EM AUDITIONS WINDOWS 95'S MUSICAL CHOPS

Electronic Musician®

August 1995

BEAT IT!

INTENSIFY your drum sequences

JAM with our ethnic percussion master class

UPGRADE your home studio for pro sessions

IT'S UNLEASHED MORE CREATIVITY THAN

The Mackie CR-1604 16x2 mic/line mixer is getting dangerously close to becoming a pro audio classic.

Not because it has the most mic inputs, knobs, buses or switches — others have long since topped us for sheer numbers of doo-dads and thingamabobs.

No, the CR-1604 has ended up in so many studios and on so many stages because it sounds good. And because it's downright easy to use.

More than any other component, your mixer is the focal point of all your creative efforts. If it's complicated to operate, you've just erected a frustrating barrier between you and your music. If it's noisy, everything that's recorded will be noisy, too.

When you're looking for an affordable, compact mixer that's good enough to regularly record complete albums and primetime TV soundtracks, call us toll-free (M-F 8:00 AM to 5PM PT).

You'll talk to a real person who'll send you our 40-page color tabloid complete with a 16-page hook-up and applications guide.

Then start exercising your musical creativity with the mixer that's becoming a classic for all the right reasons.

EXTREMELY RUDE, BLINKING SOLO LIGHT. *Sounds like a minor detail until some night at 2AM when you can't figure out why there's no sound coming out of your monitors.*

BEEFY HEADPHONE AMP WITH SEPARATE VOLUME FADER. *Instead of the usual wimpy amp, the CR-1604 has a separate, high-gain headphone amplifier section with enough gain to drive any brand of headphone to shock volume levels that will satisfy even a drummer. Also has more than enough gain to drive any monitor amplifier.*

INSIDE: QUALITY COMPONENTS *like double-sided, through-hole plated fiberglass circuit boards with solid brass stand-offs, gold-plated interconnects and sealed rotary potentiometers that resist dust & liquid contamination.*

BEST RFI PROTECTION OF ANY COMPACT MIXER. *No matter how quiet a mixer's internal circuitry is, it can be sabotoged by external radio frequency interference. RFI is created by broadcast stations, cell phones, computers and even that expensive radio-controlled car your kid got for Christmas. RFI gets into a mixer via the input jacks where it uses the internal circuit traces as miniature antennas to produce noise ranging from a low-level hiss to actual, audible voices and music.*

The CR-1604's 1/4" jacks use a shunting capacitor to stop RFI before the main circuit traces. Instead, RFI is re-routed back through the metal jack body and washer, then dissipated via the mixer's outer chassis.

XLR inputs are likewise protected from RFI via ferrite beads.

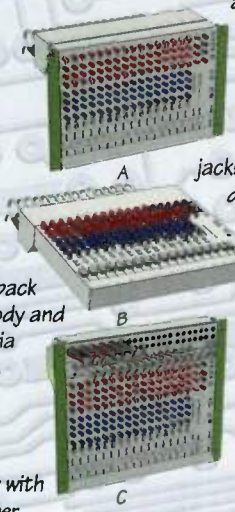
Next time you see a mixer with plastic 1/4" jacks, remember what you just learned.

DUAL PURPOSE METERING SYSTEM. *Besides showing main L/R output level, the LED ladders are used to establish input levels. Set a channel fader at Unity, press the channel's SOLO button and set input trim level. This approach achieves very high headroom and low noise at the same time. Plus you have 20dB MORE GAIN above Unity.*

INSTANT HANDS-ON-ACCESS *to constant power pan controls, musical 3-band equalization, ALT 3/4 extra stereo bus, stereo in-place solo, seven high gain Aux sends per channel (via four controls) and four high gain stereo Aux returns (20dB more gain above Unity).*

MULTI-WAY CONVERTIBLE PHYSICAL DESIGN. *The CR-1604's rotatable input pod lets you conserve space in a road rack or spread out in a project studio. Change from a 7-rack-space mixer with jacks to back (A) to a tabletop design with jacks to top (B) in minutes. Add our optional RotoPod bracket (C) and rotate inputs and outputs to the same plane as the mixer's controls (a favorite for small SR set-ups).*

Any of these conversions takes just minutes with a Phillips-head screwdriver. And our XLR10 10-mic-preamp expander can be added in any of the configurations.



NOT VISIBLE BUT VERY IMPORTANT: THE MACKIE MIX HEADROOM DIFFERENCE. *Nobody uses just one channel of a mixer(although most headroom specs are stated that way). In any mixer, the mix amp stage combines signals from ALL inputs at once. If it overloads, you can't back off the master fader because it comes AFTER the the mix amp. So audible distortion results when the mix amp gets bogged down with multiple hot inputs. Mackie's unique mix amp architecture provides as much as twice the mix headroom of conventional designs. No wonder it's a favorite of top electronic percussionists.*

ANY OTHER COMPACT MIXER.

ULTRA-LOW NOISE. When you compare noise specs, look for the one that counts: all 16 channels up at Unity Gain — not one channel at Unity gain. No other compact mixer beats the CR-1604 when it comes to low noise floor.

MULTI-FUNCTION AUX SEND SYSTEM WITH LOADS OF GAIN. AUX 1 on each channel can be used either for effects (post-fader/pre-EQ) or switched to monitor sends for stage monitor or headphone cue signal (pre-fader/pre-EQ). AUXs 2 thru 6 are post-fader/post EQ. AUX 3 and 4 knobs can be shifted to AUX 5 and 6 at the touch of a button.

MUSICAL 3-BAND EQUALIZATION. The CR-1604 redefined equalization points for compact mixers: 12kHz Hi EQ (instead of 10kHz) for more sizzle and less aural fatigue, 2.5kHz Mid (vs. 1kHz) for better control of vocals and instrumental harmonics, and 80Hz Lo EQ (instead of 100Hz.) for more depth and less "bonk." Others have copied these EQ points, but none have successfully emulated our quality equalization circuitry. It costs us more, but the result is zero phase distortion and a sweeter, more musical sound. It's another reason that the CR-1604 is a favorite of TV and film soundtrack scorers.

LEGENDARY MICROPHONE PREAMPS. Instead of sixteen "acceptable" integrated circuit microphone preamps, the CR-1604 features six big-console-quality preamps...the same mic preamp design that's on our acclaimed 8•Bus consoles. You get tremendous headroom and bandwidth with less noise and distortion. If your particular application requires more mic inputs, simply add our XLR10 10-Mic-Preamp Expander. Both it and the CR-1604's internal mic preamps have real and verifiable specs of –129.5 dBm E.I.N., 300,000Hz bandwidth and 0.005% THD. No wonder several of the world's top microphone manufacturers use Mackie Designs CR-1604s to demo their finest condenser mics at trade shows.

INPUTS AND OUTPUTS AT PROFESSIONAL — NOT HOBBYIST — SIGNAL LEVELS. The CR-1604 operates internally at industry-standard +4dBu levels to help reduce noise. But it can also handle the weaker –10dBV levels found on some digital multitrack machines and other equipment.

THE PERFECT MATCH FOR ADATs, DA-88s AND HARD DISK RECORDING SYSTEMS. We'd dearly love for you to buy one of our 8•Bus In-line consoles, but the CR-1604 makes a very effective 8-track recording mixer. The CR-1604's first eight channels have post-fader channel inserts (channel access). This VERY important feature is found on few other compact mixers. It lets you create a "split console" so that you can simultaneously track on eight channels and monitor/mixdown on eight more.

EXPANDABILITY. If you add a second or third digital multitrack, you can use one or two additional CR-1604s with our MixerMixer active combiner. It lets you run 32 or 48 channels without having to "cascade" the mixers.

- Split monitor configurable for easy 8-track digital tracking & mixdown
- Used on more superstar world tours in the last three years than all other compact mixer brands combined[1]
- Legendary studio-quality discrete microphone preamps
- Used by members of the Tonight Show band, David Letterman band, Conan O'Brien band, Saturday Night Live Band[2]
- Expandable with XLR10 Mic Preamp Expander & Mixer Mixer active combiner
- Used by Fox Television Sports for Monday Night Football on-field sound[2]
- Built-like-a-tank physical construction (it's too darned homely to be fragile)
- Used for sound design and incidental musical scoring on the world's most popular TV show
- Special mix amp architecture for twice the mixdown headroom of other designs

[1]This is no idle boast. Consider these tours for starters: Madonna, Rolling Stones, BoyzIIMen, Whitney Houston, INXS, Janet Jackson, Peter Gabriel, Bette Midler, Bruce Springsteen, Paula Abdul and Moody Blues. Mention in this list denotes useage by band members or tour techs and in no way constitutes an endorsement by the artists mentioned.

[2]More fine print: Mention in this ad denotes useage as reported to Mackie Designs and in no way denotes endorsement by the artist, program or production company listed.

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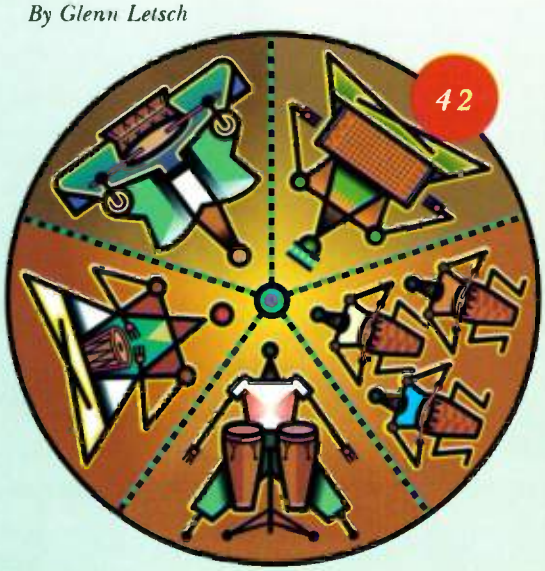
I N S I

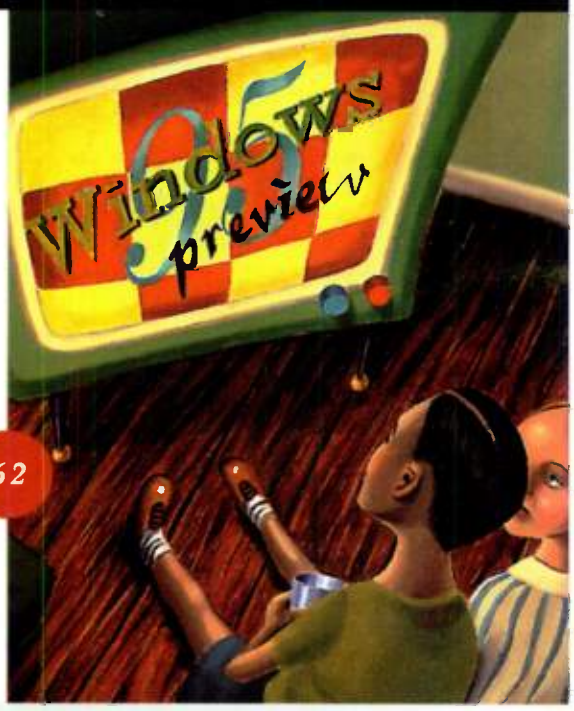
FEATURES



DEPARTMENTS

Electronic Musician®
AUGUST 1995 VOL. 11, NO. 8

COLUMNS



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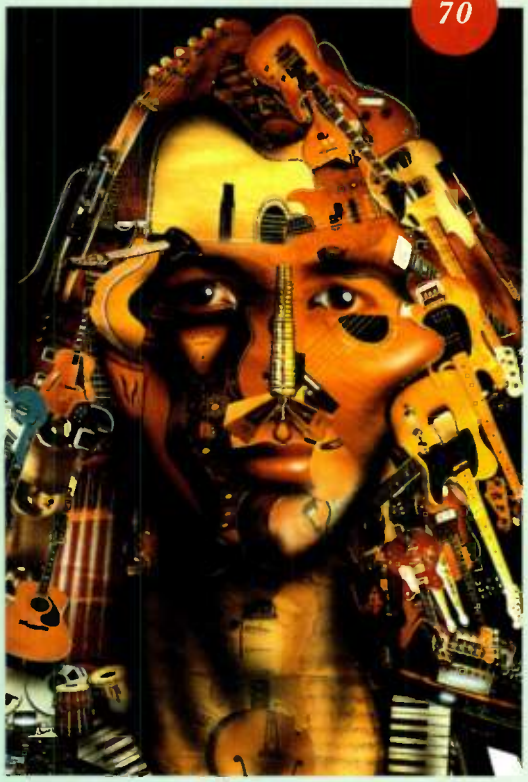

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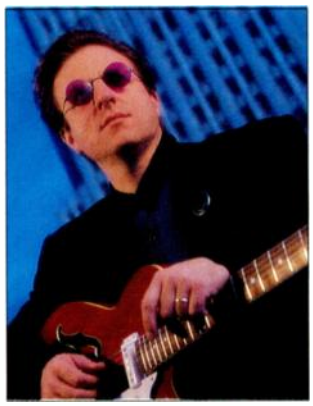
REVIEWS

Cover: Photo by Gary Laufman.

Percussionist: Fantuzzi. Makeup and styling: Kris Ravetto. Djembe drum: Haight Music.

Enhanced Boredom

Why is multimedia taking a slow trip to Lullabyville?



ROBERT PERRY

Senate Majority Leader Bob Dole's now-legendary rant against Hollywood reminds me of an elusive mystery of life: Why do crusaders against the immorality of the arts always seem to trash things they've never seen? I suspect this same inclination is at work when publicists, record-company executives, and multimedia pundits erupt into spasms of gaga over enhanced CDs. Having been spectacularly underwhelmed by present releases, I wonder whether any of these zealots have actually played one.

Basically, enhanced CDs are Red Book audio CDs with video and graphics capabilities. (For an excellent discussion on this technology, see "Tech Page: Super CD," on p. 154.) Independent artists and big stars alike have rushed to anoint themselves in the Next Big Media Format, and more than just a few label executives seem to believe that enhanced CDs are going to be to audio CDs what the CD was to the vinyl record. (Got that?) But, in reality, here's what you usually get for your mouse clicks: bland lyric sheets, poorly written biographical material, meandering and often pointless audio interviews, a lame theme "game" based on some aspect of the artist's image, and obtrusive merchandising information. Stop and think for a second: Does that *really* constitute cutting-edge entertainment? The kick is, with the exception of video and interactive elements, many of the ancient 78 rpm records stored in my parents' basement have these same "enhanced" features (lyric sheets, librettos, and interview disks). Imagine Frank Sinatra, Bing Crosby, and Al Jolson being multimedia prophets!

But the main reason I'm discouraged about enhanced CDs is because they're absolutely numbingly boring. Which brings up my main beef with the current state of the multimedia industry: the lack of inspired content. Consumers now have access to unprecedented computing power, but entertainment-wise, what is offered for these systems is often the equivalent of "See Dick run." There's an entire film studio hidden inside each CD-ROM, and conceptually we're still producing monosyllabic, one-act plays. And I'm so sick of hearing about how cool the technological tools are—"You *must* get into CD-ROM," "You just *have* to cruise the Internet," and other such drivel—when few developers seem to care about producing work that *means* something. (Nice little psychedelic screen saver there, dude!)

I believe that the "content question" is where creative musicians can help realize the promise of the multimedia industry. If you're an artist considering the release of an enhanced CD, don't just settle for onscreen lyrics and bad video clips. Think about applying some of the gumption you used to forge a unique musical voice into your multimedia productions. As musicians, we are used to bending circuit boards and digital waveforms into passionate, meaningful music. Perhaps, if we take some responsibility for improving the creative face of multimedia, we can inspire our programming compatriots to develop better content, too.

The true power of any medium is in the execution of its ideas. So let's quit fooling ourselves that we're exploiting the fruits of this technology and get busy developing some truly brilliant work.

Michael Molenda

Electronic Musician

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Music and Entertainment Group
Group Publisher Hillel Resner

National Editorial, Advertising, and Business Offices
6400 Hollis Street #12, Emeryville, CA 94608
tel. (510) 653-3307, fax (510) 653-5142

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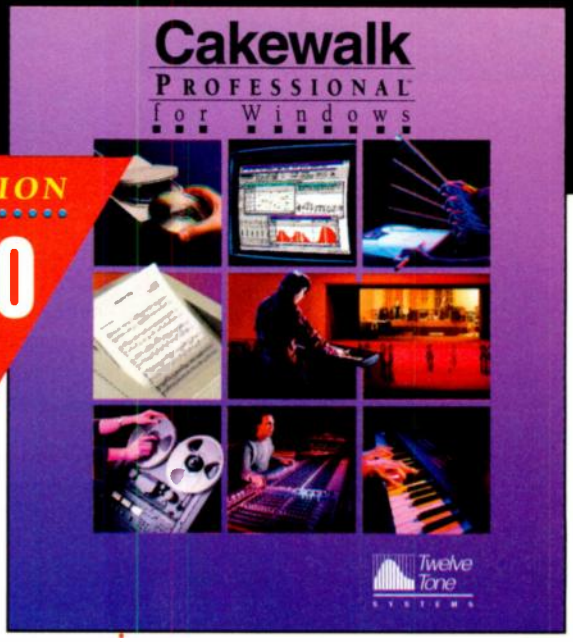
BPA INTERNATIONAL

PLAY HARD.



VERSION 3.0

WORK EASY.

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

Then bring in the Professional.

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

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

Here are some of the new 3.0 features:

BANG ON THIS

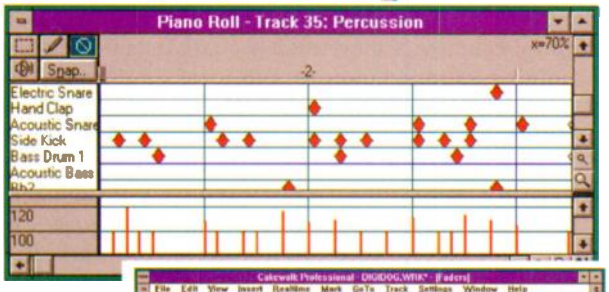
So what *else* is new in 3.0? Plenty.

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

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

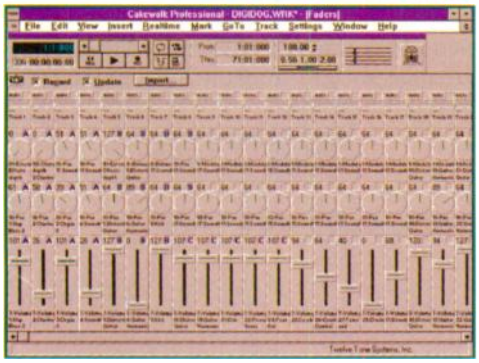
GRAB A GROOVE

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



WHAT'S THE WORD

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



MASTER MIXES

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

LIVE!

ELECTRONIC MUSICIAN 1995 EDITORS CHOICE

GS GENERAL MIDI

MPC Multimedia PC

OTHER PROFESSIONAL FEATURES:

256 tracks; rock-solid SMPTE/MTC sync; custom programming language with macro recorder; MIDI remote control; system exclusive librarian and event filters, to name a few.

And with support for MCI commands and digital audio wave files, Cakewalk Professional can be the engine that drives your next multimedia project.

So play all day. Play all night. And let Cakewalk Professional do the hard work for you.

NOW PLAYING EVERYWHERE

Cakewalk Professional 3.0 is just $349, and is available at finer music and computer stores everywhere. For more information, or to order the Cakewalk Professional Demo Pack for just $5, call:

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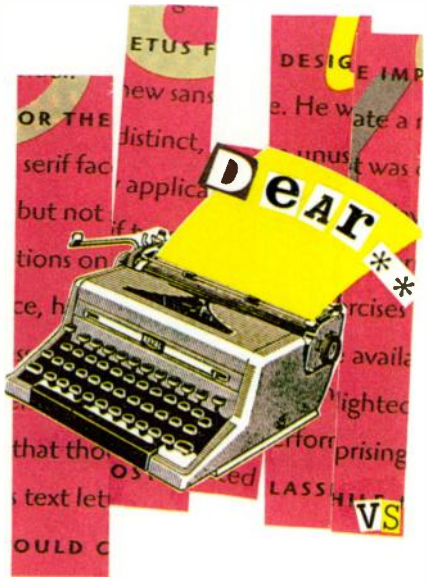

OH, NO!

In the June 1995 issue, part of Steve Oppenheimer's response to Taj Sidju ("Letters") says that the Mac CPU uses SCSI ID #6. *Not so, Mr. O.!* The Mac CPU always uses SCSI ID #7. Open the SCSI Probe utility you mentioned, and see for yourself.

Doug Buchanan
Toronto, ON, Canada

THE SOURCE

Commendations and thanks all around for your May 1995 issue. *Electronic Musician* has become my source for music-technology information. Especially gratifying was the excellent review by John Duesenberry on the phase-vocoding software ("IRCAM SVP 1.2 [Mac]"). These high-echelon articles are invaluable to me as I have not gained access to the inner circles of the industry and have little opportunity to learn of experimental and cutting-edge technologies.

J. D. Ryan
Clearwater, FL

GET THE MUSIC HABIT

Michael Molenda's recommendation to Alex in the "Tone Up" letter (May 1995), where he suggests volunteering at a recording studio to gain experience, might be impractical for some of us. I faced a similar situation as Alex and discovered that a local community college offered a certificate program in recording technology. Although I am in my thirties, and I am supporting a family and music habit, the courses were affordable and seemed to be designed with continuing education (older students) in mind. What I learned was invaluable.

Even though the equipment we used was less than state-of-the-art, it was good enough for teaching the basics of recording. In addition, my twenty years of keyboard/MIDI knowledge was as valuable to the students and teachers as what I learned from them. I still can't believe I waited all those years before going back to school.

John W. Rettberg
Haymarket, VA

ACCORDION TAKEOVER

I would like to compliment *Electronic Musician* for publishing "The MIDI Polka" (March 1995). This article is a breakthrough in educating accordion players and other musicians about the future of the instrument. The accordion can now achieve higher goals by joining its reed power sounds with the enormous capabilities of MIDI.

Obviously, Europeans are more familiar with the accordion than Americans, who often view it exclusively as an instrument for playing polkas and ethnic music. Your article proves that the accordion is a versatile acoustic/electronic instrument and can be placed right up front with guitars and synthesizers.

John J. Prudente Jr.
Greensboro, NC

TAPE, GLORIOUS TAPE

I am planning to mix my multitrack recordings onto my Pioneer Elite CT-93 cassette deck (with Dolby S) using high-quality metal tape. Can I produce professional-level masters this way? Can cassettes store musical information for decades without significant audio losses?

As an analog addict, I'm studying the possibility of buying a Fostex R8 and using it for my multitrack recordings. The main problem is tape noise. Is there any problem if I record my multitracks with Dolby and master them again with Dolby?

Finally, I would like to congratulate Michael Molenda for his feature on vocal condenser mics in the May 1994 issue of **EM** ("In Your Face"). He managed to distinguish between the beloved (AKG "Vintage TL"), the most transparent (Neumann TLM 193), and the winner (Audio-Technica CM5). Molenda made the mics talk to us.

Rui Aragão
Lisbon, Portugal

Rui—If you're very careful, you can get some pretty slamming sounds from a cassette master. (For some sonic tips and guidelines, see "Masters from Ministudios" in the June 1994 **EM**.*) However, DAT and analog reel-to-reel remain the professional standards. I'm aware that some audiophile magazines have tested the lifespan of high-quality cassettes, but I have no definitive information on how long your cassette masters will survive. Keep in mind that tape storage procedures are big issues in prolonging life; some poorly stored analog masters from the 1970s have already degenerated into gunk.*

On your multitrack question, a well-maintained analog recorder should deliver excellent sound for years. If you maximize your gain stages (for more info, see "Recording Musician: Gain Stages" in our November 1993 issue) and track hot levels, tape noise shouldn't be obtrusive. I've used pro and semipro analog machines for years and have only been frustrated by tape noise when I botched the engineering or had to deal with the whisper-soft dynamics of a classical piano performance. Tracking with noise reduction is a subjective decision that has inspired many lively debates. I recommend recording a signal with Dolby and without it and critically assessing the results.—Michael M.

TASTES GREAT, LESS FILLING

Thank you, **EM**, for a job well done. Your continued efforts to erase the line between pro and home

VALERIE SPAIN

freedom of choice

Up to 31 Voices

Up to 16 MB Memory

Stereo Sampling,
Sampling through Effects,
Resampling from Sequencer

24-Bit Effects

16-Track Sequencer

Digital Audio Recording

SCSI

Optional Digital I/O

your newest choice: the ASR-88

When it comes to samplers only ENSONIQ offers you a choice of models to fit your performance and recording needs.

The 61-key synth action ASR-10 combines advanced sampling, sequencing, and our Poly-Key™ pressure keyboard. The ASR-10 rack is ideal for studio or live performance. And now – the 88-key weighted action ASR-88. The feel and range of a true piano keyboard married to all the features that only an ASR delivers.

Whichever you choose, you'll get the most powerful sampling and music creation tool ever. With a huge library of sounds on floppy disk and CD-ROM, including our new Signature Series CD's from Chicago, D.J. Jazzy Jeff, Steve Gadd, and others. Plus a world of sounds, ready to play, from Akai™ and Roland™ CD's.

The ASR Series are the only samplers to combine sampling, effects, sequencing, and digital audio recording in one musical instrument.

Whatever your style of music, however you play it, you now have the freedom to choose. So what'll it be?

Every ENSONIQ instrument is made in America. To reach us:
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ASR-88 Bundle
16 MB Memory
SCSI Installed
CD-ROM Drive
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ENSONIQ
LEADING THE WORLD IN SOUND INNOVATION

☐ Tell me more about my ASR choices!

Also send info on:
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- ☐ TS Series *synths*
- ☐ KS-32 *weighted action synth*
- ☐ SQ Series *synths*
- ☐ DP/4+ *effects processor*

☐ I'd also like your *make music* **think ENSONIQ** demo CD *(here's $5; ship it, and watch how you handle it!).*

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Address _____

City _____ *State* _____ *Zip* _____

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P.O. Box 3035, Malvern, PA 19355-0735

What went through our minds when we designed the XP-50 Music Workstation?

Everything.

Hyperactive Reflexes

A **32-bit RISC** (Reduced Instruction Set Computer) chip gives the XP-50 lightning fast and accurate response to performance data.

Sensitivity Core

A **61-note velocity** and **aftertouch-sensitive keyboard** and newly-designed modulation lever help you add feeling to every performance. A large 40-character, 2 line backlit LCD makes visibility and data editing more efficient.

Right Brain Function

Loop, pattern and linear recording let you be creative without interrupting your thought and musical processes. **Pattern Paste** and the ability to create 100 customized patterns provide even more options.

Nerve Center

The newly designed **MRC-PRO sequencer** has 16 primary tracks which are each capable of controlling 16 MIDI channels. New Grid, Shuffle, and Groove quantize functions let you instantly adjust the feel in precise increments in realtime.

Aural Receptors

Ten tone structures allow access to two wave generators, multiple time variant filters and amplifiers, a ring modulator and booster. High-quality effects include eight reverbs, chorus and **40 insert effects** like two voice pitch shifter, rotary, time controlled delay and distortion/flanger.

Memory Center

The XP-50 nerve center is enhanced with 640 preset patches, 96 preset performances and 10 preset rhythm setups. When fully expanded, it can remember up to **1750 onboard patches**.

Linguistic Skills

The XP-50 has a **General MIDI mode** for playing commercial Standard MIDI File (SMF) song data. It also converts to the ways of other great minds like Super and original MRC formats.

Memory Overload

The XP-50 comes with a full 8 Mbytes of Wave ROM. It also accepts up to **four** 8 Mbyte SR-JV80 Series wave **expansion boards simultaneously** for a total of 40 Mbytes of sound.

Common Sense

The XP-50 will blow your mind. For anyone with a head full of ideas, it's the only workstation you should be thinking about. **Call (800) 386-7575** to order our *1995 New Products Video* ($9.95) featuring the XP-50 Music Workstation.

Vocal Capacity

64-voice polyphony and **16-part multitimbral** capability handle even the most demanding multi-instrument arrangements.

Instant Recall

Play songs from disk in **realtime** without the typical load and wait time of other workstations.

Pattern Recognition

Realtime Phrase Sequencing (RPS) allows patterns to be assigned to individual keys and **instantly triggered** for live performances, remixing, or spontaneous improvisation.

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studios have my head spinning. You project a lot of enthusiasm by rushing important and innovative news into print for the benefit of those who are not directly connected to the industry. In addition, your continuous product reviews keep us informed of new equipment as soon as it is made available.

Your faithfulness to the home recordist warrants some kind of "atta-boy." Michael Molenda's promotion to editor has reassured me of the direction **EM** is headed. In a business full of facts and specs, Molenda still keeps the notion of shooting from a musician's hip and not bogging us down with overly technical jargon. Thanks for a mag with no fluff or filler.

Robert L. Langford
robert.langford@f31.n9555.a1.fidonet.org

WHICH IS BEST?

I am an Armenian refugee (from Russia) and have lived in the U.S. for four years. I have just begun to put together my first home studio. I am an experienced musician, but I'm not very experienced with recording. Which mic is the best for recording violin? Also, which board do you recommend: the Mackie 1604 or the Soundcraft Rack Pack? Is there a source for answering all the other recording questions I have? I have been saving money for a long time, and I want to get the right equipment.

Karén Khanagov
Oklahoma City, OK

Karén—I use an AKG C414 for recording violin, because I like how the mic captures the warmth and sensitivity of the violinist's performance dynamics. An inexpensive dynamic mic, such as the Shure SM57, will document the fundamental timbre just fine, but may miss subtle tonal shadings. The Mackie and Soundcraft mixers are fine machines with different practical implementations regarding EQ, signal-routing, and other such features. Sound-wise, I don't think you'd go wrong with either, but you should make sure that the one you choose best enhances the way you like to work.

As far as a source for all your recording questions, that's a tough one! I'd suggest you raid local libraries for recording handbooks; call Mix Bookshelf (tel. [800] 233-9604) for popular titles such as **EM***'s own* Making the Ultimate Demo *(I'll even autograph a copy for you!); and cruise the engineering and audio-production forums online.—Michael M.*

WE'RE EVERYWHERE

I love your magazine for the style you have and the help you give. Even in the Ukraine, *Electronic Musician* is a joyful and pleasurable read.

Yuri Polchenko
Kiev, Ukraine

TOOT TOOT

I am a pro trumpet player and a relative newcomer to MIDI. I have limited keyboard chops, but I can sketch out musical arrangements using *Finale* and do some single-line sequencing. However, I am always arriving at a frustrating impasse, so I would rather work directly with my trumpet. Is there such a thing as a MIDI trumpet controller, or am I stuck with this keyboard albatross? I have worked with sax players who use an EWI and a Casio Digital Horn, but I have not heard of a similar device for trumpet (brass) players. My goal is to control a JD-800 from a MIDI trumpet *live!*

S. Montgomery
samontgomery@cbe.ab.ca

S. Montgomery—To paraphrase Francis P. Church in his 1897 reply to Virginia O'Hanlon in the New York Sun*: Yes, Montgomery, there is a MIDI trumpet controller. Akai used to make the Electronic Valve Instrument (EVI) in addition to the Electronic Woodwind Instrument (EWI), both of which control a dedicated sound module that also sends MIDI messages to any MIDI device. The company still makes the EWI, but the EVI just didn't sell well enough. You might be able to find a used EVI if you are diligent and lucky.*

Another option is to buy an Akai EWI and send it to Nyle Steiner (tel. [818] 248-6606; fax [818] 957-1225), who invented the EWI and EVI and then sold the rights to Akai. Steiner will convert an EWI into an EVI for approximately $250 to $300.

If you are really *lucky, you might find a Perkiphone trumpet-to-MIDI system. This system never made it into production, so there are only a few prototypes floating around out there. It consists of sensors that attach to the bottom of a trumpet's piston valves, a mouthpiece pickup, and a pitch-bend controller, all of which connect to an interface box that detects the played notes and sends corresponding MIDI messages.*

The only other option is to use a pitch-to-MIDI converter, such as the IVL Pitchrider, Fairlight Voicetracker, or Roland VP-70. Unfortunately, most such devices are no longer made, so you must hunt for used ones. To enter notes into a Macintosh sequencer, you might try Wildcat Canyon's Autoscore*, which does not convert pitches into MIDI messages in real time but does let you enter notes into a sequencer from any microphone. For more, see the review in the February 1995* **EM***.—Scott W.*

REFERENCE MATERIAL

I am really enjoying your "Creative Space" features. The studios and the personalities you cover in these articles really add a lot to your publication and to my delight. I have been a subscriber since 1988, and I still anxiously wait for the newest issue every month. I often refer to old articles on recording techniques, equipment reviews, and other miscellany. However, the more issues I collect—and I don't think I'm the only one who keeps a "library" of old **EM**s—the more difficult it is to refer to them. Have you thought of offering a database that we could use to look up articles and cross-references? It would be a complement to this already excellent magazine.

Mario Coppo
Miami, FL

Mario—We don't have a commercial database available yet, but if you're online and a member of PAN, you can access our back issue and "What's New" listings free! Our e-mail address is emeditorial@pan.com. In addition, your inquiry has prompted me to upload these listings to our **EM** *folder in the Taxi Forum on AOL (keyword: TAXI). If you're not online, we can offer an "analog" alternative: a photocopy of our printed back issue listing. Send the ever-efficient Diane Lowery a stamped, self-addressed envelope, and she'll forward a copy to you. Our address, for those who can't bear to turn to our staff box because of my frightening photo, is: 6400 Hollis Street, #12, Emeryville, CA 94608.—Michael M.*

WE WELCOME YOUR FEEDBACK.

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

THE BIG PICTURE

The world's best studio monitors are like a picture window. If they perform with accuracy and transparency, you'll not only hear the mix, you'll see it. The new **Alesis Monitor Two™ Studio Reference Monitors** do just that.

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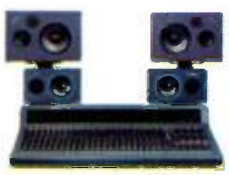

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For more information about the Monitor Two, see your Authorized Alesis Dealer or call 1-800-5-ALESIS.
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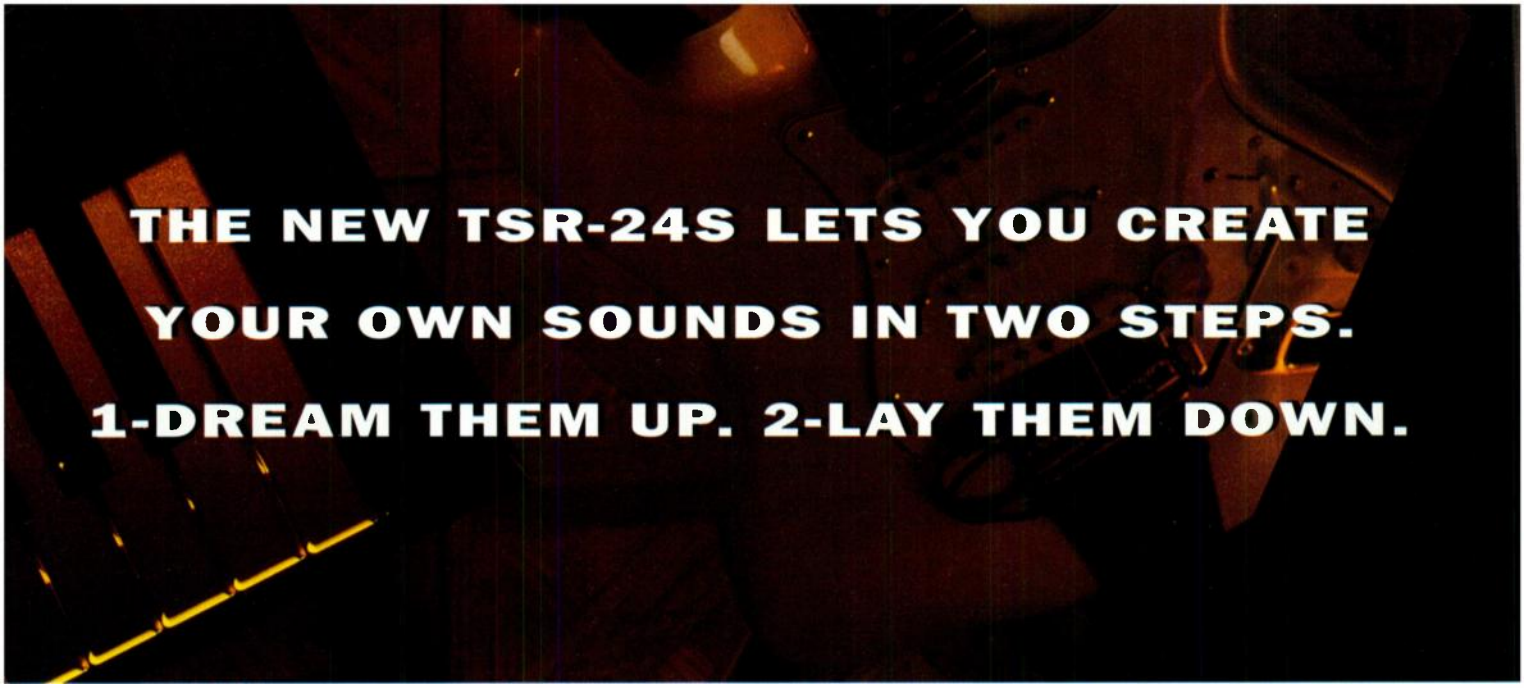

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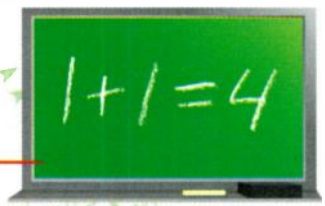

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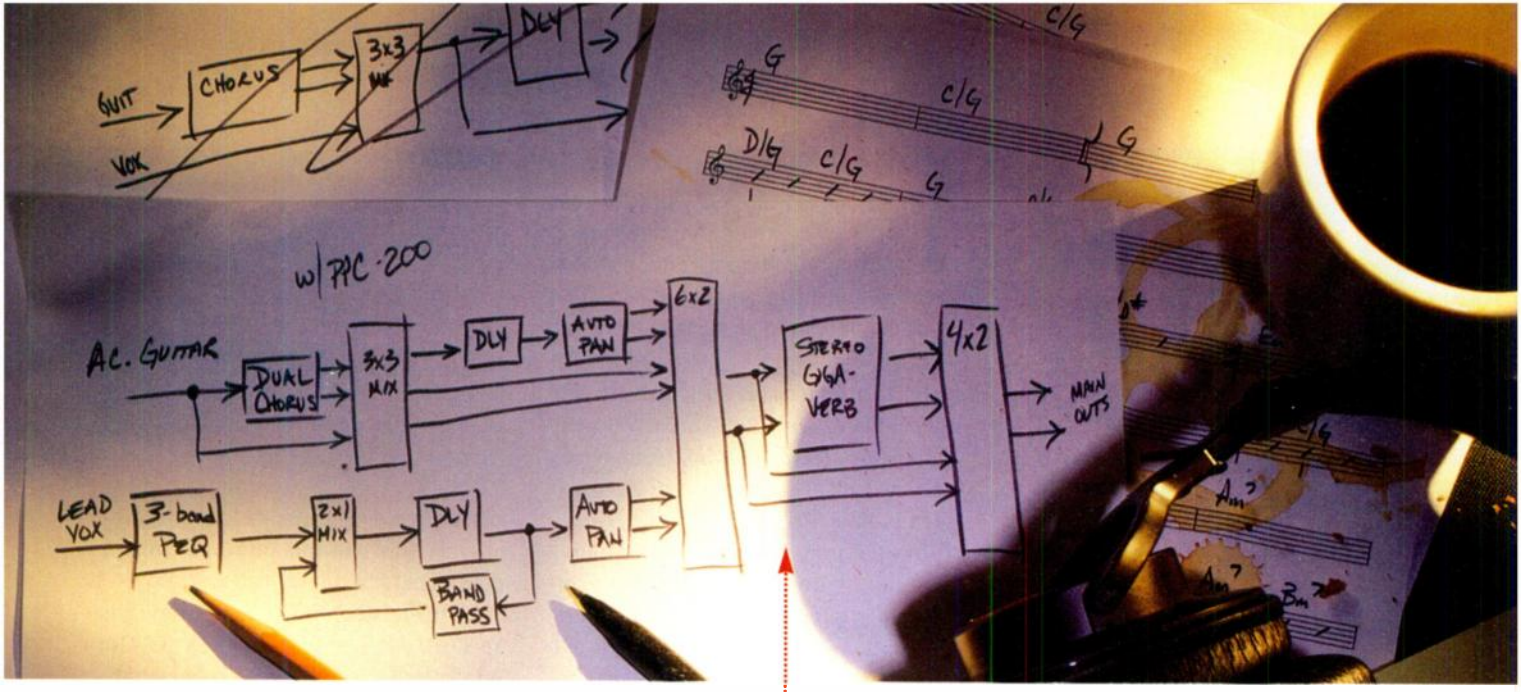

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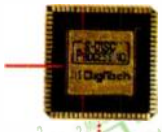

ALGORITHMS

Want reverb, chorus and flange? Press a couple of buttons. Reverb, chorus and reverb again? Redundant effects are not a problem. Link effects in any order to create algorithms, then program them in nearly limitless combinations.

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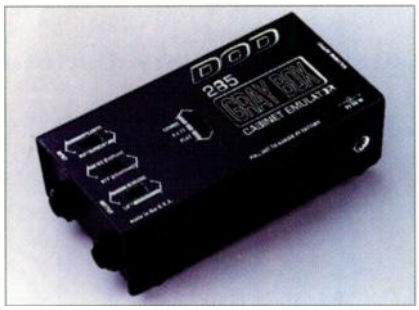
WHAT'S NEW

By Steve Oppenheimer



▲ DOD 285 GRAY BOX

Speaker-cabinet emulators have become extremely popular in recent years. These devices let you connect an instrument preamp or guitar amp directly to a mixer while retaining the sound of an amp with speakers. DOD's 285 Gray Box ($129.95) offers three different emulations: 4 × 12 cabinet with enhanced low end; twin-speaker, open-backed combo-amp with less low end and an overall brighter sound; and flat frequency response for use as a standard direct (DI) box.

The 285 also converts a high-impedance, unbalanced source to a low-Z, balanced signal, which is particularly useful for live applications such as plugging into P.A. snakes. Input signals are isolated via FET op amps to reduce loading effects. Also included is a ground-lift switch, internal pad, and ground pad for speaker-level input. Power is supplied via battery or external 9 VDC supply. DOD Electronics; tel. (801) 566-8800; fax (801) 566-7005.

Circle #401 on Reader Service Card

▶ IQS SAMM

The Yamaha ProMix 01 raised the bar for affordable 16-channel mixers, with its automation, onboard processing, and digital outputs. With all that power under the hood, a computer-based editor would be a big plus. Windows 3.1 users can accomplish this and more with Innovative Quality Software's *Software Audio MIDI Mixer* (*SAMM;* $499), which can control all the features of up to sixteen ProMix 01s.

The program lets you create groups of fader, mute, and solo controls, including groups across multiple mixers. In addition, you can temporarily group channels to control all settings simultaneously. You can create and crossfade between an unlimited number of automation sequences and create an unlimited number of Scenes.

The user interface features 256-color, 3-D graphics, and it is programmed in

32-bit assembly language for fast, smooth scrolling. Switchable zoom levels provide views of the entire console or control details.

Software Audio MIDI Mixer requires an 80386 or better PC with 8 MB of RAM, Windows 3.1, and a Windows-compatible MIDI interface. The video display must be capable of 800 × 600 minimum resolution at 256 colors. Innovative Quality Software; tel. (702) 435-9077; fax (702) 435-9106.

Circle #402 on Reader Service Card

▶ DYNAUDIO ACOUSTICS BM5

No matter how good your instruments, mics, processors, and console are, your mix can end up sounding like a real mess if you don't listen to your work on a good set of monitor speakers. Fortunately, speaker prices have been steadily dropping in recent years, while quality has continued to improve. Dynaudio Acoustics continues this trend with its BM5 2-way, passive, near-field reference monitors ($699).

The BM5's 170 mm (6.7-inch), magnesium silicate-impregnated, polypropylene woofer sports an extra-large (75 mm), aluminum voice coil, which is said to offer dramatic improvements over conventional speakers in power handling, bass response, and reduced distortion. An adjustable port lets you tune the bass response to taste. The thermally protected, 28 mm (1.1-inch), soft-dome tweeter has a neodymium magnet and aluminum voice coil. The passive crossover is set at 2.5 kHz.

The enclosures' output levels are matched to within ±1.5 dB SPL. They feature heavy internal damping for minimal resonance and offer gold-plated connectors. The drivers are magnetically shielded so they can be located near video monitors. According to the manufacturer, the speakers display exceptionally linear phase response.

The BM5's nominal impedance is 4 ohms and typical maximum SPL is 102 dB (at 1.25 meters). Recommended power handling is 150W RMS, but good results can be achieved with as little as 50W. An optional amplifier pack is planned. Frequency response is rated at 50 Hz to 20 kHz (±3 dB) and THD is <0.1% (@ 88 dB, any frequency from 100 Hz to 20 kHz). Audio Exchange International (distributor); tel. (617) 982-2626; fax (617) 982-2610.

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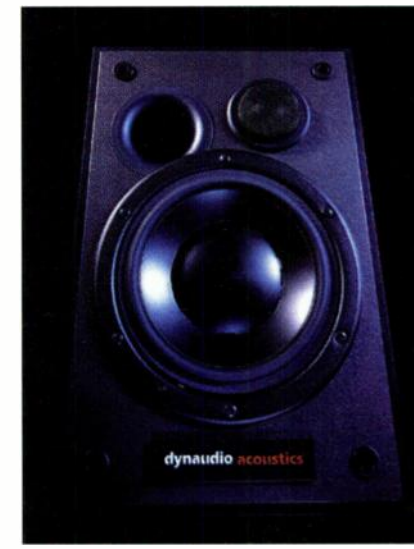

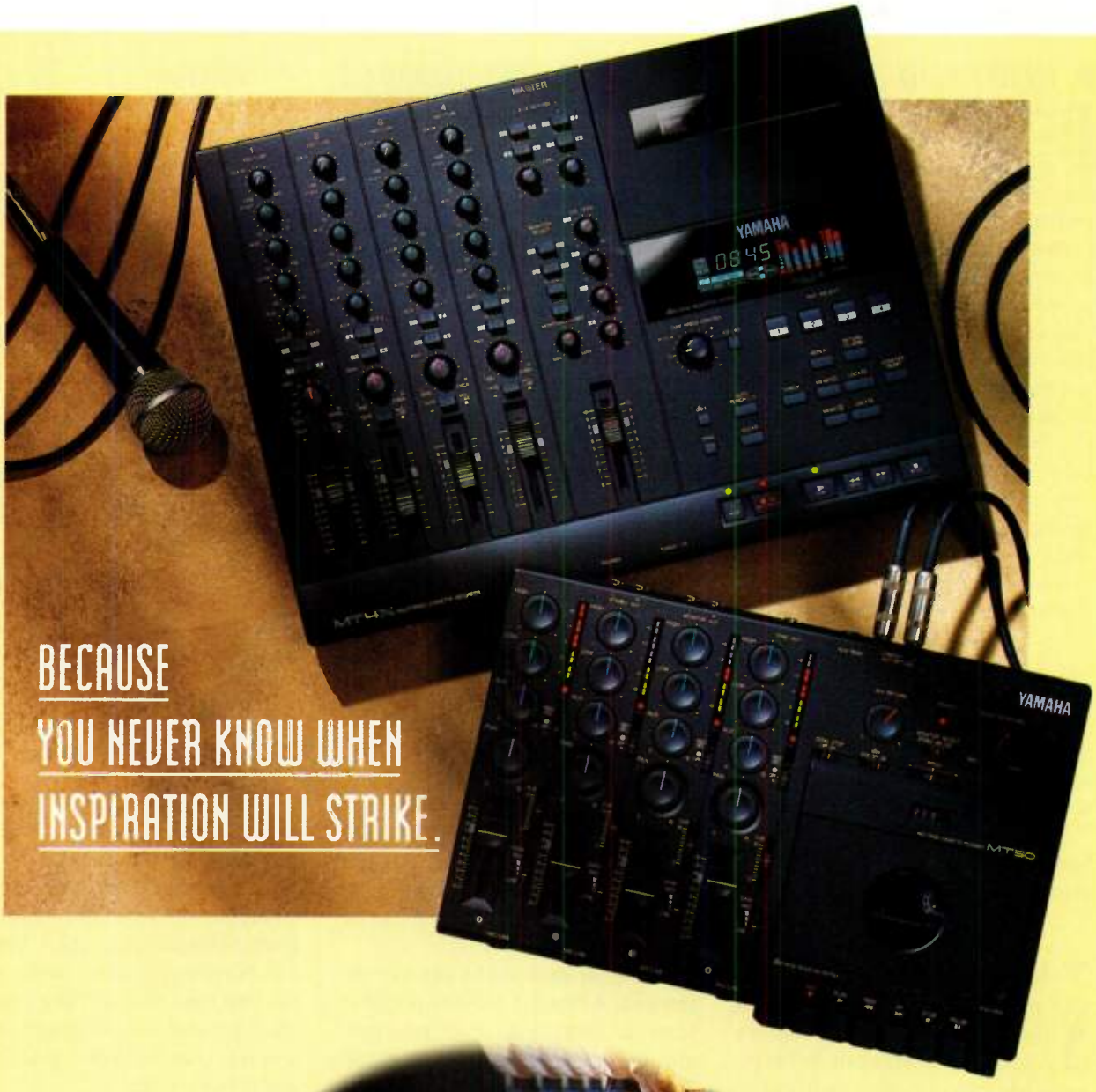

When a killer tune enters your head, nothing should get in your way. Not even that hot pastrami on rye. Which leads us to two of the best substitutes for a recording studio money can buy. The new Yamaha MT4X and MT50. Two decks that raise the standard for all 4-track recorders without raising the price. With 4-track simultaneous recording. Multi-band EQ. Lots of mic inputs. Even auto punch-in/out on the MT4X. Hurry down to your nearest Yamaha dealer. After all, the muse could strike any minute now. **YAMAHA®**

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▶ PEAVEY TUBE FEX

Peavey combines hard-driven tube distortion and multi-effects in the Tube Fex guitar tube preamp ($899.99). The Tube Fex's two 12AX7 tubes are driven at their full-rated 250V for a classic tube-amp sound. The preamp offers input gain, output gain, treble, mid, and bass controls, and you can select between Clean, Crunch, Lead, and Ultra tube modes. These parameters can be saved with each patch.

Up to seven effects, including the tube preamp, can be chained in any order. The 24-bit effects processor offers 37 types of effects. A clip LED that indicates DSP overloads can be assigned to any location in the effects chain. If the tube preamp is first in the effects chain, the input signal goes directly to the preamp, bypassing the A/D converters. The tube preamp can operate in mono or on either channel, and tube distortion and digital distortion can be used simultaneously.

A programmable stereo effects loop (with ¼-inch jacks) lets you add external processors, and a programmable speaker emulator shapes the signal for direct recording. A chromatic tuner with programmable mute is also included. All effects and tube-preamp parameters and master volume are MIDI controllable. Two CV footpedal jacks are provided, and each pedal can control up to eight parameters in real time.

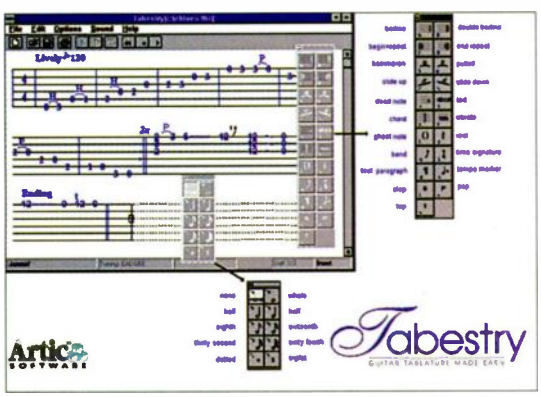
The Tube Fex stores 128 user patches in RAM and includes 128 factory presets in ROM. A RAM card slot accepts optional cards that can store 128 additional user patches.

The unit has mono, ¼-inch inputs on the front and rear panels. The rear panel also includes stereo, ¼-inch outputs and stereo, XLR direct outputs. Peavey Electronics; tel. (601) 483-5365; fax (601) 486-1278.

Circle #404 on Reader Service Card

▼ ARTIC SOFTWARE TABESTRY

Sometimes, standard music notation is overkill, especially if all you need is a simple guitar or bass part. Tablature, a common form of notation for fretted instruments, is often the best choice, but buying a full-blown notation program just to get tablature features is overkill, too. Artic Software's entry-level *Tabestry* for Windows ($59) provides tablature notation for guitar and other fretted instruments with 4, 5, 6, and 7 strings.



Tuning for each string can be customized. A floating toolbox provides tools for notating hammer-ons, pull-offs, up and down slides, ghost notes, bends, taps, slaps, pops, and vibrato. You can also enter chords, rests, time signatures, tempo markers, bar lines, repeats, and rhythmic symbols. Note spacing, line spacing, and staff spacing are user-adjustable. In addition, fonts can be individually selected for tablature notes, time signature, title, subtitle, comments, and text.

The program can print out the tablature and export it as a Standard MIDI File or ASCII file. The music can be played back via MIDI or built-in samples (bass, clean guitar, or distorted guitar) that play back through any Windows sound card. Artic Software; tel. (414) 534-4309; fax (414) 534-7809.

Circle #405 on Reader Service Card

▼ SOUNDCRAFT K-1

Few affordable mixers are truly modular, but Soundcraft's K-1 is an exception. The 4-bus console is available in 8-, 16-, 24-, and 32-channel frames ($2,995, $3,950, $5,350, and $7,495, respectively). In each case, the frames come loaded with 4-channel, mono, mic/line input blocks; users can swap any of these blocks for 4-channel, stereo, line-level blocks for an extra $200 each.

Each mono input channel has balanced XLR inputs, 100 mm fader, pan pot, phase-reverse switch, mic preamp, highpass filter, 4-band EQ with two sweepable mid bands, and six aux sends (switchable pre/post-fader). Channels can be routed to the four buses or main mix, and each channel has a dedicated mono bus switch as well as PFL and On buttons. LEDs indicate signal present and peak overload.

The master section includes four faders for the subgroups and a single fader for the L/R mix. The group outputs are balanced, XLR connectors, and there are two stereo returns/inputs. Phantom power can be defeated individually on each channel, and all channels have post-fader direct outputs. Levels are monitored via four pairs of 12-segment, peak-reading, LED ladders. The unit includes 2-track returns and a talkback circuit.

The K-1's frequency response is rated at 20 Hz to 20 kHz (±5 dB). THD is rated at <0.004% at 1 kHz and <0.02% at 10 kHz. Adjacent channel crosstalk is <90 dB (@1 kHz). Soundcraft USA/Harman Pro North America; tel. (818) 894-8850; fax (818) 830-1220.

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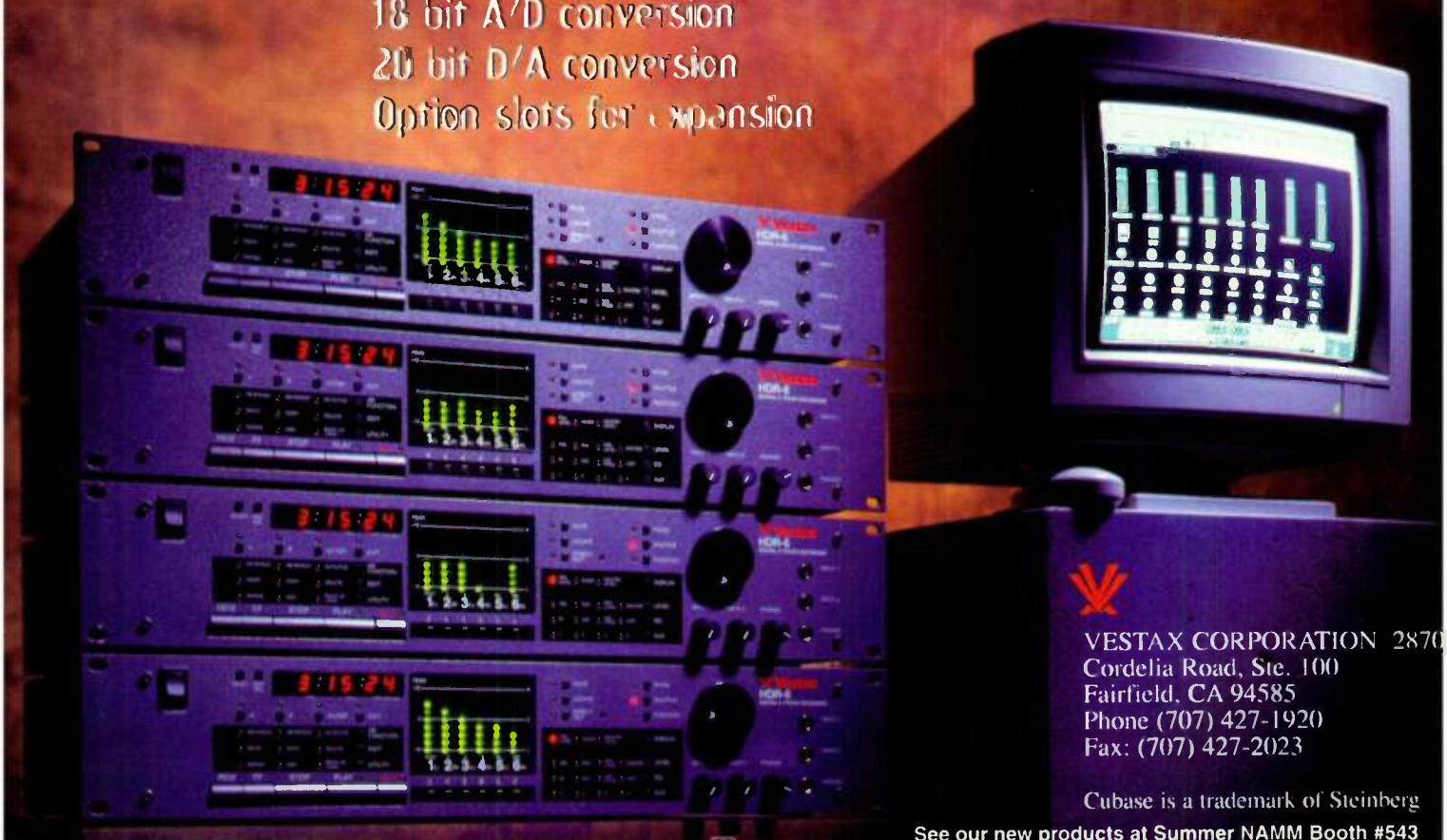

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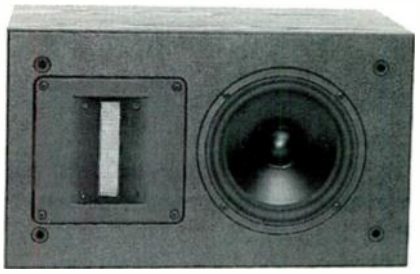
MANUFACTURED IN THE USA

▶ APOGEE ACOUSTICS CENTAURUS PRO RIBBON MONITOR

There are many ways to design a reference monitor, but only Apogee Acoustics uses a ribbon midrange/tweeter. The company's Centaurus Pro Ribbon Hybrid Monitor ($1,000/pair) has a 6.5-inch woofer with a 1.25-inch, high-power voice coil and a large, shielded magnet. The corrugated ribbon tweeter is four inches long and provides controlled vertical directivity. The drivers are crossed over at 2 kHz, and dual gold-plated binding posts are provided for biamplification.

Designed for vertical or horizontal positioning, the enclosure measures 16 × 9 × 11.5 inches. It is heavily braced and rear ported, with an optional foam port plug. The standard cabinet is black ash with a black fabric grille, but a premium version ($1,250) is available in oak or mahogany veneer or a high-gloss black finish. Each speaker weighs 26 pounds.

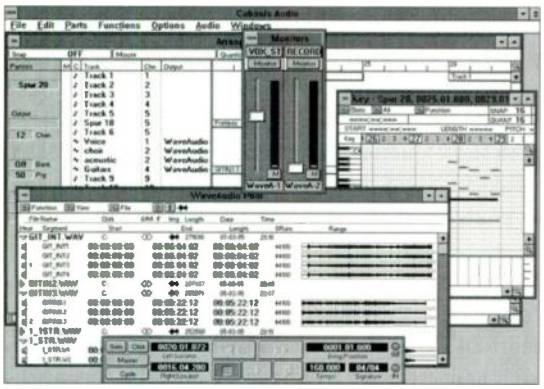


Recommended power handling ranges from 25 to 200W/channel into 8Ω nominal (6Ω minimum). Sensitivity is 88 dB (1W @ 1m, on-axis), and frequency response is rated at 45 Hz to above 25 kHz. Apogee Acoustics; tel. (617) 963-0124; fax (617) 963-8567.

Circle #407 on Reader Service Card

▼ STEINBERG CUBASIS AUDIO

Although several companies are developing integrated digital-audio sequencers for Windows PCs, the only currently shipping, professional program of this type is Steinberg's *Cubase Audio*. But if you want such an integrated environment without *Cubase Audio*'s high-end features and matching price tag, you have been out of luck until now. Steinberg's *Cubasis Audio* ($299) changes all that, combining the company's entry-level sequencer with sound card-based digital audio.



Depending on the sound card's capabilities, *Cubasis Audio* can support up to four stereo tracks (eight tracks total) of 16-bit, 44.1 kHz digital audio. Audio segments are displayed in the Arrange window and manipulated with the same graphic tools as MIDI tracks. Nondestructive WAV-file editing features include Cut, Copy, Paste, and Move. The Undo feature applies equally to audio and MIDI edits.

The Audio Pool provides an overview list of all audio files in use, complete with waveform display. The audio files can be dragged directly to any position in a song.

The sequencer supports up to sixteen MIDI channels per track, 64 tracks per Arrangement, and sixteen Arrangements per Song. Real-time Key (piano-roll), List, and Score Edit windows are available. Scores can be printed, complete with user-entered text. Instrument names and maps are supplied for GM, Roland GS, and Yamaha XG instruments.

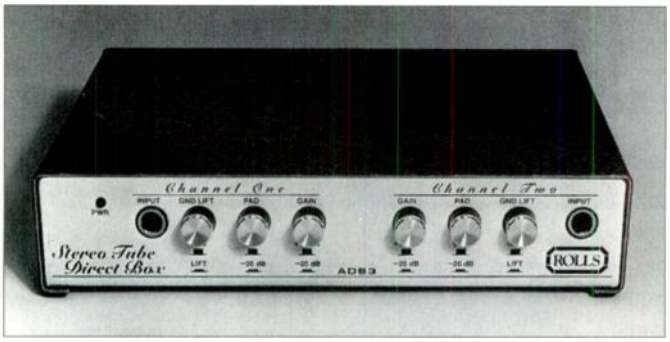
Also from Steinberg is the PC-MIDI 3 ($219), a 1-in, 3-out MIDI interface that attaches to the PC's parallel/printer port. The outputs are independent, allowing operation on 48 MIDI channels. The unit uses active electronics for high-speed data transmission. An intelligent installer is provided for the MME-compatible driver. A 20-inch cable is also included. Although it is normally powered from the PC, the interface also can be powered by an external supply. Steinberg; tel. (818) 993-4091; fax (818) 701-7452.

Circle #408 on Reader Service Card

▶ ROLLS ADB3

Some people celebrated when tube-based audio gear was replaced by solid-state equipment and, more recently, by digital products. Having cleaned up their sonic acts, however, many musicians decided to add the warmth of tube distortion back into their sound by using signal processors that feature real vacuum tubes.

In this spirit, Rolls Corporation is offering the ADB3 Stereo Tube Direct Box ($199.99), a 2-channel, active, impedance-matching, direct-injection (DI) box that uses one 7025 tube per channel. Each channel has two unbalanced, ¼-inch, audio inputs; a balanced, XLR, audio output; a ground-lift switch; a -20 dB input pad; and a ±20 dB input-gain switch. The outputs are transformer coupled.



The ADB3 can be set to an output level of -40, -20, 0, or +20 dBu via front-panel Gain/Pad switch combinations. The half-rackspace direct box is housed in a heavy, steel chassis that can be mounted to any standard rack tray. Rolls Corporation; tel. (801) 263-9053; fax (801) 263-9068.

Circle #409 on Reader Service Card

▼ MIDIMOTOR HUM BUSTER

A common cause of ground loops is the existence of more than one ground path in the AC power-distribution system. One way to avert this is by isolating each outlet. MidiMotor addresses this and other AC power problems with its Hum Buster series of rack-mount power-distribution systems.

The basic version is the Hum Buster HB-100 ($425), which eliminates AC ground loops via ten transformer-isolated AC outlets (four at 60W, four at 125W, and two at 300W; up to 1,200W total). One of the 300W outlets is duplicated on the front panel; both of these receptacles can be used as long as the total power consumption doesn't exceed 300W. Each circuit is protected by a fuse, and a 10A slow-blow fuse protects the main circuit. The unit also provides RF and EMI filtering and surge/spike suppression.

The Hum Buster-10 and Hum Buster-20 ($455 and $539, respectively) are low-power versions of the HB-100. The Hum Buster-10 has ten circuits at 125W (1A), while the Hum Buster-20 has twenty circuits at 60W (0.5A).

The Hum Buster-B ($549) provides balanced AC power, which works much like a balanced audio system, using common-mode rejection to reduce a wide variety of line-noise and ground-loop problems. Ten rear-panel Grounding Option switches set each outlet as grounded/balanced, grounded/unbalanced, or isolated/ungrounded. The unit is fan cooled and features a 10A fuse for the main circuit and self-resetting, internal circuit breakers for the secondary circuits.

A heavier-duty model, the B/1400 ($499), handles up to 1,400W (12A) and offers eleven balanced outlets. Instead of switches, it has a rear-panel terminal strip that provides connection and the grounding options.

Finally, the Hum Buster-R ($755) is identical to the HB-100 except that it also regulates each outlet at a steady 115 VAC, even when the input voltage varies anywhere from 95V to 135V. (If the input power is outside this range, the unit shuts down.) A 10-segment LED ladder indicates input voltage conditions. The Hum Buster-R uses stepless regulators for smooth, quiet operation. If a regulator failure occurs, the regulator is automatically switched out of the circuit, a front-panel LED indicates the problem, and the unit continues to operate like a regular HB-100.

All Hum Buster models are 2U rack-mount, 9.5 inches deep, and weigh 35 pounds. MidiMotor; tel. (909) 674-7555; fax (619) 295-9755.

Circle #410 on Reader Service Card

▼ AUDIOCONTROL PCA-200

Experienced multitrack cassette users know that a major drawback to this popular format is the loss of bass frequencies. AudioControl Industrial's PCA-200 low-frequency synthesizer ($299) is designed to restore the lost bass at mixdown. Unlike most bass synthesizers, the unit is not an effects processor. Rather, it uses the remaining second-harmonic signature (which is still preserved on tape) to recover and re-create the missing lows, compensating for a known nonlinearity of tape saturation.

The 1U rack-mount unit is placed between the multitrack cassette deck and a full-bandwidth mixdown deck (such as a DAT recorder). The PCA-200 includes two pairs of stereo inputs: +4 dBm, balanced, ¼-inch TRS and -10 dBu, unbalanced, RCA. There are also two L/R pairs of outputs: balanced TRS and unbalanced, RCA.

Inside the unit, the signal is split and directed through a processing-range filter; a front-panel button selects one of two ranges: 60 to 120 Hz or 40 to 80 Hz. The frequency is divided, enhanced, and passed through user-controlled, 12 dB/octave, high-cut (40 to 200 Hz) and low-cut (15 Hz to 75 Hz) filters. The wet and dry signals are then mixed with a front-panel rotary pot. An insert loop (on unbalanced, RCA jacks) for an external processor is located between the filters and the wet/dry mix control. The send can also be used to feed a subwoofer.

A hardwire bypass switch disconnects the signal from the unbalanced outputs and routes the balanced inputs directly to the balanced outputs, bypassing the processor. A rear-panel switch lets you select several grounding options, including floating, capacitor-coupled, resistor/capacitor-coupled, or directly connected to the chassis.

The unit's frequency response is rated at 20 Hz to 20 kHz (+0/-1 dB). THD is <0.01% (1 kHz @ +4 dBm, balanced out). A separate frequency analyzer, such as AudioControl's SA-3050A ($995 to $1,300 depending on options) is required for alignment. AudioControl Industrial; tel. (206) 775-8461; fax (206) 778-3166.

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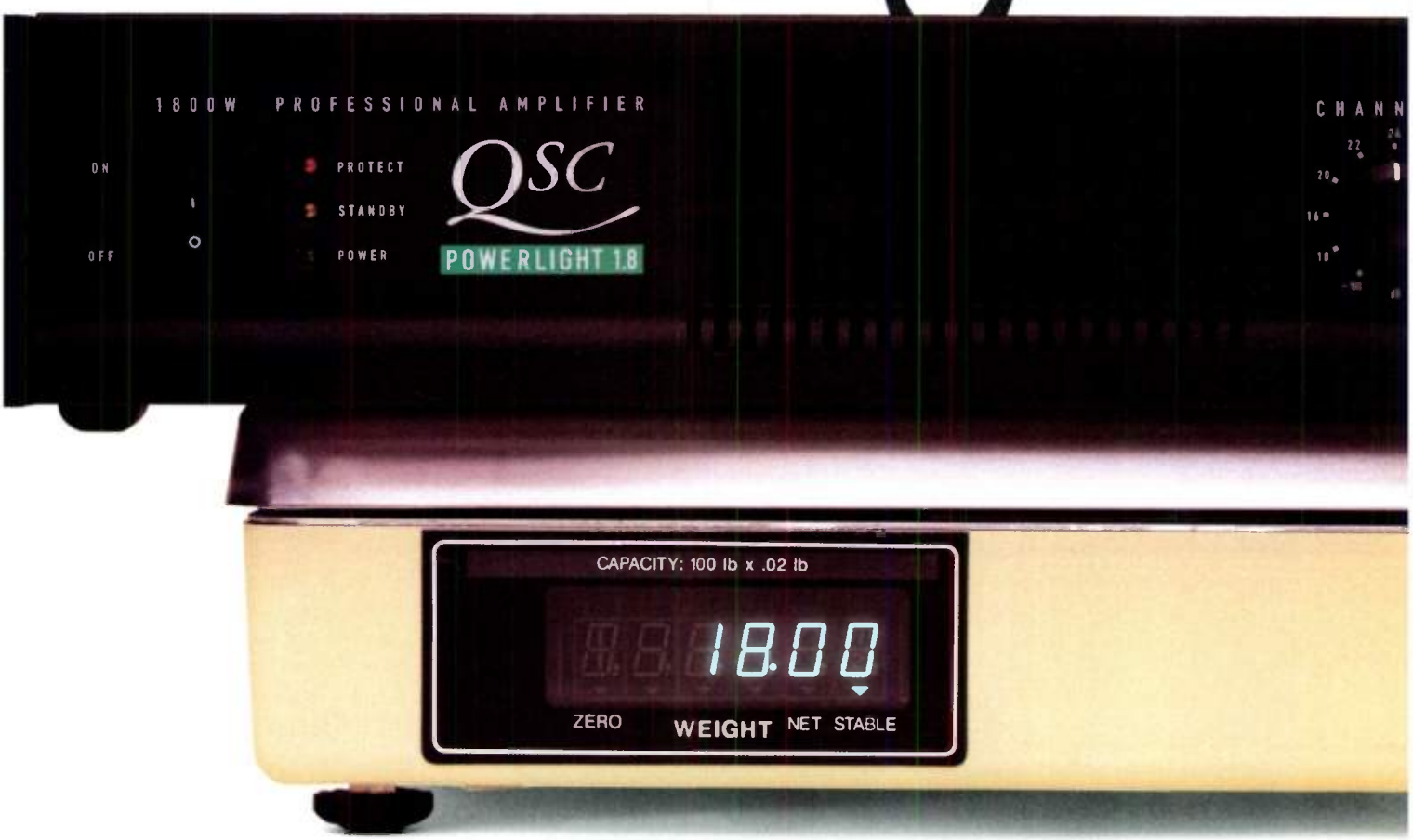

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YAMAHA 02R 8-BUS DIGITAL CONSOLE

One year ago, Yamaha debuted the ProMix 01, a remarkable small-format digital mixer at an equally remarkable price of $1,999. The ProMix 01 offers a lot, but its lack of certain features made it obvious there would soon be a higher-end product in the line. That product has finally arrived. Unveiled at this summer's APRS show in London, the Yamaha 02R is expected to be shipping by the end of the year. I got an advanced peek at a prototype, so by the time you read this, some aspects may have changed.

Housed in a tabletop chassis, the 02R has sixteen mic/line inputs (with individually switchable phantom power), four stereo line inputs, eight subgroups, a stereo output bus, and sixteen tape returns. The subgroups and tape returns are implemented on plug-in cards, up to four of which can be installed in the 02R. There are four types of these I/O cards, each of which accommodates a different audio format: Alesis ADAT optical, TASCAM TDIF-1, AES/EBU, and analog. (A fifth type of card lets you cascade multiple 02Rs.)

The card inputs can be used for tape returns or alternate inputs to the main channels, which provides up to 40 inputs. Eight of the available card outputs serve the subgroups, while any extra outputs serve as assignable direct outs. This scheme lets you configure the board exactly as you need. In addition, the 02R supports both 44.1 and 48 kHz sampling rates, and it will slave to other rates.

The master section includes a central control panel that provides access to channel functions such as pan, bus assignment, and EQ. A high-resolution, 4 × 5-inch, backlit LCD indicates the settings. Two channels of 11-segment LED output metering are standard; a comprehensive meter bridge is optional.

The input channels are in-line, with rotary controls for the tape returns located above long-throw, 100 mm, motorized channel faders. Hit a global Fader Flip switch, and the faders and rotary controls swap functions. The digital mixing and processing occurs immediately and is not limited by the speed of the mechanical faders.

All inputs include a 4-band parametric EQ with a continuously sweepable center frequency from 20 Hz to 20 kHz and adjustable bandwidth on all bands. The upper and lower bands can also be set to peak or shelf, or switched to operate as highpass and lowpass filters. The onboard multi-effects processors are essentially the same as those in the ProMix 01. The 02R also provides a total of 40 programmable dynamics processors, one for each input. In addition, any gate can be keyed from any input signal.

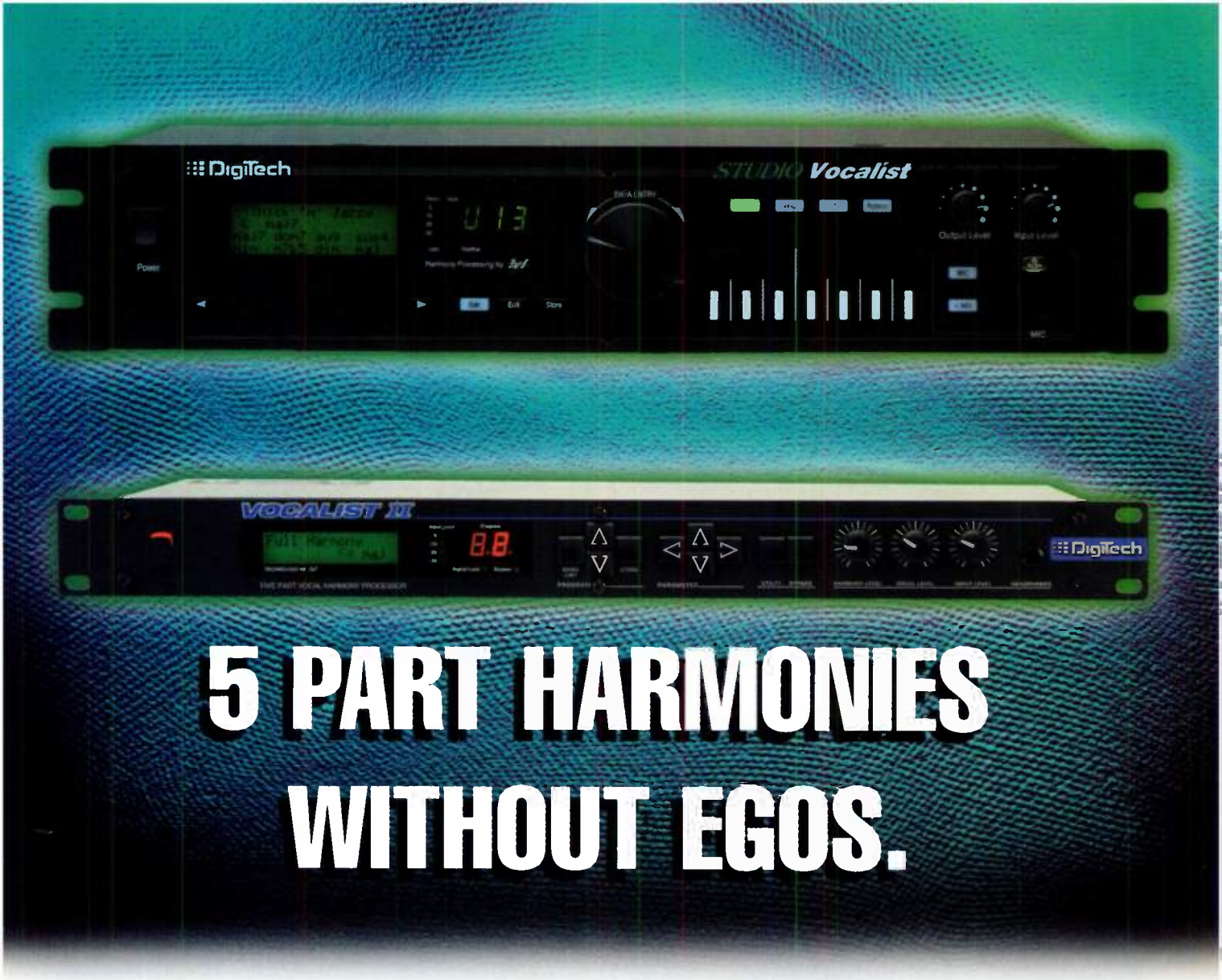
Delay is available on all inputs, which allows a number of neat tricks such as mic-alignment compensation. In addition, eight aux sends can be allocated as needed; all eight can feed external gear, or two can be routed internally and six externally.

The friendly user interface features a few detailed screens on the LCD, dedicated function keys, and a data wheel. The control-room output and main stereo buses are provided in analog, AES/EBU, and S/PDIF formats. Wordclock in and out ports are also provided, as are MIDI In, Out, and Thru jacks. A rear-panel RS-422 port permits high-speed serial control.

The automation is extensive, with real-time automation of all functions and 50 snapshots that instantly reset virtually all console controls. The mixer has 256 KB of nonvolatile RAM for snapshots and automation data, expandable to 2.5 MB. Dynamic automation and/or snapshot information can be synched to external MTC or SMPTE and backed up as RS-422 or MIDI data. The retail price is expected to be under $10,000. Yamaha Corporation; tel. (714) 522-9011; fax (714) 739-2680.

—George Petersen

Circle #412 on Reader Service Card



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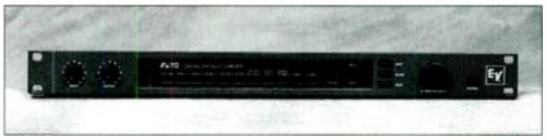
▶ ELECTRO-VOICE FX70

Surprise! Famed transducer manufacturer Electro-Voice is shipping a rotary speaker simulator. Well, okay, the Electro-Voice Fx70 ($1,180) was actually designed and manufactured by Dynacord, who has long made impressive rotary speaker simulators, including the popular CLS 222 (reviewed in the October 1986 **EM**) and DLS 223. In fact, EV offers a free upgrade modification that turns a DLS 223 into an Fx70.

The Fx70 simulates both mechanical Leslie-type rotor cabinets and electronic rotor effects in stereo. Front-panel buttons call up three of the unit's thirteen programs (the other ten are available in Option mode) and access five basic parameters: distortion (overdrive), rotor balance, speed of the bass and treble rotors, and effect bypass. Each function's status is indicated by a dedicated LED.



All 42 parameters can be adjusted via MIDI, and user programs can be saved in the onboard program locations or via SysEx. Parameters are mapped to MIDI controllers using a MIDI Learn function that assigns the selected parameter to whatever Control Change message you send. The unit has separate MIDI In, Out, and Thru connectors.

Parameters can also be edited with a rotary knob on the front panel. A 2-character LED display indicates parameter values. Two additional dedicated LED displays indicate the treble and bass rotor speeds, and a 6-segment LED ladder indicates the input level. Input- and output-level controls are provided, along with rear-panel jacks for an optional Effect On/Off footswitch and an optional double footswitch that controls Motor On/Off and Slow/Fast rotor speeds.

The A/D/A converters are 16-bit linear, and the internal processing is 24-bit. Frequency response is 20 Hz to 20 kHz with the effect bypassed and 40 Hz to 20 kHz with the effect engaged. The S/N ratio is rated at >104 dB clean and >90 dB with effect. Electro-Voice; tel. (800) 234-6831 or (616) 695-6831; fax (616) 695-1304.

Circle #413 on Reader Service Card

▶ ROLAND RSS-10

When Roland first introduced its Roland Sound Space (RSS) 3-D sound-processing technology, it was literally the high-priced (audio) spread, costing a cool $45,000. Well, hold onto your sweet spots, folks, because according to the manufacturer, the 1U rack-mount RSS-10 ($2,995) produces more convincing 360° sound placement for a fraction of the original price. The unit lets you manipulate the apparent elevation, azimuth, and distance of a sound source for playback on a 2-speaker sound system. As the sound source

moves through the 3-D space, the reverb reflections move accordingly, in real time. Up to sixteen units can be linked.

All parameters can be automated under MIDI control. Roland also provides two types of control software for Mac or Windows. One program lets you design the 3-D soundstage statically, while the other lets you control dynamic effects, such as Doppler shift, flanging, programmable movement, and so on.

The maximum source distance can be up to 81 meters (adjustable in 1 cm steps), or 655 meters (adjustable in 8 cm steps). The room size can be adjusted from 1 to 100 meters, while reverb time can be set from 0.1 seconds to 40 seconds. Input levels are displayed on a pair of 12-segment LEDs, while output levels are shown on 3-segment LEDs.

Both +4 dBm, XLR and -10 dBm, ¼-inch inputs and outputs are provided, with 20 dB of headroom. In addition to MIDI In and Out ports, an RS-422A/232C serial port is included. Roland Corporation US; tel. (213) 685-5141; fax (213) 722-0911.

Circle #414 on Reader Service Card

▼ TASCAM DA-20

DAT recorders are today's audio mixdown medium of choice, and TASCAM makes some of the best. With the DA-20 ($1,099), the company has brought the price of quality DAT machines down another notch. The new machine includes RCA analog and S/PDIF digital I/O and supports three selectable sampling rates (48, 44.1, and 32 kHz). In Long Play/Record mode (which operates at 32 kHz), it can capture up to four hours of audio on one tape. Other features include an easy-to-read LED display and a full-function wireless remote control.

One step up from the DA-20 is the DA-30 mkII ($1,599), which replaces TASCAM's popular DA-30. The new model retains all the features of the earlier unit, including both AES/EBU and S/PDIF outputs, and adds several new features.

The new Data/Shuttle wheel lets you enter program numbers and trim the ABS time display when working with Start or Skip IDs. The outer part of the wheel provides shuttling.

With the Cal/Uncal switch in the Cal position, the unit automatically calibrates itself for +4 dBm balanced or -10 dBV unbalanced signals. In the Uncal position, you can manually calibrate the machine.

With the Selectable Copy ID feature, you can make any number of unprotected digital copies, or implement SCMS copy-protection when using the S/PDIF output.

The DA-30 mkII's Long Record mode doubles the amount of playback time. It operates at 44.1 and 48 kHz for the analog inputs and at 32 kHz for the digital inputs. Finally, the DA-30 mkII has new and improved analog-to-digital and D-to-A converters. TASCAM; tel. (213) 726-0303; fax (213) 727-7656. ●

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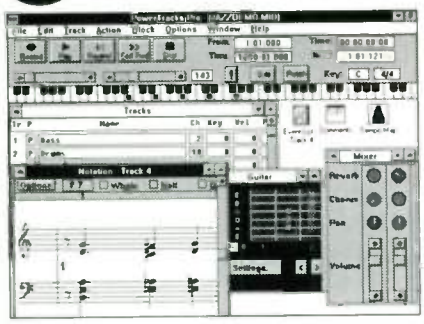

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REQUIREMENTS: PowerTracks for Windows - Windows 3.1, IBM Compatible AT, 386 or higher, 2mb RAM. Supports any device compatible with Windows 3.1 including Roland MPU401, Music Quest MQX interfaces, Key Electronics MIDIATOR, SoundBlaster, AdLib, TurtleBeach,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

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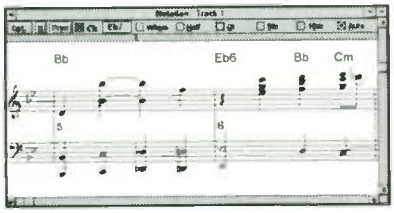

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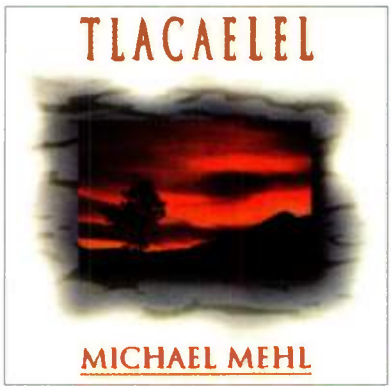
REQUIREMENTS: MACINTOSH 2mb memory, system 6 or 7, MIDI interface + synthesizer/ module with guitar, bass, drums sound, 2mb hard drive space required. WINDOWS (IBM) 2mb RAM memory, Windows 3.1, SoundCard (Roland, SoundBlaster, etc.) or MIDI system with guitar, bass, drums sound, 3.5" or 5.25" high density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



PRO FILE

In His Mind's Eye

Michael Mehl assembles a MIDI orchestra.

By Mary Cosola

When Michael Mehl first entered the realm of electronic music a few years back, he tackled a simple little project. He composed a 20-minute symphony based on the birth of the Aztec empire. Not exactly the kind of noodling around you'd expect from someone sitting down to his first keyboard workstation.

The album, *Tlacaelel,* is the result of Mehl's new-found freedom as a composer. After a ten-year hiatus from composing, Mehl released a CD of acoustic-guitar pieces in 1990 and bought a Korg 01W/FD synth workstation soon thereafter. "I decided to get into MIDI because of the orchestral possibilities," he says. "I've played piano and composed music since I was quite young, and I've always had orchestral sounds in my head. Unfortunately, I couldn't produce symphonic music because I was working with a linear instrument. For me, the discovery of MIDI was a liberation."

Around the time that he purchased his 01W/FD, Mehl read a historical novel about Tlacaelel, the warrior priest who led the Aztecs from a barbarian nation to an empire. The dramatic and powerful story inspired Mehl to retell the tale in his own way. It took him about five months to complete the title piece and two and half years to finish the CD, which he performed and sequenced entirely on his 01W/FD.

"Because I was working with only the internal memory on my keyboard," notes Mehl, "I had to be careful in terms of polyphony and the number of instruments and tracks. I have, at most, eight tracks on the title piece. I guess you could say I had a lesson in 'economy of scales.'"

Once he was comfortable using the workstation, Mehl's next task was structuring the piece to encompass the scope of Tlacaelel's vision. To capture the realism and nuance of a live orchestra, Mehl closed his eyes and created one in his mind.

"I envisioned an esplanade outside of Mexico City that has one of the most ancient pyramid ruins in the world," explains Mehl. "In my head, I positioned the orchestra on top of the pyramid at the end of the promenade, because I wanted to create the illusion that the listener is hearing the music from that vantage point. I separated the instruments as if they were at different sides of the pyramid in order to create a dimension of being in an ambient, outdoor space.

"I adjusted the instruments constantly as I went through the piece," he continues. "I would even give a specific character to the person I saw playing an instrument. It helped me to see what the musician looked like and to envision how he or she would play."

Although his composition process was elaborate, Mehl kept the technical aspects as simple as possible. "'Tlacaelel' was mixed entirely in the keyboard, with no outboard mixing," he notes.

Mehl mastered *Tlacaelel* at a friend's studio because he doesn't own any electronic music equipment other than his 01W/FD. "I'm an intuitive person, meaning I'm not really into the technical aspects of music," says Mehl. "But I know what I want to compose, so it's really a matter of figuring out the tools and making them work for me."Judging from the expansive orchestral sounds on *Tlacaelel,* you could say he's got it all figured out.

For more information, contact The Highlight Zone, 8039 Callaghan Rd. #609, San Antonio, TX 78230.

Michael Mehl

Groove THANGS

By Steve Wilkes

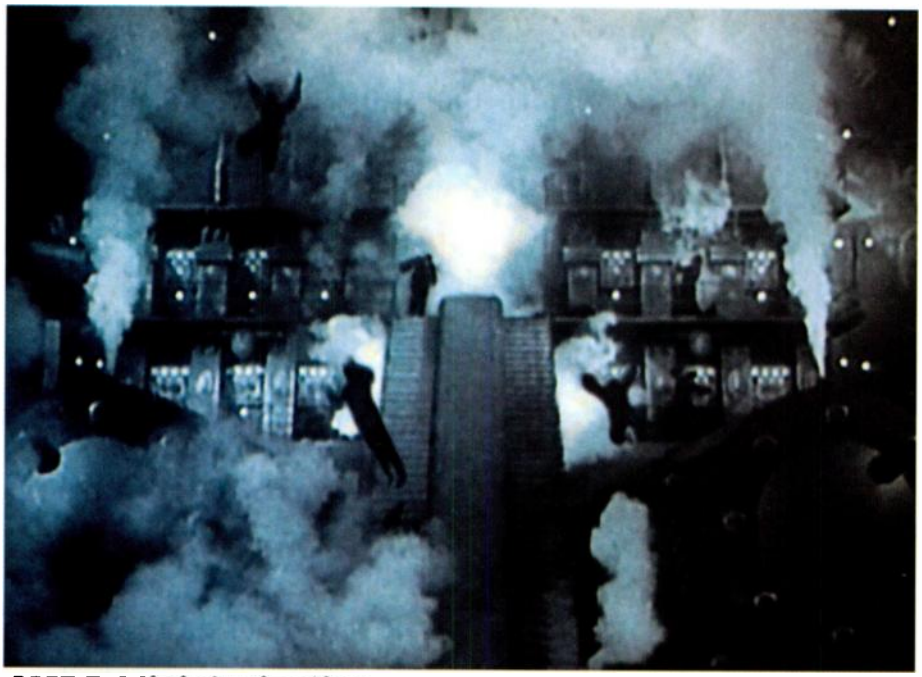
Photograph of Fantuzzi by Gary Laufman

Quixotic. This is the idealistic attitude with which many electronic musicians approach percussion sequencing. Like the romantic hero of Cervantes' *Don Quixote de la Mancha*, we tilt at our computers in an effort to win the heart of our musical Dulcinea. But alas, we are dreaming the impossible dream. An inspired idea for a drum groove comes out feeling as rigid and unyielding as a knight's armor.

Fortunately, the windmills at which we tilt are not completely unyielding. Your grooves will become more inspiring when you understand how drummers bring their parts to life with layers of sound, dynamic variation, and thinking from the bottom up. (In this article, I will focus primarily on Western percussion styles; a variety of non-Western styles are discussed in "Bang a Gong," on p. 42.)

Program your percussion sequences with a sense of humanity.

When creating an instrument of such concentrated power, a mishap now and then is inevitable.



X5DR Miniaturization Project, Korg Power Plant, 1995.

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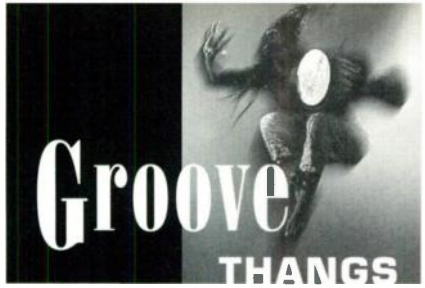


THINK LIKE A DRUMMER

So just how *does* a drummer think? After all, we're talking about a group of people who frequently beat on themselves with sticks. Perhaps, like Quixote, they are simply misunderstood individuals with an uncanny knack for thinking and executing on several levels at once.

A great drummer has the remarkable ability to operate all four limbs independently of one another. For example, you may hear Manu Katche's groove on Peter Gabriel's *US* as one homogeneous whole, but it is actually four different percussion parts played by one gifted individual. The right foot plays the kick drum, both hands and the left foot play the hi-hat, the left hand plays the snare, and both hands play the toms, all of which weave a delicate web of counterpoint and color.

Indeed, a drummer is more like the conductor of a percussion orchestra. The ability to smoothly integrate all these disparate elements into a great groove is what makes good drummers worth their weight in gold. Programmers who want to create realistic drum grooves must be aware of this "four-way independence" and use this knowledge to weave their own percussion web.

LAYERS AND COLORS

Think in layers as you program a drum groove. The kick drum is the bottom, or foundation, of the groove. The way it supports the entire track and works with the bass guitar is of paramount importance. The snare drum provides key accents that bring the drum track alive; it is the light to the kick drum's shadow. Whether on cymbal or hi-hat, the right hand provides the rhythmic subdivisions of the groove and colors the track according to the choice of cymbal. The left foot on the hi-hat often works in conjunction with the right hand, providing subtle rhythmic counterpoint, key accents, or both.

Other percussion instruments, such as shakers, tambourines, and hand drums, provide further rhythmic impetus and broaden the tonal palette. When you think about a percussion part in terms of layers and colors, a subtle shift in perception occurs, allowing you to grasp the vast tonal range offered by the percussion family. Check out any CD by Dead Can Dance for a lesson on the use of color in drum and percussion parts.

Fig. 1 provides an interesting example of painting with percussive layers. I created the sequence, "The Heat," for DrumTrax's *World Trax* collection of world-music grooves. The percussive sounds cover a broad tonal range, from the low, dark tom-tom to the percolating syncopation of the bongo. The result is a cup of aural percussive

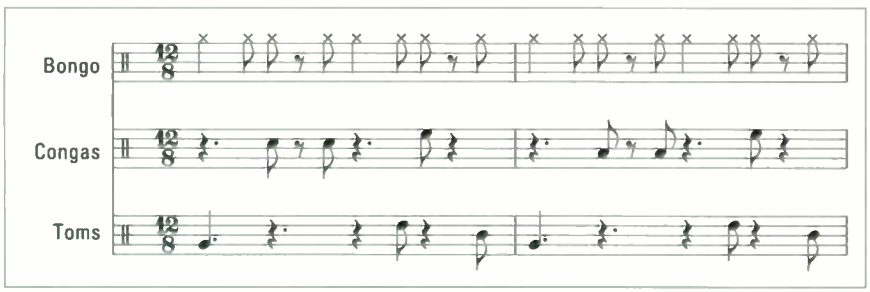


FIG. 1: The drum parts in this example are built from the bottom up.

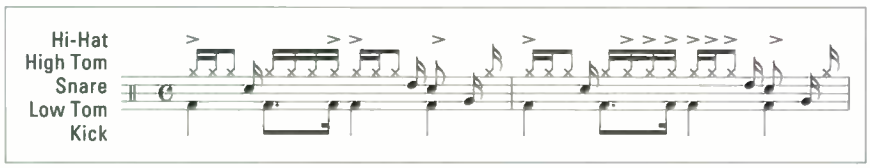
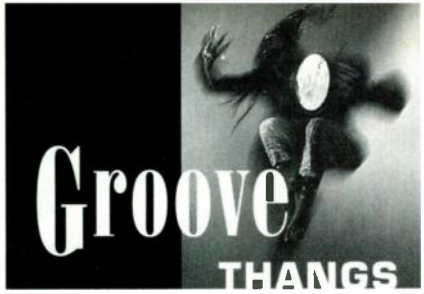


FIG. 2: This pattern illustrates the subtlety and nuance of inner dynamics. A strong kick-drum pulse on the quarter notes contrasts with the snare drum/tom-tom combination, which is also the loudest element of the drum part. The hi-hat fills out the picture with accented and unaccented sixteenth notes.



espresso that makes your feet tap while providing a good buzz for the head.

INNER DYNAMICS

A piece of music rarely calls for all the instruments to play at the same dynamic level for an entire performance. Inner dynamics provide width, breadth, depth, and subtlety to the music. This is especially true with drum parts. Good drummers phrase the hi-hat, kick drum, snare, toms, cymbals, and fills at different dynamic levels for optimum effect, and a good programmer must do the same.

The kick and snare are frequently the strongest elements. However, ghost notes—extremely quiet attacks—can often occur in the snare and kick parts. The right hand on hi-hat or cymbal provides the all-important rhythmic subdivision and, dynamically speaking, is often a backdrop to the kick and snare. The left foot on hi-hat fills out the dynamic picture with what is usually the softest element of the drum groove (along with any ghost notes). In MIDI terms, Velocity is a key element in achieving these critical inner dynamics.

Fig. 2 features an excerpt from the drum sequence "Alternative 094," from version 2 of DrumTrax's MIDI drum-pattern library. This sequence, which evokes the spirit of Manu Katche, expertly delivers the subtlety and nuance of inner dynamics. Starting with a drum groove that displays a strong kick-drum pulse on the quarter notes, it provides contrasting color with the snare/tom-tom combination, which is the loudest element of the drum part. The hi-hat fills out the picture with sixteenth notes, which also add dynamic interest by alternating between accented and unaccented attacks.

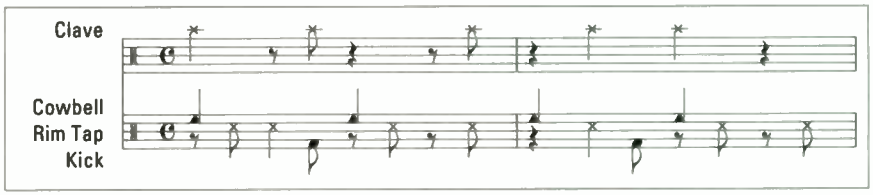


FIG. 3: The key accents of the Afro-Cuban *songo* are provided by the clave, which is performing a 3-2 accent pattern.

FROM THE BOTTOM UP

As mentioned earlier, the kick drum is usually the foundation of the groove. Therefore, it makes sense to start with this instrument as the first element in sequencing, especially when step-recording. But first, you must consider some musical questions. Does the song need a busy drum part? A loud drum part? Strategic, stylistic elements?

Once these questions are answered, you can begin with the kick-drum part as though you were laying the foundation of your home. And just as the home's foundation must support all its disparate parts, so must a kick-drum part support and work in conjunction with the disparate elements of a song. The bass part should integrate with the kick drum by reinforcing the key accents. Similarly, the drum parts that follow must congeal around the kick-drum pattern in a complementary fashion without working against the accents set up by the kick drum and bass. Following this "bottom up" approach results in drum tracks with a wonderful, organic feel.

AHEAD AND BEHIND

Ahead of, or on top of, the beat? Behind the beat? Just what do these expressions mean? Rushing, dragging, speeding up, slowing down? No—they refer to where musicians place the *attacks* of their notes. Some drummers place the snare drum (left hand) attacks slightly behind beats two and four (e.g., Ringo). Other drummers place their bass drum (right foot) attacks a little ahead of beats one or three (e.g., Clyde Stubblefield). These little quirks can give sequenced drum tracks a good dose of life and personality.

A recent listening session at a friend's studio really drove this point home. My friend is an avid blues guitarist who uses programmed drum tracks as the bed for his blues compositions. As I listened to some of his tunes, I marveled at the drummer's wonderful feel and touch. Suddenly, I realized the track was sequenced. Then, I heard the trick that had fooled me: The snare drum was a good two milliseconds behind beats two and four. This created a convincing aural illusion of a great blues band laying down a comfy groove at half-past midnight in a downtown club. On the other hand, it's well documented that Miles Davis liked his drummers to play slightly ahead of the beat. So listen to some of your favorite players to see where they place their attacks.

A SENSE OF BREATH

Good drum tracks breathe. They possess a quality that can only be described as *radiant.* This can be achieved when you understand that the spaces between the notes are just as important as the notes themselves. Think of the spaces between the notes as inhalations that contrast with the exhalations of the attacks. In the same way that a great singer uses breath to infuse a vocal performance with life, a drummer does so with the rhythmic movement of hands and feet.

Think about breath as you program your drum track. Think of the track as a living, breathing entity, not an aural manifestation of binary code. When Tony Williams performs, you hear the life force of breath in every note. Your programmed drum parts need this same quality to really work.

I use a simple rule of thumb to create radiant drum tracks: Avoid clutter. Too many programmers clutter their drum grooves with parts that an eight-limbed creature couldn't play. Any semblance

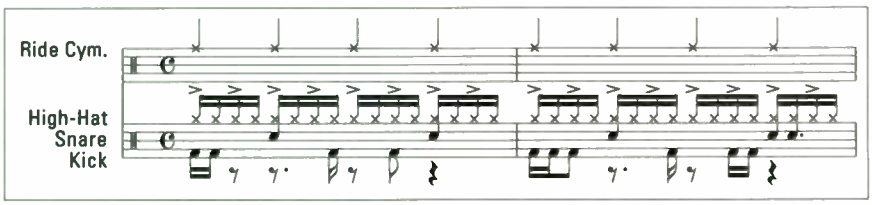


FIG. 4: This groove demonstrates the concepts of building from the bottom up, inner dynamics, layers, and colors.

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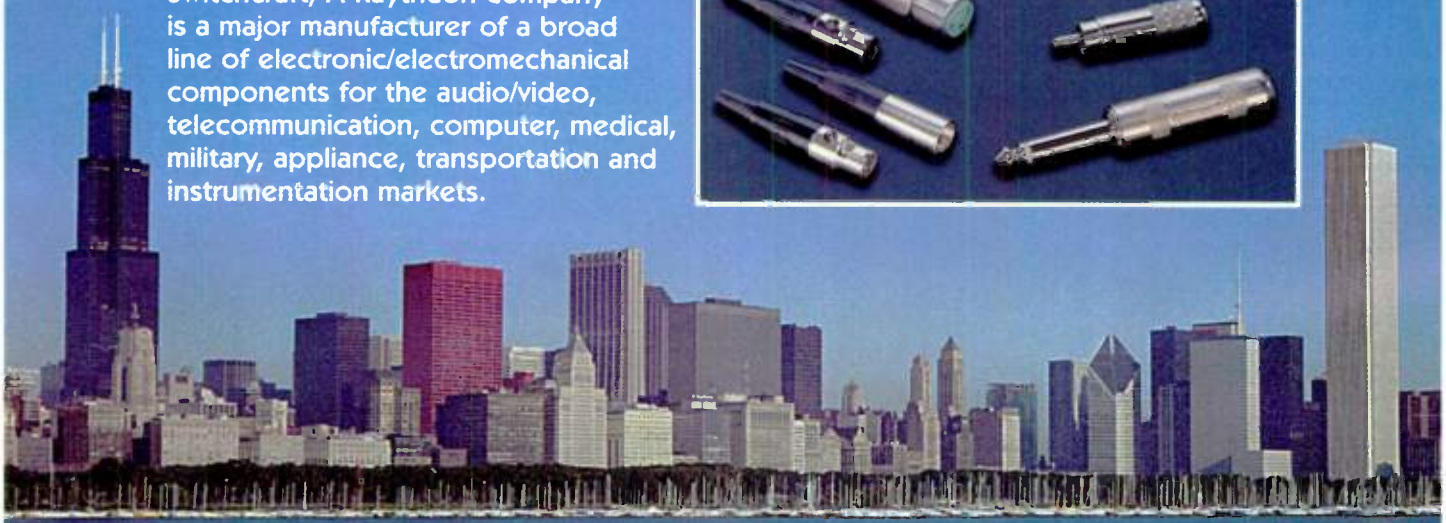

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Load while Playing	Yes	No
Styles	96	48
Store User Styles	32 + 32 Variations	4
User Pygmible Drumkits	Unlimited	2
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of breath is buried under an avalanche of notes. Such parts usually send me scurrying for the nearest Brian Eno record to heal my wounded ears with radiant ambience. Space—an interval or area between or within things—is a musical virtue. And nowhere is this more important than in sequenced drum grooves.

STYLES

Musical style provides a vital rhythmic context. You cannot create an authentic drum groove without being aware of the style in which it occurs. For example, suppose you have just landed a gig to write a new musical spot for Coca Cola, and the producers are looking for something with an Afro-Cuban feel. To attempt a drum part for this spot without being aware of *clave* (the rhythmic accentuation that provides the heart and soul of Afro-Cuban music) is like building a home with no foundation. In this case, the "bottom" goes beyond the kick-drum part. You must create the *indigenous* elements called for by a specific groove. A good programmer must be aware of the rhythmic rules of any given style. (See "Bang a Gong" in this issue and "The MIDI Samba" in the May 1995 **EM** for more on Afro-Cuban music.)

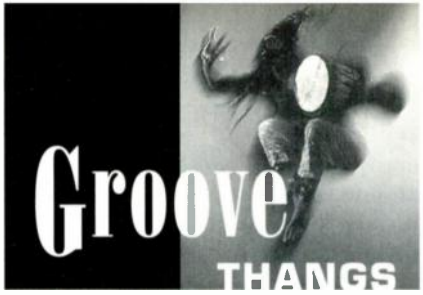
In **Fig. 3**, an excellent example of *songo*, an Afro-Cuban groove, is taken from the forthcoming book, *The Essence of Afro-Cuban Percussion and Drumset*, by Ed Uribe, a master of the Latin percussion idiom. The key accents of this pattern are provided by the clave (a wooden percussion instrument), which is performing a 3-2 accent pattern (three accents in the first measure, two in the second measure). Do not be confused by the word *clave;* it refers to both the instrument and the accent pattern.

The drum-set pattern works in conjunction with the clave part, providing a complete, burning groove. The drum-set part alone would still make an interesting groove, but it would not provide the whole scope of songo. If you're not aware of the full style in which you are working, your sequenced drum grooves are likely to result in music that feels incomplete. Study as many CDs and music books from around the world as you can find; your drum grooves (and your clients) will thank you for it.

HOT CROSS STICKS

Now let's consider how you input the data into your sequencer. There is no doubt that a keyboard works well, especially when the preceding concepts about drumming have been taken into consideration. In fact, I frequently use my Roland D-50 to record drum parts for its sheer convenience. I simply set the MIDI channel to 10, and I can immediately access any of several tone generators, with their various percussion sounds mapped across the keyboard. When I am in a hurry to get an idea down, I use this method.

Nevertheless, it is far better to use a MIDI percussion controller for the bulk of your drum programming, even if (make that *especially* if) you are not a drummer. There is no better way to get a real drum feel via MIDI than with drum sticks. I am always amazed by the incredible musical improvement when



I record the drum parts from my drumKAT.

Key reasons for this approach include a greater dynamic range and a more realistic Velocity profile that result from using an electronic percussion controller and sticks rather than a keyboard. The volume of individual parts, inner dynamics, and overall feel are much closer to that all important "groove factor."

I can see many readers shaking their heads at this point and mumbling something like, "That's easy for you to do. After all, you *are* someone who beats on himself with sticks!" To which I reply, "Guilty as charged!" But trust me when I say that even the most inexperienced nondrummer will notice an incredible difference in his or her drum tracks just by switching to an electronic percussion controller. Companies such as KAT, Yamaha, and Roland make entry-level percussion controllers for under $1,000.

SEQUENCING

For initially recording drum tracks, I'm a big believer in real-time, unquantized performances for one simple reason: It is important to record your ideas quickly. Even in the world of MIDI programming, spontaneity is an important factor in making good music. A great idea, sloppily performed, is still a great idea.

If you are a drummer, your real-time performance has a greater chance of being a "keeper." Nonetheless, drummers and nondrummers have an equal chance of conceiving great drum parts. If your idea is a good one, the step-record and quantize features of your sequencer can help clean up that drum track and get it into musical shape. This is where tweaking—putting the snare drum behind or ahead of the beat, considering your tonal palette, Velocity-scaling a crescendo into a drum fill, etc.—can become a critical factor.

Fig. 4 is an example of a good, completely sequenced drum groove. The song, "Girl from Another Planet," is from Bill Nelson's *Blue Moons and Laughing Guitars* (Caroline Records 1704-61878-2). I have chosen this example not only for its musical pertinence, but for another reason. Despite commanding tremendous respect within some musical circles, Bill Nelson has not yet won the wide-ranging appeal and commercial success he deserves. For this reason, he often ends up using sequences as his *de facto* band, something to which many **EM** readers can relate. (For more on Bill Nelson, see "Production Values: Renaissance Man" in the May 1995 issue.) Nelson's album consists of some amazing home demos recorded in anticipation of a more fully realized project that never materialized. Despite this, it is a great CD, and his programming provides excellent instruction in creating good drum grooves.

The kick drum provides the foundation, while the snare drum answers with a solid two and four. The hi-hat provides accented sixteenth-note subdivisions, which are played at a lower dynamic level than the kick and snare. The ride cymbal and tambourine provide the top end of the percussive palette while adding a nice, layered color contrast. This groove demonstrates the concepts of building from the bottom up, inner dynamics, layers, and colors, all of which lead me to think that Nelson is another one of those guitarists who secretly harbors drumming ambitions. He can appeal to the closet drummer in all of us.

IGNORANCE IS BLISS

Some of the best, most interesting drum patterns I've heard from a sequencer have come from people who know little about drumming and follow none of the suggestions presented here. Your limitations in drumming can actually be a strength. Perhaps those quirky drum patterns residing in your sequencer are really a new drumming style waiting to be discovered.

The guidelines I've discussed are meant to be helpful, but the grooves in your heart are the most important consideration. Use these ideas like a map. When it's time to get off the main route and follow your nose, please do so. Who knows? You might win the heart of Dulcinea in the process.

Steve Wilkes *is coauthor of* The Art of Digital Drumming, *published by Hal Leonard. He is the leader of a mammoth percussion group, Six Drumsets.*

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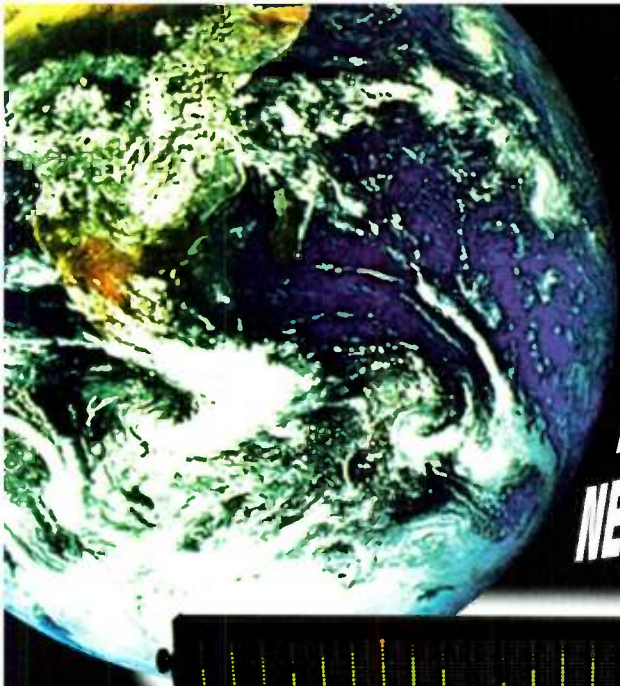

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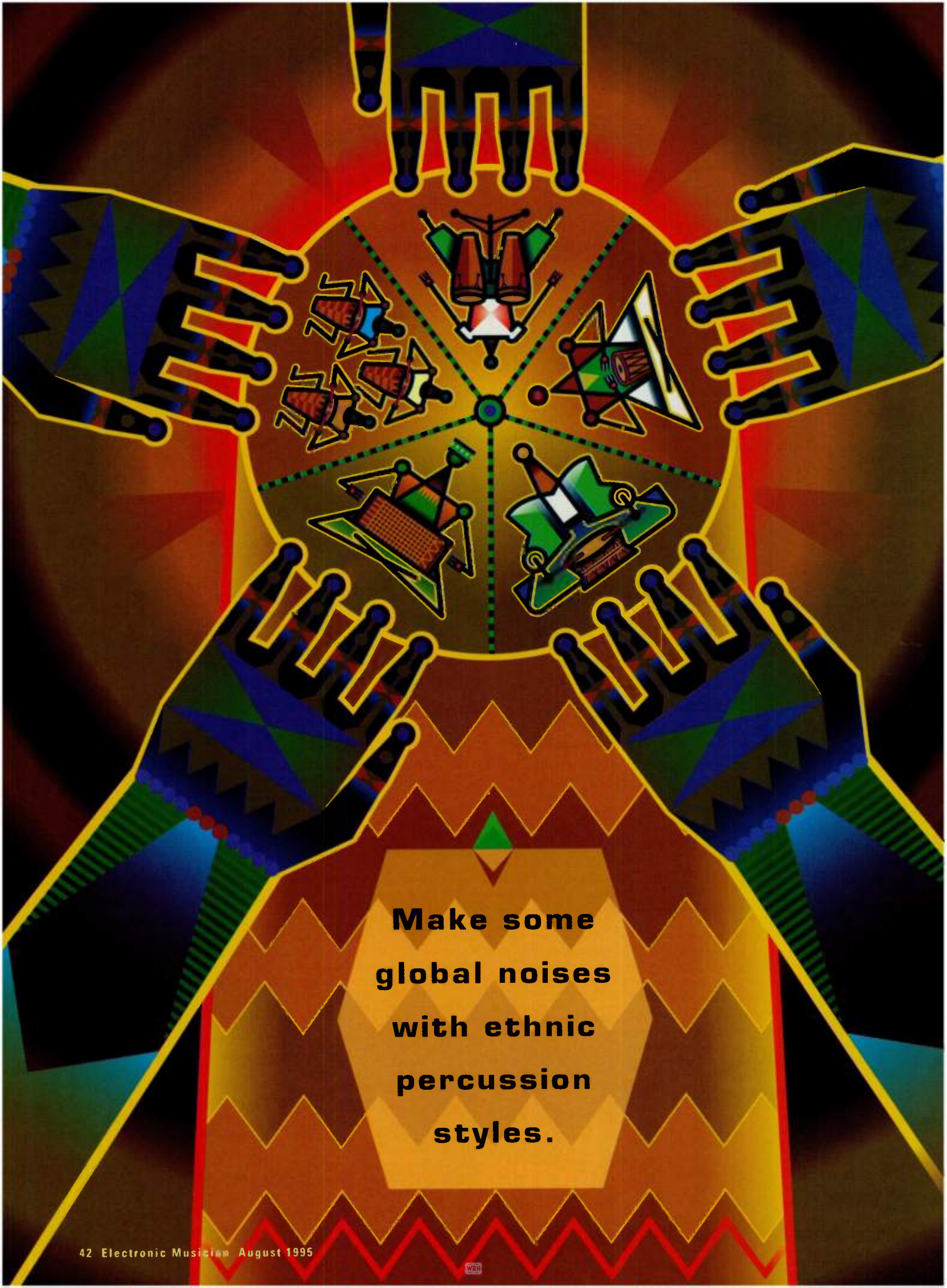

Make some
global noises
with ethnic
percussion
styles.

Illustrations by Dave Ember

BANG a GONG

The rich musical traditions of different cultures offer an infinite palette of sounds, styles, and moods. With a little knowledge, electronic musicians can weave these traditions into their own musical tapestry. For example, percussion instruments are among the oldest in the world, and most cultures include these instruments as a central part of their musical expression.

Thanks to sampling and sequencing, the sounds of these instruments can be effectively reproduced in a MIDI studio. However, you can use them most effectively if you understand how they are played in their indigenous context. If you respect their traditional applications and performance nuances, your music will be infused with an authentic flavor that transcends the ordinary.

Of course, electronic musicians generally apply this knowledge to MIDI sequencers, samplers, and sound modules, not acoustic instruments. To this end, we offer a glimpse into five percussive traditions from around the world, along with tips and techniques for authentically re-creating them in your studio.

AFRO-CUBAN RUMBA

By Neil Leonard III

AFRO-CUBAN RHYTHMS HAVE INFLUENCED North American jazz and pop music throughout this century. In the 1920s, W. C. Handy wove these enchanting rhythms into his enormously popular "St. Louis Blues" after visiting Cuba. A more intense infusion of Afro-Cuban rhythms took place in the 1940s, when Machito and his Afrocubans packed the dance floors at the Palladium in New York. This orchestra was directed by Cuban trumpeter/composer Mario Bauza, who also helped Dizzy Gillespie update his big-band sound with Afro-Cuban rhythms. By the 1960s, Cuban rhythms and percussion instruments were cropping up everywhere in North America, from Woodstock to Nashville to Los Angeles and everywhere in between.

The most popular forms of Cuban music are *son* and *rumba*. Both styles accompany highly virtuosic and sensual dances and date back to the nineteenth century. Son is Cuba's most popular dance form, and it went on to inspire salsa, which emerged in Puerto Rico and New York. Rumba is strictly a folk style performed by vocalists and percussionists. It accompanies fierce dance competitions held in Cuba's working-class neighborhoods. To get you started, I'll focus on rumba, which can be played by drums alone.

The three main styles of rumba are *columbia*, *yambú*, and *guaguancó*. Columbia is played with a 6/8 feel and incorporates both English and Spanish lyrics. Yambú is played on different-sized boxes called *cajones*. The most developed and well-known form of rumba is guaguancó, which is played by three congas (*quinto, tres golpes*, and *salidor*), a clave, and a *palito* (a thick bamboo stock played with sticks). Unlike salsa, in which a single percussionist is likely to play all the conga parts, guaguancó uses one musician for each drum.

GUAGUANCÓ GROOVES

For the basic guaguancó pattern (see notation below), you need a minimum of eight samples: clave; palito; and open, palm, and slap strikes for the salidor and tres golpes. (The quinto drummer plays a complex and individual solo over the groove, often in response to the dancers, so I have not included it in the basic pattern.) If your collection of drum sounds is limited, you can make substitutions. The accompanying drum map works with the Kurzweil K2000 General MIDI kit, although some of these substitutions do not seem like they would work based on their names (see table, "K2000 GM Rumba Map"). If you don't have a K2000, look for similar sounds in other synths.

I prefer to record each instrument separately, in real time. When I step-enter a part, I record the Velocities as played. Once you have entered the rhythm, however, you may want to quantize it or adjust the mix of the drums using Velocity messages. For example, the clave and palito timbres are relatively bright, so I usually keep their Velocities substantially lower than the congas. If I absolutely must quantize, I start by quantizing with a strength of 50%. Quantizing to a groove can work better than quantizing to a grid. When quantizing the guaguancó rhythm, try a medium shuffle groove.

EXPLORING VARIATIONS

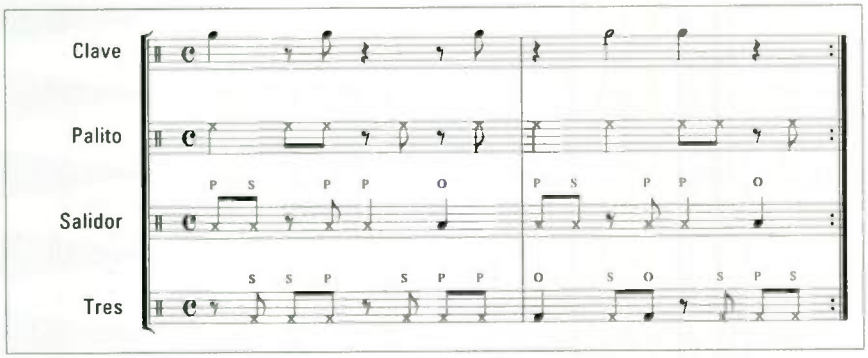
Of course, you can vary the basic pattern in many ways. A good place to start is by reorchestrating the original groove. For example, make a copy of the original pattern, and assign the tres golpes slap sound to play the palito pattern and vice versa. Make a new sequence that has the original guaguancó rhythm for bars 1 and 2 and the modified rhythm for bars 3 and 4. Loop these four bars and listen; the difference between the two rhythms is noticeable, but rhythmic flow is maintained and even enhanced.

Now take it a step further. Remap the tres golpes open pattern to the salidor open pattern and vice versa. Paste the original rhythm in bars 5 and 6 and this new rhythm in bars 7 and 8. Loop all eight bars and listen. Now choose your own orchestration changes, listening to each new variation in context before making more changes. You can even try introducing additional samples to the timbral pallet, such as bongos, timbale, sidestick snare, shakere, or agogo bells.

One problem that crops up when a rhythmic pattern is played by a new sound is that the Velocities are often in an inappropriate range for the new instrument. If your sequences offers a new Groove Quantize feature that applies to Velocity as well as attack and duration, you can quantize individual drum lines to put a particular series of notes in a uniform range, and

K2000 GM RUMBA MAP

Drum Name	GM Sample	MIDI Key Number
clave	clave	75
palito	side stick	37
salidor slap	mute hi conga	62
salidor palm	low bongo	61
salidor open	hi bongo	60
tres golpes slap	open conga hi	63
tres golpes palm	low conga	64
tres golpes open	high timbale	65



The basic Afro-Cuban *guaguancó* pattern requires a minimum of eight separate samples.

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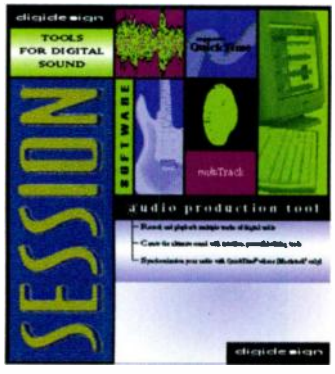

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then you can shift the range to the appropriate level.

I have achieved great results using only some of the patterns, such as the clave, tres golpes slap, salidor slap, and salidor open patterns. I map all the instruments of the guaguancó rhythm to this subset of patterns over the course of 16 or 32 bars. I also make sure that no rhythmic pattern is played by two samples simultaneously. This thinner

orchestration works well on arrangements that build in intensity by bringing in rhythm parts gradually. You can also try shifting one part of the entire rhythm so it starts an eighth note or quarter note later than it did in the original.

Cuba's premiere rumba group is Los Muñequitos de Matanzas, with several CDs out on the Qbadisk label. Their latest album, *Vacunao,* is excellent for listening to the sound of the drums. *Rumba Caliente 88/77* is a larger selection of shorter pieces that features several older members of the 43-year-old group. Both recordings are essential listening.

Neil Leonard III *teaches music synthesis and multimedia at the Berklee College of Music. When not listening to rumba, he plays concerts for saxophone and interactive music systems.*

Continued from page 5,176

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GHANAIAN DRUM ENSEMBLE

By Jeff Forlenza

SEQUENCING THE POLYRHYTHMS OF AFRICAN music is no small feat. One must be able to play these difficult rhythms before attempting to program or record them into the digital domain of samplers and sequencers. Although there are many African peoples, and thus many different dialects of African music, I'll focus on the music of C. K. Ladzekpo and his experience as an Ewe (which is pronounced ə-bay) master drummer from the coastal region of Ghana in western Africa.

Ladzekpo came to America in 1973 to teach African music at the University of California at Berkeley. Today, Ladzekpo still teaches at UC Berkeley, and he also leads the African Music and Dance Ensemble, a professional touring company based in Oakland. Ladzekpo taught himself drum programming in the early 1980s, and he continues to sample and sequence on his latest projects, including an album of traditional Ghanaian music and an educational CD-ROM about African music.

THE TIMEKEEPERS

One definitive aspect of the Ewe drum ensemble is its polyrhythms, created by the coexistence of two or more seemingly noncomplementary rhythms. In Ewe music, there is always a three-against-four "cross-rhythm," i.e., a triplet phrase played simultaneously with a four-note phrase. The drums and rhythms are interdependent in that one rhythm determines the way we hear or understand another rhythm.

The Ewes sometimes think of their drum ensemble as a family or a team. There are two time-keeping instruments: a bitonal bell called *gankogui* and a rattle called *axatse*. The bell keeps things steady, while the shaker syncs with the bell to give the ensemble its heartbeat. The other instruments include *kagan*, a slim, high-pitched drum; *kidi*, which is slightly larger and lower pitched than the kagan; and *sogo*, a larger, fat drum. The lead drum, or father of the family, is *atsimewu*, a large drum between four and five feet tall that is propped at an angle so the master drummer, or drum-ensemble leader, can stand beside it when he plays.

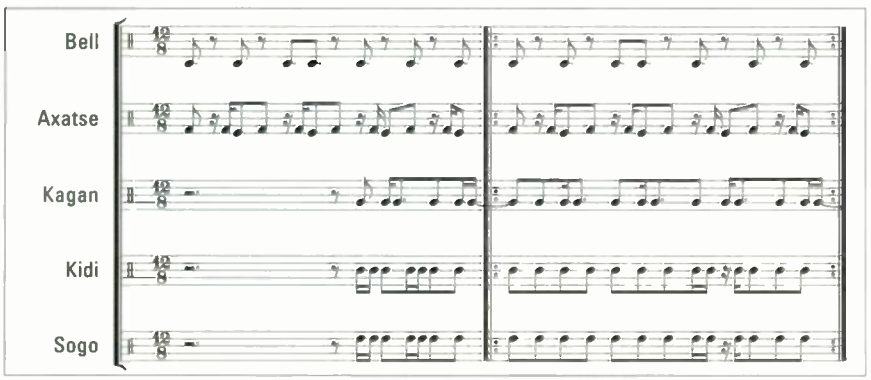
The cornerstone of the Ghanaian drum ensemble is the bell pattern, a 12/8 rhythm played with an underlying 4/4 pulse. The first step in learning to play this rhythm on gankogui is to sing it. Ladzekpo recommends first stamping your foot on the four main beats and then singing a triplet pattern on top of that to give the 12/8 feel. Once you are comfortable with that, you can clap the bell pattern while stamping your foot in 4/4 and singing the triplet feel in 12/8. Here's the bell pattern Ladzekpo teaches new students (the bold type represents notes that you clap): **1**, 2, **3**; 2, **2**, **3**; 3, **2**, 3; **4**, 2, **3** (see notation below). Once you can play this bell pattern with ease, you can approach the other elements of the ensemble.

The next instrument to learn is the axatse, or shaker. Ladzekpo stresses an onomatopoetic method for learning the shaker patterns. The syllable *pa* represents the note that you play by hitting the shaker on your knee while sitting, and the syllable *ti* represents the note you play by hitting your other hand with the shaker. This way, you are playing in a comfortable, up-and-down motion. Here's how you would sing the shaker rhythm in the accompanying example: "pa-pa-ti...pa-pa-ti." Here's how it fits into the 12/8 grid, with the bold type representing *pa* and the italics representing *ti:* **1**, 2, **3**; *2*, 2, 3; **3**, 2, **3**; *4*, 2, 3.

KAGAN, KIDI, AND SOGO

Once you are comfortable with the shaker pattern, you can move on to kagan, kidi, and sogo. Kagan is deceptively hard to play. Played with thin sticks, the kagan gets its name from its sound: You must feel the four main beats but play the two triplet offbeats with quick, steady strokes, so that it sounds like "ka-gan, ka-gan." In the 12/8 grid, it would be counted as 1, **2**, **3**; 2, **2**, **3**; 3, **2**, **3**; 4, **2**, **3**. (This rhythm and the following one are different than the notated examples.) The two notes provide a rhythmic counterpoint to the four downbeats, so they must be played with steady timing. The high-pitched kagan is like the child of the Ewe drum family.

Next come kidi and sogo, two lower-pitched drums played with short sticks. Often, kidi and sogo play the same rhythm to give a deep, supportive bed over which the lead drum plays. The three rhythmic syllables Ladzekpo uses to teach kidi and sogo are ***ki, du,*** and ***ku; ki*** is an open drum stroke, and ***ku*** and ***du*** are damped strokes played while the other stick dampens the drumhead. One rhythmic example Ladzekpo teaches is "ki-ku-du, ki-ku-ki, ku-du-ku, ki-ki." On the familiar 12/8 grid, with bold type being the open ***ki*** syllables and italics being the damped ***ku*** and ***du*** syllables, here's how it would look: **1**, *2, 3;* **2**, *2*, **3**; *3, 2, 3;* **4**, **2**, 3. In Ladzekpo's class you must be proficient on gankogui, axatse, kagan, kidi, and sogo before you approach the atsimewu, or master drum.



This arrangement, called "Togo Atsia," was sequenced by C. K. Ladzekpo, an Ewe master drummer from the coastal region of Ghana in western Africa.

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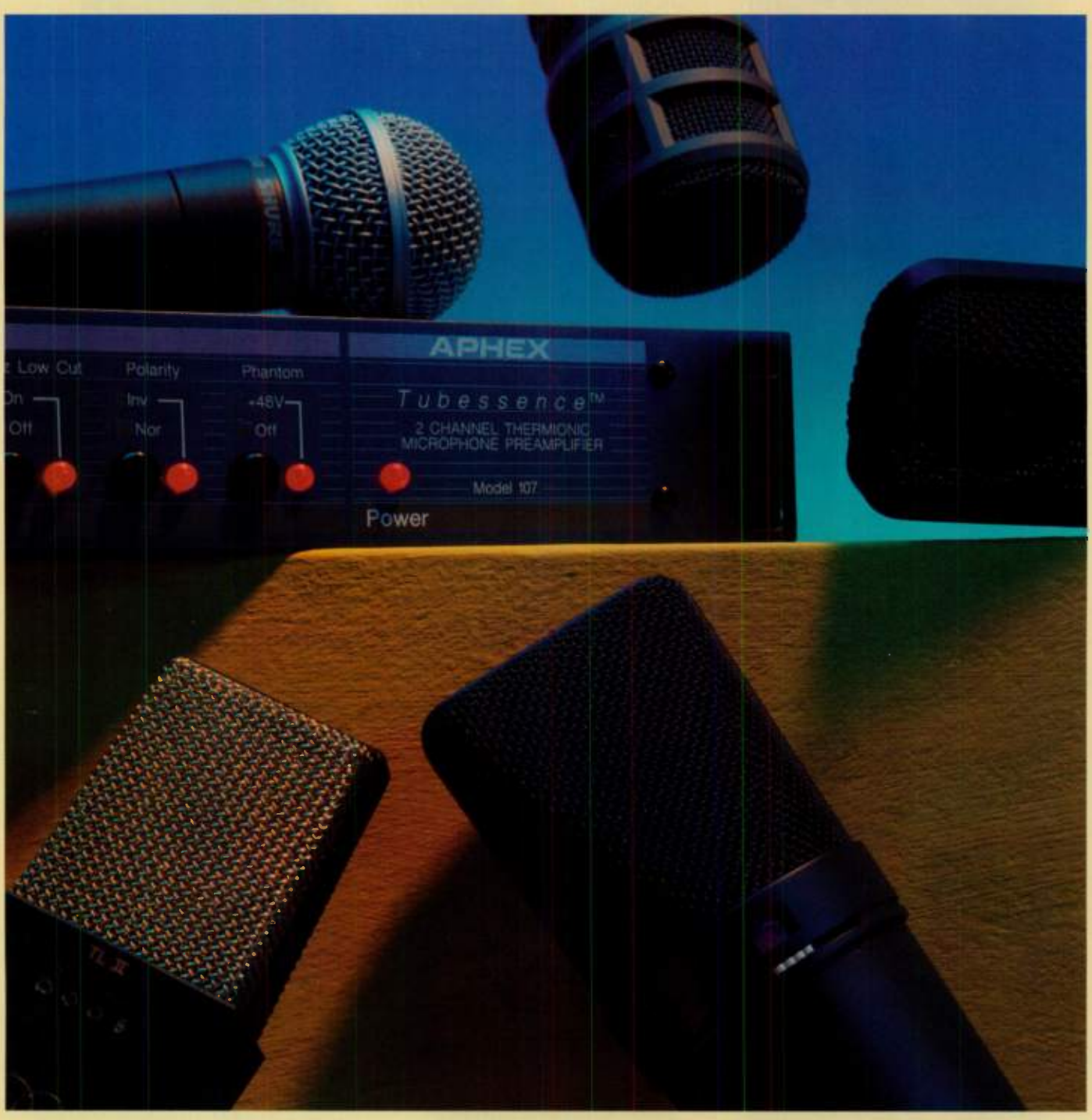

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Atsimewu has the most syllables or tones, so it is the most communicative drum of the ensemble. The village's master drummer plays the atsimewu. The master drummer communicates with the various tones of the atsimewu: He instructs the drum ensemble to "tighten up," the dancers to "step lively," or the village to "listen up." In the class I took from Ladzekpo, he played atsimewu while we learned the supporting drum, bell, and shaker parts. In a class of thirty, Ladzekpo always heard when one person was off rhythm, and he let you know!

GHANAIAN MIDI

"I use *Studio Vision Pro* to sequence drum parts," Ladzekpo explains. "First, I sample all the various pitches of a drum such as the atsimewu, which has about thirteen different pitches. Those are its syllables, or vocabulary, to create a language. Normally, I record samples with a DAT, adjust them in *Sound Designer*, and then pull them into a sampler. I use SampleCell right now. Then I can play the samples via MIDI. I start with the bell—the bell pattern is always the foundation of the arrangement—and then I add axatse, kidi, sogo, and kagan.

"When you are sequencing, you should perform the rhythm live to get some human feel," Ladzekpo explains. "I play the rhythms on a drumKAT. It's important to use a drum pad that is sensitive to Velocity and provides duration control. In addition, don't quantize. I like to play as steadily as I can, so the computer is only recording what I'm playing and not adding anything to it. I play every part live, one by one, until the sequence is done. Then I can add anything on top of that—a singer, a lead drum, whatever—just like playing with a live band."

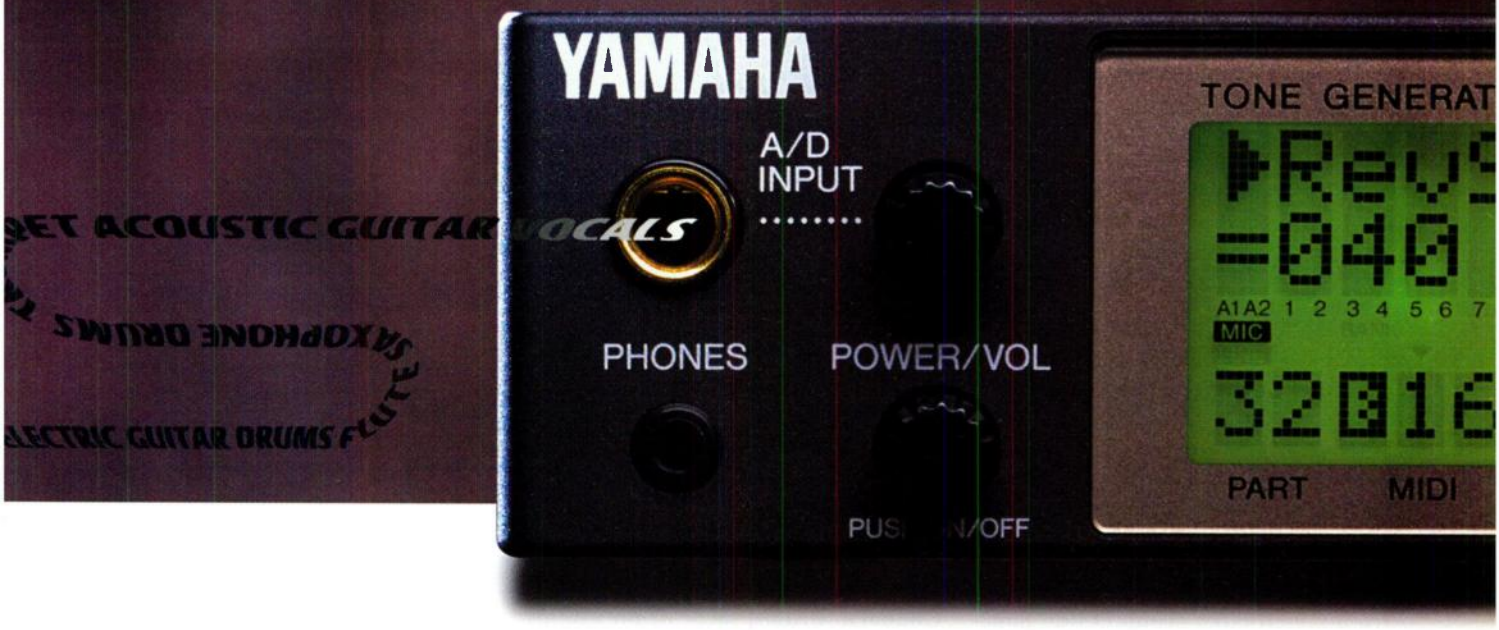
Ladzekpo sent his drum sequences to his home in Ghana, and the people were astounded. "The Ewe people from back home thought I had made one of the greatest recordings on Earth," Ladzekpo laughs, "They didn't know I cheated a little bit. Somebody had to tell them that I sequenced the music on a computer and that I fixed things, which most people did not understand anyway. It's still my music, and most of them know my style of playing, so the only difference is how clean and strong it sounds."

To get a feel for the music of western Africa, check out C. K. and the Beat Merchants' album *Yamose* (Blue Heron Records), as well as the Ladzekpo Brothers' *West African God of Thunder: Ritual Music of Yeve* (Makossa Records, distributed by African Record Center of Brooklyn, NY). An excellent book on the subject is John Miller Chernoff's *African Rhythm and African Sensibility* (University of Chicago Press).

(Special thanks to Richard Hodges at G-Wiz Labs for his help with Ladzekpo's MIDI files.)

Mix *magazine Assistant Editor* **Jeff Forlenza** *studied African drumming with C. K. Ladzekpo.*

We want your input.



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JAPANESE TAIKO

By Steve Wilkes

THE CHURCH BELL WAS ONCE A SYMBOL for both the spiritual and physical center of many American towns and cities. The tolling of the bell signified not only special events, but even the boundaries of a community—the farthest distances at which the bell could be heard. In Japan, the *taiko* drum was often the counterpart to the American church bell. This drum represented the collective heartbeat and pulse of a people. If you could hear the beating of the drum, you were a member of that community.

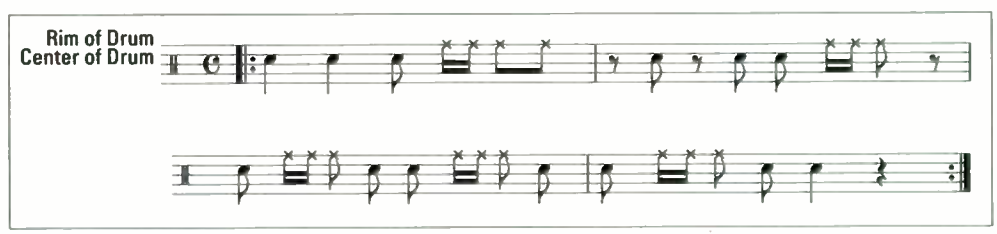
With a history nearly 1,500 years old, the taiko drum has been a ubiquitous presence in Japanese music. Taiko refers not only to the drum itself but also to the overall style of drumming. Just as in pop music, however, there are many different styles under the taiko umbrella. While studying in Japan on two different occasions, I had the opportunity to learn about these styles from famed taiko group O Edo Sukeroku Taiko. Led by drumming master Seido Kobayashi, O Edo is a major force in modern taiko. My studies in Japan also offered me the chance to visit and observe two other taiko groups: O Gion Daiko and the legendary Kodo.

DRUMS AND PATTERNS

The best known taiko drum is *O Daiko.* This is a round drum of gigantic proportions, mounted on its side and resting on a *hiki dai,* or taiko float. Its sound is thunderous, and the skill and stamina required to play the drum are immense. The smallest taiko is *shime-daiko,* a compact drum with a tightly mounted skin head. Its sound is very high pitched and hollow. The more standard, medium-sized drum is also often referred to as *O Daiko* (or simply *taiko*), and it produces a warm, dark, resonant attack. There are a number of others, such as *den den daiko* (a popular children's drum), *chijin,* and *hirazuridaiko,* but the drums I mentioned are the most common.

When sequencing a taiko groove, it's important to know the two primary sounds produced by striking the drum with sticks. A low, powerful, resonant sound (not unlike a tom) is produced by striking the drum at its center. This sound is often pronounced as *don* (as in "dome"), with the syllables *su* and *ke* being used for quieter, unaccented notes. (Like the drum sounds from instruments such as Indian tablas and Ghanaian drums, taiko drum sounds are often represented with vocal syllables.) A tight, high-pitched, staccato sound is produced by striking the drum's rim. This sound is pronounced *ka.* These two sounds can produce a nice contrast within one groove.

The accompanying cadence is performed by O Edo Sukeroku Taiko (see notation below). Notice the call-and-response pattern created by the two sounds. When you listen to the groove, you'll find its feel reminiscent of both African drumming and a military march. When performed by multiple drummers, the cadence has an extremely powerful impact. For authenticity, consider overdubbing this groove several times, without quantizing, in order to create the illusion of a taiko troupe.



This cadence is performed by O Edo Sukeroku Taiko. Notice the call-and-response pattern created by the two sounds. When performed by multiple drummers, the cadence has a powerful impact, so try overdubbing several times in a sequencer.

The choice of tone-generator sounds for the taiko pattern is crucial. My favorites are the "Wadaiko" sounds in the Roland D-110. I've used this program to simulate a real taiko troupe on a CD I recently recorded, *The Secrets of Shadows.* Correctly programmed and mixed, this sound can fool even the most erudite listener. If this sound is not available to you, try using a low tom sound and a sidestick. Experimenting with other sounds in your percussion-sample arsenal can also open some interesting possibilities. For instance, many samples of large, ethnic drums can be substituted for a taiko sound and produce convincing results.

MENTAL PREPARATION

As mentioned earlier, great strength and stamina are required to play the taiko drum effectively. Its greatest practitioners are quite athletic in performance. In fact, Kodo requires a one-year apprenticeship before being accepted into the group. This apprenticeship involves not only drum training but as many as ten to fifteen kilometers of running daily and many other stringent physical exercises. Ondekoza (another famed taiko troupe) recently completed a 9,000-mile U.S. tour in which they ran the entire tour route!

Therefore, when I'm programming a taiko groove, I try to remember that I am emulating one of the most physically demanding instruments on the planet with the mere push of a button. I take extra care to respect the instrument's history and authenticity with my sequenced patterns.

If you are interested in learning more about taiko grooves, there is no substitute for listening to recordings that feature them. Some of my favorites include *Irodori* by Kodo (CBS/Sony; import only), *Kagura* by Ondekoza (Nektar; import only), *O Edo Sukeroku Taiko* by O Edo Sukeroku Taiko (Denon; import only), and *Trisan* by Trisan (Real World/Caroline), which is a unique East-meets-West collaboration. In addition, check out the video called *Kodo* by the group of the same name (Tristar Music). ●

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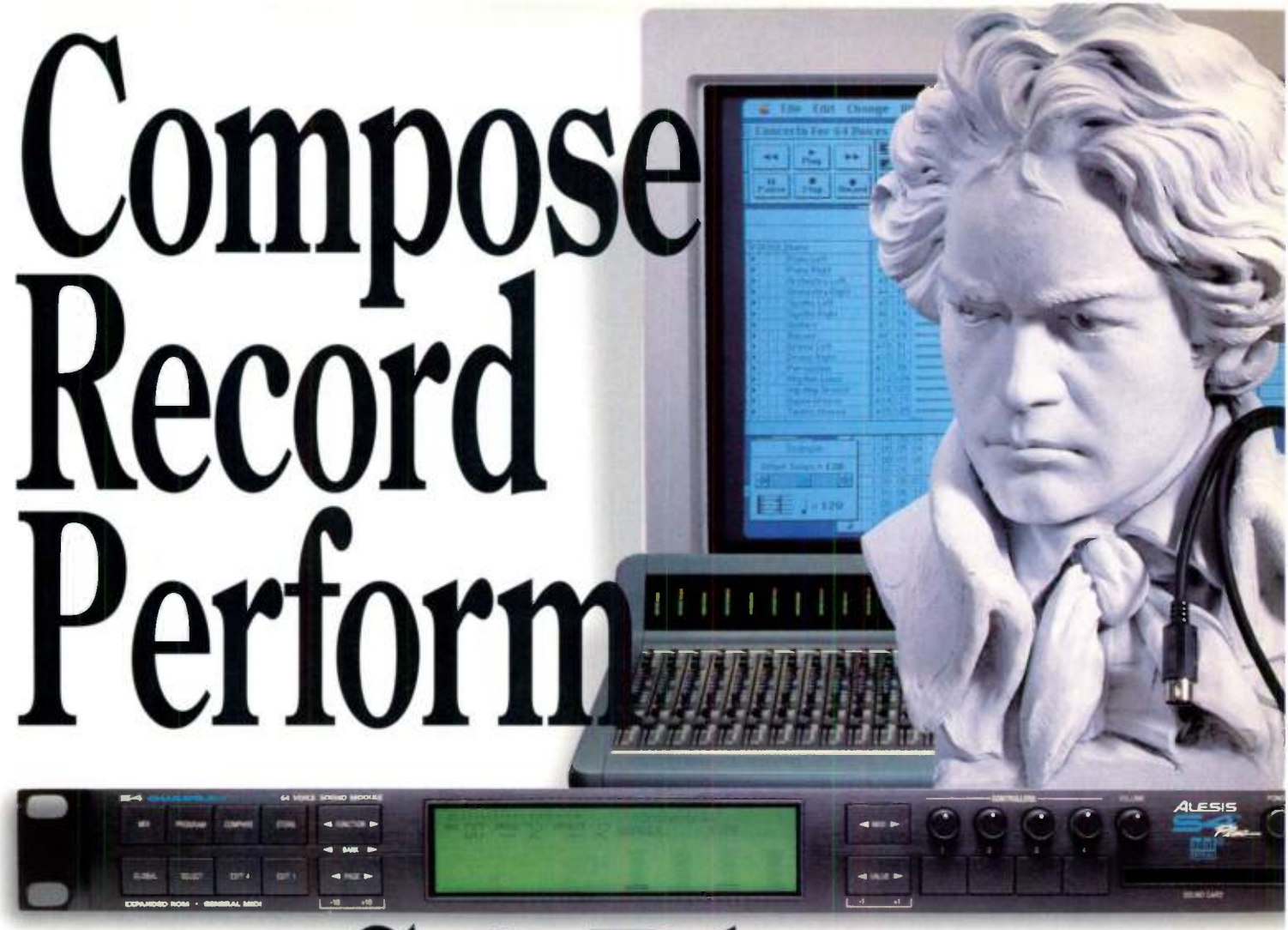

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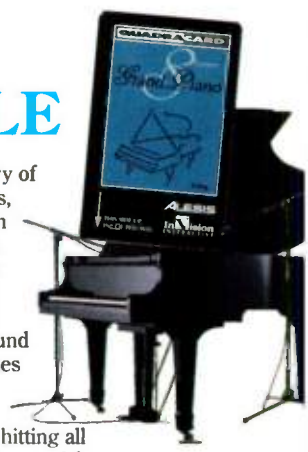

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ALESIS STUDIO ELECTRONICS

INDONESIAN GAMELAN

By Scott Wilkinson

MOST AMERICANS AND EUROPEANS ARE familiar with the concept of the town band. This concept is not limited to the Western world, however. Throughout Southeast Asia, many cities, villages, temples, and even families have their own "town band," which is called a *gamelan*. This is a percussion orchestra that serves musical, social, and ritual functions.

A typical gamelan can include up to four basic types of percussion instruments: gongs, metalophones, wooden xylophones, and drums. The larger gongs are suspended from a support beam, much like the orchestral gongs of the West. Groups of smaller gongs are tuned to a scale, inverted (open area facing down), and placed on a pair of ropes; these gongs are used to play melodic phrases. Metalophones consist of tuned metal bars suspended over resonators, much like a vibraphone or glockenspiel.

The influence of gamelan music became evident in the work of American composers such as Harry Partch, John Cage, and Lou Harrison beginning in the 1940s. Not only did they study traditional gamelans, they invented their own versions with instruments made from brake drums, pieces of glass and wood, sawed-off acetylene tanks, and anything else that sounded good when struck.

As a professional percussionist and composer, Ed Mann discovered world music long ago. He is also deeply involved in MIDI and sampling, which he has used with artists such as Frank Zappa, as well as on his own projects. "I produce percussion-based, improvisational music that blends various styles, such as pop, jazz, Indian, Indonesian, and other types of music from around the world," Mann explains.

INDONESIAN INSTRUMENTS

To emulate the gamelan sound, it's important to understand the different sections of the ensemble. The large gongs play pitches in the neighborhood of C two octaves below middle C and sustain for 10 to 40 seconds. The smaller gongs play the middle of the pitch range, roughly from C one octave below middle C to E above middle C and sustain for three to six seconds. At the high end are the metalophones, which start at about middle C and go up a tenth or twelfth from there. Metalophones with thin bars sustain from four to seven seconds, while instruments with thick bars sustain about half as long. In general, the less an instrument sustains, the more dense and active its part is.

According to Mann, the key to success in emulating a gamelan is to think in terms of contrasts: long v. short, high v. low, and sustained v. damped. "Some sounds overlap, while others don't because the musician damps their vibration," he says. "Instead of using a pedal, you damp each note by hand as you play the next note. To simulate this in MIDI, use the sound module's Mono mode to prevent the notes from overlapping."

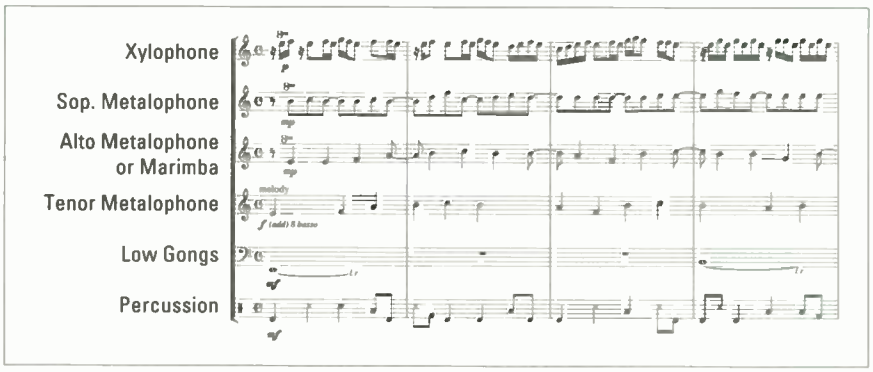
Many gamelans include two identical instruments tuned a few cents apart. This is easy to simulate electronically by detuning two copies of a gamelan instrument sample. These instruments may play the same part, or they may play interlocking patterns that form an entire melody. "Interlocking patterns are a big part of this music," explains Mann. "For example, one part may play quarter notes while the other part plays the same melodic line displaced in time by an eighth note. In MIDI sequences, pan these two parts right and left to simulate this effect."

Another important consideration is the length of the samples themselves. According to Mann, "It's critical to use each sound's natural decay as much as possible, instead of relying on the sampler's looping function. Of course, this takes more sample memory, but it sounds much more authentic. It's also important to hear these separate decays resonate with each other. That's a big part of the gamelan sound."

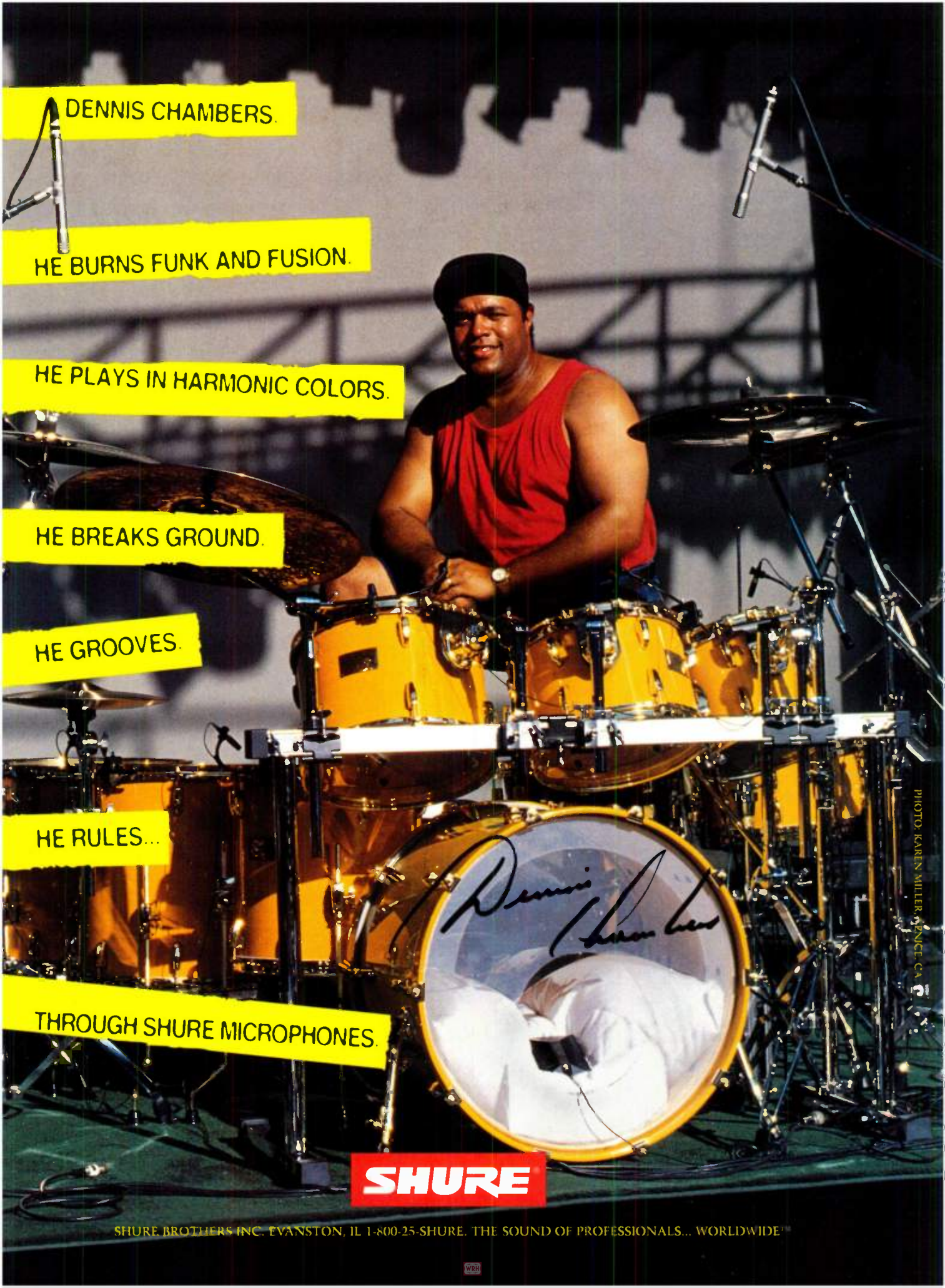
To follow this advice, you must make sure your sound modules provide enough polyphony. If they don't, a long gong decay might be cut off by another instrument that needs the voice. To avoid this problem, Mann recommends that you use as many sound modules as possible. "For example," he recounts, "the Roland R-8 Mallet Card [SN-R8-07] has some great Indonesian gong samples. I might assign the R-8 to play only the low gongs in a sequence. It is capable of playing other parts as well, but I wouldn't try to play everything on it."

Mann spends a lot of time sampling a wide variety of sounds to use in his electronic gamelan. He suggests sampling anything that sounds interesting: pots and pans, coffee cans, PVC pipe, water drops, etc. "If you hear a particular sound on a recording, you can often imitate it with other samples. In addition, it might inspire you to come up with sounds of your own."

You can also sample entire phrases and trigger them from the sequencer. This requires a lot of memory, but it



This excerpt of gamelan-influenced music by Ed Mann includes interlocking alto and tenor metalophone parts.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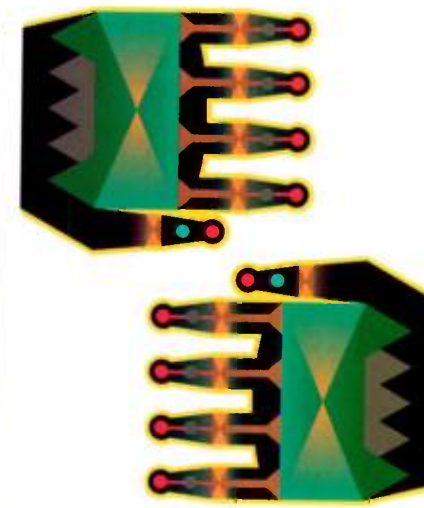
works with the gamelan style, which can be very repetitive. You can even combine sampled and sequenced phrases, which improves the human-feel factor without requiring astronomical amounts of memory.

Mann's studio includes a Mac IIfx with two Digidesign SampleCell cards, Digidesign Sound Tools, and Opcode *Studio Vision Pro*. His outboard sound modules include an Akai S900 sampler, an Oberheim DPX1 and a Matrix-6R, a Roland R-8M and a Jupiter-6, a Korg 01R/W, a Yamaha DX7, and a Simmons SDE FM tone generator. He uses a Simmons Silicon Mallet percussion controller to enter parts into the sequencer. "I often resynthesize gamelan sounds with the SDE and Matrix-6R," says Mann. "I use the SDE for the attack portion and the Matrix for the body of the sound."

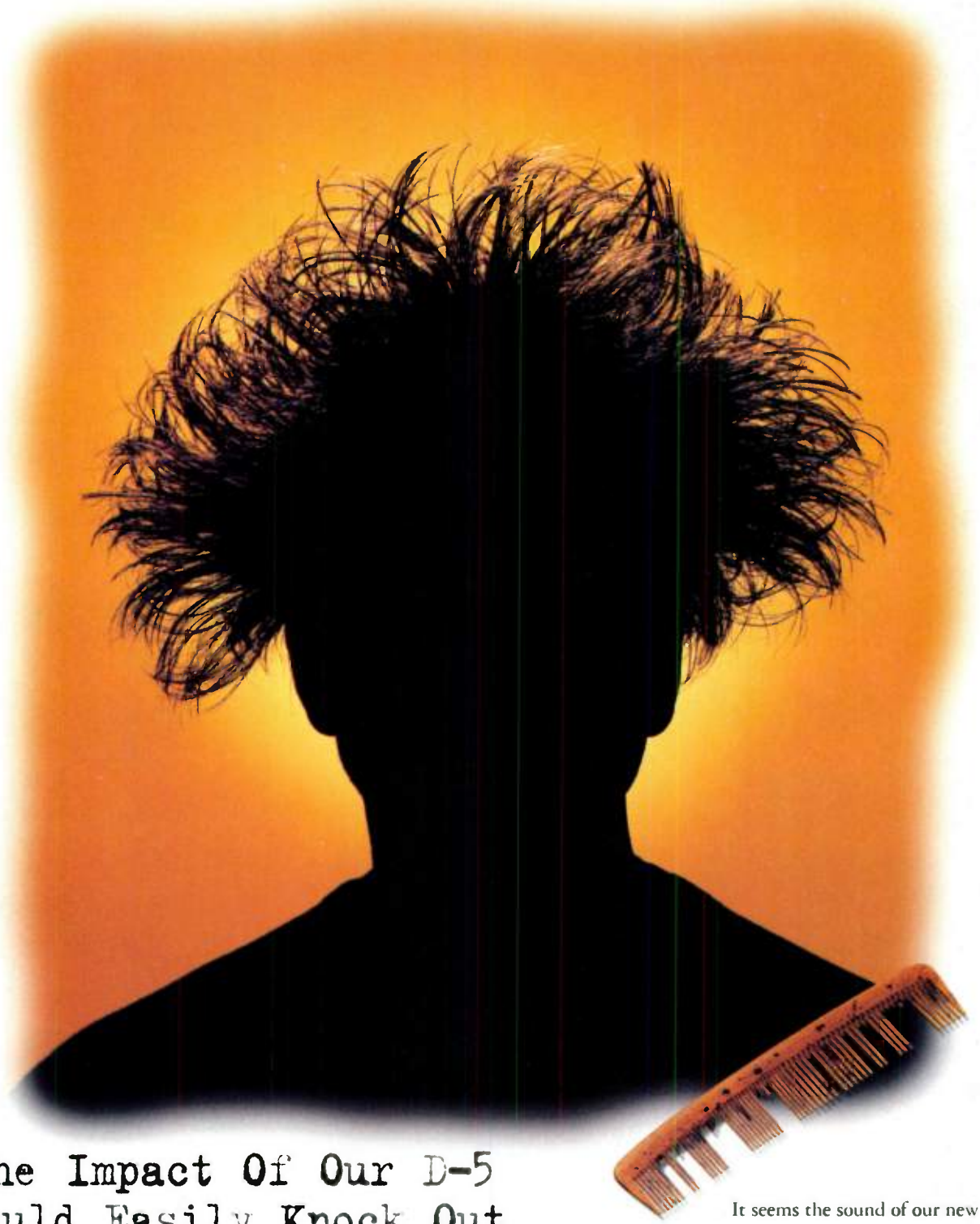
STUDYING THE MASTERS

As with all types of world music, the best way to learn gamelan style is by listening to recordings. Titles such as *Gamelan Semar Pegulingan, Golden Rain: Balinese Gamelan Music, Music from the Morning of the World,* and *Javanese Court Gamelan* (all on the Nonesuch label) should give you a good start.



Another label of interest is CMP, which offers many recordings of Indonesian gamelan music. "The music from Bali and Java is the most familiar," says Mann, "but check out the music from Sumatra, Borneo, and Thailand. In addition, listen to the recordings of Lou Harrison, John Cage, and Harry Partch."

Scott Wilkinson, EM *technical editor, studied gamelan in college.*



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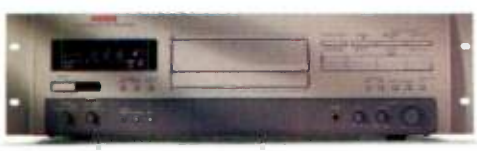

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INDIAN TABLA

By Scott Wilkinson

IF YOU CAN REMEMBER THE 1960S, YOU probably weren't there. However, you might vaguely recall hearing a sitar and tablas at a party, love-in, or other groovy gathering. The flower children adopted Indian music big time, and it remains popular with Western audiences today.

There are two classical traditions of Indian music: Hindustani in the north and Carnatic in the south. The primary percussion instrument in Hindustani music is the *tabla*. (Others include the *pakhawaj* and *dholak*, which we will not consider here.) With tablas, one person plays two drums of different sizes to accompany a sitar or *sarod* (string instruments), voice, or classical dance. However, tabla solos are also performed. Technically, the smaller of the two drums is the tabla, while the larger drum is the *baya*.

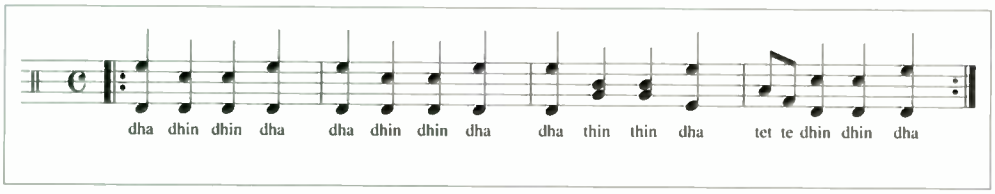
As with other world-music traditions, there is no substitute for studying tablas with a master. One place to go for such an education is the Ali Akbar College of Music in the San Francisco Bay Area. Paul Bjorgan is a student at the college, majoring in sarod. However, he also sequences neo-Indian music in his MIDI studio, which includes a Roland MC-500 mkII hardware sequencer, Roland D-110 and U-110 synths, and a Korg DDD5 drum machine. The DDD5 is especially useful because it includes a number of tabla samples.

BASIC FORMS

Bjorgan explains the basis of Indian music. "It's cyclic, not linear. It's more like a circle that lasts some number of beats. For example, what we call 4/4 time, Indian musicians call *tintal*, which is a 16-beat cycle (see notation above). The ninth, tenth, eleventh, and twelfth beats of that cycle, which are known as *kali*, do not include the low tone of the baya. Most Western musicians don't know about this, so they might put that sound on those beats, which reduces the true Indian feel." A 16-beat cycle could become boring before long, but as Bjorgan points out, it's not as simple as that. "You play embellishments each time through the cycle," he notes. "You never repeat yourself exactly."

To learn (and teach) these cycles, which are called *tals*, Indian musicians have developed a set of vocal syllables called *bols* to represent the various sounds made with different drum strokes. Although there are only two drums in a set of tablas, proficient players can extract an amazing variety of sounds from them.

The Hindustani drumming tradition includes many types of compositions, including some that are hundreds of years old. For example, *kaida* is a form of rhythmic exposition developed through thematic improvisation and variation. *Rela* is also a form of theme and variations, but it is played very fast to sound almost like a drum roll. There are also fixed compositions called *gats*, which do not involve improvisation. *Paran* is a big, grand style of composition that employs bols from the pakhawaj.



In this tintal pattern, the tablas make a wide variety of sounds. Each individual sound is represented by a vocal syllable, or *bol*. Each combination strike has its own bol, as well.

ELECTRONIC TABLAS

Being a student on a budget, Bjorgan cannot yet afford a percussion controller, so he enters most of his tabla parts from the DDD5's pads in step time. "Unfortunately, it often sounds mechanical. A pad controller would be much better; I could enter the parts in real time. Better yet, I could get one of my tabla-playing friends to enter the parts for me."

To regain some of the human feel that is lost during step entry, Bjorgan manually shifts some notes behind or ahead of the beat. "For example, I may put the first beat a little ahead and the second or third beats a little behind." It's a painstaking process, but it improves the feel of his music.

Even so, Bjorgan admits that electronic emulations don't match the genuine article. "With real tablas, you can hit the same note in many different ways, which is difficult to do with MIDI sound modules. If you want the real deal, you must hire a tabla player or learn to play yourself, which takes years." As an alternative, you could study the theory behind tablas and Indian music in general without learning to actually play the instrument. There are several instruction books, including *Learning Tabla with Allah Rakha* by Jeff Feldman (Digitala) and *Solo Tabla Drumming of North India* by Robert Gottlieb (Motilal Banarsidass Publishers Private Ltd.).

HINDUSTANI HOMEWORK

Of course, it also helps to listen to authentic recordings. The tabla master at Ali Akbar College is Swapan Chaudhuri, who has recorded several albums of solo tablas, including *The Soul of Tabla* (Interworld) and *The Majestic Tabla* (Chhanda Dhara). Other notable albums of Indian music include Ravi Shankar's *Raga Parameshwari* (Capitol), with Alla Rakha on tablas; Hariprasad Chaurasia's *Rag Kaunsi Kanhra* (Nimbus), with Sabir Khan on tablas, and *Venu* (Rykodisc), with Zakir Hussain on tablas; Ustad Ali Akbar Khan's *Duet* (RSM), with Zakir Hussain on tablas; and Imrat Khan's beautiful *Rag Madhur-Rhanjani* (MOTW), with Shafaat Khan on tablas. For a more contemporary application of Indian idioms, check out Jai Uttal's *Beggars and Saints* (Triloka).

(Thanks to Jim Owen, a disciple of Swapan Chaudhuri who has also studied with Zakir Hussain.)

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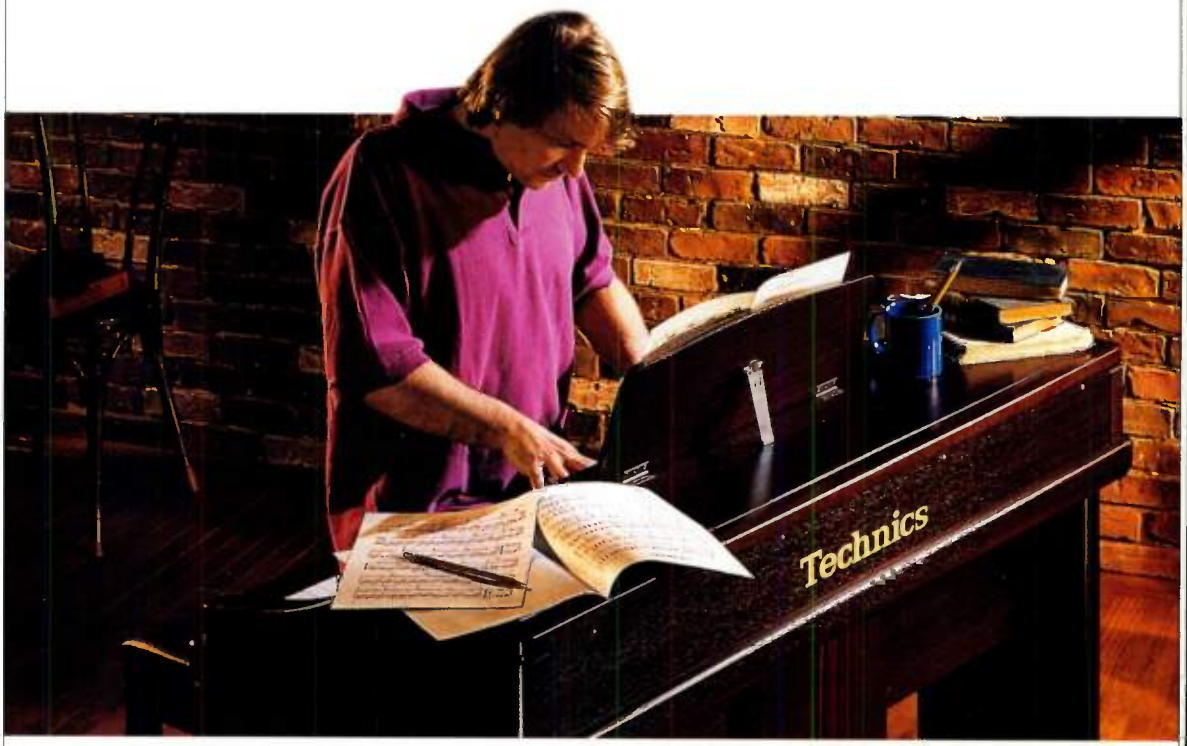

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Windows 95 Preview

Microsoft's new operating system is here at last. Was it worth the wait?

For computer users, the launch of a new operating system produces mixed feelings. On one hand, there's excitement and anticipation over promised new features and solutions to long-standing complaints. On the other hand, there's anxiety and even dread about the inevitable host of new problems and incompatibilities that are sure to crop up. Add to that the lag time before applications are updated to implement fully the new features, and the decision about when—or even whether—to upgrade becomes complex. Macintosh users were faced with this conundrum a few years ago when Apple introduced System 7; now it's PC users' turn.

Microsoft is expected to ship Windows 95 in late August. The company kicked its hype machine into overdrive months ago in order to promote this

By Charles Brannon

long-awaited replacement for the MS-DOS operating system and the Windows 3.1 graphical user interface that sits on top of it. The press has obligingly blanketed the public with coverage ever since.

With rare exceptions, the advance word on Windows 95 has been overwhelmingly positive. Windows 95 catches up to the Macintosh in many areas, offering a (mostly) 32-bit application environment, hardware Plug and Play, and other features. It surpasses the Mac in other areas, including support for preemptive, multithreaded multitasking, a feature the Mac won't support until Apple's Copland OS (System 8) is released in 1996.

So what's it like to work under Windows 95? Users should expect to spend a few weeks getting comfortable with the operating system's new look and feel. After that, most Windows 3.1 users will feel right at home.

A BREATH OF FRESH AIR

From the moment you turn on your Windows 95 computer, you'll be struck by the difference. For starters, your PC will boot directly into Windows 95; no more DOS prompt. Your computer actually starts in MS-DOS so that any necessary CONFIG.SYS device drivers or TSR (Terminate and Stay Resident) programs can be loaded up, but these artifacts are hidden behind the new animated "splash" screen that displays while Windows 95 loads.

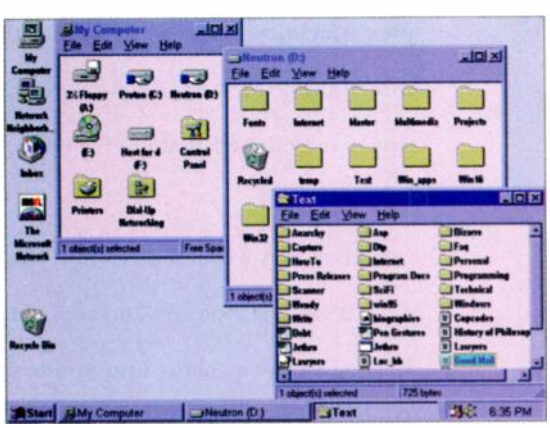

FIG. 1: The Windows 95 Explorer file system revolves around a file/folder metaphor, much like the Macintosh Finder.

Although some developers question how free from MS-DOS Windows 95 really is, most TSRs and drivers have been replaced by Windows 95 components. This should free up 100 KB or more of conventional memory formerly consumed by CD-ROM and mouse device drivers, disk-caching utilities, and network driver software. Without resorting to esoteric memory managers such as EMM386 or MEMMAKER, a DOS session running in Windows 95 (which will be required to run software that has not been optimized for Windows 95) typically will have about 600 KB of free conventional memory in which to operate. However, if you have customized your Windows 3.1 system—perhaps you turned off Numlock at startup, set a path, or loaded a scheduler—you will still need the AUTOEXEC.BAT and CONFIG.SYS files.

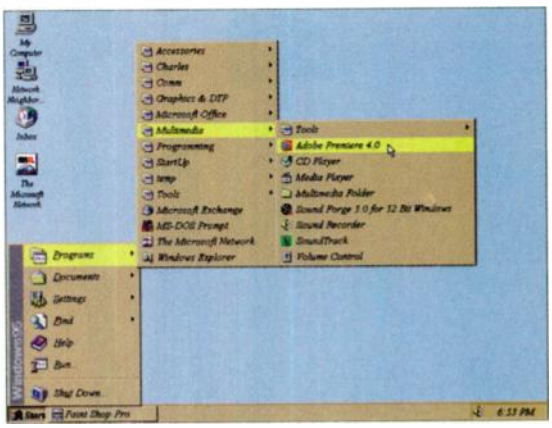

FIG. 2: The Taskbar on the bottom of the screen makes switching between open windows push-button simple. A convenient Start Button (bottom left) pops up the Start Menu, a "no-brainer" way to find any program you want to run.

You'll bid *adieu* to Windows 3.1's clunky Program Manager and File Manager and say hello to Explorer, a cohesive shell that makes your desktop come alive with functionality (see **Fig. 1**). At long last, you can view files in folders on the desktop just as they exist within directories on your disk, a capability Mac users have enjoyed from the beginning.

In fact, Mac users will feel right at home with Windows 95, as many of the new user-interface features were "borrowed" from the Macintosh interface. For example, in Windows 95 an icon actually represents the program. For instance, dragging an icon to the Recycle Bin (a fancy name for a Trash can) deletes the file, although the file isn't really deleted until you turn your computer off. Contrast this with the Windows 3.1 Program Manager, where icons exist to launch programs but don't represent the actual files on the disk.

As with the Mac, Windows 95 not only has real icons, but it also features Shortcut icons (called "aliases" on the Mac) that point to the original program or document. Shortcut icons use relatively little disk space, so you can use them freely to organize your working environment without touching the actual organization of files on your hard drive. Shortcuts can be accessed via the Start Button, which provides a convenient, hierarchical, user-configurable menu structure. By default, the Start Button menu is organized by types—user settings, documents, programs, etc.—but you can configure the top layer to include your favorite application or document (see **Fig. 2**).

The Taskbar appears as a strip at the bottom of your screen but can be hidden when not needed. Every open window has a corresponding button on the Taskbar. Switching between programs should be easy, even if windows are overlapped or buried beneath other windows.

Unfortunately, beta tests reveal that if you have a program open and showing on the Taskbar, and you click on its icon (say, to run a second instance of the program or because you forgot it was running), you get an unwanted surprise: Instead of bringing the program or document to the foreground, as on a Mac, Windows 95 spits out an error message that reports "the specified path is invalid." Apparently, the OS doesn't realize the program is already open and running.

Although DOS may soon be obsolete, DOS compatibility is still an important concern for many users. Windows 95 is no slouch in this area, offering an enhanced DOS Box that can run some of the most demanding DOS titles. However, most of the enhancements

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are "under the hood," so much of the time you won't notice the difference. If you have a particular program that simply will not run under Windows, you can use a special MS-DOS mode that lets you run in "pure" DOS.

THAT'S ENTERTAINMENT

Highly optimized operating-system enhancements render Windows 95 an instant multimedia upgrade. Super VGA graphics cards will perform like their accelerated cousins, while high-end graphics cards will run at the top of their form. Standard '486-class machines can play video with fewer dropped frames and in a larger window, thanks to Microsoft's 32-bit *Video for Windows* drivers and improved codecs. However, you should have the latest video driver installed, as these drivers remain one of the most likely sources of crashes and incompatibilities.

The enhanced 32-bit file access (first included with Windows for Workgroups 3.11) makes your drives run faster and more efficiently. Floppy disks, CD-ROMs, and network connections are cached so that frequently accessed files are retrieved from RAM instead of being repetitively read from disk.

DirectSound is a part of Windows 95 that, while invisible to the end user, enhances the performance of computer games and other forms of electronic entertainment. DirectSound provides low-level support for digital audio with minimal delay between when a digital audio file is called up and when it actually begins to play. Other benefits include "3-D" sound and real-time mixing of up to eight digital audio streams.

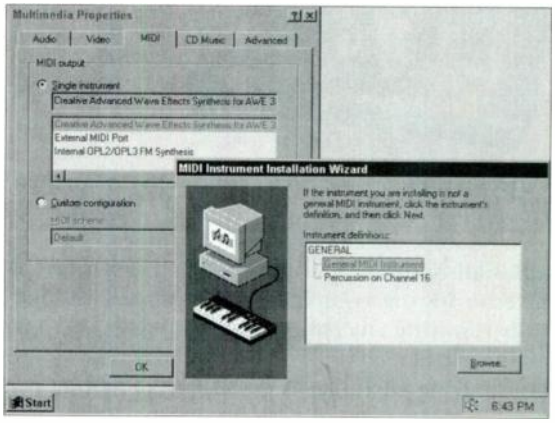

FIG. 3: Installing a new MIDI device is easy and straightforward, thanks to the MIDI Installation Wizard.

PLUG AND PLAY

Taking a page from Apple's book, Microsoft has developed a Plug and Play protocol that promises to make it easier to add hardware to your computer. The Plug and Play promise is that you can open the case of your computer and insert an expansion card, hard drive, or CD-ROM drive, or you can attach any external peripheral, without worrying about complex configuration hassles involving IRQs, DMA settings, or I/O addresses. Mac users have enjoyed this capability for a long time;

with Windows 95, PC users can finally catch up.

At bootup, the computer initially disables all optional hardware and then inventories the equipment, automatically resolving any conflicts before enabling the Plug and Play hardware with compatible settings. A Windows 95 computer can work with any expansion architecture (ISA, EISA, MCA, VESA, or PCI), although it appears the PCI format will soon dominate the industry.

In many cases, however, your older computer will need a BIOS upgrade to comply fully with Plug and Play. You must also have compatible expansion cards to take advantage of all the benefits that Plug and Play has to offer. Even without Plug and Play-compliant hardware, Windows 95 goes out of its way to support "legacy" hardware (anything that doesn't comply with Microsoft's Plug and Play standard) with a minimum of fuss.

During setup, Windows 95 attempts to detect your equipment and install the necessary drivers preconfigured with the correct IRQ settings and so forth. If necessary, Plug and Play Wizards will prompt users to insert diskettes containing the appropriate device drivers (see **Fig. 3**). When you want to add non-Plug and Play hardware, you must first install the Windows 95 drivers. Windows 95 will then tell you how to configure the card to avoid any conflicts with your existing hardware. The Device Manager enables you to browse your computer's configuration information, and the Conflict Troubleshooter walks you through the steps needed to correct any problem.

Plug and Play is not quite as simple in practice, however. Expect major problems if you try just to install Windows 95 drivers and go to work. For example, to use a sound card such as a Turtle Beach MultiSound, you probably will end up reinstalling most of your software from scratch.

To extend Windows 95's Plug and Play capabilities to sound cards and MIDI hardware, Microsoft has licensed the Open Music System (OMS) from Opcode Systems. Long available on the Mac (known as the Opcode MIDI System) and recently licensed by Apple for incorporation into QuickTime, OMS is a graphic environment that allows compatible software to communicate with internal and external MIDI devices (see **Fig. 4**). (For a comprehensive description of OMS, see the "Computer Musician" column in the March 1992 **EM**.)

According to Opcode, OMS for Windows 95 is being codeveloped with Microsoft and will be available separately as an extension to the new OS shortly after it ships. Subsequent versions of Windows 95 will include OMS as an integral part of the OS. (A Windows 3.1 version of OMS 2.0 is being developed by Opcode with help from Steinberg and should be available this fall.)

Another multimedia enhancement in Windows 95 is AutoPlay, which allows the operating system to automatically begin playing an audio CD or CD-ROM as soon as it's dropped into the drive. There's even a volume slider in the Taskbar notification area (see **Fig. 5**). This control is linked, in turn, to a full-featured mixer that enables you to set independent levels for CD-ROM

playback, microphone input, line-in, digital audio (WAV) files, and MIDI music playback. With some sound cards, you can even adjust the bass and treble levels. It's great that Microsoft included these features in the OS; under Windows 3.1, they were available only in separate applications.

CLOUDY WINDOWS

As exciting as all of this sounds, musicians who use Windows 3.1 might be wise to put off their OS upgrades until software developers have adapted their programs to take advantage of these massive changes. You can avoid the "bleeding edge" of technology by not jumping out on the leading edge.

Windows 95 will run software written for Windows 3.1, but the old software won't take advantage of all the new features simply because it doesn't know they exist. Still, you do get some advantages, such as better crash protection. And of course, when you aren't actually in a program, you still get the numerous advantages of working in a better OS.

Although each of the MIDI-software developers with whom I spoke confirmed that they were developing Windows 95 versions of their programs, none would cite a firm ship date. Twelve Tone Systems CEO Greg Hendershott came the closest. "Shortly after Windows 95 ships," Hendershott says, "we will release a version of *Cakewalk* designed specifically for Windows 95. This version will contain 32-bit components and leverage many of the new user-interface concepts in Windows 95."

Hendershott's next comment, however, indicates that Windows 95 has some problems when it comes to MIDI. "Although we have some concerns about the timing performance of 32-bit MIDI under beta versions of Windows 95," he notes, "we are confident this area will be improved before Windows 95 actually ships."

Meanwhile, MIDIMAN President Tim Ryan reports that his company is still ironing out problems with the Windows 95 software drivers for their MIDI interfaces. "Some of our drivers work perfectly right out of the box," says Ryan, "and some don't. We're now in the process of tweaking each driver to find out why it doesn't work and how to remedy it. It's not a complicated problem so far."

That such MIDI timing problems exist a mere three months before the operating system is scheduled to ship—and after Microsoft has shipped its final beta—seems ominous at the very least. Most of the problems can be pinned on the fact that Windows 95 is a preemptive multitasking OS, whereas Windows 3.1 is a cooperative multitasking OS. In plain English, this means that under Windows 3.1, each application program periodically surrenders access to CPU time so that other application programs can run. In contrast, Windows 95 automatically switches between active tasks at fixed intervals. This protects programs from each other; if one crashes, the rest of the system can continue to run unaffected. However, this paradigm shift is so fundamental that it rocks the very foundation on which time-sensitive software, such as sequencers, is constructed.

Of course, it's not impossible for a MIDI sequencer to run under a preemptive multitasking OS. Blue Ribbon Soundworks, among others, proved that years ago with *Bars & Pipes* for the Commodore Amiga. "On the Amiga, we programmed everything for 32-bit, real-time multitasking," says Todor Fay, Blue Ribbon's chief technical officer. "As far as we're concerned, we're coming home. We're going back to a paradigm that makes much more sense to us."

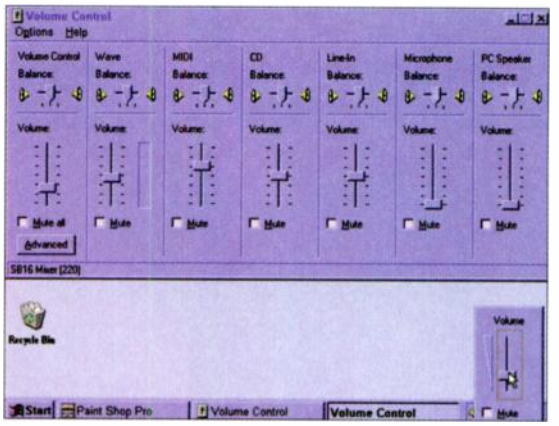

FIG. 5: The AutoPlay function facilitates multimedia audio. A click on the speaker in the notification area pops up the volume control; a right-click calls up the full mixer.

Opcode Systems is porting its MIDI software—including its *Vision* sequencer and *Galaxy* patch librarian—from the Macintosh to both Windows 95 and Windows 3.1. Of course, the Windows 3.1 versions will ship first. "We're absolutely confident in the potential of Windows 95," says Paul de Benedictis, Opcode's communications director. "We just looked at when we would actually be able to release anything. We didn't want to overlook six, eight, or twelve months of sales."

With a full line of Windows 3.1 applications already under its belt, Steinberg can afford to be even more bullish about Windows 95. Calling the new OS a "quantum leap in PC computing," Steinberg plans to offer a full line of 32-bit applications for Windows 95, beginning with *Cubase Score* 2.0.

UNDER THE HOOD

Despite a few grumbles, no one in the music industry is saying that Windows 95 isn't a good operating system, nor are they saying that their software won't eventually work with it. Windows 3.1 simply put a better user interface over a DOS engine, but Windows 95 is a major rewrite from top to bottom.

Although many developers are looking forward to the demise of MS-DOS, vestiges of DOS remain embedded in Windows 95. That's the only way Microsoft could ensure that Windows 95 would be compatible with software

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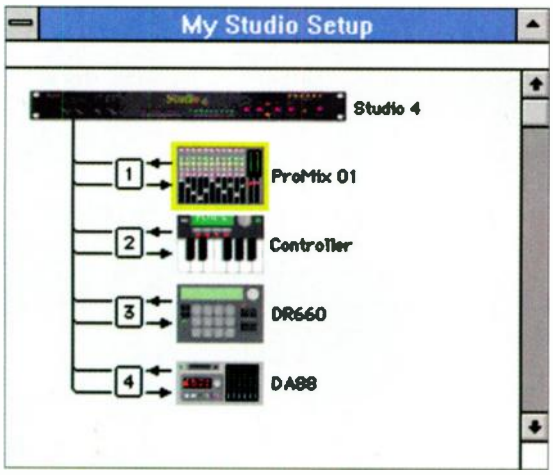
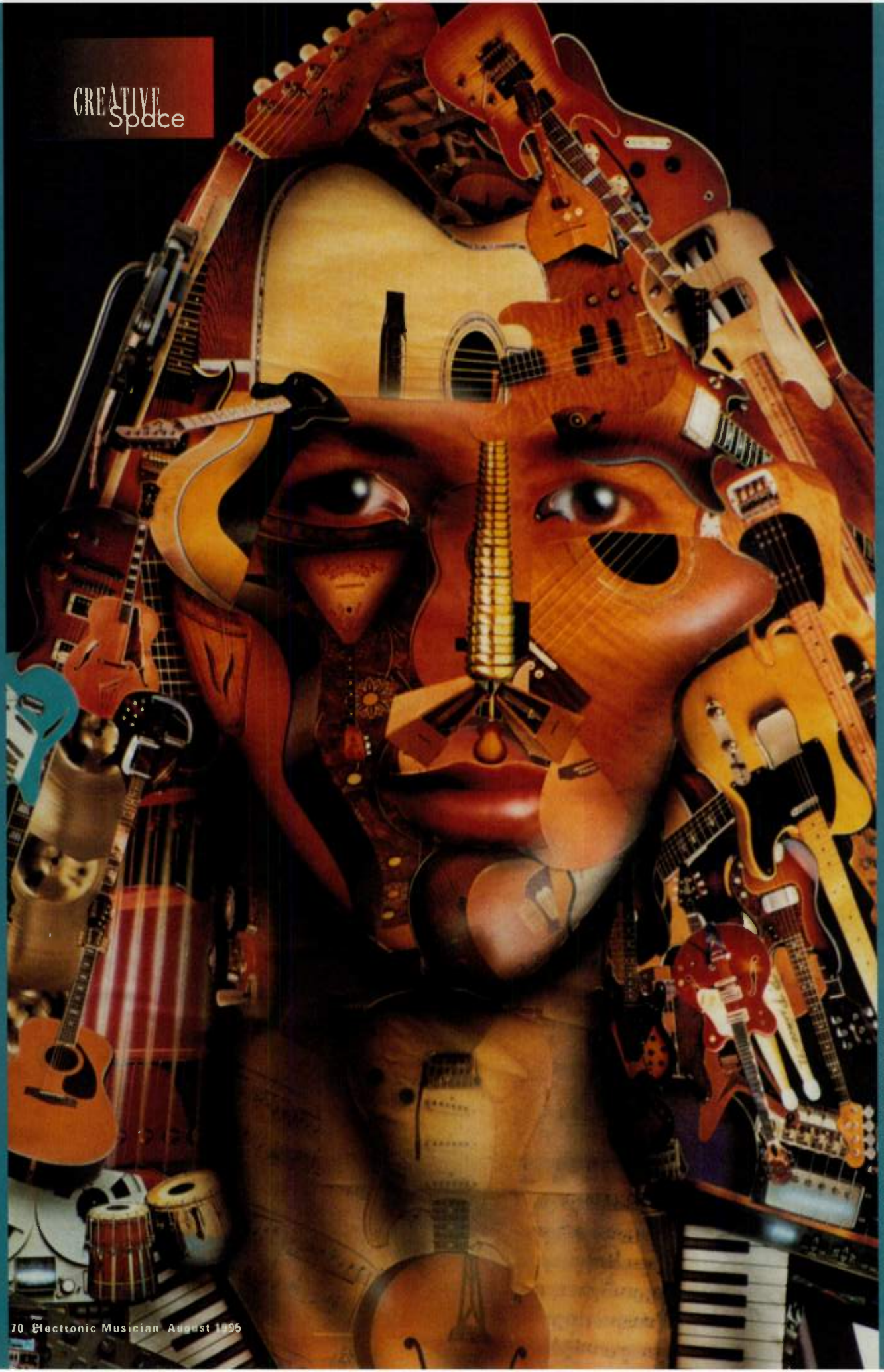


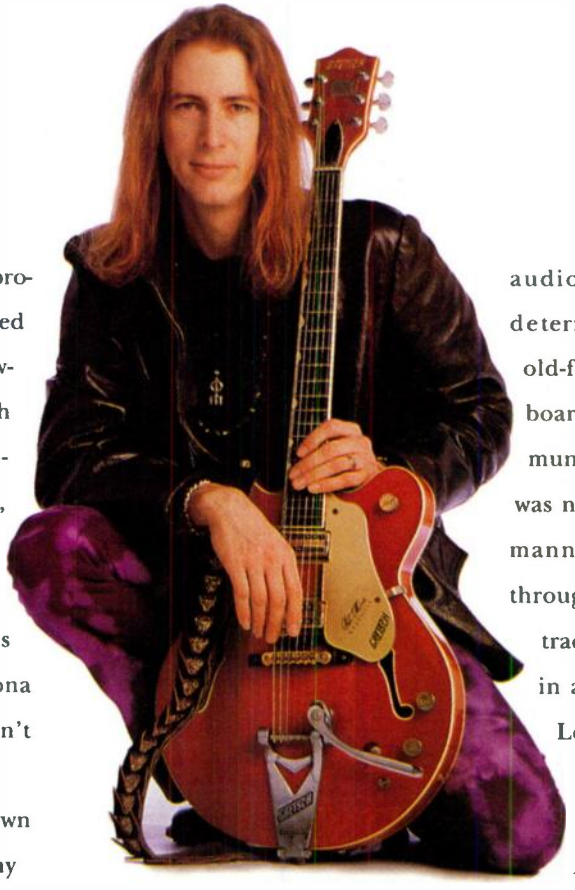
FIG. 4: Opcode's OMS lets you easily configure your system so that compatible software can communicate with internal and external MIDI devices.



PURPLE PASSAGES COVER ART BY: PRAIRIE PRINCE

HOME ALONE

Lyle Workman cuts a solo album in a purple haze.



LYLE WORKMAN is no stranger to professional recording studios. Acclaimed as a guitarist with a unique and powerful voice, he has recorded with artists as diverse as Frank Black, Jellyfish, Jude Cole, Todd Rundgren, Jonathan Cain, and jazz legend Tony Williams. And as a member of the pop rock group Bourgeois Tagg, Workman even charted a bona fide Top 40 hit with the song "I Don't Mind at All" in 1987.

But when it came time to do his own album, Workman replaced the cushy audio palaces with a whole lot of determination, ingenuity, and good, old-fashioned elbow grease. The fretboard magic of *Purple Passages* (Immune Records/Audiophile Imports) was not captured by expensive Neumann condenser mics or routed through Neve consoles. Every riff was tracked on semipro recording gear in a bedroom-sized home studio. Left to his own devices, Workman was free to concentrate solely on his musical vision. As a result, *Purple Passages* is an impressive

• • • By Glenn Letsch • • •

HOME ALONE

sonic smorgasbord of melodies, riffs, and outrageous chord progressions.

"After years of playing in bands where I was required to play specific parts, I really wanted to record something the way *I* wanted it to sound," says Workman. "*Purple Passages* was basically an example of on-the-job training. I learned how to engineer by engineering, how to produce by producing, and how to mix by mixing. I just turned the knobs and asked a lot of questions."

Workman's Macintosh, signal processors, and MIDI controllers all crowd next to the mixing console to provide easy access.

HOMEBOY

Workman's interest in recording began when he started fooling around with his father's stereo reel-to-reel deck. As with most musicians bitten by the home-recording bug, he eventually passed through the TEAC 3340 4-track and TASCAM Portastudio stages. The Portastudio, in fact, served as his primary songwriting tool throughout his tenure with Bourgeois Tagg.

In the late 1980s, Workman signed on with Todd Rundgren and upgraded his home studio with a TASCAM TSR-8 ½-inch, 8-track recorder (with dbx), an old Studiomaster 16 × 4 × 2 mixing console, and a few signal processors. All but three tracks for *Purple Passages* were completed on the TSR-8.

"I built the studio piece-by-piece," explains Workman. "As I developed the need for something, I'd go out and buy it. The more songs I wrote and recorded, the more comfortable I'd get with the recording equipment, and the more I'd realize when I needed something to beef up sound quality. For example, I bought an AKG C 414 when it became obvious a large-diaphragm condenser mic would improve my acoustic-guitar tracks, and I picked up a compressor when I noticed my signal levels were inconsistent."

TURNING PURPLE

When Workman began *Purple Passages*, most of the tracks were recorded by plugging instruments directly into the console. But as the album progressed, the quest for a more organic guitar sound drove him to experiment with live miking. The lead-guitar track on the song "Lionhearted," for instance, was recorded in Workman's bathroom with a MESA/Boogie preamp and a 100-watt Marshall half-stack cranked way up.

"I never had any complaints from the neighbors, but I certainly abused the privilege," he admits. Workman also played bass on the album, using a 1963 Fender Precision and an old Fender Jazz. The bass lines are full, punchy, and smack dab in the listener's face. A lot of the album's low-end impact was produced using compression—a Symetrix 525 was used to pump up the bass—but a large part is also due to Workman's use of the bass as more than just a support instrument.

"I've always been a fan of melodic bass lines, so I want to hear every note," he says. "If the bass tells its own story, it can make all the difference in the world. A great bass line can really energize a song. For example, if the guitar is playing a D-major triad, the bass player can change the mood of the song depending on whether he or she plays an F♯, G, A, or B over the chord."

Workman's attention to detail helped ensure that each instrument had its own place in the mix, without overpowering any other instruments or sonic layers. "When I mix, my only hard and fast rule is that I'm able to hear clearly every instrument," he explains. "I work a lot with [stereo] panning and EQ to ensure that every sound has its own spot in the audio spectrum. Musically, I keep arrangements clean by using contrapuntal parts, rather than keyboard pads and sustaining chords. Instrumental pads are often used as sonic Band-Aids to fill space, but they also tend to obscure other important elements."

Although the contrapuntal complexity of Workman's tunes makes them ripe for MIDI sequencing, drums

Workman's Workspace

Mixing Console	Soundcraft Spirit Studio 24 x 8 x 2
Recording Media	Alesis ADAT (2) with BRC controller, TASCAM DA-30 DAT recorder
Monitor Speakers	Tannoy NFM-DMT 8
Microphones	AKG C 414 B/TL, AKG C 460 B, Shure SM57
Keyboards/Sound Modules	Alesis D4, HR-16, and HR-16B; KAT dk10; Peavey DPM 3; Roland GR-50 and GR-300
Signal Processors	Alesis Microverb II, Midiverb, and QuadraVerb; BBE Sonic Maximizer 422A; DigiTech IPS 33B; Dytronics CS-5 Tri-Stereo Chorus; Furman QN-44 Quad Noise Gate; Groove Tube Speaker Emulator; Ibanez SDR-1000 reverb; MXR Delay System II; Rocktron Chameleon guitar preamp; Roland SDE-3000 delay; Symetrix 525 compressor/limiter; Yamaha SPX90II
Computers/Software	Macintosh IIci, Opcode *Studio Vision*, Opcode Studio 3, Digidesign Sound Tools II
Power Amp	Harman-Kardon PM655 Vxi integrated stereo amplifier

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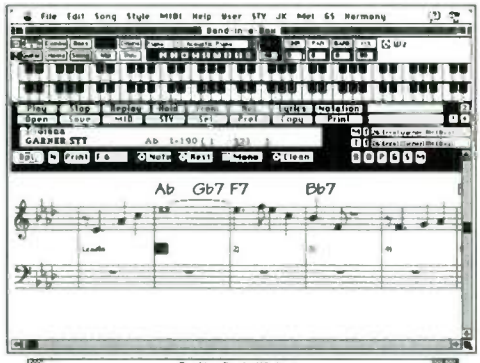

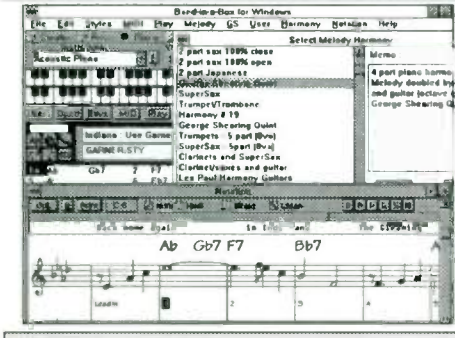

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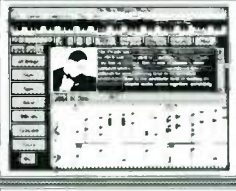

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are the only sequenced instruments on *Purple Passages*. However, a few hundred virtual tracks wouldn't have hurt. Cramming all the diverse musical events Workman wanted onto an analog 8-track was no picnic. To expand the number of available tracks *sans* sequencer, Workman had to record more than one part or instrument on each individual track. This process, called *track sharing*, can turn a mixdown session into a nightmare. Negotiating the different EQ tweaks, level adjustments, and signal processing required by the various elements recorded on a single track takes a lot of patience. Planning and split-second reactions are crucial.

"I had a friend help me mix, and it often took us 30 hours just to finish one song," says Workman. "On a song like 'Bridge of Hope,' I put sixteen completely different parts on one track. To facilitate critical sound tweaking, I'd have to 'mult' or split one tape track into several different input channels on the board. This allowed me to dial-in separate levels and EQ settings for each individual part on the track. Even then, I would be forced to mix the song in sections. I'd mix the first minute of the song onto DAT, then I'd stop and mix the next section, and I'd keep going until the song was completely mixed. Typically, I'd end up with five independent sections of a single tune on the DAT master. Finally, I'd take the DAT to a pro studio, transfer the song to a ½-inch analog machine, and have the engineer cut and splice the sections together. After mixing four or five tunes this way, I decided to get a 16-track machine!"

Enter TASCAM's MS-16 1-inch, 16-track deck and a 24-channel Soundcraft Spirit Studio console. (Since *Purple Passages*, Workman has upgraded his studio again and now records on Alesis ADATs.) Unfortunately, the additional tracks didn't solve the "overpopulation" problem; it just made mixing a little more manageable.

"Having more tracks available allowed me to put eight things on each track instead of sixteen," says Workman. "But it was still too difficult to mix an entire song without automation. I'd get half way through a mix and forget that something had to be changed back from a previous setting. It was too frustrating to try to remember each detail for the multitude of parts recorded onto each track—and now there were sixteen tracks to worry about, instead of eight! Continuing to mix in sections was the only way to survive the process."

All the hard work paid off, however, as the fidelity of *Purple Passages* is just as wonderful as that of anything you can buy at your local record store. Workman didn't seem hampered by semipro equipment or the less-than-clinical audio environment of the typical home studio.

"There's really no great mystery to recording good sounds," asserts Workman. "All I did was try to capture the natural timbre of the instrument as I heard it in the room and burn the recording levels as hot as possible without distorting the signal. Because I was basically thrown in the water and told to swim, I had to learn about recording

Workman's guitar collection stands at the ready. When you own a home studio, you never have to put away your toys.

as I went along. I took the time to experiment until I found what produced the best sound. For example, I discovered that if you hit the input of a digital reverb just below its overload point, you can back down the output level and diminish audible hiss. I also referenced all my mixes to other CDs to see whether they stacked up sonically to commercial releases and audio productions that I respected."

FINAL PASSAGE

As Workman's keyboard skills are admittedly limited, the aural richness of *Purple Passages* was achieved by expanding the guitar's tonal palette. His Roland GR-500 guitar synth often saved him from "getting painted into a musical corner" by providing interesting textures for layering melody lines and chords.

"I'd experiment with layering different timbres and just get chills," says Workman, "which is a nice reward after dealing with all the technical pressures of producing good sounds. I learned to savor those moments. Sometimes you just have to stop and smell the roses."

Session bassist and educator **Glenn Letsch** *is the author of* Bass Lessons with the Greats *(Warner Bros. Publishing). You can send e-mail to him at letschg@bdt.com.*

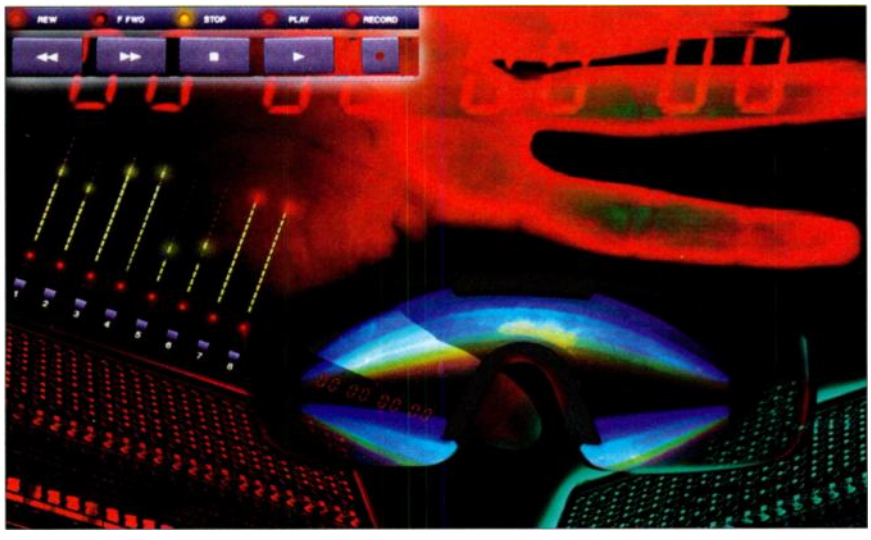
Premastering Techniques

Everything you should know about mastering as you mix.

By Scott Wilkinson

You've spent months (or perhaps years) lovingly tracking and sequencing your music in your own studio. Now it's time for mixdown. (Mixing is an art that **EM** covers regularly; see "From the Top: Mixdown Basics" in the July 1993 issue and "All Mixed Up" in the February and March 1995 issues for starters.)

One of the many things you must keep in mind while mixing is the end product: the CDs or cassettes that will be sold to untold millions of fans. The process that takes your music from mixdown to duplicated CDs or cassettes is called *mastering,* and it behooves all engineers to understand this process as they mix.



MASTERS OF THE UNIVERSE

Mastering has two goals. The first is to make your music sound as good as possible before it is duplicated. This includes making it sound like a smoothly flowing whole, rather than a disjointed series of disparate tunes. Listeners shouldn't have to adjust the volume and tone controls on their stereos from one tune to the next. The second goal is to put the entire program in the correct format for duplication in the selected medium.

The entire process goes something like this. First, you mix the basic tracks, overdubs, and sequenced parts to a 2-track format, usually DAT or open-reel analog. (For fidelity reasons, you should avoid mixing to cassette.) The product of this step is sometimes called the *premaster.*

You don't necessarily have to mix the tunes in the order you intend for the final product. The order in which they are mixed depends on many factors, including which tunes are ready for mixing, what mood you're in that day, and so on. So the second step of the mastering process is putting the mixed tunes in the desired order and separating them with the desired length of silence. This step is called the *sequence and assembly* phase of mastering, and it results in the *project master.* The entire process of going from the main mix to the project master is known as *premastering.*

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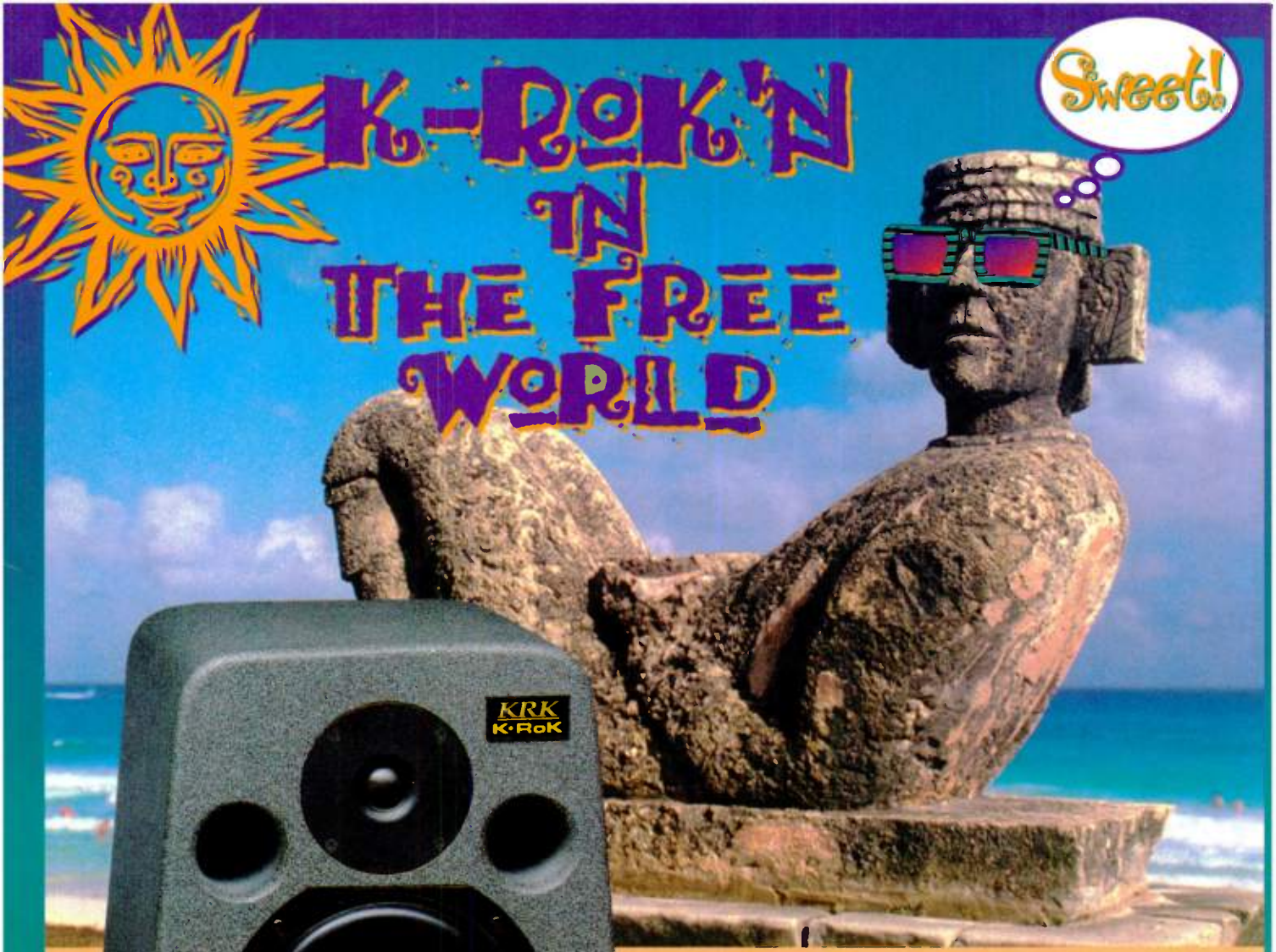

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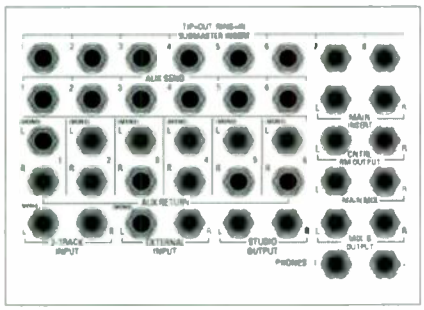
Next, you take the project master to a mastering studio, where you listen to the tape with a mastering engineer. Together, you decide what the mastering engineer can do to improve the sound even more, after which he or she transfers the project master to what is called the *master*, performing any agreed-upon tweaking in the process. Finally, the master is transferred to a *production master*, which is used to duplicate the project to the selected medium (usually CD).



The ¼-inch jacks in the master section of a Mackie 8•Bus mixer include insert points for the submaster (top) and main (upper right) buses. Inside these jacks, the tip connector sends the signal out of the mixer and the ring connector accepts the signal returning from one or more external processors.

MIXDOWN

As you mix your tunes, there are a few things you should keep in mind. First, strive for consistency between selections: You generally don't want a wildly different balance of instruments or different peak levels from one tune to another. One way to accomplish this is to mix each selection with respect to a common reference tone. At the beginning of each mixing session, record a 1 kHz sine wave from a tone generator, synth, or reference CD at 0 VU for 30 to 45 seconds at the beginning of the tape. This will help you maintain a consistent overall level from one tune to the next.

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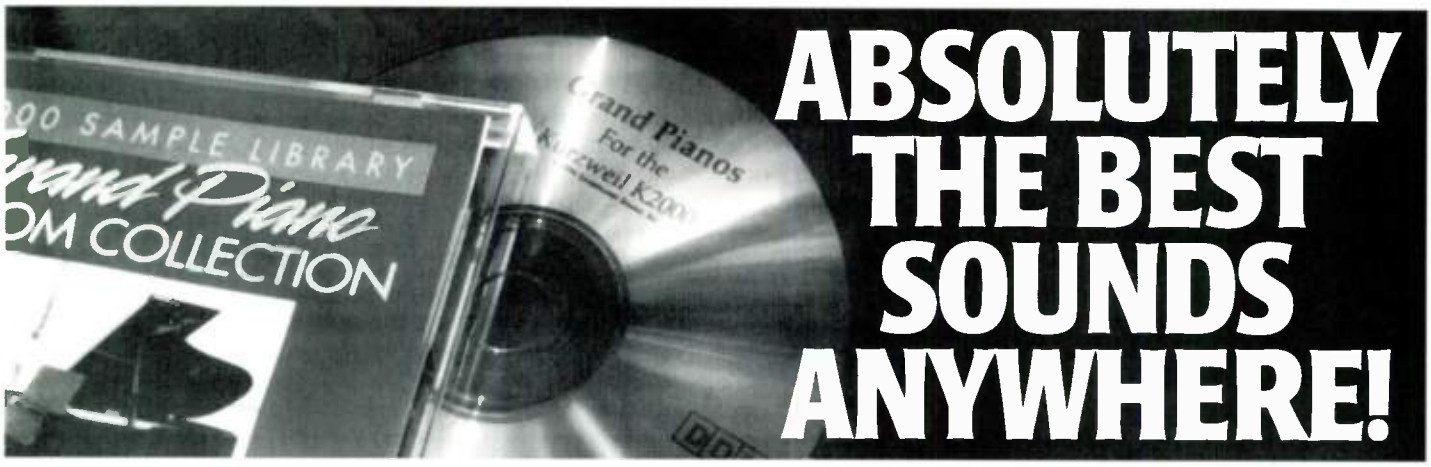
If your selections have individual problems, try to fix them in the mix instead of taking them to the mastering engineer. For example, if the vocals are overly sibilant, use a de-esser on those tracks during mixdown (see "Square One: Dynamic Duos, Part 2" in the January 1995 **EM**). A good mastering engineer can help fix such problems, but it is far easier to fix them during mixdown.

In particular, avoid problems that require opposite solutions in the same frequency range. For example, suppose you have a dull snare and a harsh, sibilant vocal occurring simultaneously. If the mastering engineer tries to fix the snare by applying EQ to the entire mix, it will make the vocal problem worse. This is much more easily solved by processing the tracks separately during mixdown.

Although it may seem too obvious to mention, avoid distortion. The mastering engineer can't do much about it other than cut the frequency at which it is the most prominent. After you mix some tunes, listen to them in several different environments (home stereo, car, etc.). Consider remixing if the sound isn't good in those environments.



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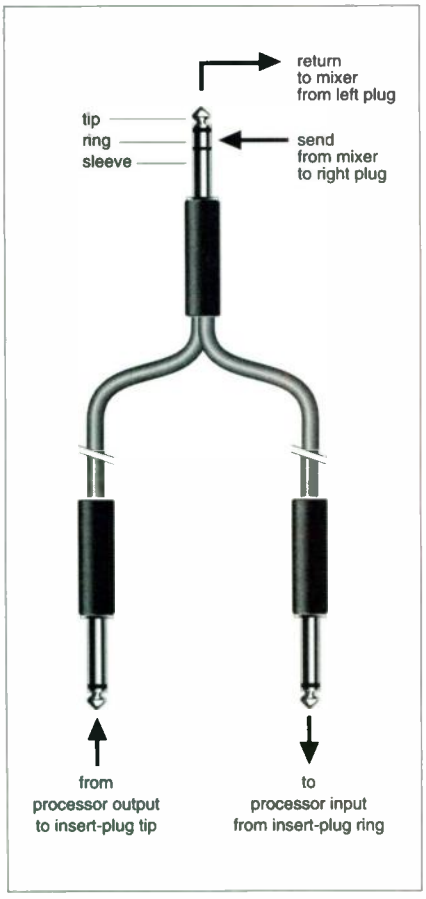
Finally, document everything, including all settings on the mixer, synths, and outboard processors. This becomes critical if you ever have to go back and remix.

PROCESSING

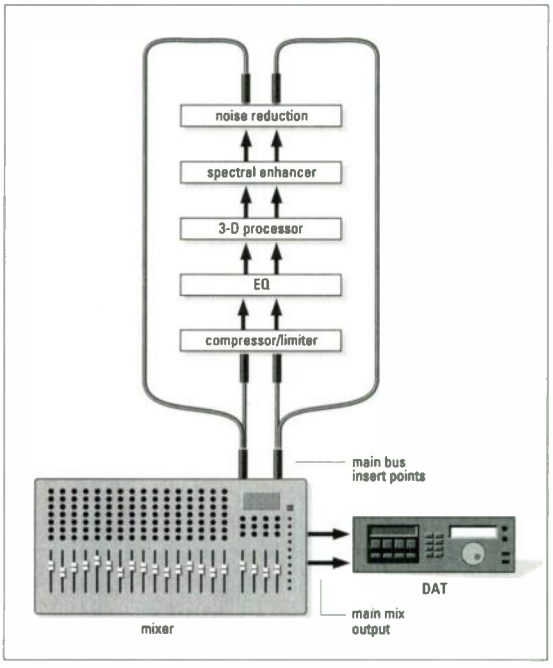
Following the generally accepted rules of recording, you should apply as little processing as possible to individual tracks as they are recorded. In most cases, it is better to process tracks as you mix; this lets you try again if something goes wrong. Typically, effects such as



An insert cable consists of a ¼-inch TRS (tip-ring-sleeve) plug at one end and two ¼-inch TS (tip-sleeve) plugs at the other end. To use this cable with a Mackie 8•Bus board, the roles of the tip and ring (and their corresponding TS plugs) must be reversed from those depicted here.

reverb, delay, chorusing, and flanging are applied to each track via the mixer's aux sends (see "Square One: On the Right Path" in the February 1995 **EM**).

However, there are several effects that can be applied to the entire mix. To accomplish this, route the main stereo signal to the desired processors and back into the mixer for final level control via the main-bus insert points. From the insert return, the signal flows to the main mix outputs and on to the 2-track mixdown deck.



Although this diagram goes way over the top in terms of total processing, it illustrates how different processors are connected to the main bus insert points. After returning from the processors, the signal proceeds to the main outputs and on to a DAT or other 2-track medium.

Many mastering engineers complain that project masters often include an overly wide dynamic range with large peaks. Some engineers recommend keeping the peaks no more than 10 dB above the average level of the rest of the program. Of course, the mastering engineer can apply a bit of compression to the entire mix, but so can you (see "Square One: Dynamic Duos, Part 1" in the December 1994 **EM**). Try a compression ratio of 2:1, and vary the threshold until you hear the best results.

Compression also adds "punch" to your mix, tightening the bass and making the whole sound meatier. However, it also tends to color the sound, which some people like, depending on the type of music. Compression is particularly important when mixing for radio airplay, because radio stations compress everything as it is broadcast.

If you are mixing to DAT, you must not exceed the DAT's "digital zero" level, at which the crest of a waveform is represented by a string of 1s. If you exceed this level, the signal will be clipped, resulting in audible distortion. (Note that this level is not necessarily equivalent to 0 VU on the DAT's meter. Some manufacturers set 0 VU to be less than digital zero so you can record above the 0 VU level as you would on an analog deck and still avoid clipping.) Many compressors include limiting, which prevents the signal from going beyond the preset level.

Mastering engineers use EQ to improve the sound of the project master. You can try this technique by inserting a stereo graphic or parametric equalizer into the main bus. However, using less than the best EQ with limited knowledge and experience may cause more problems than it solves.

If a particular track needs tonal help beyond the capability of the mixer's channel EQ, try connecting an outboard equalizer to that channel's insert point. For example, a vocal track might be buried even though its fader is all the way up. Selectively boosting certain frequencies in the 4 to 7 kHz range can greatly enhance the vocal's intelligibility. In addition, an inserted EQ can be bypassed without changing its settings, unlike the EQ in some mixers. (See "Square One: EQ Explained" in the April 1995 **EM**.)

An increasing number of mixing engineers insert a so-called *3-D processor* into the main stereo signal path during mixdown. This can also be done at later stages of the entire mastering process, instead. A 3-D processor such as QSound Labs' QSound or Roland's RSS creates the illusion that the soundstage—an imaginary stage on which the individual instruments appear to be located—extends beyond the speakers (see "3-D Audio" in the October

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1992 **EM**). Some products supposedly place sound sources above and behind the listener, hence the term "3-D," but this only works convincingly in systems such as Dolby Pro•Logic Surround, which uses a multichannel, multispeaker playback environment (see "From the Top: Dolby Surround" in the April 1994 issue).

Spectral enhancers are more common (see "From the Top: Spectral Enhancers" in the May 1993 **EM**). These units enhance the entire spectrum of the main stereo signal in one of several ways. Some units generate harmonics that are not present in the original signal (e.g., Aphex Aural Exciter), while others apply EQ dynamically according to the program material (e.g., Dolby Model 740). A third type of spectral enhancer uses dynamic phase shifting (e.g., BBE Sonic Maximizer). These devices are particularly useful for commercials and other promotional material that must reach out and grab the listener.

Finally, many mixing engineers insert a single-ended noise-reduction unit at the end of the stereo signal path. Most people are familiar with Dolby and dbx Types I and II noise reduction, but these methods require a decoder during playback. Single-ended designs, such as a downward expander or dynamic filter, require no decoding at playback, making them ideal for reducing any noise in your premaster. However, they must be used with care to avoid unpleasant audible side-effects. Be sure to place noise reduction at the end of the chain so it reduces noise from all other devices. (See "The Last Noise Reduction Article" in the October and November 1991 **EM**.) Devices such as the dbx 296 incorporate spectral enhancement with single-ended noise reduction.

Of course, few engineers insert all of the processors mentioned into the main signal path. Each device in the signal chain adds noise and degrades the signal quality to one degree or another. Most engineers recommend that you insert only those devices that are absolutely essential. In general, I suggest a compressor followed by a spectral enhancer and a single-ended noise reduction unit. However, some would legitimately argue that if you have your dynamics, gain staging, and electrical noise under control in the first place, you don't need any inserted processing during mixdown. (See "Recording Musician: Gain Stages" in the November 1993 **EM**.)

SEQUENCING AND ASSEMBLY

Once your premaster is done, it's time to sequence and assemble the tunes onto the project master. This can be done in your studio or the mastering studio. Traditionally, the selections on an open-reel analog premaster are physically cut apart, arranged in the desired order, and spliced together with leader tape, which separates the tunes by the desired amount of time.

Unfortunately, physical splicing is impractical with a DAT premaster. You can digitally transfer the tunes one at a time from one DAT to another, but this can be tricky. Unless you use a DAT machine with assembly-editing or insert-editing capabilities, the control track is broken wherever recording is stopped and started, which looks like an error to the DAT machine during

playback. Depending on the playback machine, this can result in noise or momentary muting. Even if it sounds fine on your machine, it might not on a different machine during mastering. (This is one reason to take your DAT machine to the mastering studio when the time comes.)

If you attempt this procedure, make sure to allow a couple of seconds between putting the machine in Record and starting each selection. After you have finished sequencing and assembling the selections, make a continuous digital transfer of the tape to another DAT, listening carefully for any problems during or between selections. Use the continuous copy as the final project master, keeping the original assembled tape as a backup.

Better still, digitally dump each premaster selection onto a computer-based hard-disk recorder and do the sequencing and assembly there. Depending on the system's capabilities, you can normalize the selections' gain to assure consistent levels, and you can apply compression, EQ, soundstage enhancement, spectral enhancement, and noise reduction. You can also specify the fades in and out of each selection. If you have enough hard-disk storage, you can sequence and assemble the entire project within the system and digitally transfer it to DAT in one pass. Otherwise, you must prepare the selections and transfer them to the project-master DAT one at a time.

Leave the first 30 to 60 seconds of the final project-master DAT blank because this is where any damage is likely to occur. Following this blank space, record 30 to 45 seconds of a 1 kHz reference tone at 0 VU. (For analog project masters, record reference tones at 100 Hz, 1 kHz, and 10 kHz for high- and low-frequency bias adjustments.) Follow the reference tone with 30 to 45 seconds of silence as a courtesy to the mastering engineer, who might need the time to complete the adjustments.

The selections on the project master should be indexed with sequential start IDs: Number 1 should be the first tune, not the reference tone. If extra IDs were recorded in the sequencing and assembly process, erase them and renumber the remaining IDs.

Finally, prepare detailed documentation of the project master. This should include the length of blank space at the beginning, location and length of reference tones, locations and titles of the selections, individual and cumulative timings, and maximum level readings.

TO THE MASTERING STUDIO

Now you are ready to take your project master to a mastering studio. Once again, consider taking your DAT machine with you. Even though DAT is a standard, discrepancies exist between different machines, particularly professional and consumer decks, which can lead to interchange problems.

Listen to the project master with the mastering engineer and discuss what can be done to improve the sound, such as EQ or spectral enhancement. Then let the engineer take over and prepare your project for duplication. Soon, you will have hundreds or thousands of copies of your work, which should make you feel pretty good. Then all that is left for you to do is to sell them.

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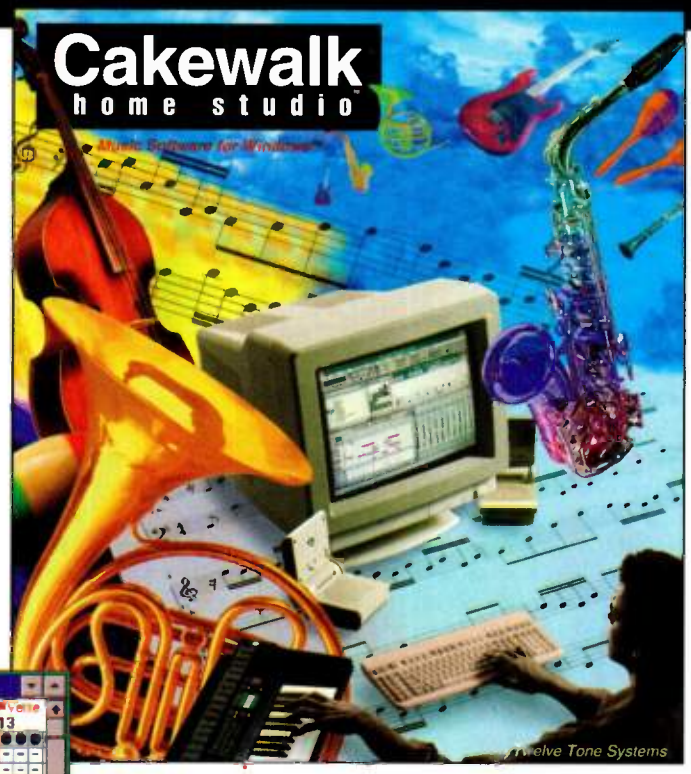

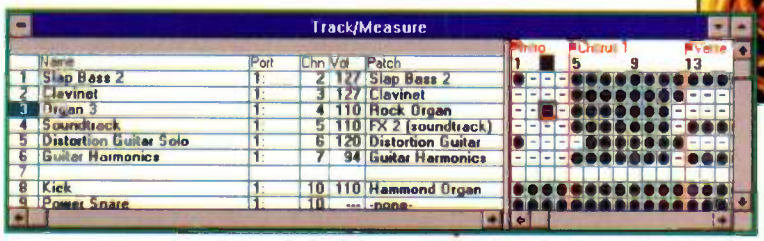

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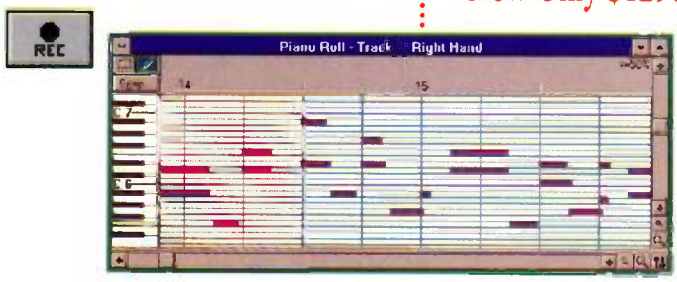

Cakewalk Home Studio Highlights:

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- Track/Measure, Piano Roll, Event List, Staff and Controller views
- Faders for volume, pan, and reverb
- Drag-and-drop editing
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- Meter/key map
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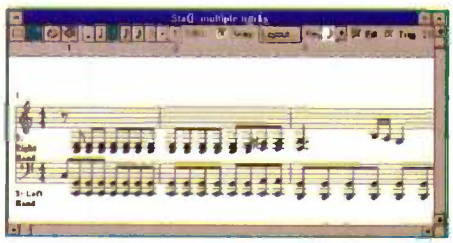

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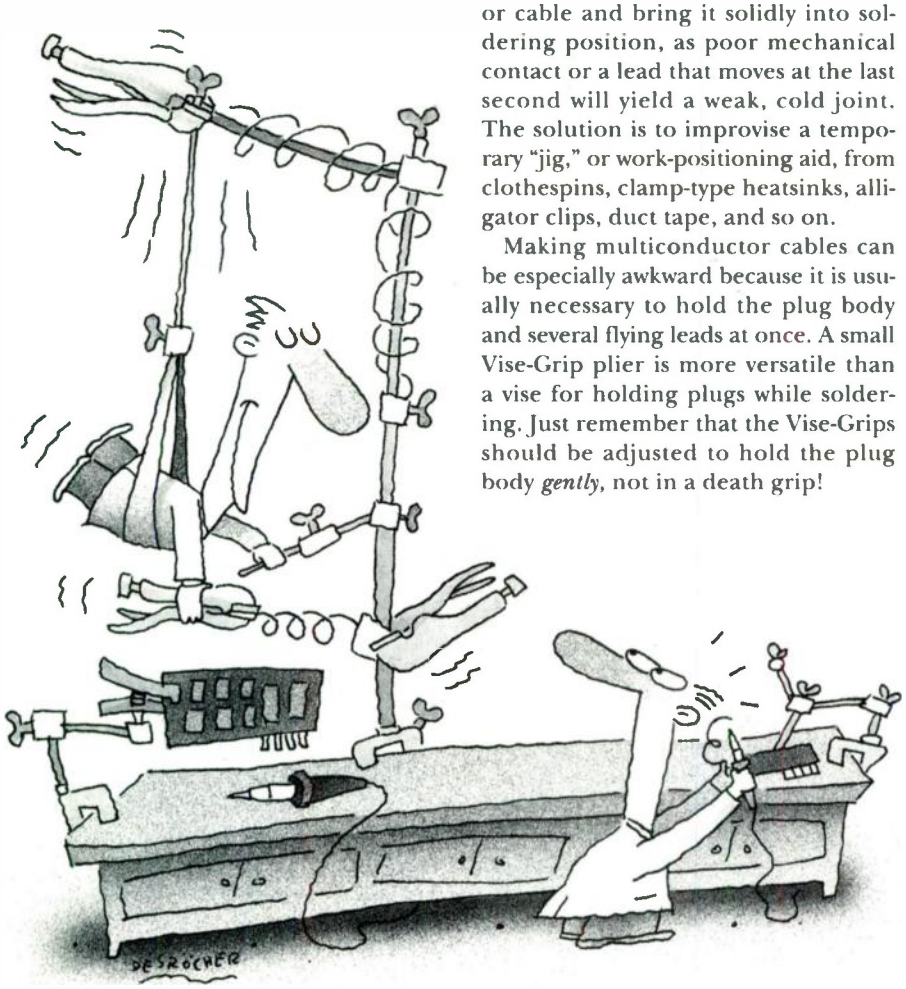
SERVICE CLINIC

Tricks of the Trade

Some simple techniques for making professional repairs.

By Alan Gary Campbell



Making cables, soldering flying leads, and tack-soldering can be exercises in sheer frustration. You must tame the errant wire or cable and bring it solidly into soldering position, as poor mechanical contact or a lead that moves at the last second will yield a weak, cold joint. The solution is to improvise a temporary "jig," or work-positioning aid, from clothespins, clamp-type heatsinks, alligator clips, duct tape, and so on.

Making multiconductor cables can be especially awkward because it is usually necessary to hold the plug body and several flying leads at once. A small Vise-Grip plier is more versatile than a vise for holding plugs while soldering. Just remember that the Vise-Grips should be adjusted to hold the plug body *gently*, not in a death grip!

I've found that the most useful work-positioning aids of all are the X-acto X-tra Hands fixtures, which provide variable positioning of alligator clips (or any holding device small enough to fit the receptacle), mounted on ball-and-socket jointed arms that are supported by a heavy base. X-tra Hands are offered in single- or double-arm models and are available from hobby and hardware stores. Radio Shack sells a clone of the double-arm model (catalog number 64-2093). The terminating alligator clips remove easily with thumbscrews.

Jury-rigged jigs can take on bizarre, pop-art appearances and are considered fair game for jibes from fellow technicians. But the only bad jig is the one you didn't think to use.

KEY CONTACTS IN THE E.R.

Sometimes a keyboard contact fails and no replacement is available. You can usually temporarily repair a rubber "membrane" switch by applying a minute amount of Elmer's Stixall adhesive to the torn area. Work gently, smoothing the fillet of adhesive with a moistened fingertip. Replace the damaged contact one as soon as possible.

Yamaha DX7-type, meta-leaf switches used in the DX7, DX7II, KX76/88, and the Korg M, T, and O series are all but impervious to normal wear. Nonetheless, leaf contacts can be severely damaged when a key is jammed or pushed

JACK DESROCHER

inward, and further damage can occur when the user tries to fix a loose, previously jammed key by pushing it back into place. Generally, the apex of the center contact (the part with the small rubber insert) will be bent back at a 90-degree angle, and the contacts above and below may also be affected.

Often, damaged leaf contacts can be resurrected. Though the job is tedious and requires a deft touch, repair is preferable to replacement, which is troublesome and expensive. Remove the keyboard from the instrument. Remove the locking strip that runs the length of the keyboard along the rear upper lip of the keyframe. Observe the damage. Remove the affected keytop, taking care not to damage the contact further. Use the position and shape of an undamaged contact for comparison and gently, a little at a time, bend the damaged contact back into alignment.

It is often helpful to use two miniature screwdrivers. One acts as a "stop," placed below and behind the tip, to support the body of the center contact. The other is used to reform the bent tip. If the angle of one of the upper or lower contacts is distorted, it may be necessary to bend the affected contact up at its base to access and adjust the degree of the angle, and then bend it back. This should be done with great care. Be patient and work slowly. Try to duplicate the original spacing and shape as closely as possible to prevent loss of Velocity response.

Note that when you reinstall the keytop, it must be kept nearly level as it is pushed into place, or the actuator will "hang" on the leaf contact and damage it again. Don't forget to reinstall the locking strip before reassembling.

ANALOG DEMONS

If you play an old Minimoog or another analog synth that has been sitting for a while, the chances are that instead of nice, in-tune notes you'll get ear-splitting cacophony that sounds like screaming banshees. Oxidation collects on the J-wire key contacts and bus bars, which provide keying and control voltages directly, so pitch and triggering jump all over the place.

The simple fix is to open up the unit (the Micromoog and Multimoog have quick-access panels) and clean the contacts with an alcohol-soaked swab. It's that easy. Even so, the symptom sounds so horrendous that if you acquire a misbehaving unit from an uninformed dealer, I bet you'll get it for cheap.

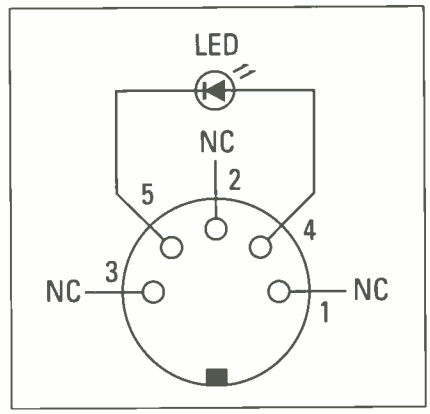


FIG. 1: Schematic for the MIDI data tester.

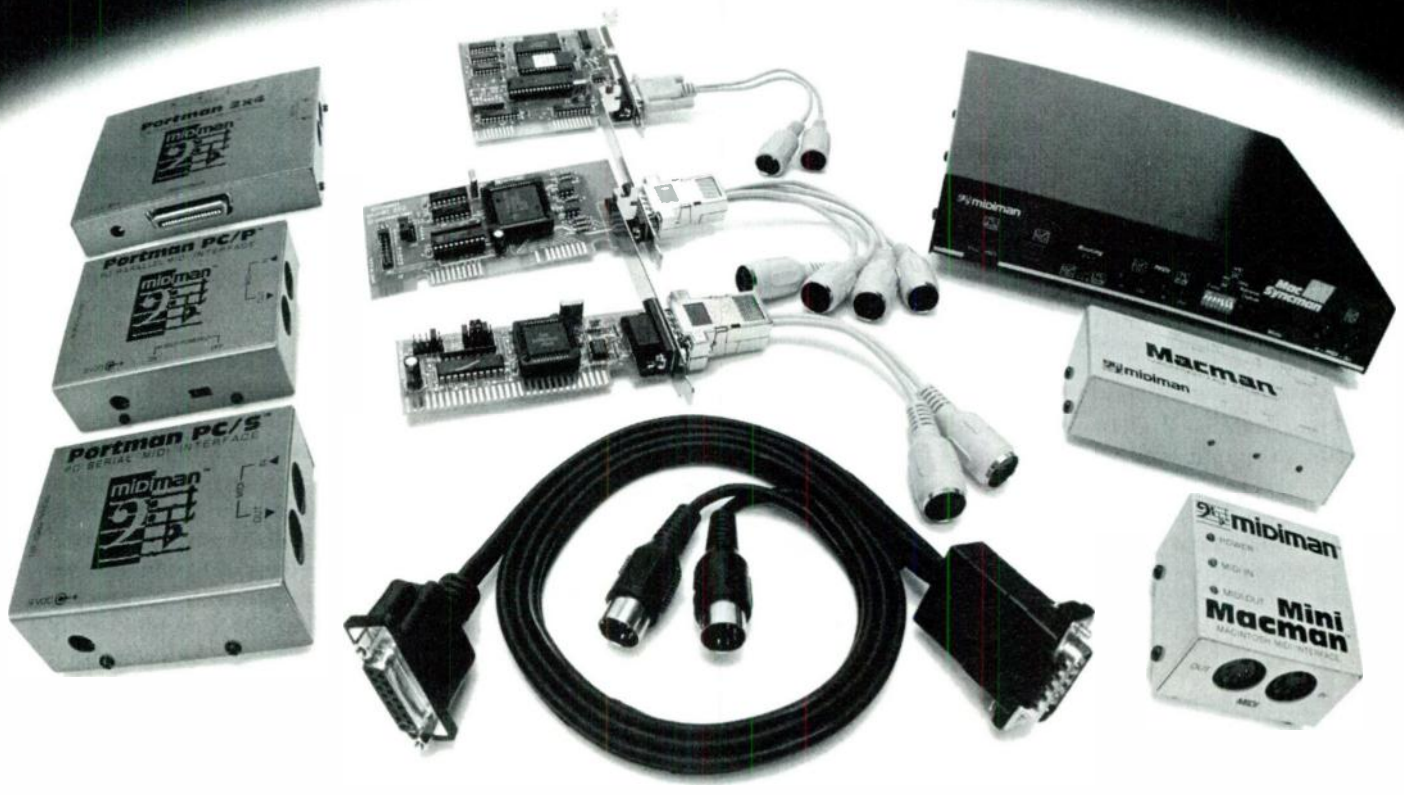
SEEKING SIGNS OF LIFE

Sometimes, especially during system setup, you simply need to know whether a MIDI Out or Thru is transmitting *anything*. A MIDI data tester is a lifesaver in such cases, and you can make this simple, passive device from a DIN plug and an LED. The LED connects across pins 4 and 5 (see **Fig. 1**) and extends through the strain relief of the plug.

To make a MIDI data tester, obtain a 5-pin DIN plug (Radio Shack catalog number 274-003 or equivalent) and a high-brightness LED (Radio Shack catalog number 276-041 or equivalent). Clean the LED leads as described in the June 1995 "Service Clinic," and trim them to the desired length. Tack-solder a piece of 22-gauge, insulated hook-up wire to each lead. Remove the DIN-plug shell from the barrel, but don't pull on the strain relief! Using the barrel as a guide, trim the LED leads so that when the assembly is tack-soldered in place, the LED lens will extend slightly beyond the end of the DIN-plug strain relief (see photo). Note that some LED leads are the right length without trimming. Tack-solder the wires in place—be sure to get the polarity right—then reassemble the plug. A slight twist will help to adjust LED height and add stability.

Of course, the LED will shine most brightly when there is a lot of data at the Out or Thru. To test a MIDI Out, wiggle a pitch-bend wheel repeatedly, or trill two notes. To test a Thru, remember to have an active transmitting device connected to the associated In. Purists argue that you really need a

Over 100,000 served.



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MIDI data tester, cutaway view.

complicated pulse-stretcher in this application, to which I say, Phooey!

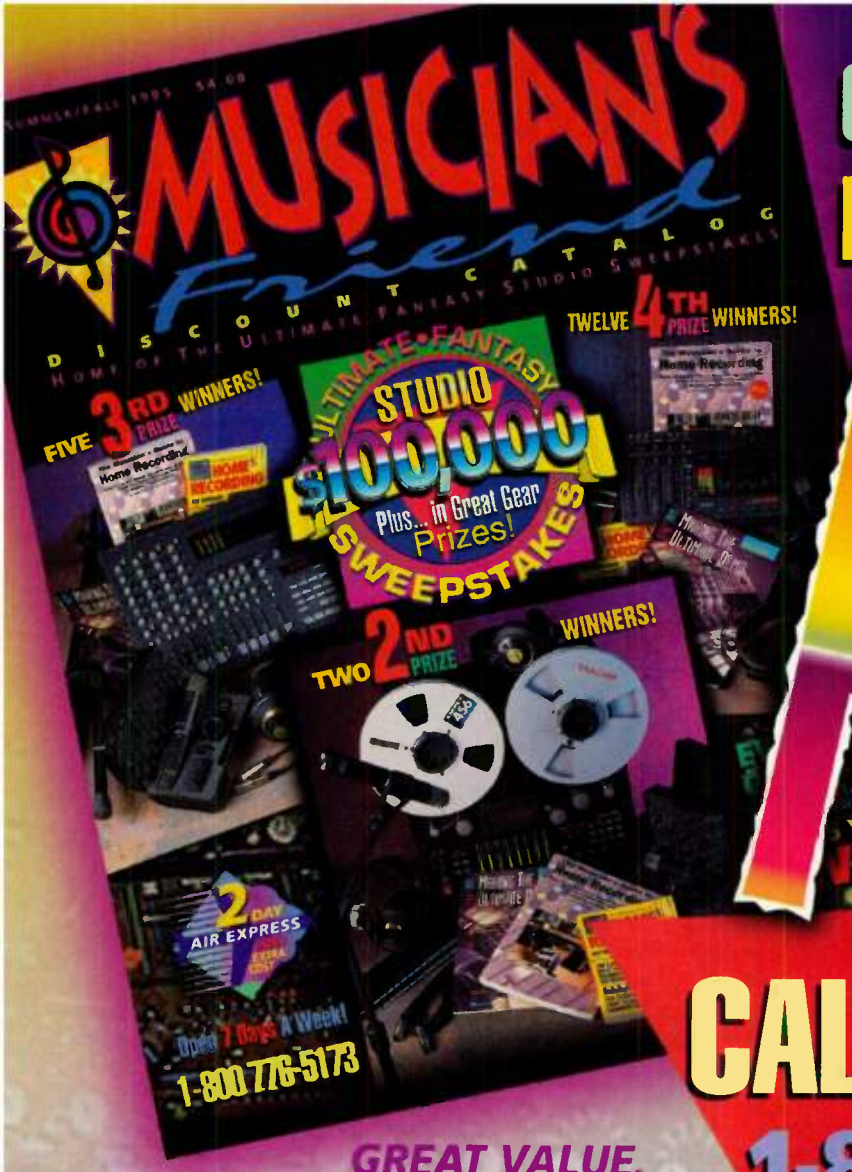
THREE TRAGEDIES AVERTED

Remove self-tapping screws received by plastic receptacles, and you're sure to strip a hole eventually. The proper fix requires some Plastic Wood added to the receptacle and allowed to cure overnight. Don't fill the hole; simply add a small amount. For screws that still "catch" the receptacle threads at some point, a dab of Super Glue on the screw tip may suffice. Silicone sealer can be used to secure loose screws at the head, but it is preferable to repair the receptacle.

The bushings on conventional pots are so long they stick out of panels, so knobs seem to "float" in an unsightly manner. Extra pot nuts are hard to come by, but there's a better fix: Stack three or more *fender washers*—big, flat washers available from well-stocked hardware stores—over the bushing before you mount the pot. This makes a secure mount, and the number of washers can be adjusted so that the threaded bushing protrudes just enough.

Have you ever opened a repaired or modified device and found silicone-sealer strings and blobs that look like they were applied by monkeys? Applying silicone sealer correctly and neatly is simplicity itself. Just apply the bead evenly and sparingly, and smooth it with a moistened fingertip before it starts to cure. A dampened swab can be used for cleanup. Spit works best, but don't eat the silicone!

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



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RECORDING MUSICIAN

Moving On Up

Ensure your home recordings can "bump up" to the big time.

By Tim Bomba

The advent of modular digital multitracks and affordable, high-quality mixing consoles is allowing an increasing number of artists, producers, and songwriters to do substantial amounts of work at home. This mass exodus to personal studios has already made a huge impact on the recording industry. Artists are producing master-quality albums on ridiculously small budgets, and freedom from the expensive ticks of the big-studio time clock has encouraged experimentation and enhanced creativity.

A rack of TASCAM DA-88s designed by the author is ready to transfer tracks at D'Elia Wittkofski post-production studios in Pittsburgh, Pennsylvania.

Of course, big studios still have their place. Just try recording a full orchestra in your living room! In addition, the pristine monitoring environments and upscale signal processing available in large facilities are valuable assets for major film, television, and record productions.

If your home-grown demo lands you a major record deal or film-scoring gig, you won't have to kiss those original tracks goodbye. Transferring your "homework" to large-studio formats such as 2-inch, 24-track or 48-track digital isn't such a big deal *if* you've taken steps to ensure critical audio performance in your personal studio.

Upgrading your studio's sonic quality will cost you some money and labor, but the benefit of knowing that your personal projects can stand up to, and be included in, pro-audio productions should far outweigh any damage to your pocketbook. During my career as a recording engineer, producer, and studio designer, I've discovered where most personal and project studios fail to perform at pro-studio levels. The following suggestions should help you achieve big-studio sound in the comfort of your home.

HALLOWED GROUND

The grounding scheme of your home studio plays a major role in how well your music is recorded. You don't want ground hums, buzzes, or other technical

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Ride the Waves

ANALOG

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PEAVEY

problems interfering with your creative flow. And you definitely do not want audio glitches to materialize after you've transferred your tracks to another format for working in a large studio.

It is critical that your studio employs a solid grounding system. The most commonly used grounding technique is called the *star ground system.* Basically, each piece of gear in your studio should have only one connection to ground. (For everything you need to know about grounding, see "On Solid Ground, Parts 1 and 2," in the September and October 1992 issues of **EM**.) A proper grounding system doesn't have to be very expensive and will save you many times its cost in reduced frustration and "cleaner" master tapes.

POWER RANGERS

Power is often the most overlooked area in studio design. The operation of your gear is directly affected by the quality of the incoming power. Let's face it, the majority of home studios are run off the same power that runs your refrigerator, air conditioning, and washing machine. Small wonder that clicks and hiccups tend to creep into your monitors and onto your masters.

You must isolate the power feeding your studio gear from the rest of the house. A qualified electrician can install an isolation power transformer at the main incoming electrical service box. Then, a dedicated breaker box is installed on the isolation transformer to feed the electrical outlets in the studio. You have now separated the power used by your audio gear from your household appliances *and* the power sources used by your neighbors. The result is clean power that is less likely to sabotage the audio quality of your recording system.

FIG. 1: A remote patch bay allows easy interfacing between your personal tracks and big-studio systems.

Unfortunately, any time you call an electrician, it costs money. But in Los Angeles, even entry-level audio editors are paying substantial bucks to ensure clean power and proper grounding for their home studios. Pristine sound is that important. (Obviously, a comprehensive discussion of power and grounding in the home studio could fill a book, but we *will* dive more deeply into these topics in a future issue.)

DIM DIMMERS

Electronic lighting dimmers are insidious noise-makers. But if you enjoy the ambience they give your dining room, the best option is to install passive rheostat types. Using these models will eliminate annoying buzzes. And don't think you're safe if the only dimmer in the house is far from your garage studio. The standard SCR house dimmer not only radiates RF (radio frequency) into the air but also tosses noise into the very power lines that feed your studio.

By the way, if you want to seek out RF in your studio, here's a quick test. Take any single pick-up guitar, such as a Fender Stratocaster, and plug it into a battery-powered practice amp. (Marshall's MS-2 "Micro Mini" fits in your hand and goes for around $35.) You must use a battery-powered amp to ensure that you're isolated from your AC power.

Now, turn the guitar volume all the way up and walk around your studio. The guitar/amp combo is like an RF Geiger counter that pin-points where RF is coming from. (Unfortunately, I forgot the name of the Nashville engineer who showed me this trick.) You may be surprised at the sources. For example, a soldering iron can generate electromagnetic energy that produces hums and buzzes in your system. Even a long XLR cable wrapped in a tight circle can produce enough energy to compromise audio quality. Hopefully, the troublemakers can be removed from the studio. Or you may discover that your room is in the path of a radio transmitter. In this instance, you can only determine the area where the interference is the strongest and avoid placing your gear right in the "sour" spot.

FIG. 2: The EDAK/ELCO connectors on the remote patch facilitate quick setup. The I/O of the three DA-88s in the mobile rack can be completely hooked up with just two connections, rather than plugging in 48 separate cables.

GOING MOBILE

The patch bay is the heart of the studio, and it sure makes changing connections easier than fishing around the back of your console. A remote patch bay (see **Fig. 1**) is even more of a boon when you're transporting your tracks to a big studio. When you travel to different studios, you just take your remote bay and place it next to the big studio's patch bay. Now you can easily connect your tape tracks to the studio's decks by simply patching from one bay to the other.

For example, for one mobile system I designed, I mounted a TTL patch bay into a road case with EDAK/ELCO connectors on the back panel (see **Fig. 2**). A 30-foot snake connects the remote bay to my rack of TASCAM DA-88s (see **Fig. 3**). When I'm transferring tracks in a studio that doesn't have DA-88s, all I have to do is plug a few cables from my patch bay into theirs and route the DA-88 signals directly to the studio's multitrack recorder. The remote bay makes the transfer extremely convenient, and it also saves a lot of studio time.

PREEMINENCE

I'm sure that most recordists would love to have a Neve, SSL, or Euphonix console at home. However, a good-quality mic preamp can deliver exquisite sonics that rival the sound of those expensive dream consoles. Outboard mic preamps and equalizers are often superior to the onboard types found in affordable mixers and can make a definite improvement in the sound captured by the microphone. In addition, you can bypass the mixer electronics entirely and route the signal from the preamp directly to tape—a pristine way to lay tracks.

Mic preamps, compressors, and equalizers are offered in tube, solid-state, and integrated circuit designs and each model delivers a unique sound. The relative quality of a particular unit is a matter of the recordist's personal taste. If you can afford it, you can cover a variety of sonic options by purchasing two different types or models of preamps.

DECKED OUT

If you want an easy collaboration with large studios, build your studio around a modular digital multitrack. MDMs are a breeze to transport and can interface relatively painlessly with other formats—especially if you have a mobile patch bay. Forget about the analog versus digital debate unless you can afford a professional 2-inch, 24-track recorder, because any analog format besides 2-inch tape is not an easy fit. Trust me, you won't find many semiprofessional ¼-inch, ½-inch, and 1-inch multitrack decks in a large studio.

The debate over which MDM deck is the best will probably continue well into the next millennium. Most audio post-production houses are going with the TASCAM DA-88 because of its speedy lock-up performance. Sound-effects editors and film and TV composers who want to be compatible with the mix studios are also using DA-88s.

FIG. 3: The I/O on the DA-88 rack includes the EDAK/ELCO connections to the remote patch bay, AES/EBU jacks, SMPTE in/out, and a ground plug.

Musicians often favor the Alesis ADAT and many home and project studios have adopted the ADAT to interface with the music community. Whichever MDM system you choose, however, it's best to use the professional standard +4 dB balanced inputs.

REALITY CHECK

A studio's technical health can ensure quality sound, but it can't guarantee a hit record, advertising jingle, or TV score. So it's important to keep equipment upgrades in perspective. You should determine what you want to accomplish with your studio. Most properly designed personal studios can already turn out quality productions, so serious upgrading should be considered based on your goals.

For instance, if your career is taking off to the point where you're shuttling between your bedroom studio and the Record Plant, you should seriously consider the "transferability" of your tracks. Keep in mind that the ability to bring pre-recorded tracks to large studio sessions is more than just a time-saver. Sometimes the passion and nuance of a performance you've tracked at home just can't be duplicated. If you can't transfer the performance to the big studio's master reel, you've lost it. And that's a tragedy that should never have to happen in today's personal-studio revolution. (For this very reason, I'm currently designing a mobile system with Michael Glabicki of the Mercury Records act Rusted Root to ensure that any great tracks he records while writing songs on tour can be transferred to the studio master.)

If you decide it *is* time to upgrade your studio, do yourself a big favor and do it right. Don't cut corners. It's no fun running into the same problems over and over. Talk to other studio owners and learn from their mistakes. Call local musicians, producers, and engineers to get their recommendations on gear. Make friends with a maintenance technician and heed his or her advice on keeping your studio happy. And above all, remember that at the end of the day, making music should still be fun.

(Special thanks to John Hurst, Bernard Frings, and Jan Kunesh.)

Tim Bomba *is a record producer, engineer, and studio-design consultant.*

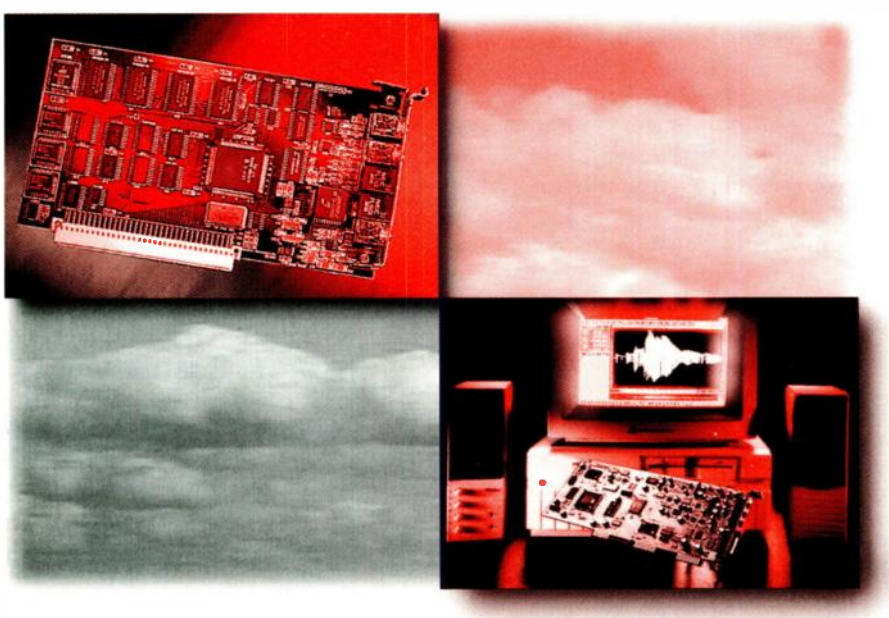
MULTIMEDIA MUSICIAN

The Sound Card Dilemma

How can multimedia composers ensure consistent playback quality?

By Scott R. Garrigus

Music for computer applications has come a long way in recent years. Instead of the monophonic bloops and bleeps we used to endure, we now have fully synthesized stereo soundtracks and sampled sound effects to please and entertain us. Of course, these audio advances have made composing for multimedia projects increasingly more complex. Today, multimedia composers have to not only contend with the usual struggle of writing music, they must also ensure that their scores are compatible with all of the various playback formats plaguing the industry. It's no picnic.



DMITRY PANICH

For example, composers must deal with several proprietary formats, which include Sega, Nintendo, and other game-specific platforms. Although game manufacturers require scores to be coded in their own special computer language, the companies typically do the coding themselves and just need the music delivered as a Standard MIDI File (SMF).

Then, there are the two music formats that dominate the market: synthesis and digital audio. Digital audio is used mostly for sound effects and voice-over performances, but its use as a music format is becoming very popular on the CD-ROM platform.

The main reason digital music can flourish on CD-ROM is because the format offers much more storage space than cartridge- or floppy disk-based programs. (Digitized music takes up a lot more space than SMFs.) Another reason for digital audio's growing popularity is the fact that the music-production process is no different from what recordists have done for years. You record and mix your tracks, and what you lay down on the master tape is exactly what the player hears when he or she is into the game.

This is not the case with SMF soundtracks. The sound of a MIDI file relies solely on the synthesizer it is played back on, and not all synthesizers sound alike.

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Tear Out (Bring to your SoundTech dealer)

So here's the rub for multimedia and computer-game composers: You never know exactly what your score will sound like. The synthesizers built into current PC sound cards are based on either FM or wavetable synthesis. FM-based sound cards are a scaled-down version of the same technology made popular by Yamaha's popular DX7 synth.

Wavetable synthesis is the newest synthesizer technology available for sound cards. The difference between wavetable and FM synthesis is like night and day. Instead of the tiny synth sounds produced by a two-operator FM device, the sample-based, wavetable modules give the listener far more reliable instrumental timbres.

So, we've got formats aplenty here and no way to ensure that your music will sound exactly the way you want it to from one system to the next. What's a composer to do?

GM TO THE RESCUE

The development of the General MIDI specification was a boon to the computer-gaming industry and has been unanimously accepted as the composing standard. Basically, the GM spec assigns a specific instrument to every MIDI program location. For example, if a MIDI file sends out Program Change 1, that program change will always call up a piano patch, no matter what brand of synthesizer it is played on. (Of course, the synth must adhere to the General MIDI Specification.)

Still, General MIDI is not without it's limitations. It has only 128 bank (or instrument) assignments and has no provisions for actual editing of patch parameters. Its largest restriction is that there are no set rules regarding the loudness of each instrument. So when a MIDI file is played back on different systems, some parts of the original score are likely to be lost or sound out of balance.

How can composers overcome these limitations and successfully compose music that *will* sound good on both FM and wavetable synths? I've developed a set of guidelines for ensuring consistent sound that may help other multimedia composers. I'll use one of my projects, an online magazine, as an example of how I work through the sound-card dilemma.

THE LIVEWIRE PROJECT

LiveWire is an online multimedia magazine published by the General Electric Network of Information Exchange (GEnie). It is put together by a dedicated team of writers, artists, and musicians who also manage GEnie's Multimedia Roundtable.

Each month, I work with *LiveWire*'s music director, Howard Wooten, to compose at least two 3-minute pieces of music. After the pieces are completed, they must be converted into no less than three different music formats (see sidebar, "CMF, MUS, and MOD, Oh My!") to accommodate the various platforms on which *LiveWire* is available. The initial pieces are composed using the General MIDI standard. However, we also follow a set of "house" guidelines to ensure our SMFs are as compatible as possible with all the diverse systems out there.

HELPFUL GUIDELINES

First, the best thing you can do is buy the two "industry standard" sound-card synths. These tools are essential for checking playback integrity. Basically, this is no different than referencing conventional multitrack mixes on a number of different speaker systems. It is critical that you can hear how your composition will sound out in the real world.

For FM synthesis, Creative Lab's Sound Blaster series is the most prevalent card found on the market. There

CMF, MUS, AND MOD, OH MY!

Four different formats are used when we create the music for GEnie's *LiveWire* multimedia magazine. I'm sure you all know about MIDI, but are you familiar with CMF, MUS, and MOD, too?

MUS and CMF files are specific to the IBM PC family of computers. The CMF (Creative Music Format) was specifically designed around Yamaha's OPL-series FM sound chips that are standard with Creative Lab's Sound Blaster PC audio cards. CMF is a 16-channel format that can be adapted to loosely conform to the GM standard. The main difference is that the file header contains information that programs the FM audio chip. As a result, CMF files can contain custom instruments and sound effects. Software programs are available that convert Standard MIDI Files to the CMF format, and the process is usually painless (but often quite time consuming).

The MUS file format is the voice of the IBM PC's monophonic tone generator—the one that produces those odd beeps, bonks, and binks. The data file is essentially an ASCII text file that is interpreted by a player program. Control is basic, as only tempo, octave, pitch, and note length can be specified. Because the MUS format is monophonic, music based on single-note melodies—such as those found in simple folk songs, pop tunes from the 1920s and '30s, and classical-music themes—works the best.

The Macintosh and Amiga versions of *LiveWire* use MOD (module) files for music. MOD files are similar to MIDI sequences because they contain tempo, pitch, and controller data. MOD files are pattern based and contain sampled audio, so it's easy to guess that their main drawback is file size. MOD files ranging from 200 KB to 800 KB are not uncommon.

However, the sampling capability of the MOD format is quite a treat. For example, if you love the sound of your 1959 Fender Stratocaster, you can sample it for use in your next MOD file. There are thousands of MOD files currently available to you online, and some of them contain dynamic vocal performances and exquisite samples of rare instruments.

For multimedia work, MOD files require a machine with at least four channels of audio. Because the Amiga and Macintosh are equipped with audio circuits that take the load off the main processor, they can display animation and graphics while the music plays in the background. On IBM PCs, however, the four channels must be created in software, and the resulting processing requirements make MOD files unsuitable for PC multimedia presentations.

—Howard Wooten

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COMPOSITIONAL TOOLS

No one really knows whether the multimedia industry will fulfill its promise of becoming *the* communications platform of the future. However, multimedia publishers are certainly offering musicians viable outlets for their creativity. Savvy developers will always be seeking fresh, original music for their computer games, historical and instructional CD-ROMs, and other products. If you want to jump into the act, the following features and columns provide some excellent insights into multimedia systems and project scoring.

are so many Sound Blasters around that they are practically a de facto standard. Other sound cards claim to be Sound Blaster-compatible, and you can certainly use them for composing and playback, but I believe it's best to have an actual Sound Blaster card on hand. In the wavetable synthesis world, Roland's Sound Canvas is the popular choice. I've also found that if an SMF sounds good on a Sound Canvas, it will sound good on most other wavetable systems.

This next point may seem obvious, but it is important enough to mention: When you actually start composing, make sure that your MIDI file is GM compatible. If you're unsure of the basic GM specs, check out the book *MIDI for the Professional* by Paul Lehrman and Tim Tully, or read Lehrman's feature, "Generating General MIDI" in the September 1992 **EM**.

Now you must negotiate the joys of system restrictions. For one, do not use more than eleven voices at any given time. This restriction is because you need to be compatible with the original Sound Blaster cards, which used Yamaha's 11-voice OPL2 FM chip. (If everyone would kindly upgrade their cards to a Sound Blaster Pro 16, which uses Yamaha's 22-voice OPL3 chip, the composer's life would be much easier.)

In addition, you shouldn't use the following MIDI messages: Controller 1 (Modulation Wheel), Controller 64 (Sustain Pedal), Pitch Bend, and System Exclusive. Why? Well, in the case of Modulation and Pitch Bend, there are no implementation standards for FM cards, so your wailing organ solo may end up sounding like alien death screams.

There are no technical restrictions for using Sustain Pedal messages, but they eat up voices quickly. Because there are not that many voices available for you to play with, I recommend that

you do not use that message. The SysEx restriction should be self-explanatory: SysEx only works with the type of device that the file originated from, so it's definitely not a generic message.

However, two important MIDI messages you *can* use are Controller 7 (Volume) and Controller 10 (Pan). Used effectively, these messages can keep your music dynamic and alive, and they can also help make up for the lack of other expressive tools.

HOUSEKEEPING

When the compositional process is over, the MIDI tracks should be "massaged" so that everything is neat and organized. A well-organized file also makes the format-conversion process much easier. I typically put the melody on track 1, channel 1, and the bass line on track 2, channel 2. Of course, the GM spec requires that percussion be assigned to channel 10. Percussion is often a special case because of its multiple parts. Wooten and I usually put each part on its own separate track. Some multimedia projects may not require this degree of separation, but *LiveWire* files must be converted to the CMF format, which can only simultaneously play one instrument per track/channel.

▼

Every sound card composer must negotiate the joys of system restrictions.

Another thing I like to do is to put default values at the beginning of each channel. This ensures that the synthesizer parameters are reset each time the MIDI file is played, and it provides a good starting point for parameters such as Volume and Pan. The values I use are Controller 7 = 100; Pitch Bend = 0; Controller 1 = 0; Controller 64 = 0; Controller 10 = 64; Controller 91 (Reverb) = 40; and Controller 93 (Chorus Depth) = 0.

Finally, every piece should be saved as a Type 1 Standard MIDI file. This SMF is the most supported type of MIDI file on the market, and it's also the easiest to work with. Don't forget to listen to your file on an FM card and Sound Canvas to make sure it sounds good on both units.

WISH LIST

By keeping these few guidelines in mind, a generic MIDI file can translate well to most playback systems. Hopefully, in the near future, we will see the development of a fully integrated standard—supported by all relevant developers and manufacturers—that covers all aspects of GM file composition. Won't it be great when the listener hears the sounds we intended. Until that day, composers are going to be stuck with all the extra work and worry required to produce a well-behaved MIDI file.

Scott R. Garrigus *is a multimedia musician and writer. He can be reached via e-mail at either garrigus@pan.com or s.garrigus@genie.geis.com.*

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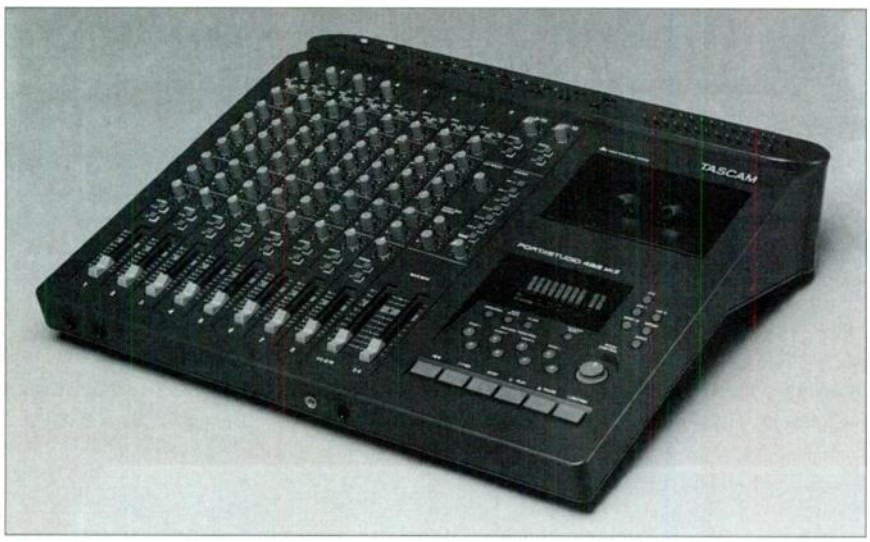
Reviews

TASCAM 488 mkII Portastudio

By Lawrence E. Ullman

Eight tape tracks make for a comfortable fit.

In this age of modular digital multitrack recorders and hard-disk recording systems, it's comforting to know that multitrack recorders based on good ol' analog cassette tapes are still alive and well. Comforting because cassette multitracks are inexpensive, easily portable, and easy to use. Comforting because blank cassettes are cheap and available just about anywhere on the planet. And yes, comforting because the better models can produce excellent sonic results.



With eight tracks, the TASCAM 488 mkII makes working within the confines of a cassette multitrack recorder a great deal more comfortable.

However, all but a few cassette multitrack recorders are limited to just four tape tracks, which can make things pretty *un*comfortable, especially if you want to record sequenced tracks along with acoustic instruments and vocals. With one track given over to synchronization, you're down to three tracks, and it drops to two if you insist on keeping the adjacent track free as a guard track. If you're careful and plan your moves in advance, you can work around the problem by "ping-ponging" tracks, but that's inconvenient and sonically undesirable.

The solution is obvious: up the ante to eight tracks. But packing so many tracks onto a tape only ⅛-inch wide poses technical challenges few companies have been willing to tackle. As a result, 8-track cassette multitrack recorders have been quite rare. Thus, when TASCAM announced they were replacing the original 488 8-track Portastudio (reviewed in the June 1991 **EM**) with a new and improved version, I was understandably curious. Called the 488 mkII, the new unit joins a select group that includes TASCAM's more expensive, MIDI-automated 688 Midistudio (reviewed in the December 1989 **EM**) and the Yamaha MT8X (reviewed in the July 1994 issue).

The Yamaha unit and the TASCAM 488 mkII are close competitors and share many basic characteristics. Among these are mixers with four subgroups; the ability to record on four channels at once; a tape speed of 3¾ ips (twice normal speed); dbx noise reduction; and sophisticated, microprocessor-controlled transports with ±12% varispeed controls, Auto Punch, and Rehearsal modes. As is often the case, the differences lie in the details.

MIXING IT UP

The 488 mkII is housed in an attractively sculpted, dark-gray, plastic case that measures approximately 21 × 17 × 5 inches. The overall design is well thought out and nicely ergonomic. I especially appreciated the angled top panel; it helps the controls fall readily to hand and makes the clearly printed labels that surround the various buttons and color-coded knobs even easier to read.

Unlike the Yamaha MT8X, which hides the input and output jacks on its back panel, most of the 488 mkII's I/O complement is mounted on a rearward-sloping section at the back of the top panel. Although Yamaha's arrangement may be more aesthetically pleasing in a permanent installation, cassette multitracks rarely stay put for long. I much prefer the TASCAM's arrangement because it allows you to patch things in and out quickly and easily without turning the unit around (no mean feat in the crowded confines of my bedroom studio).

As usual with cassette multitracks, the 488 mkII's 12-channel mixer exhibits a tradeoff between features and price. The first four mic/line channels have the most features: Each includes a ¼-inch, unbalanced input with mic preamp and trimpot, a 3-position input switch, a Tape Cue pot, 3-band EQ with sweepable midrange, two effects sends, a pan pot, two Group Assign buttons, and a fader. The next four line inputs (channels 5 to 8) lack the mic preamps and trim pots but are otherwise identical to channels 1 to 4.

In addition to unbalanced, ¼-inch mic inputs, channels 1 and 2 have balanced XLR inputs. (The XLR and ¼-inch unbalanced jacks cannot be used simultaneously.) A switch on the back panel can be used to turn +48V phantom power on or off for the two balanced inputs.

The same two channels are also equipped with ¼-inch, TRS, channel-insert jacks, which are mounted on the front panel. Although more insert points would be welcome, locating them on the two channels with balanced XLR jacks makes a lot of sense. These channels are likely to be used to record vocals, which is the most common and useful application for in-line compressors, EQs, and other signal processors.

TASCAM counts inputs 9 to 12 as four separate channels, but this is deceptive: Channels 9/10 and 11/12 are stereo inputs with just a level control and two Group Assign buttons. Although they can be used to connect any stereo line-level source, their most likely role is as stereo effects returns, as there are no effects-return jacks on the unit. Inputs 9 and 11 are labeled Mono; as long as their companion jacks (10 and 12, respectively) are left unconnected, a mono signal fed into input 9 or 11 is automatically "bridged" to the even-numbered channel.

ASSIGNMENT OF THE DAY

The mixer channels are assigned to tape tracks via four subgroups. Group 1 routes signals to tape tracks 1 and 5, Group 2 directs signals to tracks 2 and 6, and so on. Two small Group Assign buttons, labeled 1/L-2/R and 3-4, are used in conjunction with the pan pot to determine the routing of channels 1 to 8. For example, to assign a channel to group 1, you press the 1/L-2/R button and pan hard left. Panning hard right assigns the channel to group 2, and centering the pot sends the channel equally to both groups. Thus, you can send any channel to any, or all, group buses.

Two master faders control the levels of groups 1/L-2/R and 3-4, respectively. (The "L" and "R" indicate that this is the main stereo bus.) The master faders have a slightly longer travel than

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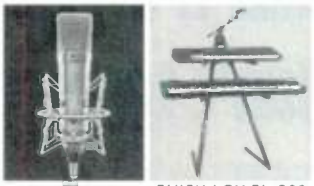
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the eight channel faders; all of them are a bit stiffer than I like.

Channels 1 to 8 have a 3-position Input Assign switch that selects between mic/line, tape, and Multi-Mix sources. As you might expect, the mic/line position is used for tracking and the tape position for mixing. The Multi-Mix position, however, requires a little more explanation.

MONITORING INS AND OUTS

During normal tracking, the output from the tape is monitored through the mono Tape Cue bus, which allows you to create a separate monitor mix that won't affect the recorded levels. A Tape Cue Monitor button selects this bus for monitoring. During mixdown, however, you monitor the groups to hear changes as you make them, including stereo placement.

The Multi-Mix position uses the Tape Cue bus to allow additional tracks—virtual tracks from a sequencer, for example—to be combined with the prerecorded tape tracks during mixdown. It works like this: The signal recorded on tape flows through the main channel, as usual. At the same time, an additional signal applied to the channel input flows through to the Tape Cue control, which now adjusts the level of the input signal, instead of adjusting the tape-playback signal as it normally would. The input signal is then routed to the same group master fader as the main channel and on to the 2-track recorder via the line output jacks.

There's just one drawback, though, and it's a doozy: The input signal is panned hard right or left, depending on whether it's connected to an odd-numbered (L) or even-numbered (R) channel! The pan control has no effect on the input signal; it continues to adjust the position of the main channel, as usual.

All is not lost, however. If you're working with a stereo device, you can connect its output to a *pair* of tracks (1/2, 3/4, etc.) and adjust the pan position using the device's stereo balance control. According to TASCAM, Multi-Mix was intended to be used in this way, presumably by MIDI musicians who want to add virtual tracks during mixdown but don't own a separate submixer. The manual makes no mention of this procedure or Multi-Mix's fixed panning assignments. In any case, this limits you to four stereo tracks, and it won't help if your device is mono.

If you do have a submixer—and I suspect many people who are doing virtual tracks will—there are easier and more effective ways to accomplish the same feat. The easiest way is to connect the submixer to the Sub Input, which connects directly to the stereo bus. Alternately, you can use one of the stereo inputs (9/10 or 11/12), provided that they are not already in use as effects returns. This last option provides a little more flexibility; you can take advantage of the input's level control and group-assign buttons and monitor/mute the input separately using the ST 9-10 or ST 11-12 Monitor buttons.

In addition to the Group, Tape Cue, and stereo-input monitor buttons already mentioned, a 2-track Input Monitor button allows the stereo output of the mastering deck to be heard through the headphones or monitor speakers. A

THEY SHOWED US THEIR MACKIE MIXER

This is a tiny fraction of the mailbags of photos we've received from Mackie mixer owner's lately. All we did was place an eeny weeny ad that read "Show Us Your Mackie" in the back of a few magazines. The response was incredible. 1000's of snap shots of Mackie owners from around the world. Call us toll-free for a complete information packet on our compact mixers and 8•Bus consoles. You'll learn why no other mixer manufacturer could ever get the kind of enthusiastic response that we did.


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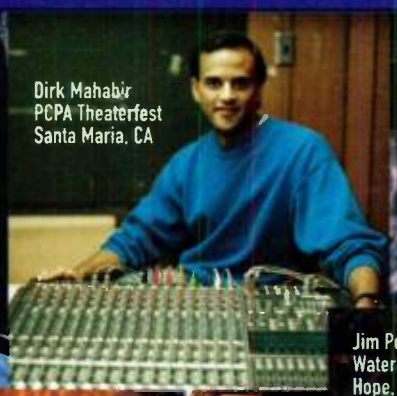
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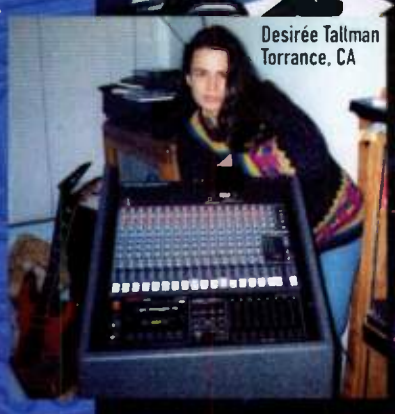
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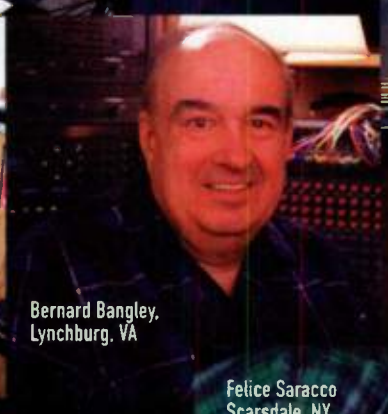
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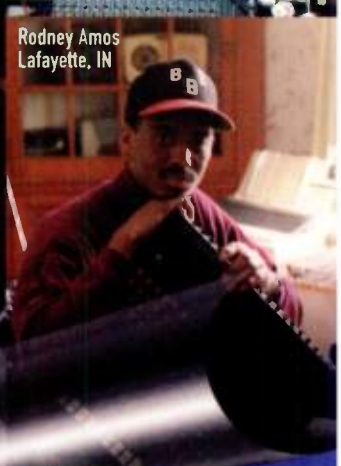
Rodney Amos
Lafayette, IN

MACKIE™

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single Monitor Level knob adjusts the headphone and line-level monitor output in tandem. Last, but not least, a Mono button allows you to monitor your stereo mix in mono; better safe than sorry.

All in all, the TASCAM's mixer is well implemented and straightforward to use. That's fortunate: Unlike the Yamaha MT8X, the 488 mkII lacks individual tape outputs, which means you're pretty much stuck with its mixer for better or for worse; keep this in mind when deciding between them.

TRANSPORTED WITH DELIGHT

The 488 mkII's transport is one the best I've experienced on a cassette deck. In addition to being lightning fast, it's very smooth and responsive, which makes locating specific points easier. As mentioned earlier, the tape speed is 3¾ ips, which yields a total recording time of slightly over 22 minutes on a C-90 cassette. TASCAM recommends high-bias, Type II tape; I used Maxell XL-II.

The transport is aided and abetted by a small, but readable, fluorescent display. There are no frills here, just eight 8-segment level meters for the individual tape tracks; two meters for the bus being monitored; a tape counter (reading minutes and seconds); and various small indicators for track record-enable, dbx NR, memory locations, and so forth.

The two autolocation memory points can be set on the fly or while the tape is stopped. Once set, pressing either of the LOC buttons fast-winds the tape to that point; hitting Play or Pause while the tape is locating causes the transport to enter that mode once the memory location is reached. A Repeat function is also available to create a loop between the two points, which can be a handy tool for practicing difficult licks. (You *do* practice, don't you?)

Like the Yamaha MT8X, the 488 mkII lets you switch transport modes on the fly, without first hitting Stop. In addition to being convenient, this capability lets you manually punch in by simply pressing Record while the tape is rolling, which is fine if you aren't playing an instrument. If you're flying solo and need both hands to play, however, manual punch-in/out can be accomplished with an optional footswitch connected to the front-panel Remote Punch In/Out jack.

Although manual punch-in/out is easy, you only get one shot, and if you blow it (who, me?), that's all she wrote. A much safer method is to use the Rehearsal and Auto Punch-In/Out functions to automate the process. Setting up a Rehearsal is easy. Simply cue the tape up a few seconds before the expected punch-in point, and hit the Rehearsal button.

Pressing Play starts the tape and establishes the preroll start point. After the tape has played for the desired preroll, you hit Record to establish the punch-in point and Play to set the punch-out location. The tape continues to play (postroll) for about three seconds after the punch out, and then it automatically rewinds to the preroll start point.

You can now rehearse your punch by hitting Play. The preroll gives you a few bars to get your musical bearings before the punch-in occurs. When the tape reaches the punch-in point, the Monitor automatically switches over, so that instead of hearing the existing material on the punch-in track (and a live source, if you decide to play), as

you do during the preroll, you now hear only the live source. When the tape reaches the punch-out point, the Monitor switches back so you can determine whether your new material smoothly flows into the existing track. Following the postroll, the tape rewinds to the start point, and you can try, try again.

Once you're sure the lick is under your fingers and the punch-in/out points are correct, you can record the punch using the Auto Punch-In/Out feature. It works exactly the same as Rehearsal, except this time the deck actually drops into Record for the duration of the punch.

The whole process is simple and makes musical sense. Although I'm sure *you* never play any wrong notes, I became quite adept at using Rehearsal and Auto Punch to fix clams. I even used these features to record silence at the end of a drum track that went on a few beats too long.

It takes practice and a quick finger on the Record button to set optimal punch in/out points, and you'll probably have to make a few passes to get it spot-on. The manual warns you to "select points that are 'in the clear,' i.e., in pauses between phrases or notes." That's sound advice. As on the Yamaha MT8X, there's a noticeable gap after the punch-out point. (This is inevitable given the relatively slow tape speed and distance between the erase and record heads.)

My only quibble with the transport was the relative positioning of the Counter Reset and RTZ (return-to-zero) buttons. Maybe it's just me, but in the heat of battle I often hit the former when I really meant to hit the latter. Obviously I'd like to see their locations reversed, which would place the frequently used RTZ button in the prime real estate under the display and the Reset button up high, out of harm's way.

SOUNDING BOARD

To get a handle on the 488 mkII's sound, I used it for a variety of projects. The first required synching the deck to my sequencer. I connected my Mark of the Unicorn MIDI Time Piece to the TASCAM's dedicated sync input and output jacks, which are located on the back panel. These RCA jacks bypass the mixer and connect directly to tape track 8. Setting the Sync switch next to the jacks to the On position defeats the dbx noise reduction on that track only and switches the track's level meter so it only displays while recording or in Record-Ready mode.

I striped several tapes with SMPTE time code at about -3 dB, and my sequencer chased every one flawlessly. I experienced no problems with crosstalk, so I consider it safe to dispense with a guard track and record audio on track 7.

Overall, I was quite impressed with the sound quality of the 488 mkII, especially considering that each tape track is a mere 0.25 millimeter wide. The dbx noise reduction kept hiss under control, though it introduced some pumping artifacts of its own, which were especially noticeable on raucous vocals. (I'm afraid all my vocals can be described thus.) Of course, this characteristic is not unique to the 488 mkII but is typical of dbx NR in general. I've always preferred Dolby S for this reason.

Of course, this analog machine doesn't have the pristine quality of a digital recorder. The dynamic range seems compressed, and there's some loss of high-end sparkle and low-end punch. But the results are nevertheless more than good enough for many applications. This is especially true if you avoid ping-ponging; although I was able to achieve excellent bounces on the 488 mkII, the resulting track inevitably suffers from increased noise and high-frequency loss. Once again, this is true of all analog tape decks, but within the confines of the cassette format, the loss looms large. However,

Product Summary

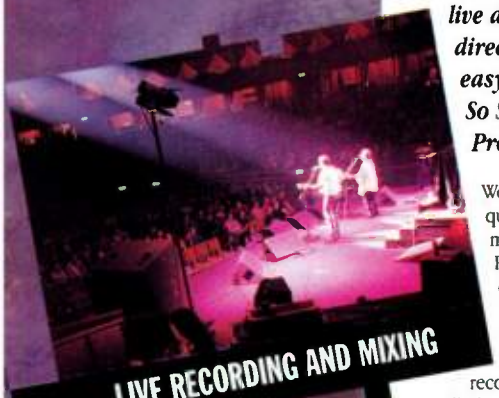
PRODUCT:
TASCAM 488 mkII
Portastudio
PRICE:
$1,799
MANUFACTURER:
TASCAM
7733 Telegraph Rd.
Montebello, CA 90640
tel. (213) 726-0303
fax (213) 727-7635
CIRCLE #437 ON READER SERVICE CARD

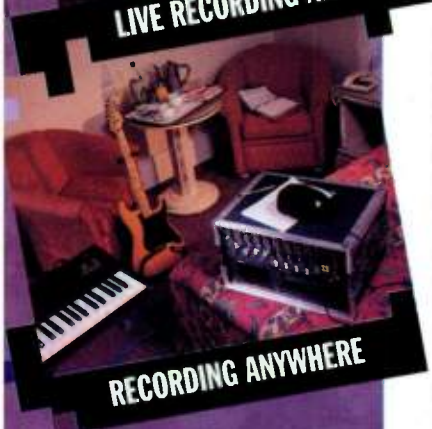
EM METERS	RATING PRODUCTS FROM 1 TO 5
FEATURES	● ● ● ◖
EASE OF USE	● ● ● ●
AUDIO QUALITY	● ● ● ◖
VALUE	● ● ● ◖

MIX TO DIGITAL MULTITRACK ANYWHERE

It's so easy to take a digital multitrack recorder out on the road. But teaming it up with a compact, affordable mixer that's up to the job of making studio quality live digital recordings direct to tape is not so easy.

So Spirit have created ProTracker.





We've packed a high quality 8 channel in-line mixer into a 3U case. ProTracker has an ultra clean signal path, and everything you need to make professional digital quality recordings – yet ProTracker will also excel when you want to overdub; it'll even mix, your front-of-house sound while you're recording. ProTracker's key to digital quality recording lies in its unique integration of superior components into the straightest possible signal path between its input and its balanced tape output, effectively giving you a pure direct-to-tape mix. To keep a tight rein on levels going to tape – and to prevent accidental digital overload distortion when a band member decides to crank up the volume – there's a fast limiter with switchable threshold: you just set and forget it. Take a good look at the impressive feature list...

MAIN FEATURES

- In-line monitoring signal format – 2 discrete inputs per channel
- 8 channels with 60mm linear faders (>90dB cut off)
- Expansion sockets for daisy-chaining ProTrackers
- New high quality, high gain mic pre-amp (-129dBu EIN) with switchable 48V phantom power on every input
- Balanced Line inputs with built-in DI capability for instruments
- Switchable High Pass Filter on every channel
- Built-in Limiter (300µSec attack time/ 3 Sec release), selectable on every channel
- Insert and Aux switchable between channel and monitor paths
- Aux globally switchable pre/post fader
- PFL on each channel
- Overload and Limiter indicators on each channel
- Monitor fader and Pan control
- Balanced Tape Send/Return, switchable between +4dBu and -10dBV
- Separate pre-fade Insert and Return sockets, eliminating Y-cables
- Stereo Effects Return with fader and PFL
- Inputs switchable to Mix to allow simultaneous front-of-house mixing and recording
- Mix routable to Tape Sends 7/8 for simultaneous 2-track recording, without affecting multitrack feeds from channels 1 to 6
- Headphone monitoring of 2-track return, Aux, 7/8 or Mix
- Solo indicator
- Monitor Outputs follow headphone output
- Mix Output and 2-Track Return accept +4dBu XLRs or -10dBV RCA phonos
- 100 – 240 VAC operation with internal universal switching power supply
- Road quality construction

Superb Live Recordings

ProTracker is the perfect live recording partner for affordable digital multitracks such as ADAT* and DA-88**; and, like digital multitracks, you can link several ProTrackers together for additional tracks. Each channel is equipped with our best-ever mic preamp and a balanced line input with direct instrument capability, so you don't have to use any noisy DI boxes. A High Pass Filter on each input cuts mic popping and stage rumble. With ProTracker, you can not only record to multitrack but you can also make and monitor a 2-track DAT master at the same time.

Overdub or Record Anytime, Anywhere

ProTracker is designed for the road. That's why we have incorporated a power supply that works all around the world, so you can make the best location recordings wherever you go. And with its compact rack design, ProTracker will fit into any outside broadcast or location recording system.

DOD Electronics Corporation
8760 South Sandy Parkway
Sandy, Utah 84070
Tel: 801-566 913
Fax: 801-566 208

* ADAT is a registered trademark of Alesis Corporatic
** DA-88 is a registered trademark of Tasca

pro TRACKER

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SPIRIT
By Soundcraft

H A Harman International Company

one of the main reasons for buying an 8-track machine in the first place is to avoid ping-ponging, so this shouldn't be much of a problem.

The mic preamps were relatively quiet and sounded good with my Audix OM-3xb dynamic mics. The EQ was also a pleasant surprise. The last cassette multitrack recorder I owned had an EQ so brittle and harsh-sounding I couldn't bear to use it. The 488 mkII's EQ, however, sounds quite good. I especially appreciated the sweepable midrange, which has a range of 250 Hz to 5 kHz, ±14 dB. The shelving high EQ is centered at 10 kHz (±12 dB), and the low shelf is at 100 Hz (±12 dB).

COMFORT ZONE

The 488 mkII's sonic limitations are typical of cassette multitrack recorders. There's only so much you can achieve on an analog cassette tape, even running at twice normal speed. Actually, when you consider that Philips developed the Compact Audio Cassette format 30 years ago as a voice dictation system for business, it's pretty amazing how much you *can* accomplish.

One thing's certain: You can create fine demo tapes on this unit, especially if you follow the advice in **EM**'s June 1994 cover story, "Masters from Ministudios." Add a DAT deck for mastering, a good mic or two, a reverb, a compressor/limiter for vocals, a submixer, and a few synths driven by a sequencer for virtual tracks, and you have a killer demo setup.

The 488 mkII and Yamaha MT8X are close competitors, with similar feature sets. The TASCAM costs $120 more, but for that amount you get low-Z, balanced, XLR mic inputs with optional phantom power. In my opinion, it's money well spent.

Speaking of money, if you can comfortably afford to spend close to $3,000 for a modular digital multitrack and mixer, go for it; the audio quality will unquestionably be better. But for those of us with slightly more modest needs and budgets, this Portastudio bears serious consideration. It sounds good, is easy to use, and has enough tracks to avoid cramping your style. For any application short of professional work, I'm quite comfortable recommending it.

Associate Editor **Lawrence E. Ullman** *would be much more comfortable if months were about six weeks long.*

KRK K•RoK Close-Field Monitors

By Rob Shrock

A solid speaker design with a unique look.

Which of the following criteria is the most important to you when you're choosing a set of close-field monitors: smooth and accurate frequency response at various monitoring levels; solid, stable stereo imaging; extended low-end response; low fatigue factor during long periods of listening; or all of the above for a screamin' good deal?

I used all of these criteria to evaluate the new, hip-looking K•RoK monitors from KRK. I say "hip-looking" because these speakers definitely do not resemble the rectangular, black-box style that is the norm for compact reference monitors. It's impossible to ignore the gray, faux-granite finish and slightly pyramid-shaped design of the cabinets. (The K•RoK print advertisement features a Mayan statue from the Yucatan peninsula, home to Mayan ruins.) These monitors would look right at home in an ancient priest's project studio.

Beyond appearance, there is a functional reason for the unique enclosure shape. KRK claims that the nonparallel surfaces optimize the frequency-response linearity and help deliver low-end punch. Each cabinet contains a 1-inch, silk-dome tweeter and a 7-inch, latex-coated, long-stroke woofer. The passive crossover features hand-wound inductors and polypropylene capacitors. Unlike some compact monitors, the K•RoKs offer banana-plug connectors.

FIRST IMPRESSIONS

First impressions are important; given a little time, the mind can create elaborate and slanted arguments for or against anything. So my first task was to conduct a preliminary listening test in which I used three CDs: Tears for Fears' *Sowing the Seeds of Love,* the soundtrack from *Bram Stoker's Dracula,* and Dionne Warwick's *Aquarela Do Brasil.* The K•RoKs sounded good on all three CDs, which contain masterfully produced pop songs, well-recorded orchestral movie-score material, and live rhythm sections with a variety of Brazilian percussion. The K•RoKs seemed louder than Audix HRM-1s or Yamaha NS-10s at a given amplifier setting.

The KRK K•RoK's unique shape looks like it belongs in a Mayan priest's studio, but the near-field reference monitor's sound is completely modern.

The KRKs deliver a smooth frequency response without the upper-midrange dead spot at the crossover point that I dislike in speakers such as Tannoy PBM-8s. They offer better-than-average stereo imaging but not quite as good imaging as the far more expensive Genelec 1030As. The low-end response is superior to the NS-10's but not quite as solid as 1030A's. After listening to all three CDs in their entirety at various levels, I found no annoying characteristics or strong tonal coloration. Best of all, the K•RoKs retail for $449.95 per pair.

CRITICAL APPLICATION

The most effective test of any tool is the quality of work it produces. With this in mind, I used the K•RoKs to mix some ADAT basic tracks from a progressive-rock project that include sampled drum sounds, a 5-string bass, aggressive vocals, and a wide spectrum of crunch, distorted, and clean electric guitars.

Compared to some earlier rough mixes of the same material done on a pair of Audix HRM-1s, the mix done with the K•RoKs had a more balanced frequency content. My earlier mixes on the Audix monitors had too much low-bass content and upper-midrange guitar tone when played back on a commercial studio's NS-10s and JBL 4033 far-field monitors. The new mixes done at my studio on the KRKs translated much better to the NS-10s than my Audix mixes had. The overall midrange interaction of guitars, vocals, and snare drum was more naturally balanced, and the songs almost sounded like I had mixed them at a commercial studio.

There were some minor translation problems on the JBL 4033s in the low-frequency range, particularly around 60 Hz (not enough) and 250 Hz (a bit too much), but the mix was still more evenly balanced than the previous

K•RoK Specifications

System Type	Woofer	Tweeter	Frequency Response	Crossover Frequency	Max. Output	Sensitivity (1W @ 1m)	Max. Power	Impedance	Dimensions (H x W x D)	Weight
2-way	7"	1"	57 Hz-19 kHz (±3 dB)	2.5 kHz	106 dB SPL	92 dB SPL	100W (continuous)	8Ω	14 x 12 x 9.75"	18 lbs.

Audix mixes. The extended low range of the K•RoKs takes some getting used to. It's nice to have the extra lows, but you should expect to spend some time making adjustments if you are used to a monitor that rolls off at 80 Hz. Although the K•RoKs don't exhibit perfect linearity from 300 Hz down to 60 Hz, good mixes can be made after a short period of adjustment with familiar material.

Mixing is a strange process. The bump at 250 Hz I heard at the studio wasn't a problem when I played cassette copies in various real-world environments (cars, home stereos, etc.). Keep this point in mind when mixing and monitoring: A lot of variables affect what you hear. For example, the amplifier brand and power rating exert great influence on a monitor's response, which was evident as I listened to the K•RoKs through a variety of amps from Crown, Hafler, Alesis, and Ramsa.

While most monitors don't sound great when underpowered, the K•RoKs did not wimp out when driven with only 50 watts and used as P.A. speakers for music and speech in a medium-sized hall. It's nice to know they can deliver good, clean, clear sound, even in an application for which they were not intended.

Product Summary

PRODUCT:
K•RoK Close-Field Monitors
PRICE:
$449.95/pair
MANUFACTURER:
KRK Monitoring Systems
16462 Gothard St., Unit D
Huntington Beach, CA 92647
tel. (714) 841-1600
fax (714) 375-6496
CIRCLE #438 ON READER SERVICE CARD

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

CONCLUSION

After using the K•RoKs for ten weeks, I've grown quite fond of them. They're great if you spend long hours sequencing and recording, because they do not cause rapid ear fatigue. MIDI tracks, distorted guitars, and vocals translate well, making the KRKs useful in a variety of applications. They are robust, yet they're light and small enough to carry around if you like to use only one set of monitors while working in different locations. I would happily track with them, and good mixes can be coaxed from them after you become familiar with the bass response. And I must admit, I will miss having these unique-looking monitors around my studio after I return the review units.

The K•RoKs deliver a lot of punch for the buck, and they would be at home in personal project studios, video-editing suites, and even commercial recording studios. If you're looking for a good set of close-field monitors, the K•RoKs are definitely worth checking out.

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

Vestax HDR-6

By Erik Hawkins

Portable ministudio meets hard-disk recorder.

At first, the Vestax name didn't ring a bell. I vaguely remembered the Vestax analog multitrack cassette decks, but that's it. But with the release of the HDR-6 6-track hard-disk recorder, I think the name Vestax will ring a lot of people's bells.

Vestax's 2U rack-mount HDR-6 is a stand-alone device that does not require a computer. It is similar in many ways to Akai's 4-track DR4d (reviewed in the February 1994 **EM**), but it offers more tracks and more features—most notably a built-in mixer with EQ—for a comparable price. (Features, of course, are not everything; it's important to consider overall quality and reliability.)

The unit can record at 32, 44.1, or 48 kHz. Global real-time pitch correction (±200 cents) can be accomplished at any sampling frequency. The 18-bit, 128× oversampling A/D and 20-bit linear D/A converters rival the DR4d's, and the internal processing is 24 bit.

The HDR-6 usually comes with a factory-installed 364 MB or 1 GB IDE hard disk, but it can be purchased without a hard disk. The unit also has space for a second, user-installed drive for up to two gigabytes of internal storage.

Backing up to DAT via S/PDIF takes half the total track time (three times the duration of a song, as the unit assumes you are using all six tracks). You can back up one song or all songs in memory. Unfortunately, there is no way to verify your backup without actually restoring the tracks.

A rear-panel punch in/out jack accepts any type of momentary footswitch, and MIDI In, Out, and Thru ports are provided. The unit has an internal power supply and an IEC standard, removable power cord. The power switch is conveniently located on the front panel.

AUDIO CONNECTIONS

The HDR-6 has two simultaneously available analog inputs, which are duplicated on the front and rear panels. The front panel offers two unbalanced, ¼-inch, line-level, analog instrument inputs with level knobs (which do not affect the rear-panel inputs). Rear-panel inputs 1 and 2 are on +4 dBm, balanced, ¼-inch, TRS jacks. The front and rear input pairs are summed internally, so you can record up to four mono sources onto any two tracks.

Also up front is a ¼-inch headphone jack with level knob. All other connections are on the rear, including the unit's coaxial and optical S/PDIF digital I/O ports. The S/PDIF inputs are independent of, and can be used simultaneously with, the analog I/O.

Although it is a 6-track machine, the HDR-6 can only record up to four tracks at once. Also, because it has just two independent analog inputs, the other two sources must be routed through external A/D converters and into the digital inputs. This setup is a little funky, but it works if you are desperate for more analog inputs. Fortunately, Vestax offers an optional plug-in card with two additional analog inputs (discussed shortly). Obviously, with these limitations, you're better off with an MDM deck (e.g., ADAT or DA-88) for remote multitrack recording.

All analog outputs are on ¼-inch jacks. In addition to the master L/R outputs, the unit has four aux sends, making a total of six outputs. In Direct Out mode, the aux sends become direct outputs for tracks 1 through 4, and the master L/R outputs become track outputs 5 and 6. There are also four stereo aux returns, which are great for bringing in extra synth inputs, in addition to returning effects.

There are two ports for optional add-on cards. The first card adds two analog inputs and is currently available ($190); a SMPTE interface card ($370) should be shipping by the time you read this. A SCSI interface card ($350) is planned for September.

USER INTERFACE

The front panel of the HDR-6 is well laid out, considering its many functions. Its gray face is accented by black portions containing clusters of LEDs that make the recording, editing, and mixing sections easy to see. It has familiar, tape-style transport buttons that feel rather flimsy and lean to one side if you don't hit them dead center. Values are set with an infinitely turning rotary dial, which doubles as a jog/shuttle wheel. Parameters are selected with tiny buttons (even smaller than the controls on a Sound Canvas), which can be a bit inconvenient, but which aren't a big problem.

The unit operates in four modes, although they are not specifically identified as such in the documentation. (The mode names used in this review are mine, not Vestax's.) Mixer parameters are set in what I'll call Mixer mode, while mutes are set in a dedicated Mute mode, audio is edited in Edit mode, and normal record and playback functions are available in Play mode. Global features such as sync and MIDI are accessed from a dedicated Function button.

Track metering is done with six 10-segment LEDs. Unfortunately, the red peak LED is not a peak-hold type. (I prefer peak-hold LEDs for digital equipment, because a peak on a digital track can mean disastrous, unsalvageable distortion.) The track LED meters can monitor the output of each track, or they can be switched so that meters 1 through 4 monitor the aux returns and meters 5 and 6 monitor the master L/R outputs. In the HDR-6's Mixer mode, the track LED meters also show the track levels, pan, EQ values, and aux-send levels. It's great for seeing the relative mix values of all the tracks.

The Record-enable buttons located just below the track LED meters have several functions. In Mixer mode, they select mixer channels for editing.

Vestax broke new ground with the HDR-6 hard-disk recorder. The rack-mount, 6-track deck incorporates a built-in mixer with EQ and four aux sends, yet it is available at a reasonable price.

When Mixer mode is not selected, they arm a track. The Record-enable buttons also function as track mutes in Mute mode. Amazingly, the Record-enable buttons' multiple functions are intuitive and straightforward: Just select a mode and choose a track by hitting a Record-enable button.

A large, 6-digit, alphanumeric LED display to the left of the track meters is the main information window. Despite the inherent limitations of this type of display, the engineers at Vestax did an admirable job of creating readable messages. Normally, the display shows SMPTE time code, which can be set to absolute or relative time. I was expecting it to display bars:beats:frames, too, considering the HDR-6's MIDI sync capabilities, but no such luck. In other modes, this display offers information on everything from pitch to locate points, song number, and sampling frequency. In Mixer mode, it displays the value for the selected parameter (e.g., level or pan) and track.

The big rotary dial normally functions as a data-entry encoder but can also act as a jog wheel. Turning the dial scrolls the track material forward or backward in much the same way a jog wheel works on a professional video deck. The difference is that the HDR-6's rotary dial is detented and does not spin freely like a normal jog wheel. This dial facilitates single-increment data entry, but as a jog wheel it takes getting used to. (I would have preferred dedicated increment/decrement buttons.)

When the rotary dial rests on a single detent, it loops a 10-frame segment of the material, which is one-third of a second. Unfortunately, this amount is not adjustable. At first, this looped segment of sound is a bit nerve rattling, but eventually I found it useful for finding cues, especially downbeats.

Many of the HDR-6's buttons have multiple functions, and often there are several pages within these functions, which can be very inconvenient and confusing. I would prefer to see more dedicated buttons. For instance, a dedicated Auto Monitor on/off button is a real necessity during most recording sessions. This function is normally used to hear the inputs for the record-enabled tracks whether the transport is stopped or recording, which is handy for punching in and out. When you press Play, you hear the track play back instead of monitoring the inputs. But when Auto Monitor is off, you always hear the inputs, even during playback.

Clearly, when you need this function, you don't want to search for it. Currently, Auto Monitor is buried twelve pages down under the Function button. So, if you need to switch Auto Monitor off to monitor the inputs during playback, it's a ponderous process. And if you accidentally fly by that page, you have to scroll all the way around to get to it again, because there's no way to scroll backward. (This is another example where dedicated increment/decrement buttons would make life much easier.)

If you dread deeply embedded menu pages, this isn't the ideal user interface for you. Simply adding a few more discrete buttons, or a 10-key pad with Shift and Quick Key functions, would make the user interface a lot better.

EDITING FEATURES

If you are used to working on a computer-based editing system, editing on the HDR-6 feels archaic. It offers basic cut-and-paste editing features only. But

HDR-6 Specifications

# Tracks	Size	Weight	S/N Ratio	Frequency Response	THD (10 dB @1 kHz)
6 total/ 4 simultaneous	3.75 x 19 x 13.5"	23 lbs.	92 dB	20 Hz to 22 kHz	0.009%

I can't overemphasize the importance of these features if you don't own a computer-based editing system; it sure beats editing on digital tape recorders. The HDR-6's Undo function (something you won't find on an MDM) reverses the last edit. However, I only had sporadic success with this function, so I wouldn't count on it too heavily.

There are a total of eight locate points in addition to A and B position points available for each song. You cannot name the eight locate points, so make sure you have pen and paper handy to keep track of them. The locate points are stacked on top of each other under the Locate key, so getting to Locate 1 is a breeze, but getting to Locate 8 is tedious.

The A and B position points are used as repeat-play points, punch in/out points in Auto Record, and a region's in/out points for editing. Using the AB points in Auto Record mode makes for perfect, razor-sharp punches. Return-to-zero is done by pressing Stop and Rewind at the same time, which is okay, but a dedicated RTZ button would have been better. Conversely, pressing Stop and Fast Forward at the same time locates to the end of the song.

The HDR-6 performs three basic assembly edit functions: Move, Copy, and Delete. These functions can be performed on a single track or all the tracks simultaneously. You set the edit points with the AB position points.

A deletion or paste occurs at the counter's current position, and the Move function allows sections to be relocated from one point to another. The edited section can be inserted (which moves all material to the right of the inserted section's end without erasing anything) or overwritten (which erases material that falls within the duration of the inserted section).

The Copy function allows sections to be copied from one point to another and repeated up to 24 times. (This is great for drum loops.) This function also allows edits to be inserted or overwritten. The HDR-6's Delete function erases everything between the A and B points. It can simply erase the selected area, or erase the selection and then shift the surrounding regions together

to fill the gap.

A separate Merge function allows several tracks to be digitally bounced down without sound degradation. The tracks are merged after the Mixer section, so if you are mixing down tracks 1 through 4 to tracks 5 and 6, all level, pan, and EQ settings are retained. If you mix five tracks to a single track, of course, the resulting mix is mono, so pan settings are lost.

SYNCHRONIZATION

The unit outputs MIDI Clock and MTC, and it synched like a jewel with Mark of the Unicorn's Performer sequencer. It supports 24, 25, and 30 fps SMPTE rates, in addition to 30 drop-frame. Unfortunately, it does not support 29.97 frames per second, which is a problem if you work with video.

According to Vestax, an infinite number of units can be synched together for an infinite number of tracks. (Basic physics instructs us that this claim is, to put it mildly, optimistic.) Synching two units is a simple matter of connecting the digital output of the master to the digital input of the slave and setting the latter's Sync Select status to "SLaVE." You can sum the mixed outputs of several HDR-6s by daisy chaining their digital outputs; the mix of all units is found at the digital outputs of the last unit in line. In this way, automated, digital mixdowns can be performed on a large number of tracks.

In practice, synching multiple decks proved more difficult. I synched two units together, and they worked fine on Song 1. However, when synching Song 2 or higher (i.e., Song 3, Song 4, etc.), I got some strange start times on the slave unit, causing the units to be as much as 44 seconds out of sync. Obviously, if you want to eventually expand into a multiple-unit setup, this is a potential problem.

DIGITAL MIXER

The digital mixer is excellent. I can't say enough good things about it. It creates a fully integrated minirecording studio in a box, making the HDR-6 a groundbreaking unit in its price range. You just have to add external effects, and with four effects sends and four stereo effects returns, you can add a lot of them.

The mixer includes Level, EQ, and Aux sections. The values for each are entered with the rotary dial and can be viewed in both the alphanumeric display and the track meters. Any or all tracks can be muted, and the mute status is saved in each program. The mixer settings can be saved in 128 program locations and recalled from the front panel or via MIDI Program Change messages.

The Level section offers volume controls for the individual tracks (pre- or post-EQ), the aux returns, and the master L/R outputs. The Level section also contains pan; spinning the rotary dial left pans the track left, and spinning it right pans the track right. In the Aux section, the four aux-send levels can be adjusted for each track.

The EQ section contains high and low shelving EQs fixed at 12 kHz and 80 Hz, respectively. The midrange EQ band is sweepable from 500 Hz to 2 kHz. All bands can be adjusted ±12 dB.

MIDI FEATURES

Aside from the MIDI Clock and MIDI Time Code features discussed earlier, the HDR-6's MIDI implementation is impressive. All mixer parameters can

Alesis ADAT Tascam DA-88 Fostex RD-8 Akai A-DAM Yamaha DMR8

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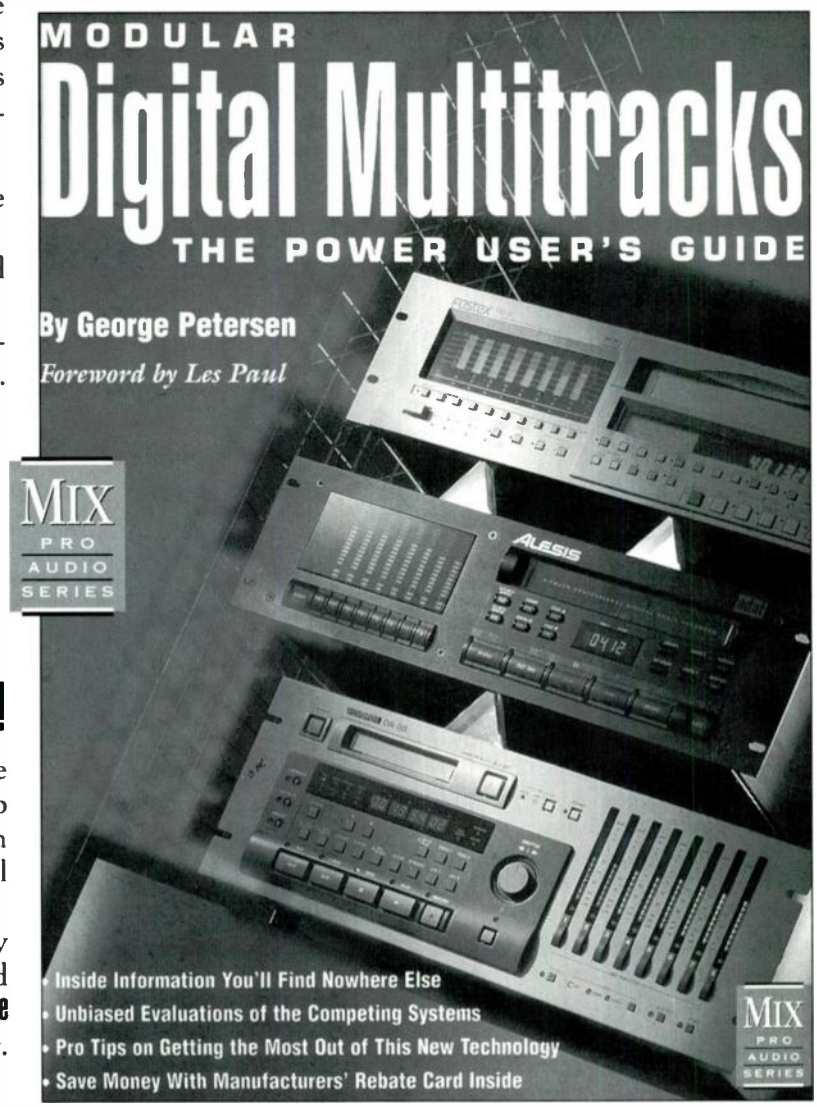

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be addressed via MIDI Control Change messages (but not Velocity or Pressure), allowing fully automated mixdowns. The parameters are premapped: For example, CC 0 to 5 control the pre-equalization level for tracks 1 to 6. User programs can be recalled via MIDI Program Change commands and can be saved to external storage via System Exclusive.

Sequencer developers Steinberg and EMAGIC currently support the HDR-6 with preprogrammed MIDI mixer windows, and Mark of the Unicorn promises support soon. Vestax claims that MIDI Machine Control support also will be added.

GRIPES

The HDR-6 has the potential to be a killer unit. However, it has some major operating-system bugs. For example, a Reduce message (for Edit Playlist mode) occasionally appears when it shouldn't, blocking a track from being record-enabled. Saving a track from the Auto Record function sometimes fails, losing the take completely.

These problems are usually momentary and are quickly cleared up by pressing Stop, without turning the unit off and on again. A lost track is gone forever, though, and losing a great take or having other unrelated tracks pop up during a take is totally unacceptable in any professional situation.

Aside from the issues already discussed, I have two gripes about the current OS. The first is that you can't go into Record while in play by holding down the Play button and pressing Record, nor can you come out of Record by pressing Play. (You can use a footswitch to punch in or out, but that isn't the same thing.) This defies the standard protocol for all professional multitrack machines.

My other gripe has to do with the HDR-6's defaults. When powering up, the unit defaults to a sample playback rate of 48 kHz, with Record Protect on. I prefer to work at the compact disc standard of 44.1 kHz so I don't need to do conversions later, and when I turn the unit on, I usually plan to record. Every time you turn the HDR-6 on, you have to dig these functions up and adjust them. I wish the HDR-6 remembered its current settings when it is powered down.

THE BOTTOM LINE

What I love about the HDR-6 is that it blows away my 4-track TASCAM 244 Portastudio as a portable writing studio. I have to travel a lot, so I can't always be in my studio to work on personal projects. Normally, I carry the 244 around so I can keep writing. But nothing I do on a 244 can be used on my final project because the sound quality isn't good enough and punch ins and outs are far too sloppy. With the HDR-6, anything I do on the road can be synched, digitally transferred to ADAT at the main studio, and used in the final mix.

The HDR-6 appears to lie comfortably between Akai's DR4d and their new DR8 (announced in the March 1995 "What's New" column) in price and functions. When the bugs are worked out, it will be, without a doubt, the best value for a stand-alone hard-disk recorder in the home market.

Vestax promises to fix their operating system problems in the near future. They need to deliver on these promises to gain serious acceptance and consumer confidence, but if they do, this unit could become a staple in many home studios and some project studios. (It will be a tough sell in the higher-end pro market, though.) Even with the OS as it stands now, I'm sold on this unit. I'll miss my faithful 4-track, but not for long.

Erik Hawkins *is a producer and musician in Los Angeles County and the San Francisco Bay Area. Recently he had a small role on an afternoon soap.*

Product Summary

PRODUCT:
HDR-6 hard-disk recorder
PRICE:
$2,300 (w/527 MB drive)
MANUFACTURER:
Vestax Musical Electronics Corporation
2870 Cordelia Rd.
Suite 100
Fairfield, CA 94585
tel. (707) 427-1920
fax (707) 427-2023
CIRCLE #439 ON READER SERVICE CARD

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

WinJammer Software WinJammer Pro 4.02

By Bob Lindstrom

This full-featured sequencer does Windows right.

Dan McKee's shareware sequencer, *WinJammer,* was one of the early players in the *Windows* MIDI wars. Its upscale, commercial version, *WinJammer Professional,* continues to be a credible competitor with other commercially available, *Windows*-based sequencers. It has multiple data windows, graphical piano-roll editing, music-notation display and editing, support for multiple MIDI Out ports, a 16-channel "mixer" panel, and more. In fact, *WinJammer Professional* is more notable for its similarity to other sequencers than for its differences.

Still, from the first time you boot *WinJammer Professional,* it's clear that in subtle and hard-to-define ways, the program differs from the competition. Somehow, in McKee's interface design, *WinJammer*'s use of *Windows* is more *Windows*-y. At boot-up, *WinJammer* displays a Hint of the Day, a feature that has become standard in Microsoft's latest applications packages. While working in any *WinJammer* editing environment, a right mouse-button click pops up a window that accesses common editing commands. Though it's familiar, it's not quite the same as other *Windows* sequencers.

WHAT YOU EXPECTED

In the features sweepstakes, *WinJammer Professional* trades off with sequencers such as Twelve Tone System's *Cakewalk Professional for Windows* 3.0. For example, *WinJammer Pro* has 64 tracks; *Cakewalk Pro* has 256. *Cakewalk Pro* boasts 480 ppqn resolution; *WinJammer Pro* ups the ante to 768 ppqn. *WinJammer Pro*'s onscreen mixer controls sixteen tracks; *Cakewalk Pro*'s uses as many as 128 tracks. *Cakewalk Pro* supports Standard MIDI Files as well as its proprietary WRK file formats; *WinJammer Pro* loads Standard MIDI Files and ROL files. Both programs have excellent support for SysEx data.

A simple control bar at the top of the *WinJammer Pro*'s main window includes VCR-like Record, Play, Rewind, and Fast Forward controls, as well as Save File and Load File icons (see **Fig. 1**). Numeric displays identify the current measure, beat, and clock tick; punch in/out points; the name of the currently selected track; the tempo in beats per minute; and a large question-mark icon that brings up *WinJammer Pro*'s excellent and extensive online help library.

Most users will employ *WinJammer Pro*'s Track List for MIDI recording and playback. Each of the 64 tracks includes an entry for the track number, name, instrument, MIDI channel, MIDI port, patch name or number, status (for example, muted or soloed), last measure, and number of MIDI events. The program automatically analyzes incoming MIDI messages and enters into the Track List the number of measures per track, number of MIDI events per track, and the MIDI channel. Other entries, such as instrument, are entered by the user.

WinJammer Professional has built-in support for the patch names and numbers of several popular MIDI instruments, including units from E-mu, Casio, Roland, and Kurzweil. If the program doesn't come equipped with support for your EarTweak 3000 synth, it's a relatively easy and only moderately

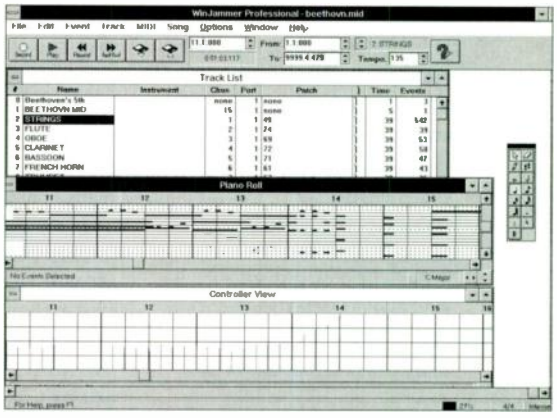


FIG. 1: *WinJammer Professional*'s Track List and Controller View windows function like those in other *Windows*-based sequencers. The Piano Roll window, however, indicates pitch with solid and dashed lines that imitate a grand staff, instead of the more customary graphical keyboard display.

time-consuming process to create your own patch-configuration file.

The Event List lets MIDI tinkerers tweak individual data values. Note-data entries show the start time, MIDI channel, pitch, Velocity, and length. Controller entries show start time, channel, value, and the number and name of the controller.

Unfortunately, the Event List is where *Windows* actually works against convenience. Unlike Dr. T's old *Keyboard Controlled Sequencer,* in which you cursored through the event-list values and edited them in place, *WinJammer Professional* makes you double-click on a data entry, which then calls up a mouse-driven entry screen. While you can click on data values and type in new numbers, the point-and-click interface is nowhere near as simple as the older method of moving a cursor from one event-list line and value to the next.

The Piano Roll window (see **Fig. 1**) incorporates one of *WinJammer Professional*'s most attractive features: an editing menu that pops up with a right mouse-button click. Unlike sequencers that always require you to return to a tool palette or key combination to trigger editing modes, *WinJammer Pro* allows you to choose Select, Draw, or Erase modes from the pop-up menu. The same menu provides access to a snap-to-grid, note-placement feature with snap resolutions ranging from 64th notes to whole notes; a choice of note lengths; horizontal or vertical configuration of the tool palette; and a submenu of display options. This simple pop-up menu feature provides a major increase in editing speed.

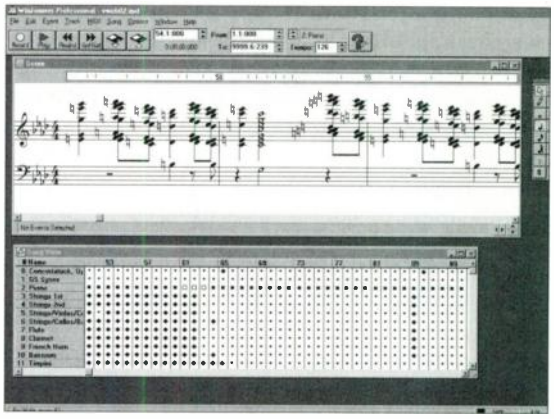


FIG. 2: Seen here in the context of the Windows 95 interface, the Score view offers a clean, swift display of standard notation, albeit only one track at a time. The Song view presents a graphical overview of the contents of several measures.

Unlike *Cakewalk Pro,* which uses a vertical keyboard graphic at the left side of the window to indicate pitch, *WinJammer*'s piano-roll display resembles the layout of a grand staff. Accidentals are indicated with a different color. Although this display makes sense (assuming you can read standard music notation), someone accustomed to glancing at a keyboard graphic may find that *WinJammer*'s combination of solid and dotted lines requires a little getting used to.

While in Draw mode, the current pitch is displayed in a read-out at the bottom of the screen, but this is no substitute for a quick glance at a keyboard graphic. Also, the icon that lets you

change note length only appears when the cursor is within a few pixels of the end of a note bar. That may work for low-resolution displays, but it required a little finesse to locate the edit point in the detailed, 1024 × 768-pixel resolution I usually use.

Some may consider it misleading to call *WinJammer Professional*'s notation display a Score window. It is more accurately called a Staff window because it displays only one track at a time on a grand staff; it does not show multiple tracks in full score (see **Fig. 2**). The Score window is, nevertheless, an acceptable environment for changing note pitches and locations. As in the piano-roll environment, a double-click on any note displays the same window you would see if you were editing in the Event List.

When the Score window is open, you can choose to print individual or multiple tracks in standard notation. The process is a trifle cumbersome; you have to choose the tracks in a File Print Tracks window and then wait while the program formats notes, measure lengths, and page breaks. The printed results are quite good for a program that doesn't claim to be a dedicated notation system.

The Keyboard window, a horizontal graphic of a piano keyboard, works nicely in tandem with the Step Record window, particularly if you're a music hobbyist who lacks a MIDI keyboard. A click on a key registers the note whenever *WinJammer Pro* is in a Record mode; in Step mode, you can use the Step Record window to set note length, duration, and start time. Setting Auto Advance mode causes the sequence to automatically advance to the next available note position.

The Controller window lets you select controllers and draw controller values in a graphical environment. Again, the pop-up edit menu lets you toggle between Select, Draw, and Erase modes, as well as set the Density values for entering controller messages. Density is identified as the number of controller messages per quarter note.

Two more windows round out the program. Song View is similar to other sequencers' Track or Measures views: It uses graphics to indicate whether each measure contains note data (see **Fig. 2**). The Mixer window gives you sixteen

Product Summary

PRODUCT:
WinJammer Professional 4.02 sequencer software

PRICE:
$199.95

SYSTEM REQUIREMENTS:
PC-compatible with 4 MB RAM; Windows 3.1 or later; Windows-compatible MIDI interface; 4 MB free hard disk space

MANUFACTURER
WinJammer Software Ltd.
69 Rancliffe Rd.
Oakville, Ontario
Canada, L6H 1B1
tel. (905) 842-3708
fax (905) 842-2732
CompuServe:
GO WINJAMMER

CIRCLE #440 ON READER SERVICE CARD

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

channels to set track volume, reverb, pan, and chorus (see Fig. 3). As with similar mixers in other *Windows* sequencers, you can record slider alterations in real time and add them to the existing sequence.

OTHER NIFTY STUFF

While *WinJammer Professional*'s pop-up editing menus have figured only occasionally in my description of the windows, they loom large when working with the program on a daily basis. In other programs, I often feel like the Tasmanian Devil as I whirlwind hands and arms from mouse to computer to keyboard to mouse to keyboard to computer to...well, you get the point. In *WinJammer Pro,* I was able to work with minimal, efficient movements, keeping one hand on the MIDI keyboard and the other on the mouse.

As an added plus, a Remote Control feature can be used to assign MIDI note events to specific program functions, which lets you initiate actions without moving more than a finger. Best of all, if you have an internal sound card, the program audibly calls out the name of the function you've just activated. When you hear the program intone "Record," for instance, there's no doubt about what's going on.

Another unique feature is Find Mistakes. When I chose this feature, I half expected a large hand to appear onscreen and point at me. Fortunately, *WinJammer Pro* is a polite, creative companion. In fact, a window appears that lets you search for particular kinds of MIDI events and juxtapositions. For example, "Accidentals" searches for all notes that are not in the current key, as set in the Key Signature events stored in track 0. "Notes with Velocity less than:" searches a track for all notes with Velocities below an entered value, which assumes most notes hit in error were played with lower Velocities. "Grace notes (smaller than):" looks for those tiny burbles that appear when you hit the wrong note, and then it quickly strikes the correct one. "Multi-struck Notes" removes two or more instances of the same note playing. All in all, Find Mistakes is no replacement for months and years of practice, but it can really sweep clean in some situations.

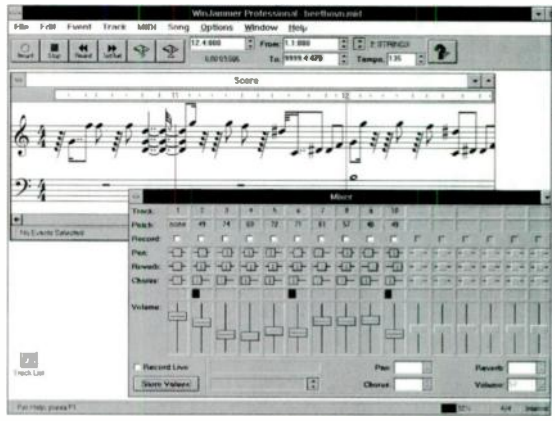


FIG. 3: The Mixer window gives you up to sixteen graphic faders that can be used to set track volume, reverb, pan, and chorus. Slider alterations can be recorded in real time and added to an existing sequence.

Along with the main sequencer, the package tucks in a module called

WinJammer Player. This handy program lets you create playlists of MIDI files and can be used to automate sequence playback for live performances. Also included is a trial version of *CanvasMan*, a *Windows*-based editor for Roland's GS-series synths.

UP AND DOWN THE SCALE

A full cavalcade of editing options fills out *WinJammer Professional*'s features. These include flexible quantizing, (including Swing Quantize), humanizing, highly customizable note and controller filters, and the ability to apply prefab or customized rhythmic patterns to existing songs. The Piano Roll and Score windows even allow you to select multiple, noncontiguous events for editing.

The standard punch in/out operations are available, and there are four ways to enter the start and stop times: You can select an area in the Song View, use the MIDI Punch In dialog, change the From/To times shown on the toolbar, or use the Song Set From/To Time commands that are accessible from the Score or Event List windows.

The program has solid synchronization support for four SMPTE formats via MTC and MIDI Clock with Song Position Pointer. You can enter MIDI Control Interface (MCI) commands into any sequence for controlling full-scale multimedia presentations.

As with other *Windows* MIDI programs, you can set several MIDI In/Out ports to include such things as internal sound cards, MIDI interfaces, and *Windows*' built-in MIDI Mapper. However, I was unable to access my MPU-401 port directly and through the MIDI Mapper simultaneously.

Overall, the program appears stable. Only once, while searching for mistakes in a MIDI file of a Weber composition that is included as an example, did I get the dreaded *Windows* General Protection Fault. I couldn't reproduce this error. Go figure. My conclusion? Don't worry, Jake, it's just Windowstown.

PUTTING ON FULL SAIL

For the price, *WinJammer Professional* is an excellent match for Twelve Tone Systems' *Cakewalk Professional for Windows*, my favorite *Windows*-based MIDI sequencer. In place of a few goodies, you get a slick *Windows* interface design, particularly those little pop-up editing windows that can really accelerate your editing sessions. Overall, *WinJammer Pro* doesn't have quite the polish and feature set of Twelve Tone's sequencer. Still, it's a close second.

As a final nod to *WinJammer Professional*'s *Windows* prowess, I must mention the program's snappy performance. Over the years of *WinJammer*'s gestation, Dan McKee has really learned to program Microsoft's mutant child. As a result, his windows seem to pop into place just a little faster and the notation leaps onto the screen just a bit more willingly than in some of his competitors' programs. In some cases, it's something you feel more than measure, yet it's there. It's just one more reason why *WinJammer Professional* feels more like a true *Windows* sequencer than other *Windows* sequencers.

A senior producer at Disney Interactive, **Bob Lindstrom** *recently purchased a new set of strings for his violin. After decades of abstinence, all he needs now is enough guts to play it.*

Gregory Paul . George Clinton Samples

By Al Eaton

We want tha funk, gotta have dat funk!

Imagine asking George Clinton, Bootsy Collins, Fred Wesley & the Horny Horns, The Brecker Bros. (part of the P-Funk studio combat unit), Sly Stone, Junie from the Ohio Players, Parlet, The Brides of Funkenstein, and the whole P-Funk family to come to your house for a funky visit and them actually showing up. That's what happened to me. Well, almost.

I checked out Gregory Paul Productions' *Sample Some of Disc, Sample Some of D.A.T.*, from the George Clinton Sample Series (distributed by the AEM Record Group), and boy, is it *funkin'*. The 3-volume CD set contains close to three hours of tight, nasty, gritty grooves, some performed live on stage and some created in the studio. As Clinton would say, these are "on-the-one"

excerpts from various stages of the band's career.

As good funk fans know, the P-Funk family included multiple bands comprising the same musicians and singers. The difference between the bands was simply which member was the main frontman giving the act its personality. (The bands were signed to different labels, which raised lots of eyebrows, not to mention legal questions.)

SIR NOSE D'VOIDOFFUNK

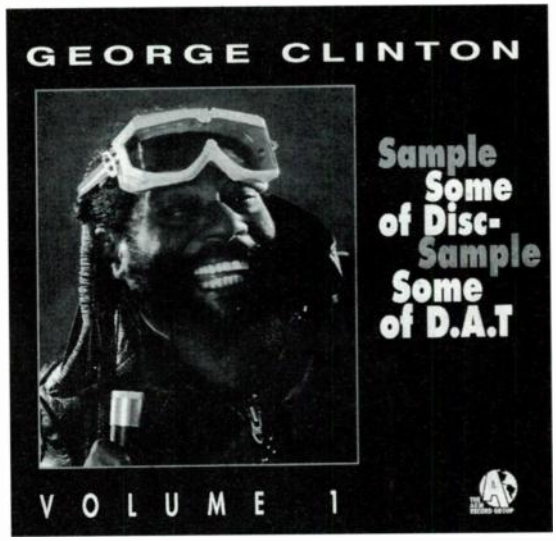
The CD tracks were taken from the original 24-track masters, which were originally recorded at 15 ips with dbx noise reduction at a level of 320 nanowebers/meter. That translates as *old-school funk,* for those of you not up on your funkentelechy. With all the high-tech equipment used today, is it any wonder we can't get the same funky sound as the old-school records? Listen up!

The master tapes were rediscovered in 1990 by engineer Chaz Martin while he was looking for another client's reel. The Clinton tapes had been stored in a vault where the temperature changed with the seasons for over ten years. The masters had suffered so much from oxide shedding that they had to be baked in a oven for eight hours at 130 degrees before they were playable. (Have you ever baked your funk?) Martin has such a true love for funk that he painstakingly researched, restored, and remixed the material and re-recorded it to DAT.

TEAR THE ROOF OFF

After my first listen, I knew the funk had survived well. All of the rough, analog qualities that made the sound of that era flowed across my studio speakers, reproduced with digital quality. I thought I was back in the 1970s, listening to B sides of my favorite Parliament records, checking out the cuts I had never flipped the records over to hear. (Yes, I said *flipped* and *record;* we're talking *vinyl* here.) I was playing the new tracks so loud that a neighbor stopped by to tell me to turn it up. (My neighbors are funky.)

Fortunately, the producers of this set did not try to give the tapes the pristine digital sound you usually hear today. They focused on keeping the mixes and tones true to the original sound of the period. The if-it-ain't-broke-don't-fix-it theory works well here.



Producer Chaz Martin did the sampling world a huge favor by salvaging and remastering these exceptional tracks from funkmaster George Clinton.

SUPERGROOVALISTIC

Volume 1 of the Clinton collection has 99 tracks containing 55 minutes and 20 seconds of music to be sampled and looped. But the documentation lists a total of 145 different tracks. This is where it starts to get tricky.

Track 1, "Blackbird Or Michael," is actually two separate 1-bar P-Funk loops. One loop could be used as a verse, for instance, and the other loop as the chorus. This format did not show up anywhere else in the CD set. (The track is named for DeWayne "Blackbyrd" McKnight and Michael Hampton, two of the band's many guitarists.)

The second track, "Trackin The P," is listed as twelve seconds long, but I counted a total of 45 seconds of track before the next index. The documentation goes downhill from there. Most of the tracks have more than one version, but these were not listed. Even with the total time for each index given, I could never find where I was until I got to the last index. (This could make things real hard when you are trying to report to the record company which samples you used in your new production.) If you start from the beginning and try to keep track of where you are on this CD, you will most likely become as lost as I was.

Also, in some cases, I found the rhythm track of a groove at one spot on the CD and the vocals or other parts of the same groove in another spot, with no reference to each other. Fortunately, this confusing method of disorganization has been corrected in later volumes, so that all related tracks are grouped together.

Volume 2 has 98 tracks with a total of 63 minutes and 14 seconds running time. The track indexing and organizational problems have been addressed in this volume. All the songs are grouped together with their variations, such as Full Track, Bass & Drums Only, Bass Only, Guitar Only, and Horns Only. Everything is exactly where you expect to find it.

Each track on Volume 2 has something a little different. A number of tracks are well over a minute in length, some are closer to two minutes, and some are longer. This means that if you were not adding say, new drum parts, you could just cut and paste the long sections to make the basic arrangement of your song.

Volume 3 contains 87 tracks of audio information, with a total running time of 57 minutes and 3 seconds. Again, there is no problem with indexing or with grouping. The documentation, although limited in information, is very easy to follow.

The first two CDs only contained musical examples. But Volume 3 also includes bonus tracks 62 through 69,

Product Summary

PRODUCT:
George Clinton Sample Series
Sample Some of Disc, Sample Some of D.A.T.
(Vols. 1, 2, and 3)
sampling CD
PRICE:
CD-audio $14.99/volume
DISTRIBUTOR:
AEM Record Group
35645 Stanley Dr.
Sterling Heights, MI
48312-2659
tel. (810) 977-1380
fax (810) 977-2053
CIRCLE #441 ON READER SERVICE CARD

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

which contain George Clinton's miscellaneous vocal and musical bites. These include phrases like "blow me," "stick it," "ease the funk in there," and "put a hump in yo' back," as well as rock-guitar hits, bass notes, individual horn licks, and synth lines.

PIN THE TAIL ON THE FUNKY

On the down side, no tempos are given, nor are key signatures and time signatures. The absence of a time signature is rarely a problem, because funk is mostly in 4/4. (Other meters are used, but most of the time they're part of polyrhythms that feature odd time signatures, such as 7/8. You'll know them when you hear them.) The lack of key signatures? Well, you'll just have to use your ears, and may the funk be with you.

Tempo information is particularly useful, however, and I'm disappointed it wasn't supplied. True, these are recordings of live musicians, which means the tempos can fluctuate. But many of these tracks have fairly steady tempos, probably because the band almost always used some sort of click track in the studio. (Sometimes called "the man in the box," the click track even got an album credit.) Even if an exact tempo could not be listed, the nearest starting tempo should have been supplied.

A last gripe regards matching part levels. When trying to mix samples, I often found that when the full band or part of the band plays, the levels are set for the overall mix, which is fine. But when only single instruments or sections of instruments play in the different part breakdowns, the volumes of the individual instruments change, so they're not consistent with the levels in the mix. This makes it hard to switch between the full band and, say, a bass breakdown, without having to adjust the volume on each sample to make them match, which can be a time-consuming process.

INVASION OF THE BOOTY SNATCHERS

These George Clinton samples are not license free, so you have to pay licensing fees beyond the cost of the CD. But after dealing with record companies on a day-to-day level to negotiate sample and publishing rights, I find the AEM Record Group's licensing among the fairest I've come across. For major projects, a lot of companies ask for up-front cash payments of many thousands of dollars, plus points. Here, the up-front payment is the cost of the CD, and the points are broken up by how much of the material is actually used.

I wish something like this could become an industry standard. The end user would have a better idea of the cost, without having to go through the trouble of recording the full production of the new song and submitting the new version to the copyright holder, who can charge whatever they wish or tell you not to use it at all.

HOW DO YEAW VIEW YOU?

Although the masters were abused over the years, it's good to hear the producers of this CD took such pride in the quality of the tapes as they were recorded. It's too bad they couldn't do the same with the documentation.

I think this product could have been even more successful three years ago.

● GEORGE CLINTON

Everyone from EPMD to Digital Underground to Ice Cube to Too Short (whom I used to produce) would have given their left platform shoe to find a new P-Funk sample they could use. Because there weren't a lot of new sources around, the records were sampled over and over until everyone burned out on them.

The saving grace is that this is the funk, the whole funk, and nothing but the funk. And at a cost of under fifteen dollars, the bottom line is the music. If you are looking for that Parlia-FUNKADELICment sound for your hip-hop and R&B tracks, you can't go wrong with the originators of this genre of music.

More of these rare gems are planned for release in the near future. In the meanwhile, rush out and get you some funk before it's too late and you forget how to dance. Go wiggle!

Al Eaton *is a producer, engineer, musician, and the owner of One Little Indian Music Productions in the San Francisco/Oakland area.*

Oberheim Echoplex Digital Pro

By Peter Freeman

Digital technology resurrects a classic looping delay.

Over the course of the last 25 years, countless musicians have enjoyed the original Echoplex tape-delay system. Able to create spontaneous layers of repeating sound in real time, as well as conventional delay effects, the Echoplex had a distinctive musical character that enabled its fans to overlook some of its rather serious drawbacks.

Chief among these was the very thing that gives the Echoplex its unique sound: its mechanical, tape-based design. The unit suffered from limited bandwidth and audible noise in its output, and it was also subject to mechanical problems: The tape mechanism was fragile and required frequent cleaning and adjustment for acceptable operation.

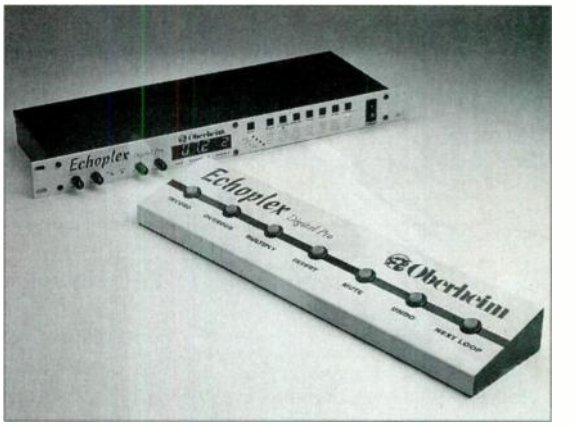
KEEPING THE MEMORY ALIVE

In an attempt to expand upon the good qualities of the venerable Echoplex, Oberheim has produced a modern counterpart. Packaged in a 1U rack-mount chassis, the Echoplex Digital Pro is a mono-in, mono-out, digital delay designed specifically for looping effects. The unit records 16-bit audio into RAM at a sampling frequency of 41.5 kHz.

The maximum recording time is determined by how much loop/delay RAM is installed. The standard Echoplex is equipped with 1 MB (four 256 KB SIMMs), which yields 12.5 seconds. Oberheim also offers a version (provided for review) with 4 MB (four 1 MB SIMMs) installed, which yields approximately 50 seconds. However, there's no need to stop there: The Echoplex's RAM can be expanded up to 16 MB using 30-pin Mac SIMMs.

The unit accepts 256 KB, 1 MB, and 4 MB SIMMs, and you can mix and match different sizes, provided you do so in pairs. I removed one pair of the 1 MB SIMMs and replaced them with two 4 MB SIMMs, which brought the recording time up to 100 seconds, more than enough for most of my applications. With the full complement of 16 MB on board (four 4 MB SIMMs), the Echoplex allows up to 198 seconds of mono recording time.

Seven front-panel function keys; a single parameter key (with four green parameter-indicator lights); and a large, red-and-green, 6-character LED display provide access to the Echoplex Digital Pro's various features. The keys' alternate functions are grouped into four Parameter Rows (Loops, MIDI, Keys, and Timing), located underneath the keys. These are accessed by repeatedly pressing the Parameters key, which causes a green LED to light next to the chosen Parameter Row. All functions are clearly labeled, so it's never difficult to know where you are. The front panel is completed by the input- and output-level controls, the Mix control, and the input-level and feedback indicator lights.



Oberheim's Echoplex Digital Pro digital looping delay is extremely useful and highly musical. It's a must-have for anyone into working with loops.

The back panel is rather spartan, with MIDI In, Out, and Thru connectors and footpedal, overdub, and footswitch connections. The Overdub jack is included in case you don't own Oberheim's optional EFC-7 footswitch ($129). The final ¼-inch jack on the rear panel, labeled Brother Sync, is

used for sample-accurate sync between two Echoplexes. This allows you to record stereo loops, which is good news for those musicians with primarily stereo sound sources (such as a keyboardist or a guitarist with multiple stereo effects).

The manual was written by **EM** alumnus Warren Sirota. It's fairly good, though it consists mostly of a long reference section that explains the functions of each parameter in detail. More effort might have been put into tutorial examples of the various functions. Fortunately, the Echoplex Digital Pro isn't difficult to learn or use.

LOOPING THE LOOP

Recording a loop is easy. Hitting the Record button puts the unit in Record mode, at which point it waits for the audio input to exceed a certain threshold before triggering recording. You can force recording to begin immediately by double-clicking the Record key. The length of each loop is determined by the length of the initial recording, which is established when a second press of Record takes the unit out of Record mode. However, this can be changed using the Multiply, Copy, and Insert keys.

Multiply allows the current loop to be extended as far as one wishes, within the limits of available RAM, so that additional material can be added to multiple iterations of the loop. For example, suppose you have a 2-bar guitar loop playing, and you wish to overdub a 4-bar melody. Hitting Multiply, you would begin playing the new melody at the start of the next cycle of the loop, play through the melody once (two repetitions of the original 2-bar loop), and then hit Multiply once more. You now have a 4-bar loop in RAM that contains two repetitions of the original two bars, with the 4-bar melody on top. It's handy and musically useful.

You can also insert new material into a loop at any point using the Insert key. There are actually three different Insert modes: Replace, Rehearse, and Reverse. Replace is equivalent to hitting Record: It erases whatever is happening in the current loop from the moment it's pressed until it's released.

Rehearse mode lets you try out new ideas over an existing loop. You can keep your experiments (in which case they're added to the loop) by pressing Insert immediately after playing the new material, or simply discard them and continue playing, leaving the original loop unaffected. Reverse, unsurprisingly, causes the current loop to play backward until it's pressed again.

You can add to loops using the Overdub key, which puts the unit in Record while the currently selected loop is playing. The performer can then add musical "layers" to the current loop as long as desired, pressing Overdub a second time to end the process. The loop continues playing throughout. This brings us to another particularly unique and useful feature of the Echoplex Digital Pro: Undo.

Undo, as its name suggests, lets you undo one or more passes of recording while in Record or Overdub mode. How many edit levels you can undo is governed entirely by the amount of free RAM. This is due to the way memory is allocated by the Echoplex: While in Overdub, newly recorded material is actually placed in a separate area of memory from the original loop that is being played, until all remaining unused memory is filled. After this point, the Echoplex starts overwriting the area of RAM used by the original loop, replacing the original data with a mixture of the original loop and the new material. This is the way one would expect things to work, and it presents few problems in a real-world context. The moral of the story is to buy as much RAM as you can afford if you think you'll use Undo frequently.

One of the most exciting aspects of the new Echoplex is its ability to hold multiple, independent loops in RAM simultaneously. Up to nine loops can be created and stored, although only one can play back at a time, and any of them can be selected by a front-panel button or optional remote footpedal. You can also copy loops from one memory location to another using the Copy command. Essentially, you can create nine different musical ideas and switch between them at will during a performance.

The switching can be executed from the front panel, the EFC-7 footswitch, or via MIDI in two different styles. By "styles," I refer to what Oberheim calls Quantized or Unquantized switching between loops. This determines when, after a front-panel keypress or incoming MIDI message, the Echoplex will actually switch from the loop currently

playing to the newly selected one. If Quantized switching is on, the switch will occur immediately after the end of the current loop's cycle. If switching is Unquantized, the change will occur instantly.

The benefits of having a choice of switching styles are obvious: When working on creating multiple loops of equal length (e.g., as the basis for a composition), one would generally want to switch to the next loop while maintaining the current tempo. Quantized switching ensures that this will always be the case, provided that all loops are exactly the same length. Unquantized switching is important for musical situations in which an instantaneous switch between loops is always desired.

In addition to its looping capabilities, the Echoplex can also act almost like a conventional digital delay line, minus any modulation facilities. Governed by the Loop/Delay parameter, this feature uses all the available memory in the Echoplex to let you create conventional delay-repeat effects. With enough RAM, this means very long delays are possible. In Delay mode, the Feedback control acts like a normal Regeneration knob on a conventional digital delay.

MIDI CONTROL

The Echoplex offers a substantial degree of MIDI control. Loops can be triggered with MIDI Note-On messages (with or without Velocity sensitivity), continuous controllers can modulate volume and feedback levels, and MIDI Clock can be used to synchronize the unit to an external device (e.g., a sequencer or drum machine). In addition, all front-panel keys can transmit Note-On or Control Change messages, which can be recorded into a sequencer to automate the unit.

Loops can be dumped to (and loaded from) a sampler or computer using MIDI Sample Dump Standard (SDS), which is useful for saving particularly good loops for later use. I do wish, however, that Oberheim had gone a step further and included a SCSI port for this purpose, as SDS is extremely slow, especially when transferring large amounts of data.

I experienced no problems with the Echoplex's MIDI implementation. Everything worked as expected, and I was able to control the unit from my sequencer with ease. This opened up many creative possibilities, particularly with regard to automating the loop recording/overdubbing process from within a sequence.

STEP ON IT

Oberheim, apparently anticipating the use of the Echoplex Digital Pro as a live-performance tool, offers the optional EFC-7 external foot controller to allow hands-free operation. The EFC-7 has seven red footswitches corresponding to the front-panel function keys. The Parameter key is not included because, according to Oberheim, accidentally hitting it in a performance situation could lead to unexpected results. However, Oberheim will provide the instructions to build a Parameter footswitch if you need one and are technically inclined.

I wish Oberheim had designed the switches on the EFC-7 a bit differently, though: Specifically, I don't feel that the red switches give enough tactile feedback when pressed, which makes using them a not-very-reassuring experience. Speaking from experience, in a live-performance context, this is not the greatest. Oberheim might do better to replace these switches with more responsive, "clicky" ones.

CONCLUSIONS

The Echoplex Digital Pro is an extremely useful musical tool, the likes of which really hasn't existed until now.

Product Summary

PRODUCT:
Echoplex Digital Pro
PRICE:
$799 w/1 MB RAM
$964 w/4 MB RAM
MANUFACTURER:
Oberheim, Inc.
732 Kevin Ct.
Oakland, CA 94621
tel. (510) 635-9633
fax (510) 635-6848
CIRCLE #442 ON READER SERVICE CARD

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

• ECHOPLEX

Looping delays are nothing new, but the Echoplex Digital Pro goes many steps further in its implementation. Obviously, in terms of sound quality this digital-age Echoplex is light years beyond its predecessor. Loops I created had all the clarity you would expect from a digital system, and the unit added no discernible background noise. I have no complaints here.

Using this box, I came up with loops that would have been extremely difficult or impossible to create on any other device. For that alone, it's worth the price of admission. It would be great to have a SCSI port on the unit and better switches on the EFC-7, but these are fairly minor issues.

Overall, this is a powerful, inherently musical device, the best of its kind at the moment. It's a must-have if you like working with loops. Kudos to Oberheim for making a dedicated unit that not only performs its task better than any competing product, but doesn't waste time and silicon trying to be a do-everything, multi-effects device.

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

Ensoniq ASR-10 v. 3.0

By Geary Yelton

A popular sampling workstation adds a new bag of tricks.

If you own an Ensoniq ASR-10, you already know what a cool sampler it is. Among its many features are stereo, 44.1 kHz sampling; flexible, high-quality onboard effects that can process external signals; the ability to sample itself, even musical phrases played through its effects; and a MIDI sequencer with impressive editing facilities.

Operating system 2.0 added two tracks of digital-audio recording to a SCSI device and support for optional S/PDIF inputs and outputs. With

digital I/O, the ability to back up a SCSI drive to a DAT recorder was added in version 2.5. I reviewed version 3.08, which offers the ability to load, edit, and play samples intended for Akai and Roland samplers if they're stored on a SCSI device. At press time, Ensoniq released OS version 3.53, which adds a few bug fixes and support for the new ASR-88 sampler.

To use these new features, the SP-3 SCSI Interface ($349 installed) and DI-10 Digital I/O Interface ($399 installed) options are required. You can buy a stock ASR-10 keyboard with SCSI already installed; the rack-mount version comes standard with SCSI.

With sampling, sequencing, effects processing, and now hard-disk recording all rolled into one, the ASR-10 is one of the most complete electronic-music workstations on the market. The original ASR-10 operating system was reviewed in depth in the April 1993 **EM**, so I'll focus entirely on the new features in versions 2.0 and 3.0.

HARD-DISK RECORDING

The ASR-10 is the first sampler to offer two tracks of what Ensoniq calls Audio Track recording, and I'm happy to report that it really works. There are two types of recording: RAMTracks, recorded directly to internal memory, and DiskTracks, recorded to an external SCSI device. Even when recording to hard disk, expanded RAM is required as an audio buffer for acceptable performance. (The ASR-10 comes standard with only 2 MB of RAM.) Recorded tracks are called "AudioSamples"; normal samples are called "WaveSamples." You can record at a sampling rate of 29.76 or 44.1 kHz, but only 44.1 kHz recordings can be played through the digital-audio output.

When a track is recorded, its playback is triggered by the ASR's internal sequencer. So why not just record really long WaveSamples instead of AudioSamples? Unlike a WaveSample, you can locate to any point in an AudioSample and begin playback. For example, you can play only the last minute of a 3-minute vocal track. A WaveSample must be played from its beginning; unfortunately, you can't vary the sample start point. Also unlike a WaveSample, you can punch in and out of an AudioSample.

Before making your first recording, you must select a sampling rate, choose

Ensoniq moved its ASR-10 sampling workstation a big step beyond its competitors by adding two tracks of hard-disk recording. The new operating system also lets the sampler import Roland and Akai samples.

either RAMTracks or DiskTracks, set a SCSI buffer size, set the SCSI access speed to match your destination drive, select the drive's SCSI address, and then (whew!) define the maximum amount of disk space you want to allocate for all Audio Track recording, and hence the maximum recording time. Fortunately, the ASR remembers this information when you reboot the sampler. On reboot, the display asks, "Reconfigure SCSI ATrks?"; if you press Yes, you have to wait a few moments while the tracks are prepared for recording and playback.

The next step is to specify your record source. You can record directly from the main inputs, through the effects processor, from the digital input, or from the main output of the ASR itself. The latter feature makes it possible for the sampler to record its own playback, which is handy for bouncing tracks.

Once configured, you press the Record button, wait for the metronome to count off, and go. MIDI sequencer tracks can be recorded before or after Audio Tracks for synchronous playback. Tempo changes are forbidden after recording audio, because audio playback is tied to the sequencer, so a subsequent tempo change would cause the Audio Track to drift in time. However, this issue won't arise if you set tempos first, then record MIDI tracks, and record the audio tracks last. Unfortunately, the ability to synchronize to an external sequencer via MIDI Clock is disabled. Depending on your musical style, this inability to lock audio tracks to external synchronization is the most serious limitation of the ASR as a hard-disk recorder.

Audio Tracks are recorded as sequencer tracks, but instead of MIDI data, they contain audio data. Audio Tracks are played by triggering the sequence that contains them. Each sequence can include up to two Audio Tracks and eight MIDI tracks. Each song (consisting of multiple sequences, plus mix and panning parameters) can also include two tracks of audio. Only two tracks can play simultaneously, however, and two voices of polyphony are used when recording and playing back audio. (Up to four voices are lost when auditioning your recording, but this is a temporary state that doesn't exist during regular playback.)

Once Audio Tracks are recorded, the ability to edit them is extremely limited. You can copy, erase, delete, and shift audio events just like other sequencer events, but not much more.

IMPORTING FORMATS

Even if you have no desire to record Audio Tracks on your ASR-10, you may be envious of other samplers' huge libraries of sounds on CD-ROM. Now there's much less reason for envy. The Import Non-ASR Sounds command lets you choose between Akai and Roland samples stored on an external SCSI device, such as a CD-ROM or hard disk. With a compatible device and a properly configured SCSI setup, importing sounds is almost as simple as loading Ensoniq samples.

Akai programs and Roland patches are loaded as if they were ASR-10 instruments, with stereo multisamples completely intact (RAM permitting). To conserve memory, you can define

the key range to be imported. Most parameters are translated, including sample names, envelopes, LFO rate and waveform, panning, and modulation routings.

The ASR-10 doesn't have resonant filters (except in the effects processor), so filter resonance parameters are ignored. You might have to go in and tweak the loop points after importing. As I expected, parameters unique to the samplers on which they were created aren't translated at all.

DIGITAL I/O TRICKS

The S/PDIF output makes it possible to digitally master sequences played entirely on the ASR-10 directly to a DAT recorder. The DAT recorder must be capable of recording at 44.1 kHz, which is impossible on consumer machines that, due to a copy-protection scheme, prevent 44.1 kHz recording from a digital source You can also use the digital output to dump a stereo mix to a digital multitrack recorder. The S/PDIF input lets you sample from CDs and other digital sources at either 44.1 or 48 kHz without degrading the signal by converting it to analog.

In addition, you can back up the contents of a SCSI disk to DAT. Using the DAT Backup/Restore command is a very slow process, although it's not as labor-intensive as backing up to floppies. The entire contents of the SCSI disk are transferred to tape; partial backups are impossible. Each 100 MB

Product Summary

PRODUCT:
ASR-10 Advanced Sampling Recorder v. 3.08
PRICE:
$2,695
v. 3.08 upgrade free
MANUFACTURER:
Ensoniq Corp.
155 Great Valley Pkwy.
Malvern, PA 19355
tel. (800) 553-5151
or (610) 647-3930
fax (610) 647-8908
CompuServe: go miensoniq

CIRCLE #443 ON READER SERVICE CARD

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

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RATE THE ARTICLES IN THIS ISSUE!

AUGUST 1995

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

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takes about 70 minutes to back up or restore, which means a two-hour tape holds less than 180 MB.

To back up larger disks, several tapes are required. Backing up a 1 GB drive to DAT takes about half a day. Even then, you still need to verify the backup. It's much easier and more reliable to back up one SCSI device to another, preferably a magneto-optical disk or removable hard disk.

SCSI PURGATORY

The ASR-10's SCSI implementation caused me more than a few headaches, especially when I tried to get it to share SCSI peripherals with my Macintosh. According to the manual, the sampler should be at one end of the SCSI chain and the computer at the other end, with unterminated devices in between. The Mac and ASR are both terminated internally, and their SCSI ID numbers cannot be changed.

I wanted to connect a Macintosh Centris 610 computer to the ASR-10 so I could transfer samples between them over the SCSI bus using Passport's *Alchemy* 3.0 software. The Mac had an internal CD-ROM drive, and I attached an external CD-ROM drive to the sampler. I also wanted the computer and sampler to share a SyQuest 270 MB removable-cartridge drive. Theoretically, I could format disks for either the Mac or the ASR-10, and each would look to the proper host.

Unfortunately, when I tried this setup, the Macintosh and the ASR-10 took turns freezing up. I called Ensoniq for assistance, and the representative patiently explained that different models of Macintosh have different SCSI implementations with regard to powering the SCSI bus. He suggested I acquire a SCSI switch box and an APS SCSI Sentry, which is an active-termination device that monitors the SCSI path and supplies power when it is needed.

After trying several variations on connecting and booting this setup, none of which worked, I discovered that the APS SyQuest drive also needed to be terminated internally. Oddly, things only worked smoothly when the SyQuest's SCSI address was lower than the ASR-10's address.

Though several people told me it couldn't be done, I also hoped to get the ASR-10 to access the Apple 300i CD-ROM drive in my Macintosh so I wouldn't have to use an external drive. I've gotten Akai and Roland samplers to work with the Mac's internal CD-ROM, so I hoped to use it with the Ensoniq sampler, too. By simply turning off the Apple CD extension, I was able to successfully break the rules and achieve the impossible.

SO IS THIS THING COOL?

Audio recording on the ASR-10 falls far short of a computer-based hard-disk recorder. In comparison, the controls and display are primitive and visual editing is nonexistent. It's also not up to the editing power and audio quality of a portable hard-disk recorder such as the Akai DR4d. Nonetheless, the addition of hard-disk recording features to the ASR-10 serve the purpose of keeping Ensoniq in the forefront of designing music workstations.

The ASR-10 was never meant as a replacement for a Digidesign system or dedicated hard-disk recorder, but rather, as an extension of the ASR's already substantial capabilities. It's kind of like a talking dog. Sure, his grammar is lousy, and he swears like a drunken sailor, but the dog talks, and all the other dogs do is bark! If you're using the ASR-10 as a workstation anyway, it's definitely handy to have an extra pair of tracks to record acoustic instruments and vocals.

The ability to import Akai and Roland samples via SCSI greatly increases the number of sounds available to Ensoniq users. I've never understood why more publishers of sampler CD-ROMs don't support Ensoniq samplers. At long last, their lack of support doesn't prevent accessing hundreds of new sounds. Maybe someday the ASR-10 will read *floppy* disks formatted for other samplers. With the ASR connected only to storage devices in a particular order, I had no SCSI problems.

The value of the software upgrade is a definite 5 out of 5. It's free, and it works. How can you beat that? Hats off to Ensoniq. Even if you don't need the sequencer or 2-track audio recording, the ASR-10 is a very good sampler. And just think; now you can record two full tracks of that foul-mouthed talking canine.

Geary Yelton *is rumored to be a fictional character from a poorly written play set in the urban South. In truth, he doesn't exist.*

Morning Star Solutions MacWavemaker

By Jim Pierson-Perry

A General MIDI synth card hits critical MASS.

Great sounds, built-in MIDI interface, and zero footprint—that's the promise of MacWavemaker, the new synth-on-a-card from Morning Star Solutions, Inc. Reminiscent of the now-discontinued Digidesign MacProteus card, MacWavemaker provides a sample-playback synthesizer with auxiliary MIDI In and Out ports on a NuBus card.

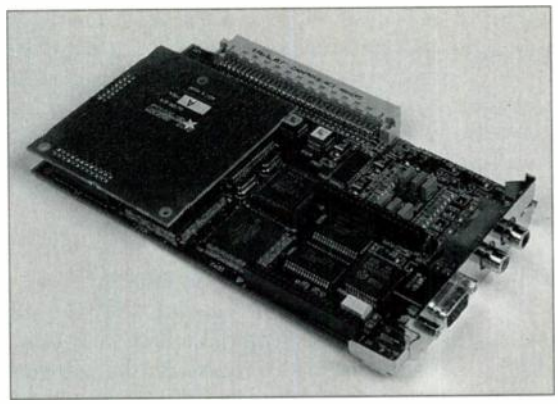
Morning Star's card is based on the Kurzweil MASS synth chip set, which has been licensed by a number of third-party PC sound-card manufacturers. (The popular Kurzweil PC-88 also uses a variant of the MASS chips in its VGM General MIDI expansion board.) The card provides an impressive 6 MB of sample ROM, 32-voice polyphony, sixteen multitimbral parts, and dual 18-bit DACs. The onboard Kurzweil effects processor offers 48 algorithms.

GETTING STARTED

MacWavemaker works with any Macintosh capable of using 7-inch NuBus cards. Installation is literally a snap: Just plug in the card and connect the RCA audio outs to an external amp/speaker. (MacWavemaker can't play through the Macintosh internal speaker.) The total time from unwrapping to playing music was about five minutes; you can't get better "plug-and-play" than this!

An extra adapter (included) plugs into a 15-pin connector on the back of the card. The adapter provides two female 5-pin DIN jacks, to which you attach MIDI In and Out cables. The jacks are labeled in black on a black casing, which is difficult to read. I wrapped a colored plastic-bag tie around one to tell them apart. The adapter also has two ¼-inch female audio jacks. These are for future expansion and are not currently used.

Morning Star tried to cover all the bases for the various music-related system extensions users might need. The



Kurzweil's MASS synth chip set is featured in Morning Star Solutions' MacWavemaker NuBus synth card for the Mac.

board comes with an installation disk containing Apple's MIDI Manager (including *PatchBay*), Opcode's OMS, and Mark of the Unicorn's FreeMIDI, along with drivers for each. Macintosh System 6.0.8 or higher is required; I used System 7.5.1 with the new Multimedia Tuner and had no problems. To use the board with QuickTime applications, you need to install Apple MIDI Manager and use QuickTime 2.0 or higher.

If the system hangs while MacWavemaker is installed, you need to do a full power-up to restart, because the Restart button does not adequately reset the NuBus slots, and you might rehang the system. This happened to me when my sequencer program froze; I pressed the Mac's Restart button and, after a moment's activity, went back to a black screen. Powering up from scratch worked fine.

Morning Star thoughtfully included an onboard diagnostic test for MIDI Manager users. MacWavemaker plays a brief stereo-piano sequence when the *PatchBay* connection is made, providing feedback that all is working properly. Similarly, OMS users can use the Test Studio command of the OMS *Setup* program to verify that the board is receiving and sending MIDI commands.

The external MIDI connections are handy for several applications. You can use *PatchBay* to connect the MacWavemaker external MIDI In port to the MASS synthesis engine and play the board from an external keyboard. The ports also serve as a standard Macintosh MIDI interface, even if you don't use the board as a sound source.

DOCUMENTATION

The manual is fine as far as it goes, but it neglects some important points. The accompanying disk contains a program called *Music Configuration* 2.0 (see **Fig. 1**), which you are directed to copy to your hard drive. Thereafter, the program is never mentioned. In fact, you must run this program after installation to have QuickTime direct its output to the synth. This allowed QuickTime to play back through MacWavemaker and accept input from its external MIDI In port. Without running this program, QuickTime only played through the internal Mac speaker using default system sounds.

The MacWavemaker manual also confuses the difference between operating the board in General MIDI mode and simply accessing the General MIDI sound bank. The board powers up in General MIDI mode, with access to only the standard GM sound bank. Bank Select, which is not part of the GM specification, is ignored. Sending the General MIDI Off System Exclusive command puts the board into a non-GM mode where the Bank Select command is active and you have free access to all sound banks. You return to General MIDI mode by sending a General MIDI On SysEx message or by repowering the board.

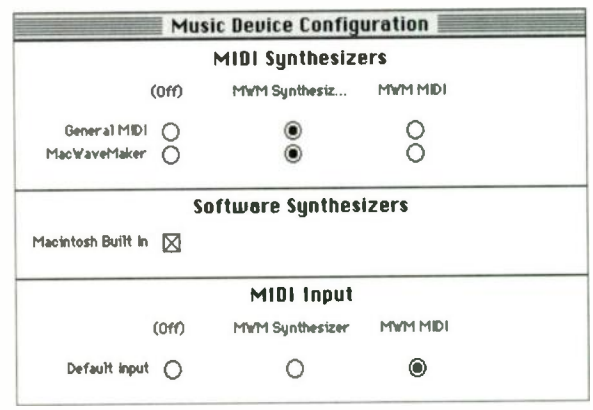


FIG. 1: Setup parameters for the Music Device Configuration program to enable QuickTime playback through MacWavemaker and MIDI input to QuickTime from an external keyboard.

MACWAVES

Over 2,000 waveforms are compressed into the 6 MB of sample ROM. There are 357 instrument sounds and over 400 drum sounds, organized into four sound banks and fourteen drum sets. The banks are General MIDI, MT-32 Emulation, SuperOrchestral (from the Kurzweil Mark 10/150 home piano), and GS-style drum sets.

MacWavemaker's sounds currently cannot be edited. The MASS chip set allows user editing, but Kurzweil has not yet released the SysEx documentation required to implement it. I hope Kurzweil completes the job quickly; the board has many good factory sounds, but I still want to make custom tweaks and add new patches.

The manual contains program lists for all banks and note assignments for the drum sets. Unfortunately, information on the number of voices used per sound was not available from Kurzweil, so it's hard to judge polyphony requirements for sequences. In general, MASS sounds follow their Roland Sound Canvas counterparts: Most sounds use one voice and some use two. Some more demanding sounds in the SuperOrchestal bank use up to three voices.

The presets mostly range from good to excellent, with good audio quality. The board compares favorably with the better GM tone modules I've heard. Its strengths in the GM sound bank are pianos, strings, guitars, synth leads and pads, and drums. Brasses and woodwinds are about average. Some particular standouts are the harpsichord, pipe organs, grand piano, and acoustic basses. The strings generally have a nice attack bite, and bell sounds are much more realistic than the original Sound Canvas model, which is considered the accepted "yardstick" for GM sound-module comparisons.

On the down side, the French horn is pathetic, Organ 3 sounds like a bad toy, and the harp lacks a convincing pluck. Ethnic sounds are a mixed lot: guitar-like sounds such as the sitar and koto are quite good, while the bagpipes and harmonica fall flat. But the synth pads and effects, which many competitors seem to give only cursory attention, are quite animated and usable. One reason for this disparity between good and lame stuff is that some sounds are samples of the instrument, while others are synthesized using a

chip that wasn't really designed for elaborate synthesis.

Moving to the SuperOrchestal bank, the overall quality improved even more. Choir voices, typically at the bottom of most GM units, are the best I've heard. Flutes and woodwinds are noticeably better than the GM versions. Ensemble and split sounds found here, but not in the GM palette, include orchestras, sax and brass sections, cello/violin splits, and bassoon/oboe splits. These make for wonderful layers and pads. Even the French horn is redeemed in the SuperOrchestal version. The only clunker is the steel drum, which sounds more like a synth.

Speaking of percussion, drum sounds are well represented. Beyond the basic General MIDI setup are versions based on Roland's GS kits: ambient, power, electronic, TR-808, brush, and orchestral. Other kits emulate those found in the Roland MT-32 and Kurzweil Mark 10, along with Kurzweil versions of clean, ambient, electronic, orchestral, and ethnic drum sets.

Overall, the drums pack a lot of punch and sound great. Cymbal hits die off naturally, without any of the ringing grunge I've heard in competing modules. The ethnic set is particularly fun to use and provides timbres frequently limited or lacking in other units. Six sets of drum sounds are programmed as Exclusives. Drum sounds in an Exclusive set cut each other off rather than playing simultaneously.

Product Summary

PRODUCT:
MacWavemaker

PRICE:
$579

SYSTEM REQUIREMENTS:
Macintosh II or better with 7- or 12-inch NuBus slot; System 6.0.8 or later

MANUFACTURER:
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AVM TECHNOLOGY SUMMIT

If you want to get those great MASS sounds, but your Mac isn't riding the NuBus, check out AVM Technology's Summit sound module ($389). The free-standing module works with PCs and all Mac models, including the PowerBook, SE, and other non-NuBus models. (I tested it with a Mac.)

The Summit is a "daughterbox"—a daughterboard inside a box—that uses the same MASS chip set as in Morning Star's MacWavemaker. All you see is a small black metal box with two female DB-15 connectors, one male DB-15, and a stereo miniplug that delivers line-level audio output. A pair of LEDs verify that power is on and MIDI data is being sent or received.

An adapter plugs into the male DB-15 jack to provide MIDI In, Out, and Thru cables. The two female DB-15s are functionally identical; when used with a PC and sound card, you connect one female DB-15 port to the sound card and the other to a joystick. With a Macintosh, the power cord plugs into one of the female DB-15 connectors, and the other is not used.

AVM Technology's Summit is a free-standing synth module that uses the Kurzweil MASS chip set. Originally designed for use with PC sound cards, the black metal box can also be used with a Macintosh.

The unit was originally devised as an add-on external wavetable synthesizer for PCs that would plug into an existing sound card. Because Macintosh users do not have a similar sound card, AVM currently bundles the Summit with an external power adapter and the MIDIMAN MiniMacman, a 1-In/1-Out, serial MIDI interface. By the time you read this, AVM expects to offer the Summit Macintosh serial MIDI interface instead; details were not available at press time. If you already have a Macintosh MIDI interface, the Summit simply plugs in as an expander synth.

The recently updated manual is an improvement over the original, but it reflects the original target audience of PC users. It goes into detail regarding physical connections to a PC sound card and installation under Windows or DOS, but there is no information on Macintosh connectivity. According to AVM, connection to a Macintosh will be documented in a supplement that will be bundled with the Summit Macintosh MIDI interface.

The manual also suffers in comparison to MacWavemaker's in that a few of the special System Exclusive commands are either ignored (for example, the command that specifies the effects-receive channel) or reversed (forced-center versus stereo pan mode). There is no mention of the Key Bend controller supported with some SuperOrchestral guitar patches or the fourth sound bank of GS drum sets.

Side by side, the Summit sounds every bit as good as MacWavemaker and offers the same sound and effects palette. However, it lacks operating-system hooks for use with QuickTime. Capabilities along that line will depend on future QuickTime upgrades from Apple.

Mainstream music software can access the Summit through a Mac serial-port interface, as with any standard synthesizer. At the current price of $389, it offers an inexpensive route to bring MIDI to your Macintosh, and it is the only option to get MASS sounds for non-NuBus Macs. AVM Technology, Inc.; tel. (800) 880-0041 or (801) 571-0967; fax (801) 571-3634; e-mail: 72662.160@compuserve.com.

THE QUICKTIME CONNECTION

While MacWavemaker already works well with QuickTime for General MIDI sounds, Apple is working to substantially enhance QuickTime's built-in MIDI capabilities. During this review, I previewed an alpha version of QuickTime 2.1 and saw a number of improvements and concepts that will let users address more of MacWavemaker's feature set.

The alpha release contained a new QT Music control panel that lets users select the MIDI destinations for QuickTime output. Currently, options are restricted to the QuickTime Musical Instruments sound set (samples taken from the Roland Sound Canvas and available in System 7.5), played through the internal speaker, MacWavemaker, and a MIDI interface on the modem and printer ports (if MIDI Manager or OMS is installed). Apple plans to expand this to recognize MIDI devices logged in under OMS and/or FreeMIDI, as well as other sound cards.

An extension called QT Synthesizers contained experimental drivers for a variety of MIDI synths, including the Yamaha TG100, Oberheim Matrix-1000, and MacWavemaker. A prototype Configuration window (see Fig. A) shows one of the possibilities. A neat surprise was the inclusion of a Karplus-Strong driver, an algorithm for software emulation of a plucked string. While the next QuickTime release will not include all these drivers, they may be made available to developers or on Apple's Technical Support World Wide Web sites.

The MacWavemaker driver is also being updated to provide access to sounds beyond the General MIDI bank and to let you select the effects algorithm. Fig. B shows an example of the Instrument Picker dialog box during conversion of a MIDI file to movie format using a prototype of the new driver. Two instrument selections can be made: the desired sound and a General MIDI alternate. The alternate would be automatically substituted if you tried to play the movie file on a Macintosh that did not have MacWavemaker installed.

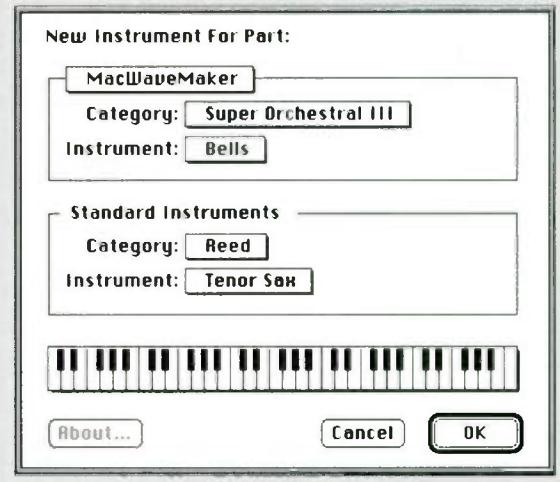

FIG. B: Sample Instrument Picker screen during conversion of a MIDI file to QuickTime movie, using a prototype MacWavemaker driver that supports access to all ROM sound banks. If played on a Mac without MacWavemaker, QuickTime substitutes a Tenor Sax from its default General MIDI sound set in place of the Bells.

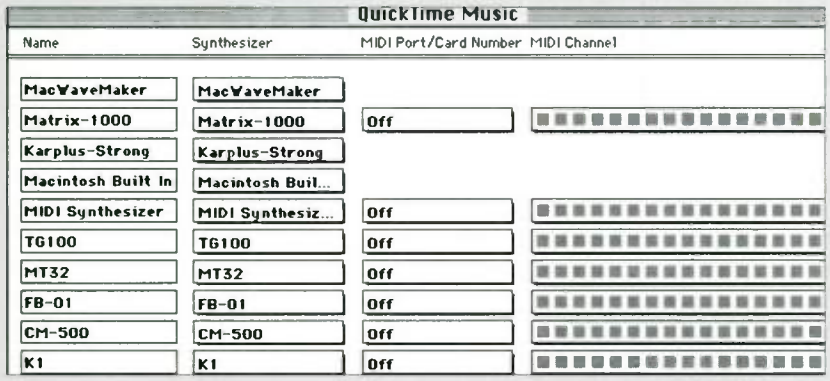

FIG. A: The prototype Configuration window for connecting MIDI devices with QuickTime applications. Note support for software sounds (Macintosh Built-In and Karplus-Strong), NuBus cards (MacWavemaker), and standard MIDI synths.

QuickTime 2.1 should be out by the time you read this. It will contain a MIDI Manager control panel that will allow you to redirect QuickTime output to another source. Multimedia titles or games, such as Bungie's Marathon, that currently play their soundtracks through QuickTime will be able to use the improved sounds and audio quality of MacWavemaker instead. Morning Star will continue to provide the MacWavemaker driver.

Examples of these are the open/closed hi-hats, long/short whistle, and mute/open triangle.

MacWavemaker makes disappointingly little use of Aftertouch for real-time changes to sound timbres. In fact, it is not even supported in the Super-Orchestal bank. The need to customize controller effects on sound parameters is a good reason for allowing user-editable sounds. On the other hand, the MASS chip set provides for polyphonic retriggering so that when you trigger a second sound on the same channel the first sound is not cut off. This feature is unusual in a sound card.

MACEFFECTS

MacWavemaker's onboard effects processor provides 48 algorithms, which represent combinations of reverb and EQ with chorus, delay, or Symphonic (combined chorus/delay). There are four reverb flavors: room, stage, hall, or none. The EQ can be set for bright, warm, or none; it has no other editable parameters.

Typical of most GM modules, effects are applied globally to the overall mix. Missing, however, are individual controls for the wet/dry mix and customization of the effects parameter settings, which are standard features on competing units.

Despite these limitations, the effects sound good—better than the effects in

ost GM modules—and e clean. The reverbs e reasonably well differentiated, and the section is sufficient for ost common applicaons. The single chorus id delay reflect good iddle-of-the-road setigs and are noticeable, it moderate, enhanceents to the sounds. In ontrast, I didn't hear uch difference beween the warm and right equalization opons, though they were bviously different from aving no EQ at all.

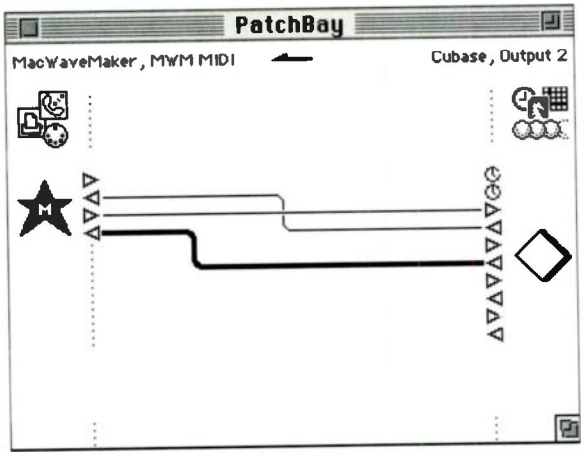

FIG. 2: *PatchBay* setup with Steinberg's *Cubase Score* for dual output. Sequence parts directed in *Cubase* to its MIDI Output 1 will play through MacWavemaker. Parts directed to MIDI Output 2 will pass through the sound card to its auxiliary MIDI Out port and be played on external MIDI synths.

IACMIDI

he MASS chip set prodes a superset of the General MIDI evel 1 sounds. Additional conollers supported include Bank Sect, Data Entry, Sostenuto, Soft Pedal, Data Inc/Dec, Registered Parameter Numbers, and All Sounds Off. Accordng to the manufacturer, it can respond o Note-Off Velocity, but I was unable o test that. Bank Select is not recogized when the board is in General MIDI mode, which is annoying.

The Pan control is disappointing, as he MacWavemaker does not support lynamic panning. Changing the Pan ontrol affects the stereo position of he next sound played, but you cannot ary the stereo position of a sound while the note is being held.

Control Change 83 selects the global effect algorithm and is recognized on any MIDI channel. This can be reprogrammed with a SysEx command to accept changes on a specified MIDI channel or to only select effects via SysEx, ignoring the controller message.

Four guitar patches in the Super-Orchestal bank offer Kurzweil's Key Bend response. This lets Pitch Bend affect only those notes physically held down, while notes held by the Sustain pedal remain untouched. It's great for emulating pedal steel-type bending of specific notes within an overall chord.

Although the board powers up in Multi mode, sending a SysEx command allows it to respond to the MIDI Mono Mode On command (CC 126). I would avoid this, however, as the synth responded erratically to note Velocity in Mono mode. In addition, sending a Program Change message caused it to pop back into Multi mode, which is irritating, but common in GM synth.

A few special functions are available through SysEx: Selected MIDI channels can be muted/enabled; the All Notes Off message can be ignored; and all sounds can be forced to a center pan position. These, along with SysEx control of the effects selection, seem less useful to musicians than to game or multimedia authors who may want to prevent undesired user actions.

REAL-WORLD TESTING

I started using MacWavemaker as a simple tone module, playing the different sounds and effects from an external keyboard. I wired my keyboard to the board's auxiliary MIDI In and, using *PatchBay*, routed the data to the card's synthesis engine. This worked fine, and the unit responded flawlessly.

MacWavemaker comes with two sample application programs. *QwertyTunes* is a simple MIDI Manager-based program that maps the Macintosh keyboard to note pitches. You can select any sound from the GM bank and "type" a tune. It's cute and provides an easy test to ensure everything is connected properly.

The other program, a demo of a *HyperCard*-based program by Patchman Music, controls the MacWavemaker. The commercial version costs $50 and lets you play MIDI files with real-time control over program selection (all sound banks are accessible), Volume, Pan, and effect. The demo version is

limited to playback only of three included sequences, but it provides an impressive taste of the card's sonic capabilities.

Next, I tried MIDI programs that required MIDI Manager, including Altech's *General Music Sequencer,* Steinberg's *Cubase Score,* PG Music's *Band-In-A-Box* v. 6.0, and a demo version of Opcode's *Vision.* I routed the programs to send their MIDI output to the card and played my external keyboard through the auxiliary MIDI In, which passed it on to the program. To my pleasant surprise, all worked like a champ for playback, recording, or just playing along on a Thru channel.

Programs that provide multiple MIDI Manager outs give you even more flexibility. I set up *PatchBay* with *Cubase Score* to send part of a sequence from the MIDI Output 1 line into the MacWavemaker synth. The rest was routed from the MIDI Output 2 line through the external MIDI Out port and to my external synths (see **Fig. 2**).

Emboldened by success, I added OMS and went back for more. The *OMS Setup* program automatically created a device list with the MacWavemaker synth and auxiliary MIDI Ins and Outs. I assigned them to synth and destination sources from the OMS MIDI Manager window. *Vision* and *Band-In-A-Box* were my OMS-compliant test programs, and both worked like a charm.

The final set of tests consisted of using MacWavemaker with QuickTime. This required MIDI Manager; otherwise, MacWavemaker was ignored. I played movie files with Apple's *Movie Player* program, and the sound came through the card's audio output without problems. The onscreen volume control on the playback-control bar even worked to change overall output volume.

Movie Player contains a Convert option that changes Standard MIDI Files into QuickTime movies. That's right, every QuickTime 2.0 owner gets a free sequencer! You can run the conversion automatically or change the instrument assignment for each track before converting. The dialog box for assigning instruments lists all available General MIDI programs in MacWavemaker, grouped by category. Sounds in the MT-32 or SuperOrchestal banks are not accessible (yet). You can use the onscreen keyboard or use an external keyboard to audition sounds.

A sporadic bug in QuickTime (not with MacWavemaker) can cause problems if you have multiple tracks on the same MIDI channel, e.g., exploded drum parts. If you collapse them into a single track per channel, all should work smoothly. Also, the conversion routine is off by one in the program numbering. You must manually set each instrument program to the next higher number to get the original arrangement used in the sequence. Supposedly, both bugs will be squashed in QuickTime 2.1. With this process, I successfully played a variety of MIDI files.

WRAP-UP

Overall, I am quite impressed with MacWavemaker. It sounds great, integrates smoothly with existing MIDI software and system extensions, provides a built-in Mac interface for external MIDI equipment, and offers an affordable entry point for home-computer musicians. It's not a complete solution; you'll still need to add an external keyboard. But even so, it competes favorably with any current stand-alone General MIDI synth. The key word, however, is *home.* MacWavemaker is not suitable for gigging, unless you plan to bring the computer along.

Morning Star is sweetening the pot by bundling Passport's *Master Tracks Pro* v. 6.0 and PG Music's *Band-In-A-Box* software. You can buy this package directly from them for $499, which is a good deal considering that the software alone is worth at least $150. They now include the appropriate configuration files so users can unpack, install, and begin making music.

Still not convinced? I don't recommend buying a product for its future prospects, but upgrades *are* planned. User editing of sounds is very much on the short list with Morning Star, provided Kurzweil comes across with the SysEx information. There are also plans involving the unused ¼-inch audio jacks. A possibility is to use one for line-level audio input to mix with the card and the other as an output headphone jack. That would make an ideal setup for school music labs. As for now, I'll give it the best recommendation I can offer: I'm buying one for myself.

(Special thanks to David Van Brink of Apple Computer.)

Jim Pierson-Perry *is a clinical chemist by day and a musician by night.*

(Windows 95 continued from p. 69)
written for both MS-DOS and Windows 3.1. In fact, not all of the Windows 95 code is 32-bit code; again, this was a conscious decision made to ensure compatibility with older software and hardware. What may be most important, however, is that Windows 95 provides a better working environment than its predecessor.

One fact of life that sticks in the collective craw at Microsoft is that the bulk of multimedia production takes place on the Macintosh, where cutting-edge professional tools first evolved, yet is delivered through Windows 3.1. Having won the hearts and minds of a majority of the end-users in the personal computer market, Microsoft has focused an unprecedented amount of attention on building formidable multimedia development tools into Windows 95. Fortunately for musicians, music production is one of the areas in which Microsoft has chosen to focus most intently.

FAST FORWARD

There seems little doubt that most of the installed base of Windows 3.1 users will eventually migrate to Windows 95. For conventional users, the new OS offers some compelling new tools and features. Musicians, however, should hold off until the software-development community sorts out the MIDI timing issues described previously. You needn't worry that Microsoft is going to stop selling Windows 95 upgrade kits any time soon, leaving you out in the cold. Besides, no matter how well Microsoft tests Windows 95, there is undoubtedly going to be some kind of maintenance release (call it "Windows 95.1" or "Windows 95A") that squashes minor bugs that weren't detected or fixed when the first version shipped.

The bottom line is that Windows 95 looks like a huge improvement over Windows 3.1, and music-software developers will soon learn how to harness its features in order to deliver more powerful tools for musicians. When the music industry is able to deliver compelling tools that function only in the Windows 95 environment, that's when you should upgrade. Until then, stay the course.

Charles Brannon *is an avid technology enthusiast and author of* The Windows 95 Book *(Ventana Press).*

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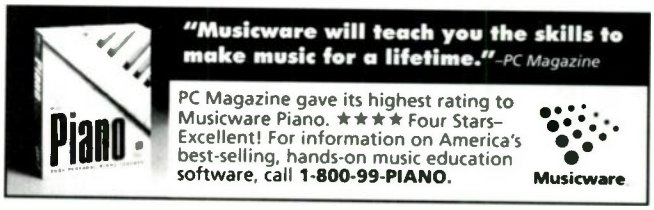

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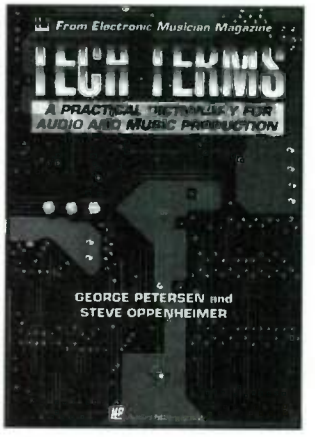

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By Scott Wilkinson

LPs have gone the way of the dinosaurs, becoming almost completely extinct in only ten years. This prehistoric format has been supplanted by CDs, which offer crystal-clear audio quality and no degradation after repeated playings. These advantages are wonderful, but the potential of CD doesn't stop there.

Of course, CD-ROMs represent one way to exploit the potential of the medium, but you can't play most CD-ROM discs in your audio CD player. As a result, some record companies are investigating a hybrid concept called *enhanced CD*. Enhanced CDs include a full audio program that is available from any CD player, as well as additional material—photos, video clips, lyrics, interviews, etc.—that can be accessed only with a CD-ROM drive.

Initial releases place the extra material in the first audio track of the CD (track 1, index 1) followed by the audio program (which starts with track 2, index 1); this is called a *mixed-mode* disc. However, listeners must consciously skip over the first track when the disc is used in an audio CD player to avoid a sustained screech as it tries to play the CD-ROM data. The second generation of enhanced CDs includes the extra material in areas of the disc that an audio CD player ignores.

Currently, there are two enhanced CD formats under serious consideration. Companies such as Sony, Philips, Microsoft, and Apple are supporting a format called *CD Plus* or *stamped multisession*, which was originally developed by Kodak for PhotoCDs. In this format, the extra material occupies the outer edge of the disc, while the audio program starts at the innermost track and proceeds outward (as it does on any audio CD or traditional CD-ROM). The two types of data, called *sessions*, are separated by a gap on the disc.

Despite the heavyweight support behind this format, it suffers from several drawbacks. For one thing, CD Plus discs require a multisession-capable CD-ROM drive, which includes about 65% of the currently installed base. Special software drivers are also needed to tell the computer where to look for the extra data. In addition, accessing the CD-ROM data is two to four times slower than normal because of the increased distance to the outer edge of the disc and the increased track length in that area. Finally, the reliability of data in the outer tracks is much lower than elsewhere on the disc because of increased mechanical vibration, especially in high-speed drives. This makes it difficult to accurately read the data, causing regular dropouts.

This screen is part of the i-trax disc *Civilization* by Doug de Forest (AIX). The buttons along the bottom of the screen let you navigate through the CD-ROM data.

The other proposed format is called *pregap*. In this scheme, the CD-ROM data is placed in the CD's pregap (track 1, index 0), an area that precedes the audio data (which starts at track 1, index 1). In addition to solving the speed and reliability problems, pregap enhanced CDs are compatible with over 90% of existing CD-ROM drives. (NEC drives are currently incompatible due to their firmware, but the company is working on this problem.)

Mark Waldrep is a pioneer of enhanced CD and founder of Pacific Coast Sound Works (a mastering service) and AIX Entertainment (a record label specializing in enhanced CDs). He uses the pregap format, which he calls *i-trax*, to indicate the presence of interactive information for the eyes as well as the ears. According to Waldrep, "There are no widespread tools available for record labels to manufacture and verify CD Plus discs. On the other hand, you can easily manufacture enhanced CDs today using the pregap format, which also provides better performance." As with all format wars, time will tell whether the corporate behemoth behind CD Plus will trample the technically superior pregap format, but it'll be interesting to watch the battle unfold.

For more information about i-trax enhanced CDs, contact AIX Entertainment; tel. (800) 668-4AIX or (213) 655-4116; fax (213) 655-4147; e-mail aixent@earthlink.net.

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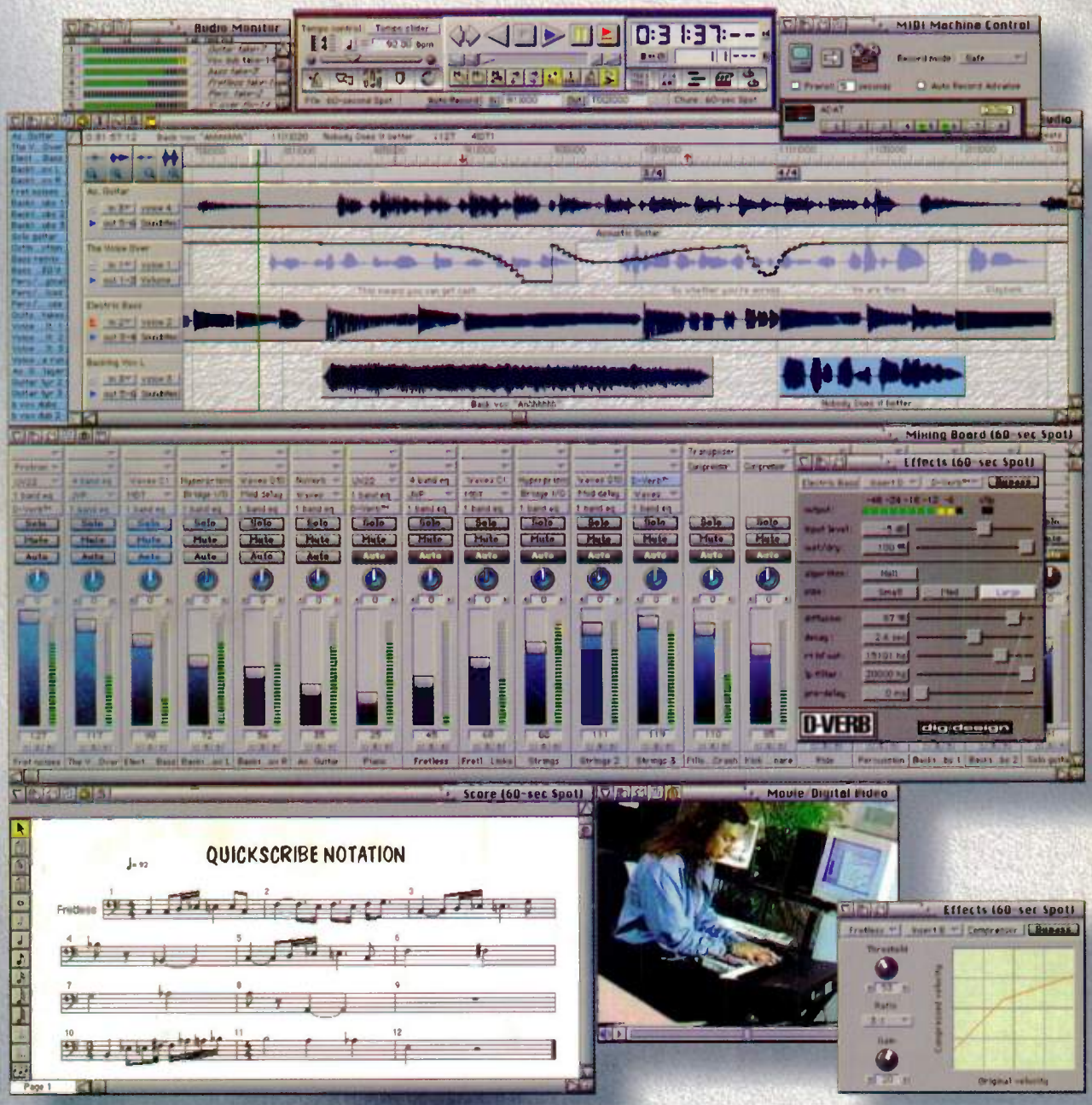

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