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Electronic Musician

March 1996

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Construct Masterpieces from Master Tapes

Condenser Mic Basics

Make a Moog Filter

LINE MIXER NEW MS1402-VLZ 14x2

INTRODUCING FOR $599*

MS1402-VLZ

- 6 mono mic/line chs.
- 4 stereo line chs.
- 3-band equalization
- Low Cut Filter (chs.1-6)
- 2 aux sends per ch.
- Mute/Alt 3-4 Bus
- PFL-in place/AFL Solo
- 60mm log-taper faders
- Aux Send 1 master control
- EFX Return to Aux Send 1
- 2 stereo aux returns
- Control Room/Phones matrix
- Control Room output
- Tape inputs/outputs
- Balanced XLR & 1/4" outputs

RFI *Mondo protection from RFI interference.*

Trim control *(chs. 1-6). Ultra-wide +10 to –40dB range handles everything from hot digital multitrack feeds to whispering lead singers and older, low-output keyboards.*

Pan *control with constant loudness and very high L/R attenuation so you can pan the channel hard left or hard right without bleed-through.*

Studio grade mic preamps *(chs. 1-6) with high headroom, low noise (–129.5dBm E.I.N.) and phantom power. These are the same discrete mic preamps used to track and mix several gold & platinum albums on our acclaimed 8•Bus console series.*

More mixer in less space. *The MS1402-VLZ takes up just 1.3 sq. ft. of work space.*

Balanced line inputs. *Channels. 1-6 are mono; channels. 7-10 are stereo.*

Low Cut Filter *(chs. 1-6) cuts mic handling thumps, pops, room rumble and wind noise. Also lets you safely use Low Shelving EQ on vocals.*

Two aux sends *per channel with 15dB extra gain above Unity.*

High shelf EQ. *±15dB at 12kHz.*

Peaking midrange *with wide, musical bandwidth centered at 2.5KHz. ±15dB.*

Low shelf EQ. *±15dB at 80Hz.*

Four buses on a 2-bus board! *Mute switch routes channel output to extra* **ALT 3-4** *stereo bus. Use it for feeding multitrack recorder channels, creating a subgroup via Control Room/Phones matrix (more info at right), monitoring a signal before bringing it into the main mix or creating a "mix minus."*

Solo. *AFL (for studio use) or PFL (for live sound mixing) via global switching. Individual channel metering via Solo makes level setting easy.*

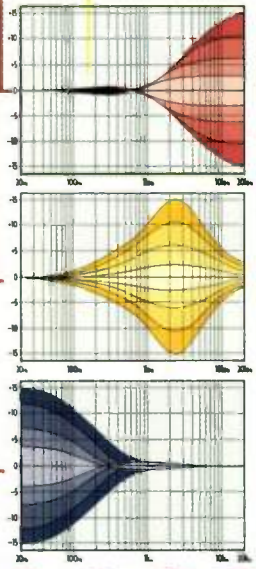
60mm logarithmic-taper fader.

Balanced inputs & outputs *(except RCA tape in/out & ch. inserts).*

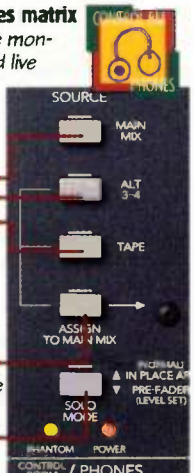
Beefy headphone amp *can drive any headphones to shock volumes.*

12-LED meter display *with Level Set Indicator.*

Separate 60mm **L/R Main Mix faders.**



Control Room/Phones matrix *adds incredible tape monitoring, mixdown and live sound versatility to the MS1402-VLZ. It lets you route any combination of Main Mix, Alt 3-4 bus and Tape Input signals to the Control Room/Phones fader, outputs & LED meters. Tape and Alt 3-4 can also be assigned to the main mix.*



Solo Mode switch *globally selects mono pre-fader (PFL) or stereo in-place (AFL).*

Built-in power supply. *No outlet-eating, hum-inducing wall warts!*

NEW

Balanced XLR outputs *with switchable mic/line output level.*

Control Room & Alt 3-4 Bus *outputs.*

Mackie's signature 3-way **Channel Inserts** *(chs. 1-6).*

60mm log-taper faders *are accurate along their whole length of travel for smooth fades. They employ a new long-wearing contact material for longer fader life & super resistance to dust, smoke, etc.*

ER NEW MS 1402-VLZ

C/LINE MIXER NEW | NOW SHIPPING | MS1

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Takes a stomping and keeps on mixing. *Our unique pressure-absorbing knob design, thick, horizontal fiberglass circuit boards and brass stand-offs resists downward impacts that would trash other mixer brands.*

Solid steel chassis *instead of aluminum or plastic.*

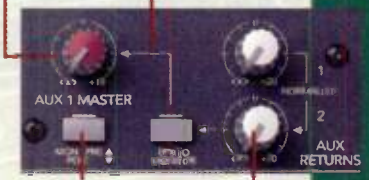
RCA-type tape inputs & outputs.

Balanced 1/4" TRS main outputs.

Balanced stereo line inputs *(chs. 7-14) are switchable from +4dBu pro level to –10dBV semi-pro levels. Can be used to boost any weak input signal.*

Fast, accurate level setting via Channel Solo. *As the Rude Solo Light blazes forth, a soloed channel's level is displayed on the LED meters. Set the channel fader to Unity, adjust input level to the Level Set marker and you've optimized the MS1402-VLZ UnityPlus gain structure for maxiumum headroom & minimum noise.*

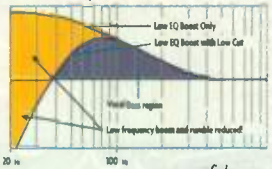
Aux Send 1 Master EFX to Monitor switch. *lets you send aux return signals (delay or reverb) to the stage monitors through Aux Send 1.*



Master Pre/Post switch. *for Aux Send 1.*

Two stereo aux returns *with 20dB gain above Unity.*

Why do we make such a big deal about our Low Cut Filter? *First, it's a real low cut filter with a sharp, 18dB per octave slope beginning at 75Hz (some so-called "low cut" filters' shallow 6 or 12dB/oct. slope lops off audible bass). Our filter cuts stage rumble, room noise, P-pops and microphone handling thumps — all of which muddy your mix, robs amp power and can actually blow woofers. It has another equally valuable benefit: without the filter, if you try to add Low Shelving EQ to vocal channels, low-frequency garbage gets boosted to potentially disastrous levels. Engage the Low Cut filter and you can safely use Low EQ to enhance vocals.*



This one really drove our Engineering Department nuts. Greg wanted to pack a gazillion studio and live sound features into an extremely compact mixer. He wanted the same nice long 60mm faders we developed for the SR Series. He wanted balanced inputs and outputs, 3-band EQ, AFL/PFL and deluxe tape monitor/Control Room features. In short, he wanted it to be the best under-$600 mixer value ever offered.

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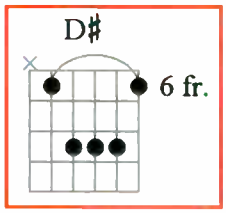

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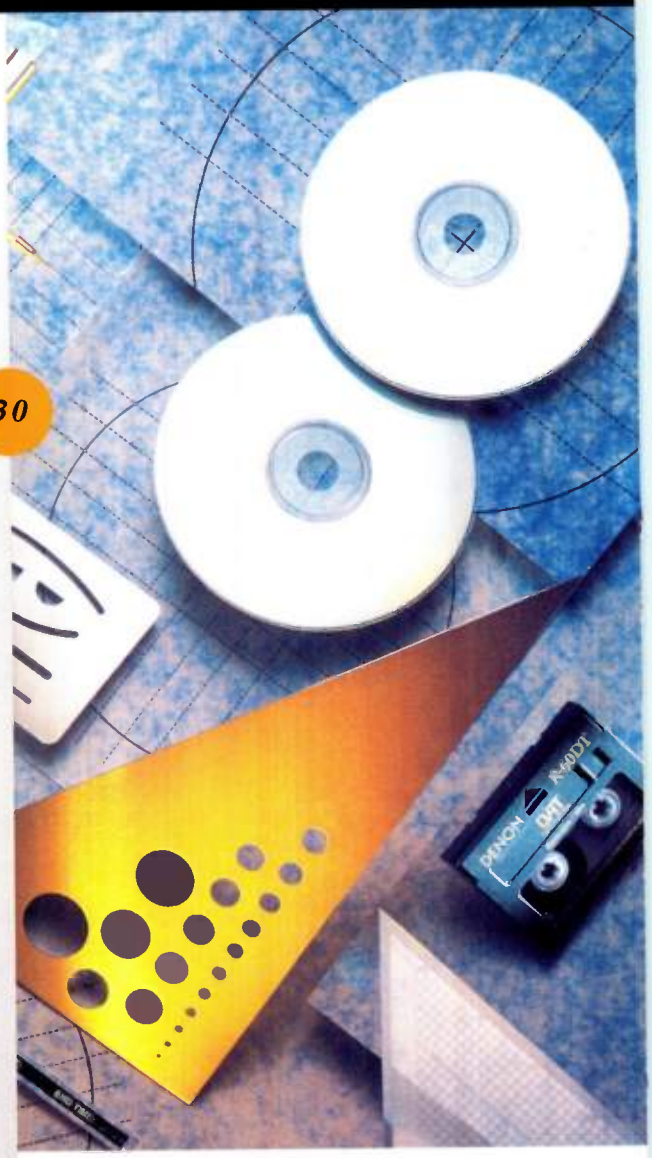
FEATURES



DEPARTMENTS

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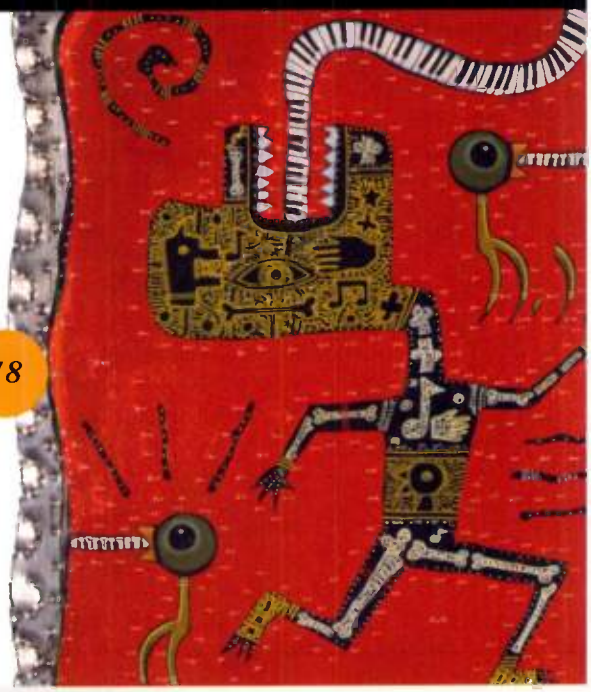
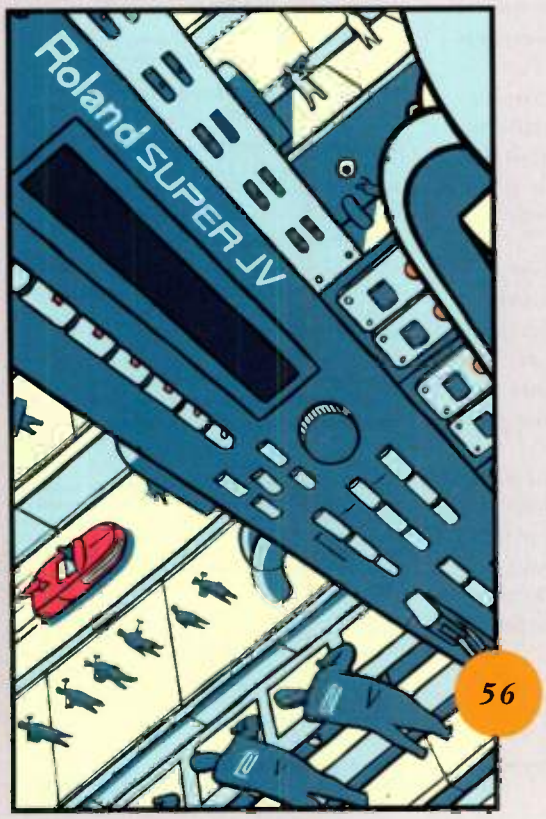
MARCH 1996 VOL. 12, NO. 3

COLUMNS



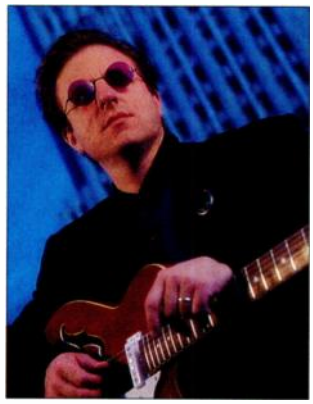


REVIEWS

Cover: Photography by Mario Parnell.

Tangible Art

If there's no evidence of your music, does it really exist?



ROBERT PERRY

Warning. Don't read this month's column if you suffer from high blood pressure, because I'm probably going to stab a few nerve endings. Okay, here's the dagger: if you don't document your music on CD, cassette, or vinyl, you're a phantom. You simply do not exist as a composer or musician. Think about it. If the proof of your talent is limited to live performances, your work dwells solely in the recesses of memory. Unfortunately, the human mind is an unreliable monument to a musician's artistry. As the audience's memory fades, so do you. Don't fool yourself into thinking otherwise. When the day comes that you tire of schlepping gear to smoky clubs—or showing off your chops at parties—your musical essence will evaporate. Poof.

Now, I'm not accusing those of you without commercial releases of being something less than musicians. The lack of an album does not diminish a musician's talent, vision, or chops. I am, however, saying that an undocumented creative life is a tragedy. And it's a tragedy that can be easily sidestepped.

Today, it is relatively inexpensive to release your own album. (You don't *have* to release CDs; cassette albums are extremely affordable and can even be produced—in limited quantities—at home.) So, if you truly believe in the music you're producing, I beg you to fearlessly hurl your work into the public domain. I'm not suggesting that you'll sell millions of units, be "discovered," or become rich and famous. Indeed, you may become ridiculed and ignored. (The public can be a cruel and fickle jury.) But—and this is a crucial "but"—your music *may* encourage a lost soul or soothe a heavy heart. You may even inspire another artist to produce a personal masterpiece, or you may just make someone happy for a few special moments. Once your music can be popped into a cassette deck or CD player, anything can happen. That's the beautiful, beguiling power of tangible art.

For example, we receive hundreds of CDs and tapes at the **EM** office. And, to be painfully honest, the majority of these releases fall way short of brilliant. However, I have found several jewels—wonderful little songs or instrumentals that have added a sparkle to my day or brought a smile to my lips. I am truly grateful that those artists had the guts to release their work, because their melodies and grooves enriched my life.

Now, is this sort of reaction from an anonymous listener worth a healthy outlay of manufacturing costs? That's something only *you* can answer. Personally, I believe that if every artist looked at his or her balance sheet before undertaking a project, our culture surely would have been denied centuries of great art. It's no secret that many great painters, poets, and composers never made a dime during their lifetimes. However, financial hardships didn't stop them from producing works that we can see, hear, and touch.

So, if you've taken the time and trouble to build a studio or record your work, please don't let the master tape become a dust magnet in an overcrowded closet. You can't have a creative legacy without a creative oeuvre. Erase your fear, record something you're proud of, and *put it out!* We feel so strongly about this that we've dedicated a ton of editorial pages to Assistant Editor Brian Knave's "book" on releasing your own CD on p. 30. Let's see what you've got. Phantom, show yourself!

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Whoops – ran out of room! So if you want to hear all the other totally cool things about the MR-rack *(like the PCMCIA card slot, the 4 outputs, or the Unisyn MR editor we'll give you)* just call us, write us, or visit your ENSONIQ dealer and say "I'd like to meet MR Rack!"

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STRONG TO THE FINISH

Rarely are magazine articles as instantly useful as "Tuning Up" (December 1995) was to me. I'm working on a project where I have to make exact MIDI duplications of the original scores for Popeye cartoons. I'm constantly searching for better samples of old instruments but never even considered the tuning aspect. After reading the article, I added a tiny amount of random pitch bend on all my doubled string and clarinet lines, and my mixes improved by 50 percent. Thanks for the tip.

Quimby Jones
axgrindr@wavenet.com

SERIOUS MUSICIANS

As I always appreciate the reviews in **EM**, I was looking forward to reading the review of the Roland GI-10 (December 1995). However, I was greatly disappointed with Erik Hawkins' conclusions regarding the microphone input. His comments reflect the limited musical values of our society, and unfortunately, the values too often expressed on the pages of **EM**.

Hawkins could not find much use for the microphone input when it came to doing "serious" music. Some of us, however, find the mic input on a pitch-to-MIDI converter quite convenient and useful. For example, I have composed and performed serious electronic music with a trombone and a Roland CP-40 since 1992, and I wanted to see whether the GI-10 could replace my current system.

It's frustrating that, in our culture, serious music is too often connected to commercial success. In reality, the practitioner of serious music is not interested in the commercial aspect of music but is more focused on creating art and exploring serious aesthetics. This kind of music does not reach the mass market. Consequently, it is not known by many well-intended folks.

EM has generally ignored the world of serious music. The orientation has been toward the commercial musician. There is nothing wrong with being commercial; it simply is not the only avenue to creating and appreciating music. There are many of us who create serious music. Most of us are not guitarists, neither are we interested in having our work on MTV. If Hawkins were aware of us, he would understand why we use devices like the GI-10 to create serious music.

Rodney Oakes
oakesr@aol.com

Rodney—Erik Hawkins' point regarding the GI-10 was simply that the mic input did not track as well as he had hoped. He found it useful only when he played simple parts and didn't try to play fast licks, and he felt it worked best with relatively pure tones, such as vibes and sax.

When Hawkins remarked that he didn't find the GI-10 mic input useful for doing "serious" music, he used the term "serious" to distinguish projects that would be released to the general public from music created for one's own amusement. If you are releasing music to the public, you should be serious about the quality no matter what kind of music it is or how many copies you sell. Getting stellar results may be less important if you're just playing for fun and don't intend to release a product.

I get the sense you are using the term "serious" music in quite a different way. Are you using this term to distinguish classical or experimental music from commercial music? I have heard the term used that way before, and I find it arrogant and unwarranted. Do people who use the term this way think Laura Karpman and Tony Visconti (whom we covered recently) are joking? For that matter, does an artist such as Allison Krause suddenly become less valid if she starts selling a lot of records with the same songs she was performing as a "pure" folk artist? I think not.

That said, we try to cover the people and music we think will interest our readers. If we have failed to cover types of electronic music our readers feel are important, we would be happy to correct this. We invite our readers to suggest artists and producers they would like to read about in our pages.—Steve O.

WHERE WAS THAT?

On page 110 of the December **EM**, the author states that the Aphex Tubessence does not have balanced outputs. Actually the outputs are balanced when the output level switch is set to +4 and unbalanced when it is set to -10.

Todd Allan
midifool@aol.com

Todd—Oops. You're right. Thank you for correcting our error.—Diane L.

SPRING TIME

In the December 1995 issue, your review of the Clavia Nord Lead needs one correction. The pitch stick is not spring attached. It is just a piece of metal screwed in tight at the bottom. When you bend the pitch stick, you are actually bending the metal left and right. This is why there is not a middle point or dead point in the center. Two tiny strain sensors are attached to the bottom of this piece of metal, and a piece of wood is attached to the top for the finger to grasp comfortably. The strain sensors "sense" the strain in the bending metal piece, which then electronically bends the pitch of the sound smoothly. In my humble opinion, the Nord Lead's pitch stick is the best pitch-bending controller I have

ERIKA LUIKART

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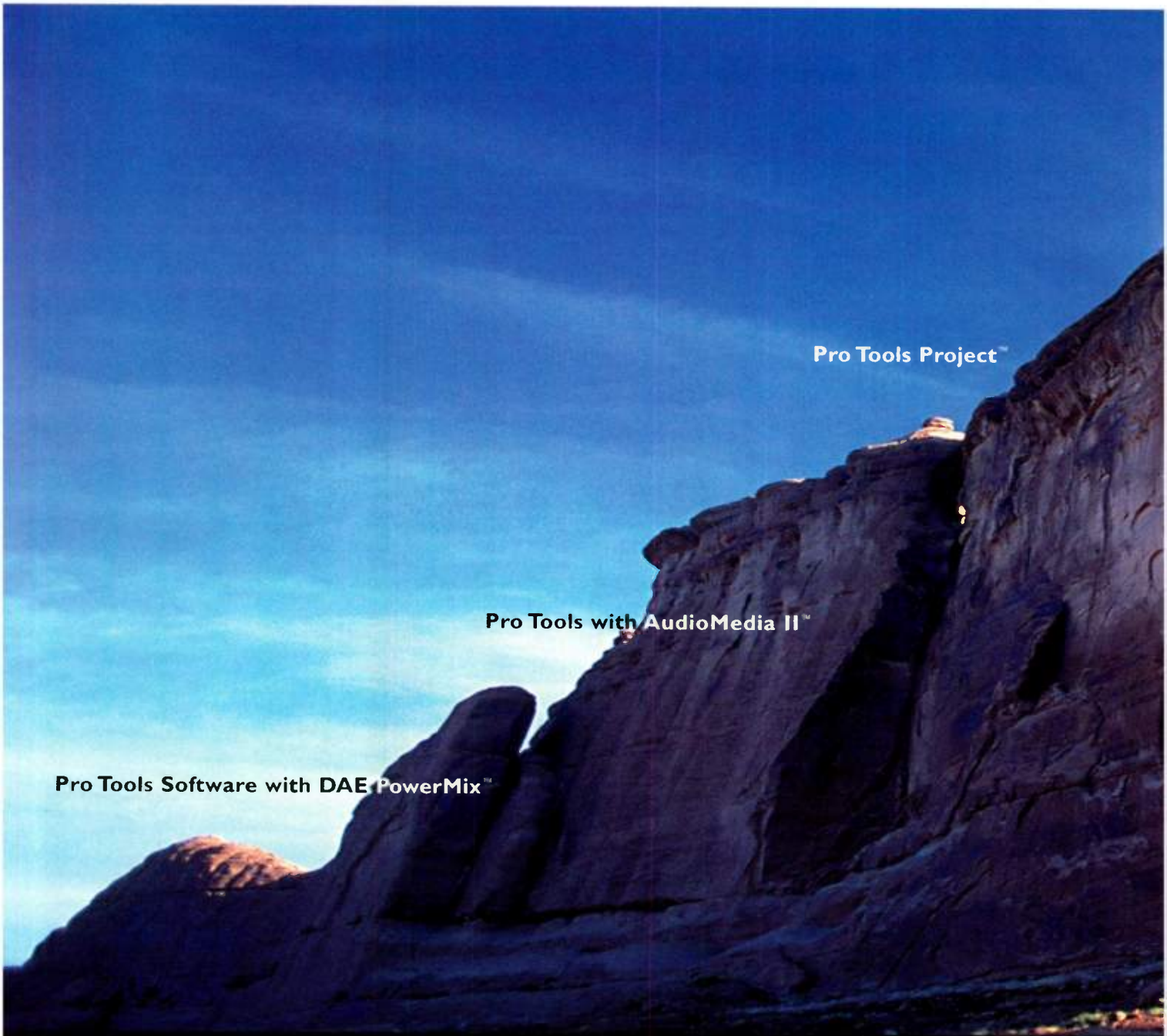

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come to play with. For example, it lets me do natural vibrato, and I can sequence the pitch stick's extreme vibrato when I pull it to either extreme and release it, resulting in a "springy-type" effect to the sound.

djdemarco@aol.com

Lance Abair of Armadillo Enterprises, which distributes the Nord Lead, responds: *Technically, you are correct. The pitch stick isn't attached to a "spring." However, the entire pitch stick is itself a spring made out of spring steel. That is why I approved the reviewer's wording. It's wonderful to see that you have been able to fully exploit one of the goals of the pitch stick, which is to provide a much more natural way to play vibrato.*

100% SOUNDPROOFED

At present, I am in the process of building a home studio. Things are going slowly (extremely slowly), but I will hang in there, taking one step at a time as finances allow.

My next step is to build a small isolation booth because my room needs to be strongly soundproofed at minimal cost. What are my choices? I know egg boxes, styrofoam, and similar material help the acoustics of a room, but I have little knowledge of soundproofing.

Shane D. Leite
shane@tri.eskom.co.za

Shane—We recommend calling Mix Bookshelf (tel. 800/233-9604 or 908/417-9575; fax 908/225-1562) for books on acoustic design. However, you have made a great suggestion for a DIY article. Thanks.—Diane L.

PC SAMPLES

A product that seems similar to Synclavier's *S/Link* is IMUSE's *TransferStation* and *SoundHack* bundle, which provides sampler support and file-format conversion for the Macintosh. (Information is available at http://www.imuse.com.) Is there anything out there that provides similar functionality for the IBM PC platform?

Nathaniel Berry
nwberry@ix.netcom.com

Nathaniel—Waves' WaveConvert *for Mac and Windows ($299) converts between stereo and mono sound files; SND, WAV, Sound Designer II, and AIFF file formats; 16-bit and 8-bit word lengths (with or without dither); and 5 kHz to 48 kHz sample rates. For details, see the January 1996 "What's New" column. You can reach Waves at tel. (423) 588-9307; fax (423) 588-9427; e-mail waves@waves.com; Web http://www.waves.com/waves.*

However, if you want file conversion, sampler support, and serious waveform editing in one Windows program, check out Sonic Foundry's 1996 EM Editor's Choice Award-winning Sound Forge *3.0 ($495; reviewed in the April 1995* **EM***) or the new junior version,* Sound Forge XP *($199; discussed in the October 1995 "What's New" column). The main features* Sound Forge *offers that are not in* XP *are MIDI support, playlists, regions, and a DSP plug-in architecture. Contact Sonic Foundry at tel. (800) 577-6642 or (608) 256-3133; fax (608) 256-7300; BBS (608) 256-6689.—Steve O.*

YES WE CAN CAN

I am happy to have discovered **EM**. I'm even happier to have discovered that the magazine is tailored not only to the more traditional electronic musician (e.g., those who asked Santa for Can reissues) but to those of us who have been swept to the shores of electronic gadgetry by the tides of scientific advance, economic incentive, practicality, and creative potential.

I am one of a generation of musicians whose first induction into music was the desire to emulate the guitar chops and chord progressions of the Buzzcocks and the Smiths. With the advent of the MIDI and MDM revolutions, many of us can now produce our masterpieces at home, which is where the *Pet Sounds* of the future are going to be coming from.

Daniel Vogel
vogel.daniel@lyons.va.gov

LESSONS LEARNED

Just wanted to let you know that your mag is the best! For a few years now, I've been ingesting **EM**, and let me tell you, I've spent more money on gear than I'll ever make using it, learned more about electronic gear from **EM** than I will ever remember, forgotten more about analog than I ever thought I would, owned more patch cords than the phone company, and had more operating manuals than remote controls; and I can talk techno-digispeak better than my rocket-scientist buddies. Thanks to **EM**, I have a new life!

Doucheman
dvdw@aol.com

PITCH SHIFTING

I want to transpose a vocal WAV file to a different key, but when I change the key of the file with a normal WAV editor, it also changes the playback speed. For example, if I transpose from C to C♯, the playback will get faster. Is there a program I can get that will keep the playback speed the same after a transposition?

Eric Maass
vxvx17b@prodigy.com

Eric—The ability to shift pitch without altering the timebase (the playback speed) is generally considered a "pro" feature. It's especially difficult to maintain the audio quality when pitch-shifting vocals. Of course, you could buy an entire professional hard-disk recording system, but that is a major investment, so let's assume you want software that will work with your existing hardware.

At least two Windows programs can accomplish this: Sonic Foundry's Sound Forge *(reviewed in the April 1995* **EM***) and SEK'D's* Samplitude Studio *(reviewed on p. 126 of this issue). I probably have overlooked other programs, so before their developers complain, I apologize in advance.*

In general, I would go with Sound Forge *for this purpose, as its specialty is audio processing and it offers a lot of other processing features you might find useful. As of this writing,* Sound Forge *is a 2-track program, however, so if you want to work with multitrack audio and can only buy one program, the answer might be* Samplitude.

Also, consider a hardware solution. Check out DigiTech's Vocalist-series vocal-harmony processors. (Studio Vocalist was reviewed in the October 1995 **EM**.*)—Steve O.*

ERROR LOG

January 1996, "Editor's Choice," p. 46: KRK's correct telephone number is (714) 841-1600; fax (714) 375-6496.

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.*

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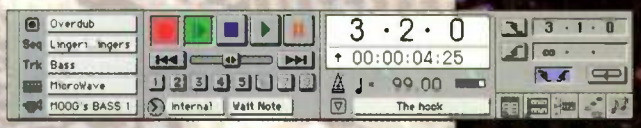

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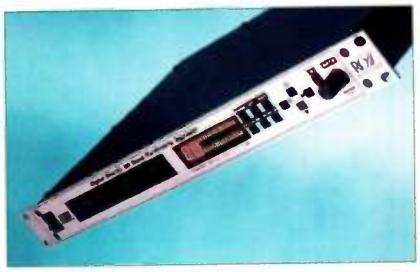
WHAT'S NEW

By Steve Oppenheimer



▲ ROSS DPX MAINFRAME EQ

Ross Systems' DPX Mainframe Digital EQ ($995) provides 30 bands of stereo, parametric EQ with 12 dB of cut or boost. The unit features 18-bit A/D and D/A converters, and all processing is done in the digital domain. The audio I/O is on balanced XLR connectors.

Each channel has an input-level control, output-level control, and up to 750 ms of programmable delay. The unit also includes a built-in compressor with controls for attack, ratio, and threshold.

The DXP has 25 factory presets that simulate various mixer and instrument amp EQs, and up to 100 named user presets can be stored in RAM. Programs can be recalled and all parameters controlled from the front panel or via MIDI.

The parameters are displayed on a high-resolution LCD, and I/O or compression levels are monitored on a 20-segment LED bargraph meter. International Music Corp. (distributor); tel. (800) 433-5627 or (817) 336-5114; fax (817) 870-1271; e-mail intermus@aol.com.

Circle #401 on Reader Service Card

▼ TASCAM M-2600 MKII

Even in the age of computers, the heart of most studios is still the mixer, and TASCAM has plenty of experience in that department. The company's latest recording console is the M-2600 MKII ($3,199/16 ch.; $3,999/24 ch.; $4,999/32 ch.). The new 8-bus board replaces the company's original M2600.

Like its predecessor, the MKII is available in 16, 24, and 32-channel configurations. Its semimodular design allows individual channel slices to be removed for servicing. Every 8-channel block can be independently switched between -10 dBV and +4 dBm operating levels. The control range of the mic preamp trims has been increased by +2 dB (total range 53 dB), so you can run at +4 dBm without requiring the 20 dB channel input pad. This significantly improves the signal-to-noise ratio.

Unlike the original M-2600, the MKII can be used with TASCAM's optional MU-2600-series meter bridges ($849, $999, and $1,199), which provides 12-segment LED ladders for each channel and stereo VU meters for the left and right main outputs.

All channels have XLR mic inputs, balanced ¼-inch line inputs, ¼-inch TRS insert points and direct outputs, and TRS ¼-inch tape inputs. The L/R main outs have both balanced XLR and unbalanced RCA connectors. A Flip switch reroutes the monitor signal through the 100 mm channel faders.

The equalizer section features redesigned circuitry with new op amps. The MKII has semiparametric channel EQ with dual sweepable mids. The low mids can be swept from 40 Hz to 1.6 kHz, and the high mids range from 400 Hz to 16 kHz. An equalizer in/out switch is provided, and the high and low shelving bands (which have cutoff frequencies of 12 kHz and 80 Hz, respectively) can be assigned separately from the sweepable mids, so one can be in the channel path and one in the monitor path. All equalizer bands offer ±16 dB boost/cut.

Six simultaneously available aux sends (two of which are stereo) provide plenty of routing flexibility. They are assignable to the channels, monitors, or aux returns. For example, during tracking, the aux 1-2 pair and aux 3-4 pair are summed to act as a combined send for the cue mix. Auxes 1 and 2 take their signal from the channel inputs, and auxes 3 and 4 take their signal from either the tape returns or the monitor path. That way, you can hear the signal before, during, and after the punch-in point. At mixdown, you can press the Split 3-4 button to have two independently addressable, stereo aux sends for effects.

There are six stereo aux returns, each of which is assignable to any or all of the eight groups, the left/right stereo bus, or the cue mix. For example, you can send a signal with reverb to the cue mix while recording the track dry. In addition, the M-2600 MKII has all the expected mute, solo (in place), and panning features. TASCAM; tel. (213) 726-0303; fax (213) 727-7656.

Circle #402 on Reader Service Card

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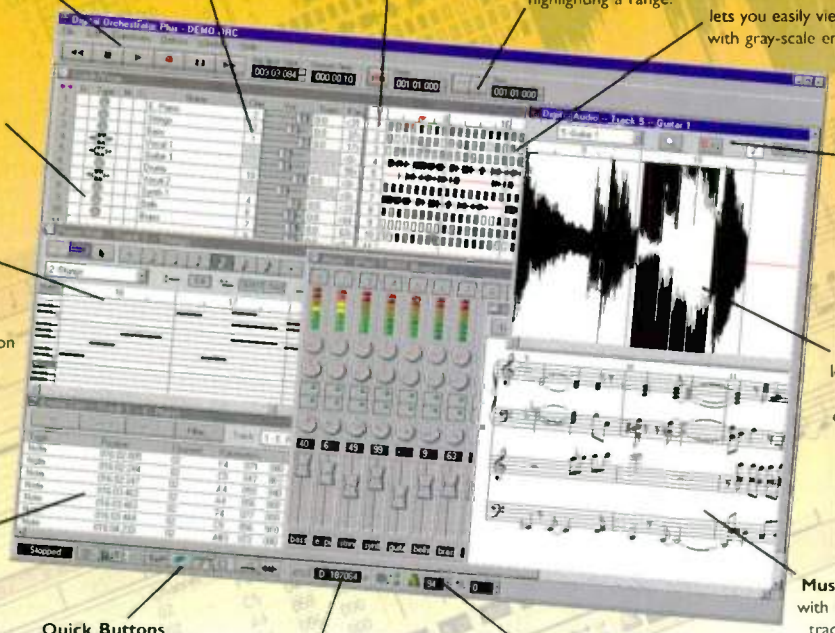

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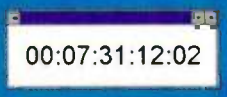

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▶ INTERVAL MUSIC TRANSFERSTATION

Sampling aficionados are always engaged in a search for new sounds, but many samplers can only read sounds in their native formats and one or two non-native formats. For example, E-mu's EIV and e64 samplers can read E-mu and Akai S1000 files but not Roland S-series files. Interval Music's *TransferStation* 2.0 ($199) helps out by importing samples into a Macintosh computer and transferring them back to supported samplers via SCSI.

The program can import samples from Akai S1000-series and Roland S700-series SCSI drives (including CD-ROM), as well as from audio CDs. It can also transfer samples, via SCSI, to and from Akai S1000- and S3000-series machines; Kurzweil K2000/K2500; E-mu Emulator IV, e64, and ESI-32; Peavey DPM-SP/SP II; and Roland S760. In addition, it can read 8- and 16-bit Mac AIFF and Sound Designer II files and write 16-bit AIFF and SDII files, which allows integration with most Mac-based digital audio editors.

TransferStation 2.0 can even audition 16-bit samples directly from hard disk, sampler memory, or CD-ROM using the Mac's internal sound capability or a Sound Manager 3.0-compatible digital audio card (e.g., a Digidesign or Spectral Innovations card). Apple's Sound Manager 3.1 and QuickTime 2.1 are included with the program.

The program requires a Mac II or better, System 7.0 or later, and a reasonably fast hard disk. *TransferStation* 2.0 is compatible with System 7.5 and SCSI Manager 4.3 and is bundled with *PlayIt!*, a desktop drag-and-drop AIFF player and Web helper. Interval Music Systems; tel. (310) 478-3956; fax (310) 478-5791; e-mail interval@netcom.com; Web http://www.imuse.com.

Circle #403 on Reader Service Card

▼ T.C. ELECTRONIC M2000

Following up on the success of its M5000 multi-effects processor, t.c. electronic introduced the M2000 ($2,000), which uses the same processor as its predecessor. The 1U rack-mount unit uses 20-bit digital converters for its two analog inputs and single analog output, which use balanced XLR connectors. AES/EBU and S/PDIF (switchable) digital I/O are also provided on an XLR connector. Internal processing is 24-bit.

The M2000 can run two independent effects algorithms simultaneously (including multi-effects algorithms) with no reduction in processing power. Algorithms include an assortment of reverbs (including the C.O.R.E. algorithms from the M5000), pitch shifting, delay, chorus, EQ, de-essing, phasing, compression, and stereo enhancement.

With the unit's single-layer user interface, all parameters are no more than one page away. The user can name effects (including presets) with a virtually unlimited number of characters. The M2000 has memory for 250 factory presets and 250 user programs. Programs can be recalled via MIDI Program Change, and all effects parameters can be controlled in real time via SysEx and Control Change messages.

The manufacturer claims a frequency response of 10 Hz to 20 kHz (+0/-0.2 dB) and a THD of 0.003% (@1 kHz, +10 dB). Dynamic range is rated at >105 dB for the A/D stage and >96 dB for the D/A stage. The unit can operate on 90 to 240 VAC without requiring a switch. t.c. electronic; tel. (805) 373-1828; fax (805) 379-2648; e-mail tcelectr@inet.unic-dk; Web http://www.tcelectronic.com.

Circle #404 on Reader Service Card

▼ RANE VP 12

An interesting trend seems to be emerging toward integrated signal processing for vocal applications. Rane's new entry into this field, the 1U rack-mount VP 12 Voice Processor ($599), offers a studio-grade mic preamp, sweepable high- and low-cut filters, a de-esser, a gate/expander, compressor, and two bands of full-range (20 Hz to 20 kHz), parametric EQ (+12/-15 dB).

The de-esser offers control over frequency, threshold, and ratio. The gate/expander and compressor include threshold and ratio controls, and the compressor has a 7-segment gain-reduction meter. The compression ratio ranges from 1:1 to 10:1, and the gate can be set at 1.5:1, 2:1, or 3:1. Any processor section can be bypassed via front-panel buttons, and the order of processing can be changed via rear-panel jumpers.

The VP 12 offers an input-gain control and overload LED. Its input path can be switched between a mic input with 48V phantom power, a separate line input, or both (summed). The unit has dual-concentric main and aux output-level controls and calibrated, LED output meters.

The mic input is on an XLR connector; and the line input is on a ¼-inch TRS jack and a screw-terminal strip. The outputs are on XLR connectors and a terminal strip. Rane Corporation; tel. (206) 355-6000; fax (206) 347-7757; Web http://www.rane.com.

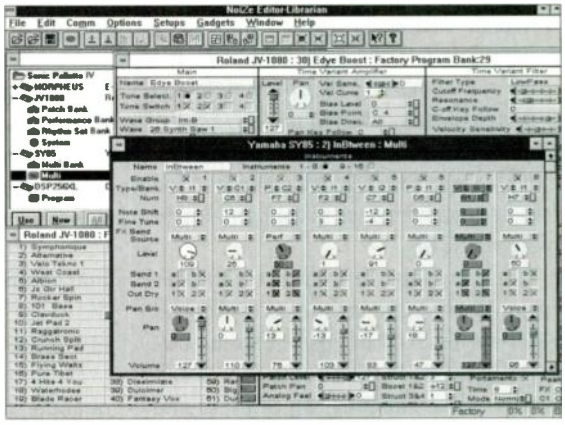
Circle #405 on Reader Service Card

▶ TERZOID NOIZE

One of the great mysteries of the Windows music-software world has been the total absence of universal editor/librarian programs. A few Mac programs have recently been ported to Windows (or are in the process of being ported), but Terzoid Software's *NoiZe* ($99.95) is the first such program to originate on the Windows platform. The program supports any MME-compatible MIDI interface and can run under Windows 3.1 or Windows 95.

The basic program includes one editor module and several user-definable librarian modules for popular devices. Additional editor modules are available for between $19.95 and $29.95 apiece. Currently supported devices include the Korg M1, Wavestation EX, 01/W series, i and X series, and 05R/W; Yamaha DX7, SY85, TG77, TX81Z, and TG500; Roland JV-80/880 and JV-1080; Kawai K5; and E-mu Morpheus, Proteus series, and UltraProteus. New modules are constantly under development, including some that support PC sound cards.

NoiZe allows multiple graphic-editor-windows to be open simultaneously and lets you move patches within banks via drag-and-drop. The editor views show entire patches in one screen, and patch banks can contain any number of patches. Patch-editor views consist of subwindows ("panes") that can be moved, hidden, and resized, and you can save configurations for a given editor.



The program's user interface features objects such as Projects, Libraries, and Instruments, which can be labeled with descriptive names, not just DOS file names. Projects contain a snapshot of the data for an entire MIDI setup, which can be saved or recalled with one click. Libraries contain collections of banks and patches that can be edited, copied between Projects, and sent to a MIDI device at any time. Instruments contain the patch data for one MIDI device.

The patch editors use 3-D, color-coded, graphic controls, such as knobs, faders, and envelopes. Toolbar buttons with pop-up help balloons access frequently used features. The program and each instrument editor includes context-sensitive online help. Terzoid Software; tel. (214) 680-7826; fax (214) 231-7025; e-mail noize@terzon.com; Web http://www.metronet.com/~terzon/noize/.

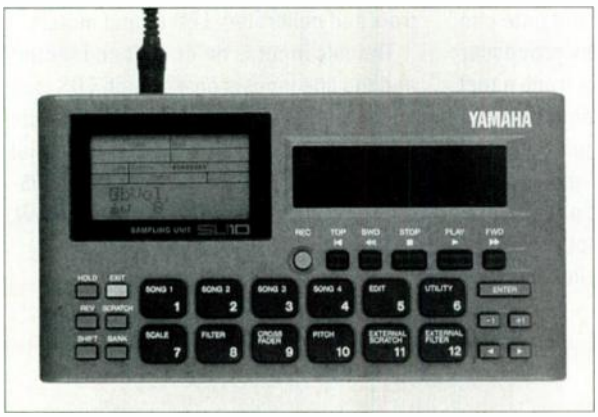
Circle #406 on Reader Service Card

▼ YAMAHA SU10

The demand for digital phrase samplers—units that record relatively small snippets and cannot create multisamples—appears to be growing, especially among disc jockeys, multimedia recordists, and hip hop artists. Yamaha brings a few new twists to the genre with its SU10 Digital Sampling Unit ($399).

Yamaha's phrase sampler can record and play back up to 48 stereo or mono, 16-bit samples, which are stored at power-down. Four sample rates (up to 44.1 kHz) are supported. You can select arbitrary sample start, end, and loop points, and samples can then be edited (truncated) to eliminate undesired portions at the beginning and end. Each sample can be played back at a different volume. Especially interesting is the SU10's ability to extract tempos of up 100 bpm from a sample.

You can set each sample to any of five Loop modes: No Loop, No Loop Reverse, Whole Loop, Whole Loop Reverse, and Partial Loop. The unit lets you Hold (sustain) selected samples, play them in reverse, and transpose them to twelve different pitches to form a chromatic scale.



The SU10 holds up to four sample-play sequences, or Songs. You can set the Song to loop-play indefinitely and can start, stop, and continue playback at any point in a Song. In addition, you can play a Song and a separate sample simultaneously.

The unit's resonant filter can be configured as lowpass, bandpass, or highpass. It can be applied in real-time, during playback or recording, to the onboard sounds or an external audio source.

One of the more unusual features of the SU10 is its ribbon controller, which can be used during playback, recording, and editing. Depending on the mode, the ribbon controller can alter the filter cutoff frequency, bend the pitch, crossfade between the unit's onboard sounds and an external input, or digitally emulate record-scratching. Like the unit's filter, scratching can be applied to the internal sounds or external audio.

The SU10's data can be backed up via System Exclusive Bulk Dump. It supports the MIDI Sample Dump Standard, so you can send its samples to a computer or a compatible MIDI instrument (i.e., one with sample RAM and Sample Dump Standard support). Yamaha Corporation of America; tel. (714) 522-9011; fax (714) 739-2680; Web http://www.yamaha.com.

Circle #407 on Reader Service Card

WHAT ARE YOU, A GUITAR PLAYER OR A TAP DANCER?

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The HR-GP5 has the ability to generate up to seven effects at the same time. Such as Compressor, Distortion, EQ, Amp Simulator, modulation effects like Chorus and Intelligent Pitch Shifting, as well as Reverb. Yes, all the power of seven foot pedals in a 1/2 rack processor. That's convenience.

As if that wasn't enough, there are also 38 different structure combinations for each preset. Effects are easily edited — the jog shuttle wheel and six direct function keys allow quick recall of settings. So, if you want your chorus before your pitch shift but after your reverb, just turn the wheel. Try doing that with your pedals. Add to the mix 100 Preset Effects and 100 User Memory Settings. And if you're playing live, there's the HR-RC5 Foot Controller for easy, hands-off operation. That's flexibility.

As Guitar Shop magazine stated, "*The HR-GP5 shines with great sound, an exemplary user interface and a new standard for signal processing in a guitar processor.*"* So, if you're in the market for a feature-packed guitar processor, why not give it a test drive. And remember, foot to the floor optional.

For more information call 1-800-635-SONY, ext. GP5.

SONY

 *"Guitar Shop, December 1994."

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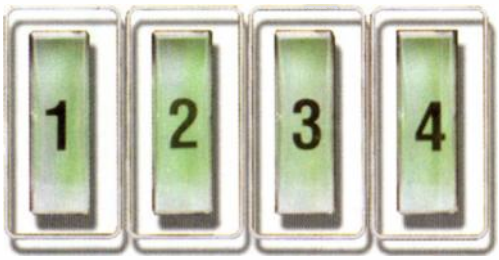

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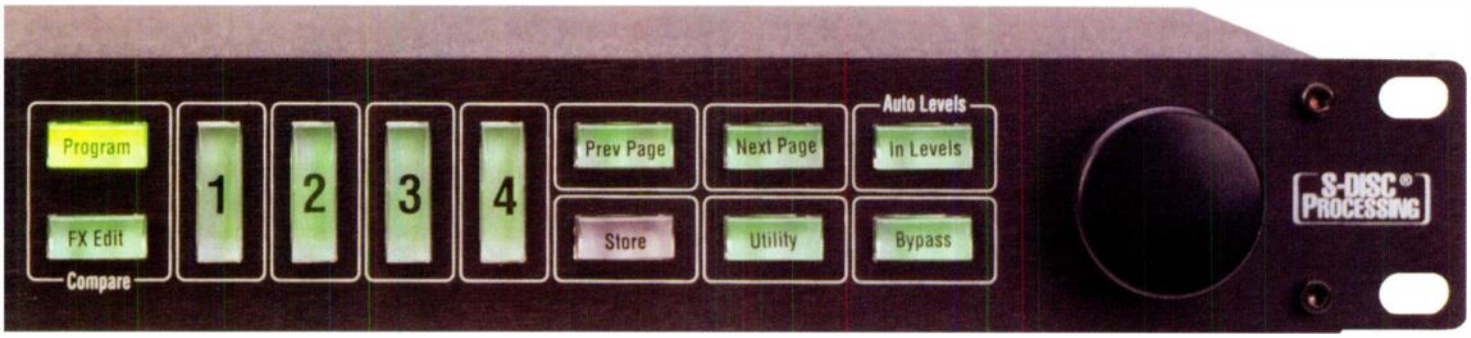

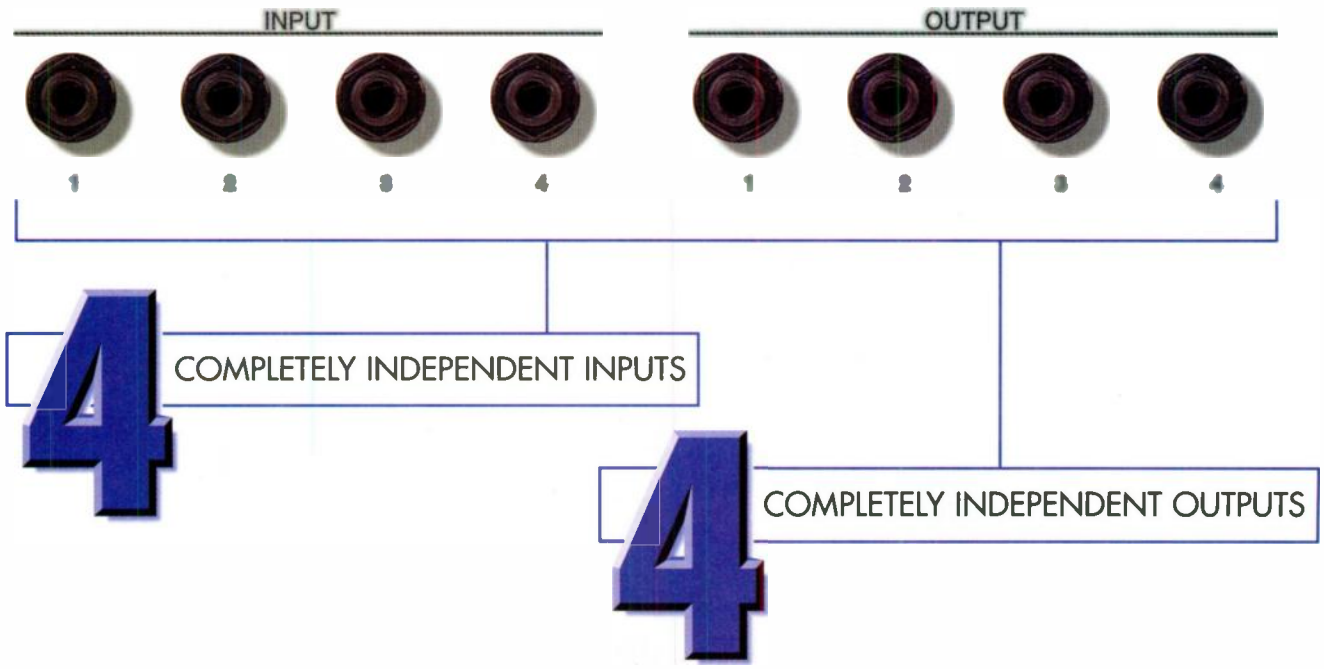

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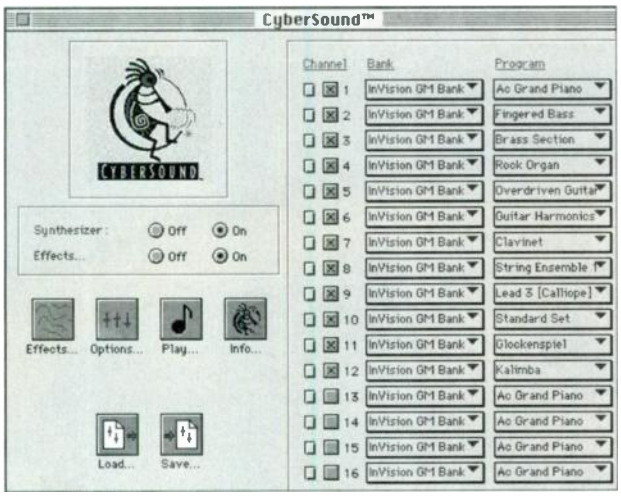

▲ INVISION CYBERSOUND VS

Along with the advantages Mac-based musicians have enjoyed over their PC-based friends, they have suffered from at least one noteworthy disadvantage: a paucity of synthesizer-equipped sound cards and software-based synthesizers has forced Macintosh users to rely on external sound sources. Although this is no big deal for home studio users, it can be inconvenient, and it is especially problematic for mobile musicians who use PowerBooks.

The sound developers at InVision have come up with a software solution to this problem, *CyberSound VS* ($249). The program loads up to 128 16-bit sounds into RAM and plays them with up to 128-voice polyphony on a Power Macintosh 9500 and between 24- and 32-voice polyphony with more modest CPUs, such as 68040 machines. Because the sounds use a mixture of digital synthesis, samples, and physical models, they consume less RAM than would be required to load 100% sampled sounds.

The program ships with 512 sounds, which consume up to 50 megabytes of hard-disk space (6 MB minimum) and include a General MIDI/GS-compatible bank. Additional sounds are under development. A simple GS-type effects processor (i.e., chorus and reverb) is included.

The software includes a control panel that lets you select patches and configure custom setups, including scaling (on the fly) the amount of CPU time consumed, which affects the trade-off between polyphony and response time. Patches can respond to MIDI Program Change, note, Pitch Bend, Channel Pressure, and Modulation messages.

CyberSound VS is compatible with Mark of the Unicorn's FreeMIDI, Opcode's OMS, and Apple's MIDI Manager, Sound Manager 3.0, and QuickTime system extensions. It works on a stock 68040 or better Macintosh with 8 MB of RAM and does not require additional hardware. It runs in native code on a Power Macintosh. The company's *CyberPlayer* 16-track Standard MIDI File player is included with the *CyberSound VS* package. InVision Interactive; tel. (800) 468-5530 or (415) 812-7380; fax (415) 812-7386; e-mail dennym@cybersound.com; Web http://www.cybersound.com.

Circle #408 on Reader Service Card

▶ PASSAC EC-500

Amplifying acoustic stringed instruments can be a tricky business. For example, the use of piezo pickups may result in a loss of the instrument's natural resonant sound. You would generally hear this in the form of excess string attack and inadequate sustain, resulting in an unpleasant harshness.

Passac has addressed this problem with its EC-500 Active Resonance Preamplifier ($395), which is designed to produce natural acoustic tones from acoustic instruments fitted with electronic pickups. Although the company especially recommends it for acoustic stringed instruments (e.g., guitar, violin, and mandolin), it can also be used with electric guitar. The EC-500 is designed to work with piezo element, piezo film, and polymer film pickups and also operates with magnetic pickups.

The unit's Active Resonance circuitry mathematically emulates an acoustic stringed instrument's natural resonance. The circuit's output is blended with the pickup's dry signal, and the combined signal is routed to an Aphex Aural Exciter circuit. You can switch between a "normal" and higher amount of Aural Exciter harmonics and adjust the Exciter's corner frequency (the lowest frequency of the enhancement range) from 800 Hz to 6 kHz. The Exciter can also be actively bypassed (i.e., the electronics are still in the circuit, but the effect is off).

The effects loop is a buffered insert point between the Active Resonance preamp and the Aural Exciter. The send and return are on separate ¼-inch jacks.

The EC-500 includes a 10 dB input pad, an output phase-reverse switch, and a master output-volume pot. The tone section includes a single treble/bass control (±12 dB at 300 Hz and 1.4 kHz) and a separate, midrange Presence control (±12 dB at 650 Hz).

The unit has one high-impedance, unbalanced input on a ¼-inch connector; one high-Z, unbalanced, ¼-inch output; and a low-Z, balanced XLR output. Power is provided by an external 18 VAC supply. Passac; tel. (713) 772-1404; fax (713) 772-7360. ●

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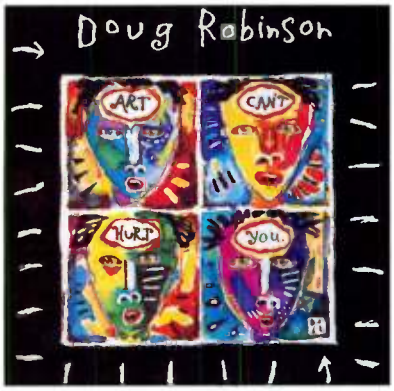


PRO FILE

Swingtown

Doug Robinson swings like a madman.

By Diane Lowery

It's hard enough to find people to groove with. But don't assume it's any easier when you're the only member of the band. It took Doug Robinson a year and a half of trial and tribulation to get his music to swing. He wrote and produced the songs and played most of the instruments on *Art Can't Hurt You*. All by his lonesome, Robinson created a jazz ensemble with rhythms that set your feet tapping.

Robinson programmed most of his rhythm-section parts on a Roland MC-50 sequencer using an R-8M, a TD-5, and a Sound Canvas for percussion sounds. He then layered acoustic and electronic instruments, creating a jazz fusion album that has the spontaneity and the density of a full live band. "With this particular CD," explains Robinson, "I wanted to prove that fusion can be sophisticated without sounding ugly, accessible without being simple minded."

So how does Robinson create interplay when it's just him and his MIDI machines? For starters, he doesn't believe in overquantizing. "Or better yet, don't quantize at all," he says. "Imperfections create tension, and tension creates interest."

On "Little Train," Robinson created tension accidently, by programming the drums when he was tired. The drums were not timed to a click track and ended up behind the beat. "I went to bed thinking, 'I gotta fix that,'" laughs Robinson. "But the next day, I listened to what I did, and I found it made the song much more interesting."

He also suggests developing "selective amnesia" when layering different instruments during recording. "When performing live, you don't always know what that guy over there is going to play, but you have to respond to it. When recording by yourself, forget about the instrument parts you've just laid down, and pretend the song is coming to you live."

Robinson applied this technique on the uptempo rocker "Lizbarber." Before recording the piano solo, he sequenced a simple drum part, which left him enough space to improvise with a lot of syncopation. Then, while listening back to his solo, he resequenced the drums in real time.

"I went back and forth, redoing the parts three times," explains Robinson. "Each time it got hazier as to what came next, which helped me improvise as I went along."

Robinson advises approaching synthesized instruments the way they might be played in real life. To keep a groove from sounding robotic, he studies the instrument he's planning to use. "You can't just dial up a perfect accordion sound," he says, "you have to think like an accordion player. Otherwise, it will sound dorky."

The important part of doing a project by yourself is to enjoy doing it. "Music is about expression, but it's also great fun, so I like my music to sound like I'm having fun," Robinson says. "I always try to create something I'd like to hear several times. That's how I define a good song."

For more information, contact Act As If Music, 335 High Sierra Dr., Exeter, CA 93221; e-mail jazzooo@aol.com. Art Can't Hurt You *is also available on the Internet at http://www.artistaccess.com/cdaudio/artistaccess.html.*

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

Doug Robinson

By Brian Knave

Everything you wanted to know about releasing your own album*

I knew a great band that sent out countless demo tapes hoping to be signed to a major label. Two words guided them through years of anonymity: record deal. In the meantime, I released my own CD and the band looked down their noses at my self-produced effort. Apparently, they felt my approach was vainglorious and second-rate, analogous to a lame vanity book printing.

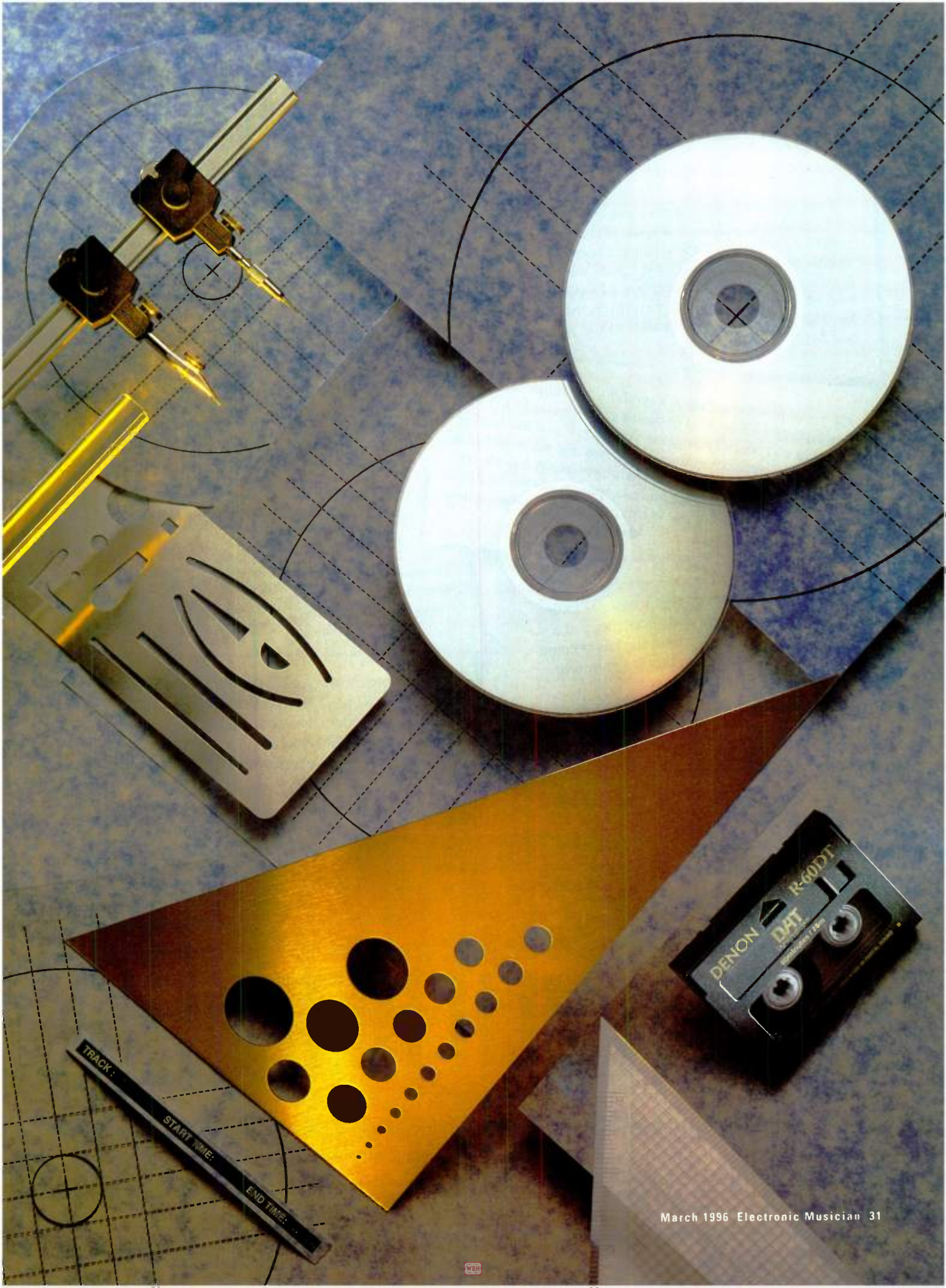
Now, perhaps releasing your own CD *is* vainglorious. But there's nothing inherently second-rate about it. Far from being akin to vanity printing, the act of releasing your own music is in keeping with the loftiest ideals of our nation: autonomy, independence, entrepreneurism—in short, what Ralph Waldo Emerson called Self-Reliance.

For today's musician, self-reliance means taking an end run around the whole crapshoot of label hunting. If a record deal is your goal, why not make the deal with yourself? By releasing your own album, you cease waiting for someone else to make your name, and you take an active role in shaping your musical destiny.

Having an album out not only expands your audience through radio airplay and record reviews, it also provides a way to make money via bandstand sales, mail order, and retail outlets. Moreover, it gives you bargaining power with club owners, some of whom won't consider booking you unless you have a CD release. Best of all, if you sell thousands of self-produced units, you can watch with glee as the major labels beat a path to your door.

* but didn't know who to ask

Photograph by Mario Parnell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"*Out of this world, exceptionally realistic, unbelievable bass end,* and *dirt when needed*, are just some of the tired expressions that could be dragged from the cliche cupboard, because this is one mother of a synth...If you want classic analog sounds then forget the secondhand pages and buy a Prophecy, and if you want to explore virtual modeling then this is the cheapest way so far. The Prophecy will be a classic in the way of the DX7, D50 and M1." – **Future Music**

"The Prophecy is a monophonic solo instrument with a projected price that puts it into the *I gotta get one* bracket. If I hadn't been told this was a digital machine, I would have accepted the analog sounds without question. I don't think I need to be a prophet to predict that the Prophecy is going to be in demand." – **Sound on Sound**

"Love at first sight. This is a synth for the future which incorporates all the best of synths past. If you like to twist, change and control sounds as you play; if you like analog; if you like realistic emulations of brass and wind; in fact if you're interested in synthesis at all, you really have to try the Korg *Prophecy*. In my humble opinion, it's the best keyboard currently available in this price range – or anywhere near it." – **Making Music**

"Divine Prophecy. If you're looking for a synthesizer that doesn't only play, but that also shapes sound, check out Korg's latest synth called the Prophecy Solo Synthesizer." – **EQ**

"Keyboard mavens will probably love this. Korg has a hot new synthesizer...Rick Wakeman's a fan: *Occasionally, and I mean occasionally, something really innovative and exciting to play appears. Prophecy comes under that rare heading.*" – **Music Monthly**

"This is an instrument that reassures sonic originality, creativity and spontaneity at a time when recreative preset-itis has become the norm. Quite simply, this is a stunning synth." – **Keyboard Review**

"This little board packs a serious punch. I really liked how the data ribbon is built onto the pitch wheel...it provides a new outlet for expression" – **Memphis Musician**

"The Korg *Prophecy*, a 37-key synthesizer featuring Korg's DSP-based Multi-Oscillator Synthesis System, has gotten a big thumbs-up from Rick Wakeman. If you heard its wailing analog-like tones at NAMM, you'd know why." – **Musician Magazine**

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LAY OF THE LAND

We've tried to structure this article as a road map for first-timers who are ready to take the self-production plunge. As a common point of departure, we'll assume you already have your tracks recorded and mixed down. The next leg of the journey is translating that DAT or analog master into a finished product. But beware: this is no straight and narrow path. Be prepared for a long and winding road that may veer sharply into a jungle of forking paths.

The fact is that you are undertaking a sizable, multistep process usually performed by a team of well-heeled day-jobbers. This doesn't mean, however, that you can't do as good a job as they would. With patience, passion, and good judgment, you can put out a product that rivals any major-label release. In fact, because it's your baby, you can bring a level of commitment and energy to the project that would be hard for any "expert" to match.

TIME AND MONEY

First and foremost, making your own CD takes money. You're going to be spending a lot of it. You've already spent a wad piecing together your studio and recording your project, so before taking another step, figure out how much *more* money you can afford to spend. Now, add 20 percent on top of that figure, and you've got yourself a budget. Trust me. If you think the total package will cost five grand, it'll run you at least six.

Likewise, the manufacturing process will take more time than you expect it to take. Pressing plants often make bold claims, and in a perfect world they can keep their promises. But few of us live in a perfect world. Be realistic and patient. A reasonable approach is to double all initial time estimates. If the manufacturer promises a three-week turnaround, expect your product in six weeks at best.

BUSINESS ISSUES

If you intend to sell your own album, you must legally establish yourself as a business—in this case a record label. The complete procedure is beyond the scope of this article, but basically it requires naming the label, filing a DBA ("Doing Business As") in your local newspaper, obtaining a business license and a resale license, and possibly doing a trademark search. Every one of these things costs money and time, so figure them into your budget. Unfortunately, birthing your business entity is only the first task on a long list of legal and administrative chores. Here are some of the other important matters on that list.

Copyright. To secure the rights to your own work, you'll need to copyright your album by filing an SR (Sound Recording) form with the Register of Copyrights. If you wrote all the songs on the album, you'll also have to copyright your *compositions* with form PA. The necessary forms are available from the United States Copyright Office, tel. (202) 707-9100.

Performance rights. Royalties don't fall from the sky. If you want to get paid for airplay and other commercial exploitations of your work, you need to join a performing-rights society. These organizations—the major players are ASCAP, BMI, and SESAC—track performances of your work and issue royalty payments. (See the sidebar "Who Collects My Royalties?") The royalty pie is divided into two pieces: one half is for songwriters and the other half is for music publishers. If you wrote the songs on your album, you can cut yourself in for a big slice of potential revenue by starting your own publishing company and registering as a writer *and* publisher. Of course, this means establishing yet another business entity. If that seems like too much trouble, you can always assign your publishing rights to an outside publisher. Just don't sell yourself short. Publishing catalogs can be as valuable as blue-chip stocks if your songs become consistent chartbusters. (To find out how to get more information on music-industry deals, see the table "Legal Stuff.")

Licenses. If your album includes one or more cover songs, you are required by law to get a mechanical license, in writing, for each song covered. The

WHERE DREAMS ARE PRESSED

The following is a list of manufacturers that can turn your master tape into boxes full of CDs, cassette tapes, and vinyl records. For a more comprehensive list, see the *Recording Industry Sourcebook* available from Mix Bookshelf, tel. (800) 233-9604 or (908) 417-9575; fax (908) 225-1562.

Andol Audio Products, Inc. tel. (800) 221-6578 or (718) 435-7322
Big Dreams Studio, Ltd. tel. (708) 945-6160
Crystal Clear Sound Tapemasters tel. (800) 880-0073 or (214) 349-0081
Digidoc Productions tel. (800) 344-4362 or (714) 385-1250
Digi-Rom tel. (800) 815-3444 or (212) 730-2111
Digital Force tel. (212) 333-5953
Disc Makers tel. (800) 468-9353 or (609) 663-9030
Europadisk, Ltd. tel. (800) 455-8555 or (212) 226-4401
HEALY disc tel. (800) 835-1362 or (613) 562-4649
Hummingbird Recording tel. (800) 933-9722 or (407) 676-9722
LMR Productions tel. (800) 988-3710 or (606) 324-9911
The Machine Room tel. (713) 781-1963
Mediaworks tel. (615) 327-9114
Megadisc tel. (704) 525-6022
Musicraft tel. (800) 637-9493 or (503) 682-8668
Nimbus tel. (800) 231-0778 or (804) 985-1100
Pacific Coast Sound Works tel. (800) 423-2834 or (213) 655-4771
QCA tel. (800) 859-8401 or (513) 681-8400
RJR Digital tel. (800) 828-6537 or (619) 267-0307
Total Tape Services tel. (813) 446-8273
Wavelength tel. (800) 720-7007 or (503) 588-2712
World Audio Video Enterprises tel. (800) 928-3310 or (613) 726-7256
World Records Group tel. (800) 463-9493 or (905) 433-0250

first thing to do is contact BMI or ASCAP to determine who holds the copyright on the composition. Then, you can either contact the publisher directly and negotiate your own rates or call the Harry Fox Agency (tel. 212/370-5330), which will issue a mechanical license. The statutory rate is 6.6 cents per song (up to a running time of five minutes), payable quarterly per number of units sold. For example, if your CD includes one 4-minute cover and you sell 1,800 units the first year, you owe the publisher $118.80. For songs longer than five minutes, the rate is 1.25 cents per minute, per song. You can also pay up front for all the units you intend to sell.

The publisher will also issue the exact wording you must use to credit the song. This information must appear somewhere on the packaging for each unit. Failure to properly license and credit someone else's song could result in a lawsuit with considerable financial damages.

But cover songs aren't the only things that may require licensing. Be sure to clear the use of any trademarks on your album packaging. The Dolby logo, for example, is required if you use any of the Dolby noise-reduction systems on your cassette release. Some full-service manufacturing houses take care of the necessary licensing for you and will also generate the Dolby logo. If your manufacturer does not provide this service, the legal ball is in your court. You will have to contact Dolby Laboratories (tel. 415/558-0200) and take care of the details. The licensing fee is $150.

Album ID. You'll also need to assign a release number to your album. This is usually a 3- to 8-digit number—you can also use letters—that helps the manufacturer and retailers keep track of your project and can later be used for your own inventory tracking. (Note: include your release number on all artwork or negatives as well.) Finally, though it's not required, you may wish to add a prohibition such as, "All rights reserved. Unauthorized duplication is a violation of applicable laws."

Bar codes. A bar code is essential if you hope to sell your product in commercial record stores. Bar-code numbers are assigned by the Uniform Code Council. Call (800) 543-8137 or (513) 435-3870 to order an application. The one-time fee is $300. Fortunately, you can use the same number (with 1- or 2-digit variations) for all your future releases.

THE MANUFACTURER

Manufacturers come in all flavors, from those that specialize in only one aspect of the job (such as pressing CDs) and require you to prepare all other materials to full-service operations that will sweeten your master, generate artwork, deliver the shrink-wrapped product to your door, and hold your hand every step of the way.

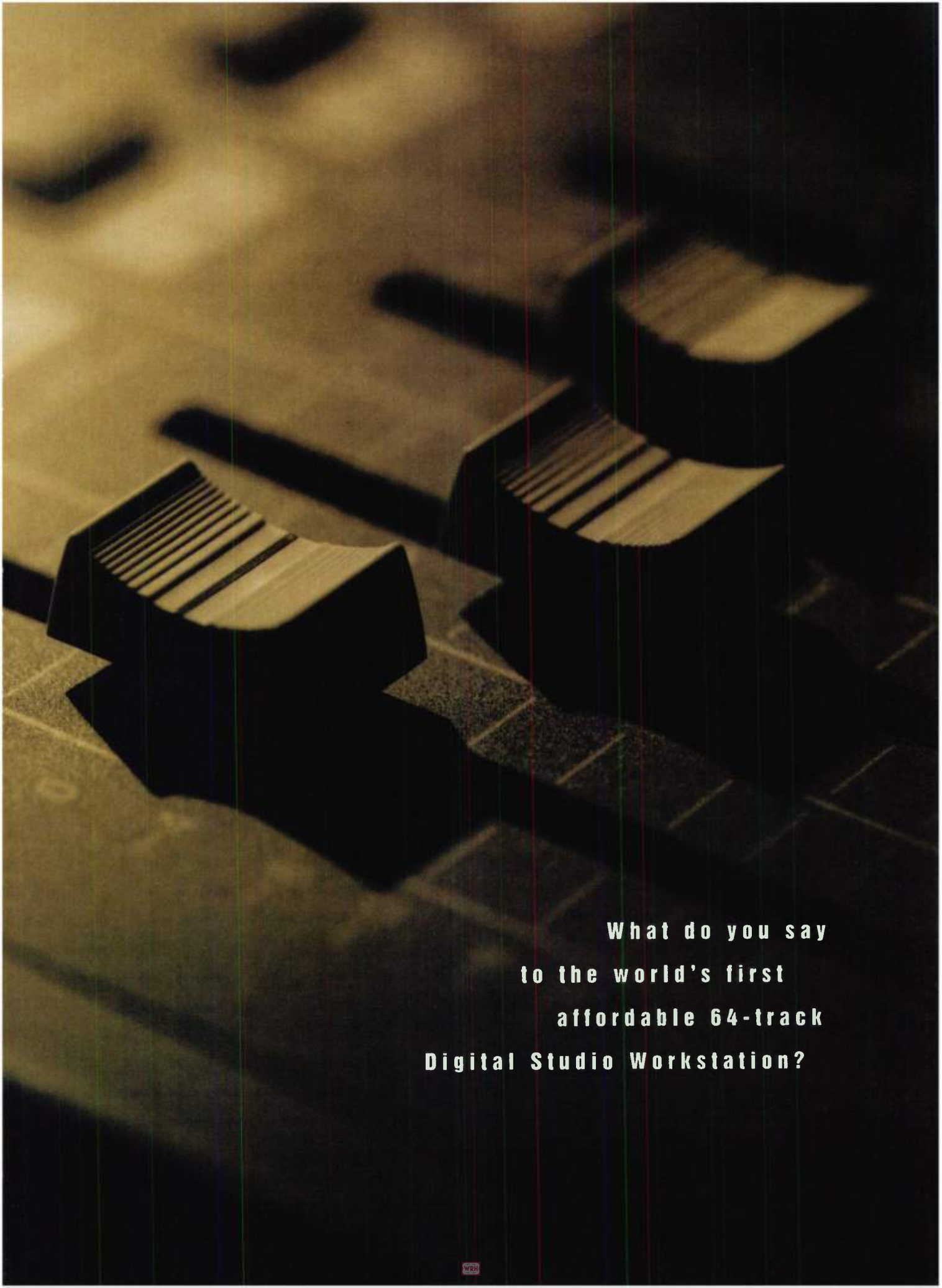
First-timers are usually better off with the latter. For one thing, full-service houses tend to offer the widest range of packages and prices. In addition, they will assign you an experienced product specialist to oversee every step of production for your title—a critical time-saver if you aren't familiar with the materials and processes required to assemble the product. Because they are accustomed to working with individual artists and short production runs, full-service manufacturers are often quite flexible, as well. For example, although graphic design may come "free" with a package deal, you might instead opt to supply original artwork.

It is quite possible to save money by subbing out individual parts of the manufacturing job, but until you are familiar enough with the process to know where the best deals are—and who you can trust—this path can be complicated and time consuming. The big difference is that, by subbing out each element, *you* become the product specialist. In general, I would recommend this approach only for the experienced producer who puts out a dozen or more titles a year, or for people with specific connections. For instance, if your bass player is also a graphic designer and a friend of your drummer's has offered to do the printing at cost, then by all means take advantage of the savings. Just make sure there *are* actual savings. You might oversee everything yourself, nail down great deals each step of the way, yet end up spending more than had you gone to a full-service manufacturer in the first place.

If you do decide to go it alone, one potentially money-saving approach is to employ the services of a CD broker. Brokers come in many flavors as well, but they operate on the same principle as manufacturers. By collecting master tapes from, say, 50 different artists each wishing to order 1,000 CDs, the broker can get a volume discount from a manufacturer that deals only in large press runs. This can be an attractive arrangement for all involved. Just make sure you know exactly what you're getting into and how much money you'll save. Get the broker's terms in writing so you have legal recourse if things go awry.

Whichever route you take, it's important to compare manufacturers carefully and choose the one that best

All manufacturers provide guidelines to assist you in preparing your release. Disc Makers' free *Guide to Master Tape Preparation* is a particularly thorough and helpful booklet that covers the ins and outs of "preparing a trouble-free master tape."


What do you say
to the world's first
affordable 64-track
Digital Studio Workstation?


MIXER MODE
INPUT → TRACK
INPUT MIX
TRACK MIX
MASTER
LOCATOR
CLEAR

Welcome home.

Say hello to the first fully integrated digital recording workstation practically anyone can afford. The VS-880 is for anyone who ever wanted more and more out of their home or studio recording environment.

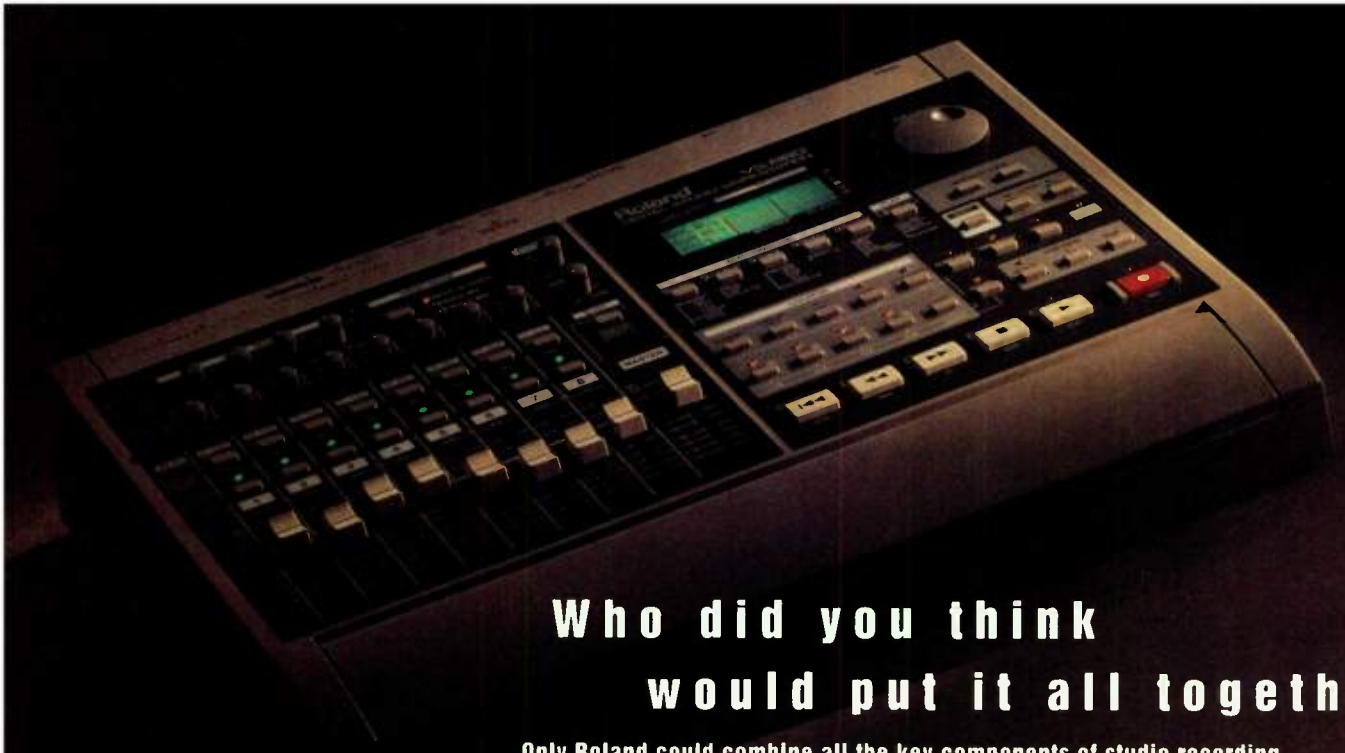
It's a 14-channel digital mixer. It's an 8x8/64 virtual track digital recorder. It's two completely independent stereo multi-effects processors*. And it's up to 500 minutes or more of random access recording time.

It's time to turn your home or workplace into the studio you've always wanted. Turn on to the VS-880 Digital Studio Workstation and discover just how easy recording, editing, mixing and mastering can be to help you create your best work.

Roland®

V-Studio VS-880

*With optional VS8F-1 Effect Expansion Board.



Who did you think would put it all together?

Only Roland could combine all the key components of studio recording in a fully digital environment.

The VS-880 is the first digital workstation of its kind.

A 14-Channel Digital Mixer

The VS-880 comes with a 14-channel digital mixer with digital EQ. Fader, pan and mixer parameters can be automated by MIDI control change messages. Internal snapshot automation is included.

An 8x8/64 Virtual Track Digital Recorder

Eight primary tracks with eight levels of virtual tracks give you the ultimate in recording flexibility. Record multiple takes, edit or undo edits and compile the best parts of various takes to create the perfect track without compromise. You can accumulate up to 64 instantly accessible tracks and choose eight for final mixdown.

Digital Editing

With the VS-880, you get fully non-destructive editing capabilities. You can copy, move, exchange, insert, cut and erase tracks. Because it functions like a word processor, you can select the perfect chorus of your song, copy it or move it somewhere else without re-recording it. Or cut out another section and have the remaining material slide over and fill the open space automatically. And if you're not satisfied with a particular edit, simply return to the previous performance. Instant locate points make editing on the VS-880 as user-friendly as it gets. For advanced applications, functions like Scrub Preview or Time Compression/Expansion are available.

Digital Mastering

The VS-880 is fully digital and has digital in and out. This makes it compatible with all your existing digital equipment, both linear tape-based and non-linear hard disk format.

Two Digital Effects Processors

A VS8F-1 Effect Expansion Board can be easily user-installed, giving you two totally independent multi-effects processors. Reverb, stereo delay, chorus, flanging, vocoder as well as distortion/overdrive and guitar amp simulation are a few of the effects that can be added during recording or during final mix in realtime. Three dimensional effects based on Roland's proprietary RSS® system are also included.

Digital Memory

You can choose the type of memory which best suits your needs. Select a 540 MB internal drive or an internal 1 Gigabyte removable Iomega® JAZ® drive capable of 500 minutes of recording time. A standard SCSI port allows for easy connection to external drives such as Iomega® ZIP®, magnetic optical or other storage media.

Synchronization

The VS-880 is MIDI compatible for synchronization with MIDI Time Code (MTC) as both a master or slave. MIDI Machine Control (MMC) also allows automated transport control, putting playback, fast forward, rewind and more at your fingertips.

The VS-880 Digital Studio Workstation is ready and waiting for your valuable input at your nearest Roland dealer. Or call (213) 685-5141, ext. 798 to order a free demonstration video.

V-Studio VS-880

Roland®

Online

Roland Corporation U.S., 7200 Dominion Circle, Los Angeles, CA 90040 (213) 685-5141 Roland Canada Music Ltd., 5480 Parkwood Way, Richmond, B.C. V6V 2M4 (604)270-6626
COMPUSERVE®: GO ROLAND Fax-Back Information: (213) 685-5141, ext. 271 http://www.rolandUS.com

suits your style and needs. Get on the phone, call a half dozen or more manufacturers, and request every piece of literature they can send you. (For a partial list of manufacturers, see the sidebar "Where Dreams Are Pressed.") I cannot stress this last point enough. Because you're doing this yourself, you'll need all the information you can get. Ideally, you should decide on a manufacturer before assembling your master tape. Order guidelines, read everything thoroughly, and don't hesitate to call for further clarification. Most manufacturers are straight up and want nothing more than to satisfy their customers. By understanding the manufacturer's requirements, you greatly increase your chances of getting the product you want.

While looking over the materials, be sure to take note of the graphic layout and color reproduction in the catalogs. If the text is typo-ridden and the graphics bore you to tears, are you sure you want this company manufacturing your album? Ask lots of questions and compare the telephone treatment you get from each manufacturer. Were you left on hold for fifteen minutes? Are the receptionists and sales reps friendly, patient, helpful? Do you even get to speak to a real person? You'll be on the phone with these folks more than you realize, so choose wisely.

Also, don't base your final decision on price alone. Once all costs are summed, price differences from one manufacturer to the next are usually less extreme than they initially appear.

THE MASTER TAPE

DAT is the current format of choice for 2-track masters and accounts for probably 85 percent of all masters received by CD manufacturers. CD-Rs (recordable CDs) and ¾-inch U-matic (commonly known as the "1630" format) account for another 10 percent, with ½-inch or ¼-inch analog tape making up most of the rest. Surprisingly, manufacturers still receive the occasional cassette master tape. They can fulfill the order, of course, but not to your satisfaction or theirs. Professional results are simply not possible with cassette masters.

Whichever mastering format you choose, the next step is deciding whether to prepare the master yourself or have it done at a professional mastering studio. One advantage of a pro mastering facility—aside from all the high-end gear—is the engineer's experience at listening objectively to other people's tracks. No matter how good you are at mixing, it's difficult to be objective about your own work. A good mastering engineer can hear and correct overall imbalances that might somehow have escaped the microscopic focus of your attention.

The services of a well-appointed mastering lab are not cheap (expect to spend $1,000 to $1,500 for a typical album-mastering session), but they could be just the ticket for pushing your production into the realm of sonic excellence. Of course, it's important to get organized before waltzing into a professional mastering studio. At $100 or more an hour, the last thing you want is to waste time looking for the right mix. (For a detailed look at how to prepare for a pro mastering session, see "The Master's Touch" in the September 1995 issue of **EM**.)

Many manufacturers offer in-house mastering, often at lower rates than independent mastering studios. If you live in the area, they'll usually let you attend the mastering session, as well; if not, look elsewhere, or take your chances. Some manufacturers take a noninterventionist, flat-transfer approach: what's on your master tape is what you get, no matter how it translates to each format. Others feel that EQ and dynamics processing are necessary to adjust the sound so that each format performs at its maximum capability. These adjustments generally come with the package, but it pays to be sure. Nothing is more maddening than the accumulation of "hidden costs." Always get complete price quotes for your project.

The other option is to master the project in your own studio. The most primitive way to do this would be to mix the songs, in order, directly onto the final master tape, complete with fades and gaps. This is not recommended, however, as you lose the option of choosing among multiple mixes. Also, if you screw up a mix, you'll have to record back over that part of the tape. If you're mixing to analog tape, a slew of mistakes and "rollovers" will eventually cause some signal degeneration. But even with DAT, where multiple takes do not risk signal degradation, each recording pass increases the likelihood of sampling errors. As for CD-R, you can only record on each disc once.

The best approach is to record multiple mixes of each song. That way you can choose the final mixes later and assemble them onto a fresh master tape or disc. At home, this would require a minimum of one playback deck and one recorder. For digital you could use a combination of DAT, CD-R, or DAW. You can even master to an MDM simply by using two tracks (stereo), which you would then bounce back to DAT.

Of course, if you're fortunate enough to have your own DAW, you can do nondestructive editing and sonic sweetening without ever entering the analog realm. But even with two DAT decks, you can produce a good-quality master tape by using your mixer and a stereo compressor. (For a complete look at this approach, see "DAT Mastering at Home" in the October 1994 issue of **EM**.) The home mastering process can also be done with two analog tape decks or one analog deck and one digital. Let's take a look at the specifics that apply to each tape format, whether

WHO COLLECTS MY ROYALTIES?

When you distribute an album, airplay and other mechanical royalties don't just fall from the sky. You must register with a performing-rights society that will chart your "plays" and send you those bountiful royalty checks.

ASCAP tel. (212) 621-6160 or (213) 883-1000; Web http://www.ascap.com
BMI tel. (212) 586-2000 or (310) 659-9109; Web http://www.bmi.com
SESAC tel. (800) 826-9996 or (212) 586-3450; Web http://www.sesac.com

you're mastering at home or in a professional facility.

MASTERING TO 1630

Short for Sony's PCM 1630 digital-tape mastering system—which runs on a ¾-inch, U-matic video deck—the 1630 has long been a standard industry mastering format. A 1630 cassette looks like an oversized VHS tape and operates basically the same, except that the system "tricks" the tape into thinking it is receiving video/audio information when, in fact, it is reading digital 1s and 0s that translate to audio only.

For years, the procedure has been to convert DAT and analog master tapes to the 1630 format, which is then used to cut the CD glass master. Advances in CD-R promise to eliminate the 1630 stage from the CD manufacturing process, but at present the 1630 is still a cost-effective format for many manufacturers. Most pro mastering labs can master your album directly to 1630, which often qualifies you for a manufacturing discount.

MASTERING TO DAT

Using quality, name-brand DAT tape, fast-forward and rewind new DATs to ensure that the tape is evenly packed in the shell. This reduces the possibility of tape malfunction. It's also wise to make sure your DAT recorder's heads have been cleaned according to the recommended maintenance schedule. This can be done manually or with a cleaning cassette. Check your owner's manual for instructions.

You will need to record fifteen seconds to two minutes of *digital black* preroll at the beginning of your DAT master (and at the end of the complete music program as well), depending on the CD manufacturer's specifications. Digital black is tape formatted with zeros only—silence—which you create simply by running the machine in record mode with input levels set at zero. You can switch Auto ID off so the leader isn't ID'd or you can manually remove the ID later.

Some manufacturers do not require calibration tones on DAT masters, but it's never a bad idea to include a 1 kHz tone. Run the tone into your source deck and set the output to 0 dB. Then, raise your record level on the master recorder to -12 dB (which has become the standard). Record at least 30 seconds of the tone. Now, both your playback and record decks are calibrated (so you can keep levels consistent between songs) and the manufacturer will have a reference tone with which to calibrate their equipment to your levels. If you don't have a tone generator, you can use calibration tones from a CD such as *The Mix Reference Disc* available from Mix Bookshelf (tel. 800/233-9604 or 908/417-9575). Check with the manufacturer to determine whether you should number the start ID for the test tone.

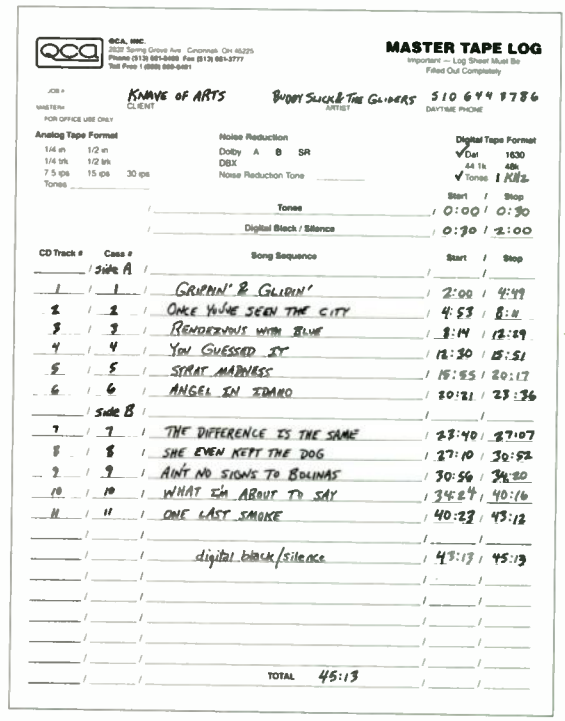
All of your songs should have start IDs, sequentially numbered and precisely positioned at the beginning of each selection. Your DAT deck automatically generates start IDs and ID numbers, but if you don't want the digital black ID'd or the test tones numbered, you may have to erase an ID or two and manually renumber the remaining selections. (Some machines perform renumbering automatically after start IDs are corrected. Check your manual.)

If your order includes CDs, be sure to record (with Emphasis off) at the industry standard 44.1 kHz sampling rate. Otherwise, you will have to pay extra for a digital sample-rate conversion, the results of which are not always satisfactory. If your master was recorded at 48 kHz, you can do a simple analog conversion by running the 48 kHz source into the analog inputs of another DAT deck and setting its record rate to 44.1 kHz. Of course, this means that your pristine digital signal is being soiled by an analog pass. However, some producers actually prefer an analog conversion, feeling that the process helps warm up digital signals.

If your order is for cassettes or vinyl only, it makes sense to record at the higher sampling rate of 48 kHz. There's an exception to watch out for: some cassette-tape manufacturers now use a *digital bin* rather than the usual analog bin-loop mastering machine. Find out whether the digital bin is set at 44.1 or 48 kHz so you can record your master at the same sampling rate.

One of the most important things to provide the manufacturer with is a complete and accurate time log (see **Fig. 1**). This includes preroll, digital black, all song titles and their respective Start ID numbers, plus ABS start and end times for each selection. The tape log also specifies the master-tape format, sampling rate or tape speed, type of noise reduction (if applicable), and artist/client information. If there is anything on the tape you *don't* want on the finished product (e.g., false starts or noises), these should be clearly noted with start and end times, as well. All this information is vital in case the engineer has questions during the mastering process.

As for the actual recording levels on your master DAT, you can take advantage of the format's impressive dynamic range by recording at close to maximum levels. Depending on the style of music, I generally put the bulk of a track at -3 or -2 dB, with transient peaks hitting zeroes. Just make sure



MASTER TAPE LOG

CLIENT: KNAVE OF ARTS — ARTIST: BUDDY SLICK & THE GLIDERS — DAYTIME PHONE: 510 644 9786

Analog Tape Format: 1/4 in 1/2 in; 1/4 trk 1/2 trk; 7.5 ips 15 ips 30 ips; Tones

Noise Reduction: Dolby A B SR; DBX; Noise Reduction Tone

Digital Tape Format: ✓Dat 1630; 44.1k 48k; ✓Tones 1 kHz

	Start	Stop
Tones	0:00	0:30
Digital Black / Silence	0:30	2:00

CD Track #	Cass #	Song Sequence	Start	Stop
	Side A			
1	1	GRIPPIN' & GRIDIN'	2:00	4:49
2	2	ONCE YOU'VE SEEN THE CITY	4:53	8:11
3	3	RENDEZVOUS WITH BLUE	8:14	12:29
4	4	YOU GUESSED IT	12:30	15:51
5	5	STRAT MADNESS	15:55	20:17
6	6	ANGEL IN IDAHO	20:21	23:36
	Side B			
7	7	THE DIFFERENCE IS THE SAME	23:40	27:07
8	8	SHE EVEN KEPT THE DOG	27:10	30:52
9	9	AIN'T NO SIGNS TO BOLINAS	30:56	34:20
10	10	WHAT I'M ABOUT TO SAY	34:24	40:16
11	11	ONE LAST SMOKE	40:27	43:12
		digital black/silence	43:13	45:13
		TOTAL 45:13		

FIG. 1: A complete and accurate time log must accompany your master tape.

Night after night, set after set, the Shure SM58 suffers the ravages of rock and roll and keeps coming back for more. So what else is new? The SM58 has been the world's number one mic for decades. To this day, it remains the standard against which all other microphones are judged. Visit your Shure dealer. See why the world's most abused microphone is still its most popular.

SHURE

Shure Brothers Inc. Evanston, IL 1-800-25-SHURE.

not to *exceed* the 0 dB mark on your DAT recorder. Some DAT decks are designed with a bit of headroom above 0 dB, but play it safe by staying *out* of the red. Digital distortion is not something you want on your album.

Again, it's good to get specifics from manufacturers before making your master, as their playback equipment and calibration methods differ. "We've gotten tapes mastered at 0 dB on consumer DAT decks that were hitting +2 dB on our end," says Bob Stone, president of World Records Group. "And there was consistent distortion throughout the program."

It's a scary reality that input and output levels often vary between different DAT machines. Even in the pro audio world, a tone recorded at 0 dB on one deck may not always play back at 0 dB on another. Some manufacturers ask that you identify the source deck (TASCAM DA-30, Panasonic SV-3700, etc.) so they can try to find a similar machine if they discover any playback problems. Given this situation, you may want to exercise caution by setting your levels to peak at -1 or -2 dB and making sure that all songs peak at the same level. The engineer can always adjust the overall program level if it is too low. If your digital tracks are distorted, though, there's not much anyone can do to fix them.

MASTERING TO ANALOG

Be sure to use premium tape and provide plenty of paper leader—three feet minimum—at the beginning and end of the master so the manufacturer has no problems threading the playback deck. Also, make sure all edits are tight and, from the oxide side of the tape, undetectable. Gaps between songs should be timed by splicing in paper leader; if you simply let the audio tape run, you'll hear tape hiss between selections.

At the beginning of the master tape, record 30 seconds each of 1 kHz, 10 kHz, and 100 Hz calibration tones, in that order. Don't forget to also record noise-reduction tones if you intend to encode the tape with Dolby A or SR. To minimize tape hiss, record analog masters as hot as possible while still leaving a bit of headroom to handle transients.

Listen back carefully to each mix, making sure high frequencies do not smear from oversaturation (usually most apparent on cymbals and acoustic piano). When the master tape and safety copy are complete, rewind both at regular speed—the "slow wind" reduces the chance of tape crinkles—and store them, tails out, in proper tape boxes.

MASTERING TO CD-R

There are two main advantages of audio CD-R. First, it lets you hear how your final CDs will sound *before* you approach the manufacturing stage. Second, it can eliminate the 1630 from the audio-production chain. At present, though, due to variations in software,

not all CD-Rs allow manufacturers to bypass the 1630.

The type of CD-R that can bypass the 1630 and cut a CD glass master directly is called a PMCD, short for Pre-Mastered CD. A PMCD includes PQ, the subcode data (carried on channels P and Q) required by the CD-mastering machine to make the glass master. At present, only the high-end studios are likely to have the capability to burn PMCDs. Furthermore, not all manufacturers are set up to master from PMCDs, and even if they are, it still may be more affordable for them to use the 1630.

Also, beware that consumer-grade CD recorders (whether stand-alone or SCSI based) may not generate the PQ data required for mastering. "Sometimes the time code from low-end CD-Rs won't line up with our equipment," says World Records Group's Stone. "They're simply not built for mastering."

When manufacturers receive a home-made CD-R (*sans* PQ), their only option is to treat it as they would a DAT, which often means going through the 1630. Sure, the home user gets to hear the CD before it leaves the house, but because it has to undergo at least one more format transfer, the final product could still sound different.

As most CD manufacturers offer customers a reference CD (for approval) before the actual run is started, producing a CD-R or PMCD may be more trouble than it's worth. For now, unless you're really intent on having a CD-R master, it makes more sense to use DAT. Some manufacturers request a DAT reference copy along with the CD-R (or 1630) anyway. And with DAT you have the option of re-recording, whereas CD-R is a write-once medium.

However, if you *are* determined to have a CD-R master, there are a few things to keep in mind. Most importantly, do not touch the data side of the disc. "We've gotten CD-Rs that were too dirty to read," says Dave Moyssiadis, chief mastering engineer at Disc Makers. "All it takes is one fingerprint to cause data errors." Always handle the disc by the edges only.

If you're mastering to your own CD recorder at home, it's important that you understand the machine's operating system. There are two ways to write data to a CD-R: track-at-once and disc-at-once. Track-at-once recorders, which shut the laser off and on between tracks, sometimes write bad data that can show up as errors at the manufacturing plant. Disc-at-once recorders are

Legal Stuff

Over the years, EM's "Working Musician" column has covered a number of legal issues relevant to releasing your own album. For copies of back issues, call Mix Bookshelf, tel. (800) 839-5977 or (510) 653-3307.

"Comprehending Copyright"	February 1992
"Music Contracts"	June 1992
"Getting Down to Business"	January 1993
"Musical Monopoly"	February 1995
"Dissecting a Deal"	May 1995
"The Name Game"	January 1996
"The Fine Print"	February 1996

FEATURES:

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

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

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

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

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

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

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

MORE FEATURES:

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

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

EVEN MORE FEATURES:

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

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

Data backup is achieved through standard audio DAT or Exabyte.

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

Now You Can See It.

OPTIONS:

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

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

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

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

ELECTRONIC MUSICIAN 1996 EDITORS' CHOICE

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

AKAI DIGITAL

Akai Digital
1316 E. Lancaster Ave.
Fort Worth, TX 76102, U.S.A.
Ph. 817-336-5114
Fax 817-870-1271

generally more reliable (PMCDs are disc-at-once) but used incorrectly can also generate bad data. "Whatever you do," stresses Moyssiadis, "don't try to stop a disc-at-once machine between tracks, or you'll end up with crap all over the disc."

As for making safety copies, if you are mastering to a SCSI-based CD recorder from your computer or DAW, you can simply run the program again to burn a backup CD-R. Making a clone from a stand-alone CD recorder requires bouncing the data to another digital format, such as DAT or MDM, and then back to the CD-R (unless, of course, you have two CD recorders). Here's a final note: because CD-R technology is changing so fast, at least some of what you read here could be obsolete six months from now. Always check with your manufacturer to get the latest format requirements.

After your discs are pressed and packaged, a machine like the one above shrinkwraps the jewel boxes before they are dispatched for shipping. This shrinkwrap line is at the Nimbus manufacturing plant in Provo, Utah.

SONG SEQUENCING

Before you lay anything down to a master tape, however, you should decide on a song order. For obvious reasons, it's usually a good idea to put one of your best songs first. Beyond that, song order is largely a matter of taste. I find it helpful to dub three or four different sequences of songs onto cassettes and then live with them for a while before committing to the final order. Consider the pacing of the songs and the effect of key changes from one tune to the next.

Another question is how much time to leave between each cut. Three to four seconds is standard, but sometimes a shorter or longer gap is more effective between two particular tracks. Let the feeling of the songs dictate the length of gaps, and don't be afraid to buck convention. It's your album, after all.

A related decision you'll need to make if you're ordering cassettes is where to break the program for side B. If possible, make both sides about the same length, with side A being slightly longer. That way, when side A is finished playing, side B is cued up and ready to go, and any blank tape winds up at the end of the whole program. And here's another tip: Start side B with a memorable song, too.

THE FORMAT

The distribution plan for your release (as well as your audience) will determine the percentage of CD, cassette, and/or vinyl. Most record distributors won't handle cassette releases, so CDs are a must if you hope to sell in major-market retail stores. And although consumers prefer CDs, cassette tapes still account for about 50 percent of the total record sales in the United States. It could be unwise not to include a good percentage of cassettes in your order. Manufacturers usually offer a 50/50 package of CDs and cassettes, a sensible first order in most cases.

On the other hand, some artists have done well with cassette-only releases. In 1983, the Hooters self-released a cassette that sold 100,000 copies and subsequently led to a major-label record deal. The big advantage of ordering cassettes is that you can do much smaller runs—as few as 50 or 100 at a time. That can be an important consideration for strapped budgets.

Of course, with any format, the bigger the order, the less you pay per unit. The differences can be sobering. For example, an order of 500 full-color CDs might cost you $4.25 per disc. But if you order 1,000, the per unit price drops to $2.25. Clearly, if you were anticipating an outlay of $2,125 for 500 CDs, you'd be foolish not to spend the extra $125 for twice as many discs. In capitalism as well as rock 'n' roll, volume rules.

You may think that, except for the dance market, vinyl is dead. Actually, certain alternative-music distributors are experiencing a resurgence of interest in LPs—and not just for the retro-chic factor. Some people feel strongly that vinyl records sound warmer and more natural than CDs. "Not only does vinyl sound better than the CD format," says Andy Jewett of Silly Bird Records, "but an LP is a much nicer *object* than a CD." Silly Bird's most recent release consisted of 500 CDs, 500 LPs, and no cassettes. One of their distributors, Revolver, placed an initial order for 30 CDs and 25 LPs—an encouraging note for vinyl enthusiasts.

FORMAT SPECS

Cassette. The recommended maximum play length for cassette tapes is somewhere between 90 and 100 minutes, or around 48 minutes per side. Be sure to ask the manufacturer about tape thickness, as longer programs require thinner tape, which is more prone to stretching and breaking. Manufacturers have cut-off points—usually around 70 minutes total—beyond which they have to switch to thinner tape so that it can still fit onto the cassette spool. If possible, keep your program time below the cut-off point to ensure that you get the thicker, more robust tape.

As for types of tape (e.g., ferric vs. chrome, low bias vs. high bias) and cassette shells, it's advisable to specify

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the highest grades. You should ask for samples from the manufacturer and compare for yourself, but in my experience the sound of low- and medium-grade cassettes is consistently disappointing—especially when compared to CDs. As analog cassette tape is already a "sonically challenged" format (with a dynamic range of 30 to 40 dB as compared to the CD's range of 90 dB or more), it's well worth spending the extra 10 or 15 percent to ensure sonic quality and durability.

Another consideration is whether the cassettes are duplicated in real time or at high speed. Not so long ago, real-time duplication, though more expensive, guaranteed higher audio quality. Now, thanks to improvements in high-speed systems, this is not necessarily the case. The problem with real-time duplication is that tapes are duped on multiple tape machines. Not only must the manufacturer maintain optimum bias, azimuth, and head alignment for each machine, but obviously the number of tapes that can be made at one time is limited to the number of machines available. This also makes real-time duplication more expensive. For these reasons, all major-label cassette releases are made using high-speed bin-loop machines, often running as high as 100 times real speed. Most independent manufacturers also use high-speed duplication. Again, it's smart to ask for samples so that you can compare for yourself.

Regarding noise reduction, Dolby Hx

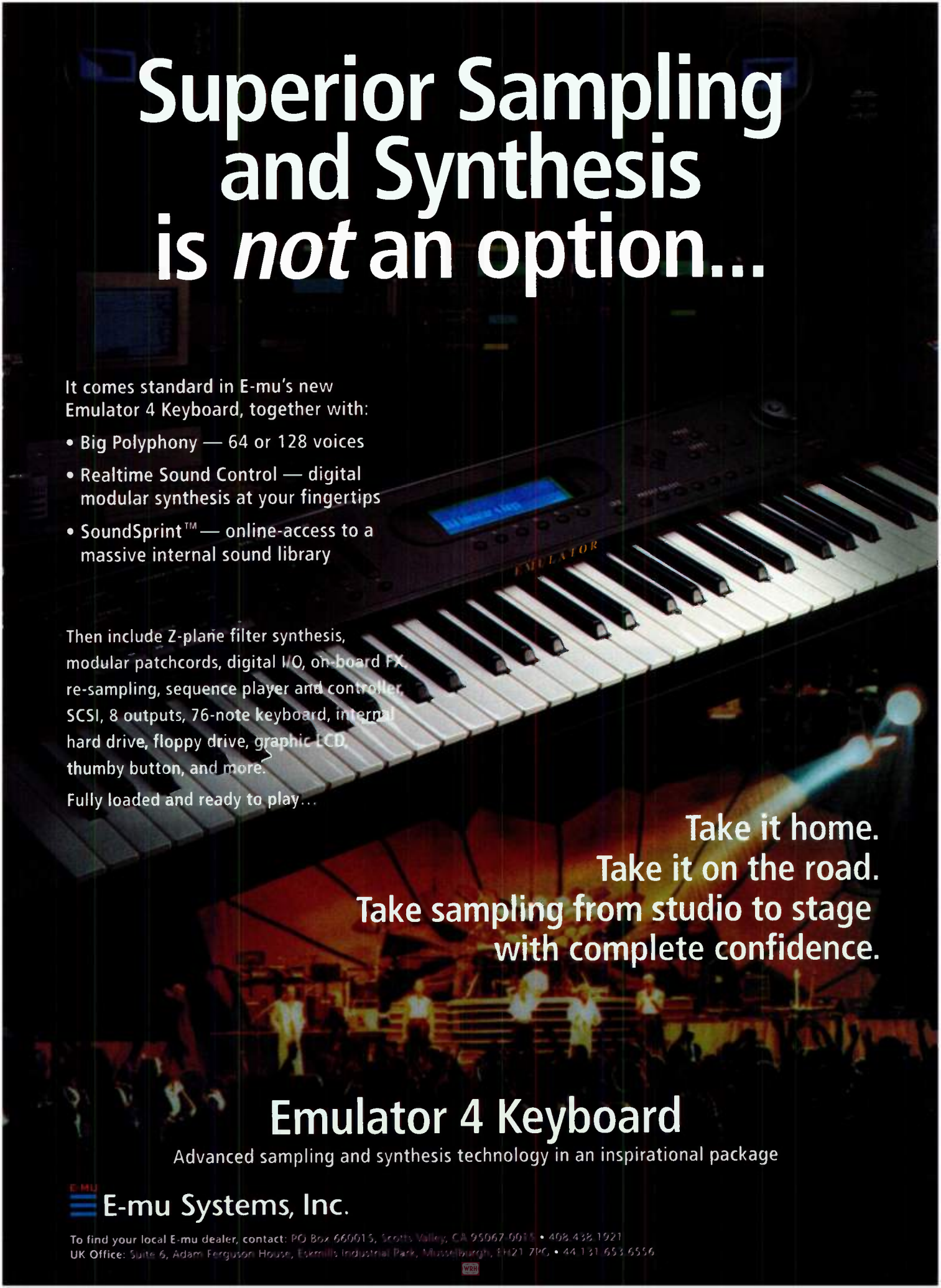
A PARTY PAID FOR THE PRODUCT

In 1990, I was the drummer for the Love Marines, a band on a budget determined to put out a cassette album. To keep expenses down, we recorded basic tracks in a church that cost $50 to rent for a day. For another nominal fee, we persuaded an engineer friend to cart over his mics, stands, and reel-to-reel 8-track deck. The final tracks were recorded and everything was mixed to DAT at a local 16-track studio. The artwork was reproduced on a color Xerox machine. We supplied the cassette J-cards and master DAT to Music Annex in Menlo Park, California, who turned the 500-cassette order around in a couple of weeks. Total cost for the shrink-wrapped product was $890.

Boldly, I paid with my credit card, convinced we would soon make the money back. For our album-release party we rented a local playhouse on an off night for $50. We posted dozens of flyers announcing the party, got some free press in the local papers, and mailed more than 400 personal invitations (which included an order form for those unable to attend). The ticket price of $10 included not only admission to the show, but a copy of the cassette tape, a lyric sheet, and dessert.

We thought it was a great deal, and evidently, so did our friends. The room sold out (maximum occupancy was 115), and in one night we had put enough cash in our hands to pay off the credit card, the club, and a good portion of the amenities. We even walked away with some pocket change.

The secret, I think, was including a copy of the tape in the price of admission. It's not every night you go to a concert and come home with a "free" tape of the band.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Pro—which improves dynamic range and frequency response yet requires no decoding during playback—is becoming standard on top-of-the line cassette runs, but ask the manufacturer to make sure. Dolby B requires signal decoding on the playback deck, so consider your end users before committing to it. (Although Dolby C and S are superior to B, there hasn't yet been sufficient demand to prompt manufacturers to offer them.)

CD. On average, the recommended maximum play length for CDs is 74 minutes, with an absolute maximum of 80 (though even this can be stretched). But be warned: the further past the recommended maximum you go, the greater the risk of tracking errors. Also, some manufacturers charge extra for programs longer than, say, 65 minutes.

As for the number of tracks on a CD, the limit is 99. If you are releasing a sound-effects or sample library that contains more than 99 separate sounds, you can simply group related sounds on one track (e.g., ten piccolo snare hits on track 64). Although many CD players can't access them, there are also 99 possible *index marks* for each of the 99 tracks.

Vinyl. The practical maximum play time for a 12-inch LP is approximately 25 minutes per side, with eighteen to twenty minutes considered optimal. Recommended maximum for a 7-inch single is around four minutes, with the optimal time between three and three-and-a-half minutes. As with the CD format, the more you surpass optimal length, the greater the chances of tracking errors. In the case of LPs, this means that the phono stylus may pop out of the grooves. Unconventional mixes can exacerbate tracking problems. For example, kick drums and other bass elements should be mixed to the center, as an imbalance of low-frequency information on one side or the other can push the needle out of the groove.

Of the three formats, the vinyl disc not only has the most limitations, it is also the most difficult for the manufacturer to get right. Excessive bass and high volume levels cause the stylus to cut deeper, wider grooves during the mastering process, which takes up more space on the disc. In other words, if your bass-heavy master clocks in at 50 minutes total playing time, you could encounter problems. The engineer might have to reduce the bass and/or overall volume or leave an entire song off the record.

THE ARTWORK

Make no mistake, the way your album looks can have as much to do with its success as the way it sounds. Not surprisingly, costs for originating and reproducing a project's graphic elements can equal or exceed the cost of making the product itself. Of course, from a marketing perspective, the packaging *is* the product. "Image is everything,"

says Director of Marketing Tony van Veen at Disc Makers. "Whatever you do, don't underestimate the importance of packaging."

Graphics for your project can run the gamut from homemade to pro, depending on your preference and budget. Generally, black-and-white art is cheapest, followed by 2-color, with full-color being most expensive. But don't think you have to spend the most to get the strongest visual impact. A well-designed black-and-white package can be stunning, whereas poorly designed, full-color graphics can suck. The important thing is that the packaging be representative of the artist and/or appropriate to the music.

The extent of your involvement in the graphic elements of your project should be determined by how much you know and care about art and whether you're a hands-on type of person. Those who are clueless should either hire a local artist or entrust their project to a full-service manufacturer that offers in-house graphic design.

One advantage of doing it locally is quality control. That is, the more of the production you can finalize at home, the more certain you can be of how the final product will turn out and the easier it'll be to make changes. If you take this route, be sure to get the manufacturer's templates (also called *specifications*) for each format. These come either as hard copy or on a floppy disk and include dimensions for cassette J-cards, CD booklets and tray cards, LP and 7-inch jackets, and disc labels.

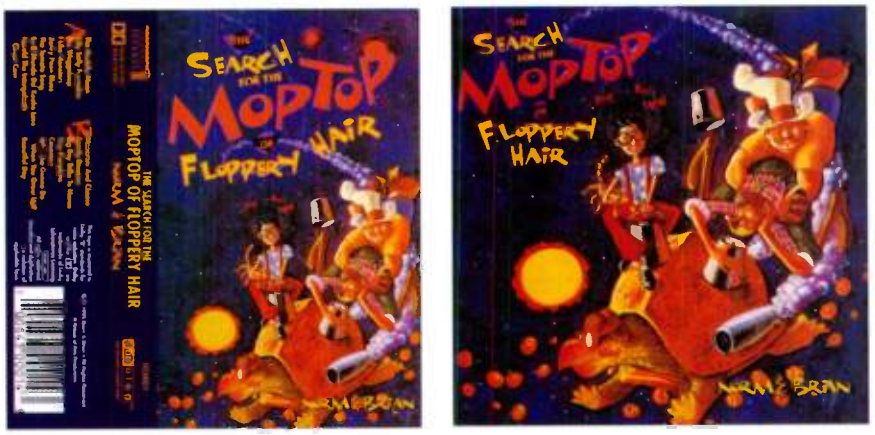

FIG. 2: If you are commissioning artwork for multiple formats, it's important to determine how the art will conform to different dimensions. Marek Reavis' original oil painting for the title shown was formatted for the rectangular shape of a cassette box. An allowance was made so the top portion could be cropped (without ruining the balance of the composition) to accommodate the square shape of a CD jewel box.

Make sure your artist and local printer follow the specifications exactly so the printed materials you ship to the manufacturer fit the CD jewel boxes and cassette Norelco boxes perfectly. Tolerances for automatic packing equipment are extremely close, so you have to be demanding and make sure you get what you're paying for. Take along a Norelco and a jewel box when you pick up your order, so you can see for yourself whether J-cards and CD inserts fit properly.

If your cover uses original artwork, such as a painting, you will need to have transparencies made. These are used to make the 4-color separations, halftones, or duotones that will be used to set up the printing press. Check your local yellow pages for custom photo labs and printers. When ordering, it's a good idea to get two of everything: one to send to the manufacturer and one for a backup. The backup also comes in handy when it's time to proof artwork. If your order includes cassette tapes as well as CDs, you also have to work with the artist in figuring out how to crop and title the artwork for both formats, as the shapes differ (see **Fig. 2**).

If you decide to let the manufacturer handle graphic design, be sure to provide only the materials the in-house artists need to produce your layouts. Don't send extra negatives or a bunch of photographs and ideas for them to choose from. Also, find out whether the artists prefer materials on paper or floppy disk. If you send computer files, make sure they're compatible with the manufacturer's computer platform and software. If you have special fonts, it's a good idea to include them in a font suitcase.

Because of differences in operating systems and software programs, computer files sometimes create more problems than they solve. "A sketch is usually more trouble free," says Jim Shelton, president of Europadisk. "It doesn't have to be elaborate, just as long as you address each element thoughtfully."

SHIPPING YOUR BABY

Don't let your finished master out the door until you have listened to it carefully from beginning to end and are absolutely sure it sounds the way you want it to. That means listening on different playback systems in multiple environments. "One of the dangers of the one-room desktop studio," says Europadisk's Shelton, "is tunnel vision. Try to get as many different perspectives as possible. Don't rely on just one set of speakers in a room."

When you're happy with your master, make a digital safety copy and listen carefully to that, too. If the master and clone don't sound identical, make another elsewhere. Finally, when it comes time to mail your master, be sure to mail the master, not the clone. (Hey, it happens!) In addition, be sure to fill out any order forms thoroughly, and double check your time logs and other project documentation. QCA owner Jim Boskin says, "Poor documentation is the single biggest cause of project delays."

Unless it's a CD-R, your master is susceptible to damage from electromagnetic fields. Keep it away from magnets (including speakers), motors, airport metal detectors, AC cables, etc. When shipping, clearly mark the package with a warning, such as, "Caution: Magnetic media. Keep away from electromagnetic fields." Also, be sure to store the safety copy in a safe place.

Even after taking these precautions, do not ship an uninsured master tape. (I usually insure mine for the entire cost of the production.) Moreover, don't rely on regular mail. Use a delivery service, such as UPS or Federal Express. This not only allows you to track the shipment, it gets your master to its destination sooner, thereby minimizing exposure to dangerous environments.

When you place your order, you'll be required to send payment for half of the project's estimated cost. That's generally how much the manufacturer needs up front before they'll begin filling your order. The balance is due when the finished product is ready to ship. Don't forget to ask whether shipping costs are extra.

THE CRITICAL REFERENCE

If your package deal doesn't include a CD reference disc, it's smart to spend the extra bucks to get one. A cassette reference isn't satisfactory, because the high noise floor can hide sonic blemishes, whereas a DAT reference often limits your auditioning options to studio environments. But a reference CD offers pristine audio and the ability to "proof" your album on different systems. (Everybody owns a CD player these days.) If possible, play the reference in a studio where you can compare it to your DAT safety copy. Then, play the disc on a boom box, a car CD deck, a friend's stereo system, and anywhere else that provides a "real world" listening environment. You can even go into a high-end-audio store, politely explain your situation, and ask whether or not you can hear the reference disc on a top-of-the-line system. Listen critically for distortion, phasing problems, signal drop-outs, and anything that doesn't sound right.

One advantage of a pro mastering facility is the engineer's experience at listening objectively to other people's tracks.

Don't be timid with the manufacturer. If *anything* is wrong with the sound of your reference disc, insist that the problem be corrected and the disc recut—that is, assuming the mistake is theirs, rather than yours. I've asked for a recut when a fifth of a second got chopped off the beginning of a song. My product specialist was incredulous at first, but when he and the engineer compared the reference disc to the original master, they heard the mistake and readily agreed to make a second disc at no extra charge. Be polite and fair, but stand your ground.

You should also be just as critical about the quality of your artwork and your liner notes. Proof everything

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meticulously. It's notoriously hard to spot errors in your own work, so engage the services of at least two other proofreaders. For artwork, make sure colors and crops are right, and don't hesitate to say if they aren't. This is not the time to be timid. Once you've okayed a proof, it's too late to make further changes without incurring substantial extra fees. To keep things on schedule, get your corrected proofs back to your manufacturer within 24 hours of receiving them. If there are no corrections, a phone call may suffice.

WHEN YOUR SHIP COMES IN

When boxes and boxes of your beautiful CDs (and/or cassettes) finally appear at your doorstep, be prepared for "overs" or "unders." That is, your order for 1,000 CDs may come in at 1,030 pieces or 975. Manufacturers always produce more units than ordered but remove rejects during quality control (where, say, every tenth piece is listened to). The price is then prorated—up to 10 percent in either direction—to account for the overs or unders.

Now the fun begins: release parties, promotion, and the quest for good distribution. A well-planned release party can launch your album as well as recoup a chunk of the money you've spent thus far. (For a first-person account of a successful release party, see the sidebar "A Party Paid for the Product.")

RECORD DISTRIBUTION

If you're itching to enter the national marketplace, a distributor is essential—unless you plan to drive across the U.S. and personally hawk your album to every small record shop. A solid relationship with a reputable distributor can spell success for your infant record company.

A distributor is a "go-between" business that buys your product wholesale, stocks it in their warehouse, and ships it to record stores as the orders come in. The only problem is, until you've created a demand for your product, most big distributors won't give you a second glance. Promotion, publicity,

steady gigs, great music, and word of mouth are what create the demand; distribution is what gives you access to record stores nationwide and even worldwide.

Actually, smaller, independent distributors are always on the lookout for new labels with good product, as their lifeblood depends on it. Do research to determine which indie distributors deal with your style of music. (For $4.95, Disc Makers will send you their *Directory of Independent Music Distributors.*) Send them your product and media kit; then follow up to find out who, if anyone, will be listening to your album. (This part of the process alone can take months.) If you're lucky enough to find distributors who believe in your music, they may be willing to carry your only offering. You're more likely to hold their interest, though, if your label generates several titles a year. By building a catalog, you demonstrate longevity—a key ingredient for any business.

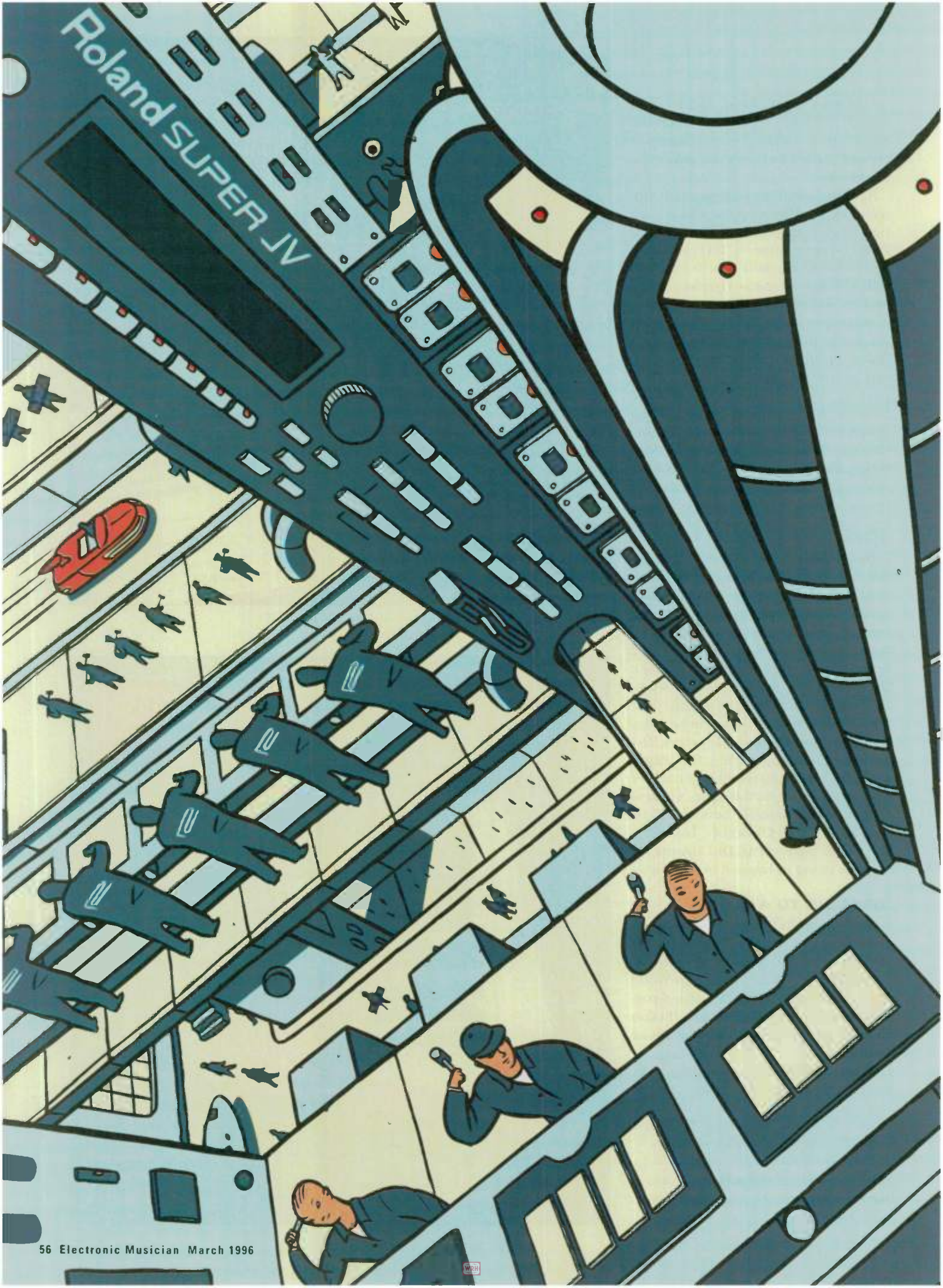
Don't think your prayers are all answered, though, when distributor orders start coming in. Initial orders are small and won't get bigger until sales heat up. Also, distributors will seek long payment terms, and they may insist on being able to return unsold product. Even when you do see money, it won't be as much as you make selling your album hand to hand. Remember, distributors buy at *wholesale* prices. Depending on the packaging, full-length cassettes will bring $4.00 to $5.50 per unit and LPs about the same, whereas CDs usually wholesale between $7.00 and $8.50 each. Obviously, volume is the key to big returns. Did anyone say this was going to happen overnight?

SPINNING TO A CLOSE

If you've gotten this far, you certainly possess one of the key ingredients for success in the independent music business: patience. "Don't rush!" says World Records Group's Stone. "Educated consumers are the best customers. It takes time for people to learn what you have to offer."

Along with taking your time, take pride in your accomplishment. Releasing your own album is not only a lot of work, it's an act of courage, faith, and self-reliance. It's also a lot of fun.

EM *Assistant Editor* **Brian Knave** *believes in the American way. He also believes in the Easter Bunny.*


Roland SUPER JV

Check out these blueprints for hammering out soundscapes with the JV-1080.

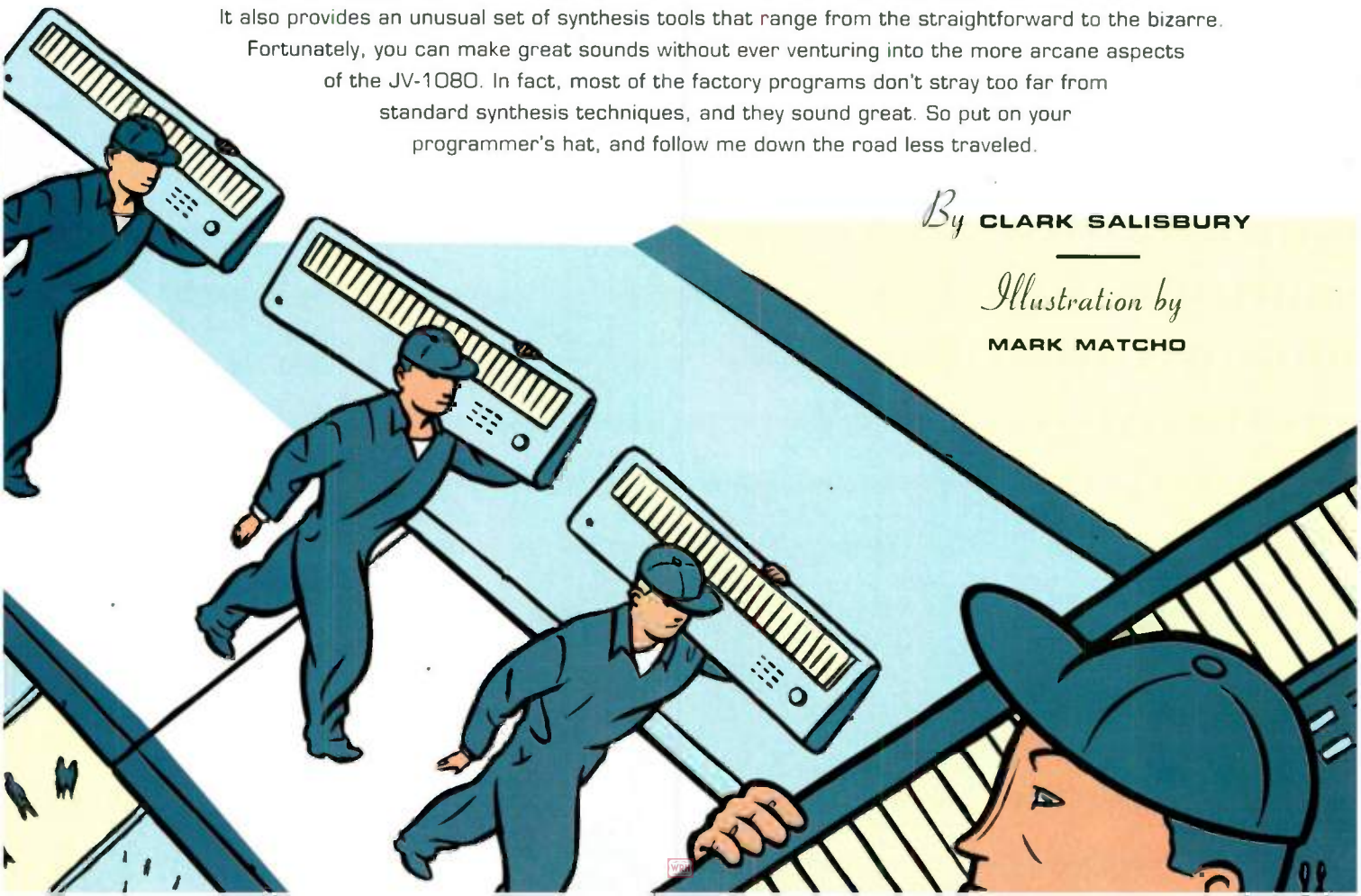
Master CLASS

Programming the ROLAND SUPER JV

The Roland JV-1080 and the XP-50 (the keyboard version) are the latest in a long line of popular synthesizers from one of the most well-respected manufacturers in the business. Tracing their ancestry directly back to the venerable D-50, these synths offer 64-voice polyphony, 16-part multitimbral operation, and an expandable architecture that accommodates plug-in boards with genre-specific sounds, such as vintage synths, techno/hip hop, world (ethnic), and orchestral. It also provides an unusual set of synthesis tools that range from the straightforward to the bizarre. Fortunately, you can make great sounds without ever venturing into the more arcane aspects of the JV-1080. In fact, most of the factory programs don't stray too far from standard synthesis techniques, and they sound great. So put on your programmer's hat, and follow me down the road less traveled.

By CLARK SALISBURY

Illustration by MARK MATCHO



Two Studio Veterans Team Up.

Ed Cherney and the AT4033

Grammy-award winning recording engineer and producer Ed Cherney has worked with some of the most talented people in the business. Bonnie Raitt, Eric Clapton, Little Feat, Elton John, and The Rolling Stones just to name a few. So it was inevitable that he would eventually work with one of the finest microphones. The AT4033.

Here's what Ed had to say about it:

"When I first used the 4033, I was working on a ballad with singer Jann Arden. But I'd always had trouble finding the right microphone to handle the level she sings at in choruses as opposed to lower volumes in the verses. *Until I tried the 4033.*"

"I just put it up with no compression, no EQ, and had her sing into it. And I mean, *it was right there.* The mic handled everything, stayed clear and open all the way through, and ended up sounding great."

For Ed and the AT4033, it sounds like the beginning of a long, successful partnership. But what about you? Just call, write, or fax for details on how you can team up with the AT4033.

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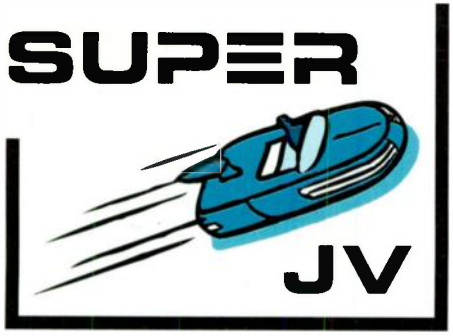

PREPARATION

At the bottom of the JV-1080's hierarchy is the Tone, which is a complete synthesizer voice. Up to four Tones can be layered to form a Patch, the basic playable element. Patches are selected by pressing the Patch button and turning the Value dial or pressing the Inc/Dec buttons. Of course, each layered Tone cuts the polyphony in half; for example, a Patch with two layered Tones can play 32 notes at once. A Performance is a multitimbral combination of up to sixteen Patches, which are assigned to Parts within the Performance. Performances are selected by pressing the Perform button and turning the Value dial or pressing the Inc/Dec buttons.

We will use several Patches and Performances as starting points for our explorations. These sounds are all from the preset ROM banks, so the exact configuration of your unit doesn't matter. To call up a preset sound, press the Preset button and one of the Bank buttons (A, B, C, or D).

The front panel reveals how many Tones are used in a given Patch: the Tone Switch buttons (which are also the first four Part Switch/Select buttons located under the display) represent the four available Tones. If a Tone Switch button's LED is lit, the associated Tone is used in the Patch. In addition, an individual Tone can be turned on or off simply by tapping its Tone Switch button.

Interestingly, Tones that aren't used in a given Patch can contain useful data. For example, the Patch A:001, "64voicePiano," uses a single Tone (Tone 2) to produce its sound. However, the unused Tones contain related sounds. In this Patch, turn on Tone 1 by pressing Tone Switch 1; it contains a piano sound with a Velocity-sensitive filter. (This may be easier to hear if you temporarily turn off Tone 2.)

By itself, this Tone doesn't amount to much, but it can be combined with Tone 2 to add some thickness to the Patch. In addition, Tones 3 and 4 contain different piano sounds. Either of these Tones can be used by itself or combined with the other Tones in the Patch to produce a variety of piano sounds.

Once you have selected a Patch or Performance, it's time to enter Edit mode by pressing the Parameter button. The eight buttons beneath the display serve several functions: each one accesses a related set of parameters (called a Menu) in Edit mode, as indicated by the color-coded labels beneath them. (Patch Edit labels are orange, Performance Edit labels are blue, and System Edit labels are gray.)

After selecting a menu, you see several individual parameters in the display. If the parameter you want is visible, navigate to it by pressing the right- or left-arrow buttons. In most menus, there are up and down arrows in the left portion of the display; you can press these arrow buttons to access additional pages of parameters. Once you have selected the desired parameter, you can change its value by turning the Value dial or pressing the Inc/Dec buttons.

Once you are in Patch Edit mode and have entered one of the menus, you can press the Parameter button again, which turns off its LED. At this point, you are still in Edit mode, but you can now turn Tones on and off by pressing the corresponding Tone Switch buttons and select a Tone for editing by pressing the appropriate Tone Select button. To select an edit menu, hold the Shift button and press the right- or left-arrow button until the desired menu appears.

This procedure also works in Performance Edit mode. In this case, however, all eight Part Switch/Select buttons are used to select the desired Part within the Performance. An extra button toggles these eight buttons between selecting Parts 1 through 8 and Parts 9 through 16.

STRUCTURE INSTRUCTION

If you spend some time turning Tones on and off, looking for gems that might be lurking within the Patches, you may run across an anomaly. There are a few Patches that change completely when you turn off one of the Tones.

For example, select Patch B:057, "Velo Tekno 2," which uses Tones 3 and 4. If you turn either of them off, the resulting sound doesn't remotely resemble the original. This is probably easiest to hear if you turn the effects off. Hit the Effects On/Off button and press the Select button directly underneath any occurrences of the word *on* in the display. Finally, hit the Effects On/Off button again to return to the Patch Play display.

Listen to each of the Tones individually. Tone 3 is not much more than a simple sine wave, and Tone 4 is just a higher-pitched version of the same thing, more or less. Welcome to the Bermuda Triangle of JV programming: the Structure.

The Tones in a Patch are paired up within one of ten available Structures. Tones 1 and 2 are combined in one Structure, and Tones 3 and 4 are combined in another Structure. Of the ten Structures, only the first two actually layer the two Tones. In the other eight Structures, the Tones tend to interact in complex and sometimes unpredictable ways.

In Structure 1, the two Tones are fully independent (see **Fig. 1**). Each Tone consists of a Wave (sample), which is routed through a Time Variant Filter (TVF) and Time Variant Amplifier (TVA). This is the Structure to use if you want each Tone to behave as a separate synthesizer voice.

In Structure 2, the Waves maintain

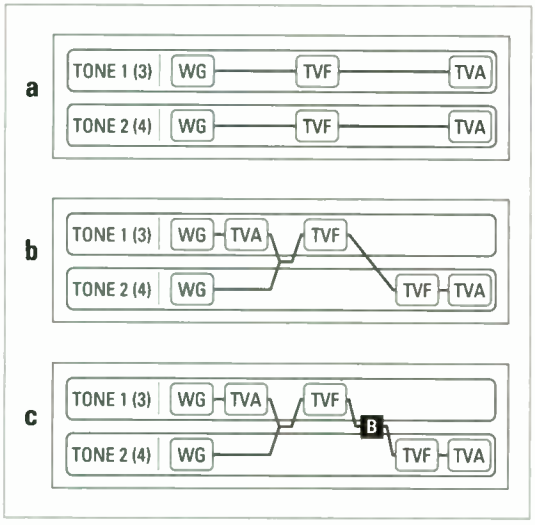

FIG. 1: Structure 1 (a) keeps both Tones completely separate, but Structure 2 (b) mixes the Waves and sends them through both filters in series. Structure 4 (c) is similar to Structure 2, but it places the Booster between the filters.

their independence, but each Tone no longer gets its own TVF and TVA (see **Fig. 1**). Instead, the Waves are mixed—the balance is controlled by Tone 1's TVA—and routed through both TVFs, which are connected in series. The resulting signal then passes through a final TVA, where the overall dynamics are controlled.

Structure 2 lets you apply two filters to the same signal. Both filters might be set to the same type, such as LPF (lowpass filter), yielding a kind of high-powered "super filter." Alternatively, you can create filter curves with two resonant peaks or combine two different filter types (such as highpass and lowpass) to produce unusual response curves.

Although Structures 1 and 2 are fairly straightforward, the same cannot be said for Structures 3 through 10. In these Structures, the Waves in a Tone pair interact with sometimes surprising results.

The behavior of Structures 3 and 4 can be difficult to grasp, and the manual is a bit terse on the subject. However, I've spent some time experimenting with them, and I've come up with a model that may or may not be technically accurate, but it produces predictable results.

Basically, Structures 3 and 4 use Wave 2 to modulate Wave 1's DC offset. In other words, as Wave 2's amplitude increases, Wave 1 is offset from 0 (see **Fig. 2**). By itself, this might not produce spectacular effects, but the resulting signal is then routed through the Booster. The Booster amplifies a Wave and then clips the Wave's peaks (see **Fig. 3**). Only Structures 3 and 4 use the Booster, and the only real difference between them is that the Booster is placed ahead of TVF 1 in Structure 3 and after TVF 1 in Structure 4.

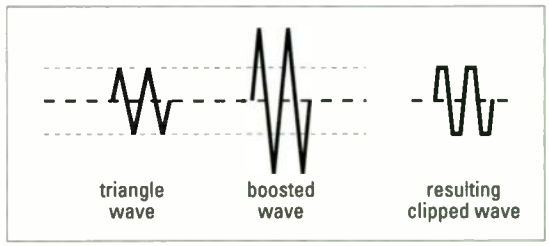

FIG. 3: The Booster increases the amplitude of a Wave and clips the peaks, which changes the harmonic spectrum.

Structures 5 through 10 use a ring modulator to produce their effects. A ring modulator accepts two input signals and produces an output signal consisting of the sum and difference frequencies that are generated from the frequencies of the input signals. Ring modulators are great for producing harmonics that seem unrelated to the original input signals. The classic applications for ring modulation are bell-like and metallic timbres.

Although the manual for the JV-1080 doesn't reveal much about the behavior of the ring modulator, a little experimentation shows it to be modeled after a DC-coupled ring modulator. In this design, some of the original input frequencies, as well as the sum and difference frequencies, are present at the output. (In AC-coupled ring modulators, the input frequencies are suppressed.) In addition, if one of the input Waves is in the subaudio range, the ring modulator can act as a TVA, with the subaudio Wave supplying the control source.

By now, you might suspect that utilizing Structures 3 through 10 can be a complicated matter. Well, it can be. But there are some structured ways to approach the Structures; let's take a look at one or two.

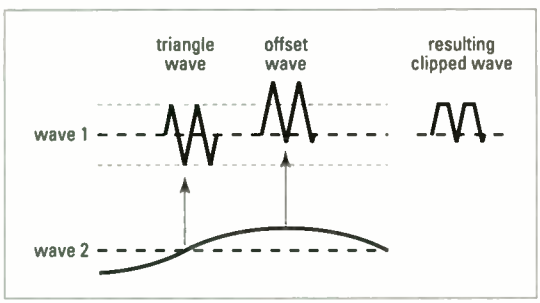

FIG. 2: In Structures 3 and 4, Wave 2 is used to modulate the DC offset of Wave 1. If the peaks of Wave 1 exceed their maximum possible amplitude, they are clipped, which alters the harmonic spectrum of the Wave.

A STRUCTURED APPROACH

To begin, select any Patch and initialize it by pressing Utility, scrolling to Initialize with the arrow buttons, and pressing Enter twice. (Don't worry about erasing a Patch from memory; the initialized Patch isn't saved unless you say so. The original Patch can be restored simply by pressing the Exit button and reselecting the Patch.)

Press the Parameter button to enter Edit mode, and then press the Wave button to access the Wave menu. Select Wave Group Int-B with the Value dial or Inc/Dec buttons; then press the right arrow to navigate to the Number field and select Wave 046 (Sine). Next, press the TVA button and navigate to the V-Sens (Velocity-sensitivity) parameter. Set this value to 0; controlling the amplitude of each Tone is critical, so we don't want Velocity to modulate amplitude at this point.

Press the TVA button again, which jumps to the TVA envelope parameters at the bottom of the TVA menu. Set the value of T1 and T4 to 1. This eliminates the ticking sound that can occur as you play the keyboard, which is caused by exceedingly short envelope times.

Tone 2 should be identical to Tone 1 at this point. The quickest way to achieve this is to make a copy of Tone 1. Press the Utility button, navigate to Copy, and hit Enter. Move two locations to the right and hit the Inc button to select Tone 2 as the destination. Press Enter to make the copy; then hit Exit to return to Patch Parameter mode. Press the Parameter button to see there are now two active Tones as indicated by the LEDs for Tone Switches 1 and 2.

Hit the Parameter button again and press the Common button twice; this jumps to the last page of the Common menu, which is the Structure page. Press the Inc button twice to select Structure 3. Notice the dramatic change in the texture of the sound; this effect can be enhanced by increasing the Booster value.

Press the Parameter button once again; its LED should now be extinguished. (You're still in Edit mode, but it's easier to select the Tone you want to edit if you are not in Parameter mode.) Hold the Shift button and press the right-arrow button five times; this should take you to the Pitch menu.

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(Note: the Pitch button is five buttons to the right of the Common button.)

Now, vary the Coarse tune parameter for Tone 1 and listen to what happens. (You can vary the tuning for either Tone and get pretty much the same result; press the Tone Select 1 or 2 button to select the desired Tone.) You can create all sorts of unusual harmonics, depending on the pitch interval between the Tones. A little bit of experimentation reveals that perfect intervals (fourths, fifths, and octaves) produce the most sonorous effects, but using other intervals produces sounds with more exotic harmonic structures.

Set the Coarse tuning parameter for Tone 1 to +48; this will produce a bell-like texture. Next, hold the Shift button, press the right-arrow button twice to move to the TVA menu, and press the down-arrow button until you reach the last page, TVA Envelope. Set T2 to 70 and L2 and L3 each to 0; this will cause Wave 1 to slowly fade after each attack, which causes the sound to evolve from the metallic, bell-like timbre to a simple sine wave. This a good start for certain kinds of bell and electric-piano sounds.

Now, hold the Shift key and press the left-arrow button twice to reach the Pitch menu. With Tone 1 still selected for editing, navigate to the KeyFlw (Key Follow) parameter; the default value for this parameter is +100, which produces normal keyboard pitch tracking. Change the value to 0. Tone 1 now plays the same pitch for all of the keys.

This can produce a number of interesting textures. For example, set the Coarse parameter for Tone 1 to +28, and move back to the TVA menu (hold Shift and press the right-arrow button twice). Set T1 to 10 and T2 to 38, which produces an attack that might work to simulate an overblown-flute sound when incorporated in a larger Patch or Performance. The point is that you can use the TVA to shape the harmonic content of a Tone as well as to shape the dynamics.

We've been working with sine waves, which are the simplest waveforms. The results differ dramatically depending on the Waves you use. Things can become unpredictable in a hurry, which might be why Structures 3 through 10 are so seldom used in the average bank of JV-1080 Patches. Still, by applying these ideas in a logical manner, excellent results can be obtained.

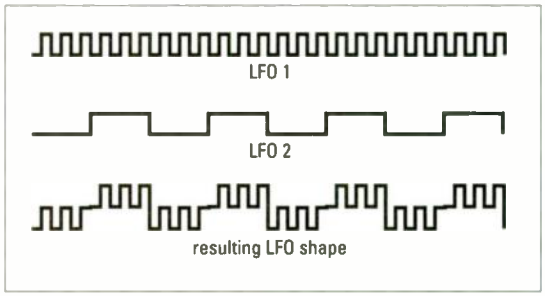

FIG. 4: The two LFOs can interact to produce some interesting effects. In this case, LFO 2 offsets LFO 1 to produce an alternating minor-third trill.

GETTING SUBSONIC

Subsonic Waves can be used as the modulator in Structures 3 and 4 to produce some rich, harmonically dynamic sounds. Some of these sounds might remind you of pulse-width modulation effects. Modulating the amplitude of Wave 1 with the output of Wave 2 can drive Wave 1 into clipping, which produces a more square-ish waveform. In other words, as the amplitude of Wave 2 increases, Wave 1 becomes increasingly clipped. The character of the resulting sound depends on the Waves and frequencies that are selected for Waves 1 and 2.

To hear this in action, start by initializing a Patch. Activate Tone 2 by pressing the Tone Switch 2 button—Tone 1 should already be activated—and select Structure 3 in the last page of the Common menu.

Now we need a Wave in the subaudio range. Several low-frequency Waves are provided, starting with Int-B 183 (Low Saw). The smoothest modulation is produced by the Low Sine Wave (Int-B 189) or the Low Triangle Wave (Int-B 190). You can use other Waves, such as the Low Saw or Low Square, but they generally produce a pop in the sound when they snap from one extreme to the other in their cycle. For now, assign Int-B 190 (Low Triangle) to Tone 2 (in the first page of the Wave menu), which will provide the modulator. Then, assign Wave Int-B 045 (Triangle) to Tone 1, which will act as the carrier.

At this point, you should be able to hear the effect I'm after, although it probably seems a bit hyper. We can mellow it out by slowing down the rate of change, which means reducing the frequency of Wave 2.

Navigate to the first page of the Pitch menu, and set the Coarse parameter for Tone 2 to approximately -18; this should slow things down a bit. However, the effect changes speed depending on what notes you play. This is because Wave 2 is tracking the keyboard, so its frequency increases as you play higher notes. You can stop Wave 2 from tracking the keyboard by setting the value for KeyFlw to 0.

Now you have the basic effect. Further tweaking can be applied in several areas. First, you can accentuate the effect by increasing the Booster value in the Struct page of the Common menu. Additional control can be obtained using the Gain parameter in the Wave

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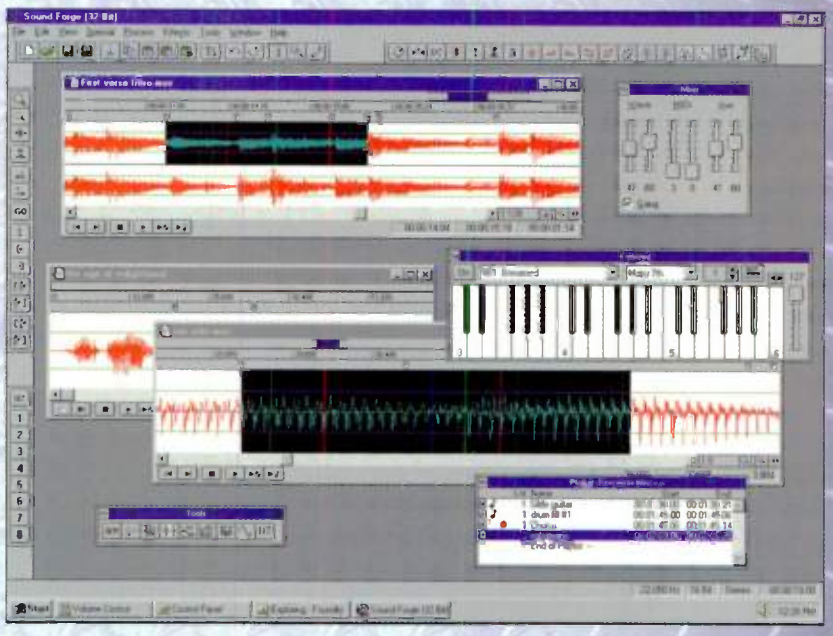

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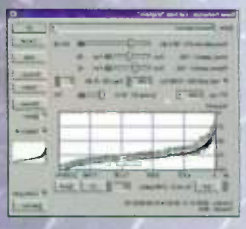

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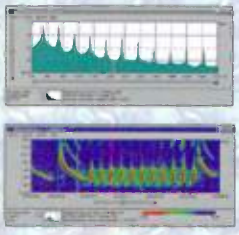

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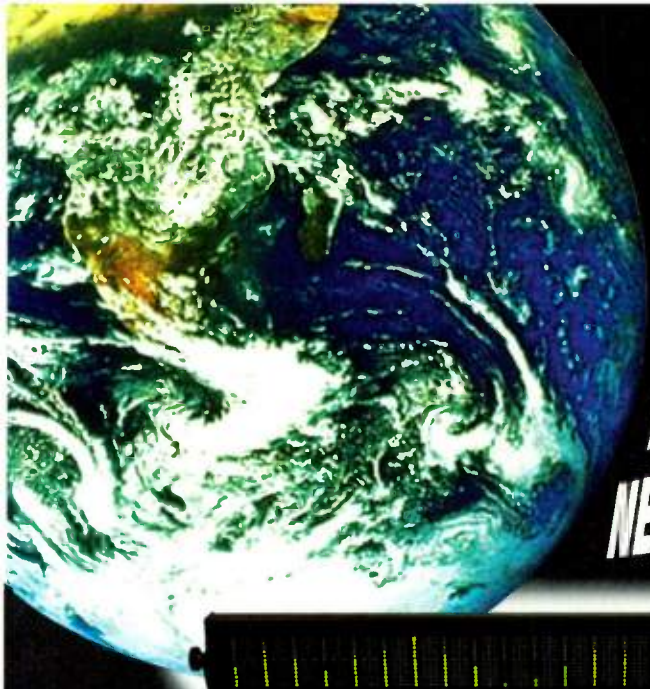

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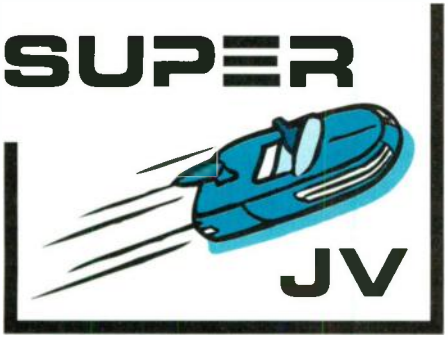

menu; this lets you adjust the level of each Wave individually, which the Booster does not permit. Also, check out how this sounds using other Waves. In particular, try changing the Wave used for Tone 1; this should provide a broad range of musically useful sounds.

A PLETHORA OF LFOS

LFO effects are another area in which the JV-1080 excels. There are two LFOs available for each Tone and several ways the two LFOs can be synchronized (including MIDI Clock), which allows a number of cool rhythmic effects.

For example, the Patch B:047, "Acid Line," makes good use of this device. LFO 1 produces a square wave that plays an eighth-note, minor-third trill. Meanwhile, LFO 2 (which also produces a square wave) plays another minor-third trill but at the rate of a dotted quarter note (see **Fig. 4**).

You can edit the rate of either LFO to create new rhythmic patterns. For

It's a Gift!

In this original Patch, Structure 4 is used with Tones 1 and 2 to produce an effect like pulse-width modulation (see Fig. 1 in main text). This also makes it possible to apply both highpass and lowpass filters to the same signal. Structure 1 is used with Tones 3 and 4. LFOs are used extensively in Tone 3 (to produce an arpeggiated figure) and Tone 4 (to produce automated panning). You will have to hold a key down for a while to hear these effects. Also, you should note the use of the pitch envelope in Tone 4 to force the assigned bass wave to play outside its preset range.

The mod wheel can be used to control the balance between the first and second pairs of Tones. Pushing it forward decreases the level of TVA 3 and 4 while slightly increasing the level of TVA 2, which increases the overall level of this pair due to the nature of Structure 4. In addition, the mod wheel controls both filter cutoff and resonance; in its extreme forward position, the sound takes on an analog-synth texture.

COMMON MENU

PATCH NAME
Structures

PATCH COMMON	
Level	127
Pan	0
Analog Feel	30
Octave	0
Stretch	OFF
Priority	LAST
Velocity Range	OFF
efault Tempo	120

VELOCITY	Lower	Upper	X-Fade
TONE 1	1	127	0
TONE 2	1	127	0
TONE 3	1	127	0
TONE 4	1	127	0

KEY RANGE	Lower	Upper
TONE 1	C-1	G9
TONE 2	C-1	G9
TONE 3	C-1	G9
ONE 4	C-1	G9

STRUCT	Struct	Booster
TONE 1 & 2	4	+18
TONE 3 & 4	1	n/a

EFFECTS MENU

OUTPUT	Output	Assign	Chorus	Reverb
TONE 1	n/a	n/a	n/a	n/a
TONE 2	MIX	127	94	0
TONE 3	EFX	96	50	60
TONE 4	EFX	127	40	0

PATCH EFX TYPE	
Type	01:STEREO-EQ

PATCH EFX PRM	
LowFreq	400
LowGain	+10
Hi Freq	8000
Hi Gain	+15
P1 Freq	500
P1 Q	0.5
P1 Gain	+15
2 Freq	4000
P2 Q	9.0
P2 Gain	+6
Level	127

PATCH EFX OUT	
Output	MIX
Assign	127
Chorus	0
Reverb	80

PATCH EFX CTRL	
Level	OFF:0
- - - -	OFF:0

PATCH CHORUS	
Rat	40
Dpt	22
Dly	40
Fbk	0
Level	127
Output	MIX+REV

example, set the rate of Tone 1's LFO 2 to 192 to get more frequent pitch changes. (This parameter is on the third page of the LFO menu.) You can also edit the pitch of either LFO to create new intervals. For example, set the Pitch of Tone 1's LFO 1 to -24 and LFO 2 to +24, which plays arpeggios based on a perfect fourth. The master clock for all LFOs with their External Sync parameter set to Clock is controlled with the Default Tempo parameter in the fourth page of the Common menu.

As long as you're messing around with the LFOs in "Acid Line," note that they are modulating not only pitch but the TVF, TVA, and pan position. And if you haven't checked out what you can do with MIDI-synchronized LFOs, you're in for a treat. The next time you're sequencing, set the JV-1080 to sync to MIDI Clock from your sequencer: press System and then MIDI; then navigate to the first page and set the Clock parameter to MIDI.

PATCH REVERB	
Type	HALL1
Time	85
Lev	127
Fbk	0
HF damp	BYPASS

CONTROL MENU KEY MODE & BENDER	
Assign	POLY
Legato	OFF
Bend Renge	-2:+2

PORTAMENTO	
Sw	Off
Tm	n/a
Mode	n/a
Type	n/a
Start	n/a

RX SWITCH	Volume	Pan	Bender
TONE 1	ON	CONT	ON
TONE 2	ON	CONT	ON
TONE 3	ON	CONT	ON
TONE 4	ON	CONT	ON

DAMPER	Hold-1 Switch	Redamper
TONE 1	ON	OFF
TONE 2	ON	OFF
TONE 3	ON	OFF
TONE 4	ON	OFF

PEAK & HOLD	
EfxCtrl	OFF
Ctrl 1	OFF
Ctrl 2	OFF
Ctrl 3	OFF

CONTROL SOURCE	
Control 2	SYS-CTRL1
Control 3	YS-CTRL2

CONTROL1 MODULATION (Destination:Depth)	
TONE 1	RES:+48 | OFF:0 | OFF:0 | OFF:0
TONE 2	CUT:-15 | RES:+24 | LEV:+6 | OFF:0
TONE 3	LEV:-60 | OFF:0 | OFF:0 | OFF:0
TONE 4	LEV:-60 | OFF:0 | OFF:0 | OFF:0

CONTROL2 SYS-CTRL1 (Destination:Depth)	
TONE 1	PL2:+14 | OFF:0 | OFF:0 | OFF:0
TONE 2	OFF:0 | OFF:0 | OFF:0 | OFF:0
TONE 3	OFF:0 | OFF:0 | OFF:0 | OFF:0
TONE 4	PL2:+17 | OFF:0 | OFF:0 OFF:0

CONTROL3 SYS-CTRL2 (Destination:Depth)	
TONE 1	LEV:+20 | OFF:0 | OFF:0 | OFF:0
TONE 2	LEV:+20 | OFF:0 | OFF:0 | OFF:0
TONE 3	LEV:+20 | OFF:0 | OFF:0 | OFF:0
TONE 4	LEV:+20 | OFF:0 | OFF:0 | OFF:0

WAVE MENU WAVE	Group	Number
TONE 1	INT-B	046 (Sine)
TONE 2	INT-B	190 (Low Triangle)
TONE 3	INT-A	052 (Nylon Gtr A)
TONE 4	INT-A	130 (Fretless A)

WAVE	Gain	Switch
TONE 1	+12	ON
TONE 2	+6	ON
TONE 3	0	ON
TONE 4	0	ON

FXM	Switch	Color	Depth
TONE 1	OFF	n/a	n/a
TONE 2	OFF	n/a	n/a
TONE 3	OFF	n/a	n/a
TONE 4	OFF	n/a	n/a

TONE DELAY	Mode	Time
TONE 1	NORMAL	0
TONE 2	NORMA	0
TONE 3	NORMAL	0
TONE 4	NORMAL	0

LFO MENU LFO 1	Form	KeyTrig	Rate	ExtSync
TONE 1	TRI	OFF	384	CLOCK
TONE 2	TRI	OFF	100	OFF
TONE 3	SQR	ON	96	CLOCK
TONE 4	TRP	ON	64	CLOCK

LFO 1	Mode	Delay	Fade	Offset
TONE 1	ON-IN	0	0	0
TONE 2	ON-IN	0	0	0
TONE 3	ON-IN	66	0	0
TONE 4	ON-IN	94	0	0

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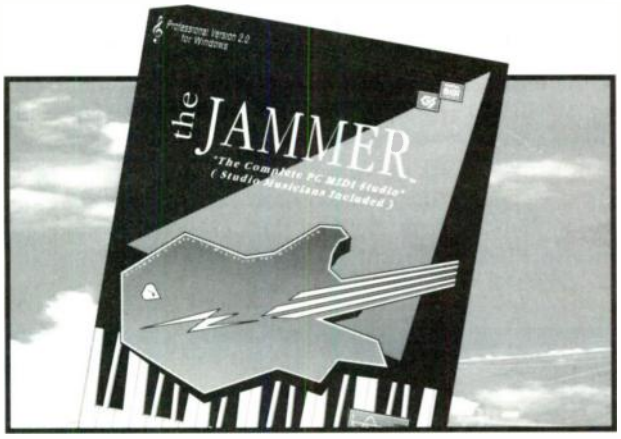

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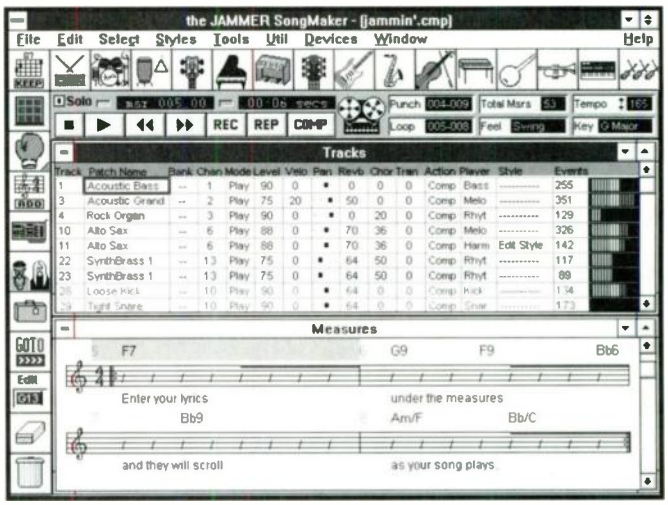

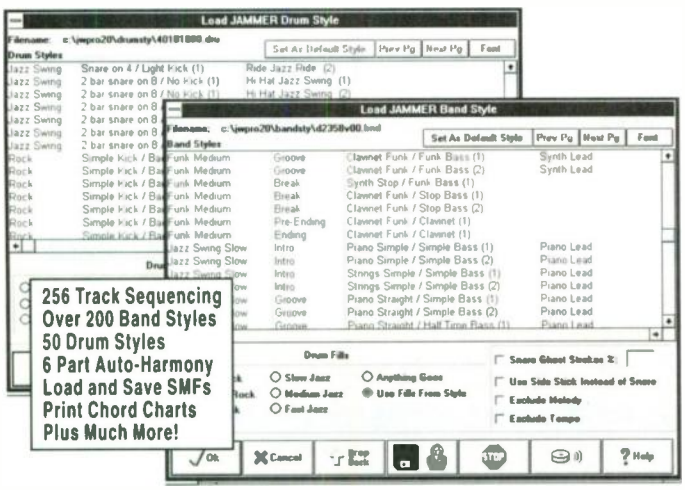

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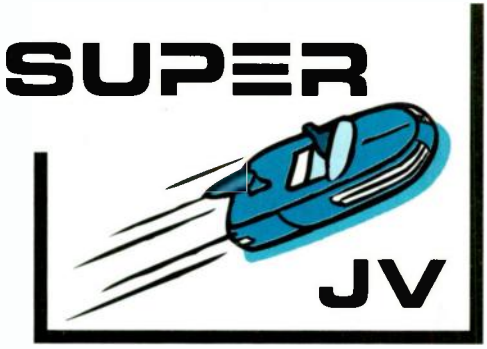

The obvious application is to use the SQR or S&H LFO waveforms to control the pitch, TVF, and/or TVA, producing synchronized rhythmic pulses.

In addition, don't overlook the less dramatic applications of the LFO, such as vibrato. Synchronizing a sound's vibrato rate to the tempo of the music is one of those subtle effects that can kick butt under the right circumstances.

EFFECTIVE EFFECTS

The JV-1080 includes lots of high-quality digital effects, along with a very flexible effects-routing scheme. Routing the effects to achieve a particular goal can be confusing, but it's not so bad once you know your way around. Note that the EFX section offers the main effects but reverb and chorus are provided separately.

Once again, start by initializing a Patch. Make sure Tone 1 is selected for editing, and then press the Parameter button, followed by the Effects button.

LFO 2	Form	KeyTrig	Rate	ExtSync
TONE 1	TRI	OFF	100	OFF
TONE 2	TRI	OFF	80	OFF
TONE 3	SQR	ON	32	CLOCK
TONE 4	SIN	ON	768	CLOCK

LFO 2	Mode	Delay	Fade	Offset
TONE 1	ON-IN	0	0	0
TONE 2	ON-IN	0		
TONE 3	ON-IN	66	0	0
TONE 4	ON-IN	94	0	0

LFO DEPTH 1:2	Pitch	TVF	TVA	Pan
TONE 1	0:0	0:0	0:0	+63:0
TONE 2	0:0	0:0	0:0	0:0
TONE 3	-28:+28	-52:+0	0:0	+42:0
TONE 4	0:0	0:0	-58:0	0:+63

PITCH MENU

PITCH	Coarse	Fine	Random	KeyFlw
TONE 1	-12	0	0	+100
TONE 2	-	0	0	0
TONE 3	-7	0	0	+100
TONE 4	-12	0	0	+100

PCH ENV DPT	Envelope Depth	Velocity Sens
TONE 1	0	n/a
TONE 2	0	n/a
TONE 3	-5	0
TONE 4	+12	0

PCH TIME ENV	V-TI	V-T4	Time Keyfollow
TONE 1	n/a	n/a	n/a
TONE 2	n/a	n/a	n/a
TONE 3	0	0	0
TONE 4	0	0	0

PCH ENVELOPE	T1	T2	T3	T4	L1	L2	L3	L4
TONE 1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
TONE 2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
TONE 3	0	86	0	127	+63	+63	0	0
TONE 4	0	14	0	127	+60	+63	+63	+63

TVF MENU

FILTER	Typ	Cut	Res	KeyFlw	Env Dpt
TONE 1	LPF	83	0	+100	-40
TONE 2	HP	40	32	0	0
TONE 3	LPF	127	60	+100	0
TONE 4	OFF	n/a	n/a	+1	0

TVF VELOCITY	V-Sens	V-Curve	V-Resonance
TONE 1	-100	1	+18
TONE 2	0	1	0
TONE 3	0	1	0
TONE 4	n/a	1	0

TVF TIME ENV	V-TI	V-T4	Time Keyfollow
TONE 1	0	0	0
TONE 2	0	0	0
TONE 3	0	0	0
TONE 4	n/a	n/a	n/a

TVF ENVELOPE	T1	T2	T3	T4	L1	L2	L3	L4
TONE 1	45	78	70	3	75	0	35	0
TONE 2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
TONE 3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
TONE 4	n/a	n/	n/a	n/a	a	n/a	n/a	n/a

TVA MENU

TVA	Level	Pan	V-Sens	V-Curve
TONE 1	127	0	0	1
TONE 2	84		+100	1
TONE 3	127	L20	+100	3
TONE 4	12	0R	+100	1

BIAS	Bias	Point	Direction
TONE 1	0	n/a	n/a
ONE 2	0	n/a	n/a
TONE 3	0	n/a	n/a
TONE 4	0	n/a	n/a

PAN MODULATE	KeyFlw	Random	Alternate
TONE 1	n/a	n/a	n/a
TONE 2	0	40	0
TONE 3	0	0	0
TONE 4	0	0	0

TVA TIME ENV	V-TI	V-T4	Time Keyfollow
TONE 1	0	0	0
TONE 2	0	0	0
TONE 3	0	0	0
TONE 4	0	0	0

TVA ENVELOPE	T1	T2	T3	T4	L1	L2	L3
TONE 1	50	n/a	n/a	68	127	127	127
TONE 2	0	n/a	n/a	68	127	127	127
TONE 3	0	70	70	44	127	6	107
TONE 4	0	98	70	44	127	0	110

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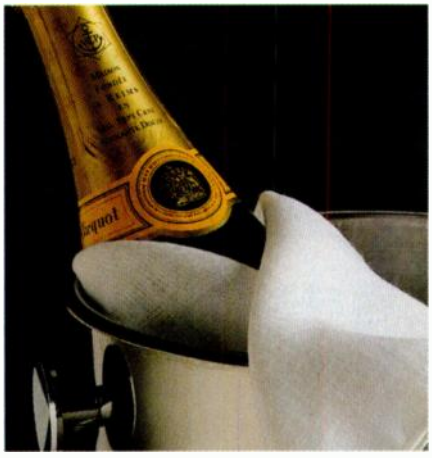

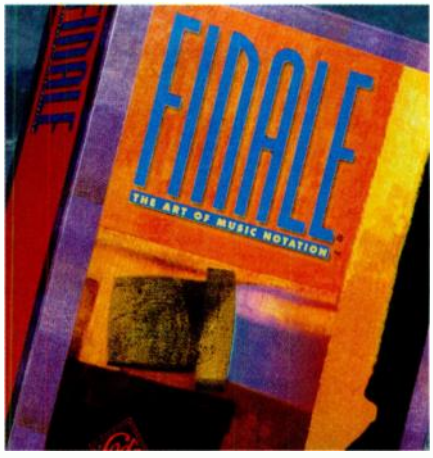

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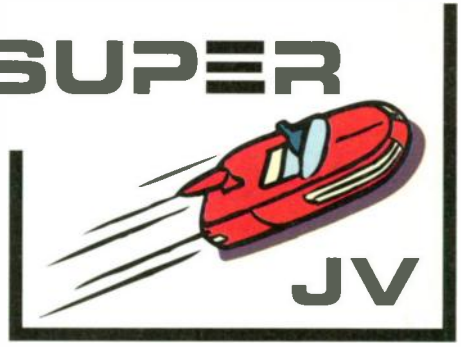

You should find yourself at the top of the Effects menu; if not, hold the Shift button and press the up-arrow button to jump there.

The Output parameter on the first page of this menu determines whether the output of the current Tone is routed to the EFX section or directly to the Mix, Output 1, or Output 2 stereo pairs. If you want to send a Tone to a single output, set the Output parameter to Mix, Output 1, or Output 2 (depending on which output pair you want to use) and set the level with the Assign parameter. Then use the Pan parameter in the TVA menu to determine at which output—left, right, or some mixture—the Tone actually appears.

Normally, you'll probably use the Mix or EFX output, as the reverb and chorus effects can't be routed to Output 1 or 2 and thus cannot be used on any Tones routed to those outputs. (On the other hand, the EFX section can be routed to Output 1 or 2.) When using the Mix or EFX outputs, you can add reverb and chorusing by increasing the value of the appropriate parameters in the Effects Output page. In addition, the EFX section includes sends to the chorus and reverb, providing another way to route a signal to these effects.

If a Tone needs no more than a little reverb and/or chorusing, simply assign it to the Mix out, which bypasses the EFX section entirely. Use the Assign parameter to determine how much dry signal appears at the Mix outputs and the Chorus and Reverb parameters to determine how much (if any) of the Tone's signal is sent to these effects. You'll probably also need to adjust the reverb and chorus levels. These parameters, as well as several others related to these effects, are found in the last two pages of the Effects menu.

If the Tone requires more processing than mere chorusing and reverb, set the Output parameter to EFX and use the Assign control to determine how much of the signal is sent to the EFX section. The EFX section provides 40 high-quality effects, including distortion, auto-wah, and rotary-speaker simulation.

If you use the EFX section, you still have decisions to make. For example, if you're using the EFX section to produce a distortion effect for an electric-guitar sound, you probably don't want to use the chorus and reverb sends on the Effects Output page, as they process the dry Tone before it's sent to the distortion effect. Instead, send to the reverb and chorus from the output of the EFX (located on the EFX Out page). This should provide a more natural-sounding guitar Patch.

Other cases are not so clear cut. For example, suppose you are designing a solo sound, and you want to use chorus and reverb, as well as one of the delays from the EFX section. Should you send from the EFX delay to the chorus and reverb, or should you add the chorusing and reverb at the main Output page? And don't forget that you can send to the reverb from the chorus, as well. (You can select Mix, Reverb, or Mix+Rev as the output destinations from the chorus.) If you get confused,

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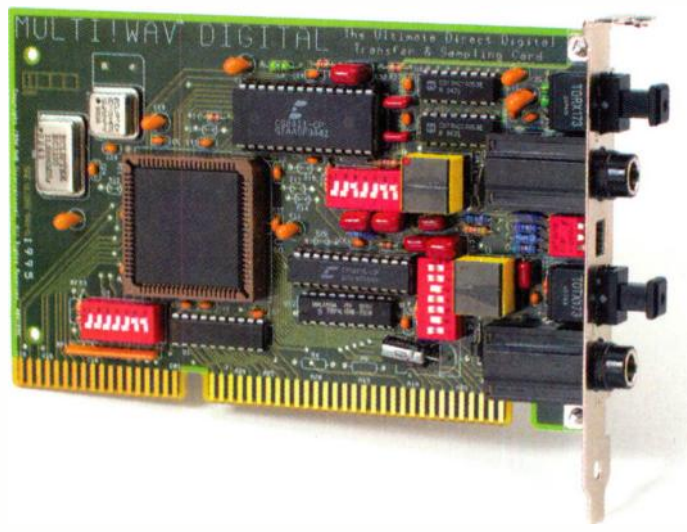

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the simple block diagrams in chapter 4 of the JV-1080 manual provide an excellent starting point for effects design.

EFFECTS IN PERFORMANCE

The effects possibilities are even more confusing in Performance mode. Of course, each Part can't have its own effect; no synth has that much processing power (at least, not yet). However, each Part does have its own routing.

Recall that each Tone in a Patch can be assigned to Mix, EFX, Output 1, or Output 2. Each Part in a Performance can be assigned to the same destinations. For example, if a Part is assigned to the Mix output, all the Tones in the Patch assigned to that Part are sent to the Mix output. The level at which they're sent is determined by the Assign parameter (along with the Chorus and Reverb parameters) in the same way that levels are set for individual Tones when editing Patch effects.

However, Performances offer an additional routing choice: Patch. If a Part's Output parameter is set to Patch, it derives its output settings from the Patch assigned to it. In other words, each Tone in a Patch assigned to that Part sends to each of the effects buses in the same amount and combination as it does in the Patch. For example, if the Patch has Tone 1 assigned to the EFX bus, Tone 2 assigned to the Mix bus, and Tones 3 and 4 assigned to Output 1, the Part that uses that Patch will have the same assignments, as long as the Part's Output parameter is set to Patch.

NAVIGATION SHORTCUTS

With the JV-1080's variety of modes, menus, pages, and programming functions, moving from point A to point B isn't always quick. However, a number of shortcuts can help you get where you're going pronto.

ACCELERATED SCROLLING

Press the Value dial while rotating to change values in larger increments. For example, parameters with a range of -100 to +100 scroll in tens. Holding the Shift button while rotating the dial has the same effect.

Hold the Shift button while pressing the Inc/ Dec buttons to scroll in larger increments.

Values automatically scroll if you hold down the Inc/Dec buttons. For hyperscrolling, hold the Inc/Dec buttons; then hold the other button.

Double-clicking on the Value dial toggles between the edited and programmed values of a parameter. The double-click rate must be pretty quick.

EXPRESS ROUTE

Hold the Shift key while pressing the left- or right-arrow buttons to move to the next menu. For example, select a Patch and hit the Parameter button. Now press one of the menu buttons. Press the Parameter button again; it's LED should extinguish. You can now use the Shift + left- or right-button combination to move to any editing menu. This lets you easily turn Tones on and off and select different Tones for editing by pressing the appropriate Tone Switch or Tone Select button without leaving the current edit page.

Hold the Shift button and press the up-arrow button to jump to the top of the current menu. Likewise, hold the Shift button and press the down-arrow button to jump to the bottom of the menu.

Tapping on the same menu button toggles between a pair of definable pages. For example, select a Patch, press the Parameter button, and hit one of the menu buttons. If you find yourself at the top of the selected menu, pressing the button again takes you to the bottom (and vice versa). If you are located somewhere in the middle of the menu, pressing the menu button toggles between the current location and the top or bottom of the menu; the direction of the move depends on how you arrived at the current location.

In a Performance, you can select different Parts by holding the Shift button and pressing the left- or right-arrow buttons. This is handy when you want to edit a Part from within a Performance.

GROUP EDITING

You can edit more than one Tone at a time, which is great for doing things like making a Patch brighter overall or changing the octave of a Patch. Within Edit mode (the Parameter button LED should be off), hold the Tone Select button for one of the Tones and press the Tone Select buttons for any Tones you wish to simultaneously edit. The LEDs for all selected Tones remain lit, and the JV-1080 display shows asterisks (*) to indicate selected Tones.

Any parameter changes you make in this mode will affect each selected Tone identically. For example, suppose you are simultaneously editing the Pitch Coarse parameter of two Tones, which are set to values of 0 and +12, respectively. If you increase the value by 1, one Tone will be set +1, and the other will be set to +13.

The first Tone you select becomes the primary Tone, and its number is then displayed in the various edit-menu pages. The displayed parameter values relate to this Tone only. Be cautious when editing in this way, because you'll be changing parameters you can't see.

While you're in an edit menu, press the Palette button to see a single parameter's value for all four Tones in a Patch or eight of the sixteen Patches that can be used in a Performance.

EDITING PATCHES FROM WITHIN A PERFORMANCE

You can edit a Patch from within a Performance. This makes it easier to tailor a Patch to a specific Performance, because you can hear the entire Performance while editing the Patch.

In Performance mode, select a Part to edit. Hold the Performance button and press the Patch button. Everything operates as if you were in Patch Edit mode, but you can hear the Patch in the context of the Performance.

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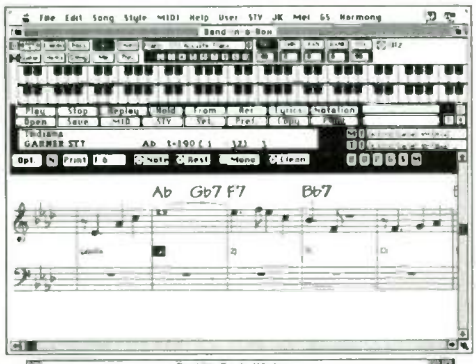

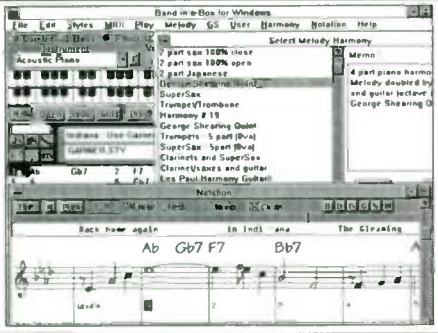

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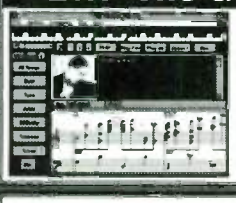

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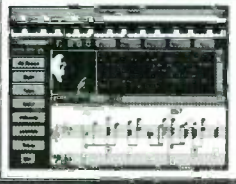

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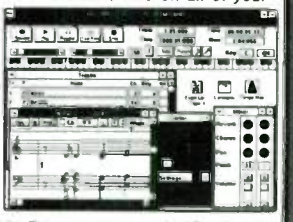

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This can quickly get confusing. It's quite possible that the effects in the Performance bear little or no resemblance to those used in any of the Patches assigned to the Performance Parts. Although a Part's effects routing might be identical to the routing used in its Patch, the actual effects used in the Performance might be completely different. So where do Performance effects come from?

The reverb and chorus effects are programmed as part of the Performance. However, the EFX parameters can be programmed as part of the Performance, or they can be borrowed from one of the Patches assigned to a Performance Part. For example, select Performance Preset A:20, "Heavy Metal." Press the Parameter button (its LED should be on), and then press the Effects button. Move to the Perform EFX Type page. The EFX Source is set to 5, which means that the source for the EFX parameters is Part 5, which happens to be using Patch B:003, "R&R Chunk."

If you select Patch B:003, "R&R Chunk," and check out its EFX Type page, you'll see that it's using effect 02:Overdrive. However, if you head back to the EFX setting for the Performance, the EFX Type is 10:Limiter. When the Performance is using a Part for its EFX settings, the display shows the effect assigned to the Performance, not necessarily the effect that's actually in use. In this case, the Performance uses the Overdrive effect as specified in Part 5's Patch.

You could use the Performance's EFX settings by changing the Source parameter to Perform (which stores the effects parameters with the Performance). But before you change the source parameter, check out what happens when you scroll through Source values 1 through 16 (which represent the sixteen possible Parts in a Performance) and play the Performance. Each number calls up a different EFX setting, as each of the sixteen Parts is given control of the EFX parameters.

This is particularly useful because more than one EFX setting is available within a Performance. Say you're working on a sequence that uses an organ Patch with a rotary-speaker effect during the verses and a distorted guitar during the bridge. Select your favorite organ with rotary effect and assign it to Part 1 of a Performance. Now, find the nastiest crunch guitar you can and assign it to Part 2 of the same Performance. (Make sure these Parts are set to different MIDI channels.) Save the Performance with Part 1 selected as the EFX Source (that is, the Source parameter on the Perform EFX Type page should be 1).

Tones that aren't used in a given Patch can contain useful data.

Record the organ and guitar parts into your sequencer as you normally would. Next, hit the System button and the MIDI button, and scroll to the second menu page, Sys-Exc MIDI. Set Tx.Edit to On. This sends any editing changes you make to the MIDI Out, which is one of the coolest features of the JV-1080.

Make sure the JV-1080's MIDI Out is connected to your sequencer's MIDI In and your organ/crunch-guitar Performance is selected. Hit the Parameter button, and then hit the Effects button. Navigate to the Perform EFX Type page and select the Source parameter; it should be set to 1, if everything has gone well.

Start your sequencer recording, and just before the guitar solo in the bridge, hit the Inc button, which sets the Source parameter to 2. This will load the distortion EFX settings from Part 2. Once the guitar has finished playing, switch the Source parameter back to 1, restoring the rotary effect for the organ. With the Tx.Edit parameter turned on, these changes will be recorded into your sequence, assuming your sequencer can record System Exclusive messages. This is a slick way to automate effects changes.

While we're on the subject, the same type of thing can be accomplished in a slightly more roundabout way, but with a lot more flexibility. While exploring the EFX Source parameter, you might notice that you can specify Parts that aren't used in the Performance.

For example, select Performance B:19, "Gospel Set." Hit the Parameter button and then the Effects button, and navigate to the Perform EFX Type page. Set the Source parameter to 7; this selects Part 7 as the EFX control source. Press the Part button (button 4), which lets you assign Patches to Parts. Next, press the Parameter, if this is necessary to turn its LED off. Make sure the 1-8/9-16 button's LED is off, and press Part Switch/Select button 7 to select Part 7. As you select different Patches for this Part, the EFX setup changes to match the Patch you select, even though the Patch isn't actually used in the Performance! You could use this feature to remotely select EFX effects by sending Program Changes to an unused Part in a Performance, as long as that Part is the Source for the EFX setup.

THE WRAP

Admittedly, our tour of the JV-1080 has left a few things out. Well, okay, it's left a lot of things out. However, I've tried to focus on some of the overlooked capabilities of this machine. Most folks don't need that much help with the more familiar programming tools available in the JV-1080. Also, it's easy to become complacent with such a compliant instrument. I hope some of these ideas might help start you down an unexplored path or two. And if you come up with any killer sounds or techniques, let me know.

Clark Salisbury *is sound designer and technician with Music & Sound Associates. His e-mail address is msaware@teleport.com.*
Thanks to Roland Product Specialist Doug Hanson and noted sound designer Andrew Schlesinger.

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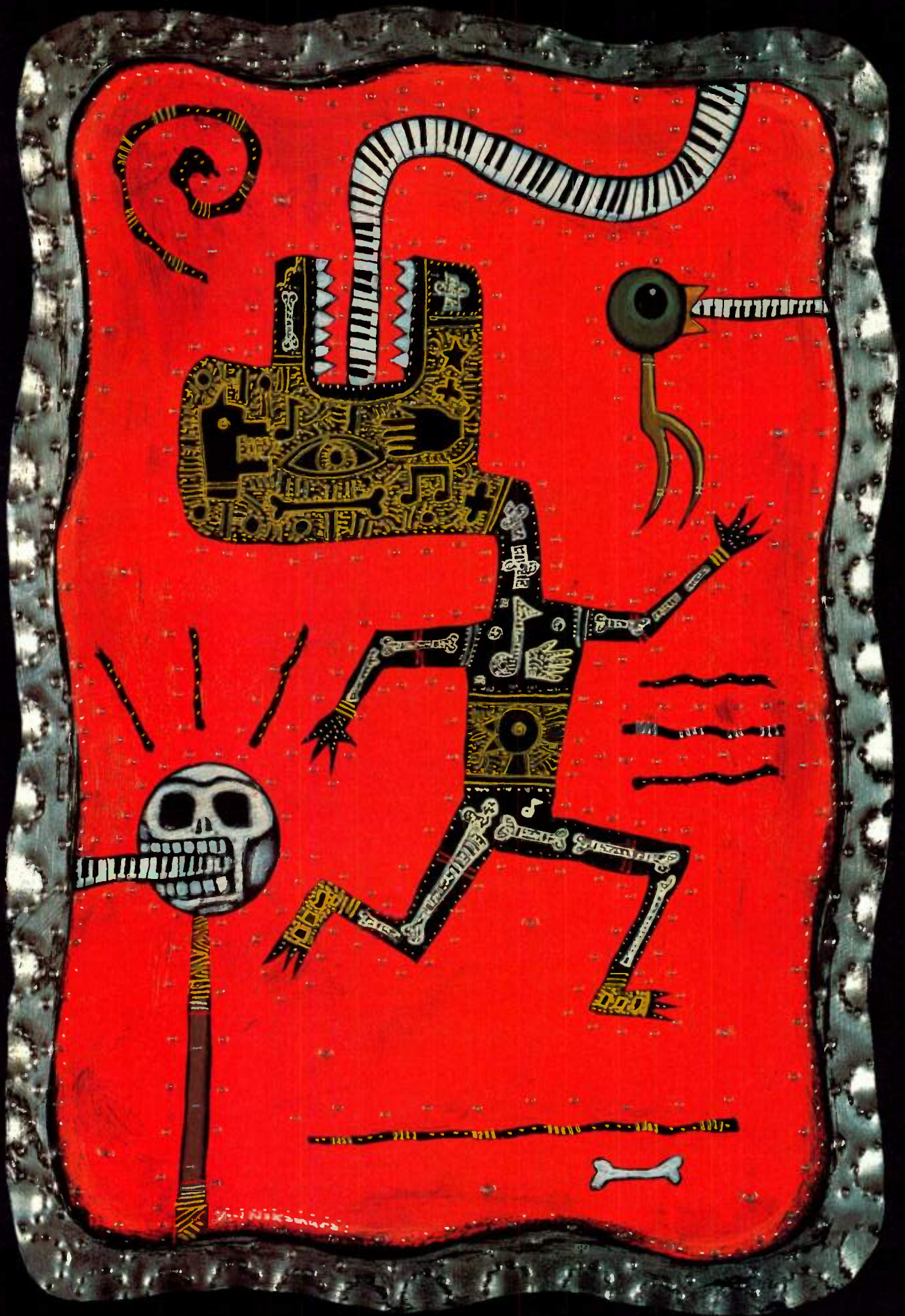


THE Natives ARE Restless

Extend your sampler's library with non-native samples.

By Jim Miller

SAMPLERS can record every sound imaginable—including the kitchen sink—and map them to MIDI notes so you can trigger them from a MIDI controller or sequencer. But it's not so easy to create a convincing musical instrument from a bunch of sampled notes. You can buy samples on audio CD, but you still have to record and loop them and program the appropriate parameters on your sampler.

As a result, most sampler manufacturers offer pre-recorded, looped samples for their products. In addition, several third-party developers offer machine-specific sample libraries. This is great as far as it goes, but what if you own a Roland sampler and you hear a killer sound on an Akai unit? Can you simply load that non-native (i.e., non-Roland) sound into your Roland machine without resampling it?

In the early days of commercial sampling, the simple answer was "no." Today, however, most samplers can import non-native samples and program data (such as envelope, LFO, and filter settings) from several popular models. Unfortunately, this spirit of collaboration doesn't necessarily mean that all samplers are now completely cross-compatible. For example, the precise hardware configuration varies from one sampler to another, so the imported program settings are usually approximations. This means that a particular sample/program sounds different in one machine as compared to another.

As a third-party sample developer, I wanted to investigate this matter more closely. I collected some popular samplers and a stack of sample CD-ROMs and conducted experiments that would reveal just how cross-compatible these mainstays of electronic music actually are.

Illustration by Joel Nakamura

THE Natives ARE Restless

Although no longer in production, Akai's S1000 remains popular. Its latest operating software allows it to import S3000 files.

THE SETUP

The samplers I included in my tests for this article were the Akai S2800 Studio and S1000 (with new operating software that allows it to import S3000 sounds), E-mu e64, Ensoniq ASR-10, Kurzweil K2000, Peavey DPM SP Plus, and Roland S-760.

All samples were imported from CD-ROM libraries. My test libraries included Akai's *CD3000 Sound Library;* Lightware's *Akai S1000 Series,* vols. 3, 4, and 6, and *CD3000 Series,* vol. 1 (distributed by InVision); E-mu's *EIIIXP Demo* and *EIIIX Sound Library,* vols. 5 and 8; InVision's *CDR-8 Orchestral Instruments* for Ensoniq ASR-10; and Roland's *Keyboards of the '60s and '70s,* vol. 2, *Africa* vol. 1, and *Rhythm Section,* vol. 1.

Interestingly, many samplers can read non-native sound data from a SCSI device but not from floppy disk. For example, the Akai S3000 can read only Akai-format floppies; all other formats must be transferred via SCSI. Similarly, the E-mu e64, Ensoniq ASR-10, and Roland S-760 can only read floppies in their native formats. The Peavey DPM SP Plus can read Akai floppies, and the Kurzweil K2000 can read all floppy formats except Roland's.

TESTING, 1, 2, 3

At first, it seemed like a daunting task: keeping track of which machines read which formats, compiling the results of each conversion, and evaluating the sound produced by each unit. However, I eventually set up a matrix that allowed me to test each machine, compare the respective results, and report my findings for this article.

During these tests, I imported a representative selection of samples and programs from each compatible format and checked for problems, such as bad loops and incorrect (or nonexistent) Velocity switching. I also evaluated the sound quality of each set of samples and compared them to the original native-format versions. In addition, I timed how long it took each machine to import and convert a set of samples.

The timing test was somewhat problematic, as I didn't have one specific set of samples in all formats. However, I simply selected a set of samples in each format that was approximately 2 MB, which got me in the ballpark when comparing load and conversion times. All samples were accessed from a single-speed CD Technology CD-ROM drive, which provided worst-case load times.

For the final results, all load times were averaged, as different 2 MB files may contain different numbers of samples, programs and parameters that must be converted. For example, the K2000 took just 33 seconds to convert one 2 MB S3000 file, yet another file of the same size took just over a minute.

There are now literally tens of thousands of sample files for each format, and it would be nearly impossible for one person to load every sound in each format into every sampler and compare the results. Given the limited amount of time I had for this project, I believe I was able to evaluate each unit's ability to import non-native formats. This doesn't mean that you won't find some files that refuse to load, become corrupted in the conversion process, or exhibit such problems as out-of-tune samples, buzzing and clicking loops, etc. None of the manufacturers claim the process is perfect.

The Akai S1000 offers an astounding eight loops per sample, which simply isn't going to work on anything other than an S1000. However, I've never programmed any sample with more than one loop, neither have I seen any samples that make use of this particular feature. If you need eight loops, you'd better stick with an S1000; even the current S3000 only provides four loops per sample.

Except for Roland, all the manufacturers represented in my tests appear to use standard delta-sigma analog-to-digital conversion. However, the S-700 series adds a proprietary emphasis/de-emphasis scheme to get the maximum sparkle out of samples while keeping noise under control. The effect is similar to what Dolby noise reduction does for analog tape recorders. As a result, some S-700 samples imported into other machines may sound just a bit brighter than samples in other formats.

Of course, brighter means better for many musicians, and they might actually welcome the additional crispness that certain Roland samples acquire

Akai's user-friendly S2800 uses the same sample, Program, and Volume architectures as the S3000. The Studio version includes a SCSI port and has more RAM than the basic S2800.

when imported to other samplers. It's a fairly simple matter to set a lowpass filter that lightly rolls off a little of the high end if this concerns you. And unless you listen to the same samples produced by a 700-series instrument and another sampler, you probably won't notice any enhanced brightness in the Roland sounds when they're imported into other instruments.

AKAI S2800 STUDIO

Because I did much of my sampling a few years back on an S1000, working with the S2800 Studio was almost like teaming up with an old friend. (The Studio version of the S2800 adds a SCSI port and extra RAM to the basic S2800 configuration.) It's very user friendly, and it reads a lot of sample formats, including Akai S1000/1100 and S3000, Roland S-700 series, and E-mu EIIIX. (The S2800 and S3000 use the same sample, Program, and Volume architectures.)

As expected, the S2800 Studio had no problem reading S1000 sounds, and loading 2 MB files took a lightning-fast average of just thirteen seconds. S3000 files actually took a bit longer to load, averaging about seventeen seconds for a 2 MB file. This is probably because S3000 files include more data than S1000 files.

Much more disturbing was the fact that many of the S1000 Programs were not accurately converted by the S2800.

> Many samplers can read non-native data from a SCSI device but not from floppy disk.

The amplifier and filter envelopes were fairly close but certainly not on the money. Most noticeably, all the LFOs were way too fast and too deep. In addition, using the mod wheel to bring in vibrato abruptly switched on the LFO, without a smooth depth transition.

I tried editing some of these Programs and was able to bring the vibrato under better control by lowering the mod-wheel depth to a value of 02 (in a range of 00 through 99), but the vibrato still switched in too suddenly. In addition, the maximum delay for vibrato is somewhat shorter than in the S1000.

These problems appear to be partly a limitation of the S2800 and not just a byproduct of the conversion process; sampling directly into the S2800 produced similar LFO and mod-wheel behavior. However, I was able to edit S3000 sounds to produce a somewhat smoother, more acceptable vibrato rate and depth. This is strange; you would think the same parameters would produce similar results regardless of which sample format was used.

I also noticed the Velocity-to-filter and Velocity-to-amplitude controls are much more pronounced on the S2800. Striking the keys softly brings in almost no sound at all, and a medium strike is enough to open the filters and play the note at close to full volume.

THE Natives ARE Restless

Similarly, although Channel Pressure (Aftertouch) smoothly opens the filters on an S1000, the S2800 goes from dark to bright with hardly any Pressure at all. I was able to adjust the Pressure-to-filter depth to produce a more musical effect, but I could not exactly duplicate the smooth feel of the S1000.

The S2800 Studio did a fine job of importing E-mu EIII samples, but load times varied widely, with an average of about 28 seconds for a 2 MB file. Unfortunately, the same problems that plagued the imported S1000 Programs were apparent here, too. In addition, none of the EIII files I tried had any Pressure programming, so I could not evaluate how these files might translate. However, the envelope information converted just fine and proved to be quite usable.

The S2800 Studio loads either Roland Performance or Patch files. A 2 MB file loads in an average time of about 25 seconds. After loading the "Dyno-Rhodes" sound, I found that the S2800 correctly read the three Velocity-switched layers, placing the samples in their appropriate Velocity ranges. However, the sample corresponding to the highest Velocity level was assigned to a range of only 126 to 127. Thanks to the S2800's friendly interface, I easily adjusted each of the Velocity levels to match the feel of my Peavey DPM C8 keyboard controller. The envelopes and filter settings were quite usable, and the Velocity controls were fine, but I still noticed the irksome LFO problems previously mentioned.

All the Roland samples sounded very clean and warm, with no trace of harshness. I was very impressed with how closely the S2800 reproduced the overall Roland sound. To my ears, the S2800 read and converted Roland sounds better than it did S1000 sounds. However, I did note one glitch: if you try to load a Roland file that is too big for the S2800's onboard RAM, the machine quits the load early and reverts to the Utility menu. If you then switch to another menu, the S2800 hangs, and you have to reboot. You need to check the size of the files you're loading before trying to import them, which is a rather simple matter.

When A/B comparing the same sample files, I found the S2800 Studio to be slightly colder sounding and a bit harsher in the upper midrange than the S1000. However, it sounded about on par with the e64 playing S1000 sounds. Adjusting the S2800's filters could smooth away some of this harshness, but I still prefer the overall sound of the other units playing samples in their own formats. Guitars and cymbals from the S1000 libraries displayed the most noticeable harshness, though some synth and percussion sounds were given an added edge that really helped punch them up.

The clear winner here was the Roland library, which seemed almost like it was custom designed for the S2800 Studio's sonic architecture. Given the massive size of the Roland library, you're probably going to find plenty of great material to import. Most of the converted Programs needed a bit of tweaking, but this was no problem thanks to Akai's large LCD and friendly user interface.

E-mu's 64-voice e64 sampler is essentially a junior version of the company's top-of-the-line Emulator IV.

AKAI S1000

With version 4.3 of the Akai S1000 operating system, this venerable sampler can now read S3000 files. Although the S1000 is no longer in production, there are so many of these units in studios around the world that I wanted to see how they handled another format. The average load time for a 2 MB S3000 file was about 21 seconds.

As you might expect, the S1000 has no problem reading S3000 samples. Basically, everything sounds great, but some of the problems I noted with the S2800 reading S1000 sounds appeared in reverse. Instead of being too fast and deep, the LFO rate and depth are too slow and not deep enough.

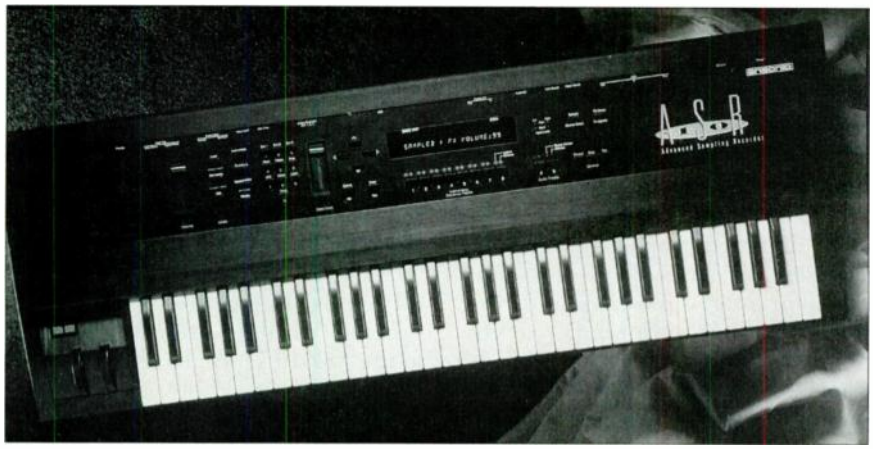
Velocity and Pressure settings and filter information are correctly converted, but they are not very pronounced. I needed to tweak the Programs to respond appropriately to these controllers. Of course, the S1000 does not have built-in delay effects, so this data does not convert. As a result, many Programs sound the same when you audition them, even if they are called something like "AmbidelaySax."

E-MU E64

The E-mu e64 sports what I consider the most friendly, intuitive user interface of all the units I tested. If you have any synth/sampler experience, you can zip around and do a lot of editing without ever opening up the user's manual, which is a very big plus.

Version 1.10f of the e64 operating system lets this device read all existing E-mu sample formats (EIV, ESI-32, EIIIx, and Emax II), as well as Akai S1000/1100 sounds. It also lets you import samples in any of these formats and then save them as an EIIIx file, making it compatible with their ultra-affordable ESI-32.

The EIIIx required a separate menu to import Akai samples, but the e64 sees any Akai CD-ROM as if it were a native-format disc, thereby skipping painful menu switching. The e64 sees Akai Partitions as E-mu Folders, Volumes as Banks, and Programs as Presets. Even better, it lets you audition any individual Akai sample via SCSI from the front panel, which is a nifty



The Ensoniq ASR-10 does a good job of importing Roland S-series files and sounds even better with Akai S1000 samples. It imports Akai Programs but not Volumes.

feature indeed! Another impressive aspect of the E-mu software is speed: 2 MB Akai files loaded into the e64 in an average time of just fifteen seconds.

In the version 1.10f software, however, the Akai sample-import function is essentially the same as the original EIIIx import scheme. Because the EIIIx can accommodate two layers (as in a 2-layer, Velocity-switched Preset), it recognizes only the first two layers in an Akai Program (of which there can be up to four). Extra layers are assigned as a separate Preset.

All S1000 files converted perfectly as far as sample data was concerned, with no buzzing or clicking loops. In most cases, Program data was also admirably converted. However, I had to hit the keys on my controller keyboard much harder to get the same brightness I heard with the same sounds loaded into an S1000. In addition, the filter cutoff was generally set too low, often producing a dark, muffled sound unless I really smacked the keys. Using a different Velocity curve in the e64 helped get the sound a lot closer to the goal. In contrast, some sounds that were programmed to control the filter depth with Aftertouch produced a brighter sound with less pressure. Amplitude and filter envelope rates were just about perfect.

On the negative side, LFO rates for vibrato were too fast and too deep for the most part. However, all the guitar Programs I tried had an acceptable rate. Delayed vibrato programmed into some string and wind sounds was not recognized by the e64 in any of the files I tried. In addition, several Programs with Pressure-induced vibrato produced an LFO rate that was actually too slow but still too deep. Fortunately, all these problems were easily corrected with a few simple edits on the e64's excellent, large LCD screen.

The S1000 was always a bit quirky about where it placed stereo samples within the Volume file and how it organized the samples within a Program. In some instances, this created problems when the e64 tried to put the left and right files together into a true stereo Program. I'm told that E-mu is aware of this problem, which will be fixed in version 1.2.

Some of the Akai samples I auditioned sounded a bit brittle and closed in. Comparisons with the same sounds on an S1000 revealed that there was indeed a little upper-midrange harshness in the sounds that was not evident on the native machine. However, a few sounds, including some basses and synthesizer samples, sounded much warmer and more full on the e64, probably due to the unit's excellent filters. Some percussion sounds were actually improved with the upper-midrange emphasis. In general, all the sounds I imported were perfectly playable, and without side-by-side comparisons, you probably wouldn't notice the difference.

ENSONIQ ASR-10

Ensoniq holds an honored position among sampler manufacturers because its Mirage was one of the first affordable samplers. The company's current offering is the ASR-10, which is capable of importing Akai S1000 and Roland S-series sounds. The particular unit I used for these tests was running version 3.08 of the operating system; the

current version is 3.53, but the import functions are the same. The average load time was about 50 seconds for one Program with 2 MB of sample data.

The ASR-10 imports only Akai Programs, not Volumes, and you can't import more than eight Programs. In addition, when you import more than one Program that uses the same samples from an Akai Volume, the ASR-10 loads the samples each time. For example, I loaded the "Jazz Bass" Program from the "Fender Bass" Volume on vol. 6 of the Lightware library, and then I loaded a Velocity-switched "Jazz Bass" Program with slaps. The samples used in "Jazz Bass" are also used in the first layer of the Velocity-switched Program. The ASR-10 loaded these samples twice.

Fortunately, loading just one Akai Program from a Volume is sufficient for most purposes. A case in point is the "Jazz Guitar" Volume from Lightware. The first Program is all you need because other Programs simply have different filter settings, which you can easily re-create in the ASR-10's Edit mode.

I was quite impressed with the sound of the imported samples and Programs. The files had perfect loops and sounded surprisingly good. In addition, stereo samples were read correctly. Acoustic guitars, harpsichords, and cymbals were fairly transparent, with plenty of high-end sparkle and only minor coloration when compared with the same sounds played on an S1000.

The only problem I encountered was a bit of aliasing in a file with lots of high-frequency content (Lightware's "Harmonica"), but this was an isolated case. A few sounds, such as Lightware's "Soprano Sax," had a hint of nasal quality in a few of the samples compared to the same sounds in the S1000.

Happily, the LFO rates for most Programs I imported were quite acceptable, although none of the delayed-vibrato information was translated. In most cases, the envelope data was fairly accurate and usable without further editing. The Velocity-to-amplifier EG attack-time setting translated quite well in Programs that use this parameter.

However, the Velocity-to-filter settings often were lost. For example, "Clean Strat" sounded exactly like "Cln.Brt.Strat." On the other hand, "Dark Strat" did have a lower filter-cutoff setting. In most cases, this isn't a problem, as filters are easily tweaked in the ASR-10's nice, large fluorescent display.

Next, I tried some of the Roland CD-ROMs. The ASR-10 only reads Roland Patches (the same level as Akai Programs), so you may not have access to some of the more complex programming offered in Roland Performance mode. The ASR had a tougher time with the Roland samples: a 2 MB Patch file required an average of nearly two minutes to load.

I started with the 3-layer, Velocity-switched "Dyno-Rhodes" Patch mentioned earlier. The ASR-10 loaded all the samples correctly with perfect loops and correct Velocity ranges for each

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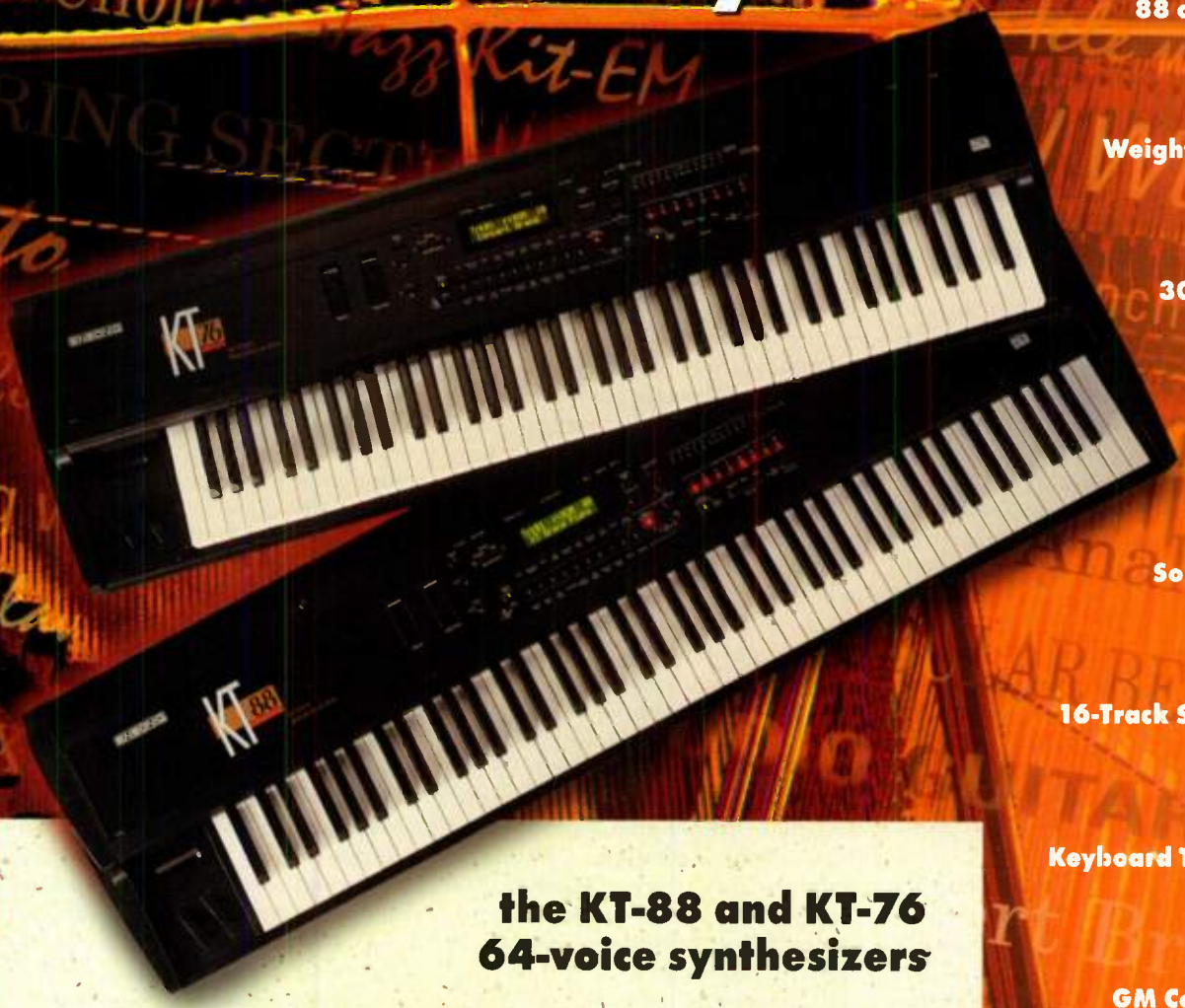

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layer. However, the filters were closed a bit too much, resulting in a muffled sound at low Velocity levels. Smacking the keys produced a brighter sound for the hard-strike layer, but this also brought in a rather noticeable hiss on some of the samples.

I tried a number of other Roland Patches, many of which sounded quite good but not as good as the same sounds loaded into the Roland S-760. I continued to hear some hiss when certain samples were played with a hard strike on the ASR-10's keyboard. This might be an artifact from Roland's emphasis/de-emphasis processing. Fortunately, it's only noticeable in sounds with little high-frequency content of their own.

I accessed an additional Roland CD-ROM, *Jazz*, vol. 1, and noticed that the noise all but disappeared in many of the trumpets and saxophones. These brighter sounds tended to translate much better than samples with less high-frequency information. All stereo samples imported just fine.

Many of the envelopes on decaying instruments (such as electric pianos) were a bit longer than when the sounds were loaded in the S-760. Of course, this is easily fixed in Edit mode. As with the Akai samples I tried, most of the LFO rates were usable, if not perfect. Pressure-to-LFO was quite well interpreted, too. In general, most of the filter settings didn't match those in the S-760, but they are easily edited.

In general, I liked the sound of the Akai samples imported into the ASR-10 better than the Roland sounds, possibly because the Roland sounds include more data than the ASR-10 can deal with. Nevertheless, the Ensoniq unit does a fine job reading both non-native formats. I just can't help wishing it could access Akai Volume information and circumvent a few of the redundant button pushes required to import sounds.

KURZWEIL K2000

The K2000 I used in these tests was equipped with version 3.18 of the operating system, which allows you to import Akai S1000 and S3000, Roland S-series, and Ensoniq samples. In addition, the K2000 can import AIFF and WAV files, which don't include any Program data.

This instrument has been able to read S1000 samples since version 1.0, and there were absolutely no problems importing this format as far as samples, loops, and related issues were concerned. In addition, the K2000 had no problems reading S3000 files. Every S1000 and S3000 sample was assigned correctly across the keyboard, had perfect loops, and sounded great.

Very rarely (usually at the top of the range), the K2000 would "pin," meaning it could not transpose a particular sample as far up as the S1000/S3000 could. At 44.1 kHz, the K2000 can only stretch a sample fourteen semitones upwards, but the S1000 can transpose by four octaves, and the S3000 can transpose by three. Typically, though, this isn't a problem.

A much bigger problem is the fact that neither the K2000 nor the new K2500 can read or convert any Program parameters. However, Velocity-switching data was recognized in most of the tests I performed. When you load files into the K2000, they are assigned the parameters associated with Program 199, the "Default Program," which is essentially a blank Program with no assigned filters, envelopes, LFOs, etc. You must create new Programs and effects for each group of imported samples.

You can work around this problem by creating or loading a K2000 Program that resembles the final result you are after with the imported samples. For example, let's say you're importing a set of acoustic-guitar samples. You can probably find a good acoustic-guitar Program in K2000 format. (There are lots of excellent Programs posted on the Internet or various online services.) You can then assign the imported samples to this Program, and with a few minor edits, you're ready to go.

You might consider creating a custom library of useful Programs (pianos, guitars, strings, brass, etc.) in K2000 format so you can import samples and find a Program to match them with. You can also use the K2000's macro capabilities to load K2000 Programs and non-native samples from CD-ROM without having to save the samples on another disk, which is mighty handy.

Several companies, including Sweetwater Sound and InVision, offer a good selection of basic K2000 Programs that can be used as templates for imported samples. In addition, companies such as Sweetwater offer K2000 Programs designed to accommodate their samples for other instruments. Sweetwater's *Power Translator* disks also use the K2000's macro capabilities to load Akai or Roland samples into K2000 Programs that have been tweaked accordingly.

Once you've assigned samples to an appropriate Program, you can easily fine tune the filters, envelopes, and effects. For Velocity-switched Programs, the K2000 creates a separate layer for each sample. It's a simple matter to select a layer and then specify the Velocity-switching ranges for each layer.

The K2000 can read Roland Volumes, Performances, Patches, and samples. With previous versions of the K2000 OS, I had problems establishing correct loops with Roland samples. I'm happy to report that version 3.18 had absolutely no problems with loops in any of the samples I tried.

However, multiple-layered samples, such as those that include Velocity

The Kurzweil K2000 reads the most non-native formats of any machine in this test, but you usually have to tweak the program parameters.

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switching, present their own problems. In fact, unless you have a Roland sampler handy, you might not always be able to understand what all the Keymaps mean when multiple layers are imported into the K2000.

For example, loading the "DynoRhodes" Volume produces a 3-layer Program with three Keymaps ("DynoRhodes -1" through "DynoRhodes -3"), and all three layers play simultaneously. As mentioned earlier, this is supposed to be a Velocity-switched sound, so I adjusted each layer in the K2000 to low, medium, and high Velocity. However, after listening to the resulting Program, it was obvious that "DynoRhodes -2" was the softest strike and "DynoRhodes -1" was the medium strike, which meant I had to readjust the Velocity ranges to reflect this. After adjusting envelopes and effects, I had a sound that closely matched what I heard on the S-760.

Finally, I tried importing some Ensoniq sounds into the K2000. All the samples loaded beautifully and sounded great. The average load time for a 2 MB file was 50 seconds.

PEAVEY DPM SP PLUS

The single-rackspace Peavey DPM SP Plus ties with the Roland S-760 as the smallest unit tested. Unfortunately, the diminutive SP also has the smallest display of any instrument I tried. It also scores low on the user-friendly scale, mostly because of the many button pushes required to access its various menus and functions. On the other hand, it is the least expensive of the units tested, so I was interested to see how well it read S1000 samples, the only non-native format it currently imports.

The Roland S-760 does a great job converting S1000 sounds, the only non-Roland format it supports. Because of the sampler's emphasis/de-emphasis scheme, some converted samples display a slight high-frequency rolloff.

Generally, the SP does a great job reading S1000 samples. Although the converted samples do not sound exactly the same as when played on an S1000, the final result is fairly open and transparent, with only a tiny bit of coloration. In fact, at its price point, I'd have to rate it as one of the better-sounding units. In general, most of the instruments had trouble converting "Acoustic 12-String" from Lightware, probably because of the many upper harmonics. The SP passed this test with flying colors; the sound was bright, rich, and clear. A 2 MB file loaded in as little as 25 seconds, but it can take as long as 62 seconds, with an average load time of about 34 seconds.

In a few instances (notably "Soprano Sax" from Lightware), some of the samples were out of tune. There are two places to tune samples in the S1000's hierarchy: at the sample level and Program level. "Soprano Sax" is fine tuned at the Program level, and the SP did not see this data.

In addition, this set of samples and many others I tried (e.g., Lightware's "Bosendorfer Grand") displayed some annoying digital noise when imported into the SP. None of the other units I tested had any such problems with these files, and not all the files I imported into the SP had the added noise. According to Peavey, this was due to the fact that my test unit came from the initial preproduction run, and the company assured me that SP Pluses arriving at stores will not have this problem. On the positive side, the SP correctly read and converted every stereo file I loaded.

Like most of the other instruments, the SP came up short in the Program-data department. In most instances, the LFO settings were quite accurate—neither too deep, nor too fast—although I occasionally encountered a problem file (e.g., Lightware's "Fiddle"). However, the SP can't read the S1000 LFO Delay parameter, so vibrato comes in too soon on most Programs with delayed vibrato.

A bigger problem was the fact that the SP cannot read the filter settings. For example, in the Lightware "Acoustic 12-String" sound, the basic Program includes Velocity control of the filter. However, it sounded exactly like the

The Peavey DPM SP Plus imports only one non-native format: Akai S1000. It does a good job of converting the samples but has problems with certain Program parameters, especially filter settings.

"Bright 12-String" Program, and "Dark Stratocaster" sounded just like "Bright Stratocaster."

The envelope attack times were different when the same samples were played on an S1000 and an SP. For example, the Lightware "Soprano Sax" produced a fairly slow attack on the SP compared to the S1000's rate. Decay and release rates were closer, for the most part, but they didn't exactly match the S1000. In addition, none of the panning Programs produced panning in the SP.

The SP reads Velocity-switched Programs accurately, but the level at which the switch occurs is rather low: a light touch plays the low-Velocity samples, and a moderately heavier touch triggers the high-Velocity sound. Layered Programs (such as those used to create a chorus effect) are a bit more problematic. The SP places different S1000 layers into different maps within the SP's architecture. To hear the correct layering, you must change "Layer A/B Switch" to "Play Both Layers" and then change the detune settings, which is hardly a big deal.

ROLAND S-760

The Roland S-760 only reads native S-700 series files; Roland S-550 and W-30 files, which must be converted; and Akai S1000/1100 files. Although a 2 MB, native-format file loaded in an average of just 33 seconds, similar-sized S1000 Volumes took just a little over a minute to load.

Many S1000 Programs were not accurately converted by the S2800.

The S-760 did a great job reading and converting S1000 sounds, both stereo and mono, with all loops intact. Envelope and filter settings were also quite usable, but they didn't exactly mirror the S1000 playing the same files. After the problems I had with the Akai and E-mu conversions, I was surprised to find that most of the LFO rates were fairly accurate. In addition, delayed vibrato and Pressure-to-vibrato control worked well. However, a few Programs that used Pressure to open the filter did not work when converted, instead staying at the initial filter setting.

A much more troublesome problem cropped up when I tried importing Velocity-switched Programs. The unit would not play both layers of some 2-layer Programs I imported, but others worked just fine. For instance, the Velocity-switched clarinet from Lightware was problematic, but both layers played with no problem in the Lightware Velocity-switched Steinberger bass. For the most part, my tests lead me to believe the S-760 will not disappoint you in its ability to read S1000 samples.

The problems I noted are fairly easy to fix with some quick edits, but the S-760's user interface is a bit more cumbersome and less intuitive than I would have liked. I had to constantly refer to the owner's manual, which was not that

much help, having apparently been written by someone who was trying to define every function rather than providing a comprehensive "how-to" guide.

I expected S1000 sounds to be a bit dull when played on the S-760, as they weren't sampled using Roland's emphasis/de-emphasis processing. However, only a few samples (e.g., some acoustic guitars and a harpsichord) were noticeably lacking in high-end crispness. In fact, a few sounds benefited from the slight high-frequency rolloff, sounding slightly warmer when played from the S-760. The difference between the converted S-760 sounds and the same samples played on an S1000 would be noticed only in side-by-side comparisons and probably only by people with so-called "golden ears."

CONCLUSIONS

For the most part, every sampler I tested did a good job converting non-native formats. In terms of the total number of compatible formats, the Kurzweil K2000/K2500 (with five) and the Akai S2800 series (with four) are the big winners.

In the case of the Kurzweil machines, though, you are required to do some tweaking to get the most out of the compatible-format feature. In fact, almost every one of the imported non-native sounds required some work to make them sound their best and respond accurately to various controllers. In particular, LFO rates and depths needed a lot of editing, along with Velocity sensitivity for amplitude and filter control.

Although I didn't have time to try more than a dozen imported samples in each machine, I encountered no real problems reading any of the data I tried. In general, I could not easily tell the difference between a particular set of samples played on different machines. The only exceptions were the Roland S-760, on which a few imported samples tended to sound a bit dull, and the E-mu e64 and Akai S2800, on which some samples sounded a bit harsh in the upper midrange. In some cases, the added character these samples acquire when imported can actually sound better than their original formats.

There is no way to predict exactly how any of these machines will react to a particular parameter. As mentioned earlier, none of the manufacturers claim that importing is perfect. Anyone who expects this process to be "load and go" is in for a disappointment. Nevertheless, I'm certain that the majority of sampler owners are happy to have the enhanced sound palette that comes with access to non-native sample libraries.

So try importing non-native sounds; you're sure to find some excellent material that will sound great on your machine. The additional editing these sounds may require is still less hassle than starting to build a sample library from scratch.

Jim Miller *is a freelance sound designer and the author of numerous* **EM** *articles on sampling. His samples have appeared in Kurzweil, Roland, Akai, Ensoniq, and Peavey libraries and in many ROM-based instruments.*

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RECORDING MUSICIAN

A Quick Take on Condensers

Broaden your sonic horizons with a variable-pattern condenser mic.

By Brian Knave

The dynamic microphone is a rugged beast. What else would you cram into the cone of a Marshall stack to document the overdrive insanity of megavolume rock riffs? Or for that screaming grunge-punk singer with the nasal voice even a mother couldn't love—what are you gonna do, sit him in the vocal booth behind a vintage Neumann U 47?

But invaluable as they are, even the best dynamic mics can't cover all the bases. A mic cabinet with nothing but dynamics is like a rainbow with only two or three colors. That's not to say you need one of everything to round out your mic selection. Actually, a single variable-pattern condenser mic can extend your sonic palette quite nicely.

The fact is, if you want to make professional-sounding demo tapes in your home studio, a good condenser mic is—dare I say it?—indispensable. Why? Simply put, a condenser mic is more efficient than a dynamic; it can hear farther, faster, and more accurately. And if you're talking about a variable-pattern condenser, well, you get not just one ear but two, which makes the unit supremely versatile.

Let's take a look at this marvel of electronics, learn what all those switches are for, and then see how to get the most from this workhorse mic. We'll start with a brief explanation of how condenser mics do their thing.

A condenser microphone can capture the subtle nuances of dynamic vocalists such as Katharine Chase of the Katharine Chase Band (shown miked with an AKG C 414 "Vintage TL").

CLAIRE ARNAUD

INNER WORKINGS

A condenser microphone derives its signal by monitoring voltage changes between two parallel, electrically charged plates. The back plate is a fixed piece of solid metal; the front plate is the diaphragm, usually a thin sheet of Mylar that has been coated with gold or some other conductive metal. As sound alters the distance between the diaphragm and the back plate, the voltage changes correspondingly. Because these changes in voltage are minute, they have to be boosted by a preamplifier built into the mic. The electrical charge

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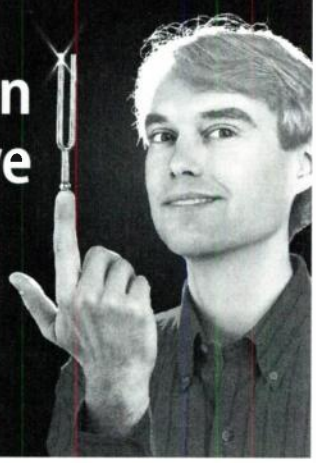
"They LAUGHED when I said they could have Perfect Pitch ...until I showed them the secret!"



The TRUE STORY

by David L. Burge

IT ALL STARTED in ninth grade as a sort of teenage rivalry.

I would slave at the piano for five hours daily. Linda didn't practice anywhere near that amount. But somehow she always seemed to have an edge which made *her* the star performer of our school. It was frustrating.

What does she have that I don't? I would wonder.

Linda's best friend, Sheryl, sensed my growing competition. One day she bragged on and on about Linda, adding more fuel to my fire. "You could *never* be as good as *Linda*," she taunted me. "*Linda's* got *Perfect Pitch*."

"What's Perfect Pitch?" I asked.

Sheryl gloated over a few of Linda's uncanny musical abilities: how she could name any tone or chord—*just by ear*; how she could sing any pitch she wanted—*from mere memory*; and how she could even play songs after only *listening* to them on the radio!

My heart sank. *Her fantastic EAR is the key to her success* I thought. How could I ever hope to compete with her?

But later I doubted Sheryl's story. How could anyone *possibly* know F♯ or B♭ just by *listening?* An ear like that would give someone a mastery of the entire musical language!

It bothered me. Did Linda *really* have Perfect Pitch? I finally got up the nerve and asked Linda point-blank if the rumors were true.

"Yes," she nodded to me aloofly.

But Perfect Pitch was too good to believe. I rudely pressed, "*Can I test you sometime?*"

"OK," she replied cheerfully.

I couldn't wait...now I'd make her eat her words...

My plan was ingeniously simple:

I picked a moment when Linda least suspected it. Then I boldly challenged her to name tones for me—*by ear*.

I made sure she had not been playing any music. I made her stand so she could not see the piano keyboard. I made certain other classmates could not help her. I set everything up so I could expose Linda's Perfect Pitch claims as a ridiculous joke.

Nervously I plotted my testing strategy. Linda appeared serene.

With silent apprehension I selected a tone to play. (She'll *never* guess F♯!)

I had barely touched the key.

"F♯," she said.

I was astonished.

I quickly played another tone. She didn't even stop to think. *Instantly* she announced the correct pitch.

Frantically, I played more and more tones, here and there on the keyboard, but each time she would somehow know the pitch—without effort. She was SO amazing—she could identify tones as easily as *colors!*

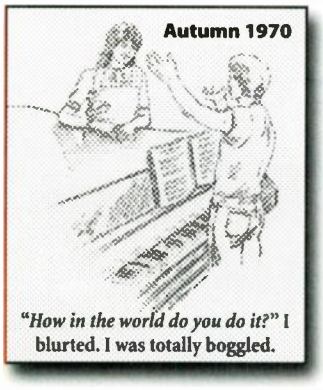
"Sing an E♭," I demanded, determined to mess her up.

With barely a pause she sang the proper pitch. I had her sing tone after tone. But as I checked her on the keyboard, I found that she sang each note perfectly on pitch.

I was totally boggled. "*How in the world do you do it?*" I blurted.

"I don't know," she sighed. And to my dismay, that was all I could get out of her!

The dazzle of Perfect Pitch hit me like a ton of bricks. My head was dizzy with disbelief. Yet from that moment on I knew *Perfect Pitch is real.*



"How in the world do you do it?" I blurted. I was totally boggled.

I couldn't figure it out...

"*How does she DO it?*" I kept asking myself. On the other hand, why doesn't *everyone* know musical tones by ear?

Then it dawned on me that *most musicians* can't tell C from C♯, or A major from F major—like artists who brush painting after painting without ever knowing green from turquoise. It all seemed so odd and contradictory. I found myself even more mystified than before.

Humiliated and puzzled, I went home to work on this problem. At age 14, this was a hard nut to crack.

You can be sure I tried it myself. I would sweet-talk my three brothers and two sisters into playing tones for me, then guess each pitch by ear. My many attempts were dismal failures.

So I tried playing the tones *over* and *over* in order to memorize them. I tried to feel the "highness" or "lowness" of each pitch. I tried day after day to learn and absorb those elusive tones. But nothing worked. I simply could *not* recognize the pitches by ear.

After weeks in vain, I finally gave up. Linda's gift was indeed extraordinary. But for me, it was out of reach.

Then it happened...

It was like a miracle. A twist of fate. Like finding the lost Holy Grail.

Once I had stopped *straining* my ear, I started to listen NATURALLY. Then the incredible secret to Perfect Pitch jumped right into my lap.

I began to notice faint "colors" within the tones. Not *visual* colors, but colors of *pitch*, colors of *sound*. They had always been there. But this was the first time I had ever "let go"—and *listened*—to discover these subtle differences within the musical tones.

Soon I too could recognize the tones by ear! It was simple. I could hear how F♯ sounds one way, while B♭ has a different pitch color sound—sort of like "listening" to red and blue!

The realization hit me: THIS IS PERFECT PITCH! This is how Bach, Beethoven and Mozart could mentally envision their masterpieces—and name tones, chords and keys all by ear—*by tuning in to these subtle "pitch colors" within the tones.*

It was almost childish—I felt sure that *anyone* could unlock their own Perfect Pitch by learning this simple secret of "color hearing."

Excited, I told my best friend Ann (a flutist) that *she* could have Perfect Pitch too. She *laughed* at me.

"You have to be *born* with Perfect Pitch," she asserted.

"You just don't understand how *easy* Perfect Pitch is," I explained.

I showed her how to listen. Timidly, she confessed that she too could hear the pitch colors. With this jump start, it wasn't long before Ann had *also* acquired Perfect Pitch! We became instant school celebrities. Classmates loved to test our abilities, leaving everyone awed and amazed by the power of our virtuoso ears.

Way back then I never would have dreamed that years later I would cause such a stir among college music professors. When I first explained my Perfect Pitch discovery, many of them *laughed* at me. You may have guessed it—they told me, "One must be *born* with Perfect Pitch." Yet once I revealed the simple *secret—and they heard for themselves*—you'd be surprised how fast they changed their tune!

As I continued my own music studies, my Perfect Pitch ear allowed me to progress far faster than I ever thought possible. I even *skipped over* two required college courses. Perfect Pitch made *everything* much easier—performing, composing, arranging, sight-reading, transposing, improvising—and it skyrocketed my *enjoyment* of music as well! I learned that music is definitely a HEARING art.

And as for Linda?

Oh yes—time eventually found me at the end of my senior year of high school, with my *final chance* to outdo Linda. Our local university sponsored a music festival each spring. I went all out for it. Guess what? I scored an A+ in the most advanced performance category. Linda only got an A.

Sweet victory was music to my ears—mine at last!

FOR 15 YEARS NOW, thousands of musicians and two university studies have proven my Perfect Pitch method. *Now I'd like to show YOU how to experience your own Perfect Pitch!*

I hope *you* won't laugh as you picture *yourself* with various Perfect Pitch skills—like naming tones and chords by ear with laser-like accuracy! I think you will be surprised at just how simple Perfect Pitch really is—*and how very valuable.*

I'll show you! Just call or write TODAY for your **FREE Perfect Pitch Lesson #1!**

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FAX: (515) 472-2700

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FIG. 1: The cardioid polar pattern does the best job of rejecting sounds coming directly from the rear of the mic.

on the plates is typically supplied by an external phantom power source, such as a mic preamp or mixer.

The big advantage of condenser mics is that the metallized plastic diaphragm can be made extremely thin. The resulting low mass means less inertia, so the diaphragm can respond faster and to a wider range of frequencies. The built-in preamp also plays an important role in extending sensitivity and dynamic range. Altogether, condenser mics are more efficient and less noisy than dynamics—a fact reflected in their much higher cost.

Another big advantage is that a single condenser mic can be readily constructed to offer multiple, switchable polar patterns. This is achieved by putting two cardioid capsules back to back within one mic. Pattern changes are affected by varying the polarizing voltage to the capsules, which is usually controlled from a switch on the body of the mic. When the rear diaphragm capsule is switched off, the mic acts as a simple forward-facing cardioid. When both capsules are combined in phase, the mic hears omnidirectionally. When they are combined out of phase, the result is a figure-8 pattern. Other cardioid patterns are made possible by incremental variations in voltage to the rear capsule.

If you can afford only one good condenser, go for the variable-pattern mic because it gives you the capabilities of three or more mics for the price of one. Let's look at the characteristics of these mic polar patterns, along with some other features included on most condenser mics.

CARDIOID

The cardioid pattern offers the greatest amount of rear rejection. This allows you to focus the mic specifically on the sound source while minimizing pickup

of reflections from the opposite end of the room (see **Fig. 1**).

Here's a practical application: if you are recording a vocal track in a one-room studio (engineer and vocalist in the same room), position the mic so the rear capsule faces the engineer and his or her equipment. That way, the mic will reject a fair amount of equipment noise and room reflections. This method can also be used to reject sound coming from another instrument while recording two or more instruments at the same time.

OMNIDIRECTIONAL

The omnidirectional pattern is the only pattern that exhibits no proximity effect or off-axis coloration. Because it hears all of a space "equally" (see **Fig. 2**), it gives the least altered, most natural sounding results. It also extends the low-frequency range of the mic—which may or may not be desirable.

A condenser in the omni setting is great for capturing ambient room sound or a true sense of the space surrounding a performance. For example, if you were using a tiled bathroom to create reverb for a guitar amp, the omni setting would most accurately document the effect. Of course, if a particular space adds *undesirable* effects to the sound, one of the cardioid patterns might be more appropriate. In addition, if you're recording a singer who jumps around a lot or doesn't know how to "work" a mic, the omni pattern can be a real session saver. The pattern should capture a full, robust tone no matter how off axis the bouncing vocalist travels from the mic.

An interesting characteristic of a mic set to the omni pattern is that, to hear the same perceived amount of ambience, it must be placed approximately twice as close to the sound source than were it set to one of the other patterns. This effect, called the distance factor, correlates with the "spacious" sound of the omni pattern. (This is easy to hear while wearing headphones and switching back and forth between omni and cardioid patterns.) Remember, there is no proximity effect, so you can get extremely close to your source without risking low-frequency accentuation. Of course, rather than get right up against the source sound to increase signal levels, you can simply add gain at the mixer or mic preamp.

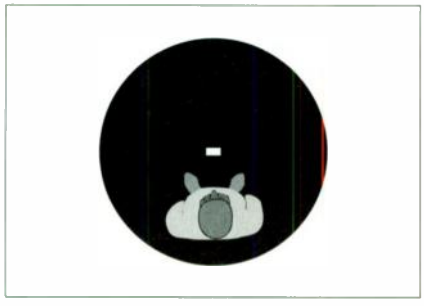

FIG. 2: The omnidirectional polar pattern has no proximity effect or off-axis coloration, resulting in the most natural sound.

FIGURE-8

The figure-8, or bidirectional, pattern exhibits the greatest amount of proximity effect, so if you need some low-end enhancement from your condenser, this could be the optimum pattern. Singing inches from the mic gives a startling "in your face" intimacy to the voice—perfect for spoken word or whispery voiceovers.

The figure-8 pattern also exhibits the best null-point rejection. The null point is the area in a polar pattern where, theoretically at least, no sound gets

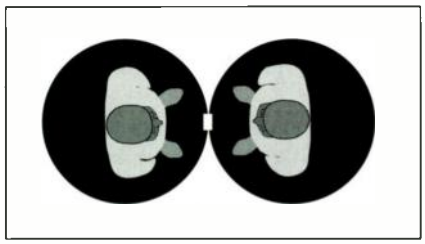

FIG. 3: The figure-8 pattern has the most proximity effect and best null-point rejection. It is commonly used for miking two or more singers but has a variety of other uses as well.

through. On the figure-8 pattern there are two equal null points, one on either side of the mic.

The figure-8's excellent null-point rejection allows for some handy studio applications. For example, let's say you are recording an acoustic guitarist who wants to sing while he or she plays. However, you want as much separation as possible between guitar and vocal so you can add different effects to each during the mixdown. A hip figure-8 solution is to aim one capsule toward the guitar (the mic is looking down on the guitar at a slight angle) with one null point directly in line with the guitarist's mouth. This position captures the guitar sound while canceling much of the vocal. Another mic—set to a cardioid pattern—can then be positioned to capture the vocal and reject the guitar. Remember, though, to check for phase cancellation by summing both signals to mono.

This use of the figure-8 would also be effective for miking a snare drum to achieve maximum rejection of the hi-hat at one null point and a mounted tom at the other. Just make sure there is no unwanted sound coming at the opposite capsule.

Of course, the classic application for the figure-8 pattern is to record two vocalists simultaneously, one on either side of the pattern (see **Fig. 3**). This is comfortable for the singers and allows them to see each other's cues.

HYPERCARDIOID

In terms of voltage to the capsules, the hypercardioid is one step from the cardioid *toward* a figure-8: the directionality of the front capsule narrows, while a narrow lobe opens at the rear where the mic can hear. This creates a tighter cardioid pattern with less direct rear rejection. The proximity effect is more than a cardioid's but less than a figure-8's.

The hypercardioid is a good choice when you want the intimacy of the figure-8 but don't want the rear capsule to "hear" the rest of the room. Also, the null points on either side of the rear-capsule lobe can be utilized to reject sounds that fall along their axis.

PREATTENUATION

The preattenuation switch allows you to pad the mic an additional 10 or 20 dB *before* the preamp circuitry to guard against signal overload and distortion. Contrary to common belief, the pad does nothing to protect the mic's diaphragm.

Another common misconception is that condenser mics are extremely delicate and readily susceptible to damage from high SPLs. This was true to some extent of early condensers, but improvements in design allow modern condenser mics to handle some pretty hot levels. In truth, most instruments are not capable of putting out enough SPLs to negatively effect a modern condenser mic. But if you think an especially loud voice, horn, bass drum, or whatever is distorting the mic, use the pad. It doesn't color the sound of the mic, and you can make up lost gain at the board.

BASS ROLLOFF

Also called a highpass filter, the bass-rolloff switch allows you to cut all frequencies beneath a designated level, usually 75 or 80 Hz. This is useful for getting rid of 60 cycle hum or any low-end noise you don't want on tape.

Low-frequencies can be rolled off at the board as well, but usually the sooner you get undesirable room rumbles out of the signal chain, the better. Some engineers I've known leave the bass-cut filter engaged at all times. I prefer to use it remedially, auditioning it to determine whether the low-end loss is agreeable or not.

SWITCHING OFF

However you use your variable-pattern condenser, don't get stuck in a rut. All those switches are there for a reason. Put on headphones and critically audition each setting for yourself. Experiment with null points, proximity effect, the distance factor, and other parameters. Set the mic above, below, or off axis to the sound source. In short, do all you can to learn to hear as the microphone does. ❦

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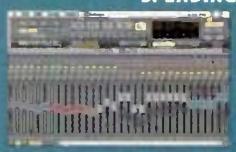

[1] Ultramix Pro™ software requirements: 25mHz or faster 68030, 68040 with color QuickDraw support & System 7.X (Mac IIci or newer) or Power Macintosh® or compatible, 8 MB total RAM, color monitor, 2MB hard disk space

No wonder hit albums and blockbuster films are mixed via automation. It gives engineers and producers infinitely more control, better mix quality — and the ability to store, recall and fine-tune a mix any number of times.

Like the word processor, spreadsheet or sequencer, computerized mixdown automation streamlines a complicated manual task — and frees you to explore new creative possibilities. But until now, serious, full-feature automation systems have been priced out of reach of everyone but the rich and famous. Or required buying a completely new mixer. Or both.

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Our Ultramix™ Universal Automation System provides everything you need except a MIDI interface box and a Macintosh™ computer[1]. Plug anything you want to automate into the 2-rack-space Ultra-34 Automation Interface:

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- any line-level instrument output (keyboard, guitar preamp, etc.)
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Now you're ready for precise, repeatable, tweakable mixes via the UltraPilot™ Control Interface and Ultramix Pro™ software.

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- Clone your best fader moves and use them in other places in the mix;
- Automute unused sections of your tape tracks or noisy MIDI sound modules;
- Via automated mute or fader cuts, make a composite mix from the best moments of several tracks of the same instrument;
- Use your basic mix as a starting point for creating off-the-wall variations;
- Make six voice-over versions of a jingle mix — and then quickly make the inevitable nit-picking client changes three days later.

Above: Three screen shots from Ultramix Pro™. Top to bottom: Main screen, Edit Fade Curves window, Group/Master Section

FREE DEMONSTRATION VIDEO TAPE.

Visit any of the Mackie Certified Ultramix™ dealers listed at left and get a free copy of The Ultramix™ Video[2], a merry madcap romp through the benefits of our automation system. Then experience the creativity and productivity of Ultramix™.

[2] If you live a gazillion miles from any of the dealers listed, you can get a copy of the video by calling us toll-free. Offer is not available via Reader Response Card — you must call Mackie. Offer expires June 30th, 1996

ULTRAMIX PRO™ SOFTWARE

• automate up to 128 chs. • plays back standard MIDI files from within the program • MIDI machine control including transport control & 11 autolocate points controlled from UltraPilot™ or software • create & modify up to 8 color-coded subgroups • on-screen metering for all chs. • Auto Mute function mutes unused tracks • solid & "glass" faders show actual level & UltraPilot™ position simultaneously • multilevel event editor • fader curve editor • fader level & mute events • Trim mode merges data between previous & current mixes • Null mode ensures seamless level transitions at punch-in points • prints out studio track sheets • optional integrated control of popular effects processors • fast operation on 030 & 040 Macs[1] • also optimized for Power Macs

Q Why does the Ultra-34 Automation Interface look like a patchbay?

A When used with our 8•Bus console, Ultramix™ operates through the channel and main inserts. A half-normalled patchbay on the Ultra-34 front lets you use your inserts for other purposes.

AutoMute: Possibly the coolest Ultramix™ feature of all?

AutoMute dramatically cuts down on cumulative noise by silencing any section of any track that doesn't contribute to the final mix. It works like 34 separate noise gates — except AutoMute doesn't rely on analog level sensing (and thus never cuts off the important leading edge of a sound). Instead, it scans your tracks, detects the start of a note and then backtimes its muting function so that none of the sound is lost. AutoMuting of up to 128 simultaneous mix channels can be done automatically during just one pass through your mix, a process that would take hours with any other automation system. Plus all mutes are fully editable within Ultramix Pro™'s Event Editor window.

Q What is the Ultramix™ system?

A It's a 3-part MIDI automation system consisting of the Ultra-34 Automation Interface (with 4-patch points per channel on the front and lots more technostuff inside), the UltraPilot™ Control Interface (looks like a fader pack but does much more), and Ultramix Pro™ software.

Q Why no moving faders?

A First, because we designed Ultramix™ to be used with any mixer or line level device without retrofitting. UltraPilot™ reads and transmits physical fader moves. Fader level changes happen electronically and are displayed on the computer screen. Second, because reliable, accurate motorized faders are extremely expensive.

Q Will Ultramix™ degrade my sound?

A Emphatically not! It's a true, pro system designed for use with digital multitrack recorders, workstations and hard disk recorders. Electronic specifications meet or exceed those of our well-regarded 8•Bus console series. Zipper noise and audible stepping are simply non-existent thanks to our proprietary smoothing circuitry.

Q Is the Ultramix™ system expandable?

A Like many other Mackie products, our automation system is designed to grow with your needs. You can add more Ultra-34 Interface modules for up to 128 automated channels — and control it all with your existing UltraPilot™ and Ultramix Pro™ software.

Q How do I get more info on Ultramix™?

A Visit your nearest Ultramix™-Certified Mackie dealer (listed at left) for a demo and a free VHS video (while supplies last). Or call us toll-free for our 48-page combination 8•Bus and Automation tabloid.

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WORKING MUSICIAN

Seductive Promotion

Call attention to yourself with a dazzling promo package.

By Mary Cosola

In this age of e-mail, Web sites, and information that travels at the blink of an eye, it's encouraging to know that some things are best done the old-fashioned way. The traditional music promotional package is one such animal. Sure, you could establish a Web page with music clips and QuickTime movies of your band, but you still need to let people know where to find it. By creating a snazzy press kit, you can deliver your music directly into the hands of music-industry professionals.

It never ceases to amaze me that otherwise gifted, intelligent artists can royally screw up something as simple as a promo kit. The contents are basic: a CD or cassette, a press release about the current album, biographical information on the band, a photograph, contact information, and any pertinent press clippings. The dilemma is that each of these components must be well crafted in order to generate any interest. It's not an easy task, but if it were, we wouldn't be dedicating a whole column to it. Remember that your press kit is your introduction to industry pros, and to paraphrase an old shampoo ad: you only get one chance to make a first impression.

DMITRY PANICH

THE DATA GAME

The purpose of a promo package is to present a band's music and background information in hopes of garnering radio airplay, reviews, or interest from a record label. Many artists make the mistake of trying to be too cute or too clever with their press kits. It's true that creating a unique and unusual package will get you noticed; just make sure you're getting noticed in a *good* way. Scads of CDs cross (and accumulate on) my desk, so if I have to spend more than a minute trying to read an "interesting" typeface or graphic layout, into the "No" pile it goes. Yes, I might be bypassing some good music, but it's your job to make me want to listen to it. And believe me, music reviewers have to sort through way more

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The DP/4. You've heard about it from the many rave reviews it received around the world. Or any number of top studios and engineers who have used it on hit records, soundtracks, and commercials.

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How could we hope to top that? Simple. We listened. To reviewers, top artists, studios, and your comments. The result? The new DP/4+.

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And as if that weren't enough, you can add other options, like 8MB of Flash ROM for loading sounds from Korg and Akai™ libraries. And the 4-track hard disk recording option, that enables you to record any sound (vocals, guitars, etc.) so that it can be integrated into a completely digital environment.

Check out the Trinity Plus with the built-in Prophecy at your Korg dealer today. Once you've played this incredible workstation, you'll never settle for "just enough."

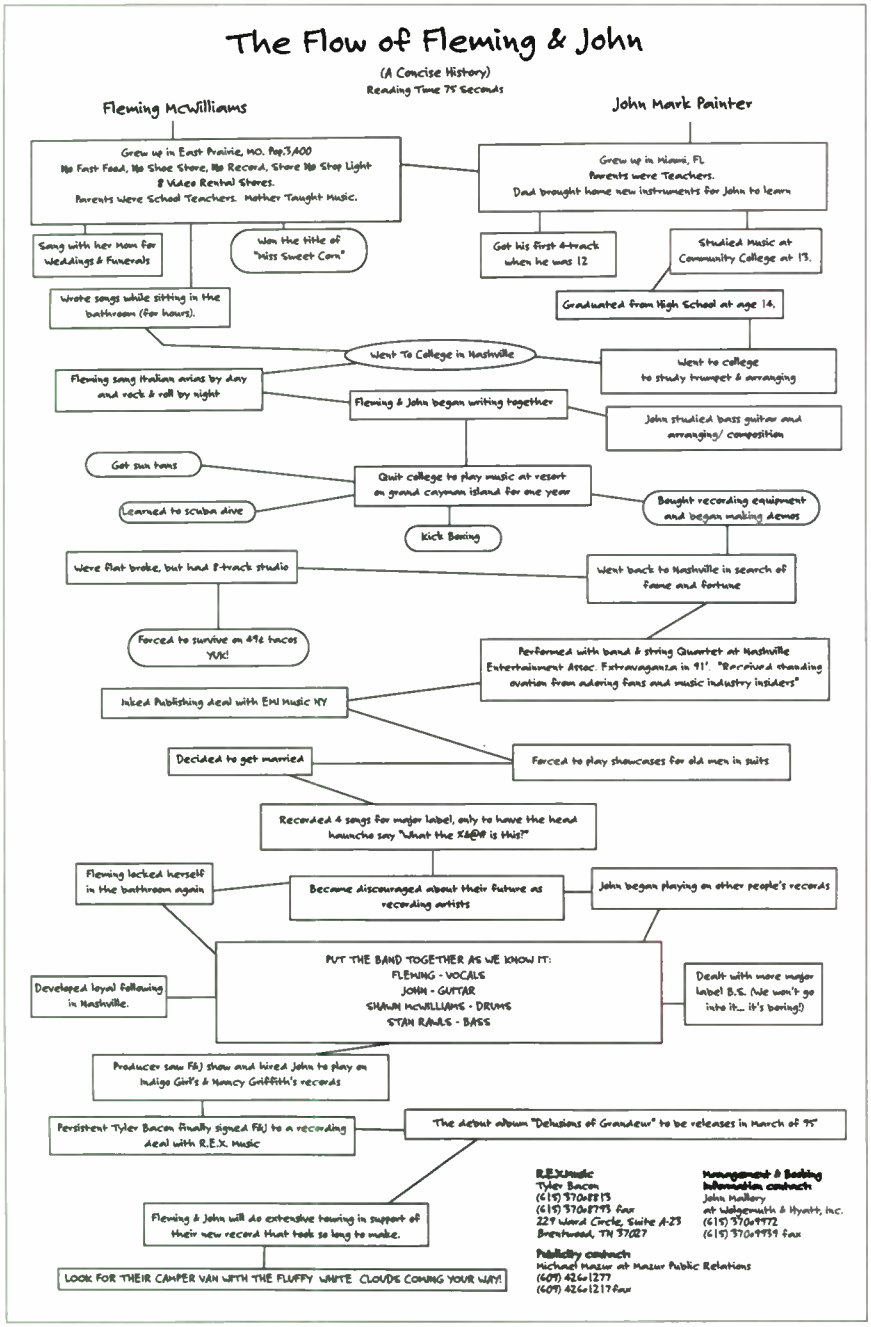
We're changing the rules. **KORG**

*Also included in the 76 key Trinity Pro, 88 weighted key Trinity ProX and available as an option.

CDs than I do, so they're bound to be even less tolerant.

If you've never created a press kit before, your interests are best served by sticking to the basics. Your press release, biographical information, and cover letter should be one page each. If you choose to include any press clippings, only send a few recent samples. A press kit the length of *War and Peace* will only incur the disdain of the recipient.

Simplicity is also the key when composing the copy for your press kit. Most people won't be interested in reading about every band you've performed with, unless, of course, you have played with artists of note. The data in your bio should be relevant to your musical talents and influences. For instance, include information about where your band is based, who does most of the music and lyric writing, who plays which instruments, and the evolution of your playing style (e.g., you started out as a Vangelis wannabe and ended



Fleming and John put together a fun flow chart of their lives. They included it in the press kit for their recent release, *Delusions of Grandeur*.

up playing Meat Loaf-esque rock anthems). And even though I've emphasized keeping things simple, be sure to include any interesting anecdotes about how your band met or about the time you hit your head and Meat Loaf came to you in a dream.

One bio that caught my attention was from Fleming and John, a husband-and-wife duo. Their press kit included an elaborate, hand-drawn flow chart tracing their childhoods, musical detours, marriage, and musical partnership, up through the release of their CD—a concise and charming way of disseminating potentially boring information. Because their press kit piqued my interest, I checked out their music and they ended up the subject of an **EM** feature article ("Creative Space: Dynamic Duo," January 1996).

RELEASE ME

The press release describing your album should be informative and accurate. I am completely put off when a press release touts "the hottest rock guitarist since Hendrix" or "the most innovative jazz trumpeter since Miles Davis." Chances are that I have just opened three other packages promising similar sonic thrills. Arrogant and overblown descriptions of your music only elicit snorts of laughter and disgust around the office. Granted, no artist wants to neatly categorize his or her music, but it's necessary that the recipient of your press kit know what kind of sound you're going for. So if it's rock music, call it that; if it's new age, so be it. Music-press editors, for example, find such basic information helpful, because they need to know

This is definitely a press-clipping "do." The band Alter Ego included four small reviews in their press kit, rather than a 15-page bound volume of every press mention they've ever received.

which reviewer to forward the CD to.

Most press releases I receive cite musical influences that show through on the album, but if you're not comfortable drawing comparisons to other musicians, explore different ways of getting your point across. Try to write about how your music is supposed to make the listener feel. An energized, driving rock number could be described as "awesome house-cleaning music." Or a cool jazz track with a soft sax lead could be called "a great song to unwind to during that Friday evening drive home from the job." The idea is to put yourself in the chair of the person reading about your band. Think about what's going to make them understand your artistic goals and make them want to listen to your music.

Another no-no is using so many wildly divergent adjectives that the person reading the description has no idea of what the music could possibly sound like. Be practical. Who's going to want to listen to a CD that's described as "a musical potpourri of Chilean wind instruments and bluegrass licks, painted on a backdrop of hip urban grooves"? (This type of turgid prose crosses my desk daily. Honest.)

SEEKING COVER

Your cover letter should be short and to the point. Type a concise note introducing yourself, stating what materials are enclosed, contact information, and any other points not made in the press kit itself, such as dates you will be playing in the area. It's a good idea to get a name or a person's title to send your information to. That way, you know your music is getting into the right hands, and you can follow up to make sure the package was received.

Be sure your letter is targeted to the right audience. For example, don't send a letter requesting a review to a magazine that doesn't do them (e.g., **EM**—hint, hint). If you plan to do a big mailing, write a few different stock letters—one for reviewers, one for radio stations, one for labels, and so on—inserting the name of the contact person on the appropriate letter. Don't ask for your materials back because it probably won't happen. If you can't afford to send out hundreds of press kits, narrow your focus by carefully researching and selecting your destinations.

Each page of your press kit should be on letterhead with your record label or band name, address, phone, and fax. This creates a professional appearance and provides a handy reference for those who wish to contact you. If you don't want to invest in letterhead, you can make it on a word processor or at least approximate the effect by putting your contact information at the top or bottom of each page (much as you would on a resume). If your home telephone number is your contact number, be sure your answering machine's outgoing message mentions your band name. (I hate calling an artist and not being sure whether I got the right the number.)

FINISHING TOUCHES

Now that we've discussed the written aspects of your press kit, let's not forget the most important element: the music itself. Always send out the best quality product you can afford. Page after page of **EM** is dedicated to getting the most

from your equipment, so do your homework and create a well-produced album. Don't scrimp on the cover art either; it plays a crucial role as the packaging that draws the eye to your music.

Even though they can be costly to duplicate, CDs are the format of choice, as most reviewers and radio stations don't want to deal with cassettes. They also look slicker and more professional than cassettes. Again, if you're concerned about costs, it's always wiser to distribute a smaller quantity of a better product.

Once you've pulled together the basics for your promo package, you can add a few nice touches. I know that I've lectured about "keeping it simple," but

▼

Simplicity is the key when composing the copy for your press kit.

that doesn't mean your kit has to be dull. Artistic touches such as interesting paper and ink colors, elegant fonts, and cool logos go a long way in catching a person's attention. Bribes also work wonders. I'm not talking about payola but little gimmicks like key chains, magnets, and other marketing trinkets. My favorite recent enclosure was a nifty CD opener that slides along the spine of a jewel case, neatly slicing open the cellophane wrapper. You can be sure that band's CD made it to the "Maybe" pile.

But no amount of loot can offset the damage done by a poorly assembled press kit. While writing this article, I've reflected on what draws me to certain releases. It always comes down to well-written copy and a professional-looking CD. In the end, it's the music that counts, but it's necessary that I be intrigued enough to want to listen to it. Your goal in creating the perfect promo package is letting industry pros know that you care enough about your music to try to convince other people to care about it, too.

Associate Editor **Mary Cosola** *wrote this story from the slag heap of CDs formerly known as her desk.*

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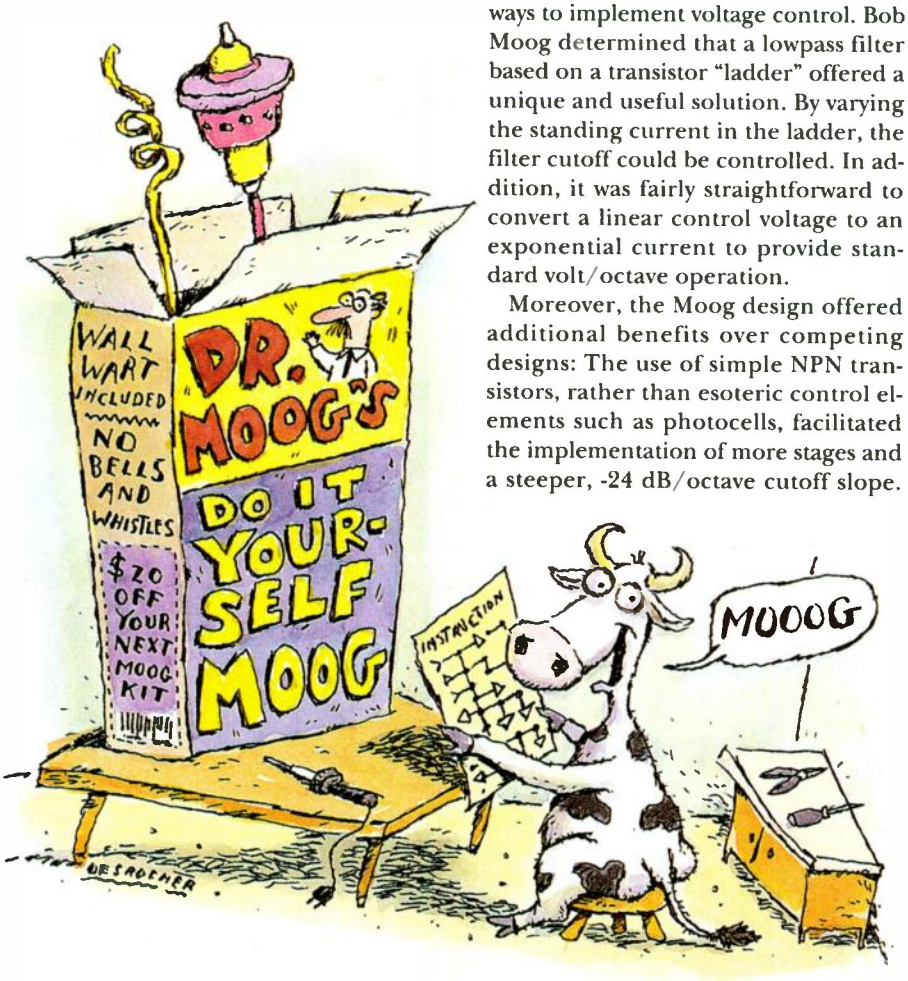
SERVICE CLINIC

Build a Moog Filter

Here's a DIY miniproject for a bona fide electronic-music icon.

By Alan Gary Campbell



JACK DESROCHER

Early VCAs were reasonably effective, but voltage-controlled filters (VCFs) were problematic, so designers sought new and better ways to implement voltage control. Bob Moog determined that a lowpass filter based on a transistor "ladder" offered a unique and useful solution. By varying the standing current in the ladder, the filter cutoff could be controlled. In addition, it was fairly straightforward to convert a linear control voltage to an exponential current to provide standard volt/octave operation.

Moreover, the Moog design offered additional benefits over competing designs: The use of simple NPN transistors, rather than esoteric control elements such as photocells, facilitated the implementation of more stages and a steeper, -24 dB/octave cutoff slope. The addition of feedback easily produced stable resonance, and the filter could be made to self-oscillate and function as a sine-wave VCO. To top it off, the audio-input stage, when overdriven, produced a distinctive, warm, mild harmonic distortion. Dr. Moog's design was awarded a U.S. patent.

The Moog filter exists in variants that range from the all-transistor version in the Minimoog to the largely IC-based version in the Moog Source. Interestingly, in Moog's ultimate design, the Memorymoog, the filter is the only hybrid element in the signal chain—the Memorymoog EGs, VCOs, and VCAs are IC-based—and it is a somewhat simpler and warmer-sounding version than that of the earlier Source.

Our do-it-yourself Moog filter (see **Fig. 1**) is derived from the simplified but highly functional design used in the little Moog Rogue. IC1 sections a, b, and c and transistors Q1 and IC2e form the control-voltage interface and exponential converter. IC1d comprises the audio-input stage. IC2 sections a, b, and c/d and transistors Q2 to Q7 form the filter ladder. The original design mated neatly with a 3080A-based VCA and opamp output stage (see "Service Clinic: Analog Service, Part 5," in the February 1996 **EM**), and that feature has been retained here via IC3 and IC4. It's almost like getting a free VCA.

I've omitted some bells and whistles in this design. There are no trims for

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ALESIS

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Rhythm Kits	16 preset 20 user	8 preset 0 user
Arpeggiator	Multifunction	No
Realtime Controller	PB/Mod lever, 2 sliders	PB/Mod wheels
Computer Interface	Yes	Yes

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WRH

the filter range, scale, or emphasis. In addition, there is no temperature compensation, so if the filter is used as a sine-wave oscillator, tuning may drift over time. On the other hand, it is a fairly bulletproof version, reasonably tolerant of perf-board construction, and uses components that are pretty easy to obtain. The audio input is designed to overdrive considerably at maximum, more so than with other Moog filters, which gives a really gutsy sound.

CONSTRUCTION

With perf-board construction, avoid a crowded layout and "rats nest" wiring; keep the input and output sections and leads well apart. Return all the indicated grounds to a single point. (In practice, paralleling them on a terminal strip is sufficient.) Use metal-film resistors; 1% tolerance is preferable but 2% is acceptable. Capacitors C1, C4 to C10, and C13 should be polystyrene; the remaining caps should be low-leakage electrolytics. It is advisable to use sockets for the ICs.

The line input is configured for a 5-volt peak (10-volt peak-to-peak) signal. To provide sufficient gain for a 1V peak signal, change R9 to 39 kΩ and R10 to 500 kΩ. The CV input is configured for a 5V positive envelope. The output delivers approximately 0 dBm at 1 kΩ nominal impedance.

The filter uses a bipolar, 12 VDC (rather than 15 VDC) power supply, so a common, 24 VAC, wall-mount transformer ("wall wart") is sufficient to drive it. A suitable, simple power-supply design is shown in **Figure 2**. Use electrolytic caps for C1 and C2 and tantalum for C3 and C4. In this application, heatsinks are not needed for voltage regulators IC1 and IC2.

OPERATION

Before power-up, double check your wiring against the schematics. Check the power-supply outputs (unloaded) with a DMM before connecting. Both the positive and negative outputs should be close to 12 volts.

Connect your VCO or synth-mixer output (or any line output, if you have configured the filter input for extra gain and wish to process an external signal) to the audio input. Connect an EG output to the filter CV input and another to the VCA CV input. A simple EG circuit was provided in the February 1996 "Service Clinic" column. (For test purposes, you can key the VCA by simply connecting a 5-volt, positive voltage gate to the VCA CV input.) Connect the line output to your mixer or amp.

Power up and adjust the VCA offset trim. Set the audio input, filter CV amount, and filter resonance controls at minimum; set the filter cutoff at maximum. Adjust the offset trimpot for minimum "thump" in the output upon key down.

Next, set the input level, filter cutoff, and CV amount controls at mid-position, and set the resonance at minimum. Select a harmonically rich waveform, such as sawtooth or square. Set the filter EG for a moderate attack and decay, with full sustain, and set the VCA EG similarly.

When the EGs are triggered, you should hear the filter open during the attack segment, hold at peak cutoff during the sustain segment, and then close during the decay segment. Increase the resonance for the signature "resonant filter sweep." At input-level settings greater than 75% of maximum,

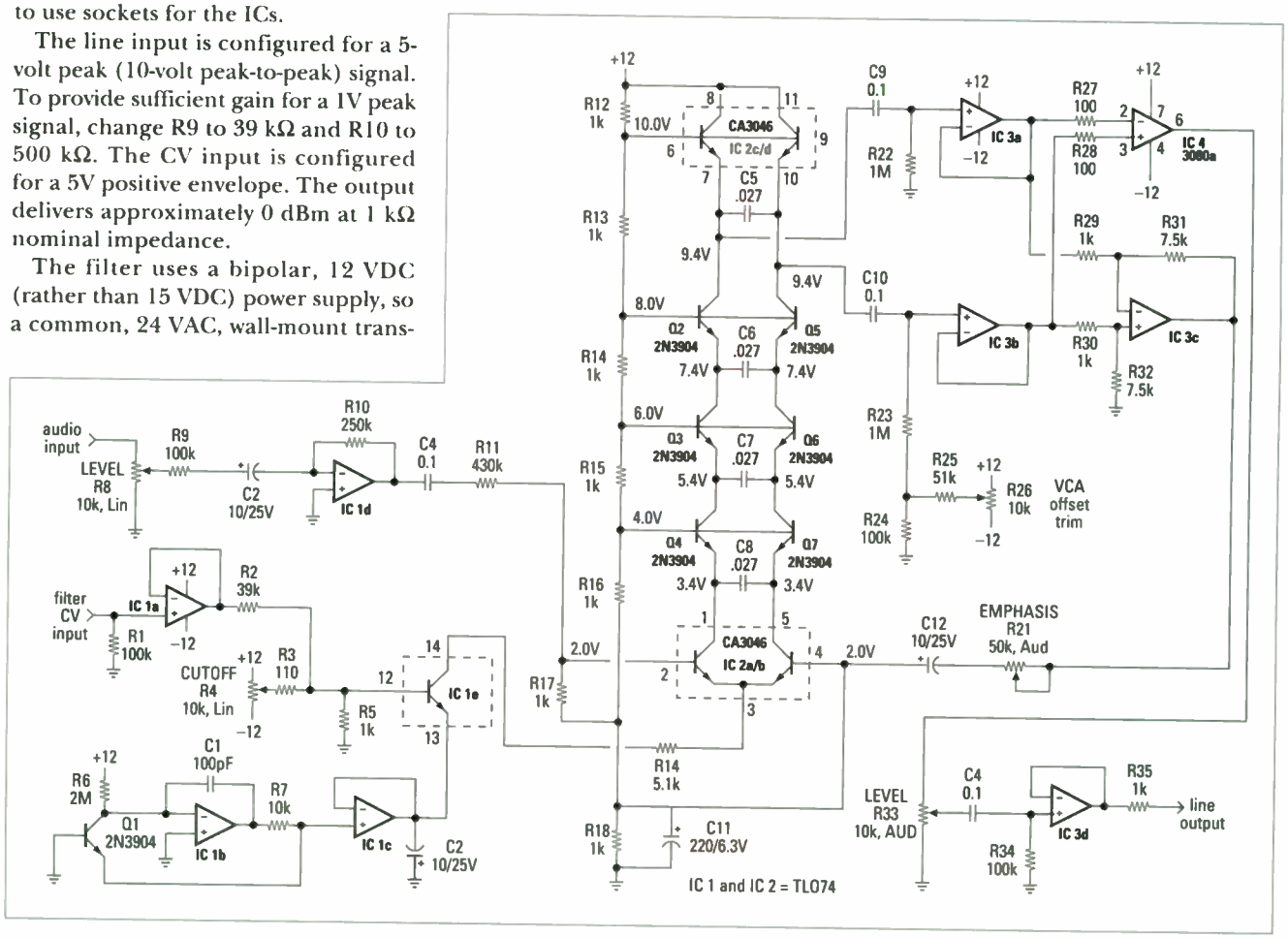


FIG. 1: This filter schematic is derived from the simplified, but functional, design used in the Moog Rogue. In techno-speak, it's a voltage-controlled, 4-pole, resonant lowpass filter.

the filter begins to overdrive. Wide open, the warm distortion this circuit produces is great for lead patches.

To use the filter as a sine-wave VCO, turn down or disconnect the audio input; connect the keyboard CV output, rather than an EG output, to the filter CV input. As before, adjust the VCA EG for moderate attack and decay, with full sustain, or simply key the VCA from the keyboard gate. Play a note and gradually increase filter resonance until the filter self-oscillates. Alternate octaves of a note and adjust the CV amount control until the filter plays in tune. The CV amount control has sufficient range to provide macrotonal or microtonal scales, if desired.

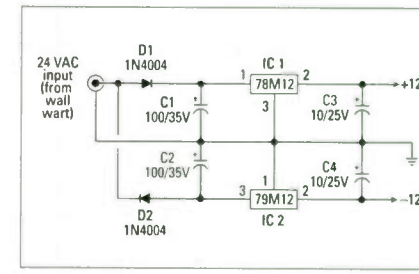


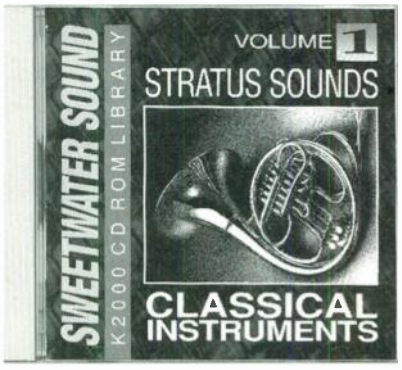
FIG. 2: This simple, safe, bipolar, 12-volt power-supply design uses a 24 VAC "wall wart."

TROUBLESHOOTING

A noticeable "thump" in the output or a dead output suggests a failed output-buffer op amp or failed 3080. (See last month's column.) No envelope response or "pegged" filter cutoff indicates a bad CV-input op amp. Partial or total loss of filter function, with an output "thump," indicates a failed transistor in the ladder.

Nominal ladder voltage decreases sequentially in approximately 2-volt steps and can be easily checked with a DMM. At the top of R12, the measured voltage should equal approximately 12 volts (the supply voltage). At the top of R13, it should equal approximately 10 volts; at R14, 8 volts; and so on. Both the top of R18 and the junction of R17 and R11 should measure 2 volts. Altered voltage readings indicate a bad transistor.

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



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Reviews

Technics SX-WSA1

By Scott Wilkinson

This keyboard workstation is a model performer.

When the Yamaha VL1 appeared, it became obvious that physical modeling would become an important synthesis technique in many products that followed. It also seemed inevitable that, as modeling technology was applied to more devices, its cost would decrease dramatically. Happily, both these prognostications have proved correct, and several instruments now use modeling in one way or another to create their sound.

The latest modeling instrument comes from a manufacturer normally associated with consumer electronics and portable keyboards. The 64-voice polyphonic SX-WSA1 is Technics' first foray into the professional-instrument market, and it's a very impressive debut for this well-regarded company. Two models are available: the WSA1 keyboard (which I reviewed) and the WSA1R rack-mount module.

FIRST GLANCE

The WSA1 keyboard's 61 keys are sensitive to Velocity and Channel Pressure (Aftertouch). The keyboard is not weighted, but the synth action is one of the best I've ever felt—firm but not stiff.

The front panel is dominated by a huge, bright, graphic LCD screen that measures 320 × 240 pixels. A dedicated contrast slider located next to the screen is a welcome change from a buried software control. This is what synth displays should be.

The screen is surrounded on three sides with soft buttons. There are five buttons on either side and eight pairs of buttons across the bottom. As you would expect, labels for these buttons appear in the display as necessary. However, the labels for the side buttons often appear slightly misaligned with the buttons when seated at a reasonable playing distance from the instrument, which makes it a bit difficult to find the desired button at a glance. This is not a problem when viewing the display from directly overhead, but I don't know many people who play in this position. In a few screens, the labels are not aligned with their buttons at all (e.g., the Song Number and Load Option labels when loading from disk).

The eight pairs of soft buttons along the bottom are mostly used to increment and decrement parameter values. They also respond to two levels of pressure. You press lightly to increment or decrement by the smallest value. Holding at this pressure starts the value scrolling after a moment, and if you press harder, it scrolls more quickly, which is a nice touch (so to speak).

Another unusual feature of the front panel is the presence of two trackball-like controllers. The larger of these—called the Realtime Controller—is spring loaded and includes raised bumps for tactile security. The smaller trackball—called the Realtime Creator—is not spring loaded and includes a small depression in the center of the ball. The Realtime Creator is surrounded by four LEDs, which indicate its position. A nearby Reset button centers the values generated by the Creator, not by the physical controller itself.

Various parameters can be assigned to the horizontal and vertical axes of each trackball, which provides some interesting performance-control possibilities. In addition, up to six sets of these assignments can be stored and recalled by pressing one of the six dedicated buttons near these controllers.

Three control wheels are located to the left of the keyboard, and each wheel can be assigned to control a variety of parameters. The left wheel is spring loaded and defaults to Pitch Bend, but the middle wheel (called Mod 1)

defaults to Modulation (CC 1). The right wheel (called Mod 2) is center detented but not spring loaded and defaults to Breath Controller (CC 2).

Four Menu buttons provide access to global parameters, multitimbral Part parameters, MIDI parameters, and floppy-disk functions. (A high-density floppy-disk drive is located under the three control wheels.) Beneath the Menu buttons are four more buttons that provide access to the sequencer functions.

Happily, a dedicated Compare button shows you the previous parameter values rather than blanking the screen as some synths do. Page Up and Down buttons provide easy access to additional display pages as necessary. To the right of the display, +1/-1 buttons and an infinitely rotating, detented data wheel change parameter values in most (but not all) situations. Below the data wheel is an Exit button.

Sixteen numbered Sound/Combination Group buttons, arranged in two rows of eight, select groups of Sounds or Combis. Numbers 1 through 10 double as numeric-entry buttons in some edit modes. I would have preferred a real 10-key pad; there's plenty of room on the front panel, and the WSA1R has one. Button 11 doubles as +/-, and button 12 doubles as an Enter button. (A dedicated Enter button next to the Exit button would have been better.) The remaining buttons select Sound and Combi Play and Edit modes as well as the desired Bank of Sounds or Combis.

The rear panel includes two complete sets of MIDI In/Out/Thru ports, which allows 32-part multitimbral operation with an external sequencer. (The internal sequencer can only address sixteen parts.) The two main audio outputs and two auxiliary (Sub) audio outputs are on ¼-inch jacks. An optional output-expansion board ($349) adds four more audio outputs and a coax (RCA) S/PDIF digital output. Rounding out the rear panel are two footswitch inputs, one control-pedal input, a headphone output, an IEC power-cord connector, and a power switch.

VOICE ARCHITECTURE

Technics calls its version of physical modeling Acoustic Modeling Synthesis. Sounds start with PCM waveforms called Drivers, which are sent through modeled Resonators. This is similar in its basic concept to the Roland VG-8 and Korg WD1 Wavedrum, which also start with actual waveforms, and unlike the Yamaha VL1, which models everything, including the initial waveforms. However, whereas the VG-8 and Wavedrum start with acoustic waveforms, which can't be sequenced, the WSA1 starts with sampled waveforms, which *can* be sequenced. (We'll get into more detail about modeling on the WSA1 later.)

There are 307 Drivers in 12 MB of ROM. These waveforms are organized into fifteen instrumental groups, such as pianos, guitars, brass, etc. Up to four Drivers can be assigned to a Tone and passed through a common, modeled Resonator. The Drivers in a Tone are Velocity-switched. Each Tone includes its own filter and amplifier, each with its own envelope generator, LFOs, and Velocity/pitch response.

Up to four Tones are combined to form a Sound, the basic playable entity. The Tones can be layered and cross-faded by pitch and Velocity, which is very nice. Sounds are organized into Groups of eight, and Groups are further organized into Banks of sixteen for a total of 128 Sounds in each Bank. Two ROM Banks and two User Banks provide a total of 512 onboard Sounds. A General MIDI (GM) Bank is derived from the other Banks, and there is a total of sixteen drum kits in ROM and four in RAM. In addition, there are three Remap Banks (consisting of Sounds from the other Banks), which are user editable along with the GM Bank.

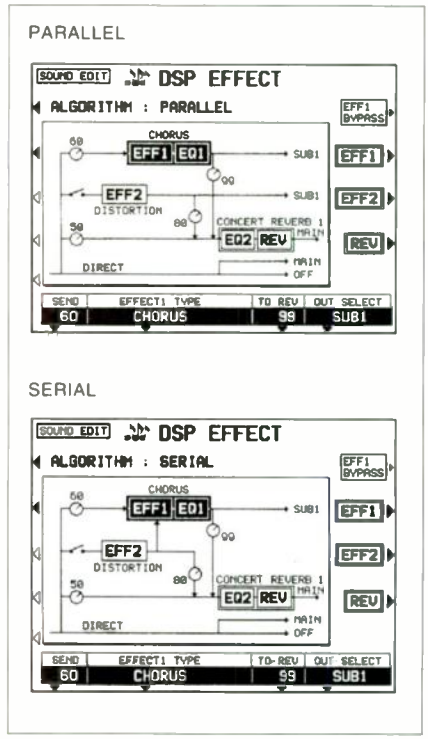

FIG. 1: The DSP effects can be configured in parallel (above) or series (below). (Courtesy Technics.)

Up to eight Sounds can be combined in a Combi, which is the multitimbral performance entity. Combis are also organized in Groups of eight, with sixteen Groups in each Bank. There is one ROM Bank and one User Bank of Combis onboard, for a total of 256 Combis.

All in all, this organization is complicated but logical. As we'll see, it generally requires more than one button push to access a given Sound or Combi.

EFFECTS PROCESSING

The WSA1's effects section is a major strength. It is divided into two main sections: Digital and DSP Effects. The Digital Effects are mostly voice-doubling, chorus-type effects. If the Sound has only one Tone, the Digital Effects take an additional voice of polyphony to do their thing. However, if the Sound has two or more Tones, no additional polyphony is needed.

The DSP Effects are located after the Digital Effects in the signal path. This section includes three multi-effects processors. Effects 1 and 2 produce 43 algorithms; the third processor (called

The Technics SX-WSA1 physical-modeling synthesizer offers 64-voice polyphony, a 16-track internal sequencer, excellent effects, and hundreds of useful sounds.

Reverb) includes the same 43 algorithms plus twelve reverbs. Effect 1 is followed by a 2-band (high and low shelving) EQ with adjustable cutoff frequency, and the Reverb processor is preceded by an identical EQ. Two algorithms configure Effects 1 and 2 in parallel or series (see **Fig. 1**).

The 43 algorithms offer a wide range of effects, including various reverbs, delays, choruses, and flangers as well as an enhancer, exciter, phaser, distortion, overdrive, compressor, auto panner, pitch shifter, manual and auto wah, rotary-speaker simulator, and ring modulator. Also available are a 6-band, fully parametric EQ and a Haas effect algorithm. (The Haas effect is a psychoacoustic phenomenon in which a sound's location in the stereo soundstage is altered by delaying one channel with respect to the other channel. As the delay is increased, the image appears to move toward the undelayed side because that side is heard first.) In addition, there are various combinations of up to three effects.

This is one of the most extensive sets of effects I've seen in a workstation-type keyboard. Not only that, they sound pretty good in general. With only two configuration algorithms, the routing is not as flexible as in some other instruments, but the sheer number of useful effects more than makes up for this.

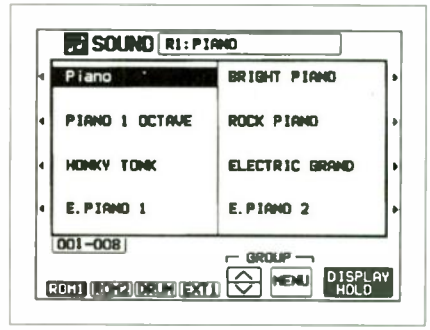

FIG. 2: Sounds are organized into Groups of eight. To select one of the Sounds in the Group, press the corresponding soft button. (Courtesy Technics.)

PLAYING AROUND

Selecting a Sound or Combi to play is not as straightforward as I'd like. First, you press the Sound or Combi Play button followed by the desired Bank button. (If you press the ROM button, you must then select ROM 1 or 2 with a soft button.) Then, you press a Sound/Combination Group button to select a Group (see **Fig. 2**). Finally, you press one of the side soft buttons to select a Sound or Combi.

In normal Sound or Combi Play mode, you can't scroll through the Sounds or Combis with the data wheel or +1/-1 buttons, which is a drag. (You can scroll through Sounds in the Part Menu and Mixer.) On the plus side, you can call up a menu of Group names and select one from there, which helps you search for the type of sound you want. In addition, you can name the Groups in the User and Remap Banks, which helps you keep track of your Sounds by song, musical genre, instrument type, etc.

Once you select a Sound, its name appears in large characters, along with the Bank and absolute Program Change number (see **Fig. 3**). Below the name is a graphic indicator of the parameters assigned to the Realtime Controller and Creator and the numbered button with which they are selected.

Below these indicators are eight parameters that can be incremented and

decremented with the soft buttons along the bottom of the display. These parameters include Octave, Level, Pan, DSP Effect 1 Send Level, DSP Effect 2 On/Off, Reverb Send Level, Int (Local) On/Off, and MIDI Port/Channel. With the exception of Int On/Off and MIDI Port/Channel, these parameters revert to their default values when you select another Sound.

Some organ Sounds replace the name and Controller/Creator display with nine virtual drawbars that you adjust with the eight pairs of lower soft buttons and the Page Up/Down buttons (see **Fig. 4**), which is way cool. You can also adjust the percussive tone that is so characteristic of certain organ sounds. However, the drawbars in the display do not line up with the buttons that control them, which is unfortunate. Arrows in the display help you find the correct buttons, though.

One soft button in the Group display is labeled Display Hold. If you activate this button, you can select different Sounds from the Group with a single button push; the display retains the entire menu of Sounds in the Group without going to the main Sound Play display. This is helpful if you're just browsing through different Sounds and helps make up for the fact that you can't scroll through Sounds in normal Play mode with the data wheel.

The Realtime Controller and Creator are very cool. Most of the preset parameter assignments change the "position" and "connection" of the model. For example, moving the Creator left and right might change where you are "playing" on a "string," and moving it up and down might change how much the "string" is muted. Other common parameters are effects levels, panning, and filter parameters. This feature is excellent for adding more expression to any performance.

Selecting Combis is much the same as selecting Sounds. Once you select a Combi, there are two pages available in the display. The first page is similar to the normal Sound Play display, except that the last pair of lower soft buttons selects the Part to which the other parameters in the display apply.

The second page presents a mixer for the Parts in the Combi (see **Fig. 5**). The parameters available on this page include the Sounds assigned to each Part, Int (Local) On/Off, Pan, and Volume. Select a parameter with the left

FIG. 3: The Sound Mode display includes the name of the Sound, the Realtime Controller and Creator assignments, and various parameters along the bottom. (Courtesy Technics.)

soft buttons, and adjust its value for each Part with the lower soft button pairs. You can also solo any Part. All in all, the mixer is very cool, and it's available from various places in the WSA1, making it easy to access as necessary.

FACTORY SOUNDS

In general, the factory Sounds are extremely clean; in fact, they are almost *too* clean. Some Sounds are more convincing if they have a bit of grunge in them (e.g., "Bowed Bass"). As Senior Editor Steve Oppenheimer remarked, the sound is clearly digital. In addition, there is a great variety of sounds onboard; in what other synth do you get an orchestral and marching tuba?

For the most part, I like the pianos and guitars, both acoustic and electric. There's a nice selection of vocal sounds, including different vowels, but they tend to sound pretty synthetic. Many of the saxes and clarinets are surprisingly good; not as good as the VL1, mind you, but better than most strictly sample-based synths. The drum sounds are generally quite satisfying, with nice, long decays on the cymbals. Most of the electronic synth sounds are excellent.

Of course, every synth includes sounds that are less than stellar. For example, the xylophone, banjo, harpsichord, and plucked acoustic bass have too much looped sustain. (All Sounds start with sampled drivers that are looped.) In addition, many of the ensemble strings are too reedy for my taste, although this can be easily fixed by setting a higher "fitting" value for the modeled Resonator (more in a moment). As usual, the brasses are not up to my standard, but I'm a brass player, and I haven't yet heard convincing brass sounds from any synth (including the VL1). I don't think much of the flutes, either.

Most of the solo sounds include automatic LFO vibrato, which I prefer to bring in manually. Given that there are four LFOs each for pitch, filter, and amplitude, it's a bit of a pain to go in and tweak them all for each Sound.

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PROGRAMMING

The WSA1 is a very deep synth, but programming is surprisingly straightforward. Simply press the Sound or Combi Edit button to display a menu of major edit areas. The Part, System, and MIDI buttons access these edit modes. Then select the area you wish to edit by pressing the appropriate soft button.

In Sound Edit mode, the major areas are Modeling, Amplitude, Pitch, Filter, Tone Layer (triggering, Velocity and key crossfading, etc.), Digital Effects, DSP Effects, and Controller Assignments. Most of these areas are self-evident, but I'll touch on a few interesting features, leaving modeling until last.

As mentioned earlier, each Tone in a Sound can have its own Velocity- and

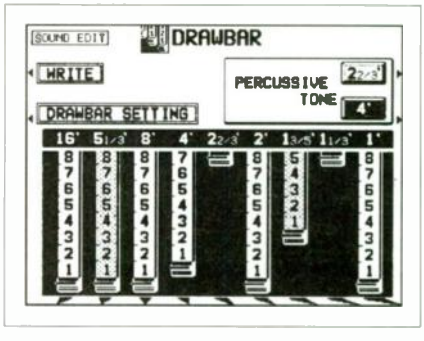


FIG. 4: Certain organ Sounds include a cool drawbar display. Each drawbar is manipulated with a pair of soft buttons, and your settings can be saved. (Courtesy Technics.)

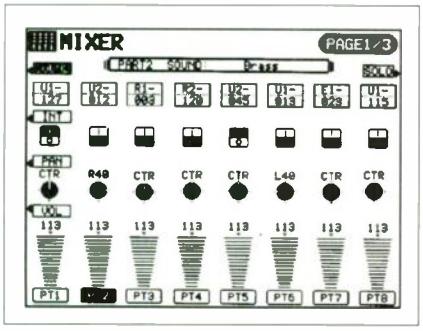


FIG. 5: In Combi Play mode, a mixer lets you tweak various parameters. (Courtesy Technics.)

pitch-crossfade settings. As you play in different pitch ranges with different Velocities, the Tone can be scaled up or down. The graphic interface makes it easy to establish these settings, which is great (see **Fig. 6**).

The pitch, filter, and amplitude areas of each Sound have their own EG with key and Velocity scaling. In addition, there are four LFOs for each of these areas, making a total of twelve LFOs available for each Sound. You can even apply each LFO to multiple Tones.

The pitch area includes thirteen octave-based alternate tunings, such as piano (stretch), Pythagorean, Werkmeister, Kirnberger, five Arabic scales, and Indonesian Pelog and Slendro. There is also one user tuning, which is also octave based with 1-cent resolution and a range of ±100 cents for each note.

The resonant filter can be highpass, lowpass, or bandpass. In addition, the lowpass and highpass settings can include a 1-band, high or low shelving EQ with variable frequency or a 24 dB/octave rolloff. (The normal rolloff is 12 dB/octave.) The filter can also be bypassed.

Assigning parameters to the onboard controllers is a breeze. In the Sound Edit Controller area, you can assign various modeling, amplitude, filter, panning, effects, envelope, and LFO parameters to the horizontal and vertical axes of the Realtime Controller and Creator and the other physical controllers. In fact, both mod wheels, Aftertouch, and the control pedal can control two parameters each, which is great.

However, assigning external MIDI controllers is somewhat counterintuitive. First, you assign a Control Change or other control message to each onboard physical controller in the System Edit area. Then, you assign the desired parameters to the physical controllers in the Sound Edit Controllers area. When the WSA1 receives messages that have been assigned to an onboard controller, these messages control the parameter(s) assigned to that controller. This seems convoluted and limited; I'd much prefer to simply assign MIDI messages to control any parameter directly. For example, I'd like the ability to assign Breath Controller (CC 2) to control level in the Sound Edit Amplitude area.

In addition, continuous controllers cannot be scaled by percentage or curve, although you can set the controller depth for each Tone. Along with the fact that the WSA1 is strongly Velocity oriented, this makes it difficult to play the instrument from a wind controller. I tried several tweaks to make various wind sounds more conducive to a wind controller without much success.

In Combi Edit mode, the mixer includes three pages of parameters for each part. The first page is identical to the mixer in Combi Play mode. The next page has parameters for Reverb Send Level, DSP Effect 1 Send Level, DSP Effect 2 On/Off, Main Output

On/Off, and Key Shift (transpose). The third mixer page includes MIDI Out On/Off, MIDI In On/Off, MIDI Port/Channel, and Sub Output On/Off.

Another cool thing about the edit modes is the ability to easily copy parameters, Tones, Sounds, Combis, and Groups from one place to another. You can also solo Tones at any time, which makes it easy to zero in on the sound you want. On the down side, if you exit Edit mode, there is no indication in the display that the current Sound or Combi has been edited.

PHYSICAL MODELING

The "normal" programming features of the WSA1 are extensive and well implemented, but the modeling aspect is the most interesting. As mentioned earlier, Sounds begin with PCM waveforms called Drivers, which are mostly sampled attack transients. As each sample settles into regular oscillation, it is looped to provide a steady sound. Without a Resonator, many of these samples are more noise than tone. In several cases, there are several attacks from the same source played with different amounts of force. For example, there are four electric-piano Drivers labeled *p, mp, mf,* and *f.* The softest one is almost pure tone, whereas each louder sample has more thump noise and other appropriate changes in timbre.

Up to four Drivers can be Velocity switched and sent through a common modeled Resonator, which is very effective for simulating the effect of playing various instruments with different Velocities. The Resonator actually consists of two parallel Resonators of the same type, although their settings can be different.

Six basic types of Resonators are available, including string, cylinder, cone, flare (brass bell), plate, and membrane (drum head). In addition, there are many variations of these basic types, including mellow, bright, and mute versions, wood and metal plates, and small and large membranes. The Resonator used with each factory Sound is labeled Original (see **Fig. 7**). In most cases, this Resonator is appropriate for the type of Driver (e.g., a flare Resonator with a trumpet Driver), although a few hybrid combinations are present, as well.

I had great fun combining various Drivers with various Resonators. For example, passing the timpani Driver through a cone Resonator sounds like a weird steel drum. On the other hand, some combinations don't work well at all, exhibiting a low level or lots of unpleasant noise. Nevertheless, you are likely to stumble upon some real gems in this way, creating sounds that have never been heard before.

You can also control the connection between the Driver and Resonator. Connection parameters include position ("where" the Resonator is excited), position movement (a cyclic variation in position), depth, and formant (a resonance curve that can be fixed or can move with the pitch of the notes you play). Other Resonator modeling parameters include fitting (how much energy is transferred from the driver to the Resonator), muting (how much the Resonator is damped), and Resonance mode, which lets you select between all harmonics and only odd harmonics. These parameters can be assigned to any of the controllers, and they provide excellent simulations of their acoustic counterparts.

Finally, you can establish the interaction between Tones in a Sound. This lets you simulate sympathetic resonance among strings and other effects. I found no ROM Sounds that use interaction, but a few Sounds in the User Banks do. This has a subtle but definite effect on the overall sound, which was also interesting to play with.

As with most other modeling synths,

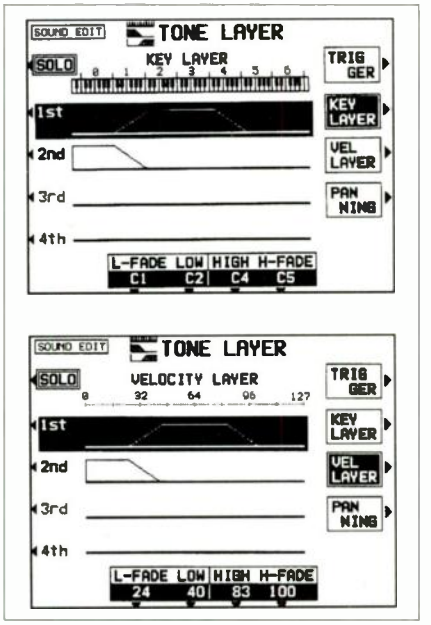


FIG. 6: The Tones in a Sound can be crossfaded by pitch (above) or Velocity (below). (Courtesy Technics.)

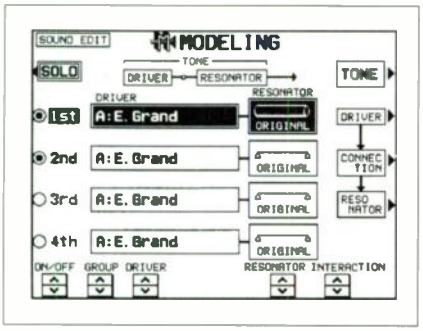


FIG. 7: In the Modeling area of Sound Edit mode, you can combine any Driver with any Resonator for each of four Tones and specify their connection and interaction. (Courtesy Technics.)

you can't tweak the models themselves in terms of their "dimensions" or "material." Technics wisely decided to limit the end user's access to these parameters, which can easily produce ugly sounds as well as nice ones. Besides, the available parameters can change the sound in radical ways, so there is more than enough grist for the programming mill.

INTERNAL SEQUENCER

The internal sequencer is easy to use and full featured. It provides sixteen tracks and a capacity of 47,000 notes that are dynamically allocated among up to ten songs. The resolution is a paltry 96 ppqn. On the up side, you can play Standard MIDI Files (SMFs) directly from floppy disk without loading them into the sequencer's memory. You can also chain the internal songs together in any order with the Medley function.

The sequencer provides real-time and step recording. However, you can't see the names of the Sounds assigned to the sequencer Parts in the Record screen; you must go to the mixer for this, which is a bit inconvenient. In addition, you hear only the Sounds that have been enabled for internal control (Local On) in the mixer until you arm a track for recording, which is a bit confusing at first.

The Master recording screen lets you insert different time signatures and tempos at any of eight locations per beat. Available time signatures range from 1/4 to 8/4. Unfortunately, you can't specify a smooth ramp from one tempo to another over a certain number of beats or measures, but this may be a bit much to expect from an onboard sequencer.

The editing functions are surprisingly complete. For most of these functions, you specify a range of measures within a track for editing. The large LCD allows graphic piano-roll note and drum editing, which is wonderful. Quantization resolutions range from quarter note to thirty-second-note triplet and includes Strength and Window (sensitivity) parameters. You can bias the Velocities in a selected region and change all occurrences of a particular note to any other note. In addition, you can advance or delay a region by up to 96 ticks.

MIDI IMPLEMENTATION

The MIDI implementation is pretty good, but it's not outstanding. As mentioned earlier, two sets of MIDI In/Out/Thru ports allow 32-part operation with an external sequencer. Sounds, Combis, and the sequencer include input/output filters for different types of MIDI messages, which is very nice. However, there is no output filter for Active Sensing, which I prefer to turn off in the studio.

You can send a Bank Select MSB and LSB along with a Program Change at any time. In addition, the absolute Bank number is automatically calculated as you specify the Bank Select MSB and LSB, which is way cool. You can also tell the WSA1 to send a different Bank Select and Program Change for each Sound when you call up a Combi.

Unfortunately, not all Control Changes are available for the onboard controllers; in an instrument such as this, they should be. The Realtime Controller defaults to sending CC 16 (horizontal axis) and CC 17 (vertical axis), and the Creator defaults to CC 18 (horizontal axis) and CC 19 (vertical axis). Mod wheels 1 and 2 default to CC 1 and CC 2, respectively.

The WSA1 sends and responds to All Notes Off and Reset All Controllers, and it even includes a panic-button function. (Press all four Menu buttons simultaneously.) However, the panic button does not send individual Note Offs on all channels as it should. In addition, Note Off Velocity is not sent or recognized, although releasing a note can have an effect on the sound; for example, "Harpsichord" uses this feature to trigger a characteristic release noise. As expected, a complete SysEx dump/load function is available.

USER INTERFACE

Technics spent a lot of time and effort on the user interface, and it shows. The large, graphic LCD allows complete words rather than cryptic abbreviations. The screens are logically laid out and easy to get around. In particular, major screens (e.g., the mixer) are available from various locations, which makes them easy to access and use. I had no trouble getting where I wanted to go.

However, the interface is not without a few problems. In particular, the use of the soft buttons is somewhat inconsistent. In most screens, the side buttons select the desired parameter directly, and the lower pairs increment and decrement the value. In some screens, however, one or more of the lower pairs scroll up and down through a list of parameters, and other pairs, scroll the value.

Not only that, the Up/Down soft buttons for the master Group menu operate counterintuitively; pressing the Up button sends the cursor downward through the list (which is the direction of increasing Group numbers), and vice versa! In still other screens, the parameters and values are scrolled by side buttons. Fortunately, the soft-button labels are large and clear enough to minimize these problems.

WISH LIST

No review would be complete without a wish list. However, my wish list for the WSA1 is relatively short. As mentioned earlier, I want to be able to scroll through the Sounds and Combis with the data wheel and +1/-1 buttons, and I want a standard 10-key pad. In addition, the data wheel and +1/-1 buttons should always scroll the value of the currently selected parameter, which they don't in some cases. All Control Changes should be available, and they should be assignable directly to any appropriate parameter. This would make the WSA1 much more amenable to wind controllers.

It would be nice to have expandable SIMM or DIMM sample memory so you could import your own Drivers. A SCSI port and/or internal hard-disk bay would also be welcome, even as options. Of course, these features would raise the price of the instrument, which is probably why they're not present.

CONCLUSIONS

This is quite an impressive instrument, especially for Technics' first professional offering. The WSA1 is the first modeling synth that lets you experiment directly with creating new instruments from different Drivers and modeled Resonators. You can't tweak the basic characteristics of the models themselves, but you have a wide variety of Resonator types to explore, and you do have many parameters to play with. This opens up a whole new field of programming, and it's loads of fun, besides.

The WSA1 is a good compromise between sample-based and modeling synthesis. With sampled Drivers, the raw attacks are always the same, except in Sounds that use Velocity-switched Drivers, and the sample loops contribute to a certain static quality. However, the modeling and Velocity parameters can change the sound of the attack quite a bit. In addition, using sampled Drivers greatly reduces the computational demands on the CPU, which allows 64-voice polyphony and a good variety of Resonators. By comparison, the VL1 models everything, including the drivers. This provides superior sounds, but it is limited to a narrow range of wind-instrument sounds and monophonic operation.

I like this instrument a lot. Most of the factory sounds are good to excellent, the keyboard action is superb, the user interface is wonderful for the most part, and programming hasn't been this much fun in years. If you're in the market for a serious keyboard workstation, you should give the WSA1 serious consideration.

EM *Technical Editor* **Scott Wilkinson** *had lots of fun with this review.*

Product Summary

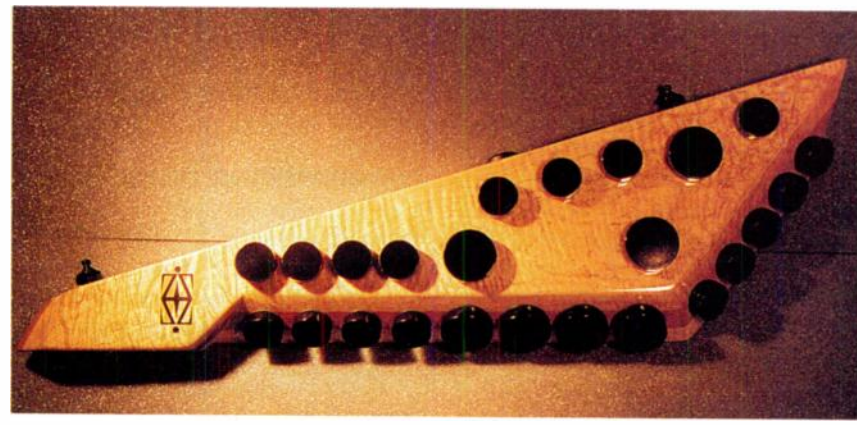
PRODUCT:
SX-WSA1 acoustic modeling synthesizer
PRICE:
WSA1 keyboard: $3,395
WSA1R module: $2,995
MANUFACTURER:
Technics
tel. (201) 348-9090
fax (201) 348-7484
CIRCLE #437 ON READER SERVICE CARD

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

Zendrum Z-2

By Steve Wilkes

This MIDI percussion controller could change the way you create music.



Designed for musicians who like to drum on things with their fingers, the Zendrum Z-series offers a unique approach to electronic percussion.

An old Buddhist monk and his disciple are walking through a quiet garden. Suddenly the master turns to the student and says, "We will now meditate on the sound of the Zendrum." They sit down on the spot and focus their attention inward. After a few moments, the master asks the student, "What did you hear?"

A beatific smile forms on the student's face. "Master, I finally heard *it*," he says. The Master nods knowingly and replies, "Congratulations. You have finally heard the sound of one hand tapping."

Welcome to a new age of drumming, an age of questions such as, "When is a drum not a drum?" This is the answer: when it's the Zendrum MIDI percussion controller, of course. Finally, tabletop drummers have an instrument that can realize their wildest drumming dreams. The Zendrum puts those tapping fingers and hands to good use.

The Zendrum comes in two models: the Z-1 is the full-size model, and the Z-2, which I reviewed, is ¾-size and weighs about seven pounds.

ZEN DESIGN

The Zendrum is anything but a conventional percussion controller. Players can begin by throwing away their sticks, as this ingenious device has no pads. Instead, the Zendrum has 24 Velocity-sensitive triggers with standard piezo pickups. You can tap them with your fingers, slap them with your thumb, gently prod them with your fingernails, or even flail at them with the

palm of your hand. Although Zendrum's controller is "built by drummers for drummers," its promise of stick-free electronic percussion should appeal to instrumentalists of all sorts.

The unit's layout is unique. Its triggers are spread out in four rows over a triangular body made of American rock maple (not unlike the percussion controller used by Future Man of Béla Fleck and the Flecktones). This makes it easy to play the Zendrum on your lap while sitting or strapped on like a guitar while standing up. (A guitar strap is not included.) On one side is the lone MIDI Out port, which I'll discuss in a moment.

On the back is a power switch, a normally-closed sustain-pedal input, and an input for an external trigger. The Zendrum gets its power over the MIDI cable, so it requires an all-pins-active cable, which is not included. (The manufacturer plans to include a cable in the near future.)

The unit comes with an external Power/Merge box that connects to a 12 VDC external power supply (included) and merges the power into the MIDI datastream. The Power/Merge box seems flimsy, and its side wall collapsed when I plugged in a MIDI cable. (According to the manufacturer, this problem has been corrected.)

PROGRAMMING FEATURES

The Z-2 sends data on any one MIDI channel; you cannot assign different triggers to separate MIDI channels as you can with a multitimbral controller. The triggers are premapped to the MIDI note numbers for a basic Alesis D4 drum kit that includes kick, snare, hi-hats, toms, cymbals, and various percussion. I was also able to use this note map with a Kawai XD-5 and Roland JV-880.

When you play melodic sounds, the factory map is a C-major pentatonic scale. If this map doesn't match your sound source, you can remap the note assignments to create a custom note map, which is saved when you power the unit down. You can switch back to the factory map at any time.

The Zendrum's MIDI Out port only sends note data; the unit doesn't support SysEx. This means you can't have more than the one custom note map in onboard memory, which is one of the unit's main drawbacks. The obvious workaround is to remap the note assignments in your sequencer, assuming your sequencer offers that feature.

A better solution is offered in the new ZX series, which was not available in time for this review. The ZX lists for $200 more than the Z-series controllers and has sixteen user-programmable kits, a MIDI In port, and support for SysEx dump and load. A firmware and hardware upgrade (also $200), planned for sometime in early 1996, will bring the current Z-series instruments to full ZX capabilities.

Alongside the MIDI port is a 3-character, alphanumeric LED readout and a data wheel that accesses the editing functions. For example, in addition to being able to program the note maps and global MIDI channel, you can set a global maximum MIDI Volume value, with a range of 0 to 15. The default value is 15 (which corresponds to a MIDI Volume value of 127), but to comfortably play the triggers, I had to set this parameter in the 5 to 10 range, and even that was a little hot.

The Zendrum also offers a so-called Noise Floor parameter, which is actually a Velocity-sensitivity offset. This helps reject external vibrations that can cause cross-triggering.

In addition, there is an Advanced Programming mode, which is most helpful for applications that call for realistic performance with drum set samples. In this mode, the Zendrum transmits four consecutive MIDI notes per trigger that cross-switch in predetermined Velocity ranges. (According to the company, future versions will let you specify any four note numbers and their corresponding Velocity ranges for each trigger.) This feature is similar to the Velocity Shift mode found in other percussion controllers.

Finally, the Program/Kit Selector feature allows the user to send a Program Change (0 to 127) from the Zendrum. Unfortunately, Bank Select is not supported.

TWO HANDS TAPPING

The response and dynamic range of the triggers on the Zendrum are good, though the dynamic range is not quite as broad as with some other percussion controllers, such as the KAT drumKAT. In addition, percussion controllers that are struck with sticks are capable of a

wider Velocity range than the Zendrum can generate.

Although the Noise Floor feature on the Zendrum helps reduce cross-triggering and false triggering, it does reduce the overall dynamic range. Even the Advanced Programming mode is limited by the overall dynamic capability of the controller. The best way to play very quietly on this instrument is to turn down the volume of your tone generator, which is a poor solution. It would be interesting to see whether force-sensing resistors, instead of piezos, would improve this situation.

ZENDRUMMING EXPERIMENTS

One of the wonderful aspects of the Zendrum is the way it allows drummers to approach their craft from a new perspective. All instrumentalists, including drummers, tend to learn a lot of pattern-based material. However, the tapping technique used on the Zendrum points you to horizons beyond the paradiddle. Indeed, a good drummer who tries this controller will almost instinctively attempt new patterns and rhythms, which can be quite liberating after years of rudiments and *Stick Control* (a famous drum-method book). Traditionalists need not fear, however; their familiar patterns and exercises can easily be transferred to the Zendrum.

The Zendrum let me experiment with many new techniques for realizing my tunes. When I changed MIDI channels from 10 (the channel conventionally assigned to drums) to a channel assigned to melodic sounds on my Kurzweil K2000, I was amazed at the results. I tapped out finger rhythms using flutes and tuned percussion, among other melodic sounds, and I even wrote a new tune on the spot—in 7/8, no less. A second new tune quickly followed. I was hooked.

In the 7/8 tune, I created contrapuntal parts in real time. My right hand played a minor-key ostinato with three fingers tapping three buttons. This part functioned as a bass line of sorts. My left hand was then free to improvise a countermelody on the other buttons. Assigning different MIDI channels to different buttons would have been great in this application. Once I found two lines that worked well together, I remapped the MIDI notes to the relative major key on some adjacent buttons. By moving my hand placement to the new buttons, I was able to alternate my new 7/8 counterpoint between major and minor tonalities for some wonderful musical contrast.

As mentioned earlier, the Zendrum has an input for an external trigger. I literally had my hands all over the instrument, so I used this input with a KAT fatKAT footpedal trigger. The response of the Zendrum's trigger input proved consistent with that of the 24 button triggers. I discovered no false triggering and generally felt comfortable with the unit's response.

Musically, the addition of the trigger input raised some interesting possibilities. Returning to the song in 7/8, I added a King Crimson-esque quality to the proceedings by playing the tonic in a repeating half-note ostinato with my right foot against the 7/8 pattern I played with my hands. It was like having Bill Bruford and Tony Levin in one axe.

After enough practice, I was able to

play these new parts with some degree of ease, so I tried sequencing them. The Zendrum was excellent in this application. I quickly began multitracking MIDI parts, and before I could say "grasshopper," I had a 5-minute song that was a product of this amazing percussion controller.

With the Zendrum strapped on guitar style, I began experimenting with bass-like thumb and palm slaps with my right hand on two buttons at the top of the controller. When triggering hand-percussion sounds, this produced a 3/2 Afro-Cuban clave. The fingers of my left and right hand were free to fill in the beats with all sorts of tapped accents and syncopations on the surrounding buttons. As visions of Tito Puente danced in my head, I realized I had stumbled across the type of hand patterns and movements for which the Zendrum is the perfect vehicle.

THE ZEN BLUES

In an earlier version of the Zendrum, there was a performance problem caused by an engineering decision to put the MIDI Note Off before the Note On, rather than after. This wreaked havoc with some melodic and harmonic applications (such as synth pads), causing hung notes. The Note Off problem has been corrected in the current version, but some pesky note-triggering problems still remain.

With certain synth-pad sounds, such as "Orchestral Pad" on the K2000, there is sometimes a slight but perceptible delay when trying to play a new note immediately after releasing the

Product Summary

PRODUCT:
Z-2 MIDI percussion controller
PRICE:
$1,350
MANUFACTURER:
Zendrum Corporation
tel. (404) 352-1646
fax (770) 425-0755
e-mail zendrum@randomc.com
CIRCLE #438 ON READER SERVICE CARD

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

sustain pedal that was holding the previous note. In other words, if you don't coordinate the release of the pedal and the strike on a new sensor just right, the new note will not trigger. I found that with a little practice, I could usually compensate for this delay.

The length of this pause varies from sound to sound and is not even noticeable on some sounds. However, if the engineers at Zendrum just take the extra step so this sustain function can work as smoothly as that of a keyboard controller, the expressiveness of the instrument will certainly benefit.

Otherwise, I got good results with the sustain pedal. By putting the sequencer into Record and then striking random sensors while holding down the sustain pedal, I could create Frippertronics-like ambient loops that were an utter delight.

AT ONE WITH THE DRUM

There's no question the Z-2 has some flaws. The dynamic response and sustain functions need improvement. In addition, one kit with 127 Program Changes and no SysEx support does not cut it in an age when KAT and Roland instruments offer 32 user-programmable kits as standard features. Rival percussion controllers offer MIDI and memory features that put them clearly ahead of the Zendrum. However, if the ZX upgrade works as promised, this product will take a great step forward.

Flaws notwithstanding, the Zendrum has magic. It has been a long time since I've picked up an instrument and felt a wave of excitement at the new possibilities it offers. Brian Eno has been quoted as saying that one of the most wonderful things about music is the rapport a musician develops and executes with a great instrument. The Zendrum is heavy on rapport. And the fact that I almost immediately took the time to practice it each day is testament to its captivating power.

If you're a drummer—or even a non-drummer who likes to beat on things—and you've heard nothing new and cool in your head lately, check out the Zendrum. You'll find some of the most thrilling drumming you've ever experienced.

Steve Wilkes *is co-leader of the electronic percussion/vocal duo dr. carrot and leader of the massive percussion group Six Drumsets.*

SEK'D Samplitude Studio 2.06 (Win)

By Zack Price

Affordable hard-disk recording takes a big step forward.

It's obvious that personal multitrack hard-disk recording will take off in a big way in 1996. Software and hardware manufacturers offer a bewildering array of products from which to choose. However, the choices really fall into two basic categories: dedicated hard-disk recording machines and computer-based setups.

If you are a Windows PC user and you're thinking of going down the computer-based path, I suggest you check out *Samplitude Studio*. Developed by the German software company SEK'D (Studio für Elektronische Klangerzeugung, Dresden, or Studio for Electronic Sound Processing, Dresden), *Samplitude Studio* is a multitrack hard-disk recording program that's rich in features and lean in price.

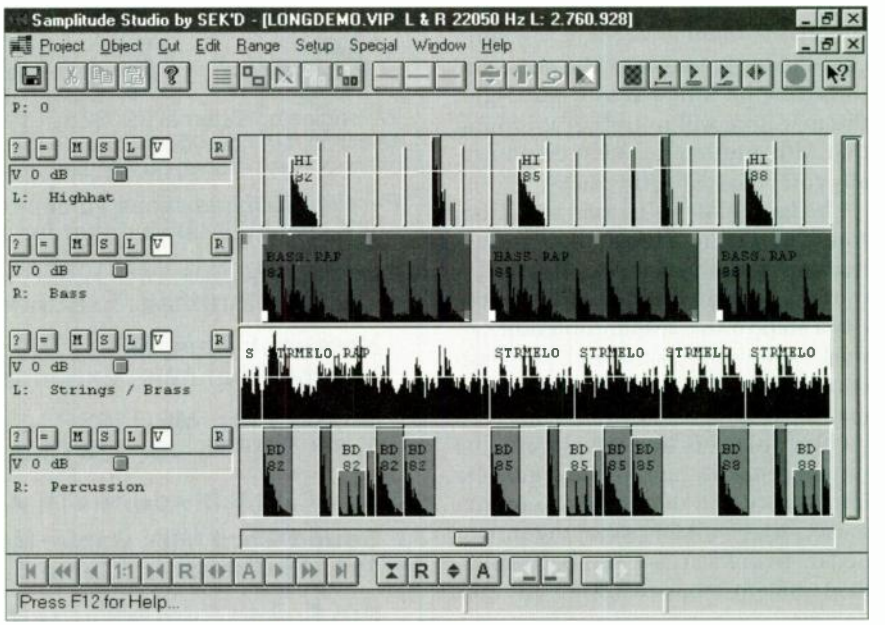


FIG. 2: This Virtual Project (VIP) window includes four mono tracks, Objects within those tracks, and various track controls. The volume of Objects in the lowest track has been altered by adjusting their height.

PICK A CARD

Samplitude Studio lets you record and play up to sixteen monophonic or eight stereo tracks, depending on your PC's capabilities. (I was able to play five stereo tracks on a 100 MHz 80486DX4 running Windows 95 with 16 MB of RAM, a VL-Bus SCSI controller, and a SCSI-2 drive.) However, you can't mix mono and stereo tracks for playback. All tracks in a file must be mono or stereo, as specified in the Setup dialog box (see **Fig. 1**).

The program works with any Windows-compatible sound card except the Roland RAP-10; in fact, *Samplitude Studio* supports up to four sound cards simultaneously. However, you can record only one WAV file at a time, no matter how many sound cards you have. On the other hand, multiple cards provide up to eight discrete outputs for mono tracks or four separate mixing buses for stereo tracks. These outputs are distributed symmetrically, depending on the number of tracks and cards. For instance, if you have eight tracks and two sound cards, the first four tracks are played by the first card and the second four tracks are played by the second card.

FIG. 1: The Setup dialog box lets you specify the number and type of tracks you need. You can also establish and save default settings for Virtual Projects.

Furthermore, all mono tracks are alternately panned hard left and right. In the previous example, tracks 1 and 3 are assigned to the left output of card 1, and tracks 2 and 4 are routed to the first card's right output. Likewise, tracks 5 and 7 go to card 2's left output, and tracks 6 and 8 are assigned to card 2's right output. You can also sum all tracks to mono, which can be useful if you have only one sound card. Better yet, just use stereo tracks instead. Unlike mono tracks, stereo tracks can be panned internally within the program.

Samplitude Studio supports simultaneous recording and playback, provided that your sound card offers this feature. You can also record with one sound card while monitoring playback from another card. However, SEK'D recommends that you use identical cards to avoid possible timing problems that can occur because of slight sampling-rate discrepancies between different sound cards.

Samplitude Studio will support Digital Audio Lab's V8 card, which was scheduled for release in late January 1996. According to the latest available information, the V8 card offers sixteen audio inputs and outputs, which should allow you to individually route tracks. Theoretically, the V8 card should also allow simultaneous recording of multiple tracks.

RECORDING PROJECTS

The center of activity in *Samplitude Studio* is the Virtual Project (VIP) window (see **Fig. 2**). This screen lets you assign sound files to tracks, along with their

start times. The VIP window also provides individual track controls, such as mute, solo, volume, and pan position.

When you're ready to record a file, simply arm the appropriate track in the VIP window, and click on the Record button in the toolbar to call up the Record Parameter window (see **Fig. 3**). Depending on the VIP settings, you are presented with a variety of recording options. For example, if the tracks are mono, you can record a mono file or a stereo file split between two mono tracks. If the tracks are stereo, your only option is recording a stereo file in one track.

You can also record a sound file without opening a VIP window or arming a track. In this case, you can use any recording mode you wish. However, keep in mind that you will probably place this sound file into a project eventually, so it must match the sample rate, resolution, and format of all the other files in the Virtual Project window. For this reason, try to be consistent with the settings. If necessary, you can use the Save In Format command to save an existing file with new settings. However, this is an extra step that creates extra files on disk.

There are two types of Virtual Projects: Hard Disk Projects (HDPs) and RAM Projects (RAPs). As its name implies, a Hard Disk Project records a file directly to the hard drive. Actually, an HDP is a group of files that includes basic information such as sample rate and resolution, the sample data itself, and graphic files that allow fast screen redraws and graphic editing.

RAM Projects let you record and playback digital audio to and from the computer's RAM. The data is also saved to disk in a single file that contains all the basic information, wave data, and graphic data mentioned previously. RAM Projects offer some important advantages. First, this approach is great for recording short rhythm loops, riffs, phrases, and other "drop in" sounds (such as effects and other short hits) because the hard drive doesn't have to repeatedly look for these short files, which are often chained together for playback in the VIP window. In addition, RAM access is faster than disk access, which speeds up data throughput and reduces processing strain on the system.

However, you must make sure there's enough RAM in your system to take full advantage of this feature. A 3-second, 44.1 kHz, 16-bit, stereo file consumes about 264 KB, and eight or nine of these files take up more than 2 MB of RAM. In addition, a significant portion of RAM is needed to execute some of *Samplitude Studio*'s other processing duties. You will need even more RAM if you want to run a sequencer or other software concurrently with *Samplitude Studio*. As a result, I recommend at least 16 MB of RAM if you plan to use this feature extensively.

After electing to create a RAM or Hard Disk Project, you must consider further options before actually recording. For instance, you might want to make sure that the file will be recorded in WAV format. If you have recorded a

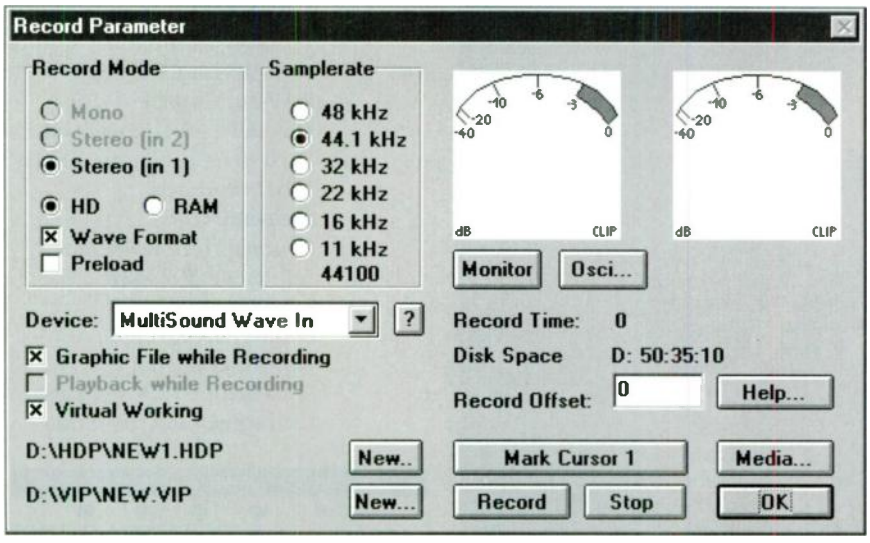


FIG. 3: The Record Parameter dialog box offers several recording options, including selectable sample rate, along with two cool VU meters.

few tracks already, you might also want to preload the file buffers for more efficient program operation.

In addition, you can tell *Samplitude Studio* to display the graphic files of the tracks you're recording. However, this task requires additional computer processing power. If you have a slower computer and you're playing some previously recorded tracks while recording, it's probably better to turn this feature off. Besides, it doesn't take very long for the program to generate the graphics after recording a track.

Finally, *Samplitude Studio* uses Windows multimedia drivers to establish a Media Link between the file you're recording and a Standard MIDI File (SMF) or AVI (video) file. I was able to link SMFs to recordings with no trouble. However, the few AVI files I have opened would not play when I linked them to Virtual Projects. On the other hand, *Samplitude Studio*'s Virtual Project demo with an AVI file played just fine. I haven't had much experience dealing with multimedia video, so user error is likely in this case.

Product Summary

PRODUCT:
SEK'D *Samplitude Studio* 2.06

PRICE:
$398

SYSTEM REQUIREMENTS:
PC with 66 MHz 80486DX2 or better running Windows 3.1, Windows for Workgroups, or Windows 95; 4 MB of RAM (8 to 16 MB of RAM recommended); Windows-compatible sound card (except Roland RAP-10); fast hard drive (fast ATA, EIDE, or SCSI-2 hard drive recommended); MIDI interface

DISTRIBUTOR:
Soundspiration Systems
tel. (214) 298-3472
fax (214) 298-8751
e-mail 75162.1066@compuserve.com
Web http://www.sekd.com

CIRCLE #439 ON READER SERVICE CARD

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

OBJECT LESSON

When the Virtual Working option is selected in the Record Parameter dialog box, *Samplitude Studio* automatically places an Object (a graphic representation of the recorded file) in the selected track of the Virtual Project window (see **Fig. 2**). Objects can be manipulated in a variety of ways—even deleted—without altering the original data.

For instance, you can move and copy Objects within or between tracks. Objects can also "snap" to a user-defined time grid based on samples, SMPTE frames, or bars and beats (more in a moment). Moreover, you can change an Object's start and end times by moving the "handles" in the lower corners. Handles in the upper corners let you fade in and out of an Object. However, these fades are linear; for logarithmic or exponential fades, you must select Fade In/Out in the Edit menu. The top middle handle adjusts the overall volume of the Object.

Finally, you can perform crossfades between two Objects on the same track. Simply drag an Object so it partially overlaps another Object and select the Crossfade command in the Cut menu or click on the Crossfade button in the toolbar. Using the Crossfade Parameter window (see **Fig. 4**), select the desired type of crossfades and adjust their curves and the crossfade time.

Performing these adjustments in real time requires extra processing power from your computer. Fortunately, you can increase the VIP's real-time buffer size to improve performance. However, you might have to apply volume changes and fades to the sample data itself. This alters the data, so perform these changes on copies of the original files whenever possible.

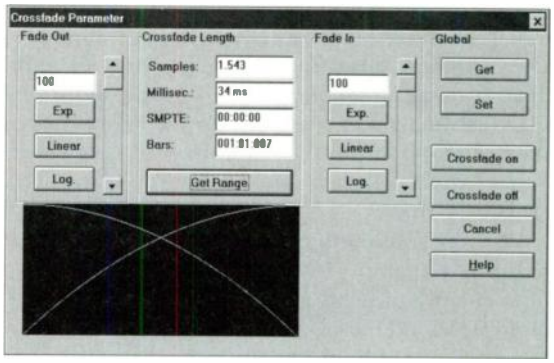


FIG. 4: The Crossfade Parameter dialog box lets you set the values for *Samplitude Studio*'s crossfade functions.

HOME ON THE RANGE

You can also create an Object by highlighting a portion of the sound file (see **Fig. 5**); the highlighted portion is called a Range. A Range does not contain the actual audio data; rather, it points to and nondestructively processes the original data (i.e., the original audio file remains intact).

If you drag the Range into the desired track and time location, it becomes an Object. Although this sounds simple in theory, doing it in other programs can be a real chore. However, *Samplitude Studio* includes some slick tricks that make it easy to create Ranges. For instance, you can adjust the start and end points while the playback is looping through the highlighted area. You can also "flip" a Range right or left

so that the previous end becomes the new beginning or vice versa. In addition, you can "pick up" a Range and drop it on another area of the sound file. Finally, you can move a Range's start or end point to the beginning or end of the Project or the next zero-crossing point.

All these tools come in handy when defining Ranges to restructure a song or to create a piece using portions from multiple sound files. Fortunately, keeping track of all these Ranges is just as easy as making them, thanks to the Range Manager. Once you've highlighted a Range, just call up the Range Manager, and give the new Range a name. Optionally, you can assign Ranges to the first ten function keys and then recall them by pressing the appropriate key.

Another helpful tool is the Bar Grid, which can be overlaid in the VIP window (see **Fig. 5**). The Snap Definition dialog box (see **Fig. 6**) offers three options. The Range option lets you use the current highlighted Range as a template for creating a grid. This makes it easy to use a measure or riff to mark phrases without necessarily creating actual measure boundaries. If you know the tempo of the sound file in beats per minute, you can use the Fixed Bar Snap option to set the grid by entering the time signature, tempo, and resolution in pulses per quarter note. The Free Bar Snap option automatically calculates the tempo after you enter the number of beats in the selected Range.

The Bar Grid is extremely useful if the file has a consistent tempo and time signature throughout. However, changes in tempo or time signature render the bar/beat marks useless. Also, pickup beats and extraneous dead space at the beginning of a sound file will throw off the grid's bar/beat marks. You may need to insert or trim the dead space at the beginning of the file to correct the Bar Grid's timing.

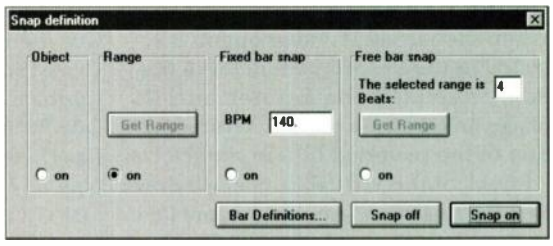


FIG. 6: In the Snap Definition dialog box, you can create a Bar Grid based on a Range, a fixed tempo, or an Object.

EFFECTS PROCESSING

Samplitude Studio offers all the expected signal-processing functions, including simple reverb and echo delay, inverting and reversing the sample data, time stretching, pitch shifting, and graphic and parametric EQ. The program also includes an unusual Normalize function. In addition to offering conventional normalization, *Samplitude Studio* can raise amplitude peaks up to 400% above their original levels. Of course, any peaks that extend above "digital zero" are clipped, but the program still processes sections of lower amplitude as if there were no clipped peaks. You can use this "overnormalization" to create some subtle and not-so-subtle distortion effects.

Another interesting effect is Convolution, which uses one file to "shape" another. For example, suppose you have rented an expensive reverb unit for a day. First, record clicks or rim shots processed through the unit with various parameter settings into *Samplitude Studio*. Then record another file, such as a vocal track, into the program. The Convolution function lets you apply the reverb characteristics of the first file, which is called the *impulse pattern*, to the vocal track without the expensive reverb unit.

You can control the amplitude of the impulse pattern and specify its balance with the other file. You can also specify how many scan points (individual samples in the impulse pattern) will be used to create the Convolution effect. Furthermore, these scan points can be distributed linearly (in equal time increments) or in a "square pulse," in which the beginning of the impulse pattern is more heavily represented than the end.

However, even the fastest Convolution calculation takes eons to perform. On one occasion, I waited nearly ten minutes for *Samplitude Studio* to process a 10-second portion of a sound file. As a result, I never had a fair chance to evaluate the quality of the processing. To be honest, I'm skeptical.

Though interesting, this feature is problematic. To begin with, you can't preview the effect before you start the process. More important, when you apply an impulse pattern from the source sound to another type of sound, sometimes you can hear the decay of the source sound. (I was able to hear this in the examples included with the program.) Overall, I'd say the Convolution feature is okay for experimenting when time is not a factor, but it's impractical for serious production work.

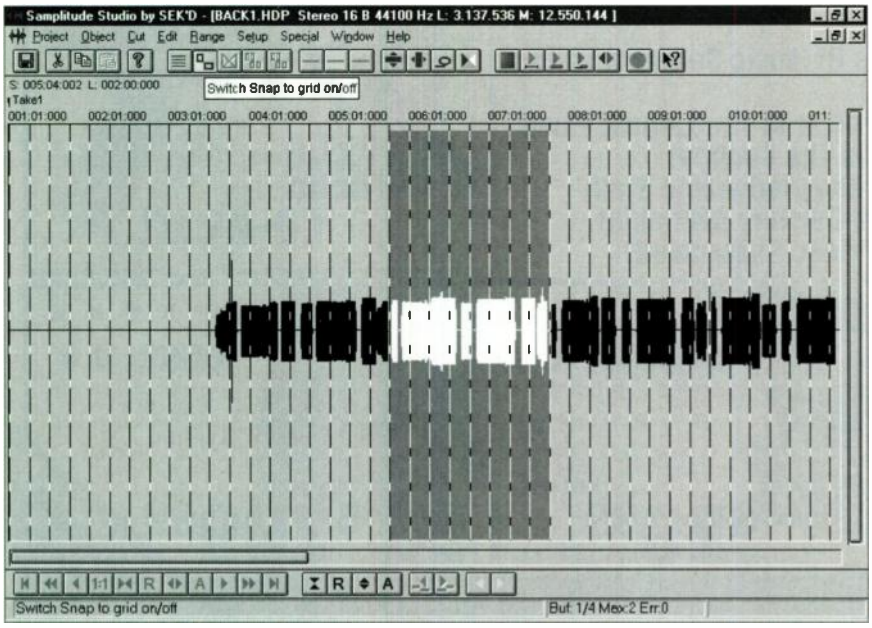


FIG. 5: This graphic display of a Hard Disk Project includes a highlighted Range and a Bar Grid overlay.

WISH LIST

I ran into some problems when working with *Samplitude Studio*'s synchronization options. The program generates

and receives MIDI Clock, and it receives SMPTE/MTC. However, when I tried to slave the program to MIDI Time Code, the program started counting MIDI Clocks (at least, the program's display said it was counting MIDI Clocks rather than MTC) before I started the clock master. When I did start the clock master, the program locked up. The same thing happened when *Samplitude Studio* was set to receive MIDI Clock input.

However, the program transmitted MIDI Clocks just fine. I never discovered the reason for this problem, and SEK'D's representative has not encountered it before. Furthermore, the problem disappeared as soon as I used SMPTE time code for synchronization.

While we're on the subject, I wish *Samplitude Studio* generated SMPTE and MIDI Time Code rather than simply receiving it. SEK'D claims this feature is difficult to implement in software, which is true, but the company plans to add MTC transmission in a future version.

Unfortunately, the program disk is copy protected. As a Windows user, I don't face this situation often, and I get uncomfortable when I can't make backup disks of my software. Once the software is installed, you can copy it to another storage device, but as with many Windows applications, there are files scattered all over the disk, making it impractical to back up in this way. Of course, you can back up to a tape drive, which is more convenient. In addition, the number of installs from the master disk is unlimited. Finally, SEK'D provides replacement disks should registered users need them.

All things considered, these are relatively minor problems compared to what you get for your money. The bottom line is that I like working with *Samplitude Studio*. The program is also proof that you can't always rely on first impressions. I was not impressed with the demo I downloaded several months ago and, judging by many of the online messages I monitored, neither were other people. However, the demo doesn't do this program justice. If you're one of those people who saw that demo and passed on the program, I suggest you give it another look.

Zack Price *lives in a weird parallel universe in which the Northwestern University Wildcats are nationally ranked Big Ten champions and Rose Bowl contestants.*

Audio-Technica ATH-M40 & ATH-D40

By Michael Cooper

Could these be the ultimate studio headphones?

I look for several things when buying studio headphones. They must offer accurate sound and be easy to listen to and wear for extended periods of time. Also, they must offer good isolation if they're to be used for tracking vocals and close-miked instruments.

There are times, however, when extremely accurate sound is *not* what you want. Bass players and drummers, for instance, often want more punch and fullness in the bottom end than a "flat" pair of headphones can deliver.

Audio-Technica has produced two new sets of headphones that are bound to please both camps. The linear ATH-M40s are engineered to give you the flat, honest truth. The bass-enhanced ATH-D40s are geared toward bottom dwellers who want to hear their music thunder. Both models do their jobs extremely well.

COMMON GROUND

Aside from the slightly different model numbers screened on the outside ear cups, the two models look virtually identical. A generously long (11-foot), thickly jacketed cable mates to the left earpiece and runs through the lushly padded headband over to the right channel, keeping your chin free of a strangling Y-cord. Most of my clients thought these cans were quite comfortable. (The exceptions were a couple of dudes with really large heads, who preferred a looser fit.) The ¼-inch, TRS plug is not molded, allowing for quick field repairs.

These are circumaural, closed-back, dynamic headphones, so they offer excellent isolation for tracking vocals and such. Where headphone bleed is not a concern, you can rotate either earpiece 180° to allow one-ear monitoring.

Boasting sky-high output and an impressive maximum input power spec (see the sidebar "ATH-M40/D40 Specifications"), these babies will rattle even the deafest drummer, and you won't burn them up when you crank up your headphone amp to "11."

ATH-M40/D40 Specifications

Type	closed-back dynamic
Driver Size	40 mm diameter
Magnet	neodymium
Voice Coil	copper-clad aluminum wire
Frequency Response	M40: 5 Hz-28 kHz D40: 20 Hz-28 kHz
Max Input Power	1,600 mW @ 1 kHz
Sensitivity	M40: 100 dB D40: 102 dB
Impedance	M40: 60Ω D40: 66Ω

FLAT CANS

The ATH-M40s' stated frequency response is 5 Hz to 28 kHz. To my ears, they offer a more extended and tighter bass than respected, established models such as the Fostex T20 and AKG K270S headphones. You'll clearly hear any rumble in your mixes.

The M40s are a bit more present in the mids and produce slightly less high-frequency detail than the Fostex and AKG models, making them less fatiguing to listen to for long periods of time. You'll hear a little more high-end detail with the T20 and K270S headphones, but you will probably suffer a quicker

Audio-Technica's ATH-M40 and ATH-D40 circumaural, dynamic headphones are loud and clear. The M40 has a relatively flat response, but the D40 has an intentionally exaggerated bass.

Product Summary

PRODUCT:
ATH-M40 and ATH-D40 studio headphones
PRICE:
$175 each
MANUFACTURER:
Audio-Technica
tel. (216) 686-2600
fax (216) 686-0719
e-mail pro@atus.com
CIRCLE #440 ON READER SERVICE CARD

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

onset of "headphone ear." As far as sheer power goes, there's no contest: the M40s are much louder.

A LOW BLOW

Although the D40s' frequency response does not extend as far into the bass as that of the M40, the D40s do indeed have a more "hyped" low end. These headphones are clearly and intentionally not flat when compared to the M40s; the bass is boosted significantly, the midrange is less present, and the highs are sharper. This is a good curve for hearing trap drums, especially cymbals, in a dense cue mix. In fact, the *D* in the model number stands for *drums,* one of the intended applications.

I had only one pair of each model, so when I used them for tracking full bands, I always gave the drummer the M40s and the bass player the D40s. As a result, I can't say how drummers like the D40s. However, I can say that bass players *love* them. Mark Schneider, one of the hottest bassists in Eugene, Oregon, usually carries his Sony MDR-7506 headphones to recording sessions because they really let him hear his bass in a thick mix. One listen to the subterranean ATH-D40s, however, and the Sonys were history.

▼

There are times when extremely accurate sound is *not* what you want.

The D40s are useful for more than just bass and drums, however. When you have a great guitar sound but the guitarist wants to hear more bottom, you don't need to EQ the tape return/cue send. Instead, just hand that string-strummer the D40s.

IN THE CAN

I only have one ridiculously minor gripe with Audio-Technica's new headphones. It would be a lot easier to remember which model has the enhanced bass if they were designated B40 for *bass* and F40 for *flat.* But name them as you like, these studio phones set a new performance standard.

These are excellent-sounding headphones, and they're incredibly loud, to boot. The tight, deep bottom end is particularly impressive on both models. This attribute, along with an overall smooth and nonfatiguing tonal character, has made the M40s my preferred reference headphones for mixing.

Both models offer top-notch performance for tracking. They're rugged, too; my clients have dropped each set a few times without any apparent damage. People with normal-sized or small heads will find them extremely comfortable to wear.

At $175 a pair, the ATH-M40s and ATH-D40s are not cheap. But for two months, I never heard anyone gripe, "I can't hear the bass" or "All I hear are my live drums; can you turn up my cans any louder?" I'm sold. I'm keeping these cans and ordering more!

Michael Cooper *is a recording engineer, producer, and owner of Michael Cooper Recording in Eugene, Oregon.*

Roland MS-1

By Erik Hawkins

This sampler could have been a contender.

The MS-1 sampler offers excellent sound quality at all sample rates. However, the onboard sequencer is pretty useless, and there is no individual sample tuning.

Roland has had a long and distinguished reputation for producing superbly crafted, professional samplers. With video outputs, mouse ports, internal hard disks, and advanced software that can be easily upgraded, most Roland samplers allow user-friendly editing, assembling, and organizing of samples without requiring a computer.

However, Roland's latest sampler—the MS-1—takes an abrupt turn in a new direction for the company. This small, tabletop module has no video output or mouse port. Instead, it offers cheap and cheerful sampling intended for phrase-oriented, beat-loop, or fly-in applications.

FIRST GLANCE

The MS-1 looks a lot like a BOSS drum machine, thanks to its size, shape, small LED screen, and big, rubber play pads. The unit operates on six AA batteries or a 9 VDC adapter. (Batteries come with the unit, but the wall wart doesn't. I hate it when a manufacturer does that!) Under continuous use, regular carbon batteries are expected to last three hours, whereas rechargeable batteries should last about ten hours. There is an on/off switch on the back of the unit.

Like many modern samplers, D/A and A/D resolution is 16-bit. Inputs and outputs operate at a nominal level of -10 dBV. The sample inputs include an ⅛-inch, stereo minijack; two RCA jacks; and a ¼-inch, high-impedance, unbalanced mic input. The minijack is powered (+1.5V), so it can be used with compatible lavaliere mics. The inputs are not available simultaneously; you set a parameter to select the input you want. The outputs are stereo RCA jacks, and the headphone output is an ⅛-inch minijack. MIDI In and Out jacks round out the connections. (There is no MIDI Thru.) An infinitely rotating thumbwheel on the side of the MS-1 controls the headphone volume and doubles as a data-entry wheel in Edit mode.

A normally-closed footswitch (such as the Roland DP-2) can be used to start and stop sampling, start and stop the onboard sequencer, or trigger a selected sample. The MS-1's maximum polyphony is four voices, but 4-voice polyphony is only available in two out of five sample banks, and the unit is monophonic when you use 44.1 kHz samples.

The MS-1 comes bundled with an audio CD containing excerpts from a bunch of different sample libraries. The sound developers/distributors represented on this CD include Time and Space (England), Best Service Soundware Co. (Germany), Advanced Media Group (England), and WC Music Research (Canada). I was impressed by the variety and quality of the sounds on this CD. It is an excellent starter CD and a nice extra if you buy this unit.

MEMORY AND SEQUENCING

The MS-1 has four sample rates to choose from: High (44.1 kHz), Standard (32 kHz), Long 1 (22.05 kHz), and Long 2 (16 kHz). As you'd expect, the rate you choose dictates how much sample time you have available (see the table "Sample Rates and Times").

Sample Rates and Times

Sample Rate	Internal Memory (in sec.)	2.5 MB Card (in sec.)	5 MB Card (in sec.)	10 MB Card (in sec.)
High (44.1 kHz)	19.6	127.3	258.0	519.6
Standard (32 kHz)	27.0	175.4	355.7	716.1
Long 1 (22.05 kHz)	39.2	254.6	516.0	1,039.2
Long 2 (16 kHz)	54.0	350.9	711.3	1,432.2

The unit uses Roland's newly developed R-DAC sampling technology. According to Roland, R-DAC is a form of real-time audio coding that gives you better than four times more sampling time per megabyte than is possible with conventional digital recording. At 44.1 kHz, for example, 5 MB usually holds one minute of monophonic audio; with R-DAC, 5 MB holds 4.3 minutes at the same sample rate.

The internal sample memory includes only 384 KB of Flash RAM, although this provides more sample time than you would expect, thanks to R-DAC. Additional sample memory can be added to the MS-1 in the form of Flash RAM cards. Besides increasing the unit's total sample time, the cards provide a convenient way to back up internal samples and sequences. Back-up files and samples can coexist on the same card. The cards are available in 1.8, 2.5, 5, 10, and 20 MB sizes and range in price from about $195 for the 1.8 MB card to about $875 for the 20 MB card.

Samples are organized into banks of eight, with one sample assigned to each of the eight rubber pads. There are two banks in the internal memory, and three banks are available on a RAM card.

The onboard sequencer is the same single-track, real-time phrase recorder (called a Realtime Phrase Sequencer, or RPS) that is found on several contemporary Roland products. No MIDI information is sent out when playing a sequence, but you can record using an external MIDI controller. There are no overdub capabilities, no editing features, and no tempo controls; the tempo you play is the tempo you're stuck with. Up to 900 notes can be stored in the sequencer's memory, which is separate from sample memory, so filling up the sequencer doesn't cut into your available sample time.

The unit provides minimal sequencer-transport controls: Play, Stop, Record, and Reset (return to the beginning). There is no rewind or fast forward. However, there is a Repeat button, which seamlessly loops the current sequence until you press Stop. You can store up to four sequences in the MS-1. If a sequence is playing, however, you must stop it by pressing Stop or by letting it end before you play another sequence. You cannot play seamlessly from one sequence to the next.

I think the sequencer is relatively useless. I can't help imagining what a cool unit this would be if it were equipped with a full-fledged, drum-machine-style sequencer. Of course, as with any MIDI recorder, you can create a more elaborate sequence in an external sequencer and record it to the MS-1 in real time.

SAMPLING AND MIDI

Sampling with the MS-1 is marvelously simple: just hit the red Sampling button, hit one of the eight pads to specify where the sample will reside, set up the input (mic or line, stereo or mono), adjust the input level, and hit the Sampling button again to begin sampling. To stop sampling, hit the Sampling button yet again. The MS-1 pauses for a second to write the sample to RAM, after which the sample is ready to be played and edited.

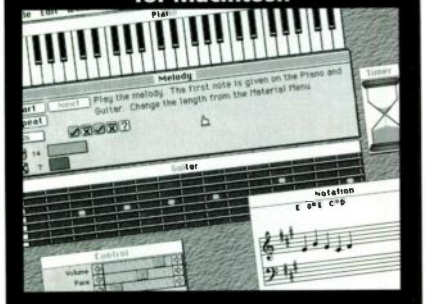
The editing capabilities of the MS-1 are very basic. First, you can adjust the start and end points of a sample. After you have adjusted these points, you can truncate the sample to optimize sample space. In addition, two kinds of loops are available: S-E and L-E. In S-E mode, the sample loops from its start point to its end point. The L-E loop plays the sample from its start point to its end point and then loops back to a designated loop-start point. The loop function can be turned on or off for each sample.

Once you enter the MS-1's Edit mode and change a parameter, there is no way to revert to the original sample unless you remember what the previous value was. (In most samplers, if you accidentally change a parameter value, you can cancel the editing operation before it is executed.) If you

Product Summary

PRODUCT:
MS-1 Digital Sampler
PRICE:
$695
MANUFACTURER:
Roland Corporation US
tel. (213) 685-5141
fax (213) 722-0911
CIRCLE #441 ON READER SERVICE CARD

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



have enough memory, you can copy a sample to a different pad and edit at will while retaining the original.

The MS-1 has a global-tuning function, but it does not allow samples to be individually tuned. If you want to tune a new sample to match a sample already in RAM, you must adjust the global-tune function to the desired pitch, record the new sample at this tuning, and then tune the MS-1 back to zero.

If you've ever tried building a groove with several sampled loops that have differing tempos, you know how tricky it can be. The key to making them work together is matching their tempos. This is done by meticulously tuning each sample up or down until the desired tempo is reached. The ability to tune individual samples while building a groove in this manner is essential. The fact that the MS-1 doesn't offer this feature is a big strike against it.

▼

The editing capabilities of the MS-1 are very basic.

The most advanced editing feature in the MS-1 is the Divide function, which lets you divide a single sample among several pads. This is useful when you have a big sample with a series of separate sounds that you want to play individually. To do this, each sound must be extracted from the original sample by moving the end point to the end of the first sound and Dividing, or cutting, the material after the end point to another pad. This process can be repeated until all the sounds have been divided out to their own pads. The process is destructive, so don't expect to go back to the original sample if you make a mistake.

There are three types of trigger settings: Gate, Trigger, and Drum. The Gate setting plays a sample as long as its pad is held down; when the pad is released, the sample stops. With the Trigger setting, striking a pad plays the sample until the pad is struck again. The Drum setting works just like a drum machine: each time a pad is struck, the sample is retriggered.

Samples can be assigned to a Mute Group, which prevents them from playing simultaneously. This parameter is indispensable when you want one sample to cut off another (e.g., open and closed hi-hat samples). The three trigger settings and the Mute Group parameter all work in the same way when playing the MS-1 from an MIDI external controller.

Any sample can be mapped to any MIDI note for convenient playback from an external controller or sequencer. The MS-1's pads are not Velocity sensitive, but the samples are Velocity sensitive when controlled via MIDI. The MS-1 responds only to Note On messages and SysEx bulk loads; all other types of messages are ignored. It would have been nice if Roland had included recognition of Start, Stop, Continue, Song Position Pointer, and Clock.

MIDI channels 1 through 16 are recognized, but the unit only operates in Omni Off/Poly mode (that is, it can only recognize one MIDI channel at a time). The only type of messages sent by the MS-1 are SysEx bulk dumps. It does not send Note On/Off when you play the pads.

IN MY OPINION

The sound quality of the MS-1 is amazingly good, even when using its low sampling rates. The default sample rate (Standard) provides plenty of bandwidth and sample time for almost all applications. Rappers and deejays will love its phat, warm sound. It sounds a lot like Roland's original S-50 sampler but with rounder, more refined DACs.

Overall, the idea behind the MS-1 is very good. There is definitely a place for a small, tabletop sampler that is easy to use and has lots of sample time. It's the perfect composition tool for deejays, rappers, and other sample heads, and it works great as a cart replacement in broadcasting. Unfortunately, it's an incomplete product. If Roland had included just a few more features, such as 8-voice polyphony, individual sample tuning, and a comprehensive sequencer, it would be a great product. If they had also lowered the price by $50, it would be an unbeatable product.

Erik Hawkins *is a being from the Groove Infinite Collective, a dimension just behind the beat but always in the pocket. Do it with soul or don't do it at all.*

Mark of the Unicorn Unisyn 1.2 (Win)

By Vinnie Tieto

Patch management so powerful and easy it's almost synful.

For electronic musicians who work in the Windows world, the past few years have been the best of times and the worst of times. The computers continue to get more powerful and easier to use, resulting in strong support and increasing dominance in the marketplace. A wide range of high-quality sequencers, sound cards, and hard-disk recording systems have laid the groundwork for a serious music-making environment.

These developments make it all the more frustrating that one important category of software has been woefully neglected: universal editor/librarians. This weak spot has caused some frustrated PC users to sneak longing looks over at the Mac world, where cool MIDI software almost seems to be a birthright.

But as Bob Dylan once said, "The times, they are a changin'." For evidence, consider *Unisyn,* Mark of the Unicorn's universal editor/librarian program. Descended from Dr. T's *X-oR,* one of the first universal ed/lib programs, *Unisyn* has been available for some time on the Macintosh. (The Mac version was reviewed in the January 1994 **EM**.) Now the program is available for Windows, too. By all accounts, previous incarnations have performed admirably.

THE BASICS

I tested *Unisyn* on a 33 MHz 80486DX machine with 8 MB of RAM. My MIDI system includes a master keyboard, an analog synthesizer, three tone modules, two signal processors, and a drum machine.

Installation is straightforward and includes selecting Profiles for your gear. A Profile is a special file that contains all the technical details about each device: communication protocols, Patch formats, parameter ranges, etc. *Unisyn* includes more than 200 Profiles for a variety of old and new synths, drum machines, signal processors, and other MIDI devices. Installing Profiles is a snap. You simply go down the list and highlight the name of each device in your MIDI studio.

The first time you launch the program, you are prompted to specify the devices in your setup and provide a few details, such as how the devices are connected to the computer. This is a one-time procedure, but you can always change a device setting if the need arises.

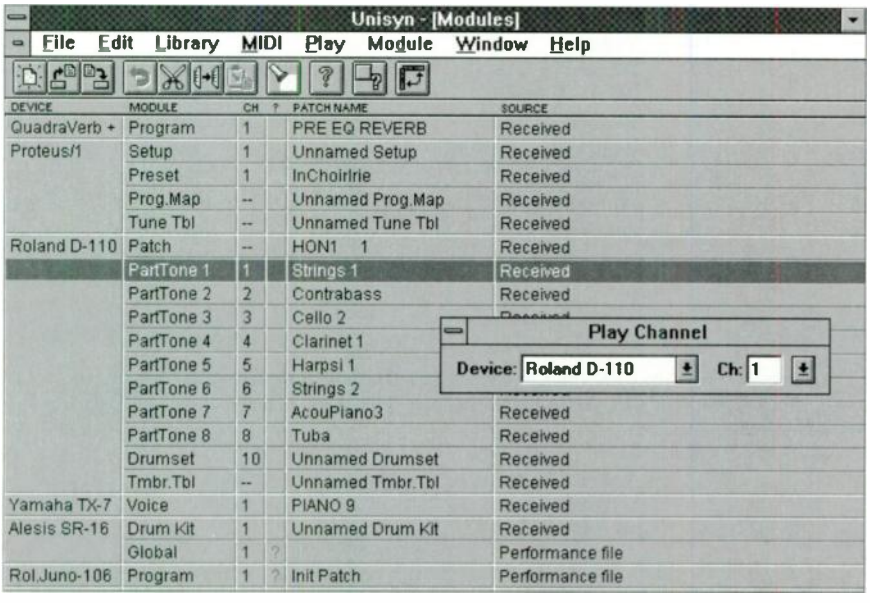


FIG. 1: The Modules window is "command central" for *Unisyn*. The Source column indicates that data was received after issuing a Get Group command. The Play Channel window keeps track of the port/channel to which you're echoing.

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RATE THE ARTICLES IN THIS ISSUE!

MARCH 1996

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

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The Modules window (see **Fig. 1**) is *Unisyn*'s central screen and provides an overview of your studio at any given moment. However, the term "module" is not used in its normal sense; for example, the Roland D-110 is considered a Device, whereas a Module is one of the data types found within that device. The D-110 has eight separately addressable timbres (called "PartTones"), a multitimbral setup ("Patch"), a drum setup, and a timbre table (which includes several parameters for each PartTone, such as Tone number, key shift, and fine tune). This is a total of eleven Modules, all of which are listed separately in the Modules window. Along with the Device and Module names, you can see the MIDI channel, Patch name, and source of the Patch in this window.

Unisyn offers several ways to monitor your sounds. To start with, you can click on the Screenkeys onscreen graphic keyboard with the mouse. Somewhat more functional is MousePlay, which sounds a note by clicking the right mouse button; the mouse position controls the pitch and Velocity. In Glissando mode, dragging the mouse produces one of thirteen different scales.

The most practical way to monitor sound is setting an Echo Channel and playing your master keyboard. When it's open, the Play Channel window stays in the foreground and serves as a constant reminder of the port and/or channel to which you are sending data.

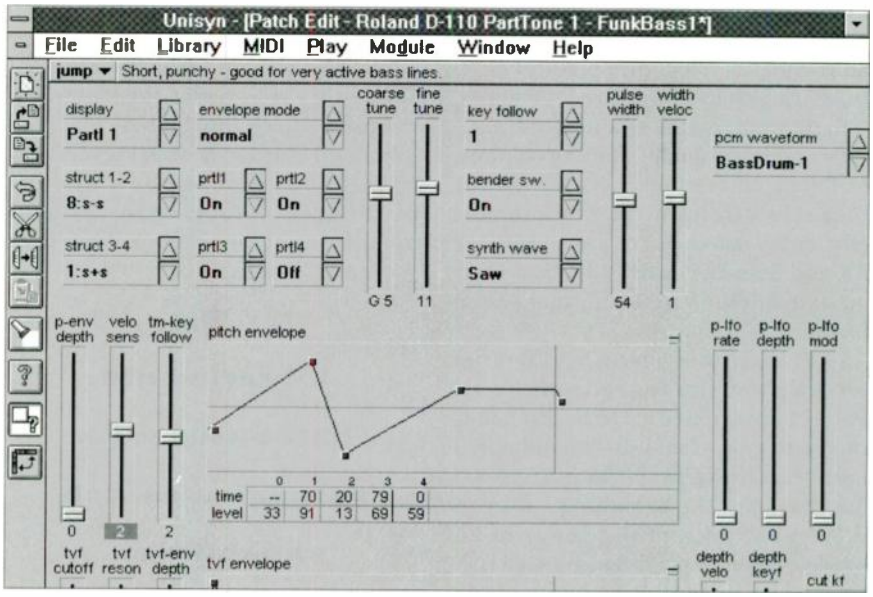


FIG. 3: The D-110 Patch Editor lets you tweak a sound. Any comments appear in the strip adjacent to the Jump menu.

GROUPS AND PERFORMANCES

One of the most important things you can do with *Unisyn* is retrieve and save data from your MIDI devices. The Get Group command offers a lot of flexibility; you can choose to retrieve just the Banks, just the Patches, or a combination of both for a complete "snapshot" of your studio. Even better, you can create your own custom Groups that include any combination of Banks and Patches in any of your devices.

For example, the SysEx dump procedure on my Roland Juno-106 is cumbersome, so I created a custom Group that saved the data from every device except the Juno. Custom Groups are also useful if you have a large setup. You might write a song that only uses a couple of devices; why not create a custom Group that retrieves the data from those devices only? If you use the same custom Group repeatedly (and you probably will), you can name and save it, after which it becomes an easily accessible menu item. This is very cool stuff.

A Performance is the file containing your studio snapshot on disk. It can include Group data you retrieve, as well as Patches from a Bank or Library. Once you have saved a combination of Patches and/or Banks as a Performance, it can be recalled at any time. One handy feature is the ability to attach comments to a Performance; these might include mixer settings, audio-routing notes, or any pertinent details about a particular recording session. Comments can also be attached to Banks and Patches.

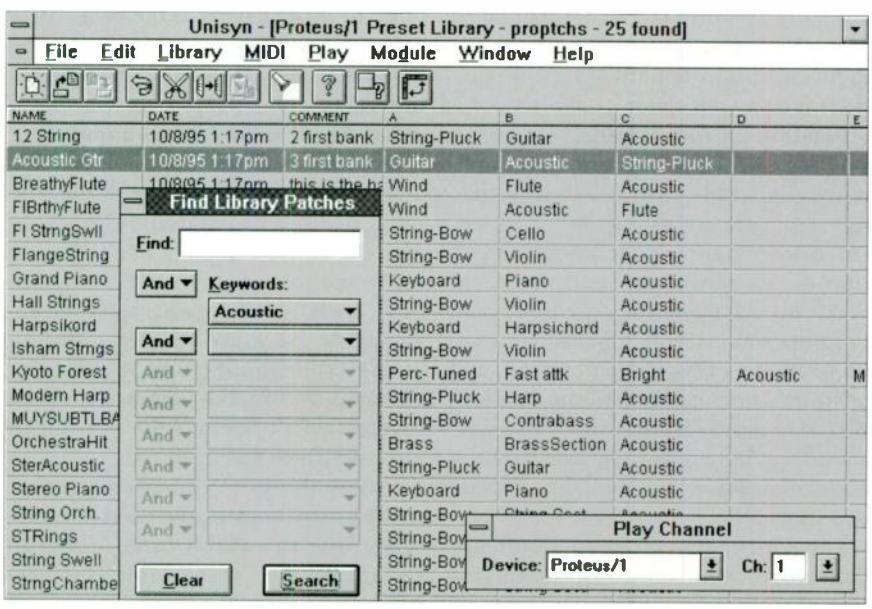


FIG. 2: The Find command lets you find all Patches that conform to your criteria. A search for keyword *Acoustic* displays all the Patches with that keyword in all currently open Libraries.

BANKS AND LIBRARIES

The Bank-editing features are well implemented. Patches can be cut, copied, and pasted, and the Clear command initializes any selected Patches. Patch-dragging options include Move, Copy, and Swap; the cursor changes shape to clarify the current option (e.g., it displays an *M* for a Move operation),

which is a nice touch. *Unisyn* also supports such standard conventions as Shift-click to select a range and Control-click to select nonadjacent Patches.

Bank windows are sizable both vertically and horizontally, and the columns of Patch names automatically adjust themselves to fit in the window most efficiently. Banks can be saved in MIDI-EX and Standard MIDI File (SMF) formats, in addition to the normal *Unisyn* format.

Banks have their place, but Libraries are where it's at for state-of-the-art Patch management. Of course, they can store tons of sounds—an unlimited number, for all practical purposes—but that's just the beginning.

To get an idea of the power of Libraries, imagine the following scenario. You're sequencing a new song, and you need to find an appropriate Patch for the bass part. A few mouse clicks later, *Unisyn* provides a list of every bass Patch on each of your devices. You decide you need a gauzy background pad for the second verse, maybe something with a soft attack and a long decay. Click, click, and every Patch you own fitting that description is listed for each device with an open Library.

Libraries are more than just glorified Banks; they're actually databases with extensive search capabilities. The Find command (see **Fig. 2**) offers several different ways to hunt down just the Patches you're looking for. When I typed *String* in the text box, I got back

▼

Libraries are databases with extensive search capabilities.

"Hall Strings," "String Orch," "12 String," and every other Patch I have with *String* somewhere in the title.

An even more in-depth method uses keywords. A keyword is simply a word assigned to a Patch that describes it. A Patch called "Harp2" might have keywords like *Harp, New Age,* and *Mellow.* A search on the keyword *Mellow* will return "Harp2" along with any other Patch that has been assigned the keyword *Mellow.*

There is a down side to this power: you must do the initial work of assigning keywords, which can be tedious and time consuming if you have a lot of Patches in your Libraries. You might end up spending a number of hours assigning keywords to Patches, but once you start using keywords and seeing their enormous benefit, you will consider it time well spent.

In addition, *Unisyn* helps you out in this regard. The program has much more than 100 musically descriptive terms that are accessible in the Library Patch Information dialog box. And if that doesn't quite cover it, you can make up your own keywords. If you program sounds, you might find it useful to create a keyword with your name or initials and assign it to the Patches you've created. To save time, you can also assign keywords to several Patches at once as you copy them from a Bank to a Library.

The *Unisyn* manual says, "Don't Go Overboard!" with keywords; you can assign as many as eight to each Patch or Group. However, having a variety of different keywords for each sound can actually help you be more creative. You might want to search for a sound based on a musical category ("*Unisyn,* show me all my jazz sounds.") or punchiness *(Hard Attack)* or synth technology *(Analog)* or emotional effect *(Edgy)* or solo quality *(Lead Voice).* The Find command supports logical operators (*And, Or, Not*), which can help pinpoint the sound you're looking for. If you've assigned your keywords well, you have a good chance of finding that ideal sound or at least something close enough to tweak.

THE PATCH EDITOR

Double-clicking on a Patch brings up the Patch Edit window (see **Fig. 3**), where sliders, envelope graphs, pop-up menus, and other objects are used to edit parameters. At first, I was turned off by the appearance of the Patch Editor, with its black text, gray background, and minimal use of color. This austere look seemed somewhat lifeless compared to the editors I've used in the past. With time, however, I developed a greater appreciation for the clean, simple layout and the lack of eyestrain as a result of the black-on-gray color scheme.

All edit parameters are found on one page. With more sophisticated devices, this can make for a rather long page, amounting to several screens full of controls. The Jump Menu is a big help with these larger pages. Tucked away in the upper left corner of the screen, it's a pull-down menu that helps you jump to specific parts of the page. After you develop a feel for where the major parameters are, navigating the page is a breeze.

The Patch Editor offers a few other nice little amenities, as well. For example, the envelope graphs display the numeric values of the envelope along with the graphic depiction; a Split Box lets you turn off the numbers, allowing for a larger visual display of the envelope. If you move a slider and then change your mind, you can slide the cursor away from the parameter, which reverts to its original value. (You can also use Undo Last Edit to accomplish the same thing). Another editing feature lets you copy predefined parameters from one Patch to another, to several Patches, or to a different section within the same Patch.

On the other hand, I found myself missing some features to which I'd

grown accustomed in other programs. For example, when I program a multi-envelope Patch for the D-110 or Yamaha TX7, I like to see all the envelopes onscreen at the same time. *Unisyn*'s TX7 editor shows a maximum of two envelopes on one screen, and the D-110 editor shows the parameters for only one Partial at a time. The Copy Predefined Sections feature is a plus, but I'd like the ability to lock different combinations of envelopes together and edit them simultaneously. In addition, if I move a slider, there's no way to tell what its value was once I change any other parameter.

DX/TX programmers are familiar with the concept of algorithms, those esoteric configurations that are best represented graphically. The TX7 editor lacks these helpful graphic depictions. Instead, an algorithm is represented by something like this: ([6>5+4]>3)+(*2>1). Not indecipherable, mind you, just a step or two further into the abstract than I care to venture.

The Blend and Mingle function and Randomize function offer an alternative to creating Patches from scratch or editing existing Patches. Blend and Mingle allows you to select two Patches from any open Bank or Library and generate a Bank of Patches that combine elements from both of the sources. The transition between source Patches can be smooth or random, depending on the selected algorithm.

A promising feature is the Parameter Mask, which lets you select which parameters are changed during automatic Patch generation and which are left untouched. Unfortunately, I couldn't try this with Blend and Mingle due to a bug in my version of the program. (MOTU is aware of this problem and says that a free maintenance update will be available shortly via download from AOL, CompuServe, and MOTU's Web site.)

I had better luck using the Parameter Mask with the Randomize function, which generates a Bank of Patches that are random variations of one source Patch. The Chaos Control buttons let you determine the degree of randomization. As with most things, experimentation and patience are the keys to obtaining good results with random Patch generation.

If you like to create new Patches using these types of tools, you should be pleased with what *Unisyn* has to offer. You can generate entire Banks of new sounds in no time with just a few mouse clicks, and you might be pleasantly surprised with the results.

CONCLUSIONS

Unisyn has an excellent manual and an abundance of easily accessible help information for every device it supports. The hardest part is the setup; I did encounter some snafus in getting everything to work together properly, but the problem was traced to something other than the program in virtually every instance. *Unisyn* functioned well with a Mark of the Unicorn MIDI Time Piece II and Music Quest 8Port/SE. It also offered glitch-free Patch editing while a multitrack sequence was running simultaneously in Cakewalk Software's *Cakewalk Pro*.

If you're making music on a PC and you have more than a couple of MIDI devices, I can't think of a reason not to own this program. Even those with a fairly minimal setup might find its powerful Library functions too tempting to resist. *Unisyn* delivers on its promise; it will save you time and make your creative sessions much more productive and enjoyable. Isn't that what great software is all about?

Product Summary

PRODUCT:
Unisyn 1.2 universal editor/librarian
PRICE:
$395
SYSTEM REQUIREMENTS:
80386 or better PC; Windows 3.1 or Windows 95; hard drive; MIDI interface
MANUFACTURER:
Mark of the Unicorn
tel. (617) 576-2760
fax (617) 576-3609
e-mail info@motu.com
Web http://www.motu.com
CIRCLE #442 ON READER SERVICE CARD

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

Vinnie Tieto *is a San Francisco Bay Area computer consultant, electronic-music composer, jazz saxophonist, writer, and teacher.*

Rocksonics MVCA-4

By Erik Hawkins

Four MIDI-controlled VCAs lend an extra hand in the mix.

There is nothing new about using voltage-controlled amplifiers (VCAs) for automated control of sound levels. Used in everything from analog synthesizers to professional mixing consoles, VCAs have long been a core technology for this application.

If you put a group of VCAs under MIDI control, you can automate your mix with a sequencer, which lets you edit the gain changes with relative ease. If the VCAs are good enough, this is superior to sending MIDI Control Change 7 messages directly to your synths because the VCAs change the gain after your mixer preamps, so they don't wreck the signal chain's gain structure. And of course, MIDI-controlled VCAs can automate all your levels, not just the levels of your MIDI instruments. For these reasons, MIDI-controlled VCA boxes such as the Niche Audio Control Module (ACM) have gained a modest popularity.

One of the newest such devices is Rocksonics' MVCA-4, which offers four good-sounding VCAs in a compact, moderately priced box. Housed in a sturdy, half-rackspace, black metal chassis, the MVCA-4 is small enough to fit just about anywhere. Rocksonics' RK-2 mounting bracket ($39) lets you mount two MVCA-4s in one rackspace.

Rocksonics' MVCA-4 provides four MIDI-controllable, good-sounding VCAs in a compact, inexpensive, easy-to-use box.

ON THE SURFACE

The front panel of the MVCA-4 sports MIDI In and Thru jacks (there is no MIDI Out), a power-indicator light, and four orange, detented, rotary pots for selecting each VCA's MIDI channel. The rear panel has ¼-inch, unbalanced (-10 dBm) audio inputs and outputs for each channel. The unit is powered by a 12 VAC, 500 mA wall wart. As there is no power switch, the unit is on when plugged in.

Integrating the MVCA-4 into your system is a simple matter of plugging a MIDI cable into its front panel and audio sends and returns into its rear. The unit will work in-line, between a source and its destination (e.g., between a guitar and an amp), or it can be plugged into the inserts of a mixer. By the time you read this, new units will have high-impedance buffers on all the VCA inputs, which should help avoid impedance-matching problems with tube equipment (e.g., when automating on-stage levels for multiple guitar amps).

Each VCA can be independently set to receive on any MIDI channel. The rotary pots that set the MIDI channel (which are actually shafts, rather than real knobs) and the channel-number hash marks are annoyingly small, which makes it difficult to select a desired channel. I'd prefer to see real knobs that are easier to turn and that line up with the MIDI channel numbers, but this is a minor issue, as most people will probably set the channel assignments once and leave them alone.

One thing I really missed on the MVCA-4 was a MIDI activity light. Considering that this unit is a dedicated MIDI peripheral, it really needs one. Fortunately, Rocksonics is planning to add a MIDI-data-present LED sometime in 1996.

MIDI IMPLEMENTATION

The Rocksonics unit can be controlled from virtually any MIDI source, including sequencers, MIDI fader boxes, keyboards, and drum machines. This is possible because the MVCA-4 responds to MIDI Note On messages in addition to Control Change 1 (Modulation) and Control Change 7 (Volume) messages. Any MIDI control source can almost certainly send at least one of these message types. For example, most drum machines don't send CC 1 and CC 7, but you can still use a drum machine to control the MVCA-4 via Note On messages.

The unit responds identically to CC 1 and CC 7. A value of 0 is equal to a gain change of -90.9 dB and a value of 127 is equal to a gain change of +2.9 dB. Both controllers produce smooth, even gain changes. The Note On response, however, causes a snapshot gain change. MIDI notes 36 and below set the gain at -90.9 dB, which gives you an effective MIDI-controlled mute. Notes 96 and above set the gain at +2.9 dB. The notes between 36 and 96 cause incremental gain changes between the two extremes.

The MVCA-4 responds to all three types of MIDI messages all of the time. Consequently, if you are using the mod wheel on your keyboard to control a VCA via CC 1 messages and you accidentally hit the keyboard, the VCA on that MIDI channel will be reset by the Note On message. The MVCA-4 always responds to the last controller it receives, so if you send it all three controllers at the same time on the same MIDI channel, whichever MIDI message reaches it last will determine the gain of the VCA on that MIDI channel.

Note On messages provide a shorter value range than continuous controllers do, and they change the gain in discrete increments. Consequently, the MVCA-4's Note On response has a

MVCA-4 Specifications

VCA Range	-90.9 dB to +2.9 dB
Frequency Response	20 Hz to 20 kHz (±0.5 dB)
THD+N	≤0.05% (@ unity gain)
S/N Ratio	≥90 dB

stepped feel, whereas the Control Change messages provide continuous attenuation. But if you don't need smooth gain changes, the ability to respond to Note On messages is wonderfully useful. Note On commands don't clog the MIDI datastream, they are easier to edit than continuous controllers, and they instantly set precise levels.

I often use a Niche ACM, which lets you control each VCA with a different continuous controller on the same MIDI channel. In contrast, although all four of the MVCA-4's VCAs can be set to the same MIDI channel, that approach gives you no individual control over each VCA. The only application I can think of for this setup would be to control quadraphonic sound.

Of course, by setting two of the VCAs to the same MIDI channel, you can control stereo sources. Therefore, if you plan on adding this unit to your system, make sure you have at least two to four MIDI channels available. If you have a multiport MIDI interface, you'll be in good shape.

Ideally, I'd like to be able to independently assign any MIDI Control Change message (0 to 127) to control each VCA and choose whether to put each VCA on its own MIDI channel or have them all on the same channel. But the MVCA-4's MIDI implementation is acceptable for most applications.

ON THE FADE

Over the month that I was able to play with the MVCA-4, I tried it out on a couple of mixes with a Mackie 8•Bus console and an ADAT. I was very pleased with the unit's sound quality; it did not noticeably color incoming signals. I was also impressed by the speed of its VCAs. Mutes executed with it seemed several milliseconds faster than mutes on the Niche ACM. (According to its specs, the MVCA-4 has about a 5 to 6 ms ramp-up or ramp-down time.)

I found the MVCA-4 incredibly easy to use. Considering how complicated most MIDI systems have become these days, any unit that does the job this quickly and effortlessly should prove a real crowd pleaser. It let me automate my levels without cluttering up my MIDI system, and it didn't bog down my creativity with a convoluted user interface.

The MVCA-4 doesn't break new technological ground, and its feature set and MIDI implementation won't satisfy everyone's needs. But if you want good-sounding, easy-to-use, gain automation at a price that won't hurt your budget, this is the unit for you.

Erik Hawkins, *a producer and musician in Los Angeles County and the San Francisco Bay Area, is currently wrestling the space/time continuum to get more time in a day.*

Product Summary

PRODUCT:
MVCA-4
PRICE:
$269
MANUFACTURER:
Rocksonics
tel. and fax (714) 229-0840
CIRCLE #443 ON READER SERVICE CARD

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

Eye & I Legacy

By Dan Phillips

Load vintage oscillators and filters into your sampler.

Zzzzssshhooooooom! Blip! Bwwaaaooowww! With their lush pads, phat basses, biting leads, and silly effects, analog synths are a significant part of the pop pantheon. Vintage equipment is trendy now, but fad or no fad, analog-synth sounds have real value in music production.

Eye & I Productions' *Legacy: The Definitive Analog Sampler* is an attempt to take the best of these sounds—from a large variety of analog synths—and put them inside your sampler. It is available on audio CD and Akai S1000-format CD-ROM; CD-ROMs in other formats are in the works, but no release dates have been set. Owners of the audio CD can trade up to the CD-ROM version for the difference in list price. I auditioned the Akai S1000-format CD-ROM on a Roland S-760 sampler, using the S-760's ability to read Akai files.

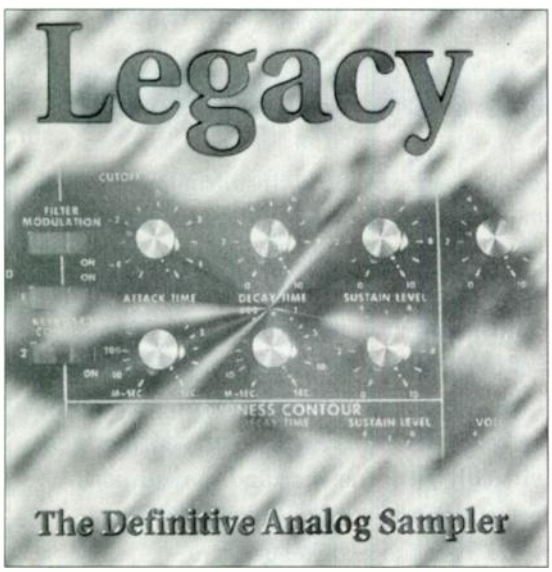
The collection includes samples from the following synths (take a deep breath): the ARP 2600 and Odyssey; Korg Lambda and MS-20; Moog Minimoog and Taurus; Oberheim Two-Voice, OB-8, and OB-Xa; Oxford OSCar; Sequential Circuits Pro-One and Prophet-5; and Roland Juno-106, Jupiter-6, Jupiter-8, and TB-303. There are also samples from four classic drum machines: the Roland TR-808 and TR-909 and the Linn LM-1 and LinnDrum.

Between eight and twenty sounds are offered for each instrument, with the exception of the Korg Lambda, for which there are only two (but one of those is *really* groovy). The CD-ROM offers additional sounds from some instruments. For instance, there are thirteen ARP 2600 sounds on the audio CD and 22 on the CD-ROM.

The documentation for the audio CD includes brief descriptions of each instrument, written in gushy, superlative tones worthy of a museum pamphlet. The CD-ROM package includes the same booklet as the audio CD (which has no mention of the additional sounds), along with a fold-out sheet containing a complete sound list.

ANALOG ATTACK

The truly stellar sounds on the CD are the warm pads; thick, buzzy comp sounds; and resonant analog organs from the Oberheim OB-Xa and OB-8. The original patches are well chosen, skillfully sampled, and smoothly looped. Overall, they translate very well to the sampler. In fact, I was surprised how much I liked these sounds, as I haven't been much of a fan of Oberheim synths. The samples are in stereo, preserving the flavor of Oberheim's individual oscillator panning.



Classic synths from ARP, Moog, Roland, and more are the focus of Eye & I Productions' *Legacy* sample CD and CD-ROM. Although the collection includes some good sounds, many samples have short or poorly made loops.

The ARP Odyssey samples are quite cool, with a number of hip basses and sounds that work very well for chordal comping. (The ability to play these sounds polyphonically is one of the advantages of working with samples; the real Odyssey can only play two notes at a time.) The Sequential Pro-One set also has its share of good sounds but with some quality-control problems. Some of the loops are bumpy and obvious, and others are too short, so sounds full of richness and motion in the beginning suddenly turn dry and lifeless as they sustain.

The Roland Jupiter-6 is one of my favorite analog synths, and *Legacy* includes several particularly well-done, warm, lush pads. Other Jupiter-6 samples didn't come out as well, however; some sounds suffer from overly noticeable split points and a clicking loop.

Legacy offers a large number of Roland TB-303 samples, but most of these miss the point for me. Without the 303's real-time control and wacky portamento, these samples seem a little flat. The loops are too short, and split points are sometimes too audible.

The Korg Lambda sounds are a surprise standout. The strings and choir have a wonderful half-synthesized, half-acoustic feel that is very warm and strangely satisfying. The Minimoog bank, as expected, yields several thick, full basses.

PROBLEMATIC LOOPS

Legacy proudly features the logo of AnTares Systems' specialized looping software *Infinity*, so it's ironic that my biggest complaint is about the quality of the loops. The majority of the loops are fine, but in a professional product, I'd expect better quality control than *Legacy* offers.

In many sounds, the loops are too short, as I mentioned earlier regarding the Pro-One samples. In some cases, a few samples have long, rich loops, and others in the same multisample have short, thin ones. Even if the attacks are fairly uniform across the keyboard, the sustains end up being mismatched. Some loops also have obvious "bumps" that call attention to themselves (and thus to the loop as a whole) every time the loop repeats.

Clicking loops are even more problematic. Small clicks, coupled with short loops, cause timbral changes in some of the Jupiter-8 and Juno-106 samples, so smooth sounds become buzzy during the sustain. A sample-and-hold filter effect in the Jupiter-6 bank and one of the OSCar samples also have clicks.

FROZEN KNOBS

There's one basic problem with the concept of sampling analog synths, which is that, once sampled, the sounds are frozen and uneditable. Two of the great strengths of analog synths are that they are dynamic—that is, they

constantly change over time and never exactly repeat—and they tend to be very accessible, with easy-to-reach knobs or sliders for all of their parameters.

Product Summary

PRODUCT:
Legacy: The Definitive Analog Sampler
PRICE:
Audio CD: $89.95
Akai S1000 CD-ROM: $189.95
MANUFACTURER:
Eye & I Productions
tel. (800) 726-7664
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DOCUMENTATION	● ● ●
VALUE	● ● ● ◖

If you like a sound but wish its filter sweep was a bit shorter or want to reduce the LFO modulation of pulse width, it's just the twist of a dial away.

But samples are static until you add modulation, and even then they don't display the natural, continuous variation of an analog-synth waveform. And the knobs are captured forever in one position. Moreover, your ability to use expressive real-time controllers is limited; if the filter exists only as part of the sample, you can't bring in a filter LFO with the mod wheel. (Of course, you can use the digital filter on your sampler, but then you're adding a second filter, and it's no longer the same sound.) In the end, this is simply a paradox of the genre; if you want the sound of an Oxford OSCar's variable resonance-width filter, you have to buy an OSCar or deal with the limitations of sampling.

Even so, it would have been nice if the CD-ROM version of *Legacy* included a little more real-time control of the sampler's modulation parameters. As it is, most sounds include very small amounts of vibrato, triggered from Pressure and Mod Wheel (Control Change 1), but that's all you get. I would have appreciated more programming gusto here. For instance, I would like to have Mod Wheel routed to the sampler's filter cutoff to control the overall brightness. Instead, you are left to program such things yourself.

RELEASE

Legacy's subtitle is *The Definitive Analog Sampler*. That establishes a pretty high standard of accountability; I think *decent* would be a better adjective than *definitive*. Some of the sounds are inspiring, but an equal number are not. Programming of real-time control options is minimal, and some sounds are marred by bad loops.

Still, there are a number of very cool sounds here, and the price is reasonable. If you're jonesing for that analog vibe, this isn't a bad place to start.

Dan Phillips *is a singer/songwriter and a principal in Touch Productions, providing music for film, television, and albums. He happily spends his weekdays at Korg Research and Development.*

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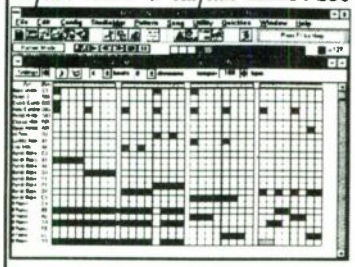
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TECH PAGE

Java Jive

A new programming language gives the Internet a buzz.

By Scott Wilkinson

When most of us wake up in the morning, the first thing we want is a cup of coffee to bring us up to speed for the day ahead. Now, a programming language called Java is doing the same thing for the Internet and other network systems. Java streamlines many activities that are traditionally the bane of netnauts, such as playing video and audio clips while online.

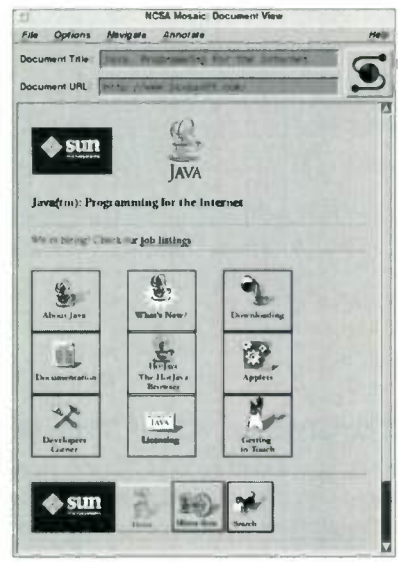
Java is a relatively simple, object-oriented programming language that is being developed by Sun Microsystems, whose high-powered workstations act as servers for the Internet, among other tasks. Java is derived from C and C++ with several modifications to optimize its goal of small, distributed, hardware-independent applications. It is multithreaded, which allows it to deal with several things at once.

Java source code compiles into a very compact object code, called *bytecode,* for a virtual processor. This virtual processor is independent of the physical processor within the computer. As a result, Java code is platform-independent. The only platform-specific software you need to run a Java program is an interpreter that emulates the virtual processor on your machine.

One of the most promising applications of Java is on the Internet. You can easily embed Java applications, which are called *applets* because of their generally small size, in Web pages. When you download the page, the applet comes with it. For example, if you download an audio clip, the application required to play it might be included automatically.

To run the applet, your browser must include the Java interpreter. Netscape *Navigator* 2.0 is the first commercial browser to do so, and others are sure to follow. The real beauty of Java is the fact that your machine doesn't need a local application to play the downloaded data. In addition, a publisher writes and compiles an applet only once, which can be downloaded and used by any computer with a Java interpreter.

As a result, Java-savvy browsers will be smaller than previous designs, which typically require you to obtain and install machine-specific helper applications to play MPEG, QuickTime, and other types of files. In contrast, Java browsers don't need permanent applications for different types of files; they download the appropriate applets with the data, use them as necessary, and discard them when they are finished. The applets become temporary extensions to the browser, keeping it lean and mean. Unlike traditional helper applications, these extensions can appear as integral parts of a Web page.



To learn more about Java, visit Sun's Java home page at http://java.sun.com.

Java audio players are in their infancy, but more sophisticated audio applets are inevitable. For example, it is possible to stream audio data in real time, which is similar to the function of *RealAudio* (see "Tech Page: Online Radio" in the October 1995 **EM**). With Java, however, you don't need machine-specific client software on your local machine to receive real-time audio over the Net.

Another potential audio applet might let netnauts mix several streams of audio with an onscreen mixer or navigate through a database of audio clips. The latter example wouldn't increase the speed of downloading, but the interface could be made much more attractive and user friendly than HTML currently allows. You can also define protocols for adaptive functions, such as monitoring throughput and optimizing the download. This might include selective compression or monitoring the client's buffer to avoid playback hiccups.

Java is giving the computer industry a big buzz and with good reason. Small, hardware-independent applications will help unify the Internet and bring us closer to an era in which it doesn't matter what computer you have. The implications for electronic musicians will be tremendous.

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