I routed the mic directly into a mixer.

TALE OF THREE SLIDERS

The ih is beautifully organized, and its front panel is clean and simple. The panel buttons and sliders are big enough and few enough to make real-time changes perfectly practical.

The most prominent controls are three sliders. The first governs the input-signal level, aided by a green LED that turns red during peaks. A good input level is crucial, especially when using the vocoding-type effects. If the input level is too low, the output is hissy at best and half-hearted or ineffectual at worst; if it's too high, the signal is

distorted. Although I didn't test the ih under live-gig conditions, I appreciated its input level being slider controlled, making adjustments easy and quick.

The next two sliders control what Korg refers to as the Lead and Harmony voices. Lead is the direct, untreated signal, and Harmony represents the processed vocals. Again, slider control makes altering the balance between them a quick and comfortable process.

NAME DETUNE

The ih can operate in one of three ways, as determined by the Detune, Vocoder, and Chordal mode buttons at the top of the control panel. You can flip between the three modes instantaneously, and you can store default settings for each mode. You can even store changes in a sequencer via SysEx so that the settings automatically change at the correct moment.

Detune mode provides gentle, layered pitch shifting, i.e., varying degrees of chorusing. This mode is very simple. Using different combinations of the Voicing buttons that run down the right side of the front panel, you can choose from light detuning with two voices, heavy detuning with two voices, or a combination (heavy) detuning with four voices.

These additional voices appear in a premixed stereo image, placed hard left and hard right. If this spread is too wide, you must reduce the stereo spread on your mixer. The signal is boosted somewhat because your solo voice has been doubled or quadrupled, and the effect is yummy. It's very flattering, very glossy, and very professional.

A VOCODER THAT ISN'T

The ih's Vocoder mode also uses a form of pitch shifting, but in this case, the pitch of the processed signal is governed by notes you play on a connected MIDI keyboard. The unit can process up to four notes from the keyboard simultaneously; if you inadvertently play more than this, the ih removes notes in first-in, first-out style.

Classic vocoding (VOice enCODING) is a process that was developed at Bell Laboratories for telecommunication purposes in the 1930s and was later purloined by musicians. With classic vocoding, parallel banks of filters are used to foist the articulation and formant characteristics of one signal (typically a vocal) upon another signal (typically a synthesizer sound) so that the synth sound is articulated by the voice. This effect can be heard on Dr. Dre's "California Love."

Although it has a so-called Vocoder mode, the ih is not a vocoder. There is no interplay between sound sources (the sole sound source is your voice), and there is no control over attack, decay, or anything else for that matter. The same terminology is used for the DigiTech Vocalist, so presumably it's an IVL thing. But the end result does sound convincingly enough like vocoding, even though the technology is not the same.

Because the ih is not a true vocoder, the sound from your MIDI instrument doesn't matter. In fact, you can use a MIDI master controller that has no onboard sounds. The keyboard merely specifies the pitches. Artistically, I like mixing the ih's output with some complementary vocal patches. I used the Korg i4S as a controller during the review, and this instrument has several splendid vocal patches. I can especially recommend "Doo Voice."

Vocoding requires a particular skill. For your vocals to remain intelligible, you must synchronize what you sing with what you play. Otherwise, you're likely to get a sort of slurring *whoop* within the phrase.

COOL VOCODER TRICKS

The ih's Vocoder mode presents numerous possibilities: some obvious, some less so. In the former category, I found it fun to use the keyboard's pitch wheel to bend block harmonies up and down. You can also hold a chord and sing rhythmically.

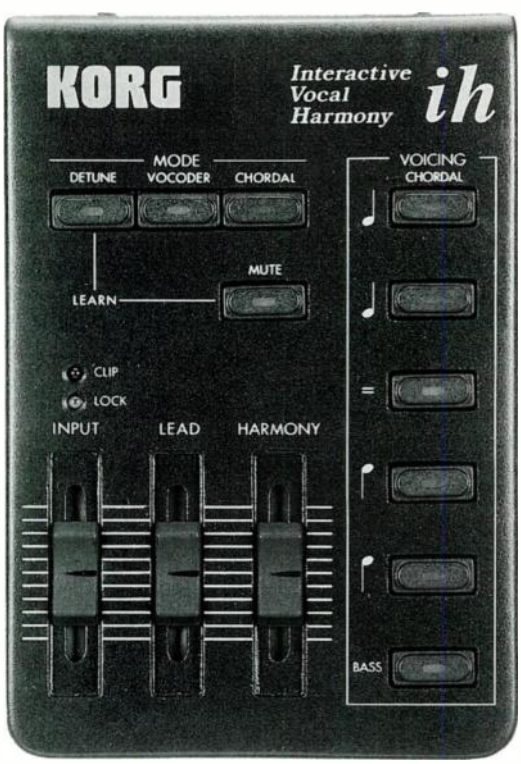
You can even add pseudovibrato by using the mod wheel. In fact, a smidgen of vibrato is inherently present in the ih's vocoding process. It's relatively unobtrusive, but I'd still prefer to have a choice of vibrato or not. Currently, the only way to kill the vibrato is to continually zero out the mod wheel. Lovers of motionless, deadpan harmonies—Enya fans, for example—might be significantly put off by this.

With newer models (those released during or after spring/summer 1996), you will be able to transpose harmonies directly from the front panel. This function will also be available as an upgrade for existing models. On my review unit, the only way to transpose a chord is to physically transpose it on the keyboard. This is not an insurmountable problem, of course, but such a maneuver might not be convenient, given the other parts you may be playing.

CHORDS A LA MODE

If "Vocoder" is not a wholly satisfactory name for the ih's manual-voicing mode, "Chordal" is only a little better. In Chordal mode, the ih automatically creates harmonies that are based upon the chords you play on a MIDI keyboard or the chords generated by the automatic accompaniment feature of a Korg i-series instrument.

However, the results in this mode are not completely predetermined. Different permutations of the Voicing buttons (which have LEDs that light when activated) instruct the ih to generate one or two harmonies above the sung pitch, one or two harmonies below the sung pitch, or one or two harmonies



Korg's ih Interactive Vocal Harmony Processor generates impressive-sounding harmonies based on user input. Created by the pitch-manipulation experts at IVL, it is a junior relative of the DigiTech Vocalist.

of each type. You can also specify a unison note or a special bass harmony, which I'll discuss shortly. Regardless of the permutation you choose, the maximum number of harmonies that can be output is four.

The clever thing about Chordal mode is that the harmonies are always appropriate to the chord you are playing. Generally, they stick to thirds and fifths. For instance, if you play a plain major triad and sing up the diatonic scale from the root, you get the following harmonies. (The first note in this example is the note you sing whereas the second, in italics, is the generated harmony.)

C-*G*, D-*G*, E-*C*, F-*C*, G-*E*, A-*E*, B-*G*, C-*G*

The second Above Harmony button produces a closer series of harmonies:

C-*E*, D-*E*, E-*G*, F-*C*, G-*C*, A-*E*, B-*E*, C-*E*

The ih appears to recognize and make sensible harmonic decisions based on most common chords. When I tested the unit with some challenging modern jazz chords, the ih erred on the side of caution, choosing the safe option of a fifth as often as not.

The Bass Harmony feature automatically creates a low harmony that can be the root of the played (MIDI) chord or another specified chord tone. The latter option enables you to produce harmonic inversions such as C/G. The Bass Harmony note generally seems very low compared to the other harmonies; it's so low, it made me sound like Lee Marvin.

SPECIAL FEATURES

Several hidden programming commands streamline the unit's operation in a sequencing environment. For a start, you can define a number of power-up settings, including Detune amount, Chordal Voice configuration, MIDI channel, and the split point above or below which the connected keyboard talks to the ih.

You can also send (and record) Control Change messages from the ih so that changes can be made at the correct point within a song. However, you must be careful with your MIDI setup, making sure you haven't created a loop. Otherwise, you'll find—as I did on more than one occasion—that the ih frantically tries to harmonize to a chord like, say, F♯m7 (♭5/11)/C. Seriously, this chord actually appeared on the i4S at one point.

ALL TOGETHER NOW

Increasingly, ours is becoming an industry of lone wolves who are working away in our project studios or on solo gigs and rarely having the need to interact with other musicians (or so we think). Vocal harmonies—a key element in many musical settings—can be difficult to accommodate in a MIDI studio. And until IVL developed its magical technology, vocal harmonies were nearly impossible for the solo live artist. The ih does a first-class job of alleviating, if not solving, the problem.

However, I think Korg and IVL missed a major trick in not incorporating pitch-to-MIDI conversion. As it is, you have the capability of generating splendid harmonies, but you can't record the vocal parts as MIDI notes. According to IVL, the ih already incorporates the underlying technology required to do pitch-to-MIDI conversion. Why not go the rest of the way?

The ih's harmonies tend to be of the Wilson Phillips variety, i.e., block chords. Clearly, the Korg unit is not nearly as sophisticated as the far more expensive Vocalist products. But there is still plenty of light and shade available between the three operational modes and various harmony options.

If you are a Korg i-series user, and especially if you are a solo performer, this type of product is an essential purchase. For everyone else, the ih, which demands only a modest outlay of cash and negligible brain power, is well worth a try.

Product Summary

PRODUCT:
ih vocal harmony processor
PRICE:
$500
MANUFACTURER:
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fax (516) 333-9108
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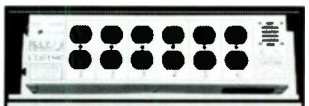

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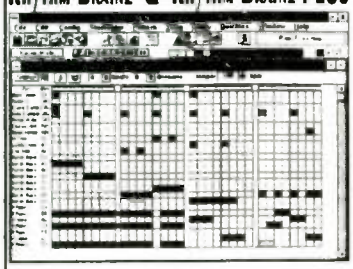

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TECH PAGE

Headspace Rangers

Interactive music is coming to a Web site near you.

By Scott Wilkinson

Scoring and integrating music and sound into a Web site or interactive game poses unique problems. For one thing, you must deal with a variety of file types. In addition, the music and sound should smoothly follow the user's input, even though this input is unpredictable. Finally, the files must be as small as possible to minimize storage requirements and download times.

To handle these problems, Headspace (tel. 415/696-9400; fax 415/696-9404; Web http://www.headspace.com) has been working on something called Rich Music Format (RMF). This company was started by Thomas Dolby Robertson to provide music and sound technology for the Internet and other interactive applications (see "Multimedia Musician: Out of Thomas Dolby's Headspace" in the July 1994 **EM**). However, the staff soon became frustrated with the lack of tools to deliver interactive music, so they began developing their own.

RMF provides composers and sound designers with a standard for delivering audio content to game and Web developers. Files of various types, such as digital audio and Standard MIDI Files (SMFs), can be incorporated into a single RMF file (see **Fig. 1**). The company also plans to include downloadable sample sets or SoundFonts when this type of file format becomes standardized.

Another benefit of RMF is the ability to encode small files. For example, you might have one small music clip with many tracks. At different points in the action, you can mute and unmute different tracks, change the balance and panning of each track, and perform other mutations that radically change the music. These parameters are stored in Music Snapshots, which can be called up in response to user activity. You can also store different musical themes that are coordinated with the user's actions.

All types of RMF data are compressed to reduce storage requirements. The nature of the compression is dependent on the data. For example, MIDI data uses a lossless compression scheme that reduces file size by at least 30 percent. At the moment, digital audio is compressed using a proprietary algorithm, but the company intends to include standard compression techniques in the future.

In addition to being a developer's tool, RMF also provides a platform-independent standard for delivering audio and MIDI data to end users of interactive products and services. This requires an appropriate player application, which Headspace calls a Rich Music Engine (RME). Anyone can create their own RME by following the RMF specification, which should be available on the company's Web site later this year. However, Headspace hopes that most developers will license their version, much as graphics companies license PostScript from Adobe.

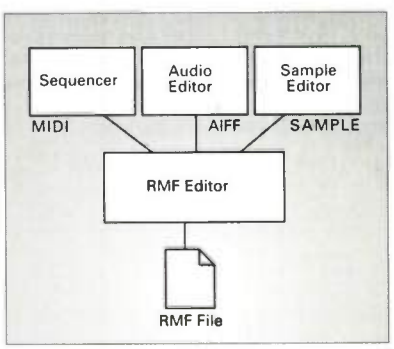

FIG. 1: RMF combines various types of sound files into a single file.

The RME allows composers to deliver music and sound files that developers can modify to meet their needs without requiring close, continuous consultation. The composer can establish "safe" ranges of various parameters, such as mix levels and tempos, which the developer can use to change the character of the music without destroying it.

In addition, the RME provides music-content management, complete with a keyword database system and information fields to keep track of tempos, keys, mix levels, and instrumentation. It also allows detailed documentation of copyright information.

For Web applications, Headspace has developed the Rich Music Markup Language (RMML), which is currently a combination of HTML, Java, and JavaScript (see "Tech Page: Java Jive" in the March 1996 **EM**). Among the first users of this technology is WebTV, which will soon offer TV-based Internet hardware to the consumer market. In addition, Headspace has recently "sonified" the Netscape *Navigator* 3.0 Web site with an RMF music library, which is only available using *Navigator* 3.0. Other applications will no doubt follow, so composers for interactive media should check it out.

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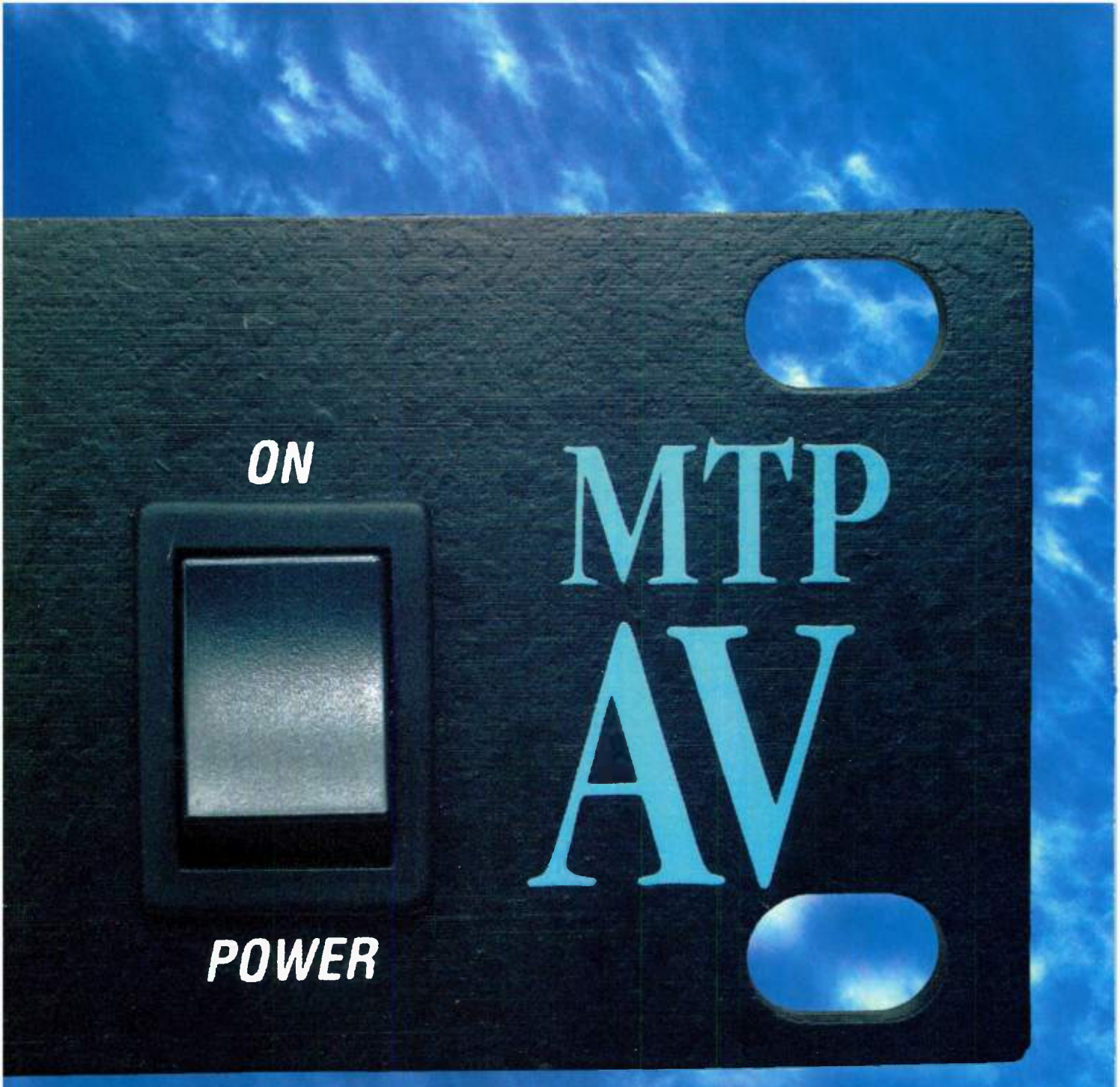

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