Know Your Studio Monitors • Record Label Showcases

Electronic Musician®

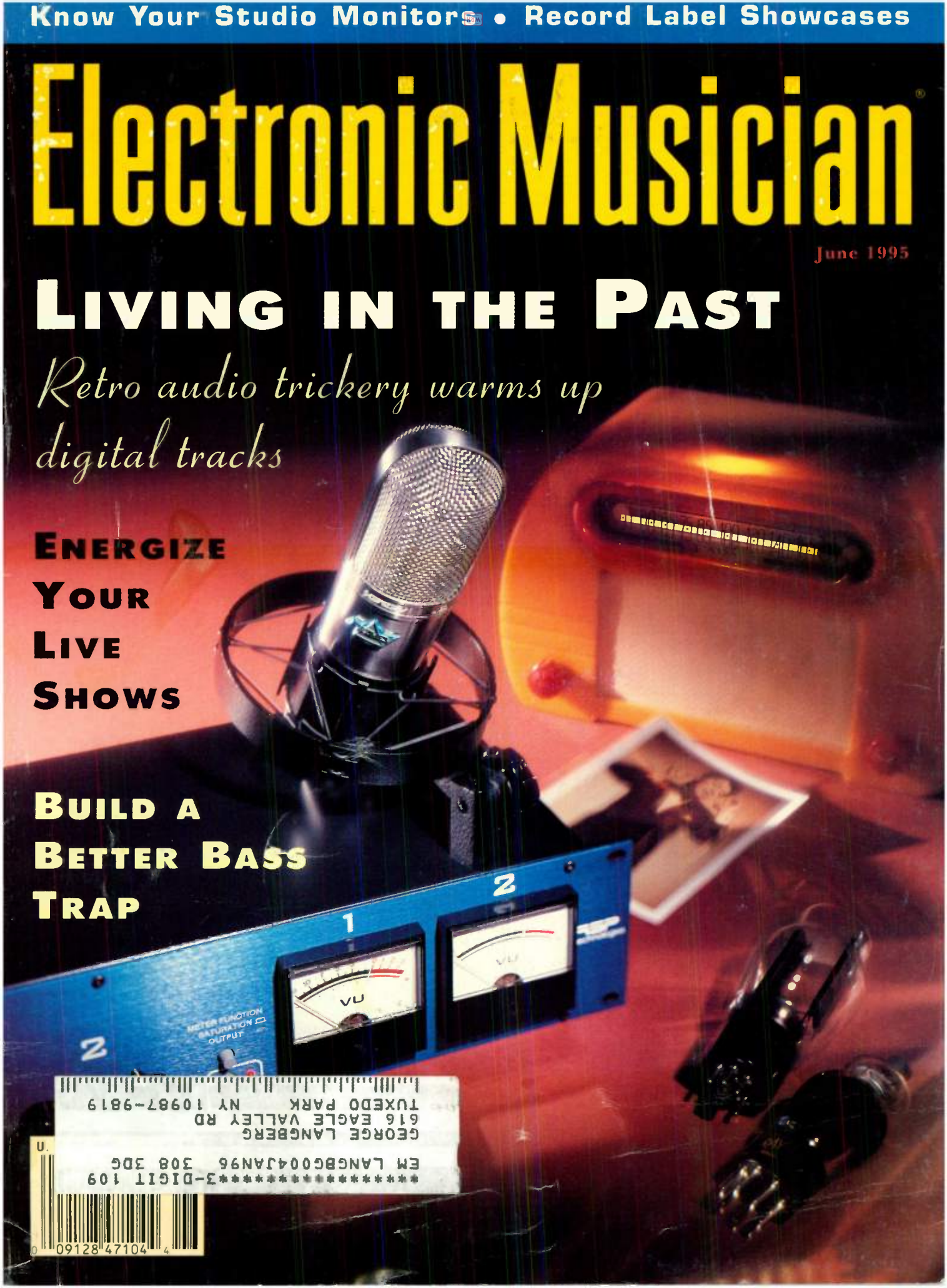
June 1995

Living in the Past

Retro audio trickery warms up digital tracks

Energize Your Live Shows

Build a Better Bass Trap



WHY MACKIE IS YOUR BEST 8-BUS

Lately, several big pro audio companies have gone out of their way to "mention" us in their own 8-bus console ads. Many satisfied Mackie owners have urged us to shoot back with hardball comparisons of our own. But that's not our style.

Greg believes that if a product is really good, it should speak for itself — without resorting to slagging the competition. First in a series, this ad details some of the features that we believe make our 8•Bus the best recording or PA console value available today for under $20,000.

Comprehensive equalization for creativity and problem-solving.

To quote Electronic Musician[1], *"It's no secret that the versatility and pristine sonics of the 8•Bus EQ have astonished jaded pros and home hobbyists alike. The 4-band EQ section includes two shelving controls fixed at 12kHz and 80Hz; parametric high-midrange EQ with a 500Hz to 18kHz sweep and a bandwidth that can be adjusted between three octaves and one semitone; and low midrange EQ with a 45Hz to 3kHz sweep. A full 15 dB of boost or cut is provided for each band. In addition, an 18 db/octave low-cut filter is set at 75 Hz. That's a heck of a lot of firepower!"*

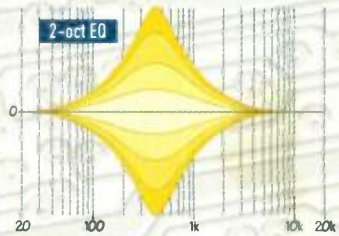
No kidding. But we also like that part about pristine sonics. One of the reasons that the 8•Bus Series took so long to ship was that Greg was determined not to compromise EQ sound quality. Cheap circuitry can create all sorts of sonic grunge that may add distinctive "character" to a console's EQ...but Greg's goal was clarity, not eccentricity.

To further quote Electronic Musician, *"In all applications, the 8•Bus EQ was extremely musical and transparent... One of the engineers summed it up best by saying, 'The 32•8 is so clean that you don't really hear the EQ; everything sounds deceptively natural, which is really great.'"*

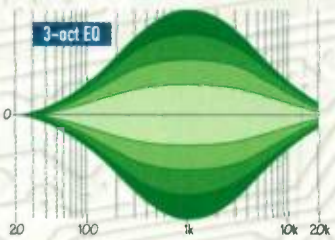
We wouldn't have it any other way.

What parametric EQ means to you.

The biggest gun in the 8•Bus' EQ arsenal is its true parametric high midrange EQ. Conventional sweepable midrange (like our 8•Bus' *low* mid), has a fixed bandwidth of about 2 octaves. No matter how high or low in frequency you sweep it (or how much you boost or cut it), 2-octave EQ's *contour* stays the same. While extremely useful, it's just one tonal "color." Having to rely on swept, 2-octave midrange alone is like being asked to paint a picture with only a bucket of bright yellow paint.

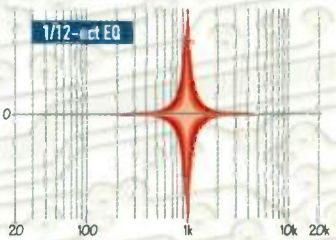


By letting you vary the bandwidth, parametric EQ gives you the equivalent of a full rainbow of tonal "colors" in your artistic pallet. Spreading high midrange EQ over three full octaves transforms it into an extremely subtle — yet extremely dramatic — effect[2]. Sweet and natural-sounding, it can unobtrusively change the character of a track without noticeable tonal intrusion. If you're used to conventional 2-octave swept midrange, you'll be surprised at how much 3-octave EQ you can add without things starting to sound obnoxious.



On the other hand, there are times when you want what can only be called surgical EQ. At its narrowest, our parametric Hi Mid is four times as precise as a 1/3rd-octave graphic equalizer. It's like having a delicate artist's brush and a magnifying glass for erasing or enhancing tiny details.

Between three octaves and 1/12-octave is a vast range of tonal colorations, nearly all possible only with parametric equalization. And, since our "HI" mid's sweep range extends from 18kHz all the way down to 500Hz, your creative palate extends over six octaves — to our knowledge the widest midrange sweep currently available[3].



Above Left to right: 32•8 console with MB•32 meter bridge, 24•E Expander with MB•E meter bridge, and The Sidecar.

Apparently we're not alone in our belief. In competition with many of the very consoles that keep "mentioning" us in their ads, we recently won the coveted *MIX* Magazine TEC Award for Small-Format Consoles. As well as *LIVE! Sound* magazine's Best Front of House Mixer Award.

To learn why, call us toll-free for our detailed, 24-page 8•Bus brochure.

[1] September 1994 issue, page 64, in a sidebar to an article on The British Invasion (of consoles). We urge you to read the whole thing so that we don't get in trouble for quoting stuff out of context.

[2] This is what we meant when we used the phrase *"Expensive British Console Sound"* in our first 8•Bus ads: Classic English desks were the first to offer extremely wideband (i.e. greater than 2 octaves wide) equalization. Obviously we didn't make ourselves clear on this point, because everyone from our competitors to at least one reviewer has taken us to task over this phrase. Okay, we apologize to all of you Anglophiles. We were merely trying to explain why we consider wide bandwidth EQ such a powerful tool and where we got our inspiration for including it...not attempting to rekindle the Revolutionary War.

CONSOLE CHOICE

An expandable console system.

If you can successfully foretell the future, you might as well play the commodity futures market, make a zillion bucks and buy a 128-channel SSL console.

However, because most of us are less clairvoyant

and a lot poorer, we've designed a system that can grow with your needs and budget. Start with our 24•8 or 32•8 console[4]. Then, when your tax refund comes back, add an optional meter bridge[5]. When you land that Really Big Project That Pays Actual Money, add more input channels (and tape returns) in groups of twenty-four with our 24•E Expander console[6].

You can keep right on growing your Mackie 8•Bus console system up to 128 channels or more.

And, beginning this spring, you can automate the whole shebang with our extremely affordable Universal MIDI Automation system. It consists of the OTTO-34 VCA gain cell unit, wicked-fast Ultramix™ Pro software and the innovative OTTOpilot™ control interface. Both the hardware and the software were debuted in final form at last Fall's AES Convention. They received rave reviews from seasoned pros who are used to working with "mega-console" automation systems.

Very Low impedance Circuitry (VLZ) for very low noise.

We like to say that the 8•Bus console's monster 220-Watt Power Supply was a product of typical, fanatical Mackie over-engineering. But one of our real motives lies at the other end of the power supply's multi-voltage connecting cable.

At room temperature, all electronic components create thermal noise. Cumulatively, this can become audible and objectionable. We design around thermal noise by making internal circuit impedances as low as possible in as many places as possible. For example, resistor values in our mix bus are 1/4 the value of those typically used — hence thermal noise is proportionally lower. Another advantage of VLZ is that low-impedance circuitry is far more immune to crosstalk problems.

VLZ

VLZ isn't easy to achieve. All circuitry must be thoroughly buffered. Plus, console current consumption goes way up, requiring a beefy power supply. Such as the massive, 31-pound, power supply we ship with each 8•Bus console.

Powersupplyus Hummingbirdus

+4dBu operation throughout.

This is a biggie in terms of overall noise and headroom. There are two current standards for console operating levels: –10dBV and +4dBu. Without knocking our competition, let's just say that +4dBu is the professional standard, used with all serious recording, sound reinforcement and video production components. This higher operating level effectively lowers the noise floor and increases dynamic range. Our 8•Bus consoles operate exclusively at +4dBu (although their tape outputs and returns can be switched to –10dBV to match other semi-pro/hobbyist gear you may still own).

Built like tanks.

Our 8•Bus Series consoles have been in the field long enough to gain an almost legendary reputation for durability. For example, a lot of them absorbed the impact of toppling monitor speakers during last year's Los Angeles earthquake with little more than a few broken knobs. Others have survived drops off loading docks, power surges that wiped out whole racks of outboard gear and beer baths, not to mention hundreds of thousands of air and semi trailer miles with major tours[7]. Read our 8•Bus tabloid/brochure to learn about the impact-absorbing knob/stand-off design, fiberglass circuit boards and steel monocoque chassis that make our consoles so rugged.

Bottom line: You simply can't buy a more dependable console. Maybe that's why *LIVE! Sound* magazine readers voted us their 1994 "Best Front of House Console."

We could go on this way for pages.

If we got into the details of 8•Bus features like special RFI protection, triple tape bussing, in-place stereo solo, constant power pan pots, or the extra 15dB of gain available at the 8•Bus's aux sends and returns, this ad would have even teenier type than it already has.

For these and other facts, call us toll-free (8:30AM–5PM PT) and ask a real live person for our obsessively-detailed, 24-page 8•Bus brochure.

OUR 8•BUS CONSOLES REALLY WORK, THE UPDATE:

Ricky Peterson mixed ☥'s recent hit single, *"The Most Beautiful Girl in the World"* on his Paisley Park Studio 32•8 console.

Queensryche's new platinum album, *Promised Land*, was totally tracked on Mackie 8•Bus consoles (with help from OTTO-automated CR-1604s). A sonic (and musical) masterpiece, it has the tight bass, crisp highs and ear-boxing dynamic range that's becoming an 8•Bus console signature. Need more proof as to why pros prefer Mackie? Buy this superb CD.

3 . . . on a comparably-priced 8-bus console. Oops! We're starting to sound competitive.

4 $3,995 (24•8) and $4,995 (32•8) suggested retail. Slightly higher in Canada.

5 $795 (MB•24) and $895 (MB•32) suggested retail. Slightly higher in Canada.

6 $2,995 suggested retail; MB•E meter bridge $695 . . . Yadda yadda, Canada, etc. etc.

7 Including the latest Rolling Stones, ZZ Top, and Moody Blues tours. (Footnote to the footnote: Mention in this ad denotes usage only, not official endorsement).

MACKIE.

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I N S I

FEATURES

36

77

DEPARTMENTS

Electronic Musician®
JUNE 1995 VOL. 11, NO. 6

COLUMNS

REVIEWS

Cover: Photo by Stephen Tang.

Special thanks to Another Time/SF, Michael Ochs Archives, Ltd., Peavey Electronics Corporation, and RSP Technologies.

Horizontal Hold

Diversity is the key to modern music production.

ROBERT PERRY

Here's a little tip that might save your music career: Do *not* call yourself a musician. Musicians are dead meat in the industry food chain. If you want to flourish in the commercial-music badlands, you had better buy a couple of hyphens and start diversifying. Call yourself an artist-engineer-producer, or a multi-instrumentalist-songwriter-arranger, or a sound designer-composer-multimedia artist. But unless you play solely for recreation, parading the appellation of a dedicated instrumentalist is tantamount to suicide.

You see, the home-recording boom did more than just provide "have-nots" with affordable, master-quality tools. Modular-digital multitracks, hard-disk recorders, digital-audio sequencers, and other breakthrough products have also bestowed upon ambitious, creative artists the means to control their own destinies. Talented go-getters no longer *need* engineers, producers, publishers, major record companies, or A&R yahoos. The glowing meters in their bedroom studios light the way toward complete autonomy. And as the music conglomerates turn further and further away from niche genres (read "minimal sales potential"), the time may come when only multitasking, self-sufficient artists can survive.

Think about it. Today, just about any home recordist can make his or her own records and distribute them in ways that are only limited by imagination. Yeah, it still takes money and sweat, but artists have always funded their own careers in one way or another. What artists have *not* enjoyed is complete, 100-percent creative control over their work and the way it is exploited in the marketplace. I think that this career aftershock of the home-recording explosion is almost as exciting as the personal studio itself. Finally, we can take full responsibility for our art. Unsympathetic A&R executives can no longer prevent our music from reaching a wide public.

But you can't be a vertical beast to reap this harvest. One-trick ponies will not be able to negotiate the myriad technical, artistic, and business challenges that stand in the way of success. The modern artist is a horizontal entity, able to compose, arrange, engineer, produce, mix, master, and market. These expanding creative responsibilities should be no surprise to **EM** readers—we've championed horizontal diversity for years. Because our staff is constantly out *making* music, not just writing about it, we saw this trend slithering down the road a long time ago. Addressing the needs of the multifaceted artist is our editorial mandate. This is why we run features on entertainment lawyers, music publishing, desktop audio production, microphone selection and placement, monitoring, and all the other critical factors that constitute the modern "horizontal" music landscape.

It's very important to me—and to everyone on the **EM** staff—that our loyal readers (and new friends) have the informational tools to exploit the wonders of the home-studio boom. If you're stumped at some stage, please call or e-mail us. We probably have a back issue available with just the article you need to overcome the challenge. Consider us a friendly, comprehensive library of everything you need to make your musical dreams bloom. Now get on out there, and make us proud!

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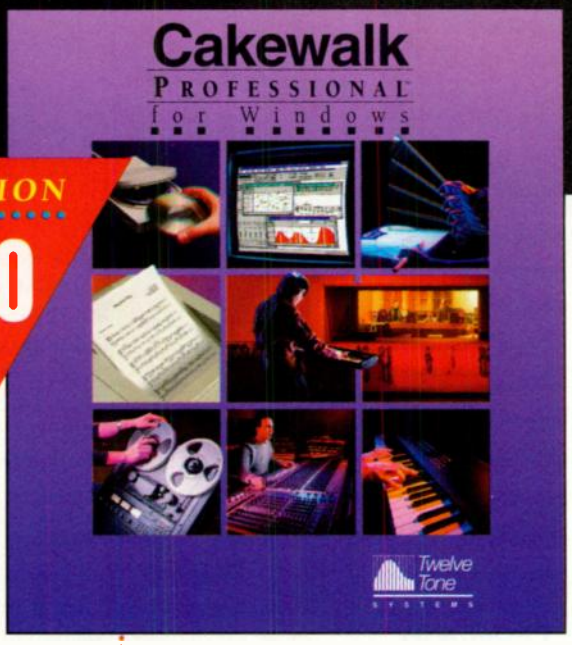
BPA INTERNATIONAL

PLAY HARD.



WORK EASY.

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

Then bring in the Professional.

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

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

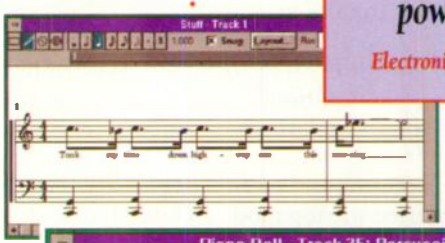
Here are some of the new 3.0 features:

BANG ON THIS

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

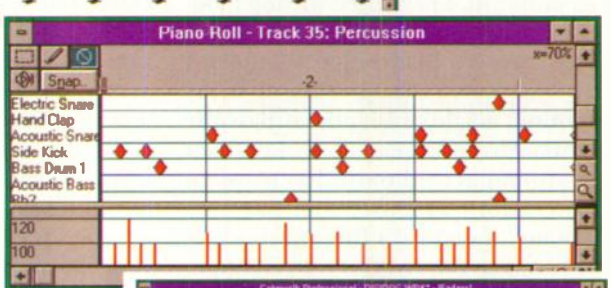
- Percussion Editing
- MIDI Machine Control
- Enhanced Swing Quantizing
- Printing Up to 24 Staves per Page
- Expanded Instrument Definitions
- Bank Select
- Way More

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



GRAB A GROOVE

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



WHAT'S THE WORD

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

MASTER MIXES

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

ELECTRONIC MUSICIAN 1995 EDITORS CHOICE

GS GENERAL MIDI MPC Multimedia PC

OTHER PROFESSIONAL FEATURES:

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

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

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

NOW PLAYING EVERYWHERE

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

800-234-1171 OR 617-926-2480.

Call today and get a free copy of Twelve Tone Systems' customer newsletter, *QuarterTone*, while supplies last.

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PROMIX 01

In response to letters from Steve Paglierani and Michael Hladilek in the April 1995 issue of **EM**, we are confident that the sonic performance of the ProMix 01 meets the expectations of the most discerning musicians. But don't take our word for it. Call (800) 937-7171, ext. 450, to receive a free CD of a ProMix session, produced and engineered by Tom Jung, President of DMP Records. You be the judge.

Peter Chaikin
Product Manager
Yamaha Corporation of America
Buena Park, CA

SMILE, SMILE, SMILE

Regarding Scott Wilkinson's "Square One: EQ Explained" (April 1995): What a wonderful, well thought out article. It was fun to learn about the origins of EQ! I especially liked Wilkinson's recommendation that one use as little EQ as possible. Emphasis (boost) is sometimes helpful, but de-emphasis (cut) is the name of the game. In all EQ cases, I recommend that you let your ears do the walkin'.

Jackson
jacksonabc@pan.com

ACCORDION FEEDBACK

I was pleased to see your article on MIDI accordions ("The MIDI Polka," March 1995). I've just added an accordionist to my band, and I'm a little worried about the "bad rap" the instrument gets. It's good to see we're on the cutting edge!

However, I should point out a bit of misinformation in your article. You said that no one is manufacturing accordions in the U.S. besides Petosa. Well, I know of at least one other company: Baldoni Accordions. They make a whole line of acoustic and MIDI accordions, including the MIDI-Accord (a strap-on keyboard controller with chord buttons for the left hand attached on a universal joint).

Their address is Baldoni Accordions, Timber Creek Plaza, N87 W 16432 Appleton Ave., Menomonee Falls, WI 53051; tel. (414) 250-9990.

Micah Ball
micah@emf.net

Thank you for the article on MIDI accordions. It was indeed interesting. I would, however, like to bring something to your attention.

Do you know by what standard the Petosa accordion is "recognized as the Rolls Royce of U.S. accordions?" As an accordionist, I have tried the top models of many kinds of accordions, and I have owned a Bianco and a Sonola. I currently own a Diamond Tiarra. In my opinion, all three brands surpass the Petosa. Myron Floren, the world's finest all-around accordionist, has played a Pancordion for 45 years. Art Van Damme, the world's finest jazz accordionist, plays an Excelsior. In addition, Petosa Accordions was not the only company that didn't close its doors from the late 1960s through the 1980s; Colombo and Sons company stayed in operation during that same period.

Gabriel Guerrero
Portland, OR

Author Scott Spence responds: *I wish we had space to print the names and addresses of every dealer of fine accordions offered in the United States. A quick call to Mr. Alfanso Baldoni revealed that his brother and cousin do indeed manufacture the fine line of Baldoni Accordions in Castelfidardo, Italy; the accordions are manufactured especially for Mr. Baldoni to sell in Wisconsin.*

Gabriel, I'm glad an accordionist found the article interesting. We'll take your word that Colombo and Sons stayed open during the 1960s through the 1980s; we cannot verify that fact. Today, however, it appears that all accordions are manufactured for U.S. companies in foreign countries, especially Italy. Regarding the Petosa accordions, I believe that they assemble their instruments here in the U.S. from components made in Italy, but I couldn't verify this fact by press time.

Whether or not the Petosa is the Rolls Royce of accordions is opinion. The Petosa was independently referred to as such by both musicians and other accordion dealers. However, the renowned Floren and Van Damme prove that some prefer Ferraris and Lamborghinis to Rolls Royces.

CRYSTAL-BALL MIXING

Being a home-recording enthusiast rather than a professional engineer, I applaud Michael Molenda's light-hearted and informative 2-part mixing series, "All Mixed Up" (February/March 1995). I also appreciate that in his efforts to educate us, Mr. Molenda did not commit the heinous blunder of talking down to us, as many music publications do. I would love to see this series extended and developed as the first two articles are already resting between my console and computer as a reference guide.

I would also like to thank you for your uncanny ability to write an article, publish it, and send it to my mailbox the same day or week I need the information. I am confident in your supernatural ability to do so and have renewed my subscription because of it. Keep it up!

Adam McIntyre
brothermac@aol.com

SCSI KNOWLEDGE

Michael Brown's article "Multimedia Musician: Rock and Soul Expeditions" (February 1995) contained valuable information. However, his comment on the "economic sense" of buying one CD-ROM drive for two

VALERIE SPAIN

IF WE CRAMMED OUR ROTARY KNOBS A LOT CLOSER TOGETHER, ELIMINATED OUR 12 FADERS AND TOOK AWAY ONE WHOLE BAND OF EQ, WE'D HAVE A MIXER JUST AS GOOD AS THE COMPETITION'S.

Yamaha has gone out of its way to give you a lot more mixer for your money. With smooth linear faders. Five-band graphic EQ. Two stereo AUX Returns. Stereo Tape Ins and Outs. Plus a total of 14 inputs. Six of which are Mic/Line Inputs with balanced XLR and 1/4" inputs. With three bands of EQ. Two AUX Sends. And four Stereo/Mono Inputs with two bands of EQ. Enough ins and outs to handle just about any mixing job. But did we stop there? No way. We also threw in PreFade Listen, 48V Phantom Power and Stereo Sub In. So do yourself a favor. Check out the new MM1402 at your nearest Yamaha dealer. Sure, we could make a mixer just as good as the competition. But why should anybody have to settle for that?

YAMAHA

EXT. 500

1-800-937-7171

Call for more information.

devices (namely a computer and a sampler) prompts me to ask if he knows how to efficiently implement this sharing setup. Having tried a SCSI switching box—and after speaking to Apple—I was informed that the Macintosh can not share a CD-ROM drive with another device in a SCSI-switching setup. The only way is to manually reconnect and reboot the computer or sampler, which from my perspective as a studio-for-hire owner is a big inconvenience and an annoyance for anyone else.

Unless you know of a new development, this letter should save some of your readers the frustration of buying a switching box and finding out that it doesn't work. In any case, please clarify this matter.

Taj Sidju
Animation Sound, Inc.
New York, NY

Taj—To begin with, you probably don't need a SCSI switcher to use a sampler and Macintosh together. In fact, you are at a disadvantage if you separate the two. If the Mac is on one end of the chain and the sampler is on the other, they not only can share drives, but you can move samples bi-directionally between them. This allows you to edit the samples on the Macintosh. For example, I use a Macintosh with either a Kurzweil K2000RS or an Ensoniq ASR-10, an Apple CD-300 CD-ROM drive, a SyQuest 270 MB drive, and a SyQuest 44 MB drive. They all live happily together for the most part.

Of course, you must follow the standard rules for SCSI. Don't exceed the limit of seven SCSI devices. You must terminate both ends of a SCSI chain, but the Mac's internal hard drive is already internally terminated, so the computer goes at one end of the chain. Many samplers are internally terminated, so they have to be at the other end of the chain, with the drives in between. Keep your SCSI chain as short as possible; most samplers support SCSI-1, so keep the chain under twelve feet total, and less if you can.

Make sure each device has a unique SCSI ID, including the sampler. If the sampler has an internal drive, the drive needs a unique SCSI ID, too. The Mac takes two SCSI IDs: ID 6 is the Mac CPU and ID 0 is the internal hard drive.

Samplers use different disk formats than the Mac, which is why you shouldn't use an internal Mac CD-ROM drive. (It won't mount a non-Mac disk without a lot of hassle.) This is also why you can't access the same drive from the computer and sampler at the same time, *though you can operate them on the same SCSI bus.*

As long as the CD-ROM drive is compatible with the particular sampler (many are not), samplers tend to be easy to please: Given a CD-ROM in their format, they'll mount and access it. The Mac can be more finicky; after using your CD-ROM drive with the sampler, you may have to mount the Mac CD-ROM on the desktop with a utility such as SCSI Probe *(shareware). But you don't have to repatch the hardware.*

If you have more than seven SCSI devices, however, you need a switcher. You note that you tried a SCSI-switching device but didn't reveal which one. The Apple rep probably assumed you were using a passive SCSI switcher, which won't do the trick on the fly, as you were told. To switch SCSI chains between different initiators (master units, such as the Macintosh and sampler), you need an active switcher, such as the Glyph SCSI Switch/Extender (see the January 1995 "What's New" for details). This type of switcher checks the SCSI bus for activity when you try to switch between initiators. The unit makes the switch only if no data is being written or read, avoiding crashes. —Steve O.

REAL WORLD

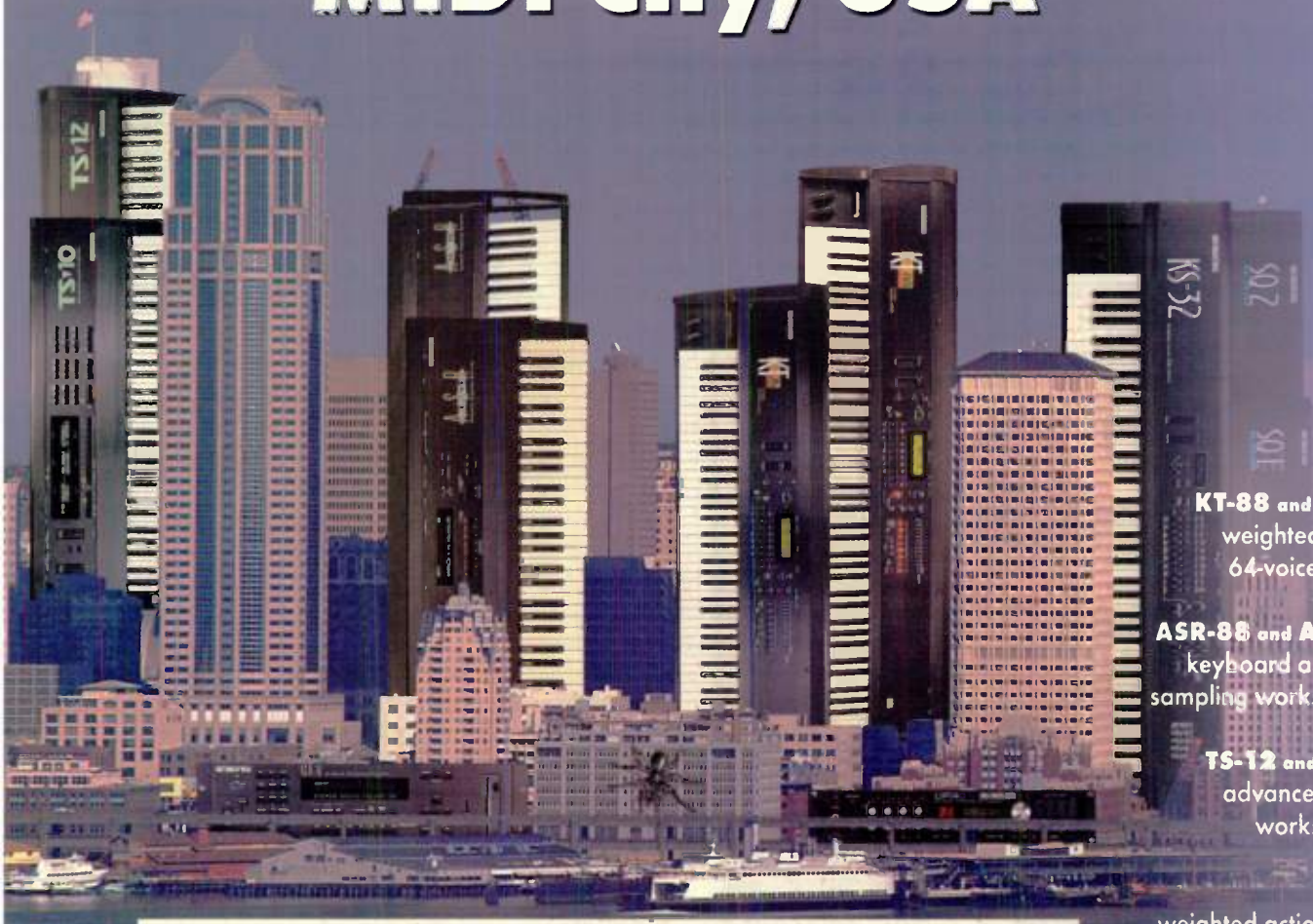
I enjoyed the February 1995 issue of **EM**. The interview with Pierre Marchand ("Creative Space: Voices Carry") was great. Because *Fumbling Toward Ecstasy* is one of my favorite albums, it was nice to see some background on how it was done. I'd love to see more features like this. I know **EM** isn't intended to be an interview magazine, but stories like "Voices Carry" add a lot to the magazine. It's nice to get some real-world perspectives on things.

Jonathan Hughes
dreamthing@aol.com

WE WELCOME YOUR FEEDBACK.

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

MIDI City, USA



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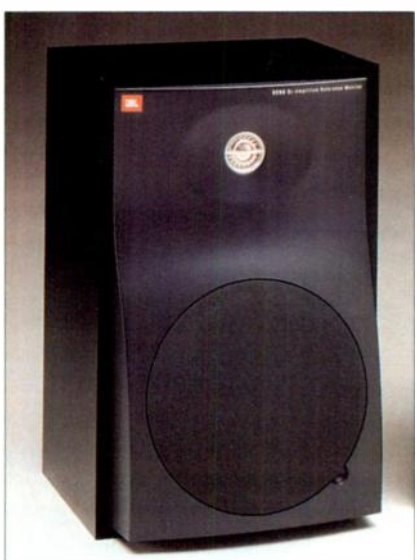
WRH

WHAT'S NEW

By Steve Oppenheimer



▲ JBL 6208

JBL's 6208 Biamplified Reference Monitor ($499 ea.) contains an 8-inch, high-excursion woofer and a 1-inch, titanium-dome tweeter. The drivers are powered by independent amplifiers with a custom internal crossover.

A sculptured baffle directs the axial outputs of the drivers so they sum at a distance of between three and five feet. The speakers are internally aligned so the low and high frequencies arrive simultaneously, minimizing phase distortion and offering superior imaging. The frequency response is rated at 60 Hz to 20 kHz (±2 dB). Each cabinet weighs under 30 pounds. JBL Professional; tel. (818) 894-8850; fax (818) 830-1220.

Circle #401 on Reader Service Card

▶ SAMICK SPM-1203

Samick's SPM-1203 12-channel powered mixer ($999) not only includes a 200 W/side (into 4Ω) power amp for the mains, but an independent 200W (into 4Ω) monitor amp. The amps can also drive 8-ohm loads and are rated at 120W in this configuration. They have built-in protection circuits and a 2-speed cooling fan.

The mixer section offers balanced, low-impedance, XLR and unbalanced, hi-Z, ¼-inch inputs on all twelve channels. The +48V phantom power can be globally defeated. Each channel features a 100 mm fader, pan pot, -60 dB trim pot, monitor send, stereo aux send, send to the unit's internal effects processor, and solo button. The 3-band channel EQ includes a high shelving filter at 10 kHz, low shelving filter at 73 Hz, and midrange peak EQ sweepable from 200 Hz to 5 kHz. There are no channel mutes, but there are LED clip indicators.

The built-in, stereo, digital effects processor offers 77 noneditable presets. There is an assortment of reverbs and delays, including several gated and reverse reverbs, multitap delay, panned 3-tap delay, and cross-feedback echo.

The mixer's master section has a 7-band, stereo, graphic EQ, which processes both channels equally but can be punched in/out separately for the left and right master buses. A mono, 7-band EQ shapes the monitor signal. Dedicated faders serve the left and right master buses, monitor bus, stereo line inputs, and the internal effects returns. Rotary pots control the line-out level and pan, master aux send, line-input level to the monitors, internal effects pan, and effects levels to the monitors.

The unit has left and right tape inputs and outputs, with independent level pots for the L/R ins and a single control for the tape outs. The tape in can be routed to the monitors, again with a level pot.

Three 12-LED ladders display the left, right, and monitor levels. Additional LEDs indicate the status of the master and monitor amp-protection circuits, the solo bus, and phantom power. Finally, a 3-character by 7-segment LED display indicates the internal effects program, which is selected with an alpha wheel and Enter key.

The mixer's frequency response is rated at 20 Hz to 20 kHz (+4/-1 dB). Its THD is less than 1%, and the adjacent channel crosstalk is rated at 60 dB, EIN at -128 dBu. The amp (monitor and main) THD is 0.5% with a 4Ω load and 0.3% with an 8Ω load. Samick Music Corp.; tel. (818) 964-4700; fax (818) 964-8898.

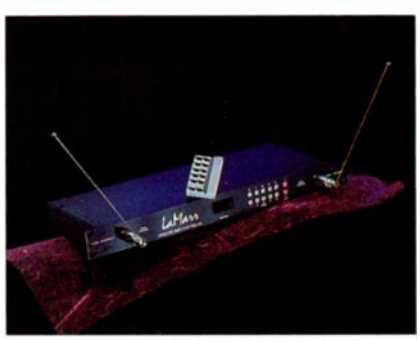
Circle #402 on Reader Service Card

▼ LAMARR WIRELESS MIDI

Until now, guitarists who wanted to remote-control their MIDI gear have relied on footswitches, which tied them to a specific location onstage. LaMarr's Wireless MIDI Controller ($999.95) eliminates this problem by letting you broadcast Program Changes to your gear from a miniature transmitter that attaches to your guitar. The transmitter attaches with special 3M-brand tape that will not mar the finish on your instrument.

The true-diversity wireless system has a range of up to 300 feet and is available on several UHF frequencies between 280 and 320 MHz. A numeric keypad and up/down keys let you type in a specific Program Change or step through programs in order. LaMarr Electronic; tel./fax (810) 544-8585.

Circle #403 on Reader Service Card



▼ ENSONIQ DP/4+

Ensoniq's first dedicated effects processor, the DP/4, was not just a me-too product. It contained four independent processors and could run them in parallel, series, or any combination to produce high-quality effects. Not content to rest on its laurels, the company is now offering the DP/4+ ($1,795), which offers all the original unit's features and adds several major hardware and software improvements.

In addition to the original 46 algorithms, eight new ones have been added, including two dynamic Class A tube-amp emulations that generate distortion as a function of performance dynamics, several other guitar-oriented effects, and a vocal remover. A guitar tuner can be set for bass or regular guitar ranges. The unit has a total of 400 presets. Four new LEDs indicate which input configuration is selected.

The DP/4+ has ground-compensated inputs and outputs and a +4/-10 dB switch for flexible level matching. A front-panel Neutrik connector accepts both ¼-inch and XLR plugs and works with a mic/line input gain switch. A Mute Outputs switch lets you take the unit offline, so you can edit over headphones without turning down the stage amp or mixer effects return.

A hardware bypass has also been added, which combines with software improvements to let you seamlessly crossfade between effects. This is achieved by fading to clean and then to the new effect.

In the cheap and cheerful category, Ensoniq has also released the MIDI Bug ($12.95), a cute plastic insect whose eyes light up when it receives a MIDI signal. It connects to a MIDI Out or Thru jack, acting as a MIDI data-present indicator. As a side benefit, it also might scare the heck out of your mother-in-law. Ensoniq Corp.; tel. (800) 553-5151 or (610) 647-3930; fax (610) 647-8908.

Circle #404 on Reader Service Card

▲ TASCAM MMC-88

TASCAM's MMC-88 MIDI Machine Control Interface ($499) lets you control the transport and recording functions of up to sixteen DA-88 digital tape recorders without sacrificing a tape track for time code. It also lets you define some extended functions not included in the MMC spec, such as track delay, crossfade time, varispeed, and preroll time.

The unit connects to the DA-88 Sync In port and offers bidirectional communications. While sending MMC commands, it can simultaneously read the tape recorder's ABS time and send it out as both MIDI Time Code and SMPTE time code at a user-definable frame rate.

The MMC-88 can integrate with an SY-88 sync card; the SY-88's MIDI Thru Port feeds the MMC-88, allowing multiple machines to be addressed with the extended functions. TASCAM; tel. (213) 726-0303; fax (213) 727-7656.

Circle #405 on Reader Service Card

▶ RANE RC 24 PAQRAT

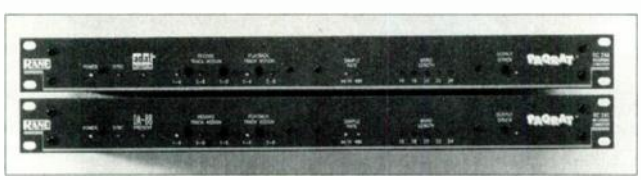
If you use a 16-bit modular digital multitrack (MDM) recorder, such as an Alesis ADAT, TASCAM DA-88, or compatible, and you want better recording resolution, it's not enough to simply buy 18-, 20-, or 24-bit A/D converters. Unfortunately, the extra bits simply get truncated. Rane's RC 24 PAQRAT solves this problem. Separate versions of the PAQRAT are offered for Alesis ADAT-compatible MDMs (RC 24A; $999) and TASCAM DA-88-compatibles (RC 24T; $899).

The PAQRAT accepts a stereo signal from an A/D converter, in AES/EBU or S/PDIF format. The unit then divides the stereo signal into four signals and records them onto four tracks of the MDM. The first sixteen bits of each stereo track are recorded to two tracks, and the remaining bits are recorded to the two additional tracks. This allows you to record at the full 18- to 24-bit resolution. (You can listen to the 16-bit tracks but may hear anomalies, as they have been truncated without dither.) A front-panel switch lets you select tracks 1 to 4, tracks 5 to 8, or both sets of tracks.

During playback, the PAQRAT reconverts the four taped tracks to two high-resolution tracks and outputs them in AES/EBU format. A front-panel switch lets you output a 16-bit, dithered signal for copying or mastering to DAT.

Front-panel indicators are provided for Power Sync (shows the PAQRAT is synched to the AES/EBU input), Transport Present (indicates the unit is connected properly), Sample Rate (44.1 or 48 kHz), and Word Length (16- to 24-bit input). Rane Corporation; tel. (206) 355-6000; fax (206) 347-7757.

Circle #406 on Reader Service Card



THE BIG PICTURE

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

Their sonic character was modeled after our TEC Award-winning Monitor One™, so you can mix on either speaker, in any size room, and get the same results. The difference? The Monitor Twos create a larger sound field, the sweet spot is bigger, bass response is deeper, and power handling is greater.

MONITOR TWO™
STUDIO REFERENCE MONITOR

Our design team's 35 years of experience has produced a remarkable crossover design with super-low phase and amplitude distortion. This unique asymmetrical network combines 2nd and 3rd order filters with crossover points at 1.5kHz and 5kHz. And to top it off, a new silk-dome tweeter delivers sweet, natural sound without the harshness that produces ear fatigue. So you can do marathon mixes and still make decisions that translate.

Monitor Twos are perfect for near to mid field monitoring in project studios, mixing suites, and even large control rooms. Or put them in your personal studio to make it sound virtually cinematic. Their combination of civilized size and serious muscle is due to our exclusive SuperPort™ bass venting technology that delivers accurate low end transients equal to much larger, more expensive systems. In fact, the Monitor Twos cost less than some near field monitors. Which makes the case for owning them, sort of...full bandwidth.

Award winning design team, 40Hz - 18kHz frequency response, 200 watt peak power, mirror-image sets, fun to touch non-slip rubber laminate on the cabinet, and a lot more. For mixes you can see. The Monitor Two is at your Alesis dealer now.

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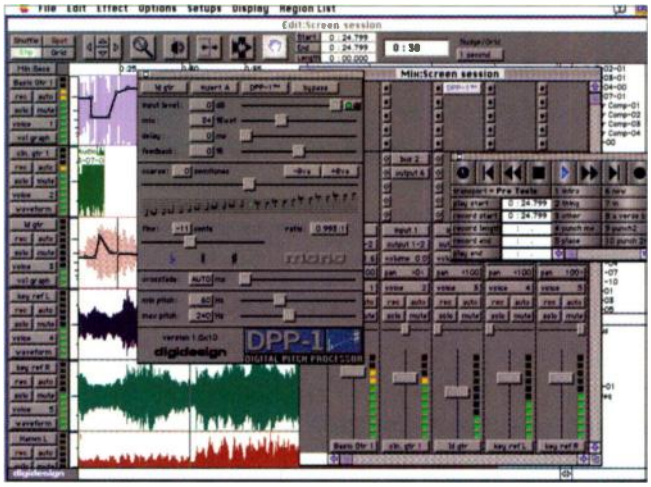
▶ DIGIDESIGN SESSION 2.0



Did you think you needed a Digidesign hardware card to run the company's hard-disk recording software? You're behind the times. Taking advantage of the Power Macintosh's inherent 16-bit audio recording capabilities, the company has introduced *Session* 2.0 for Macintosh ($395), a major rewrite of the original Session 8 software. A version of *Session* is also being released for *Windows* ($395).

The Power Mac application (actually a hybrid between native and 680X0 code) can record up to sixteen tracks with one band of parametric EQ per channel on a Power Mac 8100/100. It can record up to four tracks with EQ, or at least eight tracks without EQ, on a Power Mac 6100/66. As with other hard-disk recording programs, the exact capabilities also depend on hard-disk performance, the amount of RAM, and the other demands made on the computer's CPU, such as system extensions and other applications running in the background.

Session 2.0 can also address Digidesign Audiomedia II or Sound Tools II sound cards, which provide considerable additional processing power. Session 8 hardware support is expected sometime late this summer. The program utilizes the *Digidesign Audio Engine* (*DAE*), allowing integration with *DAE*-conscious software from Digidesign and third-party developers. *OMS* 2.0 support also is provided for synchronization with compatible sequencers.

The program offers audio mastering for *QuickTime* movies and sample-accurate sync to *QuickTime* video for *QuickTime* post-production. It also features graphic breakpoint automation of volume and pan, user-definable crossfade shape and length, time-stamping of audio Regions, and markers that are displayed in the Edit Window. Grouped faders maintain their level relationships when any of them are moved.

Aside from its ability to record without additional hardware, *Session* takes advantage of the Power Mac's CPU power in several ways. Audio and automation settings can be edited in real-time during playback. The Powerscroll and PowerZoom features allow continuous, animation-quality waveform scrolling and zoom in/out (both horizontal and vertical).

The new zoom features include Autozoom memory points, so you can immediately return to a desired viewing magnification.

The program can import and export System 7 sounds, WAV, AIFF, *Sound Designer II,* and *QuickTime* audio. Mono and stereo files are supported, with 8-bit or 16-bit resolution, at sample rates from 1 kHz to 48 kHz.

In related news, Digidesign is offering a PCI version of the company's Audiomedia II card for *Windows* machines and the upcoming PCI-based Macintoshes ($1,295). (Software support for the PCI-based Macs is expected this fall.)

The Audiomedia II PCI card, which will work with the new *Windows* version of *Session,* includes two analog inputs, two analog mix outputs, switchable S/PDIF and AES/EBU digital input and output, and DSP ports for future hardware expansion. The analog and digital I/O ports are simultaneously available and can carry independent signals. Digidesign; tel. (415) 688-0600; fax (415) 327-0777.

Circle #407 on Reader Service Card

▶ CHARLIE LAB DIGITAR

If you've ever played strummed guitar parts on a MIDI keyboard, you've learned much about hard work and patience. Charlie Labs' Digitar MIDI guitar-voicing controller ($449) is designed to ease your pain.

To use this innovative controller, you first patch your MIDI keyboard or sequencer output to the Digitar's MIDI In. Then simply send the desired 3-note or 4-note chords from your MIDI source and strum the Digitar's strings. (With a keyboard, you play the keys with one hand and strum the Digitar with the other.) The device revoices your chord into a 6-note guitar chord, using an internal bank of nearly 650 guitar-chord voicings, and sends out the resulting MIDI data, complete with performance dynamics. You can also design custom voicings. Knowledge of guitar technique and voicing is not required.

Strumming dynamics are picked up by optical sensors; there is no pitch-to-MIDI conversion, hence, no conversion delay. You can even fingerpick and trigger leads. The dynamic response is programmable, and an Auto Pitch-Bend feature allows pedal-steel effects. The unit also recognizes string-muting. You can directly control a sequencer's clock from the Digitar, so you can step-advance to the next sequenced chord.

The unit measures just 10 × 15 centimeters and can be worn like a belt. It can be played with either hand. RiCharde & Co. (distributor); tel. (408) 688-8593; fax (408) 688-8595.

Circle #408 on Reader Service Card

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Now there's a vocal processor that doesn't make the human voice sound so inhuman. Our Studio Vocalist's patented technology lets you easily create harmonies with human characteristics like random pitch fluctuation and timing imperfections. Recording those harmonies won't take multiple passes, either—just lay down a track, then play it back in 2, 3, 4 or 5 part harmony, in a variety of styles. Ideas get from your brain to your ears sooner. And the design is just as human as the sound, with controls, jacks and features suggested by thousands of original DigiTech Vocalist owners. So choose a vocal processor that doesn't sound so processed. Visit a DigiTech dealer today.

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E-MU

WRH

SOUND THINKING ▲ ▲ ▲ ▲ ▲

SYNTAUR PRODUCTIONS

Syntaur Productions has become the exclusive distributor for several sound libraries. The company is offering the complete Casio sound library for the VZ-series synths and the PG-380 guitar synthesizer. The sounds from the now-discontinued ROM and RAM cards have been transferred to SysEx files and offered in formats for the IBM, Mac, and Atari computers; Alesis DataDisk; and SysEx for several keyboards.

The Casio RC-100 through RC-150 libraries ($39.95/set) each contain 128 single-voice patches and 128 operations patches. The RC-510G through RC-530G libraries for the PG-380 ($39.95/set) contain 128 single-voice patches. Syntaur's new VZ Sets 1 and 2 ($29.95 ea.) contain 64 single-voice patches and 64 operation patches.

Having already taken over distribution for the Ensoniq Mirage, ESQ, and SQ-80 libraries, Syntaur has added Ensoniq's thirteen 10-disk SLT libraries for the EPS/ASR samplers ($74.95/10-disk set). All orders should include $4 shipping. Syntaur Productions; tel. (800) 334-1288 or (713) 682-1960; fax (713) 682-2072.

Circle #409 on Reader Service Card

YANNICK CHEVALIER

Yannick Chevalier is offering the Audio Pro Sound Effects library ($80/disk; entire library $990), an extensive collection that comprises eighteen audio CDs. Titles include *Sounds of Nature,* with sounds from the savanna, forest, pond, seashore, and so on; *Animals,* including domestic and wild creatures; *Airplanes-Airport, Trains-Station, Transportation, Traffic, Crowds-Industry, Leisure-Entertainment, Household, Bells-Sports-War, Cartoon-Footsteps,* and much more.

Each disk contains from 41 to 96 minutes of sounds, and the entire collection provides over eighteen hours of effects. A free demo CD is available.

There are three U.S. distributors. The two California distributors, both of whom also offer a Audio Pro Sound Effects database, are Gefen Systems (tel. [818] 884-6294; fax [818] 884-3108) and Leonardo Software (tel. [310] 820-2868; fax [310] 820-5753). The Florida distributor is ProMusic, Inc. (tel. [407] 995-0331; fax [407] 995-8434).

Circle #410 on Reader Service Card

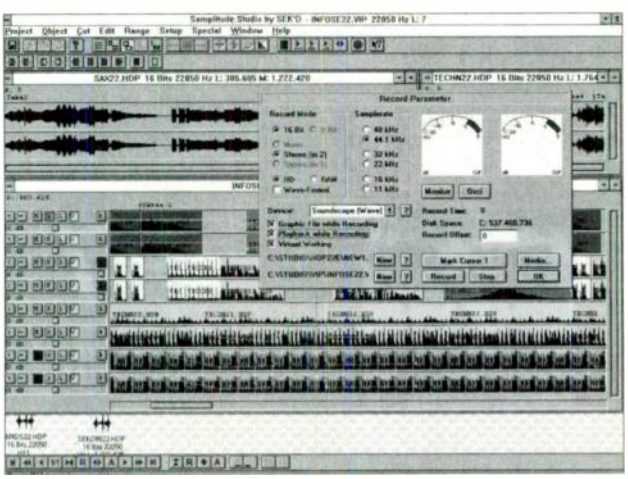
▼ SEK'D SAMPLITUDE STUDIO

The newest hard-disk recording software on the PC scene is SEK'D's *Samplitude Studio* (introductory price $398), which combines WAV file recording, sample editing, and multimedia capabilities. The program handles up to sixteen mono tracks or eight stereo tracks of audio using any *Windows* sound card, and the normal track limit can be exceeded by internally bouncing tracks. The program can simultaneously record and play back, assuming the sound card has this capability, and it can work with up to four sound cards at the same time. Mono or stereo files can be recorded at 11, 16, 22, 32, 44.1, or 48 kHz, with 8- or 16-bit resolution. Multiple projects can be opened simultaneously.

Samplitude synchronizes to MIDI Time Code or SMPTE time code. It can also import and sync with AVI files for multimedia production and can import and play Standard MIDI Files. In addition to importing and exporting WAV files, you can import and export sounds via MIDI Sample Dump (SDS). A special mode is provided for optimizing sample loops.

Editing functions include cut/copy/paste, normalize, time stretching, and resampling. By dragging "handles," you can create linear crossfades, with control of volume and fade-in/fade-out times. Grids can be defined by objects, measures, areas, and more. Effects include delay, reverb, and 3-band parametric EQ. The program offers 100 levels of Undo.

Parts can be positioned in a track by drag-and-drop techniques. The cursor position and limits of the selection areas (regions) can be changed "on the fly" during playback, and any number of selection areas and cursor positions can be saved. The waveform display autoscrolls during playback, and the zoom feature lets you magnify all the way down to a single sample.

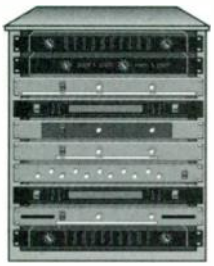


In addition to *Samplitude Studio,* SEK'D is offering *Samplitude Pro* ($199) and *Samplitude Multimedia* ($69). *Samplitude Pro* has the same features as *Studio,* except it provides eight mono or four stereo tracks and does not support SMPTE time code. *Samplitude Multimedia* also includes *Studio*'s main features, but it records and plays two mono tracks (or one stereo), and it does not support SMPTE time code, MTC, multiple sound cards, or simultaneous record and playback. An upgrade path between versions will be offered.

Samplitude operates under *Windows* 3.1 and *Windows NT* and will run under *Windows 95.* Soundspiration Systems (distributor); tel. (214) 298-DISC; fax (214) 298-3472. ●

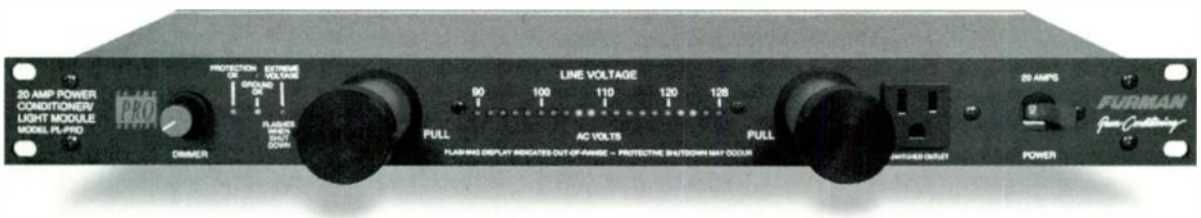
Circle #411 on Reader Service Card

This is your equipment.



This is your equipment on a power surge.

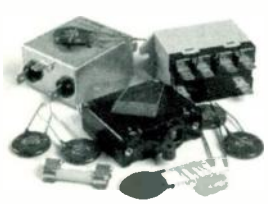
And this is Furman's new PRO Series: Absolutely the best protection you can get.



How does a new Furman PRO power conditioner keep your equipment out of the frying pan?

Simple. The PRO Series gives your equipment the industry's most comprehensive protection against damage from power problems. No other brand even comes close.

All three Furman PROs are rated at 20 amps/2400 watts, more than enough capacity for your project studio or touring rig. And that's just the beginning.



Only the PRO series uses all these protection components

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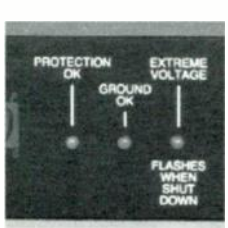

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PRO FILE

Nomadic Tribe

The Vatcher twins move on and make tracks.

By Michael Molenda

While recording their pop-rock roarfest, *Cruel*, The Vatchers almost needed bus tickets more desperately than guitar strings. The band, led by twin brothers Howard and Don Vatcher, zig-zagged between a warehouse, Howard's home, a small studio, and a high-end mixing room before the album was finished. Quite a trek for an act that was named one of the nation's best unsigned bands by *Musician* magazine last year and easily could have booked time in a commercial facility.

"Well, we'd gone that route already," says vocalist/guitarist Howard Vatcher. "So we decided rather than pay for studio time, we'd give our engineer and guitarist, Mark Schleunes, the money to buy two ADATs, a Mackie 24•8, and some decent microphones. The only problem was that Mark didn't have a studio at the time, so we recorded basic tracks in an open warehouse. We had to construct a makeshift control room with boxes and blankets, and Mark had to monitor with headphones whenever we recorded."

Seeking a bit of a comfort zone, the gypsy camp moved into Vatcher's home to record vocals and instrumental overdubs. Unfortunately, home sweet home turned a tad sour.

"My wife kicked us out," admits Vatcher. "She got tired of seeing cables all over the living room and grease stains on the carpet."

Luckily, Schleunes had established his permanent studio by the time the project was "homeless," and the band moved into his CrowMagnon Music studios to finish overdubs. When it came time to mix, however, the band planned yet another journey to a dedicated mixing facility. The move to well-equipped Sharkbite Studios proved to be a good one, as mixing *Cruel* turned out to be, well, cruel.

"We spent more than 60 hours mixing," estimates Vatcher. "You see, the great thing about recording on ADATs is that you can keep every single take. You just use a mono submix of your basic tracks as a guide, pop in another tape, and keep laying things down. We ended up with a whole box of S-VHS tapes, and each one was crammed full of overdubs."

Before the band could mix *Cruel* without risking expensive delays in the mixing studio, Schleunes had to map out the hundreds of takes and work with Vatcher to select which tracks would be bounced to the 24-track master reels. "I still found songs where I wished I had done another take," sighs Vatcher.

So after dragging guitars, drums, and band members all over the Bay Area, was it still worth it to produce *Cruel* independently?

"Well, the good points were all the time and creative control we had," says Vatcher. "I felt comfortable enough to figure out what I really wanted to do. So *Cruel* turned out sounding a lot closer to my original vision. Of course, there were bad points, too. We didn't have much recording or production experience, so we made as many mistakes as humanly possible. In fact, everytime we did something, it seemed we'd read somewhere that we had done it wrong.

"But *Cruel* was our own personal do-it-yourself project," Vatcher continues. "**EM** has always championed the personal studio thing by saying it's possible to make good records at home. So we took up your challenge and tried it." ☯

For more information, contact Beaternity Records, 723 Camino Plaza, #301, San Bruno, CA 94066.

Don Vatcher, Jeffrey Nead, Howard Vatcher (seated), and Mark Schleunes.

Bring it all back home

Clair Marlo returns to "self-help" recording.

The 14 × 18-foot home studio where Clair Marlo recorded her most recent solo album, *Behaviour Self* (Wildcat Records), is a far cry from the pro facilities she used to work in. No one brought her breakfast; no one brought her mineral water. She had to make her own tuna sandwiches and contend with jackhammers firing away in front of her house. And believe it or not, she wouldn't change a thing.

As a vocalist and musician with a wealth of composing, engineering, and audio-production credits, most of Marlo's work has been featured on other artists' projects, as well as ad spots and feature films. On *Behaviour Self,* she was able to put all of this experience to use, turning out a beautifully crafted solo effort.

"For my first album, we recorded at the best studio, using the best engineer and the best players in Los Angeles," notes Marlo. "Making *Behaviour Self* was the complete opposite of that experience. I had to deal with everything, from repairing equipment to setting up the living room for recording percussion, not to mention making sure there was no

By Mary Cosola

Photographs by Edward Colver

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"Soundscape seems to be a remarkably stable system in that I didn't experience a single glitch, crash, or hiccup during the entire review period. It's a credit to the developers that every operation worked smoothly and as advertised. That is not something you can take for granted."
Dennis Miller. *Electronic Musician Nov '94*

"Soundscape is one of the few digital recorders that permits recording while chase locking without an expensive hardware add on to control it's sampling rate. The SSHDR1 currently provides the most cost effective solution for this application."
Jim Aikin. *Keyboard Nov '94*

"The quality of the converters seems particularly high; I couldn't detect any coloration when comparing recorded material with the original. A lot of effort and care has been devoted to this crucial side of the system."
Dennis Miller. *Electronic Musician Nov '94*

"Ever since the introduction of the DAT format, the world has looked for a replacement for the razorblade. Soundscape is a sharp, affordable replacement with extras."
Eddie Ciletti. *EQ Feb '95*

"Everybody reported that their system had never crashed and that they had never found any bugs, not even on preliminary alpha or beta versions ..."
Paul Tingen. *User review for Audio Media Dec '94*

"Soundscape does offer everything that you could want from a professional quality hard disk recording system ... it is cheaper, more powerful and more stable than many similar systems. But most of all it is so easy to use, allowing you to concentrate on the music."
Philip Moore. *Australian Digital Mar '95*

"Having used Soundscape for three months in post producing audio for corporate programmes mastered on Betacam SP, it is now unthinkable to return to the old way of working ... Soundscape is reliable, simple to learn, easy to use and produces very high quality results."
Nic Blinston. *Business Video Mar '95*

"Soundscape could well find it's way replacing the analog tape recorder up and down the country ... a welcome addition to any studio set up for the sheer freedom it offers when it comes to laying tracks down quickly and easily in order to make the most of that creative muse."
Bob Walder. *Music Technology Jul '93*

"I've been playing around with Soundscape's hard disk recorder this week and feel almost as though I've had a religious experience."
Brian Heywood. *MIDI Monitor Issue 11*

"I wanted to really check out the vari sync mode. I slowed the video down to a crawl, Cubase locked in and the sequenced music was playing slowly ... a bit faster ... and ... yes the Soundscape synced up and was recording. The SSHDR1 has lots of features, creative usage of available power, sounds great, syncs great, straightforward, easy to use and expandable."
John Zulaikha. *Connections Feb '95*

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dirty laundry lying around when the percussionists showed up." Ah, the comforts of home.

FREEDOM OF CHOICE

Given her experience and industry connections, one might wonder why Marlo opted to record at home, rather than at a large pro studio. The answer can be found in two words dear to most artists' hearts: economics and artistic control.

"I liked the freedom of not having to worry about the clock, wondering how much longer a part was going to take at a studio's rate of $150 an hour," she explains. "I could record whenever I wanted. If I was tired, I could take a nap and pick up recording later. The great thing is that recent advances in technology have raised the audio quality of affordable recording gear to the point where it is now possible to do a commercial album at home. I couldn't have done this ten years ago."

When artists receive recording budgets from their labels, it's no free ride. The recording budget is 100 percent recoupable, which means the artist must repay the label from the mechanical royalties earned through record sales. (And guess who gets their money first?) Because of this, many professional musicians are finding it more economical to record at home, and not just because they can spend more time on a project for less money. These artists use their recording advances to buy new gear for their studios, thus investing not only in their current projects but in their future careers.

"Even if I were a band like Aerosmith, who can afford to spend a year working in a big-time studio with a huge budget, I would still record at home," says Marlo. "Rather than give the money to a studio so it can buy new equipment with *my* money, I'd rather invest in gear that's mine to keep."

THE CREATIVE EDGE

In addition to the economic benefits, Marlo discovered many creative advantages to working at home. On the song "Wish," for instance, she wanted to use a Latin prayer as an element in the song, so she asked Andy Prieboy (former Wall of Voodoo vocalist) to choose one for her. One evening he dropped by with a copy of the *Mea Culpa*. She recorded him speaking the prayer, which she planned to sample and place somewhere in the mix.

After he left, she experimented singing the prayer and came up with the idea of turning it into a background choir track. Five hours later, she had recorded and sampled her own backing vocal parts, thus creating the choir-inspired vibe. As for Prieboy's spoken track, she used it in the song's introduction.

"'Wish' is a great example of the freedom I had working at home," Marlo explains. "The track was pretty much done before Andy came over with the prayer, but I knew the song needed something else; I felt that it wasn't quite finished yet. I decided to play with the prayer, so I put up a mic and started singing. I just did it as a fun thing to try, but it turned out to be a high point of recording the album. I realized that if I were in a studio with

BIG SOUNDS, SMALL SPACE

The bulk of Clair Marlo's personal recording paradise is housed in her 14 x 18-foot studio. In addition to the main recording area, however, Marlo has a smaller space, dubbed "The Little Back Room." It houses a Kurzweil Midiboard keyboard controller; Akai S900 sampler; Kurzweil 1000GX and 1000PX; Opcode Studio 3 MIDI interface; Apple PowerBook 170; and Yamaha's SPX90 multi-effects processor, MV802 line mixer, and DX7 synthesizer. The following equipment resides in her main room.

Consoles	Mackie 24•8 (with 24E expander module); two Mackie CR-1604s (with Mixer Mixer); Kawai MX8SR
Recording Media	Alesis ADATs (three, with BRC remote); Panasonic SV-3500 DAT
Monitor Speakers	Auratones; Genelec 1031A; Yamaha NS10M
Microphones	AKG C414 and C414B/TLII; Audio-Technica AT4051; Neumann TLM 170; Sennheiser 441
Keyboards/ Sound Modules	drumKAT 3.5, with fatKAT pedal; E-mu Proteus/1, Proteus/2, and Vintage Keys; Ensoniq VFX; Korg Wavestation A/D, M1R, and DDD-1; Kurzweil K2000R, 1000SX, 1000PX, U1200 Pro One, and two 1000 GXs; Roland Juno-60 (with MD-8 MIDI interface), D-50, JP-8, R-8M, MKS-50, JD-880 (with string expander); Yamaha KX88 and TX816
Signal Processors	ADA Microcab; Alesis QuadraVerb; Aphex's C-2 and Type 3 aural exciters, Dominator, Expander/Gate, Expressor, Easy-Rider, and Compeller; Boss SE-50; dbx 160X; Lexicon LXP-1; Roland SRV-2000; Tech 21 PSA-1; Yamaha SPX90
Computers/ Software	Macintosh IIci; two Mark of the Unicorn MIDI Time Piece II MIDI interfaces; SyQuest 45 MB drive; every sequencing program available
Power Amps/Preamps	GML mic preamp; Hafler P500 power amp; Mastering Lab tube mic preamp
Miscellaneous	Fender 1957 reissue Strat; Italian red accordion; Aria Proll electric guitar; Ovation 1612 acoustic guitar; Kawai acoustic piano; various and exotic wind and percussion instruments

engineers and other players, I wouldn't have that freedom to get up and say, 'Oh, I have an idea' at 11 o'clock at night. Either the engineers would want to get home, or if I were already at home, I'd have to get up, get dressed, and drive to the studio. There would be no chance for the immediacy of me in my t-shirt and underwear walking into the studio to record a fresh idea."

Marlo recorded all of her own vocal tracks for *Behaviour Self*. Because she is an experienced engineer, she found it quicker to roll back to parts she wanted to re-record, rather than convey her wishes to someone else. She recorded to ADAT, using the BRC's auto-punch feature to punch in and out of spots she wanted to fix. However, Marlo doesn't recommend that vocalists record their own tracks.

"I thought it would be easier to engineer the vocals myself, but I found that the benefit of having someone else engineer is that he or she will tell you when you're flat or sharp," she says. "I didn't have anyone there to give me feedback, but again, that was by choice. I will admit that not having anyone there to bounce ideas off makes the recording process a bit more difficult. I had to take breaks every 20 to 30 minutes so I could come back and listen with 'clean' ears."

CO-CONSPIRATORS

While Marlo recorded quite a bit of *Behaviour Self*, she enlisted her husband, Alex "Ace" Baker, for some of the engineering chores, most notably the drum tracks. ("I don't do drums," quips Marlo.) The collaborative effort resulted in some interesting processing tricks.

One of these tricks was really more of a happy accident. While working on the song "Universal Love," Marlo and Baker were messing around with their Tech 21 PSA-1 SansAmp and, just for kicks, decided to process the drums through it. They submixed the drums to a mono track, routed a direct line into the SansAmp, and then ran the SansAmp output to an ADA MicroCab speaker emulator. The result is a drum track that sounds like it's roaring out of a boom box.

"We didn't start out wanting the drums to sound that way," notes Marlo. "After playing around with the drums and the SansAmp, we hit on a sound that was so skanky, we thought, 'Why change it?' It was kind of funny, the [drum] signal going in was so clean, but the sound coming out was absolutely filthy."

The drum tracks for "Your Secret Is Safe with Me" also called for some special treatment. (All of the live drums were recorded at a pro facility, as Marlo's home setup can't accommodate a large drum kit.) Marlo and Baker had mixed the song a few times and still weren't satisfied with the final results. They determined that the drum track was the problematic element; specifically, the snare timbre was too thin for Marlo's taste. Ultimately, the snare sound was beefed up by replacing certain parts of the track with a sampled rim shot.

"Because the rest of the kit is still in the mix, along with the sampled rim shot," explains Marlo, "you can still hear just a hair of the snare coming through. The trace of the original snare sound isn't a problem because it actually rounds out the rim shot timbre a little. Getting that snare to sound just right made 'Your Secret Is Safe with Me' our toughest mix."

PRO SOUNDS AND SNAGS

Marlo maintains that anyone can produce a commercial-quality CD from a personal studio. Her key to getting professional sound from a home setup starts with good microphones and mic preamps.

"I use a Neumann TLM 170 for my vocals. The AKG C414B/TL II 'Vintage TL' is also great for vocals, but I really love it on guitars," says Marlo. "It sounds like a standard C414, but with a little more sizzle. There's something about the TLII's presence peak that enhances an acoustic guitar. On percussion, I use the Audio-Technica AT4051, because I like its high-end response.

"As for preamps," she continues, "I use a Mastering Lab tube mic pre and a solid-state GML, which sounds very warm despite the lack of tube coloration. We went directly into the ADATs from the mics and mic preamps, bypassing the board completely, to make the signal path as clean as possible. We did use outboard gear, such as Neve EQ and Aphex compression, to warm up some of the tracks. I find that if you're going to digital, it's best to warm up the sound *before* you put it on tape."

As with any recording project, Marlo encountered her share of unexpected glitches. The first problem was the background noise in her studio. Marlo

In addition to the main control room pictured above, Clair Marlo also has a small setup in her "Little Back Room" and often utilizes her living room as a live recording space.

hadn't accounted for the amount of noise created by standard studio equipment, such as her computer and samplers. And then there was Mother Nature. As a resident of Los Angeles, Marlo is accustomed to the area's hot summer weather. Unfortunately, because of the noise it generated, her air conditioner had to be turned off when she was recording vocals or other acoustic parts, which made for some truly uncomfortable sessions.

"I felt terrible for the backup vocalists and other players who came in to record. It was incredibly hot," says Marlo. "We had to take a lot of breaks and let the air conditioner run to cool the room off. Then we'd turn it off when we recorded. We recorded with the lights off, too, so we wouldn't generate extra heat."

Anticipating RFI problems when recording electric instruments, Marlo invested in expensive light switches that were specially designed to not generate RFI. She wired her studio so that the

Clair Marlo recorded *Behaviour Self* in the comfort of her home studio.

lights were on their own circuit and installed the special switches, but she still had interference whenever electric guitars were recorded. So, once again, she had to record with the lights off.

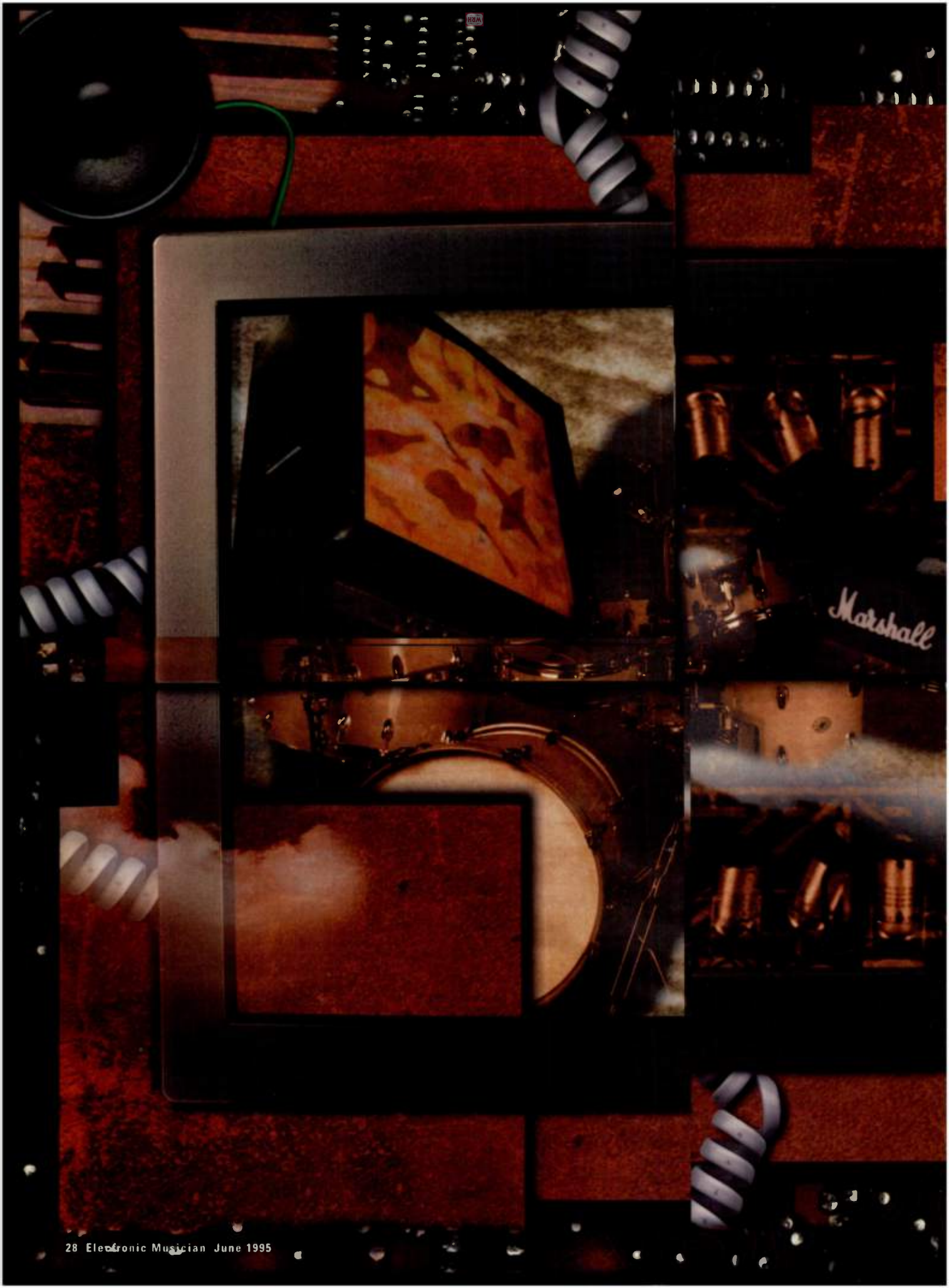
Aside from the noise problems (and as I mentioned earlier, there really were jackhammers in front of her house when the backup vocalists came in for their session), she experienced a few equipment crashes here and there, but nothing tragic. The most problematic equipment woes were her three ADATs, none of which had received their software updates at the time she was recording *Behaviour Self*. As a result, they crashed frequently and were slow to lock up for punch-ins. They've since been updated and are now working flawlessly.

BEHAVING HERSELF

Marlo is thrilled with the results of *Behaviour Self* and plans to record her next album at home. Not only is she excited at the prospect of recording and producing in her own studio, but she loves the new opportunities the home-studio revolution has wrought.

"I think the fact that record companies have cut back their recording budgets is going to spur more creativity," she says. "When you spend more time experimenting and playing at home, you create more expansive work in terms of production. And now, with more affordable gear available and new means of distribution, including the Internet, there's a lot more opportunity available to independent artists."

Associate Editor **Mary Cosola** *loves the concept of taking naps, then getting back to work when the feeling is right. Too bad it's not a reality.*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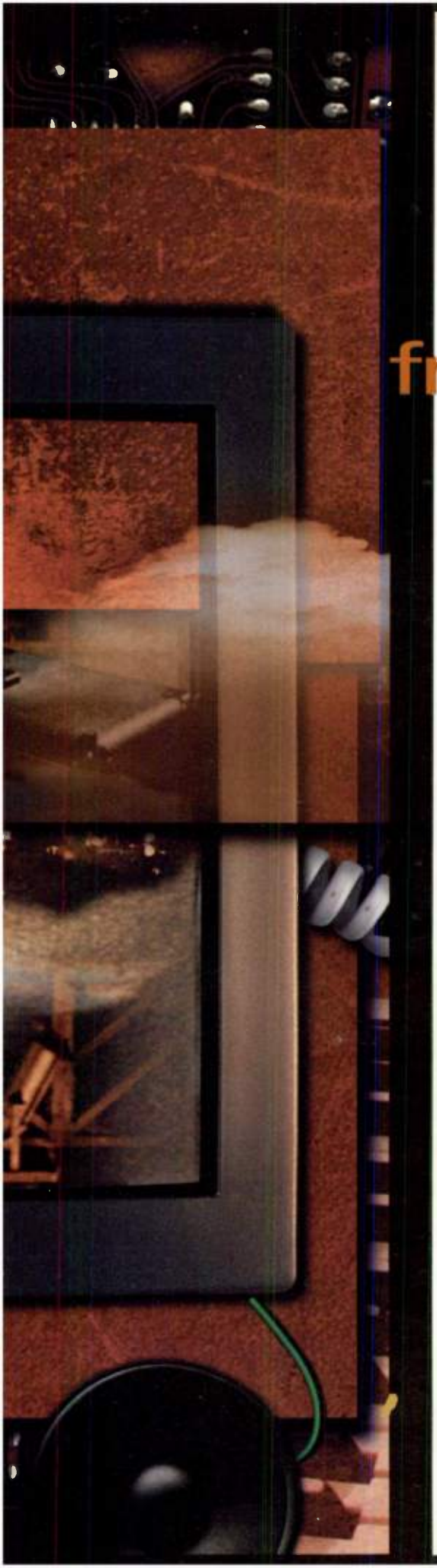

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by gerry bassermann

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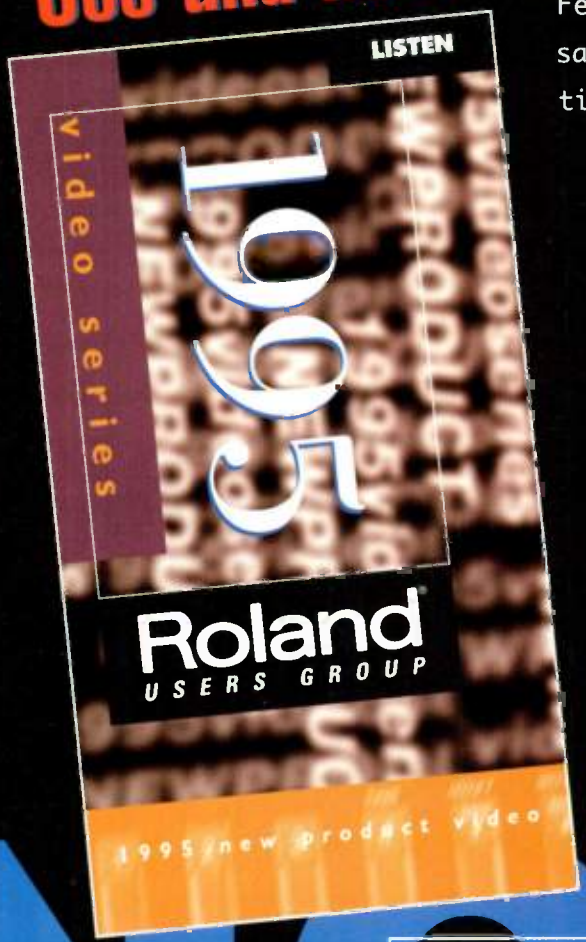

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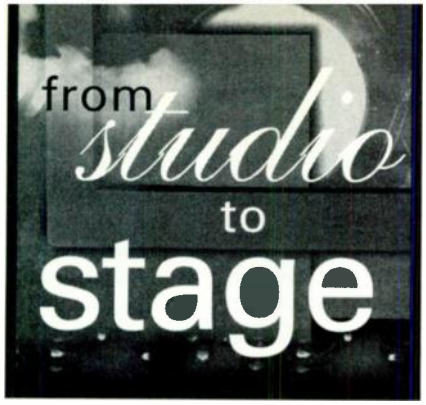


performance. Somehow, you must recreate your studio sound live on stage—*without* the sequencer.

Copping the sound and feel of a studio-produced tune is a challenge for any band, even though big-name acts have been doing it for years. They do it by throwing money, talent, equipment, money, and more money at the problem. For you and me, it's not so simple. To begin with, there aren't enough band members to cover all those lovingly crafted, sequenced parts. Even if there were, there's not enough room on stage for all the toys used in the production. Besides, no one can really play or sing live as well as the spot-on disc. And as for money...well, need I say more?

HAUNTED BY MIDI

Little did I know that I would be faced with these problems when, a year ago, some friends and I formed a band called Haunted By Waters. We started out as a quartet: bass, guitar, keys, and vocals, with everyone also beating on hand drums at various times. We recorded our material using four to eight tape tracks and lots of sequenced parts.

Then, we began playing live gigs, supplementing our sound with the same sequences used in the recordings. It was easy to replicate the fullness and rhythmic intricacy of the recordings, because the sequencer did most of the work, and we all la-di-da'd most importantly over the basics. It was pretty smooth sailing until we got into situations where it was hard to hear the beat of the sequencer adequately, and then, of course, it all went to hell in a polyrhythmic handbasket.

The audience response was always positive but mitigated by the feeling that an important energy was missing. Call it what you like: ebb and flow, a certain element of risk, or the fact that we weren't actually producing the sound at that moment. A large part of our performance was being "played back," and the audience knew it.

The resulting band meetings were long and sometimes difficult. The big question was whether we could do it without the sequencer. It wasn't as simple as adding a drummer; the sequencer was playing specific samples shaped by lots of programming, as well as layer upon layer of drums, textures, and effects. We figured it would require four or more additional members to replicate that sound live.

Haunted By Waters blends many different ethnic music styles using electronic sound generators. The sampled percussion is rarely a trap set but rather consists of frame drums, dumbeks, djembe, rototoms, congas, talking drums, etc., along with a large assortment of tambourines, bells, and shakers.

The effect is tribal, with several players on similar parts creating a random mix of events on every beat; even a simple repeating pattern seems to have unending variation. The sequences achieve this effect by using no quantization, offsetting similar tracks, playing back several different variations of a particular drum sound, and then layering that with other percussion instruments or transposed samples of the same drum.

Obviously, we couldn't exactly replicate the sound of the sequence; it was simply too complex. With a fair bit of programming, however, much of the sequenced material could be covered by taking advantage of the layering capabilities of a keyboard sampler.

Because playing drum sounds from a keyboard looks lame to an audience, we decided to go the next step and trigger our sampler—an E-mu Emulator III—from a percussion-pad controller. We had a KAT drumKAT on hand, so that's what I used, although other pad controllers would probably work just as well (as would other samplers, as long as they have sufficient layering capabilities).

KAT O' NINE TAILS

The first challenge was to identify the essential elements of the rhythm and then assign those sounds to the pads in a way that was most natural to play. With the essential rhythmic "cells" under my sticks, I could begin to enhance the sounds to mimic the sequenced parts.

The most important programming technique uses the drumKAT's ability to layer multiple sounds on one pad, with each layer slightly delayed by a different amount. When the pad is struck, a ripple of samples triggers with human-like inaccuracy. (Of course, this requires the drummer to play around

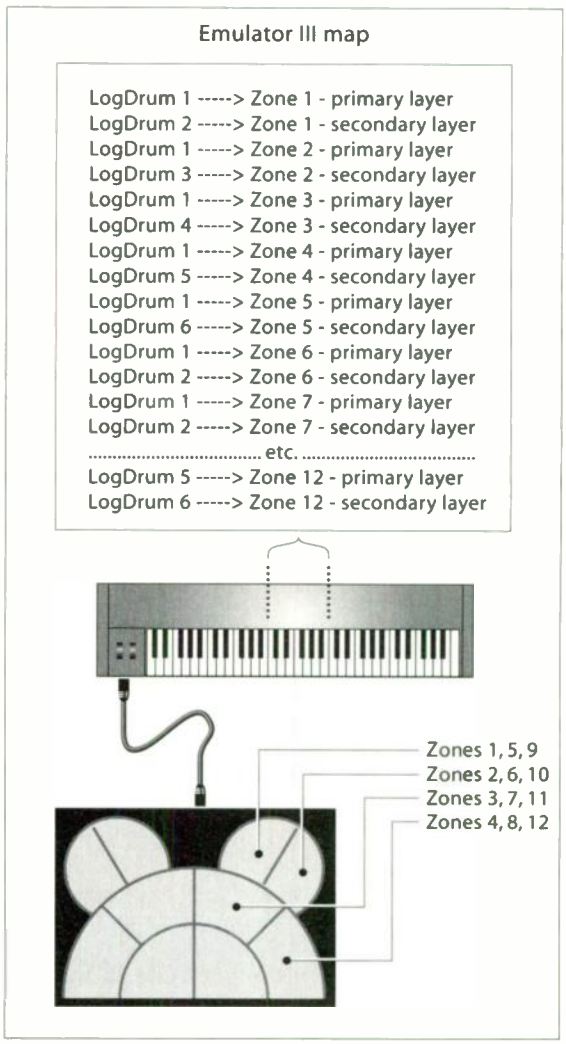
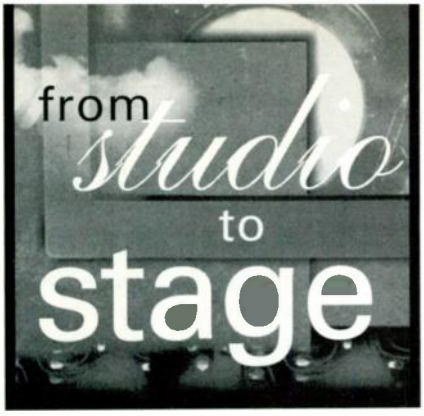


FIG. 1: To create the illusion of unending variation, six log-drum samples were organized into twelve pairs and assigned to a specific MIDI note and layer of a keyboard preset. Four pads on the drumKAT were then programmed so that each one cycled through three of the log drum hits.



with the beat.) Unfortunately, every time the pad is struck, precisely the same ripple is heard, which quickly becomes static and repetitious.

In order to create the illusion of "unending variation," you could program many pads with the same layered drums but with slightly different variations in order and timing. However, this would quickly consume all available pads and cover only one rhythmic part. My solution was to combine the layering capabilities of both the drumKAT and sampler.

First, I assigned various pairs of six different log-drum samples to twelve keys (see **Fig. 1**). Each of the twelve pairs occurs on a unique MIDI note, with one sample on the primary layer and the other on the secondary layer of each key. The samples were further differentiated by slightly retuning and delaying each layer. Playing them in a random fashion gives the impression of infinite combinations rather than the same twelve sample pairs repeated over and over.

Next, I programmed the drumKAT so each of four pads cycled through three of the appropriate MIDI notes; for example, each successive strike on one pad plays zones 4, 8, and 12, in sequence. This way, playing randomly among the four pads produces no discernible repeating patterns, especially if I occasionally hit two pads at once. The final result was the illusion of many players drumming together with the music, creating a naturally evolving, multiple log-drum part.

JUGGLING ACT

Taking on the role of drum-pad percussionist also meant I couldn't continue to perform solely on keyboards, and so we found ourselves short a player for the live act. Because Haunted By Waters' key parts are typically pads, drones, and effects, I decided to try triggering some of this texture from the pads.

It's easy to fire off a 3-note chord, autoharp strum, or ambient texture sample from a drum pad. However, it was more difficult to play the continuous, legato keyboard parts from drum pads. The drumKAT can send Note On/Note Off pairs with a user-definable gate time between them (this might be called an automatic gate), or it can send a Note Off when you remove pressure from the pad after striking it (manual gate). I found it impossible to hold a pad with one hand and continue to play the drum parts. With automatic gating, however, I did have time to hit the pad assigned to, say, a string chord, and then move on to cover more drums.

This required some reprogramming of the amplitude envelopes on the sampler to achieve smooth transitions between chords. Longer attack and release times helped the individual events flow together and sound continuously. For example, by sufficiently lengthening the attack time of the envelope, I could trigger the string chord a sixteenth note before the beat, so it would come in and blossom with the first beat of the drums. When the keyboard sound needed an immediate attack, I layered it with the first-beat drum and assigned another pad to the drum alone.

> A lack of resources just means you have to be more creative than the big acts.

Eventually, playing all keyboard parts, effects, and drum sounds from the drumKAT required more pads. I took full advantage of the KAT's nine trigger inputs, connecting some of them to a Drastic Plastic Quadrapad that mounted on the stand and others to vinyl LPs (for cymbals and gongs) with piezo transducers attached. These piezos are available at Radio Shack (catalog number 273-073; $1.49), and they work quite well attached to almost anything. Including the footswitch that I programmed to trigger yet another note in the sampler, I had a total of twenty sources at my command.

While juggling both keyboard and drum parts, I simply ran out of hands in many situations. This often occurred at a break in a phrase where a new keyboard chord, a transitional effect, a cymbal splash, and a drum fill were all needed at once. I decided to use the

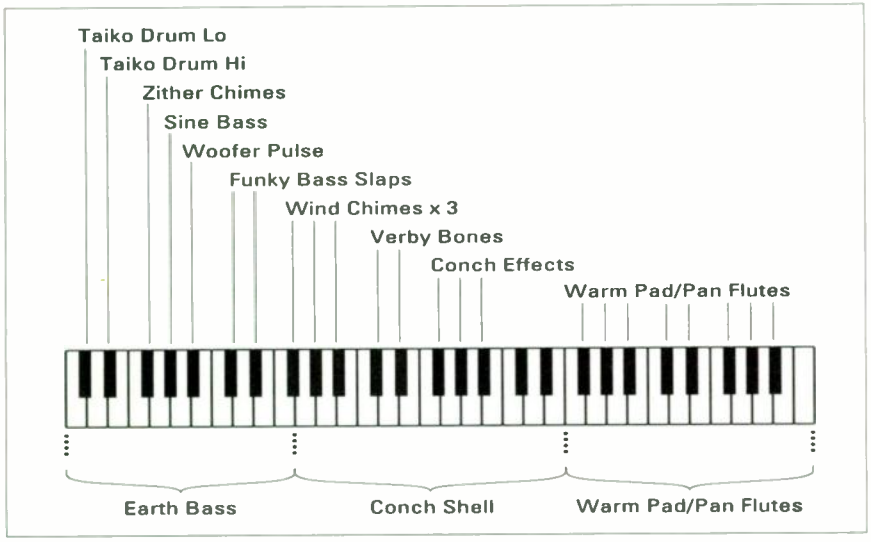


FIG. 2: For live performance, it's always a good idea to combine certain ranges from many programs into one or two presets. That way, you can punch a single button to move between setups, which greatly reduces the chance of calling up the wrong set of sounds in the heat of the moment.

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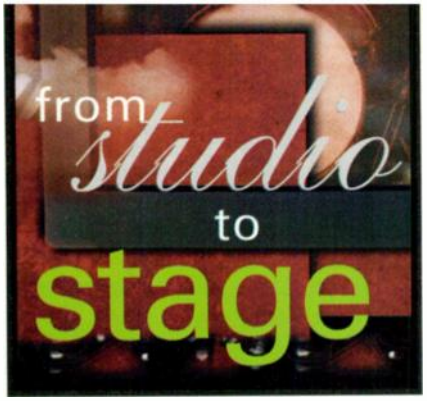

Riff Record mode of the drumKAT to capture the drum fill and fire it off with one hit, making it possible to execute all the parts.

However, incorporating static rhythmic riffs into a live performance is problematic. The tempo at which a riff is played on any given night might vary from the tempo at which it was recorded in the studio. In order to avoid that eventuality (and to ensure a consistent tempo in general), I programmed another pad to play two shaker sounds with a delay offset exactly an eighth-note in duration. This way, I could easily check the tempo at any time by hitting the shaker pad; the exactly clocked eighths would tell me if I was playing slower or faster than the original, studio-determined tempo. I could then speed up or slow down so that the drum fill would play in time.

PERFORMANCE TECHNIQUES

Keyboard players can also utilize these riff techniques to cover parts or effects they can't otherwise get to. Idiomatic effects such as piano, organ, or harp glissandos work well because they aren't strictly tempo dependent. But many times, the keyboard player must trigger exposed and important parts, such as backup vocals that have been sampled from the multitrack recorder. These critical parts bolster the texture (and pitch) of the live backup singers and the all-important confidence of the lead singer.

When playing programmed riffs live, the longer the riff or sampled phrase, the greater the risk of it wandering dangerously out of sync. Try to break up the phrase into the smallest possible musical units. That way, you have more start points, and thus, more chances to trigger them in tempo.

After playing half a dozen overdubs for the recording, a keyboardist is often faced with lots of reprogramming in order to go live. Combining certain key ranges from different programs into one or two presets for live performance is always a smart idea (see **Fig. 2**). Arrange these presets so all you have to do is punch a single increment/decrement button to call up the right one, thereby avoiding embarrassing mistakes in the heat of battle.

To play multiple overdubs at the same time, use the layering and Velocity cross-switching features of the sampler and play different parts with each hand. Even if you use multiple keyboards, specific keyboard layouts can help deliver flawless performances under these increased demands.

For example, "bad notes" that might be inadvertently grazed during sweaty performances can be left unassigned so they remain silent. This reduces some performance pressure and lets you interact more with the band and audience. Another technique is to assign these "bad-note" keys to effects or certain articulations, making it easy to hit them while playing another part in the same range.

I often program the white keys with a group of notes that covers the exact part I need to play (including any relevant transpositions for each key), and I use the black keys for "extras." For example, I sometimes program the white keys with a basic bass sound and the black keys with pops, slaps, mutes, and dives.

Even if transposing and not assigning "wrong" notes goes against your grain as a player, you can still remap the keyboard so one hand can cover a range of notes that required two hands during the recording. For example, use different, single keys within one octave to play different chordal parts, such as horn stabs and pads. This frees up your other hand to play something entirely different. My rule here is to make everything as easy as possible by preparing the keyboard setups ahead of time.

For bass players and guitarists, the main tool for replicating recorded tracks in a live performance is a programmable multi-effects unit. Even if the recording used racks of the most expensive processors, any affordable device with the right effects and enough different programs to cover the show should be able to replicate at least the sense of the recording's multiprocessing. This is true for singers as well, especially if changes must be made in effects settings between or even during songs.

MIDI is a wonderful creative tool, and it has its place. You might want to consider this when staying up into the wee hours of the morning tweaking tracks in the studio. Every once in a while, stop for a moment, and ask yourself how you'll reproduce the tracks live if it ever becomes necessary. With a little thought and a few well-programmed tools, the show can indeed go on.


SUSAN SCOTT

Haunted By Waters in performance. Author Gerry Bassermann (second from right) is surrounded by techno-toys that help him play sequenced parts live.

Gerry Bassermann *is a composer and sound designer working in the San Francisco Bay Area.*

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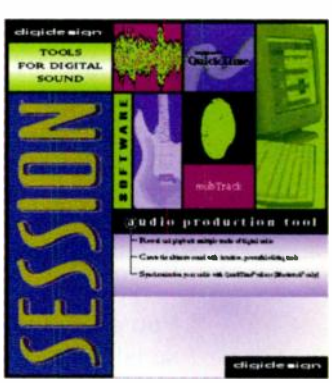

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By Michael Molenda

Retro ACTIVE

Photograph by Stephen Tang

Nostalgia merchants are doing brisk business these days. The lure of the familiar has not been lost on those who sell dreams and diversions. Hollywood is seducing baby boomers into theaters by plundering television shows from the 1950s, '60s, and '70s. Music lovers can pick any genre from punk, rhythm and blues, new wave, glam rock, or jazz and groove to young, fresh faces reciting the past. And believe it or not, fashion designer Vivienne Westwood revived the Victorian bustle at her recent Paris show.

The audio world is no stranger to this trend. Affordable digital recording systems have revolutionized the industry, but it's hardly a secret that many engineers and producers wax nostalgic for their doddering old analog recorders. Analog tape is lionized for its warm sensuality, while digital sound is, rather unfairly, characterized as cold and sterile. This perception has inspired recordists (and product manufacturers) to seek ways to "heat up" those cold digital bits.

"Colorize" your cold, passionless digital tracks.

You see, digital does *not* have a frigid personality—it has no personality at all. The digital domain is a near-perfect reflecting pool that faithfully reproduces any signal tossed into it. (Narcissus would definitely be a fan of


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hard-disk recording!) Analog is not so reverential. Any signal recorded into an analog deck is subject to tape coloration that can change the signal's timbre and texture.

Of course, this distortion of reality is what makes analog so pleasing. Varying degrees of tape saturation can add a warm, fuzzy quality to bass tones, or slap midrange and treble frequencies squarely in your face. Small wonder that musicians get such a rush from predigital rhythm and blues, rock, and jazz recordings.

Well, you don't have to sacrifice the old to embrace the new. Your hard-disk and modular digital multitrack recordings can evoke all the blissful grandeur of the analog era. All it takes is an analog mindset and a few marvelous "reverse innovations" from manufacturers to make tracks that burn, baby, burn.

RETRO•ACTIVE MINDS

The retro audio trend can be oversimplified as a resurgence of tube and analog technologies in the digital age. In fact, an important part of the movement has nothing to do with gear. The key to retro audio production is lodged deep in your brain matter, because evoking classic sounds often requires thinking about music making the way the originators did (see the sidebar, "Past/Present Production").

Unfortunately, we can't do a Vulcan mind-meld with classic artists, engineers, and producers, but we *do* have their records to study. In addition, many audio pioneers tossed out anecdotes and technical notes in magazine interviews and books. So if you want to pay sonic homage to Phil Spector, seek out every line written about the man, and listen to his singles until you can identify each element. Familiarity with the instrumentation, musical arrangements, and engineering techniques used in historic sessions is crucial. A working knowledge of Spector's production style, for example, can help you emulate his fabled "wall of sound."

Studious recordists are aware that in the days of live-to-mono recording, Spector typically had two or three of each instrument (including drums and grand pianos) playing simultaneously to increase tonal density. Modern recordists can simply update the master's methods by overdubbing and submixing unison parts on a multitrack deck or sequencer until the ultimate rock 'n' roll rumble is achieved. See what a little research and common sense can do?

To truly capture the flavor of classic sessions, however, you have to get emotional. The cerebral, anal-retentive tweaking of minute details can ruin a vintage vibe faster than you can say "Jimi Hendrix." Sequencer jockeys and digital-editing disciples must resist the temptation to build the perfect retro track, because it doesn't exist. Perfection wasn't where it was at in the old days; everyone was going for transcendent *performances*. This doesn't mean that blatant mistakes were tolerated, but the foibles of the human instrument—slight timing variances, wobbly pitch, inexact tunings, and so on—were forgiven in the light of a passionate reading. (A veteran producer once said

PAST/PRESENT PRODUCTION

In my dream, the phone is ringing nonstop with producers offering session work. Vintage sounds are in, and they want a veteran who was performing the music of the 1960s, '70s, and '80s when it was fresh and new. After all, if you want that old-time sound, hire an old-timer.

Recently, I got such a call to add sweetening to Liz Wyatt's debut CD, *Madness*. When I asked producer Michael Molenda (yes, *that* guy) what kind of sound he wanted, he opted for Mellotron string parts in a John Paul Jones-influenced style. Preparation is at least 90 percent of the battle in the studio, so I studied my Led Zeppelin records to ensure I had Jones' arrangement style down. This leads to Steve O's Maxim Number One, borrowed from the great philosopher Louis Armstrong: "It ain't what you play, it's the way that you play it." In other words, if you don't understand how a vintage instrument was used, you won't know whether your sound has the right stuff.

For session work, I rarely use unedited factory sounds, and I never rely exclusively on ROM-only synths. It isn't that I don't like them, but I want to offer a variety of sounds without hauling a ton of gear. Therefore, I brought just one instrument, but it was a killer: a Kurzweil K2000RS with version 3 software and all the trimmings, including an internal hard drive and enough RAM (16 MB) to load moderately large samples. I triggered the K2000RS from a lightweight, easy-to-use Lync LN-1000 strap-on MIDI keyboard.

The night before the session, I previewed several Mellotron samples, rejected most, and ended up with several string sounds from the InVision/Mellotron Archives *Mike Pinder Mellotron* CD-ROM and Greytsounds' *CD-ROM Series Vol. 1* for K2000. Just for grins, I also prepared some Mellotron flute and voice samples. If I had walked in with just one Mellotron string sound, I might not have satisfied the producer, and I certainly could not have supplied the tracks we ended up with.

In the end, I laid down several tracks, some in parallel and some in counterpoint. We chose two InVision Mellotron string sounds, one Greytsounds Mellotron string sound, and Stratus Sounds' marvelous "Violins 3" sample (available from Sweetwater Sound).

This leads to Steve O's Maxim Number Two: Good preparation breeds more work. When we finished the Wyatt tracks, Molenda had me add Mellotron strings to an Ascot Jacket cut for a German compilation album. I really should raise my rates for these sessions.—*Steve Oppenheimer*

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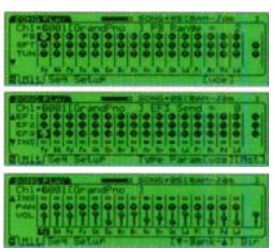
In short, the W5/W7 lets you make the music you can't quite get with any other synthesizer.

The W5/W7 16-track, 16-song sequencer is just as powerful as the mixer. A 416 KB sequencer memory stores over 100,000 notes with all the control—pitch bend, modulation, etc.—to make them work. At any point during sequence playback you can drop into voice edit mode and make and store changes without missing a beat.

Additional sequencer functions including full event editing, instant auto-locate points, track solo and mute, and automated punch-in/punch-out recording make this synthesizer as versatile as a recording studio.

The icing on the cake is the new W5/W7 Song Voice function. If you've ever created a sequence and replayed it with the wrong voices, you'll appreciate this. Song Voice bundles voices with their sequence. So you always get the sound you want and never get surprised.



The W5/W7 features an advanced digital mixer and 6 simultaneous digital effects processors.

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that the worst inventions in music history were the electronic tuner and the drum machine, because they negated a musician's individual sense of rhythm and pitch.)

In order words, a clinical, repressed performance is not an accurate representation of the retro sound. If you're going for a classic groove, first rekindle your joy for experimentation, emotion, and everything about music that used to make the hair on the back of your neck tingle with excitement. Without the human element, your track has no hope of eliciting the rapturous energy that characterized yesteryear's hippest records.

NEW WARM TOYS

Even if you don't own an analog recorder, you can still emulate the warm glow of analog coloration. To accomplish this, many manufacturers have turned to tube technology to produce processors that heat up signals *before* they reach digital tape or hard disk. The Rolls RP220, Peavey VMP 2, and Hughes & Kettner Tubeman are just some examples of affordable preamps designed to stir-fry chilly digital bits. Recordists who have a serious jones for retro audio should definitely have a tube preamp in their studio arsenal.

On that note, three manufacturers recently released excellent tube toys that I've used to add punch, warmth, and sensuality to several ADAT projects. Just about every timbre from a vintage glow to an industrial shred was within reach of these tools, and I used them both separately and together in a signal chain. I'll start with Peavey's tube condenser mic and work down the signal chain from Aphex's Model 107 Tubessence preamp to the RSP Technologies Saturator.

PEAVEY PVM T9000

With its chrome finish and deco silhouette, Peavey's PVM T9000 tube condenser mic (shown on our cover and opening spread, along with RSP's Saturator) is like a vintage-audio poster

ANTIQUE HUNTING

If you want to get in on the vintage-instrument revival, you have many choices. To begin with, almost every company that sells samples or synth patches offers a collection of vintage analog synth and keyboard sounds.

In my opinion, samples have an edge over synth patches, because they are recordings of the real thing. You'll get the best results if your synth or sampler lets you filter and amplify the sounds with complex modulation over time, as nonrepeating timbral changes typify analog synths. This is also where sampler users reap the benefits of installing large amounts of sample RAM, as long samples can capture extended timbral changes.

It is a fact that contemporary digital synths lack the warmth of analog instruments. However, you can warm up your digital machine with analog signal processors. Peavey's Spectrum Analog Filter is a particularly cool tool for giving digital instruments a fat, furry analog sound. The unit contains a close equivalent to the VCF and VCA portions of a Minimoog. This means you can process any audio signal with real analog synth circuits, under MIDI control.

For the sequencing sessions where polyphony, sampler memory, and multitimbral parts are pushed to their limits, it's great to have vintage sounds in a modern, dedicated instrument. Examples include E-mu's Vintage Keys Plus and Classic Keys modules, Voce's various electric piano and organ modules, and Oberheim's new OB-3, which emulates the regal Hammond B-3.

Alternatively, vintage sounds are available on an internal plug-in daughterboard for Roland's expandable JV series synths, and Yamaha is planning a similar offering for its W-series synths. A still different approach has been taken by Clavia, whose new Nord Lead (distributed by ddrum) digitally simulates an analog synthesizer.

If you will accept no substitute for the real thing, you can choose among a whole new generation of analog synths. Novation's BassStation (available in the original keyboard version and an improved rack version) can really shake your subwoofers and can do a pretty fair Roland TB-303 emulation. Studio Electronics, long known for modifying and MIDIfying vintage analog synths, offers the SE-1 (reviewed on p. 120 of this issue), the modern equivalent of a Minimoog.

Fortunately, some of the people who brought you the original vintage synths are still at it. The Oberheim OB-Mx was partly designed by synth pioneer Don Buchla and is the worthy successor to the Oberheim Xpander. Tom Oberheim is also back in the synth-designing business. His Marion Systems offers the MSR-2, a PC-style, 2-card cage that integrates two different synths, one on each card. Currently, only one type of card is available: a digitally controlled analog synth. Bob Moog, often regarded as the king of early analog synthesizer design, offers real, honest-to-gosh Theremins through his company, Big Briar. And don't overlook Waldorf's Wolfgang Duren, designer of the great-sounding, but unstable, PPG Wave synthesizer. The Waldorf Wave and MicroWave are essentially modern, stable versions of the PPG instrument.

Finally, the most obvious sources of vintage sounds are used instruments. Be very careful if you decide to buy a survivor, as you can easily get stuck with a moldy lemon. In addition, you'll have to deal with all those "vintage" problems, such as tuning instability and unreliability. An excellent survival guide for vintage synths is our feature "Unearthing Antiquities" in the November 1994 EM.—*Steve Oppenheimer*

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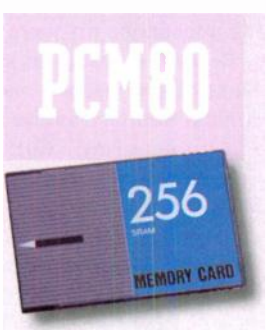

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child. But the T9000 is more than just a classy chassis; the mic delivers the sensual warmth of expensive, vintage tube models for a relatively affordable $1,299. And that price includes the mic, a shockmount suspension, the AC power supply, and the 25-foot cable used to connect the mic to the power unit/preamp. Frequency range is 20 Hz to 20 kHz, and the mic includes switches for a -10 dB pad and an 80 Hz low-cut filter.

The T9000 offers a cardioid polar pattern, and the manufacturer claims the mic can handle sound pressure levels up to 137 dB. I believe it. I miked a kick drum with the T9000 (with the 10 dB pad activated, of course) and it captured every impact without overloading or distorting. Even aggressive signal bleed from the snare, toms, and cymbals couldn't intimidate the mic into breaking up.

The sound, by the way, was marvelous. All the warm resonance of the drum was evident, along with the tight snap from the beater pad. It was easy to position the mic to record a Ringo-type "boom-boommph" that absolutely rocked the house. And although the low frequencies were quite lush, not a trace of muddiness was present. I even referenced my kick tracks to some 1960s and '70s rock records and happily discovered that the modern boom-booms sounded pretty darn close to the classic variety.

The T9000's vintage burn inspired me to attempt miking a barking Marshall combo amp. If anything disappoints me about digital audio, it's how the medium treats raging guitars. Digital resolution is just too precise to deliver appropriately tortured tones. Until I started working with digital recording systems, I hadn't realized how important tape coloration and compression was to the classic guitar sound. Could the T9000 help put some gristle into my digital guitar tracks?

Well, let me tell you, this microphone is a guitarist's savior. I positioned the T9000 one foot away from, and slightly

THE ANALOG MYSTIQUE

If anyone can speak with authority on the retro audio revival it's Tony Visconti. The legendary producer spent the '70s and '80s helming classic albums by T. Rex, David Bowie, Thin Lizzy, Boomtown Rats, The Alarm, and Iggy Pop. But although he is responsible for some of retro's hottest sounds (including the pitch-shifted, brutally cool snare swack on Bowie's innovative *Low* album), Visconti has little nostalgia for the good old days of analog recording.

"Analog is currently viewed very romantically, and its sonic myth is something I don't care to add to," he says. "The great thing about digital recording is that whatever you put in comes out. You can't say the same thing about analog, because analog tape coloration changes the timbre of everything you record. It's only when the sound is restored by EQ tweaks and signal processing that the track begins to resemble something familiar and wonderful. What most people call the 'analog sound' is actually a long string of audio decisions made to restore the sonic vitality that is lost when music is recorded onto analog tape.

"For example, I started my last Moody Blues album on an analog multitrack with Dolby SR, but abandoned it after the first day," continues Visconti. "I had worked very hard designing a kick-drum sample, and I was disheartened when the sound changed during playback. It was recorded with a nice attack at 2 kHz, but came back with a serious frequency shift down to around 900 Hz. The tape-deck manufacturer was aware of the problem but said it was a trade off for delivering less print through. I quickly switched to a Mitsubishi digital multitrack and was happy to hear my beefy kick drum virtually unchanged on playback."

Because digital gives back exactly what it gets, Visconti maintains that clinical source sounds can be avoided by ensuring your microphone captures enough warmth and punch.

"I always approach recording an instrument with this axiom: Use the right mic for the right job," he says. "David Bowie once complained that his voice sounded too thin on record. So during the *Young Americans* sessions, I avoided using the typical choice of a Neumann U87 or U47, which tended to brighten his vocal timbre. I looked for a microphone with a warmer quality and settled on the Beyer M160 double-ribbon mic. Bowie loved the sound of the M160 and used it on stage for many years afterwards."

But careful microphone selection and placement aren't the only ways to record robust signals. Visconti has a few secret weapons that bestow digital tracks with lush, fat timbres. One of his favorite tools is Manley Industries' Tube Direct Interface. He'll typically take a vocal, bass, or drum track directly out of his ADAT recorder, route the track to the Manley box, and then re-record the processed sound on another track through the ADAT's analog inputs. Another trick is to fly tracks digitally into Digidesign's *Sound Designer II* and run them through the Jupiter Systems' *MDT* dynamics-processing plug-in (reviewed in the September 1994 EM).

"Today, there's almost no limit to what you can do in a home studio," enthuses Visconti. "I recently made some demos with a Bowie sound-alike, and I went out of my way to sound retro. For a laugh, I sometimes play the tape to A&R executives and tell them it's unreleased Bowie from the *Hunky Dory* days. They believe it! But the real joke is what they're hearing as a warm, 1970s audio production was recorded at home on ADATs and 'mangled' in my computer."—*MM*

off-axis to, the Marshall's right-hand speaker cone. Then I played a chord and almost dropped my Les Paul. The sound possessed all the fury and fire that first made me fall in love with electric guitars. The tone was articulate and aggressive, with a wonderfully smooth, transient response. I wasn't even tempted to touch the console EQ; the sound was nearly perfect.

When I referenced the T9000 tracks to guitar tracks recorded directly to digital, the tones captured by the T9000 were rounder, fatter, and just plain "bigger." A closer match was discovered when I compared the T9000 tracks to guitars recorded on analog tape. The digital tracks recorded with the T9000 definitely exhibited the warmth and density of guitars tracked on analog.

Finally, I used the T9000 on some lead-vocal sessions. (Some of you probably think I should have done the vocal test *first*, but things just didn't work out that way!) As expected, the mic graced every voice with a warm, mellow resonance. Articulation was extremely clear, however, and the T9000 proved to have a rather transparent response. I had a couple of the performers sing the same lines through an AKG C414 and the T9000—the mics were positioned six inches directly in front of the singer's mouths, and no windscreens were employed—and the T9000 held up very well.

The popular C414 condenser is not a tube mic, so its personality was crisper and more "open" sounding than the T9000's. The T9000 sounded a tad muted by comparison, but the added warmth the mic provides is more than fair compensation for its restrainted midrange response.

For imposing that warm, retro sound upon the digital domain, the T9000 is a brilliant tool. It is cost effective, sounds sexy, and does the job. If you're looking for a sonic time machine, check out this mic.

APHEX MODEL 107

If a true tube mic isn't in your future, Aphex has the next best thing. Their Model 107 Dual-Channel Thermionic Microphone Preamplifier ($595) adds tube coloration to any mic. One of the hippest benefits of a quality microphone preamp is that you can bypass your mixing console and record signals direct to tape or hard disk. Removing the console electronics from the signal chain provides a cleaner path to your recording deck and optimizes signal quality.

If you work this way—and can give up your console EQ during tracking—you certainly won't miss your mixer. The Model 107 packs a lot of features into one rackspace. On the front panel, each of its two channels features an XLR input; a 20 dB pad; a gain level control; two signal level indicators, "OK" and "Overload"; an 80 Hz low-cut filter switch with a status LED; a polarity switch, with a status LED, that switches between normal and inverted polarity; and a 48V phantom-power switch with a status LED.

The rear-panel connections are beyond simple. For each channel, you get a ¼-inch output that accepts either balanced, stereo TRS cables or unbalanced, mono TS cables; a switch that changes the operating level between -10 dBV and +4 dBu; and a ¼-inch phone jack that accepts a footswitch input for the Model 107's remote mute function. (You can use an on/off or momentary footswitch to mute the preamp's channel, just like the mute button on a mixing console, to prevent unnecessary signal bleed into a live microphone when recording and playing on stage.)

I used the Model 107 with a number of condenser and dynamic microphones, and the preamp definitely improved the sound of every mic I plugged in. Low frequencies seemed to "seat" better in the overall tonal spectrum, while mid and high frequencies sounded smooth as silk. Presence peaks in dynamic mics were rounded to a softer, more pleasing timbre without losing clarity or articulation. The Model 107 is subtle and musical. It adds that warm, analog glow to miked tracks, but does its magic without dulling the source sound.

Anything that could be miked benefited from the Model 107's tube enhancement. Vocals sounded clear and present, guitars sounded fat, and drums sounded tight and punchy. For comparison, I recorded each track with and without processing, and the processed tracks were clear winners every time.

The Model 107 is an investment every home recordist should consider, especially if your mic collection is limited to one or two inexpensive dynamics. Believe it or not, this box will make those two mics sound as though you have a professional microphone cabinet at your disposal.

RSP SATURATOR

The RSP Technologies Saturator certainly deserves an award for Coolest Product Name. It looks pretty slick, too! The 2U rackmount device boasts a metallic blue finish and glorious retro knobs and meters. In fact, everything about the Saturator is quite distinctive, including its market niche. The tube processor resides in its own little product category as, well, a "saturator." Audio signals routed into the Saturator are subtly, or not so subtly, processed by the unit's 12AX7 tubes to emulate the warmth of analog tape coloration.

The 2-channel device is primarily designed to be connected between a recording console's stereo bus and a DAT machine to warm up stereo mixes, or routed to a mixer channel's insert points to process individual tracks. Each channel has a set of balanced mono XLR inputs/outputs *and* a set of ¼-inch inputs/outputs that can be run balanced or unbalanced. All connections are on the rear panel.

The front panel has just two controls for each channel: Drive and Output.

RETRO TOYS

Aphex Systems Ltd.
tel. (818) 767-2929
fax (818) 767-2641

Peavey Electronics
tel. (601) 483-5376
fax (601) 486-1278

RSP Technologies
tel. (810) 853-5150
fax (810) 853-5937

Tech 21
tel. (212) 315-1116
fax (212) 315-0825

Aphex Model 107

You also get two very large VU meters (one for each channel, of course) that can be switched to monitor either the output level or the amount of saturation. I never managed to correlate the saturation reading to a consistent sound, so I opted to use my ears for checking and auditioning saturation levels. All in all, the VU meters seemed pretty useless for critical signal monitoring. As a cosmetic touch, however, they're truly inspired. The final controls are the power button and a handy bypass switch.

When using the Saturator to heat up digital tracks, the Drive control can be a helpful friend or an evil demon. If gain staging is optimized to address the input signal, you should have no problems. However, low input levels can result in audible hiss, while aggressive Drive settings can fry your signals down to charcoal dust. Although the owner's manual kindly suggests specific Drive knob positions for different instruments and applications, the Saturator can still be a bit touchy. Depending on the input signal, a minute tweak can have major repercussions or hardly change a thing. In short, be careful.

Sonically, the Saturator is a dream machine. Buddy Saleman, the head engineer at my recording studio (and a sometime **EM** contributor), used the device extensively on preproduction demos for Tommy Boy/Warner Brothers artists the House Jacks. The Saturator quickly became an essential part of the sessions and a vital component of the overall production sound. It wasn't exactly a small order to fill. The Jacks are an *a cappella* act, so the Saturator's audio quality had to be above reproach; there would be no instruments to cover hiss, sputter, or distortion. But being undressed, so to speak, didn't faze the Saturator. As long as gain stages were set properly, the unit's audio was always white-glove clean.

The Saturator was used to dial up all kinds of sonic environments, from a warm, silky glow to almost renegade distortion. Vocals were typically recorded through an AKG C414, with the Saturator connected via a channel input send and return. The saturated vocals definitely sounded warmer and more sensual than vocals recorded direct to ADAT *sans* processing.

Warmth and sensuality aren't the Saturator's only processing traits, either. You can get downright mean with this box. When one of the House Jacks wanted to mimic a screaming guitar solo with his voice, Saleman enhanced the sense of realism by deliberately overdriving the input signal. The trick was so successful that several people accused the band of sneaking guitars into the act.

Used as a stereo premastering processor, the Saturator does a good job of warming up DAT mixes. Subtlety is essential, however, as you can easily scorch your mixes with a heavy hand on the Drive level. It's not a bad idea to run a clean, unprocessed mix and save the saturation treatment for a DAT safety master.

There's little more I can say except that the Saturator is a blast. For $699, you get a device that's so hot, it's probably contributing to global warming. That may be bad news for the environment, but it's certainly a boon for your digital sessions. With the Saturator in your rack, no one will ever complain that *your* digital productions sound cold and sterile.

THE SANSAMP SHRED

Of course, tubes aren't the only way to warm up your digital tracks. Frequent **EM** readers are aware that I often use Tech 21's SansAmp PSA-1 (reviewed in the October 1994 **EM**) to torture sterile signals. Athough the 1U rackmount unit is designed for producing guitar

UNHOLY CIRCUITRY

I'm a stomp-box addict. Yes, these little buggers tend to be noisy and easy to trip over, but if you want that 1960s guitar sound, the stomp box is your best friend. Obviously, I can't name every hip pedal (hey, this isn't *Guitar Player*), but here are some of the wacky toys I've used on recent projects.

Lately, I've been obsessed with wah-wah pedals. Vox makes an excellent pedal and Dunlop Manufacturing still sells the original Cry Baby. I hardly ever use a wah-wah for its chicka-chicka effect, opting instead to employ the pedal as a tone control. During guitar solos, I move the pedal somewhat randomly between "painful" (full) treble and "obnoxious" (mid) treble to give the notes a sense of timbral movement. You can also find some bizarre low-mid sounds for rhythm parts. Working the pedal can be a exercise in tonal anarchy, but if you find the right combination of tone, note selection, and performance dynamics, the sonic rewards are awesome.

Speaking of anarchy, I never managed to tame the original Electro-Harmonix Big Muff distortion pedal. It was hiss-saturated, nasty, and prone to searing feedback, but it also produced a marvelously fierce lead tone. Sovtek has reissued the Big Muff in a cleaner, more manageable configuration, but rest assured, the sound is still absolutely vicious. Other distortion boxes that deliver the vintage shred are the FZ-2 Hyper Fuzz by Boss, The Rat by Pro Co, the TS-9 Tube Screamer by Ibanez, and Tech 21's new XXL. If you're in a Hendrix kind of mood, try messing with DOD's FX-33 Buzz Box. It's an octave/distortion pedal that can produce some extremely wild roars.

Looking for that shimmering, sizzling swoosh that washed all over those old ELO albums? Here's your box: Dunlop Manufacturing has brought back the classic MXR Phase 90 phase-shifter.

My favorite modulation effect of all time, however, was this strange cast-iron phaser made by Roland. I can't remember the model number, but if you find one, don't ever let it go.—*MM*

amp simulations, I've processed everything from vocals to snare drums with the PSA-1. By tweaking the unit's Pre-Amp, Buzz, Punch, and Drive controls, I've managed to produce emulations of heavy tape compression, slight analog coloration, and heavily distorted, VU-meters-in-the-red recordings. This box is definitely not just for guitar players. In fact, some of my producer buddies have yet to use the PSA-1 on guitar. They're having too much fun cooking up every other signal they can find.

▼

I'm thankful the tube revival proves that "old" doesn't mean "obsolete."

If you're looking for even more fun, Tech 21 recently released its Bass Driver DI ($225), which is a combination preamp, direct box, and tube amp emulator in stomp-box form. The Bass Driver DI is totally cool if you yearn for the sound of a miked bass cabinet on your productions but can't manage the roar and rumble in your home studio. The box does a pretty mean simulation of a Fender Bassman and an Ampeg SVT, and you can't get much more vintage than those babies. This pedal is really the way to go if you're bored with the sound of passive direct boxes.

RETRO OUTRO

As audio technology advances about a billion times faster than Clark Kent can change into Superman, it's strangely comforting to see vintage gear work side by side with cutting-edge innovations. And as I slide into an age where I'm twice as old as the youngsters lugging their guitars into my studio, I'm thankful the tube revival has proven that "old" doesn't necessarily mean "obsolete." In addition, the reverence for classic sounds affords mature artists a last, fleeting stab at coolness. So listen up: If a spiteful whippersnapper is tormenting you, simply state with the utmost pride, "Hey, I'm not old, I'm totally retro!"

EM *editor* **Michael Molenda** *is often described in the past tense.*

DO ✦ IT YOURSELF

Build a Better Bass Trap

Tame sonic gremlins with acoustic treatments you can construct all by yourself.

By Ethan Winer

When I built my first recording studio in the late 1960s, there was no such thing as semipro audio equipment. In those days, if you wanted a 4-track tape recorder, you parted with big bucks for an Ampex or a Scully. A decent limiter cost nearly $1,000, and a good spring-reverb unit would set you back about $2,000.

We can all be grateful that high-quality audio gear is now available on even the most modest budget. But there is still one important feature that sets professional studios apart from most basement or garage operations: proper acoustic treatment. When handled correctly, acoustic treatment makes the difference between a mixdown room that sounds clear and tight and one that sounds muddy. And if the playback sounds muddy, you must work much harder to create a good mix.

Fortunately, even this aspect of your recording environment need not bust your budget, especially if you are willing to invest time and effort. But before we get to the details, let's take a look at the rationale behind acoustic treatment.

ACOUSTICS 101

Two very different and unrelated types of acoustic treatment are used in recording studios. One is sound *isolation,* which is intended to minimize leakage between rooms and between a room and the outside world. The other type is acoustic treatment used *within* a room to minimize reflections that cause reverb, echoes, and standing waves. This is the type of acoustic treatment we are concerned with here. (Acoustic isolation problems and solutions were discussed in "Sound Sanctuary" in the June 1991 **EM**. Room acoustics and treatment were discussed in "The Taming of the Room" in the August 1991 issue.)

If you walk into an empty room and clap your hands, you'll hear a series of closely spaced echoes. Often, these echoes include a discernible musical pitch, called *ringing,* especially if the room is small. Echoes and ringing are caused by sound waves bouncing back

JAY MUNRO

The author's studio combines a treated mixing area with a live performing room suitable for recording a small orchestra.

JAY MUNRO

The control room includes traps on the side walls. Because there is no rear wall, additional traps are installed on the ceiling.

and forth between opposite walls. This can interfere with mixing, particularly when the ringing effect emphasizes certain frequencies. The time between echoes and the specific frequencies that are emphasized depends on the room's shape and dimensions. The frequencies emphasized can also be greatly affected by the room's construction materials and decor (for example, hardwood floors, carpet, drapes, and mirrors) and vary with the number of people in the room.

To avoid these problems, professional mixing rooms are designed to eliminate most reflections. Deadening the room helps you hear any artificial reverb and other effects without the natural ambience of the room itself. It also reduces ringing, which means less fussing to fine-tune the room (see sidebar, "Fine-Tuning the Control Room"). But proper acoustic treatment involves more than just eliminating audible echoes and ringing, which impact only the midrange and upper frequencies. Unless your recording is limited to voice-overs and narration, it's just as important to eliminate the reflections that occur at low frequencies.

Many home-studio owners install sheets of acoustic foam rubber on their control-room walls, mistakenly believing that is sufficient. After all, if you clap your hands in a room treated with foam (or fiberglass or heavy blankets), you don't hear any echoes or ringing. But these products do nothing to control low-frequency reflections, and hand claps don't reveal this shortcoming. Basement studios with walls of brick or concrete are especially prone to this problem; the more rigid the walls, the more they reflect low-frequency energy. Building a new sheetrock wall a few inches inside a cement wall can reduce low-frequency reflections dramatically. The new wall vibrates, absorbing some of the sound energy instead of reflecting it all back into the room.

Unfortunately, this solution is inadequate for a serious mixing room. You get much better results with resonating boxes designed specifically to absorb low-frequency energy. These boxes are called *bass traps,* and they absorb the low frequencies that fiberglass and foam rubber miss. In most bass traps, plywood panels vibrate over a broad range of bass frequencies, and fiberglass mounted behind the panels damps that vibration to absorb the bass energy from the room.

When bass frequencies bounce around in a room, they generate *standing waves.* Standing waves are pressure nodes created when a sound wave reflected from a wall interacts with the direct sound emanating from the loudspeaker. At certain frequencies, the reflections reinforce the direct sound, increasing its level. At other frequencies, the reflections cancel the direct sound, reducing the level of those frequencies.

Standing waves can be reduced with nonparallel walls and an angled ceiling, but such construction is too costly for most home studios. The variation in bass response caused by standing waves is perhaps the single biggest cause of mixdown dissatisfaction for home-studio owners. You create what you think is a terrific-sounding mix in your studio, only to get complaints that it sounds either boomy or thin everywhere else.

Standing waves can also occur at midrange frequencies, but they are less intrusive because most musical material does not include many sustained, single notes in this range. Furthermore, midrange wavelengths are short enough that moving your head even a few inches will bring back a canceled tone. However, it is possible for a sustained note on a flute, French horn, or clarinet to create a standing wave.

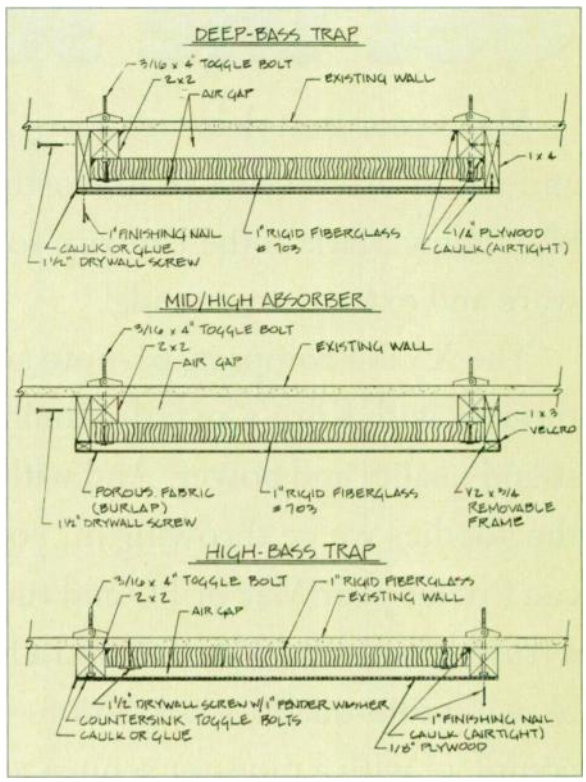
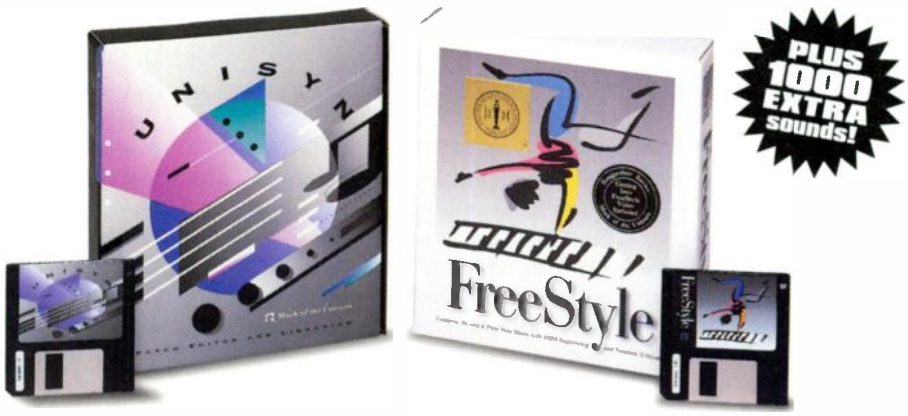


FIG. 1: Overhead plans for all three traps.

Buy the synth.



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THE COST OF PERFECTION

Although acoustic foam-rubber products are useful for absorbing midrange and upper frequencies, they are relatively expensive. Sculpted foam rubber two inches thick costs about five times as much as type 703 rigid fiberglass board one inch thick, which is just as effective as the foam rubber. (Rigid fiberglass is similar to the fluffy type used for home insulation, but it is much denser. A sheet of 1-inch 703 exhibits equal sound-absorption characteristics as a much thicker batt of regular fiberglass.) Likewise, prebuilt commercial bass traps are readily available, but they cost many times more than the raw materials needed to build your own.

The plans provided here include a mid/high-frequency absorber that uses a sheet of rigid fiberglass one inch thick, covered with fabric for appearance. This is complemented with two types of bass traps made from plywood and 1-inch rigid fiberglass to handle the low frequencies. The deep-bass trap uses ¼-inch plywood to absorb the lowest bass frequencies; the other is built with ⅛-inch plywood to handle the upper-bass range.

ETHAN WINER

FIG. 2: The bass-trap frames are assembled and mounted before attaching the fiberglass and plywood panels. These traps are on the ceiling over the mixing desk.

The rigid fiberglass is made by Owens Corning, and it can be purchased in boxes of 2 × 4-foot panels from a commercial insulation supplier. Nearly any

FINE-TUNING THE CONTROL ROOM

The published frequency-response curves for a speaker are normally derived from measurements made in an *anechoic chamber*, a room that's acoustically dead at all frequencies. Eliminating all reflections ensures the accuracy of the measured response. But like a car-maker's inflated mileage claims, measuring a loudspeaker's response in an anechoic chamber does not reflect reality. What really matters is the frequency response of the speakers in *your* room.

When you play sound through speakers in a normal room, certain frequencies are reinforced and other frequencies are attenuated according to the acoustic characteristics of the room. Most recording studios try to compensate for this effect by "tuning the room" in one way or another.

The first step is properly measuring the frequency response of the speakers in the room. This requires a pink-noise signal source, a spectrum analyzer (or sweepable filter that passes only ⅓ octave at a time), a calibrated microphone, and a voltmeter with a decibel readout. All-in-one units combine these components into a single package, making the measurements fairly easy to perform. The microphone doesn't have to be perfectly flat, as long as you know what its response really is and incorporate any deviations into your measurements.

There are different philosophies regarding the best way to tune a control room, and no single method is always correct. What you do—if you do anything at all—depends on your mindset, the size of your wallet, and perhaps the kind of music you produce. Many people are satisfied to adjust the tweeter level on the speakers, if one is provided, and accept the results.

If the speakers are biamped, the relative level between the low and high frequencies can be further adjusted with the controls of the crossover. Acoustic treatment goes a long way toward eliminating response-skewing reflections. Furthermore, all speakers have a "sound," and it's not wrong to pick a speaker that sounds the way you like and simply leave it at that.

Another philosophy is to try for a perfectly flat response at any cost. Once the speakers have been made as flat as possible by adjusting the tweeters and crossover, ⅓-octave equalizers are added to the signal path between the mixer and power amp. For example, if a 3 dB dip occurs at 1 kHz, the equalizers are set to boost that frequency range by 3 dB to compensate. In practice, the equalizers are usually set independently, since each speaker and its location in the room may require a different correction.

My personal philosophy is to avoid ⅓-octave equalizers if possible, because they can introduce as many peaks and dips in the response as they remove. However, I am not totally opposed to corrective equalization. The measured response of my JBL 4430 speakers was acceptably flat, except for a 4 dB rise centered at 400 Hz. For a single bump like this, a parametric equalizer set to the appropriate frequency and bandwidth is ideal. But I was able to avoid adding yet another device to the signal path by altering the existing line-out EQ circuit on my mixer. By simply adding two capacitors, I changed the midrange frequency from its original 1,200 Hz to the 400 Hz needed to correct my speakers' response.

ETHAN WINER

FIG. 3: The bass traps are built using wooden frames and plywood panels, sealed with caulk to make them airtight. The gap below each frame allows room for the carpet, which is not yet installed.

porous fabric can be used on the mid/high absorbers to cover the fiberglass and make it more attractive. I chose an off-white burlap because it is inexpensive and acoustically transparent, yet it also looks good.

There are many different types of bass traps, and these are as effective as any. They are particularly well suited for small rooms, because the traps protrude very little; the thickest unit is only four inches deep. A width of two feet yields two traps from each sheet of plywood, with no waste. These traps are equally useful in large recording areas, perhaps mounted only on one wall to retain some of the room's natural ambience. You could also line one wall with bass traps only to tame the low frequencies without affecting the ambience in the upper frequencies.

CONSTRUCTION

Each of the three trap designs is based on a wooden frame that is first assembled and then mounted on the wall using toggle bolts. After mounting each frame on the wall, attach the rigid fiberglass, followed by a plywood panel for the bass traps, or a fabric grille for the mid/high absorbers. The accompanying plans (see **Fig. 1**) and parts list (see sidebar, "Parts List") provide most of the detail you need to build these traps, but here are some additional points to keep in mind.

Select good-quality #2 pine boards that are not warped, avoiding any with excessive or open knots. Inexpensive fir is adequate for the 2 × 2s in the deep-bass traps and mid/high absorbers because those boards aren't visible. I recommend "AC" plywood for the bass-trap fronts, which means that one side (the "A" side) is smooth and looks good when painted. Of course, the good side is mounted facing out. Any decent lumber yard will gladly cut the plywood sheets in half lengthwise for you.

The deep-bass trap and mid/high absorber use 1 × 4 and 1 × 3 frames, respectively, to which you attach the inner 2 × 2 boards that support the fiberglass. Be sure to use screws instead of nails throughout for maximum strength and stability. The high-bass trap uses a single frame made of 2 × 2s only, which should be joined in the corners with screws.

The plan drawings (see **Fig. 1**) present an overhead view looking down into each box, so they don't show the top and bottom end caps that seal and complete the boxes. However, the accompanying photos show how the finished boxes should look (see **Figs. 2** and **3**). Note that the length of the end caps in the parts list is slightly overstated; the true length depends on the thickness of the various boards. The correct length is two feet minus the thickness of each 1 × 3, 1 × 4, or 2 × 2. I recommend you follow the old carpenter's adage: "Measure twice, cut once."

For the mid/high absorber, the burlap is stretched only slightly and attached to a second, removable frame, using staples. The removable front frame is attached to the main 1 × 3 frame using short (2- to 3-inch) strips of adhesive-backed Velcro, which are stapled into the wood for extra strength.

The removable frame has a 2-foot crossbar that is not evident in the drawings or photos. This crossbar is made from the same board as the removable frame and oriented horizontally in the middle of the frame, which prevents it from collapsing when the burlap is pulled snug. Don't pull the burlap too tight; if it ever loosens, you can mist it

ETHAN WINER

FIG. 4: Master carpenter Rick Castillo attaches a bass trap to the wall with toggle bolts.

Take it...

1994 Editors' Choice for Best New Mic
ELECTRONIC MUSICIAN MAGAZINE

1995 Sound Products of the Year Award
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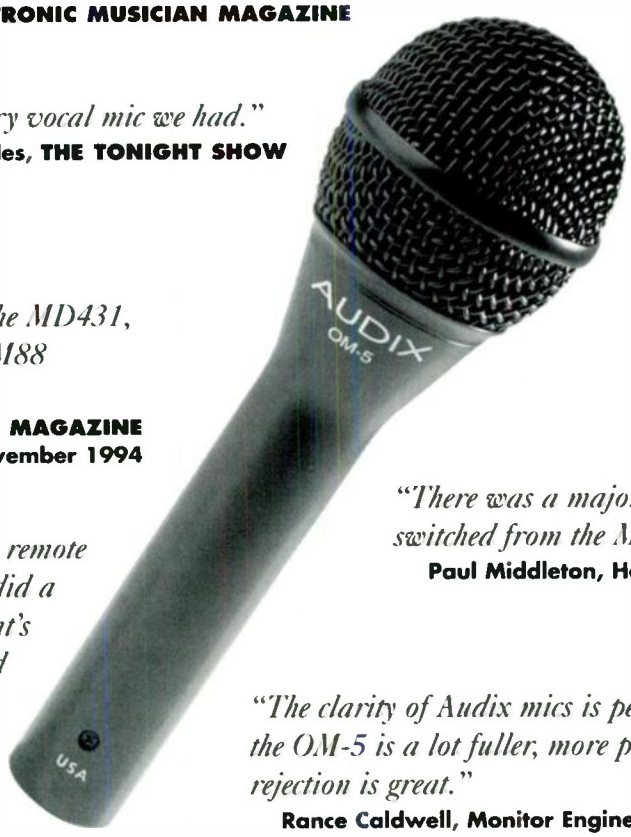
"The OM-5 outperformed every vocal mic we had."
Bob Whyley & Steve Kades, THE TONIGHT SHOW



"The OM-5 outperformed the MD431, Beta 58, N/DYM857 and M88 for gain before feedback"
Mark Frink, MIX MAGAZINE
November 1994

"The OM-5 is the most significant audio improvement we've made to the show."
John Harris, Audio Engineer, JON STEWART SHOW

"There was a major improvement when we switched from the M88 to the OM-5."
Paul Middleton, House Engineer for BONNIE RAITT

"At a very crowded and noisy remote held on the street... the OM-5 did a superb job of defining the talent's voice and rejecting background clutter."
RADIO WORLD
February 1995

"The clarity of Audix mics is perfect... compared to the SM58, the OM-5 is a lot fuller, more present, and the feedback rejection is great."
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In just one year, the Audix OM-5 has made a big impression. The reasons are clear—unmatched quality, uncolored reproduction, higher gain before feedback, and the Audix reputation for the very highest quality.

Unlike some mics that rely on neodymium magnets for high output, the OM-5 uses VLM™ (Very Low Mass) technology. An Audix exclusive, VLM is created with a super strong, yet very thin and lightweight diaphragm. The lightness allows quicker response to acoustic impulses for unequalled levels of resolution, rejection and gain before feedback.

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PARTS LIST

The following lists include the parts needed for one of each type of treatment. The prices are approximate and might vary in your area. However, they should give you a rough idea of how little these treatments will cost.

Deep-Bass Trap

½ sheet (2′ × 8′) ¼″ AC plywood	$10
2 pieces 1″ × 4″ × 8′ pine	$11
2 pieces 1″ × 4″ × 2′ pine	$3
2 pieces 2″ × 2″ × 8′ fir	$4
2 pieces 2′ × 4′ × 1″ rigid fiberglass	$5
12 pieces 1″ fender washers	$1
10 pieces 3/16″ × 4″ toggle bolts	$2
40 pieces (approx.) 1½″ drywall screws	$1
120 pieces (approx.) 1″ finishing nails	$2
1 tube nonhardening caulk	$3
Total	**$42**

High-Bass Trap

½ sheet (2′ × 8′) ⅛″ AC plywood	$10
2 pieces 2″ × 2″ × 8′ pine	$4
2 pieces 2″ × 2″ × 2′ pine	$1
2 pieces 2′ × 4′ × 1″ rigid fiberglass	$5
12 pieces 1″ fender washers	$1
10 pieces 3/16″ × 4″ toggle bolts	$2
20 pieces (approx.) 1½″ drywall screws	$0.50
120 pieces (approx.) 1″ finishing nails	$2
1 tube nonhardening caulk	$3
Total	**$28.50**

Mid/High Absorber

2 pieces 1″ × 3″ × 8′ pine	$9
2 pieces 1″ × 3″ × 2′ pine	$2
2 pieces 2″ × 2″ × 8′ fir	$4
2 pieces ½″ × ¾″ × 8′ pine or poplar	$5
3 pieces ½″ × ¾″ × 2′ pine or poplar	$2
2 pieces 2′ × 4′ × 1″ rigid fiberglass	$5
12 pieces 1″ fender washers	$1
10 pieces 3/16″ × 4″ toggle bolts	$2
40 pieces (approx.) 1½″ drywall screws	$1
12 pieces (approx.) ¾″ finishing nails (for burlap frame)	$0.25
3 yards dyed burlap	$3
1 roll Velcro	$5
Total	**$39.25**

lightly with water in a squirt bottle to make it shrink.

INSTALLATION

The finished traps are two feet by eight feet, and they're mounted vertically on the walls of your control room in alternating order. Start with a deep-bass trap, then a mid/high absorber, then a high-bass trap, a mid/high absorber, a deep-bass trap, and so on around the room (see **Fig. 3** and opening photos).

Bass energy tends to build up in the corners of a room, so try to arrange the order of the traps so that the bass units are in the corners and the mid/high absorbers alternate with the remaining bass traps along each wall. It is perfectly acceptable to have two adjacent bass traps in a corner, but it's best if one is a high-bass type, and the other is a deep-bass unit. You may also change the size of a mid/high absorber if necessary to accommodate the room dimensions. The center ceiling absorber (see **Fig. 2** and opening photos) was made slightly narrower than the others because the full two feet was not available.

If your walls are less than eight feet high, you can shorten the traps accordingly during construction. In a room with high ceilings, center the traps vertically on the walls. It is not necessary to line all four walls, but you should cover at least three of them, optionally omitting the front wall behind the monitor speakers.

Like many home studio owners, I record acoustic instruments, as well as electric guitars and synthesizers. Because I mostly record myself, the recording and mixing areas are combined in one large room. In this case, there is no rear wall in the mixing area, so additional traps are mounted on the angled ceiling to maximize absorption (see **Fig. 2** and opening photos). There are also four bass traps in the rear corners of the room that are not visible in the photos.

The assembled frames are mounted on the wall using five toggle bolts per side, evenly spaced (see **Fig. 4**). While one person holds the frames against the wall in the correct position, another drills ¼-inch holes through the 2 × 2s and into the wall. Then remove the frame and enlarge the holes in the wall to accommodate the toggle bolts. Be careful not to drill into any existing electrical wiring! Once the final holes have been drilled, you can bolt the frames to the wall.

It is imperative to seal the bass traps with a liberal application of caulk at

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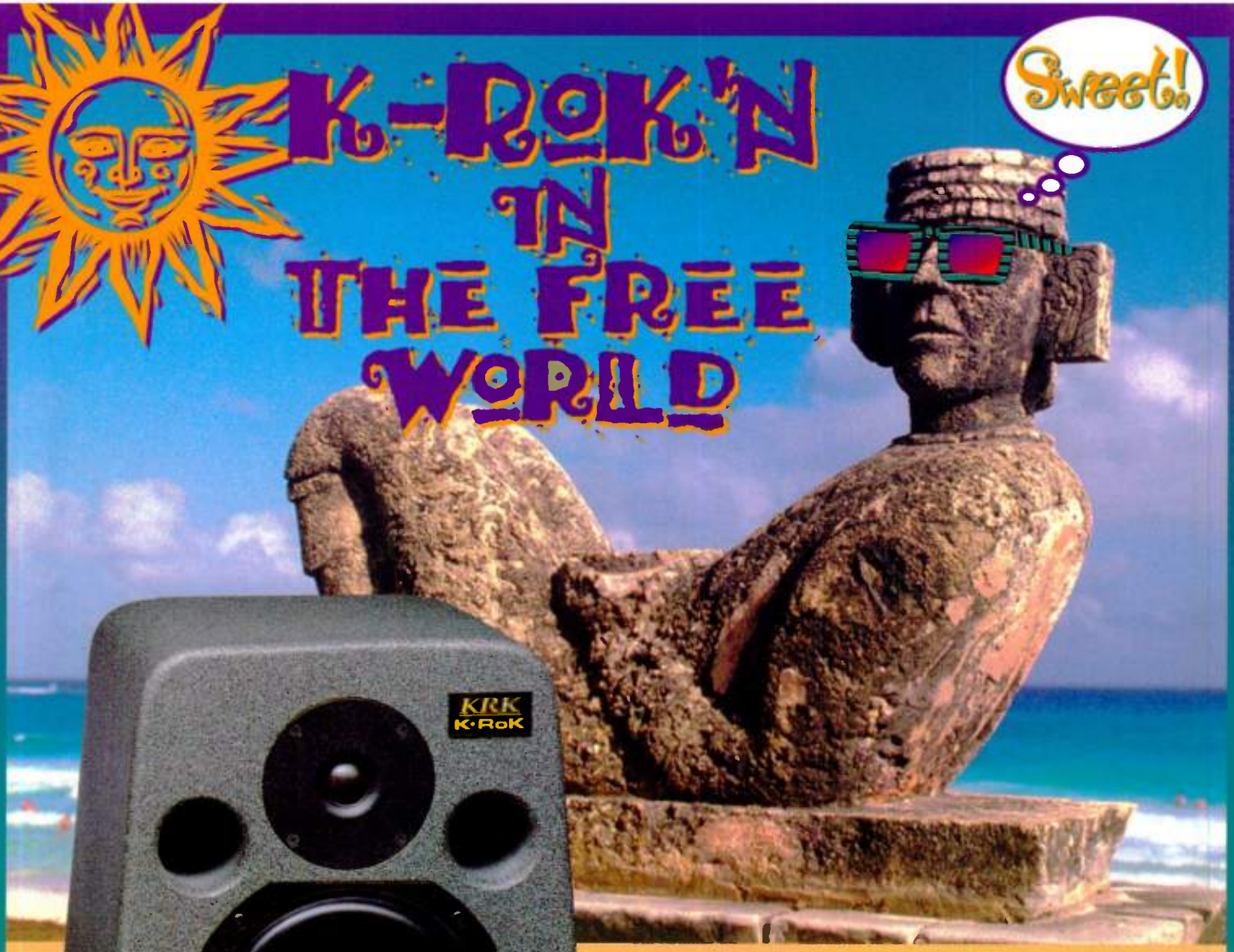

The new KRK K-RoK close-field monitor looks as if it's been carved out of solid granite. These bizarre-looking little monsters feature a unique box design that produces better linearity and low-end punch than any monitor in their class.

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all joints and where the wood frame meets the wall. Apply caulk to seal the frame to the wall before attaching the fiberglass, and work it in thoroughly with your finger. Any seams in the wallboard behind the traps should also be caulked.

Attach the rigid fiberglass panels using 1-inch fender washers to keep the screw heads from pulling through the fiberglass. For the high-bass traps, the fiberglass can be glued directly to the wall if you prefer. Note that you must cut down the fiberglass slightly to fit it within the frames. Wear a protective face mask during this process to avoid breathing any errant fibers.

Caulk or construction glue is also required between the frame and the plywood front panel. Apply the caulk to the front edges of the bass traps just before attaching the plywood to the frame. I used 1-inch finishing nails spaced about two inches apart to attach the plywood, but you can use fewer nails if the plywood is glued instead of caulked. Be sure to use a high-quality silicon-based caulk, the kind that is guaranteed to never dry out. The mid/high absorbers don't need caulking.

If the traps are installed before the final floor covering, be sure to leave a sufficient gap at the bottom of the boxes before attaching them to the wall (see **Fig. 3**). I used a scrap strip of sheetrock to rest each frame on when drilling the mounting holes and attaching the toggle bolts.

AL FINE

As you can see from the parts list, the raw material for these traps is relatively inexpensive. With the help of a friend, it took about a week to build 21 traps and absorbers for my studio. Most home studios probably need fewer traps. Also, it took us a little longer than it might have otherwise because seven of the traps are mounted on the ceiling.

I have built three commercial studios using this trap design, and I can attest that it works very well. In each case, these traps tamed a room that was unusable for serious mixing into a room that sounds good and is a pleasure to work in.

After 30 years of lead guitar and electric bass, **Ethan Winer** *now plays classical music and jazz on the cello.*

Nearer My Monitor to Thee

Near-field reference monitors help engineers make heavenly music.

By Scott Wilkinson

As you may recall from last month's column, microphones convert acoustic sound waves into electrical audio signals (see "Square One: Microphonic Machinations" in the May 1995 **EM**). In technical terms, a microphone is a type of *transducer*, a device that converts one type of signal into another. More specifically, mics and direct-contact pickups are also known as input transducers, because they provide an input signal to mixers, tape decks, and other audio devices.

At the other end of the signal chain are output transducers, otherwise known as loudspeakers, which convert electrical audio signals into acoustic sound waves. In most studio speakers, this conversion process is essentially identical to the technology in moving-coil dynamic microphones, but in reverse. An audio signal passes through a coil of wire, called the *voice coil*, which is suspended in a permanent magnetic field. As the current fluctuates in the wire, it generates an oscillating magnetic field that alternately pushes and pulls against the permanent magnet, which causes the voice coil to vibrate.

The voice coil is attached to a *diaphragm*, which vibrates with the coil (see **Fig. 1**). As the diaphragm vibrates, it jostles nearby air molecules, creating acoustic sound waves that eventually reach our ears. The combination of voice coil, magnet, and diaphragm is called a *driver*.

There are three basic applications for loudspeakers: home entertainment, sound reinforcement, and studio reference. (Speakers used in the studio are called *monitors*.) Studio monitors can be divided into two types: *main* and *near-field* or *compact*. If you've ever been to a commercial recording studio, you've probably seen a pair of gigantic speakers mounted in the wall of the control room; these are the main monitors. In addition, you might have noticed some smaller speakers sitting on or near the mixer console; these are near-field reference monitors. Most

This studio includes two Meyer HD-1 near-field reference monitors on stands that isolate them from the mixer. (Photo courtesy of Rocket Lab Mastering Studios, San Francisco.)

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home and small project studios don't have room for large main monitors, so engineers in these facilities rely exclusively on compact reference monitors to hear the results of their work.

PURPOSE

Commercial studios started using small reference monitors to check the mix as it would sound on a car stereo or boom box. The first commonly used compact reference monitor was a small cube speaker from Auratone. As car and portable sound systems got better, engineers needed better near-field reference monitors, so the recording industry adopted the Yamaha NS-10M, a bookshelf speaker originally intended for home use. This speaker soon became the *de facto* standard for compact reference monitors and is now found in most commercial studios. However, there are many other options for small reference monitors.

By commonly accepted definition, near-field reference monitors are placed close to the engineer's ears, typically at a distance of about one meter. In this position, most of the sound you hear comes directly from the speaker itself, rather than reflections from the walls, ceiling, and other objects in the room. This minimizes the effect of the room on what you hear.

However, the monitor must be far enough away that the sounds from the individual drivers "fuse" into an apparent point source. If you are too close to the monitor, you can distinguish the sound from each driver separately. (This is usually not a problem in coaxial designs; more on this shortly.)

Many home-studio owners mistakenly think they can use home-stereo speakers as studio monitors, but these two types of speakers are designed with different goals in mind. Home speakers are intended to make recordings sound as good as possible, masking any problems that might appear. Many home speakers emphasize the high and low frequencies with the familiar "smile" EQ curve (see "Square One: EQ Explained" in the April 1995 **EM**). This may sound good, but it isn't accurate. Using home speakers as studio monitors also tends to cause ear fatigue, because the midrange is often de-emphasized, which causes you to strain to hear it. Finally, home speakers are designed to be used in the far field, where most of the sound you hear is reflected.

On the other hand, near-field reference monitors should reveal any flaws in the recording so you can fix them before your music is released. They must be as accurate as possible, adding nothing to the sound that isn't in the original signal.

DRIVERS

Compact reference monitors consist of one or more drivers mounted in a box, or *enclosure*. The two main types of drivers used in these monitors are *cones* and *domes*. Cone diaphragms are used in drivers called *woofers* to reproduce the lower frequencies. Midrange drivers use smaller cones to reproduce the middle of the sonic spectrum. Cones are often made from a material such as treated paper, polypropylene, or Kevlar.

Cones are impractical for high-frequency drivers, called *tweeters*, because the voice coil is too small to handle a reasonable power level from the amplifier. As a result, most tweeters use a small dome as the diaphragm, which allows the voice coil to be much larger. Domes also exhibit a wide dispersion pattern and fast transient response. Most domes are made from metal, such as titanium or aluminum, although some people think metal domes sound harsh. For this reason, Alesis uses stiffened-silk dome tweeters in the Monitor One and Monitor Two.

Most near-field reference monitors include two drivers: a woofer and a tweeter. This is called a *2-way* design. A few models, such as the Alesis Monitor Two, are 3-way designs, with three drivers: woofer, midrange, and tweeter. Some monitors include multiple drivers for one or more of the frequency ranges, but they are still called 2-way or 3-way designs. In any case, the drivers must be placed as close together as possible so that the sound from each one fuses into a coherent point source at the proper distance from the speaker.

Monitors that use separate drivers are called *discrete* designs. Typically, the drivers are mounted next to each other on the front face of the enclosure. This works well as long as you remain in the *sweet spot*, where the sound from the drivers becomes coherent. This location depends on the dispersion pattern and may not be directly in front of the monitor (which is called *on axis*). But if you move away from the sweet spot, particularly along the imaginary line that connects the centers of the drivers, the sound can change dramatically.

Some companies, most notably Tannoy and UREI, employ a *coaxial* design in some of their monitors. In this approach, the tweeter is mounted at the apex of the woofer (see **Fig. 2**). This is more expensive than discrete designs, but it is naturally coherent, making an excellent point source from just about any distance. In addition, there are fewer anomalies as you move away from the sweet spot.

ENCLOSURE

Compact reference monitors should be as small as practical for the driver complement. This lets you take them from one studio to another, providing a reliable, familiar sound no matter where you work. However, small enclosures do not support low frequencies well. The lowest practical frequency in most small monitors is typically around 60 Hz. In addition, the edges and corners of the enclosure are usually rounded to improve the high-frequency response and dispersion of sound.

Most near-field reference monitors include one or two extra holes in the enclosure; this is called a *vented* or *ported* design (see **Fig. 2**). In this design (which is sometimes called *bass reflex*),

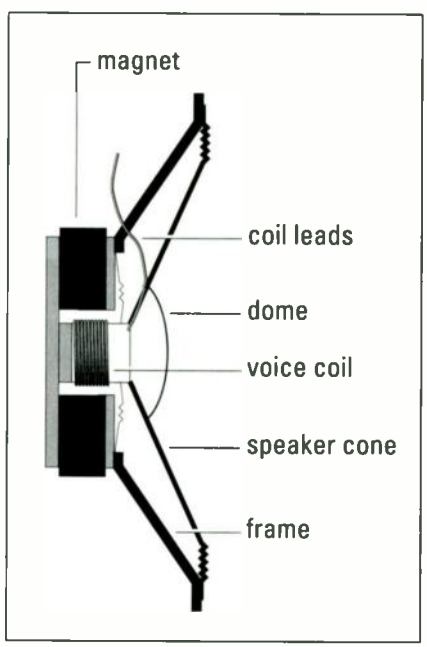

FIG. 1: A typical speaker driver includes a voice coil, permanent magnet, and diaphragm, which can be a cone or dome.

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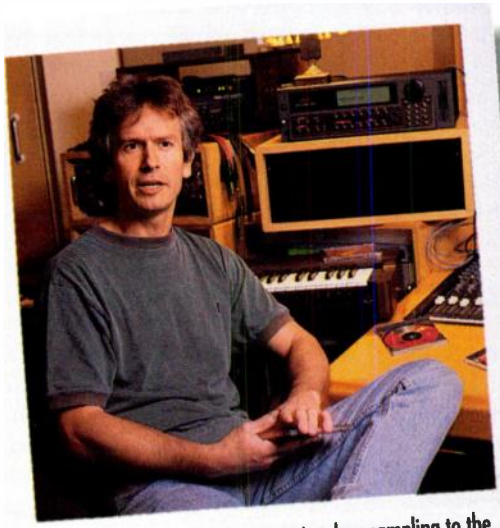

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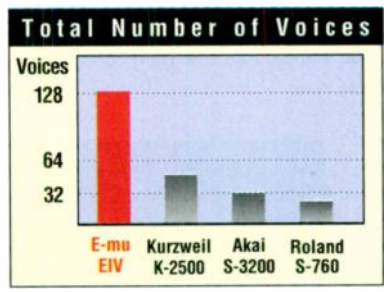

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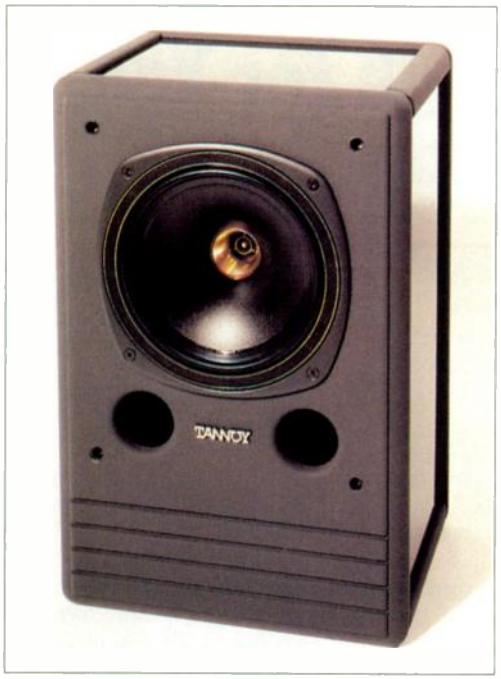

FIG. 2: The Tannoy System 8 DMT uses a coaxial design, which Tannoy calls Dual Concentric, and a front port.

the port "tunes" the enclosure to resonate at a frequency below the woofer's natural rolloff. As the frequency drops below this rolloff, the woofer generates less acoustic energy. However, the enclosure starts to resonate at these frequencies, and this acts like an equalization boost. This amplifies the woofer's signal and extends the low-frequency response of the monitor well below a similarly sized but completely sealed enclosure. (Sealed enclosures are sometimes referred to as *infinite baffle* or *acoustic suspension* speakers.)

Some designers place the port in the front face of the enclosure, while others locate the port in the rear face. Rear-ported designs can cause problems if mounted too close to a wall, which tends to emphasize low frequencies in any monitor, especially rear-ported models. On the other hand, rear ports allow smaller front faces. Also, the front face can become weakened if it has too many holes, increasing the possibility of unwanted mechanical vibrations. Some ported monitors come with a port plug, which reduces the low-frequency response and may be useful if you mount the monitor near a wall or corner.

It is well known that the sound waves from the drivers are slightly delayed with respect to the electrical input signal (we're talking microseconds) and that the sound from the woofer is delayed more than the sound from the tweeter. One major factor in this discrepancy is the distance from your ear to the voice coils of the woofer and tweeter, where the sound actually originates. A tweeter voice coil is less than an inch from the dome, while a woofer voice coil is several inches from the edge of the cone. If the woofer and tweeter are mounted in the same flat face of an enclosure, the tweeter's voice coil is closer to your ear than the woofer's voice coil. This causes the high frequencies to arrive slightly ahead of the low frequencies, which can diminish detail and blur the overall sound.

Another important factor in the delay discrepancy is the *crossover*, an electronic circuit that splits the incoming signal into separate frequency bands and directs each band to the appropriate driver. Crossovers tend to delay

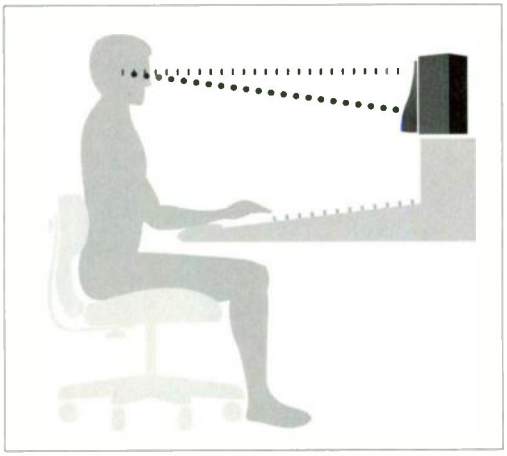

FIG. 3: The JBL 4200 series of near-field reference monitors recess the tweeter with respect to the woofer so high and low frequencies arrive at your ears simultaneously.

the low frequencies more than the highs, which compounds the problem.

There are two ways to correct this situation. Some designers physically recess the tweeter with respect to the woofer so the voice coils are in the same plane (see **Fig. 3**); examples include the JBL 4200 series and several models from KRK. In some coaxial designs, the problem is eliminated by mounting the tweeter at the apex of the woofer cone. Other manufacturers mount the drivers in the same plane and use electronics to correct the time discrepancy by slightly delaying the tweeter with respect to the woofer. Still others use both techniques.

ELECTRONICS

As mentioned earlier, the crossover splits the incoming signal into bands, which are then sent to the appropriate driver. Most inexpensive monitors include a *passive* crossover, which splits the signal from a power amp with a simple lowpass and highpass filter. More sophisticated systems often include an *active* crossover, which splits a line-level signal before it gets to the power amp. In this case, each driver requires its own amp; this is called *biamping* in a 2-way monitor or *triamping* in a 3-way design.

Because active crossovers are normally located before the power amps in the signal chain, most monitors with active crossovers also include internal power amps. These are called *powered* monitors. Powered monitors provide a greater degree of consistency when you take them from one studio to another. In addition, there is no crosstalk between amplifier channels and no risk of overtaxing the amp's power supply. Tannoy makes a small monaural amp called the Limpet that attaches to the back of any monitor, offering the advantages of powered speakers to nonpowered designs.

Other aspects of a monitor's electronics, such as equalization and time correction, can also be passive or active. In fact, there are different degrees of active operation. For example, a monitor might have an active time-correction circuit and a passive crossover. Active systems are more "tweakable" than passive designs, but they add more electronic components to the signal path, which tends to increase noise and distortion.

PERFORMANCE

Unlike many home-entertainment speakers, reference monitors must reproduce as many audible frequencies as

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possible without emphasis or attenuation. The *frequency response* of a monitor is the range of frequencies it can reproduce at a given amplitude, usually within ±3 dB of a nominal level. The frequency response should be as flat as possible, and it should fall off evenly as you move away and/or off axis from the monitor. Among other things, frequency response can be greatly affected by the room in which the monitor is used.

The efficiency with which a monitor converts an audio signal into an acoustic sound wave is called its *sensitivity*. This specification relates the output sound pressure level (in dB SPL) with an input signal of one watt measured at a distance of one meter. Most near-field reference monitors are rated at 88 to 93 dB SPL (1W/1m).

Another significant performance parameter is the *maximum power rating* of a monitor. This is the maximum amount of power from the amp that the monitor can safely handle.

It's important to match the output from a power amp with an appropriate monitor. You might think it's safer to use an underpowered amp than one that is overpowered. However, underpowered amps are more likely to be driven beyond their rated output, which results in clipping and generates distortion that could damage the drivers. It's much better to use an overpowered amp, as long as you exercise caution. Such an amp can easily supply enough continuous power with minimum distortion, and it has plenty of power in reserve (which is called *headroom*) for quick transient peaks.

You often hear the words *soundstage* and *imaging* applied to speakers of all types. Soundstage refers to the imaginary stage between the two speakers (which includes width and depth), while imaging refers to how well the speakers can localize individual instruments in the soundstage. (Note that some people use soundstage to mean the front-to-back placement of instruments and imaging to mean the left-to-right placement, while others use either term synonymously to mean left-to-right placement.)

Good imaging depends on coherent sound from the drivers at the proper distance. Uniform dispersion of sound from the monitor is also critical, particularly in the horizontal direction. As you work at the mixer, you tend to move horizontally to reach controls, but you rarely move vertically. As you move between the monitors, the tonal balance should remain consistent.

EVALUATION

If you're in the market for a pair of near-field reference monitors, here are a few tips to help you shop. Bring along a couple of familiar CDs with wide dynamic range and well-recorded vocals and/or instrumental passages; solo piano tracks are also useful. Listen to the monitors in the near field (about one meter), not from across the room. Move around the monitor to see how it performs off-axis.

Try to find a monitor that accurately reproduces what's on the CD, not one that makes it sound as good as possible. The midrange reproduction may be the most important, because this is the range of the vocals and many solo instruments. The tonal balance should remain consistent at different volume levels, and a sound mixed to the center should be well defined directly in the center of the stereo field.

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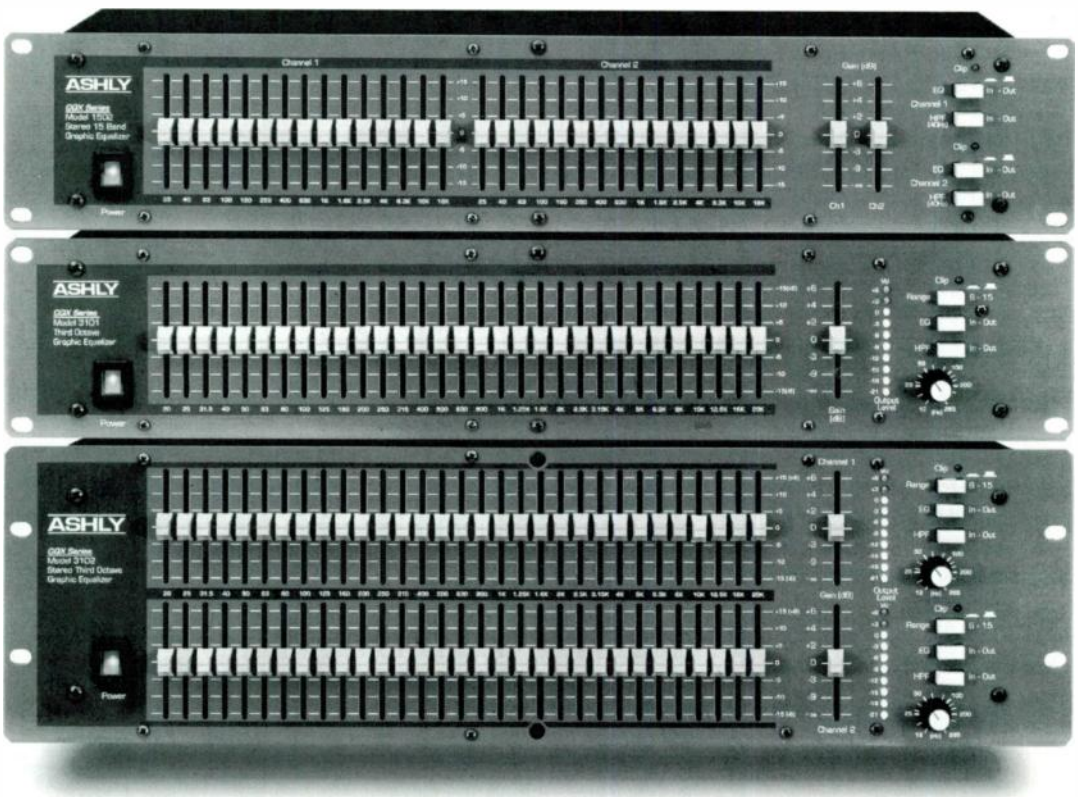

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PLACEMENT

Once you have selected your monitors, it's time to place them in your studio. An excellent starting point is to form an equilateral triangle with the two monitors and your head in the normal listening position. The distance from each monitor to your head should be approximately one meter. You can increase the distance between the monitors, if necessary.

To allow more flexibility, try to mount the monitors on separate stands, not directly on the console or meter bridge. Make sure the stands are solid and secure the monitors by using rubber feet or other nonslip measures. Small, lightweight speakers can actually crawl around when reproducing loud, low-frequency material if they are not secured in some way.

Angle the monitors inward toward your head and adjust their height so the tweeters are at the same level as your ears. Adjust the angle of the monitors to maximize the width of the sweet spot at the listening position.

Try to keep the monitors at least two to three feet from any wall or corner, particularly if they are rear-ported. (Alesis designers claim that anything over six inches is okay.) If they are too close, the bass response will be emphasized. You may want to use port plugs to reduce the bass response if you must place the monitors near a wall or corner. Also, place the monitors far from any reflecting surface, which eliminates any external influence on the speaker's frequency response. (This is called placement in the *free field.*)

Another important technique is minimizing reflections in the room, which can introduce phase and amplitude distortions and confuse the soundstage. The biggest culprits are walls, windows, and mirrors. In addition, parallel surfaces (opposite walls, ceilings, and exposed hardwood floors) can lead to standing waves, which greatly affect the frequency response you hear. If possible, install acoustic treatment to minimize these problems. (See "DIY: Build a Better Bass Trap" on p. 46)

Keep the cable runs from the amplifier to the monitors as short as possible to prevent induced noise and signal loss. Use fairly large speaker cable, at least 10 or 12 gauge. If you place a speaker near a video monitor, the image may become distorted due to the strong magnetic field from the speaker. Some speakers are magnetically shielded, which prevents this video distortion. In any case, don't put magnetic storage media, such as floppy disks and recording tape, near a speaker; this can spell disaster.

Finally, try not to mix at extremely high levels. This reduces the amount of time you can spend in front of your monitors, thus reducing your chances of getting an accurate mix; it also can permanently damage your hearing. With the proper caution and application, your near-field reference monitors will provide years of useful service, helping you create the best possible sound for your music.

(Thanks to Bill Calma of Tannoy, Dennis Goettsch of JBL, Frank Kelly of Alesis, Keith Klawitter of KRK, Ed Long of E.M. Long Associates, John Meyer of Meyer Sound Labs, and George Petersen of *Mix* magazine.)

EM *Technical Editor* **Scott Wilkinson** *likes to get up close and personal with his monitors.*

WORKING MUSICIAN

Showcasing for A&R

How to pass the music industry's most critical audition.

By Nadine Condon

As a developing artist, you are likely to read a zillion self-help books on the "art of the deal," or how to get signed to a record label. For my money, the most crucial step toward getting a deal—indeed, the most important event in your early musical career—is performing at an industry showcase. It often becomes the only aspect of your career where you can be in complete control of your destiny. It is the one time where having a high-powered lawyer, a mogul manager, and an ace producer will not make a bit of difference.

Counting Crows' charismatic performance at a BMI showcase started a fierce bidding war between several major labels.

Even a fabulous demo tape can be a total waste if you can't play your music live when it counts. At a showcase, it's simply you and your music; play well or lose the deal. Understanding the dynamics of the event will help you structure your showcase successfully.

As an independent producer, I have helped BMI (the world's largest performing-rights society) produce several regional showcases. The purpose of these showcases is threefold: to recognize the valuable music resources in the area by offering showcase opportunities in a professional setting; to provide a vehicle for music business professionals to work together; and to stimulate and nurture the grassroots music community.

To these ends, BMI has showcased more than 100 artists to approximately 300 music-industry professionals. Bands that have gone on to obtain record-label or publishing deals include Counting Crows, 4 Non Blondes, Candlebox, American Music Club, Swell, Seven Day Diary, and Sextants. Here are a few things I learned from helping produce these showcases.

WHY SHOWCASE?

Thanks to advancements in music technology, many people can go into a studio and create a masterpiece. However, record labels look at artists as

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investments, not art, so they want multitalented artists with a long life-span. To protect their sizable investment, they want a complete package: artists with great studio chops, charming personalities, immense stage charisma, and the ability to play the music-industry promotion game (meet-and-greets, in-stores, special promotions, and so on) for several years.

Live-performance touring is not only a major sales tool for rock 'n' roll records, it's a means of "breaking" new bands, so it's absolutely necessary that a band be able to play. (Certain genres of music do not demand this, but I am talking about the rock 'n' roll field, not dance or rap.)

At a showcase, the A&R reps get to know you and watch your development. It's also their first opportunity to bring more powerful label reps to see you. Your performance will help determine whether you get signed or need to go back and retool your act.

ANDREW MACNAUGHTAN

The pummeling sonics and sexual posturing of 4 Non Blondes might have scared off some record executives, but the band ultimately became a huge success.

WHEN TO SHOWCASE

Bands should incorporate showcasing into their general business plan as part of their overall focused approach to developing industry relationships. A&R reps do not have time to keep coming to see you or wait for your act to develop. Remember, there are thousands of bands trying to get signed. It is imperative that you make the most of your brief opportunity.

It's a mistake to showcase without a good demo, because then you don't have a good calling card to sustain interest in your band. It's also a huge mistake to showcase when you're not ready. Being ready means having your live show together so you make the best impression on the reps. Focus on good song selection, good pacing of the set, and no dead stage time. (This is not the time to fiddle with knobs or chat with each other.) Play a short set of your best material; 20 to 35 minutes is long enough. Most reps make up their

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"This little mixer has the same electronics as Mackie's incredibly popular CR-1604. The 1202 is billed as a 'low noise, high headroom mixer' and it certainly lives up to its word. The board has a very clear, clean, quiet sound. For home and studio recording applications, I can see the board becoming equally popular as a 'starter unit' and as an auxilliary mixer." *Recording Magazine*

"GRADE: A. One of the product wonders of the pro audio world, the MicroSeries 1202 mic/line mixer is priced so ridiculously low that audiophiles can make good use of it for home recording projects. I tried it with a CD player via the tape inputs and found its sound as clean as that of some audiophile stereo preamps costing twice the price." *Audio Magazine*

[1] Suggested retail price. Your mileage may vary. Price is slightly higher in Canada and outer reaches of the Spiral Nebulae.

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minds after the first three songs.

If the reps are interested in your act, they will start to follow your live schedule, so make sure you have enough followup gigs. Don't just play one showcase and disappear. Make it easy for reps to see you by sending them notices with your gigs' correct start times. The most bothersome thing a band can do is advertise inaccurate start times, making the rep hang around a club waiting.

Sound and lights are important to your show, but only for your peace of mind. If you are happy with the staging, you will perform better. Most reps are more concerned about the essence of your presentation than its technical quality. They are looking for performance ability, personality, and stage presence. Of course, you don't want technical glitches that delay the show or break your rhythm, so make sure you have a thorough soundcheck to work out the bugs.

REGIONAL CONFERENCES

Numerous regional music conferences and showcase weekends have developed in the last five to ten years. These conferences aid the regional musical community and bring all aspects of the music business together.

By assembling talent in one location, you encourage A&R attendance, because the label reps take these weekends seriously. The clubs take showcases seriously, too; they want to make a good impression on the reps in order to book hot up-and-coming acts in the future. Therefore, many clubs upgrade their P.A. system and lights and make sure the house engineer is top-notch. This can really help you put on a first-rate presentation.

Who gets selected to perform at these events is always a subjective process, and every conference planner has different criteria. At this point, I believe a band should have several things happening simultaneously. First and foremost, a band must have a good demo tape. I'm not as concerned with production quality as with original songwriting, good singing, and solid playing.

Second, the band should perform live and have a following. Crowd numbers aren't important; when a band plays off-nights in clubs to establish a draw, it shows that they are serious about their careers. I also look for local

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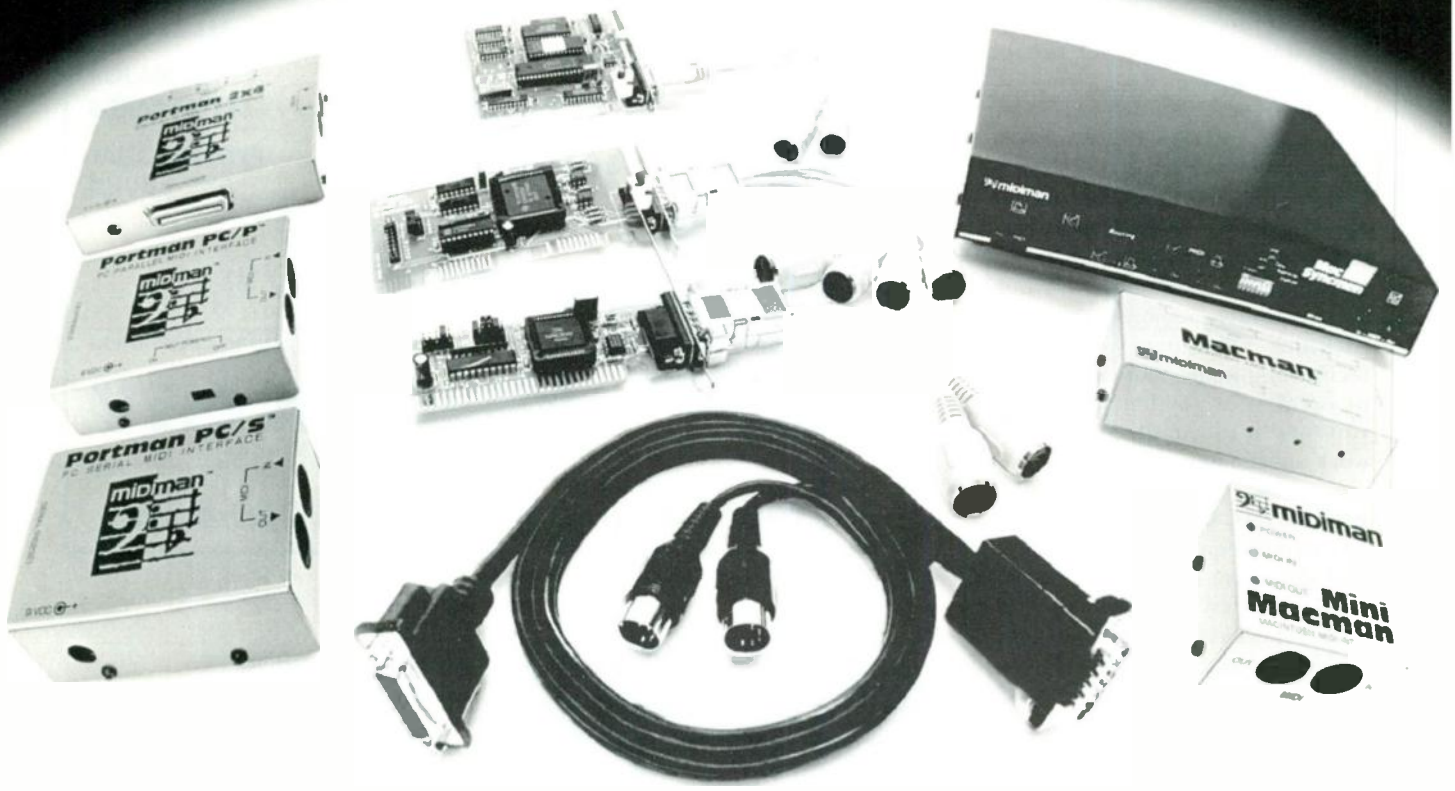

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press, which again tells me they are working to get recognition. I don't care how underground the press is, it's a start. Reviews, combined with postcards listing performance schedules, catch my eye and help me follow the band's development.

Finally, I look for emerging management or attorney involvement. While this is not absolutely necessary, it shows that the band is committed to moving onto a more professional level.

SHOWCASE DOS AND DON'TS

Do play a short set of your best material; approximately 20 to 35 minutes.
Do notify all your industry reps with the correct start time.
Do make sure all your equipment is working.
Do have a complete soundcheck.
Do keep the set moving and fast-paced.
Don't worry about getting the perfect sound.
Don't play every song you've ever written.
Don't bog down the set with inane stage patter or knob-fiddling.
Don't pose and posture; it's dated.
Don't play to the industry reps, play to your audience.

SUCCESS STORIES

Despite all these criteria, most reps go on gut feelings. If something moves them, or if a band has a special vibe, they'll trust their instincts and pay attention. To this end, probably the most exciting band I've helped showcase for BMI was Counting Crows, in February 1992. The band members had been playing around the San Francisco Bay Area in different bands for awhile before they joined forces. We heard the demo tape and immediately flipped—it had great songs and production—so we booked them into BMI's annual February showcase. Only a handful of people knew them, but we all thought they were special.

Counting Crows is a success story because besides the great demo tape and their lucky showcase, they had put together a wonderful team of professionals. Their managers, Steve Jensen and Martin Kirkup, were experienced and savvy music-industry insiders. Their attorney, Allen Leonard, was also well connected. Along with this, BMI talked to every A&R rep in the business about this talented, but unknown, new band.

In preparation for the show, most of my dealings were with the band's guitarist Dave Bryson. He and vocalist Adam Duritz were the bandleaders. Bryson brought Duritz to meet me, and I sat and explained the showcase lineup to them. They were to play first, and this was a deliberate move to ensure a big, early crowd for the show. (We knew *everybody* wanted to see them.) Duritz sat and pleaded with me to put them in the middle of the bill or later in the evening; he was afraid no one would be at the club at 9 p.m. I did everything I could to assure him that the club would be packed. I'm sure he didn't believe me, but there was nothing he could do about it.

The night of the showcase, I was worried that the band might not perform as well as on their demo. Prior to the showcase, they had only played a few shows, and I knew they wouldn't be polished. But Bryson assured me they would be ready. By 9 p.m., everyone who was anyone was in the club anxiously awaiting the start of the show, including well over 30 label and publishing representatives.

That evening is now legendary, as the band performed a compelling, honest set of powerful pop songs. They weren't at all polished, and some thought the performance was flawed. But Duritz showed that he had a charismatic stage persona, while his fellow band members provided a tight set of original material. As *Rolling Stone* magazine stated in its Counting Crows cover story on June 30, 1994, "Counting Crows was still evolving as a band when an appearance at a BMI showcase in February 1992 kicked off a bidding war involving nine labels."

Candlebox's youthful vitality and strong performance at an industry showcase nailed a deal with Madonna's Maverick Records.

Candlebox was another band that opened a showcase bill. They were very young and just starting to make a name for themselves in Seattle. Madonna's Maverick Records was brand new and just beginning to look for talent. The Seattle scene was hot because of Nirvana and Pearl Jam, and there was strong industry interest in this show. Candlebox played a solid set. Their youth and vitality, along with the enthusiastic support of their young, dynamic lawyer, Scott Harrington, probably won them a deal.

THE FICKLE FINGER OF FATE

To show you how subjective the showcasing selection process is, consider my experience with 4 Non Blondes and the Sextants. The two bands played on the same bill at a club in San Francisco in 1990. I fell in love with the Sextants and thought 4 Non Blondes were just okay. The ringing harmonies of the Sextants reminded me of Fleetwood Mac, although I wasn't sure fans in Iowa would listen to 4 Non Blondes' overt sexual politics and raucous rock 'n' roll.

The two bands went on to obtain major-label deals, the Sextants with Imago and 4 Non Blondes with Interscope. However, the Sextants record went nowhere, while 4 Non Blondes skyrocketed. It just goes to show that you never know. Those fans in Iowa proved themselves to be a lot hipper than I was.

Nadine Condon *is a music-business consultant specializing in promotional strategies. Her clients include BMI, Island Records, Atlantic Records, Higher Octave Records, CBS Radio, and The Plant Recording Studios. She has worked with artists such as Melissa Etheridge, Steve Miller, and Craig Chaquico.*

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MULTIMEDIA MUSICIAN

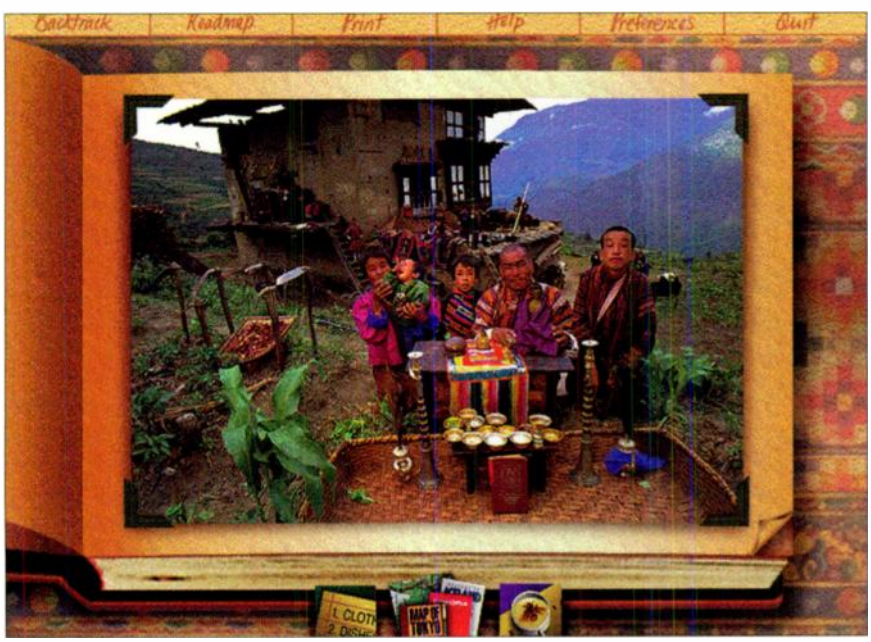
Family Portraits

Audio production secrets from a Material World.

By Michael Brown

In terms of producing consumer multimedia titles, CD-ROM is the best game in town. CD-ROM technology, however, presents multimedia producers with some major stumbling blocks. For example, the limited bandwidth of current CD-ROM drives places severe qualitative limits on audio and video content. This limited bandwidth also makes it difficult to synchronize audio and video events. And no matter how compelling the music, narration, sound effects, and visual elements may be, synchronization problems can rapidly drain a multimedia title of its impact.

The creative team at Watts-Silverstein and Associates, veteran video and multimedia producers, is well aware of this fact. When they set out to produce their first consumer multimedia CD-ROM, StarPress Multimedia's *Material World: A Global Family Portrait,* they knew that synchronization would be one of the biggest challenges to overcome.



Material World **explores the lives and material possessions of 30 families around the globe. Each family agreed to pose in front of their home surrounded by almost all of their possessions. The Namgay family, from Bhutan, places special value on their two jeles (long, double-reeded ceremonial clarinets) and fourteen choeps (metal bowls that hold water offerings on their Buddist altar).**

GLOBETROTTING

First, however, the team had to get a handle on the immense size of the project at hand. Freelance photojournalist Peter Menzel and sixteen of his colleagues—with the support of the United Nations and the World Bank—had fanned across the globe, visiting 30 nations to document the lives of an average family from each of those countries.

One photojournalist lived with each family for one week, during which time he or she interviewed, photographed, videotaped, and compiled written observations about the host's life, lifestyle, and aspirations. As the title indicates, Menzel was particularly interested in cataloging his subjects' material possessions. Amazingly, the photographers convinced their hosts to pose, surrounded by nearly all of

their possessions, *outside* their homes. When the team was finished, they had amassed more than 25,000 photographs, 112 hours of audio and video material, and reams of notes.

Clearly, a single CD-ROM disc could hold only a fraction of that material. The question of which material to include and which to leave out then emerged.

"The 30 pictures that display the family in front of their house with all their material possessions were clearly the focus of the project," says co-creative director Paul Gregutt. "We made them the centerpiece of the title."

In addition to that material, Gregutt and co-creative director Ted Evans squeezed onto the disc nearly 1,500 other photographs (with captions); dozens of short movies; a short, original musical composition, plus a snippet of each country's national anthem; a relief map of each country; and an almanac-style description of each country.

Gregutt and Evans organized all this material into 61 short multimedia presentations: an introduction to the title, plus a presentation focusing on each country and one that focuses on each family. All of the presentations feature voiceover narration by retired CBS correspondent Charles Kuralt. The result is a series of minidocumentaries that provide a revealing portrait of the Earth's human inhabitants.

PRE-PRODUCTION

One of the reasons that *Material World* looks so polished is the quality of the pre-production work. Gregutt spent six weeks writing the script, while Evans sifted through the thousands of photographs and designed the user interface. They examined all 112 hours of videotape and took extensive notes, including the type of background sounds that were present in important scenes.

"While I was watching the video of the Ethiopian family," says Gregutt, "I heard these nice slapping sounds as the wife made dung patties for fuel. I made a note of that and later incorporated it as a sound effect beneath Kuralt's narration."

Next, they created storyboards with timing notes that outlined how each of the modules would flow. They provided these to the audio engineer during the earliest stages of the audio-production cycle.

COMPOSING

Securing the rights to existing indigenous musical recordings would have been prohibitively expensive; in some cases, it would have been impossible. Instead, Watts-Silverstein contracted composer Dan Dean to produce original recordings that reflected the ethnic musicology of each of the countries. Dean is a jazz bassist and veteran post-production artist who produces commercial music for clients such as Nike, Soloflex, and Boeing.

"The producers would tell me they needed music for a particular country, and they'd usually send me an audio cassette containing samples of music from that culture," says Dean. "I don't know where they got them; they'd just show up on an unmarked cassette with a note explaining, 'Here's an example of Mongolian music,' or something like that. I also referred to a number of books that I collected during my university days to get ideas about the appropriate scales and instrumentation."

Using musical arrangements that were faithful to the cultures being represented was important to Gregutt and Evans. "We're dealing with a product whose subject matter literally spans the globe and goes out to where people actually live and examines their lives," says Gregutt, "so we wanted the music to reflect that authenticity."

Dean relied on his sizable collection of samples for his two 32 MB E-mu EIIIx samplers, plus his Korg 01/RW and Wavestation A/D sound modules. He used an E-mu EIII as his keyboard controller. The most difficult aspect of the project, according to Dean, was coming up with microtonal scales so that the music wouldn't sound tempered.

"The EIIIx supports user-definable scales," says Dean, "so I would just detune some of the notes in the scale to make it sound more organic. I might take a xylophone patch, for instance, and warp out some of the notes to make a scale that sounded like the recordings I'd been given. It's difficult, because there just aren't enough sample libraries of ethnic instruments. There are a lot of African instruments, such as gourd marimbas, that you can't find in any sample library. You have to improvise."

Dean used a Quadra 800 and Mark of the Unicorn's *Performer* to produce the 30 1-minute compositions he created for *Material World*. He had enough outputs and memory on his samplers to perform virtual mixes and record directly to tape. He delivered the final product to Watts-Silverstein on DAT cassettes.

ENGINEERING

Audio engineer Ella Brackett mixed much of the *Material World* soundtrack at Seattle's Bad Animals studio. Charles Kuralt's narration was recorded at a

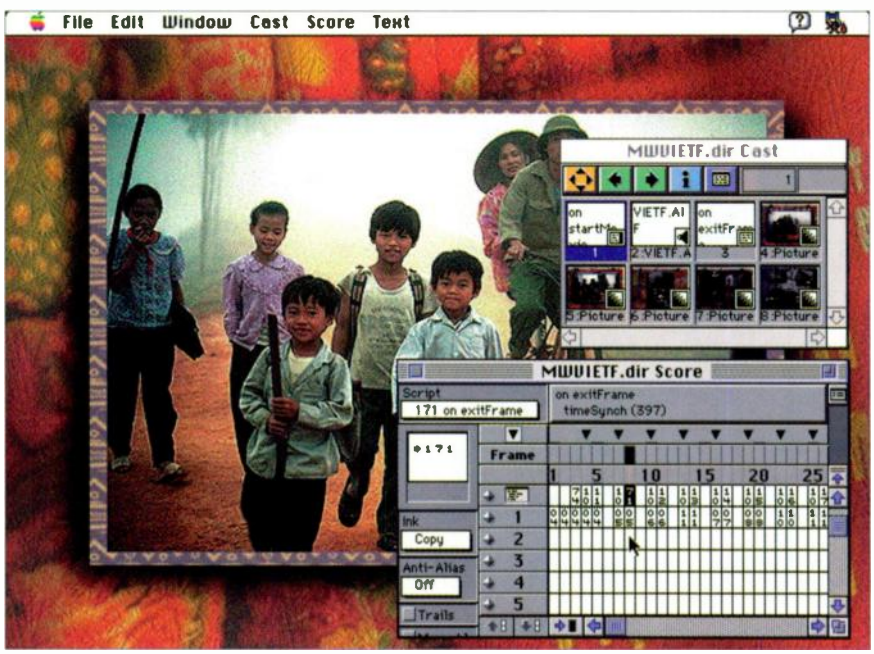
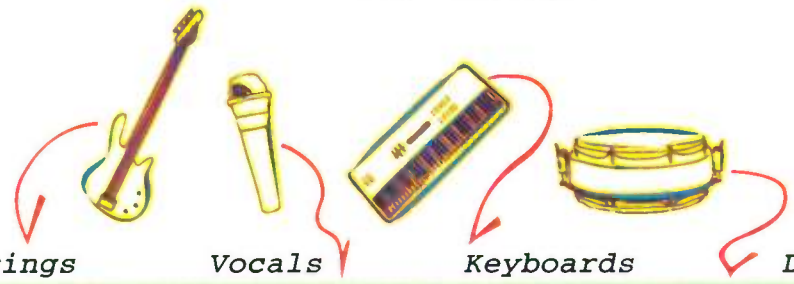


FIG. 1: The Score window in *Director* is similar to the event list in a MIDI sequencer. The columns represent time, and the rows represent tracks.



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PEAVEY

New York studio and delivered to Bad Animals on DAT, as were Dean's music tracks.

Brackett performed much of her work on a New England Digital (now The Synclavier Company) Post Pro digital audio workstation, an unusually high-end system for multimedia work.

"We went to great lengths to make sure that the audio stayed in sync with the video," says Brackett. "Watts-Silverstein provided us with storyboards marked with timing notes for each module as soon we started working on the audio. By the time we were ready to do the final sweetening and mix, they had given us rough visuals on VHS tape. We dubbed that to a ¼-inch work tape striped with SMPTE time code, so we could synchronize the audio to the visual events. Theoretically, the timing wasn't supposed to change after that.

"We mixed for the lowest common denominator: the sound coming out of the computer's speaker," Brackett continues. "We tried to keep everything simple and tight. I equalized the project in much the same way that I would EQ a television commercial. I knocked out a lot of the low end and made sure that it cut through when we listened to the tracks in the low-fidelity environment of multimedia speakers. I kept the vocals fairly tight, but I did minimal EQ to the music."

Charles Kuralt's baritone narration cuts through the mix so well that you'd

FIG. 2: *Director*'s Lingo scripting language is the secret to the tight audio/visual synchronization that the producers were able to achieve.

swear you were watching CBS's *On The Road* or *Sunday Morning* on television, instead of a multimedia program on a CD-ROM.

"I compressed Charles to death," says Brackett. "They probably compressed him when they originally recorded him in New York, I compressed him on the way into the Post Pro here, I compressed him on the way back out again, and then I put the final mixes through a compressor. In fact, I probably compressed everything harder than I would have for any other medium. When you're compressing at a 4:1 ratio with a 10 dB threshold over and over again, everything gets pretty squished."

Barrett delivered the final stereo mixes to Watts-Silverstein on time-code DAT, but Evans also asked for and received the premix tracks in order to digitize the music, voiceover narration, and sound-effects tracks individually.

SWEETENING

Evans and Gregutt went through an elaborate audio-sweetening process on this project. They dumped each of the *Director* modules onto videotape, reviewed the tape, and made notes regarding the sound effects they thought would be appropriate for each scene. They pulled hundreds of sound effects from the video footage and from sound-effects libraries, digitized them, downsampled them, and added them as backing tracks to the video and narration. For instance, the segment on a Mexican family has a photograph of a man welding, so Gregutt recorded some welding sound effects from a sound-effects library.

Gregutt pulled many other sounds from the videos that were shot in the field. "The videotapes had a lot of sounds of people going about their daily lives, crowd noises from a market scene, and things like that," explains Gregutt. "Even though the language from such scenes wasn't distinct, I didn't want to use a backing track with English in it if I was showing a marketplace in Mongolia. Those are the kinds of sounds that I pulled from the video.

"One of the things I learned from that process," Gregutt continues, "is that a lot of the nuances of the audio get lost when you have to squeeze it into low-resolution, digital form. Unless I know that I'll have more room on the disc for higher-resolution audio, I'll probably do less sweetening the next time around."

DIGITIZING

Evans admits that he's not entirely happy with the audio on *Material World*, but he says it was the best they could do considering the space limitations they had to deal with. He also feels the mix that was done didn't go far enough to account for the fact that the tracks were going to wind up on a CD-ROM, as opposed to video or an audio CD. "It was a good 'record' mix," says Evans, "but often that kind of mix doesn't work in a low-resolution environment."

As is common with multimedia projects, Evans digitized the audio in stereo at 16-bit resolution and at a 44.1 kHz sampling rate. He subsequently downsampled the resolution to 8-bit and the sampling rate to 22 kHz. This practice delivers better-sounding 8-bit/22 kHz audio than if the audio is digitized at 8-bit/22 kHz in the first place. Evans chose Macromedia's *SoundEdit 16* sample-editing software and the built-in digitizer on a Quadra 660AV for this task. He saved the files in AIFF format.

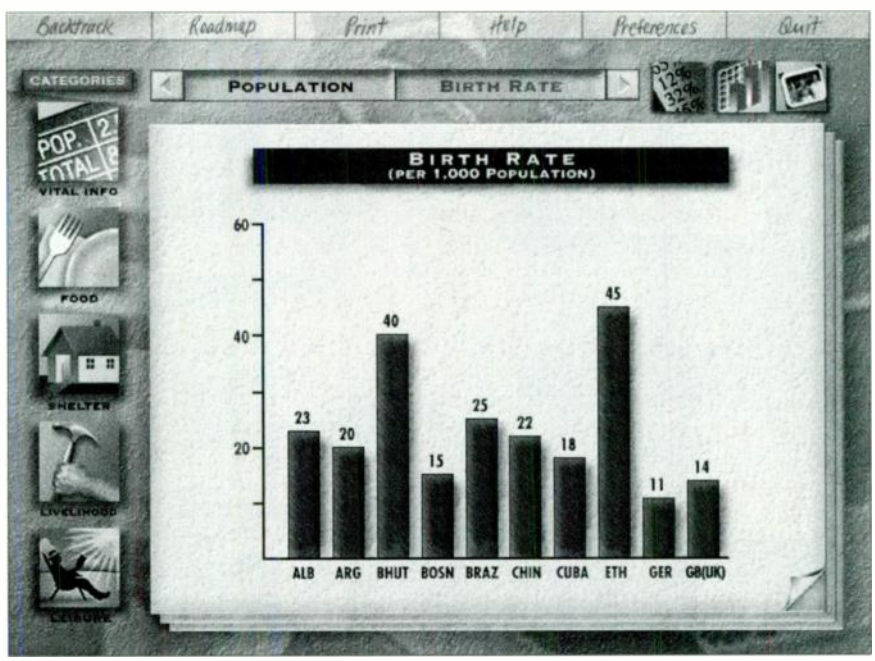
"I wanted the premix tracks, so I could manipulate the tracks individually before I sampled them," says Evans. "For instance, I knew I would need to warm up some of the sound effects before I downsampled them. High-frequency sounds tend to sound tinny or disappear altogether when they're recorded at or converted to 8-bit."

The team used Apple's *MovieRecorder* software to digitize the Hi-8 mm videos that were recorded in the field. They captured the video without any compression to get the highest-quality video possible. They applied the Cinepak video-compression algorithm to the footage on a second pass to reduce the size of the files, but they didn't compress the audio at all.

"Still photographers don't make the best videographers," Evans chuckles. "And the last thing they were paying attention to was the quality of the sound, but most of what we used was like home movies anyway; it was people cooking in their kitchens or saying their names."

SYNCHRONIZING

Aside from the sheer scope of its coverage, the most impressive element about *Material World* is the tight synchronization between the audio and visual events in this production. This fact is doubly impressive when you realize that Macromedia's *Director*, the authoring system with which *Material World* was created, doesn't support SMPTE time code. The creative team accomplished this feat by exploiting Lingo, the scripting language that is built into *Director*.



In the interest of speed, the producers of *Material World* decided to use premade bar charts, instead of having the program plot graphs on the fly.

Although it is possible to create a *Director* presentation simply by pointing and clicking with the mouse, intricate details can be created only after you've mastered Lingo. "There are a couple of ways to get around the synchronization problem," Evans points out. "One way is to produce your audio tracks in the form of *QuickTime* audio and then write a *Director* script that will sync to *QuickTime*. That works okay, but if you play the script back on a slow computer, the audio will break up because *QuickTime* will drop frames in order to keep up."

Evans' solution was to digitize the audio tracks and store them as AIFF files external to the *Director* script. "It's kind of a bogus workaround," says Evans. "But it works. Because we arranged the visual elements in a series of modules, we had the engineer master the audio tracks in the same way. The first thing we did after we received the audio tracks was to lay down the narration in time with the visuals. After that was done, we went back through again and added the music tracks. Then we went back through a third time and did our audio sweetening."

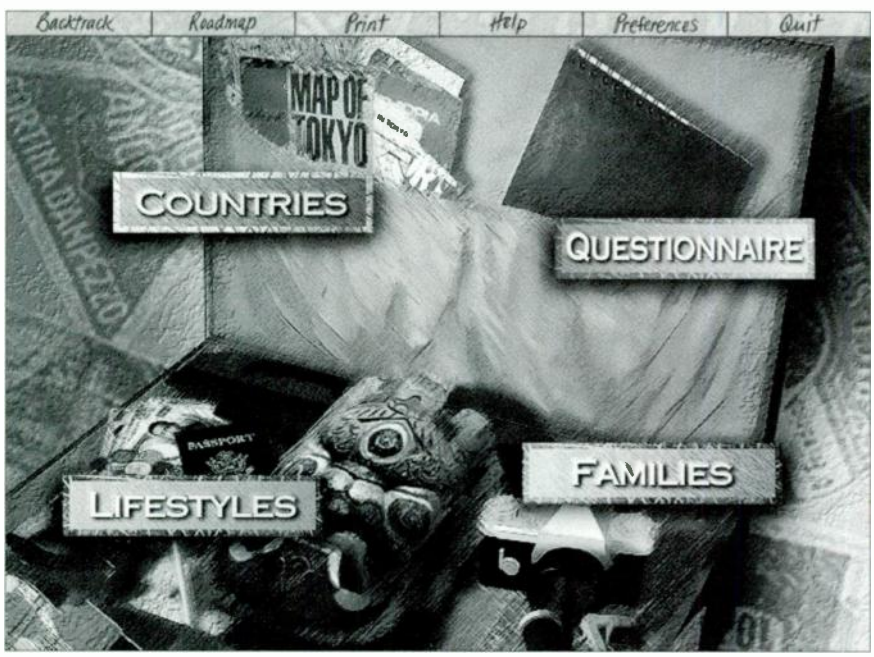
Once this rough cut was finished, Evans created a series of Lingo scripts that lock the production's timing to the computer's internal clock.

Director's Score window (see **Fig. 1**) is similar to the event list in a MIDI sequencer. The columns represent time, and the rows represent tracks. The cells formed by the intersection of the rows and columns are frames that contain events. One track each is dedicated to the production's tempo, color palette, timing, sound, visual transitions, and Lingo scripts; the remaining tracks contain "Cast Members," which can be external sound files, still pictures, *QuickTime* movies, or other elements.

The upside-down triangles in the Score window are frame markers, and the numbers below that are frame numbers. The black box in the row of boxes labeled "Frame" indicates the production's current frame. As the indicator passes over each frame, the events in that column are executed.

Theoretically speaking, every event in a given column should begin at exactly the same time as the indicator passes over it. Given the performance limitations of a personal computer, however, it's not nearly that simple. One of the most common problems that multimedia developers face is that they have little or no control over the computer that their production will be played back on. They can define certain minimum requirements, but that's about it. As a result, if they create their product on a midrange computer, it may play back slower on a slow computer and faster on a fast computer. Imagine producing a movie and having it play back at different speeds depending on which theater it's shown in!

One solution for *Director* producers is to establish a clock time and identify certain frames in the production as "key frames." If, during playback, the production falls behind by a given number of clock ticks, *Director* can skip ahead a few frames to the next key frame. Likewise, if the production gets ahead of itself, it can mark time by repeating a few frames until it's time to move on to the next key frame.



The viewer can explore *Material World* by embarking on four different journeys, all of which depart from this suitcase.

SCRIPTING

The Lingo script in **Fig. 2** shows some of the tricks that Evans used to make *Material World* so smooth and well synchronized. The script that begins with the statement "on startMovie" sets up certain aspects of the computer's environment. The command "set colorDepth to 8" puts the computer's video hardware into 8-bit (256 colors) mode, while "set the soundLevel to 7" sets the level of the computer's sound hardware to a value of 7 on a scale of 10. In order to prevent hiccups during playback as the computer copies files from the disc into memory, *Director* allows the programmer to preload those files into memory before they're played back.

The command "unLoadCast" clears any unneeded cast members that may already reside in the computer's memory. The commands "preLoadCast 64,73" and "preLoadCast 88,106" load those new cast members into memory. As you may have already guessed, the command "preLoad "VIETF.AIF" loads that AIFF sound file into memory.

The script that begins with the statement "on timeSynch x, y" is a global script, i.e., it applies to the entire production. It looks at the key frames and decides whether the production is falling behind and should bounce ahead to the key frame—dropping frames in the process—or if it's on time and can display all the frames or pictures in the score. If the title is viewed on a very fast computer, the script might even repeat some frames in order to stay in sync.

In this script, x represents the key frame, and in the statement "set y = x + 60" the value of 60 represents 60 CPU clock ticks. The value of y, therefore, is the key frame plus 60 CPU clock ticks.

The statement "if the timer > y then

go to marker(2)" compares the value held in the timer to the value of y. If the timer's value is higher than the value in y, then the presentation is falling behind. In that case, *Director* will drop frames and skip to the next marker in order to maintain sync.

The statement "if the timer < x then repeat while the timer < x go to the frame" compares the value held in the timer to the value of x. If the timer's value is less than the value of x, then the production is tolerably in sync and *Director* will display the next frame in the sequence.

In both scenarios, if the production gets 60 clock ticks either behind (the timer value is greater than the value of y) or ahead (the timer value is greater than the value of x), *Director* will either skip or repeat frames until the production is in sync again.

▼

The producers pulled hundreds of sound effects from the video footage.

ENJOYING

Material World is a wonderfully well-produced CD-ROM title. Although CD-ROM technology is still too limited in terms of audio/visual quality, Peter Menzel, StarPress Multimedia, and the creative team at Watts-Silverstein have set a high mark for other multimedia producers to shoot for.

Anyone who is using or plans to use *Director* as their multimedia authoring system would do well to study its Lingo scripting language before they start. There may be a heavy learning curve to get past, but once you've mastered it, you'll be able to produce more compelling multimedia projects.

Michael Brown *has packed his wheelbarrow and moved on, but he wants to thank all the people who made his stay at* **EM** *such an incredible adventure.*

SERVICE CLINIC

Soldering, Part 1

Choosing and using the right tools for those hot, tricky jobs.

By Alan Gary Campbell

JACK DESROCHER

Proper soldering and desoldering skills are indispensable for the do-it-yourselfer or professional tech. Yet I have made a lot of money repairing poor soldering and desoldering "repairs," much of it done by professionals.

Soldering and desoldering are readily demystified with the right equipment and materials, some directed practice, and a little common sense. During my first soldering experience, I inadvertently grabbed the hot part of the soldering-iron barrel. If someone as mechanically inept as I can learn to produce high-quality solder joints, anyone can.

HOW SOLDERING WORKS

Solder is an alloy, most commonly formed from a 60:40 ratio of tin and lead. Typically, solder is extruded, like wire, and comes on a spool. Electronics solders have a central core, or cores, (see **Fig. 1**) of resin flux that is heat-activated. (Acid-core solders should *never* be used for electronics work.) When solder is applied to the junction of two wires, the flux acts as a cleaning agent, and the solder and outer molecular layers of the wires interact to form a physical and chemical bond.

The pencil-type soldering iron with a permanently clad tip is the modern standard. Tips for modern irons do *not* require filing and tinning, as in the old days. If you file the cladding off a modern tip, you'll ruin it.

Investing in a cheap or generic iron is false economy. For the novice, a 30-watt (approximately), pencil-type iron from a major manufacturer—such as Ungar or Weller, but not Radio Shack—is the minimum required. The iron should feature easily replaced, clad tips and a grounded design with a very low tip potential. (Look for a 3-wire power cord.) The latter is important, as modern ICs can be damaged by stray tip voltages and static.

This is merely a minimum. It is unrealistic to expect a basic iron to recover quickly between joints, so work may proceed slowly. Also, the iron probably won't have sufficient capacity for larger, electromechanical components, such as audio jacks.

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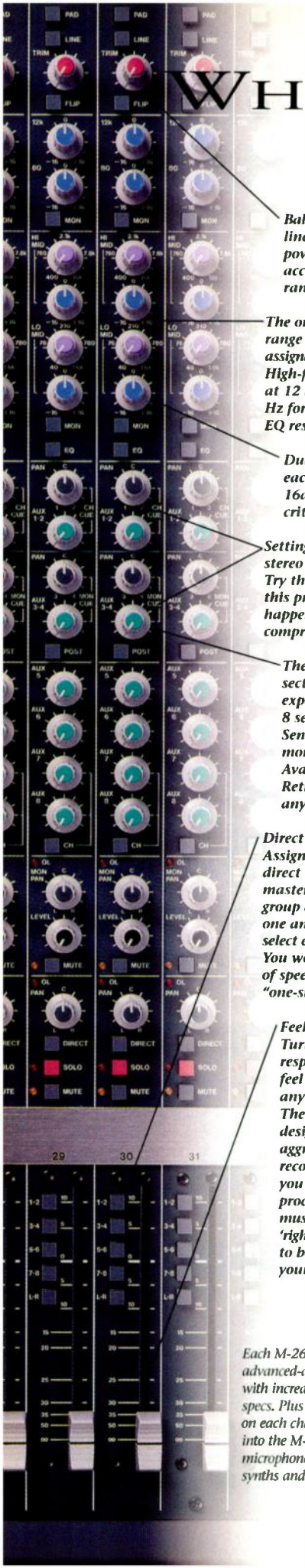

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Dual sweepable mids on each channel let you apply 16dB of boost or cut at critical frequencies.

Setting up two independent stereo cue mixes is no problem. Try this with other mixers in this price range, it just won't happen or you'll have to compromise something.

The most versatile AUX section in its class; rivaling expensive high-end consoles. 8 sends total, 2 in stereo. Send signal in stereo or mono, pre- or post-fader. Available all at once. Return signal through any of 6 stereo paths.

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Feel those 100mm faders! Turn those smooth and responsive knobs! They feel and work better than any other in its class. The M-2600's physical design takes the aggravation out of recording and lets you focus on the process of creating music. Everything is 'right where it ought to be'. Try it for yourself.

Each M-2600 channel features advanced-design mic pre-amps with incredibly low-distortion specs. Plus you get phantom power on each channel. Feed anything into the M-2600 from condenser microphones to line input from synths and sound modules.

For your personal or project studio, don't settle for anything less than a dedicated recording console. Some may try to convince you that a "multi-purpose mixer" works fine for multitrack recording. But don't take their word for it. The compromises, hassles and workarounds just aren't worth it.

Want proof? Ask your salesman how a multipurpose mixer handles these common recording situations. But listen carefully for workarounds, repatching schemes and other compromises. Then compare it to how easily the M-2600, a *true* recording console, sets up and does things.

SITUATION Separate headphone mixes for the talent and the producer. The talent wants a reverb-wet mix, but the producer wants it dry. Everyone wants it in stereo.

Compromise: Multi-purpose mixers require you to sacrifice 4 AUX sends and tape returns to get 2 stereo headphone mixes; but you need those sends/returns for outboard effects! What a dilemma.

M-2600 Solution: With a few buttons, assign up to two, independent stereo AUXs to be used as headphone mixes. Everyone hears the mix they want — and you've still got four AUX sends and returns free for signal processing gear.

SITUATION You're EQing tape tracks to get just the right sound. You're using the shelving EQ for the monitor mix, and the sweepable mids for the channel buss. Still, the drummer wants a certain frequency out of his mix — a job for the sweepable mids.

Available with 16, 24 or 32 inputs, the M-2600 is optimized for digital recording. Don't wait till your first session to discover the compromises and hassles other boards will put you through.

Compromise: Few multi-purpose mixers have EQ assignment. You're stuck with the shelving EQ on the monitor mix, and the sweepable mids on the channels *(if they even have split EQ)*. You've got no choice. Good luck trying to explain this to the drummer.

M-2600 Solution: Assign the shelving EQ, the sweepable EQ, or both to either the monitor or channel buss as necessary. The entire EQ section is splittable and assignable and can work in tandem.

SITUATION Mixdown. You're sending tracks to effects units for added studio polish. You want to take advantage of true stereo effects. How do you do it?

Compromise: Most multi-purpose mixers have fewer AUX sends than the M-2600's eight. Usually only in mono. And, some sends are linked, so you can't send them to different signal paths. So you settle for only a few effects, or forego stereo effects altogether.

M-2600 Solution: Pick one: 8 mono sends or 1 stereo and 6 mono sends or 2 stereo and 4 mono sends. Each with its own level control and separate output jack. So you can use true stereo effects and still have sends left over for effects. Send the effects signals back via 6 stereo returns.

That's not all! The M-2600 doesn't compromise sound, either. You'll appreciate the new TASCAM sound — low-noise circuitry and Absolute Sound Transparency™. It all adds up to the perfect console for any personal or project studio — combining great sound with recording-specific features you'll need when recording, overdubbing and mixing down. Features you can get your hands on for as little as $2,999 *(suggested retail price for the 16-input model)*.

So forget compromises. Invest in a true recording console. The TASCAM M-2600.

DING, MOST OTHER CONSOLES MPROMISING SITUATION.

Only the M-2600 provides two independent stereo cue systems. Demanding performers can hear the submix or scratch tracks the way they want, so they'll perform better. Meanwhile, the control room or producer's mix is unaffected. You can accommodate everyone involved in the production — without interrupting the creative flow.

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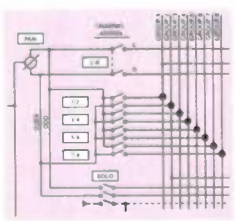

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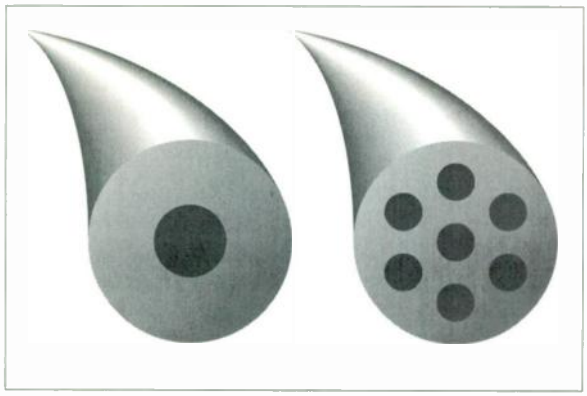

FIG. 1: Some technicians feel multicore solder (right) provides more reliable flux activation, as the multiple, smaller cores respond more quickly to heat. However, single-core solder (left) is more common in industry, and good-quality solder of either type should yield excellent results.

A *soldering station* adds a closed loop, temperature-control system to the basic, pencil-type iron. It is called a "station" because the control electronics are commonly housed in a substantial base unit. With a typical soldering station, the user can adjust the tip temperature by simply turning a knob. At the maximum temperature setting, there is usually enough reserve energy to solder medium-size electromechanical components. The closed-loop circuit ensures that the tip temperature recovers quickly between joints. Even though a station is more expensive than an iron, it is a better investment. The increase in speed, reliability, and range of work is considerable. Properly maintained, a station lasts indefinitely.

DESOLDERING EQUIPMENT

The simplest desoldering device consists of a copper braid. The braid is placed in close contact with (or wrapped around) the joint to be desoldered and heated with a soldering iron. Wicking draws solder away from the joint and into the braid. Braid is inexpensive and straightforward to use, but there is significant danger of overheating the work, which can damage components or lift a trace on the PC board. Moreover, braid will often leave solder in the hole and make safe removal of the component lead difficult.

Somewhat more effective is the plunger-type, vacuum solder-removal device. The device is "cocked," like a crossbow, by engaging a plunger against the force of an internal spring. The device's suction tip is placed over the joint to be desoldered, then the joint is heated with a soldering iron, and the plunger is triggered. Again, overheating the joint or leaving solder in the hole are concerns.

Older, vacuum-bulb-type devices, once common, are similar in function but provide unpredictable results and are not recommended. Hybrids that attempt to combine a vacuum bulb and a soldering iron, providing a heated tip, can easily overheat the work and should not be used.

None of these devices approaches the safety and ease-of-use of a desoldering station. A desoldering station provides a closed-loop, temperature-controlled tip, but the desoldering tip has an axial bore, like that of the plunger-type device, through which solder is sucked into a reservoir. On most desoldering stations, an internal pump provides convenient, virtually instantaneous vacuum to the tip. (A few stations utilize an external vacuum source.) The vacuum is controlled by a trigger in the grip of the desoldering assembly.

A desoldering station is a mandatory acquisition for a service center. But these devices are somewhat expensive, with base models starting at $300. This is perhaps beyond the range of the do-it-yourselfer. For those who do not routinely need to desolder multiple joints, there are ways around the limitations of braid and "solder suckers," which we will discuss later.

SOLDERING BASICS

The beginning do-it-yourselfer often finds it difficult to solder uniformly. This is understandable, as there are many variables. First, make sure you have the proper equipment—iron, tip, sponge—in good working order. Then make sure the work is clean. Wire and component leads are rarely ready to solder straight out of the package. They should be thoroughly cleaned with a plain, detergent-free, Scotch Brite-type pad before soldering. When they're so shiny you can almost see yourself, they're ready.

PC boards with raw-copper, unplated traces (such as those sometimes provided in kits) should also be thoroughly buffed before soldering. Copper can oxidize quickly and is highly affected by body oils. Wait to clean the board until just before you solder and avoid excess handling.

Potentiometer and switch terminals can be difficult to clean; cheap pots are prime offenders. Occasionally, with cheap parts, you'll have to settle for imperfect results, as continued cleaning will not improve the surface condition,

The Weller DS 800 electronic desoldering station provides a closed-loop, temperature-controlled, hollow tip through which solder is sucked into a reservoir. An internal pump provides suction.

but it will remove all the plating! Very fine steel wool can also be used to effectively clean component leads and PC boards, but steel wool residue is highly conductive and must be kept away from electronic equipment.

Electronics solder is intended to provide a low-resistance connection only, not to serve as "glue." In general, component leads should be secured mechanically before soldering. Spreading leads slightly before soldering will help to stabilize PC-board components. "Tack soldering," where no mechanical support is provided, is advisable only when specifically called for in a given procedure.

Better solder provides better joints. Though the 60:40 alloy is ubiquitous, 63:37 is preferable for all electronics work, and it is mandatory for high-tech PC boards with plated-through holes. It provides much better whetting and does not pass through a noticeable "plastic" state as it changes from solid to liquid phase. It is only slightly more expensive and is worth the cost. Excellent results can be obtained with single- or multicore solders, but use only high-quality solders, such as the Kester brand (available from electronics suppliers). Avoid generic solders from Radio Shack and department and hardware stores.

Next time, we'll examine more soldering techniques, desoldering techniques, and tricks to make difficult jobs easier.

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EM *contributing editor* **Alan Gary Campbell** *is owner of Musitech.*

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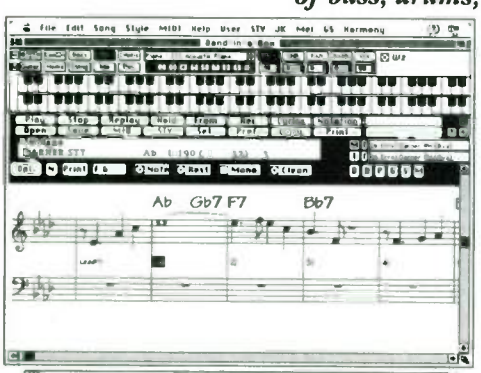

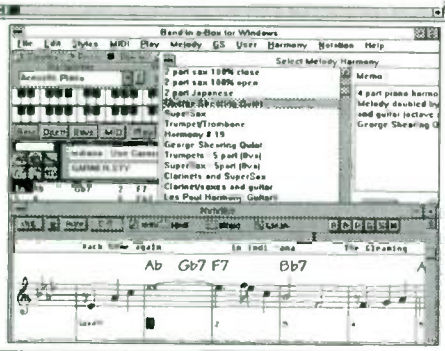

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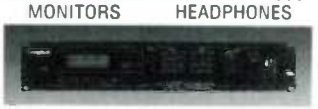
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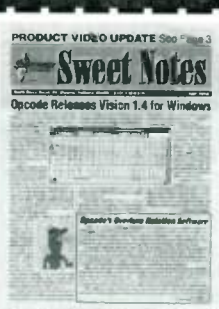

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Reviews

Alesis QuadraVerb 2

By Larry the O

Affordable multi-effects for the all-digital age.

Most EM readers own or have used at least one piece of Alesis gear, whether it's an ADAT, MIDIVERB, SR-16, or whatever. Alesis pioneered inexpensive digital audio products, and one of its greatest hits was the QuadraVerb multi-effects processor. According to Alesis representatives, the new QuadraVerb 2 is so different from the original QuadraVerb that it shouldn't even share that name, but it does anyway. (Presumably, naming it after its popular antecedent gives the new device a marketing advantage.)

Like its namesake, the Q2 is a multi-effects processor that offers EQ, delay, pitch-shifting, and reverb. As with the original, the Q2 presents a combination of features and performance that is groundbreaking for an effects processor in its price range. But there the similarity pretty much ends.

Although it derives its name from Alesis' popular QuadraVerb, the QuadraVerb 2 is a far more powerful beast. For example, the new unit offers up to eight effects Blocks per program, discrete processing of the left and right inputs, higher quality effects, and ADAT 8-channel digital I/O.

The QuadraVerb 2's front panel describes it as a "Dual Channel Octal Processing Master Effects w/Digital I/O," which is a mouthful, but accurate. To translate, the unit processes the left and right inputs discretely (unlike the original QuadraVerb, which summed them to mono before processing), uses up to eight effects Blocks per program, and features some effects that are much higher quality than its predecessor, especially the reverb. The Q2 also includes ADAT 8-channel digital I/O, a major step forward.

GETTING PHYSICAL

Physically, the Q2 is a bantam. It is only six inches deep (no extra-deep racks needed for this puppy), requires 1U of rackspace, and weighs a mere 4.2 pounds. Part of the reason for its svelte countenance is the outboard power transformer, which is of the tolerable "lump-in-the-line" variety, as opposed to the much-hated "wall-wart" type.

The rear panel is straightforward, with stereo, balanced, TRS ¼-inch inputs and outputs that can also be connected unbalanced. The outputs are even servo-balanced, which alleviates the annoying level loss that can happen when unbalancing a balanced output. The ADAT optical digital I/O connectors are joined by a BNC jack for receiving a 48 kHz word clock from Alesis' BRC or AI-2 controllers, which is required when using digital I/O in a system with several units. The rear panel includes ¼-inch phone jacks for Bypass and Advance footswitches as well as MIDI In and Out/Thru.

The front panel has separate (thank you very much), concentric level controls for the left and right inputs, an output-level control, dual 4-segment LED level indicators, backlit (thank you again) LCD display, Value/Enter wheel/switch, and lots of buttons. (I'll describe these as I get to them.) The level controls allow you to use both -10 dBV and +4 dBu devices, even if the source is one level and the destination another. This is a small, but useful, convenience. The LCD shows the current program name and number, a block diagram of the program, indicators that show which editing page you are currently on and how many pages there are in your current context, whether digital I/O is present, and whether MIDI data is being received. (Every MIDI device should have a data-present indicator.

The Q2 uses Sigma-Delta A/D conversion (18-bit, 128× oversampling) and 18-bit, 64× oversampling Delta-Sigma D/A conversion on the outputs. I like 'em; they sound good. The Q2 is aimed at performers, who will typically put the unit in series and mix wet and dry internally, and project studios, who do their effects mixing at the console. In recognition of this fact, Alesis has thoughtfully included a Global Direct Signal Mute, which removes the direct signal. This avoids the hassle that many other processors present, in which you must create studio versions of programs without any direct signal and live versions of the same programs with direct input mixed in.

Curiously, the utility of this feature is hindered by the fact that the Q2's Bypass is an effects mute, not a true hard-wire bypass or even the software equivalent. Bypass simply mutes the effects Blocks; if there is no direct signal mixed in, there is no output in Bypass mode. In my opinion, Bypass should be absolute: If there is a problem or failure in the unit, it should take no more than one button-press to take it out of the signal chain. The Q2's design makes effect in/out comparisons difficult for in-line effects such as EQ and Stereo Enhancement. (The Block Bypass feature in the newly announced version 2 software for the Q2 does allow signal to pass through a bypassed Effect Block, which fixes the problem.)

IN YOUR INTERFACE

Thanks to the graphical part of the LCD display and an intelligently conceived operating system, editing and programming the Q2 is as easy as can be for this type of device (When the option is available, I prefer to use editing software on a Mac or PC rather than program something like the Q2 from its front panel. I hope a QuadraVerb 2 editor will be offered soon.) The signal flow is laid out in the display as a series of effects Blocks, with the signal running from left to right, connected by "virtual patch cords" (on-screen lines). The double-ended Block button on the front panel selects a Block for editing.

Once you've selected an effect Block, press the Type, Routing, Parameter, or Mix button to select the function you want to change. Within each function, the double-ended Page button steps through the available parameters. Turning the Value/Enter wheel edits the selected parameter value, and pushing on the wheel (which has a switch action) enters it. All Q2 buttons except Page and Block have LEDs, making it simple to see the mode you are currently in. For example, adding or deleting a Block is as easy as selecting the Block, pressing Type, and setting it to a new effect type or Off to delete it. The next page selects the algorithm within the selected type. Establishing the routing is just as easy and flexible.

By the same token, it's a piece of cake to feed the Q2 from an ADAT. You hook up the ADAT's digital out to the Q2's digital in, push Global and page over to the Input Audio Source parameter, set it to Optical Data, page twice more to Digital Channel In, and select the ADAT track numbers you want as sources for the Q2's left and right channels. Done.

I used the analog outputs, but selecting channels to digitally send the signals back to the same or another ADAT is done on the same page. In a more complex system than I used, it is necessary for all the digital-audio devices to be running from the same 48 kHz word clock, which the Q2 receives from the system master (BRC or AI-2) through the BNC connector on the back. Fortunately, my situation was simple, so I got off easy.

FRESH-BAKED PROGRAMS

There are fourteen algorithms for reverb, four for delay, eleven for pitch-based effects (including flanging and chorusing), and fifteen types of EQ (including Resonator, Mono and Stereo Tremolo, and Stereo Simulator). The 100 factory presets (including a Bypass preset) and 100 user programs provide a wide range of processing, from utilitarian to bizarre, giving the user an excellent idea of the unit's capabilities. When looking for an effect sound, I usually go through some presets first, because using a preset as a jumping-off point is faster than starting from scratch. In almost all cases, I was able to find a preset that provided a useful place to start.

The majority of effects processors' presets emphasize the bizarre more than the utilitarian, which is probably sexier to sell, but not as practical to use. Although the QuadraVerb 2 includes numerous reverb programs that are good for day-to-day needs, there

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are few programs oriented towards EQ. Sometimes you don't need reverb, chorusing, or delay, just another couple of channels of parametric EQ. One program cleverly uses the Q2's modulation capabilities to create a brick-wall limiter; I'd also like to see a few programs that use this trick to create more compressor-like action.

One of my applications was to process a pedal-steel track I was mixing for a live album by singer/songwriter Caren Armstrong. The performance was recorded to an Alesis ADAT, which meant I could use the optical connection to convey the pedal-steel track to the Q2, instead of running through 50 feet of cable and patch bays and a couple of gain stages in the mixer. (The optical I/O could also be used to do things like process and mix two channels from an ADAT, then bounce them down to one, all without leaving the digital domain.)

To add spaciousness to the pedal steel, I modified the "BrightInstPlate" preset, which uses the Large Plate algorithm. The sound was far and away the nicest Alesis reverb I have heard: a dense, smooth decay without the metallic "ringiness" common to cheesy reverbs and even the plate programs of some otherwise nice units. It was lush and delicious.

Although the QuadraVerb 2 is a discrete stereo device, it is not true stereo, as the two channels are processed not only separately, but entirely independently. All the effects Blocks have mono inputs; to make a stereo reverb, you set up two identical mono reverbs and feed one channel to each.

This makes a real difference on stereo source material, such as a stereo piano recording or a stereo tom-tom submix (one of my most common scenarios). If something is panned slightly left in the source material, it is reverberated by the right reverb a little less than the left reverb, but it doesn't sound *farther away;* in a good, true stereo digital reverb, this would involve time and spectral differences, as well as level. The result was a smearing of spatial placement of the toms in the mix. To be fair, this is a fine point that only becomes apparent in certain applications, and the few true stereo digital reverbs on the market cost considerably more than the Q2. But Alesis markets the Q2 as capable of being a "primary reverb," in which context the issue is worth considering.

The Room reverbs give a good sense of a small space, and they don't exhibit metallic ringing (which is often worse in Room algorithms than Plates). Like the Plates, the Halls are dense and rich.

All the reverb programs offer numerous parameters, including several, such as Spread and Reverberation Swirl, that I have not seen before in an Alesis reverb. Fine adjustments make a significant, if often subtle, difference in how the effect works in a track, so I appreciated the level of control available in the Q2.

The three chorus and two flanging algorithms also have a nice, rich sound with pleasing stereo effects in the stereo algorithms. In fact, I preferred the Leslie-simulation presets constructed from choruses, tremolo, and filtering to the Leslie algorithm because of the ability to more smoothly control the speed of the "rotors." The delay algorithms are straightforward and include a nice multitap delay that can be controlled via MIDI Clock and is displayed in beats per minute. The Q2 offers up to five seconds of delay.

There are eleven EQs (four of the EQ algorithms are not EQs *per se*), including shelving, parametric, and even a 5-band graphic. At first, I thought these sounded awful. However, I learned that combining a digitally equalized signal with the original is not a good idea in general. It turns out that any digital EQ is achieved by sample-level delays. When mixed with the undelayed signal, it sounds, as I noted,

Product Summary

PRODUCT:
QuadraVerb 2 multi-effects processor
PRICE:
$799
MANUFACTURER:
Alesis Corporation
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Los Angeles, CA 90016
tel. (800) 525-3747
or (310) 558-4530
fax (310) 836-9192
CIRCLE #437 ON READER SERVICE CARD

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

awful. After removing the original signal, the EQ sounded quite clean.

However, I take exception to Alesis' definition of a parametric equalizer. For example, the 3-band parametric features only one band of parametric EQ (the mids), plus sweepable lowpass and highpass bands. Although this is a useful configuration, it is not a 3-band parametric and would not let me do the type of pinpoint EQ on two or three frequencies for which parametrics are often used. Fortunately, it is possible to construct a true multiband parametric out of 1-band parametric effect Blocks.

In general, the Q2's pitch shifting did little for me. It's simply not high quality. Applied judiciously and blended with other effects, the pitch shifting could be useful. However, I would not plan on pitch-correcting lead vocals with it. Other algorithms include a stereo simulator, resonator, ring modulator, and tremolos.

NATURE OF THE BEAST

To understand what the QuadraVerb 2 can and can't do, it is necessary to understand the basic nature of a multi-effects device. There is a fixed amount of DSP power available in any effects device. For a box that only does one effect at a time, this is of no concern to the user.

However, multi-effects devices offer the designer three approaches. The most common approach is to create "hard-wired" algorithms with predetermined effects in a predetermined order. In other units, users can "mix and match" effects to the limits of the available DSP power. A third approach, used in such units as the DigiTech TSR-24, simply limits the amount of processing available to any effect, so they can be combined with impunity.

Of course, if different effects modules demand different-size slices of the available DSP pie, some combinations will eat the pie faster than others. In short, if you use a really nice reverb (reverbs have the biggest DSP appetites, as a rule), you may not be able to add a separate parametric EQ and chorus on each channel. The user quickly becomes familiar with the "DSP is full" message.

This is not a design flaw, it's a fact of life. Perhaps a few more years will bring DSP so cheap and powerful that this will no longer be a frequent concern, but it is right now. Alesis chose to offer several versions of the same effect that demand different amounts of processing power and let the user pick the compromises. The difference between more and less computationally "expensive" algorithms is clearly audible, especially in clarity of the spatial image, high-frequency response, and intelligibility.

The point is that although the Q2 offers all these rad effects, you cannot necessarily use them all at once. I frequently ran into the limits of its DSP. Then again, I'm addicted to really nice reverbs. For example, I wanted to EQ the outputs of the Large Plate with a 3-band parametric on each channel, which are very DSP-intensive processes. No dice.

Learning to live with this limitation is usually a rather annoying trial-and-error process, but Alesis has eased the pain a little by providing a chart in the back of the manual that shows what

percentage of the DSP and effects memory is consumed by each of the unit's effects. (For example, the Large Plate uses 67 percent of the DSP, and each 3-band parametric EQ eats 30 percent.) At least you can do a little planning instead of being rudely surprised. Many of the presets use half a dozen effects or so by cleverly evaluating which ones eat up processing (reverbs) and which come cheap (delays). In addition, you can use two or more units to produce more elaborate effects without losing audio quality, thanks to its digital I/O buses.

LIFE IS CHANGE

The QuadraVerb 2 has some nice features for modulating effects parameters. Up to eight modulation paths can be assigned per program, and most parameters are controllable, although some respond better than others. For example, EQ gain does not change smoothly under MIDI control, but I did not hear zipper noise or other nasty artifacts.

In addition to MIDI control, the Q2 incorporates two modulation sources that depend on the input signal. One of these is simply a peak (envelope) follower. The other is an envelope generator that triggers when the input crosses a programmable threshold. The peak follower lets you control things like delay times or delay feedback that decrease as the signal increases. The EG is used to create the limiter program mentioned earlier. Because input-triggered envelope control of level is essentially what a traditional compressor does, this feature allows all manner of dynamically triggered functions: compression, ducking, even expanding and gating. A nice touch is the ability to select either channel or both as the trigger signal. To top it off, you can tap in a tempo or control the delay with MIDI Clock.

Beyond the Q2's MIDI modulation capabilities, it also offers the common amenities of Program Change mapping and SysEx dumps.

One improvement that, alas, was not made over the original QuadraVerb is that the parameter display doesn't show the effect of modulation. It is helpful to see a parameter's actual value in the display and watch it change as an external MIDI controller (or other modulation source) changes. Another feature that lightens the drudgery of

programming is moving a MIDI controller to select it as a modulation source, rather than selecting it with the Value/Enter wheel.

LET'S MAKE A DEAL

The QuadraVerb 2 is a powerful, rich-sounding device that displays some of the common limitations of multi-effects processors. But unlike most of its competitors, it allows the user to choose where the compromises will be made. The unit is as easy to program as a sophisticated device can be, with a well-conceived operating system, a helpful owner's manual, and quick-reference

▼

The Q2 is far and away the nicest Alesis reverb I have heard.

cards for the factory presets and user programs that come with the unit.

As of this writing, Alesis has announced the version 2.0 software upgrade for the QuadraVerb 2. The upgrade increases the number of user programs to 200 and adds overdrive, Block input bypass (which allows reverb and delays to decay naturally), an LFO for modulation, and stereo sampling (which just uses one effects Block per channel) with triggered playback. Version 2.0 also adds a linear ramp generator that can be triggered by the input signal for use as a control source. For example, this would be useful if you wanted to trigger a flange when you hit a cymbal crash.

For true-stereo reverb and pitch-shifting applications, I would turn to something more upscale, but the Q2 can do an exemplary job on everything else. With high-quality reverb, chorus, flanging, EQ, and delay, plus excellent audio I/O and strong MIDI and modulation features, the Q2 presents an outstanding value. It is a superb choice for performers and project studios.

Larry the O *is a sound designer at LucasArts Entertainment, as well as an active performer and independent engineer/producer. He's just too busy to breathe.*

Audix OM-5

By Lori Bolender and Mike Cutter

A quality dynamic microphone for live vocals.

Audix has another winner with the OM-5 dynamic, hypercardioid microphone. Best for live vocals, it offers excellent off-axis rejection, a smooth proximity effect, and comfortable handling. Its transient response makes it a good choice for toms, too.

If you have been involved with the sound reinforcement industry for any length of time, you are probably familiar with Audix microphones. Ten years ago, when few quality vocal mics were available for stage use, Audix was the popular "alternative" choice. Today, however, there are multitudes of excellent vocal microphones and Audix mics have entered the mainstream.

Mixing singers is one of our favorite engineering tasks, so we embraced the opportunity to review the new OM-5 dynamic mic from Audix. If it's good enough for such stars as Bonnie Raitt and Crosby, Stills & Nash, it's worth checking out.

CONSTRUCTION

The OM-5 is a hypercardioid mic, one of a series of three Audix mics designed for live vocal performance. It comes in a smooth black finish, with a matching black steel-mesh windscreen.

Audix uses proprietary technology utilizing a low-mass diaphragm of strong, yet thin and lightweight mylar. The mic's specs indicate excellent protection from high-level sources (see table "Audix OM-5 Specifications"), and we certainly never approached its SPL limit. The U.S.-based manufacturer really stands behind their product, too, offering a lifetime warranty on OM-series parts.

OM-5 Specs

Type	dynamic
Polar Pattern	hypercardioid
Frequency Response	40 Hz-20 kHz
Maximum SPL	144 dB
Impedance	200Ω
Weight	10.5 oz.

FIELD TESTS

We used the OM-5 as one of five main vocal mics for The Diamonds, a popular singing group from the 1950s. The other four mics were Shure Beta 58s, the vocal mic of choice these days. Admittedly, the Beta 58 is considerably less expensive than the OM-5, but the 58's popularity makes it the obvious standard by which a dynamic vocal mic should be evaluated.

What we found was somewhat surprising. The OM-5 and the Beta 58 were remarkably similar, with all input settings nominal and EQ flat. However, once we rang out (equalized) the monitors for maximum levels using the Beta 58, the differences between the two microphones become apparent. The OM-5 retained much of its warmth and fullness, while the Beta 58 lost some body and presence. In the front-of-house mix, the Audix microphone required very little EQ and sounded just wonderful on the bass voice.

During another performance, we used it as the drummer's vocal mic for Big Bang Beat, one of the most popular dance bands in the San Francisco Bay Area. The off-axis rejection was very good, eliminating much of the ambient drum noise. The smooth midrange presence rise allows the OM-5 to really cut through the mix without adding a harsh edge.

Although we didn't have the opportunity to try the mic on a regular drum kit, we used it on some makeshift percussion instruments. The OM-5's transient response was very good, and we anticipate it would be a good choice for miking toms, especially given its warmth.

SING ALONG!

We enjoyed working with this microphone. The OM-5 has an attractive appearance and is comfortable to hold. Its handling noise is negligible. The hypercardioid pattern provides excellent gain before feedback, and its proximity effect lends a pleasing low-end warmth, especially to female voices.

Although the Audix mic costs a few bucks more than the Beta 58, it's worth the money. If a smooth, live vocal sound is a priority, the OM-5 is a worthy choice.

Lori Bolender *and* **Mike Cutter** *have been sound engineers/technical directors at the San Francisco Hilton for over six years. Lori recently assisted with the recording of the Three Tenors concert, and Mike has been a recording engineer at OTR studios.*

Product Summary

PRODUCT:
OM-5 dynamic microphone
PRICE:
$329
MANUFACTURER:
Audix Corporation
PO Box 265
Lake Forest, CA 92630
tel. (714) 588-8072
fax (714) 588-8172
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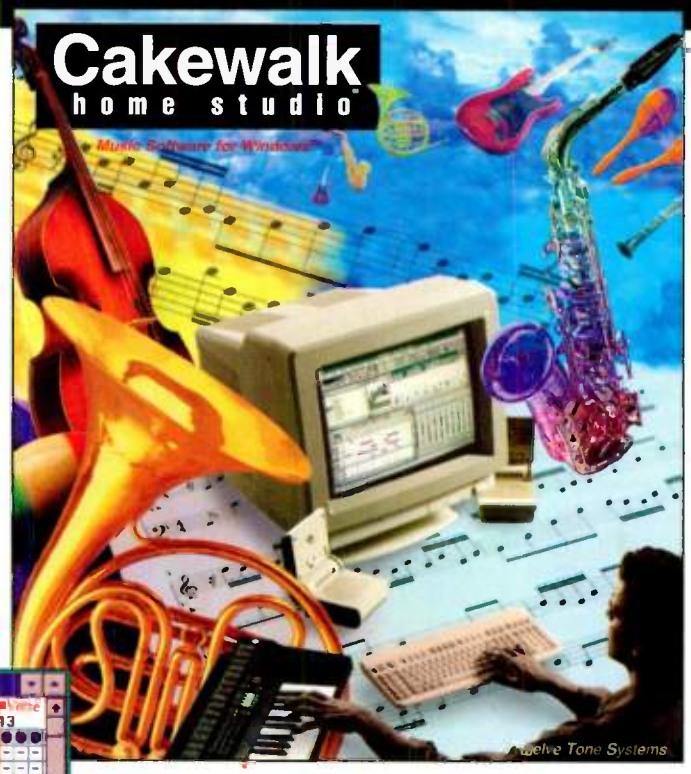

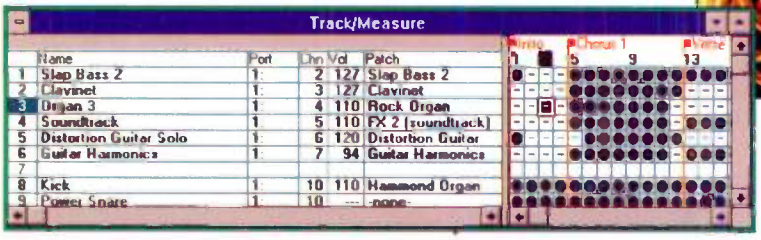

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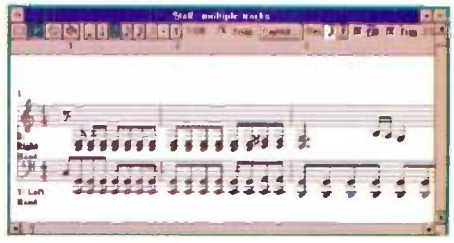

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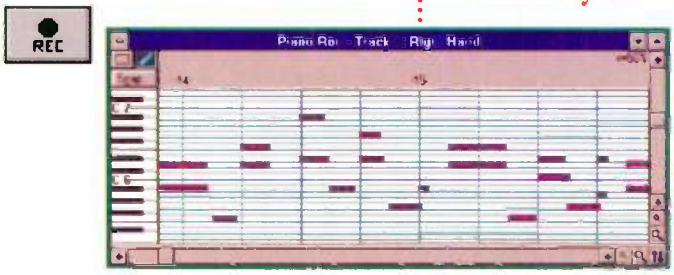

1995 Multimedia World Readers' Choice Winner

PC Multimedia PC

Steinberg Time Bandit 1.5 (Mac)

By Eric Leach

Throw off the constraints of time.

For those who have seen the movie *Time Bandits*, Steinberg's similarly named program may evoke images of lippy dwarf pirates stealing a time machine from God Himself and swashbuckling through history. Although the program may not be as colorful and entertaining as Terry Gilliam's film, its ability to manipulate digital audio files is as exciting for musicians as a time machine would be for historians.

Time Bandit is a stand-alone Macintosh application that performs off-line time-stretching and time-compression on digital audio files, without affecting pitch. The program also can handle various types of pitch manipulation without affecting time. The current version, 1.5., supports AIFF, *Sound Designer I*, and *Sound Designer II* file formats. The program is copy-protected with a hardware dongle (sigh).

Time Bandit is provided in both 680X0 and Power Macintosh version and will run on a 68020-based Mac. A "smart" installer determines which CPU you have and loads the appropriate files, including Apple's *Sound Manager* 3.0. Thanks to *Sound Manager*'s ability to handle 44.1 and 48 kHz, 16-bit stereo audio, *Time Bandit*'s output can be monitored through the Mac's internal speaker or audio output without any additional hardware.

Although the program's audio performance is acceptable on a fast machine (more on this later), better results can obtained by using a Digidesign audio card (Audiomedia II, Sound Tools II, Pro Tools, etc.). In addition to providing additional processing power and permitting 16-bit playback (which cannot be done on a stock 680X0-based Macintosh), the Digidesign card's digital-to-analog converters are superior to those in a Power Macintosh.

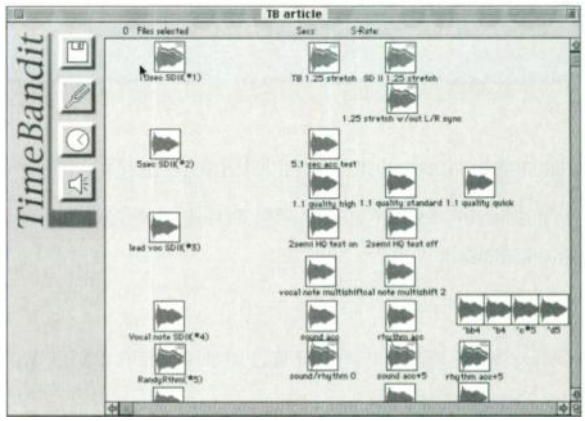

FIG. 1: All file-management and processing functions are accessed from the finder-like Session Window.

WINDOW IN TIME

The Session Window is where you manage audio files, which appear as icons on a desktop (see **Fig. 1**). This Finder-like approach makes *Time Bandit* extremely easy to navigate; you select and arrange files using time-honored Macintosh mouse techniques. An info line at the top of the window displays the length and sample rate of selected files, and the icons contain tiny graphics that indicate whether the audio file is mono or stereo.

A series of pull-down menus, complemented by dedicated icons for Load, Pitch Shift, Time Stretch/Compress, and Playback, provide instant access to all work areas. When you boot up, *Time Bandit* automatically loads a Session named "Time Bandit Session." If you replace this file with your working Session, you can get *Time Bandit* to automatically load it for you.

To load an audio file into your Session, simply click the Load icon, and a standard file dialog box lets you find your file. You can audition the file, or go ahead and load it. If the audio file has associated *Sound Designer II* markers or *Cubase Audio* regions, *Time Bandit* asks you if you want to process the whole file or just the Block defined by the markers or region. This ability to process only a portion of the file can save you time otherwise spent cutting up your audio files.

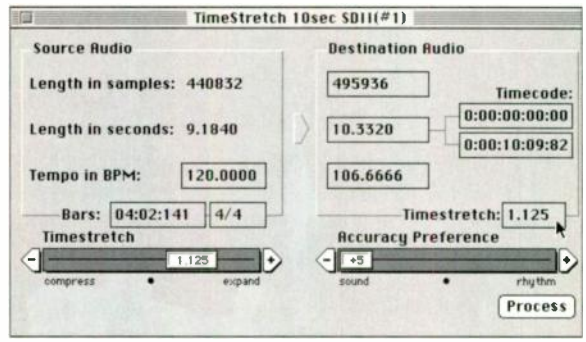

FIG. 2: The TimeStretch dialog box is used to expand or compress audio files without affecting pitch.

What if you want to change these Block settings or edit your audio file? No problem! Double-clicking a file's icon opens up the digital-editing program of your choice. I was glad to see this specific feature, but you still have to navigate to the editing window once your program is open.

Audio files are played by selecting the file and clicking on the Play icon. You can A/B several files by selecting each file in the desired order before you click Play; *Time Bandit* will faithfully play your files in sequence. A Sound Info function provides detailed information about selected files, including documentation of any processing *Time Bandit* has already performed. You can add additional notes and even change the sample playback rate. I constantly referred to this handy feature to help keep my session organized.

TEMPORAL MECHANICS

Selecting a file or batch of files makes them available for processing. After

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processing, you'll see new icons in your Session window, which represent the new files placed on your hard drive. *Time Bandit* always works on a copy of the audio file, so there's no need get it right the first time.

Under the Options menu, you will find several processing parameters, including Quality mode. Your three choices are High, Standard, and Quick, each with varying degrees of quality/speed tradeoff. You may want to try using Quick mode (which for me was about sixteen times faster than High mode) to adjust your processing settings, and then process your final version in High mode, which gives you remarkably better results than Standard or Quick mode. Another Option is Effect mode, which gives you extended time-stretching/compression and pitch-shift parameters for more drastic processing.

Under the Action menu, you'll find the Preprocessing feature. Audio files selected for Preprocessing are analyzed by *Time Bandit* for future processing. The advantage here is that you can let *Time Bandit* Preprocess all necessary audio files the night before and save yourself about 20 to 25 percent processing time during your editing session.

Speaking of processing time, it can become a serious issue when working on large files. Many different factors affect processing time, particularly CPU speed. I found that processing on a Quadra 950 was about 75 to 80 percent faster than identical processing on a IIcx.

CPU speed also affects playback quality when using *Sound Manager*. When working on the IIcx, the *Sound Manager* output settings had to match the file's sample rate and mono/stereo format for accurate sound reproduction. If *Sound Manager* has to work to translate the file, the resulting strain on the CPU can sound *bad*. In comparison, playback on a Quadra 950 sounded fine. Changing *Sound Manager*'s output settings to accommodate a slow machine can become tiresome if your Session includes various types of files.

A STITCH IN TIME

Selecting a file in the Session window and clicking on the clock-face icon opens the TimeStretch dialog box (see **Fig. 2**). Used to enter the parameters necessary for time compression/expansion, the dialog is laid out in two main sections: Source Audio and Destination Audio. The Source Audio section gives the selected file's length in samples and seconds along with an adjustable tempo readout that allows you to enter the tempo of the original file. If you don't know the tempo, you can instead enter the number of bars/beats/ticks and the time signature, and *Time Bandit* will kindly calculate the tempo for you.

Using the original file's tempo to set up a tempo change is one way you can calculate the TimeStretch factor, which is the amount of compression/expansion to be performed. The TimeStretch factor is displayed in the middle of the dialog as a percentage. You can also change the TimeStretch factor directly by typing in the amount or by manipulating the slider. If you know the SMPTE time-code frame at which you want the sound to start, you can even enter a Stop frame and let *Time Bandit* "fit" the sound between your time-code cues. This feature can save you a lot of editing time otherwise spent trimming sound clips.

▼

I would use time or pitch correction more often if I had *Time Bandit*.

The Destination Audio section also shows you the anticipated length and tempo of the to-be-processed file based on the TimeStretch factor. Any of these readouts can be changed, and the changes will update the TimeStretch factor as well as the other readouts. To see these figures update in real time, simply hold down the Option key as you change.

Entering destination length on the sample level provides extremely precise control over the amount of compression/expansion performed. To check out just how accurate *Time Bandit* is, I stretched a 5-second file (220,500 samples) to 5.1 seconds (224,910 samples). The resulting file length of 5.0937 seconds (224,634 samples) was well within the manual's advertised accuracy of 10 ms.

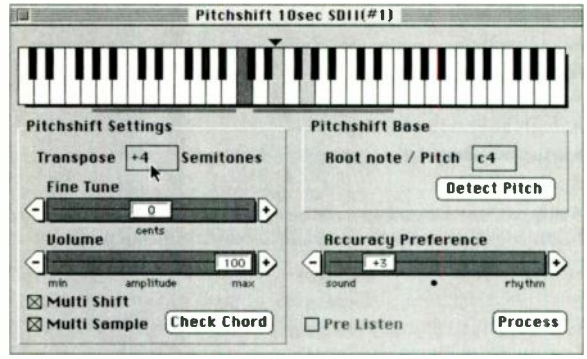

FIG. 3: *Time Bandit*'s Pitchshift window allows various types of pitch manipulation, including pitch shifting, multishifting, and multisampling.

HARMONY TIME

The Pitchshift dialog box is also divided into two main sections, called Pitchshift Settings and Pitchshift Base (see **Fig. 3**). The Pitchshift Base section includes a Root Note/Pitch setting that allows you to set the note you wish to use as a basis for changes. Of course, all pitch changes are relative, so I usually left this at its C4 default. *Time Bandit* can also detect the average pitch of your file for you (see **Fig. 4**) and even provides an assessment of how accurate its findings were.

A graphic keyboard across the top of the dialog displays the root note and allows you to select harmonies. Gray bars indicate the range of notes available without Effect mode enabled. (Effect mode extends *Time Bandit*'s processing range to allow more radical effects.) A Pre Listen function gives you a quasi preview of what your new pitch will be, based on changing the playback sample rate. This is mainly useful for checking and fine-tuning your desired pitch change.

In the Pitchshift Settings section, you can directly enter your pitch-change value in semitones, use a slider to make fine adjustments measured in cents (hundredths of a semitone), and adjust the volume of the new pitch with a second slider. You'll also find boxes to select Multi Shift and Multi Sample.

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Advertiser	Reader Service #	Page
ABS Music	501	118
Ace Music Center	-	97
Alesis (QuadraSynth)	502	69
Alesis (S4 Plus)	503	71
Alesis (Monitor 2)	504	15
Aphex Systems	505	33
Ashly	506	66
Audix	507	51
Bananas at Large	508	121
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Cool Shoes	512	73
dbx	513	102-103
Digidesign	-	35
DigiTech	514	17
Disc Makers	515	121
Discount Distributors	516	122
Duquesne	517	125
Echo Park	518	108
Effective Video Solutions	519	124
E-mu Systems (Classic Keys)	520	18
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ILIO Entertainments	532	52
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Key Electronics	-	83
Korg	535	48
KRK Monitoring Systems	536	56
Kurzweil Music Systems	537	139
L & M Music	538	122
Leigh's Computers	539	119
Lexicon	540	41
MacBEAT	541	123
Mackie Designs (8•Bus)	542	2-3
Mackie Designs (MicroSeries 1202)	543	72
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PG Music (Band-In-A-Box)	556	90-91
PolyQuick	557	118
Presonous Audio Electronics	558	57
QCA	559	116
Quik Lok/Music Industries	-	110
Rhythm City	560	73
Rich Music	561	99
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Roland (XP-50)	563	54-55
Sam Ash Professional	-	89
Sonic Foundry	564	85
Sound Quest	565	94
Soundscape Digital Technology	566	24
Soundtrek	567	65
Soundtrek #2	568	117
Soundware	569	59
Speir Music	570	116
Steinberg/Jones	571	64
Studiomaster	572	104
Sweetwater Sound	573	92
TASCAM	574	86-87
Taxi	575	114
Thoroughbred Music	576	98
Twelve Tone	577	7
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World Records Group	582	112
Yamaha (MM1402)	583	9
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c. "Cover Story: Retro•Active," p. 36	709	710	711	712
d. "DIY: Build a Better Bass Trap," p. 46	713	714	715	716
e. "Square One: Nearer My Monitor to Thee," p. 58	717	718	719	720
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MIX BOOKSHELF is the world's leading resource for information on recording technology and the music industry. Every year, tens of thousands of music-industry professionals and hobbyists rely on our knowledgeable staff for accurate, no-hype recommendations and attentive customer service.

THIS SPRING, we're particularly excited about the books we've published ourselves over the past couple of months, including a new title from our Rockpress imprint, the new *1995 Recording Industry Sourcebook* and *Sourcebase*, the first annual *Audio and Music Education* and *Onstage* directories, and our first-ever CD-ROM: *The Allen Sides Microphone Cabinet*. Backed by the industry knowledge of the publishers of *Mix*, *Electronic Musician* and Mix Bookshelf, these titles will give you invaluable help with your music business or music production career. And this is just the tip of the iceberg—be sure to call for a free copy of our main catalog, with over 600 titles in all!

A revolutionary new microphone

Cardinal Business Media, Inc. presents

The Allen Sides

From the publishers of Mix,® Electronic Musician® and Mix Bookshelf®

This unique, fully interactive CD-ROM lines up the top microphones, both classic and contemporary, for a series of audio comparison tests on dozens of musical instruments. A superb resource for professionals and students alike, the disc features:

- A "Selector Cabinet" of both popular and classic mics for recording each instrument, chosen and recorded by famed studio engineer Allen Sides.
- 16-bit Red Book audio samples of the selected mics and instruments, as played by session pros like drummer Hal Blaine and guitarist Elliot Easton.
- Allen Sides' "Tips" for getting the best sound from each microphone.
- A color photograph of each microphone and the mic placement setup for each instrument.
- Complete specifications for each microphone, including frequency response diagrams and polar patterns.
- A color photograph of each musical instrument, with description and characteristics.
- A "Microphone Basics" section by noted author John Woram, including information on microphone design, characteristics and usage.

Mix Bookshelf

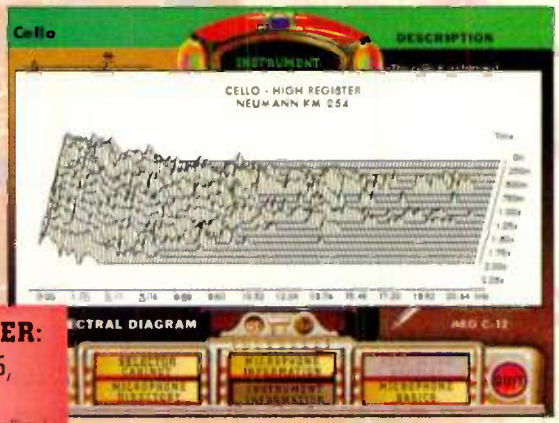
auditioning tool on CD-ROM!

Microphone Cabinet

Call Toll-Free! 800.233.9604

This amazing disc features samples of 66 mics on 33 different instruments. These include six different drums and cymbals, several types of percussion, five guitars, a Hammond B-3 organ and a wide variety of brass, woodwinds and strings. The microphones were chosen from Allen Sides' world-renowned collection at Ocean Way/Record One studios in Los Angeles, including models from: **AKG, Audix, Audio-Technica, B&K, Beyer, Coles, Crown, Electro-Voice, Groove Tube, Milab, Neumann, RCA, Sanken, Schoeps, Sennheiser, Shure, Sony and Telefunken.** You can sort by microphone to check out the best instruments for each, or sort by instrument to see which mics to use. The disc also includes a directory of microphone manufacturers and their current product lines. **Item MC) $69.95** plus $5 shipping and handling.

SPECIAL INTRODUCTORY OFFER:
Buy before September 1, 1995, and **pay only $49.95!**
(Publication date: June 15. Add $5 for shipping and handling.)



Allen Sides has recorded and mixed sessions for dozens of world-class artists such as Ry Cooder, Count Basie, Ray Charles, Sinead O'Connor and Brian Setzer.

David Schwartz, producer of this CD-ROM project, is the founder and former editor-in-chief of *Mix*, the world's leading magazine for sound and music recording and production.

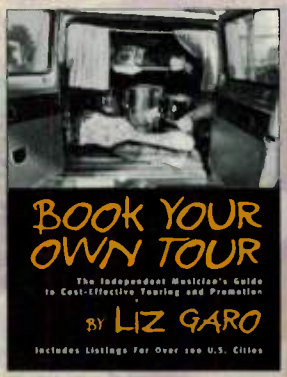
New Rockpress titles from Mix Bookshelf!

We're excited to announce that Mix Bookshelf and Rockpress have joined forces to publish indispensable guidebooks for independent musicians and labels! This alliance will allow Mix Bookshelf and Rockpress to respond much faster to the needs of our customers with new books and updated versions of the Rockpress classics. To start off, we're introducing two new titles for 1995.

RELEASING AN INDEPENDENT RECORD, 5th Ed.
Gary Hustwit
© 1995, 182 pp. (P)
3025A) $24.95

We've still got copies of the 4th edition left, and we're making them available while supplies last at 25% off the cover price — only $14.95!

Available in August, this updated edition of our #1 music business book shows, step by step, how to run your own record label and market your music on a national level. Learn how to get reviewed by the press, work with distributors, sell direct to retailers and tour behind your album. Features all-new sections on publishing and performing rights, sample contracts and a music publisher directory, plus expanded, updated directory information, including over 3,000 contacts in retail, distribution, print media and booking.



BOOK YOUR OWN TOUR
Liz Garo
© 1995, 175 pp. (P)
3049A) $19.95

This guide to "planning and surviving an independent tour" offers city-by-city directories of clubs, promoters, record stores, radio stations, print media and other fun stuff, like where to stay for cheap and where to get good coffee and vegetarian food. Garo also includes sections putting together promo packages for clubs, dealing with club owners and promoters, getting paid and using local media, as well as sample contracts, tons of interviews with folks who've been through it all. She even provides a van buyer's guide and directions for building a loft! This is by far the most complete title of its kind.

And check out these Rockpress classics:

GETTING RADIO AIRPLAY, 2nd Ed.
Gary Hustwit
© 1993, 125 pp. (P)
Learn how to get your record played on radio and make waves for your band by being smart about sending out review albums and professionally following up with phone calls. Features interviews with radio station music directors, record label promotions staff and independent artists who've done it. Includes new, updated college and commercial radio directories. **3027A) $19.95**

NETWORKING IN THE MUSIC INDUSTRY
Clevo & Olsen
© 1993, 225 pp. (P)
Find ways to meet other music professionals who can help your career with this streetwise book. Learn how to use music conferences, video, computer bulletin boards, music associations and the press to make valuable new contacts. Includes candid discussions of label/artist relationships, music publishing and the indie scene. **3052A) $19.95**

101 WAYS TO MAKE MONEY RIGHT NOW IN THE MUSIC BUSINESS
Bob Baker
© 1992, 140 pp. (P)
If your career plan only covers gigging and recording, you could be ignoring dozens of money-making opportunities. Use this book to discover specialized niches you may have overlooked, generate extra revenue and jump-start your career. Don't spend a lifetime paying dues—explore these untapped markets and cash in now! **3045A) $14.95**

Mix Bookshelf

New titles from Music & Entertainment Directories!

Call Toll-Free! 800.233.9604

1995 RECORDING INDUSTRY SOURCEBOOK

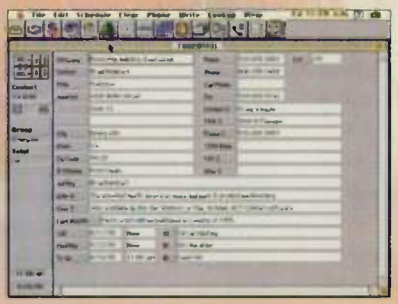
© 1995, 475 pp. (Spiral) **1951A) $74.95**

Announcement: Beginning with this 1995 edition, *Recording Industry Sourcebook* and Mix Bookshelf have joined forces to create North America's essential music business and production directory! This massive industry guide is a top-quality, spiral-bound, tab-divided book with over 12,000 updated listings in 55 categories. It offers comprehensive directories of record labels, producers, managers, distributors, attorneys, equipment suppliers, music video companies, media contacts and much more. Entries list contact names, titles, phone and fax numbers, styles of music preferred and information on whether they'll accept unsolicited demos.

RECORDING INDUSTRY SOURCEBASE

We also offer our unparalleled database on 3.5" disks for Macintosh or Windows! Professional Manager gives you 55 categories covering music business and production, while Personal Manager breaks out the production categories for working musicians. Both packages include *ACT!* contact management software and a copy of the *Sourcebook* itself.

Professional Manager, Macintosh **1946MA) $695.00**
Professional Manager, Windows **1946WA) $695.00**
Personal Manager, Macintosh **1945MA) $395.00**
Personal Manager, Windows **1945WA) $395.00**



Audio+Music **EDUCATION 95**

AUDIO AND MUSIC EDUCATION 1995

© 1995, 88 pp. (Bound) **AME) $15.00**

New for 1995 is our comprehensive listing of programs from all over the U.S. and Canada in music recording, music technology, electronic music, music business, audio post-production, sound reinforcement, broadcast communications and music theory. Also includes articles on careers and choosing a program, plus resource listings of industry organizations, publications and software manufacturers.

ONSTAGE

ONSTAGE 1995

© 1995, 96 pp. (Bound) **OS) $15.00**

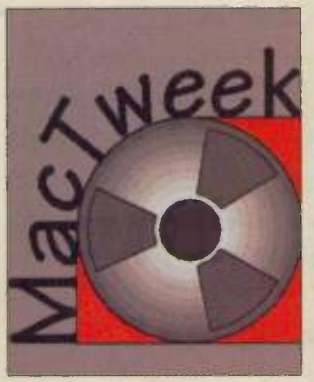
Onstage, available in July, encompasses all segments of audio performance in a single annual directory. Listings include remote recording, sound reinforcement, lighting companies, equipment retail and rental, arenas and stadiums, booking agencies, managers, touring companies, promoters, production personnel, insurance companies, security services, corporate sponsors, festivals and more! Plus, we've included a list of high-tech services such as networks and satellite broadcast companies.

1995 MIX MASTER DIRECTORY

© 1995, 208 pp. (Bound) **995A) $24.95**

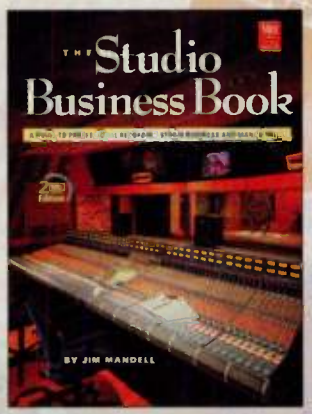
Our national business-to-business directory for the audio industry features manufacturer listings with new and current products, cross-indexed by product type. It also lists audio recording and video production facilities, sound reinforcement and remote recording companies, mastering, duplication and CD replication services, independent engineers and producers, studio designers and suppliers, recording schools, seminars and programs, trade organizations, and more.

New titles from Cardinal Business Media!



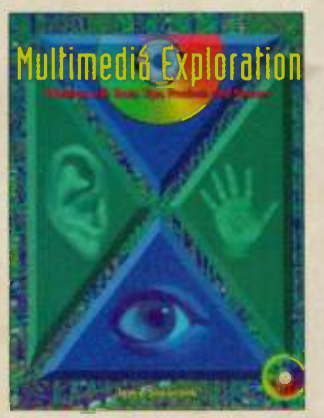
MACTWEEK/ WINTWEEK
Keith Seppanen
© 1995, one 3.5" disk.
Macintosh **018A) $14.95**
Windows **019A) $14.95**

New from Mix Bookshelf—an accurate computer simulation of the tape alignment procedure for analog recorders! Designed as a supplement to classroom instruction, this inventive program is divided into three sections: Overview allows the user to explore the various components of the recorder. Tutorial demonstrates the alignment procedure step by step, and Simulation lets you perform the procedure unaided to test your comprehension.



THE STUDIO BUSINESS BOOK, Revised Edition
Jim Mandell
© 1995, 288 pp. (P)
1319A) $34.95

The updated MixBooks edition of this informative, wide-ranging guide offers in-depth, detailed, specific information on all aspects of putting together and managing a recording studio, including: writing a business plan; getting funding; buying equipment; determining expenses and rates; bidding on projects; developing new contacts; advertising and PR; scheduling; managing, hiring and firing personnel; and more. It also provides a reference guide to studio terms and technology, a list of industry organizations and a recommended reading list.



MULTIMEDIA EXPLORATION: Working With Tools, Tips, Products and Sources
Jamie Showrank
© 1995, 311 pp. (P) with CD-ROM
3921A) $38.95

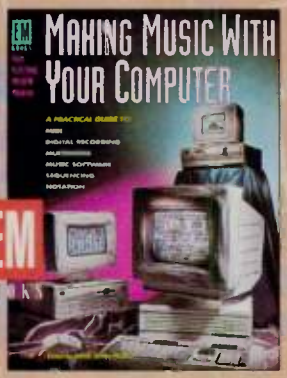
This new book/CD-ROM package from CBM Books walks you through multimedia applications and authoring, the resources used in multimedia projects, and the systems that network multimedia data. Features chapters on enabling technologies, the various aspects of CD-ROMs, sound sampling and synthesis, MIDI, photo images, digital video, networking, conferencing and online applications. It also includes lists of multimedia organizations and periodicals, authoring tools, CD-ROM recorders, conferencing products and Internet packages.

MODULAR DIGITAL MULTITRACKS: The Power User's Guide
George Petersen
© 1994, 128 pp. (P) **003A) $29.95**

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

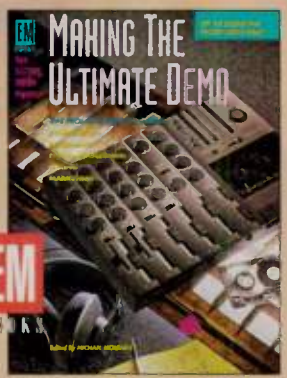
Mix Bookshelf

MixBooks/EMBooks



MAKING MUSIC WITH YOUR COMPUTER
David (Rudy) Trubitt, ed.
© 1993, 128 pp. (P)
013A) $17.95

A valuable introduction to the basics of computer music—whether you're a computer user entering the world of music and sound or a musician searching for the right computer, this book will help you get the most out of today's electronic music technology. You'll learn how computers contribute to the creative process and get tips on selecting programs and gear, plus info on MIDI sequencing, music notation, hard disk recording and desktop multimedia, a directory of manufacturers and an extensive glossary.



MAKING THE ULTIMATE DEMO
Michael Molenda, ed.
© 1993, 128 pp. (P)
017A) $17.95

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

CONCERT SOUND: Tours, Techniques & Technology
David (Rudy) Trubitt, ed.
© 1993, 180 pp. (P)
004A) $24.95

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

MIX REFERENCE DISC
From Mix magazine
© 1994, one compact disc
MRD)

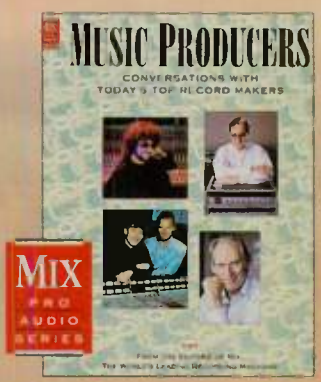
Special half-price offer: Regularly $29.95
now only $14.95!

From the world's leading pro audio magazine comes the most affordable and most widely used test-tone CD on the market today. This versatile professional tool has a variety of applications, including tape-deck alignment, audio equipment calibration, testing sound-system performance, troubleshooting and diagnostics. It features alignment tones, 1/3-octave bands, frequency sweeps, a digital black-noise check and frequency response tests, at a fraction of the cost of competing test-tone CDs.

SOUND FOR PICTURE: An Inside Look at Audio Production in Film and Television
The Editors of Mix
© 1993, 140 pp. (P)
011A) $17.95

Packed with film-scoring secrets! Take a look behind the scenes as top Hollywood sound professionals reveal how dialog, sound effects and musical scores are recorded, edited and assembled into seamless soundtracks. Exclusive case studies spotlight blockbusters like *Terminator 2*, *Malcolm X*, *The Simpsons*, *The Doors*, *Twin Peaks* and many others, focusing on both the equipment used and the philosophical side of sound design.

MIX PRO AUDIO SERIES



MUSIC PRODUCERS: Conversations With Today's Top Record Makers
The Editors of Mix
© 1992, 128 pp. (P)
006A) $17.95

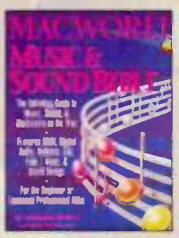
Twenty-four producers, including Don Dixon (R.E.M.), Bruce Fairbairn (Aerosmith), Daniel Lanois (U2), Bill Laswell (P.I.L.), Jeff Lynne (Tom Petty), George Martin (The Beatles), Hugh Padgham (Sting), Phil Ramone (Billy Joel), Rick Rubin (Red Hot Chili Peppers), Don Was (Bonnie Raitt) and 13 others, discuss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

Bookshelf Bestsellers

MODERN RECORDING TECHNIQUES, 4th Ed.
Huber & Runstein
©1995, 425 pp. (P)
Entirely rewritten edition of this popular intruductory text is a comprehensive, readabl up to date guide to all facets of recording **1031B) $29.99**

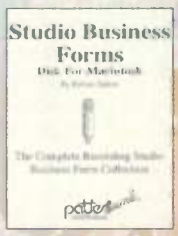
THE MUSICIAN'S BUSINESS AND LEGAL GUIDE
Mark Halloran, Ed.
©1991, 454 pp. (P)
The most complete, accessible book yet on music business and law, with real-life examples that any musician can understand. **3013B) $29.95**

MIDI FOR THE PROFESSIONAL
Lehrman & Tully
©1993, 239 pp. (P)
This advanced reference combines in-depth technical information with expert creative advice and practical production tips. **3480A) $19.95**



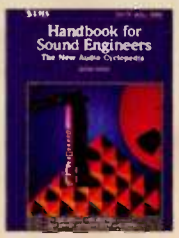
MACWORLD MUSIC & SOUND BIBLE
Christopher Yavelow
©1992, 1,398 pp. (P)
In-depth analysis of over 800 Mac hardware and software options for MIDI sequencing, notation, digital audio, sampling and multimedia, plus System 7 coverage. **3522B) $37.95**

SOUND REINFORCEMENT HANDBOOK, 2nd Ed.
Davis & Jones
©1989, 417 pp. (P)
This comprehensive reference work on live sound reinforcement examines every aspect from current and cables to speaker placement and room equalization. **1405B) $34.95**



STUDIO BUSINESS FORMS
Kevan Patten
46 vital documents on disk, including work order, contract, invoice, equipment inventory, take sheets, track sheets, cue sheets, and more, plus tape label and J-card templates.
Paper version **1056A) $39.95**
Macintosh **1057A) $39.95**

MUSIC BUSINESS CONTRACTS
Kevan Patten
©1993, 44 pp. (Bound) plus disk
Essential music contracts on computer disk! Includes forms for recording and publishing deals, songwriters, vocalists, performers, joint ventures partnerships and producers—43 in all.
Macintosh: **3031-MA) $49.95**
IBM (3.5" disk): **3031-P3A) $49.95**



HANDBOOK FOR SOUND ENGINEERS: The New Audio Cyclopedia, 2nd Ed.
Glen Ballou, ed.
©1991, 1,506 pp. (H)
The definitive pro audio technical reference, with updated coverage of sound-system design and installation, loudspeaker and enclosure design and typical audio circuitry. **1595B) $99.95**

BUILDING A RECORDING STUDIO, 4th Ed.
Jeff Cooper
©1984, 209 pp. (Spiral)
This classic advanced book on studio planning and construction covers acoustics, soundproofing and studio and control room design.
1300C) $29.95

New gear from Electronic Musician and Mix!

Show your allegiance to your favorite magazine with one of our classy, 100% cotton T-shirts! Choose from the brand-new *Electronic Musician* design, with playful figures on a teal background, or the classic *Mix* logo on a black shirt. Or get one of our high-quality hats, featuring embroidered logos (emerald blue for *EM*, gold for *Mix*), terry sweatbands, braided visors and adjustable leather straps.

Extra-Large EM T-Shirt **090XL) $12.95**
Extra-Large Mix T-Shirt **080XL) $12.95**
Electronic Musician Hat **015B) $12.95**
Mix Hat **010B) $12.95**

HOW TO ORDER

- **Use your credit card**—call toll-free (800) 233-9604 from the U.S. and Canada, or fax (510) 653-5142; international orders call (510) 653-3307.

- **Send checks or money orders to:**
Mix Bookshelf
6400 Hollis Street, Suite 10
Emeryville, CA 94608

We accept Visa, MasterCard, American Express, Discover Card, personal check or money order. CA, CT, IL, MA, ME, NY, PA and TX residents please add state sales tax; Canadian residents include 7% GST. Sorry, no CODs.

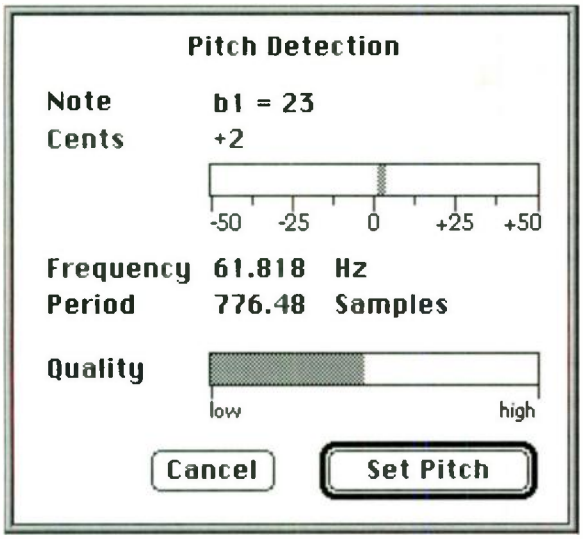


FIG. 4: The Pitch Detection feature checks your audio file and displays its average pitch, along with a Quality reading to gauge the accuracy of the detection.

Multi Shift allows you to select up to fifteen harmonies that will be *added* to the root note on the new file. A Check Chord button spells out the name of the chord your selected harmonies will form and allows you to Pre Listen. Multi Sample is essentially the same as Multi Shift, but it produces individual files for each harmony. I didn't find much utility for this beyond the possibility of saving some time in a sampling session.

Despite the program's lack of an intelligent harmonization option, I figured the Multi Shift function would be ideal for creating some vocal harmonies, so I gave it a try. By selecting a third and a fifth and tweaking the cents and volume settings, I came up with some convincing background vocals. Pitching down seemed to give the best results. *Time Bandit* seems to work better on less complex waveforms, so ahhhs and ohhhs turned out better than enunciated lead lines.

However, when I tried to create a vocal doubling effect by entering a pitch shift of less than a semitone (+15 cents, in this case), I ran into a small bug: Unless you enter a value in the semitone field, *Time Bandit* ignores the cents settings and simply creates a copy of your original file.

I got around this by enabling Effect mode, which gives you access to more drastic parameter changes. To create a shift of +15 cents, I specified a pitch-change value of +1 in the Semitone field and then adjusted the Cents value to -85. This workaround produced the desired outcome, although like most mechanical doubles, it sounded a little too perfect. Whenever I came up with results I liked, I took advantage of the Save/Load Pitch Settings function to store my setup for other vocal parts.

The TimeStretch and Pitchshift windows each have an adjustable slider for Accuracy Preference. The idea is that you get better results on musical material such as vocals by using a high Sound Accuracy setting, while you achieve better results on rhythmic material such as drums by using a high Rhythm Accuracy setting. Following these guidelines noticeably improved my results.

REALITY CHECK

The main question concerning a specialized application such as *Time Bandit* is "how well does it work?" I took *Time Bandit* into a few real-world situations for testing. One test was to compress a 32-second commercial spot into 30 seconds; *Time Bandit* passed to the satisfaction of the engineer. Another engineer used *Time Bandit* to add harmonies to a guitar part, which was also successful.

For a third test, I attempted to pitch-shift a song mix down one whole step for a vocalist. By experimenting with the various parameters and processing a half-step at a time, I came up with surprisingly good results.

Time Bandit may not work miracles, but it is very good at performing limited amounts of processing for specialized circumstances. One key for obtaining maximum results is to let *Time Bandit* work in small amounts: processing tracks individually, stretching a file several times in smaller amounts, and so on.

To get an idea of how *Time Bandit* stacks up against similar applications, I compared processing results against the time-stretching/pitch-shifting functions found in Digidesign's *Sound Designer II* version 2.8 and Sonic Solutions' Sonic System version 2.16.

Given that *Time Bandit* is a dedicated time-stretching/pitch-shifting program, I expected its results to be noticeably better, and they were. *Time Bandit*'s time-stretched/compressed files turned out to be more precise in terms of target file length, and its always-work-on-a-copy approach was very convenient.

Sonically, the other programs generally sounded as good or better than *Time Bandit* in Quick or Standard mode, but such results didn't obtain in High Quality mode. As an engineer, I would probably consider time or pitch correction a viable problem-solving option more often if I had *Time Bandit*.

THE END OF TIME

Time Bandit is complete, flexible, and useful. I found it reliable on complex files for time corrections up to about ten percent and for most types of pitch shifts.

At a retail price of $399, *Time Bandit* may be a bit pricey for a casual user. But if you're working on critical files, such as full mixes, or if you plan on performing quite a bit of this type of processing, it will probably earn its keep in no time.

(Special thanks to BetaLab.)

Besides missing deadlines, **Eric Leach** *spends time channeling for the spirit of an ancient Taoist philosopher.*

Product Summary

PRODUCT:
Time Bandit 1.5
time-stretching software
PRICE:
$399
SYSTEM REQUIREMENTS:
Macintosh 68020 or better;
4 MB RAM minimum, 8 MB RAM recommended;
System 7 or later
MANUFACTURER:
Steinberg
17700 Raymer St., Ste. 1001
Northridge, CA 91325
tel. (818) 993-4161
fax (818) 701-7452
CIRCLE #439 ON READER SERVICE CARD

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

Barbetta Sona 32C Pro

By Julian Colbeck

The pro choice for no-frills, integrated amplification.

Professionals have known this for years, and they've done well keeping the fact to themselves, but now it's out: If you're looking for simple, uncluttered, ultra high-quality keyboard amplification, go Barbetta. Barbetta is a new name to me, and I suspect for many players. But this California company has been around since 1984, and their range of specialized keyboard amps have become not just the favored but the insisted-upon tools for many top pros.

I've always loved the idea of an amp with just inputs and outputs. If the basic quality is there, why would you need to fiddle around with tone controls or effects? The Sona 32C Pro may not be quite this spartan, but don't look for configurability and options here. In the great computer tradition, what you see is what you get. And what you get is fabulous.

HERE'S LOOKING AT YOU

The Sona 32C Pro is no great shakes in the looks department. I would describe the cabinet as particle board painted black, though the official description quotes it as "high-density, polyurethane-bonded fiber with textured acrylic finish." The corners have standard-gauge protectors, and there's a top carrying handle sufficient for taking the strain of the unit's 41 pounds.

The front is dominated by a huge, round barbecue of a metal grille protecting the single 15-inch woofer. Atop this flares out a horn, behind which lurks a 3 × 7-inch tweeter, with a single port to the right. Minimalist is one thing, but there are no controls whatsoever at the front.

Connections and controls lie at the back. You get four input jacks; a mono, low-impedance, ¼-inch line-out jack; a master volume control; 3-band EQ that affects all channels at a stroke; and a similarly one-size-fits-all, post-fader, mono effects-send/return loop. Power connects via a standard IEC socket, with rocker on/off switch.

The exterior of the Sona 32C Pro might look plain, but the internal design is musically and electronically sophisticated. This is a biamped, active speaker system, meaning that separate amplifiers are used to power the woofer and tweeter, with a low level, Thompson-Butterworth-type crossover.

There are two ways to use the Sona 32C Pro: connect individual instruments directly to each input, or feed the instruments into a small mixer and take the output from the mixer into the amp. In general, I recommend the latter. Though direct connection is admirably streamlined, the review unit had no channel trim or volume pots, so I had to set individual levels on the instruments. This was inconvenient, and it could wreak havoc with the signal-to-noise ratio. Fortunately, Barbetta has introduced channel gain controls and an additional low-impedance, mic-level input on 1995 models, which will be available by the time you read this. It seems minimalism and market forces are uneasy bedfellows.

PRELIMINARY HEARING

To get started, I plumbed a Roland JD-800 into one of the Sona 32C Pro's

Barbetta put very few features in its Sona 32C Pro, but the stage amplifier's sound quality is absolutely first-rate.

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four inputs jacks, set in a low tech-looking row at the back of the amp. I play....Wow, has someone spring-cleaned or been tweaking my synth? Where is all this gloriously crisp, clean, spacious sound coming from? And out of the JD's mono output, to boot. Have I hit upon some magic EQ configuration by accident? (I peer anxiously over the edge of the unit.) Nope, all flat.

This amp purely and simply sounds like a million bucks. Only once before have I heard an amp make so dramatic an improvement: on a Steve Hackett club tour a few years back, when my trusty 400W Yamaha power amp blew up and was replaced, without my prior knowledge, by a Crest Audio amp. The gig took on almost psychedelic proportions as each "new" sound appeared in turn, freshly painted and raring to go. This is the power of, and difference between, good and great amplification.

The glorious thing about the Sona 32C Pro's EQ is that whatever you do, it sounds good. I ran a succession of keyboards and modules through the amp, including a Roland JD-800, Korg M1, Akai sampler, and Novation BassStation, and couldn't find a bad frequency. You get three fixed bands of EQ with 18 dB boost and cut per band. The low shelving band cuts off at 50 Hz, the high shelving band cuts off at 10 kHz, and the midrange bandpass filter is centered at 1 kHz. These frequencies were selected, according to Barbetta, for "optimal control of acoustic response." Normally, I'd disregard such a phrase as standard manufacturer waffle, but not here. This amp reeks of design by someone with ears.

I took one of those typically velocity-dependent, spiky JD-800 patches as an example. With the equalization flat, the sound thrusts out with all the quality and clarity of a $500 set of headphones. Obviously, when you crank up the treble, the spikiness is enhanced dramatically. But it never becomes shrill, just more pinpoint spiky. Beef up the bass, and the tone warms and fattens up, yet it doesn't lose distinction. Cut or boost the mid range, and you're not dealing with obsessive honk or wimpdom, you're simply looking at more density, or a hollowing of the tone.

As the tone controls must perform for all inputs equally, you're going to use them sparingly. But it is good to know, and almost magical to observe, that if you need to make even a fairly drastic adjustment to cure one problem sound, you are not going to louse

Product Summary

PRODUCT:
Sona 32C Pro stage amp

PRICE:
$899

MANUFACTURER:
Barbetta Electronics
5301 N. Commerce Ave.
Moorpark, CA 93021
tel. (805) 529-3607
fax (805) 529-0659

CIRCLE #440 ON READER SERVICE CARD

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

up all your other sounds in process. Change them, sure, but not louse them up. There is a difference.

PATCHING

The post-fader effects loop lets you patch in your trusty effects processor, but levels and intensities must be set on the effects unit. Remember, any processor you attach affects all input channels; you cannot pick and choose. With this in mind, a light coating of reverb is all I'd recommend.

George Benson keyboardist David Withan, a confirmed Barbetta user, generally links two amps as a stereo pair, feeding them from his left and right mixer outputs. Withan's testimony is "Set it and forget it." He finds it especially crisp and punchy in the low end for piano. (He uses a Roland MKS-20.) Set it and forget it is about right, too, because of the positioning of the controls. If you want to make adjustments during a gig, you have to dive over the unit and scramble about at the back, which may not be your, or the audience's, idea of stagecraft.

YOUR TRUE VOICE

Finally we come to the who, where, and why of the matter. The Sona 32C Pro is not a typical keyboard combo. If you're looking for routing options, individual effects levels, and the like, this is not the unit for you. On the other hand, if you're looking for unbridled quality, the Sona 32C Pro will serve well as the amp and speaker components of your system. I suggest a small mixer to accompany, however.

The power rating of 160W should be enough to fill a small club or cut through the murk and mayhem of the theater or concert stage when used for onstage monitoring. Being able to hear yourself onstage is a fundamental requirement. And yet, monitoring has always been a problem for me, as it is for most keyboard players.

I have used everything from socking great, 1,000-watt, full-range, mini P.A.s, to near-field studio monitors, to house wedges. Sometimes, *nothing* is the better option. The compact, portable, punchy Barbetta Sona 32C Pro is one of the best solutions I've come across.

Julian Colbeck *is the author of* Keyfax *books 1 to 5 and, frightening as it may seem, is also a keyboard player, currently with Steve Hackett.*

Digital Audio Labs FastEddie 3.33 (Win)

By Zack Price

This low-cost sound-file editor runs rings around the competition.

Some budget sound-file editing programs are painfully slow. Loading large files seems to take centuries, and civilizations rise and fall while you wait for screen displays to redraw. Ice ages advance and recede while the program performs signal processing on *short* wave-file segments. (Okay, I'm exaggerating but try working with some of these programs. You'll soon share my impatience.) Unfortunately, alternatives to these poky programs that don't cost an arm and a leg have been few and far between.

Digital Audio Labs has changed all that with the introduction of *FastEddie,* a low-cost *Windows* sound-file editing package that leaves many other programs eating its dust. The package consists of three independent programs. The main application, *FastEddie,* is used for recording, editing, and processing WAV files. The second program, *Sound Catalog,* triggers WAV-file playback via mouse, MIDI, or computer keys. *Playlist Editor,* the third application, plays sound files sequentially and allows you to split those files into regions for remixing.

SEE EDDIE RUN

Most budget sound-file editors create screen plots (the visual representation of a sound) directly from the file data each time a sound file is loaded. Other tasks that alter screen views, such as zooming in on a smaller waveform section, force screen redraws that are rendered directly from the sound-file data, too. Unfortunately, reading and plotting the data for every change is time-consuming. In fact, the only efficient way to work with such programs is to view and edit short time segments of any given sound file. However, that's not always practical or desirable when you need to work with large files and large file segments.

FastEddie takes a different approach to drawing screen displays. Whenever a

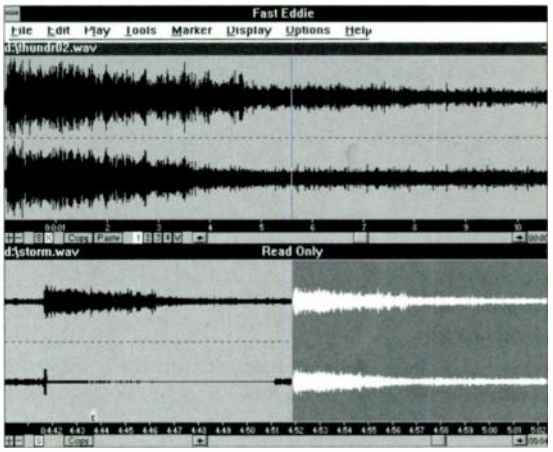


FIG. 1: *FastEddie*'s main screen, showing the Open (Read Only) window on the lower half and the Open For Modify window on the upper half.

WAV file is recorded, *FastEddie* also generates a companion Metasample file. The Metasample file enables the program to quickly display waveform data and speeds up screen redraws. As an added bonus, this approach makes viewing and editing large segments of a sound file much more feasible.

Metasample files also greatly speed up WAV file loading. Whenever a WAV file is loaded, *FastEddie* looks for its associated Metasample file. If no Metasample file exists, the program creates one. Once an associated Metasample file is available, loading even a large WAV file is almost instantaneous.

THE STARTING LINE

The *FastEddie* screen is divided into two parts: the Open window on bottom and the Open For Modify window on top (see **Fig. 1**). Although files loaded into the Open window cannot be edited or processed, you can copy information from the Open window into one of four selectable paste clipboards. The copied data can then be pasted into the Open For Modify window for further editing and processing. In contrast, files loaded into the Open For Modify window can be directly edited or processed. You can also cut, copy, and paste information to and from the Modify window, or process any selected areas with the Processing Tools (more details on this later).

Data pasted into the Open For Modify window can be saved as a new WAV file or as an Edit List file. Edit List files don't contain digital audio data; they simply point to selected regions of source WAV files for playback purposes. Since Edit List files are much smaller than WAV files, it may make more sense to save modified data in this format when hard-disk space is limited. Be aware, though, that Edit List files are useful only if the source WAV files still exist. Erase or alter the source files, and you compromise Edit List file playback. (*FastEddie* warns you ahead of time if a WAV file you're trying to delete or change is referenced in an Edit List file.)

Sometimes the hard drive can't find the source file or temporary file data fast enough to play them back smoothly. If this occurs, pasting numerous short edits in the Open For Modify window can cause skipping to occur during playback, especially on slower machines. To deal with this problem, you can use the Combine Edits function to consolidate the separate edits into a new, larger sound file for faster playback.

Keep in mind that playback problems could also be caused by a severely fragmented drive. Be sure to defragment your hard drive before each editing session so that there will be no doubt as to when you need to use the Combine Edits feature.

FastEddie, like most budget sound-file editing programs, makes use of markers to identify specific edit points in a WAV file. You can drop in up to 300 markers per window on the fly during recording or playback and move those markers to more precise locations afterward. Once placed, moving from

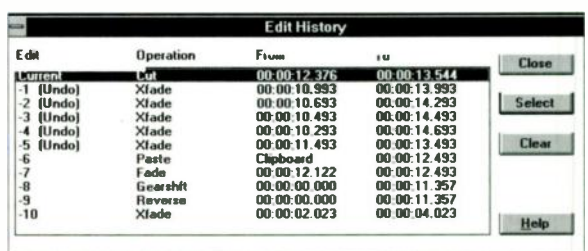


FIG. 2: The Edit History list shows the last ten edit changes, including the type of change and its time location in the Open For Modify window.

marker to marker is as simple as pressing Tab to go forward and Shift-Tab to move backward.

Although the default marker names start at A, B, C, and so on, you can change any marker name to a more meaningful or useful one. Furthermore, marker names and locations can be saved and recalled as an Edit List file. That's a handy feature if you have a long editing job you can't complete in one session.

PROCESSING TOOLBOX

FastEddie has eight different processing tools for manipulating digital audio data. Compared to the number of editing tools found in other budget WAV file editors, that's not very many. However, don't confuse quantity with quality; these tools perform signal processing at speeds approaching real time execution. By contrast, some soundfile editors often take two to fifteen times real time to process WAV data, depending on the effect selected.

FastEddie's processing tools should be familiar to those who have used WAV-file editing programs. For example, the Reverse tool plays the file backward. The Gain Change tool adjusts overall volume level, while the Normalize tool rescales wave peaks relative to a new maximum peak level.

Another familiar tool is a 2-band shelving EQ with a 20 dB boost or cut for each band. The bass band is adjustable from 1 Hz to 1 kHz, and the treble band can be set from 1 kHz to 20 kHz.

Although its name is unique, the Gearshift tool does the familiar task of compressing and expanding playback time. As in many such programs, this alters the pitch of the processed data. However, Gearshift is limited to shifting playback by no more than ten percent at a time. This is fine if you're trying to adjust material that doesn't quite fit into a set time frame, e.g., for a commercial. For more radical applications such as sound design, though, Gearshift is less useful.

FastEddie's other tools include a Mix tool that mixes pasted data from a clipboard with digital audio data in the Open For Modify window. Each part (the clipboard and the Modify window) has separate volume controls for adjusting mix levels beforehand.

The Fade tool performs fade-ins and fade-outs of highlighted areas in a sound file. Users can choose between linear or logarithmic fade curves, or create a custom curve using markers. Just set the amplitude level for each marker point in the Fade tool dialog box and execute. *FastEddie* will make smooth fades between each marker and between the endpoints of the highlighted area and their closest markers.

FastEddie provides two ways to eliminate the pops that can occur when two sounds are pasted side by side. Listed in the Option menu rather than the Tools menu, the Automatic Crossfade feature does just what its name suggests: It works behind the scenes, automatically performing a short crossfade at any point where an edit could cause a click or pop.

The Manual Crossfade tool can also be used to remove clicks, although it is more commonly used for edits such as overlapping the end of one song with the beginning of another. It's easy to use: Just place the cursor between the two sounds you want to crossfade, using the Find Next Splice command. The Manual Crossfade tool lets you set the type of crossfade desired and the fade

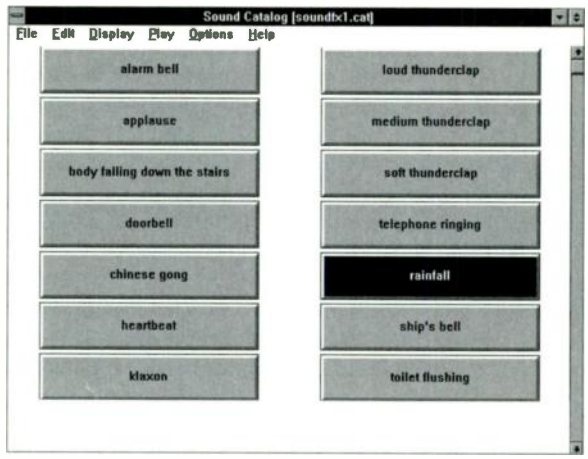


FIG. 3: The *Sound Catalog* screen displays the trigger buttons for each WAV-format sound file in the Catalog.

duration. You can also customize crossfades for more precise control.

HISTORICAL PERSPECTIVE

Complex editing sessions involve a great deal of cutting, pasting, and processing. Many programs utilize destructive editing only, or save the most recent edit. *FastEddie,* however, employs nondestructive editing and saves the last ten edit stages. This makes it easy to go back to previous points in an editing session. Just call up the Edit History box (see **Fig. 2**) to see the last ten stages of an editing session, then select the proper edit stage to recall a particular step. The Edit History function is great for auditioning and comparing different edits. Also, if you suddenly realize you messed up an edit a few stages back, you can easily return to the "pre-mistake" level and start over from there.

Some types of edit changes (effects processing, for instance) are stored in temporary files. This makes an Edit History potentially data-intensive, and you'll need to reserve enough free hard-disk space to maintain it. If drive space becomes scarce, you can clear the Edit History to eliminate the temporary files and reclaim the needed disk space. However, it's important to remember two things: The last edit stage becomes the new first stage once the Edit History list is cleared, and the Edit History exists only while the current editing session is active. Therefore, you may want to save any earlier edit stages as separate sound files before clearing the Edit History. This is extremely important if you haven't decided which takes you want to use.

CATALOG SHOPPING

The *Sound Catalog* (see **Fig. 3**) is a separate application that lets the user trigger WAV file playback via mouse, MIDI, or computer keys. Sound files are organized into groups (a Catalog), with each sound file represented onscreen by a button that serves as a trigger for sound-file playback. Although the *Sound Catalog* contains a collection of multiple sound files, it can play only one file at a time. Moreover, it triggers only WAV files. If you want to play an Edit List file, you have to save it as a WAV file first before adding it to the Catalog.

Sound files are added to a Catalog by selecting the Add command from the Edit menu. Type the desired file name in the Catalog Item dialog box, or hit the Browse button to select a file from a list of available sound files. Once a file is selected, its abbreviated name appears in a Display String box.

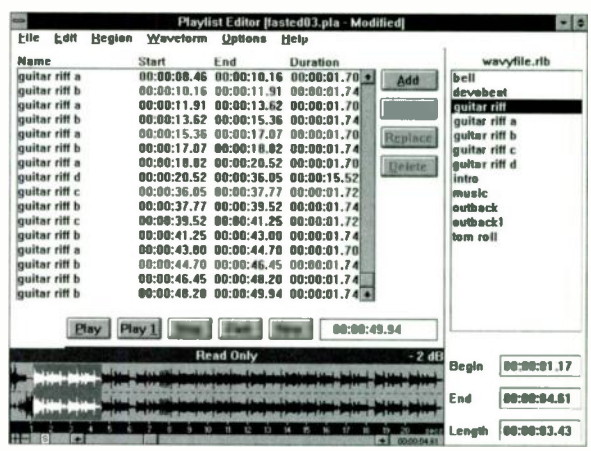


FIG. 4: The Playlist Editor screen includes the playlist on the left side of the screen; the Waveform Display is below. The upper right-hand portion of the screen contains the Region Library, and the lower right side shows time information concerning highlighted sound-file portions in the Waveform Display.

You can keep the name, or change it to a longer, more descriptive name. The name you type in the Display String box will appear in the appropriate onscreen trigger button.

You can also assign computer keys and MIDI note numbers to Catalog items (discussed shortly). Once a Catalog is created and the key and note triggers assigned for each sound file, it can be saved as a separate file.

There are many trigger playback options available in the *Sound Catalog*. The simplest way is to point with the mouse and right-click on the desired file's onscreen button. You can also trigger playback using a computer key that has been assigned to a sound-file button. Either method makes it easy to drop in sound effects or short musical segments on the fly. By activating the Queue playback option, you can type on the computer keys in a particular order, and the *Sound Catalog* will play the sound files back in the sequence chosen. It's a quick and easy way to string different sound effects together.

Finally, you can trigger file playback from an external MIDI device or sequencing program via a designated MIDI note number. Furthermore, you can decide how the *Sound Catalog* will respond to MIDI note data. When the Ignore MIDI Stop option is checked, a sound file triggered by a MIDI Note On will play until its end, or until a

FASTEDDIE'S BIG BROTHER

Digital Audio Labs' *The EdDitor Plus* package is nearly identical in appearance and function to the *FastEddie* bundle. However, *The EdDitor Plus* contains a number of features not found in *FastEddie*.

For example, *The EdDitor Plus* supports simultaneous record and playback of four virtual tracks (two stereo files), punch-in recording, and SMPTE triggering of Playlist entries. There's also a mouse scrub-play feature, as well as the capacity to mute, move, and insert silence in highlighted areas of the Open For Modify window.

As expected, these extras come at a higher price. (*The EdDitor Plus* lists for $349.) The increased capabilities demand additional hardware requirements, too. First, an 80486DX-50 (not DX2-50) or '486DX2-66 with 8 MB RAM is the minimum recommended system.

Although *The EdDitor Plus* works with any *Windows*-compatible sound card, the simultaneous record/playback and punch-in features only work with Digital Audio Labs' CardD Plus card ($795). Moreover, a MusicQuest MQX16S or MQX32M MIDI interface is required for SMPTE triggering of Playlist entries.

Users of Digital Audio Labs' *FastEddie* can upgrade to *The EdDitor Plus* for $220, which is the difference in list price between the two programs.

new Note On command triggers another sound file. If Ignore MIDI Stop is *unchecked*, a sound file triggered by a MIDI Note On command will play until its corresponding Note Off command is received. This option makes the *Sound Catalog* behave more like a sampler. Naturally, if no Note Off command is received, sound-file play simply stops when it reaches the end.

Triggering playback through MIDI is made possible with the D.A.L. MIDItasker, a software driver included in the *FastEddie* package. The MIDItasker works with your computer's MIDI interface by monitoring its MIDI traffic from both sequencing programs and external devices. When the MIDItasker detects a MIDI note assigned to a Catalog sound file on the specified channel, it intercepts that note and sends it to the Catalog Player without interfering with the rest of the MIDI datastream.

The MIDItasker makes the job of triggering sound files in sequencing

Product Summary

PRODUCT:
FastEddie 3.33
sound-file editor
PRICE:
$129
SYSTEM REQUIREMENTS:
40 MHz 80386DX, 80486, or Pentium-based, IBM-compatible computer; 4 MB RAM (8 MB recommended); VGA monitor; MS-DOS 5.0 or above; *Windows* 3.1; 200 MB or more hard-disk space; *Windows*-compatible sound card; mouse; disk-optimizer program for defragmentation
MANUFACTURER:
Digital Audio Labs
14505 21st Ave. North
Suite 202
Plymouth, MN 55447
tel. (612) 473-7626
fax (612) 473-7915
CompuServe: GO DIGAUD
CIRCLE #441 ON READER SERVICE CARD

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

programs much easier, because it eliminates the need to insert Media Control Interface (MCI) commands for playing sound files into a sequencer. Just play or insert the appropriate MIDI number on the selected channel into your sequencer while running the *Sound Catalog* program.

▼

FastEddie's

speed of operation

sets a new

standard.

Although MIDItasker works great with the *Sound Catalog,* I experienced a minor problem while the MIDItasker was present on my system. Whenever I tried to load Sound Quest's *MultiQuest* editor/librarian program, it repeatedly displayed a MIDI-driver configuration error. Even so, the program still loaded up and ran after I acknowledged the error message. I had no problems with other MIDI programs, and it seems unlikely that the MIDItasker will cause conflicts on most systems. However, keep in mind that some sound cards that double as MIDI interfaces can't perform both MIDI and digital audio functions at the same time. If you have that type of sound card, you'll need a separate MIDI interface to use the MIDItasker.

THE PLAYLIST EDITOR

The Playlist Editor program (see **Fig. 4**) lets you nondestructively arrange sets of songs in any chosen order or splice a song into sections for reconstructing into a new framework.

Creating a Playlist is a 2-step process. First, regions must be created and placed into the Region Library. Regions, the building blocks of a Playlist, differ in their construction according to the task at hand. If you're arranging a playlist of different songs, simply add their WAV or Edit List files to the Region Library.

To reconstruct a song, however, you have to create regions by selecting portions of the song's WAV or Edit List file. To do so, you first load a sound file into the Waveform Display section and highlight the areas of the file you want to use. Then confer a region name on each selected area and add them to the Region Library.

Next, arrange the playback order of those regions by adding them to the Playlist. To do that, highlight a region name in the Region Library, then click on the Add button. Each inserted Playlist entry shows the region name, the entry's start and end times, and duration of play. You can add a region as many times as you like, and it's easy to insert, delete, or replace a Playlist entry anytime.

Normally, each entry starts playing immediately after the end of the previous entry's play. If you prefer, though, you can delay the start time of each entry. This feature is ideal for putting pauses between songs. However, you cannot start playing the next region before the previous region has completed playback.

You can't always tell if the regions composed of highlighted sections fit properly until they're pieced together in the Playlist. Fortunately, it's possible to modify existing regions by resizing the highlighted areas in the

Waveform Display. Once a region is modified, the Playlist is altered accordingly, and the associated times for each entry change, too.

I suffered from one annoying glitch while working with the Playlist Editor. Whenever I resized highlighted areas in the waveform display, "ghost" lines appeared in places that no longer contained highlighted information. That made it harder to ensure that I had made "splices" in the right place. (I was able to make the "ghost" lines disappear by toggling the zoom level back and forth, however.) According to the folks at Digital Audio Labs, this problem occurs only rarely. In their experience, it seems to happen to those who use the generic *Windows* video driver, rather than the driver for their specific video card.

Even so, I feel that Playlist Editor has room for improvement. First, the waveform display is too small to easily create and modify regions. Enlarging its height would make working with the display more tolerable. Also, the waveform display area should have a loop-play feature. Often a region is played many times in succession, behaving much like a controlled loop. The only way to hear if you have a seamless "loop" is to string a region together a few times in the Playlist. It would be much easier to hear the loop before creating and adding the region to the Playlist.

Finally, it would be useful to save a Playlist as a WAV file, especially when the Playlist is a reconstructed song. Currently, the Playlist Editor lets you save region libraries and Playlists as separate file types. However, the only way to access a reconstructed song is to load its region library and Playlist file. You can't arrange several remixed songs into a song set unless you put each region of every remixed song into one huge region library and Playlist. A more efficient alternative would be to first "condense" a remix-style playlist into a WAV file and then arrange all the remixed WAV files into a song set.

FINISH LINE

Overall, *FastEddie* is a powerful program package. The application contains the necessary tools for editing WAV files quickly and easily. The playback options in the *Sound Catalog* provide a variety of ways to trigger sound files, with each method uniquely suited to particular tasks. The Playlist Editor, while it has flaws, makes basic song remixing and side mastering easier to accomplish. Furthermore, the well-written manual and excellent tutorial make the software easy to learn.

FastEddie's recently lowered $129 list price is competitive with other budget WAV file editors. However, its speed of operation sets a new standard that most budget WAV file programs just can't match. In short, Digital Audio Labs has made a fast break to the head of the pack.

Zack Price *'s interest in MIDI and digital audio is due in part to his documented inability to work and play well with others.*

The Digital Kitchen
Definitive Grooves

By Al Eaton

Spice up your dance tracks with hot CD samples.

So many sample CDs are hitting the market that it's easy to become jaded. But it only took a few of the 99 break beats on this audio CD to completely win me over. You can use these sounds as the bed or topping for many original songs, without fear that you'll end up with tracks that sound the same. In particular, the drum and percussion sounds have that true hip hop grit and funk I just can't find as stock sounds on modern drum machines. In addition to the break beats, there are hundreds of drum hits and drum loops.

OOPS!

The review copy also included deejay record scratches of various sounds, performed by DJ Pimp D. Unfortunately, many of the scratches clearly originated from the published recordings of other artists. I was impressed that as soon as I informed producer Nate Goyer and Eye & I of the problem, they immediately apologized to the copyright holders and started remastering the disc for reissue without the recognizable deejay scratches. By the time you read this,

***Definitive Grooves,* from The Digital Kitchen, is especially strong on contemporary drum loops and drum hits, but also offers excellent horn stabs, orchestra hits, vocoded blurbs, synthesized speech, and more. The bass sounds are well recorded, but only high and low samples are provided for each sound.**

the remastered version will be out. It contains 102 deejay scratches, but you can't tell where they came from, so it should be safe to use them.

All this means is that if you bought a copy of the earlier version, you'd be foolish to use the deejay-scratch tracks in a commercial project. (I called Paris, whose work was included among the scratches, and asked him if he planned to do anything about it. "I won't act now," Paris said, "but if I hear my work incorporated into somebody else's hit record, I'll go after anybody who had anything to do with infringing my copyrights.") The rest of the material on the CD—the vast majority of the collection—is legitimate and license-free.

You're not getting less value with the remastered disc, because you couldn't legally use the deleted scratches anyway, and ten usable replacement scratches have been added. There is ample material here to justify the purchase price.

DELIVERING THE GOODS

Scratch tracks aside, I found this disc quite valuable. It's filled with the types of sounds that you hear on the songs at the top of the charts these days. The beats and rhythms themselves are mostly contemporary, even though some of them are a little too busy for today's hip hop. Of course, you're not limited to using them only for that style of music. Throw in some tempo changes and a little digital-audio editing, and these loops can easily be used for house, acid jazz, etc. And if you can't find the loops you want, there are plenty of great-sounding drum hits you can use to make your own.

The number of sounds on each track is small, between five and ten, which makes it easy to maneuver around the CD while you're looking for loops or setting up loops for sampling. If you set your CD player to continuously repeat a particular track, you won't have long to wait before the sample that you want repeats.

Most of the loops are 2- and 4-bar phrases, but there are a few 1-bar loops, too. To simplify the process of setting the loop points in your sampler, all loops repeat the full downbeat of the first bar after the last measure plays. This idea is so simple and so useful that I have to wonder why *all* sample-loop producers don't embrace it.

DRUMMING UP SUPPORT

The drum loops and drum hits are the strong points of this CD. The individual drum and hi-hat hits consist of 41 bass drum samples spread over five tracks,

Product Summary

PRODUCT:
The Digital Kitchen
Definitive Grooves
sample CD
PRICE:
$79.95
DISTRIBUTOR:
Eye & I Productions
930 Jungfrau Ct.
Milpitas, CA 95035
tel. (408) 945-0139
fax (408) 945-5712
CIRCLE #442 ON READER SERVICE CARD

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

52 snare drum hits spread over five tracks, 25 closed hi-hats spread over three tracks, and fourteen open hi-hats spread over two tracks.

I like the fact that each of the single drum hits are played twice in a row. This makes it easy to put your sampler in sample-trigger mode, listen for a sound that makes you tingle, and grab the hit when it's repeated.

Each set of drum-loop tracks has several different tempos. It would have been nice to have all the loops with the same tempos grouped together. That way, you wouldn't have to skip around so much while looking for that perfect groove. However, I don't consider this to be a major problem, because the track reference sheet lists both the bpm and the length (in bars) of each loop. The liner notes are laid out nicely and provide a thorough and easy-to-understand description of the CD's contents.

▼

The disc is filled with the sounds you hear at the top of the charts.

COOKIN' IN THE KITCHEN

I was disappointed to discover that all the bass sounds are provided only as high and low samples. It's hard to get a convincing bass synth sound with only two samples to cover the entire keyboard. Used judiciously, however, it can work.

All of the other sounds on *Definitive Grooves* (horn stabs, orchestra hits, vocoded blurbs, synthesized speech, and more) make this one happening collection. Everything was cleanly recorded, well edited, and usable. I've already incorporated many of these sounds into my current productions, and I'm sure I will use them on many sessions to come.

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

Studio Electronics SE-1

By Steve Lerner

A new tool for a world that can't live without analog synths.

Discussion about analog synthesizers is sensitive and political, much like arguing about regional bagels. Classic-tasting bagels are baked in one and only one place: New York. Classic analog synthesizers are built in one and only one place: the past. This doesn't stop thousands of entrepreneurs from attempting to bake bagels in California, but the only thing you taste is disappointment.

Fortunately, the situation is brighter for analog synths. Studio Electronics has long been known for MIDI-fying Minimoogs, and the company's hot new SE-1 analog synth gives a proper nod to the classics. A look at the front panel told me they did the right thing: Rather than make a Minimoog clone, they made a new, 3U rack-mount analog synth with design influences from the Minimoog, but with far more control and power.

LOOKS AND BRAINS

The right side of the SE-1's front panel is laid out like a performance-oriented analog synth. On the left is the Programmer section with a data-entry knob; 4-line by 20-character, green, backlit LCD screen; and four directional cursor buttons. On the right are the 24 dedicated knobs that control most of the sound-related parameters (e.g., oscillator tuning, pulse width, envelopes, and filter settings).

The LCD screen is easy to read in a dark, live setting, and the vintage-style knobs are cool, if small. A section of knobs often can control more than one bank of functions; in such cases, you switch modes with small, lighted buttons, which is very efficient. The panel has nice, electronic music-style, sans-serif lettering, which impresses the gearheads and ravers.

Access to the SE-1's modulation, voice allocation, MIDI, and utility pages is accomplished by holding the Shift key and hitting the left or right cursor

keys. When you use the dedicated knobs to adjust a parameter for which there are additional options in the Programmer (such as the oscillator frequency, where you can further adjust coarse and fine tuning), the LCD jumps to the appropriate page. Switching between menus is easy with the cursor keys, and the data-entry knob is large and has good resolution.

The SE-1 has a practical memory-protection scheme: You can allow the patch to be modified and written, modified and not written, or not modified and not written. This comes in handy for live performance; you won't accidentally write over your crucial patch once it has been tweaked to oblivion. Each of the two memory banks contains 100 alphanumerically named patches, all in user RAM. You can save and load any or all programs via MIDI System Exclusive.

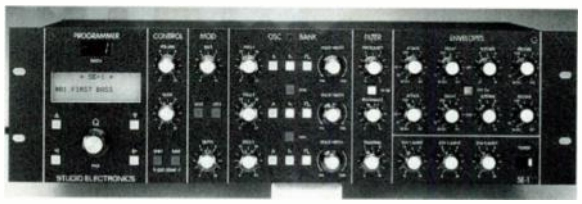
The rear panel is about as simple as you can get. It holds one ¼-inch audio output; an IEC-standard AC jack; and MIDI In, Out, and Thru ports. There is no dedicated headphone output, but if you crank up the master volume, you can drive headphones from the audio output.

No analog synth should be so complicated that experienced synthesists have to consult the manual, and the SE-1 meets this dictum. It was simple to find every function I traditionally use, with easy access to creative tools I don't normally use. However, beginners may want to invest in a book on analog synthesizer basics (or back issues of **EM**!), because the manual is just a 7-page printout, stapled together, with barely adequate descriptions of the features, no applications notes, and no tutorials.

A GREATER OSCILLATOR

This is a monophonic, digitally controlled, analog synth. You can hear the difference when you compare it to an older analog synth, because the tuning of the oscillators doesn't drift as the cold garage studio warms up after the floodlights are turned on. (The Minimoog gives you a forced lesson in microtuning while you play.)

Like the Minimoog, the SE-1 has three oscillators. However, each of the Minimoog's oscillators offers only one waveshape at a time, while each of the SE-1s can produce any combination of pulse, sawtooth, or triangle waves simultaneously. You can globally tune



Although the SE-1 doesn't sound exactly like a Minimoog, Studio Electronics' digitally controlled analog synth is the closest thing to a modern, MIDI-controlled version. The new synth is more reliable, more versatile, and more stable than its predecessor.

the synth and independently tune each oscillator with a front-panel knob. The Minimoog's unstable tuning gives it a very throaty, chorusing quality. The SE-1 lets you fine tune the last two oscillator banks plus or minus a little over a semitone, which allows you to achieve this effect.

You can hard-sync the tuning of oscillators 2 and 3 to oscillator 1 so that the slave will tune only to harmonics of the master. A lighted Sync button shows that this feature is engaged.

Studio Electronics remembered to include several classic features that are important in achieving a vintage analog-synth sound. For example, you can have the synth respond to the last note, high note, or low note played on your MIDI controller. The Glide (portamento) feature includes a dedicated glide time knob and an auto-glide parameter that determines whether the pitch dives down (positive value) or rises up (negative value) to the note being held.

FAMOUS FILTERS

The Minimoog's signature is its characteristic voltage-controlled filter (VCF). The SE-1's filter can be lowpass or highpass, and its slope can be front-panel switched between 12 dB/octave (Oberheim S.E.M.-style) and 24 dB/octave (Moog-style). The 12 dB/octave filter also can be bandpass, but you have to set this up in the programming section. If you increase the resonance far enough, the 24 dB/octave filter can be driven into oscillation.

The filter only scales in whole steps, which means you get a chattering sound when turning the knob. For ravers and techno types who live for real-time manual control, the inability to reach for the VCF Cutoff Frequency knob and turn it for a smooth sound is a major flaw in an analog synth. Fortunately, the envelopes and LFOs don't have this step limitation when modulating the filter, and you can get semitone resolution under MIDI control. Also, Studio Electronics can modify the unit to permit a real hardware sweep with an external footpedal. The filter sounds okay, but it definitely does not sound as good as a Moog filter.

One unfortunate difference between the SE-1 and many traditional analog synthesizers is that the former makes no sound unless it receives a MIDI Note On message. This type of older analog synthesizer (for example, the ARP Odyssey) does not require a keyboard or other trigger source; if you simply set the envelopes, open the filter, and turn up the VCA, you can get sound. Many classic, electronic-music pieces have been performed exclusively with knobs and patch cords. I'd like to see this implemented in a future firmware upgrade. For example, it would be great if holding down the Shift button and then clicking one of the oscillator waveform buttons kept the oscillator on until it was deselected or the preset was changed. In fairness, the Minimoog also requires a trigger to make sound.

Unlike a Minimoog (and many other classic analog synths), the stock SE-1 does not offer an audio input that would allow you to process external signals with the VCF and VCA. Fortunately, an audio input can be added for a reasonable price ($25).

Product Summary

PRODUCT:
SE-1 analog synthesizer
PRICE:
$1,469
MANUFACTURER:
Studio Electronics
18034 Ventura Blvd.
Suite 169
Encino, CA 91316
tel. (818) 776-8104
fax (818) 776-1733
CIRCLE #443 ON READER SERVICE CARD

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

MODULATION MANIA

Modulators are the main source of dynamic and timbral change in any synth, altering its settings in real time. The SE-1 provides the basic internal modulation sources and paths one expects in a Minimoog-class analog synthesizer (see table "SE-1 Internal Modulation Paths"). You get three assignable low-frequency oscillators (LFOs), each of which can generate a triangle wave, up or down sawtooth, square wave, white noise, or sample-and-hold. The frequency and depth are controlled via dedicated knobs, while a pair of lighted buttons indicate which LFO the knobs control.

There are two sets of Attack, Decay, Sustain, and Release knobs, which control four ADSR envelope generators.

▼

No analog synth should be so complicated that you need a manual.

You switch between EGs 1/2 and 3/4 with a lighted button. ADSR 1 is hard-wired to the filter and ADSR 2 is hard-wired to the voltage-controlled amplifier (VCA). The envelopes can be globally switched between linear and exponential curves. Beneath the ADSR area are knobs for setting the Velocity scaling of EGs 1, 3, and 4. You can even invert EGs 1 and 3 using the Programmer.

Single or multiple filter-envelope retriggering is possible. With single triggering, the envelope is triggered only when you completely release a key and restrike the next key, somewhat like playing staccato. With multiple triggering, the envelope is retriggered with every key strike, even if you haven't completely released the previous key. This allows you to play in a more legato manner.

MIDI IMPLEMENTATION

The SE-1's MIDI implementation is good, but not great. Aside from Note On/Off messages, the SE-1 recognizes MIDI Pitch Bend, with selectable range (up to two octaves, in semitones); Channel Pressure; and Velocity. It also

receives twelve Control Change messages that have been premapped: CC 1 (Mod Wheel), CC 2 (Glide Time), CC 7 (Volume), CC 64 (Sustain), CC 65 (Glide On/Off), and CC 121 to 127 (Channel Mode messages, such as All Notes Off and Omni Mode On/Off). The only problem is that Control Change 2 is supposed to be the Breath Controller message; Control Change 5 is the proper message for Glide Time (Portamento Time).

The SE-1 also can receive two user-definable continuous controllers, which can be any of the 128 Control Change messages except the aforementioned twelve.

You can route these control messages to LFO depth, oscillator 2 and 3 frequency, pulse-width modulation (any oscillator), filter cutoff, filter resonance, oscillator 2 or 3 level, ring-modulation level, or noise level. Each controller can be scaled. In contrast, a Minimoog with a Wine Country MIDI modification can only recognize Note On/Off, Pitch Bend, and Modulation.

The unit's MIDI features have several noteworthy limitations. First, unlike editing with the front-panel knobs, when you change a parameter via MIDI, the LCD screen does not update to reflect your changes, even when you manually switch to the appropriate page. In addition, the knobs do not send their values over MIDI (as in the Novation BassStation, for example), so you can't incorporate your front-panel tweaks into a sequence. Finally, a few important parameters, such as the ADSR settings, cannot be controlled via MIDI.

SE-1 Internal Modulation Paths

Envelope Generator 1 can modulate:
Filter cutoff frequency
Filter resonance
Envelope Generator 2 can modulate:
VCA audio output level
Envelope Generators 3 and 4 can modulate:
Amplitude, noise generator
Amplitude, oscillators 2 or 3
Amplitude, ring modulator
Filter resonance
Frequency modulation, oscillators 2 or 3
Pulse-width mod, any oscillator
LFOs 1, 2, and 3 can modulate:
Amplitude, noise generator
Amplitude, oscillator 2 or 3
Amplitude, ring modulator
Filter cutoff frequency
Filter resonance
Frequency, any oscillator*
Master volume
Pulse width, any oscillator

*LFO 1 can also modulate the frequencies of all oscillators at once.

ONSTAGE FIELD TESTS

I took the SE-1 to several gigs, where I used it as a bass synth for drones and rhythmic sequencing. Setting the synth for square and sawtooth waves with no sustain yielded a wonderfully fat bass sound. A slight LFO mod of the cutoff frequency sounded great for pounding techno. I would have liked to manually adjust the cutoff frequency, but the whole-step increments would not have sounded good live.

The sound was rich for ambient drones, but setting the SE-1 to drone was a bit trickier. I had to use a 1-note loop on my Weird Blinking Lights 4014 arpeggiator so only one note would be sent to the synth. But when I tried to use the LFO for modulation, its frequency proved too fast for a deep, ambient, live session. (A Minimoog LFO isn't slow enough for this application, either.)

Playing live with the SE-1 demonstrated two critical issues that are typical of digitally controlled analog synths. First, I had problems with the SE-1's patch memory. You can spend hours tweaking a patch, then save it, and not get exactly what you saved when you recall it. All settings are in software, so this should not happen, but it did. (I've had this problem with other digitally programmable analogs, such as the Matrix-1000.) Among the SE-1 parameters that don't get saved correctly every time are the individual tunings of the oscillator banks, which are clearly visible in the programmer section of the synth. (The manufacturer was unable to reproduce this problem.)

The second issue is common among digitally controlled analogs with knobs. The problem occurs when a preset setting is far different from the current knob positions. When you turn a knob, a very undesirable sound results. For example, let's say the preset includes a lowpass filter whose cutoff frequency is programmed several octaves below

where the cutoff-frequency knob is set. Turning the knob up causes a loud jump in cutoff frequency. This type of design, which is not unique to digitally controlled analog synths, is a result of the manufacturer's conscious design decision. Its advantage is that the knob always reflects the actual parameter value.

In contrast, with the old Oberheim OB-8 approach, the knob immediately starts changing the parameter incrementally, regardless of the knob's position. You obtain a smooth change, but the knob's position might not reflect the actual parameter value. I would like to see a third approach, found in some effects processors, where the knob remains inactive until it reaches the current value. Once it passes the current value, the knob's position reflects the new value, but without the sudden jump.

RETRO VERSUS VINTAGE

The SE-1 and the Minimoog sound very similar, but not identical. The Minimoog clearly sounds "richer" and "fatter," but why? After all, the SE-1's 24 dB/octave filter and the famous Moog filter are supposed to be virtually identical. A look at each of their square, sawtooth, and triangle waveforms on an oscilloscope told at least part of the story.

The Minimoog's square wave is not a square wave. It is a rhombus wave with a changing voltage during the high

Rating the SE-1

Sometimes four EM Meters just don't say enough. Here are a few informal, supplemental meters to fill the gaps.

Ability to impress ravers	4
Ability to obsolete the Minimoog	4
Ability to obsolete the Oberheim Matrix-1000	1
Ability to obsolete the Roland SH-101	2
Ability to obsolete the Roland TB-303	3
Drone quality	2
Knob-twisting satisfaction	2

part of the pulse. The sawtooth has an exponential slope, instead of a linear one, while the triangle wave is not quite symmetrical and has a slight voltage spike at the top. These imperfect versions of properly created waveforms are a large part of the Minimoog's fat sound. Using the voltage-controlled filter eventually reduces the waveform into a sine wave as you increase the resonance.

The SE-1 was obviously designed to emulate these imperfections. The waveforms had almost identical shapes to the Moog, but they weren't a perfect duplicate. The square wave was a little more square, the slope of the sawtooth was different, and the triangle wave was a little straighter, without the voltage spike at the top. In addition, the SE-1's filter had a slightly different effect on the waveform. Although this might not explain every reason for the sonic differences, it's revealing to actually see the variations.

Studio Electronics is coming out with the Vintage Filter Kit (estimated price $25 to $45), a modification that should add just enough harmonic distortion to bring the SE-1's waveforms much closer to those in the Minimoog. The easy-to-install daughterboard brings the SE-1 closer to the original Moog design.

IN THE END

Due to the Minimoog's characteristic architecture, it has a unique, rich sound that will probably never be precisely duplicated. However, despite its slightly weaker sound, the SE-1 still sounds great and is more powerful and efficient than the Mini. Its more flexible oscillators, envelopes, and LFOs make the SE-1 more powerful than the Minimoog, and its MIDI implementation is far more comprehensive than that of a MIDI-modified Mini.

To top it off, the SE-1 is smaller, more reliable, more versatile, and more stable than a Minimoog. It can't replace a love for antique synthesizers, but it is a great new tool for a world that has realized it can't live without analog synthesis.

Steve Lerner *recently moved to Brazil from San Francisco, where he was a quality-control engineer for Sonic Solutions. His band, Weird Blinking Lights, uses only analog synthesizers and plays at raves and other underground electronic music events.*

Lexicon Reflex

By Rob Shrock

This may be the reverb for budget studios.

Lexicon has long been famous for high-end digital reverbs, and with good reason. The 480L has a trademark sound that is heard on most pop and rock records today, and the models 200, 300, and 224 are used almost everywhere. The Lexicon reverb sound is thick, smooth, three-dimensional, and mature.

That's fine for the big studios, but what about the rest of us? In the late 1980s, the Lexicon reverb sound became available to the masses in the LXP-1, followed by the LXP-5 and LXP-15. In addition, the company created a cool little MIDI parameter editor called the MRC. An LXP and MRC was like having a pubescent 480L and LARC remote controller in your home studio for about a tenth of the price. Although the sound quality wasn't quite up to the standards of the full-grown units, the little guys sounded pretty darn good and ended up on more than a few records and a ton of demos and jingles.

The next generation of affordable Lexicon processing is called the Performance Series, which includes the Alex (reviewed in the July 1993 **EM**), JamMan (reviewed in the March 1994 **EM**), and Vortex (reviewed in the May 1994 **EM**). The newest member of this product line is the Reflex Dynamic MIDI Reverberator, which offers Lexicon's advanced, musically pleasing effects algorithms using today's modern, less expensive DSP power.

LAYOUT

The entire front panel includes only five knobs and three buttons, with a few lights and labels. On the left are three knobs that control the input level, wet/dry mix, and output level. An LED next to the Input knob glows yellow to indicate an input signal and red for signal overload. To the left of the 3-digit LED display is a Store(+)/Clear(-) button, which normally toggles between storing the current settings and skipping the current effect in a footswitch step sequence.

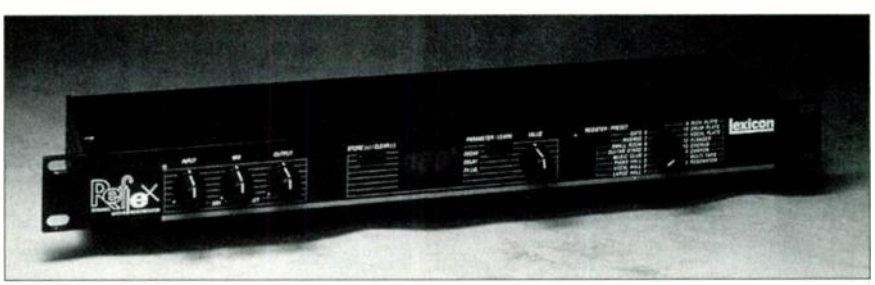
To the right of the numbers in the display are three more LEDs, which appear next to three parameter labels: Decay, Delay, and FX Lvl. Each parameter is selected by pressing the Parameter/Learn button until the corresponding LED is lit. The Value knob edits the selected parameter value. The Register/Preset button determines whether the Preset knob selects from sixteen preset effects or 128 user effects, which are called Registers.

Eight different algorithms are available in the Reflex: Hall, Plate, Flanger, Multi Taps (4-tap delay), Resonator, Inverse (reverb), Gate (reverb), and Chorus. The three parameters affect the sound differently according to the current program. In the Hall, Room, and Plate presets, the Decay parameter determines the nominal reverb decay time, while Delay sets the predelay time. In the Flanger preset, however, Decay controls the flange resonance and Delay controls the flange depth.

For the most part, the numbers in the display are arbitrary. The decay time for reverb programs can be set to a value from 1 to 16. I prefer to know what the front-panel numbers mean in practical terms, but I got excellent results just using my ears.

IN THE FIRE

I received the Reflex in the mail the day before I was scheduled for a mixing



The Lexicon Reflex provides high-quality reverb and other effects in a simple package.

session. I had no time to open the manual but took the unit to the session anyway. The front panel looked easy enough to dial up at least some kind of sound, so we hooked it up.

The drums on this particular tune had been recorded with a combination of live kit and drum toms and sidestick. The original recorded snare sound wasn't making it, so the tape track was triggering an Alesis D4 module. The main reverb units in the studio (Lexicon 480L and t.c. electronics M5000) were already being used for vocals, snare, sidestick, and the rest of the band. I needed something to pull the whole drum-kit sound together and create a small sense of air and space, so the dry samples wouldn't sound obvious. We were on a tight budget and schedule, with little time to tweak parameters in every box.

After adjusting the Input and Output knobs on the front of the Reflex, I dialed up "Music Club." I applied it to the whole drum kit, as well as a little on the piano and acoustic guitars. No programming, no editing, nothing, and the factory preset sounded great! It fit right into the track with no fuss. I meant to come back and experiment with editing, but the sound was so appropriate and worked so well that tweaking ceased to be an issue.

The next day, I had to do rough ADAT mixes of three tunes at my home studio. There was still no time to open the manual, learn all the hidden features, dive into the MIDI implementation, and so on. This time, I decided to try the Reflex as my main vocal 'verb. Could I get that pop diva sound you hear on Top 40 stations?

I turned the Preset knob to "Vocal Hall"; it sounded pretty good, but not quite right for the tune I was working on. I thought that the Parameter/Learn button would get me into an edit mode but discovered that it only toggles through the Decay, Delay, and FX Lvl parameters, while the Value knob adjusts the selected parameter's value. The numbers in the display didn't make much sense; I just used my ears, and it started to sound really good. It wasn't a 480L, but it didn't cost as much as a small foreign car, either.

THE SPECS

I admit I was astonished when I finally opened the manual and flipped to the specifications table in the back. The internal processing is 16-bit, but the sampling rate is only 31.25 kHz, which yields a frequency response of 20 Hz to 15 kHz (+1/-3 dB). The dynamic range is listed as 85 dB. These are respectable figures, but not outstanding. Had my ears deceived me?

Specs can be misleading. I've used several processors with much better specs, only to be disappointed with poor audio performance and general lack of musicality. Not so with the Reflex. Forget the numbers; this box sounds great. Most reverb sounds don't need a lot of information above 12 kHz to sound natural, and with proper gain staging, the Reflex caused no real noise problems. Even a 480L will hiss at you if it's not set up properly.

I was most disappointed to learn that the Lexicon Reflex is not a true stereo reverb. Like many other effects units, the inputs are summed before processing. Although this is not an uncommon occurrence in modern effects processors, it is also not a reflection of the cutting edge, and there are several true stereo reverbs available in roughly

the same price range. I really like the added depth you get by maintaining a stereo image in the processing stage, especially on drum kit overheads. Bummer.

ADVANCED PROGRAMMING

Most of the knobs and buttons have different functions when used in Advanced Programming Mode (APM). Although programming is easier with the MRC remote editor, all editable parameters are available from the unit's front panel.

To enter APM, you simultaneously press the Parameter/Learn and Register/Preset buttons. Depending on the selected program's algorithm, eight to ten parameters are available for editing, including the three that are immediately available on the front panel (see table "Hall Parameters"). These parameters are selected with numbers 1 through 10 on the Preset knob and adjusted with the Value knob.

This is where the manual comes in handy, because the parameters are different from one algorithm to another. In addition, the parameter values in the display are arbitrary. For each algorithm, the manual lists the parameters and identifies the minimum and maximum values for each one. For example, time values of 1 through 16 in Hall and Plate algorithms correspond to 0.25 through 6.5 seconds. However, there is no indication of the equivalent numbers between these limits.

In APM, numbers 11 through 16 on the Preset knob access the Utility functions, which include Program Change Receive Enable/Disable, MIDI Channel, Dump All, Dump Current Effect,

Hall Parameters

APM Setting	Parameter Name	Display Range	Actual Range
1	Mid Reverb Decay	1 to 16	0.25 to 6.5 seconds, typical
2	Predelay	1 to 128	0 to 246 ms
3	Effects Level	1 to 128	0 to 100%
4	Bass Multiply	-8 to +8	0.3 to 2.5x, nominal
5	High Freq. Cutoff	1 to 16	321 Hz to 13.8 kHz
6	Size	1 to 64	8 to 71 meters
7	Predelay Feedback	-128 to +128	-99 to +99%
8	Diffusion	1 to 128	0 to 100 (arbitrary units)
9	Reflection Level	1 to 128	0 to 100%
10	Reflection Delay	1 to 128	40 to 168 ms

The Hall algorithm offers ten parameters in Advanced Programming Mode (APM). Notice that the numbers in the display bear no resemblance to the actual parameter values.

Footswitch (to choose between latching and momentary types), and Algorithm ID (which displays the number of the current algorithm). Pressing the Register/Preset button returns to normal operation.

An MRC remote editor greatly enhances the editing process, providing more detailed information about parameter values. However, it is not without problems. For one thing, you can access only eight parameters, even if the program includes nine or ten.

Secondly, the MRC sees the Reflex as an LXP-1, and several of the parameters are different between the two processors. For example, the MRC displays a maximum decay time of over eight seconds for reverb programs, but the Reflex tops out at 6.5 seconds. The manual lists a few discrepancies between the two units, but not this one. It left me feeling a little suspicious about the accuracy of the MRC displays, but overall it was a big help.

MIDI CONTROL

In addition to standard MIDI capabilities (receiving Program Change commands, loading and dumping programs via SysEx, etc.), one of the coolest capabilities of the Reflex is its Dynamic MIDI Patching. This lets you assign a MIDI source controller to a Reflex destination parameter for real-time control. You can establish up to four of these Patches per program, including multiple destinations for one source, and save them with the program in a user Register. Sources can be Control Changes 0 through 31 and 64 through 95, Last Note, Velocity, Aftertouch, Pitch Bend, and Tempo. Any Reflex parameter can be a Destination.

Setting this up is as easy as choosing the desired parameter, pressing and holding the Parameter/Learn button, and moving the desired MIDI controller. (MIDI channels can be assigned the same way.) It was wonderful to control the reverb decay and amount in real time on a female vocal performance of a sensitive ballad; it really heightened the impact of the lyrics. If you've never experimented with controlling effects via MIDI, you're really missing out.

The Reflex also lets you send multiple controller sources to the same destination parameter, although the values of the controllers are summed. In addition, each Source can be limited to a certain range. For example, a footpedal could give you a normal range of delay regeneration for a keyboard sound, while a keyboard slider provides that extra amount of regeneration when you want to go over the top.

Delay times in Chorus and Multi Tap programs can be synchronized to MIDI Clock. Fourteen beat values are available (see table "Synchronized Delay Values"). A footswitch jack is available on the back and can be used to step through chains of Registers, or to learn any MIDI message and engage or disengage the command.

Synchronized Delay

Value Setting	Beat Value
1	sixty-fourth note
2	thirty-second note
3	sixteenth-note triplet
4	sixteenth note
5	eighth-note triplet
6	dotted sixteenth note
7	eighth note
8	quarter-note triplet
9	dotted eighth note
10	quarter note
11	half-note triplet
12	dotted quarter note
13	half note
14	whole note

The delay time in the Multi Taps and Chorus algorithms can be synchronized to MIDI Clock at one of fourteen beat values.

CONCLUSION

The Reflex is a winner. It sounds like an expensive Lexicon reverb and is reasonably priced. The reverb tail is smoother than the LXP-1, and the chorus is rich and warm. The dynamic MIDI control is excellent and allows for creative applications.

Although it's great that all parameters can be edited from the front panel, I wish the onboard programming was more informative. I look forward to a dedicated editor/librarian program written especially for the Reflex, which would eliminate the inconsistencies with the MRC.

But the bottom line is sound. Clearly, any studio and gigging musician would benefit from having one (or several) of these around. If you can only afford one reverb unit, and you can't spend more than five hundred bucks, look here.

(Special thanks to Dan Nix at Marketing Concepts in Dallas and Speir Music.)

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

Product Summary

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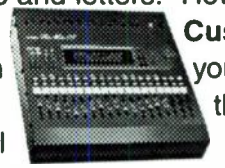

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TECH PAGE

Nifty Notation

A new file format lets programs share notation data.

By Scott Wilkinson

Anyone who has worked with computers knows the importance of standard file formats, such as Audio Interchange File Format (AIFF) and Standard MIDI File (SMF). These formats let different programs on different platforms share files, without the worry of compatibility problems.

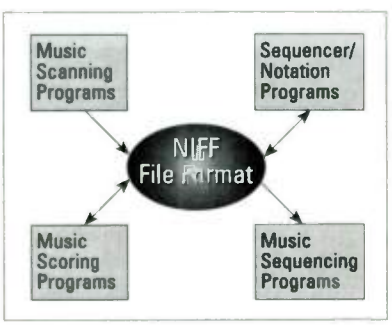
Until recently, however, there has been no standard format for music-notation files, even though notation programs are among the most popular types of music software. Standard music notation is an extremely dense and complex language with many ambiguities, which makes it difficult to codify in a computer. Each notation-software developer has traditionally used its own data format to represent the elements of notated music.

With the emergence of music-scanning software and the integration of notation into sequencer programs, it has become more important than ever to establish a standard format for notation files. In response to this need, a consortium of developers has designed Notation Interchange File Format (NIFF). NIFF allows notation data to be shared by notation, sequencing, publishing, and scanning software on both the Mac and PC platforms, without the loss of detail that results when SMFs are used for this purpose.

Led by Cindy Grande of Grande Software, who is the principal architect of NIFF, the consortium includes Passport Designs, Opcode Systems, TAP Music Systems, Mark of the Unicorn, Twelve Tone Systems, Musitek, and San Andreas Press. (Coda initially cosponsored the project but recently withdrew support.) In addition, professor of music Alan Belkin of the University of Montreal serves as the main musical advisor.

NIFF is based on Microsoft's Resource Interchange File Format (RIFF) data structure, in which related data are grouped into "chunks." For example, a note chunk must include the notehead shape, logical (notated) duration, and staff step (vertical position on the staff). Optional data can include performance duration (number of MIDI Clocks), accidental, accidental placement, number of dots, dot placement, number of flags, whether it's a grace or cue note, special fonts, and many other pieces of information. Related chunks are grouped into "list chunks," such as staves and pages.

Computer representation of musical notation involves up to three types of data: logical, graphical, and performance (MIDI). Logical elements in a NIFF file include the entire score, individual parts (streams of musical events and associated symbols, text, and graphics that can be extracted and played by an individual performer), and voices (independent streams of musical events, symbols, text, and graphics within a part).



NIFF allows sequencer, notation, scanning, and page-layout software to share notation information in a standard format.

Parts and voices are "poured" into logical staves, of which there are two types: part staves and system staves. A part staff describes the characteristics of the staff in which a part's data appears, while a system staff describes the characteristics of the staff as it appears in a system on the page. This two-tiered organization arises from situations such as violin-section *divisi* parts that appear on separate staves only in a portion of the score.

Graphical elements describe the positions of symbols on the page. When graphical information is present, the reading program must decide whether to observe the graphical data or use its own defaults. In the best case, the program will let the user make this decision. If no graphical information is present, the program should provide its own intelligent defaults.

NIFF is an important step toward integrating various types of music software with respect to notation. It is flexible and open-ended, allowing it to be extended in the future while maintaining complete upward compatibility. As **EM** Senior Editor Steve Oppenheimer says, "Open standards open doors."

(For more on NIFF, contact Cindy Grande; tel. [206] 244-3411; fax [206] 824-2612; e-mail 72723.1272@compuserve.com.)

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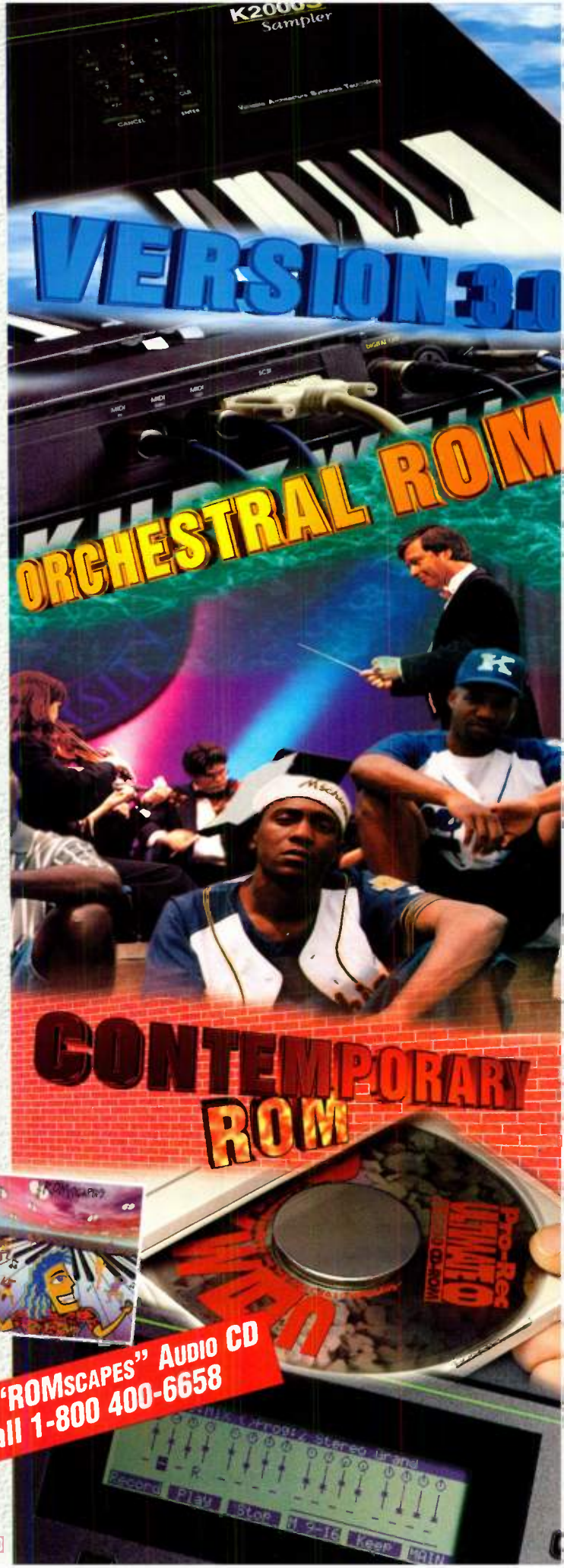

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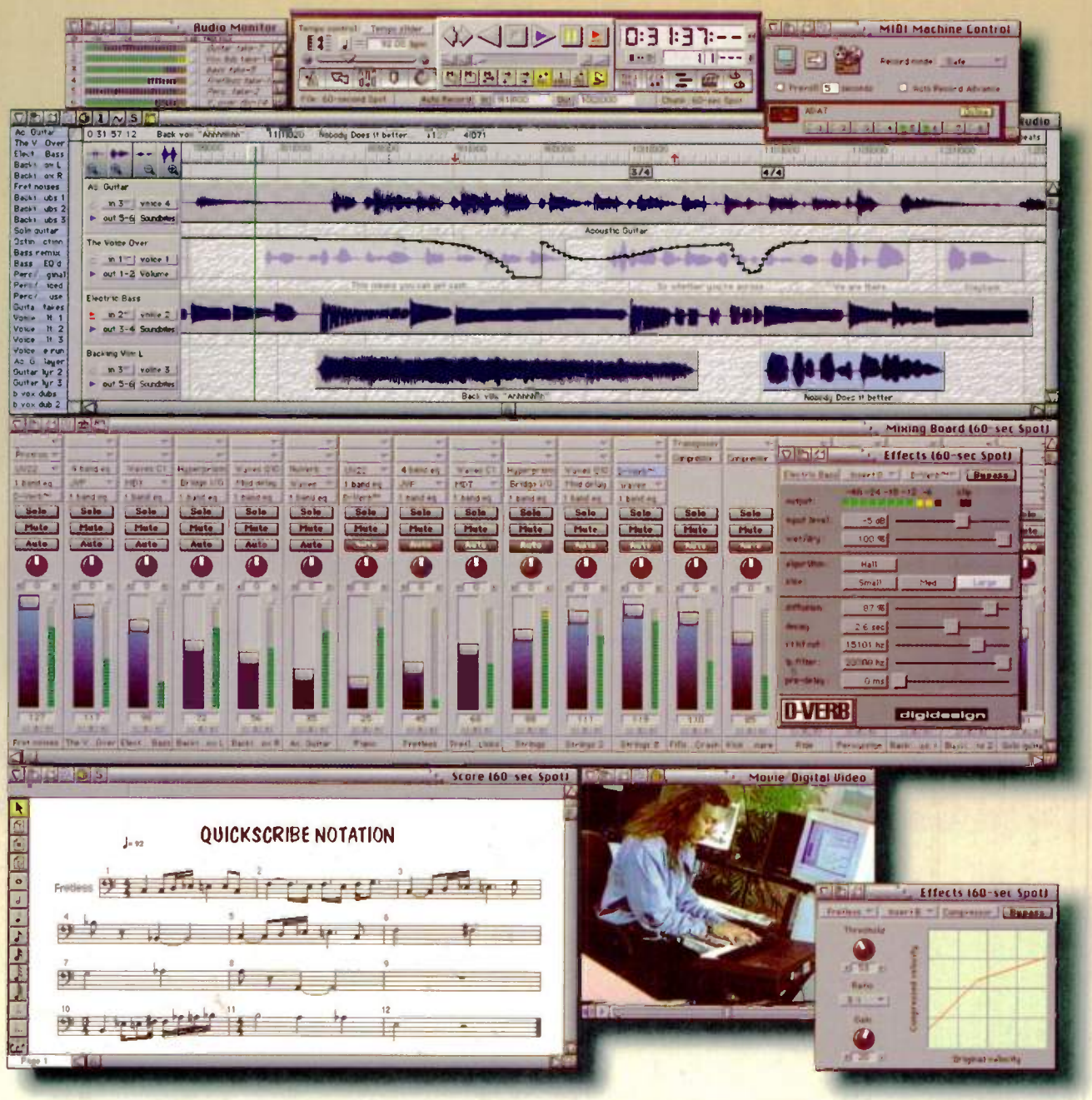

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