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Electronic Musician®

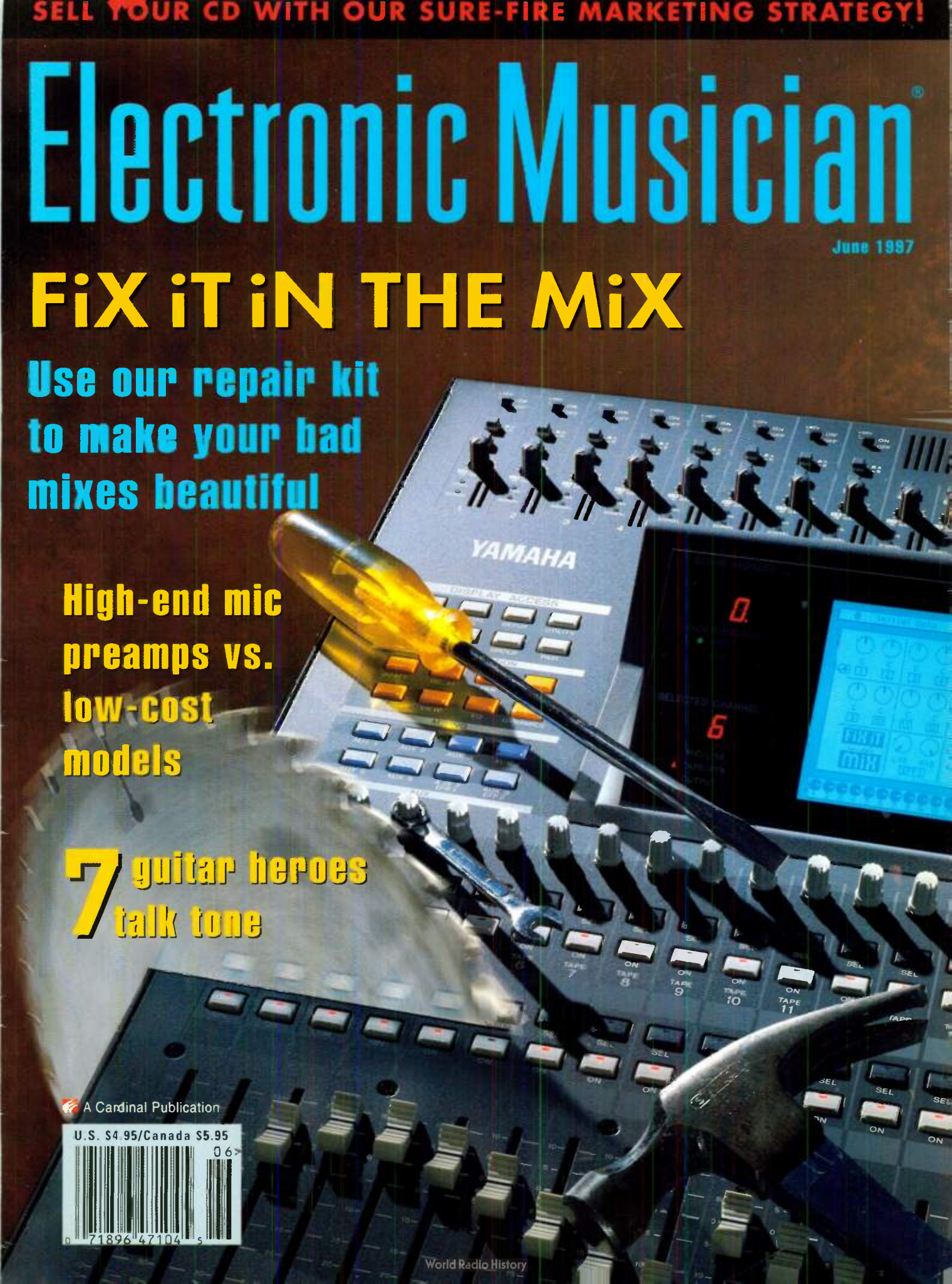
June 1997

FiX iT iN THE MiX

Use our repair kit to make your bad mixes beautiful

High-end mic preamps vs. low-cost models

7 guitar heroes talk tone



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World Radio History

7 REASONS TO BUY OUR TO MIX MORE CREATIVELY,

1 VLZ CIRCUITRY FOR ULTRA-LOW NOISE AND CROSSTALK. *A fancy new name for the same old circuitry? Nope. VLZ (Very Low Impedance) is a Mackie innovation based on solid scientific principles. Through the careful deployment of high operating current and low resistor values at critical points in our consoles, thermal noise & crosstalk are dramatically reduced. Open up all the channels, subs and masters on an 8•Bus console and compare what you hear (or rather don't hear) with any Brand X console. And because VLZ circuitry needs loads of high current, we ship a humongous, 220-Watt power supply with every 8•Bus & 24•E expander.*

2 IT EXPANDS ALONG WITH YOUR NEEDS AND BUDGET. *You'd be surprised just how many 8•Bus console setups like the one below are currently in use. But you don't have to start out this way. Start out with a 24•8 or 32•8 and then grow your 8•Bus console 24 channels at a time with our 24•E add-on modules. 1, 2 or even 3 of 'em connect in minutes. They come with their own 220-watt power supply; optional meter bridges are available.*

3 IMPECCABLE MIC PREAMPS. *A console can have motorized dooflammers and an optional MIDI espresso attachment, but if the mic preamps aren't good, you don't have a fully-useful production board. Our discrete preamps with large-emitter-geometry transistors have won a critical acclaim for their exceptional headroom, low noise (–129.5dBm E.I.N.) & freedom from coloration. VLZ circuitry in the preamp section also reduces crosstalk.*

4 THIS CONSOLE JUST PLAIN SOUNDS GOOD. *Sure, you may be able to buy a Brand X console for less. But you end up with a console that sounds like...well...a Brand X console. Granted, we're getting into a pretty subjective area here...but we have tall mounds of 8•Bus warranty cards that rave about our consoles' "clarity," "sonic purity," "sweet sound," "transparency," "lack of coloration" and a lot of other superlatives we wish we'd thought of first.*

Above: 24•E 24-ch. expander with optional MB•E meter bridge and stand.

Above: 32•8 with optional MB•32 meter bridge and stand.

7 MAC® & WINDOWS® 95-BASED AUTOMATION THAT'S RELIABLE, PROVEN AND AFFORDABLE. *Along with affordable digital multi-track recorders, the Mackie 8•Bus has made it possible to do world-class productions on a modest budget. But until now, Big Studios have still had one remaining and unattainable creative "secret weapon"... computerized level automation. That's why we developed the UltraMix™ Universal Automation System. It gives you fully editable and recallable control of input, channel and master levels – plus features not found on even the most expensive proprietary Mega-Console automation systems. Equally important, it doesn't degrade sound quality, introduce zipper noise or cause audible "stepping." UltraMix is currently being used to mix network television music themes and on several major album projects – by seasoned engineers who grew up on Big Automation Systems. Their verdict is that UltraMix is a serious automation solution – stable, reliable and frankly easier to use than more expensive systems. The basic system controls 34 channels and can be expanded to as many as 128 channels. UltraMix Pro™ software, for 030/040 & Power PC Macintoshes and PCs (Windows® 95 required), includes a wealth of features like editable fader curves, built-in level display, up to eight subgroups, SMPTE time code display, event editor with pop-up faders, optional control of outboard effects devices, and the ability to play Standard MIDI files from within the program.*

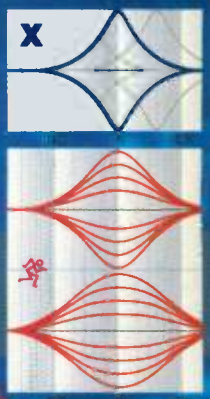
UltraMix™ includes the Ultra-34 interface, UltraPilot Controller and software for $2797 suggested U.S.. retail. Macintosh® or Windows® 95-compatible PC not included.

World Radio History

8-BUS CONSOLE... AND 2 TIPS ON HOW EFFICIENTLY AND, WELL, MORE FUNLY.*

5 PROFESSIONALS REALLY USE THEM. *The members of Boyz II Men could have afforded any console they wanted for their studio's second room. They chose an 80-input 8•Bus setup with 102 channels of UltraMix™ automation. In the studios of artists as diverse as k.d. lang†, Yes, Queensryche, Aerosmith, Lee Roy Parnell, Bryan Adams, Carlos Santana, Whitney Houston, Eric Clapton & U2, our consoles really are used to make great music.*

6 WIDE MID RANGE EQ. *Whether you're tracking or mixing, equalization is one of your most important creative tools. Mackie's 8•Bus consoles feature extremely-wide-bandwidth peaking EQ that can be used to achieve effects that simply aren't possible with narrower EQ. Most Brand X midrange EQs have a fixed bandwidth of about 2 octaves (blue graph at right). You can sweep it up & down the frequency spectrum, but the "sharpness" of the EQ curve is always the same. This kind of EQ is good for some purposes... but if you've worked with it before, you know it's too drastic and localized for gentle changes in overall tonal coloration.*



The 8•Bus true parametric Hi Mid lets you spread the bandwidth out to as much as 3 octaves (red curves above). That extra octave of "width" gives you a whole new creative palette.*

Above: 24•E 24-ch. expander with optional MB•E meter bridge and scand.

Above: The SideCar, matching 8•Bus equipment rack.

8 WHAT ULTRAMIX AUTOMATION CAN DO FOR YOU:

- *Hone a complicated mix one track at a time with every fader move recorded*
- *Clone your best fader moves and use them in other places in the mix*
- *Automute unused sections of your tape tracks or noisy MIDI sound modules*
- *Via automated mute or fader cuts, make a composite mix ("comp track") from the best moments of several tracks of the same vocal or instrument*
- *Save mixes for recall and editing at any time (great for mixes with music beds or "donuts")*
- *Make six voice-over versions of a jingle mix – and then easily make the inevitable nitpicky client changes three days later*
- *Step up to big-league automation without breaking the bank!*

9 LEGENDARY RELIABILITY. *One of those factors you probably don't think much about – until your console goes down in the middle of a critical late-night session. Built with pride in Woodinville, WA USA, Mackie 8•Bus consoles have an enviable three-year track record for enduring continuous, round-the-clock use and abuse.*

* Poetic license applied for.

† Mention in this ad denotes usage only, as reported to Mackie Designs, and is in no way intended to constitute official endorsement by the artists or groups listed.

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World Radio History

Q: What's the difference between a PCI soundcard and the

Layla by ECHO™

Professional Digital Multitrack Recording System?

A: Oh, about a gazillion things.

RECORD IT
Hook up directly to each of your console's eight buses. Transfer tracks from a tape-based digital recorder for editing. Record your band live without premixing. Layla gives you eight independent balanced analog inputs—all simultaneously accessible, all outfitted with exceptionally low-noise 20-bit A/D converters. (We even put two extra inputs on the front panel to help you capture those moments of inspiration without needing to fire up your whole rig.) And in case you were wondering: Input levels are adjustable in software from –10dBV to +4dBu.

These days it seems like everyone and their brother is making PCI audio interface cards for the PC and Mac. To say the marketplace is a bit confused is like saying Times Square on New Year's Eve is kinda crowded. So how do you separate the good from the bad and the ugly? Easy. Look hard at the features, determine what's important to you, then balance that against what's going on in your pocketbook.

We'll help. Study these pages carefully. We think you'll soon see that Layla delivers the features and performance you want—at a price that's remarkably easy on your budget.

Okay. Got the picture? Obviously Layla isn't just another card, but a complete system. A system designed to help you make great-sounding music. Designed to grow as your needs grow. Designed to change the way you think about hard disk recording.

Designed to knock your socks off.

Different. Powerful. Multitrack. Digital. 24-bit. Rack-mount. Sync. DSP. MIDI. Timecode. Compatible. Expandable. Lovable (truly). $999. (Wow.)

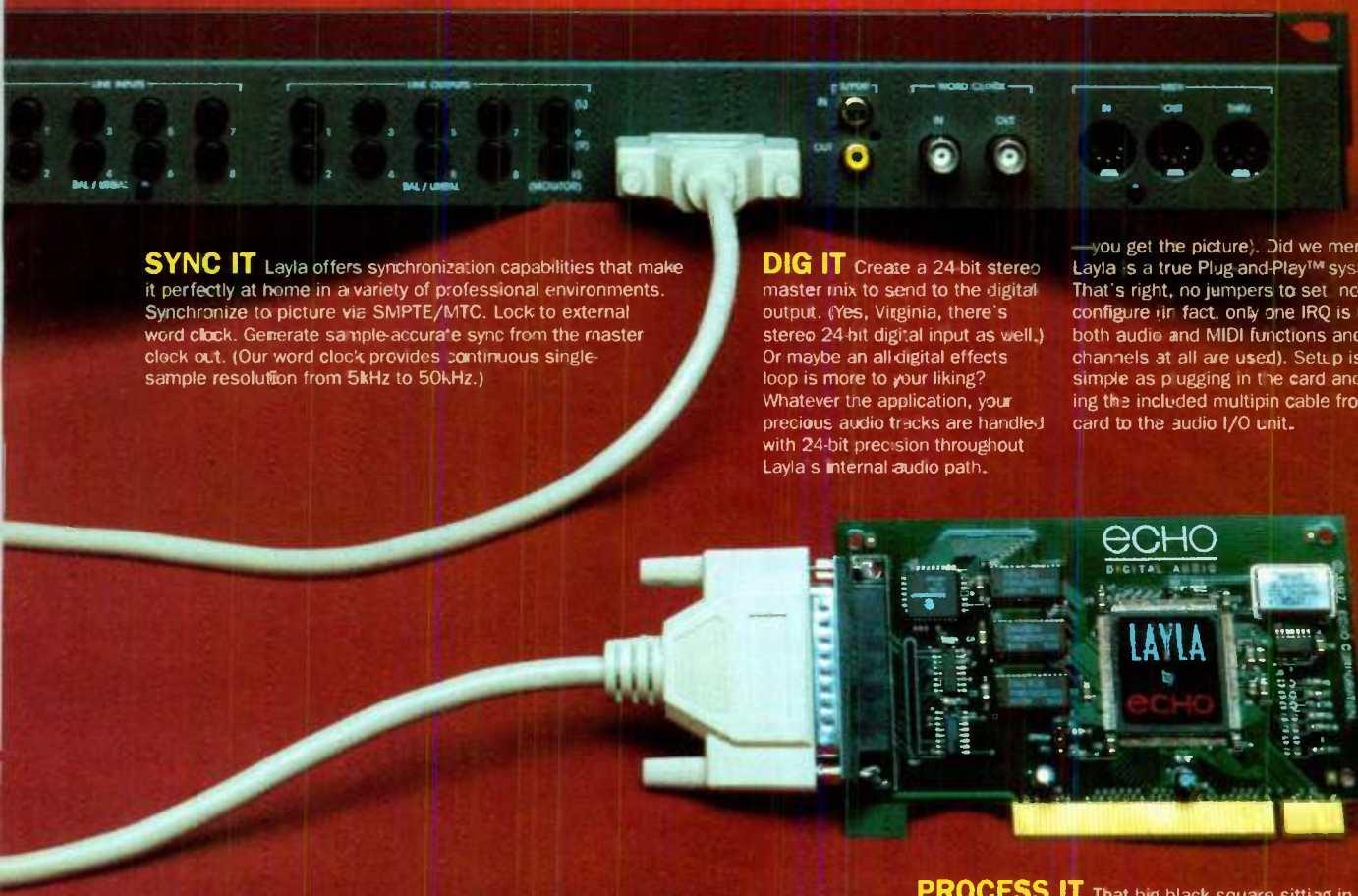
Brought to you by Event Electronics. www.event1.com info@event1.com

World Radio History

PLAY IT Forget about having to premix output tracks—forever. Layla features ten independent balanced analog outputs, each one boasting a superior quality DAC, for true 20-bit audio performance. And our exclusive OmniBus™ audio assignment architecture lets you easily configure the outputs as aux sends, monitor mixes, discrete track outs—you decide. Plus you can play back on all ten output channels while you're recording on all eight input channels . . . that's not just full duplex—that's octadecaplex!

EXPAND IT Now for the really big news: You can synchronize multiple Layla systems—expansion is as simple as plugging in another card and connecting the word clock output of the master unit into the word clock input of the slave. (Daisy-chain as many Layla units as you have PCI slots in your computer.) When you build a larger system you not only get more hardware ins and outs (how does 24 inputs x 30 outputs grab ya?), you get more (lots more!) DSP horsepower.

MIDI IT(!) All right. We admit that MIDI in/out/thru probably isn't the most earth-shattering feature you've ever seen (even if it is opto-isolated). But we know you'll appreciate the convenience of being able to create a simple, yet powerful audio/MIDI multitrack recording system without having to hook up a ton of additional gear (or worrying about your MIDI interface card conflicting with the IRQ on your digital I/O card, which conflicts with your SCSI card, which conflicts—you get the picture). Did we mention that Layla is a true Plug-and-Play™ system? That's right, no jumpers to set, no IRQs to configure (in fact, only one IRQ is used for both audio and MIDI functions and no DMA channels at all are used). Setup is as simple as plugging in the card and connecting the included multipin cable from the card to the audio I/O unit.



SYNC IT Layla offers synchronization capabilities that make it perfectly at home in a variety of professional environments. Synchronize to picture via SMPTE/MTC. Lock to external word clock. Generate sample-accurate sync from the master clock out. (Our word clock provides continuous single-sample resolution from 5kHz to 50kHz.)

DIG IT Create a 24-bit stereo master mix to send to the digital output. (Yes, Virginia, there's stereo 24-bit digital input as well.) Or maybe an all-digital effects loop is more to your liking? Whatever the application, your precious audio tracks are handled with 24-bit precision throughout Layla's internal audio path.

EDIT IT Work with total freedom. Edit your music with the precision and flexibility that only random-access disk-based recording can provide. Layla is compatible with any audio recording/editing application that uses standard Microsoft Windows 95 calls—which means Layla works with virtually all of today's most popular programs, including Cakewalk's Cakewalk Pro Audio™, Steinberg's Cubase Audio™, and Sonic Foundry's Sound Forge™ (to name just a few). You also get support for software plug-ins from respected manufacturers like Waves and Arboretum Systems. Don't yet own recording software? Not to worry: Layla comes complete with a custom version of Syntrillium Software's Cool Edit Pro™—a powerful multitrack audio recording and editing environment—so you can enjoy a no-hassle musical experience right out of the box. (Our Macintosh software package, which provides compatibility with a host of professional audio and MIDI sequencing applications, is scheduled for release in Summer '97.)

PROCESS IT That big black square sitting in the middle of the Layla PCI interface is Motorola's latest-generation DSP—the 56301, a 24-bit chip running at an astounding 80 million instructions per second. In addition to being a giant chunk of raw processing power, it's the PCI bus master, meaning that it handles all the routing of data in and around your system. That leaves your computer's CPU free to do things like drawing screens really fast. The 301 also handles audio timing information, so you get dead-on synchronization accuracy and—here's one for the engineers out there—zero-latency sample-positioning (in other words, it always knows what audio is supposed to play when and where).

ECHO IT Why does it say ECHO on the card? Simple. Our strategic partners, ECHO Corporation, are the engineering team behind Layla. ECHO has been providing audio ASICs and DSP system software and drivers to the computer industry for the last 17 years, and their designs have been sold and licensed to such industry leaders as Analog Devices™, Motorola™, Rockwell™, Sony™, S3™, and VLSI™. Why should you care? Because it's your way of knowing that the Layla hardware and software driver (the key to making Layla compatible with so many of the great Windows 95 audio applications) were designed by people who really—we mean really—know computer-based digital audio.

EVENT
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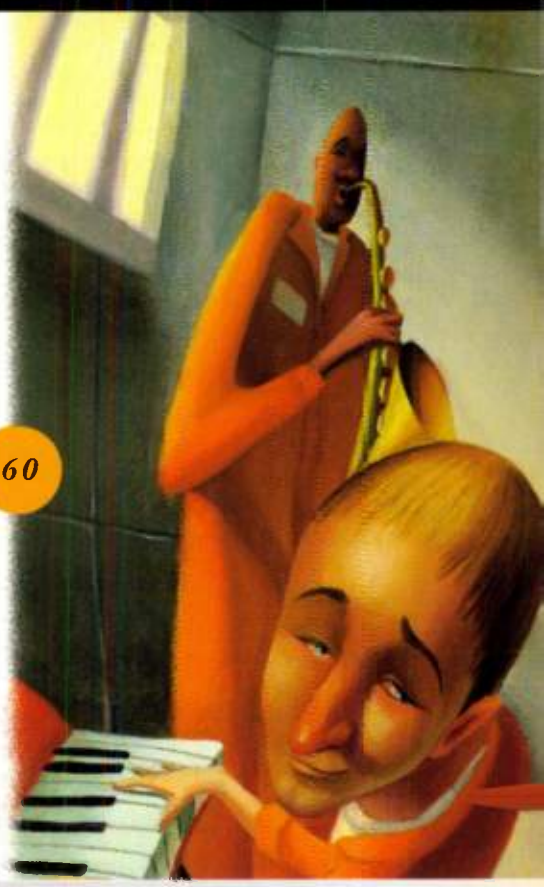

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Cover: Photography by Mario Parnell.
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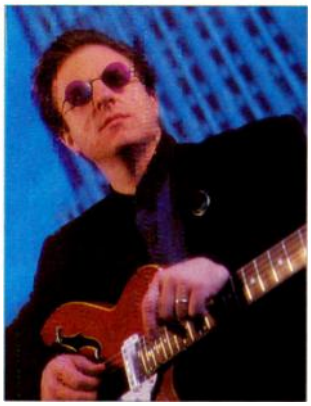
"Home, home on the Web..."



ROBERT PERRY

Let's get the self-flagellation out of the way, pronto. That **EM** has been slacking in the electronic-publishing department is hardly a secret. (The phrase "No, we don't have a Web page yet" almost became a company motto.) There were, however, some good reasons for being tardy. For one thing, we're not college students leaping into a cool new hobby. We are a commercial entity with tremendous responsibilities to our staff, our readers, and our industry. Therefore, any new endeavor must build upon all that **EM** stands for: our commitment to disseminating "real world" music-production techniques, our practical take on product reviews, our fun-yet-sophisticated graphic vibe, and all the other stuff that makes us what we are.

Then, we had to beat ourselves up over "The Concept." It was imperative that we create a distinctive personality for eMusician and identify the site's audience. Electronic publishing is, after all, a relatively youthful medium with its own sensibilities. We could not assume that the content (and *context*) of our print magazine would be appropriate for Net readers. In short, it was no picnic developing an "**EM** for the Web." But thanks to tons of teamwork, we can finally change our mantra to "Yes, we have a Web page!"

So what about "The Concept"? It's simple: we want eMusician.com to be your primary resource for information on personal music production. To accomplish this goal, we made eMusician a user-friendly, fast-loading data center. Are you in the middle of a tough mix and sorely need a few tips about compressor settings? Just log into eMusician's Article Archive and type "compression" to scroll through any number of helpful recording features. You can also access a handy Production Assistant, which is a database of essential manufacturer and music-industry listings.

In addition, we sought to "humanize" the Web experience by offering a more personal forum for our editors. This month, for instance, Steve O. reveals how and why he chooses the products we review. These columns are exclusive to eMusician, and readers can e-mail their comments directly to each editor. And finally, we committed ourselves to constant "site improvement." We're considering future upgrades, such as chat rooms, downloadable audio files of our gear tests, and discussion groups.

Obviously, making all this happen took a lot of effort from a lot of people. The staff heroes include our former art director, Linda Birch, who did a smashing job of designing a site that is fun, colorful, and easy to negotiate; the wonderful people at Quest who are administering eMusician.com; Editorial Assistant Joe Humphreys, who undertook the Herculean task of wrangling our databases (with some help from our assistant editor for special projects, Mo Clancy, and our publisher, John Pledger); and Managing Editor Mary Cosola and Production Director Ellen Richman, who developed the schedule for getting all the content "locked and uploaded."

I'm very proud of eMusician. It's an infant, of course, and will require care and encouragement from **EM**'s extended family. So all you virtual aunts and uncles out there shouldn't be shy. If you have a suggestion for helping "our baby" grow strong and wise, e-mail it to me at molendamc@cardinal.com.

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Groove On This?

ASR
SAMPLER RESAMPLER

The new ASR-X™ features:

- ASR Sampler
- MR Synthesizer
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- On-Board Sequencer
- Resample w/Effects while sequencing!
- New Resonant Filters
- 44.1 Khz Sampling rate
- 20-Bit Analog to Digital converters
- Velocity sensitive pads
- Expandable to 10 outputs
- Optional SCSI
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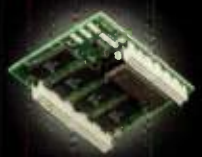

- Expandable to 26MB of ROM with optional MR-EXP board

We went to the masters of sampling and asked them to list the top features they would like to see in the ultimate groove machine. They said to make it easy to sample, resample, and loop, include a built-in synth, add some incredible effects, resonant filters, an easy to use sequencer and put it all into a portable box with pads.

Introducing the new ASR-X™ from Ensoniq—pick one up today and get into a groove!

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HOW LONG MUST I DREAM?

As someone who has been singing the praises of MiniDiscs for quite some time, I was excited to see the cover of the April 1997 issue of **EM**. Unfortunately, I was disappointed by the actual article ("Dream Dates"). I am aware that there are some in this world who can afford to purchase $3,500 pieces of equipment on a regular basis. I would venture to say, however, that a large portion of your readers finance their habit with "real" jobs and for those, the advent of a 4-track recorder that operates in the digital domain is a gift from the Gods. Please consider running a serious, informative article on these wonderful machines in the near future. I think a lot of people would be surprised at what can be accomplished.

Danny Hamilton
dhamilto@sprintmail.com

Danny—We have a comprehensive MiniDisc feature coming up in our July 1997 issue.—Diane L.

SAMPLING THE MONSTER

My hat's off to Jim Miller regarding sampling the Hammond B-3 ("Organic Chemistry," April 1997) because this job can be bigger than anyone realizes. For years, large companies have been trying to cash in on a product that will accurately mimic this classic sound. Although sampling with careful miking techniques will come close, some of the subtle nuances of this fine instrument will forever remain a mystery to many would-be electronic-instrument manufacturers. For example, there is one thing Mr. Miller forgot to mention: *foldback*.

Foldback occurs when certain fundamentals run out of available notes at the upper and lower octaves of the keyboard. The lower fundamentals (lower half of the drawbars) when played in the lowest octave on the keyboard will actually play a note one octave higher; the upper half of the drawbars also fold back one octave when notes are played in the uppermost octave. As you select different drawbar settings, the color in these outer octaves is quite different from the color of the rest of the keyboard, which is crucial to the Hammond B-3 sound. Be sure to sample these notes at all the configurations, as well. This detail has been neglected in some B-3 sound-alike patches and products.

Leland Berg
Chief Audio Engineer
IVS Inc.
leland@amerigon.com

Great article on a great sound ("Organic Chemistry")! We've found the B-3 and Leslie sound is showing up more often with our clients. A couple of things we've learned: not all Leslies are the horn-and-rotor combo most of us think of. We've run across a Leslie made in the late fifties to early sixties that is a full-range JBL firing into a rotor—a complete Leslie without the "top" half. It operates similarly to other Leslies, but it requires a different miking procedure. We contacted a tech for Leslie, and he said different versions of the Leslie had various configurations. So don't be surprised if you run across a "nontraditional" Leslie. Also, a good place to find the B-3 and Leslie combo is in churches (at least in the South). Traditional stereo mic techniques (*x-y*, ORTF, NOS, Blumlein, etc.) have all worked well for us. Always listen in mono and stereo; adjust mics if there is a problem. As for placement, don't be afraid to put mics anywhere. A sound that may not knock you out by itself may sound great when used with other sounds.

Bruce Reeves
bruce@audioguys.com

Jim Miller's article "Organic Chemistry" didn't mention anything about sampling the bass pedals on a B-3. Granted, if you're in a rock band with a bass player, sampling the pedals really isn't important. However, if you play in a jazz organ trio (guitar, organ, drums) and don't want to lug your B-3 to the gig, you should sample the pedals so you can play semi-authenic-sounding bass lines with your left hand in the bottom octave of your keyboard.

Phil Hopp
gclip@worldnet.att.net

WHAT GIVES?

I was surprised to see Michael Molenda's "correction" in his response to Joe Rodriguez ("Letters: XT Confusion," April 1997). Molenda told him that "the ADAT XT cannot perform this type of composite editing on a single machine." If this is true, then most of the vocal tracks and guitar solos on the last album I produced do not exist!

The XT performs digital track bouncing internally, so you can easily create a composite track in the digital domain. On one song, for example, I cut five tracks of soprano sax solos and, using the auto-punch function, copied all the best riffs to the sixth track. Using the adjustable crossfade function, I created a beautiful, seamless track.

Just follow these steps: hold down the digital input button; enable the source track for bouncing; release the digital input button; record-enable the destination track; and set up your auto-punch points, or just punch the old-fashioned way.

When you finish the first punch, select a new source track and new punch points. Notice that no BRC is needed for any of this. Hope this clears up Joe's question.

Larry Clark
lclark@bee.net

OLGA KALMYKOV

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Larry—I wasn't clear on my own concept! You are right, and I apologize for heaping confusion upon confusion. The TASCAM DA-38's electronic patch bay allows you to comp tracks in a single pass whereas the Alesis XT requires the start-and-stop operation that you described. Why I decided that fact made the XT a "noncomp" machine is one of those mysteries of my mental health. Thanks for setting the record straight!—Michael M.

YES WE CAN CAN

I have a correction to make in the article "The Fab Five" (March 1997). I use Voyetra's *Digital Orchestrator Plus* and love it. Along with Syntrillium's *CoolEdit*, it can do about anything I want done. However, the article said the program doesn't have the ability to delete dead or quiet space from digital audio. It can. I do it on every track by using the built-in "noise gate" and cutting all below a certain level—it works great! I have been very pleased with what Voyetra *DOP* can do.

Marty Altenberger
marty@granitecity.com

YOUR OPINION, PLEASE

Thanks for the great article on home-studio logistics ("Home Improvement," February 1997). With today's effects processors, such as cabinet simulators and digital reverb, how do you feel about skipping all that miking and going directly to the board?

Dean Gionis
Buffalo, NY
isgwww@aol.com

Dean—I say, "Do whatever sounds cool!" I've been into saving my ears of late, so I typically record blaring electric guitar parts through an old PS Systems Power Tool cabinet simulator. The Power Tool lets me set up amps in the control room and go nuts while monitoring at humane levels. The sound quality is great for rhythm tracks, volume-swell pads, and "taste" riffs. Guitar solos, however, typically sound best when recorded "wide open" in a wonderful acoustic space by empathetic mics with creative mic placement—at least to my *ear. Each method—direct or miked—has its own distinct vibe, so experiment with both until you find a sound that knocks you out. I should mention here that miking is becoming a lost art in some circles, and it would be a shame if direct recording becomes "standard operating procedure." Mics and ambient environments offer myriad tonal colors that cannot always be reproduced by a box.—Michael M.*

SIMPLE RESPONSE

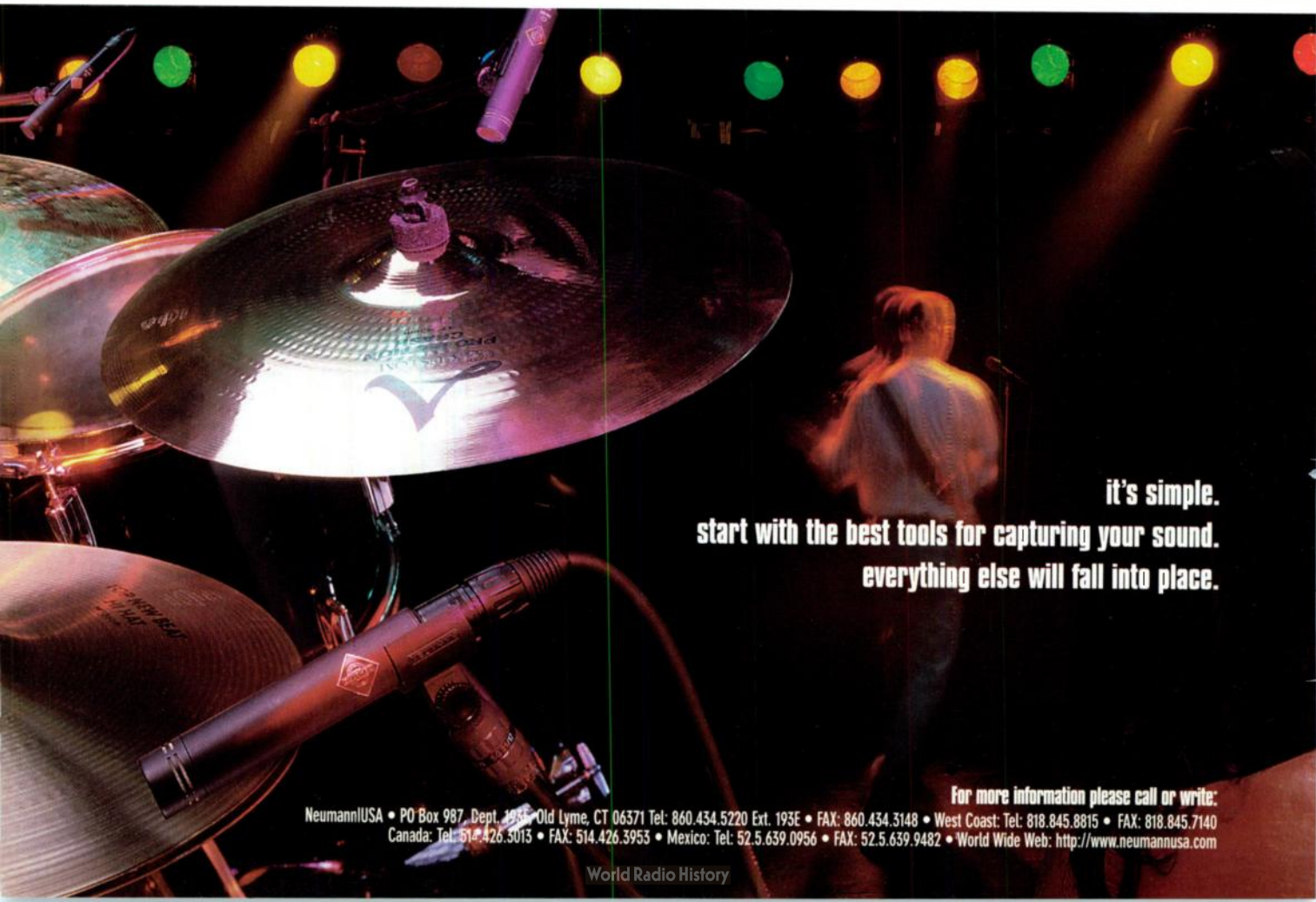
Thank you for your eye-opening review of modular hard-disk recorders ("The Magnificent Seven," November 1996 **EM**). I would like to know whether connecting a Darwin with a computer through the Darwin's ADAT Optical Card and the planned Windows version of the Korg 1212 I/O sound card (which has an ADAT optical interface) will enable a two-way street between the Darwin and a computer.

Dan Shaham
dqs6106@is2.nyu.edu

Dan—Yes.—Steve O.

MT8X THEORY

I am currently in the market for a MIDI interface for my Toshiba



laptop computer. I will probably purchase *Cakewalk Professional*. Does the *Cakewalk* software take care of sync, or is it also dependent on the type of interface? I currently have a Yamaha MT8X 8-track cassette recorder, which doesn't have MIDI inputs. I want to mix sequenced tracks along with vocals and acoustic instruments. Is sync even worth considering?

Michael J. Evan
nantcoke@tl.infi.net

Michael—Synching your tape deck and sequencer is essential if you want your taped vocal and guitar parts to play together with your sequenced MIDI tracks. To sync your laptop computer with an analog tape deck such as Yamaha MT8X (reviewed in the July 1994 EM*), you need a device called a* time-code generator/reader. *Many MIDI interfaces include time-code generator/readers, so you should buy one of these interfaces. (They aren't terribly expensive.)*

The time-code generator/reader writes ("stripes") a SMPTE time-code signal to one track of your tape deck. (SMPTE time code is an analog signal that would sound like awful noise if you were foolish enough to listen to it.) When you play back the tape, the time-code reader translates the SMPTE time code into MIDI messages that your MIDI interface sends to your computer so that your sequencer (e.g., Cakewalk*) can follow along. In effect, the tape deck is the master, and the computer acts as the slave in that it follows ("chases") the time code on tape.*

Note that if you stripe SMPTE time code with the MT8X, you should not *depress the Sync button, despite the manual's instructions. This button was designed for use with an older type of time code called FSK, and it defeats the dbx noise reduction, which shouldn't affect SMPTE time code anyway. But it also puts a filter in the line that* can *cause problems with SMPTE.*

As noted, time code is loud and obnoxious, and it is quite possible that the time-code signal could "bleed" over to an adjacent track. Therefore, it is best to stripe time code on track 8, because it is an outside track; at worst, time code could bleed onto track 7, but the other six tracks will be safe. Ideally you should leave track 7 blank (as a "guard" track), but if you must record on track 7, I suggest you only use it for constant, moderate-level parts such as pads. Although this reduces your MT8X to six (or seven) audio tracks, it's a necessary and worthwhile tradeoff in order to incorporate your MIDI tracks.

By the way, for complex reasons, it's okay to record on track 7 while *striping time code on track 8 with an MT8X, but if you record on track 7* after *striping time code, it can mess up the time code at playback. I speak from personal MT8X experience here.*

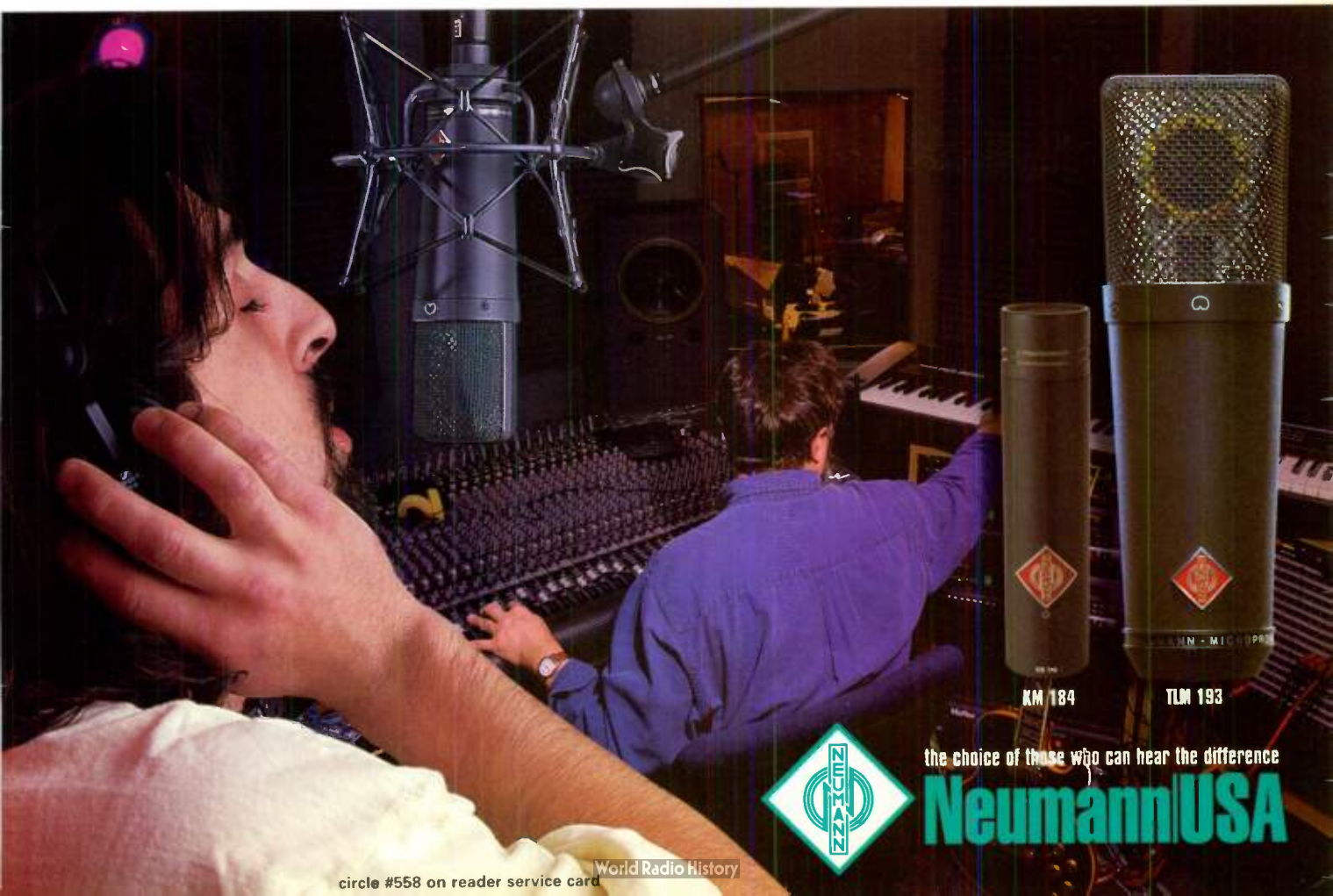
For more information on synchronization, check out "That Synching Feeling" in the October 1996 EM*.—Steve O.*

ERROR LOG

May 1997, "What's New: Special Winter NAMM Report," p. 22: The transfer speed of the Mackie Digital 8•Bus' built-in modem (initially announced as 33.6 kbps) has not been finalized. Also, the OS resides on the internal hard drive, not in Flash memory.

WE WELCOME YOUR FEEDBACK.

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



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Jim Aikin, Keyboard, March, 1997

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WHAT'S NEW

By the EM staff

▲ PROPELLERHEAD REBIRTH

Dance-music fanatics who have been pining after the Roland TB-303 Bassline and TR-808 Rhythm Composer now have another option. Propellerhead Software's *ReBirth RB-338* ($199) is a software emulation of two TB-303s and one TR-808. Instead of samples, the program uses mathematical models of the oscillators, filters, etc. The original controls are replicated in the user interface, and programming the software and original hardware versions is virtually identical.

You can create up to 32 patterns (1-bar phrases) per song, record parameter changes into the song, and save the results to disk. *ReBirth* outputs 16-bit, 44.1 kHz stereo audio, or you can stream the audio to disk as AIFF or WAV files. The program syncs to MIDI Clock.

The software is available for Power Mac and Windows 95 or Windows NT. Steinberg North America (distributor); tel. (818) 993-4091; fax (818) 701-7452; e-mail rbinfo@propellerheads.se; Web www.propellerheads.se.

Circle #401 on Reader Service Card

▶ STARR LABS Z-BAR

Throne-weary drummers fed up with the sedentary requirements of their instrument now have fresh incentive to get mobile: the new Z-Bar MIDI Percussion Controller ($1,299) from Starr Labs. This lightweight (5.5 pounds), space-age-looking controller features 24 dual-trigger pads (i.e., 48 switch areas) mounted on top and twelve single-trigger pads mounted along the side. With a Z-Bar strapped on like a guitar, this layout lets the top pads be played with fingers and the side pads with thumbs, allowing for fast, strum-motion rolls.

All 48 top triggers can be assigned to a MIDI note, and the unit's software permits a variety of ways of selecting and playing sounds (including the addition of a joystick and breath controller). The unit's side pads offer further MIDI control, including the ability to send Control Change messages. You can stack up to eight notes per pad (chosen from the top pads) and record them on the fly, which is especially useful for forming chords while playing a pitched-instrument sound.

The Z-Bar's hollow, aluminum body measures 33 x 2 x 4 inches. A wing-shaped, molded-plastic body houses the control electronics and a 2-line, 40-character display. Six Hot Keys and a volume knob give quick access to onboard functions. Two strap buttons are provided for stand-up performance. Starr Labs can outfit the Z-Bar with a wavetable card to provide sounds and stereo audio outputs. Starr Labs; tel. (619) 233-6715; fax (619) 233-1231; e-mail harvey@cts.com; Web www.catalog.com/starrlab.

Circle #402 on Reader Service Card

▼ DIGITECH VCS-1

DigiTech's VCS-1 ($999.95) is a 2U, rack-mount dynamics processor whose two channels each comprise a vacuum-tube gain stage, compressor, gate, limiter, and de-esser. The compressor sections have threshold, ratio, attack, and release controls and hard- or soft-knee, RMS compression. An Auto switch engages automatic, program-dependent attack and release times. The downward expander–type noise gate and brickwall limiter feature variable thresholds, and the gate and de-esser have attenuation controls. The two channels can be stereo linked and include individual bypass switches.

The VCS-1's Tube Gain control lets you decide how hard to drive the tube, and an output trim lets you bring overdriven signals back down to nominal output level. The unit features a large, illuminated VU meter on each channel that can display output level or gain reduction. If the channel is bypassed, its meter can display input level. Red clip LEDs monitor several key points in the circuit.

The unit's rear panel offers XLR and ¼-inch TRS balanced ins and outs. Nominal input level can be switched from +4 dBu to -10 dBV; output level is determined by the output knob. There is also a balanced ¼-inch sidechain send and return for each channel. DigiTech; tel. (801) 566-8919; fax (801) 566-7005; Web www.digitech.com.

Circle #403 on Reader Service Card

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YAMAHA AN1X

Musicians looking for analog-synth sounds have a growing number of options, from new modular systems to digital synths that mimic the vintage instruments' sound and feel. A new entry in the latter category is Yamaha's 10-note polyphonic AN1x ($1,495), which uses DSP-based modeling of analog circuitry to re-create not only the analog sound but also the familiar voice architecture in which you select a waveform, route it through a filter and amplifier, apply envelopes, and so on.

The 61-key keyboard is sensitive to Velocity and Channel Pressure. You get Pitch and Mod wheels, an *x-y* ribbon controller, and eight rotary knobs, each of which provides real-time control over eight functions. For example, when the VCF button is depressed, the knobs control filter attack, decay, sustain, release, cutoff, resonance, EG depth, and Velocity sensitivity. An Assign button lets you map the knobs to the parameters you want close at hand.

Two Scene memories store snapshots, and you can crossfade between the two. The AN1x has a 16-note Step Sequencer that imitates the pattern sequencers of vintage synths. In addition to 24 preset patterns, the Step Sequencer can store up to 144 user patterns, which can be chained together for longer passages. A separate Parameter Sequencer can record up to sixteen seconds of real-time changes in 4 of the 64 knob functions and stores them as part of the sound. You can speed up, slow down, or sync the playback of these changes to MIDI tempo. The AN1x also has a 30-pattern arpeggiator.

The unit offers 128 user-programmable presets and four effects: reverb, delay, 3-band EQ, and Variation (including rotary speaker, distortion, and auto pan). Ports include ¼-inch L/R outs, a headphone jack, and MIDI In, Out, and Thru. Yamaha Corporation of America; tel. (714) 522-9011; fax (714) 739-2680; e-mail info@yamaha.com; Web www.yamaha.com.

Circle #404 on Reader Service Card

DUY SHAPE

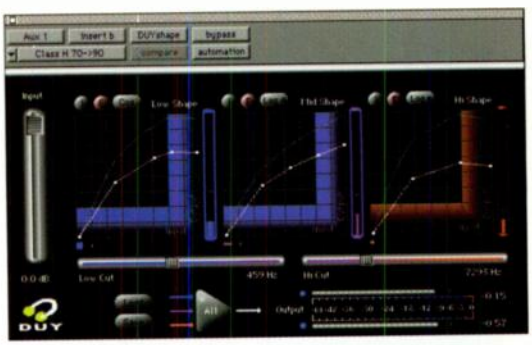
DUY is the first Spanish company to bring DSP plug-ins to America. The Barcelona-based firm introduced five plug-ins at NAMM, and a sixth was announced at the European AES Convention in Munich. All have an internal resolution of 48 bits. These plug-ins are available in Sound Designer II, AudioSuite, Premiere, and VST formats, except for *Declicker*, which currently is available only in Sound Designer II format. You can run multiple DUY TDM plug-ins on a single DSP Farm card.

DUY Shape (TDM $619; SDII $389; Premiere $146; VST or AudioSuite $345) marries three independent, user-defined waveshapers with a 3-band (2-band with some Digidesign cards), modeled "analog" filter that has continuous crossover points across the full audio range. The waveshapers can be used with eight different curves, including linear, log, and cosine functions. You can use the frequency-dependent waveshaping for such applications as dynamic enhancement, EQ, frequency enhancement, and frequency-dependent compression.

DaD Valve (TDM $699; SDII $419; Premiere $192; VST or AudioSuite $395) uses physical-modeling technology to simulate the sound of tube processing—tubes are known as "valves" in Europe—including triode, tetrode, and pentode, with a full range of biasing and operating levels. You can independently control spectral and dynamic responses using 1,600 configurations. Try it for vocals, sound effects, and mastering mixes.

Max DUY (TDM $349; SDII $259; Premiere $122; VST or AudioSuite $235) uses a proprietary algorithm for level maximizing with no harmonic distortion, even at low frequencies. It offers release-free operation to avoid pumping effects.

DUY Wide (TDM $349; SDII $259; Premiere $122; VST or AudioSuite $235) offers stereo and multichannel spatial/soundstage enhancement, with phase inversion available on each channel. You can use it to process pairs of channels in AC-3, Dolby Digital, and MPEG-2 and for enhancing Dolby Stereo, Pro Logic, and Surround Multimedia mixes. The *Digital Declicker* (SDII only $129) automatically cleans up pops and clicks.



At the European AES Convention, DUY announced *DaD Tape* (TDM $499; SDII $319; Premiere $135; VST or AudioSuite $295), a software analog-tape simulator. *DaD Tape* can simulate four different tape recorders: an older machine with tube circuitry, a transistor-based machine of the late 1960s, an op amp–based machine of the 1970s, and a recent-model tape deck. The software also simulates the most common noise-reduction systems and features a proprietary noiseless-tape mode. You even get a unique tape-speed feature (7½ ips, 15 ips, and 30 ips) that permits unusual combinations of tape recorders and speeds. DUY recommends this plug-in for use with a variety of instruments but especially for percussive sounds, thanks to its rounding of peak transients.

Prices listed are subject to fluctuations in currency exchange rates and don't include the shipping charges of $15 per parcel and $4 per extra product within the same parcel. DUY; tel. +34 (3) 217 4510; fax +34 (3) 217 6313; e-mail info@duy.es; Web www.duy.es.

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MODULE MANIA ▲ ▲ ▲ ▲

▲ YAMAHA

Yamaha has introduced a new XG-format tone generator that expands on the company's MU50 and MU80. The MU90R ($799.99) is a 1U, rack-mount module with 779 programs and 30 drum kits. This 64-note polyphonic, 32-part multitimbral unit has six effects blocks: Reverb, Chorus, Variation (62 types), Insertion 1 and 2 (43 types each), and 5-band EQ. One hundred Performance memory locations are provided.

Two ¼-inch audio inputs with 16-bit A/D converters can be routed to the internal effects, which can be independently switched via MIDI Program Change. Several preset programs are provided for this purpose, including a variety of guitar programs. The unit has two sets of audio outputs: the main L/R outs and a pair of auxiliary outs. The latter can carry the main stereo mix, or you can assign it to any combination of individual parts. Yamaha Corporation of America; tel. (714) 522-9011; fax (714) 739-2680; e-mail info@yamaha.com; Web www.yamaha.com.

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▼ ALESIS

The mad miniaturizers over at Alesis have been at it again. This time they've come up with three ⅓-rackspace (4.5-inch depth) synth modules, each featuring 64-note polyphony and 16-bit, 48 kHz, uncompressed samples. The NanoSynth ($499) is 16-part multitimbral and contains the same 8 MB sound library as the company's QS6 keyboard synth. The 512 preset programs include a GM bank, and the 128 user memory locations let you store edited programs or import a bank of sounds from another Alesis synth.

The NanoPiano ($399) includes 8 MB of sample ROM and 256 preset programs. Much of the module's sample memory is dedicated to stereo recordings of one Bösendorfer grand piano. Additional programs include more pianos, organs, electric pianos, vibes, clavinets, strings, synth pads, and voice programs chosen to complement the piano timbres.

Finally, the NanoBass ($349) features 256 programs in 4 MB ROM. The emphasis is on synth bass for dance-music styles; many of these sounds include resonant filter sweeps and other effects. In addition, you get acoustic-upright and electric bass-guitar sounds for pop and rock styles. Pops, plucks, slides, and slaps are included for creating a natural sound. Each program has one preassigned adjustable parameter that you can tweak with a front-panel knob.

All three modules have four onboard effects buses that include thirteen effects types. Editing must be done via MIDI, as the front panels have controls only for volume, effects level, channel, and program selection. (In the NanoBass, the effects-level knob is replaced by the parameter-adjust knob.) A patch editor for use with MOTU's *Unisyn* is included with each module. All three units have ¼-inch L/R outs, MIDI In and Out jacks, and external, wall-wart power supplies. Alesis Corporation; tel. (800) 5-ALESIS or (310) 841-2272; fax (310) 836-9192; e-mail alecorp@alesis1.usa.com; Web www.alesis.com.

Circle #407 on Reader Service Card

▼ E-MU

Following up on the release of its Orbit the Dance Planet and Planet Phatt modules, E-mu has returned to planet Earth. The company's latest 1U rack-mount sound module, Carnaval ($1,095), presents a palette of Latin sounds and beats. The 32-note polyphonic, 16-part multitimbral module delivers 8 MB of sample ROM and more than 100 percussion instruments, brass, violins, organs, accordions, guitars, acoustic basses, vocal effects, and synth sounds. There are 384 ROM presets and 256 RAM program locations.

Carnaval's synthesis architecture includes 32 6-pole resonant filters, LFOs, and pitch EGs.

Beats mode features 100 drum loops that can be synched to MIDI Clock. Users can create Songs that cycle through up to ten linked Events. Each Event can play a rhythm, tell a song to jump to another Event, jump to another Song, stop playback, and so on. There are 28 factory Songs and memory for 28 user Songs.

The unit's X-Factor feature lets you transpose a drum loop in real time by ±36 MIDI notes so that each hit uses a different sound than before. For example, if you are using the General MIDI percussion map and transpose the drum loop down by two notes, each hit that was playing Low Floor Tom (Note 41) will be playing Hand Clap (Note 39), and the other instruments will be similarly transposed. E-mu Systems; tel. (408) 438-1921; fax (408) 438-8612; Web www.emu.com.

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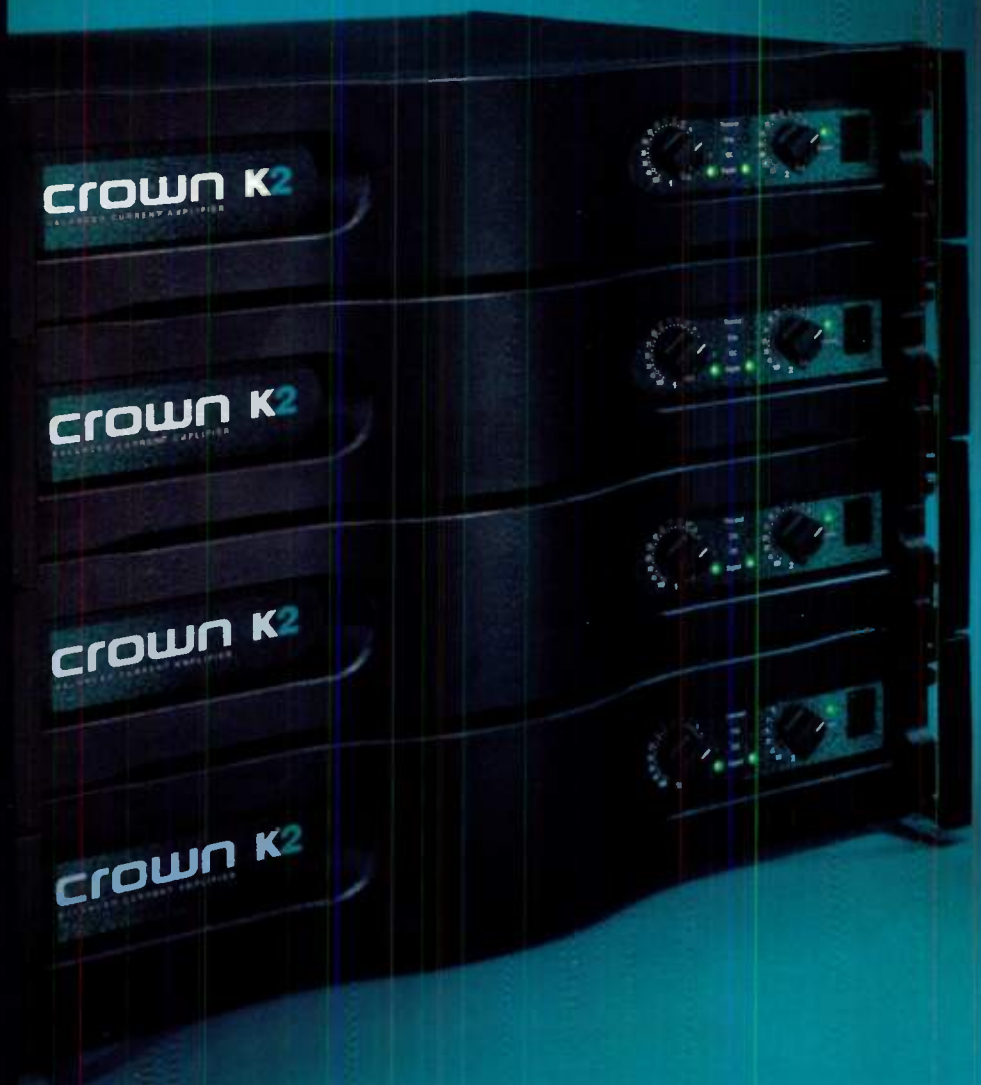
JUST ONE LOOK TELLS YOU IT'S RADICALLY DIFFERENT.



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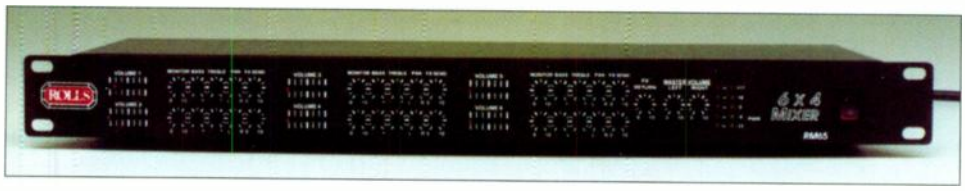
World Radio History

▶ ROLLS RM65



If space is at a premium, why not try a 1U rack-mount mixer? The Rolls RM65 ($320) is a 6-channel unit that furnishes the essential mixer functions. Each channel provides a monitor and effects send, bass and treble control, pan pot, and horizontal fader. The master section consists of left and right master-volume controls, an effects-return master-volume control, and dual 5-LED output-level meters.

The unit's rear panel provides an XLR mic input, ¼-inch line input, trim control, and phantom-power switch for each channel, as well as ¼-inch jacks for left and right output, effects send and return, monitor out, and auxiliary bus in. The unit has an internal power supply. The signal-to-noise ratio is rated at 106 dB and total harmonic distortion at <0.003%. Rolls Corporation; tel. (801) 263-9053; fax (801) 263-9068; e-mail rollsrfx@rolls.com; Web www.xmission.com/~rollsrfx.

Circle #409 on Reader Service Card

◀ FOSTEX COP-1

One quick way to get a frustration headache is to try to interface two pieces of gear that both have S/PDIF I/O yet are incompatible because one has only optical ports and the other coaxial (RCA) connectors. In most cases, you have to find a piece of gear that has both types of ports and use it as a go-between—that is, unless you have a converter.

Fostex now offers the affordable COP-1 ($95) coaxial/optical S/PDIF converter for bridging these two signal formats. This cheap 'n' cheerful gadget has an optical S/PDIF input and output on one side and coaxial S/PDIF input and output on the other. The box is powered by an external 9 VAC power supply. Fostex Corporation of America; tel. (800) 9 FOSTEX or (562) 921-1112; fax (562) 802-1964; e-mail info@fostex.com; Web www.fostex.com.

Circle #410 on Reader Service Card

▼ ROLAND VK-7

If working the club circuit with a shiny plastic keyboard has you down, check out Roland's new 128-note polyphonic VK-7 Combo Organ ($2,495). Designed to emulate classic organ sounds of the '60s and '70s, this 61-key axe features not only drawbars, amp-overdrive effects, and rotary-speaker simulation, but a real wooden (alder) cabinet, as well.

Simulated organ sounds are created using Roland's newly developed Virtual ToneWheel technology, which incorporates 91 voices in constant, independent oscillation. This is said to eliminate the negative effects of phase-shifted overtones at the same pitch when multiple keys are pressed. Tube-amp simulation and rotary-speaker effects (with independently adjustable rotating speeds for horn and rotor) are created via Roland's Composite Object Sound Modeling (COSM) technology.

Vibrato, chorus, reverb, key-click noise, second- and third-harmonic percussion, and leakage sound can be added. In addition, there are 26 PCM-based orchestral sounds for layering with organ sounds. Altogether, there are 64 organ presets, 34 orchestral sounds, and 16 user presets. The user presets memorize all user settings, including organ sounds, orchestral sounds, the keyboard mode, effects, and more.

The VK-7's control interface offers nine harmonic drawbars, dedicated sound-selection buttons, and a backlit LCD. All MIDI information, including drawbar messages, is sent and received in real time. The instrument has ¼-inch stereo outs (L/Mono, R), a ¼-inch headphone out, two independent MIDI In ports (so you can use multiple external controllers), one MIDI Out, two control-pedal inputs, and one expression-pedal input. An 11-pin connector lets you connect to an external rotary-speaker system. Roland Corporation; tel. (213) 685-5141; fax (213) 722-0911; Web www.rolandus.com.

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World Radio History

SPECIAL REPORT ▲ ▲ ▲ ▲

▶ COMING SOON: 20-Bit ADATs

Alesis and high-end pro-audio manufacturer Studer have announced the codevelopment of ADAT Type II, a new 8-track, 20-bit recording system based on the S-VHS ADAT format. Slated for release in the late summer or fall, the first two Type II recorders will be the Alesis Meridian (less than $7,000) and the Studer V-Eight, which will retail for about ten percent more than the Meridian.

The Type II format will allow 20-bit linear recording (up to 67 minutes on a T-180 tape at 44.1 kHz). However, Type II decks will feature a 16-bit mode that is fully compatible with existing Alesis, Fostex, and Panasonic machines that use the original 16-bit ADAT format. The 20-bit tapes will not be playable on the Type I ADAT decks. However, up to sixteen ADAT decks of any vintage can be interlocked for 128 tracks, in sample-accurate sync, merely by connecting the standard Alesis 9-pin sync cables between transports.

A major difference between Type I and Type II ADATs is that the new format includes a dedicated SMPTE time-code track (time code can also be derived from the machine's absolute-time counter) as well as an analog auxiliary track for cueing or other purposes. The new decks also offer built-in sync to MIDI or SMPTE (all frame rates supported), MIDI Machine Control, video-reference I/O, and word-clock in/out.

All analog interfacing is via balanced XLRs (including time-code and aux tracks) or the 56-pin EDAC connector used on previous Alesis ADATs. A/D conversions are 24-bit. ADAT Lightpipe digital in/out ports are standard, and an expansion slot is provided for an optional 8-channel AES/EBU digital I/O interface.

Other features include up to 170 ms of delay on each track, auto punch with Rehearse mode, digital routing to and from any track on one machine or within a system, and internal trimpots for precisely matching operating levels (±5 dB) to your console. System status, locator information, and metering appears on two large, fluorescent displays.

Housed in die-cast, 4-rackspace chassis, the Meridian and V-Eight have the look and feel of professional video-editing decks, with large jog/shuttle knobs, illuminated transport buttons, and keypads for entering SMPTE addresses or locator points (of which you get 100).

Under the hood, both machines feature the Matsushita IQ transport used in Panasonic's high-end video-editing systems and operate twice as fast as the Alesis XT. A 40-minute (T-120) tape rewinds in 30 seconds; wind speed is 80 times play speed, and shuttle is ten times play speed. Variable-speed forward/reverse "reel rocking" is also possible, and audio from the aux track can automatically be routed to any track output in Jog mode.

The transport offers more than mere speed. Dual direct-drive motors under servo control move the tape efficiently, and this design eliminates the idler wheel, so tape handling is gentler. With no brake adjustments needed, no idler to clean/replace, and an automatic head-cleaning wand, maintenance needs should be greatly reduced. An offline mode allows formatting on one deck while recording on the others in a system, without repatching sync lines. After formatting, a Tape Certify function can check the tape and provide a count of tape errors.

An LRC mini remote is included with the machines. An optional Controller Autolocator Desktop Interface (CADI) can control up to eight ADATs (64 tracks) with access to all controls, track arming, and sync functions. Unlike the BRC, CADI does not house all the system synchronization circuitry. Communicating to any Type II deck via a single RJ-45 Ethernet-style cable (up to 300 meters), CADI merely acts as the interface telling the system what to do.

The real power is in the ADAT itself. Also on the RJ-45 bus is display information for the optional, redesigned, 32-track meter bridge. Like the new ADATs themselves, the meter bridge provides error/interpolation indicators and features a choice of metering modes, including a high-resolution 0.2 dB/division setting.

Beyond its silver-colored faceplate, the Studer V-Eight is substantially different from the Alesis Meridian. The V-Eight employs a parallel port for 9-pin video-editor control. It also features a front-panel 8 x 2 monitor mixer with a headphone out and a Cascade function for monitoring multiple machines.

—George Petersen

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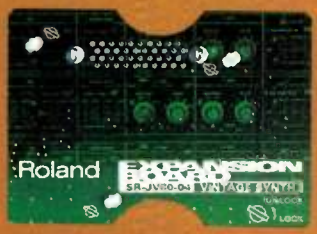

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PRO FILE

Vintage Vanguard

Acme Rocket Quartet captures the hi-fi vibe.

By Brian Knave

There's nothing new under the sun, but there are new ways of putting old things together. Acme Rocket Quartet has a thing for vintage gear, 1950s hi-fi, and bizarre sounds, yet they combine these elements in a decidedly postalternative way. "We're not really retro, and we're not jazz fusion," says guitarist Roger Kunkel, formerly of Thin White Rope. "Rather, we're inspired by the idea of the mad scientist in the lab screwing around with electronic devices. We call our music 'Electrojaz,' as in Electrolux vacuum cleaners."

Kunkel also plays an ARP Explorer 1 and a tone generator he scored from a surplus store. Steve Edberg plays drums, David Thompson bass, and John Killebrew trumpet, cornet, flügelhorn, and French horn. With influences ranging from Gene Krupa and Django Reinhardt to cartoon music and Henry Mancini soundtracks, the quartet serves up quirky instrumentals that suggest too many nights spent watching Dragnet reruns.

The group's homegrown debut is a study in tonal juxtaposition and moody improvisation. Though the sounds are organic (or at least analog), they're frequently more "out there" than cutting-edge digital-synth patches. Killebrew coaxes a menagerie of weird sounds from his horns, and Kunkel explores otherworldly timbres with his tube toys. Also featured are environmental sounds: a car starting up, wine pouring into a barrel, even backward tape effects. None of this is groundbreaking, of course; but in an era of push-button music, it proves a welcome change-up.

Kunkel recorded the album using a TASCAM TSR-8 reel-to-reel deck and a 424 Portastudio; however, he mostly eschewed standard multitracking in favor of live-to-stereo recording. He was too familiar with the experience of isolating each instrument only to end up with a recording that doesn't sound like the band. "That approach is valid, but it can easily move away from the live-music experience. We wanted a live, spacious sound, like you hear on Brubeck's 'Take Five.' Those old recordings may be low-tech, but you can't deny how enjoyable they are to listen to."

The low-tech approach, says Kunkel, "puts it right out front that the purpose of the recording is to show off the music, not the gear. Plus, it proves that it doesn't take a lot of money to make a record." After some experimenting, Kunkel hit upon an inexpensive signal path that simulated the sound of his beloved hi-fi recordings. "I recorded with two Crown PZM mics, placed on the floor, through an Aphex Tubessence mic pre onto two tracks of the Portastudio, double speed with dbx, pushed hot to get some natural compression. Next, I added a bit of Lexicon Reflex reverb ['Rich Plate'] and stereo compression [dbx 166A]. Last, I dialed in some low process from a BBE 462 Sonic Maximizer to add the low end that was missing from the cassette format."

For increased hi-fi attitude, Kunkel employed radical panning, sometimes putting bass in one speaker and drums in the other. "This technique can be overused," he says, "but it creates a tremendous sense of stereo spread. It's realistic, too, because if you're sitting in a room listening to a band, the bass might be on the left and the drums on the right. That's just how it is."

For more information contact Lather Records, PO Box 42563, Portland, OR 97242; e-mail rnr@slip.net.

Acme Rocket Quartet. (Clockwise from bottom right: Roger Kunkel, John Killebrew, Steve Edberg, David Thompson.)

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In plain English, the result is sheer perfection. The PRO2 is the only digital piano on the market which sounds its best with the reverb turned off allowing the natural ambiance of the soundboard to provide a characteristic warmth never before heard on a digital instrument. With up to 47 additional sounds of outstanding quality and with a price starting at below $2000 (PRO1), it's no wonder these instruments are sending shock waves throughout the music industry. Check one out at a dealer near you today and find out what all the fuss is about. **If you've been waiting for the ultimate grand piano sound in a digital keyboard....the wait is finally over.**

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Heavenly Tones

SEVEN GUITAR HEROES REVEAL HOW THEY PRODUCE DIVINE SOUNDS.

How did they do that? Guitarists have asked this question from the first moment Les Paul or Django Reinhardt or Charlie Christian blew their minds. And the query has not been given a rest since. (Just run a time line from Link Wray to Jimi Hendrix to Eddie Van Halen to, well, you get the idea!) Of course, technique and creativity are probably the core reasons a guitarist captures our imagination, but tone plays a large part, too.

Obviously, it is difficult to articulate what makes a player move his or her fingers in a certain way or mysteriously choose one chord inversion over another. What we *can* do, however, is break down a guitarist's tonal components to reveal the nuts and bolts of a transcendent sound. What follows are "blueprints" of the rigs and signal paths of seven prominent axe slingers, from country picker Pete Anderson to futurist David Torn. The bad news is that cloning these rigs will not make you sound *exactly* like Robben Ford or Ronnie Montrose, but you should be able to emulate a tone you love, add your own style, and blast into new sonic territories. And maybe someday, someone will listen to one of your records and say, "Wow!"

BY MATT BLACKETT

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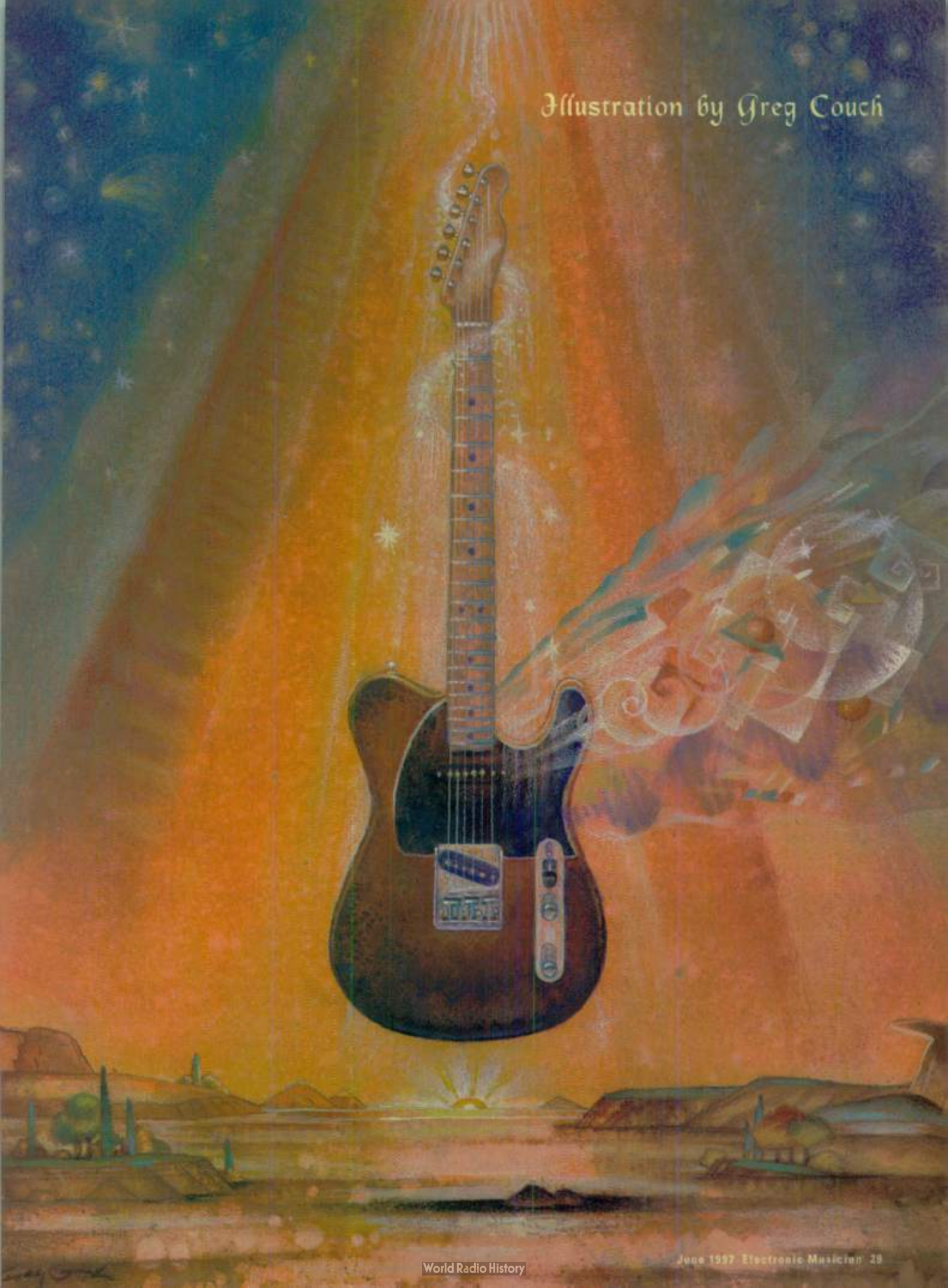


World Radio History

PETE ANDERSON

As Dwight Yoakam's guitarist and producer, Pete Anderson has played a major role in changing the way people record, arrange, produce, and ultimately, listen to country music. However, Anderson feels no pressure to compete with hotshot Nashville pickers and keeps "whatever the song needs" as his main focus. "The idea is to support the song, as opposed to *outplaying* the song," he says.

On "Don't Be Sad," Anderson played a 1959 Fender Strat (strung with heavy-gauge strings) for the rhythm lines and a Tele for the solo and the fills after the second chorus. A blackface Fender Twin loaded with Electro-Voice speakers was the amp of choice for the entire song. "I'll cast the guitars and amps for a particular song," says Anderson, "because the different sounds let me dial colors into the recording."

For miking, Anderson favored a Shure SM57 positioned close to the amp and tilted off-axis to the speaker cone. A room mic, another dynamic, was placed approximately four feet in front of the amp at a height of five feet. The two signals are then blended to taste. "You don't want too much of the room sound because then the guitar will not be present enough," he warns.

DAVID BRYSON

Track: "Angels of the Silences" (on *Recovering the Satellites* by Counting Crows; Geffen)
Axe: 1969 Gibson Les Paul Gold Top
Pickup: Bridge
Amp: Marshall Bluesbreaker
Printed Effects: None
Mic: Shure SM57
Mic Pre: Console
Console: Neve 1073
Recording Format: Analog (2-inch, 24-track)
Mixdown Effects: None

DENNIS KEELEY

Extra oomph was added to the signals via a vintage Fairchild tube limiter, and everything was recorded directly to tape on a Studer 24-track machine. A vintage Neve console was used for monitoring only.

DAVID BRYSON

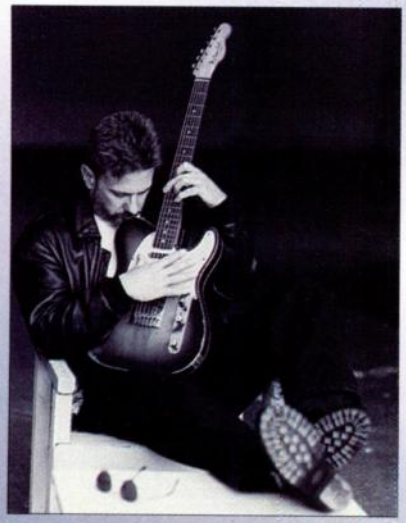
When it comes to backing up a vocalist and being an effective ensemble player, David Bryson (shown far left in the above photo) of the band Counting Crows is as great an authority as anyone. Finding his sonic niche in an increasingly busy mix seems to come naturally to Bryson, due, in part, to his ability to be a good listener.

"You don't want to upstage the singer," he says, "but it's important that you compete with and push the singer. Therefore, Dan [Vickrey, Crows lead guitarist] and I don't just provide a bed for Adam [Duritz]; we come up and surround him. Soundwise, my tone tends to be pretty thick, and Dan's tone tends to be bright. So his parts ride with the vocal, and mine ride with the bass."

To find his space on "Angels of the Silences" from the Counting Crows album *Recovering the Satellites*, Bryson chose a 1969 Les Paul Gold Top plugged straight into a Marshall Bluesbreaker amp. Because Bryson's guitar parts are recorded live with the rhythm section, however, it was critical to isolate the guitar sound from the drums and vice versa.

"To maintain separation, we put the amps in what we called 'dog houses'—these padded, insulated, wooden boxes," says Bryson.

Bryson's Bluesbreaker was miked "close and straight on" with a Shure



PETE ANDERSON

Track: "Don't Be Sad" (on *Gone* by Dwight Yoakam; Reprise)
Axes: 1959 Fender Stratocaster; 1959 Fender Telecaster
Pickups: Middle (Strat); bridge (Tele)
Amp: Blackface Fender Twin
Printed Effects: Spring reverb
Mic: Shure SM57
Mic Pre: Boulder
Console: None (recorded direct)
Recording Format: Analog (2-inch, 24-track)
Mixdown Effects: None

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Heavenly Tones

modified Telecaster into either a MESA/Boogie Maverick or a Fender Super Champ, compressed the signals with an A.R.T. Pro MPA, and recorded direct to digital tape with a Palmer PDI 09 speaker simulator/DI.

"The Palmer PDI 09 lives between your amp and speaker, and the box is voiced in such an incredible way that you get out exactly what you put in," says Montrose.

All the electric parts on *Mr. Bones* were recorded in this fashion, even the end-of-the-world, distorted slide work on "Don't Think Play." Montrose simply cranked up the studio monitors to cause his guitar to resonate and produce some sweet, harmonic feedback.

"I really enjoy searching for ways to get new guitar tones," says Montrose. "Why would you want to do the same old things or copy other players, when you can explore, have fun, and find your own voice in the process?"

David Torn

Track: "In the Sand of This Day" (on *What Means Solid, Traveller?;* CMP)
Axes: Framus Acoustic; Klein Electric
Pickup Used: Both (Klein)
Amp: Rivera M-100
Printed Effects: Various (see text)
Mic: CAD E-200
Mic Pre: Console
Console: Mackie 24•8
Recording Format: TASCAM DA-88
Mixdown Effects: Lexicon PCM 80 (reverb); Reflex (delay)

RANDI ANGLIN

Will Ray

There aren't many instrumental guitar bands on the scene that can hang with the Hellecasters. Whether it's their peaches-and-cream harmonies, death-defying string bends, or just plain gorgeous guitar tones, Will Ray, John Jorgenson, and Jerry Donahue have scores of guitarists singing their praises. And, of the three, Ray is undoubtedly the most twisted, diabolical, and downright wacky.

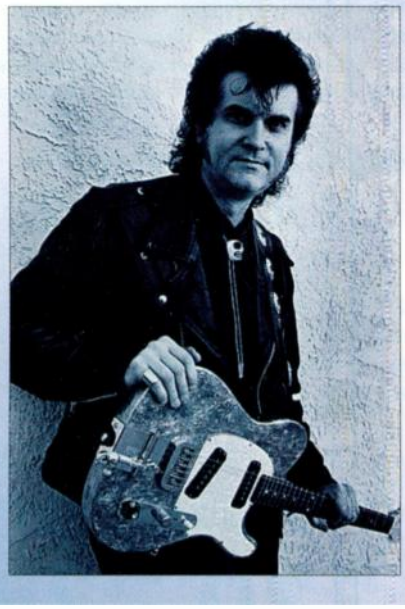
On his tune "Hanging at Tom and Rita's," Ray plugged a G&L ASAT Special through a pedal board consisting of a Boss CS-3 Compressor, an Ibanez TS-5 Tube Screamer, an MXR Micro Amp, and a Morley volume pedal. His amplifier was a Matchless SC-30 that was close-miked—half an inch from the grille and tilted slightly off-axis—with both a Shure SM57 and an Electro-Voice RE20.

"Those mics give me the best of both worlds," says Ray. "The RE20 captures a bit more low end, and the SM57 produces much more high end."

The mics were routed to a TASCAM M3500 mixer and recorded onto analog 2-inch, 24-track tape. After that, the signal path got a bit nutty because the tracks were transferred to each Hellecaster's personal-studio format to facilitate recording overdubs at home. Ray and Donahue use Fostex 16-track analog decks; Jorgenson tracks on a Fostex RD-8.

"We're cheapskates," says Ray. "And when you work at home you can spend as much time as you want on a part, and it doesn't cost you a cent of [commercial] studio time. Keeping costs down is even more important to us now that we've formed our own record company, Pharoah Records."

Given the amazing cohesiveness of their guitar parts, it's surprising that



Will Ray

Track: "Hanging At Tom and Rita's" (on *Escape from Hollywood* by the Hellecasters; Rio)
Axe: 1992 G&L ASAT Special
Pickups: Neck; bridge
Amp: Matchless SC-30
Printed Effects: Boss CS-3 compressor; Ibanez TS-5 Tube Screamer
Mics: Electro-Voice RE20; Shure SM57
Mic Pre: Console
Console: TASCAM M3500
Recording Format: Varied
Mixdown Effects: Delay; reverb

World Radio History

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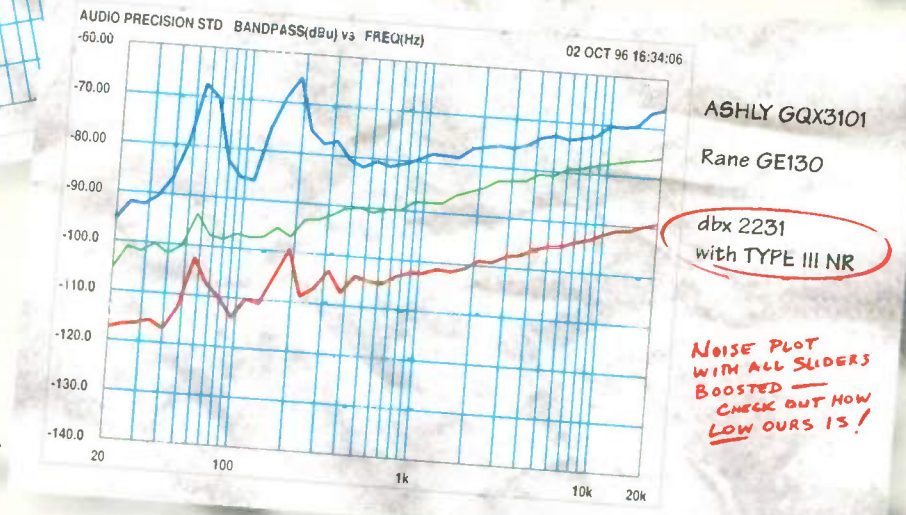

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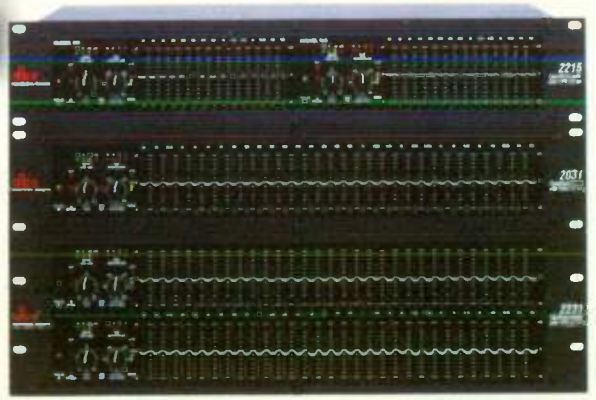

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these guys aren't even in the same town when most of their killer lines are recorded. "We don't even know what anything sounds like until all our home-recorded tracks are bounced back to 2-inch 24-track for the mixdown," reveals Ray. "But this isn't really a problem. You can always fix everything in the mix."

David Torn

Here's a prime example of understatement: It has been a busy six months for David Torn. In that time, the workaholic guitarist has recorded with k.d. lang, Jane Siberry, Tony Levin and Bill Bruford, Jewel, Chris Massey, and Michael Whalen. He also has acted as guitar player and sound designer for film composer Carter Burwell ("He does all the Coen brothers stuff," says Torn) on scores for *Locusts, The Chamber,* and *Kiss the Girls.*

No stranger to weirdness, Torn found the time to add his talents to *The Covenant,* a record of Sephardic rabbis singing over hip-hop beats. Oh, and he also performed in Japan as a featured soloist in Ryuichi Sakamoto's 75-piece orchestra—an event that was documented for audio CD, CD-ROM, and video releases. "I'm starting to feel like a real schizophrenic, and I like it," admits Torn.

For the song "In the Sand of This Day," Torn's signal chain was almost as schizophrenic as its master. The tune is pretty schizo, too: it is actually two songs in one. The first bit is a 3-minute acoustic guitar and vocal ditty recorded on a Framus strung with heavy-gauge steel strings. The guitar and vocal parts were recorded simultaneously, in mono, with a single CAD E-200 aimed toward the sound hole.

"I thought the recording was going to be nothing more than a demo because I had written the song three minutes before I recorded it," says Torn. "So I just put the mic on its omni pattern and pointed it at the guitar. Then, I bent over and sang into the mic as I played. And of course, *that* track makes it on the album."

For the second part, the acoustic section crossfades into an electric guitar fest that features two tracks of Klein Guitar and one track of E-bow parts. The guitar was fed through Torn's "normal" pedal board (what means *normal,* traveller?) which includes a TC Electronic compressor and phaser, a Guyatone WR-2 Auto-Wah, a Prescription Electronics Experience pedal, a Boss volume pedal, and an old Boss analog delay. From the pedal board, the signal was routed to a Rivera M-100 amp head, then to an ADA Ampulator, a Mackie 24•8 mixer, and finally, to TASCAM DA-88. For the electric part, no speaker cabinets or microphone were in the picture at all.

"Of course, there are some mics I love desperately, and I can't get certain sounds any other way except by using those mics," says Torn. "But the Ampulator allows me to get my sound on tape—with feedback—at five o'clock in the morning."

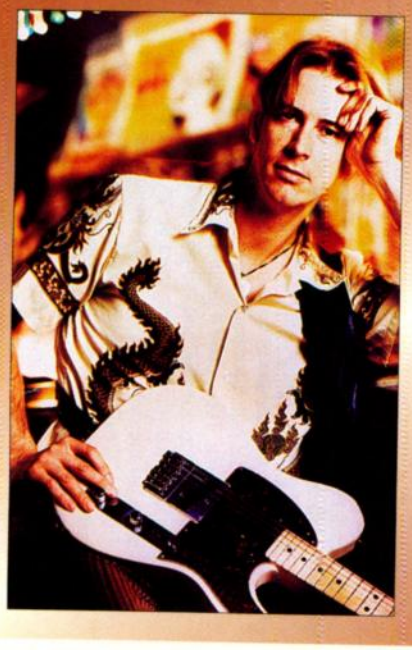
Lyle Workman

Lyle Workman is one of those guitarists who invite euphoric epithets such as "The Greatest Guitarist on the Planet." Able to cover a staggering array of styles, Workman has played with Todd Rundgren, Jellyfish, Tony Williams, Herbie Hancock, Stanley Clarke, and Frank Black and has produced a mind-boggling solo album.

On "The Last Stand of Shazeb Andleeb," from the latest Frank Black album, Workman used a single setup for the entire tune: a Fender Custom Shop Tele (outfitted with a Parsons-White B-Bender) and a Vox AC30 amp. Miking was also fairly conventional: a Shure SM57 and an RCA ribbon were each placed approximately four inches from the speaker cabinet.

"This track represents my most straightforward setup," says Workman. "The song required a clean sound, and the AC30 delivers a sparkling and nicely compressed tone. It was critical to get a good basic sound because everything we do goes down live. We only punch in to fix the inevitable weird notes that appear here or there."

To instill the sound of the album with a certain rawness, a 16-track head stack was installed on the Studer deck, instead of the usual 24-track heads. "The increased track width on the 16-track heads let us hit the tape with real high signal levels," explains Matt Yeaton, the album's engineer. "This meant that we could get that groovy sound of intense tape saturation and tape compression. And the limited tracks also forced us to make decisions on the fly, which added a sense of immediacy to the performances. We simply didn't have the luxury of laying down a bunch of tracks and waiting until later to decide which ones to use."



BILL REITZEL

Lyle Workman

Track: "The Last Stand of Shazeb Andleeb" (on *The Cult of Ray* by Frank Black; Epic)

Axe: Fender Custom Shop Telecaster with B-Bender

Pickup: Bridge

Amp: Vox AC30

Printed Effects: Tremolo; Way Huge Electronics Red Llama (boost for solo)

Mics: Shure SM57; RCA 77DX ribbon

Mic Pre: Console

Console: Custom Neve 8028

Recording Format: Analog (2-inch, 16-track)

Mixdown Effects: AMS RMS (reverb)

Matt Blackett *is a Northern California guitarist and instructor. His band, Cream of WeeGee, has a CD out on Bleufood Records.*

World Radio History

February, 1996
dbx engineering management brainstorms for ways to differentiate product in EQ marketplace.

March, 1996
Meanwhile, in a dark lab, dbx engineers work late at night on a revolutionary new noise reduction circuit design.

May, 1996
dbx engineers make presentation on the new noise reduction circuit. Management wants to hear it work. Engineers go back to the lab to perfect the process.

June, 1996
Engineers hand-solder the first prototype board with the new noise reduction circuit. They call engineering management to listen.

July, 1996
Rob Urry, President of dbx, and Roger Johnsen, Director of Engineering, listen to the new circuit and agree that this may be the feature they have been looking for. They decide that the circuit should be included on the new EQs. Looking for even more, they decide to develop a new Limiter design for inclusion on the new EQs.

Aug 9, 1996
Lynn Martin, VP Sales and Marketing hears the new circuit and doubles the forecasted domestic sales for the new EQs. John Batliner, International Sales, does the same.

Aug 19, 1996
dbx management decides to introduce the new line of EQs under the name "20 Series Equalizers with Type III™ Noise Reduction", at the fall AES show, to be held in Los Angeles during November.

20 Series EQ with TYPE III™ Noise Reduction

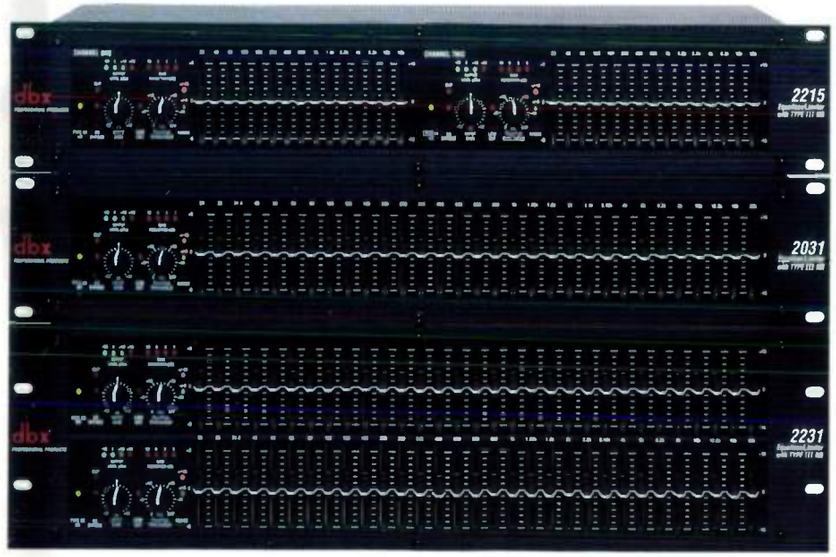
Aug 30, 1996
As press leaks occur, the phones start to ring with inquiries regarding the new EQs, which will include a patent-pending Limiter, PeakPlus™, and the new NR circuit, which will recover up to 20dB of signal-to-noise ratio.

September, 1996
Prototype equalizers are built by Engineering and testing begins. The new circuits work amazingly well, and the new EQs are scheduled to go to AES, and into full production after the show.

November 1996
At the AES show, people listening to the live demo think the Type III™ Noise Reduction switch is nothing more than a mute switch, the effect is *so* dramatic. The EQs receive positive reviews, and ads are placed in all the industry magazines.

EQ
SOUND COMMUNICATIONS
MIX
S&VC
LIVE SOUND!
Pro Sound News

February, 1997
dbx 20 Series EQs are released to the public in three models, featuring Type III™ Noise Reduction and PeakPlus™ Limiting (derived from the popular 1066). They are billed as an all-in-one answer for sound engineers who need limiting in a sound system, as well as the quietest EQs in the industry.



In live sound reinforcement and recording, it has become increasingly important to use the quietest gear possible. One of the weakest links in the chain can be equalization. It is important to note that dbx EQs are already very quiet, and the noise we are talking about would be present in any other EQ. Simply put, any typical equalizer can have up to 31 small "amplifiers" in the signal path, decreasing the signal-to-noise ratio by a significant amount. This can be a problem when you're trying to be as transparent as possible, and still provide a significant amount of reinforcement; sometimes even more than "significant." We all know how common complaints are about noisy sound systems.

To deal specifically with this problem, dbx unwraps Type III™ Noise Reduction in the new 20 Series Equalizers. When we were first designing these equalizers, we looked for something that would make it "more for less money." At the same time we were developing a noise reduction circuit with simultaneous encode and decode. The two turned out to be a perfect match for each other and Type III™ was developed to go into the EQs from the beginning of their development. Type III™ was engineered to offer the user the ability to reclaim up to 20dB of lost signal-to-noise ratio, due to noise in equipment such as an EQ. When a noise reduction circuit has simultaneous encode/decode, the problems of tracking, phasing, and error detection/correction become a problem of the past. With Type III™ there are no phase problems because the circuit tracks beautifully through the entire audio spectrum. Type III™ Noise Reduction eliminates the tracking and decoding errors that can occur in other independent encode/decode systems. After all, simultaneous means simultaneous; no floating filter artifacts, no pumping or breathing. Graceful, powerful, perfectly transparent. dbx Type III™ Noise Reduction is set to become another worthy standard in the audio industry.

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We did. We're dbx.

In fact, we put them together in one box.

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PROFESSIONAL PRODUCTS

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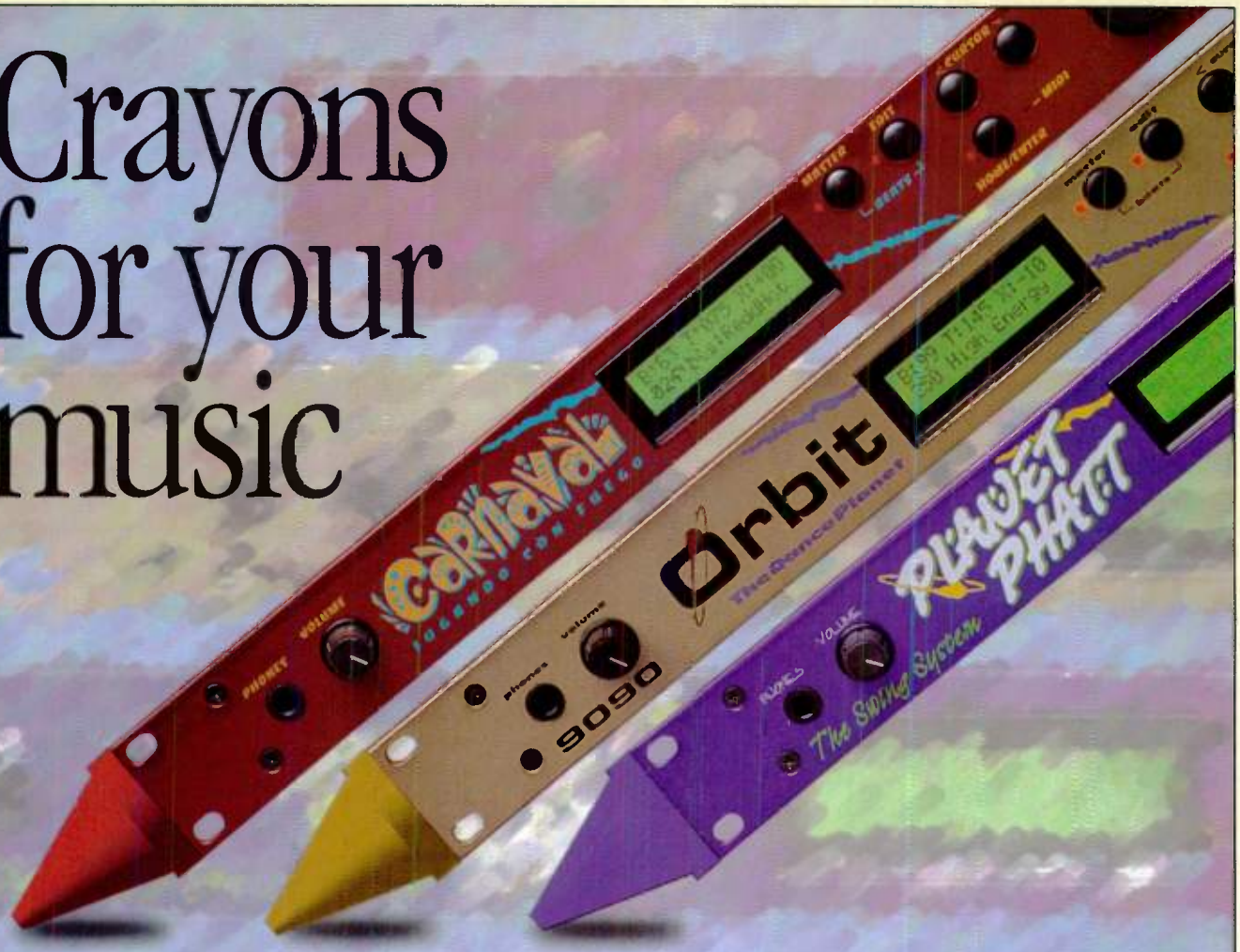
Crayons for your music



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Orbit V2 the Dance Planet™ V2– Hold on and get ready to sweat. Orbit will take you to places other products have only dreamed of going. High energy dance music pulsates out of Orbit using its powerful synthesis capabilities to create mind boggling sounds, beats and sound effects. Orbit focuses on rhythmic creativity by using two MIDI synchronized LFOs per patch to rip through its unprecedented selection of filters, creating rhythmic ecstasy and sound synthesis for the next millennium. Feel the energy.

Planet Phatt the Swing System™ – No boring, tired old sounds here—just slammin', funkadelic, in-your-face original sounds from E-mu's cutting-edge sound designers. Created specifically for hip-hop, rap, acid jazz and trip-hop, Planet Phatt has the features and sounds that hits are made of. Sounds and BEATS not only can be played back, they can be manipulated, dissected and pulverized in order to create a sound that is uniquely yours. This is a serious tool for the urban music scene. Get ready to swing.

Carnaval™ – The only sound module available created for any type of Latin music—salsa, tejano, Latin jazz, merengue and more. Carnaval features a huge palette of authentic and traditional instruments as well as Latin rhythmic loops, all controlled by E-mu's BEATS mode. With all the classic Latin sounds as well as modern sounds, Carnaval will add spice to your music. Turn up the heat. ¡Jugando con Fuego!

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Philippe Saisse Plays the New Yamaha AN1x.

As composer, producer and studio musician, Philippe Saisse is in demand by the who's who of the music industry. He's recorded with Tina Turner, David Bowie, the B-52's, Gato Barbieri, Luther Vandross, the Rolling Stones, David Sanborn, Billy Joel, etc. etc. etc. (Not to mention his own solo albums). When he plays

Philippe Saisse's "NuXT Voyage" available on Verve Forecast

with the best, what instrument does he play?

"Everything around me is Yamaha except my toothbrush," says Philippe, who used a CS1x synthesizer and 02R digital mixer on his last album. Now Philippe is particularly enamored of the new Yamaha AN1x virtual analog synthesizer. "It brings me back to the days when synths were warm and thick and you didn't have to be an engineer to make music; the AN1x is intuitive—just grab a knob and it does something."

Even with all the synthesizers out there, the AN1x is truly different. Call (800) 932-0001 ext. 690 for information. Or see it at a Yamaha synthesizer dealer.

Get an AN1x and, like Philippe, you'll be in good company with Yamaha.

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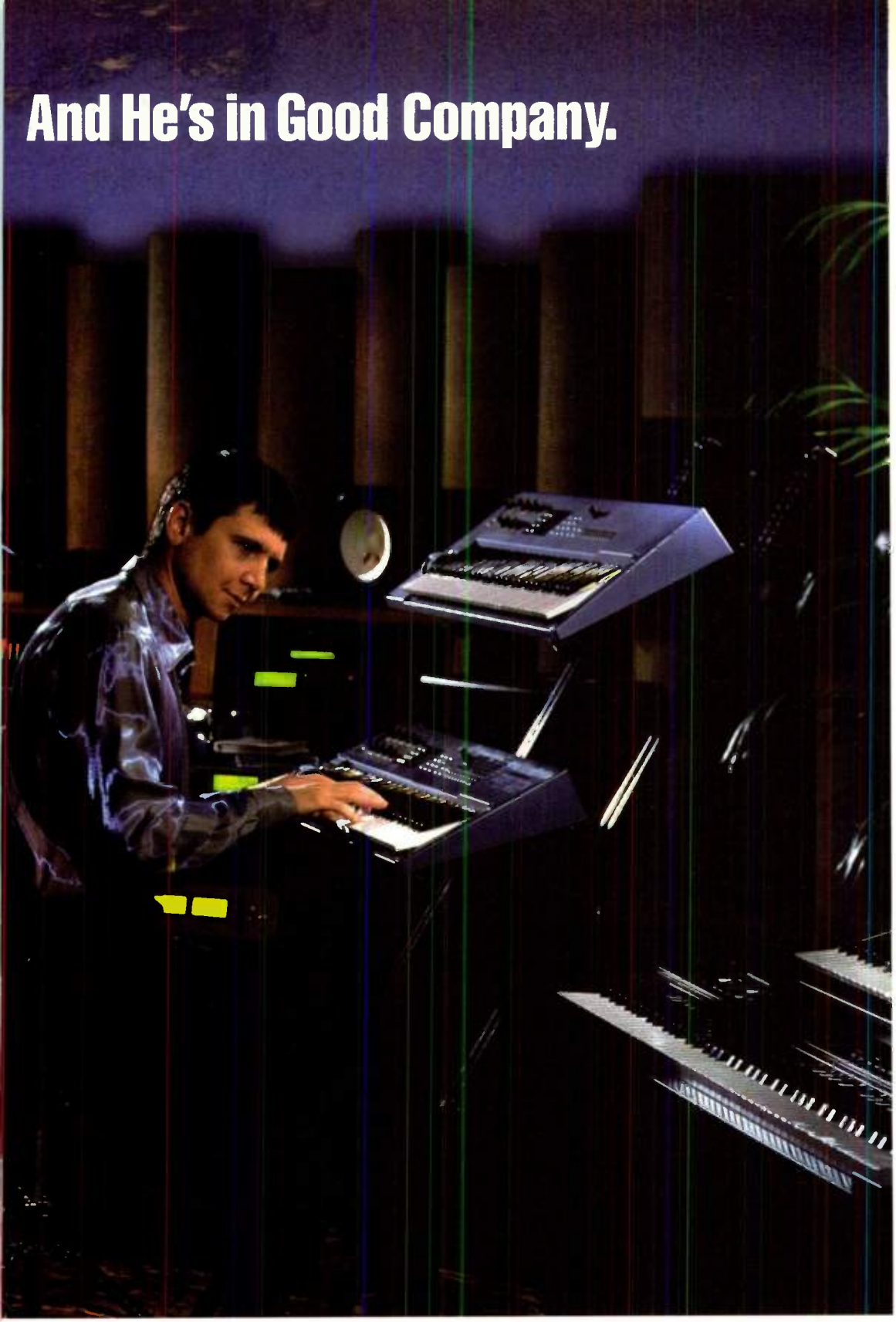
And He's in Good Company.



You've Heard Philippe with:

B-52's
George Benson
David Bowie
Peabo Bryson
Jonathan Butler
Culture Club
Kid Creole
Bill Evans
Dan Hartman
Nona Hendrix
Miki Howard
Takeshi Itoh
Mick Jagger
Al Jarreau
Billy Joel
Grace Jones
Chaka Khan
Sandy Lam
Al Di Meola
Hall & Oates
Nelson Rangell
Nile Rodgers
David Sanborn
Snap
The Power Station
The Rolling Stones
Tina Turner
Luther Vandross
Kirk Whalum
Vanessa Williams
Brian Wilson
Steve Winwood
Toshinori Yonekura

AN1x Specifications

KEYBOARD:
61 keys with initial/after touch

TONE GENERATOR:
Analog Physical Modeling Synthesis VCO x 2 (Sync, FM), Ring Modulator, Noise, LFO x 2, PEG, VCF (FEG), VCA (AEG)

POLYPHONY:
Maximum 10 notes

MULTI-TIMBRAL CAPACITY:
Maximum 2 timbres (with polyphony of 5+5 notes)

VOICE:
128 User voices

PATTERN GENERATOR:
Arpeggiator: 30 patterns; Step Sequencer:128 patterns

FREE EG: (Parameter Sequencer)
4 tracks per voice (maximum 16-seconds per Track)

EFFECTS:
Reverb x 12, Delay/ER x 9, Variation x 14, EQ (stereo 3-band) x 1

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Illustration by Joe Saxe

RICH MAN POOR MAN

Hang on to your wallet as EM compares eight high end low-end mic preamps.

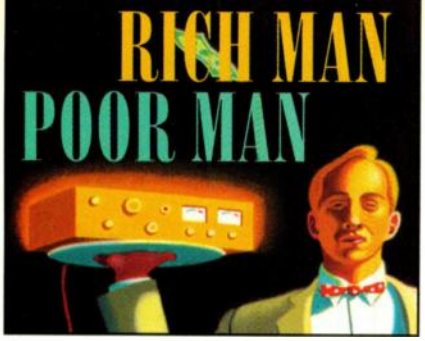
A fundamental premise of this magazine is that, thanks to numerous recording-technology innovations, it is now possible to produce music in a home studio that sonically rivals major-label releases. That's no meager supposition. It purports that a home studio costing, say, 30 or 40 thousand dollars can turn out mixes that sound almost as good as those made in studios costing millions. Fueling that premise are many new products released each year—so-called semipro and low-end stuff—that not only sound good but can be had for low prices.

But is it possible the potential of low-end recording has been exaggerated? Anyone who has been at this game for a while, and has gotten the occasional whiff of top-of-the-line gear, can't help but entertain suspicions that the tools we use aren't quite up to snuff. "If only I had what the big boys use at Capitol Records," we tell ourselves, "I could make a *really* great-sounding record." But the fact is, you don't have the resources of Capitol Records. What's an underfunded audio-visioncry to do?

Well, before despairing, you might want to check out the following little face-off at the EM corral. Because we're not only asking the hard questions, we're putting them to the test. To wit, what advantages, if any, are to be gained from using high-end versus low-end gear? Can one readily hear the differences? If so, are the differences subtle, moderate, or extreme? And finally, do they make that big a difference in the finished product?

By Brian Knave

World Radio History



You may think the answers to these questions depend largely on the type of equipment under consideration. That is, the sonic superiority of a half-million-dollar SSL console to a twelve-hundred-dollar Mackie mixer should be readily apparent, right? One would think so; but until you actually A/B an SSL with a Mackie, you *don't* really know. And therein lies the rub: most of our readers will never get an opportunity to compare SSLs with Mackies. (Hey, we probably won't either, so don't sweat it.)

Fortunately, not all recording gear is as unwieldy as a half-million-dollar console. So, to kick off our rich man/poor man comparisons, we've trained our senses on a smaller but equally critical element in the audio signal path: microphone preamplifiers. It's the mic preamp's job to provide gain to the signal produced by the mic. But we're not talking just any gain: ideally, it should boost the entire audible frequency range evenly, without imparting unwanted coloration or distortion.

The key word there is "unwanted." Actually, any audio electronic device necessarily imparts some coloration to a signal, however infinitesimal. The question, then, isn't simply how much the preamp colors the sound, but whether the sound it imparts is desirable. So grab a note pad and listen up as we put eight different mic preamps side by side for a careful comparison.

SELECTION PROCESS

We indulged the rich man/poor man theme by comparing four of the least expensive mic preamps with four of the most expensive. Also, we divided the ranks into solid state and tube (or tube-hybrid) models. To narrow the field, we weeded out preamps that offered EQ, digital converters, and other extras. These multitaskers (sometimes called *voice processors*) are increasingly popular, but for our purposes they only muddied the waters. After all, if you spend four grand for a stereo mic preamp featuring 20-bit converters, extensive onboard EQ, and full-featured dynamics processing, it's hard to know what part of the expense goes to the preamps. To keep the playing field as even as possible, we wanted units with similar basic features and controls. In the end, we settled on dedicated, stereo mic preamps with a minimum of extras—at least for seven of the units.

The eighth mic preamp was in a console. For the low-end, solid-state camp, we included what today is perhaps the most commonly found mic preamp in home and project studios: the Mackie. This same stalwart mic pre is found in all Mackie mixers, from the 1202 to the 8-bus analog models to the forthcoming 48-channel digital console. Considering that so many of our readers are familiar with Mackie mic preamps—not to mention that Mackie mic preamps have tracked countless productions, including a number of platinum records—it seemed sensible to include one as a reference point. For the second, "poor man" solid-state mic pre, we chose the Symetrix SX202, a diminutive and unassuming unit with a good reputation and low price.

For the high-end, solid-state category, we gravitated first to the highly acclaimed Millennia Media HV-3B, a 1994 TEC Award Nominee. Our second pick was the MPA 100 by Precision Analog Systems, a more-pricey but lesser-known Class A mic pre that came highly recommended.

There were several units to choose from in the tube category. For the low end, we picked the A.R.T. Dual MP and Bellari RP520, not only because of their popularity but also because they were the least expensive and most closely matched—feature for feature—with the other units tested. (Note, however, that A.R.T.'s Pro MPA is more closely matched to the Bellari RP520; we chose the Dual MP simply because it was cheaper.) Both the Dual MP and RP520 are hybrid designs utilizing tube and solid-state circuitry. The circuitry in the Dual MP is the same as that in A.R.T.'s single-channel Tube MP, a 1996 TEC Award nominee.

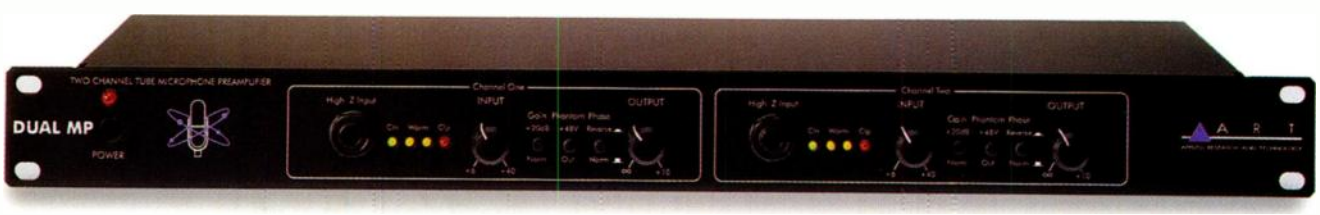
BRIAN KNAVE

Bellari RP520

For the high end, we chose a well-regarded veteran (and the most expensive unit in the bunch), the Tube Tech MP 1A, and a relative newcomer, the lesser-known but fast-rising Giltronics 2TMP. The 2TMP's cousin, model 356AT (which features the same mic preamps as well as dual line amplifiers), won Giltronics the 1996 AES Par Excellence Award from Pro Audio Review.

TEST METHODOLOGY

I tested all the units in my home studio using the shortest possible signal path: mic to preamp to recorder. To minimize variables, I used a single Neumann U 87, set on the cardioid polar



A.R.T. Dual MP

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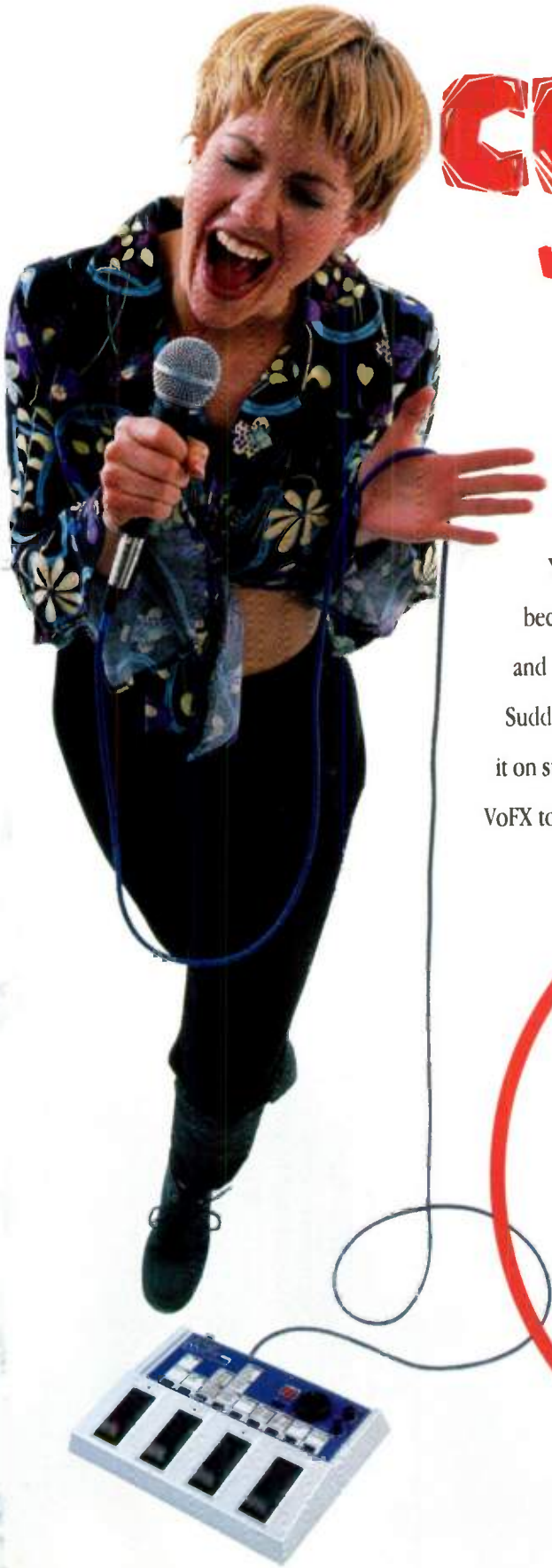

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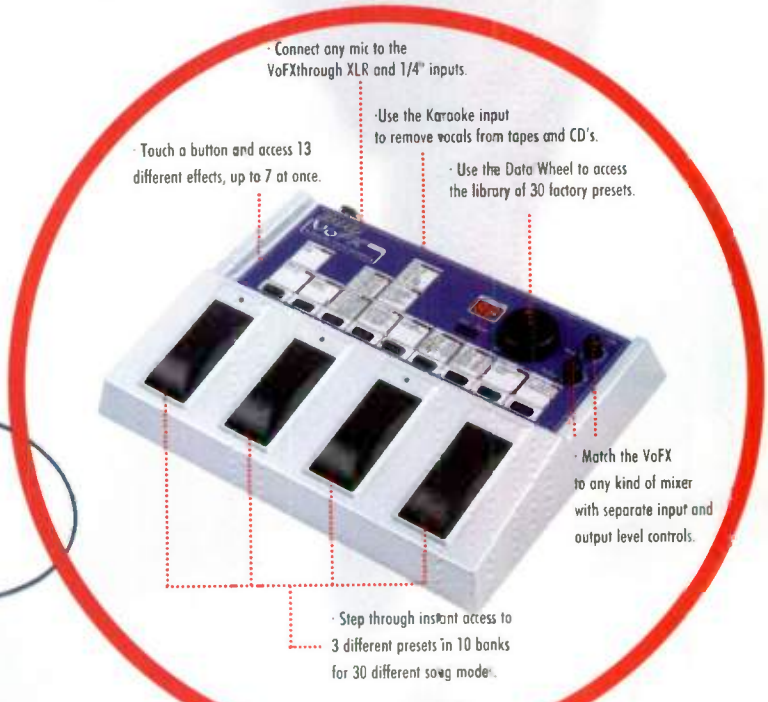

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Sound Designer

Stephen Hunter Flick is a communicator. As the two-time Academy Award-winning sound effects specialist whose work includes films like *Speed, Apollo 13,* and *Twister,* Stephen works with major studios (20th Century Fox, Universal, Sony Pictures to name a few) creating sounds that aren't just heard, but felt. From compiling over 2,000 sound files to create a massive tornado to transporting or even cutting straight to digital picture, Stephen's work takes space. Big space. Space like the 1 gigabyte capacity of the Jaz® drive. Incredibly, he used 41 Jaz drives at once on *Twister*, demonstrating its usefulness as an industry standard.

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World Radio History

pattern, for each of the five instruments recorded. For each unit, I connected the preamp's balanced outputs to a Whirlwind fan-out cable patched into an ADAT XT's EDAC connector (balanced inputs). For the Mackie console preamp, I patched the channel strip's direct out (which is unbalanced) into one of the XT's RCA (unbalanced) inputs, bypassing the console-strip and output-bus circuitry. To keep the unbalanced cable run short and noise free, I used the shortest cable I could find: a 3-footer.

I considered using higher-resolution A/D converters to minimize coloration from the ADAT XT, but I ended up going with the XT's converters on the grounds that it would better approximate conditions found in most home studios. Besides, the XT's 18-bit converters sound pretty darn good. Recording to the ADAT proved convenient as it allowed me to lay down all eight preamp tracks side by side. When it came time to compare signals, I simply muted the eight channels, raised the faders to unity gain, and then unmuted whichever channel I wanted to hear. This setup allowed me to flip back and forth rapidly between tracks to really pinpoint tonal differences.

The five instruments I recorded were acoustic guitar (a Martin D-35), female vocal (alto to soprano range), 18-inch medium crash cymbal (a hand-hammered Sabian), diatonic harmonica (Huang Silvertone) played in second (blues) position, and a 4-inch triangle.

I chose to test with an acoustic guitar not only because it outputs a wide frequency range with complex harmonic structure, but also because it's one of the instruments for which top engineers often specify a premium mic pre. Vocals was another obvious test. (I asked the "test" singer, Nancy Hall, to prepare an *a cappella* piece that used broad frequency and dynamic ranges.)

The cymbal test was an idea I got from John LaGrou of Millennia Media, who says, "We normally use bell tree, voice, and cymbal to test our mic pres. These sources were chosen for their complexity—we've found that high-partial energy is the most difficult to reproduce accurately in audio electronic circuits." I wasn't able to get my hands on a bell tree, so I used a small triangle instead. It proved an excellent test of high-frequency transients and upper-partial harmonics. As for harmonica, it's the instrument I've been playing longest (more than 28 years), so I figured it would be good for letting me test accuracy of tonal reproduction.

All listening tests were performed in mono—another sensible recommendation from LaGrou. Tracks were monitored dry through a Mackie 16•8 console with the EQ and low-cut filters disengaged. For speaker playback, I used a single Event Electronics 20/20bas (powered and biamplified) monitor. I also relied heavily on my Grado Labs SR-325 headphones—very accurate reference headphones boasting a frequency response from 18 Hz to 24 kHz.

Each instrument's tracks (excepting harmonica) were compared one against every other in a blind listening test performed by **EM** Editor in Chief Michael Molenda and Senior Editor Steve Oppenheimer. To keep these tests as "blind" as possible, I renumbered and reshuffled the tracks for each instrument, playing them back in a different order each time. This ensured that the subjects were not able to guess which track was which. For the cymbal, triangle, and harmonica, I also did extensive real-time comparisons of the original source to the recorded tracks.

The grueling real-time comparison tests required positioning my head between the monitor and instrument, listening first to the monitor, and then striking or playing the instrument and

BRIAN KNAVE

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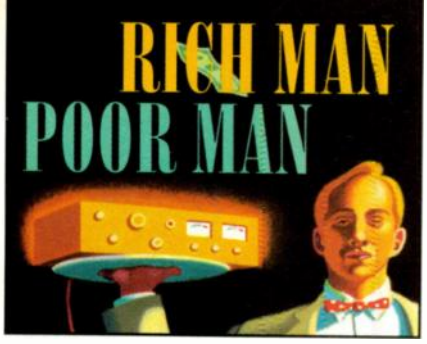

comparing the sounds. The triangle and cymbal were especially brutal; I had to test the products over a period of several days, taking frequent breaks to avoid burnout.

FEATURES

If you've witnessed, as I have, the relish and reverence with which some engineers describe their favorite mic preamps, you may wonder whether there's more going on here than meets the ear. In certain cases you'd be right, because some of these units are way cool on the eye as well.

The Tube Tech MP 1A was my favorite in the looks department. This hefty, blue, all-steel behemoth, if it weren't so shiny, might seem to have come from an army-surplus store, circa 1950. Its sparse front panel features two huge, black, antique-looking gain knobs (stepped in 5 dB increments) beneath a hemisphere of white numbers ranging from 20 to 70; long toggle switches for low-frequency cut (20 and 40 Hz), 20 dB pad, and 48V phantom power; a fat on/off knob; and a red power-on indicator light as big and bright as the one on a Fender Twin. The unit is also a DI preamp sporting two front-panel, unbalanced ¼-inch DI inputs (-10 dB). From the MP 1A's rear panel extend two cylindrical output transformers and a large, square, main transformer. Also on the back panel are balanced XLR input and output connectors. The 2U rack-mount unit is internally powered and has a detachable power cord.

Another hip, retro-looking mic pre is the Bellari RP520. Sporting a gold-colored aluminum faceplate and dual, needle-style VU meters, this 2U rack-mount box offers Gain and Volume (output) controls for each channel, as well as phantom power, 30 dB pad, and line input. Having controls for both gain and output levels allows the user to dial in clean settings or push the tubes hard to increase warmth. The RP520's VU meters, which monitor output level of the tube stage (responding only to changes in the Gain control), are helpful for setting levels that provide the best signal-to-noise ratio. In addition to the 30 dB input pads (located on the front panel), the rear panel offers 30 dB output pads as well, giving the preamp considerable gain-level flexibility. The unit's rear-panel I/O is flexible, too, offering balanced XLR input and output connectors as well as *two* unbalanced ¼-inch connectors per channel. Rear-panel phase-reverse switches are also provided. The internally powered unit has a fixed power cord.

BRIAN KNAVE

Singer-songwriter Nancy Hall of the San Francisco–based band the Curios plays her Martin D-35 into a Neumann U 87 for EM's preamp listening tests.

I also liked the elegant visual vibe of the Giltronics 2TMP tube preamp. The shiny black faceplate of this sturdy, 2-rackspace unit is cleanly laid out; each channel offers a continuous output-level control and four toggle switches: one each for phantom power, phase reverse, 20 dB pad, and sensitivity (which provides a further 10 dB of attenuation). The rear panel offers balanced XLR inputs and outputs and a detachable power cord.

Of the tube preamps tested, the A.R.T Dual MP was the only single-rackspace unit. The flat-black front panel provides input- and output-level controls and a "High Z" line-level input jack for each channel as well as switches for phantom power, phase reverse, and 20 dB gain (the opposite of a 20 dB pad). Each channel also sports a 4-step LED array that displays how the tube gain is affecting the input signal. The first indicator light is green and labeled "Cln" for clean. The two yellow lights in the middle are labeled "Warm." The last one, labeled "Clp," is red and lights at approximately 6 dB before clipping (or, as the manual puts it, "audible distortion") sets in. As with the Bellari RP520, the Dual MP's input and output controls allow the user to select a clean sound or to dial in varying degrees of warmth and tube distortion. The unit's rear panel provides balanced XLR input and output connectors as well as an unbalanced ¼-inch output connector. The Dual MP is internally powered and has a fixed power cord.

The snazziest-looking solid-state mic pre was Precision Analog Systems' MPA 100. The back, sides, removable rack ears, and front-panel perimeter of this stylish and sturdy 1U rack-mount box are made of anodized aluminum finished in a deep red. The front panel is off-white colored with a Lexan overlay. It features continuously variable gain controls (20 dB to 50 dB with an option for 60 dB) and four red, European-style, push-button switches per channel. The switches—for phantom power, 20 dB pad, phase reverse, and mute—are paired with individual indicator lights in red, green, yellow, and red, respectively. The front panel also provides 10-segment LED meters (five green, five yellow, ranging from -20 dB to +10 dB) and a separate peak-indicator light for monitoring output levels

BRIAN KNAVE

Millennia Media HV-3B

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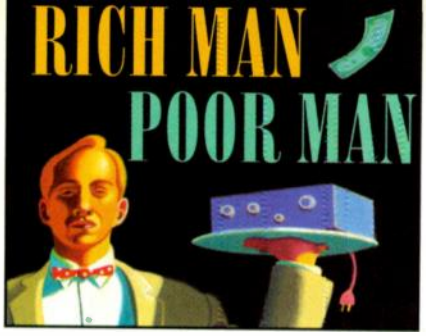

(set for +24 dBu). The MPA 100's rear panel offers balanced XLR inputs and outputs, ground/lift switches for each output, a DC ground/lift switch, and a power fuse. The unit's power cord is detachable.

Millennia Media's HV-3B is a rugged, black, 1U rack-mount preamp with a down-to-business demeanor. The unit's front panel provides two toggle switches, two indicator lights, and a stepped gain control per channel. The 12-position gain knob is incremented in 1.5 dB steps. A tiny, 3-position toggle to its right "ranges" the gain by 18 dB, providing a total range from 8 dB to 60.5 dB. The other toggle is for phantom power. The indicator lights show normal operation (green) and nominal peak level (red), which lights at +24 dB. (Actually, the unit can deliver unclipped, undistorted signals at over twice this level.) The toggle switch for AC power is situated next to an array of four green DC power-supply indicators labeled -25, +25, +50, and +130. (The +130 indicator is for units outfitted with the B&K High Voltage option, for use with high-voltage B&K microphones; my test unit didn't have this option.) The HV-3B's rear panel offers balanced XLR inputs and outputs, a voltage-selection switch (either 115 VAC or 230 VAC), a power fuse, and a detachable power cord.

Of the bunch, Symetrix's SX202 was the runt. This lightweight, ½-rackspace unit is dark gray with pale gray knobs and switches. A no-brainer to operate, it offers continuously variable gain controls (ranging from 20 dB to 60 dB), a 15 dB pad, and an LED clip light per channel. (The red clip light comes on when the preamp output is within 4 dB of clipping.) Phantom power is supplied to both channels with a single switch. The left channel also provides a phase-reverse switch. The SX202's rear panel offers balanced XLR inputs and balanced/unbalanced ¼-inch TRS-jack outputs. There is also a ¼-inch balanced/unbalanced TRS jack that sums the inputs of the two channels. Of the preamps tested, the SX202 is the only one that requires external power (from a wall-wart power supply).

LISTENING TEST

For the most part, the differences between the preamps was subtle, sometimes extremely so. Also, each fared differently depending on the instrument. Surprisingly, it wasn't always a case of the more expensive units sounding distinctly "better" than the cheaper ones. Though the less-expensive units tended to color the source sound more than the high-end units, it was precisely this added coloration that led Molenda or Oppenheimer to sometimes favor a low-end preamp's sound during the blind listening tests. One place where the more expensive preamps clearly shined, though, was headroom. I'm not talking about specs as much as the sound of the unit when hit with a big transient peak or sustained loud note. Again, the difference wasn't drastic, but without exception the more expensive mic preamps better accommodated extreme dynamic changes.

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As a group, the tube units obviously sounded different from the solid-state ones. Interestingly, both low-end tube preamps offer a way to adjust the amount of tube distortion (using the separate input- and output-level controls) whereas their more expensive counterparts do not; but even at their cleanest settings, neither the Bellari RP520 nor the A.R.T. Dual MP was quite as uncolored sounding as the Tube Tech MP 1A or Giltronics 2TMP. On most instruments, the high-end tube models tended to sound cleaner, truer, and slightly less "tubey" than their low-end counterparts. That is, they imparted a "roundness" to the sound but without adding as much bass and midrange (and noise) to the signal as the cheaper tube preamps.

Instrument Applications. Now we'll look at specific findings from the listening tests while considering the instruments one at a time. That will help show which mic preamps were more flattering—and which more faltering—on each instrument.

Acoustic Guitar. On acoustic guitar, I preferred the sound of the solid-state mic preamps. Of those, my favorite was the Precision Analog Systems MPA 100, which was slightly warmer and less "clinical" sounding than the Millennia Media HV-3B. (Molenda described these two preamps as "well mannered"; while Oppenheimer found the MPA 100 a "smidge muddy.") The Symetrix SX202 sounded remarkably good, too, although it was not quite as accurate and uncolored sounding as the Millennia or Precision Analog units.

In the blind test, both Molenda and Oppenheimer favored low-end units. Molenda liked the Symetrix, which he called "calm and elegant sounding"; Oppenheimer preferred the darker, warmer timbres of the A.R.T. Dual MP and Bellari RP520.

Vocal. We all had the same favorite on vocals: the Tube Tech MP 1A. It lent a very mild and pleasing tube coloration to the voice without sounding boxy or unnatural. When our singer opened up on high, loud notes, the Tube Tech was right there, never faltering or clouding over. In comparison, the A.R.T. and Bellari, though both sexy sounding, were not as realistic (they added more low mids) and seemed to choke a bit when the singer belted.

BRIAN KNAVE

Symetrix SX202

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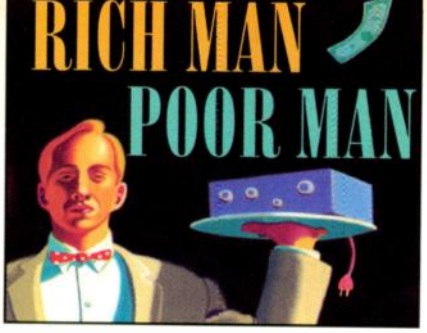


Following close on the heels of the Tube Tech was the Giltronics 2TMP, which sounded very similar to the Tube Tech, but cleaner and slightly less tube-like. (In this case, the Tube Tech seemed to impart the more seductive blend of accuracy and tube coloration.)

The solid-state units sounded good on vocals as well but seemed thin compared to the tube preamps. Molenda liked the Precision Analog best, which he described as "very even and transparent." The Millennia Media was almost identical sounding but seemed a tad more "edgy" and thin. The Symetrix was warmer and darker than the Mackie; compared to the rest, though, both sounded slightly "enclosed" or boxy. And in comparison to the Millennia and Precision Analog, the Symetrix sounded warm and almost tube-like whereas the Mackie came off as crisp and slightly harsh.

Harmonica. Careful real-time comparisons revealed that the Millennia was the most true sounding, with no audible coloration. Again, the Precision Analog was slightly warmer and less edgy sounding and made the notes seem ever-so-slightly thicker. The Symetrix was warmer and thicker still whereas the Mackie sounded thinner and brighter, though not bad by any means.

The tube preamps were less natural sounding than the high-end solid-state units, but I preferred their tone for harmonica. Of the four, I liked the Giltronics best: to my ear, it complemented the harmonica perfectly, resulting in a fat, full, yet very natural tone. The Bellari was a touch brighter and more aggressive but sounded almost as delicious. The Tube Tech sounded great, too, but in comparison seemed slightly tame. Of the tube units, the A.R.T. was definitely warmest and thickest, but there was the slightest muffled quality in its sound.

Cymbal. The Millennia Media did the best all-around job of duplicating the sound of the crash cymbal, and the unit was also the favorite in the blind test. It produced a clear, balanced picture, with all frequencies and dynamic characteristics present and accounted for. The Precision Analog was almost identical sounding, but compared directly to the live cymbal it seemed to slightly enhance some of the lower frequencies. Surprisingly, the Bellari came next closest to replicating the balance of frequencies and overtones in the cymbal whereas the Giltronics, though slightly darker, produced a fuller, richer tone than the Bellari.

The A.R.T. cymbal track was darker still with good sustain but slightly less attack. The Tube Tech provided great attack and sustain but mildly enhanced the highs. The Mackie, though it had good attack and sustain, really lost a portion of the low mids, making the cymbal sound noticeably brighter than it did in actuality. The Symetrix sounded similar to the Mackie, with mildly exaggerated highs, but was slightly more true to the source.

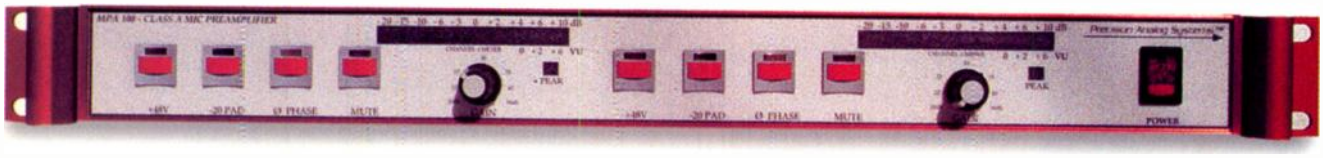
Triangle. Interestingly, the triangle evoked more distinct timbral differences from the different mic preamps than any other source sound. It also seemed to turn some of the other results on their heads. Again, though, the Millennia produced the most accurate sound, virtually indistinguishable from the source. The Precision Analog was extremely close, but it gave the triangle a pinch more body and increased the "clunk" of the dead hit (the muted, lower-pitched strike produced with the fingers close around the instrument).

The most musically pleasing triangle sound came from the Tube Tech. It was bright yet round and pretty sounding. The Mackie also produced a round, pleasant tone that, unexpectedly, was not overly bright. Surprisingly, in this case the Symetrix was considerably brighter than the Mackie, almost to the point of being brash. It noticeably exaggerated certain upper harmonics.

Tube Tech MP 1A

Another preamp that made the triangle sound very musical was the Bellari; at the same time, however, it plainly diminished a lower harmonic that was present in the source. The A.R.T., on the other hand, made the triangle sound heavier than it was and exaggerated certain high partials at the same time, resulting in a slightly harsh tone overall that Molenda described as "gronky."

The biggest surprise, though, came from the Giltronics preamp, which altered the tonal balance of the triangle



BRIAN KNAVE

Precision Analog Systems MPA 100

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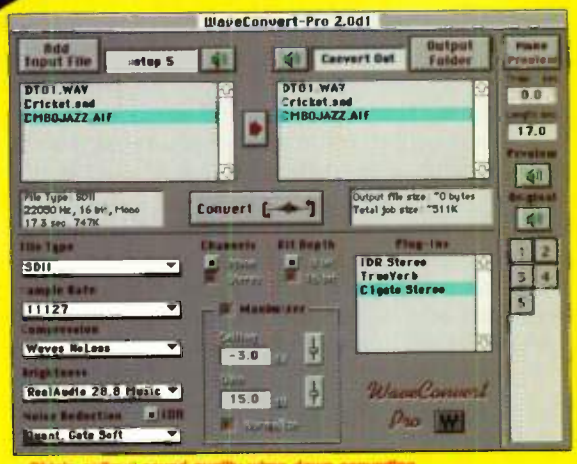

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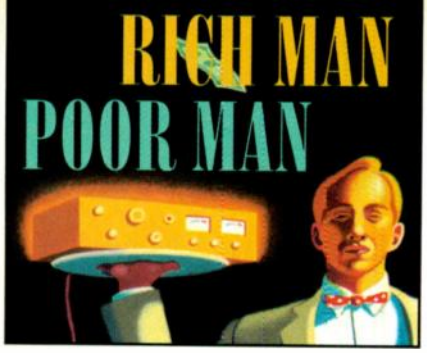

considerably. The resulting sound was excessively bright and metallic, pronouncing the clang of the beater but de-emphasizing the sustain of the triangle's primary pitch as well as the warm "clunk" of the dead hit. Thinking I had maybe screwed up while recording, I went back and twice rerecorded the track. But the results were the same.

OVERALL PERFORMANCE

Here are some pronouncements on the audio quality of each of the individual mic preamps.

"RICH" SOLID-STATE PREAMPS

Millennia Media HV-3B. For sonic accuracy, transparency, and realism (i.e. least amount of coloration), the HV-3B leads the pack. This is the unit I'd choose for live stereo recordings of jazz, classical, or any other style of music for which sonic realism is desirable. The precisely stepped gain controls make it a snap to match stereo levels, and the high headroom allows for dynamic surprises.

Precision Analog Systems MPA 100. This unit sounds very similar to the Millennia Media, but it imparts a slightly warmer, thicker sound to the signal. I found its pinch of coloration musically pleasing, and for studio use I would probably choose the MPA 100 over the HV-3B. (Also, in the studio, I would prefer to have continuously variable gain controls.) But either of these units is a class act and would significantly enhance anyone's studio or live-recording rack.

"POOR" SOLID-STATE PREAMPS

Symetrix SX202. For a low-cost, solid-state mic pre, the SX202 is hard to beat. Though a tad less accurate and transparent than the high-end units, it is nonetheless a clean and very good sounding preamp. On most instruments, it provides a warmer, smoother, fuller sound than the Mackie preamps. Thanks to its size, this would be a great mic pre for stereo location recording or for stereo-miking, say, a grand piano. In the studio, it does a fine job on vocals, acoustic guitar, and other sources, providing an attractive and economical upgrade for the home or project studio.

Mackie. Compared to most of the other mic preamps in this face-off, the Mackie preamp came out sounding bright, crisp, and a tad thin. Of course, context is critical, because sometimes you may want a bright, crisp sound.

For example, though the lone acoustic-guitar track recorded through the Mackie sounded brighter than the other guitar tracks, Molenda remarked that it would be his first choice for a rock song. In that case, the enhanced highs and bright, percussive attack would complement the mix. Then there's the considerable price differential: for the price of one Mackie CR1604-VLZ mixer ($1,199), you get *sixteen* mic preamps. No matter how you slice it, that's still less than $75 per mic pre.

"RICH" TUBE PREAMPS

Tube Tech MP 1A. If I were a rich man, this is the mic preamp I'd take home—if only for how luscious it sounds on vocals. The MP 1A imparts a

SHOW ME THE SPECS!

Here's a basic specification chart for the rich and poor preamps we auditioned. We say "basic" because each manufacturer derived these specs from different test methods, and finding "level playing field" ratings proved to be near impossible. If you crave the comprehensive data, try cruising the manufacturer Web sites.

Manufacturer/ Model	Type	Maximum Gain	Frequency Response	Dynamic Range	Equivalent Input Noise	THD	Stereo Crosstalk	Price
A.R.T. Dual MP	tube hybrid	70 dB	10 Hz–20 kHz	>100 dB	-129 dBu	<0.1%	>75 dB	$329
Bellari RP520	tube hybrid	70 dB	20 Hz–40 kHz	129 dB	-129 dB	0.1%	n/a	$600
Giltronics 2TMP	tube	50 dB	20 Hz–20 kHz	100 dB	-123 dB	<0.05%	>70 dB	$2,100
Mackie	solid state	60 dB	20 Hz–50 kHz	>110 dB	-129.5 dB	<0.004%	>75 dB	n/a
Millennia Media HV-3B	solid state	65 dB	2 Hz–300 kHz	127 dB	-131 dB	<0.002%,	>120 dB	$1,895
Precision Analog Systems MPA 100	solid state	60 dB	5 Hz–180 kHz	>120 dB	-127 dB	<0.009%	>90 dB	$2,195
Symetrix SX202	solid state	66 dB	20 Hz–20 kHz	>110 dB	-127 dBV	0.007%	>75 dB	$319
Tube Tech MP 1A	tube	70 dB	5 Hz–60 kHz	>110 dB	<-87 dBm	0.065%	>60 dB	$2,395

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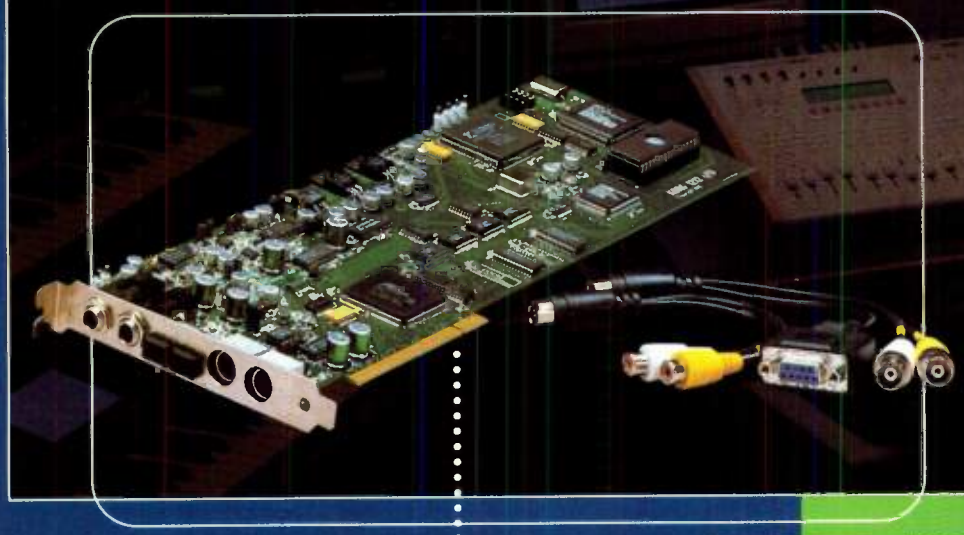
SoundLink DRS 1212 I/O
Multi-Channel Audio Interface



The SoundLink DRS 1212 I/O, along with Deck II software, brings the price of full-function, multi-channel computer based recording to a point that just about anyone can afford. And since the 1212 I/O conforms to the new PCI format, your investment will last longer than just a few months!

With the power of advanced personal computers, full-function multi-channel recording and editing is possible without the addition of costly, specialized hardware. The only true limitation has been in the area of multi-channel I/O. With the introduction of the SoundLink DRS 1212 I/O Multi-Channel Audio Interface, that limitation no longer exists.

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The new 1212 I/O even offers a Word Clock input and output, plus an ADAT time code input, for system synchronization. Between the 1212 I/O with Deck II software, the 168RC Recording Console, an ADAT and a Trinity Music Workstation DRS, the combinations and configurations can meet the needs of just about any music production application.

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mild and consistent tube coloration that never sounds boxed in, overbearing, or unnatural. And no matter how hard you hit it, the sound remains musical and open with no sense of being constrained by a low ceiling. In addition, the thing is built like a tank, and the DI inputs add extra usefulness.

Giltronics 2TMP. The 2TMP sounds very similar to the Tube Tech but with slightly less tube coloration, resulting in a generally brighter tone (except on cymbals, where for some reason it sounded darker). Compared to the low-end tube units, the 2TMP is sweeter, less aggressive, and more natural sounding. But it still maintains the lush sound tube preamps are prized for. Except for the weirdness I heard in the very high end (on the triangle), this unit is a definite contender.

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"POOR" TUBE PREAMPS

Bellari RP520. Just as the Giltronics and Tube Tech preamps sound similar, so do the Bellari and A.R.T. Compared to the Dual MP, though, the RP520 is slightly brighter, thinner, and more "edgy" sounding—yet more accurate in reproducing the source sound. The differences are subtle, though. Also, bear in mind that both units feature input and output controls, which allow for a range of tonalities from "clean" to "toasty." Compared to the high-end tube units, both the Bellari and A.R.T. preamps were a wee bit noisy.

A.R.T. Dual MP. The Dual MP consistently produced the warmest, fattest sound of the mic preamps we tested. Both Molenda and Oppenheimer rated it high on vocals and acoustic guitar in our blind listening tests. If you're looking for a cheap fix to "warm up" your digital tracks or make your vocals thicker, darker, and more lush sounding, this unit could be just what the doctor ordered. However, for my tastes, it occasionally proved *too* warm and thick sounding. Thankfully, the fat, low-mid enhancement never reached the point of obscuring upper-end clarity. Considering its low price, this box is one heck of a good deal.

THE BOTTOM DOLLAR

I know that I've resorted to the word "slightly" a lot in this article, but it's the adverb that best qualifies many of the tonal differences I've been trying to describe. Believe me, it took careful listening just to hear some of the differences I've described.

What I've learned—in this admittedly limited and subjective test—is that microphone preamplifiers don't all sound the same, but given a certain minimum level of quality, they don't sound all that much different, either. The analogy that comes to mind has to do with buying a mountain bike. For a thousand dollars you can purchase a good-quality mountain bike that weighs in at around 27 pounds. For two thousand dollars you upgrade to advanced, lightweight components that bring the weight down to 24 or 25 pounds. Spend three thousand and you get a 22-pound bike built of space-age materials. Clearly, doubling the expenditure does not reduce the weight in proportion.

It's a similar situation with mic preamps: you spend five, six, maybe ten times the money and in exchange get a fraction more accuracy, transparency, or whatever. Meanwhile, the low-rent version performs the same basic function almost as well and in some circumstances—musically speaking—may sound as good or better. Nonetheless, it's entirely understandable that people pay handsomely for that extra bit of quality. After all, it's our music that's at stake.

I have also learned that mic preamps are similar to microphones in that they both play a foundational role in equalizing a signal. In the act of creating the signal, a microphone imprints its EQ "curve" on the signal. This imprint is what we call the sound of the mic, captured on tape. In that sense, the mic preamp can be thought of as

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the second stage of EQ. Its EQ imprint, however, is usually even more subtle than the microphone's.

The cymbal tracks provided the clearest illustration of that subtlety. While switching quickly back and forth between them, listening to the steady decay of the crash, I could hear minute shiftings in the balances of frequencies. To get a sense of those shadings, put your lips into a whistle position and then, while saying "shhhhhhhhh," slightly move your lips. You will hear something like the shift I'm talking about.

Because each mic preamp offers a slightly different sound, ideally one could choose among them as one chooses among microphones, looking

The real-time comparison tests were grueling.

for the preamp that best complements the source sound (and mic). Of course, the expense and "research time" involved in such an approach makes it impractical for most recordists. But for the sake of sonic variation, it's not impractical, ultimately, to have at least a few different mic preamps lying around. In that case, for example, you would almost certainly want to have a tube mic pre as well as a solid-state unit.

Back to the original questions we posed, my conclusion is that there's not necessarily a direct correlation between amount of dollars spent and amount of "sound quality" received. The very nature of music (and sound) is too subjective for that kind of reductionism. However, it is fair to say, regarding mic preamps, that the more expensive units are typically quieter, more accurate, and more transparent sounding than the lower-dollar ones. Also, based on their construction, I would say it's likely the higher-dollar preamps will prove more durable as well. Beyond that, you'll have to draw your own conclusions.

Assistant Editor **Brian Knave** *apologizes to any women, rich or poor, who might feel excluded by the title of this piece. Special thanks to Nancy Hall, Event Electronics, Neumann, and Whirlwind.*

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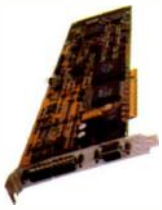

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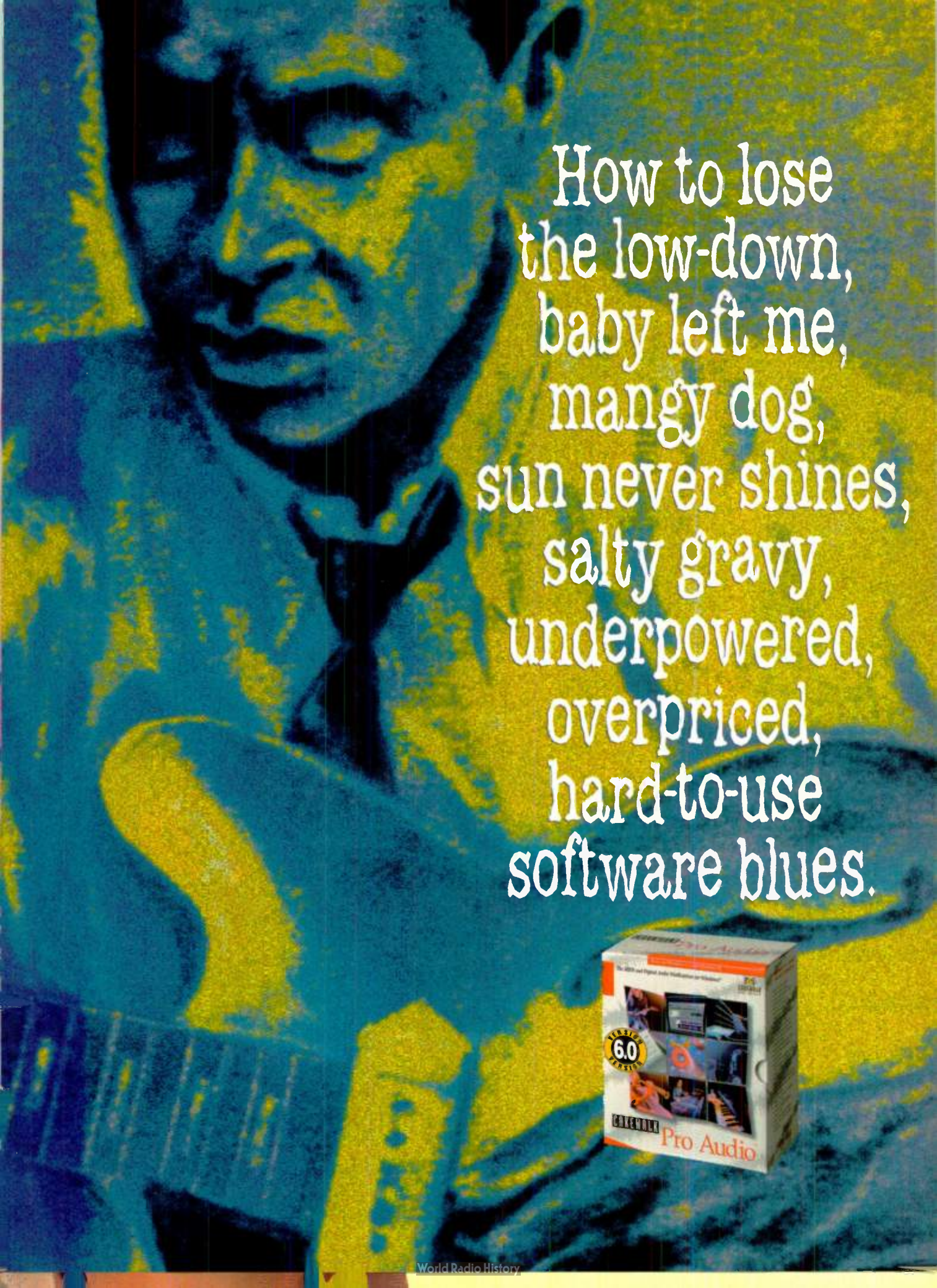

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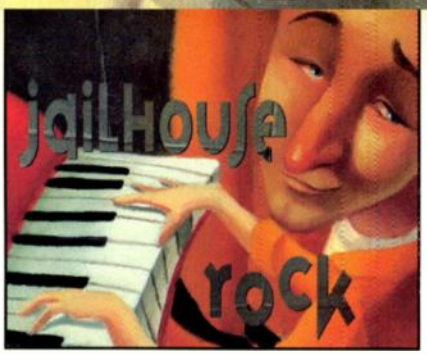

In 1976, a former contact from San Francisco talked to BeauSoleil about scoring an underground film he was producing. A TEAC 2340 4-track machine was brought in for the project, and the Freedom Orchestra was born. "We improvised on different themes to create the score," BeauSoleil recounted. "When the recording was over, I had to use a razor blade to edit hours of tape from these long jam sessions to fit the film."

BeauSoleil got his first hands-on exposure to electronic music during the recording of the soundtrack. "I needed to enhance the sound palette of the basic rock instrumentation we'd used. I read *Polyphony* magazine [which later became *Electronic Musician*] and a couple of books by Craig Anderton to learn how to build my own circuits and instruments. From there, I graduated to building modules from scratch using parts from electronics surplus houses, and I used the modules to create new sounds." Thereafter, he studied audio electronics for several years in a prison vocational electronics program.

This learning phase gave him the opportunity to develop skills he has put to good use ever since as a synth programmer and engineer. In 1984, he persuaded Jerry Kovarsky of Casio to loan him a CZ-1 synth in exchange for developing sounds for the instrument. (Kovarsky is now with Korg.) This was BeauSoleil's first experience with digital programming, but because the instrument was based on an analog architecture, he was able to complete several volumes of sounds. He is also a guitar player, so Casio later provided him with a PG-380, a MIDI guitar synth that he still uses as a stand-alone instrument. Actual programming of the PG-380 had to be done on Casio's rack-mounted VZ-10, from which patches were transferred on a data card. This programming experience and his connections at Casio later led to programming gigs with Ensoniq for the KT-76 synth, Kawai for the K4 synth, and Kurzweil for the K2000.

One of the Activities Section's bands rehearses in the studio's live room.

In addition to his other projects, BeauSoleil is currently doing field testing for Harvey Starr of Starr Labs on the Ztar, a guitar-like synth controller. Years ago, BeauSoleil began developing a similar instrument, which he called the Syntar, but because of technical limitations, he was never able to get it off the ground. He has high hopes for the Ztar, however. "Harvey has created a wonderful instrument. It is solid state and digital, electronic from the ground up with no physical strings. The fingerboard is all buttons in rows like strings, although there is a version with string triggers for the right hand. The standard version has rows of trigger buttons arranged in a string-like fashion so they can be tapped or strummed, and they have aftertouch capabilities, which is a big advance."

Bobby BeauSoleil holds his Casio PG-380 MIDI guitar synth that he received in exchange for developing a library of sounds for it.

GETTING WITH THE PROGRAM

Finally, in 1994, BeauSoleil requested to be transferred closer to family and was moved to the Oregon State Penitentiary (OSP) in Salem. Through this change of location, he found a change in possibilities. Because of budget cutbacks and the resulting dismantling or reduction of cultural programs, the California system had not allowed much room for creativity. What he found at OSP was an administration very interested in finding ways to help people change their behavior patterns. More specifically, prison officials wanted to institute a video-production program. Several years prior, a project to install an audio-recording facility had been launched, as well, and the work had gone as far as the wiring of two

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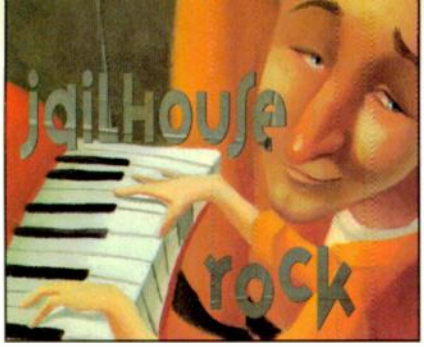

rooms with XLR and ¼-inch patch panels. That project had been abandoned, and one of the rooms was being used for storage when BeauSoleil arrived. He had taken training in basic video production at Tracy and Soledad prisons in California, so he convinced prison officials to let him assist in developing the video facility and completing the audio studio, as well.

This turn of events gave BeauSoleil the chance to act on the philosophy he'd developed after so many years in prison. "You can get locked into routines in prison that are designed to make you feel powerless unless you take measures to create opportunities for yourself," he says. "People in prison tend to be conditioned by the environment to feel like they can't make it any different, but I've found ways to make time work for me rather than having time done *to* me."

Aside from the new wiring, though, about all BeauSoleil found in the "A/V room" was 20-year-old guitar amps, a tired drum set, and a noisy P.A. With the cooperation of the OSP administration, BeauSoleil started getting in touch with his old music-industry contacts. Those contacts became even more important after Oregon voters passed Measure 17, which diverted funds that might have, among other things, provided money for developing the new studio.

"In this day and age, we can't count on taxpayer dollars to fund this kind of program. Money is being funneled into building more prisons and buying more beds," BeauSoleil explains. "But I'm not trying to pat myself on the back for what's been accomplished here. The credit for the response we've received belongs to the people in the industry." And respond they have. In addition to those who have contributed gear in exchange for programming, other equipment manufacturers, including Mackie, Hafler, KRK, Kawai, A.R.T., Fender, MESA/Boogie, and Paradigm, as well as software companies, such as Keyfax and Beatboy, have either loaned or contributed equipment to the program. (See sidebar "Pitching In" for some insights from a few of the contributors to the OSP A/V program.)

The undertaking of setting up the studio received mixed reactions from his fellow inmates. Being a new guy from another state, BeauSoleil was viewed with some reservation. Thomas "Zinn" Dickerson, BeauSoleil's coworker in the A/V program and one of OSP's rap artists, says, "We had to talk a lot in the beginning to be able to understand each other. There's naturally a lot of tension here because of the environment and the way it can affect guys. But Bobby has the patience to try to get them to understand what he's trying to do and to get through to them."

WORKING THE SYSTEM

An interesting thing about the A/V program is how it's able to "justify" its existence. The same Measure 17 that diverted funds from the development of the program also requires that all

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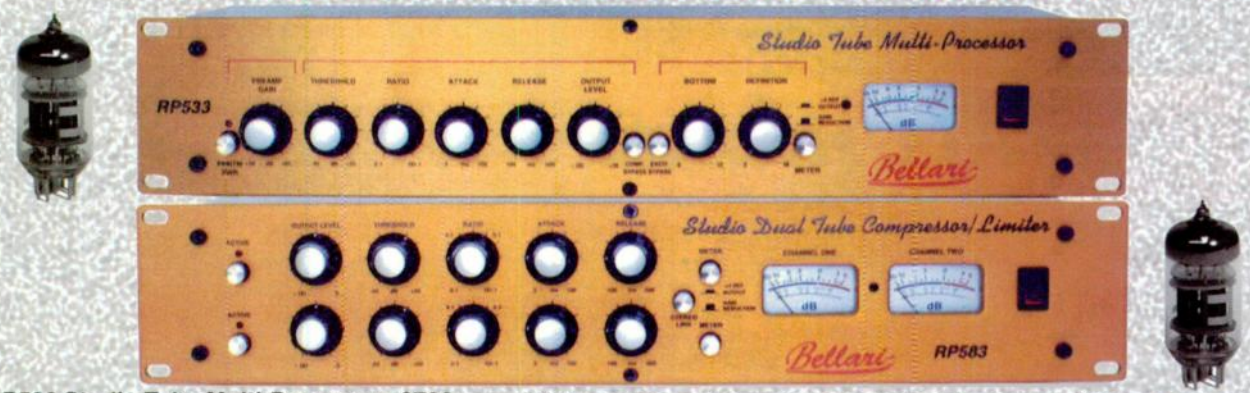

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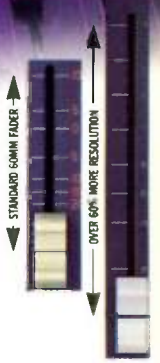

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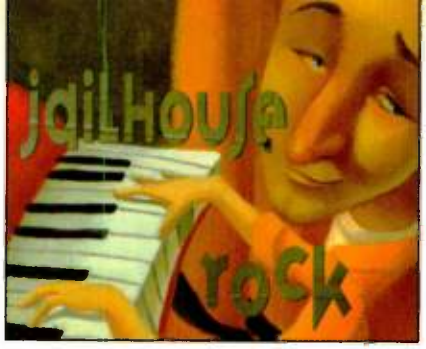

prisoners have full-time jobs, but most of those jobs don't exist. However, by establishing a viable training program, funds can be made available for that training. The video program qualifies for those funds by providing training in production and producing informational and training videos. The only problem is that the money must be used almost exclusively for video equipment. The acquisition of audio gear is left to the generosity of contributors and BeauSoleil's powers of persuasion.

Nevertheless, the program has been quite a success. For example, *Los Hermanos* is a powerfully dramatic video written and produced by the inmates that documents the youth intervention program of the same name. In it, inmates provide at-risk adolescents with first-hand accounts of their crimes to make the youths seriously consider the consequences of their actions before it's too late. Reyes Miranda, a board member of the Los Hermanos program, is one of the inmates featured talking to a group of young people who were brought into the prison. He tells them, "The actual crime took one minute—one minute of stupidity. I've now been incarcerated for nine years." Watching the faces of the kids as they hear this only adds to the intensity of the moment. It's also obvious how powerful these experiences are for the prisoners as they recount their actions and

PITCHING IN

There is no question that Bobby BeauSoleil is an effective communicator. This is readily apparent when one looks at the sheer number of contacts he's made within the music industry. The only thing more varied than this network of manufacturers and suppliers is the reasons they have for supporting BeauSoleil and the OSP A/V program.

Jim Giordano, national sales manager at Studiomaster, was skeptical when BeauSoleil first contacted him. He receives many requests for donations and as a rule does not give away merchandise. However, after hearing about the community benefits of the program and reviewing the extensive documentation BeauSoleil provided, he was won over. "This request stood out. It was different in that I was moved. These are guys who are not just killing time; they're doing something genuine and constructive."

Bernie Chlop of Systems Development Group in Maryland was impressed with what BeauSoleil had managed to accomplish within the state prison system's bureaucracy. "We've done projects with some local institutions here, and at the county level you can't even get a Bible in without major hassles," he says. "For Bobby to have done what he has at the state prison level is just amazing."

David Sweet of DK Sweet Artists Relations Consulting recently contributed an Alesis ADAT. His reasons for becoming involved with the OSP A/V program go beyond his feelings about BeauSoleil as a talented musician. He believes in the work that's being produced. Disturbed by the content of some rap and its effect on young people, Sweet is supportive of the program's antiviolence rap CD. He also feels it is important to lend support to antiviolence and other youth-intervention programs. "Once they're thrown into prison, young people are hidden away, and no one really knows what happens to them. The unintended consequence is that the idea of being a criminal is then romanticized, and the prisoners become heroes and martyrs. The OSP programs let kids find out what life on the inside is really like without any of the mystique."

Anyone interested in contributing equipment can reach Bobby BeauSoleil by telephoning the Oregon State Penitentiary Activities Division at (503) 378-2289, or by writing to A/V Project Studio, c/o Dudley Janeway, Oregon State Penitentiary, Activities Section, 2605 State St., Salem, OR 97310-0505.

World Radio History

The A/V program's mixing station sports a Studiomaster Star System console (with an Ensoniq KT-76 in the foreground). The console's upright configuration suits the tight quarters perfectly.

recognize themselves in the faces of their young audience.

The A/V program also records inmate sports events and outside performers who come to OSP, but *Los Hermanos* is more typical of the kinds of projects the program seeks to produce. Los Hermanos offers a 9-month program that includes a course book and curriculum developed by the inmates. Other programs served by the A/V production facilities include youth intervention programs and a planned victims/offenders program (in which inmates and crime victims will meet face-to-face). By producing these programs on video, they can be made available to the broader community and educate a larger audience than just those individuals who come to OSP to participate.

Another project in the works is a compilation rap CD featuring prison rap artists; BeauSoleil is engineer and coproducer with the artists. He says, "We want to put out an album of hardcore rap by guys who have seen it, who have street savvy as well as heavy prison experience. The overall lyrical theme will be a reverse spin on the violent messages in some releases. Wannabe hard guys use the scene to sell their image, and sometimes that takes the form of glorifying violence and crime. The main purpose of our release is to share viewpoints that reveal more of the whole reality, including the painful consequences of violence and crime to the individual and the community."

Dickerson, one of the artists who will be featured on the CD, agrees: "Most of the friends I came up with are either dead or in prison. Through music, I can relate real life experiences to try to help others who are coming up and help them to begin to understand their real potential." Negotiations for publishing and distributing the as-yet-untitled CD are currently underway between the Oregon Department of Corrections and New Millennium Communications, a record company located in the United Kingdom.

THE STUDIO

In discussing the equipment and technical aspects of the studio, BeauSoleil points out that the two rooms were originally concrete boxes with horrible sound. One of his industry contacts, Bernie Chlop at Systems Development Group, supplied BeauSoleil with acoustic foam, Sonora panels, and diffusers, along with several suggestions as to their placement based on computer models of the rooms developed from blueprints provided by BeauSoleil, who is tremendously grateful: "It made a big improvement. The live room is much sweeter sounding, and the mixes I'm doing now seem to translate well to other systems."

As far as hardware is concerned, several factors play key roles in determining what gear is best suited for the program's needs. As BeauSoleil explains, "We have very limited space for equipment, and because there are no funds for upkeep, we have to look for things that can stand up to use by seven different bands." (See table "The A/V Project Studio" for a complete list of the studio's equipment.)

The recording room doubles as a practice room, and each band gets a two-and-a-half hour practice session two or three times a week, one of which each month can be used for recording. "In the live-recording room, we have a Mackie 1202 [12-channel mic/line mixer] that sounds great, and it's bulletproof, so guys who are unfamiliar with it can't hurt it," says BeauSoleil. "Most of the amplifiers for the guitars and bass were given to us by Fender, and Kawai contributed almost the entire MIDI keyboard setup. Our old acoustic drum set died of natural causes, and now we use an electronic kit." Having read about the Dauz Drum Kit, BeauSoleil contacted Dan Dauz, who gave him an experimental kit. BeauSoleil has it set up to trigger sounds from an Alesis DM-5. "It works great. It's held up to constant adjustment by different players and has rubber ball joints to hold the drum triggers. The

THE A/V PROJECT STUDIO

Following is the equipment used in the Oregon State Penitentiary's Activities Section A/V project studio. Almost all of the gear was either donated or traded in exchange for development services.

Mixers	Kawai MX-16; Mackie 1202; Studiomaster Star System
Recording Media	Alesis ADAT; TASCAM DA-20 DAT deck; Technics RS-BX501 cassette recorder
Monitor Amp	Hafler Pro 2400
Close-Field Monitors	KRK K-RoK; Paradigm Mini MKIII
Processors	A.R.T. DR-X 2100 multi-effects
Synthesizers	Ensoniq KT-76
Assorted MIDI Gear	Kawai MAV-8 MIDI patch bay, MM-16 MIDI mixer, Q-80EX sequencer
BeauSoleil's Personal Gear	Casio PG-380 guitar synth and MIDI controller; Kurzweil K2000RS module; Starr Labs Ztar MIDI controller
Zinn's Personal Gear	Epiphone Sheraton II electric guitar; Yamaha QY-22 sequencer/sound module
Miscellaneous	Monster Cable contributed connectors and cable used in wiring the audio system; Systems Development Group contributed acoustic-foam panels and custom diffusers

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rest of it is made of metal and has stood up to everything over the past year."

The live room also has a MESA/Boogie V-Twin Tube Preamp. "It looks indestructible, like something chipped off of a Harley Davidson," says BeauSoleil. "We have a very limited supply of microphones, so running the signals through the V-Twin gives us all the classic tube-mic sounds."

In the control room, aside from the Kurzweil K200RS, Ensoniq KT-76, and the trusty Casio PG-380, the main features are a Studiomaster Star System console and an Alesis ADAT. "The control panel of the board is almost vertical exept for the faders, which are in the normal position. This makes for a large rear panel that forms a patch bay with access to all the key signal points; that and the normalled scheme on the front panel give great flexibility for 8-track recording. It has a built-in stereo noise gate and compressor, and the upright design has a small footprint. I don't know where we would have put a more conventional mixer."

BeauSoleil says building his own modules is a thing of the past because of the wide array of commercially available gear. When asked what hardware he'd really like to get his hands on, he says, "A Power Mac would be dynamite; we'd just have to find room for it in our little space!" He adds, "Some of the guys have their own gear, mostly guitars and a few hardware sequencers with built-in sounds, such as the Yamaha QY-22. I'd like to see more of those around. It's an instrument that's more suitable than a guitar, because there's no security problem. A guitar has parts that can be turned into weapons, although I've *never* seen an instrument used as a weapon. No violence has ever occurred within any prison music program I've been involved with."

GETTING RESULTS

Most of us have images of prisons as places where violence and victimization are commonplace, which brings up the question of what kind of difference the studio and A/V program has made at OSP. "The program has developed its own subculture that breaks down barriers within the inmate population at large. There's more interaction among culturally diverse people than elsewhere in the prison system," BeauSoleil explains. "We're artists. A lot of these guys were not artists before; it's something they've developed since they've been in prison. They've made the choice to do something creative."

Dudley Janeway, a recreational therapist at OSP for 28 years and the supervisor of the A/V program, agrees. "You'll see a lot of personal growth within any program that lets people use their creativity and God-given talents," he says. "They can create a finished product, and the community can say, 'That's nice work, we want to use it.' At that point it doesn't matter who you are or where you are, in prison or not."

Dickerson gives perhaps the most moving testimony to the program's benefits. "A lot of guys' lives have been changed through music. I know mine has. Before music, I was down in the hole for a year or two at a time. Officers treat me completely different now. This is the first time in my life there's something I'm proud of, something I'm sure of."

After being in prison for 28 years, it seems that BeauSoleil's philosophy of making time work *for* him has paid off. He's helped create a world that allows him personal fulfillment, gives other inmates opportunities they wouldn't have had otherwise, and provides value to the community. He considers himself lucky to have been able to pursue his musical activities and believes it would not have come about if the administrators at OSP had not been sensitive to the needs of the inmates. But as Janeway points out, "Bobby provided the expertise in expanding the program and created the enthusiasm to move it forward."

BeauSoleil's efforts have helped establish a new-found trust between inmates and administration and among prisoners who otherwise would not have reached across the cultural and ethnic barriers that normally separate them. And whether or not BeauSoleil feels he deserves credit for helping that to happen, those are goals everyone should strive for, no matter which side of the prison walls they live on.

Jeff Silver *is a songwriter and freelance author living in Atlanta.*

World Radio History

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Fix it in the mix

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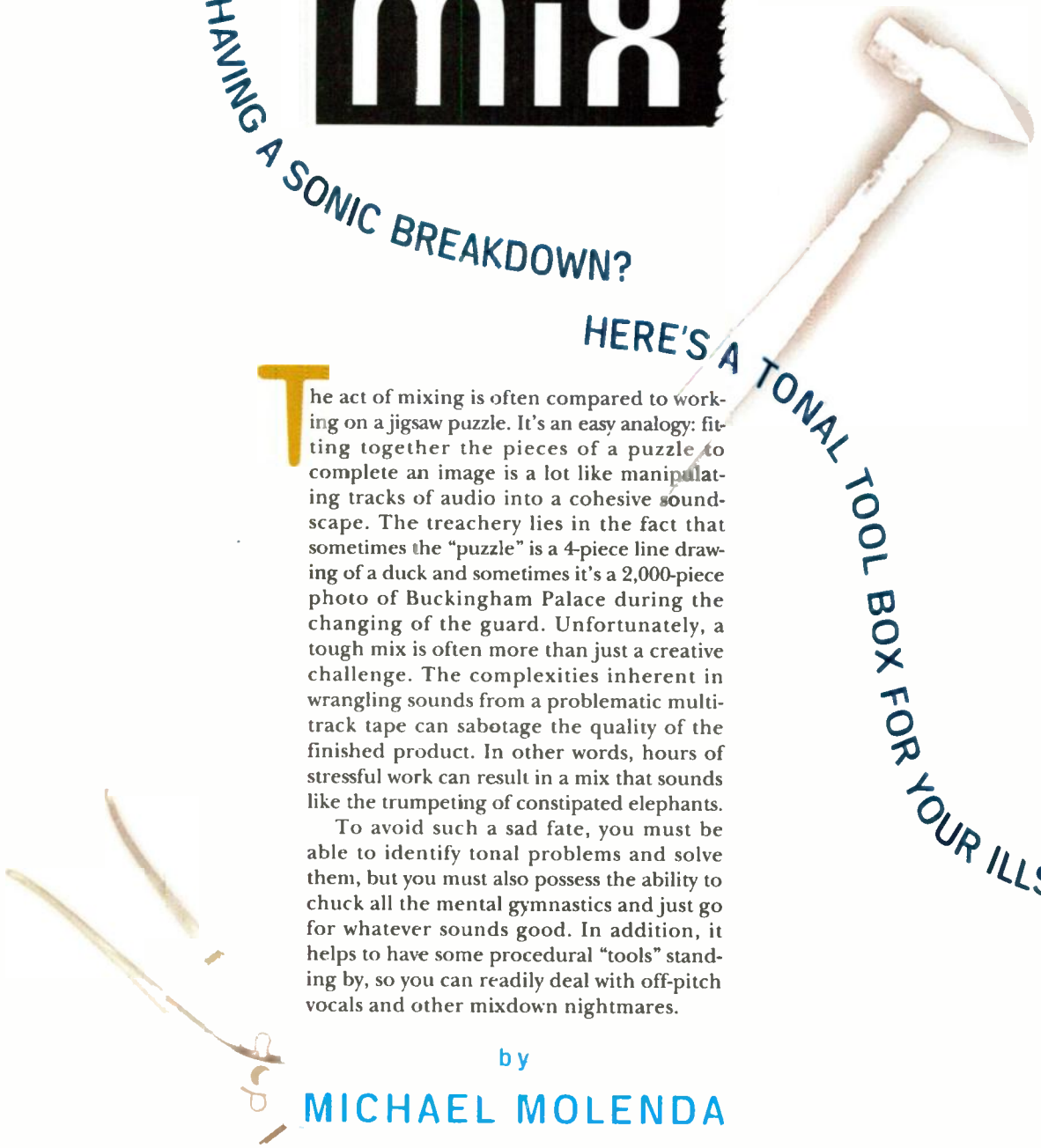


The act of mixing is often compared to working on a jigsaw puzzle. It's an easy analogy: fitting together the pieces of a puzzle to complete an image is a lot like manipulating tracks of audio into a cohesive soundscape. The treachery lies in the fact that sometimes the "puzzle" is a 4-piece line drawing of a duck and sometimes it's a 2,000-piece photo of Buckingham Palace during the changing of the guard. Unfortunately, a tough mix is often more than just a creative challenge. The complexities inherent in wrangling sounds from a problematic multitrack tape can sabotage the quality of the finished product. In other words, hours of stressful work can result in a mix that sounds like the trumpeting of constipated elephants.

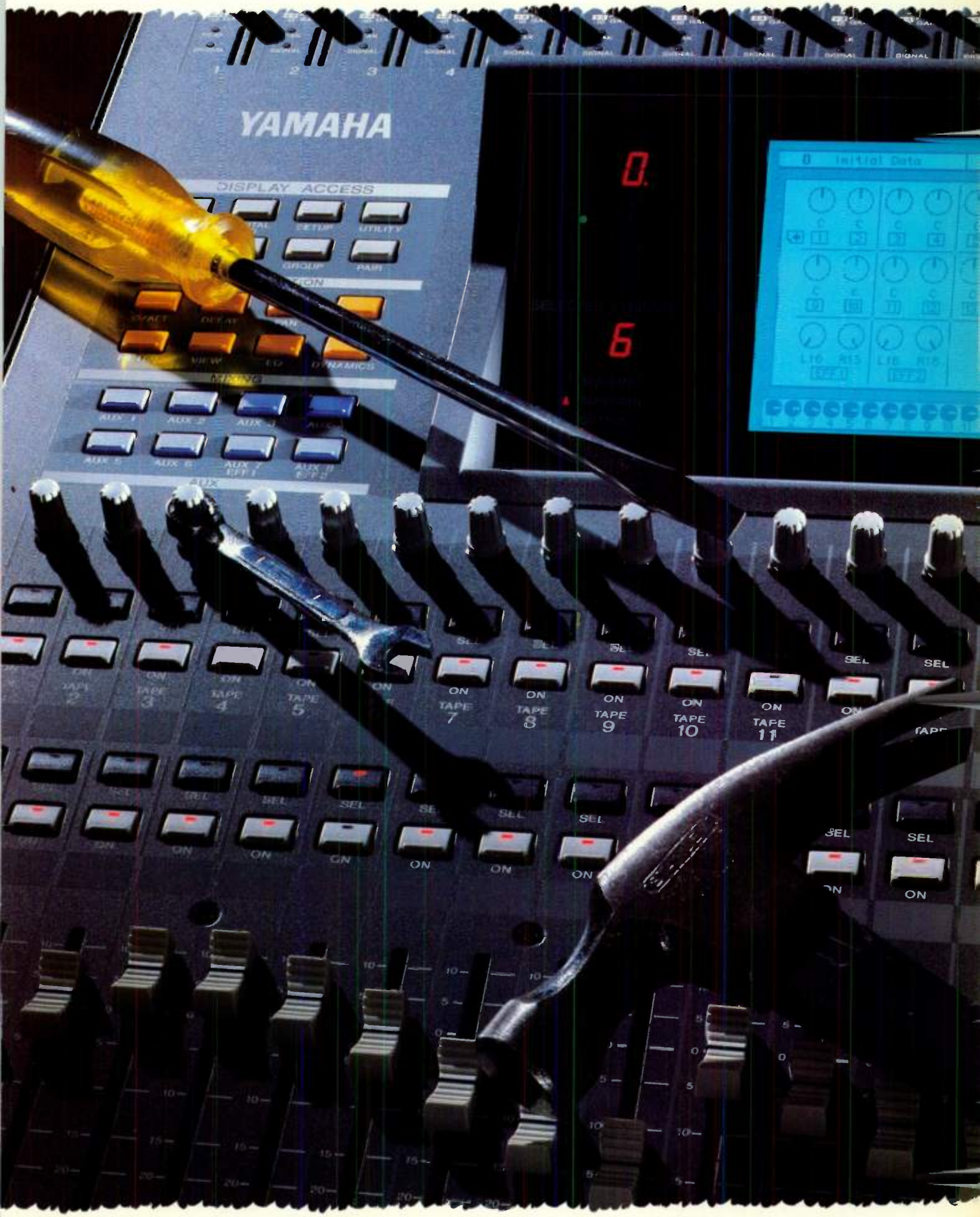
To avoid such a sad fate, you must be able to identify tonal problems and solve them, but you must also possess the ability to chuck all the mental gymnastics and just go for whatever sounds good. In addition, it helps to have some procedural "tools" standing by, so you can readily deal with off-pitch vocals and other mixdown nightmares.

by

MICHAEL MOLENDA

World Radio History

PHOTOGRAPHY BY MARIO PARNELL



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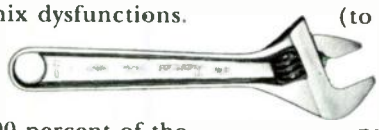
Admittedly, it's extremely difficult to produce a slamming mix with tracks that were poorly recorded. (I've often said that the "fix it in the mix" scenario is usually a myth.) But whether you're mixing your own work or an outside project, there *will* be times when you'll be confronted with butchered tracks. That's life. Unfortunately, it's a deadly spot of ill luck when bad tracks drop into your lap, because you can't just throw up your arms and surrender—you'll still be expected to deliver a professional mix, thank you very much!

The purpose of this feature, therefore, is to provide you with a few quick fixes for common mix dysfunctions. I've often had to use these techniques to salvage audio wrecks, and approximately 90 percent of the time, I've been able to "save the patient." The 10 percent of mixes I could not save were either too far gone to resuscitate or were (horrors!) released anyway as demos, alternate tracks, or B-sides.



So you see, the odds *do* favor surviving a brutal mix session. As you rummage through our little "tool kit," you'll discover that there are many ways to improve a poor mix before it hits the streets. If you've uncovered some mix repairs of your own, e-mail them to me (molendamc@cardinal.com), so I can share them with visitors to our Web site (www.eMusician.com). Let's start our mix maintenance class by identifying some essential audio tools.

Tool Time

During mix sessions, seemingly rational individuals often turn into megalomaniacs who must have more and more signal processors to do a good job. Well, it's always nice to have a wealth of tonal tools at your disposal, but great mixes have been produced with a single plate reverb. Therefore, it's simply bad form to blame a subpar mix on a lack of gear. For most styles of music, you should be able to create a brilliant 16- or 24-track mix with a minimalist tool kit composed of: your console's 3-band channel EQ with sweepable mids; one reverb for overall ambience; one reverb for the vocal; and a stereo compressor (one channel to "seat" the vocal atop the mix, and the other to tighten up the bass).

A more plush kit might include a 4-band EQ on the console input channels; four multi-effects boxes (to facilitate different treatments for the overall ambience, the lead vocal, and the background vocals and to leave a processor free for "taste" effects, such as flanged guitar solos); three stereo compressors (one unit to punch up a stereo drum submix, and the remaining four channels of compression to service lead vocals, background vocals, the bass, and any other signals you desire); one quad noise gate (to clean up entrance noises, buzzes, hums, and other messy bits); and a de-esser (to tame sibilance on vocals). This expanded kit should provide all the tools you need to produce a solid, documentary-style mix and still have a bit of fun dialing in some wacky effects. The main thing, however, is not to trip out about what you haven't got but to creatively use what you *do* have to produce a smashing soundscape.

Assess the Job

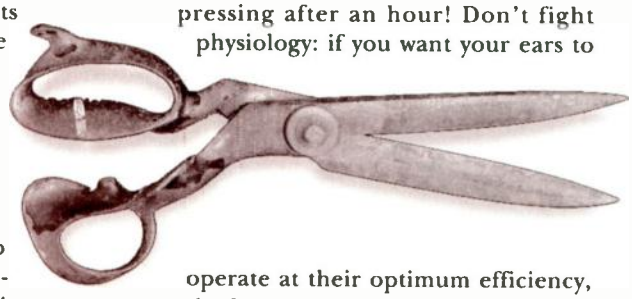
Once you have your signal-processing tools assembled, you should define your mix objectives. For example—taking into account the type of frequency spectrum best suited to the work—do you want the mix to sound big, small, wet, or dry? Perhaps you envision disparate sonic environments evolving throughout the song. Another objective might be to produce a dense instrumental onslaught that ebbs and flows against the vocal whereas another tactic would be to always keep the vocal up front. Obviously, there are a lot of directions you can take, so having a game plan definitely helps guarantee a successful mix.

In addition, you should initiate some checks and balances to ensure that any sonic problems you encounter *are* problems and not just elements you're obsessing over due to fatigue or unrealistic expectations. Here are some tenets I follow to keep my mind focused on the job at hand.

Identify key elements. What really sells the work? Is it the vocal? The groove? The flashy guitar solo? A strange and wonderful instrument timbre? All of the above? Tag the elements that make the work truly extraordinary and punch up those elements in the mix. This sounds like a "duh," but you'd be surprised at how many mixes bury the moneymaker.

Don't obsess on individual tracks. Few people buy an album because they lose themselves in the sound of the kick drum, so why do some musicians spend hours tweaking a track that isn't the main focus of the work—especially when the "soloed" timbre may not sound very good once it is returned to, and referenced against, the entire mix? For maintaining a global perspective on the soundscape, I've always liked producer Joe Chiccarelli's method: he initially brings up all the faders without touching a single EQ knob, solo button, or signal processor and listens for what the mix is *missing*. Only within the context of the complete mix will Chiccarelli add effects or mess with tones. That's smart mixing, kids!

Rest those tired ears. Ears can get just as tuckered out as any other part of your body, but some musicians seem to think they can truck on forever. As far as your mix goes, that assumption can be deadly. No matter how virile you may feel, your ears *will* start to shut down somewhat after four hours of intense, critical listening—and that timeline is only if you monitor at relatively tame volume levels. If you are a master blaster, your ears may start compressing after an hour! Don't fight physiology: if you want your ears to operate at their optimum efficiency, take frequent "quiet" breaks and crank the levels only when you need to check specific elements (such as bass frequencies) at high volumes.



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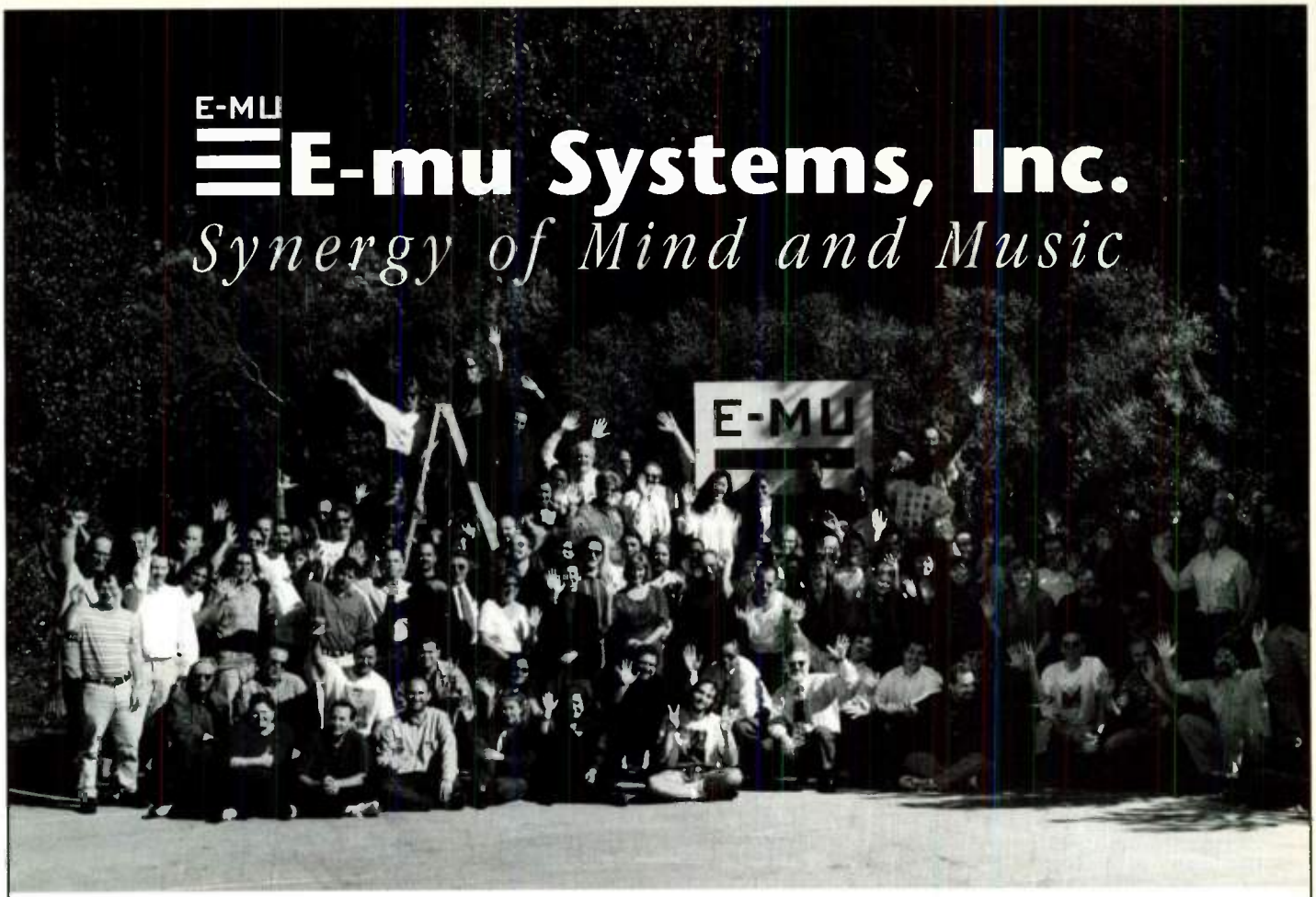

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Take Ricky Nelson's good advice. In his song "Garden Party," Ricky nailed it when he sang, "You can't please everyone, so you've got to please yourself." Mixers should take that line to heart or risk driving themselves crazy with doubts. You should only concern yourself with producing a mix that rocks your world. Forget about the bazillion constructive criticisms you'll inevitably receive, because even if the Almighty did a mix, a percentage of music pros would still slag it off as a piece of aural doo-doo. Take solace (and strength) in the fact that there are many ways to construct a soundscape and no definitive "right" or "wrong."

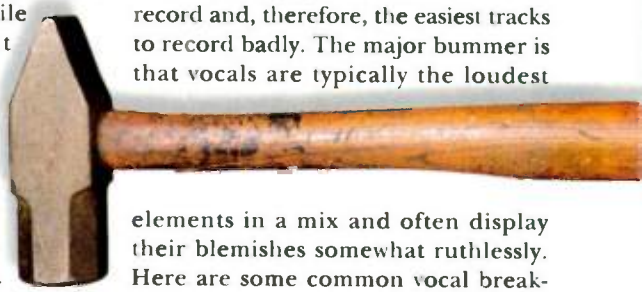
If you don't believe me, listen to a hits-format radio station when they play a block of uninterrupted music. You'll hear mixes that are bass heavy, mixes that are bass shy, mixes that are clear and transparent, and mixes that are pea-soup dense. Obviously, none of those mixing styles prevented the songs from becoming hits. I rest my case.

Always have fun. It's rather sad how many people forget that having fun is important. For example, if you get stressed out and serious while mixing, your mix just might reflect your angst. That's cool if you're mixing Russian dirges, but most music benefits from a little *life*. If you strive to instill some fun into your mixing strategy, I can almost guarantee that the quality of your mixes will improve.

I maintain a fun factor by not turning the act of mixing into drudgery. For me, this means never spending more than four hours on a mix. I figure that if I don't get something in the can within four hours, I'll simply beat myself up trying to polish raw sewage. I'd rather scrap the mix and start from scratch at a later date. I don't consider starting over a drag—I actually enjoy approaching mixes as "live performances" where I have one chance each "show" to get it right. This play method always keeps my enthusiasm for the music very high, and unlike some of my peers, I *never* get burned out at the board.

E-Z Vocal Repairs

Vocals can be the hardest tracks to record and, therefore, the easiest tracks to record badly. The major bummer is that vocals are typically the loudest elements in a mix and often display their blemishes somewhat ruthlessly. Here are some common vocal breakdowns and suggested repair methods.



Distortion. This is a bad one. Occasionally, a singer will bellow into the microphone and overload the capsule,

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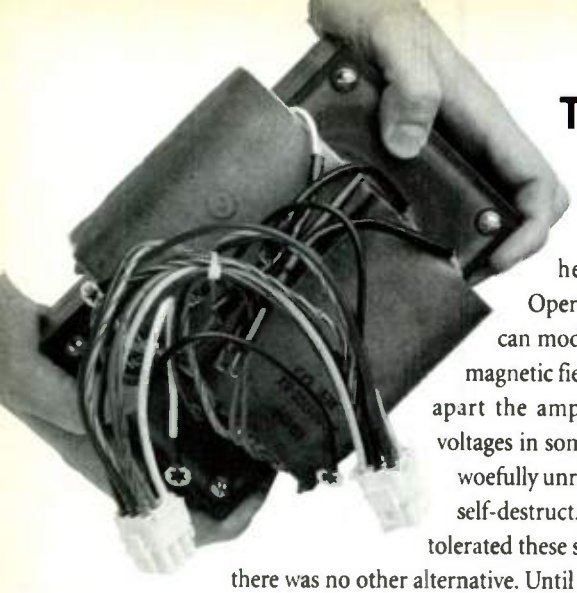

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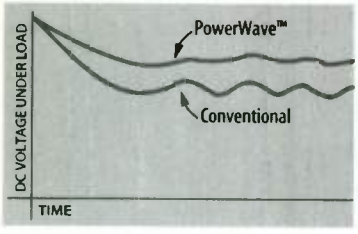

PowerWave sags less under load and has less AC ripple

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PowerLight 1.4	300	500	700
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PowerLight 3.4	725	1150	1700
PowerLight 4.0	900	1400	2000

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QSC's PowerLight Project Team *(clockwise from left):* ***Darrell Austin,*** *Technical Services Manager;* ***Pat Quilter,*** *Chief Technical Officer;* ***Robert Becker,*** *Design Engineer;* ***Greg McLagan,*** *Market Manager (Live Sound);* ***Doug Teulie,*** *Industrial Designer*

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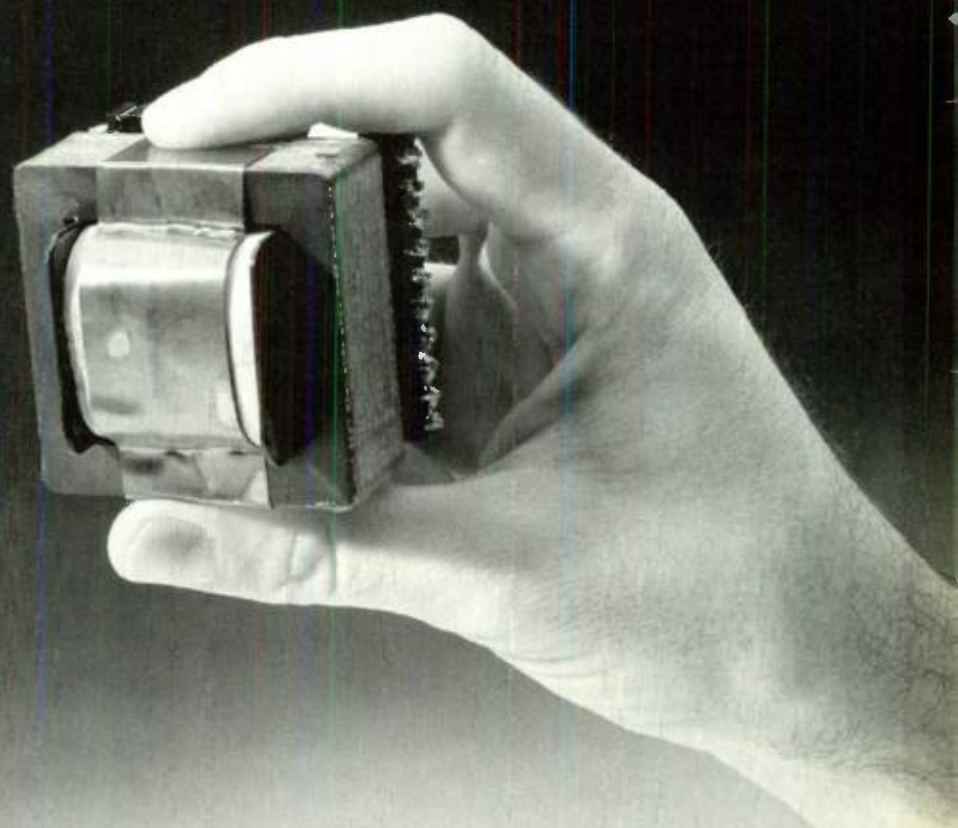

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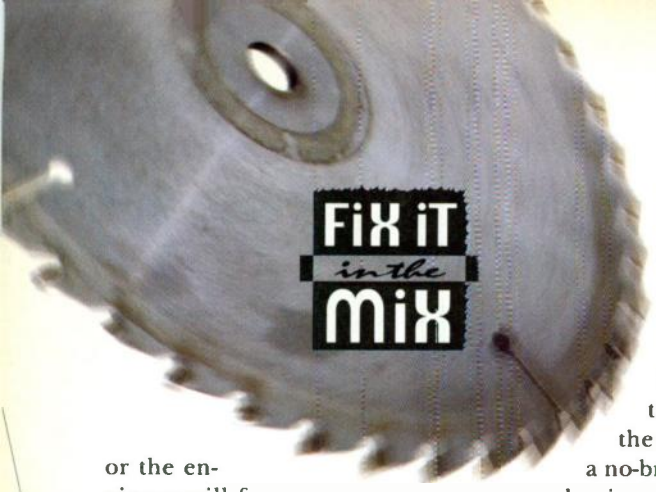

or the engineer will fry a gain stage somewhere between the mic, the mic preamp, the compressor (if inserted into the signal chain during recording), and the console faders. Of course, in the heat of recording, no one noticed the deadly glitch (or glitches) until the final mix.

First, assess whether the distortion is obnoxiously noticeable against the complete mix. Do not freak out if you hear distortion while soloing the vocal track because the instrumentation of the rhythm track may cover your sin. In addition, keep in mind that compression may raise low-level buzzes to annoying levels. If you've inserted a compressor into the signal chain, remove it and see whether the distortion fades back to a passable level.

If the distortion remains tragic, you have two quick fix options: rerecord the distorted sections or celebrate the dysfunction. Rerecording is a no-brainer, except that it requires the singer to be available and ready to work (and ready to deliver as good a performance as you have already recorded). However, switching from mix mode back to tracking mode can tweak your nerves and distract you from the critical listening required to construct a good mix. If the retracking session does not go smoothly or takes more than an hour or so, consider rescheduling the mix for a later date when you're less distracted.

Celebrating the distortion is a riskier choice, but it *can* be musically appropriate. After all, those old Otis Redding records where you can hear him tearing the mic apart with a soulful bombast are absolutely spine tingling. Of course, you have to make the "mistakes" sound like creative choices.

For example, on a recent mix for a Swedish artist, we discovered that entire vocal tracks were compromised by preamp distortion. There was no way to avoid the dreaded "fizzies." So we celebrated the distortion by running the signal through a Tech 21 SansAmp and distorting the vocal even *more*. However, we didn't process the voice to Trent Reznor–style ultradistortion, because that sound was inappropriate for the track. We simply added a warm buzz that covered the preamp glitches and made the vocal sound as if it was recorded with a vintage tube mic that was squashed to heck with an old Urei compressor. Whew. It's not every day that your mix is saved by a guitar processor!

Dynamic distress. Even though every **EM** reader should know about the benefits of compression by now (we've published tons of compressor applications, face-offs, and reviews), I still hear a lot of self-produced CDs where the vocal dynamics are like a roller coaster ride. It is not a good thing to force the listener

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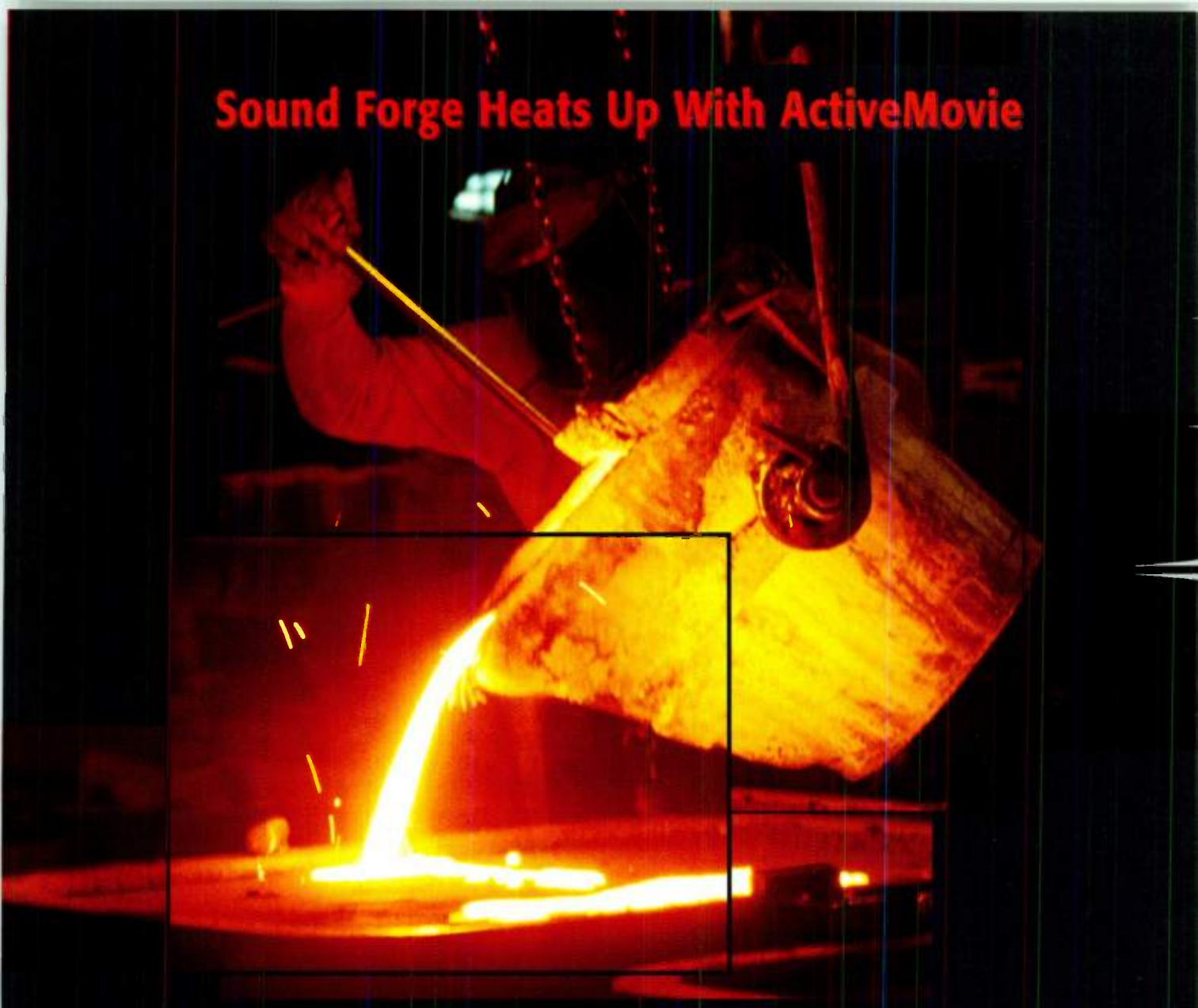
Sound Forge Heats Up With ActiveMovie



Sound Forge 4.0, the award-winning digital sound editor for Windows, now supports ActiveMovie audio plug-ins. Sonic Foundry has selected ActiveMovie (a component of Microsoft's Interactive Media technology) as the foundation for the Sound Forge plug-in architecture. ActiveMovie plug-ins will be supported by a variety of audio software companies including Sonic Foundry and Waves.

Sound Forge also supports the ActiveX Streaming Format (ASF) – the new audio and video Internet and intranet streaming standard used by Microsoft's NetShow On-Demand.

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to "chase" the vocal. Especially in pop- and country-style mixes, the voice should always be front and center. To achieve this, try compressing the lead vocal at a ratio of 2:1, with a threshold of at least -10 dB. If your compressor has Attack and Release controls, set them where the vocal sounds smooth and natural. (You don't want the compressor to abruptly "catch" the signal so that the voice appears to be expanding and contracting—an effect known as "pumping and breathing.")

Pitch problems. Here's a revelation (not!): Many vocalists can't sing consistently on pitch. The irony of pop music is that this isn't necessarily a bad thing: poor pitch certainly hasn't stopped Sheryl Crow from selling megamillions of records and winning a Grammy. Attitude is often more important than precise intonation. But what if your vocal tracks exhibit neither? In these bad-to-worse scenarios, I recommend fixing the pitch. Then, at least, you've diminished the obvious problem—and electronic pitch correction is way easier than adjusting the psyche of lackluster vocalists and inspiring them to put some fire into the tracks that must be rerecorded.

For a recent demo by a West Coast singer-songwriter, it was essential that we correct the consistently flat vocal performances as they were detracting from the beauty (and saleability) of the songs. A high-end pitch processor was not available, but the pitch-shifting program on an Ensoniq DP/2 did an amazing job. We simply ran the signal through the DP/2 and returned it on an open channel fader. As the vocal was consistently a semitone or so flat, we were able to find a setting that "tuned" the voice to the track, set it, and forget it. (Obviously, the original lead-vocal track was not audible in the mix.) To make the pitch-shifted signal sound a little more natural, we compressed the signal (a ratio of 4:1 at a -12 dB threshold) and added a slapback delay to cover the slight midrange grittiness of the pitch-shifting effect.

Sometimes, however, you don't get this lucky, and the vocalist is flat and sharp all over the joint. In these sad

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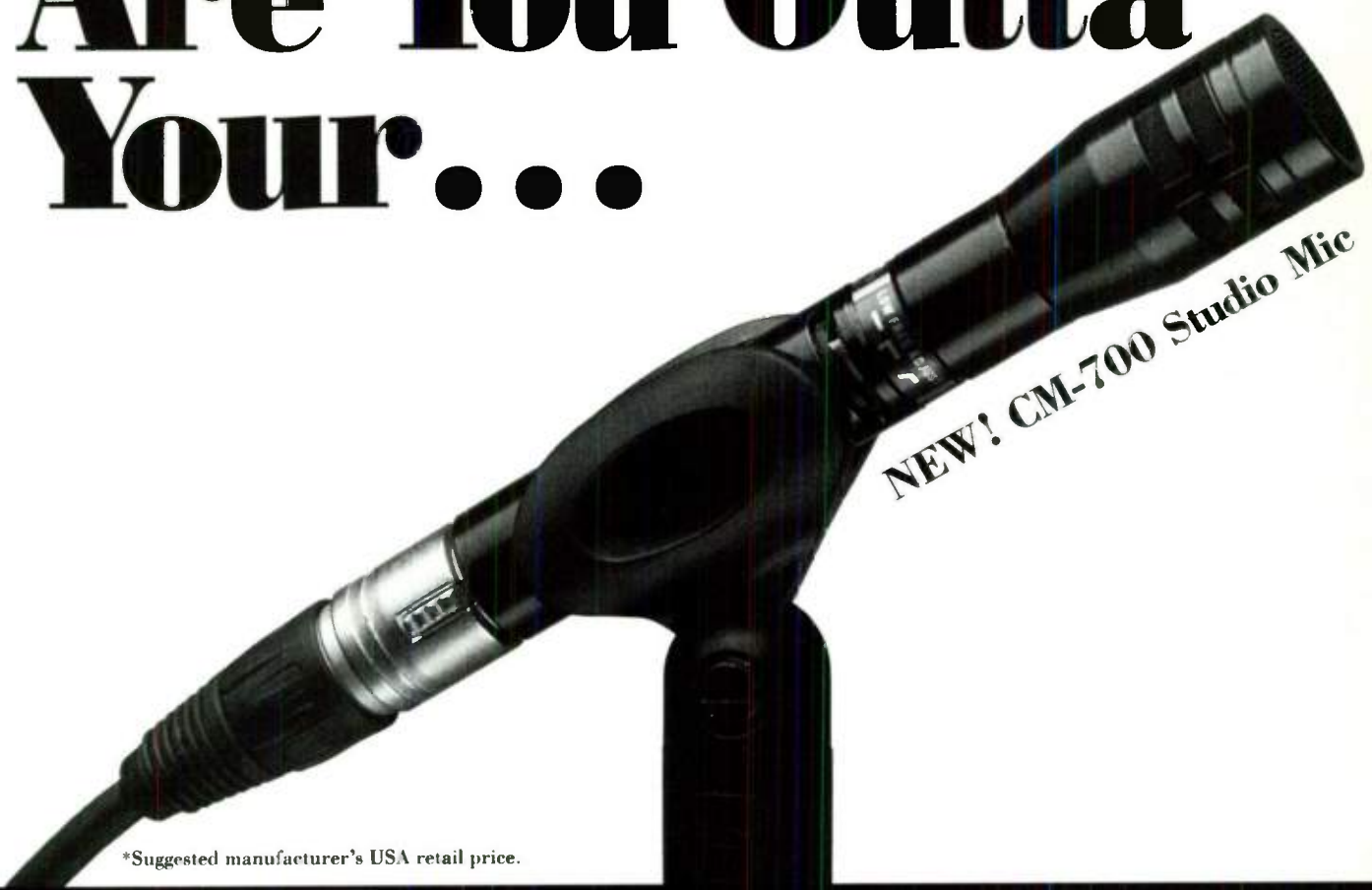

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– Bill Tullis, Music Engineer/Producer
Turner Broadcasting

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"The revelation came with vocals .... placed in front of a singer, its performance was so startling that I had to go back to the console to check that I was listening to the right channel, as the richness and depth I was hearing could easily have come from one of the large-diaphragm workhorses that I was using as a comparison."

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– Dave Folster, Reviewer, Studio Sound

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situations, you'll have to find a clear track on your multitrack recorder and do a punch-by-punch fix. Concentrate on each bad note, correct it, and punch the fixed note into your new comp vocal track. Again, this is a tedious process, so you may want to fix the vocal and return to the mix at a later date. (For more information on pitch shifting, check out "Recording Musician: Mixing with Pitch Shifters" in the June 1993 **EM**.)

Pops. Plosives are usually very easy to fix, so there's no reason to let a big old "pop" mar your vocal track. *After* you finalize your compression settings (compression tends to accentuate a plosive's problematic bass frequencies), solo the vocal track and activate your channel EQ. A 5 dB or 7 dB cut at around 100 Hz should do the trick. For particularly aggressive plosives, I've cut 100 Hz by 15 dB. This tweak often thins out the vocal tone, but a slight boost in the low-mids (typically 500 Hz to 750 Hz) can replace some beef without bringing the plosive back from the dead.

Sizzles. Sibilants—those snake-like "ssss" sounds—can compromise a vocal performance by making every "s" as painful as a saw cutting into a metal pipe. Trying to diminish the sizzle with your channel EQ is usually not a good idea, as the necessary high-midrange cuts can make the vocal sound dull. The ideal way to kill sibilance is to employ a de-esser. (Many mic preamps, such as the Focusrite Green Series Voicebox, now include a de-essing processor.) These devices are easy to use. You just adjust the knobs until the sibilance is under control. (Just be careful not to hit the signal so hard that the vocalist sounds like he or she has a lisp!) If you don't have access to a de-esser, be careful not to boost the mids too much, as that will accentuate the problem. In addition, go easy on the vocal reverb. The timbre and decay of the reverb can often make the sibilance appear more pronounced. A drier vocal sound may be your salvation.

Wimpy voices. As the current style is *not* to double lead vocal tracks, I'll often be confronted by vocal tracks that sound thin and do not "own" their place in the mix. (Which, of course, is why the old recording giants doubled vocals in the first place!) To put some punch and density back into the singer's warble, I double the vocal track electronically with a digital delay. Usually, this trick can be accomplished with a delay setting of 30 milliseconds and no feedback. Then, I EQ the electronic double to bolster the original track. Often, this requires boosting lows and low-mids that make the double sound rather dull and boomy when auditioned by itself. However, when the chunky double is mixed in with the tonally timid original track, the combination can sound robust and rockin'.

If you don't mind an obvious doubled-vocal sound—such as Debbie Harry's tracks on those old Blondie records—position the console faders for a 50-50 mix of the double and original tracks. For a more subtle mixture, one that "fakes" the sound of a single voice, use 70 percent of the original vocal and 30 percent of the double. In addition, I always crush the electronic double with a compression ratio of 4:1 at a threshold of -15 dB to ensure that the signal dynamics are rock-solid.

E-Z Guitar Tweaks

A guitarist's single-minded obsession with his or her guitar tone can sometimes result in a sound that makes *them* happy but does little for the frequency spectrum of the mix. And guess what? It's your job to bring these selfish tone tyrants under control so that their sound enhances the overall mix. My advice? Be ruthless.

Bad choices. Sometimes I wonder if people listen to their own songs. What can you say, for example, about a clean guitar tone on a raving tune that cries out for an AC/DC–style crunch-o-rama? Luckily, you can change weak tones to strong ones by running the guitar through any number of signal processors that include amp or speaker simulators. The venerable Tech 21 SansAmp is also a big help when you need to add some machismo to a guitar track. The processed sound may not be as wonderful as if the guitar had been plugged into a Marshall in the first place, but at least the amp emulation should give the guitar the tonal kick it needs to drive the track.

Unfortunately, it's rather impossible to go the other way—to turn a massively distorted guitar (that ends up, incredibly, on a tender ballad) into a peaceful tonal partner. Just about all you can do is try to neuter the guitar's roar by cutting out its chunky midrange frequencies and burying the track in the mix.

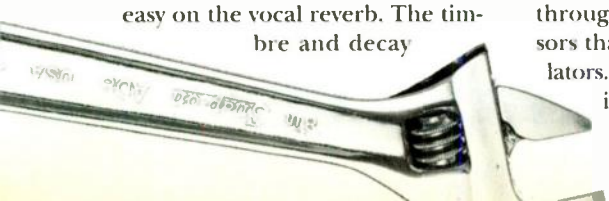
Lazy boys and excitable kiddies. The big joke drummers hurl at guitarists is that axe slingers don't play with the groove, they destroy it. The sad truth behind the joke is that drummers have a point. Relatively few guitarists can seat themselves comfortably into a rhythm track, and most tend to rush the beat. If the accents are compromising the track, try obscuring them by running the signal through a digital delay and timing the repeats until they move into the rhythmic pocket. This fix may take some work to tune in, but it'll be worth it when the track locks down. If you need help finding the groove, solo the snare drum (or main percussive instrument) and the delay return, and time your delay adjustments off the rhythm instrument. Obviously, you can use the myriad track timing options of an MDM or DAW to fix sloppy playing, but I've found that the digital delay trick remains the fastest way to solve this all-too-common problem.

Too much information. Don't forget that if a mix is slathered in layered and contrapuntal guitar tracks, there is no law stating you must use every track that was recorded. Clean up the frequency spectrum by identifying the essential guitar tracks (main rhythm, main melody, solo, etc.) and mute all the rest.

E-Z Bass Saves

Bass players typically have their tonal stuff together, but a couple of problems tend to crop up. Assuming a decent performance is recorded, the main challenge is to seat the bass into the mix where it can hold down the sonic foundation without causing the track to sound boomy or muddy. And, to be honest, the mix problems are often with the mixer, not the tracks.

Ninety-pound weaklings. Now, here's a novel concept: bass is bass. A lot of



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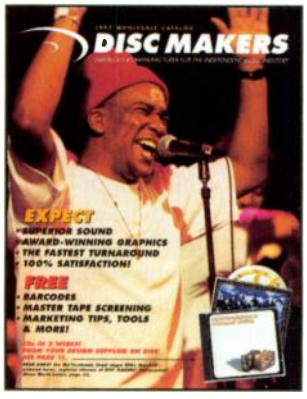

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mixers tend to shy away from bass frequencies and cripple the function of the bass player in the process. True, you don't want to muddy a track with low-end rumbles, but that doesn't mean you have to turn your mix into a sissy track.

If your bottom end is weak, boost the bass track approximately 5 dB at approximately 200 Hz. Sometimes I also boost 80 Hz by 3 dB if I really want to shake the room. Then, you should listen to the overall mix and raise the level of the bass track until the frequency spectrum sounds balanced from top to bottom.

Touchy feelie. If a bassist plays with his or her fingers, the attack may waffle a bit too much to produce a tight, driving thump. Once again, the heroic compressor can come to your aid. To keep those dynamics pumping mightily along,

try compressing the bass track with a 2:1 ratio and a -10 dB threshold.

Faders Down

In the middle of dislodging this feature from my petulant brain, I realized I should be writing a book! There are so many mix problems—and so many ways to approach and solve those problems—that a single magazine article seems to be merely an appetizer. Luckily, our new Web site (www.eMusician.com) offers us another avenue for disseminating information. So, keep checking the "Michael Molenda on Producing" page and the "Brian Knave on Recording" page for a continuing dialog on producing stellar tracks. Happy mixing!

Michael Molenda *is* **EM***'s editor in chief, co-owner of Tiki Town Studios, and a cranky old record producer. He is currently composing the score for a film documentary on the Indian settlement of Alcatraz.*

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By Dennis Miller

A popular television commercial for a well-known investment firm claimed, "When Merrill Lynch talks, people listen." The same can be said of Microsoft: when it sets a standard for multimedia applications, developers not only listen, they stand up and salute. Because the history of multimedia on the desktop has been so littered with false starts, proprietary solutions to common problems, and the lack of cooperation among software developers, it's major news when Microsoft steps in to set the course.

This is precisely the situation with the announcement of Microsoft's ActiveMovie Application Programming Interface (API), which created a standard that has sweeping impact on how applications share data. The new standard answers some of the biggest concerns facing multimedia developers and has received instant support from most of the key players in the multimedia industry. Just before press time, Microsoft announced it was renaming ActiveMovie; the new name, at least for now, is DirectX Media.

DirectX Media provides a means by which plug-in components created by one company can be used with compatible programs from any other Windows software developer. Like other APIs, it's a resource, or layer, that Windows provides developers to facilitate communication within the operating system.

Technically speaking, DirectX Media contains the services for capture and editing, componentization, media streaming, animation, D3D Retain mode, VRML, and DPlay (for Internet chat lobbies). The host application (e.g., *Cakewalk Pro Audio*) sits on top of DirectX Media. DirectX Media sits atop the DirectX foundation, which

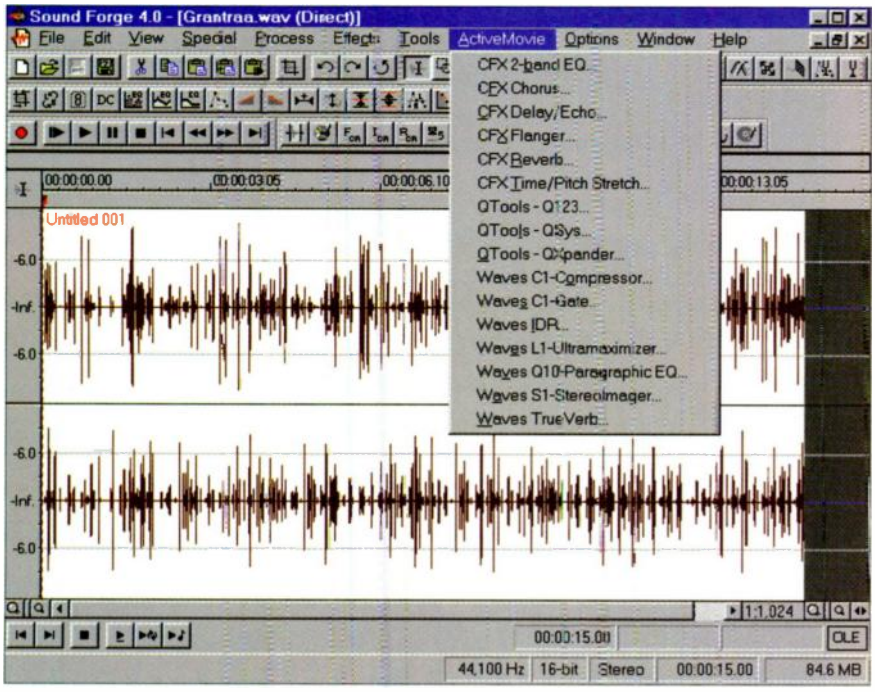

FIG. 1: Because *Cakewalk Pro Audio*'s audio-processing effects are DirectX Media compatible, they can appear within *Sound Forge*'s ActiveMovie Tools menu. ActiveMovie was renamed DirectX Media after this version of the program was released.

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(and love :-))

Even if you've never heard of Event (possible—especially if your last name is van Winkle), you already know us very well. Because Event is made up of folks who've been major players in the music and audio industries for a long, long time. Folks who've designed and manufactured some very highly respected and innovative pieces of gear—some of which you may very well own (all the cool people do).

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We founded Event on the principal that "the customer is precious." That means we make only those products that our customers want, need, and can afford. Products that provide access to new levels of musical expression. Products that put high-end, professional tools in the hands of us mere mortals. (That's right. We use the gear we make, so we build the stuff that we want in our own setups.)

We began our business with the microphones and speakers you see pictured on this page. Thanks to you—and to the kind support of the industry at large—these products have been tremendously successful. We want to give our heartfelt thanks to all of you who have bought a set of our speakers or a RØDE™ microphone. We hope you've gotten as much pleasure out of using them as we have.

...is just getting started. And now...

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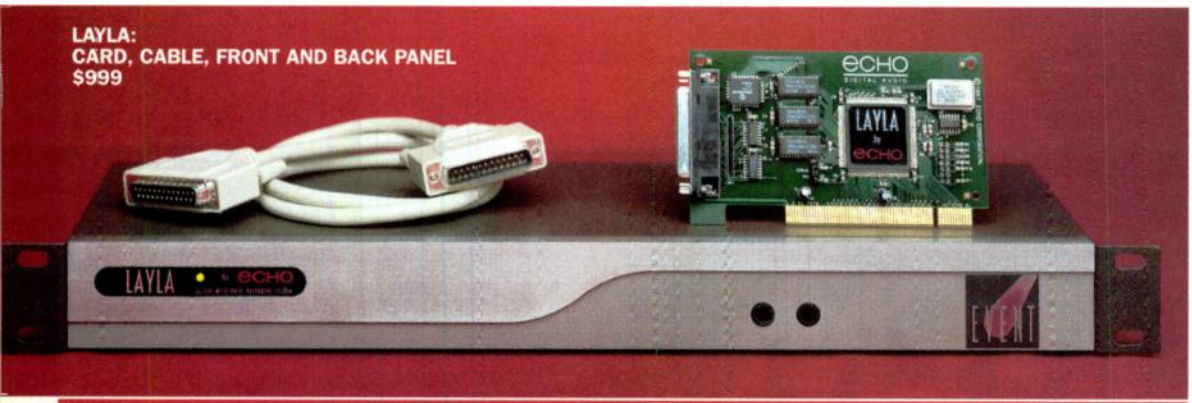

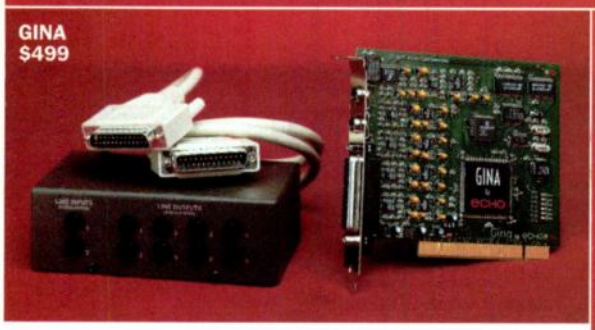

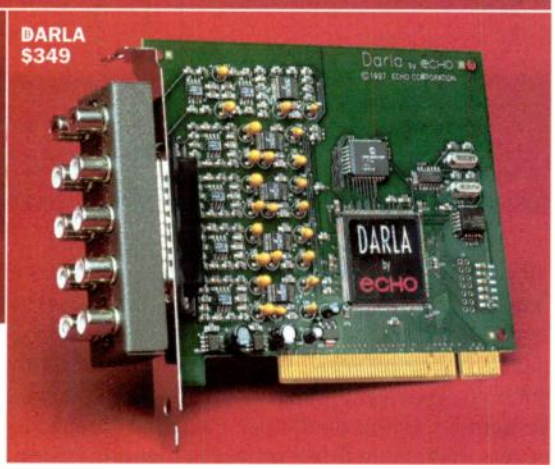

Affordable Digital Recording Hardware

Introducing our new family of cross-platform PCI-based multitrack audio recording systems, designed by digital audio gurus and Event's strategic partner, ECHO Corporation. Our proudest offering: **Layla by ECHO™**, a rack-mount audio interface with eight balanced analog inputs, ten balanced analog outputs (ins and outs are all simultaneously accessible), digital I/O, a 24-bit signal path, massive on-board DSP, word clock (for sync and expansion), MIDI, and much, much more—all for an amazingly low $999.

Or meet **Gina by ECHO™**: two analog inputs and eight analog outputs (all 20-bit, of course), digital I/O, and on-board 24-bit DSP. Appreciate clean design? So do we. That's why all of the audio connections on *Gina* are pro-quality 1/4" jacks mounted in a rugged breakout box. Appreciate reasonable pricing? *Gina*'s $499 tag is sure to make you smile.

If you only need two analog inputs and eight analog outputs (again, all 20-bit!), on-board DSP, and a breakout box loaded with RCA audio connectors, then say hello to **Darla by ECHO™**—priced to fit just about anyone's budget at only $349. (No, that's not a misprint.)

All three systems are compatible with audio recording and editing software applications that "talk to" the Microsoft Windows 95 .WAV device driver—which means you don't have to give up your favorite software in order to take advantage of the fantastic sound quality that Layla, Gina, and Darla offer. You can, for example (with full apologies to all of the fine software programs we're unintentionally leaving out), run Cakewalk Software's Cakewalk Pro Audio™. Or Steinberg's Cubase Audio™ and WaveLab™. Or Emagic's Logic Audio™. Or Innovative Quality Software's SAW Plus™. Or Sonic Foundry's Sound Forge™. Or Syntrillium Software's Cool Edit Pro™. (In fact, a custom version of Cool Edit Pro comes with each Layla, Gina, and Darla system, so you can be up and running even if you don't already own multitrack recording software.) Plug-ins? You bet. Including perennial favorites from Waves and Arboretum Systems.

And since getting up and running is half the battle (a battle we firmly believe you shouldn't have to fight) all three systems are true Plug and Play™ compliant. We even give you a utilities disk that examines your system before installation, so you know exactly what performance you'll be able to achieve.

Don't worry. We haven't forgotten our Mac-based friends. Our PowerPC-compatible systems (same hardware, new drivers) are coming this summer. Prepare to be stunned.

Precision Monitoring Systems

Building on the technological innovations that arose from the 20/20*bas* development, our intrepid engineers, messieurs Kelly and Dick, set out to create an active monitoring system that would be a perfect complement to the digital audio workstation environment. Requirements: small footprint, reference-quality frequency response, non-fatiguing to the ears over long periods of use, magnetically shielded, and *way* cool looks (!). The result: the **Tria™ Triamplified Workstation Monitoring System.** This integrated three-piece system comprises a floor-mounted VLF (Very Low Frequency) driver housed in a cabinet that is also home to five separate power amplifiers, active crossovers, and a full set of calibrated trim and level controls, plus

RØDE™ NT1

Large Diaphragm Condenser Microphone

Hot on the heels of the awesomely successful NT2 comes the **NT1**, a true large diaphragm condenser microphone. Like its predecessor, the NT1 boasts low-noise transformerless FET circuitry, and features the highest quality components. With a 1" gold-sputtered diaphragm inside a proprietary shock-mounting system, a unique head design that provides both durability and pop filtering (while remaining acoustically transparent), and a wide dynamic range that makes the mic ideal for use in a wide variety of applications, the NT1 is destined to become a fixture in the modern project and professional studio. And at only $499, it's just plain scary.

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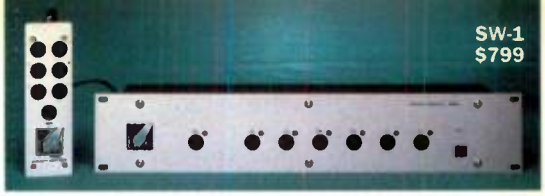
waiting for.



SW-1 Speaker Switcher

Bet you were almost going to pass over this part. After all, a speaker switcher isn't exactly the most exciting product in the world. But the **SW-1™ Speaker Switcher** delivers breakthrough performance and functionality, thanks to the clever engineering of Peter Madnick, who has long been a fixture in high-end audio equipment design. (He's actually pretty scary, possessing serious chops in both the analog and digital domains.)

What makes the **SW-1** unique among switchers is its ability to simultaneously handle both active and passive monitoring systems. Of the six pairs of speakers that can be connected, up to three sets can be active. Switching among them is as easy as pressing a front-panel button. Or use the included remote control so you never have to leave the sweet spot when switching. Naturally, the audio path is beautifully transparent and the switching noiseless. There is one thing about the SW-1 that we haven't quite figured out: If you own a pair of Event monitors, why would you have any other speakers that you needed to switch to?

two biamplified satellite speakers, each with a 5-1/4" poly-propylene driver and 1" neodymium soft dome high frequency driver.

What's truly remarkable is that the biamplified satellite speakers reproduce frequencies down to an incredible 55Hz, so the listener experiences full-range sound when positioned in the near field environment (that is, sitting in front of a computer screen). With the addition of the VLF, the system response reaches down to 35Hz, resulting in full bandwidth audio reproduction that is as accurate, precise, and pleasing to the ear as our award-winning 20/20*bas* system. You simply must hear **Tria** to believe it. Even then, you may not believe the price: $849. (Yes, that's for the *entire* system.)

The **20/20p**™ is a direct field monitor designed to provide an affordable pathway into the world of powered speakers. Utilizing the proven 20/20 design, the system comprises a 20/20 cabinet with two full-range 100 watt power amplifiers—one of the amps drives the powered cabinet, the other drives a passive 20/20 satellite. The resulting sonic clarity is exactly what you'd expect from a system bearing the 20/20 name: extended low frequency response, exceptionally clear midrange, and sparkling high end. What does this kind of audio quality cost? A low, low $599 per pair.

As with all of our active monitoring systems, the **Tria** and **20/20p** offer continuously variable high and low frequency trim controls, input gain controls, balanced inputs with combination 1/4"/XLR connectors, and full magnetic shielding.

EMP-1 Microphone Preamplifier

What better to complement a RØDE Classic, NT2, or NT1, than a custom microphone preamp that combines superior sonic performance with the features demanded by today's studio professionals? (Okay, we admit the thing sounds pretty amazing with other brands of mics as well.) First off, you should know that the **EMP-1™ Microphone Preamplifier** was designed by engineering wizard Peter Madnick. Why is that important? Because, in Peter's own inimitable words, it means that the unit features a transformerless design utilizing a common-mode choke input *[translation: RF interference is virtually eliminated]*, a superior differential input *[translation: EM interference is suppressed]*, and servo-controlled DC to maintain zero DC offset *[translation: There are no distortion-inducing capacitors]*. Ahem. Thank you for those fascinating explanations, Peter.

Put in terms the rest of might have a chance relating to: The EMP-1 offers ultra low noise operation, selectable phase, low cut filtering, phantom power, a line output (for running directly into *Layla*, perhaps?), and an internal power supply—all in a downright sexy little box. Now, what does all that mean? It means that the EMP-1 is a mic pre worthy of your finest microphones. (Don't let its low $299 price tag fool you. This preamp is the real thing.)

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provides the low-level APIs for hardware acceleration and so forth. The DirectX foundation, of course, sits atop the hardware.

Although plug-in capability is only one aspect of DirectX Media, it is the one that has the most direct and immediate effect on the desktop musician. That's because it allows you to share functions, such as audio-processing operations, among all software that supports the standard. For example, because *Cakewalk Pro Audio* 6.0's audio-editing commands have been written according to the DirectX Media standard, the program's DSP features appear as menu options directly in Sonic Foundry *Sound Forge* (4.0a and above), Steinberg *WaveLab* (1.51 and above), and any other program that supports DirectX Media (see **Fig. 1**).

Moreover, third-party developers such as Waves and QSound Labs are creating DirectX Media plug-ins that can be used by any compatible host program. These plug-ins are cost effective for the end user, who can purchase one copy of, say, a top-quality reverb and use it from within any number of applications.

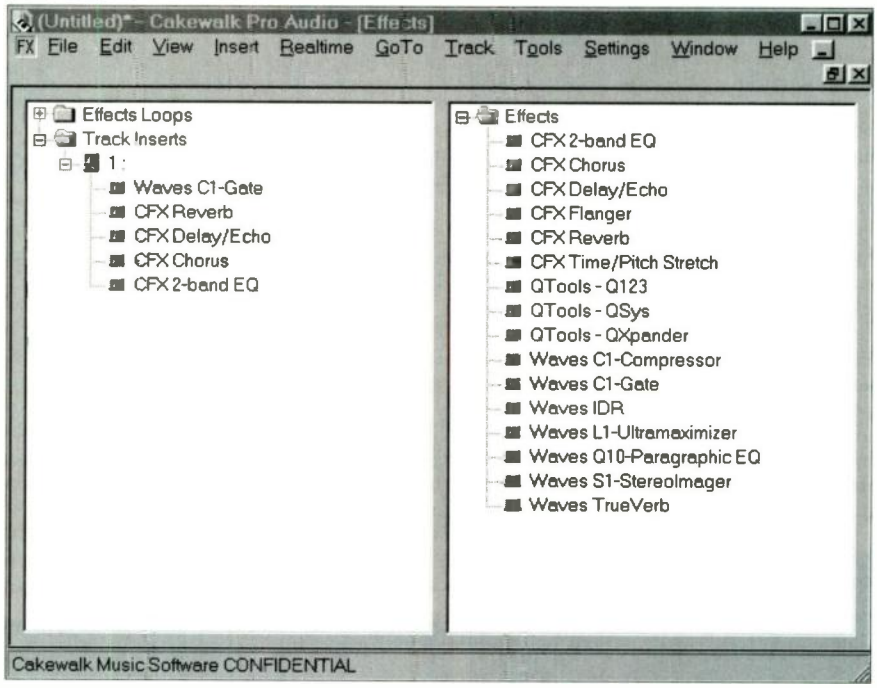

FIG. 2: Virtual effects chains can be built that employ DirectX-compatible plug-ins.

LIFE OF CONFUSION

Of course, plug-ins are not new in the desktop world. For example, many graphics programs support Adobe *Photoshop* plug-ins. On my system, I have perhaps 700 to 800 shareware and commercial plug-ins and at least four host programs that can use them all. Because *Photoshop* is the predominant graphics standard for Windows and Macintosh, every new graphics program that appears must include *Photoshop* plug-in compatibility as the price of entry into professional circles.

Unlike the graphics world, the music community has several incompatible and competing plug-in standards. Macintosh users must deal with at least five plug-in architectures: Adobe Premiere, Steinberg VST, and Digidesign TDM, Sound Designer II, and AudioSuite. (TDM plug-ins are a special case because they require at least one Digidesign Pro Tools audio card and DSP Farm processing card connected via the company's proprietary, high-speed TDM audio bus.) It's not surprising that a sixth format, Macromedia Xtras, was practically DOA in the audio world.

On the PC side, Windows software developers also have a number of incompatible standards to consider. These include "open architectures" for Sonic Foundry *Sound Forge*, IQS *SAW Plus*, Adobe *Premiere*, and Steinberg *WaveLab* and *Cubase VST*. As with Xtras on the Macintosh, *WaveLab*'s proprietary plug-in architecture was basically dead on arrival—only Steinberg supports it—but Steinberg has essentially replaced it with *VST* for Windows anyway.

What's a third-party plug-in developer to do? Most plug-in developers have concluded that they have to support multiple standards in order to stay in business. In some cases, this only requires a small amount of new code, but it still confuses consumers and creates extra work for developers and distributors.

One reason for the tangle of plug-in architectures is that these architectures have been created by competing developers who have been unable or unwilling to find common technical and political ground. But Microsoft is by far the biggest kid on the software block, it doesn't sell music software, and of course, it created the Windows OS. Therefore, developers of Windows music-software can agree upon Microsoft's DirectX Media format. With DirectX Media established as an almost universal standard for Windows software, the multiple-architecture quandary in which users and plug-in developers have found themselves should become a thing of the past. Unfortunately, Apple has established no such solution for Mac users.

THE HOST'S VIEW

According to Greg Hendershott, CEO of Cakewalk Music Software, the acceptance of DirectX Media is preordained. "DirectX offers the ability to mix and match software components from different suppliers because developers can write one plug-in and have it work with a variety of applications," he notes. Cakewalk President Tom Cook adds that "DirectX gives users greater freedom to choose their work environment. If they can get many of the same features in different programs, they will select a host program more for its stability and for the interface it offers. Having a standard also allows developers to focus on the usability and friendliness of their software instead of spending time reinventing features that already exist."

Monty Schmidt, president of Sonic Foundry, another early adopter of DirectX Media/ActiveMovie, agrees. "The industry has always wanted standards, and Microsoft has come along and delivered them to us," he says. "Though DirectX was originally intended as a way to stream multimedia data on the Internet, the music community will benefit tremendously by the work that Microsoft has done. We

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now have a very efficient technology for the processing of audio data, and I would expect to see many new and innovative products appearing that support this approach."

A slightly different perspective is offered by Bob Lentini, principal developer of Innovative Quality Software's multitrack audio editor *SAW*. "We have our own API that we believe will give a third-party developer better performance than DirectX can offer," he states. "But we want our users to have the best of both worlds, so we're developing a method by which any DirectX plug-in will talk to our API. That way, the end user could use DirectX plug-ins with *SAW*." Lentini claims that DirectX support will appear shortly after the release of the new 32-bit version of *SAW Plus*, which should have occurred by the time you read this.

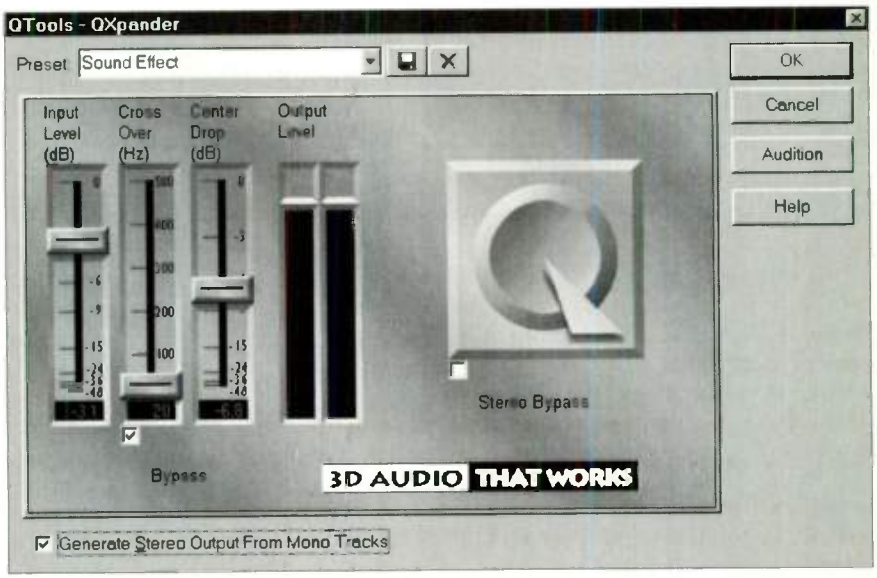

FIG. 3: QSound Labs has released a DirectX Media version of QTools, a set of plug-ins that formerly was available only in *Sound Forge*'s proprietary format.

UNDER THE HOOD

Technically speaking, DirectX Media provides a means for more efficient communication between different software components without excessive layers of Windows code in between. "You can think of a DirectX plug-in as a hardware effects unit with an input on one end and an output on the other," Cakewalk's Hendershott explains. "Plug-ins can be chained together because DirectX specifies how they will communicate with one another. Because the plug-ins can share data buffers, you don't need to make a copy of the information that's passing through, which makes the signal move through the chain more quickly."

Depending on how a developer chooses to implement DirectX Media in its software, users could conceivably build virtual effects chains using any of the plug-ins they have installed on their systems. **Figure 2** shows a chain I built using *Cakewalk Pro Audio* 6.0 as the host program. On the right side of the screen is a list of my DirectX plug-ins, including three plug-ins from QSound Labs' QTools package and several programs from Waves.

Cakewalk's onboard processing functions (shown with the CFX extension) also appear; they're now DirectX Media compatible. To build the chain, I simply dragged the various effects from the right window into the Track Insert display on the left and set the parameters for each option. With this configuration, the audio in track 1 passes through the effects in series on its way to the D/A converters on my sound card.

Developers also must decide whether the user will be able to make changes to effects parameters in real time. If the developer allows this and if your processor is fast enough, you could conceivably change parameters while the sound is playing. (Steinberg *WaveLab* and IQS *SAW Plus* already have this capability but only with their proprietary plug-in architectures.)

Keep in mind that there is always a bit of a lag time with real-time processing, so you may notice a slight delay as you move the sliders or knobs that control the effects' parameters. This is where TDM shines compared to software-only approaches such as DirectX Media. With TDM, you don't notice the processing delay most of the time because the plug-ins can access lots of dedicated processing power (four Motorola 56000-series DSP chips per DSP Farm card), and data is routed very quickly, thanks to the TDM bus.

PREDICTIONS

What new products will DirectX Media generate? Already, there are numerous announcements of DirectX-compatible plug-ins. First out of the gate was Waves' Native Power Pack. (See the *Sound Forge* review sidebar "Waves Native Power Pack" on p. 148 of this issue.) This comprehensive set of high-quality mastering tools includes the *L1 Ultramaximizer* peak limiter, *Q10* paragraphic EQ, *C1* compressor/gate, *S1 Stereo Imager*, and *TrueVerb* reverb.

In addition, QSound Labs has released a version of its QTools plug-in suite in DirectX Media format (see **Fig. 3**); the program formerly was available

INFORMATION PLEASE!

To obtain more information about DirectX Media, take a look at the Web sites of Sonic Foundry (www.sfoundry.com) and Cakewalk (www.cakewalk.com). Each provides extensive information and sample code for developers. (You will need a password for this section of Cakewalk's site.)

You can also take a look at information from Microsoft's Imedia group (www.microsoft.com/imedia), where you'll find endless details about the format. There's not much about audio at this site; the developers seem to be more concerned with the video applications of DirectX. But it's a great resource nonetheless.

Keep in mind that writing plug-ins is not a trivial matter, despite the help you'll get from these companies. A recent-version C++ compiler and some programming skills are required.

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only as a plug-in for *Sound Forge*. Further announcements from Arboretum Systems (*Hyperprism* multi-effects), Tracer Technologies (*DART Pro* noise reduction), Steinberg (a long list of plug-ins), and others indicate a vast number of plug-ins will appear shortly. Obviously, there is plenty of support for Microsoft's standard.

In addition to programs from well-established audio companies, Sonic Foundry's Schmidt expects many esoteric products to appear from shareware authors. "We've created a software developers' kit that walks the user through the process of creating plug-ins. Using the kit makes developing plug-ins much easier, and because it's free, we expect it will generate a lot of interesting new products."

There is a down side to using a large variety of plug-ins, however. Schmidt claims that a poorly written plug-in has the potential to bring down your entire system, and he dreads the issues his tech-support people will confront when trying to diagnose users' problems. "Our first question to every caller is going to be 'What plug-ins do you have installed?' I expect we will be swamped by all the different configurations people will have."

MICROSOFT ÜBER ALLES?

Has DirectX Media made the other Windows plug-in architectures obsolete? Though the tide is heading its way, the struggle is not over. Key players in the industry could present more effective solutions for the sharing of applications, forcing developers to support even more formats. For example, when Digidesign finally brings TDM to the Windows platform, many high-end users will probably migrate in that direction.

DSP programming wizard Meir Shashoua of Waves, the first company to provide a DirectX-compatible music product, says that, as new technologies evolve, his company will support them. "We're always open to a new architecture if it looks like the market is going in that direction."

But Cakewalk's Hendershott believes that DirectX Media will continue to evolve and remain the dominant force in audio data–sharing technology. "DirectX is an open standard and can be extended at any time," he notes. "As we see new audio-file formats, higher sample rates, and higher bit resolutions coming into the market, DirectX can incorporate those developments. You could even create a plug-in that knew about a certain type of hardware in your system or one to process MIDI data or put video on your screen. It's really flexible." Cook adds, "We're really only scratching the surface at this stage, and the quicker DirectX becomes accepted, the better it will be for both the developers and the end users."

Although there are other approaches to sharing audio data on the PC, DirectX Media seems to be the wave of the future. More developers will jump on the bandwagon soon, which means you'll be seeing many new programs that you can use no matter what audio editor or digital audio sequencer you prefer. That's an exciting development for the PC user, but watch out. Before long, you may have a few hundred plug-ins lying around on your system!

Dennis Miller *is a composer living in the western suburbs of Boston.*

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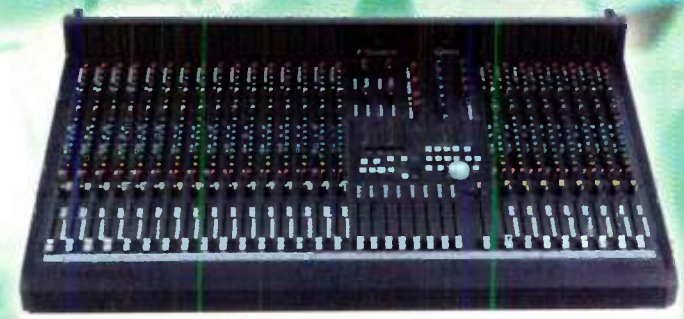

...you wrote the ad.

- "I just sold my Mackie 8-bus and purchased the new Ghost console. The difference is amazing. The Ghost is the warmest sounding board I've ever used." – Mike Perkin (The Lab Recording Studio, Emmaus, Pa)

- "I replaced a console that was more than 3 times the price, and got a quieter, more transparent, and sweeter sounding console! Big console feel, with an amazing price!" – Kurt Bevers, Brownell Sound, Oregon.

- "An incredibly musical console, ultra flexible with a real usable EQ. It is absolutely the best sounding project studio board that I've heard". – Howard Givens, Spotted Peccary Studios."

- "I love the desk, the EQ is just marvellous. Ghost is the best 8 bus recording desk on the market." – Lee Hamblyn, Engineer.

- "Intuitive handling, flexible routing, great Soundcraft sound." – Melvin Fernandes, Recording Engineer, CMM Studios, India.

- "I use the Ghost for several radio shows doing live performances. The EQ is amazing, I'm on air in 5 minutes! Doing dance stuff is one, doing live stuff is another. But I use only one board for both of them, The Soundcraft Ghost." – Barney Broomer, Sonic One Rotterdam.

- "Ease of operation and the numerous in-line inputs for my synthesizers and samplers is why I purchased the Soundcraft Ghost console." – says President of Saban Entertainment and producer of Mighty Morphin Power Rangers Shuki Levy.

- "I didn't know how useful mute groups could be and how good the EQ had to be until we used the Soundcraft Ghost." – Stefaan Windey, La Linea Musicproductions b.v.b.a., Belgium.

- "It sounds great and the EQ is very precise which makes it very easy to pin-point the frequencies I need to work on. Ghost enables me to finish mixes on the console at home, without having to use any other studio." – Phil Kelsey (Remix Engineer)

- "The console is very user-friendly and is constructed so well that it can easily withstand the rigors of even the most hectic of production schedules." – Corey Dissin, Producer at Paul Turner Productions.

- "Both myself and our Production Director Jeff Thomas used the console for PowerStation and were equally very, very impressed. For the money, the console is fantastically versatile, has good headroom and a very impressive EQ." – Alex Lakey (Engineer for PowerStation)

Ghost

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SERVICE CLINIC

Dinosaur Quarry, Part 2

Our resident herpetologist does surgery on a living saurian.

By Alan Gary Campbell

Q. I've seen several Minimoogs "modularized" by removing the base and keyboard, leaving just the upper part to be controlled by a MIDI-to-CV box. How is this accomplished, and is it something the do-it-yourselfer can achieve?

A. Aside from the physical removal of the lower case/keyboard, several electronic modifications are required. This is a reasonable project only for someone with service experience—not necessarily a professional technician but not a novice, either. Nevertheless, given the number of questions we've received regarding this modification, it seems appropriate to cover the basics here. Moreover, contact wear and deterioration have by now rendered many Minimoogs unreliable under control of the internal keyboard, which makes external MIDI control all the more desirable. Pursuant to this modification, reference to a Minimoog service manual (or at least photocopies of the relevant pages) is mandatory.

Disconnect all cables. Place the unit face/keyboard down on a soft, clean surface. Remove the screws around the perimeter and along the center line, and lift off the bottom plate. Locate the 6-pin and 12-pin Cinch-Jones plug-and-socket assemblies below and behind the pitch-bend and modulation wheels; these connect the keyboard and performance controls, respectively. Carefully cut the nylon ties (if present) that secure the connectors in position. Then gently pry the connectors apart with a small screwdriver. Work them apart a little at a time, and take care not to strain the attached wiring.

Next, remove all the screws that affix the hinge (attached to the Minimoog's electronics module) to the case below. At this point, you should be able to lift the case up and off of the electronics module; the wire bundles attached to the Cinch-Jones plugs will pass through the cutaway. If you are certain that you do not want to reintegrate the Minimoog "halves" at a later date, you can drill out the pop rivets that attach the hinge to the electronics module, but you must be careful that no metal

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shards wind up roaming around inside. More simply and safely, not to mention reversibly, you can use some silicone sealer to fix the hinge in an unobtrusive, retracted position close to the module body. A dab every inch or so should be sufficient.

Now remove the screws along the top and sides of the module that affix the rear cover, and lift off the cover. Notice the voltage-controlled oscillator's PC board at the right rearmost section of the case (as viewed from the back of the Minimoog). It has the oscillator-calibration pots, normally accessed through the holes in the cover, mounted on it. Using a large, flat-blade screwdriver, gently pry the oscillator card out of the edge-connector socket below. Do not force the board out of the socket or try to remove it in one motion. Pry up a little at a time along the free portions of the board's bottom edge. Behind the oscillator card is the keyboard-interface/contour-generator board; remove it in the same fashion.

Now that you have room to work, you'll need to drill a hole to mount an SPST miniature toggle switch to control the final decay for the contour generators. This can mount at a convenient point among the existing front-panel controls or along the upper apron. Again, take care not to allow metal shards to enter the case.

Depending upon the type of MIDI-to-CV converter you intend to use, you'll either need to rewire the existing

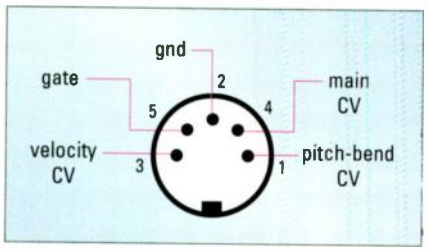

FIG. 1: This Minimoog mod DIN jack pinout is simply a suggestion; the actual scheme is not critical as long as it's consistent.

CV-input jacks or add a DIN jack. If you intend to use a converter that doesn't have MIDI Velocity-to-CV and MIDI Pitch Bend-to-CV or other additional outputs (or you simply don't want to use these outputs), rewire the existing jacks as follows: Desolder the gray wire from the Oscillator input jack (along the upper apron); resolder this wire to the jack ground. Tack-solder one end of a length of 22 to 24 gauge, insulated hookup wire to the jack's now-empty tip connector. This becomes the CV input. Desolder the blue wire from the Filter input jack; resolder this wire to the jack ground. Now tack-solder one end of another length of hookup wire to the Filter jack tip connector. This becomes the Gate input. The wires will be connected later.

If you intend to use Velocity or other controllers, add a 5-pin DIN (MIDI) jack along the upper apron instead, which will carry all the CV and Gate signals via one cable. (There is some room alongside the existing jacks.) A matching connector must, of course, be added on the MIDI-to-CV converter. Desolder the blue wire from the Filter input jack, and then desolder the white/orange wire from the Loudness jack. Resolder both wires to pin 3 on the DIN jack. This is the Velocity CV-input connection. It doesn't really matter which DIN pins are used for which functions, but if you use a different scheme, be sure to keep it straight (see **Fig. 1**).

Desolder the gray wire from the Oscillator input jack (along the upper apron); resolder it to pin 1 on the DIN jack. This is the Pitch Bend, Aftertouch, or Modulation CV input. (Note that whatever MIDI-to-CV function is connected here, it will control *pitch*.) Solder one end of a short length of hookup wire to pin 2 on the DIN jack; tack-solder the other end to the ground tab on one of the input jacks. This is the input ground. Solder a length of hookup wire to pin 4 for the main CV input and one to pin 5 for the Gate input, to be connected later.

Note the right-forward edge-card connector, i.e., the connector used by the keyboard/contour board, which is the board *behind* the oscillator board and closest to the panel. Locate the brown wire at the fourth connection from the right and the white/green wire at the fifth connection from the right. Carefully cut both wires about one inch out from the connector. (This will leave enough length to reconnect them if you make a mistake or later wish to reverse the modification.) You may have to cut one or more cable ties to do this. Take great care not to nick or cut any other wires.

Tack-solder both of the two free wires (*not* the lead fragments attached to the connector) to a single length of hookup wire and insulate the joint with some heat-shrink tubing. Connect the free end of the hookup wire to either the CV input jack (formerly the External Oscillator Input) or to pin 4 of the DIN jack, depending upon which scheme you're using.

Now, one at a time, clip the wires from the Cinch-Jones plugs that previously

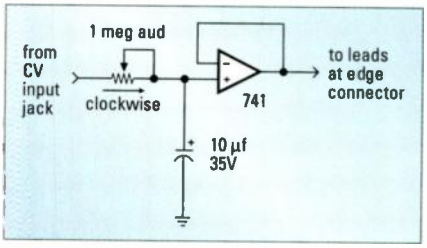

FIG. 2: The op amp in this new Glide circuit can borrow power from the Minimoog.

connected the keyboard and the performance controls, pull them up through the grommet at the bottom of the housing, and make the following new connections: On the 12-pin Cinch-Jones plug, clip the brown wire at pin 1 and the yellow wire at pin 2, and connect both to ground, either at one of the input jacks or by clipping the white ground wire at pin 5 and connecting to it. Clip the white/gray wire at pin 8, the white/violet wire at pin 9, and the white/yellow wire at pin 12, and connect all three together. Clip the two white/brown wires at pin 10 and connect both to one terminal of the SPST switch installed earlier; clip the white/green wire at pin 11 and connect it to the other switch terminal.

On the 6-pin Cinch-Jones plug, clip the green wire at pin 5 and connect it to the Gate input jack (formerly the External Filter Input) or to pin 5 of the DIN jack, depending upon the scheme used. The remaining wires should be clipped and bundled inside the module; no further connections are required.

Triple-check your wiring, and then reinstall the keyboard/contour and oscillator boards and replace the back cover. The modularized Mini is ready to rock. If you use the DIN-plug connection method, you'll have to make related modifications to your converter box, too. Because there are various converters available, the details must, unfortunately, be left to the reader. Note that this mod absolutely requires a DIN cable with all five pins connected, be it a MIDI or audio cable.

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FURTHER MODS

The modularized Minimoog works optimally with a 10V Gate and 10V Velocity signal but will function with 5V signals. Note that, due to limitations in the Minimoog design, the modification disables the Glide function and the Modulation control. Perusing the schematic, it seems that these functions could be restored by adding some pots and an op amp, wired as indicated in **Figures 2 and 3**, but I have not tested this, so some experimentation may be required.

The 741 (or TL071) for the new Glide circuit must use the Minimoog's bipolar supply. The capacitor must be polystyrene to avoid drift. You can use the existing Glide pot, but you'll have to find room for the new Modulation pot. Note that dynamic modulation-depth control in response to a control voltage requires the addition of a low-offset VCA in the modulation output path, which is greatly beyond the scope

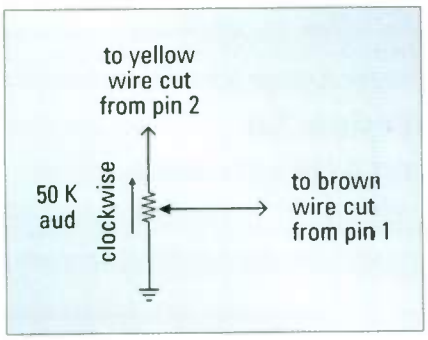


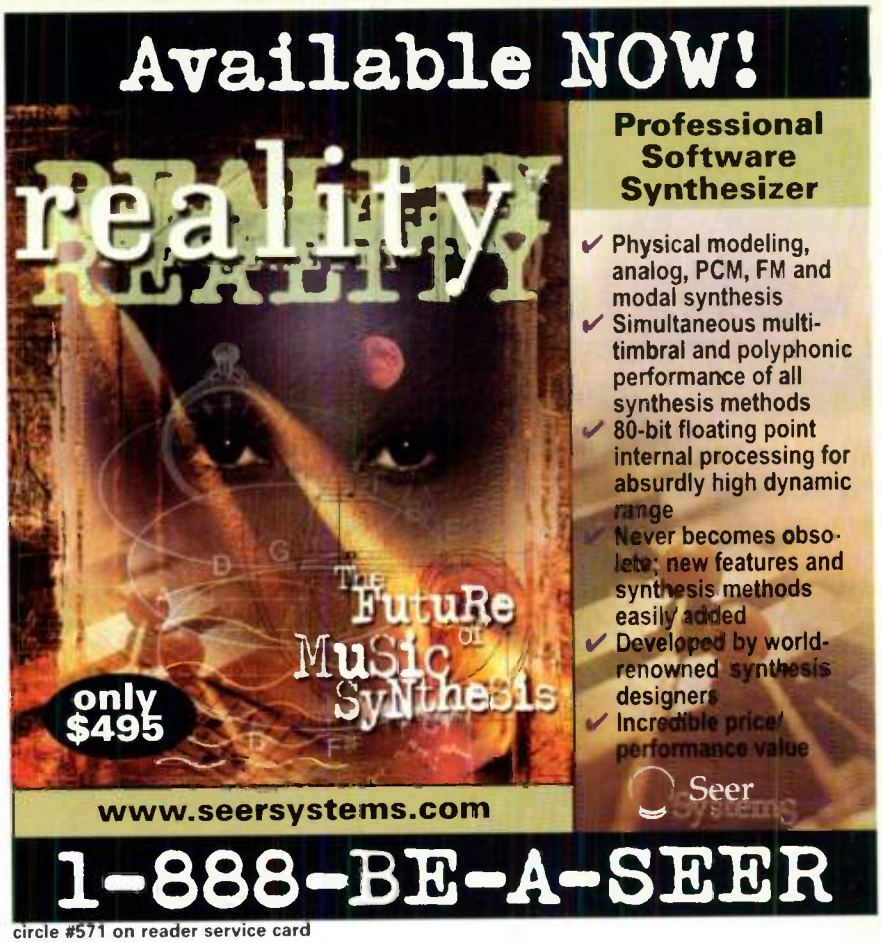
FIG. 3: When building the new Modulation Amount circuit, remember that miniature pots are much easier to fit on the crowded panel.

of this column. Calibrating the Minimoog's oscillators is a good idea after you complete the modification.

What should you do with the leftover case bottom/keyboard? One of my customers made his into a planter!

By the way, because many of the used Memorymoogs in service lack owner's manuals, many players don't realize that the Memorymoog has a built-in MIDI-to-CV converter of sorts. When a MIDI-fied Memorymoog is played as a slave instrument, the mono CV/Gate output on the rear panel follows along.

EM *Contributing Editor* **Alan Gary Campbell** *is the publisher and editor of the* New Music Journal *and the owner of Musitech, a consulting firm specializing in electronic-music product support.*



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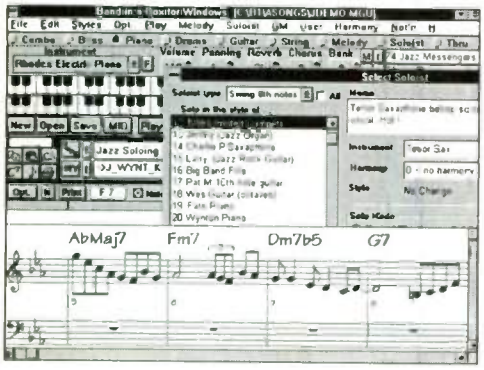

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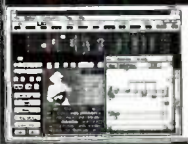

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Get on the SCSI Bus

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By Scott Wilkinson

As electronic music matures, computers become ever more integral to the creative process. These machines offer many advantages, but they also pose some unique problems. Among these problems is the need to store and transfer large amounts of data. Of course, fixed and removable hard disks, CD-ROMs, and data DAT recorders have enormous storage capacities, but this data isn't much good if it can't be quickly accessed and transferred from one device to another.

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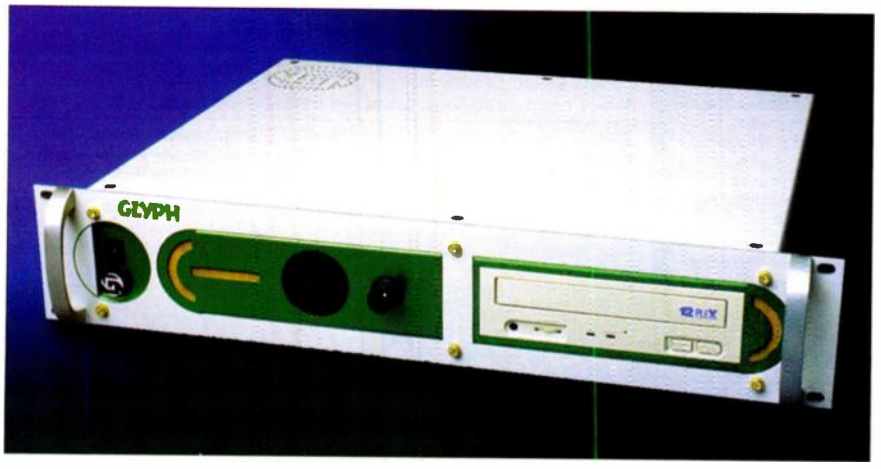

The new Glyph 2U rack enclosure can hold a 3-1 SCSI switcher in the left half, which lets three initiators (such as samplers) share the CD-ROM drive (or any other device) in the right half.

ON THE BUS

SCSI is a parallel interface or *bus;* it sends several bits simultaneously on separate wires within the SCSI cable. In addition, SCSI devices are connected in a *daisy-chain* configuration (see **Fig. 1**). As a result, most SCSI devices include two SCSI connectors on the back panel, which allows them to be placed anywhere in the chain. It is not possible to split or merge SCSI signals with a "Y" adapter, and ring and star configurations are not allowed. There can be no more than eight devices in a single SCSI chain, and all SCSI connections should be made with all devices powered off.

There are several flavors of SCSI, which we'll get to shortly. The varieties differ in several important respects. For

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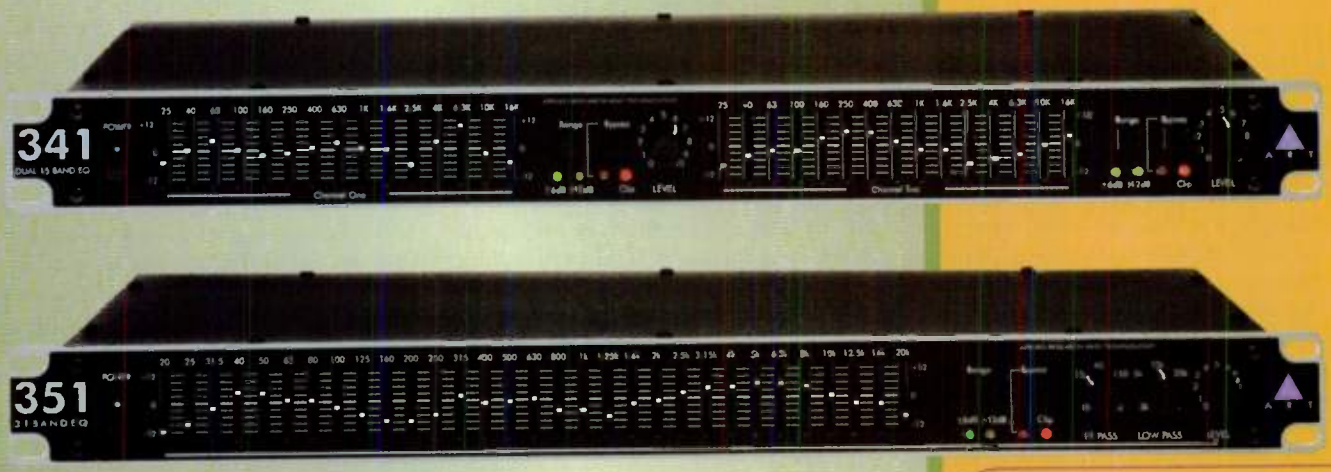
Real World Dependability and Value



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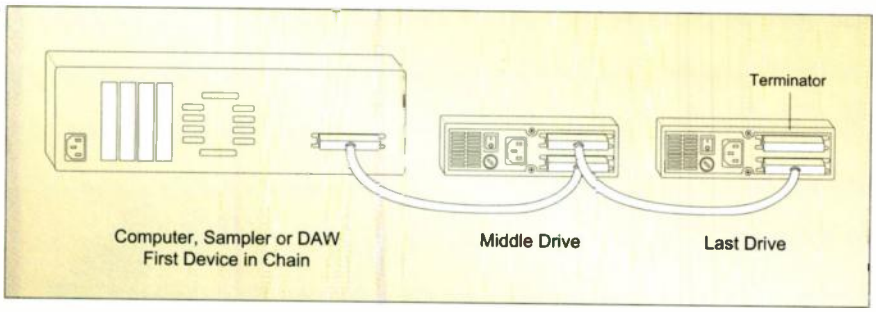

FIG. 1: SCSI devices must be connected in a daisy chain, and the devices at each end should be terminated. (Courtesy Glyph Technologies)

example, the *data-path width* determines the number of bits that are sent simultaneously, each on its own wire within the cable.

Another important characteristic is the rate at which data is sent along the cable. There are actually two data rates to keep in mind: the *maximum data rate*, which can usually be maintained only for short bursts of data, and the *average data rate*, which is much lower than the maximum rate. The average data rate is determined by a number of factors, including the specific characteristics of the devices in the chain (e.g., seek time, latency, throughput, and bit density) and the controlling computer, which is called the *initiator* in SCSI-speak.

The maximum cumulative length of all cables connecting SCSI devices in a single chain (including any cables that reside within a computer or sampler) depends on the type of SCSI you are using; in general, the faster the data rate, the shorter the cables must be. In addition, 25-conductor cables (which were popularized by Apple for the Macintosh and are also used on virtually all samplers) don't include many of the ground wires found in standard 50-conductor SCSI cables, which decreases the maximum cable length.

There are four common types of connectors found on SCSI devices and cables. As mentioned earlier, Apple decided on a 25-conductor cable for the Macintosh, which uses a DB25 connector. (PowerBooks use a smaller 25-pin connector.) A DB25 connector is also used on most samplers and modular hard-disk recorders because it is smaller than the standard Centronics 50-pin connector (see **Fig. 2**) that is commonly found on computer storage peripherals and PC printer cables.

A high-density 50-pin connector (which is sometimes called a micro DB50) is used with the faster forms of SCSI, and forms of SCSI with a data path wider than eight bits use a micro DB68 high-density, 68-pin connector. Fortunately, it is normally possible to use an adapter to join one type of connector with another.

Most forms of SCSI are *single-ended;* i.e., voltage values of +5V and 0V relative to a common ground reference represent digital zeros and ones on each wire in the cable. The faster varieties of SCSI sometimes use a *differential* bus in which zeros and ones are represented by voltage differences between two twisted pairs of wires for each bitstream. This is similar to balanced mic cables, and it allows much longer cable lengths. However, it is relatively rare and is found only in very high-end SCSI systems.

SCSI ZOO

Over the last few years, several varieties of SCSI have been developed (see the table "SCSI Zoo"). Normally, devices that implement older forms of SCSI should work with devices that implement newer forms of SCSI, but this is not always the case; the SCSI implementation in some older devices is not close enough to the spec to work with the newer ones. Except as noted, all forms of SCSI use a single-ended bus.

The original version, which is sometimes called SCSI-1, was finalized in 1986. It has a maximum data rate of five megabytes per second (MBps), a practical data rate of 2 MBps, and a data-path width of 8 bits. The maximum cable length is three meters. SCSI-2 is an extension of the original SCSI command set that doubles the maximum cable length but offers no increase in data rate or data-path width. In fact, there is little difference between the two, and they are essentially interchangeable.

Fast SCSI increases the maximum data rate to 10 MBps, but on average, anything over 5 MBps is considered excellent. Ultra SCSI (also called *Fast-20*) increases the maximum data rate to 20 MBps, and Ultra2 SCSI (also called *Fast-40*) increases the maximum data rate to 40 MBps. Unlike the slower forms of SCSI, which are single-ended, Ultra2 uses a *low-voltage differential* (LVD) bus to extend the cable length. An even faster form of SCSI, called *Ultra3* or *Fast-80*, is under development and should achieve a maximum data rate of 80 MBps using an LVD bus.

Fast, Ultra, and Ultra2 are all types of SCSI-2 that are said to be *narrow*, which denotes an 8-bit data path. All three types are also available in *wide* versions, which use a 16-bit data path to increase the effective data rate. If a SCSI bus is capable of supporting data paths from 16 to 32 bits wide on a single cable, it is sometimes called SCSI-3. SCSI-2 can also support these data-path widths, but it requires two cables to do so. Most devices with wide forms of SCSI are high-end fixed-disk drives. In addition, wide SCSI does no good if you don't have a wide controller in your computer. Finally, wide SCSI is very expensive and not used much in the music industry.

It is possible to mix devices that implement different forms of SCSI in the same chain, but there are a few caveats. For example, the slowest device should be the last one in the chain. In addition, don't put a wide device between the initiator and a narrow device; in this case, the wide device reverts to the narrow bandwidth. Glyph Technologies, manufacturers of SCSI products for media applications, recommends you not combine wide and narrow devices in the same chain.

Many Macintosh models provide a single SCSI bus for both internal and

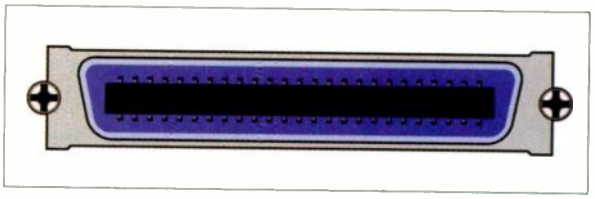

FIG. 2: One of the standard SCSI connectors is the Centronics 50-pin. (Courtesy Glyph Technologies)

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external devices. However, some newer models provide two separate buses: one for internal devices and another for external devices. In this case, the internal bus is often Fast SCSI, and the external bus is regular SCSI. As a result, it's better to use an internal, A/V-capable, Fast SCSI drive for hard-disk recording in such a computer.

FIG. 3: This is a micro DB50 external terminator, which is commonly used with the faster forms of SCSI. (Courtesy APS Technologies)

DEVICE ID

All SCSI devices in a chain must be assigned their own, unique ID number from 0 to 7. No two devices in a chain can have the same ID number; if they do, chaos will reign. However, ID numbers need not correspond to the location of the devices in the chain.

The higher the ID number, the higher the priority of that device. For example, if two devices try to access the SCSI bus at the same time, the device with the higher ID number gets to go first. ID number 7 is usually reserved for the initiator, which would normally be the computer; in a music system, a sampler or modular HDR might be the initiator. All other hard disks, CD-ROMs, scanners, and all other SCSI devices (including devices installed within the computer) are assigned unique ID numbers from 0 to 6; ID 0 is normally the boot disk. In newer Macintosh computers, the internal CD-ROM is normally assigned to ID 3, which can cause problems if you unwittingly assign ID 3 to an external device on the same SCSI chain.

External devices typically include a small switch that lets you set the ID number for that device. In older (and internal) devices, this might be a circuit-board jumper or DIP switch. Samplers typically let you set their device ID in software, but some devices (for example, Macintosh computers) have a fixed ID number that can't be changed by the user.

A new protocol called SCSI Connect Auto-Magically (SCAM) is under development and promises to automatically set the ID numbers of all of the SCAM-compliant devices in a chain. This will help users set up SCSI chains with less hassle.

TERMINATION

To minimize noise and ensure a clean signal in a SCSI chain, the devices at both ends of the chain must include a *terminator*. This is a source of much confusion for many people, but it's actually quite simple: a chain of SCSI devices must have an impedance-matching terminator circuit at each end of the chain and nowhere else. This includes the SCSI controller within the initiator (computer, sampler, etc.) and any internal devices (hard drives, CD-ROMs, and so on), which many people forget.

If this rule is not followed (that is, if one or both of the devices at the ends of the chain are not terminated and/or devices in the middle of the chain are terminated), several mysterious problems can crop up. Proper termination assures a clean signal, which greatly increases the reliability of the SCSI bus.

Many SCSI devices include internal termination, which often consists of one, two, or three "resistor packs" called *single in-line packages* (SIPs). These are typically yellow, blue, or black blobs of plastic with several pins in a straight line, and they are located on a circuit board within the device. They are sometimes soldered in place, but more often they can be removed or installed as necessary.

These SIPs must be removed if the device is not at the end the chain, and they must be installed if it is at the end. Unfortunately, this normally involves opening the case and fiddling with the internal circuit board. If you remove the SIPs, store them carefully so you can reinstall them if you reconfigure your SCSI chain. Don't lose them because finding exact replacements can be difficult. Some devices include a

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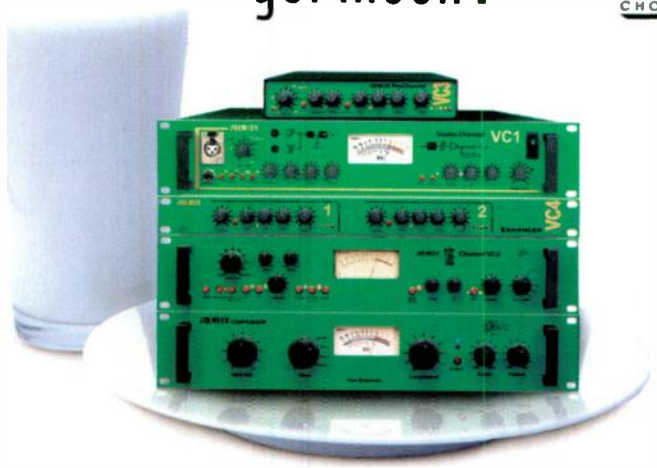

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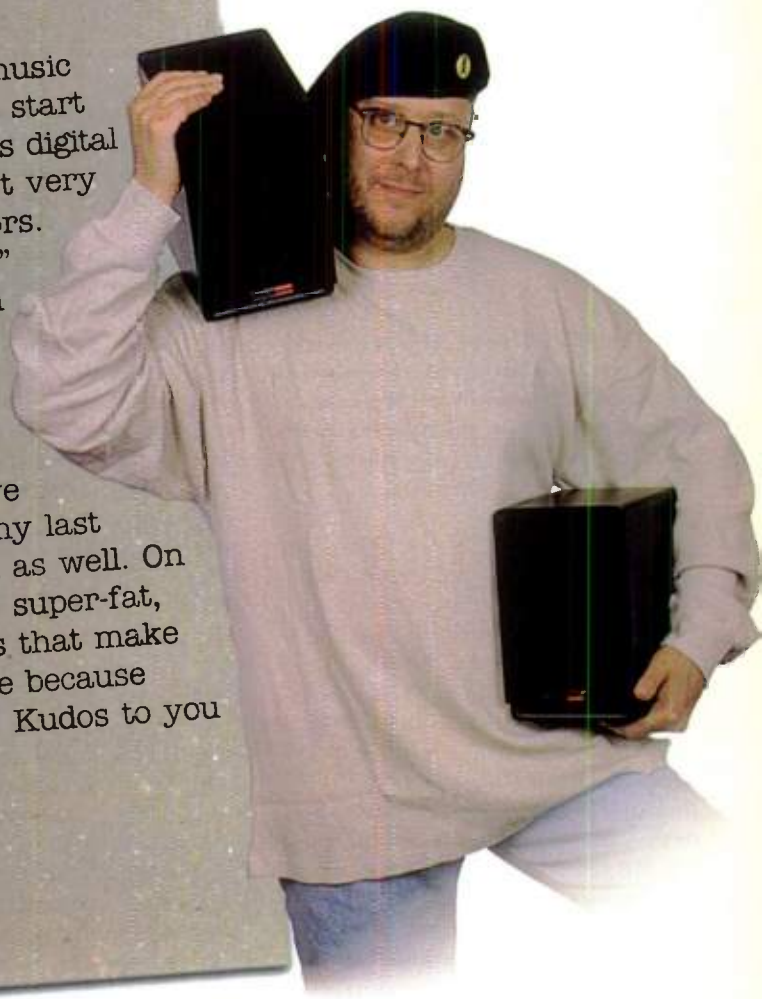
Keep up the great work,

Dann Glenn

Bassist—Recording Artist, Nightvision Records



PH15-vs

SPECIFICATIONS

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power capacity	*45 watts RMS per ch.*
nominal impedance	*4 ohms*
sensitivity	*88 (1w@1m)*
crossover frequency	*2.6kHz*

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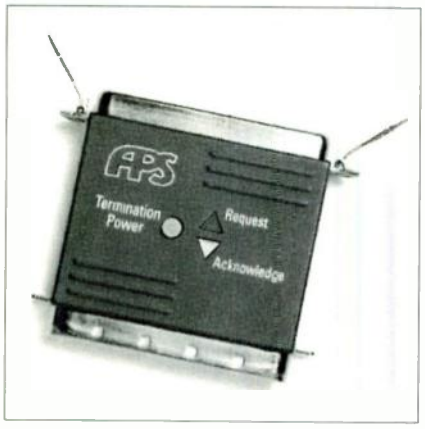

FIG. 4: The APS SCSI Sentry II is a pass-through active terminator that adjusts the termination resistance to varying voltages. Active termination can solve many problems with unreliable SCSI devices, especially in long SCSI chains. (Courtesy APS Technologies)

termination on/off switch or circuit-board jumper, and many modern devices automatically detect whether they need to be terminated and set themselves accordingly.

Another termination option is an *external terminator*, which looks like a SCSI connector with no cable (see **Fig. 3**). An external terminator is attached to either one of the SCSI connectors on a device. Many people remove all internal SIP terminators and use external terminators as needed. This makes it relatively easy to reconfigure your SCSI bus (i.e., add or remove devices).

One type of external terminator is called a *pass-through terminator*, which includes a male SCSI connector on one end and a female connector on the other end. It can be connected to an external device just like a normal external terminator, and its extra female connector duplicates the device's own connector.

But why would you terminate a device (call it device A) with a pass-through terminator (assuming it's the last device in the chain) and then connect another device (call it device B) to the terminator's duplicate connector? In this case, device A would no longer be the last one in the chain, and it shouldn't be terminated. In an ideal world, you wouldn't do this; you would simply remove the terminator from device A, connect device B to device A, and place the terminator on device B.

However, this is not an ideal world. Occasionally, the SCSI bus must be "tuned," which means that one sometimes needs to add termination where it shouldn't normally go. Adding a pass-through terminator to the middle of a SCSI chain can sometimes solve a mysterious problem that doesn't respond to other solutions. If you try this, however, proceed with caution; you can easily create more problems than you fix.

SIPs and external terminators provide *passive termination*, which consists of a simple resistor circuit. An *active terminator* (see **Fig. 4**) includes additional circuitry to adjust the termination resistance to varying voltages. Active termination is superior to passive termination, and it can solve many problems with unreliable SCSI devices. It's particularly important for fast and/or long SCSI chains. However, active termination is more expensive than the passive variety. (Some people use the word "active" to refer to automatic, passive termination instead of termination that uses active circuitry, which can lead to some confusion.)

Terminators need some power to operate properly, so many SCSI devices supply *terminator power* to the SCSI bus. If you have terminated a SCSI chain properly but there is no terminator power, you can still encounter problems. Make sure that at least one device in the chain (preferably the initiator) supplies terminator power. SCSI-1 devices are not required to supply terminator power, but SCSI-2 requires it from the initiator, so this is not much of an issue these days. In addition, other SCSI-2 devices are allowed (but not required) to supply terminator power.

If terminator power from one device fails, the entire bus could become nonfunctional. On the other hand, if several devices are supplying terminator power, the bus might remain functional. This is one reason that all devices in the chain should be turned on, even if you are not using them. (In general, you should power up all SCSI devices before booting the initiator.) Some external terminators include an LED that indicates the presence of terminator power on the SCSI bus.

TERMINATING COMPUTERS

If you think the previous discussion of termination was hairy, the issues surrounding the termination of a SCSI bus within a computer are downright furry. A few Intel-based PCs include a SCSI port, but most require an optional controller card to use external SCSI devices. In addition, most PCs don't use SCSI for their internal storage devices; they use an IDE or PCI bus instead.

On the other hand, most Macintoshes use a SCSI bus for both internal and external devices. Unfortunately, termination is handled in various ways, depending on the specific model. For example, models that predate the Quadra 800 (for example, the Mac SE/30) include passive termination on the internal hard drive but not on the motherboard. There is only one terminator in the internal SCSI chain, but this chain is very short, and the bus operates at a relatively slow speed, so it actually works with only one terminator. If you connect one or more external devices to the SCSI port, the last one *must* be terminated or you will certainly have problems.

Apple added automatic, passive termination to the Quadra 800's motherboard, which detects the presence of all SCSI devices and enables or disables its termination accordingly. The internal hard drive is permanently terminated and remains at one end of the chain.

The Power Mac 8100 added a separate Fast SCSI bus for internal hard drives while retaining the standard bus for external devices. The new internal bus is permanently terminated on the

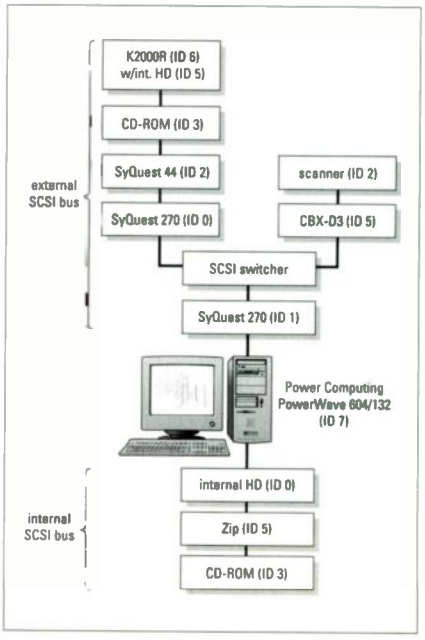

FIG. 5: EM Senior Editor Steve Oppenheimer has created a complex SCSI system in his studio.

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The SCSI Zoo

Type	Data Path Width (bits)	Max. Data Rate (MBps)	Average Data Rate (MBps)	Max. Total Cable Length
SCSI-1	8	5	2	9'9"
SCSI-2	8	5	2	19'6"
Fast	8	10	6	9'9"
Ultra (Fast-20)	8	20	8	4'11"
Ultra2 (Fast-40)	8	40	10	9'9"
Fast Wide	16	20	10	9'9"
Ultra Wide	16	40	12	4'11"
Ultra2 Wide	16	80	14	9'9"

motherboard, which also provides automatic termination for the external bus. Interestingly, an internal CD-ROM is connected to the *external* bus (officially called the "Internal/External" bus) rather than the faster internal bus. If the internal CD-ROM is the only device on this bus, it should be terminated (which is done at the factory); if there are external devices connected to this bus, only the last one should be terminated.

The Power Mac 7500, 8500, and 9500 models use a similar SCSI design, but the internal CD-ROM is connected to the faster internal bus along with the internal hard drives. In addition, the internal bus is now controlled by a custom chip called Macintosh Enhanced SCSI Hardware (MESH). High-end Power Macs will continue to use MESH for the internal bus, which will probably be implemented for the external bus, as well.

SCSI HELPERS

Several companies make helpful devices that extend the capabilities of SCSI. For example, *SCSI repeaters* amplify, clean, and resend the SCSI signal, allowing longer cable lengths. Among other applications, this lets you isolate a noisy computer in a closet or even in another room while your removable hard-disk drives remain in the music studio (see "Desktop Musician: Getting Away from It All" in the February 1997 **EM**).

SCSI switchers let you add or remove devices (or entire chains of devices) from a SCSI bus while the power is on without physically connecting or disconnecting any SCSI cables. You should always use an electronic switcher rather than a mechanical switch, and the switcher should terminate the branches that are not active. In addition, a switcher should poll the active SCSI bus and not switch until there is no read or write activity on the bus.

Some devices perform both of these functions. For example, Glyph Technologies (tel. 800/335-0345 or 607/275-0345; fax 607/275-9464; e-mail gorn@glyphtech.com; Web www.glyphtech.com) makes the GSS-210S 2-way switcher/extender, which lets two initiators share a SCSI chain (albeit not at the same time) or one initiator switch between two SCSI chains.

MUSIC SYSTEMS

It's possible to have more than one initiator on a single SCSI bus (e.g., computer and sampler), but this doesn't always work as expected. For the most reliable operation, use a SCSI switcher to select the desired initiator. A simpler option is to place the initiators at opposite ends of the SCSI chain, but this is a hit-or-miss proposition; the initiators might or might not share the same bus nicely, depending on their individual SCSI implementations. I have a Mac IIci at one end of a SCSI chain and a Kurzweil K2500 at the other end, which work fine: the Mac recognizes a Mac-formatted, SyQuest removable cartridge, and the K2500 recognizes a K2500-formatted cartridge.

Most SCSI-capable samplers have only one SCSI connector, which means that they must be at the end of the chain. Two notable exceptions are the K2000R and K2500, which include two SCSI connectors. All current K2500s include active termination with a switch on the back panel, which makes it easy to configure the unit for any SCSI setup. However, the first production

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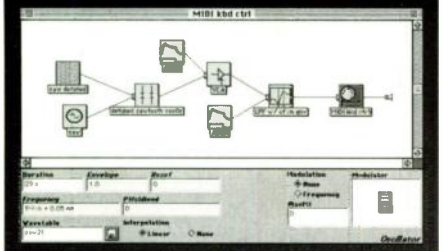

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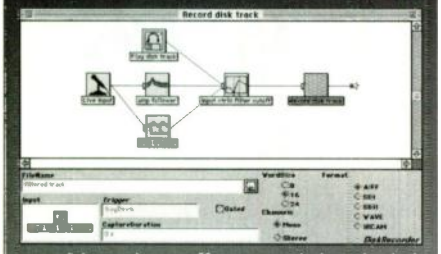

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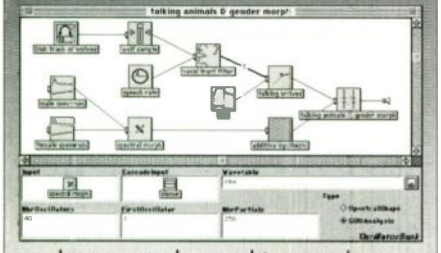

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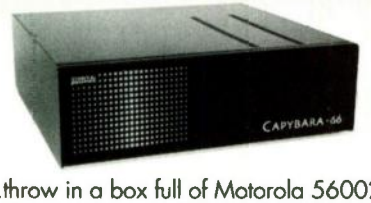

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units used passive termination and did not have a switch, which means you must fiddle around with the SIPs on the internal hard drive (if installed) and the K2500 SCSI controller to properly terminate the system. In this case, it's best to have a qualified technician do the dirty work.

When using SCSI with a hard-disk recording system, the higher the average data rate, the more tracks you can record and play simultaneously. In general, you need an average data rate of at least 5 MBps for eight tracks of digital audio. Of course, the performance of any HDR system also depends on the characteristics of the drive itself (see "Square One: Hard-Disk Recording" in the April 1997 **EM**).

EM Senior Editor Steve Oppenheimer has established a complex SCSI system that illustrates some of the points I've discussed (see **Fig. 5**). His Power Computing PowerWave 604/132 computer provides two separate SCSI buses: internal (Fast SCSI) and external (normal SCSI). The internal bus includes the computer itself and a Quantum internal hard drive, Iomega Zip removable drive, and Toshiba CD-ROM drive.

The first external device is a SyQuest 270 MB removable drive followed by a Glyph GSS-210S 2-position SCSI switch/extender. One branch of the switcher includes a Yamaha CBX-D3 digital audio recorder and an HP ScanJet IIcx scanner, terminated by an APS SCSI Sentry active terminator (see **Fig. 4**). The other branch includes another SyQuest 270, a SyQuest 44 MB removable drive, an Apple CD300e CD-ROM drive, and a Kurzweil K2000R with its own internal hard drive.

This setup offers several advantages. For example, the same ID number can be assigned to one device in each branch of the chain after the SCSI switch and within the computer. (The only exception is the computer's ID number, because the computer is a part of both the internal and external chains.) In addition, the branch that includes the K2000R can operate independently from the rest of the system. If the switcher is set to the branch that includes the CBX-D3 and scanner, the K2000R can still access the removable and CD-ROM drives because the switcher automatically terminates the unused branch. Pretty slick, eh?

TROUBLESHOOTING

As mentioned earlier, SCSI problems can seem like black magic at times, but these problems can normally be traced to more rational sources. The most common sources of trouble are poor-quality cables—use only high-quality, shielded, twisted-pair cables—and a cumulative cable length that is too long. For example, when Oppenheimer added the second SyQuest 270 drive to the K2000R branch in his setup, that branch became unreliable. He determined that even with the repeater included in the Glyph GSS-210S SCSI switch/extender, he had exceeded the maximum cable length when he added the new device. Replacing some of the cables with shorter ones solved the problem. In general, use the shortest cables you can in any SCSI system.

Other sources of trouble include incorrect termination, incorrect driver software, and two or more devices with the same ID number. Problems can also arise if a device implements SCSI incorrectly or includes a poor-quality power supply and/or enclosure, in which case there's not much you can do except replace the device. IRQ conflicts with other devices sharing the same memory space in Windows can also cause problems.

Occasionally, you might encounter a problem that does not respond to any reasonable treatment. In this case, try swapping the physical order of devices in the chain. In addition, check to see if there is a conflict between the software drivers in your system. As mentioned earlier, try inserting a pass-through terminator at various points in the chain. If all else fails, it might be a good idea to pray to the SCSI gods while lighting incense before stone idols under a full moon!

SCSI is an important standard for all electronic musicians who use computers, samplers, and/or modular hard-disk recorders. The ability to quickly transfer large amounts of data is essential for modern music making. Once you understand SCSI, you can use it to streamline your studio and get the data where you want it in short order.

EM *Technical Editor* **Scott Wilkinson** *thanks Steve Gorney of Glyph Technologies, Ken Keyes of Iomega, Bobby Brim of APS Technologies, Mike Eneboe of Apple Computer, and J. D. Buller of Components Express for their help with this article.*

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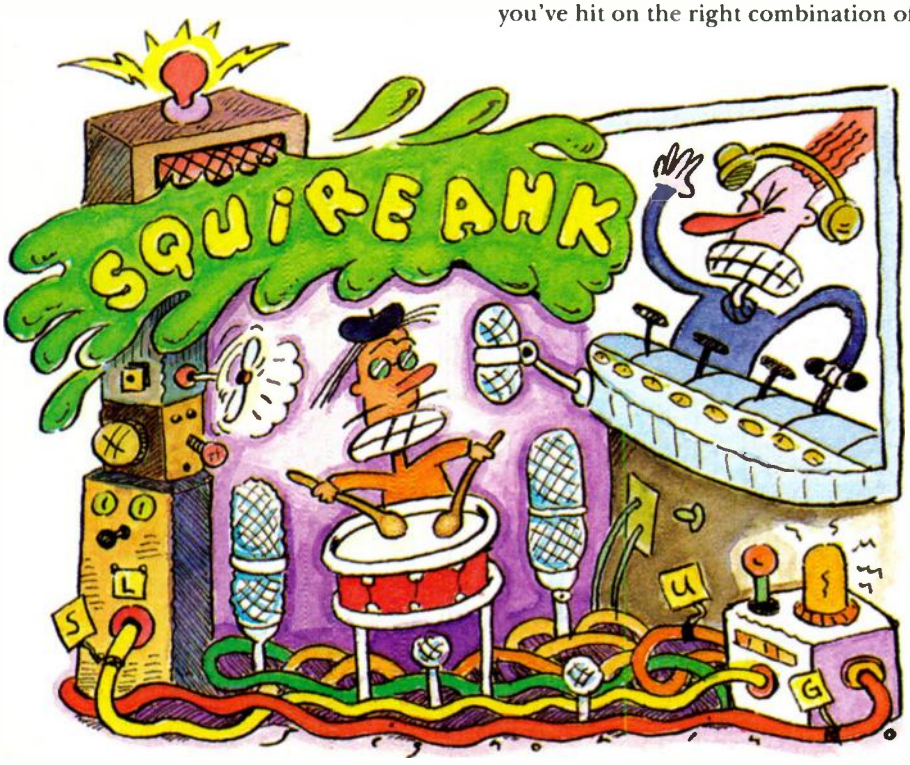
The ABCs of Recording

Follow these guidelines so your mixes don't turn into alphabet soup.

By Brian Knave

Audition microphones carefully. This is where the signal starts, so it's arguably the most critical stage in the whole process of recording. Picking the right mic for the job and positioning it for the best sound are two of the most important skills an engineer can master. Keep an open mind and open ears. Don't presume to know which is the right mic; rather, audition a variety for each source sound. You'll know that you've hit on the right combination of mic and mic placement when the recorded sound leaves nothing to be desired. Then, when it comes time to mix, there's precious little to do but raise the fader.



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Back up your work. This rule applies to analog, DAT, and MDM media as well as floppy disks and hard-drive data. Some people say anything done on a computer doesn't exist until it has been saved in three separate places. When you lose your work to a hard drive that has inexplicably died, you'll know what they mean. If you don't have two MDMs or DAT machines, occasionally rent or borrow a second machine and make safety copies of important tapes (or save from DAT to MDM or vice versa). It may be a hassle, but it's not nearly as painful as losing great tracks forever.

Control unwieldy dynamics with compression. Used musically, a compressor can be a recordist's best friend. Sure, it's possible to make good recordings without compression, and certain styles of music (e.g., classical or traditional jazz) may fare better without it. But you'd be hard-pressed to find a song on anyone's Top 40 list that didn't use compression on at least the lead-vocal track. Compressors are ubiquitous for a good reason: they make tracks "pop." (For information on using compressors, see "The Sophisticated

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Mix" in the April 1996 and "Recording Musician: Ready, Set, Compress!" in the May 1997 **EM.**)

De-ess vocal tracks to minimize sibilance. Of course, it's always best to strive for low-sibilance recordings (mic selection and placement, pop filters, and windscreens can help). But a time *will* come when an otherwise superb take is marred by an ugly sibilant or two. That's when a de-esser can save the day. If you don't have a dedicated de-esser, you can improvise one by patching a mult of the vocal signal through a graphic EQ and then into the sidechain input of a compressor. Now dial up a superfast attack time on the compressor, and *boost* the frequencies on the EQ that you want to diminish. (For more information about using sidechains, see "Recording Musician: Working on the Sidechain Gang" in the July 1996 **EM.**)

Engage the low-cut filter on your microphone (or console) when recording vocals. Why? Well, unless you're recording a basso profundo, there's little vocal information below 100 Hz anyway—but there may be room rumble and 60-cycle hum. And it's best to filter out that gunk at the earliest point in the signal path.

Fix it in the mix but only as a last resort. That is, always proceed as if you *can't* fix it in the mix. Sure, you can "doctor" less-than-pristine tracks—but you typically compromise something in the process. That's why it's better to get it right the first time. Scrutinize your work as you go to make sure you've laid down clean, consistent, distortion-free, and in-tune tracks. Fashioning a great mix is challenge enough without the additional task of having to fix a bunch of screw ups. (If, after taking every precaution, you still end up with some lame tracks, check out "Fix It in the Mix" in this issue.)

Go gently into that good studio. Whether it's your space or someone else's, treat it with respect. That means not only the obvious stuff like keeping food and drinks away from consoles and processors but also knowing *how* the gear is supposed to be used. It's important, for example, to learn the correct sequence of powering up and down, i.e., which units are first on, last off (FOLO) and which are last on, first off (LOFO). There are also protocols for handling tape and other magnetic media (e.g., not putting them next to speaker magnets, magnetized tools, or other sources of electromagnetic fields) as well as for handling ribbon and condenser microphones. Finally, it's important to keep records of equipment usage and implement a regular studio-maintenance program.

Have patience. The adage that everything takes longer than you expect is often doubly true in the studio. In general, audio engineering is better suited to the Zen initiate than the Type A personality. The preferred drink is herbal tea, not coffee.

Isolate noisy gear. This goes for humming CPUs as well as sputtering guitar amps. In the former case, a machine closet may be in order. (For information on machine closets, see "Desktop Musician: Getting Away from It All" in the February 1997 **EM.**) In the latter, use gobos to isolate the amp from other instrument mics. Or put the noisemaker in another room, if necessary. Take advantage of cardioid mic positioning to minimize leakage, and use noise gates to further isolate the sound.

Junk lame gear. This is no call to throw out hip, vintage equipment but a reminder that good technique can take you only so far. For example, if you've been trying to get a million-dollar vocal sound with a fifty-dollar mic but keep falling short of the mark, it may be time to trade up. Likewise, if your cheapy effects processor is incapable of adding reverb without reams of noise, a new, quieter unit may be long overdue. In the end, first-rate audio requires both good technique *and* good gear.

Keep the record button ON. This is a fundamental rule in the recording arts. It doesn't matter if the levels are correctly set yet or if the artist says she needs to rehearse first before tracking: *anytime* you roll tape (or the hard drive) for a rehearsal or to set levels, go ahead and engage the record function. The muse is fleeting. She has a funny habit of visiting on the first pass and then taking the rest of the night off.

Label everything. This includes tapes, disks, discs, and removable cards and cartridges, as well as cables, patch bays, and other studio peripherals. For example, I color-code mic cables and stands (with colored tape) so I can confirm the signal path at a glance, and I label each cable end (using white tape and a felt-tip pen) to make patching a breeze. This helps when it comes to breaking down gear, patching in new equipment, and troubleshooting, too. Also, always use track-designation strips on the console and keep detailed track sheets of all sessions. (For more information on track sheets, see "Recording Musician: Hard Copy" in the November 1995 **EM.**)

Monitor at various levels. That's because the human ear perceives certain frequencies more critically at specific volume levels. For example, if you set relative mix levels while monitoring solely at high volumes (say, 110 dB), when you turn down the volume, the bass and kick drum will seem wimpy. Conversely, if you set relative levels while monitoring at low volumes only (say, 70 dB), low-frequency information will likely be overpowering when the tracks are played at high volume. Monitoring at various levels helps you find a happy medium.

Nip noise in the bud. The sooner you get rid of it, the better. For example, if you're recording bass guitar direct and the bass player's pickup is buzzing, go ahead and sweep through the high frequencies with a parametric EQ, pinpoint the offending buzz, and kill it before printing to tape. Put down clean tracks from the get go because at mixdown time, a little bit of noise on each track will quickly accumulate into a lot of noise in the mix.

Optimize signal levels. Again, the goal is to minimize noise, and setting proper gain stages is one key step toward achieving that goal. Set each gain stage in the signal path at its optimum signal-to-noise ratio. This is usually around 75 percent of its maximum output, a level that puts the signal well above the noise floor yet still offers ample headroom. (For more information on setting gain stages, see "Recording Musician: Optimum Gain Structure" in the March 1997 **EM.**)

Punch in with confidence. That is, *don't* punch in until you're certain you

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know exactly where to go in and out of the track. Rehearsal is the key. Most pro recorders offer a rehearse function specifically for this purpose as well as an auto-punch mode. The latter is especially useful if you're recording alone, so get acquainted with it. A few tips: downbeats are typically good points for punching in bass-guitar parts. Depending on tempo, try counting sixteenth notes ("one ee and uh, two ee and uh," etc.) and punching in one sixteenth note before the downbeat (i.e., on the "uh"). For acoustic rhythm-guitar parts, try punching at the end of a downstroke just before the next upstroke (e.g., just after "and" and before "uh"). That way, you don't risk marring the downstroke, which is generally more important to the rhythm than the off beat.

Quantize with caution. Nothing spoils a good groove like overquantization. To start with, make a copy of the sequenced track and experiment on that rather than the original. Proceed with low values first, gradually increasing to higher values if necessary. That way, you maintain a more natural feel. Also, try quantizing individual instruments at different values, for example, kick and snare drum at higher values and hi-hats, toms, and cymbals at lower ones (if at all). Avoid quantizing fills and solos altogether. Quantization is the great equalizer; overused, it will make your grooves sound like every other overquantized groove.

Reference your mixes. This is not cheating—it's simply the best way to get perspective on your creations. After all, everything we know in life, we know in relation to something else. So by all means, don't finalize any mix until you've compared it critically to others. Choose the best mixes you can find done with similar instrumentation and in the same genre you're working in. It's not that you're striving to make your mixes sound the same as, say, Steely Dan's or Peter Gabriel's. But by listening closely to theirs (or whoever's), you acquire a context for better hearing what creative choices you've made as well as confidence about why you made them.

Sequence whenever possible. This is not to recommend how you should work or what kind of instrumentation you should use. But if you *are* using MIDI controllers and sound modules on a particular song and your studio is equipped with a sequencer and sync capabilities, then it's advisable to record those instruments into the sequencer rather than onto tape. Why? There are several reasons. For one, you save audio tracks (which is smart no matter *how* many tracks you have). But you also preserve audio integrity, because at mixdown, the sounds will be coming fresh from the sound modules rather than from tape (and therefore through fewer circuits, converters, etc.) Finally, of course, sequenced tracks offer far greater editing capabilities than standard, tape-based audio tracks, so they let you maintain the greatest number of creative options until the final mixdown.

Trust your ears. Meters and indicator lights have their place, of course, and should be consulted regularly. But in all things musical, the ear must be the final arbiter. That means if a meter says you've clipped a signal but you don't hear any distortion, it's probably because there *is* no distortion. Don't rerecord a fabulous track just because a red light goes on; rerecord it because it doesn't sound right to you (or because it doesn't knock your socks off). Ditto with equipment manuals. If the instructions tell you never to use the gear in such-and-such a manner, but you do anyway and end up with a sound that blows you away, what are you going to do—erase the track because you disobeyed? Innovation, after all, is not about following the rules; it's about breaking them.

Use clean power. Here's a ground rule if there ever was one (pun intended). In general, clean power means that nothing else is drawing power from the same AC circuit as your gear. In addition, make sure your studio equipment isn't drawing too much power from its circuit. Still another potential—and common—problem is bad grounding. Not only can bad grounding add unwanted noise to your mixes, it can also lead to weird equipment behavior, equipment failure, fire, and electrocution. (For more information on studio power and grounding, see "On Solid Ground," parts 1 and 2, in the September and October 1992 issues of **EM**. Also, you

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should consult with a professional electrician who knows about the power requirements specific to audio recording.)

Ventilate your studio. That may be easier said than done, but it's important to do. Humans can go long stretches without lots of things, but air is not one of them. With home studios especially, the goal of constructing a soundproof space typically supersedes the need to make it user friendly. But if there's no flow of fresh air, there will also be no flow of fresh ideas. At the very least, if you can't manage to properly ventilate your studio, remember to throw open the doors every hour or so to replenish the oxygen supply. Your brain will thank you for it, and you'll play better music, too.

Wait until jets, helicopters, and big trucks pass before recording. No matter how "soundproof" you've made your studio, it's doubtful its walls will block the low rumble of these track-spoiling nuisances. Such environmental sounds will be especially noticeable if you're recording with a high-quality condenser mic. For a critical pianissimo passage—say, a solo flute interlude or whispered vocal part—wait and record in the wee hours. By then, the din of civilization will have subsided enough to let you proceed without constant interruption. Silence is golden but may require caffeine.

e**X**ercise tape. This is all but essential for open-reel tape but is a good idea for new DAT and MDM tapes, as well. Simply fast-forward to the end, and then rewind. This precautionary measure assures that the tape is evenly packed on the spool, and it can also help distribute a concentration of particles that may have formed on a particular section of the tape during manufacture.

Yank cables—not! When removing cables from patch points (and power cords from electrical outlets), you should pull firmly on the connector, not the cable itself. This would seem a no-brainer, yet I can't tell you how many times I've seen people yank on cables to remove them from patch bays and processors. Audio cables are already susceptible enough to malfunction; yanking on them only hastens their demise.

Zero in on phase problems by testing your mixes in mono. Phase cancellation can occur for a number of reasons, including radical equalization, improper stereo miking, and phase reversals inherent between the inputs and outputs of signal processors. Get in the habit of checking your mixes in mono at various stages in the recording process, especially any time you stereo mic or bring an instrument into the console through two or more input modules (e.g., direct and amplified electric guitar). If summing the channels to mono causes the sound to "collapse," lose frequency content, or in any way sound weird, you probably have a phase problem. In the case of stereo mic phasing, solo each mic to determine which sounds best, and then move the other until the problem disappears. Phase reversals originating internally in equipment can often be resolved simply by locating the problematic box and reversing its phase.

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So take heed: in this time of upheaval, the best way to approach your career is to get back to basics by creating a grass-roots regional infrastructure and building up slowly from there. As the market stabilizes, the artists and labels that have vision and patience will survive. The bottom line is to have great music and to produce the very best CD that you possibly can. With sufficient talent and a solid, well-informed business plan, you have a much better chance of success.

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It takes an average of six to eight weeks to design and manufacture a new title and about two weeks to rerun an existing title. Remember to include shipping time, too. Shipping varies depending on the service, but it usually takes from five to ten days. Give yourself leeway in case of problems.

DISTRIBUTION

You must have distribution in place before you release your CD. Without it, you have a closet full of CDs that you can sell only at gigs or online. The ins and outs of distribution are beyond the scope of this article, but suffice it to say that without distribution there is little reason to engage in a full-scale CD promotional campaign. You will simply be spending a lot of money for minimal product branding. Getting airplay or advertising doesn't do any good if your record isn't readily available to the buyer.

Submit your new title to your distributor no later than three months prior to the street date; send a copy of the final mix on cassette along with the artwork as soon as you have both. This timing is imperative because distributors have catalog and other deadlines that they have to meet. You definitely want to be included in the monthly or bimonthly publications they put out. Also, send copies of the CD to the distributor's sales reps as soon as possible, for they are the ones who will be selling it to the retailers. Stay in touch with them, develop strong relationships, and keep abreast of how your CD is doing.

Getting a distribution deal is very difficult these days if you are an unsigned and unestablished act, but it's not impossible. I strongly recommend that you budget the funds to hire a full-service music promotion firm to get you in the back door and nail down a distribution deal.

PROMOTION

The old-fashioned method of putting together a strong live act, honing it until it sparkles, and then gigging as often as possible is still the best method of promoting yourself. Whether you're a blues band, a trance/techno ensemble, or a solo act, getting on the stage and performing killer shows is the surest way to generate a buzz about your music. There's simply no better way to improve your odds of achieving success.

Playing live should be an ongoing effort, but I highly recommend that you save the big tour for *after* your record release, hitting the appropriate cities and towns at the same time that your other promos are peaking in those areas. Work out the timing so that any co-op advertising between your label and distributor—and any other print or radio advertising—is running in the local media when you get into town to perform.

As a rule, print advertising doesn't work unless you are a major artist and/or have the budget to sustain an ongoing ad campaign in a highly visible publication over a long period of time. However, selective, niche-market advertising—such as running an

JULY	AUGUST–SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	JANUARY	FEBRUARY	MARCH 1st	MARCH–MAY
■ Finish recording and mastering ■ Finish artwork	■ Send demo cassettes and artwork to distributor ■ Manufacture CD ■ Teaser postcards to media	■ Start publicity campaign ■ Send CDs to media for review	■ Step up publicity campaign: saturate media with press releases to coincide with gigs ■ Submit print ads to publications	■ Contact local media for TV and radio interviews ■ Book in-store performances to coincide with street date	■ Submit CD for listening stations ■ Send promo copies to sales reps ■ Send teaser postcards to radio stations ■ Start radio promotion: send CDs to stations around the second or third week of month	■ Send CDs to retail for in-store play ■ Mail one-pagers and other retail promotions	■ STREET DATE	■ Tour in support of record

FIG. 1: Here is a basic time line for coordinating your CD release. Note that for a CD with a street date of March 1, the promo process should start in July of the previous year.

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In-store appearances are a great way to work your release. Being physically present in a Borders Books, Tower Records, or a niche-music store playing your songs while the CD is sitting there on the shelves produces immediate results: people hear you, they like you, and they buy your CD right then and there. Promote in-store performances with posters and flyers at least three weeks before the show. Another great PR tool is online concerts. Just make sure that all of these elements fall into the time period around the street date of your release.

RADIO

Radio play is key in the success of your CD. This is where playing live figures heavily. If your band is going to be playing in an area and has generated interest there, then radio will be much more receptive to you. Be aware that radio does not usually back-announce information on the song just played (e.g., what label the record is on and where it's available), so it's up to you to have advertising and publicity lined up to support the airplay.

New artists should release a record after the first of the year, preferably in February or March. Avoid May and September because many college radio stations turn over their staffs during those months. Send CDs—and only CDs—no more than 30 days prior to the street date. Do not send shrink-wrapped CDs; you want your disc to be as accessible as possible. Send them to the music director, and include the track-sheet description. You should also find out the station's hours for music calls. Music directors are usually only available two days a week, a couple of hours each day, for calls.

▼

A killer live show is the oldest and surest method of promoting your music.

Make plenty of follow-up calls. Simply sending your CD to the station and calling once or twice won't work. Be persistent, but be nice; learn to become a "pleasant nuisance." Again, this is a job for professional radio promoters. These pros make their living by knowing the DJs at different stations and when to call. Bear in mind, though, that radio is ancillary. Just getting radio play alone doesn't mean much; if the records aren't in the stores at the time of the airplay, your return is minimal.

PUBLICITY

Be prepared to send out a lot of sample CDs to reviewers and other music-media people. The more people that hear your music, the better. If you are looking at a release date in late winter or early spring, you should start generating publicity for your release in the late summer or early fall of the previous year. Everyone in the industry is swamped from fall up through December, so give yourself time to get your CD out there and circulating. Hopefully, you will also get reviews that will run about the time of the street date.

When buying a dubbing machine for your personal or project studio, TASCAM gives you high speed relief from duplicating chores. The 202MKII Dual Auto Reverse Cassette Deck is twin two-head decks in single 3U rack-mount design that can work together or separately with the touch of a button. It's perfect for making high speed dubs or creating composite tapes from multiple sources. Record on one deck while playing-back on the other, or program for continuous looping playback. The 202MKII is the perfect blend of multi-function capability, quality sound and user friendliness. And at $529* it's ideal for budget-minded musicians and studios. Best of all, it's from TASCAM, so you know it's built to last.

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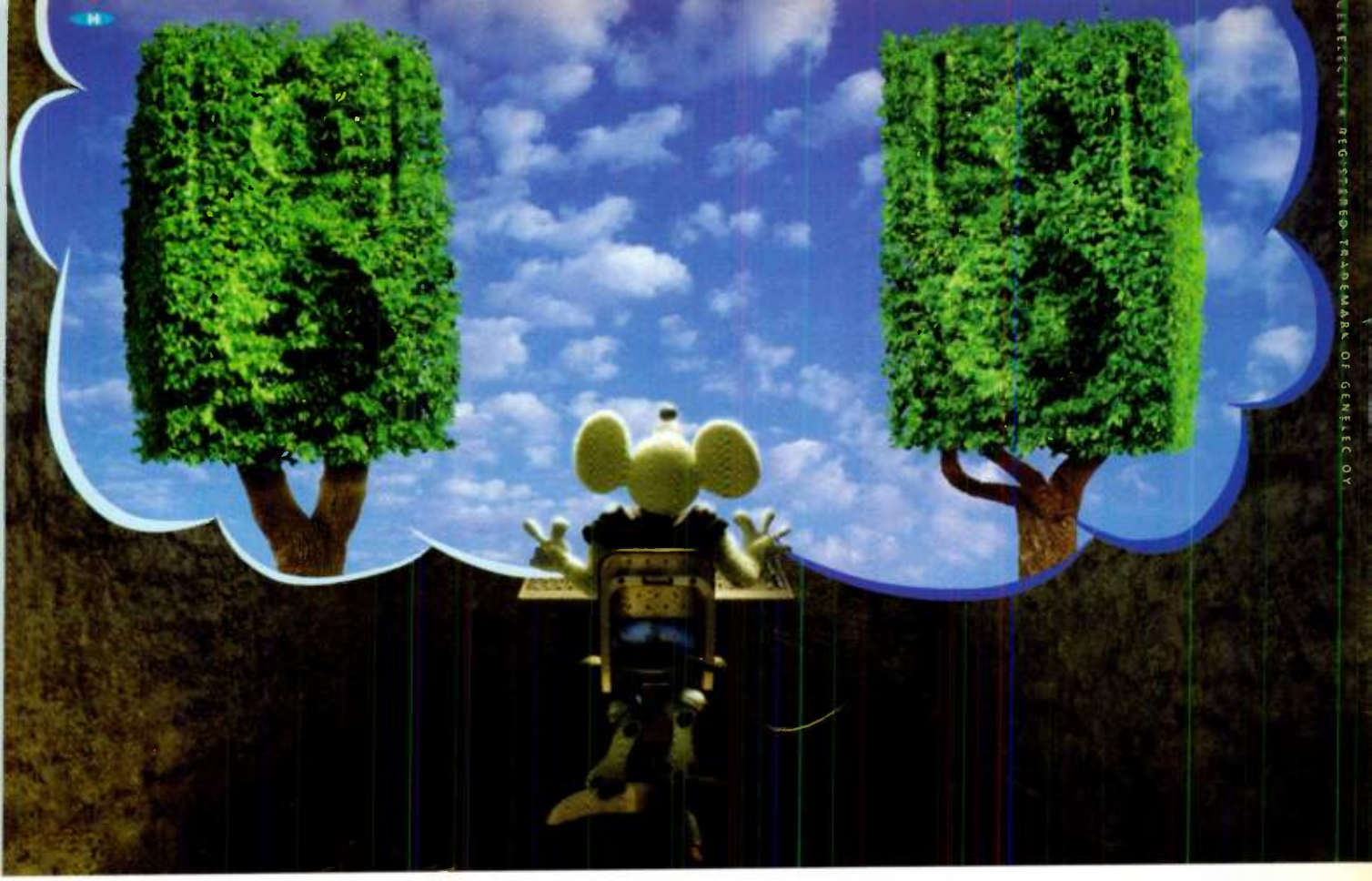

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Remember that multiple impressions sell CDs, so call as much attention to yourself as early on as you can.

As a rule, you should start your publicity push four months ahead of the street date, although it is beneficial to send out some sort of teaser in the form of postcards or press releases six months ahead of time. Send copies of reviews at least three months before your street date; all of the major consumer publications require three to six months of lead time for editorial deadlines. Local publications usually need less lead time; contact the paper's editorial office to find out when you need to submit for reviews. Your reviews should coincide with your release date as much as possible.

Be sure to submit press releases to print-media music calendars two weeks prior to any gig you have booked. Most newspapers will not respond to you personally; you merely send a press release to the editor of the calendar section and cross your fingers that you are included. If you are a well-known act that has done a lot of pavement pounding already, the editor will welcome any gig information. Furthermore, if you have done a good job of creating a buzz, you can interest journalists in writing feature articles on your band.

Also, work with local radio and try to get interviews to correspond with your release. You can do live, on-air performances at some stations in conjunction with your interview. This is great publicity and should be a part of any artist's regional and national efforts. Television—cable, public, and network, if possible—should also be a part of this effort. Local cable-access stations are a good way to get your act on TV in your area.

A TALE OF WOE

A friend told me about a certain release that illustrates a good example of how *not* to work a record. This particular CD was a Christmas album, and a very good one at that. The publicity campaign needed to get underway by June or July in order to have the retailers stocked and the press published during the all-important holiday season.

Unfortunately, this act didn't have a comprehensive written agenda for their record. They didn't get into the studio to record until the beginning of August, they finished recording in September, and the CD wasn't mastered and pressed until mid October. Radio goes soft in October, so if you aren't getting airplay well before then, you are wasting your time and money. The press mailing didn't go out until November 5—way too late to have any impact.

Apparently, this could have been a popular release because the people who did hear it called the independent label and wanted to know where it was available. Obviously, it's a good sign when people call to request your CD; what little exposure this CD received still created a demand for it. Nonetheless, the release fell flat and didn't sell many copies.

Had this project been timed properly, with all the elements in place well before Christmas, the record could have sold well. Short of that, the group simply should have been patient and waited until the next year to release the album. Remember: you control the way the public sees your art; no one else has to know that you recorded it the year before.

ALL LINED UP

This is your music. You've worked hard all your life to improve as an artist, playing gig after gig in noisy, smoky clubs in order to hone your skills and get a chance at success. Why, then, do so many musicians focus only on the creative process and fail to think about the bigger picture? Sadly, it appears that many are simply ignorant of the *business* side of music. Don't make the mistake of waiting until your CDs are finished before making your business plan.

The key thing is patience. Just because a CD is done doesn't mean it is ready to be released. Get opinions from people in the industry first, and try to gain some objective insight as to how your project will do before you spend thousands on promotion. Work on creating a comprehensive and systematic marketing plan. The success of your CD is too important for you to wing it. Even if you use a professional service, the better informed you are, the easier it will be to work with them towards your goal. Good luck, and we look forward to hearing your music!

Jeff Obee *is a fretless bassist and synthesist in the San Francisco area who, after twenty years in the music business, has only three brain cells left.* *Special thanks to PJ Birosik of Musik International, Greg Steffen of National Music Marketing, Lori Hehr of Hehr Public Relations, Mike Carlson of MC Promotions, and Kathy Monahan of KDM Promotions.*

Pulling Together the Pieces

The steps in coordinating the release of your CD could each warrant an entire article. In fact, many of these steps have been covered in these very pages. Listed below are past "Working Musician" columns that have detailed various aspects of releasing your own record. Also, check out the EM back-issue archive on our Web site at www.emusician.com for other features and columns.

"Working Musician" column	Issue Date
"Shopping Your Demo Tape"	February 1993
"Record Promotion"	May 1993
"The Fine Art of Self-Promotion"	May 1994
"Surviving Club Gigs"	December 1994
"Dissecting a Deal"	May 1995
"Showcasing for A&R"	June 1995
"The Fine Print" (legal checklist for releasing your album)	February 1996
"Seductive Promotion"	March 1996
"Label Machinations" (starting a record label)	May 1996
"Taking It to the Street" (alternative marketing)	June 1996
"The Road to Self-Publishing"	July 1996
"Music Business Glossary"	May 1997

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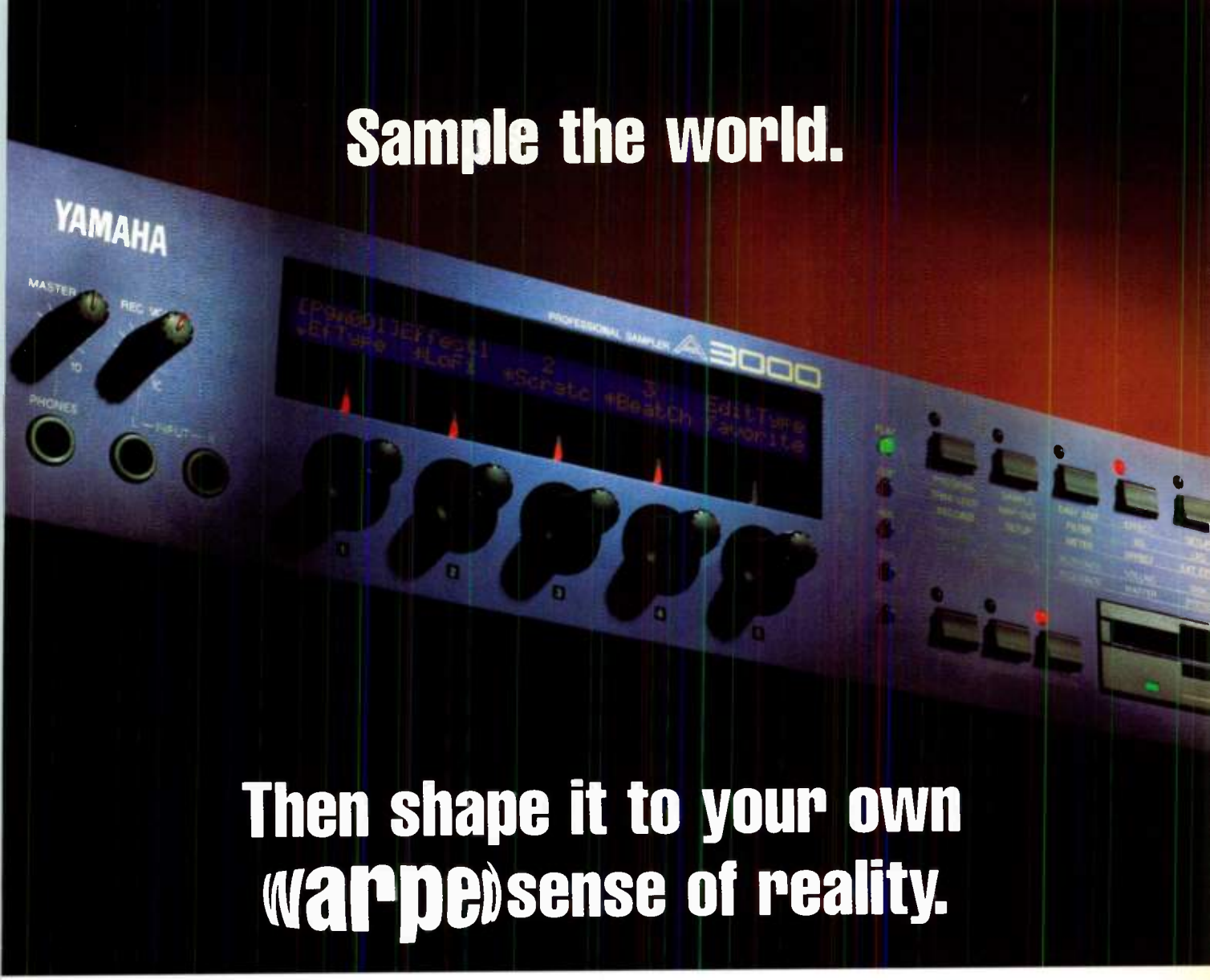

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Lexicon MPX 1

By Peter Freeman

A fully professional, midpriced effects processor.

I have always had problems with the "middle ground" between low-end and high-end effects processors. Many companies make units in the $1,000 to $1,800 range that do all the standard things musicians have come to expect: reverb, delay, chorusing, flanging, pitch shifting, and so forth. In this price range, however, I have generally noticed an absence of truly great-sounding devices with professional features that offer serious competition to the high end.

In this climate of mediocrity, Lexicon has come up with a box that definitely ups the ante. It is both great sounding and professionally featured, yet it manages to remain firmly in the affordable category.

OVERVIEW

At first glance, the MPX 1 looks conventional. It's a 1U rack-mount unit with input/output level controls, dual LED-ladder input-level meters, 3-digit LED program-number display, and 16-character × 2-line LCD. Tap and A/B buttons (explained shortly) are located directly to the right of the LCD, followed by nine illuminated Effect keys (Pitch, Chorus, EQ, Mod, Delay, Reverb, Mix, Patch, and Bypass). A data-entry knob and eight function keys round out the MPX 1's controls.

Sounds innocuous enough, right? However, the rear panel provides some clues to the surprises found inside the unit. First of all, there's a real IEC 3-prong power connector, not a wall-wart jack, which is unusual in this price range. In addition, the rear panel sports balanced XLR input and output jacks, balanced ¼-inch TRS in and out jacks, and S/PDIF digital I/O on RCA jacks. Most manufacturers wouldn't bother with XLR and digital I/O on a box this inexpensive; Lexicon has gone the extra mile here, which is highly commendable.

The MPX 1's rear panel also includes a ¼-inch footswitch input (which can accommodate up to three independent footswitches) and a ¼-inch foot-controller input in addition to MIDI In, Out, and Thru. Interestingly, the MIDI In jack is a 7-pin DIN rather than the normal 5-pin variety. This jack can accommodate a standard MIDI cable or a powered foot controller, such as those made by ADA.

Under the hood, the MPX 1 is very impressive. There are two separate processing chips: one for reverb and one for other effects. As a result, it is possible to have stereo effects and independent stereo reverb at all times, with no compromises. There are 200 ROM presets, 50 RAM locations, and 57 types of effects, which are organized by several criteria (e.g., name, number, type of input, type of effect) in a database. This lets you quickly search for the programs that pertain to your specific application.

The basic effects blocks include Pitch, Chorus, EQ, Mod, Delay, and

The Lexicon MPX 1 may look mild mannered from the outside, but its processing capabilities are extremely cool. A separate, stereo-reverb processor is never compromised by the presence of other effects, which include pitch shifting, chorusing, delay, EQ, and modulation effects.

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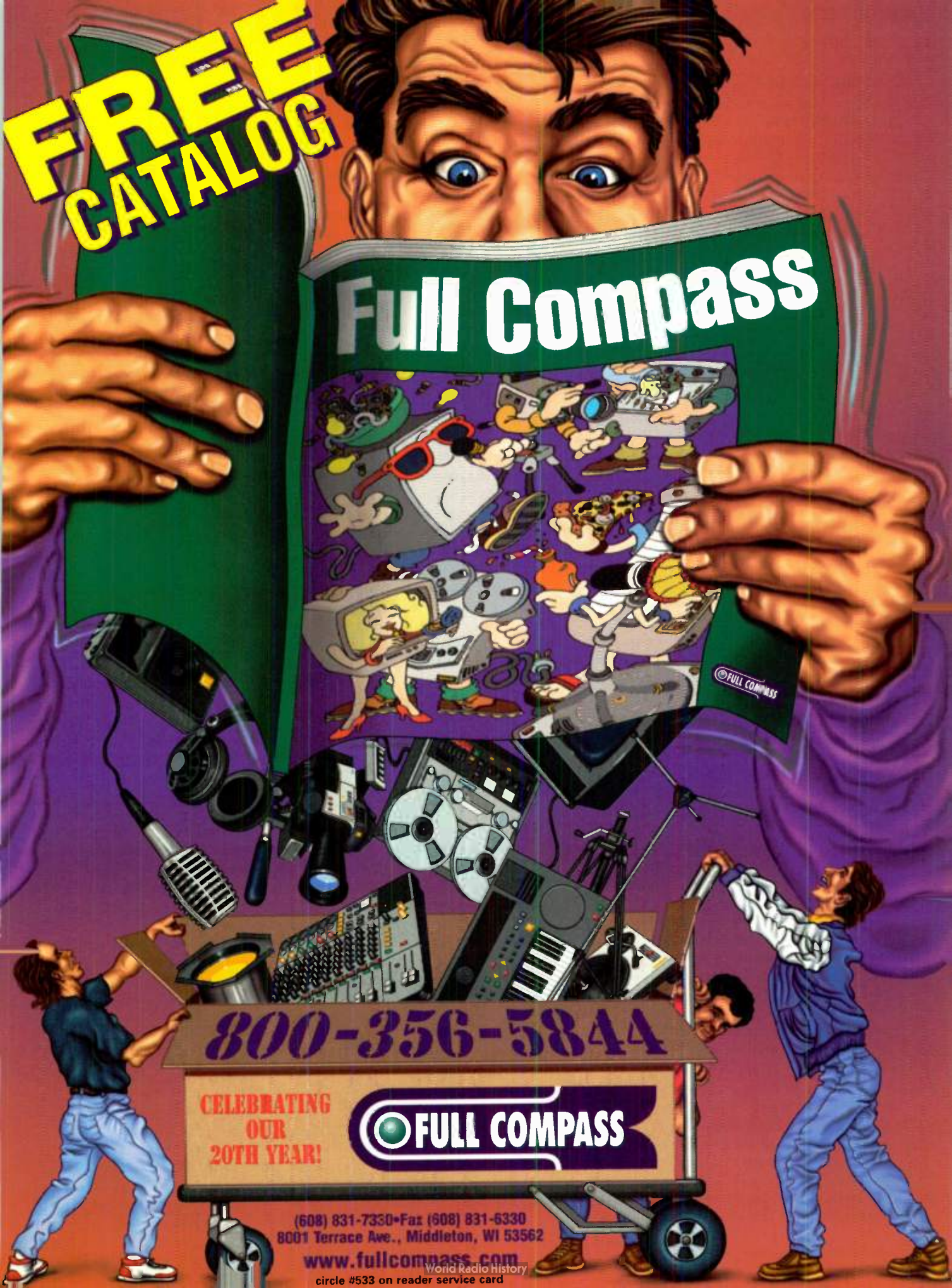

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Reverb, which can be ordered in many different user-selectable configurations. The MPX 1 also has extensive patching and modulation capabilities, including the ability to use the input level as a modulation source.

The MPX 1 offers a truly impressive degree of control over its programs. Using the Edit and Effect buttons, you can navigate the parameters of the effects blocks with ease. A pair of left/right cursor buttons move you around the LCD's parameter fields, and a Value button alters the currently selected parameter. Unfortunately, I didn't find this arrangement to be particularly enjoyable, mostly due to the Value button. I would have preferred a second, dedicated data knob *à la* the PCM 80, but I suspect the extra cost was an issue here. Ultimately, I got used to it, but it's inelegant.

The process of editing an MPX program follows the way you would "speak" the desired action (e.g., "I want to *edit* the *pitch* block"; hit Edit, then Pitch). Once I learned this, it instantly became second nature. As I looked through the manual, I was staggered at the depth of editing capabilities of this unit, and it took me a little while to get comfortable with them. However, I eventually got up to speed and was creating presets soon thereafter.

PITCH

The Pitch block can perform either detune (±100 cents) or shift (-4,800 to +1,900 cents) effects. As with some of the other blocks, each of these operations includes mono, stereo, and dual variations.

The Pitch block also offers Volume and Test Tone functions. The Volume effect is a dynamic level control that can be placed anywhere in a chain with the other effect blocks to act as a gain trim, volume control, crossfade control, or stereo-to-mono mixer, to give just a few examples. Test Tone generates an audio sine wave that is quantized to the pitches of a chromatic scale over nine and a half octaves. Interestingly, it can be "played" from a MIDI keyboard or by some of the modulation sources in the MPX 1.

The quality of the MPX 1's pitch shifting is surprisingly good. It tracks various types of inputs well (including guitar, bass, and voice), and in certain cases, it can even handle limited polyphonic input, such as simple guitar chords. In addition, its ability to produce two harmony notes at the same time is useful.

CHORUS

The Chorus block can actually produce eight distinct types of effects: Chorus, Flanger, Phaser, Rotary Cab, Aerosol, Centrifuge, Orbits, and Comb. Within each of these effects, many variations are possible.

There isn't space in this review to cover each of these effects in detail, but I'll give you a quick rundown. The Chorus effect is true stereo, multivoice chorusing, and it sounds very musical. For the most part, the Flanger and Phaser are classic versions with enough control to produce a wide range of variations, from extremely subtle to very pronounced. The Rotary Cab effect does a good Leslie simulation—no, you won't toss out your 147 cabinet, but it is good sounding and usable—and the speed-up and slow-down effects are quite realistic.

Aerosol is a kind of chorus/flange hybrid that is very flexible, capable of effects ranging from vibrato to resonant flanging and stereo-image enhancement. I particularly liked the Aerosol flanging.

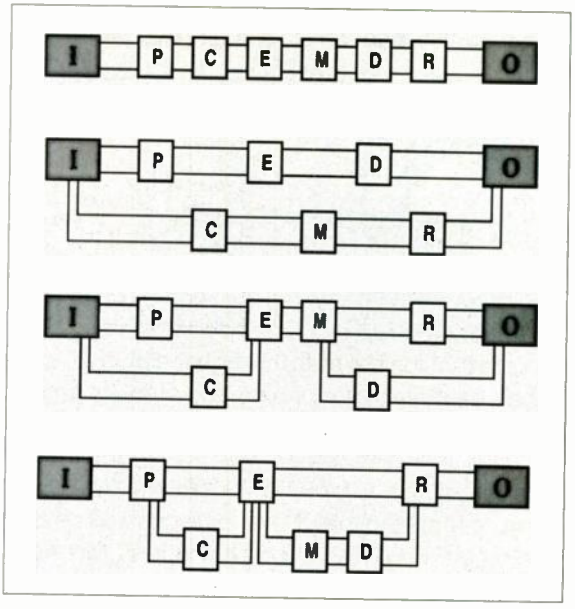

FIG. 1: Each effect block can be placed in one of two stereo signal paths, and their inputs and outputs can be merged and split between the paths.

EQUALIZER

The MPX 1's EQ block also offers multiple functions: 1-, 2-, 3- and 4-Band Parametric Mono; 1- and 2-Band Parametric Stereo; 1- and 2-Band Parametric Dual, SweepFilter, Wah, Fc Splitter, and Crossover. In the Parametric modes, you have control over Q, center or cutoff frequency, gain, and type (low/high shelf or bandpass).

SweepFilter mode behaves like the filters on an analog synthesizer; modulation sources such as LFOs and envelope generators can control it. Wah mode yields more conventional stompbox effects, such as envelope filtering (hello, Mutron III) and auto-wah. The "MPX Blue" program makes good use of this, as does "RevWahtouch," an envelope-filtered reverb.

The Fc Splitter is an unusual feature in a device of this type. It splits a mono signal into two frequency bands; the low frequencies are sent to the left output, and the high frequencies are sent to the right output. The frequency thresholds for both channels are individually adjustable. Crossover mode is similar to Fc Splitter, except there is only one crossover frequency, common to both low and high. These two filter modes are perhaps not the most practical for everyday use, but they could be quite handy for achieving certain specialized effects.

In general, I like the sound of the MPX 1's EQ section. Although it is clearly "electronic" sounding, it can produce some wonderful effects, particularly when combined with the Delay and/or Reverb blocks, as a number of the presets do skillfully. As with most EQs in multi-effects devices, you probably won't want to use it as an instrument EQ (which would tie up the entire box for a task that is best handled by a dedicated EQ anyway). But in combination with the rest of the effect blocks, it's dynamite.

MOD

The Mod block performs pan, gain, and volume processing. Like the other blocks, it can be controlled with any MPX modulation source, including MIDI controllers. The available Mod modes are Panner, Auto Pan, Tremolo (mono and stereo), Overdrive, and Volume (mono, stereo, and dual).

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The Panner is a conventional panning effect; a control must be used to change the pan position of an input signal. Auto Pan is the same, except it uses the Mod block's separate, dedicated LFO for panning effects. This is useful because you don't need to use one of the "regular" MPX 1 LFOs as a control source. The Tremolo effects do conventional volume modulation with the LFO in the Mod block, which offers pulse-width, phase, rate, and depth controls.

The Overdrive mode won't win any awards for "heaviness," but as the Rotary presets demonstrate, it adds a lot in combination with certain other blocks. According to the manual, Overdrive is not intended to function as a complete guitar-amp simulator, but I'm glad it's there.

Last in the Mod block are the Volume effects, which are included as a convenience for programs that do not require any of the other Mod functions. By placing the Mod block at strategic points in a chain with the others, you can effectively control the volume between stages of a program. This is potentially useful for creating dynamic effects using an external MIDI controller.

Overall, the Mod effects are invaluable. Adding Tremolo or Auto Pan was often the finishing touch when I was creating presets; the unit would definitely be lacking without them.

DELAY

The Delay block is one of the key areas of the MPX 1. It has a number of features in common with the PCM 80, such as the ability to specify delay times in terms of beats, milliseconds, feet, and meters. In addition, the front-panel Tap button can be used to establish the delay time, which is a blessing.

The four Delay modes include Delay (mono, stereo, and dual), Echo (mono, stereo, and dual), Ducker, and Looper. The only difference between Delay and Echo is that the Echo effects go through a 1-pole lowpass filter before reaching the output stage. This is useful for creating simulations of tape-echo effects and analog delays. Maximum available delay time is 2,000 ms in mono, 1,000 ms per side in dual and stereo modes.

The Delay mode also includes cross feedback, in which an adjustable amount of the left channel's feedback signal is sent to the right channel's delay input and vice versa. Depending on the input signal, this can make certain types of delay effects more complex and interesting. One particularly interesting feature of the Delay block is the ability to route the output of another block to the Delay's feedback input. If the other block is located after the Delay block, it is placed inside the feedback loop.

In Ducker mode, the input level controls the delay's output level; as the

MPX 1 Specifications

Analog Inputs (¼-inch TRS/XLR)	2/2
Analog Outputs (¼-inch TRS/XLR)	2/2
Digital Inputs/Outputs	1/1
Digital Audio Format	S/PDIF
Processor 1 Effects	Delay, Pitch, Chorus, EQ, Modulation
Processor 2 Effects	Reverb
ROM Presets/RAM Programs	200/50
A-D Converters	18-bit, 128x oversampling
D-A Converters	20-bit, 128x oversampling
Sample Rate	44.1 kHz
Frequency Response	20 Hz–20 kHz (±1 dB)
THD	<0.01% (20 Hz–20 kHz)
S/N Ratio *	95 dB typical (A-weighted)
Dynamic Range *	95 dB typical (A-weighted)
Operating Levels	-10 dBV, +4 dBu
Dimensions	1U x 9" (D)
Weight	6 lbs. 2 oz

*analog input to analog output

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input gets louder, the delay output gets softer. In Looper mode, the delay output remains constant; instead, the input level controls the ratio of input to feedback signal into the delay. If the input level is high, you hear the initial delay, but there is little if any feedback. When you stop the input signal, the feedback takes over, looping the material that came in during the last delay cycle. You can then modify the looped material in real time by playing over it. Loud sounds replace old sounds in the loop; soft sounds are layered with old ones.

This is not a full-featured looping delay (like the Oberheim Echoplex Digital Pro, for instance), but it can produce some interesting results. One useful example is a preset called "Capture EQ," in which a Looper delay endlessly repeats an input sound while you search for the right EQ for that particular sound.

REVERB

There are five algorithms in the Reverb block: Chamber, Hall, Plate, Gate, and Ambience. As expected, these algorithms sound very good indeed; after all, reverb is Lexicon's strongest suit. The Ambience algorithm is worth noting; it creates "space" around the sound without being obvious or distracting. This algorithm rounds out the other reverbs nicely.

The characteristic "Lexicon sound" is entirely present and correct in all the Reverb algorithms. Although it is not as rich sounding as the PCM 80 or 90, the Reverb block is musical and high-quality enough for the vast majority of musical situations. I like the Halls and Plates in particular, but that's just my personal taste; all the algorithms are of equally high quality.

PROGRAMMABILITY

Without a doubt, one of the MPX 1's strongest suits is the depth of its programmability. There are more features and possibilities available in the architecture of this box than I could possibly hope to discuss (or even list), but I will touch on as many as possible.

Considerable flexibility is provided in three key areas: effects-block order, signal flow, and modulation. The blocks can be arranged in virtually any order in two independent, stereo signal paths, and the inputs and outputs of any block can be merged and split between these paths (see **Fig. 1**). Needless to say, this provides an extremely high degree of control and flexibility when creating programs.

On the modulation front, the choices are fairly staggering thanks to an extensive array of internal and external (MIDI) control sources. The available

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internal controllers include two LFOs, two ADR envelope generators, a sample-and-hold circuit, and the rear-panel foot controllers.

In addition, the A/B Glide feature moves smoothly between user-specified A and B values when you press the front-panel A/B button. The glide occurs at a user-specified rate, which can also be modulated. Two envelope followers generate a control signal that varies with the level of their specified Source parameter, which can even include the input level to the MPX 1. And all of these internal controllers can be transmitted as MIDI Control Change (CC) messages for sequencing/automation purposes or for controlling other devices.

The low-frequency oscillators (LFOs) deserve a special mention. They include two parameters called OnSrc and OnLvl that control when and for how long they operate. In addition to being simply on or off, both LFOs offer five other modes of operation.

▼

One of the MPX 1's strongest suits is its programmability.

In Latch mode, LFO on/off is toggled when the OnSrc value rises above the OnLvl threshold. In Gate mode, the LFO remains on when the OnSrc value is greater than OnLvl. Once mode makes the LFO sweep through one complete cycle when the OnSrc value rises above OnLvl.

With Reset mode, the LFO is always on, but it's reset when the OnSrc value rises above OnLvl. Finally, in RTrig mode, the LFO completes one cycle when the OnSrc value rises above OnLvl, but it can be reset to zero if this happens during a cycle. This kind of detail is a good example of the MPX 1's overall design; it has lots of depth and flexibility.

MIDI IMPLEMENTATION

Like other aspects of the MPX 1, the MIDI capabilities are so extensive that it would be extremely difficult to exhaust all the possibilities. As part of Lexicon's Dynamic MIDI scheme, virtually any MIDI message (including MIDI Clock) can be used as a modulation source. System Exclusive bulk dumps and loads can be performed, and the unit can transmit System Exclusive messages in response to front-panel keystrokes, allowing complete MIDI automation of all operations.

Of course, Program Change messages are transmitted and recognized. Three 128-location Program Change maps are stored internally, which is great; this allows the unit to be configured for three different MIDI systems. Ten internal Program Chains can be created, with ten programs in each one. Clearly intended for live performance, this makes it easy to assemble ten different sets worth of MPX 1 programs, which can then be recalled with the front-panel knob or any control source.

Elsewhere on the MIDI front is another unusual find: a full-featured arpeggiator that processes notes appearing at the MIDI In and transmits them as arpeggios to the MIDI Out. Very cool.

SOUND QUALITY

The quality of the Lexicon MPX 1's presets is generally outstanding. A lot of time and effort obviously went into creating some of these programs, which is clearly evident as you browse through them.

For example, "TouchSpinner" causes a Leslie-like chorus effect to become more prominent as the input gets louder; softer inputs produce a more subtle effect. "MPX Blue" is a rich, complex combination of Centrifuge Chorus, Plate Reverb, and filtered, autopanned Delay. Of course, the MPX's extensive editing capabilities make it possible to create effects from scratch quite easily, but the fact that the presets are so good is a big plus nonetheless.

Having lived with the MPX 1 in my studio for a month or so, I am reluctant to give it back. After using it in a few different mixing situations, I'm quite impressed; it performed well on everything I threw at it (vocals, guitars, synths, and drums/percussion). I particularly like what it did with guitar and drums, especially in the area of rhythmic, processed delay effects. I was able to treat it like a "PCM 80 Junior," using it for effects I'd normally achieve with the PCM 80, with excellent results.

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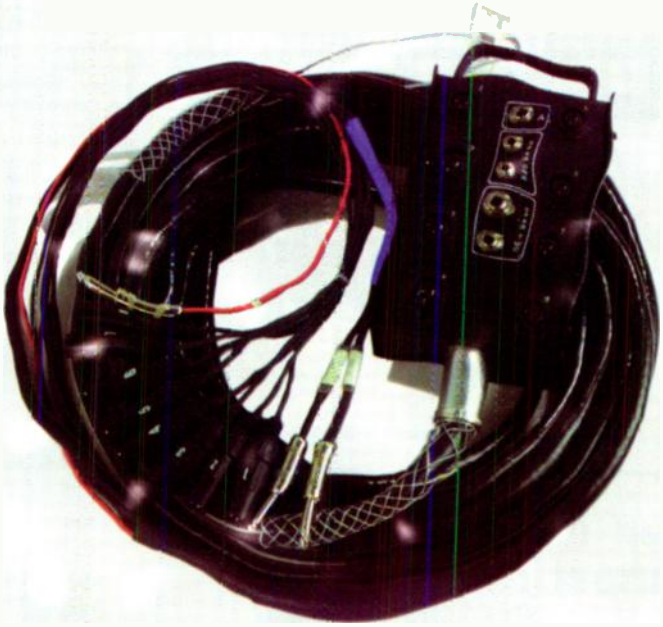

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• MPX 1

Considering that the PCM 80 lists for more than twice the MPX 1's price, this is remarkable.

CONCLUSIONS

The MPX 1 clearly sets a new standard in quality for the money. Besides being the most feature-packed box anywhere near its price—and these are professional features, at that—it sounds great, and it's not difficult to learn and use. I own a PCM 80, and I wish it had some of the features of the MPX 1. This is a pro-level box despite its low price, and it is unquestionably a powerful tool suitable for any musical situation from live to studio.

As usual with Lexicon products, the MPX 1's manual is exemplary. It is well written and edited, clear and concise, and it goes to enough detail to make the learning curve as smooth as one could reasonably expect. Full marks on this one.

If I have one complaint about the MPX 1, it's one that could be leveled at just about any professional effects device out there at the moment: the user interface. Specifically, the number of features far outweighs the size of the LCD. It is lamentable that most (if not all) current effects devices have many more software pages and features than they have space to display them, making it a big pain to keep track of what you're doing when creating programs. This is by no means an MPX 1–specific complaint, but the unit does suffer from this problem. I'm sure the reason is cost; big, bright LCDs cost lots of money. Most companies couldn't make viable products if they were to include the kind of display that these boxes really need.

Having said that, however, this device is a killer. The sheer programmability and flexibility of the MPX 1 kept surprising me. There are so many interesting possibilities that it's difficult to understand how the thing could be as inexpensive as it is. One doesn't expect this much power in this price range, much less digital and balanced I/O. I laughed, I cried; this unit is a must hear.

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, Nile Rodgers, Shawn Colvin, L. Shankar, Susan Deihim, Richard Horowitz, and Seal.*

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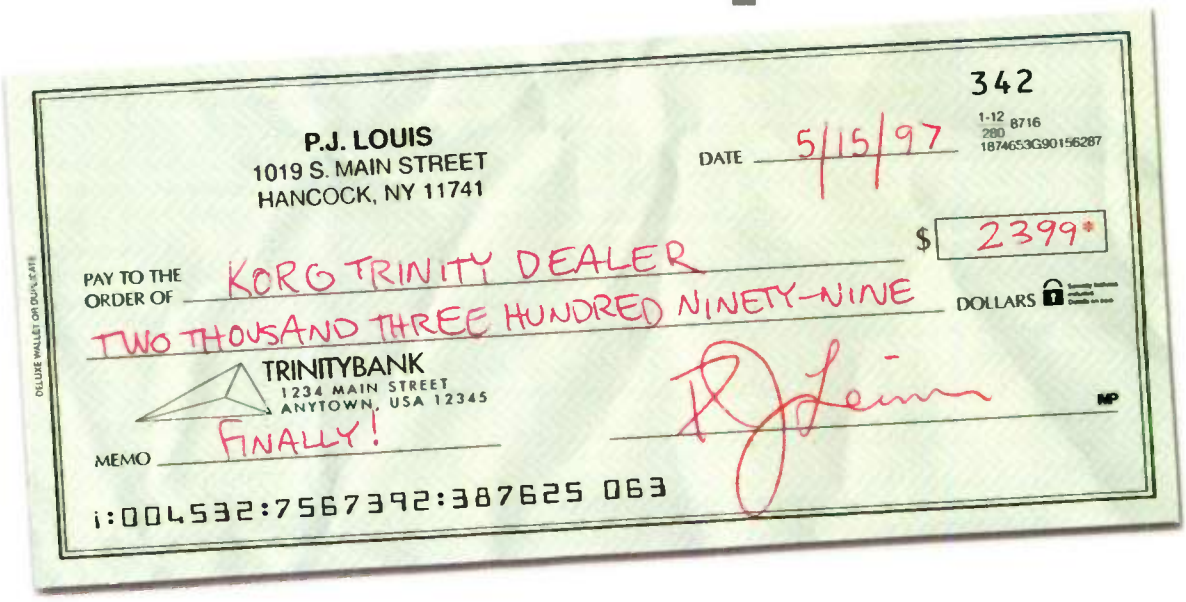

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Sonic Foundry Sound Forge 4.0a (Win)

By Dennis Miller

Top-notch audio editor keeps forging ahead.

Several years ago, **EM** did a comparison review of Turtle Beach's *Wave for Windows* and Sonic Foundry's *Sound Forge* audio editors for the PC. At the time, *Wave* was the universal standard for editing and *Sound Forge* was the young upstart. My, how times have changed! In just a few years, *Sound Forg* has become one of the most powerful programs in the desktop-music world and now totally dominates in its class. A new release, version 4.0a, should ensure that Sonic Foundry's program stays on top of the audio-editor heap for some time to come.

Sound Forge 4.0a offers major enhancements in many different areas. Topping the list is support for Microsoft's DirectX Media (formerly known as ActiveMovie) plug-in architecture, which allows plug-ins written for one application to work with any other compatible program. (For details, see "Desktop Musician: Microsoft DirectX Media" on p. 86 of this issue.) Another new feature is support for AVI video-file playback directly within the program. With fast enough hardware, you can accurately synchronize digital video with audio, making *Sound Forge* an excellent platform for multimedia artists wishing to incorporate video in their work.

Among the other new features are support for many Internet audio formats, a Preset Manager (which allows you to use your custom presets with another copy of *Sound Forge*), and several new or enhanced processing options. Also new is a nondestructive cutlist, which causes the program to skip all regions in the list during playback. This feature is especially useful for working with dialog.

In order to get through all the new features, I'll have to skip many of *Sound Forge*'s basic functions. For an in-depth look at the program's other areas, see my review of version 3.0 in the April 1995 **EM**.

OPEN SCREENING

Version 4.0a's main screen (see **Fig. 1**) looks similar to that of earlier versions, but as soon as you start playback, you'll notice a major difference: the display now scrolls while your audio plays back. Scrolling is very smooth on my Pentium 133, and the display synchronizes flawlessly with the play position.

The new Amplitude Level ruler is easy to adjust: simply click and drag on the Spinner button between the vertical zoom icons in the lower left of the screen, and the screen zooms in or out continuously. You can jump instantly to maximum zoom from any resolution by double-clicking to the left of the waveform area, and you can use the vertical zoom icons to move among the twenty different zoom levels. In addition, you can drag the entire waveform display up and down with the mouse to view different portions of your file.

Similar options are available for zooming horizontally, and a dedicated zoom tool lets you highlight an area and automatically zoom in to maximum. *Sound Forge* now allows you to define and save a Workspace, which is a screen layout that retains the size, position, and view of all open files. Another new option lets you automatically reload all files that were open when you last quit the program.

Finally, many of the program's functions have been regrouped more logically. All the pitch manipulations, for example, are now in the same menu, which makes working with the new version more efficient than ever. The vast number of customization options available also allow you to fine-tune the interface with great detail.

RECORDING

Sound Forge's numerous recording features should be adequate for nearly any 2-track application. In addition to recording to a new or an existing open sound file, you can punch in and out by setting start and end times in the Record window (see **Fig. 2**). You can also set a preroll and postroll time to hear the existing audio before and after the punched region.

New sync options for recording allow you to generate SMPTE using an adjustable start and preroll time, or it can receive time code to start and end recording. You can also toggle on and off the meters that display the record levels and the remaining record time while recording.

If you know that you will need to split a recording into regions, you can drop in markers while recording and let *Sound Forge* automatically convert each marked area into a new region. This feature is especially useful if you're working with speech or dialog replacement. The program also has a DC Adjust option that looks at your signal for any DC offset and removes it upon recording. This can significantly

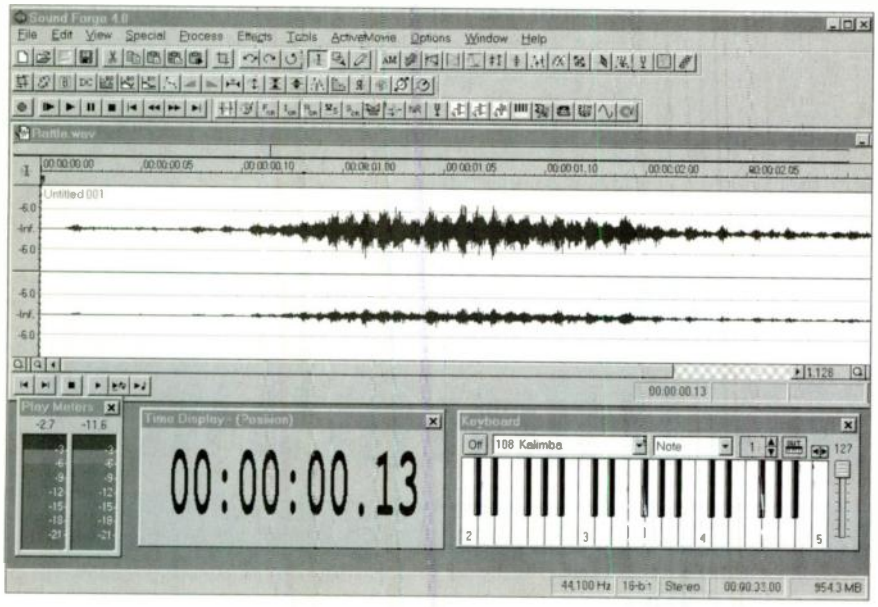

FIG. 1: *Sound Forge*'s main window is highly customizable and displays numerous toolbars and status indicators.

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improve the signal-to-noise ratio in your files. You simply enable the Calibrate feature in the record menu, and *Sound Forge* will detect the incoming signal's DC offset.

Keep in mind that, like most waveform editors, *Sound Forge* has no Undo recording option, so anytime you overwrite existing data, it's permanently gone. To avoid regrettable mistakes, always record to a new window, and then overwrite any existing data with the new file when you're sure you want to make the change.

EDITING

Version 4.0a offers many new and improved editing tools. A new Direct mode ranks among the most important. Rather than make a backup of your file when you first load it, Direct mode allows you to work on the original version of your data. This makes screen redraws and file Open and Save functions nearly instantaneous, yet you can still undo any changes you make or choose not to save your edits when closing the file. Speaking of undo, a new multiple-step Undo feature allows you to return to any point in a work session and even preview what the music sounded like at that point. With enough hard-disk space, there's no limit to the number of undo steps available.

Sound Forge's new Reactive Preview feature lets you hear changes as soon you make them. Simply move a slider or change a value in any edit screen, and the program will automatically recalculate and play back your data using the new setting. At first I found this rather annoying because the program updated too quickly, often before I had finished making changes. But then I discovered that you can override the feature by simply holding the Shift key down when you change a parameter. The new setting will not be calculated until you let the Shift key up. You can also use the Bypass feature in most edit screens to compare your edited version with the original and toggle it as you listen to a preview of your edited file.

MO' BETA PLUG-INS

Just when you thought *Sound Forge* had all the features one program could handle, Sonic Foundry announced two new plug-ins for its software. *CD Architect* and *Acoustic Modeler* should be available by the time you read this. I had a chance to work with a beta version of *CD Architect,* and it has answered my questions as to which software to use with my new CD recorder. *CD Architect* far surpasses the low-end recording software that comes with most CD-R hardware and rockets into territory formerly inhabited only by *Red Roaster.* But at half the latter's cost, *CD Architect* would appear to be a better value.

As a plug-in, *CD Architect* loads directly from *Sound Forge*'s menu bar and integrates seamlessly with the main program (see **Fig. A**). The feature set is extensive and includes adjustable pregaps, independent master-channel level settings, and CD-player seek emulation with real-time unmute simulation. There's support for numerous CD recorders, including several autoloader models, plus a test-burn mode to ensure that your system can pump out data fast enough to avoid buffer underruns. You can also extract audio tracks from CDs and preview each track before you write it to the hard disk.

Like other CD-recorder software, *CD Architect* lets you drag preexisting files right onto the workspace, but you can also build your CD's master list by converting regions in an open sound file directly into tracks. A waveform representation of all the files you are recording appears at the top of the work area. You can drag the waveforms around to create overlapping tracks or manipulate amplitude envelopes directly onscreen to create crossfades. In addition, you can also type the overlap or crossfade information into text fields for even more exacting control.

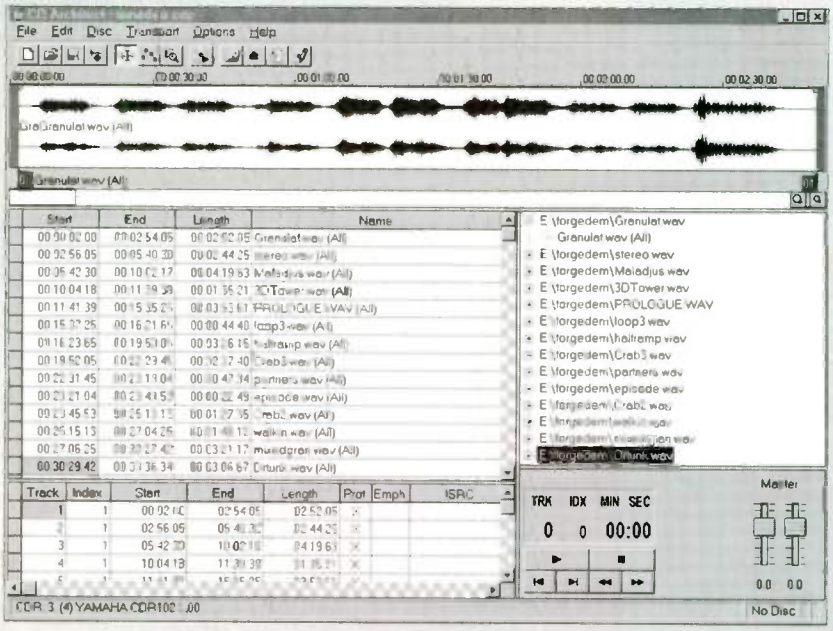


FIG. A: Sonic Foundry's new *CD Architect* plug-in provides professional options for creating audio CDs.

Acoustic Modeler allows you to "sample" the characteristics of an acoustic space and then apply those characteristics to your own audio. It will ship with a library of "acoustic signatures," and I imagine that we will see numerous *Acoustic Modeler* files appearing at music sites all over the Internet. Sonic Foundry claims that this process produces extremely high-quality results. Price and availability have yet to be determined.

World Radio History

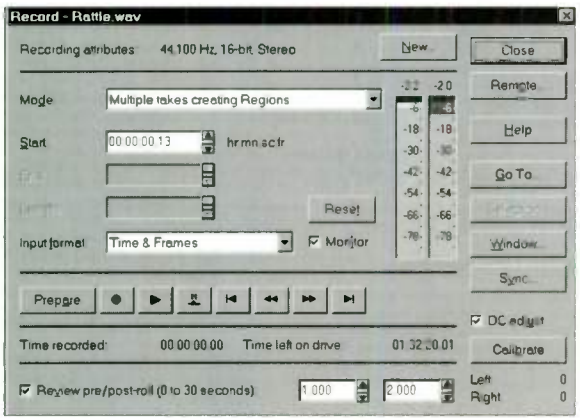


FIG. 2: The Record window offers settings to adjust preroll and postroll times when punching in as well as level meters to monitor your source.

Sound Forge offers numerous features to ease the task of accurately defining selections. In addition to simply clicking and dragging with the mouse, you can use the Set Selection dialog box to type in a range with single-sample accuracy. You'll find numerous preset selection options in this dialog; for instance, you can select from the current cursor position to the end or beginning of your file or select to the previous or next marker. In addition, you'll find a list of the regions you've defined. You can also use simple keystroke combinations to choose these and other ranges automatically.

A selected region can be extended or contracted by various amounts using either the mouse or keyboard shortcuts. The Snap to Zero Crossing option forces the selection to extend to the next zero crossing. Best of all, you can define ranges directly within any of the editing or processing dialogs.

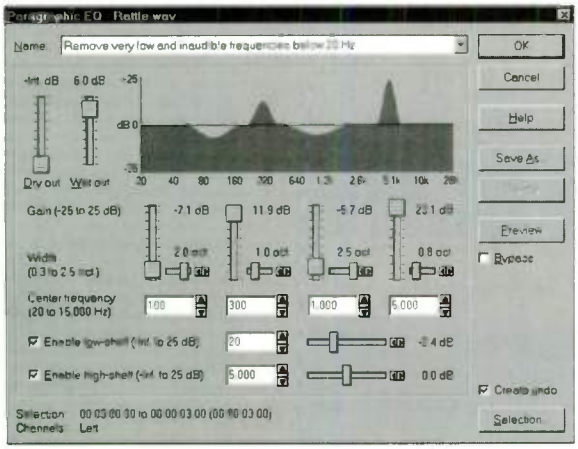


FIG. 3: The Paragraphic EQ window displays an amplitude-versus-frequency graph that updates as you change settings.

And it's not necessary to jump back out to the main window to alter your selection.

Sound Forge is equally flexible when entering data in parameter windows. For example, hitting the Home or End keys when you have a fader or track bar highlighted will automatically set the parameter to its maximum or minimum value. Double-clicking will reset the value to its default. These and other shortcuts are great time-savers when you're deep in an editing session.

Sound Forge has supported drag-and-drop editing for some time, but several recently added options give new meaning to the term *ease of use*. With two main windows open, highlight a range in the first and drag it to the second. You will see a shaded area in the second window that represents the source material you are adding, and the cursor will display a letter indicating which mode will be used to mix the data.

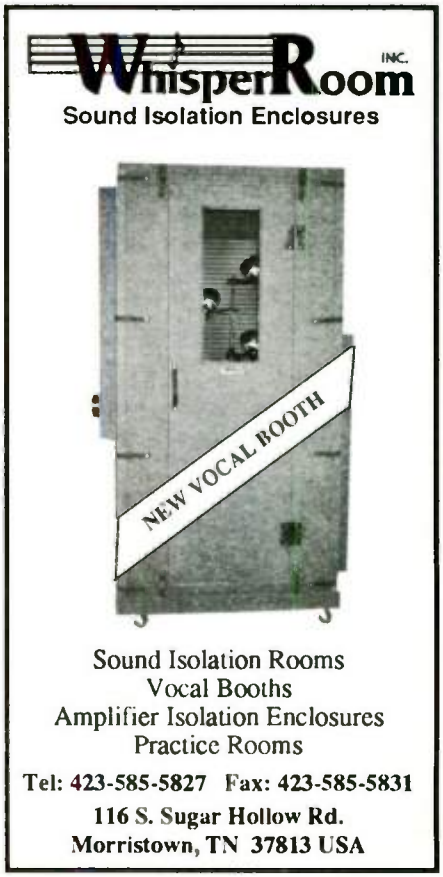
You can toggle among the three modes—Mix, Paste, and Crossfade—by clicking the right mouse button while holding down the left. When you let the buttons up, a new dialog appears that allows you to fine-tune the mix settings. Any mixed data can be snapped to markers, to region start and end points, and even to the beginning or end points of selections. And if you drag across the ruler that appears at the top of the main window, the data will snap to reference time points regardless of the time display mode you're using.

Sound Forge has many other features that make common audio-editing tasks easier, but the automatic ducking option ranks near the top of my "most useful" list. If you're in the business of making radio spots, you will love this feature, which automatically lowers the volume of a music bed when you paste in your voice-over. You can

(continued on p. 147)

circle #574 on reader service card

circle #600 on reader service card



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MICROPHONES

AKG

C414B/ULS

A reputation for flawless performance and uncommon flexibility in the most demanding studio and concert sound applications make this microphone a perfect choice for any high-end application.

- Dual 1" Gold-sputtered diaphrams.
- Flat on-axis response.
- 126dB dynamic range.
- Switchable 10dB and 20dB pad.
- 20Hz–20kHz.

CAD

E-300 Studio Condenser Microphone

A multi-patterned side address mic that combines vintage capsule design with advanced head-amp electronics, the E-300 has an unusually wide frequency response of 10 Hz to 20 kHz and an exceptional dynamic range of 137 dB. Also extremely low self noise of 11dB. Ideal for the most critical applications.

Shown with optional ZM-1 Shockmount

audio-technica.

AT4033 SM
Cardioid Capacitor Microphone

The AT4033 is a transformerless, studio microphone designed for use in the most demanding applications.

- Gold-plated, "aged-diaphragm" condenser element with internal baffle plate to increase S/N ratio which,
- Low-noise, transformerless electronics.
- Dynamic range is 123 dB without built-in attenuator.
- 140 dB SPL w/o distortion above 1% T.H.D. A built-in switchable 10 dB (nominal) pad increases it to 150 dB.
- Internal open-cell foam windscreen.
- Integral 80 Hz hi-pass filter for easy switching from a flat frequency response to a low-end roll-off.
- **Includes Shock Mount**

AT4050/CM5

The AT4050 multi-pattern condenser expands upon the AT4033 to set the standard for studio performance mics.

- 2 capacitor elements.
- Cardioid, Omnidirectional, and Figure 8 polar pattern settings.

PORTABLE HARD DISK RECORDING

Roland

DM800
Digital Audio Workstation

A compact, stand-alone multi-track hard-disk recorder that provides an amazing array of features at an unbelievably low price. Used music production, post production and broadcast, it performs all digital mixing operations from audio recording and editing to rotation track-bouncing and final mixdown. It supports SMPTE and MTC and features a built-in Sample Rate Resolver for sync with any time code.

NEW PRODUCT!

VS-880 V-Xpanded
Digital Studio Workstation

The VS-880 V-Studio Digital Workstation, is now even more versatile with the release of the VS-880 V-Xpanded. This new version incorporates powerful additional functions that allow you to get the most out of the VS-880's incredible creative potential.

NEW FEATURES

Mixer Section

- Auto Mixing Function records and plays back song data in realtime including fader movements and panning positions. *No external sequencer is required!*
- Easy recording with an inserted effect in "INPUT-TRACK" mode.*
- Process the master output with a specific inserted effect such as total compression.*
- Scene change via MIDI program change message.

Recorder Section

- Simultaneous playback of 6 tracks in MASTER MODE recording.
- Digital output with copy protection.

Effects Section*

- 10 additional effect algorithms (30 total) including Voice Transformer, Mic Simulator, 19-band Vocoder, Hum Cancellor, Lo-Fi Sound Processor, Space Chorus, Reverb 2, 4-band Parametric EQ, 10-band Graphic EQ, and Vocal Cancellor.
- 100 additional preset effects patches.
- Effect change by MIDI program change message.
- Effect edit by MIDI control change message.

And More...

- Additionally, over 20 powerful and convenient features in editing/sync sections have been added.

The functions marked * require the optional VS8F-1 Effect Expansion Board

VS-880-S1 SYSTEM EXPANSION KIT

Current owners of the VS-880 can now enjoy unprecedented support from Roland with the release of this System Expansion Kit. Supplied on a ZIP disk and including a new owner's manual, the VS-880-S1 will provide current version users with all of the benefits of the VS-880 V-Xpanded at a fraction of the cost.

FOSTEX DMT-8 VL

The latest in the Fostex HD recording family, the DMT-8 VL truely brings the familiarity of the personal multi-track to the digital domain.

- 18 bit A/D, 20 bit D/A conversion.
- Built in 8 channel mixer, Ch 1&2 feature mic & line level.
- 2 band EQ and 2 AUX sends per channel
- Cut/Copy/Move/Paste within single or multiple tracks.
- Built-in MIDI Sync., 6 memory locations.
- Dual function Jog/Shuttle wheel provides digital "scrub" from tape or buffer without pitch change. 1/2X to 16X.
- Divide the drive into 5 seperate "virtual reels", each with it's own timing information.
- **NO COMPRESSION!**

DIGITAL MULTI-TRACK RECORDERS

TASCAM DA-88/DA-38

- Hi-8mm tape format.
- ATF system ensures no tracking errors or synchronization loss on up to 16 cascaded decks.
- 16-bit D/A, selectable 44.1 or 48KHz.
- Flat 20Hz to 20KHz. 92dB dynamic range
- Seamless Punch-in and out, for programmable digital crossfade and insert.
- Individual track delay for special effects and timing correction.

ALESIS ADAT XT
S-VHS DIGITAL

The ADAT-XT sets the standard in modular digital multitrack recording. The ADAT-XT operates up to four times faster than the original ADAT and offers an intelligent software-controlled tape transport as well as provides onboard digital editing and flexible autolocation.

- Includes LRC remote control with transport and locate functions
- Advanced transport software continuously monitors autolocation performance.
- 56-pin ELCO connector operates at +4dB and -10dB
- Built-in electronic patchbay
- Flawless copy/paste digital edits between machines or within a single unit.

HARD DISK RECORDING

digidesign

ProTools Project
Digital Audio Workstation

With Pro Tools Project you get 8 tracks of record/play and, on some Power Mac systems, up to 16 tracks of playback and up to 64 virtual tracks! The Pro Tools Project system includes an audio card and award winning Pro Tools software and your choice of either an 888 I/O, or and 882 I/O interface. Project also features MIDI recording and playback as well as Quickpunch™ punch-on-the-fly. **TO MANY FEATURES TO MENTION!!!**

Requires-

- Computer- qualified NuBus or PCI-equipped Macintosh.
- Hard Drive, system software 7.1 or greater.
- 24MB RAM minimum, 14" monitor (17" recommended)

SOUNDSCAPE
DIGITAL TECHNOLOGY LTD.

Version 2.0

SSHRD-1
Hard Disk Recorder/Editor

A professional Multitrack Digital Audio Workstation, the SSHDR1 combines the highest quality processing hardware with easy-to-use Windows-based software for the most complete and affordable solution for high quality digital audio recording and editing on the PC. The SSHDR1 has over 50 powerful editing tools and is expandable from 8 to 128 tracks, with up to 32 inputs and 64 outputs. Ideal for a wide range of applications ranging from recording music in project studios with an 8 track system, to multi-unit 32, 48 and 64 track systems used by major TV and film studios for audio post production linked to video.

SSAC-1
Accelerator Card

NEW PRODUCT!

The new SSAC-1 is a DSP card that can be added to any existing SSHDR-1 system for faster processing as well as an additional 8 channels of I/O in the form of a TDIF port. This card is needed by anyone who wants to upgrade to V2.0.

SS810-1
8 Channel I/O

This is a rack mount unit that connects to the SSAC-1 card via the expansion port to give you 8 XLR ins & outs with superb A/D-D/A conversion. It also features an ADAT Optical interface. The **SS810-D** is without the analog converters for users who wish to connect an ADAT without the additional channels.

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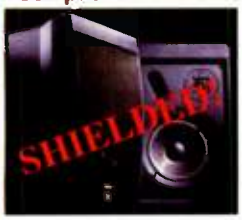
STUDIO MONITORS

JBL

Control 5
Compact MonitorLoudspeaker



The Control 5 is a high performance monitor for use in a variety of applications. It's smooth, extended frequency response combines with a wide dynamic range to provide acoustic performance that's ideal for recording studios, A/V control rooms & remote trucks.

- 6-1/2" low frequency driver provides solid, powerful bass response to 50 Hz and a pure titanium 1" dome handles high frequency response to 20 kHz.
- Choice of black, gray or white finish.
- A host of mounting systems including ceiling, rack and tripod allow positioning in exactly the right spot.

4206 & 4208
Near-Field Reference Monitors

The 4206 and 4208 near field monitors are 6" and 8" respectively. Both offer exceptional sonic performance, setting the standard for today's multi-purpose studio environment.

- Multi-Radial baffle.
- ABS baffle virtually eliminates baffle distortion.
- Superb imaging & greatly reduced phase distortion.
- Vertical alignment of the transducers across the baffle center.
- Pure titanium diaphragm high frequency transducer provides smooth, extended response.

• Magnetically shielded for use near video monitors.

CASES

CALZONE Case Co

Calzone manufactures a complete line of E.I.A. case products for transporting delicate electronic, computer, audio and video components. Built to ATA 300 specifications, their rackmount cases offer maximum protection in 3 standard designs– Case in Case, Standard Rack, and Shockmount, Floating Case in Case.

Titan Series– Developed to meet the rigorous criteria of the U.S military.

Escort Series– Their most popular line of cases, built to ATA (Airline Transportation Association) spec.

LD-ATA Series– Developed especially for the musician ready for the road.

Have any case custom built to your personal specifications.

MIXING BOARDS

MACKIE

MS1202-VLZ
12-Channel Compact Mic/Line Mixer

- Gain control, pan, 2 band EQ, and 2 Aux sends.
- 4 mono, 4 stereo channels (12 inputs total).
- Great for "extra inputs" on the fly.
- Phantom-power.

MS1402-VLZ
14-Channel Compact Mic/Line Mixer

- Mic preamps w/Trim control (channels 1-6).
- 60mm "long" faders.
- Mute switch routes to alt 3&4 bus.
- Low-cut filter.
- Phantom-power.

CR1604-VLZ
16 x 4 x 2 Mic/Line Mixer

- 7 Aux sends, 3 band EQ.
- Large 10-segment LED meter.
- Lowest noise/Highest headroom.
- 16 studio grade mic pre's.
- 3 different setup positions.
- Low-cut filter. • Phantom-power.

The new MS-1202, 1402 and 1604 all include VLZ (Very Low Impedance) circuitry at critical signal path points. Developed for Mackie's acclaimed 8•Bus console series, VLZ effectively reduces thermal noise and minimizes crosstalk by raising current and decreasing resistance.

SR24x4 • SR32x4
Sound Reinforcement Consoles

These consoles do for live sound what the acclaimed 8-bus series has done for studio recording. Both professional grade mixing consoles, the SR32-4 and SR24-4 were built to deliver the same kind of useful features found on "bigger boards" while standing up to 24-hr-a-day use.

- Fast, accurate, easy level setting via "solo".
- 4 submix buses.
- 3 band EQ w/ sweepable mids.
- 6 Aux sends.
- Globally switchable AFL/PFL.
- Mackies "VLZ" technology for low noise.
- Tape return to main mix, mono out w/level control.

TASCAM
M-1600
16/24 Channel 8-bus Console

NEW!

Great for modular Digital Multitrack setups and hard disk recording, the M-1600 is part of Tascam's next generation series of recording consoles. It features multiple option for inputs and outputs and uses the same, easy to install D-sub connectors as Tascam's more expensive console, all in a compact design.

- XLR Mic inputs w/phantom power on 8 channels.
- Signal present/overload indicators on each channel.
- Balanced/Unbalanced tape returns and Balanced Group/Direct outputs using D-sub connectors.
- TRS Balanced Line Inputs on all channels.
- 3-band EQ with sweepable mids.
- 5 Aux sends (1 stereo)
- 4 assignable aux returns.
- Perfect for use with DA-88 and ADAT setups.

MINIDISC MULTITRACKS

TASCAM
564 Digital Portastudio

JUST IN

The Tascam 564 Digital Portastudio combines the flexibility and superior sound quality of digital recording with the simplicity and verstility of a portable multi-track. Using MiniDisc technology, the 564 has many powerful recording and editing features never before found in a portable recorder.

- Self-contained digital recorder/mixer.
- Uses low-cost, removable MiniDiscs.
- 2 AUX sends / 2 Stereo returns.
- 4 XLR mic inputs.
- Channel inserts on inputs 1 & 2.
- 5 takes per track, 20 patterns, 20 indexes per song.
- Random access and instant locate.
- Non-destructive editing features with undo capability include: bounce forward, cut, copy, move.
- Full-range EQ with mid-range sweep.
- S/PDIF digital output for archiving.
- MIDI clock and MTC.

STUDIO MONITORS

ALESIS

Monitor 1
Near Field Reference Monitors
IN STOCK!

Monitor Two
Mid Field Studio Reference Monitors

Today's popular music demands more bass at louder volumes than a small near field monitor can possibly produce, the Monitor 2 is the answer.

- 10", 3- way speaker design delivers the same accurate tonal balance and imaging of the Monitor One—but with a much larger sound field.
- 5" mid frequency driver offers exceptional mid frequency detail.
- 1" silk dome high frequency driver delivers a broad but natural frequency response from 40Hz to 18kHz.

NEW PRODUCT

Point Seven
DESIGNED FOR MULTI-MEDIA!

- Shielded reference monitor.
- Front ported venting system for great bass response.
- 50 watts RMS–100 watts peak @ 4Ω.
- 85Hz–27kHz, ±3dB.
- 2kHz crossover for accurate phase and a wide "sweet spot" for mixing.
- Accurate flat sound reproduction.
- Great for studio and multi-media applications.

TANNOY

PBM Series II
Near-field Reference Monitors

The PBM II Series is the industry standard for reference monitors providing true dynamic capability and real world accuracy.

PBM 5 II

- Custom 5" injection-molded bass driver.
- Woofer blends seamlessly with the 3/4" polymide soft dome ferro-fluid cooled tweeter providing extended bandwidth.

PBM 6.5 II

- 6.5" lowfrequency driver and 3/4" tweeter.
- Fully radiused and ported cabinet design reduces resonance and diffraction while providing deep linear extended bass.

PBM 8 II

- High tech 1" soft dome tweeter and 8" driver capable of powerful bass extension under high SPL demands.
- Hard wired crossover features true bi-wire capability.
- Full cross-braced matrix medite structure virtually eliminates cabinet resonance as a factor.
- Ensures precise low frequency tuning by incorporating a large diameter port featuring laminar air flow at higher port velocities.

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PROCESSING

ALESIS
QuadraVerb 2
2 Ch. Master Effects

Alesis' most powerful signal processor, the Q2 offers amazing audio fidelity in a versatile multi-effects unit.

- 100 preset and 200 user-editable programs.
- Octal Processing allows use of up to 8 effects simultaneously in any order
- Choose between over 50 different effects types for each block, including reverb, delay, chorus, flange, rotary speaker, pitch shift, graphic and parametric EQ, overdriver and more.
- 5 seconds sampling, triggerd pan, and surround sound encoding are built in.
- Selectable -10 dB and +4dB levels, servo-balanced TRS inputs and outputs.
- ADAT Digital Interface allows you to work entirely in the digital between the Q2 and an ADAT XT.

MidiVerb 4
Parallel Effects Processor w/Auto Level Sensing

The **MidiVerb 4** extends Alesis' line of affordable professional multi-effects processing. It provides the sonic quality and programming power required for studio recording and live sound reinforcement at an affordable price. *1 rack space.*

t.c.electronics
Wizard M2000
Studio Effects Processor

The M2000 features a "Dual Engine" architecture that permits multiple effects and 6 different routing modes making it a great choice for high-end studio effects processing.

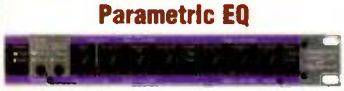
- 250 factory programs including reverb, pitch delay, chorus, flange, phase, EQ, de-essing, compression, limiting, expansion, gating and stereo enhancement
- 20-bit A/D conversion, AES/EBU and S/PDIF digital I/O.
- "Wizard" help menus, 16-bit dithering tools,
- Tap and MIDI tempo modes.
- Single page parameter editing, 1 rack space.

APHEX
107 Tubessence
2 Channel Mic Preamp

The 107 delivers outstanding sonic performance, as well as a great degree of presence, detail, & image.

- Up to 64dB of gain available
- 20dB pad with red LED indicator, 2 LED input meter
- Full 48V phantom power with red LED indicator
- Low cut filter at 80Hz, 12dB/octave
- Polarity inversion switch with LED indicator
- Switchable +4dB/-10dB output, 1/4" Balanced.

109 Tubessence
Parametric EQ



The Aphex 109 is an extremely versatile, high performance parametric vacuum tube EQ with unique features, flexibility and sound.

Great for "warming up" digital signals.

PROCESSING

JUST IN

Lexicon

Buy a PCM-80 & receive a FREE Pitch FX Card
valid 4/1/97 thru 7/31/97

PCM-80 & PCM-90
Digital Signal Processors

A great combination for any studio owner with an ear for the best. The **PCM-80** delivers high quality multi-effects based on the legendary PCM 70, maintaining Lexicon's high standards for sonic clarity and extraordinary processing power. The **PCM 90** is a digital reverb with its roots stemming from the 480L and 300L effects systems. From tiny phone booths to the grand canyon, the PCM 90 is incredibly realistic. Together, they make an excellent addition to any rack mount arsenal.

MPX-1 Multi-Effects Processor

Lexicon's latest addition to thier Digital effects family, the MPX-1 features top-quality effects in an eay to use, 1 rack space unit. With 56 Pitch, Chorus, EQ, Modulation, Delay, and world-class reverb effects accesable from the front panel, as well as TRS and XLR balanced I/O and complete MIDI implementation, the MPX-1creates a new standard for cost and quality in a multi-effects device.

CD & CASSETTE DUPLICATION

marantz
CDR615 / CDR620 Compact Disc Recorder

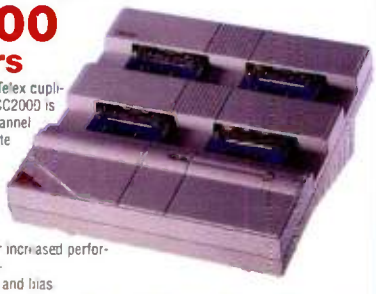
Both next-generation stand-alone write-once CD recorders they offer built-in sample rate conversion, CD/DAT/MD/DCC sub-code conversion, and adjustable dB level sensing. Additional features include adjustable fade in/fade out, record mute time, and analog level automatic track incrementing. A 9-pin parallel (GPI) port and headphone output with level control are also included.

CDR620 ***Additional Features–***

- SCSI-II Port • XLR (AES/EBU) Digital In/Out and Digital cascading
- 2x speed recording • Index Recording and playing*
- Defeatable copy prohibit and emphasis*
- 34 key, 2-way wired remote (RC620)

*Available on CDR615 w/optional Wired Remote (RC620)

Telex
ACC2000/4000
Cassette Duplicators



Designed for high performance and high production, Telex cuplicators offer easy maintenance and operation. The ACC2000 is a 2-channel monaural duplicator, the ACC4000 is a 4-channel stereo duplicator. Each produces 3 copies from a cassette master at 16X normal speed and with additional copy modules you can duplicate up to 27 copies of a C-60 original ***in under two minutes.*** And they copy both sides at once!

ACC2000XL / ACC4000XL
The XL Series feature "Extended Life" cassette heads for increased performance and wear characteristics. They also offer improvements in wow and flutter, frequency response, S/N ratio and bias.

Telex Copyette EH Series Duplicators

The Copyette series produce high quality, low cost cassettes in large quantities at approximately 16X normal speed. The 2 versions are capable of duplicating either 1 or 3 cassettes at a time. Available in both mono and stereo.

Stereo Copyette 1•2•1
Weighing only 8 lbs. (3.6 kg), this unit has a durable, impact resistant housing and includes a removable power cord, carrying handle and protective cover. Optical, non-reflective end-of -tape sensing system provides gentle tape handling.

Stereo Copyette 1•2•3
This duplicator copies both sides of three cassettes at once, yet it's as small as the 1•2•1. It weighs only 12 pounds (5.4 kg) and includes a hard cover to protect the unit while not in use. It uses all DC Servo motors for the ultimate in reliability.

COPYETTE CASH REBATE OFFER
Recieve direct from Telex $50 cash when you purchase a Copyette EH 121 Mono or Stereo duplicator. Recieve $100 on the Copyette EH 123 Mono.
OFFER AVAILABLE THROUGH MAY 31ST, 1997.

HEADPHONES

AKG
K240M

JUST IN

The first headphone of choice in the recording industry. A highly accurate dynamic transducer and an acoustically tuned venting structure produce a naturally open sound.

- Integrated semi-open air design
- Circumaural pads for long sessions.
- Steel cable, self-adjusting headband.
- 15Hz–20kHz, 600Ω

SENNHEISER
HD 265/HD580

The **HD-265** is a closed dynamic stereo HiFi/professional headphone offering high level background noise attenuation for domestic listening and professional monitoring applications. The **HD 580** is a top class open dynamic stereo HiFi/professional headphone that can be connected directly to DAT, DCC, CD and other pro players. The advanced design of the diaphragm avoids resonant frequencies making it an ideal choice for the professional recording engineer.

PRO CASSETTE DECKS

TASCAM
202 MKIII / 302

These decks provide high-fidelity sound reproduction and a wide frequency response, as well as a host of features to help you easily dub, edit, record or playback using 1 or 2 cassettes.

- Dual Auto Reverse, Normal and high-speed dubbing
- "Dolby HX Pro" extends high frequency performance and minimizes distortion.
- Auto sensing for Normal, Metal and CrO2 tape.
- Functions like Intro Check, Computerized Program Search, Blank Scan and One Program quickly find the beginning of tracks you want.

302 ***Advanced Features–***
The 302 is 2 independent decks, each with their own set of RCA connectors, transport control keys, auto-reverse, and noise reducing functions.

- Individual/Simultaneous record capability on both decks
- Cascade and Control I/O let you link up to 10 additional machines for multiple dubbing or long rec & playback.

112MKII/112RMKII

A classic "no frills" production workhorse, the 112MKII is a 2-head, cost effective deck for musicians and production studios. It features a parallel port for external control and an optional balanced connector kit for integration into any production studio. The **112RMKII** features a 3-head transport with separatehigh performance record and playback heads as well as precision FG servo direct drive capstan motors.

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STUDIO DAT RECORDERS

TASCAM DA-20/DA-30MKII

- Multiple sampling rates (48, 44.1, and 32kHz).
- Extended (4-hour) play at 32kHz.
- S/PDIF Digital I/O, RCA Unbalanced In/Out.
- SCMS-free recording. Full function wireless remote.

DA-30MKII Additional Features–

- Variable speed shuttle wheel.
- Digital I/O featuring both AES/EBU and S/PDIF.
- XLR balanced and RCA unbalanced connections.
- SCMS-free recording with selectable ID.
- Parallel port for control I/O from external equipment.

Panasonic SV-3800/SV-4100

The SV-3800/SV-4100 feature highly accurate and reliable transport mechanisms with search speeds up to 400X normal. Both use 20-bit D/A converters to satisfy the highest professional expectations. The **SV-4100** features instant start, program and cue assignment, enhanced system diagnostics, multiple digital interfaces and more.

Fostex D-15/D-25/D-30

PORTABLE DAT RECORDERS

TASCAM DA-P1

- Rotary 2 head design, 2 direct drive motors.
- XLR mic/ line inputs (w/phantom power)
- Analog and S/PDIF (RCA) digital I/O.
- 32/44.1/48kHz sample rates & SCMS-free recording.
- Built in MIC limiter and 20dB pad.
- TRS jack w/ level control for monitoring.
- Includes shoulder belt, AC adapter, & battery.

HHB PDR1000/PDR1000TC

- 4 head Direct Drive transport
- XLR mic & line analog ins, 2 RCA line outs. Digital I/O includes S/PDIF (RCA) and AES/EBU (XLR)
- L/R channel mic input attenuation selector(0dB/-30dB)
- 48V phantom power, limiter & internal speaker.
- Illuminated LCD display shows clock and counter, peak level metering, margin display, battery status, ID number, tape source status and machine status.
- Nickel Metal Hydride battery powers the PDR1000 for 2 hours. AC Adapter/charger included.

PDR1000TC Additional Features:

- All standard SMPTE/EBU time codes are supported, including 24, 25, 29.97 29.97DF, & 30 fps.
- External sync to video, field sync and word sync.

MS1000 Master Sync module ensures drift will be no more than 1 frame in 10 hours.
HM1000 Headphone Matrix provides a rotary switch for selection of Stereo, Monon Left, Momo Sum, & M/S (mid-side) Stereo modes.

JUST IN

KEYBOARDS & SOUND MODULES

Roland A-90EX

Master Controller for the Next Century

The A-90EX is an 88-note, weighted master controller with the best keyboard action currently on the market—bar none. It offers incredibly realistic piano sounds, powerful controller capabilities and 'virtual' programmable buttons which can be configured to operate your software and other devices. The A-90EX combines the majestic sound of a concert grand, the expressive action of a fine acoustic keyboard and the comprehensive MIDI functions of a master controller—all in a portable stage unit.

Keyboard Controls

- Master Volume Slider and Global Transpose features allow you to send control commands to your entire MIDI setup without changing the balance between connected units.
- Sequencer Control Section lets you control song selection, tempo and other parameters quickly.
- The keyboard can be split into eight zones and features 20 different controls and connectors.

Superb Sound

- 2 types of stereo-sampled grand pianos, various acoustic and electric pianos (including a great classic Rhodes).
- 128 patches selected from Rolands extensive "JV" and "JD" series library.
- 64-voice polyphony. Built in effects.

Extensive Performance Configurations

- Stores up to 64 Performances,(128 w/optional M-512E card) which may consist of up to 4 preset Patches along with various user-configurable parameters such as zone, effects, and MIDI channel.

88 Key Keyboard

- Proprietary 88-note hammer-action, velocity sensitive keyboard with aftertouch offers the natural resistance and rebound of an acoustic piano, and the control of a synth.

JV-2080 64-Voice Synthesizer Module

JUST IN

Roland resets the standard with the incredibly expandable JV-2080 64-Voice Synthesizer Module. This amazingly powerful package offers unprecedented expandability, digital signal processing, and remarkable operational ease, all housed in a 2-unit rack-mount design.

Features

- 64-Voice polyphony / 16-part multitimbral capability
- 8 slots for SR-JV80 series expansion boards.
- 3 independent effects sets plus independent reverb/delay and chorus.
- 6 outputs. Main Stereo and 4 assignable.
- NEW patch finder and Phrase Preview functions for easy access to the huge selection of patches.
- Large backlit graphic display.
- Compatable with the JV-1080, XP-50, and XP-80.

NEW SR-JV80-10 "BASS & DRUMS" EXPANSION BOARD NOW AVAILABLE!

JP-8000 Analog Modeling Synthesizer

NEW PRODUCT

Analog is back FOR REAL! This synth delivers a killer array of real-time control, Roland's revolutionary new analog modeling technology, and FAT, FAT SOUNDS!

The assignable ribbon controller, 4 octave keyboard, built in arpeggiator w/ external sync capability, and RPS function will make this little gem a must have for DJs and re-mixers as well as that funk musician looking for some new inspiration.

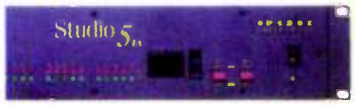
- 8 note polyphonic, 49-key velocity sensitive keyboard.
- Newly developed DSP oscillator.
- "Motion Control".
- Single, Dual, & Split mode, assignable "on-the-fly".
- 128 user/ 128 preset patches, 64 user/64 preset performances.
- Tone control, 12 chorus, and 5 delay effects.

PMA-5 Personal Music Assistant

The PMA-5 is a completely new concept in personal backing machines. This little guy fits in the palm of your hand and includes a 306 tone GS/GM sound source, an 8-track sequencer, and a powerful intelligent arranger with 600 patterns and variations. A custom LCD touch panel user interface makes operation a breeze.

MIDI

OPCODE Studio 5 LX Macintosh MIDI Interface



The Studio 5 LX is arguably the most advanced MIDI interface on the market today. It incorporates a MIDI patchbay, MIDI processor, and SMPTE synchronizer with it's interface functions, all in a 2 rack space unit.

- 15 Inoependant MIDI ins and outs.
- SMPTE reads and writes all formats– 24, 25/29.97/29.97DF/and 30.
- Network multiple units, 240 MIDI channels each.
- 128 patches, unlimited virtual instrument controls.
- 2 assignable footswitch inputs, 1 controller input.
- 8X speed when used with OMS.
- Internal power supply.

Studio 3 & 4 MIDI interfaces, and Vision sequncing software also available.

JUST IN

Mark of the Unicorn MIDI Time Piece AV

8x8 Mac/PC MIDI Interface

The MTP AV takes the world renowned MTP II and adds syncronization that you relly need like video genlock, ADAT sync, and word clock sync, even Digidesign superclock!

- Same unit works on both Mac & PC platforms.
- 8x8 MIDI merge matrix, 128 MIDI channels.
- Fully programmable from the front panel.
- 128 scene, battery-backed memory.
- Fast 1x mode for hogh-speed MIDI data transfer.

Pocket Express Mac/PC MIDI Interface

With the pocket express you get a 2 in 4 out, 32-channel interface that supports both Mac and PC. It also features a computer bypass button that allows you to use it ***EVEN WHEN THE COMPUTER IS TURNED OFF!***

Digital Performer Macintosh MIDI Sequencer w/ Integrated Digital Audio

Digital Performer contains all of the sequencing capabilities of Performer V.5 and adds Digital Audio to the picture. Apply effects such as Groove Quantize, shift, velocity scaling and more- ***IN REALTIME!***

- MIDI Machine Control, Quicktime Video playback.
- Sample rate conversion.
- Spectral effects, pitch correction.
- Real-time editing and effects processing.
- Complete Notation.

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set both the amount of attenuation and the prefade and postfade times for the music, plus set an overall volume level for both the source and destination. And like other edits, you can preview the result before actually doing the mix.

Another one of my favorite tools is AutoTrim/Crop, which detects silences based on a threshold that you set and automatically deletes them from the file. I used this tool to cut out long pauses in a recording of a live performance I was editing for compact disc. The process worked perfectly on the first pass using one of the included presets.

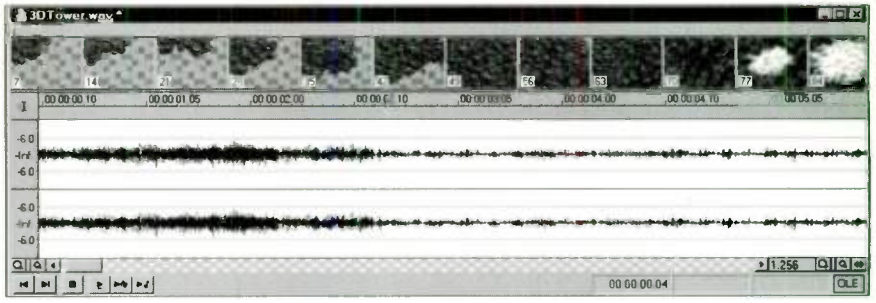

FIG. 4: Video frames can be viewed in *Sound Forge*'s main window and will accurately reflect the position of your play cursor.

PROCESSES AND EFFECTS

Sound Forge 4.0a offers several new processing tools and significant updates of many others. A new Paragraphic EQ combines four bands of EQ with highpass and lowpass filters (see Fig. 3). It offers individual Wet and Dry output settings and nearly a dozen presets for many of the most common equalization tasks. You can set bandwidth values between 0.3 and 2.5 octaves, though I wish you could also specify values in hertz. Like many other places in the program, there are handy shortcuts that make editing much easier. For example, double-clicking on a Gain slider resets it to zero.

QSOUND LABS QTOOLS

QSound Labs (tel. 403/291-2492, fax 403/250-1521; e-mail proaudio@qsound.com; Web www.qsound.ca) is well known as a leading supplier of 3D processing tools for the multimedia world. The company's clients include numerous software developers, such as Mindscape and Sega, plus recording artists Julian Lennon, Madonna, and Sting. The first QSound product to appear for the PC is the QTools suite of three plug-ins for *Sound Forge* ($199). It should also be available as a standalone DirectX Media plug-in suite by the time you read this. When applied to suitable audio material, QTools offers a very effective enhancement of your music's stereo image, plus an accurate stereo-position localizer for mono files.

Using QTools is simple: highlight a range of data you want to alter (in the case of *QXpander*) or select your entire file (with *QSys*) and then run the plug-ins from *Sound Forge*'s Tools menu.

The first plug-in, *QSys*, provides a 128-step, graphic pan control for placing a mono sound anywhere in an expanded stereo field. (The company uses the terms "hard Q left" and "hard Q right" to distinguish the extreme positioning available with the software from normal, full left- and right-panned signals.)

This type of processing is best suited for a music mix where you want to place instruments in an exact location, either inside or outside of the normal sound stage. Or you could create a very wide stereo image by copying a mono file, panning one copy hard Q left and the other hard Q right, then mixing the two. (For best results, you would need to add a bit of delay between the two sides.) Because *Sound Forge* is a 2-channel program, you'll have to do a lot of copying and mixing to get the full effect of this option. I imagine that in a multitrack program, it would be easier to use.

The next plug-in, *QXpander*, takes a stereo signal and widens the perceived stereo image. There's a slider available to control how much of the center channel gets attenuated and a crossover-frequency control used to select the range of low frequencies that you want bypassed by the process. Working with files that have clear stereo separation proved most effective, and I heard at least a 20-degree increase in the stereo image. Processing some files that already contained dramatic pans enhanced the effect even further. However, if you use a stereo file with identical information in both channels, the process will have little effect.

The third plug-in in the original QTools/SF package is *QSRC*, which provides high-definition sample-rate conversion. In the new DirectX version, the third plug-in will be *Q123*, a mono-to-3D synthesizer, which I did not have for review. It would appear to be a much better choice for creating a wide stereo image than going through all those steps I mentioned with *QSys*.

Overall, QTools is an inexpensive solution to enhancing the stereo soundstage, but like all 3D applications, its effectiveness depends heavily on the position of the listener. If you're designing sounds for situations in which you can be sure your listener is seated in the sweet spot—for example, multimedia work that is typically heard through speakers on either side of a computer monitor—then it should definitely fill the bill. But if that's not the case, there is some question as to how useful the tools will be. Also keep in mind that the effect is optimized for speaker playback and is not effective with headphones.

Finally, be sure to do all time-based processing (such as reverb or delay) on your files before using a stereo-image expander, or you will lose the impact the expander will have. Always balance the speakers in your studio carefully, and pay close attention to your position relative to your monitors.

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WAVES NATIVE POWER PACK

The Native Power Pack from Waves ($600; tel. 423/689-5395; fax 423/688-4260; e-mail waves@waves.com; Web www.waves.com) is a comprehensive processing toolkit consisting of the *L1 Ultramaximizer, Q10 ParaGraphic EQ, C1 Compressor/Gate, S1 Stereo Imager, TrueVerb* virtual-space reverb, and *WaveConvert* batch converter. I've noticed a dramatic improvement in the sound quality of my work since I've started using them. **EM** has reviewed the Mac versions of these programs in the July 1995 issue, so I'll just give a brief summary of their capabilities.

The *L1 Ultramaximizer* combines a peak limiter, level maximizer, and requantizer that can significantly improve the resolution of sound files. As with the other processes, the L1 is controlled from a single screen that you access from *Sound Forge*'s ActiveMovie menu (see **Fig. B**). Eleven presets provide optimal processing for numerous types of source material, and there are also several controls available to help you create the perfect effect.

The *TrueVerb* is an excellent-sounding natural room simulator with a graphic interface that makes editing intuitive. Onscreen, you will see graphs representing the frequency and time response of your effect, plus various buttons and sliders to control them. The plug-in's output compares well to hardware processors from TC Electronic and Lexicon, and the full-screen, graphic interface far surpasses a small LCD for ease of use. I especially liked working with the distance-from-source parameter; when I set the distance parameter to maximum and the room-size parameter to minimum, it seemed to place me outside of the room. I wish there were a way to automate settings so they could change over time—in effect putting an envelope on a parameter—but that's not an option at this stage. Still, the level of control is high and the output as good as any I've heard.

The *S1 Stereo Imager* does an effective job of expanding the stereo soundstage or localizing a sound. A 2-dimensional Stereo Vector display provides a preview of the position and gain level of your sound after processing. You can adjust all of the important controls by simply moving the elements of the display with the mouse. Though I didn't find the output of *S1* to be quite as wide as that of QTools, it offers far more controls and can be adjusted in real time.

The *C1 Compressor/Gate* module is a powerful dynamics processor that combines a full-band compressor/limiter with a gate/expander. Its flexible controls provide capabilities found in traditional outboard gear such as attack and release time, adjustable from 0.01 ms to 1 second, and a ratio control for adjusting the compression or expansion ratio in the area above the threshold.

The *Q10 Paragraphic EQ* is a 10-band equalizer with very responsive controls for adjusting filter type, center or cutoff frequency, and Q. Filter types include high shelf and low shelf, bandpass, highpass, and lowpass. You can adjust the frequency between 16 Hz and 21 kHz with 96-step-per-octave resolution.

Finally, *WaveConvert*, a standalone program, provides conversion options for sampling rates, word lengths, file formats (WAV and AIFF), and channels (Stereo/Mono). The program offers several methods to improve the sound quality of converted files—a necessity when moving from high-end audio to the multimedia world. A key feature is *L1*-style peak limiting for maximizing signal amplitude beyond simple normalization.

The Native Power Pack uses a programmable copy-protection key, but mercifully, all the plug-ins, including those that will appear in the future, can run from a single key. Another slight annoyance is the absence of written documentation. Though you can print out the excellent online help and the html-format documentation files that come with the software, I would prefer to have a manual in the box. Fortunately, the manufacturer has promised to include printed manuals in future versions, and the new manuals will be available to current owners by early summer.

Despite these minor annoyances, the Waves Native Power Pack is one of the best additions you can make to your audio workshop. You'll be amazed at what an improvement it will make.

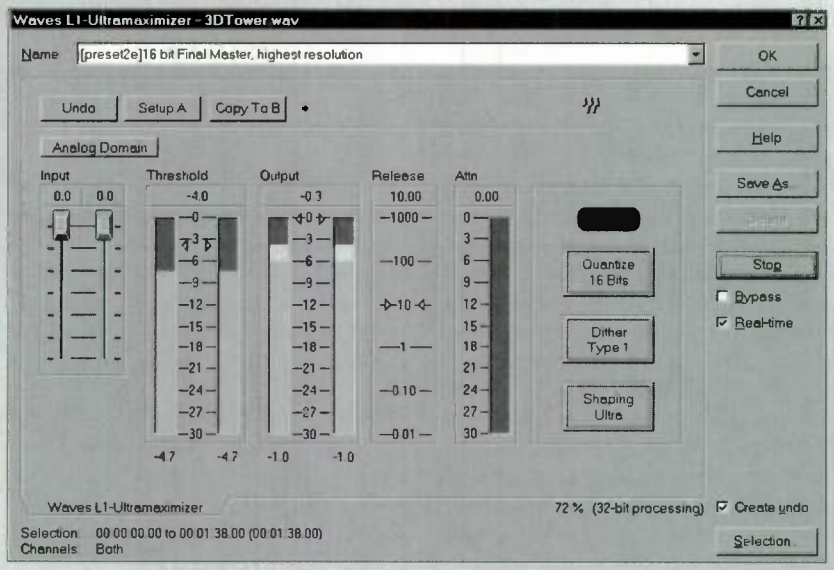

FIG. B: Waves' *L1 Ultramaximizer* includes settings for many common mastering tasks and is easy to control.

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The Effects menu now includes Phaser and Wah-wah, each with several adjustable controls. The reverb and pitch-change effects have also been enhanced. *Sound Forge*'s Time Compress/Expand algorithm has always been adequate, but the new routines are more convincing and easily match those of several dedicated signal-processing toolkits I use. I only wish that you could stretch a sound more than five times its length in a single pass. I will admit that I'm a freak for the artifacts this operation would no doubt produce!

The program supplies several other sound-shaping processes, including a versatile multiband dynamics processor that provides compression and limiting of four user-defined frequency bands. The de-esser preset worked especially well, and there are numerous settings for fine-tuning the process to suit your own material.

The Pan/Expand feature gives you a 16-point envelope for moving sound around, and it includes modes for mixing the channels together or preserving stereo separation. As with other parts of the program, you can display a waveform view of your data right in the Pan window to help in designing the pan envelope.

Product Summary

PRODUCT:
Sound Forge 4.0a
digital audio editor
PRICE:
$495
SYSTEM REQUIREMENTS:
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EASE OF USE	● ● ● ●
DOCUMENTATION	● ● ● ● ●
VALUE	● ● ● ● ●

THE X FACTOR

With the growing support for Microsoft's DirectX Media architecture (see "Desktop Musician: Microsoft DirectX Media" on p. 86), 1997 will definitely be the Year of the Plug-In. Throughout the year, you'll be seeing new products that any DirectX-compatible program can use. *Sound Forge* 4.0a, Cakewalk Music Software's *Cakewalk Pro Audio* 6.0, and Steinberg's *WaveLab* 1.6 are among the first applications to support this new standard, and QSound and Waves are providing plug-ins for these applications.

I got quite a charge when I first saw *Cakewalk*'s reverb and time-expansion features appear as menu entries in the *Sound Forge* Process menu. Even more exciting was the ability to use third-party plug-ins in three different programs. This is certainly going to be an interesting year for PC-based electronic musicians.

PLAYBACK

Sound Forge 4.0a now offers a Scrub feature that allows you to drag your mouse over the sound-file overview to hear your file play. This feature also includes smooth playback-level meters with adjustable resolution. You can view a large time display onscreen during playback, and as before, you can continuously loop selected regions or even the whole file.

The powerful Playlist feature allows you to try out any number of arrangements of your data. First, you can define as many regions as you need by dragging a highlighted range to the Regions List window. Then open the Playlist window and arrange the regions in any order. You can also drag a range directly to the Playlist window or use the Auto Region option to segment the file according to criteria you determine.

The program allows you to arrange regions in any order in the playlist and repeat them from 1 to 999 times. You can also assign MIDI triggers to initiate playback of any event. Furthermore, you can create a new file from the data in the playlist using the Playlist/Convert command, or you can convert the playlist into a cutlist.

AUDIO FOR VIDEO

With the huge boom in multimedia, many desktop musicians have found that working with audio and video in

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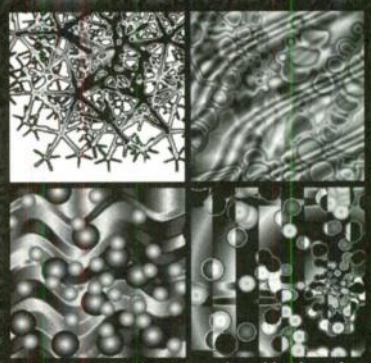

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the same program is essential. *Sound Forge* takes a step in the right direction by letting you view and perform basic edits on AVI files with frame-accurate synching of the two media. Though not intended to match a dedicated nonlinear video editor, *Sound Forge* offers the strongest video support I've seen yet from a pro-audio program.

Open an AVI file from *Sound Forge*'s File/Open menu, and a strip appears along the top of the work area that shows key frames of your video (see **Fig. 4**). If you zoom in enough, you can view every video frame, and as you move your cursor in the waveform display, the frames update to stay aligned with your current position. Video plays back with audio if you select the Animate Video Strip option, and unlike other music programs I have seen, Sound Forge lets you start playback from any place in a file. You can also use the Playlist to create a simple video edit decision list (EDL).

Using *Sound Forge*'s Attach command, you can associate specific sound files with videos and merge them into AVI files. You can also select from among the various video compression options that are installed on your system. You even can save single frames to the Clipboard as BMP images and load them into an image editing program for enhancement.

SUPPORT

With a program as deep and complex as Sonic Foundry's *Sound Forge*, it's important to have numerous support materials to keep you working. Take heart:

▼

Several features give new meaning to the term "ease of use."

Sound Forge has some of the best support options around. In addition to extensive, indexed online help and a thorough manual, new video tutorials are accessible directly from the online help menus. These well-produced tutorials cover many of the major functions of the program. In the Help file, you'll also find a complete online glossary that explains dozens of digital audio terms. Answers to many common questions are posted at the Sonic Foundry Web site (www.sonicfoundry.com). In addition, almost every screen element, whether a tool icon or a status window, displays a descriptor message as you pass the mouse pointer over it. It's simply impossible to get lost in this program with so many help options available.

SUMMARY

Though the world is clearly moving towards multitrack editing through both stand-alone audio editors and integrated digital audio sequencers, there is no substitute for the huge number of features *Sound Forge* provides. In fact, it's hard to imagine any serious desktop musician who wouldn't find this program indispensable. As more and more new plug-ins begin to appear, *Sound Forge* will become more powerful and could easily end up as the centerpiece of your entire music-production environment. ●

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TC Electronic Finalizer

By Richard Chycki

Master the art of mastering in the convenience of your studio.

Mastering is the proverbial "magic dust" that is sprinkled over a master, purportedly to bring life to program material and optimize mixes for radio or any playback system. But unless you have big-label support, the cost of regular trips to a mastering house can be prohibitive. Enter TC Electronic's Finalizer, which is designed to deliver several of the processes used by mastering engineers into the hands of home- and project-studio owners, all for about the price of an album-length mastering session.

The Finalizer simultaneously offers 20-bit A/D and D/A conversion; 5-band, 24-bit, stereo digital equalization; spectral enhancing; normalizing; expansion; compression; limiting; dithering; and manual or auto fade. The unit also features switchable, front-panel metering of several analyzer functions, including phase correlation, level flow, and peak hold. Furthermore, a Wizard function offers simplified operation by prompting answers to basic questions and then automatically implementing appropriate settings. The Wizard can be bypassed for hands-on access to over 75 parameters. That's a lot of power under the hood of a 1U rack-mount box.

FACE OF FINALITY

The Finalizer's display window offers eight pages (three of which have two submenus) and depicts all parameter settings and preset information in a relatively uncluttered and graphically logical way. Front-panel LED metering is extensive. The unit offers 10-segment stereo input-level meters, 26-segment stereo output-level meters, and a triad of 10-segment meters for monitoring gain-reduction for each frequency band of the compressor. Individual LEDs indicate internal overload, soft-clipped output, expansion and limiting for all three frequency bands, sample rates, and MIDI activity, as well as presence of a memory card, internal calculation, and/or edited preset.

Parameters are accessed via dedicated buttons grouped under three sections: Functions, Program, and Control. Function buttons include Main Page, Tools, Wizard, and Utility; Program buttons include Recall, Store, Compare, and Bypass; and Control buttons include OK, Help, and left/right or up/down switches for Block, Band, Parameter, and Menu. There is also a large, rotary adjust wheel for dialing in parameter values and preset numbers. The well thought out button matrix coupled with the rotary control allows speedy navigation through each of the Finalizer's processing blocks and parameters.

The unit samples at 44.1 kHz or 48 kHz in both master and slave modes and will accept 32 kHz material via its digital ports. (The unit does not convert sample rates, which would have been a welcome feature.) SCMS copy protection can be enabled or disabled and status bits set for consumer or pro formats. A PC slot allows storage of presets to a PC card and enables quick system updates should they become available. The Finalizer even has an onboard test oscillator that outputs a 1 kHz tone at six levels from -20 dB to 0 dB.

The rear panel offers balanced XLR inputs and outputs for analog connections; S/PDIF coaxial and AES/EBU XLR digital connections; MIDI In, Thru, and Out ports; and a ¼-inch pedal/fader input. No optical ports are available.

The overall operating levels are software selectable between +4 dBu and -10 dBm, and the analog input and output levels can be adjusted over a 22 dB range. Signals are present on all outputs—analog and digital—all of the time.

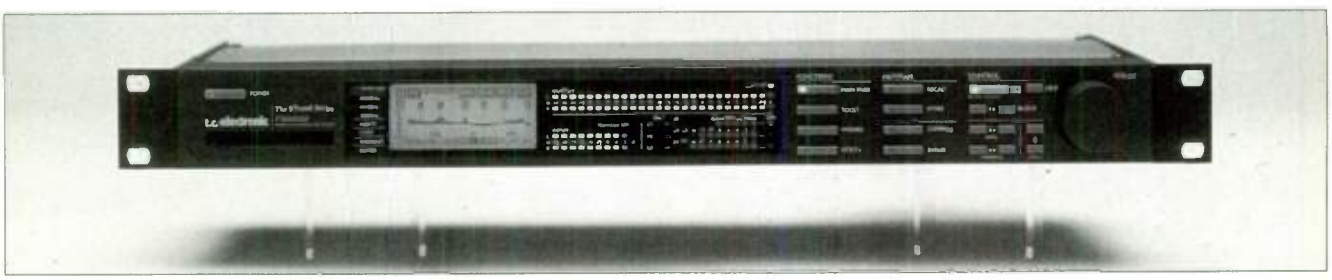
CHIP OFF THE BLOCK

The Finalizer's operating system uses eight software blocks configured in a fixed order: input, EQ, insert, normalizer, expander, compressor, limiter, and output. The Help key calls up simple guidelines for each of the processing blocks. Depressing the OK button toggles each block in and out of the signal path, input and output blocks excepted.

The input block is where the user determines input gain, digital and analog formats, and sampling rate. A highpass filter (useful for removing DC or subbass noise) is also available. There is no audio kill switch, however, which would have been useful for laying down digital black at the head of DATs and such. Unlike parameters in most of the other blocks, those in the input block cannot be stored to memory.

Because the Finalizer's functions are post A/D (and therefore in the digital realm), it's vital to maintain healthy input levels to benefit fully from the resolution of the converters. This is in contrast to converters such as the Apogee AD-1000, which employ analog limiting immediately before the A/D section to increase the overall audio energy being sent for conversion.

The equalizer block is a 5-band EQ: three bands parametric and two bands shelving. The three parametric bands are identical, which allows frequencies to be duplicated for deep cuts or boosts. Up to 12 dB of boost or cut is available per band. A frequency/dB graph visually charts out the EQ curve on the EQ page as well as on a small section of the main page. All EQ parameters are fully recallable.



TC Electronic's Finalizer is a powerful and versatile tool featuring several mastering processes in a single box and exceptional 20-bit A/D converters.

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The insert block introduces one of three modules to the signal path: a stereo-adjust module for manipulating channel balance and the "spread" of the source material; a de-essing module for sibilance control; and a proprietary Digital Radiance Generator (DRG) for emulating desirable artifacts (second-harmonic distortion, or "warmth") that arise from the use of analog tape.

The normalizer block begins the level-optimizing process. It combines a limiter with the ability to increase program gain by up to 18 dB. Limiting can be set for hard or soft clipping, and the number of consecutive samples clipped is constantly shown. A waveform representation of the program material is refreshed every second to monitor the effects of altering the headroom.

DYNAMIC BLOCKS

The expander, compressor, and limiter blocks have several features in common. For example, each divides the frequency spectrum into three sections (using the same crossover points), and each section can be individually processed. Parameters such as attack, decay, and ratio are programmed independently for each processing block and its respective frequency bands. Multiband controls are grouped together in an optimum default ratio but can be split up and individually tailored if required. In addition, the compressor block offers an extra function for controlling the crest factor (the ratio of a signal's peak level to its RMS value, which provides a measure of how "peaky" the signal is) and the relative level of the three frequency bands. The compressor's gain compensation, or makeup gain, is automatic.

One advantage of working in the digital realm is that you can employ "look ahead" processing—i.e., the processing takes place before an audio event occurs. This feat is accomplished by inserting a small delay in the audio path but not in the sidechain path, thus giving the dynamics processor time to do its thing in advance. This is especially useful for grabbing rogue transients that might otherwise slip by. The Finalizer lets you insert a 1 ms to 10 ms delay into the audio path for this purpose.

The output block is where dither and bit resolution of the output signal are set, accommodating from 8-bit to 24-bit words. Although the Finalizer can process 24-bit audio via its AES/EBU ports, the 20-bit setting is recommended for analog I/O and 16-bit for CD and DAT formats (to prevent word truncation). Both linear- and exponential-taper auto fades are available, with fade speeds up to 60 seconds (although the manual claims a maximum of 35 seconds) in length. However, I found neither fade taper very palatable. I prefer the external fader, which plugs into the rear of the unit. The external fader is calibrated in a few simple steps from the diagnostic pages. But

Finalizer Specifications

Analog I/O	2/2 (XLR)
Digital I/O	AES/EBU (XLR) and S/PDIF (coaxial)
D-A Converters	20-bit, 128x oversampling
A-D Converters	20-bit, 64x oversampling
Sample Rates	32 kHz, 44.1 kHz, 48 kHz
Maximum Input Level	+22 dBu
Maximum Output Level	+22 dBu @ +6 dB output gain
Frequency Response (Input)	+0/-0.2 dB, 10 Hz–20 kHz
(Output)	+0/-0.5 dB, 10 Hz–20 kHz
THD (Input)	0.003% @ 1 kHz, +10 dBu
(Output)	0.008% @ 1 kHz, +10 dBu
Dynamic Range (Input)	>105 dB
(Output)	96 dB
Crosstalk (Input)	<-60 dB, 10 Hz–20 kHz
Input Sensitivity	-22 dBu–10 dBu @ 12 dB headroom
Output Gain Range	-26dB to +6 dB
Dimensions	1U x 8.2" D
Weight	5.2 lbs.

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having more fade-taper selections—and/or the ability to save custom tapers—would be a welcome addition. As with the input block, output-block parameters cannot be stored to a preset.

CONTROL ISSUES

Twenty-five presets are included in ROM and 128 user programs can be written to RAM. Preset changes are not instantaneous, nor are they glitch free. It takes about a second for the processing blocks to be accessed and updated, and the unit does not completely mute itself during this transition time. Therefore, timing is critical if one attempts to change presets between songs.

It's inconvenient that input levels cannot be stored, but it is possible to work around this shortcoming by setting the input levels for the loudest program and then using the gain make-up in the equalizer section (which can be stored), coupled with the balance control in the stereo-adjust module of the insert block (also storable), to tweak and store levels. Just pray that you don't need to de-ess or add DRG to the material: you can use only one of the three functions in the insert block at a time.

Left and right input channels are individually adjustable, but only in 1 dB increments, despite an illustration in the manual depicting the unit set to 0.5 dB steps. One decibel is a substantial level jump in the worlds of mastering and A/D conversion, so it's unlikely you'll fine-tune input levels with these controls anyway.

All parameters in the Finalizer are hard-patched to MIDI controllers. Hence, it's possible to fully automate the unit using a sequencer and a MIDI controller. Updating parameters via System Exclusive messages is preferable to using preset loads because preset loads update all six of the storable blocks each time the preset is loaded whereas SysEx messages address only parameters that have been changed, which is faster and quieter. Moreover, recording and playing back fader movements via MIDI offers a customized automation feel and lets you work around the pedestrian auto-fade curves nicely.

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The Wizard is an excellent concept and a great way to learn how the unit's various parameters affect program material. Under the direction of the Wizard, the Finalizer performs in a manner consistent with the selected answers. However, to my ear, the Wizard settings impart too strong a sonic signature on the material, and the material soon begins to sound homogenous. That's not necessarily a bad thing (depending on the material), but it is worth noting.

CLOCK DOCK

When set for digital input, the Finalizer uses a dual phase-lock loop circuit to provide a solid lock to the external clock. A benefit of this design is excellent jitter reduction. Clock is derived from either the AES/EBU or S/PDIF inputs. Oddly enough, the AES/EBU and S/PDIF inputs are connected internally, so you can't connect both simultaneously without confusing the unit. In hard-wired studios where both digital formats are required, this could result in a lot of crawling around to the rear of the rack for cable swaps.

Although the manual fails to mention this, it is possible to lock the Finalizer to external word clock through the digital inputs while simultaneously converting analog audio to digital. This is done by setting the sample rate to Digital Input and Select Input to Analog. The feature is valuable for tracking applications that require locking the Finalizer's clock to an external source. However, for greater word-clock compatibility, a BNC connector would have been a nice addition. (The broadcast version of the Finalizer, called the DBMAX, offers a BNC input for this purpose.)

ACID TEST

I tested the Finalizer in a variety of master-tweaking situations and also auditioned it strictly as an A/D converter. I started with some tapes of live performances—a difficult test because the masters were rough and uncontrolled. First, I fired up the Wizard to get its "opinion." I didn't like the sound of the Wizard's EQ selections; they reminded me of the sculpted-V settings one sees on boom-box graphics. But I did achieve impressive results quickly by switching the unit to manual operation after the Wizard implemented its settings and then manually tweaking the EQ and dynamics sections.

Some of the Finalizer's presets are useful, but in general I got better results by taking the time to dial in custom settings. For example, the "CD Master" preset does a good job of showcasing the unit's capabilities, but it is very conservative.

The Finalizer is designed for mastering finished mixes, but of course it can also be used during mixdown. For the most part, though, I felt uncomfortable using much more than the A/D converters and the normalizer while mixing to DAT. However, I achieved fantastic results using the unit as a 20-bit A/D converter and keeping energy to tape high by hitting the limiter (i.e., bringing levels up to digital zero) in the normalizer block. Of course, because I was working with DAT only, I didn't get a chance to save the output in 20-bit words; but the 16-bit dither sounded clean and open in the top end and provided good imaging.

I also tested the converters with program material (and a 10 kHz test tone) at very low levels to check the audio quality at low bit resolution. At under -60 dB, things began to sound raspy. But by sending the digital output through an Apogee DA-1000, I determined that the raspiness was coming from the Finalizer's D/A converters, not its A/Ds.

The Finalizer uses the same 20-bit A/D converters found in TC's flagship M5000 with the updated converter cards. Left and right channels each have their own discrete conversion circuit. However, D/A conversion is not so elaborate: the two channels share one multiplexed converter, the same type found in TC's Model 2000. The specs reflect this (see table "Finalizer Specifications"). TC's reasoning here is that the majority of applications will be either digital in/digital out or analog in/digital out and that the analog outs will be used primarily for monitoring.

Occasionally, while mixing, I also tweaked the program material a bit with the EQ, just as I normally would with analog equalizers patched into a

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main mix bus. The Finalizer's EQ is both surgically accurate and very smooth sounding.

If you use the Finalizer's dynamics and EQ functions during mixdown, do so sparingly. That way, you can go in the next day and experiment with the unit's other functions, confident that you have the original master as a back-up. The Finalizer is so powerful and versatile that it can really destroy a mix if used improperly. It should be thought of as a spice: use just enough to bring out the full flavor but not so much as to ruin the dish. In other words, if you have the slightest doubt as to whether or not to execute a Finalizer function, don't do it.

FINALIZED WORDS

TC Electronic's Finalizer sounds great and is a joy to use. Its multitiered operating system allows for simple and complex operations that can have subtle or dramatic results on finished mixes. Although the unit's performance is high-end in many ways, a few frustrating limitations and omissions restrict its versatility and control: the input gain is stepped in unforgiving 1 dB increments, and the unit can't store input and output level parameters.

The unit's A/D converters blow the doors off those found in most DAT machines. In fact, people are buying the unit primarily for its converters. But the Finalizer would have been even more useful as a general-purpose ADC (and during tracking) had TC Electronic included optical I/O for Alesis ADAT and TASCAM Digital Interface

Product Summary

PRODUCT:
Finalizer
mastering processor
PRICE:
$2,495
MANUFACTURER:
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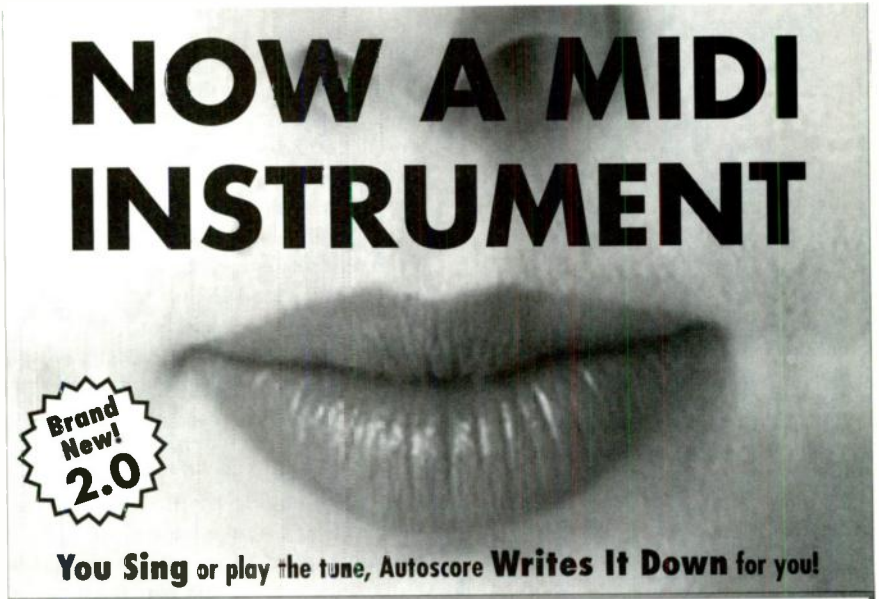

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(TDIF). This is a surprising omission, especially given the number of ADAT/BRC studios in the unit's target market, not to mention the inclusion of presets designed for tracking, such as Aggressive Jazz Bass or Singing Bass Drum.

Clearly, TC's purpose with the Finalizer is to deliver several stages of the mastering process in a single, relatively hassle-free box. This they do well. The Finalizer is a powerful and versatile mastering device.

However, I would like to add that by no means is the Finalizer—or any other machine—a replacement for taking your completed mixes to a mastering house. I have a favorite mastering engineer, and I take advantage of his services not because of the gear he uses but because of his ears. I respect his objectivity, creativity, input, and experience—things no manufacturer can ever put in a box. But short of those human qualities, TC Electronic managed to get about everything else into the Finalizer.

Richard Chycki, *a self-professed gear pig, is a producer-engineer based in Toronto, Canada.*

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Novation DrumStation Rack

By Steve Wilkes

A hard-kicking, analog percussion sound module.

You're standing on a busy city street corner waiting for the light to change, when suddenly you feel a slight rumble in your legs and chest. The rumble increases until you can identify deep bass coming from the speakers of an urban land cruiser. You breathe a sigh of relief as you realize it's no earthquake, just the current techno, hip-hop, or dance hits emanating from said vehicle's music system.

If events such as this alarm you, prepare yourself; this phenomenon is about to become more intense as techno, hip-hop, and dance artists and producers get their hands on one of the deepest drum modules ever: the Novation DrumStation Rack.

OVERVIEW

The DrumStation Rack emulates the sounds and vibe of the classic TR-808 and TR-909 drum machines by Roland, bringing analog rhythm to your MIDI rig with a vengeance. The module provides 8-voice polyphony in a 1U rack-mount enclosure. The front panel includes a headphone jack, volume knob, 10-key pad with multifunction buttons, and knobs that are dedicated to tweaking each drum sound. A 2-character LED provides a variety of information, but it's a bit cryptic. Additional buttons select the 808 or 909 sound sets, write-enable or protect the user memory, audition sounds, and select the desired operating mode.

The back panel accommodates the included lump-in-the-line external power supply and sports a pair of main stereo outputs and six individual outs, all on ¼-inch unbalanced jacks. The six individual outputs are important because they allow you to apply processing independently to each drum sound.

MIDI In, Out, and Thru jacks are joined by a DIN Sync output, which is used to synchronize older, pre-MIDI drum machines. The DrumStation can take MIDI Clock messages from a sequencer and convert them to DIN Sync, which is very cool if you have older equipment. The unit sends and receives on MIDI channels 1 through 16 and responds to Velocity, Program Change, and Clock messages. In addition, it can send and receive SysEx bulk dumps, and the sounds can be mapped to the General MIDI standard.

The DrumStation can send and respond to MIDI Control Change (CC) messages in real time. In addition, the parameters controlled by the front-panel knobs can respond to CC messages or Velocity. Conversely, any real-time tweaking of the front-panel knobs can be recorded to a sequencer, which affects the corresponding sound when played back.

In addition to being a stand-alone device, the DrumStation is intended as a companion piece for Novation's now-popular BassStation analog bass synth. In fact, the BassStation sends certain CC messages that are assigned to DrumStation parameters not available from the front panel. Both of these products are geared toward the working electronic (especially techno/dance) musician.

In his book, *A Year with Swollen Appendices*, ambient/electronic-music guru Brian Eno refers occasionally (and tantalizingly) to his desire for a new kind of synthesizer with a more organic means of editing sounds via simple controls. The DrumStation's array of knobs and buttons on the front panel made me think that this might be such an instrument. The first thing you want to do when unpacking the DrumStation is get your hands on it. With its data-entry keypad, rotary knobs, and buttons, the DrumStation invites manual interaction.

SOUNDS

The DrumStation features the full set of sounds from the original Roland TR-808 and TR-909, not just a selection from these classic drum machines. These sounds include bass drum, snare, rim shot, hand clap, closed and open hi-hats, crash cymbal, and three toms (low, mid, and high). The TR-808 also included cowbell, three congas (low, mid, and high), maracas, and claves, and the TR-909 included a ride cymbal, all of which are found in the DrumStation.

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DrumStation Specifications

Synthesis Types	Analog Sound Modeling, PCM
Polyphony	8 notes
Programs (ROM/RAM)	25/15
Audio Outputs	2 stereo main outs, 6 individual outs
Dimensions	1U x 3.9" (D)
Weight	2 lbs. 9 oz.

The sounds are organized into 25 preset programs, each of which features different setups, edits, and/or combinations of 808 and 909 sounds. For example, Program 11 applies distortion to the bass drum, snare, and toms, and Program 23 assigns some sounds to the individual outs. Fifteen user memory locations are also available to save your own kits.

The DrumStation sounds that emulate "skinned" instruments—snare, bass drum, congas, etc.—were created using Analog Sound Modeling (ASM). Most of the other sounds are samples, but the open and closed hi-hats and crash cymbal were created using a hybrid of samples and ASM techniques.

Not surprisingly, Novation claims that the details of ASM are a Big Secret. However, I've been able to construct a brief explanation from speaking with the company's representatives and reading the manual. Apparently, ASM performs a Fourier analysis on the original drum sounds, breaking them down into their simple components. These simple components are then converted into digital form and recombined to create the sounds in the DrumStation. If my concept of the technology is accurate, it's probably more properly termed resynthesis than "modeling."

To my ear, any audible difference between PCM and ASM is negligible. All the sounds are great and full of classic authenticity. As a matter of fact, the general audio quality of the DrumStation is wonderful. I just wish Novation would go a step further and create a few new sounds to go with the classics in this unit.

DIGGING IN

The 808 and 909 sounds are divided into several groups, each of which are edited with their own dedicated controls. The categories are Bass Drum, Snare Drum, Tom Toms (low, mid, high), Rimshot/Hand Clap/Cowbell, Hi-Hat (open, closed), Cymbals (crash, ride), and Congas/Maracas/Claves.

The pitch and output level of each group is adjusted with rotary knobs. Each group also includes a unique knob or two, such as Attack and Decay for Bass Drum, Snappy and Tone for Snare Drum, etc. (The Snappy parameter simulates the tension of the bottom snare on the drum.) Selection switches in the last five groups let you choose which sound will be affected by the corresponding controls.

The buttons in the numeric keypad perform various functions in Utility mode. Drum Select lets you select the drum sound to be edited, Front Cut truncates the attack of any sound, Controller/Velocity lets you select whether the front-panel parameters respond to MIDI CC or Velocity data, and Note Off Recognition determines whether a sound responds to a Note Off message or simply plays its full duration when triggered.

Other Utility mode functions include General MIDI, which maps the sounds according to the General MIDI specification, and Output Set, which lets you control the panning and output assignment of any sound. Assign Bank determines which sounds respond to MIDI CC data, Pitch Play lets you play a drum sound in scale-like fashion, Distortion adds distortion to any sound, and Demo plays the DrumStation's demo sequences. In Program mode, the keypad can select the program to be played or edited.

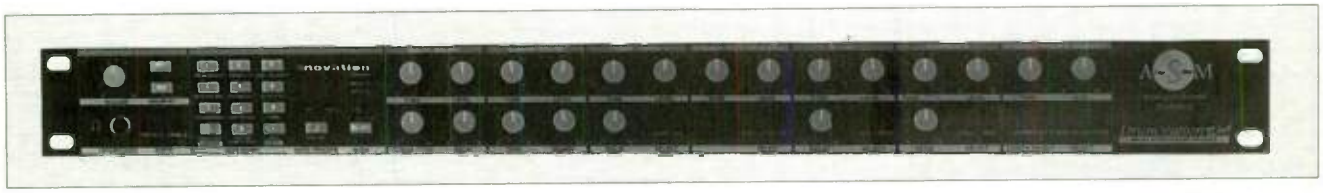
HANDS ON

Editing the sounds is a breeze. First, you select the desired drum kit (808 or 909), program, and sound. The sound can then be altered using the corresponding front-panel controls.

The Audition/Auto-Trigger feature is especially cool: pressing the Audition button plays the selected sound, and pressing the Audition and Trigger buttons together plays the sound in a simple 4-bar sequence loop while you edit the sound. Pressing the Audition and Trigger buttons again stops the loop. This is incredibly handy for hearing the immediate results of your edits in a rhythmic context.

I first used Audition/Auto-Trigger while tweaking a bass-drum sound. The DrumStation played the sound in a 4/4, quarter-note pattern, accenting the first beat of each measure. It was a pleasure to hear the sound play while I experimented with its pitch, volume, and so on. And if you select another sound (say, tom-tom) and adjust its controls, the Audition/Trigger sequence immediately triggers that sound while continuing the sequence.

Then I entered Utility mode to check out the Distortion and Front Cut functions. After pressing the Audition/Trigger buttons, I applied Distortion to the bass drum. With a range of 0 (no distortion) to 15 (maximum distortion), the bass drum altered quite noticeably from a very dry, almost Steely Dan–type of sound to a very grainy, gnarly specimen that would be appropriate on a Public Enemy album. Front Cut has an



The Novation DrumStation combines the sounds from the classic Roland TR-808 and 909 with extensive real-time control capabilities in a 1U rack-mount case.

World Radio History

equally impressive range of possibilities: 0 to 99 milliseconds can be removed from the attack of any sound.

Even better is the DrumStation's ability to transmit MIDI CC messages in real time. After connecting the DrumStation's MIDI ports to my sequencer, I used the front-panel knobs to tweak the Snappy and Tune parameters of the snare drum while the sequencer played a groove I had previously recorded. It's wonderful to hear your edits as the sequence plays so you can react to what you're hearing.

After some experimentation, I recorded my tweaks in a separate track of the sequencer. During playback, the snare drum faithfully morphed through several pitch and Snappy (bottom snare tension) changes. This is a handy editing and performance capability that techno and hip-hop artists will love. I can't wait to hear what an artist like Aphex Twin will do with this.

Once a set of sounds has been edited to your liking, it can be saved in one of the unit's fifteen user programs. A Compare button lets you A/B the original and edited sounds before saving.

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COOL KAT COMBO

I connected my drumKAT to the DrumStation to check out the CC/Velocity function. It was easy to set the snare-drum sound to change the Tune and Snappy parameters in response to Velocity. When I played the drumKAT, the snare sound responded to soft hits with a low pitch and dark sound; progressively harder hits raised the pitch and increased the bite.

Next I sequenced a groove with lots of fast, improvised snare hits. When I played back the sequence, the DrumStation followed my nuances beautifully. The end result was a zig-zagging drum groove with a loose, loopy snare, whose pitch and color constantly shifted.

PUMP IT UP

The first few times I played with the Novation DrumStation, I sat at my usual (somewhat close) proximity to the studio monitors. But when I stepped back farther in the room, I was stunned by the sonic boom produced by the DrumStation Rack. My new next-door neighbor got a brief glimpse of what it's going to be like living next to an electronic percussionist; the DrumStation's kick and toms literally rocked the house.

So far, I've used the DrumStation on two live gigs. On each, I was a little worried about overloading the stage monitors and mains with the DrumStation's deep bass drums. But I was pleasantly surprised at the warm, consistent low end produced by the unit throughout each gig. There was no unwanted distortion, and no EQ tweaking was needed to compensate any sound. Just plug in, play, and enjoy the rave.

In fact, the wonderful audio quality of the DrumStation is one of its most attractive features; the unit sounds great in any context. For one sequence, I used the toms, congas, and kick from a DrumStation kit to replace some deep ethnic percussion samples I had been using previously. The unit even sounded great when used in place of low African hand-drum and percussion samples.

DOLLARS AND SENSE

The DrumStation lists for $995.95, which seems pretty expensive compared to other drum modules (such as the Alesis DM5). But Rogue Music in New York reports that the street price of the TR-909 is currently $1,295 and a TR-808 with MIDI goes for $1,095! (Years ago, I remember borrowing a TR-808 from a friend and literally throwing it in the front seat of my car without a carrying case! Who knew?) In that context, the DrumStation seems like a bargain.

▼

The audio quality is one of its most attractive features.

In addition, the DrumStation is one of those products that fills a unique niche. Although there are many less expensive drum modules, most are the jack-of-all-trades variety that do not offer extensive real-time control. With the DrumStation, Novation is going specifically for those styles (house, hip-hop, dance, techno, ambient, jungle, drums 'n' bass) that gather under the modern electronic-pop umbrella. If analog drum sounds are your love, this baby is more than worth the price.

Product Summary

PRODUCT:
Novation DrumStation
Rack drum module
PRICE:
$995.95
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EASE OF USE	●●●●
SOUND QUALITY	●●●●◖
VALUE	●●●◖

Steve Wilkes *is one half of the vocal/electronic percussion duo Fordham/Wilkes and once held his own rave with just a pair of maracas.*

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World Radio History

Waves AudioTrack 2.2 (Mac)

By David Kaplowitz

Versatility is paramount with this EQ/dynamics-processing combo.

More and more audio professionals are becoming multimedia professionals nowadays. Hype aside, there really is money to be made in audio for CD-ROM and the Web, and many savvy desktop-audio production veterans are cashing in. In response, some manufacturers of desktop-audio tools are beginning to design products that are intended for both music-CD and multimedia-audio production.

Waves' *AudioTrack* is clearly a response to this broadening of interests. The software is compatible with an impressive range of applications for both audio and multimedia, thanks to its availability in Digidesign TDM and Sound Designer II, Adobe Premiere, and Steinberg VST plug-in formats. In addition, *AudioTrack* can run within Waves' *Multirack* application (formerly called *WaveShell-RT*), which means you don't need a separate host program that supports one of the aforementioned plug-in architectures.

AudioTrack combines a 4-band parametric equalizer with a compressor/expander/gate and works on mono or stereo tracks. The EQ is similar in function and user interface to Waves' *Q10* 10-band parametric EQ plug-in, and the compressor/gate is similar in user interface to Waves' *C1* compressor/gate. However, *AudioTrack* uses different compression algorithms than *C1*. Obviously, if you're already using *Q10* and *C1*, you probably don't need the new program.

AudioTrack functions almost identically no matter what compatible application and plug-in architecture you're using. I'll point out a few differences as we go along.

GETTING STARTED

The installation process for *AudioTrack* and other Waves plug-ins is a little different than with most software. All Waves plug-ins run within a software environment called a "WaveShell," which connects the host application and the plug-ins. Different WaveShells need to be put in the Plug-Ins folder for each application. For example, WaveShell-P goes in your Adobe *Premiere* Plug-Ins folder and WaveShell-TDM goes in your TDM Plug-Ins folder. The Waves installer searches your hard drive and puts the appropriate WaveShells in the right places.

The *AudioTrack* plug-in is the same regardless of the plug-in architecture you use—only the WaveShell differs—and it can be located anywhere on your drive. However, for consistency, Waves recommends you put all your Waves plug-ins into a Waves Plug-Ins folder.

In addition, if you're using Waves software in the TDM or *Sound Designer II* environments, you need to connect Waves' hardware dongle to your ADB port. (The dongle has a through port for connection in an ADB chain.) You'll also need to contact Waves and get an authorization number to enter into the provided *WaveKey* utility before using the software with *Sound Designer II* or Pro Tools with TDM.

One anomaly I found is that the installer placed a copy of the WaveShell-P in both my Adobe *Premiere* Plug-Ins folder *and* in my Adobe *Photoshop* Plug-Ins folder. I don't know why; perhaps it just indiscriminately seeks Adobe Plug-Ins folders.

USER INTERFACE

Waves gave *AudioTrack* an intuitive and easy-to-use interface, which is always good but is especially important in a program that is intended for desktop-production veterans and neophytes alike. Only occasional reference to the manual should be necessary if you're familiar with EQ, compressors, expanders, and noise gates. If you're also familiar with how to install Waves software, you probably won't even need the manual.

AudioTrack is laid out logically in a single window (see **Fig. 1**). A pre-EQ fader allows you to attenuate the input level to avoid clipping. The manual suggests you lower the input level 6 dB or so to create more headroom for EQ boosts.

From the input fader, the signal proceeds to the EQ section and then to the compressor/expander and gate sections. An Input Energy meter shows you the level of the signal coming out of the EQ. There's an output fader, an output-level meter, and a clip indicator that identifies output clipping or EQ clipping. When the level gets too high, the clip indicator turns and stays red until you single-click in that area to reset it. The meters at every gain stage are nice and help you control how the signal is processed.

Most parameters can be edited using the mouse or Mac keyboard. Standard Macintosh keyboard conventions are employed, including Tab for navigation through the window, standard Copy and Paste commands, numerical entry for values, arrow keys for fader control, and the Enter key for toggling parameters such as EQ filter shape.

PRESETS AND SETUPS

Like all Waves plug-ins, *AudioTrack* includes well-implemented features for storing a library of Presets and doing quick comparisons between different Setups. The terminology takes a little getting used to, but once you learn it,

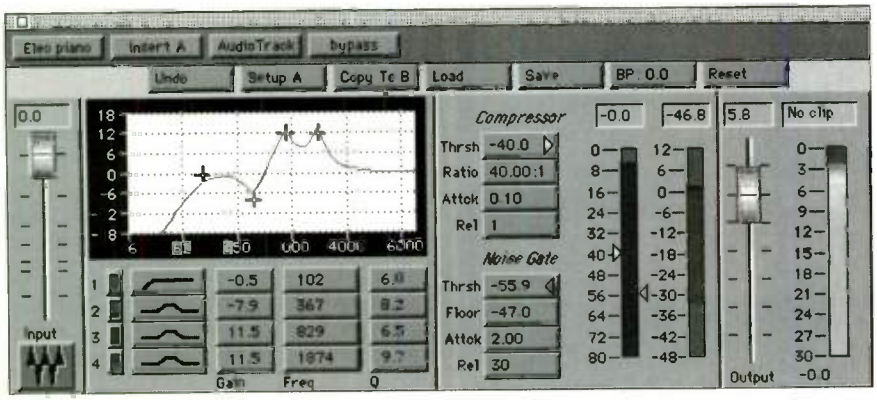

FIG. 1: Most controls in Waves' *AudioTrack* are contained in one window. The input-level fader is pre-EQ, and the Input Energy meter and dynamics processor are post-EQ. The clip indicator turns red to show output clipping or EQ clipping.

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the features are pretty straightforward.

A Preset includes the values for all parameters in the *AudioTrack* window. The software includes nine factory presets, including Classic compressor/EQ, Multimedia Hi-pass filter, and Loudness (see **Fig. 2**). The Save button stores a user preset as an independent entity available in the Preset menu or within a Setup file, which can contain multiple presets. Unfortunately, there is no provision for renaming presets. Furthermore, the manual states that user Presets can be changed and deleted, but it doesn't say how, and I couldn't figure it out. I'd like to be able not only to change and delete presets but also to delete individual presets from within Setup files.

Similarly, the Load button accesses a menu that is divided into three sections: Factory Presets, User Presets (as many as you want), and Setup files. You can load independent presets or a preset from within a Setup file. For example, the Setups folder contains a file called "Effect Setups." If you load the "Effect Setups" file, an Effect Setups section of the Load menu is created that includes all presets contained in the file. Setup files are loaded for each track, and to add a user preset to a Setup file, the Setup file must be active for the current track.

Two Setups can be available at once; pressing the Setup button toggles between the two. (Setup A is active by default.) You can copy your current Setup to the alternate Setup with the press of a virtual button. Let's say you have a setting you're pretty happy with in Setup A, but you want to tweak it just a bit more. Simply copy the current Setup to B, switch over to the new Setup, and tweak away without worrying about losing Setup A. This feature would be a welcome addition to many applications; for instance, I've often wished for immediately recallable alternate mixes in *Pro Tools*.

The Setups section includes a few other self-explanatory buttons, including Reset and Undo (one level). The BP button is one of the few things in *AudioTrack* that isn't intuitive: The BP stands for Bypass, but this isn't a regular Bypass button. Instead, it allows you to adjust the volume of the dry (bypassed) sound by ±12 dB so that you can match the levels of processed and dry sounds. This feature only works within applications that support the Bypass feature; for example, it is not available in *Premiere*.

FILTER TIPS

The EQ section is a 4-band "Para-Graphic" EQ that combines the features of a graphic equalizer with the precision of a parametric EQ. *AudioTrack* displays an editable EQ curve representing the frequency response and provides precise control over the bandwidth (Q). Each band has a fixed lower frequency limit: band 1 starts at 16 Hz, band 2 at 100 Hz, band 3 at 250 Hz, and band 4 at 1.6 kHz. The upper-frequency limit is the Nyquist frequency (half the sampling rate) of your material; with 22 kHz material, the upper range of the EQ is 11 kHz.

Several controls are provided for each band. In/Out buttons let you turn on and off any of the four EQ bands. Filter Shape buttons let you select among five filter types: peak/notch, high shelf, low shelf, highpass, and lowpass. The Gain and Frequency controls can be edited by moving graphic markers representing each band in the graphic window, by scrolling through numerical values with the mouse, or by entering in a numeric value from the Mac keyboard. Changing the Q is only possible by scrolling through values or entering in a number.

Some filter types are not affected by all of the parameters, due to the nature of the filter. High- and low-shelf filters, for example, are not affected by the Q setting, and highpass and lowpass filters are affected only by the frequency setting, not by Q or gain. The highpass filter is only available in band 1 (the low band), and the lowpass filter is only available in band 4 (the high band). All of this is logical.

AudioTrack's EQ is quite flexible, but being accustomed to the more powerful, 10-band *Q10*, I sometimes craved more bands and a tighter Q. However, for most multimedia applications and many audio applications, four bands should be adequate. The EQ is sonically transparent; it does not perceptibly color the sound, so it imparts no discernible sonic signature.

SQUEEZING AND STRETCHING

The compressor/expander section's attenuation meter lets you know whether compression or expansion is occurring. With compression, the meter displays a downward red bar, and expansion is shown as an upward yellow bar. The Input Energy meter shows the post-EQ level.

The compressor/expander threshold marker appears as a small triangle on the left side of the Input Energy meter. It is exactly aligned with that meter, making it easy to set the threshold to complement the incoming signal. You get the usual four adjustable compression and expansion controls: Threshold, Ratio, Attack, and Release. Ratios of 1.01:1 to 40:1 result in compression, and ratios of 0.5:1 to 0.99:1 cause expansion.

This is a good, basic compressor, capable of subtle yet effective compression, but it also is able to compress the heck out of things to achieve an ultra-compressed, distorted sound. For example, if you set the threshold to -40 dB, the ratio to 40:1, and the attack and release at minimum, you can add serious fuzz to, say, a bass sound.

SLAMMING GATE

Like the compressor/expander, the noise gate is simple yet functional. The

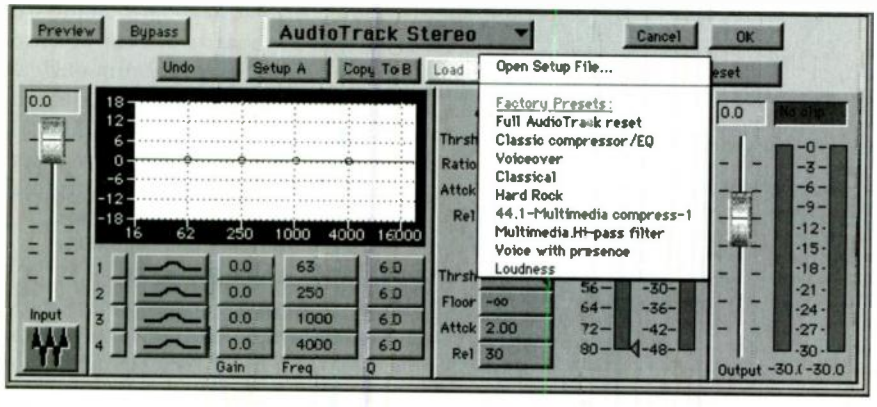

FIG. 2: Nine factory presets come with *AudioTrack*. You can create an unlimited number of user presets and save multiple presets in a Setup file.

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Threshold parameter controls the point below which the gate will close, and Floor sets how far down the gate will close. (Setting Floor to ∞ dB provides muting.) Attack controls how fast (0.1 ms to 1 second) the gate opens after a sound goes above the Threshold, and Release controls how fast the gate closes, (1 ms to 10 seconds). The downward red bar on the Attenuation meter indicates the reduction in signal.

The gate worked as expected for eliminating hum from tracks and getting rid of mouth and throat sounds in between vocal verses and sentences in voice-overs. It also worked fine for making a gated-reverb sound using a slow gate and basic reverb.

IT'S SIMPLE, DOC!

The manual, like the software, is simple and well designed. It covers all of the program's operations and provides straightforward descriptions of relevant concepts such as EQ, compression, expansion, and noise gating. An icon notifies advanced users that they can skip over these sections.

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Product Summary

PRODUCT:
AudioTrack 2.2 EQ/dynamics-processing plug-in

PRICE:
$300

SYSTEM REQUIREMENTS:
Power Mac or 680X0 Mac with FPU; MacOS 7.1 or later; *Multitrack* (*WaveShell-RT*) or host program that supports Sound Designer II, TDM, Premiere, or VST plug-ins; Apple Sound Manager 3.0 (with applications that do not support Digidesign audio cards)

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On the downside, the manual is sometimes redundant, describing some concepts and features several times. Also, the description of the Load/Save functions is pretty weak; a little experimentation is necessary to get the hang of how these features work. Interestingly, version 1.0 of *AudioTrack* included an index in the manual, but version 2.2 has no index. Fortunately, a new manual should be available by the time you read this, and it will include an index.

WOULDN'T IT BE NICE?

As much as I like *AudioTrack*, I would like to see Waves add a few more features. To begin with, I want to be able to save separate Setup files for the EQ, compressor/expander, and noise gate. Although the Load/Save features in Waves software are really cool, they're somewhat inflexible when all the features are wrapped into one plug-in such as *AudioTrack*. It would also be nice to be able to bypass the EQ and compressor sections independently.

I would also like to be able to change the order of the signal flow. For most applications, having the signal pass through the EQ first and then on to the compressor/gate is fine, but I don't like being locked into that order.

Installation of any Waves product can be a little sticky, especially in the TDM or *Sound Designer II* environments. The authorization process for the *WaveKey* in these environments is inconvenient.

I was also disappointed that there is no provision for renaming Presets, nor is there a clearly discernible way to delete Presets from the Preset menu or from a Setup file.

CONCLUSIONS

Waves' goals for *AudioTrack* were seemingly modest: to create an easy-to-use, versatile tool for audio and multimedia professionals, based on technology from *Q10* and *C1*. For the most part, the developer accomplished these goals.

Gripes aside, I recommend *AudioTrack* for those who don't need the power of Waves' more full-featured plug-ins. If simple and effective EQ, compression/expansion, and gating are what you need, you won't be disappointed.

David Kaplowitz *is a sound designer, composer, and cofounder–co-owner of the San Francisco–based recording facility Found Sound (fndsound@sirius.com).*

World Radio History

A.R.T. Pro VLA

By Jim Miller

Powerful dynamics control and transparent audio at an affordable price.

Many musicians and engineers feel that all-digital recordings lack the warmth and richness associated with analog gear. Others think that this perception might be the result of a tremendously effective marketing campaign by a number of manufacturers. But whatever the case, you don't need me to tell you that tube gear is hot right now.

The fact is, studio owners are faced with a growing number of tube-based products. Some of these units adhere to a "pure tube" aesthetic whereas others combine solid-state technology with one or more tube stages. Years ago, tube-based processors were often priced out of reach of the average musician or home-studio operator. But this has changed, as is evidenced by the Pro VLA Professional Two Channel Vactrol/Tube Leveling Amplifier from Applied Research and Technology (A.R.T.). The Pro VLA is both pro quality and affordable. And though it uses solid-state inputs and outputs, it houses real 12AX7A tubes.

GETTING ACQUAINTED

Removing the 2U rack-mount Pro VLA from its box, I was relieved to see that the product designers had dispensed with A.R.T.'s former style of front-panel art. It always seemed to me that those bold, brightly colored, postpsychedelic graphics were more appropriate for monster trucks than audio gear. The new design is clean and classy with easy-to-read, white lettering silkscreened on a black, semimatte faceplate. The only touch of color comes from the small, violet triangle in the company's logo.

This 2-channel unit is clearly designed for pro and semipro use, offering both balanced TRS ¼-inch and XLR jacks on the back, plus an internal power supply with heavy-duty cord (no wall wart). On the front panel are duplicate sets (one for each channel) of rotary controls for threshold, ratio, and output and push buttons for VU-meter switching (to input or output), attack (fast or Auto), release (fast or Auto), and bypass/active (with accompanying status-indicator light). The right channel has an additional button for linking the two channels, along with another status-indicator light. The front panel also furnishes two 10-segment, gain-reduction LEDs and two large, analog VU meters that light up with a beautiful, warm glow, reminding me of my faithful old TEAC 3340 4-track reel-to-reel deck.

In all, the Pro VLA is a nicely packaged unit. However, I did note one minor design anomaly: the bypass/active light comes on in Bypass mode rather than Active mode. To me, this seems counterintuitive. I would prefer that the red light on each channel indicate when the VLA is active.

INITIAL SPIN

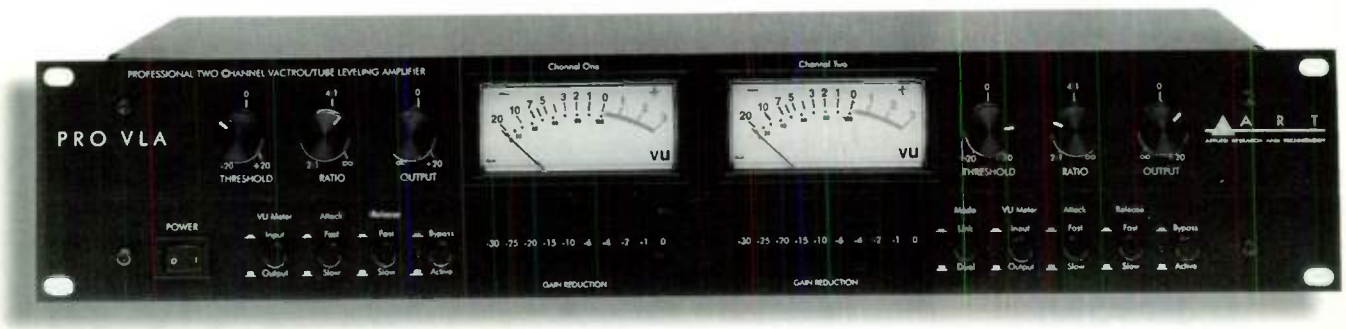
I used the Pro VLA's balanced TRS ¼-inch jacks, which work best with my particular studio setup. Once I had everything hooked up, I ran a straight signal (in this case, a DAT recording of a Latin rock group) through the unit in Bypass mode to make sure I was getting clean audio. Then I set the output of the Pro VLA to minimum and switched it into Active mode. After a minute or two of tweaking, I dialed in pretty much the same levels as I had with the unit in bypass mode. Then I went to work to see how much I could compress the audio without degrading the feel of the original material.

The threshold control on my review unit showed only three values: -20, 0, and +20. So I had to do a bit of guessing about settings. With the threshold set at about -5 dB, ratio at about 3:1, and output at around +3 dB, I was able to get an audible amount of overall gain increase without sacrificing any of the original dynamics or compromising the overall feel of the recording.

According to the front-panel LEDs, I was getting a maximum gain reduction of about 6 dB. At the same time, the VU meters showed that I was staying around the 0 dB level. I kept the attack and release buttons in the Fast mode, necessary because of the amount of percussion in the recording. And, of course, I had the channels linked. (In Link mode, channel 1's threshold and ratio controls serve both channels, and the output controls function independently for each channel.)

This thing sounds fabulous! I really like the Pro VLA. It has a superbly transparent, musical sound that allows you to bring peak signals under control without seriously squashing the dynamics or creating sonic artifacts that can degrade a finished product (e.g., the nasty pumping or breathing sounds that many less-capable units exhibit even at moderate settings).

In particular, congas, timbales, and other types of hand percussion really seemed to benefit from the processing,



The Pro VLA Two Channel Vactrol/Tube Leveling Amplifier from A.R.T. uses optical electronics and hand-matched 12AX7A tubes to provide warm, transparent, and musical-sounding dynamics control.

World Radio History

maintaining terrific presence throughout. In one spot, I even noticed a particularly nice kick-drum pattern that I had not been aware of before. The Pro VLA actually let me hear a little more low-frequency information. This is very cool.

According to A.R.T., the secret lies in using optical electronics rather than traditional voltage-controlled amplifiers (VCAs). Of course, another contributing factor is the hand-matched 12AX7A tubes; this type of tube typically produces musical compression.

A DIFFERENT DRUMMER

Putting away the high-powered Latin mix, I tried out a recent recording with a more traditional, guitar-driven sound. The song features lots of acoustic guitar and vocals plus some clean electric-guitar work and only minimal percussion in the form of a simple trap set.

I was immediately impressed by the presence and clarity the acoustic guitar acquired when the mix was processed by the Pro VLA. Switching the processing out, I was astounded by how lifeless the recording seemed. Up until that point, I thought I had created a very nice mix. I guess even old dogs can be taught some new tricks. (And here I thought I had this audio-engineering thing all figured out!)

I was also impressed that there were sections of the music that seemed to remain untouched by the Pro VLA. I had to switch the processing in and out to confirm what my ears were telling me: the unit was enhancing the parts that benefited most and somehow leaving the rest of the music intact. In one particular spot, the vocals seemed to actually move forward in the mix while the drums stayed nicely controlled and virtually unchanged.

▼

The Pro VLA has a superbly transparent, musical sound.

Next, I tried altering the attack and release from Fast to Auto (which is labeled "Slow"). This changed the overall character of the compression a bit, but without damaging the feel of the mix. Still, I felt that it sounded better in Fast mode. I even tried compressing the signal more (using the threshold and ratio controls) and found that regardless of the settings, the recording retained a very musical quality, though without as much dynamic range as I favor.

Okay, I thought, the Pro VLA won the first round. But I was determined to throw some heavy artillery in its direction in the form of some electric lead-guitar work and a little low-down electric bass.

PROOF IS IN THE LES PAUL

I took the Pro VLA to UniForce Studios, where I was laying down some lead-guitar tracks and bass parts for an album project. I knew that my MESA/Boogie amp was more than capable of producing highly compressed lead tones, so as an experiment, I gave the Pro VLA a chance to "squash" my leads and then compared the results. I plugged in my Les Paul Custom and backed off a bit on the Boogie's overdrive. Then I ran the speaker outputs of the Boogie into a Hughes & Kettner Red Box MkIII direct box, from there into the Pro VLA, and finally into a Mackie CR-1604VLZ mixer.

With the Pro VLA's threshold set at -10 dB and ratio at about halfway between 4:1 and infinity, I achieved 15 dB of gain reduction with an occasional flickering peak in the -20 dB range. This required me to turn the unit's output control up close to the +10 dB mark to keep the volume consistent with my unprocessed signal.

The result? Well, it didn't sound the same as my MESA/Boogie's compression, nor was there as much smooth, buttery distortion. But, in general, I liked the sound. The tone was a bit cleaner than I'm used to but was still quite warm and "up front." I was reminded of Danny Kirwan's tone on some of the early 1970's Fleetwood Mac albums—not a bad sound by *any* stretch of the imagination.

Once again, changing from fast attack and release to Auto mode slightly changed the character of the compression. In this case, the Auto mode produced a slightly better, more fluid sound. The only drawback was a bit more overall hiss on the tail end of long notes. But this was really only noticeable when the track was soloed.

PANDORA'S P-BASS

Next, I hauled out my Fender Precision Bass, set the Boogie to produce a clean tone, and then ran the speaker outputs through the Red Box and into the Pro VLA, leaving the front-panel

Product Summary

PRODUCT:
Pro VLA 2-channel compressor
PRICE:
$599
MANUFACTURER:
Applied Research and Technology, Inc.
tel. (716) 436-2720
fax (716) 436-3942
e-mail artroch@aol.com
Web www.artroch.com
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settings the same as they had been for the Les Paul. This produced a sound that was slightly too compressed, without enough front-end "thump." So I backed off a bit on the threshold (to approximately -5 dB) and ratio (to just over 4:1), which resulted in a nice amount of compression. These settings allowed me to play as sloppy as I wanted without clipping the signal or losing the quieter notes.

Having said that, I still prefer controlling the dynamics of my bass playing manually. (I enjoy the challenge.) But the Pro VLA performed admirably and would be an excellent choice for bass players who haven't had years of experience keeping levels consistent.

VIVA LA VOCAL

I have worked with a great many experienced vocalists over the years who know how to control their dynamics by moving away from the mic during loud passages and getting closer for quiet ones. However, it can take years to achieve that much control, and many vocalists simply never get there. That's why most vocal tracks benefit from some amount of compression.

The vocalist at this particular session was a talented songwriter, but her dynamic control was less than perfect. We had been using a dbx 165 compressor on previous tracks with very good results. But when we patched in the Pro VLA, everyone immediately heard the difference. There was a much more natural sound to the vocals, with less overall "scrunching" and noticeably less noise. If I hadn't known better, I would have sworn there was some sort of subtle gating going on in the Pro VLA. We could still hear a bit of hiss in spots when the track was soloed but not nearly as much as we heard from the other unit at the same general settings.

Knowing I would have to return the Pro VLA within days of writing this review, we didn't dare use it to record the one vocal track we auditioned it on for that session. We felt that there was too much of a difference in the sound quality between the two units. After all, who wants to be reminded of "what could have been" every time they listen to their album?

FINAL CHECK

Returning to my own studio, I plugged in my trusty AKG C 414 condenser mic, threw down some vocal tracks, and did some A/B comparisons with my dbx 166 compressor. This confirmed for me that the Pro VLA was indeed a much more versatile, more transparent performer. Next, I did a comparison of acoustic guitar recorded with each of the two units. The difference here was somewhat less dramatic, but it was still the Pro VLA that pleased my ears the most.

Remember, too, that as a true dual-channel processor, the Pro VLA allows you to run different instruments through each channel and control each one separately when the channels are unlinked. This is a real plus if you need to use one channel for processing vocals and another for guitar, bass, or some other instrument.

LESSON LEARNED

If you've read this far, you can probably tell that I think A.R.T. has built a real winner this time. Considering that the Pro VLA carries a list price of just $599, I'm sure the word will get around quickly that this unit has very little competition.

Only at the highest settings did the Pro VLA compression become so pronounced that it sounded less than natural. This is a claim I don't believe can be made for many other compressors at this price point (or even more expensive units, for that matter). At reasonable, real-world settings, the audio emerging from this unit's outputs is very natural sounding, with no hint of the artifacts imposed by inferior units. Even for a guy who doesn't much care for compressors, I found myself thinking of plenty of applications for this remarkable audio processor.

Every manufacturer loves to use buzzwords like transparency, warmth, and musicality when describing their own products. For my money, A.R.T. is justified in using exactly those words to describe the Pro VLA. It's one of the few products I have encountered that has caused me to rethink the way I work in my studio. That's high praise, indeed.

Jim Miller *is a longtime sound designer, sometime session guitarist, and frequent contributor to* **EM**.

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Niche Automation Station

By Peter Freeman

User-friendly MIDI faders, buttons, and knobs.

MIDI-automated software and hardware have proliferated in recent years, and the demand for hardware controllers has correspondingly increased. Using a mouse and a sequencer's faders for real-time control of effects processors, synth parameters, and such devices as Niche's Audio Control Module (ACM) is clumsy and relatively imprecise. A hardware controller for these devices is essential for practical mixing.

Given the company's experience producing the ACM (which controls levels for eight channels of audio), the Niche Automation Station is a logical follow-up. The tabletop MIDI-control device provides sixteen faders, sixteen Mute buttons, and four EFX knobs. All can be programmed to send a variety of MIDI messages; despite their names, the Mute buttons and EFX knobs can perform other functions. A Mute button is positioned directly underneath each fader, which is ideal for MIDI Volume muting.

OVERVIEW

The Automation Station offers MIDI Volume and Mute/Unmute automation and sends Control Changes, Aftertouch, Program Changes, Song Select, Pattern Select, and Pitch Bend. It also responds to external MIDI Program Changes and Control Changes. The unit can dump and load its memory via MIDI System Exclusive.

However, the unit's individual controllers cannot transmit System Exclusive messages, which are required to control (and automate) some parameters on certain effects processors and synths. For instance, many Roland Sound Canvas parameters can be accessed only by means of SysEx. The EFX knobs practically cry out for such applications. No can do, I'm afraid. This is really a puzzling omission; the comparable Peavey PC 1600 sends SysEx quite nicely. (According to the manufacturer, adding the code for this capability would have required using a larger EPROM.)

The programming interface consists of five function keys, a data-entry knob, two cursor keys, and a small, yellow, backlit LCD. During normal operation, the display conveniently shows a bar graph that indicates the position and mute status of each fader.

The usual MIDI In, Out, and Thru jacks are mounted on the rear panel, along with an input for the ubiquitous (and always annoying) wall-wart AC adapter. A standard IEC 3-prong power cord would have been a better choice for professional applications.

FADERS AND MUTE BUTTONS

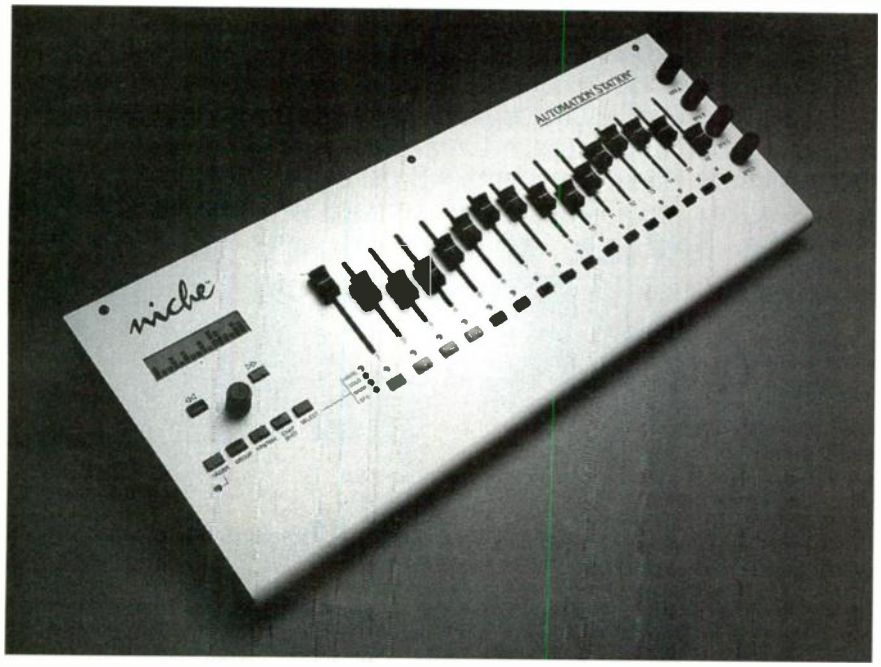
When you assign a system MIDI channel for the Automation Station, fader 1 is automatically assigned to the system channel and the other faders are on successive channels. Each Mute button operates on the same MIDI channel as, and in tandem with, the fader above it. The default system channel is 1, for example, so fader and button 1 are normally on channel 1, fader and button 2 on channel 2, and so on.

Each fader can send Pitch Bend or any Control Change 0 to 127 message along with a value. The Disable Faders button globally disables all sixteen faders. Unfortunately, you cannot send Aftertouch with the faders.

One very cool feature that sets the Automation Station apart from other such boxes is its ability to chase controllers. With this feature, the Automation Station "listens" to sequencer playback and follows the levels of the controller that the unit has been programmed to handle on each channel. Then, when you touch a fader, the Automation Station sends values starting at the current instantaneous level. This way, you don't get sudden value jumps when you move a fader, which is a common problem with competing products. The unit's bar-graph display reveals each channel's current controller value based on the sequencer's output.

The Mute button functions depend on their mode. ACM mode is designed specifically for use with the Niche Audio Control Module. In this mode, instead of sending preprogrammed values, the buttons mute audio by sending a MIDI CC 7 (Volume) message with a 0 value. To unmute, they send a CC 7 message with the associated fader's most recent value. This makes sense for mixing.

When ACM mode is off, the unit becomes a more general-purpose MIDI controller. The Mute buttons can be programmed to send not only MIDI Volume events but also various other



MIDI control over effects processors, synths, and software is easier with a hardware controller such as the Niche Automation Station. The tabletop device provides great software features, but the hardware quality is questionable.

World Radio History

Control Changes, Program Changes (but not Bank Select), or Aftertouch, all at a set value. You can also send Song Select, Pattern Select, Start, Stop, or Continue messages for a sequencer or drum machine. Furthermore, the buttons can send different messages on two successive presses (e.g., mute/unmute or Stop/Start), which is quite useful. When not in ACM mode, the Automation Station is best suited for such applications as altering effects and synthesizer parameters and controlling a drum machine.

With ACM mode off, you can choose from four Mute-button modes: Mute, Solo, Snap, and EFX. A set of four LEDs next to the Select button indicate which mode is active. Mute simply mutes the selected MIDI channel; Solo mutes all except the selected channels. I'll discuss the other two modes as we go along.

EFX KNOBS

Each of the Automation Station's four EFX knobs can be programmed to send a different set of MIDI Pitch Bend or Control Change messages for each MIDI channel. However, one EFX knob cannot send messages on all sixteen channels simultaneously; each knob simply controls the value for one message on one channel at a time, which is assigned by hitting the Mute button for that channel in EFX mode. The unit does not have controller curves.

I find faders preferable for this kind of control. But Niche could only fit sixteen faders on a box of this size, and if you are already using the faders for other tasks, the knobs come in handy.

SNAPSHOTS

Snapshots are especially useful for automated mixing. These instantaneous "pictures" of the fader and mute status can be stored in the Automation Station's memory for later recall. Any or all Automation Station channels can be included in any Snapshot, which is nice because it allows a Snapshot to change only specific elements of a mix, leaving the rest untouched.

You can use any fader to crossfade between the active Snapshot and any other Snapshot stored in memory, which lets you manually move between all values at once. Interestingly, a fader assigned to this function can still be used simultaneously for its regular programmed task. If you are recording

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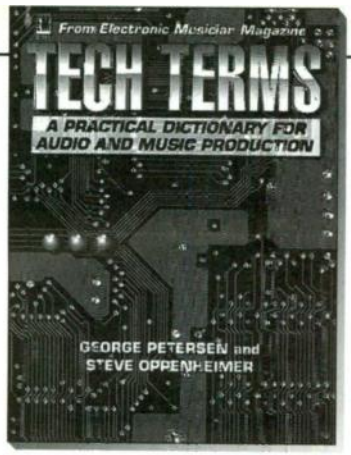

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your automation changes into a sequencer, you can control a large number of fader moves using just the crossfader data and a Program Change to recall the destination Snapshot.

The unit has onboard storage memory for up to 32 Snapshots, which can be recalled via MIDI Program Changes. In addition, the Mute buttons can be used in Snap mode to recall the first sixteen Snapshots (button 1 recalls Snapshot 1 and so forth).

▼ The Automation Station is a logical follow-up to the Niche ACM.

GROUPS

Fader grouping is an important tool for automated mixing, and it is fairly well implemented on the Automation Station. Any of the Automation Station's channels can be grouped under the control of a master fader so that the master controls all the group's members at once. Up to sixteen groups can be created, but a fader can only be the master for one group. However, faders can be members of multiple groups. You can even set up crossfade groups, which is a very cool function. With a crossfade group, if you pull down the master fader, any faders that are members of its group and are in Cross mode will fade in while the other grouped faders fade out.

Nested groups are also possible, which is an excellent feature. For example, if a group of five faders is created for a drum kit, with fader 1 as its master, fader 1 will control the overall volume of the entire kit. A nested group—essentially a subgroup—can be created containing the kick drum and snare, with the kick fader as master. That way, the kick and snare can be adjusted together while still under the overall control of the drum-group master.

Mute groups can also be created that work just like the fader groups, except that they can have more than one master. Cross-muting groups are also possible. These simply allow you to reverse the status of the members of a mute group in relation to their master. In practice, when you unmute a channel that is a master of a cross-muting group, all the other members of that group are muted. This is extremely useful when you want to work with individual members of a group and still maintain control of the group as a whole.

EASE OF OPERATION

Programming the Automation Station is simple and quick. Hitting the System and Select keys puts the device into programming mode. In this mode, moving any control on the unit causes the control's name, number, and current MIDI data assignment to be displayed on the LCD. Changes are made with the data-entry knob.

I easily found my way through the Snapshot and Group functions with a little help from the manual here and there. The occasional prompts from the display when entering certain functions (for example, Choose by Select) were also helpful. The manual is clear and concise but lacks an index and a proper MIDI implementation chart.

CONCLUSIONS

In general, the Automation Station behaved well. It provides a solid variety of continuous controllers and switches, and the user interface is reasonably straightforward. During a mixing session, I used the Automation Station in conjunction with the Niche ACM to automate eight channels of ADAT material I was mixing with virtual tracks from the computer.

I mentioned a few criticisms earlier,

Product Summary

PRODUCT:
Niche Automation Station MIDI controller

PRICE:
$549

DISTRIBUTOR:
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fax (818) 701-7452
e-mail rjmgniche@aol.com

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VALUE	● ● ●

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the most irksome of which was the inability to send SysEx from the controllers. I also wish you could send Aftertouch from the faders and use the buttons for such messages as Bank Select and All Notes Off. The Automation Station also lacks pedal and switch inputs, which is a shame.

But the most serious problem is that the quality of the hardware is poor. The buttons feel cheap and unreliable; I sometimes hit them during a mix and got no response. It turns out you must hit them fairly hard and precisely to ensure that data gets sent, which is a pain when you're trying to pay attention to the music in a mix. The faders offered a nice amount of resistance, and I generally liked working with them, though sometimes the resistance was a bit too much for precise adjustments.

Niche clearly invested a lot of effort in advanced software features (e.g., the sophisticated grouping features). The nested grouping features are cool, as are the crossfades. Of course, with some clever programming in a pro-quality sequencer or with Opcode's *MAX*, you can create all the groups and crossfades your heart desires. But the

▼

The unit's ability to chase controllers sets it apart.

Automation Station makes it easy. The ability to chase controllers is another big plus. And if you already own one or more ACMs and need a convenient control surface for them, the Automation Station might be a reasonable option because it was designed with the ACM in mind.

For the most part, the Automation Station did its job, and that might be good enough for some users. But for less money you can buy a Peavey PC 1600, which admittedly does not have spiffy nested groups, Snapshot crossfades, or programmable knobs but does send SysEx strings and has pedal and switch inputs. I'd even put up with the PC 1600's less friendly user interface because it is better built than the Automation Station. Ultimately, what good are fancy features if you don't trust the hardware? ●

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TECH PAGE

Audio Service Bureau

This system could change the way you apply DSP.

By Scott Wilkinson

Most electronic musicians apply digital signal processing (DSP) to their music with hardware processors or software running on a Mac or PC. Although these products are becoming less expensive every day, truly high-end processing is still out of reach for most of us. Wouldn't it be great if you could apply high-end DSP and pay only for the time you use it? Of course, you can rent high-end equipment, but rental agencies don't always have what you need.

A Finnish company called Sound Objects (tel. 358-9-4774-8020; fax 358-9-4774-8021; e-mail info@soundobjects.com; Web www.soundobjects.com) has a better idea. What if you could process your audio files on a remote, high-power computer server with much better quality than you could otherwise afford? This is the idea behind the company's *Renderson Sound Processing Server* software.

The system is based on the Renderson Sound Description Language, which is a sort of PostScript for the audio domain. This text-based, object-oriented language can describe any DSP operation. In addition, it is platform-independent, and it includes hooks for external programs, which allows software developers to create graphic front ends and lets other programs launch Renderson jobs.

The first implementation of the Renderson language is Sound Objects' *Sound Processing Server (SPS)*, which is a DSP engine and software-development environment. This software currently runs on DEC, HP, IBM, SGI, and Sun server platforms, and it can be remotely accessed and utilized from client PCs, Macs, and Unix-based systems.

SPS includes more than 30 high-quality DSP modules. The available modules include reverb, dynamics processing, filtering, time compression/expansion, pitch shifting, synthesis, spectral analysis, morphing, sample-rate conversion, and more. These modules can be combined to build new functional units, and entirely new modules can be created using the Sound Description Language.

According to the company, *SPS* supports an unlimited number of simultaneous audio tracks (including tracks at different sample rates) and any number of processing modules per track, no matter what the horsepower of the host processor. Of course, the slower the processor, the longer it takes to complete a given operation while maintaining the highest possible quality, regardless of the platform.

Speaking of audio quality, *SPS* uses 64-bit, floating-point arithmetic throughout the signal path, which lowers the noise floor and helps avoid clipping. It can also accommodate any sample rate up to radio frequencies (in the *megahertz* range!).

SPS is optimized for online applications with built-in support for network protocols, which allows a client computer to access the software over a LAN (e.g., within a recording studio) or the Internet (see **Fig. 1**). Many LANs can accommodate real-time tweaking, but the bandwidth of current modems limits the ability to monitor this process over the Internet.

Fortunately, there are several ways to deal with this limitation. For example, a low-resolution "draft" mode can be used for monitoring while dialing in the desired effect, after which you can download the high-quality result. However, this concern could soon vanish with the advent of high-speed cable-TV modems and ADSL (see "Tech Page: The Need for Speed" in the March 1997 **EM**).

This software is currently available only to software developers and qualified end users, although a retail version should be available by the end of the year. Sound Objects expects *SPS* to first catch on in LAN environments and high-end production facilities with T1 (or better) phone lines, but new Internet-access technologies could bring centralized, high-quality DSP services within easy reach of any home studio.

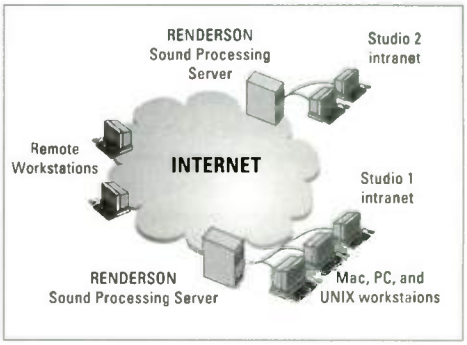

FIG. 1: Users can access *Renderson Sound Processing Server* from a LAN (also called an intranet) or the Internet. (Courtesy Sound Objects, Inc.)

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