Hot Digital Audio Sequencers! Cakewalk Pro Audio and Opcode Studio Vision Pro

Electronic Musician

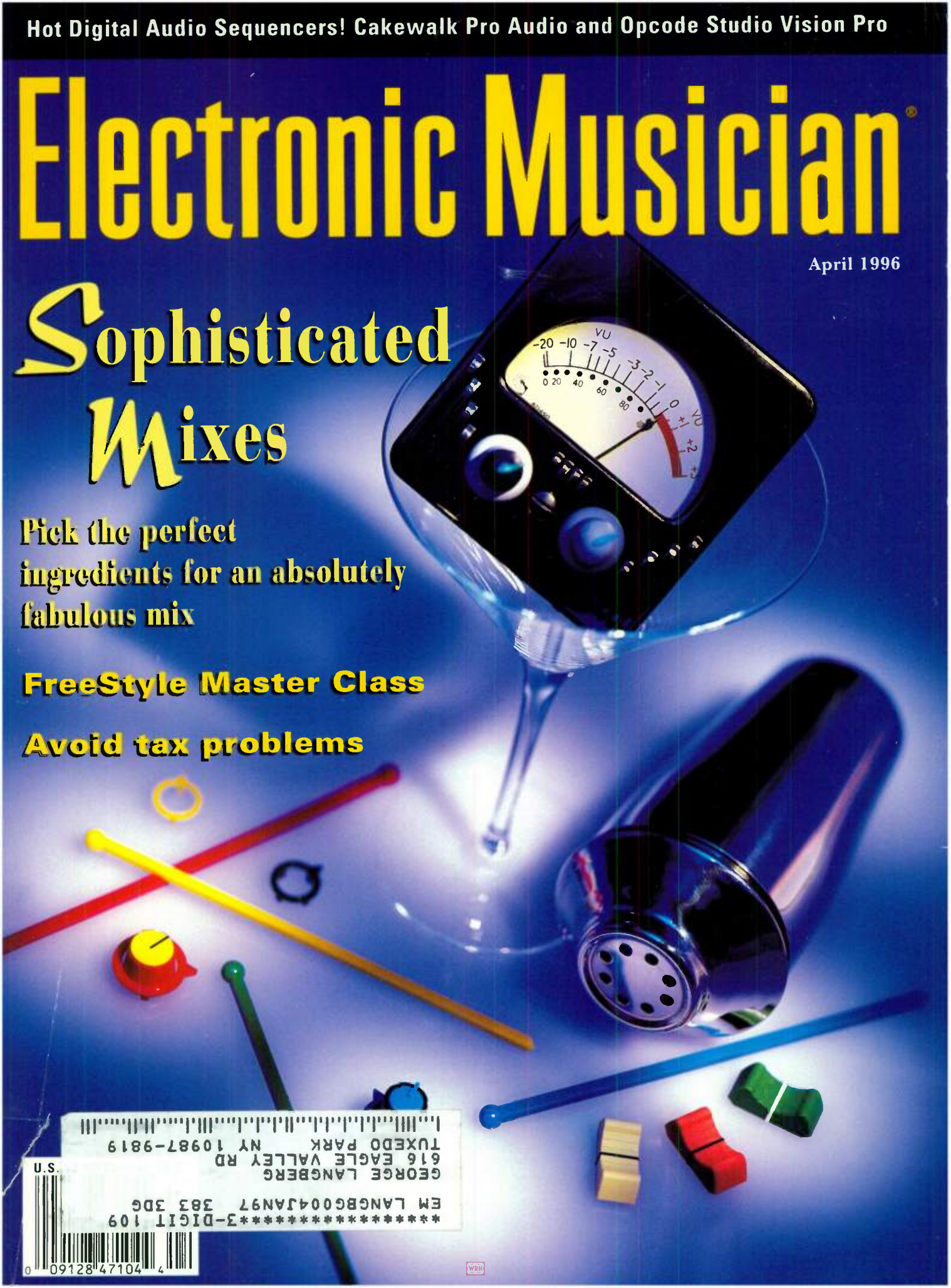
April 1996

Sophisticated Mixes

Pick the perfect ingredients for an absolutely fabulous mix

FreeStyle Master Class

Avoid tax problems



1202 VLZ

DM LOW-NOISE MIC/LINE MIXER • MADE IN USA

NEW MS1202 VLZ

12-CHANNEL HIGH-HEADROOM LOW-NOISE MIC/LINE MIXER • 12-CHANNEL HIGH-HEADROOM LOW-NOIS

MS1202 VLZ

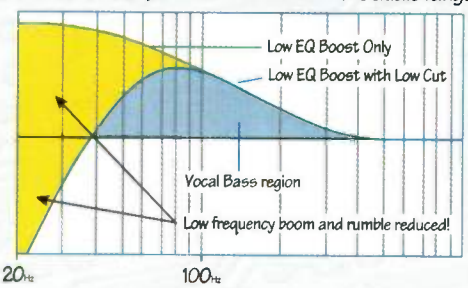
- 4 mono mic/line chs. with studio-grade mic preamps
- 4 stereo line-level chs.
- 2 aux sends per ch.
- 2 stereo aux returns
- Aux 1 master level
- Efx return to Mon. 1
- Aux 1 pre/post switch
- 3-band EQ w/Lo Cut filter
- Mutes on every channel
- Extra stereo bus via Mute
- Easy metering via PFL Solo
- Control Room monitoring
- XLR & 1/4" outputs
- Multi-way metering
- Headphone output
- 4 channel inserts
- Sealed rotary controls
- Built-in power supply

also includes Mackie extras you don't get with other comparably-priced mixers:

- A 50-page manual written in easy-to-understand language. It includes step-by-step hook-up and operating instructions, a glossary of pro audio terms, hints and tips on everything from phantom power to balanced lines and numerous attempts at lame jokes (Dense, boring, humorless manual translated from another language available upon request).
- Tech support from real people. No trips through a voice mail maze; no endless waits on hold. If you need help or advice at any time you'll quickly get through to a pro audio veteran who knows the MS1202 VLZ backwards and forwards.

60dB GAIN *on first 4 channels via balanced XLR mic inputs let you record even the faintest sound sources with incredible clarity.*

LO CUT FILTER *(Chs. 1-4). With the exception of bass guitar, low frequency synth sounds and kick drums, almost all sound is in the audio range*



above 75Hz. Our Lo Cut Filter reduces or eliminates unwanted frequencies below 75Hz. It's great for cleaning up the "mud" in recording & live sound work, and also lets you boost lower vocal ranges without increasing stage rumble, mic thumps, etc. (see the drawing above). This 18dB/octave filter lets you safely and creatively use the Lo EQ on the higher bass frequencies.

3-BAND EQ *on all channels. You asked for it. Musical EQ like on our CR-1604 & LM-3204. Others have copied our EQ points (12kHz, 2.5kHz and 80Hz) but not the warm, musical sound that our expensive, discrete circuitry produces.*

EFX TO MONITOR *switch and level control on Aux Return 1. When you're using the output of Aux Send 1 to feed stage monitors, you can now blend reverb or other effects back into the Aux Send 1 monitor mix, separate from the house mix (just like with our SR Series.)*

A MUTE ON EVERY CHANNEL PLUS AN EXTRA STEREO BUS! *As on our CR-1604, pressing a MUTE switch UNassigns the channel from the main L/R bus and reassigns it to the Alt 3-4 output. You can create two stereo pairs for output to a 4-track, bounce multiple tracks onto 2 more tracks, or preview a source not yet in the main mix via phones or monitors.*

PFL SOLO *makes level setting easy. Just push a solo button, watch the famous Rude Solo LED start blinking, and adjust the trim control (ch. 1-4) for 0dB on the meters. Solo also replaces your source selection, feeding the control room and phones. Great for previewing or cueing a signal prior to adding it into the mix. This solo is non-destructive. It doesn't interrupt the main left/right, 1/4" TRS or XLR outputs.*

LEVEL SET MARKER. *When used with PFL/SOLO, the level set procedure gives you low noise, maximum headroom and best dynamic range every time! No more guessing about how to set your gain trims. No more worrying about internal clipping!*

OTHER COOL STUFF *includes sealed rotary controls, solid steel chassis, thick, double-sided fiberglass circuit board and our signature built-in power supply that provides plenty of current for the MS1202 (instead of a wimpy, outlet-eating wall wart).*

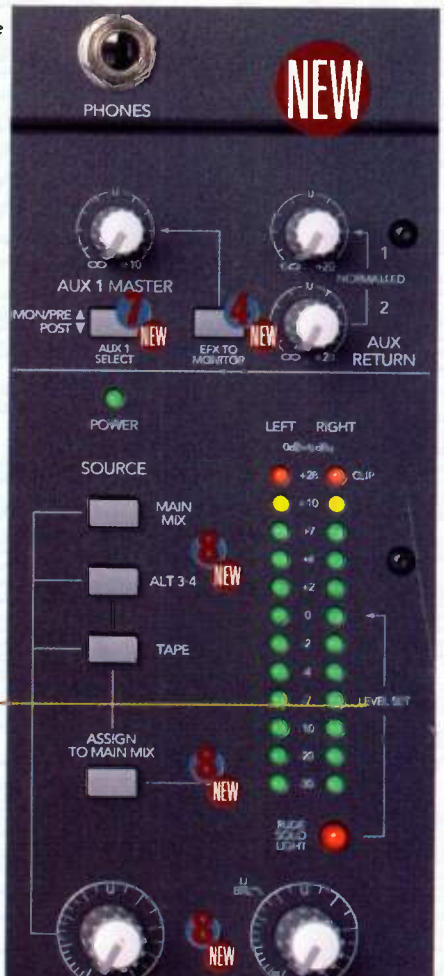
IN STOCK AT MACKIE DEALERS NOW EVEN AS YOU READ THIS!

NEW

WE'VE ADDED A DOZEN NEW

Global AUX 1 PRE/POST *switch. Aux Send 1 on each channel can be pre-fader/pre-EQ (great for stage monitor mixes), or post-fader/post EQ (for effects in the studio).*

CONTROL ROOM/PHONES SECTION *with level control. A mini-version of a popular 8•Bus feature that adds boocoo monitoring, mixdown and metering flexibility. Headphone and Control room amp outputs are now separate. Switches let you select any combination of Main Mix, Tape In and Alt 3-4 signals for routing to the Phones and Control Room outputs and meters. Perfect for creating custom headphone mixes, monitoring tape levels, etc. Plus, an extra button lets you re-route this multi-source signal back to the main mix! For example, a new input via Tape In or a source from the ALT 3-4 stereo bus. It's a feature that has been appreciated on our CR-1604.*



MS1202 NEW VLZ

MS1202 VLZ

12x2 MIC/LINE MIXER

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12-CHANNEL MIC

IMPROVED MS1202

FEATURES & VLZ CIRCUITRY TO OUR CLASSIC 12-CH. MICROSERIES MIXER!

WHAT IS VLZ? *VLZ stands for Very Low Impedance. Originally developed for our 8•Bus consoles, it's a unique Mackie approach to circuit design that reduces thermal noise and seriously cuts down on crosstalk. The end result is that VLZ design cuts circuit thermal noise in half! VLZ demands high current – which requires a beefy power supply. Naturally the MS1202 VLZ has one with far more current output than any other ultra-compact mixer.*

ALL INPUTS & OUTPUTS BALANCED *(except RCA-type tape inputs & ch. inserts). The MS1202 VLZ is compatible with anything you can plug into it. Plus, balanced lines let you run long cable distances with minimal hum and buzz. You can also use unbalanced lines, if ya need 'em.*

AN ESSENTIAL PART OF ANY PRO AUDIO TOOLKIT.

No matter what size your main mixer is, there's always a use for a MicroSeries 1202 VLZ. With its great specs and superb sound quality, you can use the 1202 right alongside big PA or recording consoles as...

- *A keyboard or drum submixer*
- *A high quality mic preamp*
- *An effects submixer*
- *A –10dBV to +4dBu level matcher*
- *A headphone or monitor mixer*
- *An emergency back-up mixer*

BALANCED XLR MAIN OUTPUTS *(along with balanced 1/4" TRS output jacks). XLR outputs let you connect the MS1202 VLZ directly into amps, workstation modules, pro VTRs and other equipment that have female XLR line level inputs without having to use an adaptor. Press the adjacent 30dB pad switch to match the higher input sensitivity of camcorders and other mic level inputs.*

RCA TAPE LOOP INTERFACE *provides convenient hookup to tape decks and other line level devices with "phono"-style connectors. The interface's internal +4dBu operation lets you get the most from both semipro and pro equipment.*

VIRTUAL PAD *on first 4 channels' line inputs. Now there's 10dB of attenuation when trim is all the way down. Unity is at 9:00 instead of 7:00. When mixing down the hot outputs of digital multitrack recorders, this extra "pad" lets you add gobs of equalization without overload.*

1) Although the MS1202 is designed as a desktop mixer, it can also be rack-mounted in 7 spaces.

2) Keith Medley, our Applications Specialist likes to demonstrate its ruggedness by throwing a 1202 onto the floor and then standing on it. No damage. A true story, but don't try this at home unless you really trust us.

IT TAKES UP UNDER ONE SQUARE FOOT OF WORKSPACE, BUT WE DIDN'T COMPROMISE.

The MS1202 VLZ is directly descended from our 8•Bus consoles. Same high headroom & low noise. Same electronic components. It's designed to play in the big leagues with digital multitrack recorders, workstations and hard disk recorders. Yet its suggested retail price is just $429.*

PHANTOM POWER *(with its own switch) so that you can use high-quality condenser microphones.*

For 5 years, our Micro Series 1202 12-ch. mic/line mixer has racked up an impressive track record[1]. It's toured with superstars, gathered network news, worked 24 hours a day in video post suites, pinch-hit as a submixer next to mega-consoles and recorded audiophile direct-to-DAT albums. The 1202 has also been the ultra-reliable main mixer in more home studios than you can shake a patch cord at.

Why? Because the MicroSeries 1202 has proven itself to be the best sounding – and best value – small mixer you can buy. Better mic preamps. Less noise. More headroom. And legendary reliability[2].

But we haven't let the MS1202's success go to our heads. For the last 5 years, we've been reading warranty cards for suggestions on how we could improve it.

This is the result. Same great value. Same rack-mountable, built-like-a-tank construction. But with some exquisitely handy new goodies that make it an even more effective tool for both recording and live performance.

F'instance, we've added a complete Control Room section that makes monitoring, tracking and mixdown easier. For on-stage performers, we added PFL Solo switches on every channel, reverb foldback into Mon. 1, and balanced inputs & outputs.

Plus stuff everyone will appreciate, such as midrange EQ, ALT 3-4 (the extra stereo bus first introduced on our CR-1604), mute switches on every channel and 8•Bus VLZ circuitry for even less noise and crosstalk.

Visit your Mackie dealer (the new MS1202 VLZ's in stock right now) or call us toll-free for detailed information.

*Suggested retail price. Slightly higher in Canada and on Alpha Centauri.

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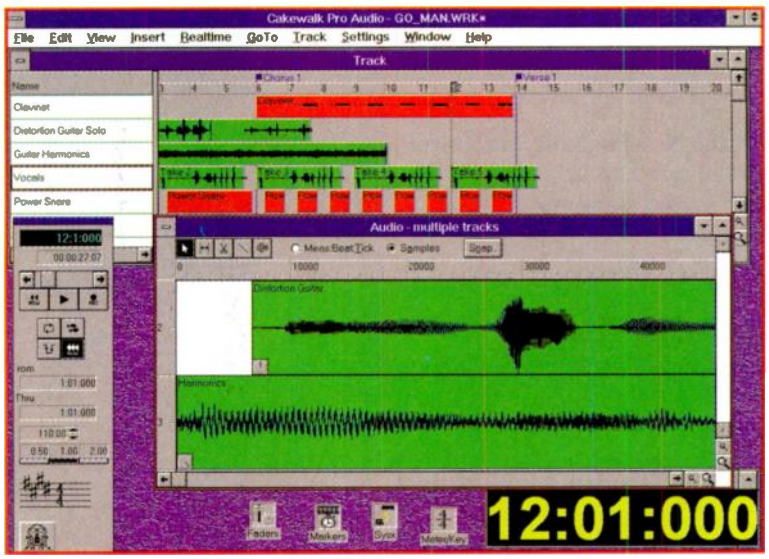

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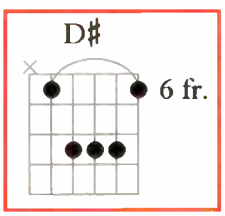
Now your printed scores will look even more polished. Cakewalk Pro Audio's staff notation supports dynamic markings, expression text, enharmonic spellings, and even guitar chord grids.



See and Hear It for Yourself.

Cakewalk Pro Audio is available at finer music and computer stores everywhere.

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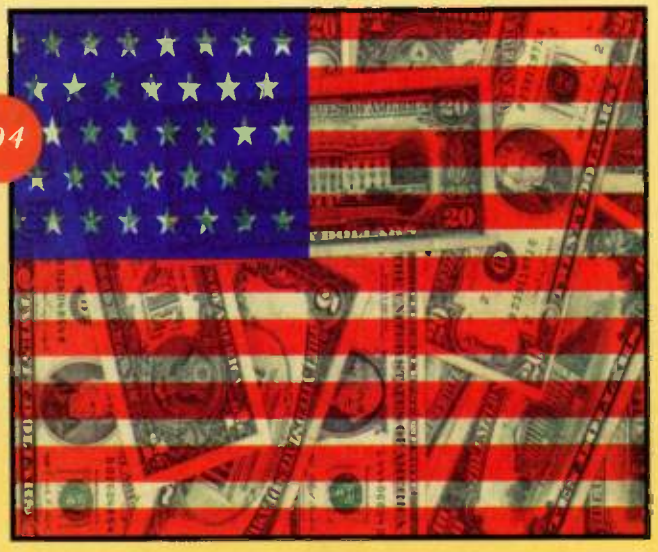
I N S I

FEATURES



DEPARTMENTS

Electronic Musician®
ten! years of hot tracks & big gear
APRIL 1996 VOL. 12, NO. 4

COLUMNS

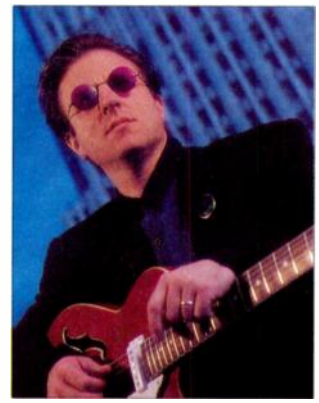
REVIEWS

Cover: Photography by Eric Harger.

Special thanks to Selco/SIFAM.

The Tyranny of Intellect

Mixing the life out of your music? Well, stop *thinking* about it.



ROBERT PERRY

Details are like opiates. They are seductive and sensual, and you can lose your soul to the nurturing oblivion of their embrace. It's easy to become addicted because, unlike Inspiration—which bubbles up from a mysterious cauldron of emotional impulses—details are forged from Reason. Details can be trusted. They are as clean and clear as simple mathematics. And as "attention to detail" is often described as one of the characteristics of a well-ordered mind, people feel secure obsessing over details as if they were little monuments to achievement. So what's wrong with this picture?

For an artist about to mix a record, plenty. Blind obedience to details can smother the passion that exists in all great art. I've seen it happen countless times. In the recording studio, detail worship often drives engineers to spend hours tweaking basic tones, ultimately lulling an energetic soundscape into snooze-ville by repeatedly "refining" its elements. In fact, when a musician complains that his or her messy rough mixes kicked butt over the staid, lifeless final mixes, it's obvious that someone overintellectualized the sound-sculpting process.

Now, I certainly do my share of worrying over details. However, too many engineers forget to strike a balance between technical elegance and soulful funk. Art is borne of emotions, and artists should struggle to refine the purity of those emotions rather than surrender the spark of passion for the "perfect" snare-drum sound. Let your heart and head collaborate as equals. The Greeks had it right: all things in moderation.

I'm launching this rant because our cover feature, "The Sophisticated Mix" on p. 48, is in serious danger of being abused by detail addicts. We've provided certain ingredients for constructing killer mixes, but these technical details should not be considered as the architecture of a good mix. They are merely a *foundation* for creative sound sculpting. For example, ballet dancers take daily classes to refine the body positions required to interpret choreography. However, when the curtain rises during a performance, the great dancers forget all about the "muscle details" and lose themselves in the music.

A good audio engineer should follow the dancer's example: master your mixing tools, but sacrifice technical details to the whims of the music. And don't be afraid to make what a detail addict would consider a "mistake." Like a Japanese ceramic that purposely flaunts an imperfection to better accentuate its beauty, a supposed blemish can often be the most interesting element of a mix. So stop thinking and start *feeling!* I'm sure that your mixes will improve dramatically.

Getting away from the mixing console for a moment, I'd like to close this column with some joyful announcements. My brother, James, and his wife, Shelley, recently introduced baby Chance Tyler to this wild earthbound party. I'm an uncle again! Also, **EM**'s magnificent Editorial Assistant, Jennifer Seidel, and her husband, Kevin, are expecting their first child late this summer. Bravo! Here's hoping that each of these little angels undertakes a life journey overflowing with health, happiness, and wisdom. And, oh yeah, may they all grow up to be **EM** readers.

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When it comes to equipping your studio, your list of effects needs can grow pretty long. Probably longer than your budget. So make the right choice – one that will cover all of your signal processing needs from tracking to final mixdown. The DP/2 from ENSONIQ.

What makes the DP/2 so special? To start, it offers sixty-five great-sounding algorithms – the most complete selection available anywhere. Take a look at the list – you'll find all the tools you'll need to record and mix your music.

Use compression, de-essing, or EQ for recording voice-overs or vocals. A variety of speaker and amp simulations help you record guitar or bass direct and get anything from a natural mic'd amp sound to some serious "crunch." Shape drum tones or clean up noisy signals with a number of EQs, gates, and expanders.

An assortment of time-based effects *(including chorus, flanging, phasing, delays, pitch shifters, and combination effects)* are there to add richness and life to a track. And a selection of world-class reverbs lets you place each instrument in its own perfect "space" in your mix.

Not only does the DP/2 offer a complete range of processing functions; it has 600 well-crafted presets to handle every recording and live sound application you can throw at it. The presets are organized by type so you can quickly find what you need and get right back to your music.

The DP/2 offers two of our powerful ESP chips – 20 MIPS of industrial-strength DSP power that we use to create stellar-sounding effects. With two inputs, two outputs, and two processors the DP/2 is equally useful as two separate mono in-stereo out effects devices or as a true stereo device utilizing both processors.

From its low-noise hardware design to its many new algorithms and presets, the DP/2's great sound has been refined from our DP/4 Parallel Effects Processor. The effects legacy that has become a fixture in top studios and live rigs around the world is now available in a single rack unit designed for your project studio and live performance needs.

Serious work requires a complete set of the right tools, each designed for the job at hand. For your recording needs, there's no better choice than the DP/2.

DP/2 ALGORITHMS				
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Large Plate	3.6 sec DDL 2U	Guitar Amp 3	Keyed Expander	EQ-Chorus-DDL
Small Plate	8 Voice Chorus	Guitar Amp 4	Inverse Expander	EQ-Flanger-DDL
Large Room	Flanger	Digital Tube Amp	Ducker/Gate	EQ-Panner-DDL
Small Room	Phaser-DDL	Dynamic Tube Amp	De-esser	EQ-Tremolo-DDL
Gated Reverb	Rotating Speaker	VCF-Distortion 1	Rumble Filter	EQ-Vibrato-DDL
Reverse Reverb 1	Speaker Cabinet	VCF-Distortion 2	Van der Pol Filter	EQ-DDL with LFO
Reverse Reverb 2	Tunable Speaker 1	FuzzBox	Vocal Remover	Sine/Noise Generator
NonLinear Reverb 1	Tunable Speaker 2	Guitar Tuner 2U	Vocoder 2U	ADSR Envelope Generator
NonLinear Reverb 2	Parametric EQ	Pitch Shifter	No Effect	Distortion-Chorus-Reverb
NonLinear Reverb 3	EQ-Gate	Fast Pitch Shift	Plate-Chorus	Distortion-Roto-Reverb
MultiTap Delay	EQ-Compressor	Pitch Shift-DDL	Chorus-Reverb	Wah-Distortion-Reverb
Dual Delay	Guitar Amp 1	Pitch Shift 2U	Flanger-Reverb	Compressor-Distortion-Flanger-Reverb

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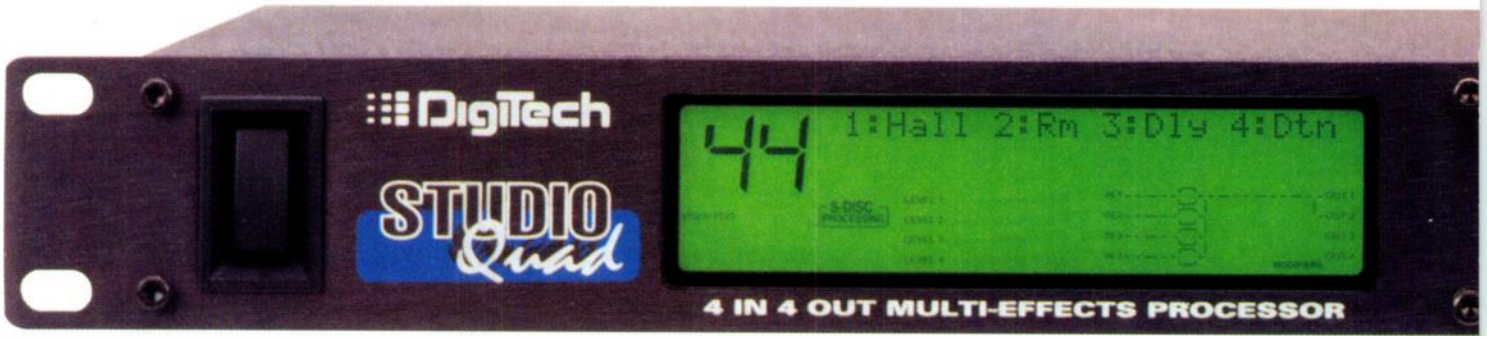

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The Studio Quad features 4 completely independent inputs and outputs that give you the power of four independent mono processors or two true stereo processors. Imagine the power to process two true stereo sources simultaneously without sacrificing control. But true stereo is only the beginning. Imagine having 4 independent reverbs for vocals, guitar, keyboards, and drums, where each reverb can be optimized specifically to achieve the best audio performance for each application. And imagine a processor that gives you the power to create any combination of effects, in any order. And then multiply by four.

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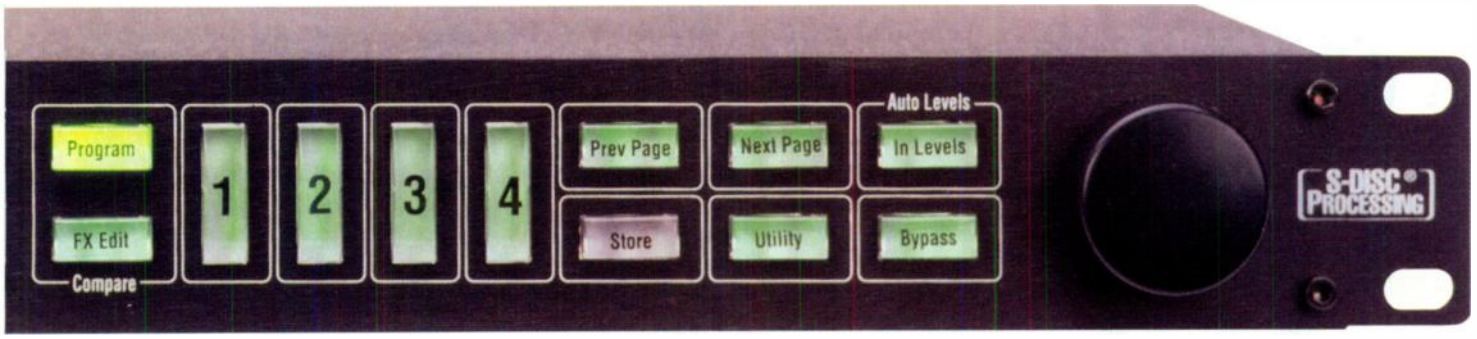

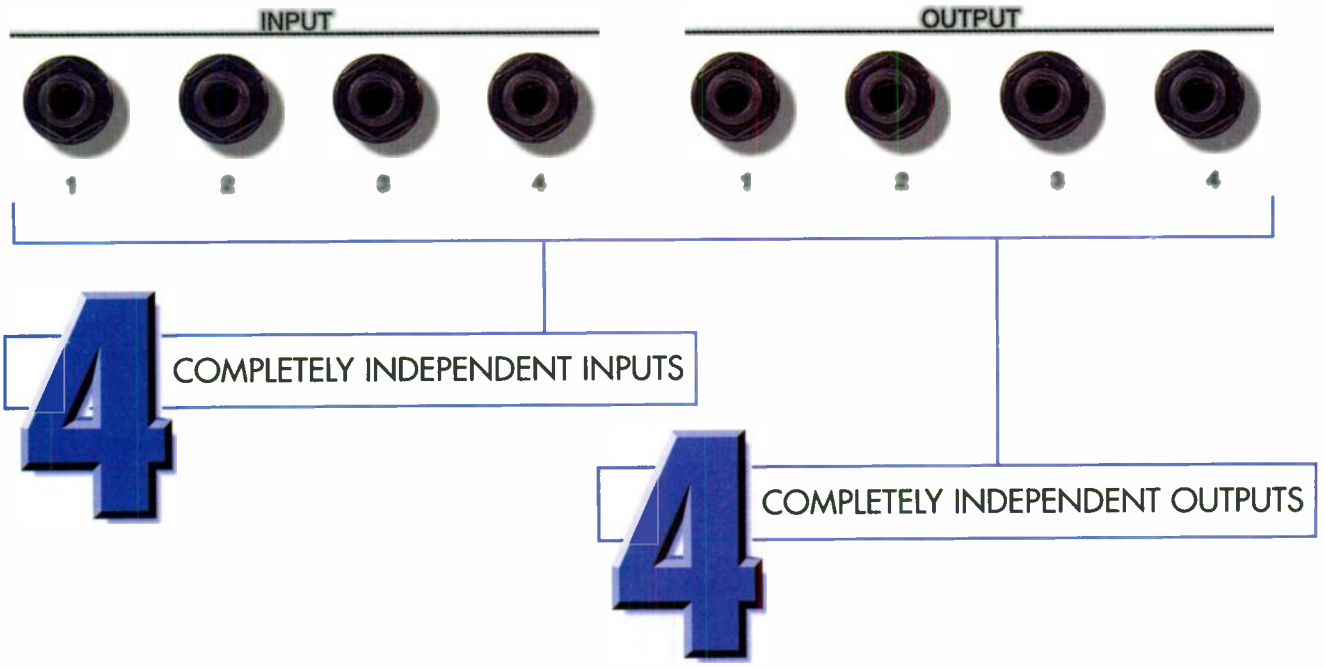

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HUZZAH!

Congratulations on your February 1996 issue. I have been a longtime subscriber and have enjoyed watching **EM**'s evolution. Your magazine has been a valuable ally over the years.

K. G. Williams
kgwmaya@pinc.com

Congratulations on your tenth year! **EM** has helped me acquire the skills and know-how to upgrade my 8-track personal analog studio to a 16-track project studio. I could never have done this without your wonderful mag.

Andy Soriano
Studio One Eleven
Manila, Philippines

TURN THE BEAT AROUND

I am a drummer and percussionist who also composes and arranges music. Therefore, I would like to point out a few basic problems in Brian Knave's article ("Recording Musician: Sonic CPR for Drums," January 1996).

I disagree that "it's hard to make a set of drums sound good." If the drummer you are working with is worth his weight in salt, his drums will already sound good. All you have to do is make them sound as good or better on tape. This isn't as direct as placing a mic in front of a guitar cabinet, but it can be done and done well.

In addition, when dealing with tuning double-headed tom-toms, you should *not* start with the bottom head. Aside from things like head diameter and shell depth, the top head is primarily responsible for the pitch of the drum itself. The bottom head's role is to resonate with the top head to provide a punchier, fuller tone. However, if the top head is out of tune, it is difficult to make the bottom head sound any better. The preferred method is to remove all the bottom heads to isolate the top head's pitch and sound. When the top heads are in tune with themselves and the toms are in tune with each other (from high to low), then you put the bottom heads back on and tune the bottom heads to the same pitch as the top heads. You'll find this extra step saves you a lot of headaches and makes things sound better.

The drum set is one of the most personalized instruments. No two kits are alike, and most drummers have a certain amount of difficulty playing other people's kits. So I was shocked when Knave suggested moving the snare drum to the left of the hi-hat to reduce sympathetic vibrations! That's like asking a guitarist to play with the low E string where the G string is and move everything else up. It would take a lot longer than "a few minutes" to adjust.

As expressive and emotional an instrument as drums can be, much of that expression is communicated from the variety of sounds a drummer can provide. I have recorded in pro studios with both a 4-piece kit and a 15-piece kit, and the additional pieces help to provide greater variety. Removing pieces from a kit may make an engineer's job easier, but it will simplify the sound the drummer can provide. With all due respect, the simple sound of Charlie Watts of the Rolling Stones has never been extremely exciting.

Ryan R. Dyson
Portland, OR

Ryan—Okay, so it's not hard for you to make a set of drums sound good—neither is it hard for me—but I will stand by my statement because I've worked with dozens of good to excellent drummers whose drums sounded lame. In fact, more than once when I opened for major acts, a "star" drummer would ask me whether I would tune his drums. Part of the issue here, as you point out, is that drum sets are so personalized—as are opinions about what constitutes a good drum sound. Keep in mind, though, I am writing primarily for home-studio operators, most of whom are not drummers and many of whom may not always have access to players "worth their weight in salt."

My point about beginning the tuning process with the bottom head is likewise aimed at the home-studio operator. Here we may simply have a difference of opinion. As stated in my article, my experience is that, on most double-headed drum kits, the bottom heads are the most neglected. I agree that "if the top head is out of tune, it is difficult to make the bottom head sound any better." But the point of starting with the bottom head is not to make it *sound better but to get it in tune with itself so that the top head can be tuned. That is, when the bottom head is drastically out of tune—which is often the case—no amount of top-head tuning is going to solve the problem. As for your "preferred method" of removing the bottom heads altogether so as to first tune the top heads, that's certainly one effective approach; but for the typical budget recording session, this time-consuming solution may not be an option.*

As for my out-there suggestion about repositioning the snare drum to the left of the hi-hat, I made it clear this is a last-resort remedy. I'm not recommending it as the first thing to do, but in a pinch it works. Sometimes you do what you have to do to save a session.

Finally, I didn't say that the "sound of Charlie Watts is extremely exciting," only that he has created some great drum tracks with a minimum of drums. Neither did I recommend removing pieces from a drummer's kit if he or she is using all the pieces. But many drummers lug a 10-piece kit into the studio, only to play kick, snare, and two toms. If those idle drums are making unwanted noise, get 'em out of there!—Brian K.

A ROSE BY ANY OTHER NAME

Thanks for your informative article on the much overlooked problem of trademarks in the music

ERIKA LUIKART

WHY IS SWEETWATER SOUND THE "RIGHT CALL" FOR YOUR MUSIC?

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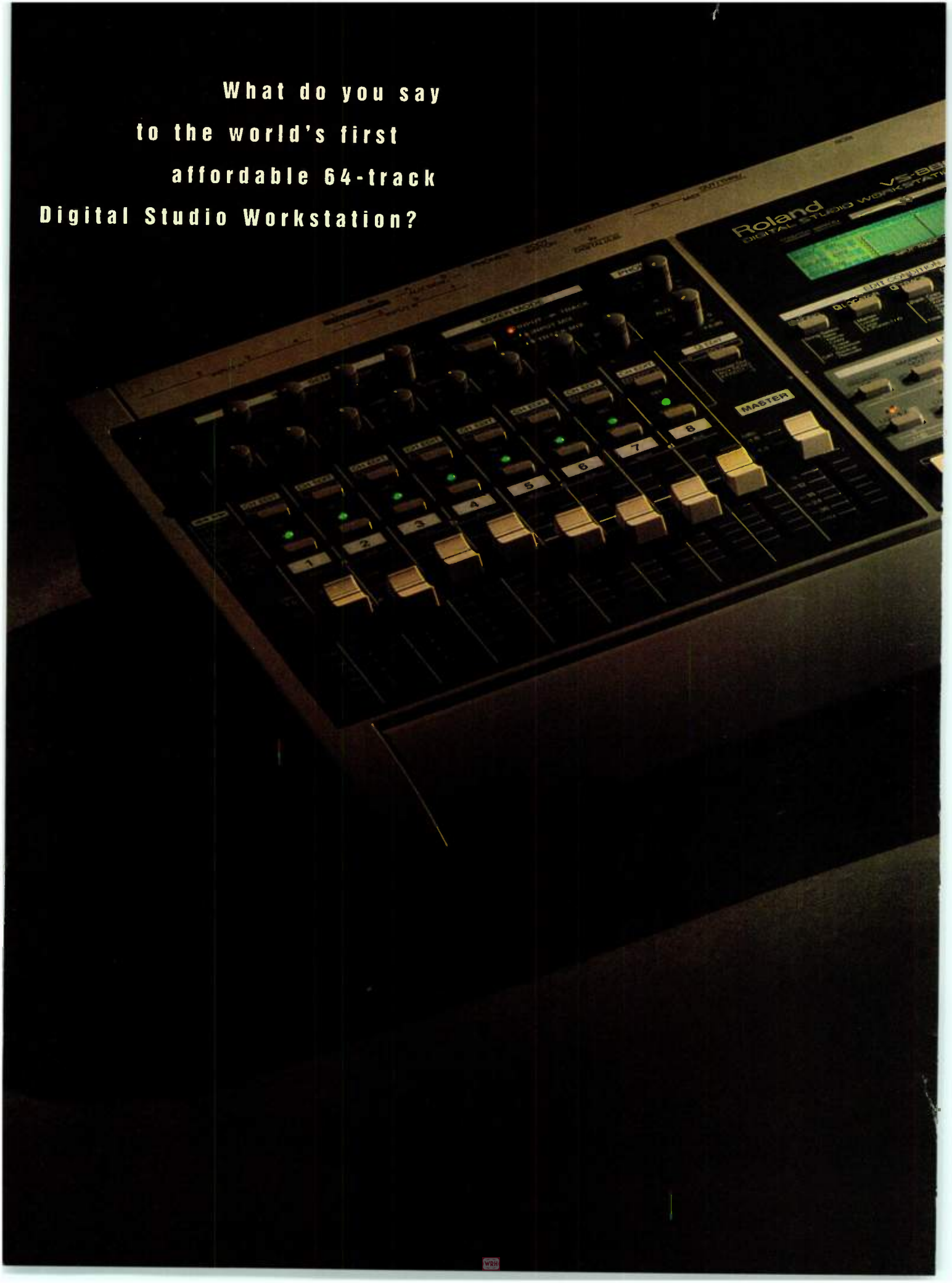

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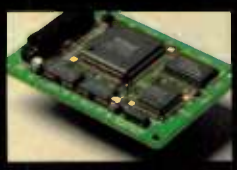
The VS-880 is fully digital and has digital in and out. This makes it compatible with all your existing digital equipment, both linear tape-based and non-linear hard disk format.

The rear panel has four RCA and four 1/4" inputs, digital in/out, MIDI in/out for sync and automation, a programmable footswitch input, headphone jack, two aux sends, master outs and a SCSI port for archiving or adding additional storage devices.



The user installable VS8F-1 Effect Expansion Board adds two completely independent stereo multi-effects processors. There are 200 patches, extensive effects including 3-D RSS capability, and guitar effects chains with COSM-based guitar amp simulator.

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.

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.

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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.

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business ("Working Musician: The Name Game," January 1996). My question is this: Would there be a legal conflict if my band were to name itself a noun that is also the name of a well-known company (e.g., Fender)?

dkahler666@aol.com

EM author and entertainment attorney Michael Aczon responds: *Noting that the primary issue of a trademark infringement is that the public may be confused as to the source of the service being provided, you must look at your proposed use and decide whether it falls into that category. If your proposed use of the Fender name was to call the band "Fender Guitar Gods," the public may be inclined to think that they will be buying CDs or attending concerts of an all-star band made up of major-label artists who are endorsed by Fender. A possible solution for you may be to contact the well-known company and obtain a license from them for the use of their name. In any case, you should contact a lawyer who handles trademark issues (found in your local telephone book or through referral services in your area) to assist you in this matter.*

DON'T FORGET US

This letter is an observation, not a complaint. Your magazine has been extremely helpful to me in setting up my electronic music studio and in making the best use of my equipment.

Most of the time your writers seem to assume that all composers are writing songs for bass, drums, guitar, keyboards, and vocals, with extra stuff thrown in for variety. In addition, there is significant emphasis in your articles (and for that matter, in the way equipment is designed) on reproducing "real" sounds electronically. I understand that that's where the money is; that's your market. But for some of us, "electronic music" has an entirely different meaning. In the same way that twentieth-century visual artists and novelists have pushed meaning beyond the boundaries of representation, so electronics and computers have opened new doors of musical perception. For those who walk through, sound becomes its own medium. Tonality, "real" spatial relations, and acoustical representation, although useful, are largely irrelevant.

John Cage was right. All sound is music; it's how we listen that matters. In the tradition of electronic and computer music that developed in the 1950s and early '60s, this view was taken to heart. Listen to the early works of Karlheinz Stockhausen, to Mario Davidovsky's incredible tape manipulations, and to other work done at the Columbia-Princeton Electronic Music Center. These and other pioneers made possible the equipment we use today. This tradition continues stronger than ever. Check out Paul Lansky and David Rosenboom. Step into Maggi Payne's surreal sonic landscapes. There are many others.

I don't mean to suggest there are mutually exclusive camps here. Many composers live in both worlds. Frank Zappa and Brian Eno come to mind. What I am suggesting is that **EM** and your readers visit this other world from time to time. You will learn a lot that can enrich what you write for bass, drums, guitar, keyboard, and vocals.

David Mooney
dmooney@library.ccac.edu

STATIC CLING

What is going on with my DAT? It will sit idle without a tape loaded when—ZIP!—a noise comes from its outputs. The noise often gets recorded on what would otherwise be a clean pass. It doesn't matter whether the DAT is set to analog or digital input. Perhaps it's a grounding problem, but sometimes I swear that static from my footsteps on the carpet triggers the noise.

John Baker
jbaker@metaviolet.com

As the weather has become colder and my house drier, static electricity has taken over my studio. I used a humidifier, and it helped, but the problem is still extreme. My Roland JV-90 freezes up whenever it gets a little static zap and must be rebooted each time. I'm afraid to touch any of my equipment for fear of damaging it. What can I do?

Eric Wills
wills@fredonia.edu

Author Alan Gary Campbell responds: *Static problems as severe as those Mr. Wills describes require intervention, and static can be treated at many levels. For a house-wide problem, it is best to install a central-humidification unit that works with the heating and air-conditioning system. In mild climates where central-heating units are less common, it is necessary to make do with room humidifiers; raising the humidity in several rooms will give some improvement in all rooms. A small, cool-mist type humidifier can be run intermittently in a home studio without problems—between takes, for example. Distilled water should be used to avoid mineral-dust fallout on equipment and furniture.*

It is advantageous to install antistatic carpeting in any studio, though this can be expensive. Low-pile carpet is less static prone, in any case. Various antistatic sprays are available to treat carpets, and most are effective, but the improvement is often short lived.

Perhaps most important is the installation and use of grounded "touch plates" at strategic points in the studio. These devices, most common around office PCs and readily available at computer stores, provide a conductive pad or strip with an attached cable that facilitates connection to an earth ground. The user simply touches the device occasionally to discharge accumulated static.

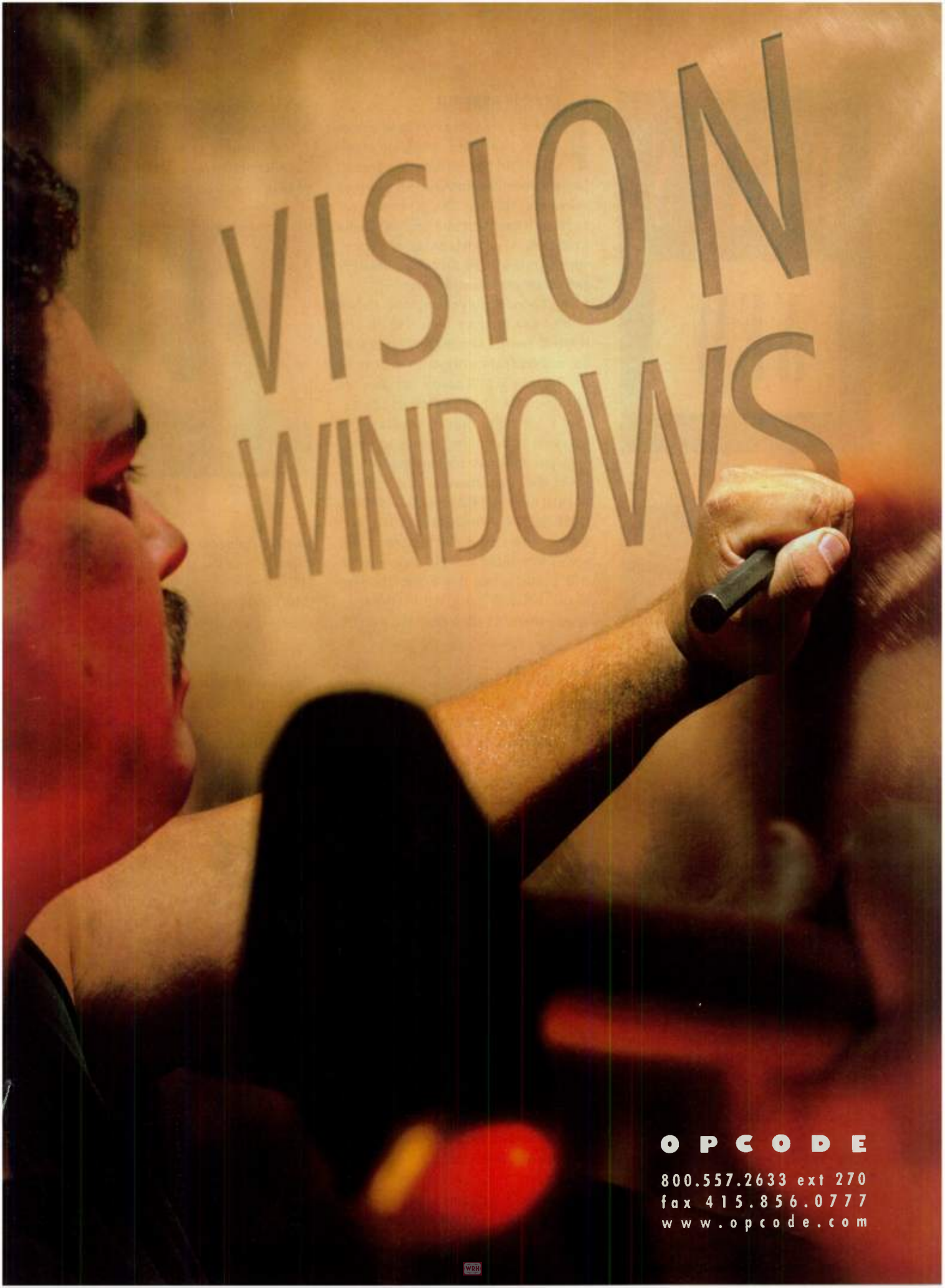
Although static discharge can certainly cause transient noise—and worse—in electronic music equipment, the problem with Mr. Baker's DAT machine is more likely due to AC line noise or an internal fault because it occurs when the unit is idle, with no one in close proximity. Frequently, decks and effects processors have grounds lifted to secure a "star" ground for the studio installation and thereby avoid ground loops. Unfortunately, some AC line filter and surge suppression circuits that are internal to the equipment in question operate at reduced effectiveness with lifted grounds. Check the DAT grounding and correct it, if necessary. Line noise can cause the symptoms described, and if proper grounding doesn't help, an external AC line filter should be tried. Note that not all surge-suppressor modules include line filters. If a line filter doesn't help, evaluate the unit at a different location where the AC power is known to be clean. If the problem occurs there, it is most likely an internal fault that should be referred to the manufacturer.

ERROR LOG

December 1995, "What's New," p. 18: Voce's correct e-mail address is voce@pipeline.com.

WE WELCOME YOUR FEEDBACK.

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

By Steve Oppenheimer

▲ RIP-TIE CABLECATCH

I have found numerous ways to tie groups of cables together, but the usual methods have their drawbacks. For one thing, they don't secure the bundled cables to a surface, such as the side of a rack or table.

Rip-Tie's CableCatch fasteners tie small groups of cables together with Velcro that you can open with a quick pull at the tab. This means you can get rid of those old wire cable ties that jab your fingers and the nylon ties that break too easily and are bad for the environment. Better yet, peeling away the CableCatch's backing reveals a gummed surface strong enough to securely fasten your cables to racks, walls, and the like.

Prices range from $5.49/2-pack of ⅝ × 2-inch CableCatches to $236/50-pack of 1 × 12-inch fasteners. Rip-Tie; tel. (415) 543-0170; fax (415) 777-9868; e-mail mfennell@riptie.com; Web http://www.riptie.com/velcro.

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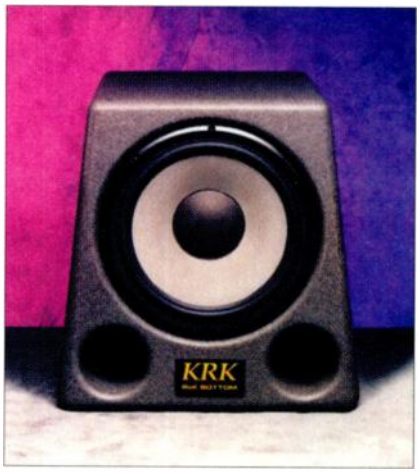
▶ KRK ROK • BOTTOM

Following the success of their unique K•RoK near-field reference monitors, KRK has introduced a companion piece, the RoK•Bottom powered subwoofer ($1,395). The 2.1-cubic-foot enclosure has the same unusual shape as the K•RoK, which is designed to minimize parallel walls for better linearity and maximum low-end punch.

The 12-inch, polyglass, long-stroke woofer can produce up to 110 dB SPL (1 kHz @ 1m). Its sensitivity is rated at 91 dB, and frequency response is 31 to 80 Hz. The built-in KRK power amp delivers 140W into 8Ω. The RoK•Bottom can accept a full-range signal, separate the lows with its internal crossover, and pass the highs and mids to a satellite system.

KRK has also announced powered versions of its K•RoK ($2,090), 6000 ($2,370), 7000B ($2,770), and 9000B ($3,590) reference monitors. Each pair features a KRK power amp rated at 140W/side into 8Ω. THD is rated at less than 0.002% (20 Hz to 20 kHz, 120W @ 1m), and the noise floor is less than 106 dB below full output. Shielded versions are available for an additional $150 to $200.

The powered systems (including the RoK•Bottom) have regulated power supplies to all voltage gain stages. They use Neutrik connectors that combine balanced ¼-inch and XLR inputs. Group One Ltd. (distributor); tel. (516) 249-1339; fax (516) 753-1020; e-mail krksys@msn.com.



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▼ ATI PRO⁶

ATI's Paragon mixing consoles feature high-quality input modules, but the price of such a console is prohibitive for most home and personal project studios. Fortunately, the best part of the Paragon's input module is now available in ATI's single-rackspace Pro⁶ Multiple-Mode Audio Signal Processor ($2,295).

The 6-stage processor includes a high-voltage mic preamp, which offers adjustable gain from unity to +65 dB on a single, detented control. Each band of the defeatable, 4-band parametric EQ can be shelving or peaking, with center frequency and gain on dual-concentric pots and Q on a separate control. The unit also includes separate 24 dB/octave highpass and lowpass filters. The insert point can be switched pre- or post-EQ.

ATI's patented, full-featured RMS compressor is said to maintain the high-frequency content even at high ratios. The compression ratios range from 1:1 to 10:1, with gain ranging from 0 to +20 dB. The ducker/noise gate offers hold and decay times of up to four seconds and up to 60 dB of attenuation. The ducker/gate and compressor have separate external-audio trigger (key) inputs, and both sections in multiple units can be independently linked in stereo. Separate attenuation meters monitor the gate and compressor, and a third meter shows the input level.

The Pro⁶ specs are impressive. Frequency response is rated at 10 Hz to 100 kHz (+0/-1 dB), and THD is rated at 0.008% (20 Hz to 20 kHz @ +4 dBm). Equivalent input noise is rated at -132 dBm with a shorted input and -129 dBm with a 150Ω source, and residual output noise is -90 dBm. The unit offers balanced I/O on XLR connectors. Audio Toys Inc.; tel. (410) 381-7879; fax (410) 381-5025.

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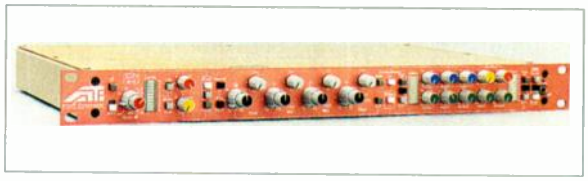

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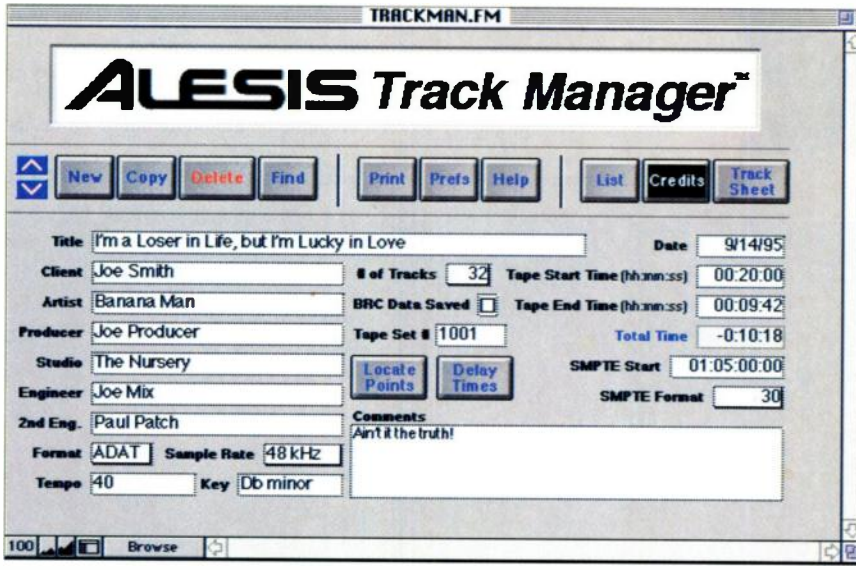


▲ CREATIVE INPUT TRACK MANAGER

Managing tape libraries and track sheets wasn't much fun in the good ol' analog-recording days, and it can still be a pain when dealing with ADAT/DA-88 recordings. If you're awash in digital multitrack tape, Creative Input's *Track Manager* ($29) may be the balm you need.

This tape- and track-management database application for Macintosh and Windows helps you create searchable track sheets for your entire MDM tape library. For that matter, it can be used in any multitrack studio, although it has been optimized for MDMs. It even lets you make numbered sets of tapes: e.g., a set of three tapes for a 24-track (3-machine) session. *Track Manager* requires Claris *FileMaker Pro* 2.1 or higher (not included), but it is also available bundled with a runtime version of *FileMaker Pro* ($59).

The user enters such data as song name, date, artist, client, producer, engineer, sample rate, key signature, tempo, tape format, and SMPTE start time and frame rate. You can view and edit 8, 16, 24, or 32 tracks at a time and can search by multiple criteria. A scrollable comments field stores up to 64 KB of text.

Up to ten locate points can be entered and named for each song. The program calculates the relative time equivalent for each locate point based on the Locate 0 position. When start and end times of a song are entered, *Track Manager* indicates the total length of the song.

The program can print song lists and track sheets and VHS cassette labels (face and spine) using Avery labels. (Unfortunately, Avery does not currently make labels for the DA-88's 8 mm tape format.) The labels show the Tape Set number, song name, sample rate, and much more.

Track Manager features context-sensitive online help. In the "value-added" category, the program includes a utility that converts bpm to milliseconds. A demo version of *Track Manager* is available at several locations on America Online and CompuServe. Creative Input; tel. (800) 839-INPUT or (310) 833-5627; fax (310) 833-6842; e-mail cre8vinput@aol.com.

Circle #404 on Reader Service Card

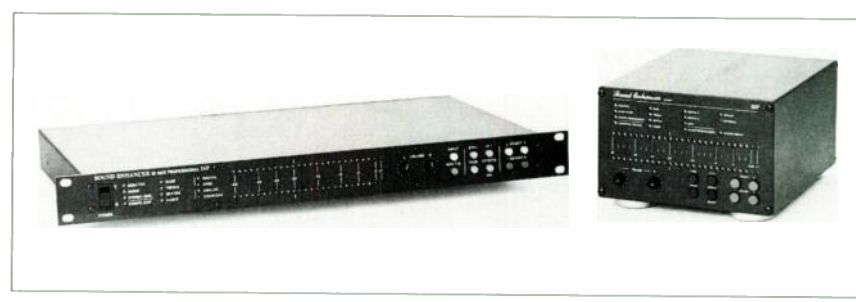
▶ PHILIPS SOUND ENHANCER

In this age of digital recording, many recordists end up with an assortment of boxes to perform A/D and D/A conversion, sample-rate conversion, and noise reduction. But now, Philips Key Modules has combined all these features in their Sound Enhancer, which is available in two versions: the IS 5022 single-rackspace package ($2,400) and IS 5021 tabletop unit ($1,500).

Both versions use 20-bit A/D and D/A converters. They accept signals sampled at any frequency between 15 and 50 kHz and convert them to 44.1 or 48 kHz. A jitter-removal feature is included for transferring DAT recordings that exhibit this problem.

Several types of processing are included. Quantization Noise Imaging improves 16-bit signals by adding dither to move noise outside the audio range. A scratch suppressor/declicker and an adjustable lowpass filter (6 to 16 kHz) further reduce noise.

Other processing includes compression, expansion, ±12% pitch variation (which does not affect the output sample rate), fade in/out, soundstage (spatial) enhancement, and bass and treble shelving filters. Stereo balance and level controls are supplied, and a pair of 26-segment LED meters indicate levels on both versions.



The IS 5021 tabletop unit has analog I/O and S/PDIF digital I/O on RCA connectors. The IS 5022 1U rack-mount unit is the "pro" version, offering analog I/O on unbalanced, ¼-inch and balanced, XLR connectors; S/PDIF on RCA jacks; and AES/EBU digital I/O on XLR jacks. This lets you convert between the two types of digital I/O. Mackenzie Laboratories (distributor); tel. (909) 394-9007; fax (909) 394-9411; e-mail mackenzie@earthlink.net.

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▼ EMEDIA

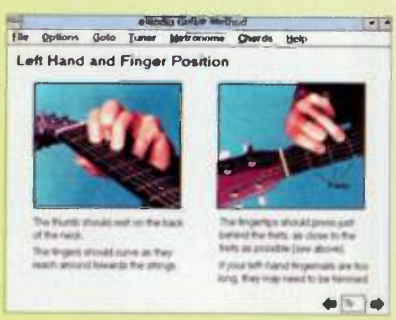
CD-ROM seems a natural medium for teaching, and eMedia's *eMedia Guitar Method* for Windows ($59.95) takes advantage of it. (A Mac version is expected in the second quarter of 1996.) Instructor Kevin Garry's 60 lessons are spiced with more than 30 videos and three hours of audio. You can even choose between male and female vocals to help match the student's vocal range. A recording feature uses a sound card's input to let students record themselves and compare their versions with the instructor's.

The lessons are aimed at teen and adult students. They cover a wide range of topics, from stringing the guitar and playing chords to strumming styles, playing melodies, and fingerpicking. There are approximately 50 songs and 50 exercises. Songs include such old favorites as "Scarborough Fair" and "House of the Rising Sun."

The program includes an adjustable metronome with audio and visual feedback and a tuner that uses the sound card's mic input and gives visual feedback. The chord dictionary includes fingering charts and audio clips for more than 250 chords. An "Internet Song Guide" shows you where to access free songs on the Net. More than 500 of these songs are referenced at appropriate places in the lessons.

eMedia Guitar Method requires at least a '386 PC with 2 MB of RAM, 7 MB of free disk space, Windows 3.1 or Windows 95, a CD-ROM drive, a Windows-compatible sound card, and a VGA+ display. eMedia; tel. (206) 329-5657; fax (206) 329-0235; e-mail adrianjo@aol.com; Web http://www.emedia.org.

Circle #406 on Reader Service Card



▶ ARS NOVA

Ars Nova's *A Little Kidmusic* ($75) emphasizes the fun of playing music with accompaniment. Aimed at children ages 3 to 13, this program for the Mac includes a library of 30 traditional songs. There also is a Mystery Melody feature in which the computer generates a new tune. The student can play tunes by tapping letters on the computer keyboard or playing a MIDI keyboard. The program adds the accompaniment, following the player's tempo.

The program can be configured for one of three age settings: Small for preschoolers and Medium and Big for those old enough to read. Preschoolers are introduced to standard music notation using a real staff, with beamed notes and barlines. The child can play a tune errorlessly by hitting the Play button and tapping any key on the computer keyboard; the pitches will play correctly, with accompaniment. This way, the young student gets the satisfaction of learning to play a rhythm without worrying about the correct notes. Songs are selected by simply clicking on pictures, and they can be played with a guitar, piano, organ, or human voice. With the latter, the synthesized voice sings solfege syllables appropriate to the key.

Medium-level students can work through a graduated series of tunes that teach the basics of pitch and rhythmic notation. The student identifies pitches and taps out rhythms by clicking on a virtual keyboard or using the computer keyboard or MIDI keyboard. Although there is no criticism for making errors, an apple appears over a note if it is played with the right pitch or at the right time. Each song is scored by awarding gold stars, which form a musical "constellation."

The Big level includes a simple sequencer that lets children write their own tunes by playing them in real time or by step-entry. The computer puts in the barlines and can add an accompaniment if desired. The student can edit the music, save it, and print it. In addition, full songs with composed chords and lyrics can be created with Ars Nova's *Songworks* and added to the program. Songs can also be easily removed from the song folder.

A number of Adult options are provided, which let the parent/teacher specify the age group and decide whether buttons should always "speak" when pressed, whether gold stars should be displayed, and so on. Six sets of user files come with the program, allowing you to customize the settings for up to six students, and more can be purchased.

Ars Nova eschews nonmusical games aimed at teaching musical skills (e.g., shooting galleries to teach pitches). The manufacturer believes that such games send the wrong message, teaching the child that music and learning are not interesting on their own and must be disguised. *A Little Kidmusic* focuses on enjoying the musical and the learning experiences.

The program runs on any 68020 or better Macintosh (color is recommended) with at least 4 MB of RAM and System 6.0.7 or later. It is compatible with Wildcat Canyon's *Autoscore* pitch-to-MIDI conversion program. Ars Nova; tel. (800) 445-4866 or (206) 828-2711; fax (206) 889-0359; e-mail info@ars-nova.com; Web http://www.ars-nova.com.

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▼ PLAY MUSIC, INC.

Blues guitarists can get some multimedia schooling from Play Music's *Play Blues Guitar with Keith Wyatt* CD-ROM for Windows ($59.95). The program mixes text with more than 100 minutes of video and animation to present the rhythm and lead electric guitar parts for four songs: a 12-bar medium shuffle, a slow blues, a minor-key blues, and an 8-bar blues. The music is played on your sound card's synth or an external GM synth. The parts are divided into choruses so the student can work on a section at a time. After learning a chorus, the student can play along with the programmed "band."

Each chorus is linked to general technique lessons, which cover such topics as playing chords and scales, phrasing, and soloing. An animated music glossary shows how the fundamentals of melody, rhythm, and notation apply to the blues.

The program features an animated virtual fretboard that displays the correct finger position (including string bending) while the song plays. The user can alter the tempo, mute an accompaniment instrument, and loop sections of music for concentrated practice. The CD-ROM includes 40 practice sessions for use with the animated fretboard.

The minimum requirements for *Play Blues Guitar* include a '486 PC with 4 MB of RAM, Windows 3.1 or 95, SVGA graphics, a CD-ROM drive with at least a 150 KB/s transfer rate, and a GM synth. Play Music, Inc.; tel. (800) 887-PLAY or (818) 766-2958; fax (818) 766-7616; e-mail s.szymk@ix.netcom.com; Web http://www.playmusic.com.

Circle #408 on Reader Service Card

▶ JUMP! SOFTWARE

Jump! Software's *Piano Discovery System* ($199 w/keyboard; $59 software only) provides a year's worth of music lessons on a CD-ROM for Windows. The student interacts with the software using a 4-octave MIDI keyboard (included) that connects directly to a sound card or joystick port. According to the manufacturer, the music ranges from "Bach to rock." The program is recommended for ages 6 through adult.

Discovery Island is the scene, and the activities have an island theme. The action takes place in six buildings. In Discovery Schoolhouse, the subject is music theory and piano technique. Two "music tutors" alternate giving instructions via narration and text. The tutor can play the piano part, or the student can play it, or the student can play either hand (selectable) of a duet with the computer.

In the Bungalow, the student plays along with onscreen sheet music, with exercises designed to develop note- and rhythm-reading skills. The student can work on tapping the rhythm while the computer generates the correct notes or focus on getting the notes right while the computer corrects the rhythm. The program tracks and evaluates the student's progress.

The Performance Hall is similar to the Bungalow, except it features a backup band or orchestra. The audience response (and the "review" in the *Discovery Island Times*) are a function of your precision; if you play the song almost exactly right, you get a standing ovation.

On the Jam Stage, the student can jam with a preprogrammed backup band on a very nice nightclub stage (with footlights!). The student can trigger fills and instrumental riffs, change the song's key by playing notes in the bottom octave (home-keyboard style), and play with or without auto-corrected chords or notes. The student's part is recorded and the performance can be played back.

The Arcade includes three games. "Gallery" is a shoot-'em-up game (with ducks, cans, balloons, and similar targets) designed to reinforce reading music notation without rhythmic demands. "RipChord" teaches chords, and "Aliens" teaches melody recognition, fingering techniques, and finger dexterity. As with the Bungalow, the program evaluates the student's progress in the Arcade.

Finally, no computerized musical island would be complete without the Recording Studio, a 16-track sequencer that plays back using any Sound Blaster-compatible, 16-bit sound card.

The *Piano Discovery System* requires a '486/33 or better PC with 8 MB of RAM; Windows 3.1 or 95; a sound card; 10 MB free disk space; a double-speed CD-ROM; and an SVGA display. Jump! Software; tel. (415) 917-7460; fax (415) 917-7490; e-mail jumptec@aol.com. ●

Circle #409 on Reader Service Card

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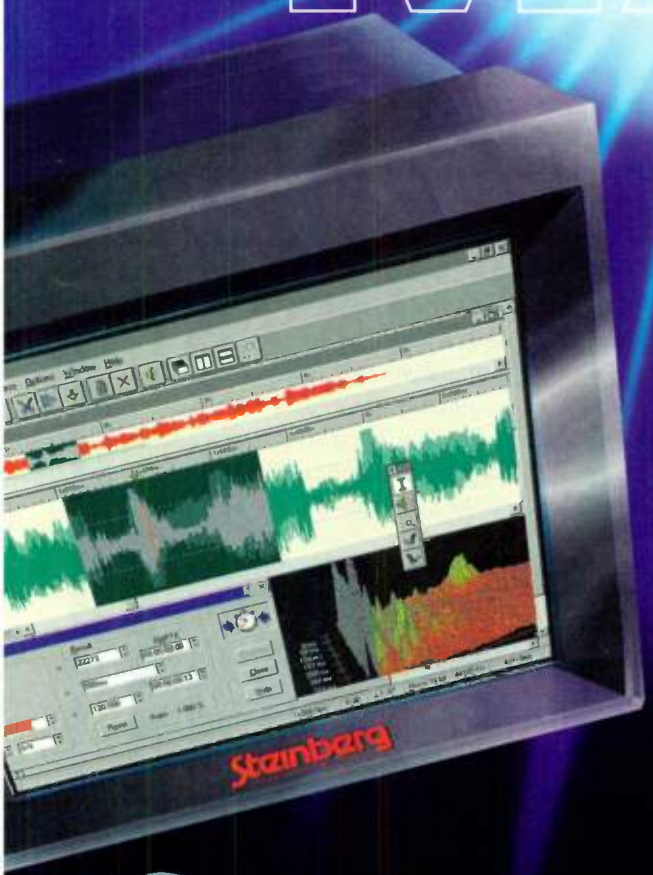

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WINDOWS 95

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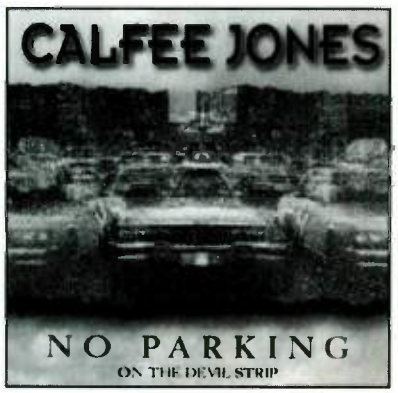

PRO FILE

The Working Man's Blues

Calfee Jones hits us where we work.

By Mary Cosola

There aren't many of us who haven't been touched by the recent epidemic of corporate layoffs and reorganizations. When it hit Calfee Jones, he used it as a creative catalyst to pen some songs about the woes of the working person. Jones is a blues guitarist/songwriter whose employer went through a major overhaul, or what they called a "realignment." Blown away by the consolidation of divisions and the ensuing layoffs, Jones wrote a song called "Realignment Blues." He gave copies of the song to a few coworkers who in turn distributed it around work. A copy of the tape made its way to the chairman of the board, who listened to it and wanted to discuss it with Jones.

"When I got called up to the chairman's office, I thought, 'Oh man, now I'll have to write 'The Unemployment Blues,'" relates Jones. "It turned out he really liked the song. The company even financed a video for it that was played to employees around the world."

Inspired by the fact that he and the chairman could both relate to a song about the state of corporate America, Jones decided to create a blues album of work-related tunes. A year and a half later, he produced his first CD, *No Parking on the Devil Strip*. The CD showcases Jones' knack for combining classic blues lyrics with ripping guitar work. In addition to six original tunes, *No Parking* features four covers, including fun, updated versions of Roy Orbison's "Working for the Man" and the Vogues' "Five O'Clock World."

Because Jones' previous recording projects were 4-track cassette productions, he decided to upgrade his studio setup. He invested in a Fostex R8 8-track recorder, a TASCAM M1508 mixing console, Audio-Technica AT 4033 and Shure SM57 mics, and Alesis Monitor One studio monitors.

"When I started mixing, I was trying to mix through my home-stereo speakers, even though I knew I should only mix through pro-quality speakers," he admits. "I finally broke down and bought the Monitor Ones. I really noticed the difference. There's a midrange muddiness that most home recordings are plagued with. But I learned that I could get rid of that by using really flat studio monitors."

Jones also learned how to be a whole blues ensemble. For *No Parking*, he wanted to add keyboard and horn parts to the core instrumentation of guitar, bass, and drums. The challenge was making the nonguitar parts sound natural without betraying his lack of playing experience.

"I used a synth for the drums and keyboards," says Jones. "But holding down a key for a horn part just doesn't cut it, so I used a little Casio horn controller. That way I could at least get the realism of running out of breath. I kept the keyboard and horn parts pretty sparse. I wanted them to support the other, more important elements on the album, like the vocals and the guitars."

Bleeding Gums Murphy, the sax man of *The Simpsons* fame, once advised Lisa Simpson, "The blues ain't about making yourself feel better, it's about making other people feel even worse than you do." But Jones feels his tunes are more about commiseration than misery: "The attention my song got at work made me realize that if there's one thing we all have in common, it's working. I wanted to put out an album that we can all relate to."

For more information contact Patri-Kat Records, PO Box 26482, Akron, OH 44319; e-mail patrikatco@aol.com.

Calfee Jones

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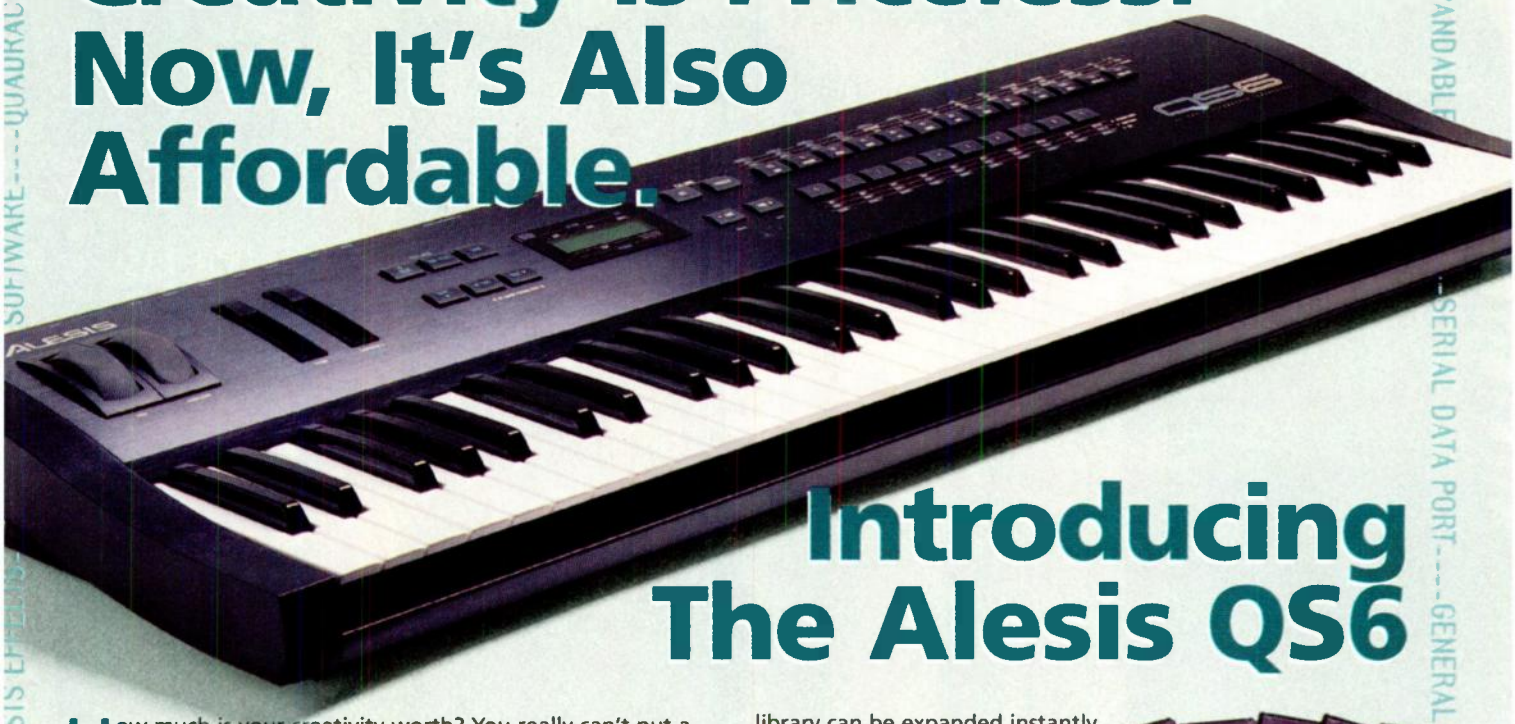

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Illustration by Stuart Bradford

By Jennifer Seidel

FieLd Trip

EM boards a big yellow bus and pays a visit to David Wilson and his New England Synthesizer Museum.

ONE of the disadvantages to being in the "information age" and seeing technology advance before our eyes is that we're getting older faster. Our kids have no context for life before CD-ROMs; our junior associates stifle giggles when we talk about what we studied in college; and some of the instruments we played in high school are already in a *museum*. "And over here, ladies and gentlemen, we have Cro-Magnon man, the Gutenberg press, and a Minimoog." Sheesh.

THIS isn't something we have to feel bad about, however. People are spending hundreds of dollars nowadays on digital instruments that simulate the synths that we played fifteen or twenty years ago. A few companies are even making *new* modular synths for those who haven't had enough. (See "Living Fossils" in the November 1995 issue of **EM**.) And the market for used synths is growing quickly. So go ahead and dust off those synths in the basement. You don't have to be embarrassed anymore.

DAVID Hillel Wilson is not at all ashamed of the 120 "outdated" synths that he has. In fact, he put them all together and created the New England Synthesizer Museum. At this 1,400-square-foot flat in Nashua, New Hampshire (about an hour north of Boston), visitors can discover new sounds and rediscover old ones by playing around with the Moogs, ARPs, Oberheims, and other synths that crowd around begging for attention. As Wilson says, "Few things are as technologically and aesthetically pleasing as a Moog synthesizer."

Wilson is just an ordinary musician with an extraordinary passion for synths. He's an "analog kind of guy" who composes using his synths and an old version of *Cakewalk* running on his '286. More than just the curator, Wilson has purchased and repaired most of the synths in the museum. He has recently secured nonprofit status and is close to securing tax-exempt status, which he hopes will inspire people to make donations of money and synths to the museum. Although many people offer to buy the synths, Wilson refuses to sell any. "What kind of museum," he asks, "sells its exhibits?"

THE MAKING OF A CURATOR

Music has long been Wilson's primary hobby. His father has a degree in music but always worked in computers. Wilson's own awakening to electronic music came, not surprisingly, when he heard the album *Switched-On Bach,* which features Wendy Carlos playing a modular Moog synth. Soon after that, his father came home with ARP literature, a little blue plastic demo record, and posters of the ARP Soloist, the 2500, and the 2600.

The fuel to this fire came in the early 1970s when the University of Bridgeport (Connecticut) offered a two-week class in synth programming. Wilson's parents enrolled their son, who was only in grade school, in this class. (The other students, except for one high school student, were all adults.)

In addition to taking this class, Wilson experimented with some early kits. In particular, he remembers when PAiA announced their 3-octave piano-keyboard version of the 2720. "It was $239," he says. "I still remember my order number; it was 120373, which was the date I ordered it. But I didn't get the whole synth until six or eight months later. You see, they ran the ad to find out how many people were interested in buying these *before* the synthesizers were actually ready. They sent modules as they finished them. In my first batch, I got the envelope generator, VCO, and LFO, and I just played around with those awhile. A few months later, the second batch came, which had the filters, VCA, and power supply. *Finally* they sent the 3-octave keyboard."

The museum's crown jewel is a Rhodes Chroma with serial number 001A.

Playing with kits, including one for the PAiA Proteus, inspired the young Wilson to try making his own synths. He financed his start-up synth company by selling off modules he didn't need to his father, who had a PAiA synth of his own. Wilson's prototype was designed to have sixteen oscillators, sixteen envelope generators, eight filters, and a computer-based, 8-voice polyphonic keyboard. But, according to Wilson, "everything failed miserably."

Reluctantly, the hopeful inventor decided to become a consumer like everyone else. His first pro synthesizer was an ARP Odyssey that he bought from a friend for $200. After that, he bought a Sequential Pro-One for $79 at a Nashua music store. He followed this up with an ARP Solus for $85. As Wilson relates, "The people at this store realized they could sell me all of their old analog synthesizers if they brought them to the store one at a time."

Wilson didn't intend to start collecting for a museum; he was just accumulating synths for his own use. The thought of a museum didn't occur to him until someone else suggested it. Wilson was at a tent sale, debating whether to buy a Mellotron. ("It was so mechanical," says Wilson, "it wasn't really what I wanted.") But the salesman—the U.S. sales representative for Mellotron—kept telling him, "If you're gonna have a museum, you've gotta have a Mellotron," and the seed was planted.

During this same period of time, people were asking him to fix their synths and to teach them to play their synths. As Wilson explains, "I was doing a lot of the stuff that museums do anyway. And I wasn't buying synths to sell them. I was buying them for my use and to share them with other composers."

DAVID WILSON

Yale University faculty member Jack Vees (left) and museum friend Michael Brogan (right) assist in the restoration of Yale's monster ARP 2500 system, a current museum project.

DAVE'S TOP TEN

Wilson reflected upon his large collection of synthesizers, coming up with a Top Ten list. (Eight are in the museum and two are on his wish list.) He started with his top two. "If I were left on a desert island with only one synth," muses Wilson, "I'd take my modified Oberheim Two Voice or a Korg Mono/Poly."

1. Oberheim Two Voice (modified). Wilson modified his Oberheim Two Voice, one of the first synthesizers he acquired, so that all of the rear patch points are brought out to the metal

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Field Trip

strip on the top, making it possible to patch over anything. He describes one of the many configurations possible with these modifications: "Typically, the control voltage produced by the EG is routed to the VCA, so the sound gets louder when I press a key and dies out when I release it. Instead, I sample the voltage, turning it into discrete steps, and send it to a VCO. This produces a stream of notes that rises and falls as I play the keyboard."

According to Jim Cooper of JLCooper (who was on the original Oberheim staff), "The Two Voice had a sound all its own, built mainly around two full filters that had a certain edge to them, which the ARPs and the Moogs at the time didn't have. And it had nice, stable oscillators: you could play in tune, or you could have notes oscillate a little bit from each other and hold their same relationship."

2. Korg Mono/Poly. Wilson's other "desert island choice" has four VCOs, one filter, and two EGs. "This is kind of a silly machine. It has a lot of modulation routings," says Wilson. "And I've found that if you set each of the four oscillators to a different octave, put it into a polyphonic mode, and start playing Bach on the keyboard, you can almost make it sound like Wendy Carlos multitracking."

Wilson rounded off the other eight entries in his Top Ten with these well-known pieces:

3. & 4. ARP 2500 and 2600. "These are general-purpose synths," explains Wilson. "They're patchable and they're modular, so you have fewer limitations with these than you do with smaller pieces such as the ARP Odyssey."

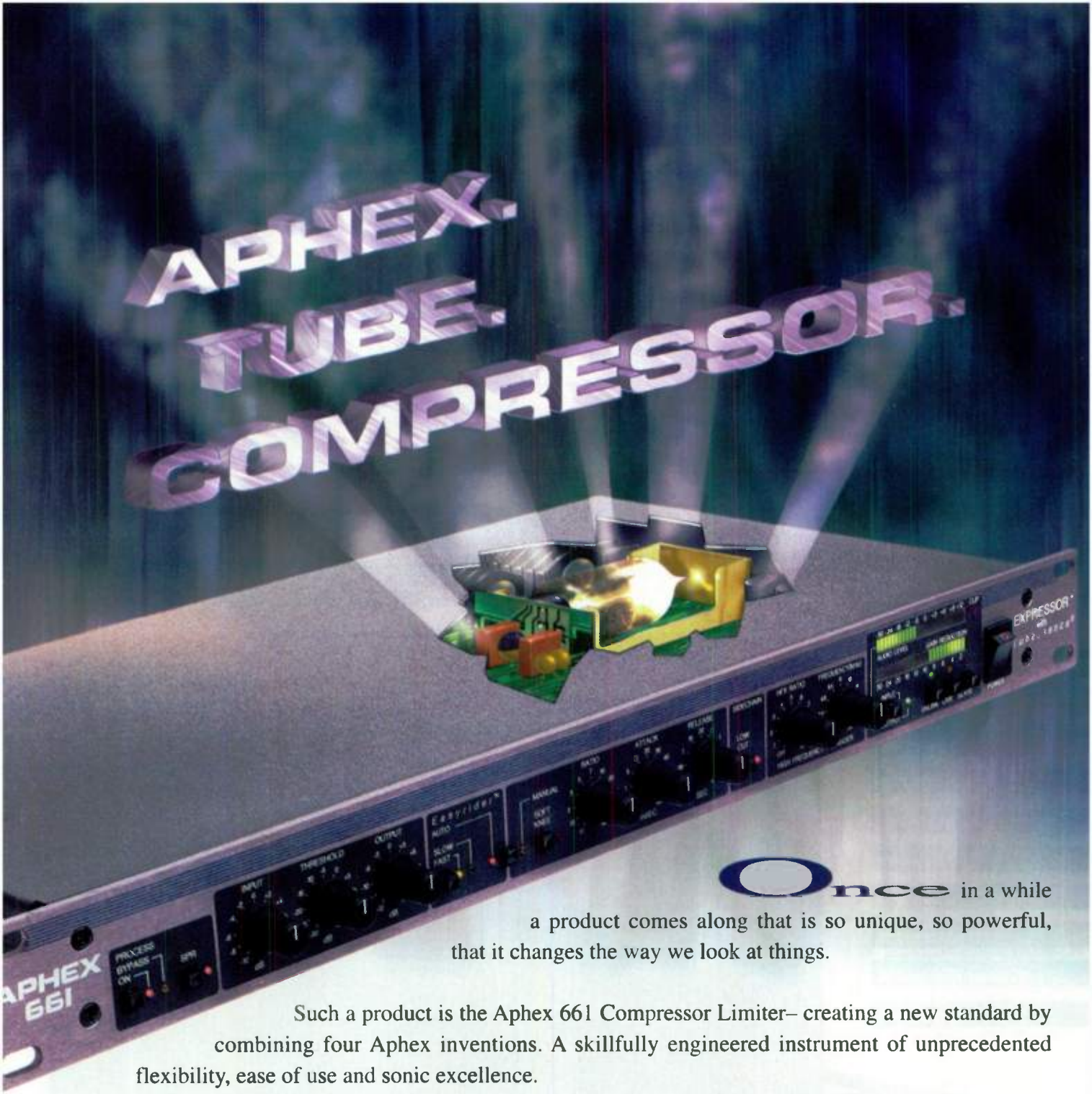
The museum has a few 2600s in its collection. "We have an old-style 2600, and we have a modern 2600 that's missing its keyboard," Wilson notes. (He sometimes gets synths inexpensively when they are missing parts or aren't working. He repairs them or gets lost parts later.) "We also have a 2600 that I've used with a few modifications. Basically, I've put in ¼-inch jacks for the mic input and the stereo output to make it useful."

The ARP 2500 could qualify for a museum spot for several reasons: For starters, it was ARP's first synth. And it was featured in the spaceship-landing scene in *Close Encounters of the Third Kind*. But most importantly, it introduced new technology to the synth market. Unlike the Moogs available at that time, the 2500 didn't use patch cords. Instead, its signal routing was done with matrix switches.

David Frederick Sr., ARP's vice president of sales and the man who did all of ARP's demo records, calls the 2600 "ARP's bread-and-butter synth." When asked about the 2600's impact on the synth market, Frederick says, "It just

DAVID WILSON

The museum pieces fill every available space. Here, on the floor, are a Cheerleaders Cindy-2 (a synth Wilson designed when trying to start his own company, top left), an EML ElectroComp 500 (top right), an Oberheim OB-1 (bottom left), and a Korg Mono/Poly (bottom right).



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- 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.

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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.

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had tremendous, unique sounds. And it was quicker than the Moog because a lot of the things you'd want to do didn't need patch cords. Just flip a few sliders, and you'd get a lot of good sounds: jazz guitars, rock guitars, oboes, even traditional woodwind and brass instruments. But if you wanted to be really cool and get a bunch of other sounds, you could start walking the patch cords around. The 2600 reigned about five years, which back in those days—with changing technology—was a long time."

5. EML ElectroComp 101. Wilson talks fondly of an arrangement on an EML demo record featuring this "patchoverable" synthesizer, which has four oscillators and a 2-voice keyboard. "In 'Homage to Bartok,'" Wilson explains, "a piece by a man named Kim Corbet, there's this one sound at the end where he has a slow sawtooth wave gradually sweeping the filter up in a small range, like half an octave. Then he has the sample-and-hold generator sampling that wave and using the output to move the filter up and down much farther. So it will do a couple of tweeps over here and then go over there and do a couple of tweeps. And with all that going, he still has three VCOs to do harmony with. It's a fantastic arrangement. You can do the same thing on an Odyssey, but you end up having only one VCO left for the harmony."

The ElectroComp 101 was EML's most popular synth: EML manufactured about 1,000 over ten years; their next most popular synths, the 200 and the 300, came in far behind at about 400 units each. Even though the 101 didn't have a pitch-bend wheel or a modulation wheel, it did have a pitch controller, a duophonic 3½-octave keyboard, and four oscillators; and it didn't require patch cords for producing sounds.

KYLE JARGER

Curator David Hillel Wilson shows off some synthesizers in the museum's stash. They are, clockwise from top left, an EML ElectroComp 200, EML Syn-Key, Moog 15 (in for repairs only), Mellotronics Mellotron, ARP 2500, Aries 300 modular, Buchla Touch Keyboard (old enough to read "San Francisco Tape Music Center"), Wavemakers sequencer, and Oberheim Two Voice.

6. ARP Quadra. Also included on his Top Ten list is the ARP Quadra, "for the string sound and the fake polyphonic sound," says Wilson. The sound is "fake," he explains, because the Voices share an oscillator instead of each having its own oscillator.

David Frederick Sr. explains why he thinks the Quadra is worthy of distinction. "At that time, the Quadra was state-of-the-art," he says. "Nobody else had anything like that. In those days, most synths were either monophonic or duophonic. Some of them didn't

COLLECTOR'S ITEMS

Here is just a sampling of the 120 synths found in Wilson's museum.

Alpha Syntauri
Aries 300 Modular
ARP Avatar
ARP Axxe
ARP Explorer I
ARP 4- and 16-voice pianos
ARP Odyssey (white, black, and orange)
ARP Omni I and II
ARP Sequencer 1613
ARP Solus
ARP String Ensemble/Solina
Casio CZ-1000
Chamberlin *(not in working condition)*
Crumar Orchestrator
Crumar Performer PRF
Deltalab Effectron
Digital Keyboards Synergy
Electronic Dream Plant Wasp
Electronic Music Labs ElectroComp 101, 200, 400/401/416, 500
E-mu Drumulator
E-mu Emulator
Freeman String Symphonizer
Korg Mini-Korg K-3
Korg MS-20
Korg MS-10
Korg Polysix PS-6
Korg Poly Sixty-one
Linn LM-1
Mellotronics Mellotron
Moog Micromoog
Moog Minimoog
Moog Poly Interface module*
Oberheim DSX
Oberheim Two Voice
Octave-Plateau Cat
PAiA Proteus
PAiA 6710 Vocoder
Roland SH-101
Sequential DrumTrak
Sequential Pro-One
Sequential Six-Trak
Simmons SDE Expander
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360 Systems Digital Sample Playback
360 Systems MIDI Bass
Yamaha CS01

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DAVID WILSON

Rare birds stick together. Here we have (top, L to R) a Jen SX-1000, Quad panner (custom built by Yale University), Schober Reverbatape, Roland M150 module, EDP Wasp, ARP Little Brother, (middle, L to R) Jen SX-2000, Wavemaker sequencer, Oberheim DS-2A sequencer, customized PAiA Proteus, (bottom, L to R) customized Oberheim Two Voice, and teak Mellotronics Mellotron.

even have memory in the second channel. And we came out with the Quadra, which was polyphonic."

Wilson's ARP collection is one of his biggest sources of pride. "We have one of every product ever made by ARP," Wilson says. "And it is my intention to get one of everything from all the other major manufacturers—and the minor ones, too, if I can." Wilson must also take a lot of pleasure in his ARPs; they account for three of the entries in his Top Ten.

The museum is within 100 miles of the ARP factories and ARP founder Alan R. Pearlman's house. Wilson has, on occasion, called upon Pearlman for help identifying equipment. He tells a story of driving to Pearlman's house to show him a photo. "He identified a module in a photo of the 2500 that turned out to be the triple-balanced modulator," relates Wilson. "They didn't make many of these, because no one seemed to want them."

7. Moog Memorymoog. What list would be complete without what Wilson calls "the last and greatest of the Moog synths"? He notes that this is the only polyphonic synth he has in the museum that has three oscillators per voice instead of just one or two.

Bob Moog gives his appraisal of the Memorymoog, even though he was not with Moog Music when they released it in late 1982. "The Memorymoog was the only Moog synthesizer that was polyphonic and microprocessor controlled," Moog says. "It summed up all the successes that Moog Music had had up until that time. It had the sound of six Minimoogs, and the microprocessor allowed you to save digital representations of the knob settings so you could save sounds."

8. Yamaha DX7. "My DX7 is one of the two pieces that I bought brand new," says Wilson. "As probably happened with a lot of people, I went into the music store and they said, 'Here, try this.' I played it and said, 'Oh my God. We have the perfect synth. We don't have to build any more.'

"But now, ten years later," Wilson continues, "the DX7 is just another synth with its own limitations. I find the modulation routing to be very inflexible, and although the 6-operator-per-voice FM synths were superb, Yamaha insisted on propagating 4-operator synths and 4- and 2-operator sound cards for the PC. This, of course, was substandard quality."

Bryan Bell, president of SynthBank, reflected on how the DX7 impacted the electronic-music industry. "At that time, most instruments were still made by hand: not only pianos and guitars but even synthesizers," Bell recalls. "Yamaha was a major musical-instrument manufacturer who, with the DX7, had consumer-electronics technology, purchased intellectual property from Stanford University, and used mass-production techniques—modern, assembly-line techniques—to make a powerful consumer product."

Bell, an audio engineer and all-around technical guru for many artists (including Herbie Hancock), remembers the impact the DX7 had on musicians who had been living in what he calls the "stone knives and bearskin" era. "The DX7 was the first synth that was stable as far as programming and that had built-in MIDI. But at that time," he says with a laugh, "MIDI was such an unused function that it wasn't marked on the DX7's front panel; you had to go to something like the eighth function just to find the MIDI menu. [In later versions, they actually printed

DAVID WILSON

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Field Trip

MIDI on it.] And it was finally possible to create computer-based editor/librarians and sequencers for it."

9. Moog III C. Another of Wilson's top faves is a unit that he is still trying to get for the museum: a Moog III C. "It's a beautiful machine," he describes, "with the black panels and the silver bars and the patch cords. It's beautiful to look at and to play."

Bob Moog relates what he thinks made the III C distinctive. "The III C was the largest standard modular system that R. A. Moog, Inc., made in the 1960s," says Moog. "It is the most complete and most expensive collection of analog functions that we ever

GOTTA HAVE ONE

Got an itch to get a few used synths for your own listening pleasure? Below is a list of a few places you can start scratching. You can also find out who is selling or trading instruments by scouring classified ads, browsing your local music store, frequenting yard sales, contacting pawn shops, and using your best Internet skills to "visit" newsgroups (e.g., rec.music.makers.marketplace) and bulletin boards (e.g., America Online's Classifieds area). For advice on buying used equipment, see "Unearthing Antiquities" in the November 1994 issue of **EM**.

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"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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"I don't think we ever built a standard modular system that has more synthesis capabilities than the III has," Moog continues. "If you ever see pictures of a big modular synth in the '60s, it's likely to be that model." (The *C* in III C stands for *console cabinet;* it was also available in a portable model, the III P. The III P is featured on the cover of *Switched-On Bach* even though Wendy Carlos never used a standard Moog.)

10. Buchla modular. This is the other synth on Wilson's list that isn't yet in the museum. "Everyone who comes in wants to play this synth," Wilson says of Buchla modulars, "but we don't have one. Of course, I hope to get one as soon as possible."

Don Buchla, says Wilson, tried to offer musicians a new instrument without any presupposed ideas of how to use it. "His philosophy," explains Wilson, "was that putting 'real' keyboards on synthesizers might mislead composers and players into a fixed way of thinking," such as only composing with the 12-tone, equal-temperament scale associated with the piano keyboard. "Thus, his synthesizers often had a row or an array of touch plates instead of a keyboard."

THE ELUSIVE ONES

Not all of these synthesizers fell into Wilson's lap. In fact, a few of them were pretty hard to get. Wilson remembers the time that elapsed between hearing about an ARP 2500 for sale and actually buying it. "The local music store told me someone had come in trying to sell them an ARP 2500, but they told him they weren't interested," Wilson says. "However, they gave my phone number to this gentleman and told him that I would probably purchase it. I ran out right away and bought an answering machine so I wouldn't miss his call. He ended up calling me about three years later. I offered him $500, and he said, 'For that much, you can have my 2500 *and* my 2600!'"

Wilson has had to pass up pieces when he wasn't able to afford them and when he didn't have room for anything new. For example, he was unable to buy a large ARP 4-voice—the piece needed to complete his "one of every ARP" collection—priced at $50 when he was still living in a small apartment. By the time he moved into his house, he had to pay $200 for one.

LIBRARY & GARAGE, TOO?

In addition to opening the museum to the public, Wilson often provides other services to musicians. For instance, the museum is one of the few sources for ARP manuals, so he has photocopied old manuals and schematics for those

in need. One of Wilson's goals for the museum is to make it a source of documentation for submodules and synthesizers. To make this happen, he's trying to determine who holds the rights for many of the manuals and schematics so he can get permission to reproduce them.

Another service Wilson offers is synth repair. He does a lot of work on the synths he has purchased, and he's willing to do work for others either for a fee or for barter. The museum is credited on a CD by Architectural Metaphor because Wilson serviced some of the band's instruments. He has also been able to do repairs in exchange for synths that were then added to the museum's collection.

You can find more than one of some of the synths in Wilson's collection, and this is no accident. By buying duplicates of some pieces, Wilson is able to barter for pieces that the museum doesn't have yet. This was the case when Wilson acquired an Ampron Aubade (a synth that Wilson hadn't heard of then and still knows nothing about) in exchange for an Roland SH-101. Someone told him that a gentleman was looking to trade an Aubade for an SH-101, so Wilson went out and bought another SH-101 so he'd have an "extra" to barter.

PRICELESS

Value is not only an issue of what something would go for on an open market; it is also a matter of sentimentality. Among the museum's MVPs (most valuable pieces) are the ARP prototypes, the modified Oberheim Two Voice, the Sequential Prophet-5, and the Mellotron. Wilson got the Prophet-5—almost every museum visitor asks about this synthesizer—along with the Prophet Remote Keyboard for only $600. The Mellotron is one of eighteen teak Mellotrons ever made and one of four imported into the United States.

The museum's crown jewel is a Rhodes Chroma with serial number 001A. Wilson, knowing that many of the synths still around are in the hands of universities, ran an ad in *Music Educators Journal* asking people to contact him if they had synthesizers to sell or donate. The ad was seen by a teacher at the Tenacre Day School, which Phil Dodds' daughter attended. Dodds (who worked on the Chroma for ARP before that product line was sold to Fender/Rhodes) built this Chroma by hand for

ARE WE THERE YET?

As far as David Hillel Wilson knows, he operates the only nonprofit synthesizer museum in the United States. Contact information for the New England Synthesizer Museum and for an unrelated synth museum in London is given below.

New England Synthesizer Museum
6 Vernon Street
Nashua, NH 03060-2672
tel. (603) 881-8587
Open by appointment only.

London Museum of Synthesizer Technology
PO Box 36
Ware, Hertfordshire SG11 2AP
England
A book and video featuring the London museum are available from Analog Modular Systems, Inc. (see sidebar "Gotta Have One").

FieLd Trip

the school, so it was numbered between serial numbers 1 and 2. Unfortunately, Dodds himself does not have a Chroma or an ARP 2600, despite the fact that he played a major part in their development. Wilson hopes to buy another Chroma for Dodds as a gift of appreciation from the museum.

MISSING PIECES

Wilson is always on the lookout for pieces that he doesn't yet have in the museum. Some synthesizers at the top of his wanted list include any Moog rack-mounted pieces (except a Liberation controller), a Taurus One, and any modular Moog pieces. The only modular synthesizers the museum has are ARP and Aries pieces; Wilson is looking to get more from Buchla, Roland, Synton, Serge, and Polyfusion, to name a few.

Wilson is also seeking an Oberheim SEM (serial number 0252) that was part of his collection until he noticed it missing a few months ago. "Apparently," Wilson says, "a visitor 'borrowed' it without permission." (If you are that visitor, please return it to the museum so the rest of us can enjoy it!)

THE POINT

What would drive someone to spend thousands of dollars and years of his life in an effort to amass such a large collection of analog synths? The answer may be as simple as a love for the music they make.

"My goal," says Wilson, "is to keep these sounds in our musical vocabulary. I don't want anyone to listen to Wendy Carlos or Emerson, Lake & Palmer and say, 'Wow, I wish I could sound like that.' I do this for all the composers who say, 'I want that sound.' I'm a composer, and I know when no other sound will do except *that* one." Wilson gets sounds to composers simply by opening his museum to the public and has said that he would allow people to record at the museum if they so desired. It might be possible sometime in the future, Wilson speculates, to get sounds to others via the Internet, too.

The museum has one of every ARP product ever made.

Wilson has not created this museum just to have people come and *look* at synths. This is an interactive museum by design. These are living, breathing synths, not just shells of old has-beens. So if you're living on or visiting the East Coast, make it a point to check out the museum. *Those* sounds are waiting for you in a flat in New Hampshire.

EM *Editorial Assistant* **Jennifer Seidel** *gets a kick out of writing about synths that are older than she is.*

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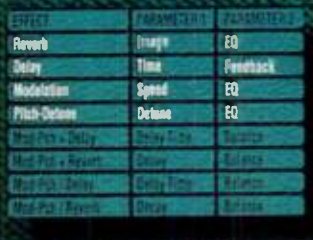

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By Brian Knave & Michael Molenda
Photography by Eric Harger

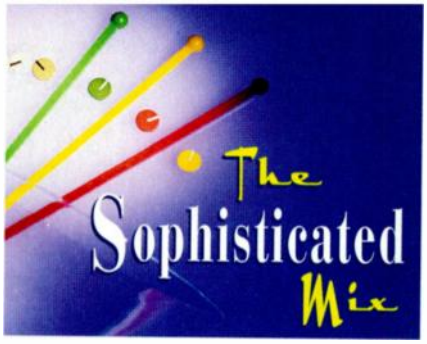
The Sophisticated Mix

Hey all you hep cats and kittens! Stop slumming with the cheap beer and fondue set. It's martini time! Forget all that off-the-shelf stuff because with a little practice, you can start shakin' and stirrin' some *real* excitement. We're talking about killer mixes here: rhythm tracks that jump and strut, vocals that shimmer, and keyboard pads that ooze sensuality like sweet molasses, daddy-o.

Of course, you can't just conjure a slick mix from thin air. You need some potent ingredients, kick-butt sprinkles of sonic mayhem that can propel your music through high-fidelity speakers with all the toughness and class of Mr. Frank Sinatra circa 1958.

To this end, we've put together a few recipes that should help you concoct some brilliantly tasteful mixes. All you need is a decent mixing console, a compressor, an expander/gate, and a reverb unit. We didn't touch on the use of delay or modulation effects, such as chorusing and flanging, because *that* scene alone would require a whole article to run down. But even limited to these basic ingredients, you should be able to slam down some exquisitely cool sonic vistas. Mmmm.

Whip up a wicked aural cocktail.



So put on your favorite Perry Como records, grab your finest dinner jacket, and let's start mixing up a wild, wild party!

The EQ Fizz

Console EQ knobs should be considered the most dangerous tools in the mixologist's bag of tricks. Drowning a mix with inappropriate or unnecessary frequency tweaks can slaughter the very essence of your sonic cocktail. Here are some tips for enhancing the flavor of a mix with subtle dashes of equalization.

Taste first. It's considered a culinary *faux pas* to salt your food before you even taste it. It's a valid point. Therefore, don't let force of habit entice you to blindly twist EQ controls before you take a critical listen to the soundscape. Believe it or not, the sounds you recorded may be just fine as they are. As you move up faders during the mix, leave the signals flat and assess the force of each instrument's character. If a guitar slashes into the chorus with the right amount of bravado, don't change a thing. However, if the bass starts to lose presence in a dense stew of tracks, feel free to crank the tone controls until the low end punches through. Ultimately, sparse use of equalization (actually, it should be called *re-equalization* because most engineers tend to record with EQ) produces cleaner, more transparent mixes.

Cut it out. You don't necessarily have to boost mid and high frequencies to add presence or clarity to a signal. Sometimes cutting low-mid or bass bands can thin out a sound enough to help it stand out in a cluttered sonic spectrum. In addition, cutting frequencies is often a cleaner, more pleasing way to accentuate signals than boosting the high EQ to ear-piercing levels.

Mine for gold. If your console has fixed EQ controls, there's not a whole lot you can do except boost or cut the frequencies offered. However, consoles with sweepable mids (see **Fig. 1**) deliver a wide range of tonal options. Given the added control, it's almost criminal not to experiment a little with the bandwidth to determine the perfect EQ tweak for an instrument. Boost the signal a healthy 10 dB or so to make tonal changes extremely audible, and slowly sweep across the entire bandwidth. Listen for the frequencies where the EQ really enhances an instrument's sound. Then, cut the signal by 10 dB and repeat the sweep, noting the "sweet spots" where less equalization sounds marvelous. This entire operation takes just a few minutes to complete, yet it provides volumes of information about an instrument's tonal personality.

Don't assume. It's amazing that people can listen to a mix and say, "I think the guitar needs a boost at 7 kHz." How can the engineer be so sure that 7 kHz is the absolutely perfect frequency to tweak? If the guitar seems dull—or simply not bright enough—there are a number of frequencies that can be boosted (or cut) to add some sizzle. Sadly, a lot of musicians act on their preconceived notions and end up making what may be a less-than-brilliant tonal adjustment. Don't allow your ego to drive your mixes. Always do what's best for the overall tonal spectrum by experimenting with the EQ controls to find the ideal tweak.

Move it on over. This mixing trick is cheating a tad because it's not an EQ tweak, but you can also clarify an instrument's sound in a mix by simply panning it off-center. For example, if you've toiled over the sound of your kick drum and electric bass but the low end remains as muddy as swamp water, try panning the kick to 11 o'clock and the bass to 2 o'clock. Moving the bass elements slightly out of the center of the mix should clear up the low-frequency gunk. This panning trick usually works with all instruments—from ride cymbals to pianos.

FIG. 1: The console EQ strip can be a dangerous weapon if tone controls are abused.

Compression Cocktails

Compression is to the mix what vermouth is to a martini: you don't really taste the vermouth, but a martini just isn't as smooth without it! Simply put, a compressor is a signal processor designed to reduce the dynamic range of audio signals. Why would you want to reduce dynamic range? One reason is that a smaller dynamic range makes a signal easier to "seat" into a dense mix. A very dynamic singer, for example, might disappear into the track during whispered passages. But raising the vocal level so that the whispers are audible means that any screamed sections will probably be loud enough to break glass. In the old days, the only way an engineer could solve this dilemma would be to move the channel fader up and down to maintain consistent volume levels.

But don't think smaller dynamic range necessarily means smaller sound. "The trick," according to compressor guru Jon Bosaw from Symetrix, "is to reduce dynamic range without flattening or changing the dynamic feel of the piece."

When you apply gain reduction to a signal, the meters on your console should reflect the changes in signal levels as they are altered by the compressor. Let's take a bass track as an example. If the quietest portion of the track is -20 dB and the loudest part is 0 dB, then the dynamic range of the track is 20 dB. With that big of a range, the quietest notes will be hard to hear in the mix.

Here's where a compressor comes to the rescue. By applying 15 dB of gain reduction, we can compress the track's dynamic range to 5 dB. This is done by adjusting threshold until the gain-reduction display on the compressor reads 15 dB. Assuming the system is properly calibrated, this change is reflected on the console meters, which should now show the loudest signals

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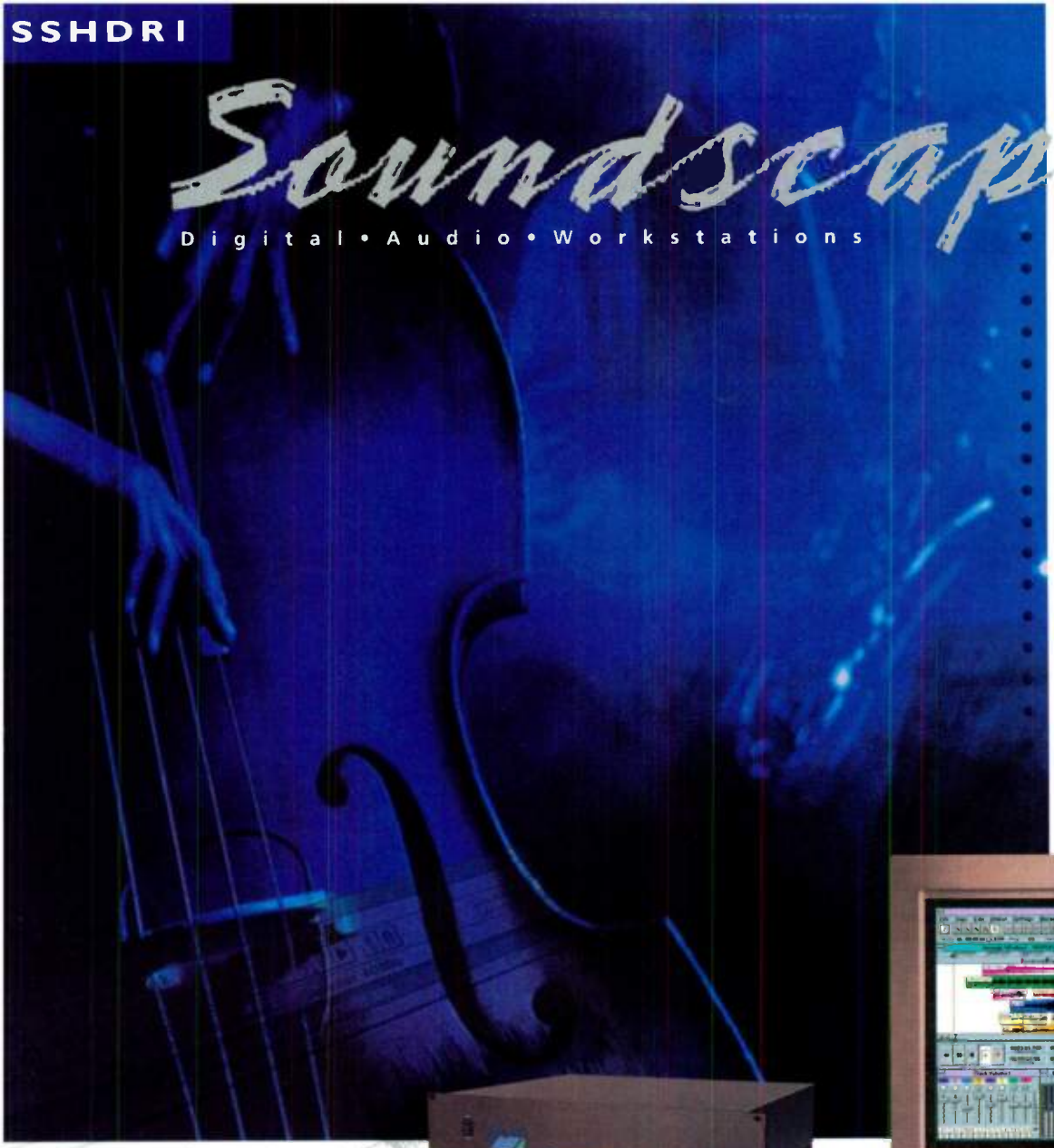

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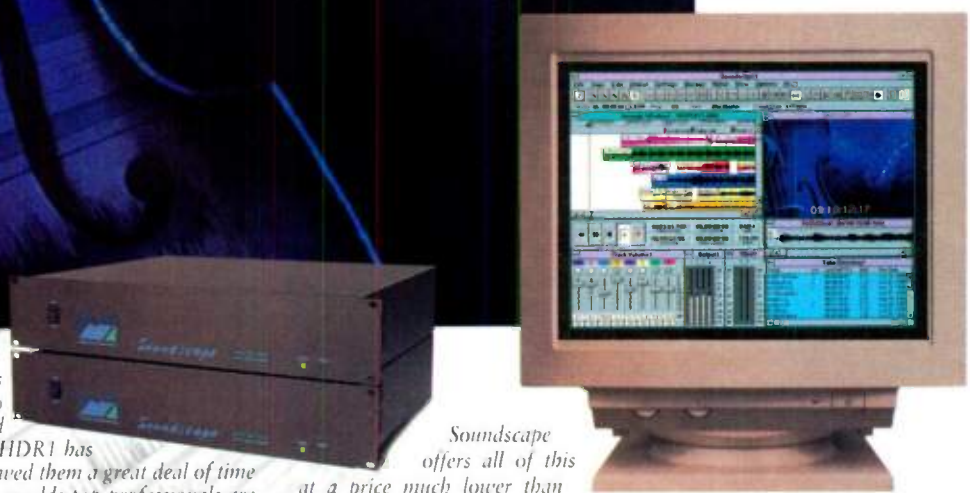

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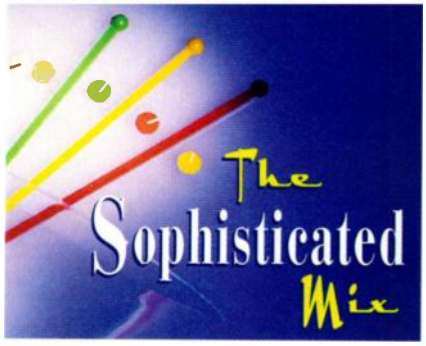

peaking at -15 dB rather than 0 dB. (The quietest notes are still at -20 dB.) Next we adjust the compressor's output knob to add 15 dB of make-up gain so the console meters again peak at 0 dB. The quietest passages of the original bass track are now at -5 dB (15 dB louder), making the whole track seem louder and more distinct. *Voilà!* Compression.

THE INGREDIENTS

Working with a compressor requires familiarity with four basic parameters: threshold, ratio, attack time, and release time (see **Fig. 2**). *Threshold* is the level at which compression kicks in. By setting threshold to 0 dB, for example, all signals at or above 0 dB get compressed, but those that fall below 0 dB are unaffected. *Ratio* is the expression of the difference between signal increases (volume) at the input of the compressor and those at its output. The left number refers to input, the right to output. For example, a 5:1 ratio means that every 5 dB change at the input (as long as it's above threshold) results in a 1 dB change at the output.

Attack time is how long it takes—measured in milliseconds (msec) or microseconds (µsec)—for the compressor to apply gain reduction to signals above threshold. A slow attack time will let fast transient signals pass threshold before compressing the rest of the signal; a fast attack will catch transients, but in the process it may diminish high-frequency content. *Release time* is how long it takes—measured in seconds and hundredths of a second—for a signal to be restored to its unprocessed state after it falls below threshold. Generally, slower release times result in a more natural sound, whereas fast release times maintain a more consistent output level and make low-level sounds louder.

Threshold and ratio work together to effect the outcome of a signal. The lower the ratio, the less control the compressor has on the signal; the lower the threshold, the sooner the compressor applies that control. This relationship between the two controls affords flexibility and sonic variation. "There are two different-sounding ways," explains Bosaw, "to get 6 dB of gain reduction out of a compressor: low threshold and low ratio or high threshold and high ratio."

As for attack and release times, optimal settings are usually those that follow the signal envelope—that is, settings that match the natural attack, decay, sustain, and release of the instrument's sound.

Some compressors have automatic attack- and release-time circuits rather than manual control knobs; others have an auto switch that lets you bypass the knobs. "Which one you use depends on the desired result," explains Bosaw. "To make a kick drum sound even with each hit, you would want a manual attack. But an automatic attack might be better for cutting a live-to-tape vocalist."

Unlike time-domain effects (reverb, chorus, etc.), compression is designed to solve a problem (wide dynamic range) without making a sound of its own. It can be used to create an effect, but for most applications a compressor should be sonically transparent.

DASHES OF FLAVOR

Gain reduction comes in at least three flavors: leveling, compression, and limiting. The difference between one and the next is usually a matter of degree.

The aim of leveling is to maintain a consistent output level without coloring the sound or affecting short-term dynamics. This is achieved by setting an intermediate ratio (e.g., 6:1), slow attack and release times (so quick dynamic peaks can get through), and a threshold low enough to include hard-to-hear low levels. "Imagine you are listening to a full orchestra," says Bosaw, "and wishing the flutist would play louder during the flute solo so you could hear the individual notes better." Proper leveling would bring the flute up relative to the orchestra (and possibly the orchestra down relative to the flute) but not so much that it would spoil dynamics or create unnatural artifacts. In this example, leveling would be applied in stereo to the entire mix.

Compression requires the reverse parameters: a low ratio with faster attack and release times. The goal is to compress the dynamic range and bring low-level signals up. This "tightens" the sound so the instrument recorded on that track is easier to hear in the mix. For this application, the compressor is typically inserted into the signal path via a channel insert.

A related application would be to add presence by increasing gain at the input while lowering threshold. "Except for sidechaining, this is the only audio effect that a compressor can perform," says Bosaw. "Increasing presence gives the effect of moving the microphone closer to the instrument. Sometimes it can help a wimpy vocal track sound ballsier."

Limiting uses the highest ratios (10:1

FIG. 2: Mastering a compressor's parameters bestows many sonic options upon mix masters. Compression can be used as an effect to make sounds seem like they're roaring out of the mix, or more subtly, to help a vocal "seat" better into dense rhythm tracks.

FIG. 3: An expander can be described as a kinder, gentler noise gate. Because there is no drastic cut-off of the source sound, expansion is a neat sonic trick for cleaning up tracks without imposing unnatural signal decays.

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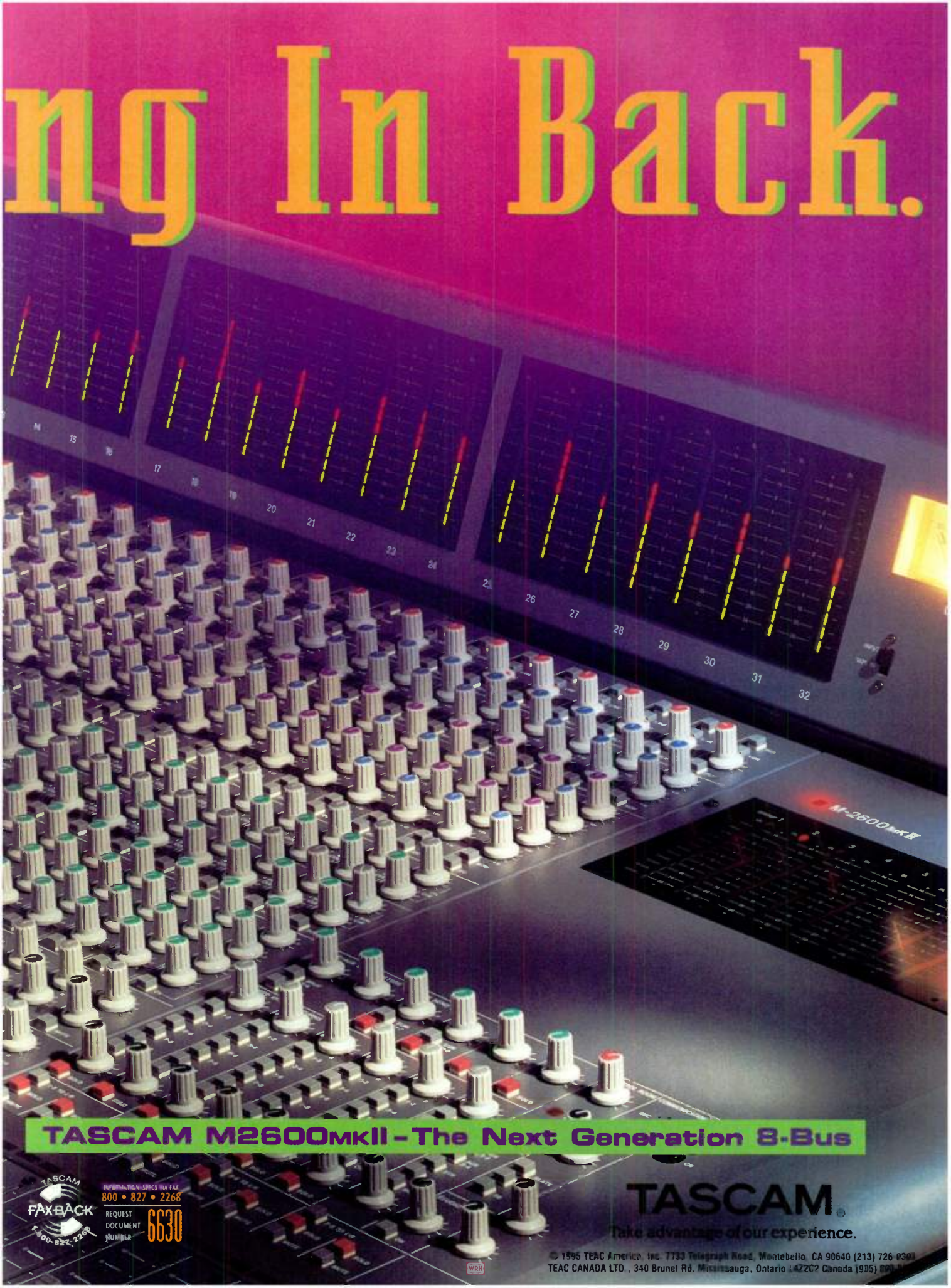
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and up) and fastest attack and release times. Threshold is generally set high, so the compressor (now a limiter) stays out of the way until a peak comes along. These parameter settings allow the user to define maximum output levels. Extreme ratios—e.g., 20:1 up to ∞:1 (infinity to one)—combined with extremely fast attack and release times will create an absolute limit (determined by threshold) at which peak levels are automatically capped. Called *peak limiting,* this application is useful for protecting sensitive devices in the signal chain (speakers, for example) or for stopping signal peaks from going over the limits of the recording medium and thereby causing distortion.

SERVING TIPS

Here's a quick guide for setting the parameters on a compressor. First, make sure the bypass switch and any other special switches (softknee, slave, etc.) are off. Next, set ratio to minimum (usually 1:1) and threshold to maximum. These settings render the compressor inactive but still in the signal path. Now, using the console meters to gauge the input signal and the compressor's output meter (if it has one) to gauge output, adjust the input and output controls so the two levels match. This is called *unity gain.*

Next, set the attack- and release-time controls to an average value (usually close to center). While listening to the signal, increase the ratio to an average value, and then start lowering the threshold. Keep an eye on the gain-reduction display to see how much gain reduction is taking place. Once you've determined an approximate threshold setting, it's time to start varying the ratio, attack-time, and release-time controls and listening to the results.

After finding settings that provide the results you want, adjust the output control to make up the gain that was lost to gain reduction. Of course, you can add more or less than that amount if you wish. These are only guidelines: don't hesitate to break the rules if breaking them gives you the sound you desire!

Straight Expander Gate

Straight shots of whisky aren't always easy to get down. But chase 'em with a few gulps of beer, and the whisky is decidedly less noticeable. Okay, so a boilermaker is hardly sophisticated. But it does help illustrate the function of an expander, which, like a cold beer, can be used to push down certain low-volume sounds that are otherwise hard to stomach.

An expander does the opposite of a compressor: it increases the dynamic range of audio signals. This can come in handy for adding life to a track that has been overcompressed. But more commonly, expanders are used to reduce unwanted, low-level noise between vocal phrases, notes, or chords. By increasing dynamic range, an expander is able to make soft signals softer and thus less audible. This process is known as downward expansion.

Just as high compression ratios make a compressor into a limiter, high expansion ratios make an expander into a noise gate. More precisely, a gate is an infinite-ratio device. Rather than reduce noise gradually, it works like a switch, completely shutting out unwanted sounds.

Expanders work slower than gates, gradually turning down the volume of unwanted sounds. "The advantage of an expander," points out Marvin Caesar, president of Aphex Systems, "is that it slides rather than bangs on and off. When it is adjusted properly, it can be very musical."

THE MAIN INGREDIENTS

The parameters for controlling expander/gates are similar to those on compressor/limiters, with a few variations and additions (see **Fig. 3**). *Threshold* is again the level at which the expander kicks in, but this time the process—expansion or gating—applies only to signals that fall below threshold. An expander with threshold set at 0 dB will process (reduce) only those signals that fall below 0 dB. A gate will shut off all the audio as long as the signals are below threshold. *Ratio* is the expression of the difference between signal decreases below threshold at the input of the expander and those at its output. This time, though, the left number refers to output and the right to input. For example, a 2:1 ratio means the expander converts an input signal that gets 5 dB quieter into an output signal that gets 10 dB quieter.

Attack time is how long it takes for the expander to react to signals that rise toward threshold. *Release time* is how long it takes for the signal to be attenuated as the input decreases below threshold. *Hold* (sometimes called *sustain*) lets you delay the onset of the gate's release and control the duration of that delay after a signal drops below threshold. *Range* (also called *depth* or *floor*) allows the user to set a limit on the maximum attenuation performed by the expander. At 90 dB, for example, the range of potential attenuation would be very wide. On the other hand, a 0 dB range would permit no attenuation, effectively bypassing the unit.

ADDED SPICE

Full-featured gates often include a key filter. This feature enhances gate selectivity by allowing the user to specify which signals, based on frequency and bandwidth, will open the gate. The frequency control lets you select the center frequency of the sound that will open the gate, whereas the bandwidth control lets you adjust how wide the band of sound is on either side of the specified center frequency.

Using a key filter is a straightforward

FIG. 4: Inspired use of reverb can add dimension to a dull, lifeless track. Of course, too much of a good thing can bury the personality of a sound in a wash of ambient muck. Tip: Singers always seem to ask mix engineers to pile on the reverb. If you want a professional mix, don't do it!


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process, according to dbx Sales Coordinator Michael Charles. "It's just like using a parametric EQ," he says. "Start with the bandwidth open as wide as it can go. Find the frequency of the instrument you want to cut out. Now simply narrow the bandwidth until you've just covered the sound you want gated. Generally, you want the bandwidth as narrow as possible."

Using an expander properly requires setting threshold carefully. Try to leave most of the music above threshold and therefore unaffected. Ideally, put below threshold only the background noise you want to downward expand (attenuate). As for ratio, the lower settings are generally more natural sounding, and the highest ratios produce an effect much like a gate.

Attack, hold, release, and range are the parameters that allow you to determine the relative smoothness or harshness of downward expansion. Because the hold control momentarily "freezes" attenuation when the signal level drops below threshold, it leaves time for reverb tails and instrument decay to fade naturally. Combined with a complementary release time, this can really smooth out the sound of the expander. (In gate mode, the hold function helps prevent false triggering and subsequent "chatter.")

Be careful not to set range so far down that you hear the noise floor modulating or "riding up" behind the signal. "A nice starting-point range for a vocal application would be 6 dB," suggests Caesar. "You only want a few dBs of attenuation so the sound is musical. On the other hand, for a drum, you might go as far as 90 dB to obtain a powerful, explosive sound."

In gate mode, a too-deep range combined with a too-fast attack time could lead to a different problem: a "click" on the front end of the signal as an excessively steep sound wave is formed when the gate opens. "This might accentuate the attack on a snare drum nicely," says Caesar, "but on a bass drum it would probably sound horrible."

In general, gates are easier to set than expanders, as there is no ratio to fuss with, and it is relatively simple to determine by ear where to position threshold. For gating a dry, percussive sound such as snare drum, use a fast attack combined with enough hold and release to include the amount of snare rattle you prefer. For a kick drum, set the attack time fast enough so that you don't hear a click. Then, lengthen the release time to allow for the bass-frequency decay of the drum's tone (unless you intentionally want to truncate the decay to isolate the snap of the kick). For cymbals, pianos, or other instruments with longer decays, open hold up most of the way (three to four seconds) and set a longer release time, so as to capture the signal's complete envelope.

SERVING TIPS

An expander can be a helpful tool during a mixdown to get rid of headphone bleed that leaked into the vocal microphone during tracking. Some vocalists, for example, like to hear the click track while they sing because it helps them

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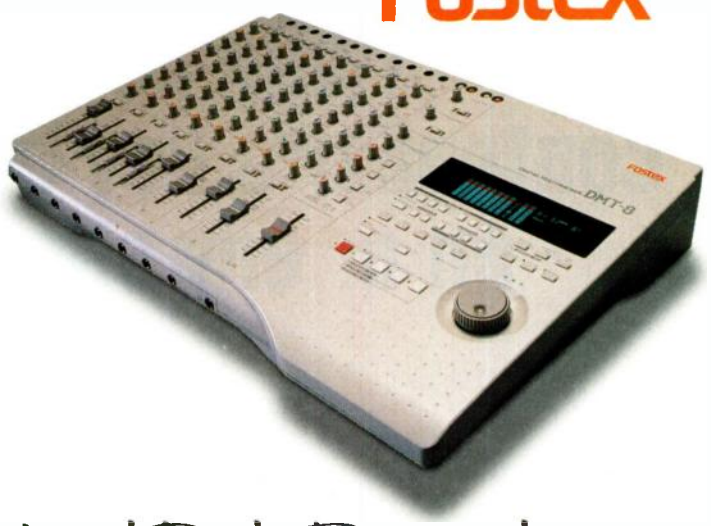

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with their phrasing. Unfortunately, when it comes time to mix, that click can appear as an unwanted guest if it leaked through the headphones enough.

Here is Charles' advice on how to terminate such annoyances: "First, set threshold just above the signal bleed, making sure not to include any of the softer vocal passages. Then, starting at 2:1, gently adjust the ratio. Listen to that and see how natural it sounds. Next, set the hold time. Start with a half a second or less. What you don't want is to have the bleed to come back above threshold and then rush up in volume. You're listening for smoothness. When the hold sounds good, you can set the attack and release times. Start with release time near the center value and the attack time a little faster. Bear in mind that you want to be gentle. If attack and release times are too fast, you'll get pumping."

If you have ever recorded a heavily overdriven guitar amp, you'll understand another reason expander/gates are so popular in the studio. Tons of gain sizzling through a preamp makes not only killer distortion, but killer noise as well.

An expander can push down extraneous grunge during solos, whereas a gate can mute amp noise between licks. Use a generous hold time to permit healthy sustain and fades. The trick is setting the ratio high enough to eliminate obnoxious amp buzz but low enough so the gate will close without making an equally obnoxious sound of its own.

A final note for the desktop recordist: if you think a retreat into the digital kingdom magically immunizes you from the need for noise gates, think again.

"The fact is," says Caesar, "there's a tremendous need for gates in the MIDI studio. Even if you send a Note Off to a sound module, it's still sitting there hissing. And with a whole bank of modules, you could have a noise floor of -20 dB." The solution is a noise gate on the output of each sound module.

Reverb Sunrise

A mix without reverb is like a tequila sunrise without grenadine: there's no color to complement the rest of the drink, and hey, where's the sweetening? But add too much reverb, or mix it improperly, and those distinct colors turn to mud. Just the right amount, though, can make a mix shine.

THE INGREDIENTS

Mixing with a digital reverb unit requires familiarity with a few basic parameters: type, decay, delay, and predelay (see **Fig. 4**). Most units have other parameters as well, but these four will get the ball rolling.

Type (sometimes called *size*) refers to the type and size of room that the unit's algorithms are attempting to digitally replicate. (An algorithm is a mathematical formula that tells the electronics what to do.) Digital reverb units typically contain a variety of rooms—small, medium, and large—plus chambers, concert halls, and plate reverbs. *Decay time* (also called *reverb time* or *T-60*) is how long it takes for a reverberating sound to fall 60 dB below the original sound's level (at which point it is effectively inaudible). The longer the decay, the longer the effect rings out.

Delay is a discrete reflection or echo. *Delay time* is how long it takes for a sound to "bounce back" from the walls of a room. "Reverb," explains Product Specialist Steve Frankel of Lexicon, "is simply thousands and thousands of delays, each creating an internal feedback loop."

The rate and envelope of these reflections helps the ear determine the size of the space. *Predelay* is the amount of time between the initial sound and the onset of reverberation.

SERVING TIPS

Decay and delay work together to help define the dimensions and characteristics of a space. For example, longer delays typically signify a larger room. If we then add a long decay, it suggests to the ear that the space is not only big, but highly reflective as well. The resulting sound is characterized by multiple, widely spaced echoes—such as you might hear in a cavern. Shortening the decay time reduces the amount and volume of reflections, giving the impression that the walls are more or less absorbent. On the other hand, shortening the delay while maintaining lots of decay would help suggest a small but highly reflective space—like a bathroom.

Predelay can be used to help the reverb stand out. "By adding enough predelay," says Frankel, "you can literally separate the sound source from the space and the reverberation. First you hear the dry sound; then a certain time later you get the reverb. This effect happens to some degree in a real space. Properly used, it will accentuate the room."

As a starting point for a soothing reverb martini, begin with a single track and choose the size or type of room you imagine will best complement the sound source. If it's a good-sounding reverb unit, that may be all you need to do. Of course, by adjusting the output level (either on the unit or at the aux send or return), you can turn the sound of that particular room up or down. If this alone doesn't create the effect you want, go next to decay and delay. One way to learn what these knobs do to the sound is to leave one at the lowest value while turning the other. After getting a sense of how each affects the sound individually, set both knobs at medium values, and then turn one or the other up and down, noting how the two parameters affect one another.

"Save predelay for last," suggests Frankel. "You can set some predelay on an individual track, but when you run the whole mix you may need to tweak the delay and predelay to compensate for the addition of the other instruments. If you need more separation, grab your predelay."

"Most importantly," adds Frankel, "you should use your ears. Manufacturers have their own magic algorithms, and each manufacturer handles the parameters differently. Changing the type of room on two different boxes is almost certain to give you two different effects."

JUST A JIGGER

It's easy to get carried away with reverb (and tequila too, come to think of it), so a good rule of thumb is to use a little less than you think necessary. Be especially judicious with decay, as too much will create a wash that overwhelms the

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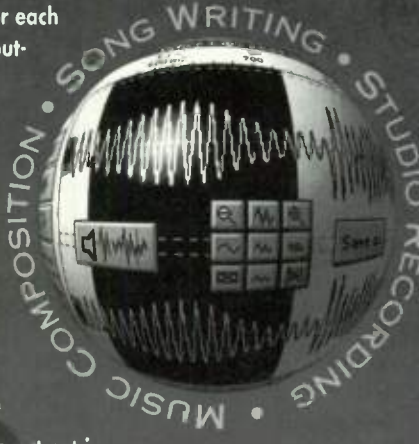

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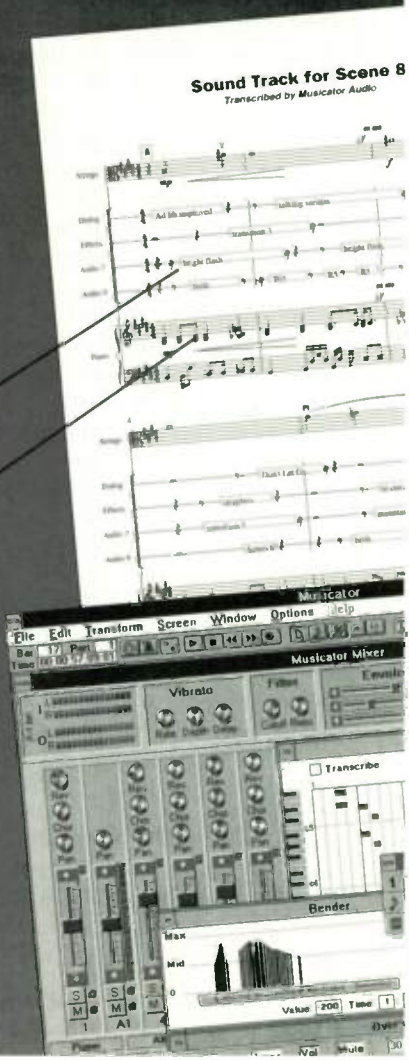

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original signal. Using delay time in moderation is also critical, as an unmusical reflection rate can detract rhythmically from both the phrasing of the source sound and the groove of the song.

Mixology

Familiarity with the tools of the trade is only half the battle when you're aspiring to be a mix master. You need to have some tricks and techniques under your belt in order to bring out the full flavor of your mixes. To this end, we've asked a certified mix guru to serve up a few tips. (After all, even a superhunk such as Tom Cruise needed Bryan Brown's bartending counsel when he aspired to the mixologist's hall of fame in the movie *Cocktail*.)

Joe Chiccarelli is an independent triple threat: an engineer-producer-mix doctor. He has mixed and/or produced tracks for a diverse client list that includes American Music Club, Tori Amos, Joan Baez, Shawn Colvin, Glenn Frey, Bob Seger, George Thorogood, and Frank Zappa. Chiccarelli even has the requisite John Travolta coolness connection, having recorded the Bee Gees' "More than a Woman" for the *Saturday Night Fever* soundtrack. The following helpful hints are in Chiccarelli's own words.

Make a plan. The best thing you can do is to have in mind what you want the end product to sound like and chisel away until you get there. It's important to have a picture, or a concept, that you can carry through to the end of the mixing process.

When I'm producing a record, as opposed to being hired to mix a project that has already been recorded, I always "mix" each track as I'm laying down parts. For example, if I don't want a guitar in the first verse, I erase it. I don't record flat, neutral sounds and plan to dress them up later during the mix, either. If I want some wacky effect on the piano, I record it to tape in exactly the spots I want it to appear. I'm always thinking of the finished product.

Be fearless. Do whatever it takes to get where you want to go. Don't shy away from using tons of compression or drastic EQ if that's what the track requires. You should even break down the mix temporarily if, for example, you decide it would be better to improve a vocal part by rerecording it. It's a drag to take your head out of the mixing space, but if retracking something will make the final product better, you've just got to do it.

Fight brain fatigue. Don't listen to the tracks too much before you mix them. When I'm hired to mix a record, I'll listen to the rough mixes once, maybe twice, and that's it. It's important that you approach the mix with a fresh, objective perspective. Try to get a gut instinct as to where you think the record should be, as opposed to overthinking everything. Avoid tweaking and tweaking and tweaking until you lose sight of what the track really is.

I think the age-old complaint that rough mixes often sound better than the record comes because you just go for it when doing the roughs. You don't think too much or overanalyze the tracks. As such, the roughs may sound a bit ragged, but they're a lot more spontaneous and have a hell of a lot more emotion than most final mixes.

Don't get obsessed. You can do your mix more harm than good if you spend hours and days tweaking it to death. I usually go in, get the track to feel the way I like it, and then call it a day. A week later, if I really hate the mix, I'll go back and try it again. I've found that if you get too deep into a mix, you can reach a point where everything sounds perfect, very linear. Everything is even, well balanced, and boring.

For the most part, I try to take no more than eight hours for a mix. I typically spend three hours getting basic sounds and rough balances between instruments and another few hours tweaking the fine details of the balance. Then the band or artist will come in, and I'll spend another few hours changing the things they may want to do differently. In eight hours, it's done.

Avoid going solo. Always try to avoid the trap of soloing instruments to death. So many people spend hours soloing the bass to dial in a sound, and in the scheme of things, it doesn't make any difference because the whole is greater than the sum of the parts. For example, a guitar that sounds thin and ugly when it's soloed can sound absolutely brilliant in the track. The way the thin tone fits in with the other instruments may be just right.

I bring *all* the faders up, get an overall balance of the tracks, and try to make the basic mix sound like a song. Then, I'll start shaping sounds to get specific elements to balance with everything else in the mix, rather than getting analytical about individual sounds. I may delete a guitar in certain sections or listen to just the bass and drums for a while. The main goal, however, is always to hear the whole track flat as a song.

Edit yourself. If you want your mix to go smoothly, try to limit your overdubs. People always record too much stuff, so mixing usually becomes a matter of clearing out unnecessary elements. I estimate that most artists overrecord by at least ten percent. The problem is, after months of layering tracks, you tend to forget about your rhythm section. All the energy you had on the band tracks disappears because you've smothered the tracks with overdubs. By the time you mix, you're fighting to get that energy back into the track—but it's already there! You're fighting yourself, because you've loaded up a bunch of tracks with all this information that's taking away from the basic groove.

Share the wealth. You can really increase your sound-sculpting options by multing—that is, bringing a single sound up on two or more faders. This can be done either by assigning signals to subgroups or by inserting the single end of a Y-cable into a channel's direct out or insert send and the cable's ends into the line inputs of two separate channels.

For example, I'll typically bring up the snare drum on two faders. The main snare track will be EQ'd just the way I like it, but the additional snare track will have 1 kHz boosted like crazy to produce a real honking tone. When I creep the "honking" fader into the mix a little, the snare seems to pop out of the track a bit more and add a real aggressive snap.

This trick also works great if I have some guitar tracks that sound nice but that could use a little more meat. In that case, I'll take all the guitars and assign them to a stereo subgroup that, in turn, is routed to a stereo compressor. Then, I'll really squish the subgrouped guitars and fade them underneath the main guitars to fill out the low-mid frequencies.

On vocals, I usually use two compressors. My main lead-vocal channel will have pretty conservative EQ and compression so that it just sits nicely into the track. But these settings may not help the vocal jump through the mix when all the other tracks are brought in around it. So I'll send the vocal to another fader and route the signal to something ugly, such as an old Urei 1176 compressor, and boost 4 kHz or 5 kHz to add bite. When this channel is tucked way underneath the main vocal track, it really adds personality to the voice and helps it cut through the mix.

Go back to mono. To really see whether frequencies are clashing, listen to the mix in mono. I think that monaural monitoring provides a more accurate picture of the tonal balances. For example, if you have one guitar panned right and another one panned left, the two tones may seem distinct and separate. However, I've found that listening to the guitars in mono often reveals that they sound the same. After the "mono check," I can add 400 Hz to one guitar and cut 400 Hz from the other to ensure that they *do* sound different. This is really a great trick for making sure that some frequencies aren't eating up other frequencies.

Spread the sound around. Don't restrict yourself to one listening environment, or one set of speakers. I always reference my mixes on Yamaha NS-10Ms, KRK 9000s, and the studio's large monitors.

One is a lonely number. Finally, to cover all the bases, always do alternate mixes: more lead vocal, less lead vocal, louder guitars, and so on. Don't lock yourself into a single choice for the "best mix."

Last Call

An adventurous bartender is always on the prowl for new, totally lethal concoctions. The recipes and ingredients provided in this feature are best when they are used as foundations for your own personal style of mixology. After all, there is no right or wrong in mixing—only what is appropriate for the track.

For example, we recently referenced a whole pile of modern rock CDs during a remix project and discovered drastically different sonic approaches. One track sounded almost tinny and had the hi-hat mixed as loud as the lead vocal, and another pushed the bass until the thump-thump-thump overwhelmed the entire production.

The experience illustrated that it's darn hard to make a mixing "mistake" these days. If you can prove that your aural choices enhance the mood and atmosphere of the song, you're home free. So why not be fearless? Just shake up that sonic martini shaker and let your sophisticated aural cocktails speak for themselves.

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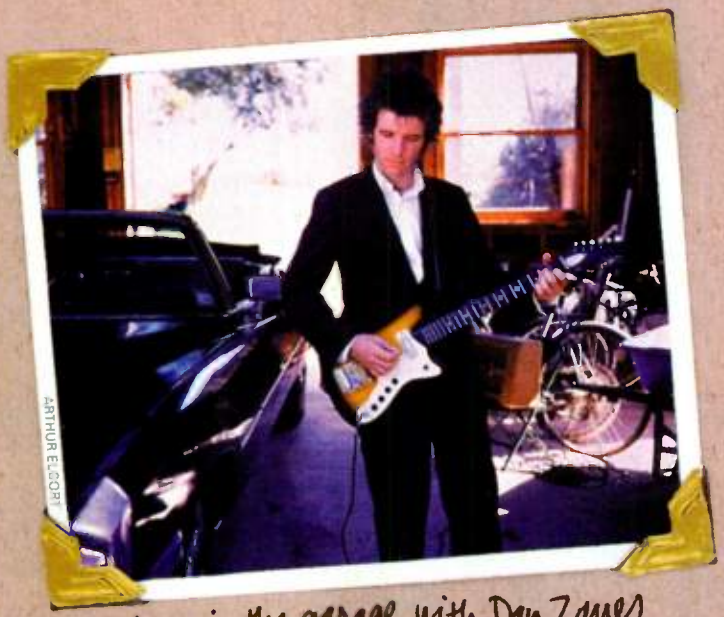

Rockin' in the garage with Dan Zanes.

Super Songwriter Elvis Costello.

Producer Mitchell Froom Lets the Songs Do the Talking

By Michael Molenda

Producing some of pop music's most accomplished songwriters can be a tricky business. On one hand, it's the producer's responsibility to help enrich and document the artist's vision. But on the other hand, if the producer imposes too much control or offers musically inappropriate suggestions, he or she risks diminishing the individuality of the artist.

Mitchell Froom walks that creative tightrope like a master aerialist. His production style is often characterized by an uncluttered, almost intimate, soundscape. The sonic and musical arrangements are brilliantly subtle and spotlight the unique voice of the artist rather than the technical panache of the producer.

Froom's devotion to supporting the needs of the song brings to mind a story in movie producer Robert Evans' autobiography, *The Kid Stays in the Picture*. Evans said if anyone commented on how great his tie looked, he immediately tossed it in the trash. The tie's job, he said, should be to make *him* look good, not to call attention to itself. Like Evans' ties, Froom may disappear into the fabric of his productions for artists such as Elvis Costello, Crowded House, Los Lobos, and Richard Thompson, but he sure makes the artist sound great.

I talked to Froom before he left for a recent session in France, and he offered to share some of his production concepts with **EM** readers.

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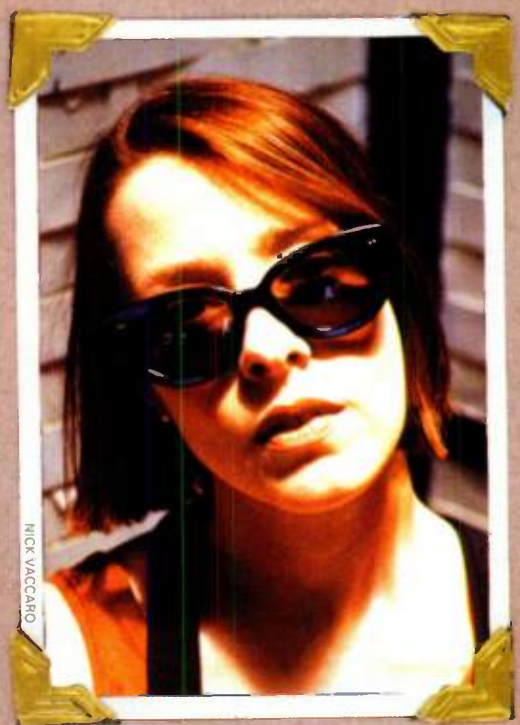

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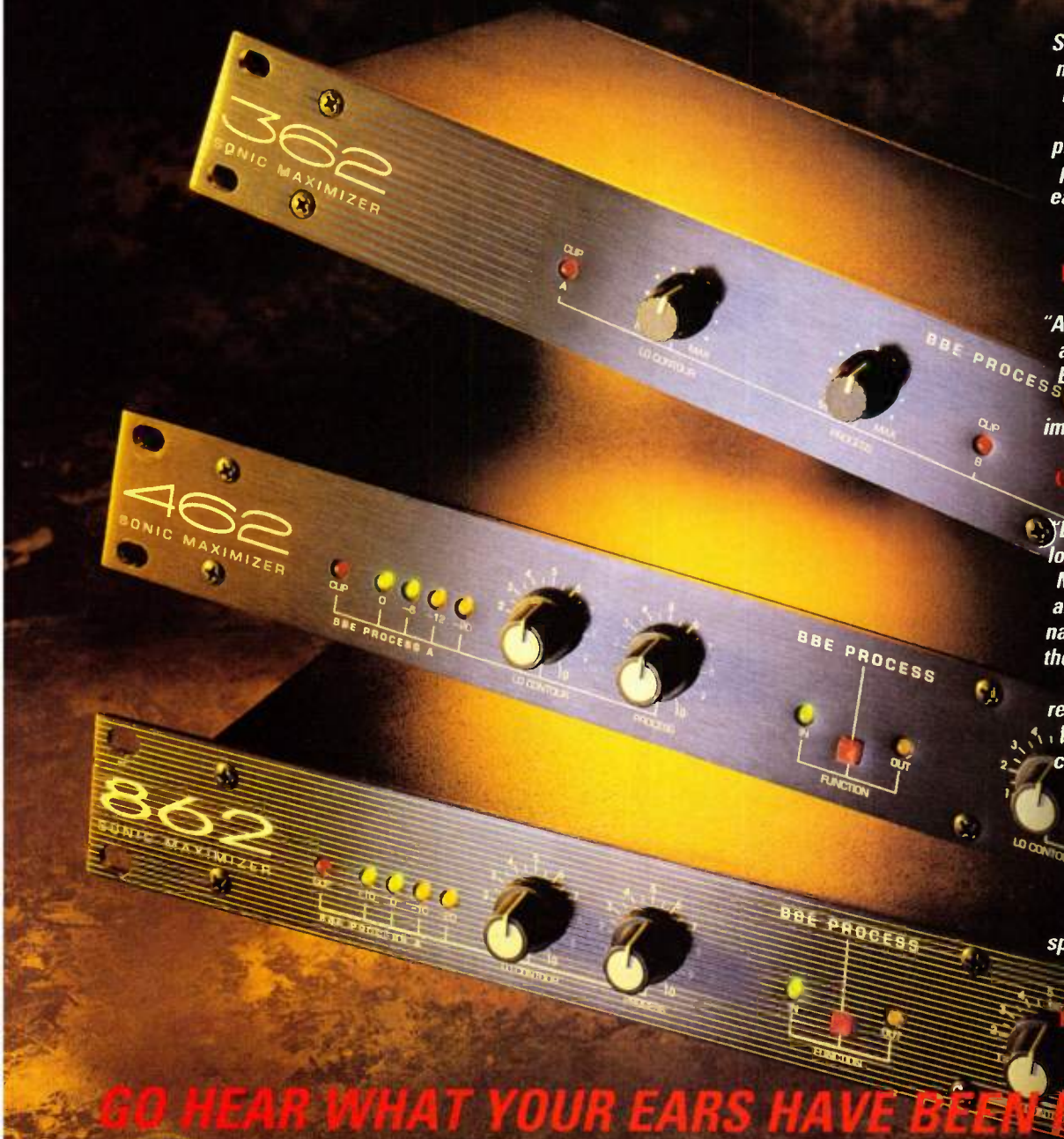

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What are the most valuable skills a producer should possess?

The main thing is having the ability to adapt to each situation. You have to find where you're needed and try to supply help. To do this effectively, you should have a lot of knowledge in different areas. For example, I really get involved in the musical arrangements, and I can also play—I often put down some keyboard tracks on the records I produce. My weakness is that I'm not a recording engineer, but I've solved that problem by forming a creative partnership with [engineer] Tchad Blake.

Also, being empathetic to the artist and the songs is critical. Producers who bring their signature sound to each project don't tend to hang around very long. After a while, their records all start to sound the same, as if they're always producing the same band but with different singers. These types of producers may become fashionable very quickly, but they often become unfashionable just as fast.

Arranging seems to be a lost art these days. I often think it's because young producers—especially in the alternative and rock genres—are intimidated by the classic perception of an arranger sitting at a piano writing out all these complex orchestrations.

Let's look at it another way, then. An arrangement can simply be referred to as the overall noise, and you want this noise to be an engaging one that pulls the listener into the track. The mistake people sometimes make is to separate sonics from the musical arrangement. Great-sounding records are invariably great arrangements, not just feats of brilliant engineering and mixing. I'm a fan of what George Martin did with The Beatles. The essence of his production was looking at guitars in an orchestral sense and putting the sounds together to make something really powerful.

To do this, a good arranger must respond to the music. I try to discover and develop something in a song that defines an overall theme. There are no rules, really, but it's important to know what you're trying to achieve musically, as opposed to just getting a decent drum sound and then doing a bunch of meaningless overdubs.

Can you describe how you might "discover" an overall theme?

Some of the stuff on Suzanne Vega's *99.9°F* album has real R&B roots. Few people would notice that, but if you listen to the bass lines you'll hear it. The idea for that direction came about when we were running down the songs. You see, when you're in a room with the artists playing their material, you can often get a unique insight into their particular kind of groove. Working with Suzanne, I realized that the rhythm of her melodies came from this R&B, street-singing sort of place.

Do you find that a lot of preproduction time is required before the essence of an artist's work is revealed?

It varies. For me, preproduction typically involves a couple of weeks of sitting in a room with some guitars, keyboards, and a drum machine, just making noise and figuring things out. I usually work on one song per day. I've found that if you can just come up with one compelling idea, that idea rules the day. After that, your job is easy. You just have to take a critical look into the song to find clues about its internal rhythm.

In Dan Zanes' case [for the album *Cool Down Time*], we had the luxury of a huge amount of preproduction time, but that's because we were also writing songs together. On the other hand,

MR. BONZAI

Mitchell Froom (right) and super engineer Tchad Blake.

when I work with Los Lobos, we simply walk into the studio and get going. They write a lot of songs on the fly, so the sessions have a real open feeling—it's almost a form of improvisation. With Richard Thompson, we may get together for a day before the sessions start. I tend to work with the same people over and over, so for these projects I don't need to do a lot of preproduction.

When I work with artists for the first time, however, I start the preproduction process with some very serious discussions. First, I ask them to send me some of their favorite records, because you can get some really cool ideas based on what someone grew up listening to. Then, I ask whether they had specific problems with their previous record and what they think I can do for them. In return, I try to be very specific about what I think we should try to do on the next record and why.

Ideally, the preproduction process should be used to develop an overall scheme for the record. You don't want to walk into the studio with a first-time artist without knowing what to do. Having said that, after I communicate my ideas to the musicians, the track often develops its own plans. Sometimes, the initial ideas I developed during preproduction prove to be completely wrong. But if I'm working with good players, we all realize immediately when an idea isn't happening and find something else to do. You have to be flexible and let the song guide you.

Working up one song a day is cooking by some standards. Do you try to maintain that level of immediacy during the actual studio sessions?

Things come together really quickly. My main concern is getting that "engaging noise" from the voice and track, so I like to get everything going right on the spot. If a part isn't recorded live with the band, it's often put on immediately afterward. In our situation, what most people call the basic track is pretty much the *complete* track. At the end of the day, the song usually sounds just about how it's going to sound when the record is released. I like to keep things moving and to mess around and have a bit of fun. If everything is too planned out, the track tends to go down real flat. If you want to generate any excitement on tape, you have to allow for spontaneous performances and be prepared to live with what may seem like imperfections.

What you *don't* want to do is cut a basic track and then try to make it sound interesting later. You'll just get yourself in trouble by putting on more and more overdubs. If that happens, you're trying to be interesting for interesting's sake, and those overdubs will probably have nothing to do with the real heart of the song.

DENNIS KEELEY

Crowded House

So what happens if a track just isn't coming together?

If we're in the studio and something is not working, we completely tear the song apart. We don't bother with subtly changing it around the edges. If a song is lying flat, there's some real fundamental problem that must be solved, so we just start over.

Do you find that certain situations never fail to sabotage a recording session?

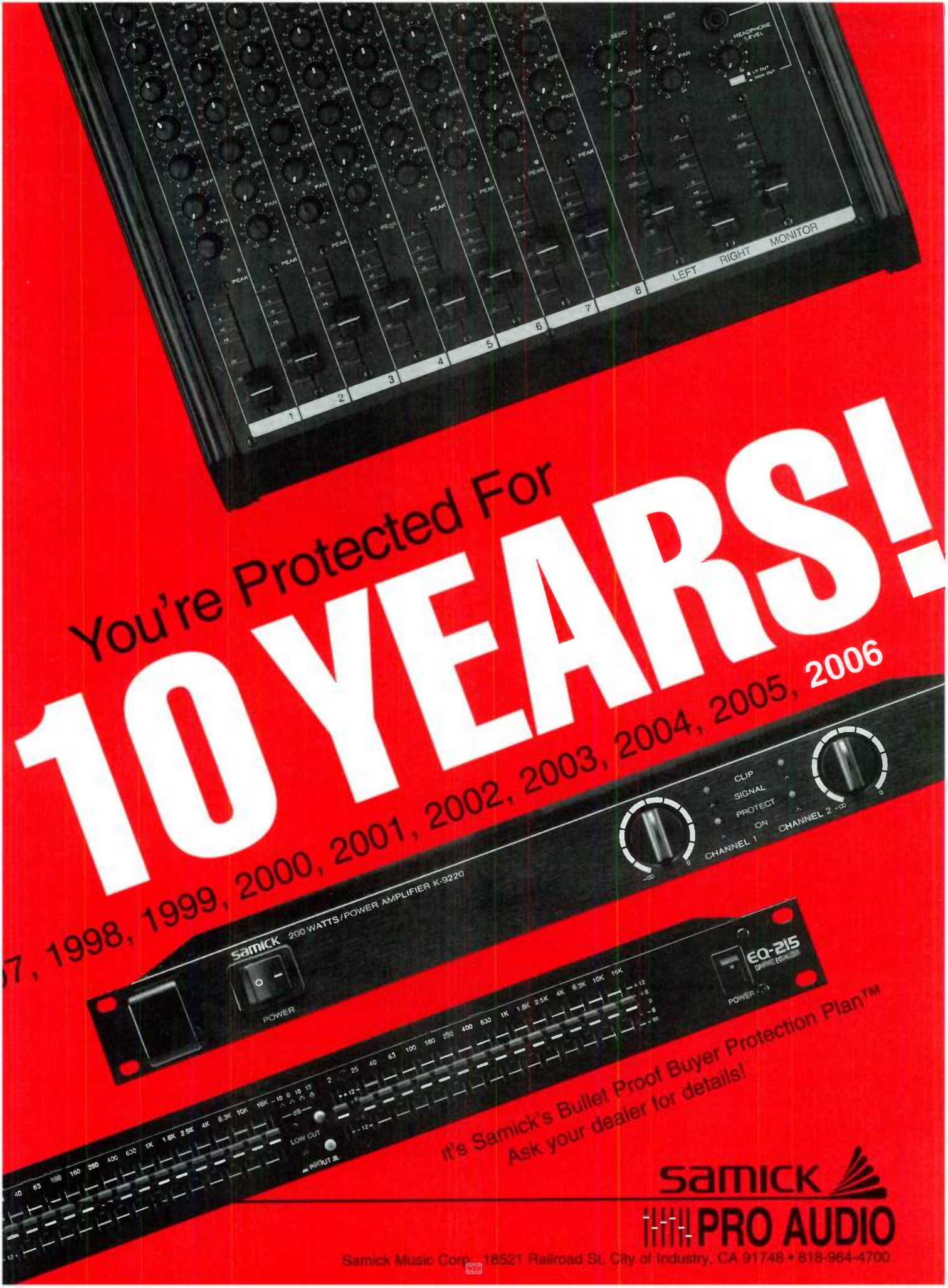
The worst thing that can happen—the absolutely worst thing—is for people to get fearful. Good music cannot develop without a basic feeling of confidence. Now, I'm not talking about arrogance, I'm just talking about an artist having the confidence to trust in his or her instincts and stay open minded if the music starts heading into radically different directions.

Also, there's no way I'll get involved in a project if an A&R person wants to be in the studio every day pitching ideas or if a label executive wants to change this and that. These are warning signs that the project is going to be grief and that the compromises I'll be forced to make will be the ugliest kind—compromises that are not based on the good of the music.

When outsiders impose themselves on a project, they fail to understand that a certain aesthetic emerges as the artist-producer-engineer relationship develops. Someone from the outside can't just come in and start changing everything. I'll listen to whatever anyone has to say, but if they enter the field, they must be prepared to be put down if they don't make sense. After all, between Tchad, myself, and the artist, there are already *plenty* of opinions.

This may be coming out of left field, but I've noticed that your records tend to be pretty organic. You seem to use effects rather sparingly.

Tchad is really responsible for the amount and type of effects we use, but I will say that we tend to prefer records that may seem uncomfortably dry to some people to those where you can hear a bunch of reverbs clattering against each other. Using a lot of effects can bury the music and the personality of the artist, whereas a drier sound spectrum, with wide stereo panning, can make an intimate song almost confrontational.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Speaking of which, one thing I've admired about you is that the artist's personality always seems to be at the forefront of your productions.

The main part of the job is to stay absolutely out of the way when you're not needed. If you can't make the decision to leave a good thing alone, you've no business being a producer. In fact, one reason I'm not very proud to be a member of the "producer club" is that a lot of producers just *can't* stay out of the way. Many decisions are made purely for personal ego gratification rather than for what is musically appropriate.

On the debut record by Cibo Matto, for example, I literally did almost nothing. I had never experienced a project so complete that the band needed me so little. It was hard to stay out of the way, but it was the right thing to do. Actually, my main motivation for working on the record was making sure it didn't get ruined. The group is composed of one woman with a sampler and another woman who sings, and they put together these amazing loops at home. There are intentionally a lot of rough edges to the way the loops fit together, and if the wrong people were involved in the project, they might have tried to soften things up a bit—although I don't think the band would have tolerated it.

Another project that required limited involvement was the Latin Playboys record, which I love. The band brought in these home-studio tapes that were recorded on an out-of-alignment 4-track cassette deck. However, the arrangements, the musical ideas, and the performances were amazing. Making the record consisted of bouncing the [cassette] rhythm tracks to a 24-track deck in a pro studio and letting the group figure out how to sing something over them. My job in that situation was to hear these home tapes and say, "We shouldn't try to redo these tracks; they're great."

PETER SANDERS

Richard Thompson

As you've just used two home-bred projects as examples, I'd love to hear your take on the personal-studio boom.

Well, it certainly helps the people who are good and does nothing for the people who aren't. One bad aspect of home studios is that records have become totally devalued because so many people can put out an album now. There are something like 300 records a week that get released, and a lot of stuff gets thrown out into the public before it really should be. Conversely, in the 1930s and 1940s, very few people actually recorded. Musicians would have to struggle in the clubs and be able to present themselves very powerfully before they could even think about recording. Today, you can do so much with mirrors and samplers that anybody can put out anything. And it's so fashionable now to leave things rough. You know, it's cool to have tracks that just fall apart at the end, or tracks that are extremely distorted, or whatever. But people tend to forget that for a track to be cool, it still has to be *good*.

Obviously, giving everyone access to powerful tools doesn't mean everyone will make powerful music.

That's for sure! I often think about why records used to be better than they are now. They had a lot more spirit, and they tended to sound more unique. I think the key was that there wasn't much money to be made back in those days. People would just go off and make their own records, and they had to work very quickly. There was no standard that anything had to live up to, so the records ended up having, well, *personality*.

Also, when I was growing up, the rock section of our music store was one bin filled with maybe twenty albums. If I liked a record, I listened to it every single day for a year. It just seems that music meant so much more to people back then. Most music today, however, seems to be experienced *functionally*. It's something to exercise to, or to provide background for cleaning the house, or to liven up your commute.

But I still naively make records thinking somebody may listen to it more than once—that there's a kid sitting in a room somewhere who really digs music and will listen to a record intently from start to finish. I can't help myself. That's the place I come from.

EM *Editor* **Michael Molenda** *recently opened a new recording studio (Tiki Town) with producer Scott Mathews and also signed a European recording deal, but he's still keeping his day job.*

FROOM'S CLIENT LIST

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Elvis Costello
Crowded House
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Tim Finn
Latin Playboys
Los Lobos
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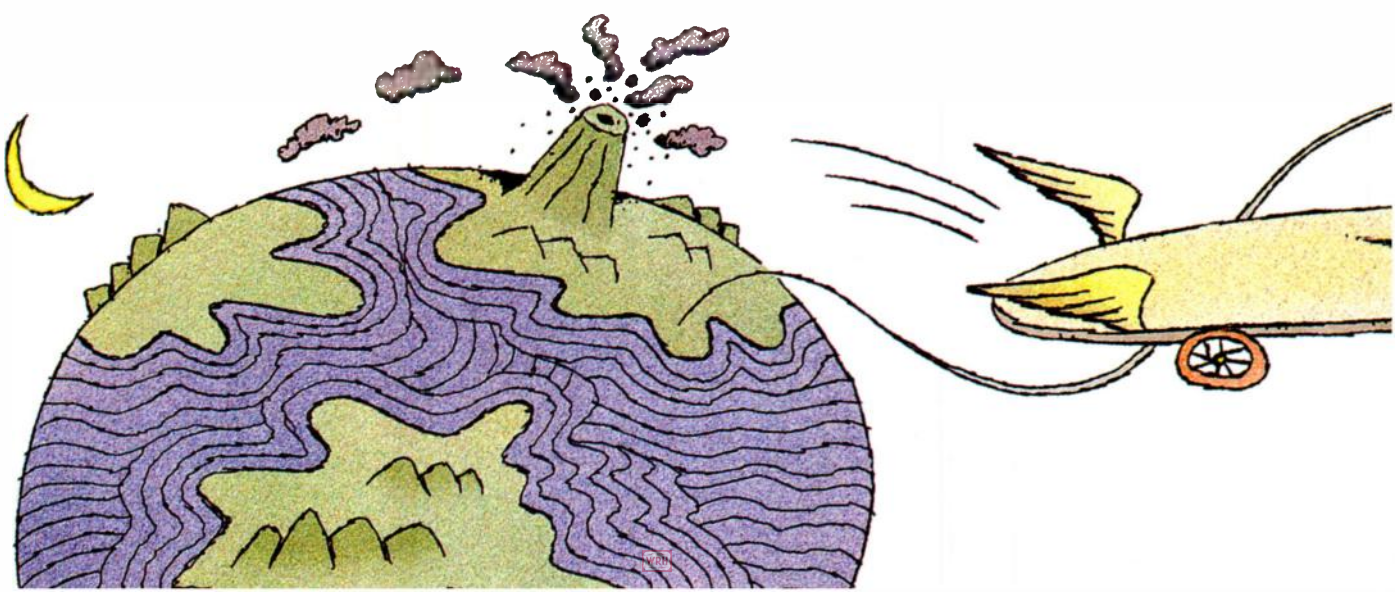
HEAD OUT ON THE CREATIVE HIGHWAY WITH MOTU'S INTUITIVE SEQUENCER.

BY JIM COOPER WITH SCOTT WILKINSON



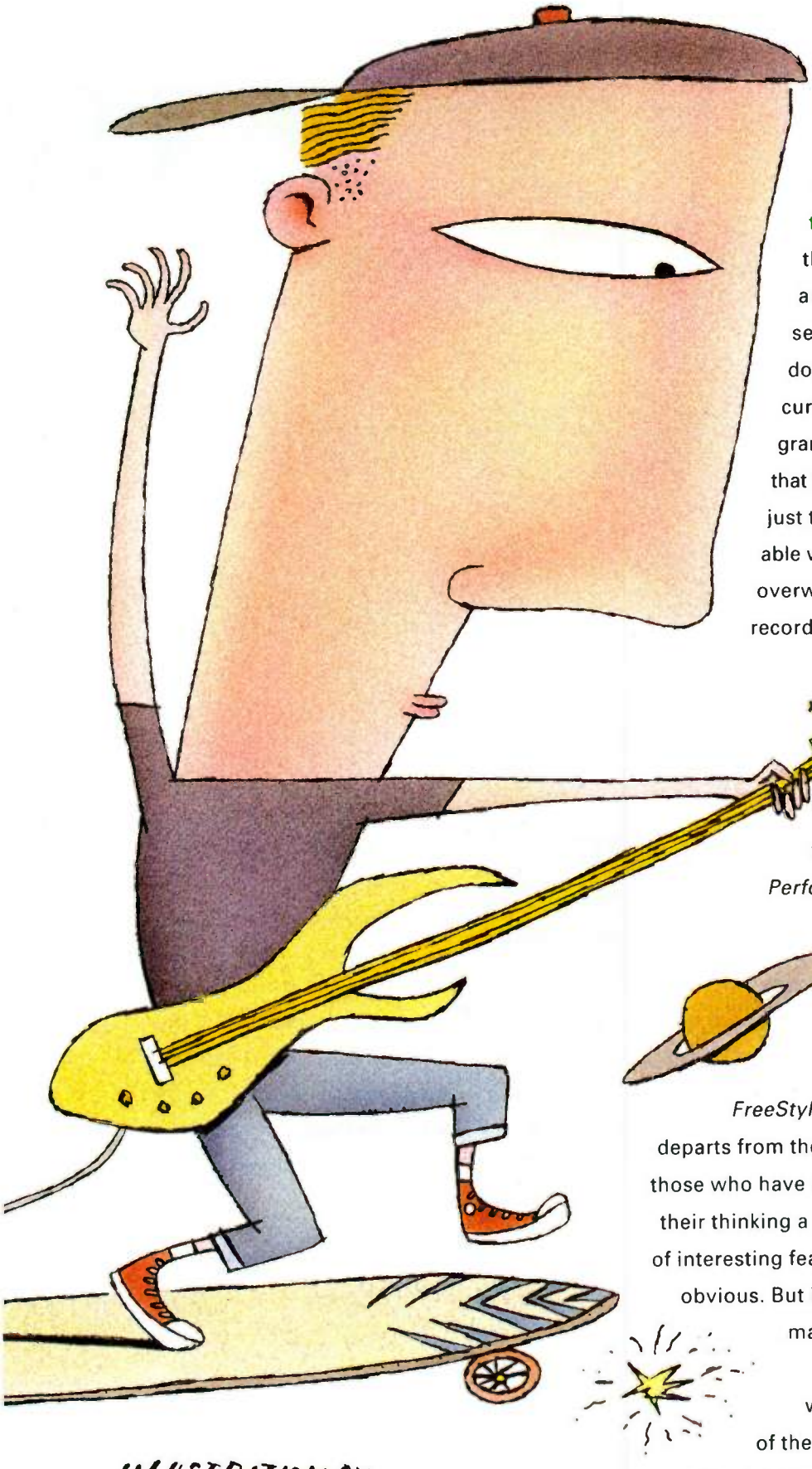


ILLUSTRATION BY JACK DESROCHER

MIDI sequencers have come a long way in the last few years. Each new product offers more sophistication and features than previous versions. However, this added power comes at a price: as the feature set expands, so does the learning curve. Some programs are so deep that it takes months just to get comfortable with their basic functions. This often overwhelms people who simply want to record some music with minimum fuss.

Master CLASS

To address this problem, Mark of the Unicorn (MOTU) introduced *FreeStyle* in 1994. Unlike the company's flagship sequencer, *Performer*, *FreeStyle*'s unique, intuitive approach makes it ideal for those who don't want to deal with MIDI channels, sequencer tracks, and the like.

Despite its ease of use, *FreeStyle* can take a little getting used to. It departs from the standard sequencer paradigm, so those who have used other programs must reorient their thinking a bit. In addition, there are a number of interesting features that may not be immediately obvious. But in my work as a MOTU product and marketing manager, I've discovered a few techniques that can go a long way in helping you get the most out of the program. These suggestions apply to *FreeStyle* version 1.02 for the Mac and version 1.04 for Windows, which are virtually identical.

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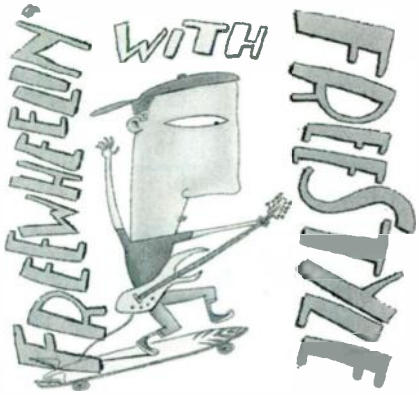

FREEMIDI SETUP

FreeStyle relies on FreeMIDI, MOTU's system extension that coordinates all MIDI activity within the computer. Before you start using the program, you must tell FreeMIDI about your studio: the devices you have, the MIDI port to which each one is connected, the channels to which they respond, the sounds within each one, whether or not they are General MIDI devices, etc.

FreeMIDI includes predefined information for many synths and other devices, which automates this process in many cases. If you have an instrument for which the default sound names don't appear in *FreeStyle*'s Sound menu, contact MOTU (tel. 617/576-2760; fax 617/576-3609; e-mail techsupport@motu.com) to request the latest version of FreeMIDI, which will be sent to you free of charge. Alternatively, you can download it from the company's Web site (http://www.motu.com), America Online (keyword MOTU), or CompuServe (MIDI Vendor C forum).

PLAYERS AND TAKES

Before we begin to explore specific techniques, let's take a quick look at the program's basic design. (For a complete evaluation, see the review in the February 1995 **EM**.) Instead of standard sequencer tracks, *FreeStyle* starts with an Ensemble of Players. The program comes with a variety of preset Ensembles, such as Rock Band, String Quartet, etc. You can also assemble your own Ensemble from an extensive library of Players and save it as a template.

Each Player is assigned to play a patch in a specified sound module on a particular MIDI channel. Other Player settings include transposition and various notation parameters for the Notation view. If you have a General MIDI synth, all Players are automatically mapped to the correct sounds the first time you open a file. You can then select any sound on any synth in your system for each Player. After that, you need not think about devices and channels again. Simply select "Piano" from a Player's pop-up menu, and that Player will play the "Piano" sound on its designated sound module.

Most sequencers let you record each part several times on different tracks and select or assemble the best performance. However, *FreeStyle*'s approach is different. You record as many Takes as you like for each Player. A Take is retained until you explicitly delete it. You can choose the best Take or assemble a composite from various Takes.

▼

With the Remote Control feature, you can reach a new level of spontaneity.

It is certainly possible to record parts from the beginning of a song to the end in a linear fashion, but *FreeStyle* also supports pattern-oriented sequencing with full loop-record capabilities. The basic building block in *FreeStyle* is called a Section, which can be used to record the verse, chorus, and bridge of a song. You can then assemble the Sections into a Song within the Arrangement window, making copies of Sections as necessary.

Sections start and end on a bar line, but they also include a Pickup bar at the beginning and an Overhang bar at the end. When you insert each Section into a song, any notes in the Pickup and Overhang bars automatically overlap into the preceding or following Section, which means you don't have to insert these notes manually (see **Fig. 1**).

Like most sequencers, *FreeStyle* includes graphic piano-roll and standard-notation editing. Of course, the Pickup and Overhang notes are visible in these views, but they are hidden in the Arrangement window. Unlike most other sequencers, all parts are visible at the same time in a single piano-roll window; each Player's notes are a different color. In the notation display, you can view any combination of Players on their own staves.

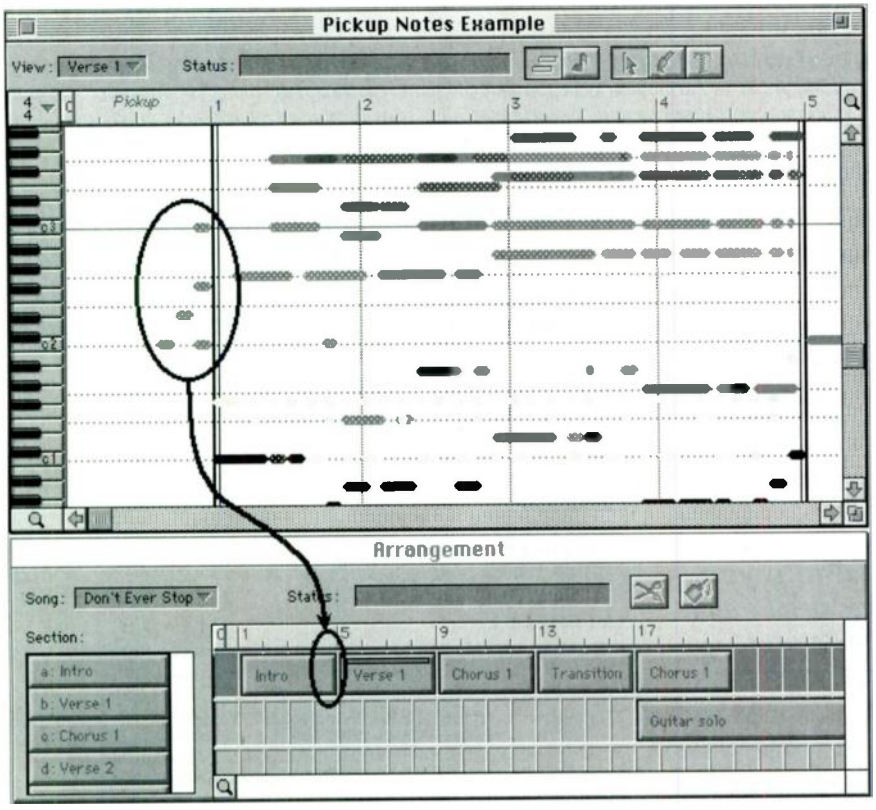

FIG. 1: Verse 1's pickup notes automatically overlap the end of the Intro Section that precedes it.

MAXIMIZING PARTS

One of the most useful features of *FreeStyle* is its ability to dynamically

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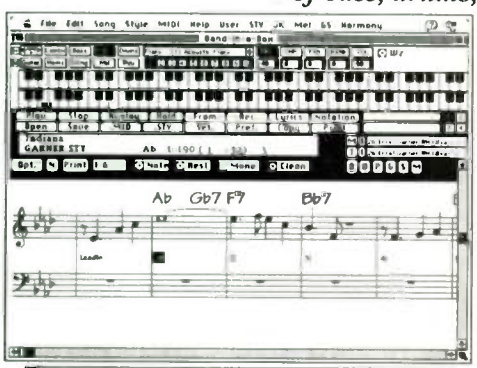

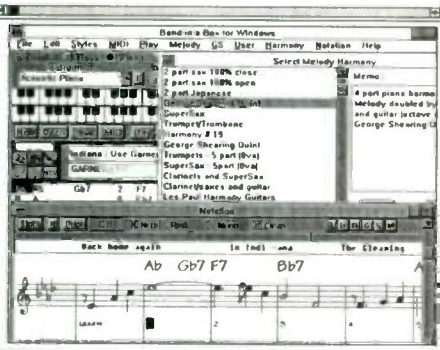

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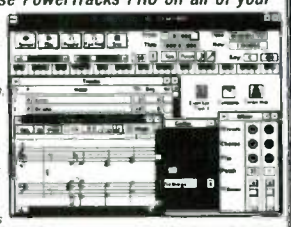

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allocate notes on different MIDI channels. For example, what if you're composing for an ensemble of twenty Players but you have only one sound module that receives on sixteen channels? In *FreeStyle*, you simply record the parts for each Player and let the program determine how to play it back on your gear. *FreeStyle* automatically assigns parts to MIDI channels, changing them dynamically during playback to best accommodate all the parts you've recorded (unless you override this feature on a device-by-device basis in FreeMIDI).

In this case, a single 16-channel device can play twenty parts without problems, provided that no more than sixteen Players are sounding notes simultaneously. Even then, *FreeStyle* will do its best to decide which Players can best afford to lose channels.

If you use this feature, keep two points in mind. First, *FreeStyle* does not steal channels from devices for which the "Does Not Accept Program Changes" parameter is enabled in FreeMIDI. Second, your MIDI instrument might be using more than one voice per Player (depending on the patch you've selected). As a result, you may run out of polyphony before you run out of MIDI channels. Try to select simple, unlayered sounds for each Player to maximize the number of simultaneous parts.

RECORDING AND EDITING

FreeStyle defaults to the General MIDI patch set when it first maps the Player library to your MIDI rig. However, you can customize the Player library in any way you want. For example, when you add a bass Player to your Ensemble, it can be your favorite bass sound. To do this, pull down the Setup menu, select Player Library, and select Edit Player in the submenu. Then, select the desired Player from the pop-up menu and select a patch from the Sound menu. Once you select the bass Player, you can change it to any other bass sound for a specific song without affecting your library Player.

Another useful feature of *FreeStyle* is Remote Control, which lets you record most of your song without taking your hands from the keyboard. Use the Remote Controls item in the Setup menu to assign each function to the desired key on your controller. The program comes with stickers you can affix to your controller to remind you of the key assignments.

For example, suppose you have a cool groove going and you want to jam over it before you record a part. Using

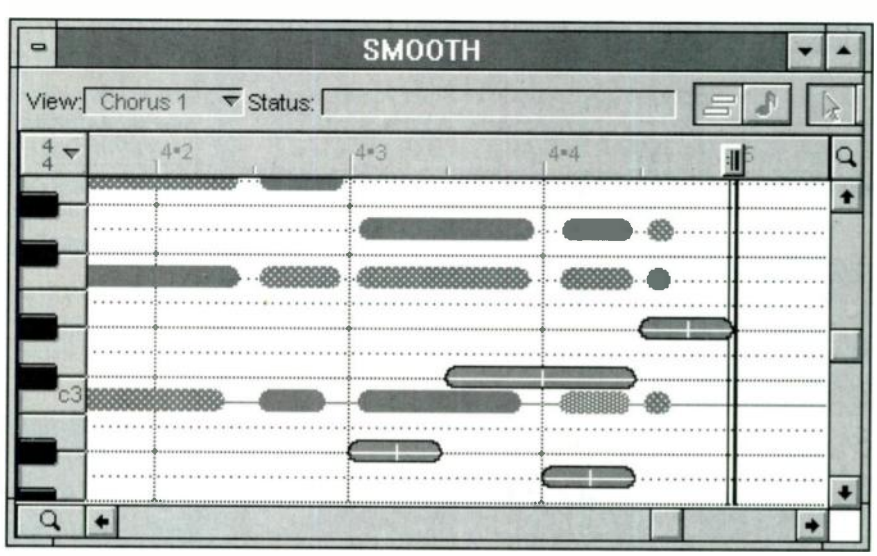

FIG. 2: If you are looping a section and want to hear the pickup notes every time, check the Smooth Record Loop option. The pickup notes become "ghost notes," as indicated by the large crosses in this example. This also helps if a couple of notes intended for the downbeat actually start just ahead of the measure.

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Solo. *AFL or PFL via global switching.*

60mm logarithmic-taper faders.

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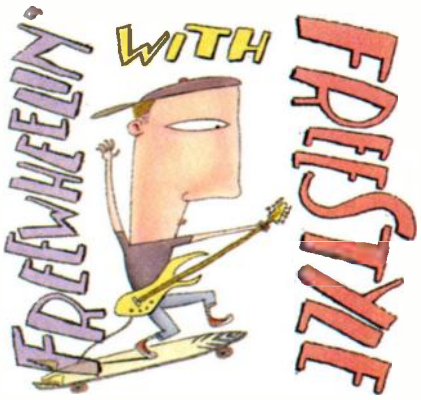

the Remote Controls, you just press Play, select the Player and Take you want to use, and press Record when you're ready to lay down a Take. This way, you don't lose your groove by going over to the computer, pressing Record, and running back to the keyboard. Once you get used to the Remote Control function, it will feel like you've reached a whole new level of spontaneity.

As mentioned earlier, you can record several Takes for each Player and pick the best one or assemble parts of different Takes into a composite part. After recording several Takes, add a new Take, which is initially empty. Select and copy the desired part of a previous Take, and go back to the new Take. Place the playback wiper anywhere in the measure you want to put the copied material into and paste. Repeat this procedure for the portions you want from the other Takes.

FreeStyle's measure-relative pasting makes it easy to paste with precision. This feature lets *FreeStyle* preserve the location of the pasted material with respect to the measure. You can even paste during playback. Simply wait for the playback wiper to enter the measure in which you want the copied material to go, press Command-V (Control-V in the Windows version) on the computer keyboard, and *FreeStyle* places the material at the proper place within the measure.

If you want to quickly add percussion instruments to your song, select the drum part (kick, snare, hat), open the piano-roll editor, press Command-A on the Mac (Control-A in Windows) to select all data, hold down the Option key (Control key in the Windows version), and drag any note upward by an octave or two. This copies all the selected notes into the new pitch range. Most drum kits include percussion instruments one to two octaves above the basic kick, snare, and cymbal sounds, so copying the basic part an octave or two higher causes each duplicated note to trigger a percussion instrument of some kind. Delete the notes you don't like. In addition, try shifting them forward or backward by half a beat or so. The results can be stunning in just a few clicks.

▼

The ability to dynamically allocate notes on different MIDI channels is especially useful.

For more instant percussion, take a piano, guitar, or bass part, paste it into the drum part, and adjust the range so that the notes trigger percussion instruments. This can instantly generate new, potentially inspiring, and certainly unpredictable percussion parts. As you might imagine, this works best with rhythmically active parts.

Here's a basic idea that is often overlooked: transpose your song to other keys, especially those you don't use too often (F♯ major, perhaps?). The resulting change in the quality of the overall sound can be startling, depending on the patches you are using for your Players. Transposing also allows easy and dramatic modulations. Just be careful not to transpose the drum parts, or you'll mess up the note maps.

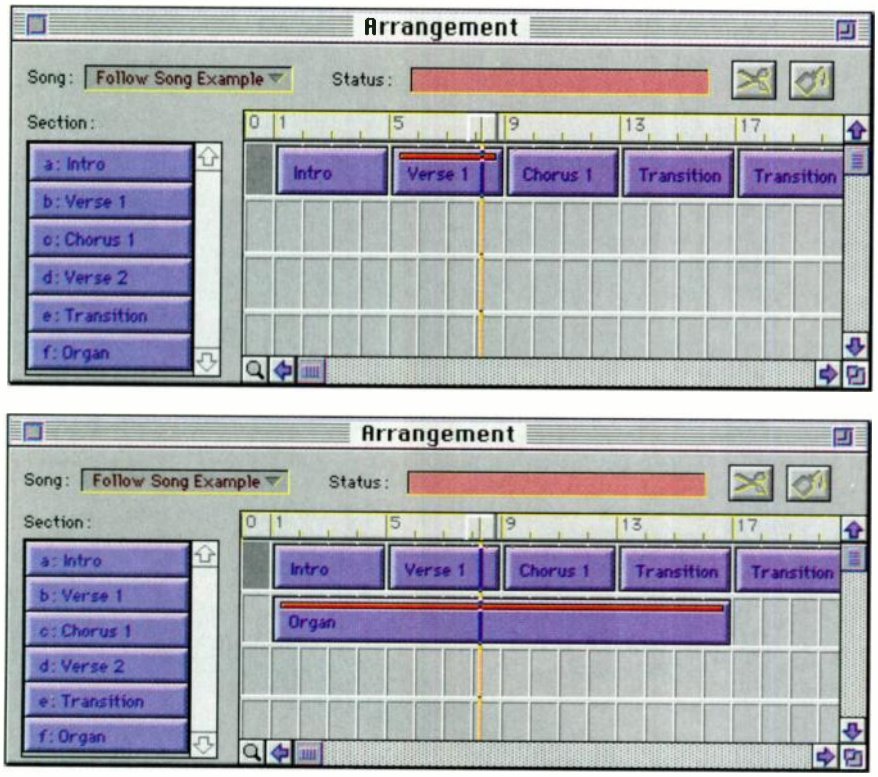

FIG. 3: Sections are placed in the Arrangement window to assemble a song. You can also record a part continuously across several Sections by placing them in the window's top row (upper figure) and checking the Follow Song option. To record a continuous part into a separate Section, place it below the top row (lower figure), turn off Follow Song, and record as usual.

PICKUPS AND LOOP RECORD

To record notes into the Pickup bar, select Wait For Note from the Record menu, click the Record button, and then click the Play button. *FreeStyle* will loop in the Pickup bar until you start playing. Play your first notes or controllers before the downbeat of bar 1, and the data is placed in the Pickup bar, after which the cursor proceeds into bar 1. When you place the Section in the Arrangement window, the data in the Pickup bar will overlap the last bar in the previous Section (see **Fig. 1**).

Suppose you are working on a 4-bar Section that starts with some pickup notes. You want to loop record the four bars, but you want to hear the pickup notes every time through the loop.

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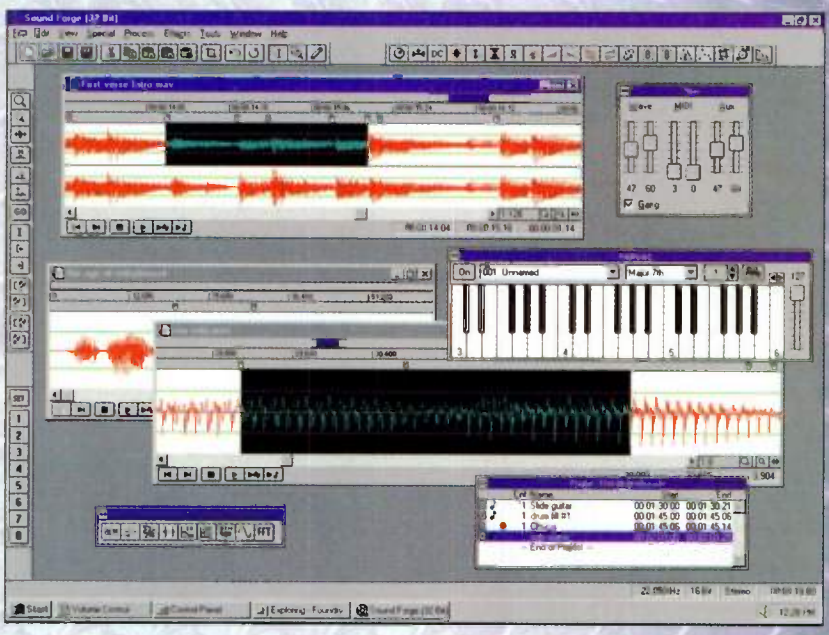
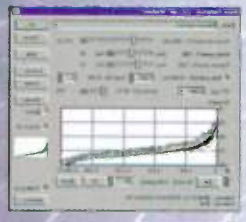


Noise Reduction Plug-in



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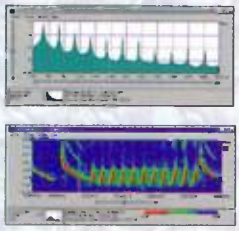

Spectrum Analysis includes Spectrum Graph and Sonogram display for easy frequency (or pitch) identification.

Batch Converter Plug-in

The Sonic Foundry Batch Converter Plug-in is a time-saving utility for those needing to convert tens, hundreds, or even thousands of sound files to different formats automatically. All plug-ins require Sound Forge 3.0.

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Sound Forge XP, a general purpose sound editor, provides the same easy to use interface found in the professional edition. Sound Forge XP is intended for sound designers, multimedia developers, and hobbyists requiring a powerful yet affordable sound editor.

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You can accomplish this by selecting Smooth Record Loop from the Record menu. This feature temporarily adds "ghost notes" at the end of the loop to mimic the effect of pickup notes. The ghost-note symbols include a large cross to identify them as ghost notes (see **Fig. 2**), which can be edited by changing their originals in the Pickup bar. Remember, the ghost notes only appear when you have Record Loop turned on and have selected the Smooth Record Loop option in the Record menu.

Once you have recorded a part with some pickup notes, how do you record another part that also includes pickup notes? Just hit the Rewind button, its Remote Control equivalent, or press the Return key. *FreeStyle* will instantly jump to the Pickup bar and loop until you play something, after which it continues into bar 1 and on to the rest of the Section.

SECTIONS

Suppose you already have intro, verse, and chorus Sections in your song and you want to add an organ part to each section while the entire song plays. Simply check the Follow Song item in the Record menu. When Follow Song is on, recorded notes go into the Section currently playing in the top row (called the Song Structure row) of the Arrangement window (see **Fig. 3**).

Alternatively, you might want all the organ notes to go into a separate linear section that plays concurrently with your intro, verse, and chorus Sections. To do this, create a new Section and place it at the beginning of an empty row in the Arrangement window. Click on the new Section to enable it for recording. (For linear recording, make sure that Follow Song is unchecked.) Then rewind and record your organ part into this new section. Audibly, the results are the same as if you had used the Follow Song feature, but in this case, all the organ notes are recorded into a separate Section that can be moved around independently from the other Sections.

If you are loop recording in a Section and you want to move on to the next Section without stopping, select Advance Record Loop from the Record menu (or press its keystroke equivalent, Control-F3 for Windows or Command-7 for Mac). This advances the record loop to the next Section, provided the loop points started out on Section boundaries before you invoked the command.

Sometimes, you may want to divide a long, linear Section into smaller pieces in order to rearrange your song. In addition, it is sometimes easier to hear the boundaries than it is to see them on the screen. To mark the boundaries while listening, create a new song that contains only the long Section in the Song Structure row of the Arrangement window. Play the song from the beginning with the Arrangement window in front of any other open windows. As you reach the points at which you would like to divide the Section, click the Scissors button. A dialog box appears asking you to name the two pieces of the Section as the music continues to play. The division occurs on the nearest bar line at the time you clicked the Scissors button. Type in the names, click OK, and continue using the Scissors button in real time until the entire Section is divided as desired.

Stacking Sections vertically in the Arrangement window is a great way to add flexibility and variety to your arrangements. For example, try recording brass stabs in a separate section and placing them above or below the other Sections. This gives you a lot of flexibility in placing embellishments, "riffets," and the like throughout the piece with instant graphic ease. You can generate a large collection of embellishments and place them throughout the piece to supply variety and consistency at the same time.

In addition, consider stacking different Sections of your band for greater flexibility. For example, you might have a Section called "Verse Rhythm" that includes the basic rhythm-section Players for verses 1, 2, and 3. Then you can stack different combinations of other sections (brass, strings, chords, etc.) on top of it for verses 1, 2, and 3, varying the combinations each time.

Stacking Sections can also help with the transition from recording Sections individually to refining them within the context of an entire song. For example, you could record the bass part individually in the Sections as you create them, then mute the bass Player in each Section after placing them in the song, and re-record the bass part straight through in a separate Section for a more continuous feel.

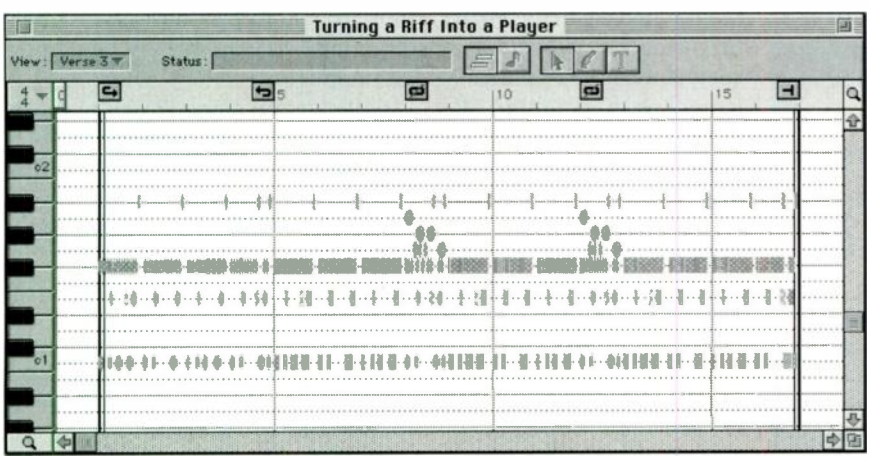
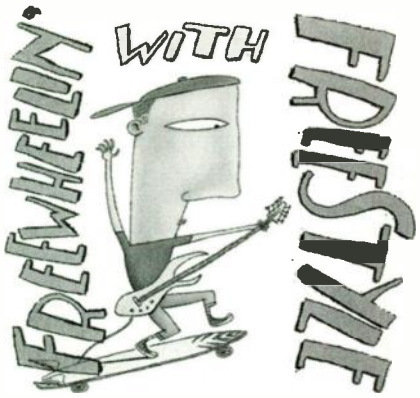


FIG. 4: When you click on the Become Player button in the Metronome window, the Riff Metronome is converted into a looped Player whose notes can be edited as usual in the piano-roll display. The playback-loop override markers in bars 8 and 12 indicate that you can modify and add notes to those bars without affecting the original loop.

RIFFS AND GROOVES

Another interesting feature of *FreeStyle* is the Riff Metronome, which plays a short musical segment over and over as you record. This provides much more musical feel and inspiration than a simple, click-based metronome. The Metronome window is opened from the Setup menu, which lets you select



the desired riff and provides other metronome controls.

FreeStyle's preset riffs are all drum or percussion licks. However, a riff can be performance data from any single Player. For example, you might have a favorite rhythm-guitar or bass riff, which can be any length you want. Simply click on the desired Player's name to solo it in the graphic-editing or notation window, select the notes you want to include in the riff, and select Save as Metronome in the Region menu. The riff is saved as a Standard MIDI File in the Metronomes folder, and it appears in the Riff Metronome pop-up menu. When selecting notes for the riff, don't worry if they don't start exactly on the first beat of the first measure; *FreeStyle* does the right thing and includes the entire measure.

When you build a song on top of a riff, the riff often becomes an integral part of the song. For example, suppose you're using a drum-based Riff Metronome for the entire song and you want to refine it into a real drum part. How do you turn the riff into actual notes you can see and edit? Open the Metronome window from the Setup menu, click the Become Player button, choose an appropriate Player from the pop-up menu, and click OK. You now have a new Player at the bottom of the Players palette. In addition, Take 1 of that Player includes all the notes of the metronome riff, repeated in a playback loop for the entire duration of the Section or song (see **Fig. 4**).

To add fills, crashes, and other embellishments and variations, you must override the playback loop. To do so, cue *FreeStyle* to the measure in which you want to modify the loop, and select Override Playback Loop from the Region menu. You can then add, delete, or change notes in the measure as desired. Repeat this procedure for each Section.

Some drum-groove libraries (such as those by DrumTrax) supply their grooves in *FreeStyle*'s native file format. Other libraries usually supply grooves in Standard MIDI File format. To use a groove as a Riff Metronome, open the MIDI file using *FreeStyle*'s Open command in the File menu. If necessary, combine all the notes into one Take for one Player. Then, select the notes in the groove and choose Save As Metronome from the Region menu. If the MIDI files only have one track, you don't need to bother with this procedure: just drop them into *FreeStyle*'s Metronomes folder (or Windows directory).

The Time Offset slider in the Quantize window pushes the selected music a little behind or ahead of the beat. This even works as a song is playing. Try pulling the bass a little behind for a funkier, laid-back feel (especially at medium tempos), or push it ahead for a little more tension and urgency.

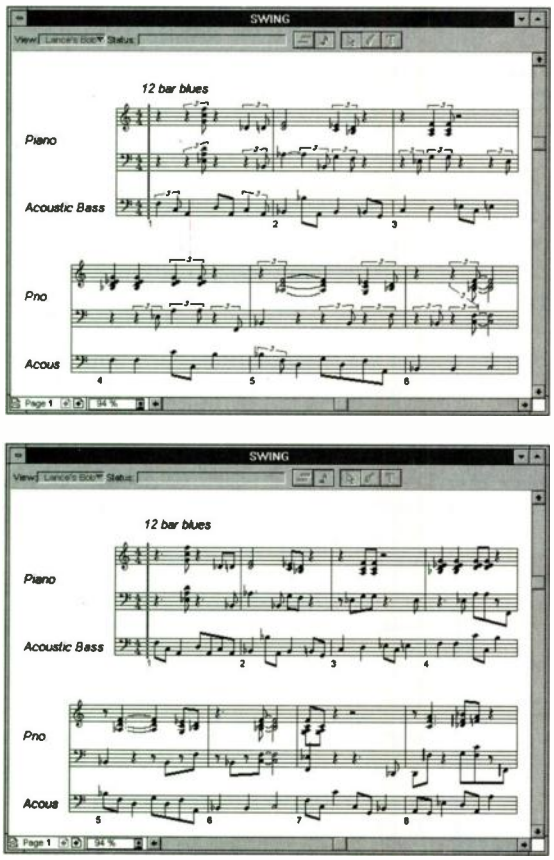


FIG. 5: If you record a part with a swing feel, the Notation view can be awash in triplets (top). Use the Straighten Swing feature to notate the part as straight eighth notes (bottom). This doesn't affect playback, only the visual notation.

CONTROLLERS

The Controller Grid is a great way to quickly polish your tune. To display controller data, select Controllers from the View menu in the Windows version or the Windows menu in the Mac version. To draw controller data for a particular Player, click on the Player's Record button, select the desired type of controller from the pop-up menu below the Controller Grid, and click on the pencil, line, or curve tool. Controllers are listed by name, not Control Change number.

Begin by setting initial controller values for each Player so they always start at the correct level. To set the initial value, click (don't drag) the pencil tool at the beginning of the first Section. In general, click the pencil to set a constant level and drag the pencil tool, line tool, or curve tool to create smooth changes over time.

One of the most common applications of controllers is automated mixing. Draw Volume curves to punch up highlighted instruments in the mix. Judicious, dynamic use of Volume brings a flat mix to life.

You can spice up a solo by swinging it around the stereo field with Pan curves. You can also bounce hard left and right by clicking the pencil tool at the top and bottom of the Controller Grid. *FreeStyle* automatically cuts and pastes the controller data along with the notes, so feel free to apply them liberally, even if you know you'll be editing the notes later.

Duplicate the piano Player, and pan the two Players hard left and right for a Phil Spector/Wall of Sound effect. Try delaying one side by a few ticks to heighten the effect. Add Chorus Depth and External Effects Depth (reverb), but don't go overboard with these controllers.

To apply different amounts of reverb to different drum sounds (e.g., big reverb on the snare with a fairly dry kick), add a second drum Player, select a different kit for that Player, and apply the effects controllers as desired. By selecting a different kit for the second Player, you ensure that *FreeStyle* will keep the two drum Players on separate

MIDI channels, which in turn lets you apply different effects settings.

NOTATION

If you use the same notation layout repeatedly, you can create your own notation templates, which saves a lot of time. The Save As command in the File menu includes a Stationery option. If you save a file as Stationery, it becomes a template you can open when you begin a new file.

Before you create a Stationery file, format the notation display (both instrument part and score) just the way you like, with title, instrument name, scaling, copyright notice, company info, and so on. To format an instrumental-part layout, display only one Player; it doesn't matter which one. To format a score layout, display two or more Players. Then everything will be in place and ready to go the next time you start a new file by opening the Stationery file.

If you are playing with a swing feel and using the Notation view, be sure to turn on the Straighten Swing feature in the Notation menu. This feature notates everything in straight time instead of triplets. The music plays back as it was recorded because the Straighten Swing feature affects only the look of the notation, not the performance itself (see **Fig. 5**).

▼

***FreeStyle* can take a little getting used to.**

If notes are missing in the Notation view, they are probably short and quiet. Such notes are hidden by *FreeStyle*'s Ignore MisTakes feature. To turn this feature off, uncheck the Ignore MisTakes item in the Notation submenu of the Setup menu. This will force *FreeStyle* to display all notes in the current document. To change the default setting for new documents, choose Preferences from the Edit menu, click on the Notation icon, and turn the Ignore MisTakes parameter on or off.

If you are working in the Notation view and want to assemble Sections in the Arrangement window, switch to the Piano Roll view first; it's faster at redrawing than the notation display. This also helps when you are transposing, quantizing, or cutting and pasting larger regions. You can then return to the Notation view when you are done.

Despite its simple and intuitive appearance, *FreeStyle* offers a lot of sequencing power. We've touched on a few ideas to get you started, but there are many more techniques waiting to be discovered as you dig into the program. Don't be afraid of trying something just to see what happens, but don't forget to save your work often and back up your important files regularly. With these simple precautions, you can look forward to years of making music with *FreeStyle*.

Jim Cooper *is a marketing and product manager at Mark of the Unicorn.* *Thanks to Dick Trismen, Joe Kowalski, Carl Wallace, and Dave Abrahams for their assistance with this article.* **Scott Wilkinson** *is* **EM***'s technical editor.*

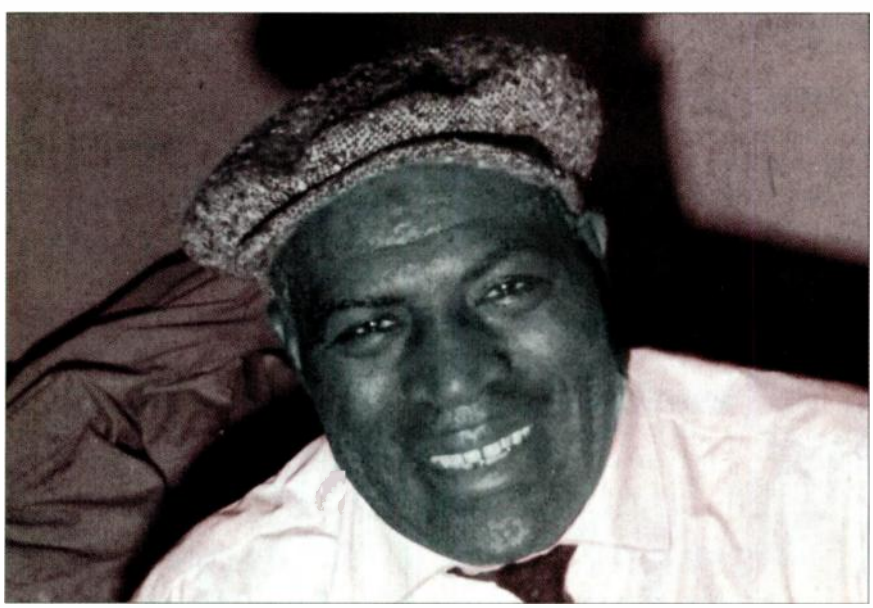
RECORDING MUSICIAN

The Mini Mic Cabinet

Achieve maximum results with a minimum of mics.

By Brian Knave

In last month's column, we looked at the features and basic uses of a variable-pattern condenser microphone. Although many MIDI-based personal studios can function just fine with a single mic, if you track acoustic instruments and want to make professional-sounding recordings, it's smart to have both a variable-pattern condenser *and* a dynamic microphone. In fact, these two mic types can be used as a "mini mic cabinet" for the home studio.



BRIAN SMITH

You don't always need an expensive condenser mic to capture great vocal performances. Howling Wolf sometimes did his blues shouting through a Shure 520D "Green Bullet" microphone plugged directly into a guitar amp.

Fortunately, a lot can be done with these two mics. Let's begin by considering how dynamics and condensers differ—a good place to start when determining which is best for a particular job. Then, we'll look at some applications. This minimalist approach is relevant even if your mic cabinet is fully loaded; by learning to get the most from the least, you extend your working knowledge of each microphone in your collection.

HOW THEY DIFFER

As a rule, condenser mics are more sensitive than dynamics. A microphone's sensitivity is related to its output level. A highly sensitive mic typically produces enough gain to capture the subtle nuances of soft sounds. Therefore, a condenser mic is generally better for recording, say, an acoustic stringed instrument, finger snaps, or a whispery vocalist. On the other hand, using a condenser for miking a fully cranked Fender Twin would probably be inadvisable, as the signal might be too hot for the board or even strong enough to distort the mic itself. A dynamic, however, would capture the Twin's roar without a thought.

Another general rule is that dynamic mics have a single diaphragm, thus only one polar pattern. Most commonly this pattern is cardioid. Obviously, the combination of low sensitivity and a single pattern limits the functionality of a

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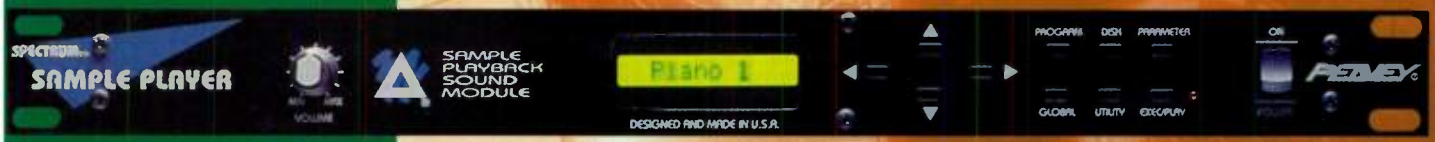

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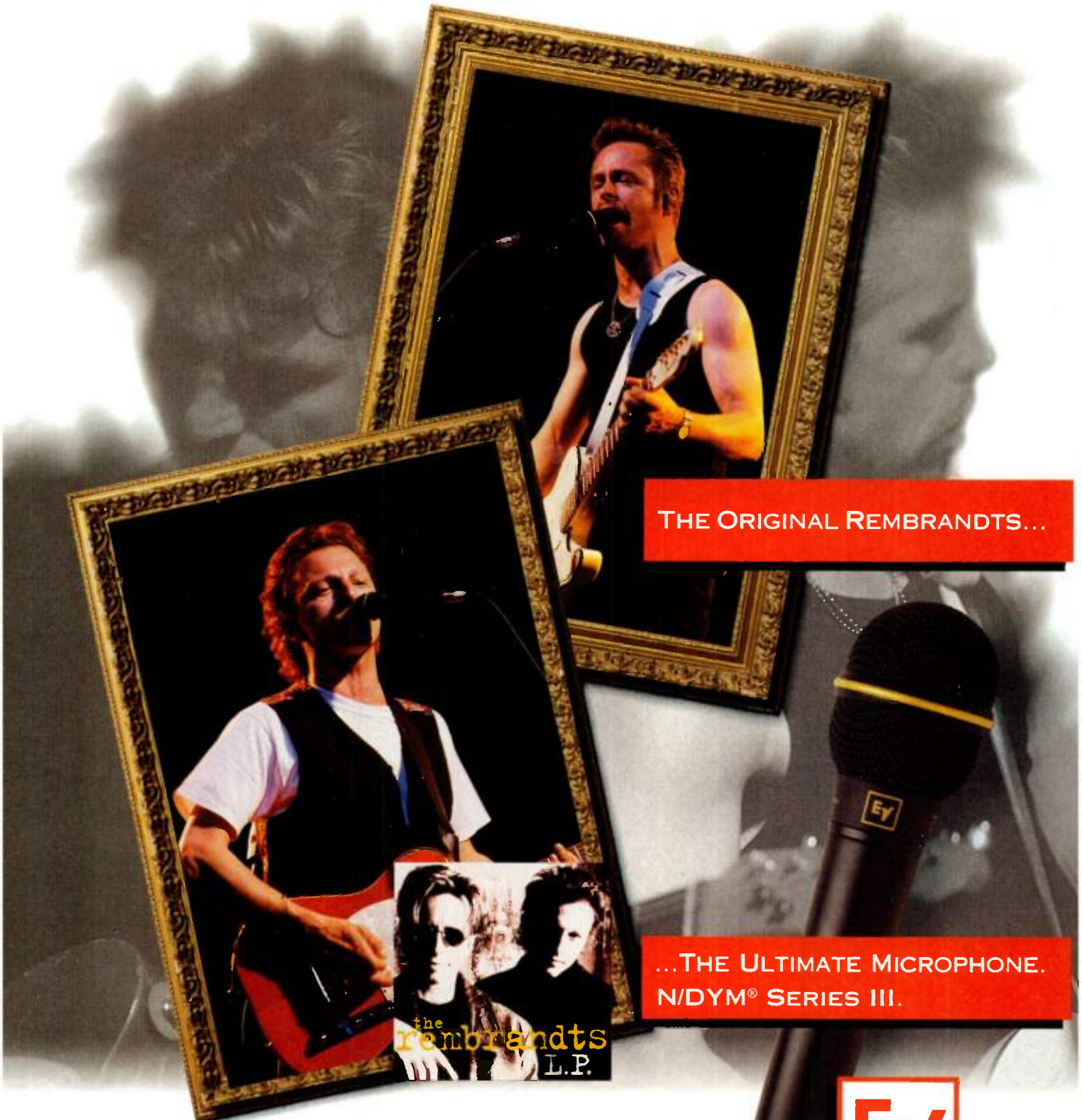

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dynamic microphone as compared to a variable-pattern condenser. But these limitations are precisely what make the dynamic more appropriate for certain applications. A dynamic, for example, is excellent at rejecting ambient sound occuring behind the mic, whereas a condenser, due to its sensitivity, will hear some rear sound even when set to the cardioid pattern.

Dynamic mics also exhibit a conspicuous proximity effect, which makes them a good choice for enhancing the bass frequencies of a thin-sounding voice or instrument. A condenser mic, no matter which pattern it's set to, will not produce as dramatic a proximity effect. (For a more detailed discussion of dynamic, condenser, and other mics, see "Square One: Microphone Machinations" in the May 1995 issue of **EM**.)

ONE AT A TIME

As we'll see later, you can get excellent results by using two mics on one instrument (which gives you the option of a stereo spread). But when one mic is sufficient or you need to record two instruments at once, you're faced with the question of which mic to use for which instrument.

The short answer is to audition both mics and use the one that sounds best for the specific situation. In time, you'll become familiar with the idiosyncracies of each mic, but don't let this lead to laziness or dogmatism. What works one day may not work the next. The following are general guidelines only. When it comes to art, leave room for the unexpected.

Vocals. The voice is the chameleon of instruments. Not only is each one unique, but even the same voice can change drastically from day to day (or morning to night). That's why it's especially true that you never know which mic is best suited for a particular voice on a particular song until you've auditioned them all.

More times than not, the condenser wins out, but some singers sound best on a dynamic mic. Bonnie Raitt, for example, prefers the Electro-Voice RE20 for her studio vocal tracks. The sensitivity that generally makes a condenser mic desirable doesn't necessarily flatter all singers.

"Sometimes a condenser is just too brittle or sharp sounding, especially for a really harsh voice," says Dennis Alichwer, chief engineer at Fantasy Studios in Berkeley, California. "In that case, a dynamic might help smooth out the harshness."

Occasionally, the anomalies of a specialized dynamic mic can be just the ticket for getting a particular sound.

FIG. 1: A drum set can be miked quite effectively with only two mics: a dynamic in the bass drum and an overhead condenser just behind and above the drummer.

Blues singer Howling Wolf sometimes sang through a Shure 520D "Green Bullet" microphone, a high-impedance, magnetic-element mic (usually reserved for harmonica) plugged directly into a guitar amp.

Horns. I have produced great results on saxophones, trumpets, and French horn with both dynamic and condenser mics. Brass instruments put out so much sound that you can mic them effectively from a distance, at close range, and from a variety of angles. It all depends on the kind of sound you want. For example, I recorded a tuba recently, and though my AKG C 414—positioned about two feet back, looking down on the bell—reproduced the sound faithfully (including fingering and valve noise), the resulting track had too much sheen and not enough honk. I pulled the condenser microphone and positioned an AKG D 112 large-diaphragm dynamic so that it was sticking just inside the bell. That isolated the sound and accentuated the fat, low-mid grunt I was looking for.

Strings and woodwinds. I've lumped these acoustic instruments together because the environment they are recorded in is often so critical to the quality of the final recording. Although it's relatively easy to create a dead space for recording vocals (to which you can later add effects), an acoustically dead room is not ideal for recording, say, a string section, flute, or oboe. The natural sound we associate with these instruments includes room ambience, preferably from a room with "good" acoustics.

When going for a natural sound with room ambience, a condenser mic is generally the better choice. The condenser's sensitivity allows it to be placed far enough back to hear the body of the instrument resonating in the context of the space. The standard dynamic mic, on the other hand, must be placed so close to the instrument that the "naturalness" of the sound is compromised. Furthermore, condensers are better at capturing the richness and harmonic complexity of an instrument such as the cello.

First, find the point where the instrument sounds best in the room. Then, position a condenser mic a few feet away in the cardioid pattern. For a section of instruments, try the omni pattern.

Percussion. The higher-pitched hand percussion instruments (shakers, triangles, claves, agogo bells, tambourines, etc.) typically benefit from the sensitivity and quick diaphragm response of a condenser mic. For those that can require a lot of lateral playing motion (e.g., large shakers, shekeres, and tambourines), I use the omni pattern so the musician can move freely without getting off axis. On the other hand, some neat sonic variations can be had in cardioid mode by "working" the mic to take advantage of the proximity effect.

Bongos, congas, dumbeks, djembes, and other hand drums can be recorded effectively with condenser or dynamic mics depending, again, on the kind of sound you want. My favorite way to record dumbek or djembe is with a condenser a few feet away, facing the head and a dynamic in back, pointed into the bell of the drum. If you're close-miking a large, mambo-style cowbell (which can put out some deafening SPLs) and you want that fat, choked sound, mute the bell and move in close with a dynamic; for an unmuted, overtone-rich bell, go for room ambience with a condenser placed three or four feet away.

FIG. 2: To capture a stereo spread when miking a piano, angle a dynamic mic toward the bass strings and a condenser toward the treble strings.

DOUBLING UP

I often double-mic each instrument as I go, even if I can't afford the final luxury of two tracks per instrument. That way, I have two different-sounding tracks I can either choose between or blend and bounce together onto a new track. The mini mic cabinet can accommodate this approach or even be used to record a multiple-acoustic instrument such as a drum set. Check it out.

Drum set. You'll be surprised at the results possible if the kit sounds great to start with. Obviously, put the dynamic in the kick drum. This is not because the condenser can't handle the high SPL but because it can do more work elsewhere. Experiment with the position of the dynamic mic to achieve the best balance of beater impact and low-end thud from the bass drum.

Now position the condenser just behind and above the drummer's head, facing down at a slight angle toward the drums (see **Fig. 1**). That way, the mic is hearing the set as the drummer hears it while at the same time de-emphasizing the bass drum. I usually prefer the cardioid pattern for this application, though omni works, too. You can also get good results with the

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condenser mic in front of the drums at about chest level.

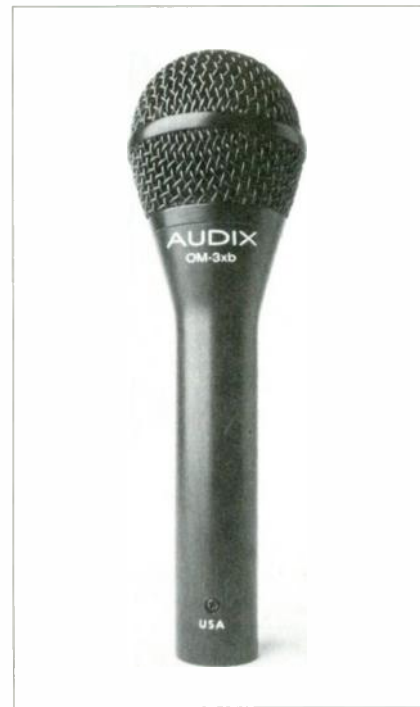
For a jazz ballad on which the drummer plays brushes, place the condenser two or three feet from the kit. Aim the mic at the snare and ride cymbal or hi-hat, depending on which cymbal gets the most use. If brush work carries the whole tune, bring the mic in even closer. Start with the cardioid pattern, but audition the omni pattern, as well.

Now, if I were recording drum tracks for a rap groove—where a slamming bass drum sound is all-important—I might put the dynamic on the snare and save the condenser for the kick. But first, for safety's sake, pad the condenser with the -10 dB switch. Then, position the condenser inside the drum, three to eight inches from the batter head, slightly off axis to the beater. The cardioid pattern is more hassle free, but some rap producers prefer the omni. I've even heard of an engineer using the figure-8 pattern to achieve a blend of thwack from the beater and "note" from the front head. You really have to experiment, as every bass drum sounds different from the next.

Acoustic guitar. Position the dynamic mic three or four inches from the guitar, aimed just between the highest fret and the sound hole. Set the condenser to the omni or cardioid pattern and position it about two feet above and three to six feet back from the guitar, looking down at the instrument. The dynamic mic should produce a warm tone with a focused, low-end punch, and the condenser should add harmonic content and room ambience.

Acoustic piano. On an upright or a grand, position the dynamic four to ten inches above the bass strings, aimed at the register favored by the pianist's left hand. Then, place the condenser (using the cardioid pattern) halfway between the treble strings, angled slightly to the right (see **Fig. 2**). You may need to put the condenser a bit farther from the sound board than the dynamic, and with a slight off-axis tilt, to minimize hammer noise. Expect to spend some time positioning the mics for an optimum blend. Work in increments, as the slightest repositioning can affect a big change in sound.

Electric-guitar amp. The traditional technique is to simply aim a dynamic at the speaker cone, with the mic virtually touching the grille cloth. But if you can afford two tracks, set up a condenser as well, about four to eight feet back from and above the amp. The dynamic provides crunch while the condenser captures room ambience. It's simplest to set the condenser to the cardioid pattern, but if you have time to mess with mic and amp placement, the figure-8 can create cool effects by focusing the sound and blending it with reflections from the opposite end of the room.

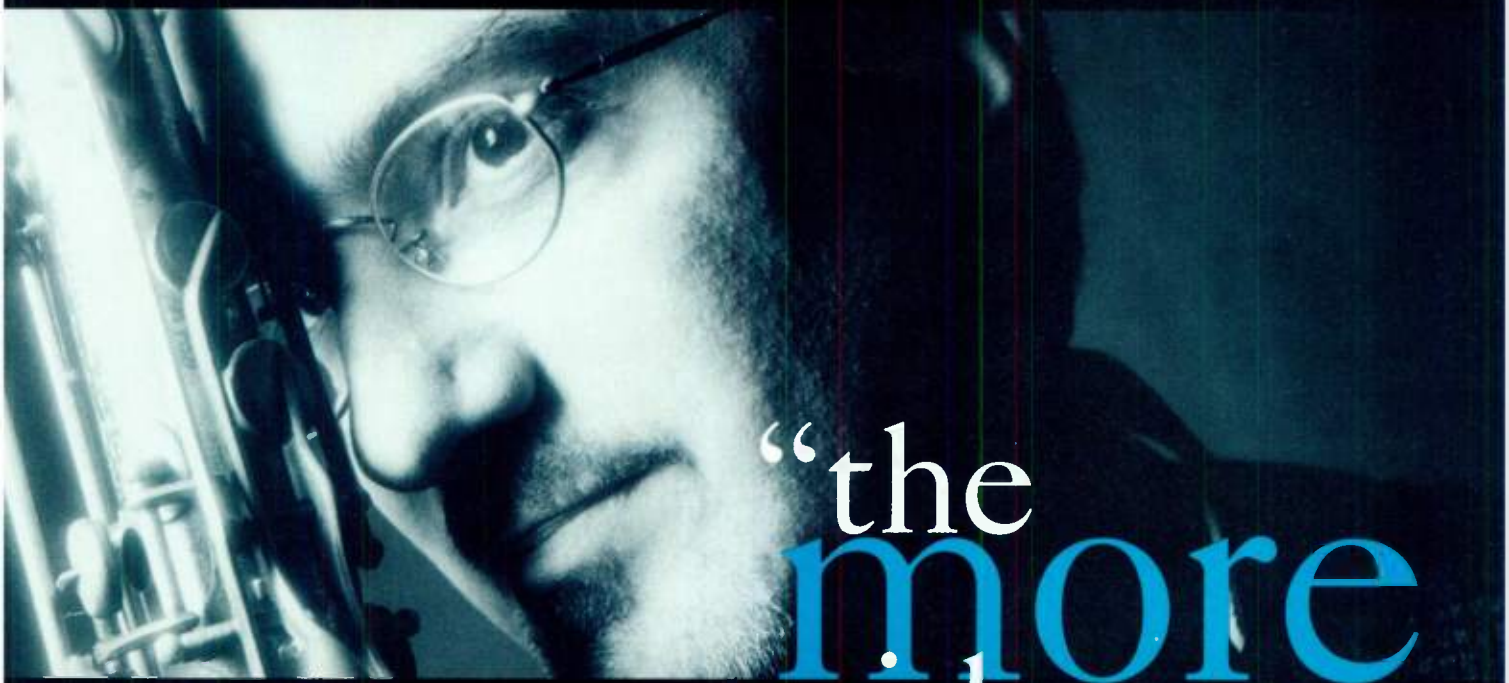


A standard, hand-held dynamic mic can be as useful in the studio as on stage. The Audix OM-3xb boasts an impressive 38 Hz to 21 kHz frequency response and can handle up to 144 dB SPL—great for shoving into the bell of a rockin' sax.

CABINET CLOSED

If there's anything that can make a recording fiend salivate, it's a generous assortment of classy microphones. I hope I've shown, however, that the home recordist's more meager pickings don't have to prove a liability. So get in there and experiment. The more conversant you become with the mini mic cabinet now, the better job you'll do later when its shelves are full.

Assistant Editor **Brian Knave** *built a carbon mic for a science fair in ninth grade. If anyone knows where it ended up, please contact him.*



"the more i know,...

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the less I know. I'm constantly in the shed. Sometimes it's just maintenance, and sometimes I'll go through really creative periods – on the saxophone and the EWI. Always trying to get better, trying to improve. I work on identifying the holes and exploring ways to fill them. I've always positioned myself in lofts, apartments or houses that I could play in. I set my space up in a way that makes it convenient. I keep the tools that I need nearby. My saxophone, piano and a set of drums. I keep the electronics in the other room, so I'm not so attracted to pushing buttons. In that small setting, I'm able to achieve more on the instrument, focus on the music at hand. I can sit at the piano, pick up the horn – it seems to feel right that way. Ultimately, I'm not sure where ideas come from. I hear melodies often when I'm away from the piano – doing other things. I get inspired by other musicians, ideas come to me driving in my car, you never know. I find that it's particularly important, in writing, to keep myself open for ideas – and to be in the proper environment to take advantage of them. It will usually start on the piano for me, and eventually makes its way to the computer. Then I'll organize the ideas, evolve it and do the fine tuning."

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Making an Enhanced CD

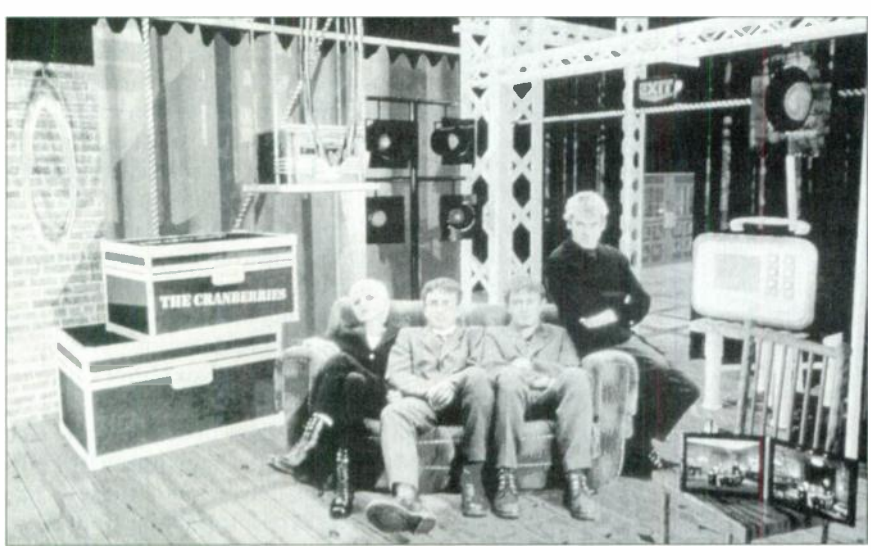
Enhance the quality of your music's life by producing an E-CD.

By Mary Cosola

Isn't it odd that certain words and modifiers fall in and out of vogue? Last year, for example, the prefixes *über* and *cyber* were all the rage, as in *übermodel Cindy Crawford* and *jacking into cyberspace*. One catchword that's emerging as a front-runner in 1996 is *enhanced*. Magazine layouts bear *photo-enhancement* credits, and what was once known as a push-up bra is now called a *bust enhancer*. The savvy consumer knows that when *enhanced* is used in this way the item in question isn't anything new, it's actually an ordinary thing made to appear slightly different or more attractive. Such is the case with the enhanced CD.

Enhanced CDs (E-CDs) play audio tracks on regular CD players, but they also contain other data that can be accessed from a CD-ROM drive, such as video, photos, lyrics, and interactive games. In technical terms, E-CDs contain both Red Book audio (16-bit, 44.1 kHz, Pulse Code Modulated), which is accessed by your audio CD player, and Yellow Book data (computer, encoded audio, and picture data), which your CD-ROM drive accesses. The task of an E-CD producer is to get these different types of data to peacefully coexist on a single disc.

Currently available E-CD titles include *doors and windows* by the Cranberries, *Stripped* by the Rolling Stones, and *An Enhanced Evening* by Kitaro. The multimedia content on these discs consists mostly of interviews, performance clips, and band trivia and scrapbooks. The introduction of the E-CD was heralded as a new and exciting way to inject some life into the record industry. Unfortunately, the content on most E-CDs I've seen amounts to nothing more than glorified, interactive liner notes. That's not to say that the E-CD is a creative option to be ignored. For those of you who would like to bridge the gap between CD-ROMs and audio-only compact discs, the enhanced CD is the perfect option.



Irish rockers the Cranberries have released their own enhanced CD, *doors and windows*. You can go backstage with the band and select audio clips from the radio or click on one of the trunks to see video clips of their life on the road.

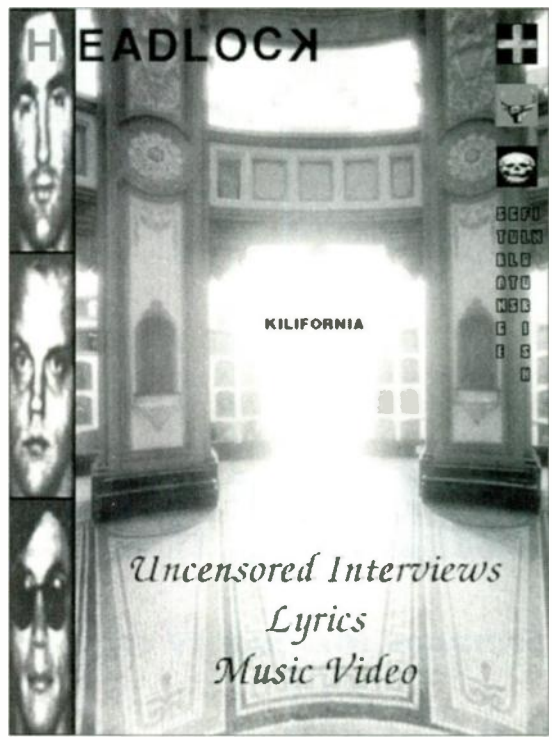
FORMAT, SCHMORMAT!

P. Troy and his band, Headlock, recently decided to take the plunge into the realm of E-CDs with their album *Strange Cults Flourish in Kilifornia.* Troy is a partner with Alec Way and Jeff Edwards in Hbourne Interactive, a San Francisco multimedia firm that does everything from video-game manufacturing to Web-page design. In order to give **EM** readers a taste of what it takes to create an E-CD, Troy invited us to take notes on the production of *Strange Cults.*

Troy agrees that the potential of the E-CD hasn't been fully realized. "The enhanced CDs I've seen I don't like," he says. "To me, they're just 'bells and whistles' added to a regular audio CD. However, the medium has the potential to deliver a respectable product."

It's important to note that within the general E-CD realm there are a few different formats. Many of you might be familiar with the mixed mode "track one" problem that has plagued some of the early E-CD releases. When playing the audio portion of a disc that uses the track-one format, the user has to skip the first track because it may blast horrible noise through the speakers, possibly causing irreparable damage. This happens because the CD player is trying to read the E-CD's data tracks, which are recorded on the first track (hence the term *track one*), with the audio relegated to the remaining tracks.

Another E-CD format is *track zero* (or *pre-gap*). In this format, the data tracks are on track zero, which avoids the track-one problem because most CD players skip over track zero and go straight to track one. Philips Media uses the term *rainbow* format for its E-CDs that use the track-zero approach because these discs play on some CD-ROM drives, CD players, and Philips CD-i players. Sound perfect? Well, not really. The problem with the track-zero approach is that some CD-ROM drives can only find data tracks if they're located on track one. Among the brands of drives incompatible with track-zero E-CDs are NEC drives, which command a huge share of the CD-ROM-drive market. (You should bear in mind, too, that NEC drives are not the best for musicians anyway, as they are not compatible with most samplers.)



Pictured above is the opening screen from the multimedia portion of Headlock's enhanced CD, *Strange Cults Flourish in Kilifornia.*

Yet another option, and the path chosen by Troy, is the *multisession* format. This process avoids the track-one noise problem by putting the audio tracks first and programming the disc so that audio CD players ignore the subsequent data tracks. The problem with this format is that about half (or more, depending on whose numbers you believe) of the CD-ROM drives on the market can't play these CDs without an upgrade to their software device drivers. But then again, the industry must have some faith in this format because it is the one endorsed by Sony, Philips, and the RIAA (Recording Industry Association of America). Furthermore, just about all CD-ROM drives currently produced support multisession discs.

"I believe that the multisession format will survive because it is actually more in demand for data storage," notes Troy. "People who use SyQuest or data DAT can now use CD, which is cheaper, faster, and has a longer lifespan. Also, the multisession format lets you stamp data updates into 'sessions.' This is like having your shoes in one box, your shirts in another box, and so on. You don't have to deal with the fact that you've mixed your shirt with your shoes. Your driver reads these organized pieces of information from their little 'boxes' on the CD. In addition, if you've used multisession technology, you don't have that track-one noise to deal with.

In this screen from the Rolling Stones' enhanced CD, *Stripped,* clicking on Mick Jagger's head brings up a QuickTime interview clip.

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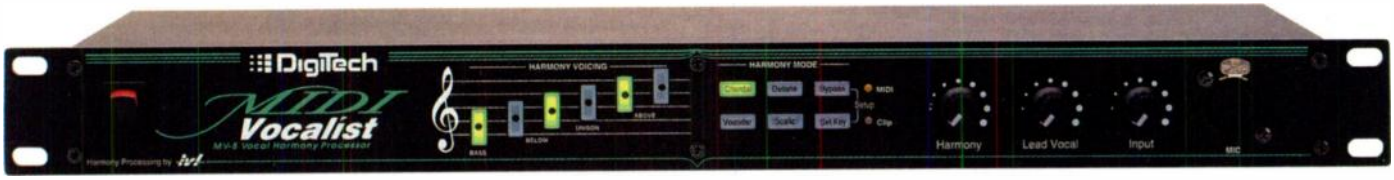

MIDI VOCALIST

The MIDI Vocalist makes it easier than ever before to achieve soaring vocal harmonies from a single voice. Now even the novice can connect a microphone and MIDI keyboard and be making fuller sounding music right now! All controls have been placed within easy reach so that with the touch of a front panel button, a foot switch or a MIDI controller, arranging vocal accompaniments can be performed when the creative urge strikes.

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- **Front panel buttons transmit MIDI for sequencer control**
- **Choice of line or mic inputs**
- **All parameters accessible via MIDI**
- **Footswitch controllable with optional FS-300**

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"The problem is that currently there is no industry standard for drivers," he continues. "A lot of computers can't read these different formats. If you have a Mac, chances are that it supports multisession. Apple has supported the multisession drivers for the last year and a half. Also, there are various sources for driver upgrades, such as through the RIAA and from Apple's Web site."

(The software driver update from Apple can be downloaded from their Web site, http://quicktime.apple.com.)

BASIC ASSEMBLY

Regarding the basic equipment home recordists would need to make their own E-CDs, Troy has the following thoughts. In the hardware category he prefers a Macintosh with a color monitor, CD-ROM drive, video-capture card, sound card, graphics scanner, and CD recorder. (Hbourne used a few different Macs: Power Mac 6100 and 8500, Centris 660 AV, and Mac IIci and IIvx.)

The next order of business is choosing multimedia authoring software. And there are plenty to choose from. Troy suggests looking at Macromedia *Director,* Apple *Media Tool Kit,* or Oracle *Media Objects* with *Brilliant Tools.* The best bet for nonprogrammers is *Media Tool Kit,* because it deals in easily indentifible icons, rather than code and project timelines. You'll also need to incorporate other multimedia, graphic-design, and audio software programs. Troy estimates that basic equipment costs can run anywhere from $15,000 to $50,000.

AN ENHANCED HEADLOCK

Before you get on with the business of using these hardware and software tools to assemble your E-CD, you need some music. Recording an album would be a subject of another article, if not an entire book, so we're starting our tour of Troy's E-CD project *after* the final album tracks were produced. The core of Headlock's recording setup included two Macs (IIci and IIvx); Digidesign's Session 8 card, SampleCell sample playback card, and Audiomedia II sound card; Opcode's *Studio Vision Pro;* Sequential's Prophet 2001+ sampler; and two Mackie CR-1602 mixing consoles.

"If you already have music recorded, you can capture the sound using a sound card such as Audiomedia II," says Troy. "We assembled our music using *Studio Vision* and Digidesign's 882 I/O box, SampleCell, and *Sound Designer II.* We mastered to DAT and transferred the sound digitally to *Sound Designer.*"

The band decided that they wanted the multimedia portion of the E-CD to include interview segments, a music video, and graphics of their song lyrics, using QuickTime movies for the interview and music-video segments.

"The interviews were shot with video cameras and captured with Radius' Video Vision card," explains Troy. "They were then compiled into 15 fps for Cinepak movies using Adobe *Premiere.*"

They approached the music video from another angle. Using digital imaging software such as MetaTools *Bryce,* Electric Image *Electric Image,* Strata *Studio Pro,* and Adobe *Photoshop,* they created backgrounds that they later merged with the live-action video using *Premiere.* This is akin to the process used in virtual-reality games where actors are filmed against a blue screen and that footage is later merged with

INTERACTIVE INFO

This article is intended to give you an overview of how Hbourne Interactive approached the production of Headlock's *Strange Cults Flourish in Kilifornia* E-CD. You can reach Hbourne Interactive at tel. (415) 928-8668 or e-mail hbourneint@aol.com.

If you want to learn more about the audio and authoring aspects of producing a multimedia project, check out some of the past articles in **EM**. Listed below are a few articles that can get you started. Back issues can be ordered by calling Mix Bookshelf at (800) 839-5977 or (510) 653-3307.

Feature Articles

"Author! Author!" (entry-level Windows authoring programs).....September 1994
"Home Movies" (entry-level Mac authoring programs).....November 1994
"Disc-O-Mania" (finding the perfect CD-ROM drive).....January 1995

"Multimedia Musician" columns

"Authoring Systems".....May 1993
"QuickTime Movie Sound".....August 1993
"QuickTime 2.0".....October 1994
"The Sound Card Dilemma".....August 1995

the game's various scenes and settings.

"Once the visuals were created in *Premiere*," says Troy, "We could import 22 MHz audio for the video soundtrack. We had to downsample the audio [with dither] from 44 MHz to 22 MHz, 16-bit. The smaller bandwidth audio is what gets played with the QuickTime movie on the computer, and the 44 MHz audio is played on the CD player."

Like most E-CDs, *Strange Cults* has graphic interfaces in the form of buttons and links that allow the user to move to other screens, videos, and graphics on the disc. To create the graphic interfaces and to assemble all these building blocks of video, sound, and graphics into the final E-CD product, Hbourne used *Director*, later switching to *Media Tool Kit* because it supports the Interactive-TV format that many multimedia producers feel is the wave of the future.

"The decision about what authoring tool to use should be based on which computers you're targeting your product to," advises Troy. "For instance, if you use *Director* and you author on a Mac, you must have a PC and the Windows version of *Director* in order to cross-platform. The same is true for *Media Objects*. If you're using *Media Tool Kit*, cross-platforming is a breeze, especially when you're authoring on a Power Mac 6100 with a '486 microprocessor, which allows you to do cross-platform testing easily. You should also take your programming knowledge into account. *Director* can be used by nonprogrammers, intermediate programmers, and skilled code writers alike."

Troy points out that you should test your product as you go along, particularly when cross-platforming. He notes that the biggest difference is the way things look from computer to computer: "When working in *Director*, the graphics look darker and dissolve transitions are less smooth on PCs than on Macs. There are also differences in the way the CD operates that are dictated by your choice of authoring tool and the type of computer used to produce the project."

ENHANCING THE STONE

As with most emerging technologies, the E-CD horizon is filled with conflicting formats and vastly different approaches to creating a viable product. But rather than view this as a reason to avoid creating your own E-CD, look at it as an opportunity to forge your own path and cast a vote toward the standardization of this technology.

Associate Editor **Mary Cosola** *is furiously working on a way to create an enhanced version of her life.*

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The Taxman

At tax time, it's always wise to CYA with a CPA.

By Michael A. Aczon

One of the most overlooked aspects of a musician's career is the tax ramifications of doing business. In a world of overnight successes, where bands go from passing out cassettes at small bars to supporting platinum-selling CDs with arena tours, the dramatic swings in income can be a kiss of death for the artist who didn't bother to plan for the Taxman. For most of us, a tax audit ranks right up there with a root canal *sans* anesthesia. A musician's taxes tend to be complicated because most artists don't exactly punch a clock. As such, an artist's journey through the tax maze is fraught with potential stumbling blocks.

DMITRY PANICH

A TAXING SITUATION

Let's start with the basics. The federal government is empowered to tax the income of its citizens, which it does via the Internal Revenue Service. Additionally, each state may tax its residents based on income and for doing business in the state (e.g., sales taxes and property taxes). Counties and cities may also tax those who are residing and/or doing business within their jurisdiction. It is your responsibility to determine which local tax laws apply to you. State and local tax codes vary so much that I will limit our discussion to the major considerations regarding federal taxes.

Your income from *all sources* is taxable income. Time and time again, we read about prominent figures who neglected to report income and ended up having to pay the piper in a big way. Income you receive from gigs, session work, synthesizer and drum-machine programming, royalties, and any other music-related work is taxable income. One way the federal government makes sure that you are not receiving certain income "under the table" is to require the entities paying you (e.g., record companies, night clubs, producers) to report to both you and the IRS how much money they paid to you during the year.

THE RIGHT TO WRITE OFF

A common fallacy in the music business is that every nickel an artist spends is a

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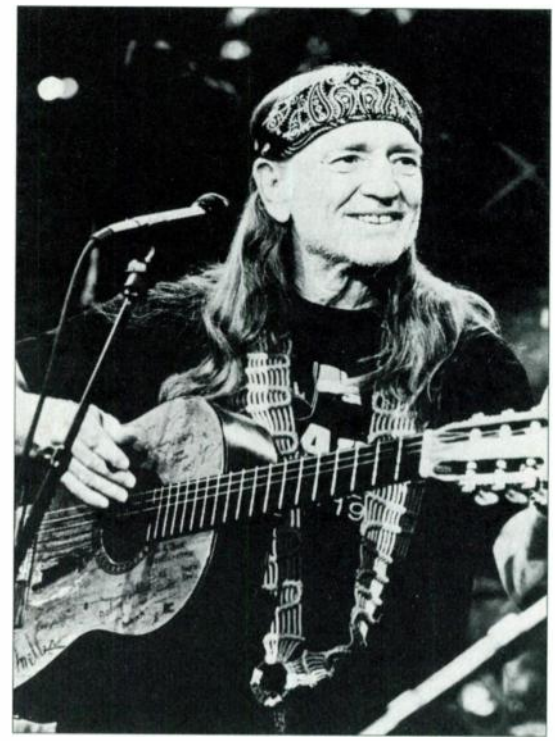
tax deduction (commonly called a *write-off*). It is easy to fall into the mental trap of thinking that the more money you lose at a side business, the better off you are, because such losses offset the money that you make at your day job. This is not true. If you lose money at your business for too many years in a row, the IRS doesn't consider it a business anymore; it is merely a hobby. The costs involved in pursuing a hobby are not deductible, no matter how promising your band's prospects.

Let's say you have determined that your music career is a business. Now you're ready to benefit from the same write-offs other business people have enjoyed for years. What are these write-offs? The general rule is that you can take deductions for *ordinary and necessary expenses* in connection with running your business. If a deduction looks out of the ordinary or unnecessary, it may come under IRS scrutiny and trigger an audit. Following are some of the common, allowable expenses that most musicians encounter.



Willie Nelson's tax problems are legendary. The country singer even released a mail-order album solely for the purpose of paying off his tax debt.

Studio/rehearsal/office-space rental. Whether you rent on an hourly, daily, or monthly basis, this expense is commonly considered to be reasonable. The IRS is sometimes inspired to take a closer look at write-offs that involve a "home office/studio" space. Many write-offs for home space are denied because the space was not used *solely and exclusively* for the business. When planning your home studio, make sure that it will be used only for your business purposes and will not double as a living area. The size of the deduction is usually based on the percentage of the entire space taken up by the work area (e.g., your studio takes 15% of your house, so your deduction is equivalent to 15% of your rent/house payment).

Equipment purchase/lease. Musicians, studio owners, producers, and gear-hungry artists go crazy over this potential write-off. There is good news and bad news when it comes to equipment purchases. Yes, you can write off equipment purchases. However, there is a dollar limit on how much you may write off. So before you run out and buy a fully automated $500,000 mixing console, be sure to speak to your tax advisor about what the limits are. Many musicians are opting to lease equipment because—based on the deal they make with a leasing company—they have the flexibility of updating their equipment while writing off the lease payments, thus avoiding the dollar limit imposed on purchases.

Recording costs/fees. If you rent a recording studio for your projects, the costs related to the recording are potential deductions. This includes studio rental, mastering fees, engineer costs, and related expenses.

Professional services. Fees paid to lawyers, accountants, studio-design consultants, and session players are all potential write-offs. Because these professionals are working for you, you should provide them with an IRS 1099 miscellaneous-income form at the end of the year. If over the course of the year you pay more than $600 to any of your independent contractors, you are required to submit a copy of their 1099 form to the IRS, as well.

Travel and entertainment. Take one look at the headlines about politicians

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under fire from the IRS, and you can figure out that the ordinary and necessary limits of travel expenses are being tested on a daily basis. Hotel and truck-rental costs incurred by your band for touring are probably allowable. Your bender with a bunch of "cool dudes" you met in Fargo, North Dakota, is probably not allowable, unless you can prove that it was in furtherance of your business purpose (perhaps one of the "cool dudes" was a booking agent). A trip to the Bahamas to "get your head together" is questionable, whereas a trip to Cannes, France, for a music conference is probably allowable.

Only a small percentage of your business meals may be written off, so don't

Over the course of his turbulent career, Chuck Berry has faced a number of tax woes, including a 100-day prison stint in 1979.

be so anxious to pick up that check at your local restaurant just for the sake of getting the write-off. Plan accordingly and determine the purpose of your actions before you assume it is an automatic write-off.

Supplies. I have found that many musicians confuse supplies with equipment. I have also found that many musicians neglect to write off their supplies. The money spent on pens, pencils, stationery, audio- and videotape, computer supplies, cotton balls, and the like adds up to a substantial amount when the day is done.

Education and conferences. From taking a MIDI course at your local junior college to attending a major recording-industry seminar, anything that you do to further your skill and knowledge

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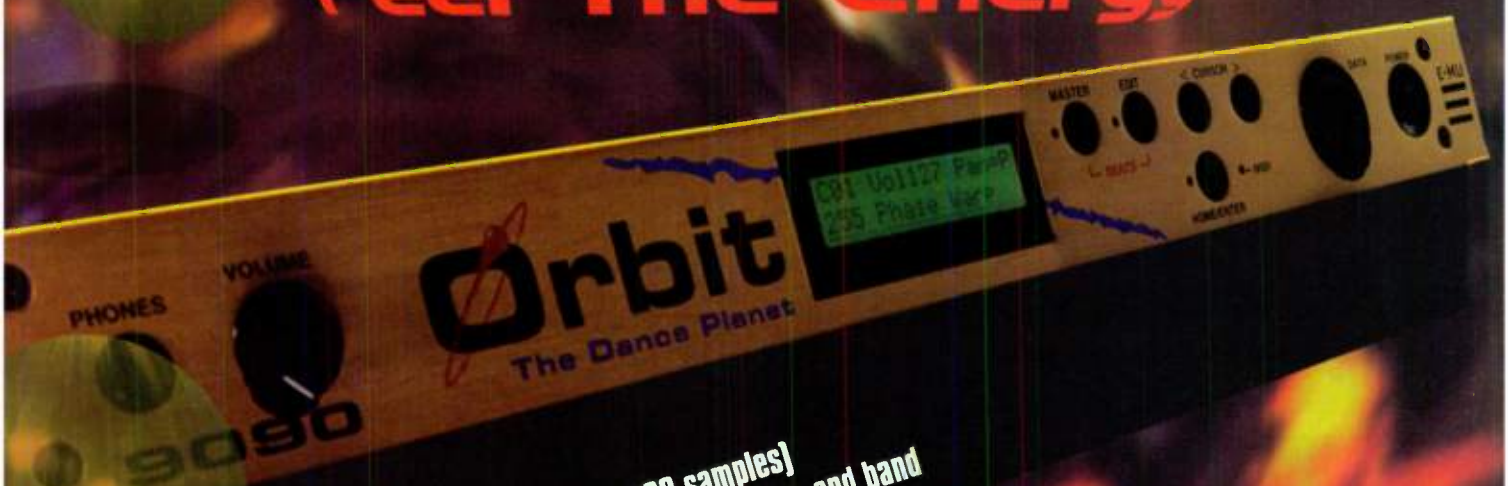

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in connection with your career is a potential write-off. Along this same line, books and subscriptions to trade magazines (like **EM**) are also are allowable.

Postage, phone, and related costs. Don't overlook deductions for costs associated with promotional efforts. Photocoping, faxing charges, overnight-mail delivery fees, and telephone bills add up to a substantial amount of money and are possible write-offs for your business.

There's more. The list of potential deductions goes on, depending on how creative you and your tax advisor wish to be (within the limits of what is ordinary and necessary, of course). These other deductions include union dues, voice lessons, photo costs, automobile expenses, equipment-insurance costs, and so on.

WILL I HAVE TO DO TIME?

The IRS conducts audits, sometimes randomly and sometimes based on specific questions raised by a tax return. Don't hit the panic button and begin planning your escape from a federal penitentiary yet. An audit is simply a meeting with an IRS agent to determine whether you have indeed paid the correct amount of tax. If you are prepared and have a well-documented case, keeping all receipts and being able to justify all of your expenses, you will survive an audit.

If your case is complicated, you may wish to enlist the aid of a professional, such as an accountant or tax lawyer, to advise you or even attend the audit. You should be prepared to spend some money for these professional services, though, as they are sometimes time consuming and such consultants bill on an hourly basis. If some of your expenses are disallowed, you may be liable for the unpaid taxes and various penalties based on the adjusted income from the audit.

TIPS AND FINAL THOUGHTS

With the decentralization of the federal government, states and municipalities are taxing more aggressively than ever. For traveling musicians especially, particular attention must be given to those states that have gone after—and collected taxes from—sports figures earning money in their states. If you do a 20-city tour spanning four states, be prepared to deal with four different state tax codes for the money earned in each state.

The key to all financial management in your career is impeccable record keeping. A number of financial-management software programs are available that can help you keep good records. Federal tax laws are changing daily, so be sure to enlist the aid of a competent tax advisor to assist you. Referrals from colleagues and legal-referral services should be of help. It is important to choose a tax professional you are comfortable with and who is familiar with the entertainment industry. If you treat your books and financial matters with the same precision that you give your sequencing files, the weeks before April 15 shouldn't be so taxing!

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

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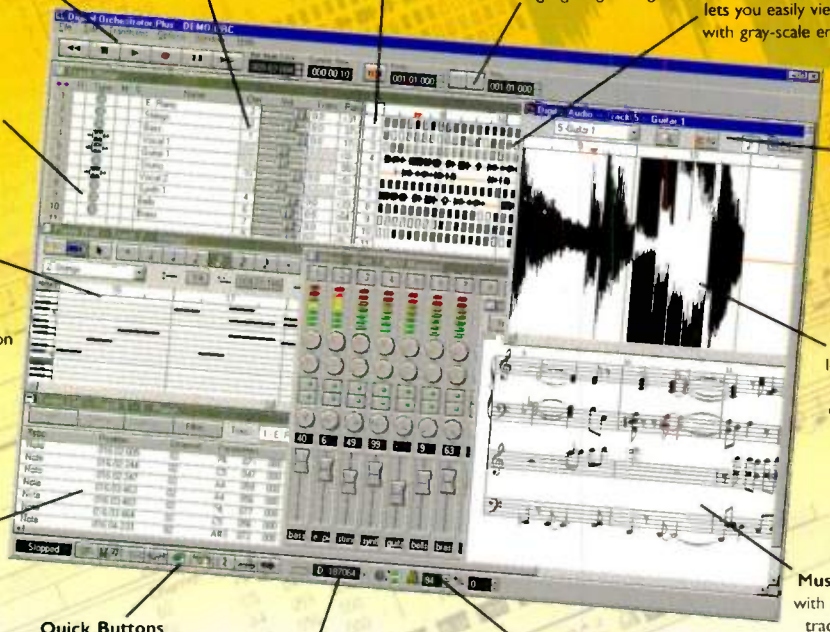

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Reviews

Opcode Studio Vision Pro 3.0 (Mac)

By Michael Denten and Erik Hawkins

One of the first digital audio sequencers is still one of the best.

The buzz on the street is that Opcode's *Studio Vision Pro* 3.0 represents the next logical step in the evolution of the digital audio sequencer. The newest version of the world's first digital audio sequencer provides the first true bridge between digital audio and MIDI sequencing and expands the program's already potent integrated audio-processing power. Version 3.0 proves yet again that Opcode's reputation as a "first on the block" kind of company is well deserved.

Studio Vision Pro 3.0 is a deep program. Its complexity and duality (being both a digital audio recorder/editor and a MIDI sequencer) make it impossible to discuss all of its features in a single review. Therefore, we will focus on the newest features and changes implemented since *Studio Vision* 2.0. Most of these updates are found in the audio section, so we concentrated our efforts there.

(For more background information, see "All for One," **EM**'s April 1994 cover story, in which *Studio Vision* 1.7 "faced off" against its main competitors and v. 2.0 was previewed. *Studio Vision* 1.0 was reviewed in the February 1991 **EM**.)

The MIDI sequencer in *Studio Vision Pro* 3.0 is almost identical to *Vision* 2.0, which was reviewed in the May 1994 **EM**. *Vision* is now up to version 3.0 ($495), which provides basic digital audio capabilities on a Power Mac with Sound Manager 3.1 or later. It doesn't include DSP features, and it isn't compatible with Digidesign or Yamaha hardware, but it does include mixer consoles and support for OMS 2.0.

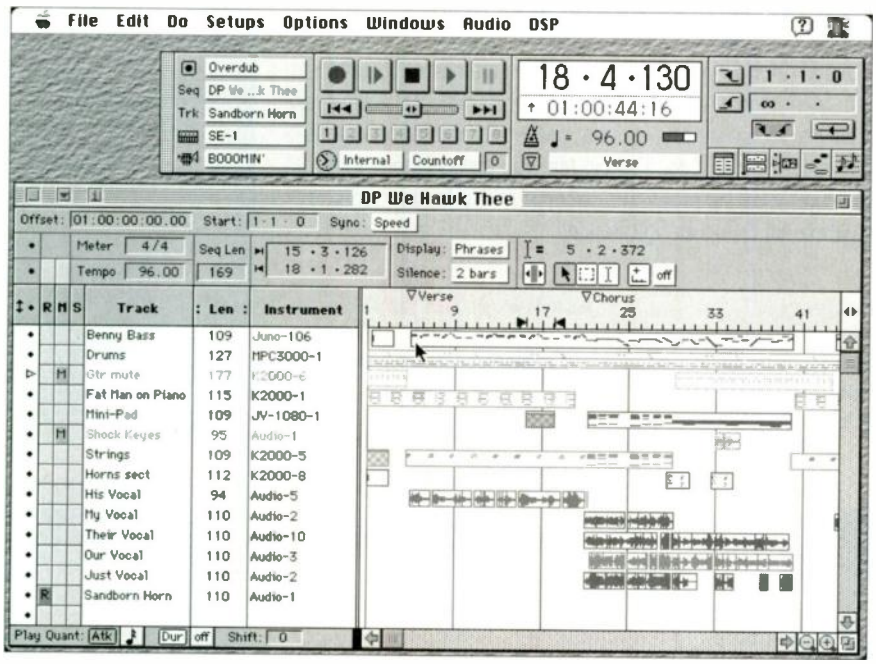

FIG. 1: *Studio Vision Pro*'s Track Overview window displays MIDI Instruments and Audio Instruments simultaneously.

HARDWARE SETUP

Today's *Studio Vision Pro* can run in a variety of hardware/software configurations. For trouble-free operation with any configuration, you should have as much RAM in your computer as possible and the biggest, fastest hard disk you can afford.

Studio Vision Pro can run on any Power Mac in conjunction with Sound Manager; no additional hardware is needed. However, the program is not available in native Power Mac code. For the best audio performance, System 7.5 or later, Sound Manager 3.1 or later, and a minimum of 12 MB of RAM are recommended.

The number of tracks that can be played back simultaneously from a Power Mac varies according to the speed of the processor and other aspects of your system. As a result, Opcode cannot guarantee any specific number of tracks. On the faster models (e.g., the 9500) you might get ten tracks, whereas the slower models (e.g.,

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the 7100) usually provide six tracks. The number of simultaneous playback tracks also varies according to how much data is recorded in the sequencer; the more sequencer data, the fewer tracks you can play at once.

Yamaha's CBX-D5 (ROM version 2.06 or later) and CBX-D3 hard-disk recording products are now compatible with *Studio Vision Pro*. Both CBX models provide four individual analog outputs, one pair of stereo analog outputs, one pair of stereo analog inputs, and a stereo S/PDIF digital output. The D5 also includes a stereo S/PDIF input, digital EQ, and a multi-effects processor. The D5 is a tabletop unit and the D3 is 1U rack-mount. Both connect to the computer via SCSI and let you hear four tracks simultaneously.

When using a CBX-D5 or D3, System 7.5 (or later), a minimum of 12 MB of RAM, and a hard disk with a transfer rate of at least 375 KB/second are recommended. A Yamaha software driver for the CBX units is included with *Studio Vision Pro* and is automatically placed into the OMS folder when you install the sequencer.

If you have a computer with NuBus slots, you can use Digidesign hardware, including Pro Tools, Session 8, Sound Tools, and Audiomedia. In conjunction with Digidesign's Digital Audio Engine (DAE) system extension, this allows a variety of input and output configurations. The number of simultaneous playback tracks varies with each hardware setup, from four tracks with Audiomedia to sixteen tracks with Pro Tools. When using a Digidesign setup, System 7.0 or later, DAE 1.42 or later, and a minimum of 12 MB of RAM are recommended. When using Pro Tools I and II with more than four tracks, you'll also need the A/Rose extension software, which comes with *Studio Vision Pro* 3.0.

▼

It's wise to break your audio recordings into as many Audio Events as possible.

We spent most of our time working with *Studio Vision Pro* on a Mac IIci running System 7.1 with 32 MB of RAM, a 4-track Pro Tools II system with DAE 1.42, and three 1 GB hard disks. We also noodled around with *Studio Vision Pro* 3.0 running on a Mac Centris 650 with an Audiomedia II card and on a Power Mac 8100 with nothing but Sound Manager.

Except for speed differences, the software performed identically on all three computers. We did experience some strange glitches when trying to execute certain DSP functions on the Centris 650 (especially Audio-to-MIDI). After processing, the resulting waveform was often pegged and distorted. This didn't happen all the time and could usually be worked around.

We also had a problem with the internal metronome on the 8100, which caused the screen to freeze after recording. This turned out to be a conflict with System 7.5.2. (The 8100 was the only computer we tried that was running this system.) Using MIDI notes as our click instead of the internal metronome worked fine as an alternative. Opcode is aware of this problem and recommends you not use the internal metronome.

WORKING WITH AUDIO

If you are used to working with *Studio Vision*, you will find no big changes in the audio recording features. Audio data is still contained within Audio Instruments. The Audio Instruments can be viewed in the Track Overview window in the same manner as MIDI Instruments (see **Fig. 1**).

There are sixteen Audio Instruments available, regardless of how many audio tracks your system can play simultaneously. A particular Audio Instrument can inhabit multiple tracks, and multiple Audio Instruments can inhabit the same track (see **Fig. 2**). The number of simultaneous voices playable by each instrument can be set to fixed or dynamic allocation. Audio Instruments can be assigned to any or all of your hardware's outputs.

Audio recordings—which Opcode calls Audio Events—are stored within Audio Instruments and can be treated just like MIDI events. They can be moved around in time and between tracks, shortened, lengthened, reversed, transposed, and quantized. In addition, their tempos can be adjusted. They can even be converted into MIDI events. (Many of these capabilities are made possible by Opcode's new DSP functions, which we'll get to later.) A single Audio Event can be divided into multiple Audio Events, and an unlimited number of Audio Events can coexist in a single Audio Instrument.

Creating multiple Audio Events is accomplished by simply cutting an Event

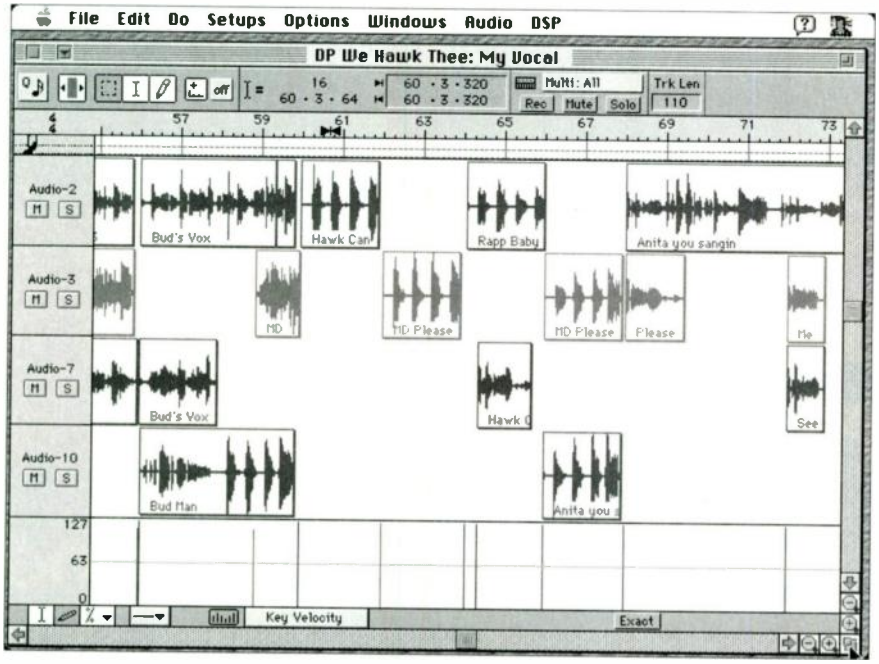

FIG. 2: Several Audio Instruments can be viewed and edited simultaneously on the same track. This makes it easy to arrange multiple takes into a single take on a single track.

Making cool sounds. That's pretty much the purpose of all multi-effects processors, and a task that the Sony HR-MP5 executes extremely well. It all starts with our dual-effects block architecture. Each block boasts both an effect and an equalizer. These can be used at the same time to create the exact sound you want, with your choice of a serial, parallel, or dual mono configuration. Throw in the fact that each preset can be programmed with a different configuration, and it all spells one magical word: versatility.

With the HR-MP5, you get an abundant variety of effects, 51 in all. These include Delay, Chorus, Flange, Pitch Shift, Reverb, and Dynamic Filtering. Add to the menu 100 pre-programmed and 100 user-definable presets, and it's easy to see that the HR-MP5 has a fully stocked effects buffet.

But don't just take our word for it, listen to what the experts are saying. Such as EQ Magazine, "*Sound quality that's better than expected for the price... smooth reverbs, digital clarity but with a warmth that sounds distinctly undigital.*"* Yes, the Sony HR-MP5. It's versatile, convenient, affordable, and great sounding. In conclusion, allow us to leave you with some quotes from Keyboard Magazine, who wrote, "*...clean and smooth presets... the display is big, bright and packed with information ...friendly, easy-to-understand icons at every turn... this user interface is one of the best we've seen,... A+ for Sony.*"** What more can we say? For more information, call 1-800-635-SONY, ext. MP5.

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*"EQ, August 1994." **"Greg Rule, Keyboard Magazine, April 1995."

THEY DON'T CALL IT OPCODE SYSTEMS FOR NOTHING

Opcode Systems' *Vision* and *Studio Vision Pro* sequencers provide maximum value when used as part of an integrated software system. To this end, Opcode bundles its *Galaxy* 2.0 universal MIDI-device patch librarian and the Open Music System (OMS) 2.0 system extension with *Studio Vision Pro* 3.0 and *Vision* 3.0.

Registered users of *Galaxy* 1.2 or *Galaxy Plus Editors* 1.2 (reviewed in the May 1992 **EM**), which adds complete patch-editing features, get a free upgrade to *Galaxy* 2.0 or *Galaxy Plus Editors* 2.0 when they buy or upgrade to *Studio Vision Pro* 3.0 or *Vision* 3.0. The main differences between *Galaxy* 1.2.4 and *Galaxy* 2.0 are that the latter requires OMS 2.0, it includes more librarian modules, and its windows look like those in *Studio Vision Pro* 3.0 and *Vision* 3.0.

Galaxy organizes all your patches for a given MIDI device into Banks, complete with patch names. If your device can't export its patch names (as with many older models), you can easily name the patches yourself. Programs for a given MIDI device can then be swapped back and forth to form custom Banks. If no product-specific *Galaxy* librarian module exists for a SysEx-capable device, the device's programs can still be saved in a generic bulk dump.

Banks can be organized into Bundles, which can contain programs from any assortment of MIDI devices. For example, you can store all your string sounds in a Bundle, or all your reverb patches, or all sounds for a particular song or project.

Although *Galaxy* is an independent program, it can run in the background and integrate tightly with *Studio Vision Pro* and *Vision*. Once you have stored your patches in *Galaxy* and organized them into Banks, you can subscribe to them from within the sequencer.

With this accomplished, a simple pop-up menu allows you to call up any program in your Bank by name and assign it to the desired track. You can even organize your patches into categories using keywords, which show up in the pop-up menu; a submenu shows you all the patches that match the keyword or occur in the Bank (see **Fig. A**). Once you select a sound, *Galaxy* automatically loads it into the synth and the sequencer correctly routes the track data. This Name Manager feature even works with non-Opcode sequencers or patch librarians as long as they are OMS 2.0-compatible.

That brings us to the heart of the Opcode system, OMS 2.0. This system extension pumps the life-giving blood (MIDI data) among the various organs (applications). OMS 2.0 acts as a central organizer, MIDI driver, and timing source and provides interapplication communication (IAC) for compatible software. OMS 2.0's Setup routine automatically detects which devices you have, their MIDI channel assignments, and to which MIDI interface and port each device is attached, ensuring that data is correctly routed.

OMS provides a common clock for all compatible programs and allows them to multitask. For example, you can switch to *Galaxy Plus Editors* and edit a patch while the sequencer is playing. OMS's IAC capability even lets you route MIDI data between applications, so you can record the patch edits into the sequencer during real-time playback. IAC also is handy if, for instance, you want to custom-process MIDI data with Opcode's *MAX*.

The OMS driver lets all your MIDI programs use the same MIDI interface (including multiport interfaces) without requiring separate drivers. It supports most multiport interfaces, including Opcode's Studio 3, 4, and 5 and MOTU's MIDI Time Piece and MTP II. The driver also fixes MIDI overflow problems endemic to certain Mac models.

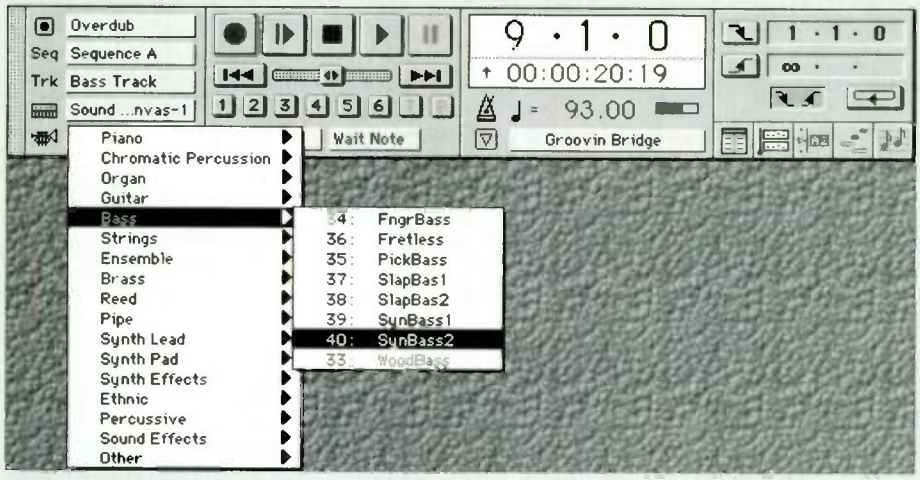

FIG. A: You can group patches into categories using keywords, which show up in this pop-up menu; the submenu shows you all the patches that match a given keyword.

One change introduced in OMS 2.0 is that the Studio 4 and Studio 5 programming features that had been integrated into *OMS Setup+Patches* 1.x are now separated into an independent *Patches* application, which is included with *Studio Vision Pro* 3.0 or *Vision* 3.0. This means that you don't need a special version of OMS for Studio 4 and Studio 5; OMS is OMS, and *Patches* is *Patches*.

In addition to Opcode, an impressive roster of companies now offer OMS-compatible software, including Steinberg, PG Music, Passport, EMAGIC, Digidesign, Lexicon, and Mackie Designs. Apple has announced it will adopt OMS as part of its Mac OS, and Microsoft plans to add OMS to Windows 95; however, no release dates have been announced.

—Steve Oppenheimer

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into two parts or by using the Strip Silence function. Strip Silence creates multiple Audio Events by removing any audio that falls below a user-definable threshold for a specific amount of time. Selecting a single Audio Event and executing Strip Silence produces several Audio Events. Gaps between the new Audio Events denote the areas in which the audio level fell below the threshold.

Like a good gate, Strip Silence includes an auto zero-crossing option and offers controls that adjust threshold, duration, attack time, and release time. In addition, Strip Silence is a nondestructive process. If you have a lot of gaps between Audio Events after applying Strip Silence, you might want to execute the Compact function to save hard-disk space. The Compact function throws away audio data that are not used by any Audio Events.

As with most digital audio editors, it's often wise to break your audio recordings into as many Audio Events as possible. This speeds up DSP processing time and allows more precise editing when it comes to certain functions, such as quantizing audio or reversing a sound.

A Record Monitor window provides access to basic recording settings for the Audio Instruments. You get the most choices if you use DAE; otherwise, some of these choices aren't available. You can check input levels, select linked stereo or mono operation, and select which input is routed to which Audio Instrument. You can also specify your monitor-input preference, electing to monitor the input at all times or to monitor the input while it's idle or recording and monitor the audio coming from disk upon playback, as with a professional multitrack deck.

IMPORTING AND CONVERTING

Studio Vision Pro's ability to import audio files varies with each system configuration. Using Sound Manager or a CBX, you can import AIFF and Sound Designer II files. These configurations let you audition AIFF files but not Sound Designer II files.

Using DAE and any Digidesign hardware, you can import Sound Designer I and II, AIFF, and Dyaxis files. With Digidesign systems, you can preview any files appearing in the Import Audio menu. You can also import audio at any sample rate, but all audio in the project must be sampled at the same rate. Digidesign hardware only supports 16-bit audio; to import 8-bit files, you must use Sound Manager. According to Opcode, *Studio Vision* works with 8-bit files, but it's unreliable, and the DSP functions don't work at all. As a result, the company doesn't recommend the use of 8-bit files.

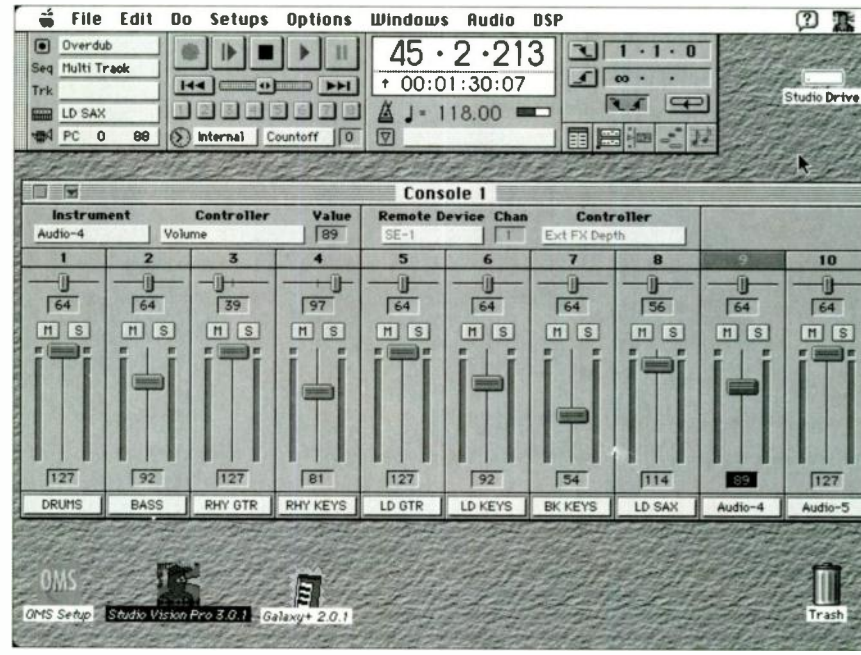

FIG. 3: A new virtual mixer section provides control over MIDI and audio tracks. Controller information for a selected channel can be readily displayed above the console.

Studio Vision Pro 3.0 includes two sample-rate conversion functions: Conversion Overview and Convert Sample Rate. Convert Sample Rate is a new DSP feature; Conversion Overview has been around since *Studio Vision* 1.5.

Conversion Overview is used to import files with sample rates that are different from the session's sample rate (e.g., importing a 22 kHz sample into a 44 kHz session). It can also convert an entire session to a new sample rate. The length and pitch of a converted sample remains identical to the original.

Stereo, interleaved files can also be converted to two linked mono files. When used with DAE, *Studio Vision Pro* cannot play stereo, interleaved files, but it can play linked mono files. Sound Manager and CBX setups can read and play stereo interleaved files.

Convert Sample Rate is used mainly for resampling audio. You simply select an Audio Event, resample it, and a new Audio Event is saved to hard disk without destroying the original. If the new audio's sample rate is different than the session's sample rate, it plays back at a different speed. For example, converting an Audio Event to 32 kHz in a 48 kHz project yields a shorter Audio Event at a higher pitch.

Most hardware supports a limited number of sample rates. However, *Studio Vision Pro* plays audio regardless of whether the session's sample rate matches the hardware's sample rate. If you import an audio file with an oddball sample rate, it can still be played and edited. This is accomplished by on-the-fly sample-rate conversion. Any session's sample rate is converted to the hardware's current sample-rate setting, in real time. (Remember, all the audio in a session must be at the same sample rate.)

This on-the-fly conversion works, but it does not yield the best sound quality. For better sound quality, the entire conversion process should be executed offline; i.e., you should convert the oddball sample rate to one that matches your hardware using the Conversion Overview function before importing the file.

COOL CONSOLES

Studio Vision has received a lot of flack about its weak fader section. Most of Opcode's competitors now have pretty impressive virtual mixers, but it seemed Opcode had put very little effort into theirs. We're happy to report that this is no longer the case. Although *Vision*'s

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➤ **I/O Overload Protection**	Protect against misconnection of I/O up to 50 VDC.	✔	✔	✔
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➤ **Multi-Layer PCB**	Improve performance by reducing "digital" noise.	✔	✔	✔
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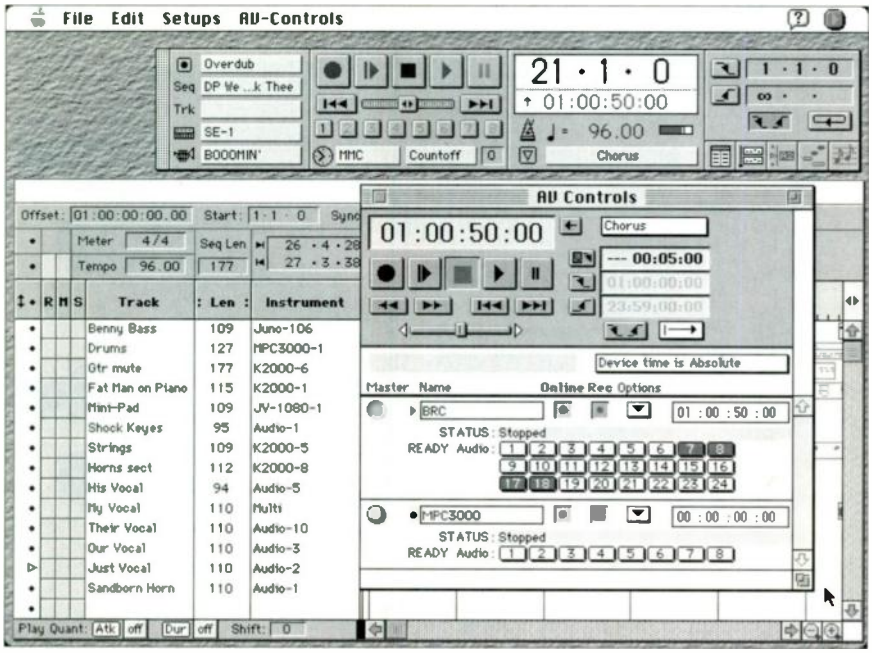

FIG. 4: In this screen, a vocal track has been converted to MIDI data. MIDI notes appear above the audio display and Pitch Bend appears below.

original faders remain intact, an entirely new virtual mixing section has been added. It isn't the ultimate virtual mixer, but it is a step in the right direction.

Four consoles are available, each of which can include between four and 24 channels. The consoles cannot be sized, but the channel strips can be set to Narrow or Wide; the Narrow setting effectively cuts the horizontal size of the console in half.

Each channel has two dynamic controllers, which can be automated: a long-throw, vertical fader and a short-throw, horizontal fader (see **Fig. 3**). Each channel strip includes an associated numerical display for each fader, mute and solo buttons, and a name that denotes which track/instrument the channel controls. For MIDI devices, the faders can be assigned to send any MIDI Control Change message (CC 0 to 127). For Audio Instruments, the vertical fader is locked to CC 7 (Volume), and the horizontal fader sends CC 10 (Pan). The mute and solo buttons cannot be automated. However, a new feature, not associated with the consoles, allows individual Audio Events to be muted on playback.

The consoles can accommodate up to four TDM plug-ins per channel, each of which can be linked to Quick-Access buttons. This lets you easily access and edit plug-ins as effects for your audio tracks. Next to the TDM Quick-Access button, there is also a handy Bypass button. Such easy access to your plug-ins is a nifty feature that makes the consoles much more powerful than they are by themselves.

Although *Studio Vision*'s consoles don't have as many bells and whistles as the consoles in other digital audio sequencer packages, they are easy to work with because of their simplicity. You can easily build consoles from existing audio and MIDI tracks by simply selecting the desired tracks and engaging the Build Console function. It would be great if the consoles had more dynamic controllers per channel. A grouping function with configurable slaves and masters would also be nice; currently, you can't even link two faders for simultaneous operation.

DSP TO BLOW YOUR MIND

In version 3.0, DSP functions have finally been added. Basic DSP functions include Normalize, Reverse, Invert Phase, EQ, Fade In/Out, Pitch Shift, and Time Scale. We tried all of these functions and experienced no problems with them. We were particularly impressed by the quality of the pitch shifting; it sounded as good as, if not better than, the best hardware harmony processors. We found the Reverse function useful for obscuring obscenities in a radio remix of a hip hop tune; we just reversed the bad words.

However, we were disappointed that we could not audition any of the DSP effects before applying them. In the case of the EQ and Fade In/Out functions in particular, it would be nice to know how the processed audio will sound rather than waiting around for the computer to process it and then discovering it's wrong. In addition, the DSP functions cannot be applied to stereo files. In this case, you must split the stereo file and process each side separately.

A few DSP functions epitomize Opcode's innovative spirit and require more extensive explanations. Audio-to-MIDI, MIDI-to-Audio, and Adjust Audio Tempo are truly mind bending and represent the first real bridges between the worlds of digital audio and MIDI sequencing.

The Audio-to-MIDI function converts a digital audio track into MIDI data. This yields results that are nothing short of amazing. Notes, Velocity, Pitch Bend, Volume (CC 7), and Brightness (which can be set to CC 0 to 127; the default is CC 73) are all derived from the audio track and placed in an attached MIDI track (see **Fig. 4**).

Product Summary

PRODUCT:
Studio Vision Pro 3.0 (Mac)
PRICE:
$995
SYSTEM REQUIREMENTS:
Mac IIci or better, System 7.0.1 or later, 12 MB of RAM, hard disk; 680x0 machines require any current Digidesign I/O hardware or Yamaha CBX-D5/D3; Power Macs can also use Sound Manager 3.1 or later
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fax (415) 856-3332
e-mail info@opcode.com
Web http://www.opcode.com
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EASE OF USE	● ● ● ◖
DOCUMENTATION	● ● ● ● ◖
VALUE	● ● ● ◖

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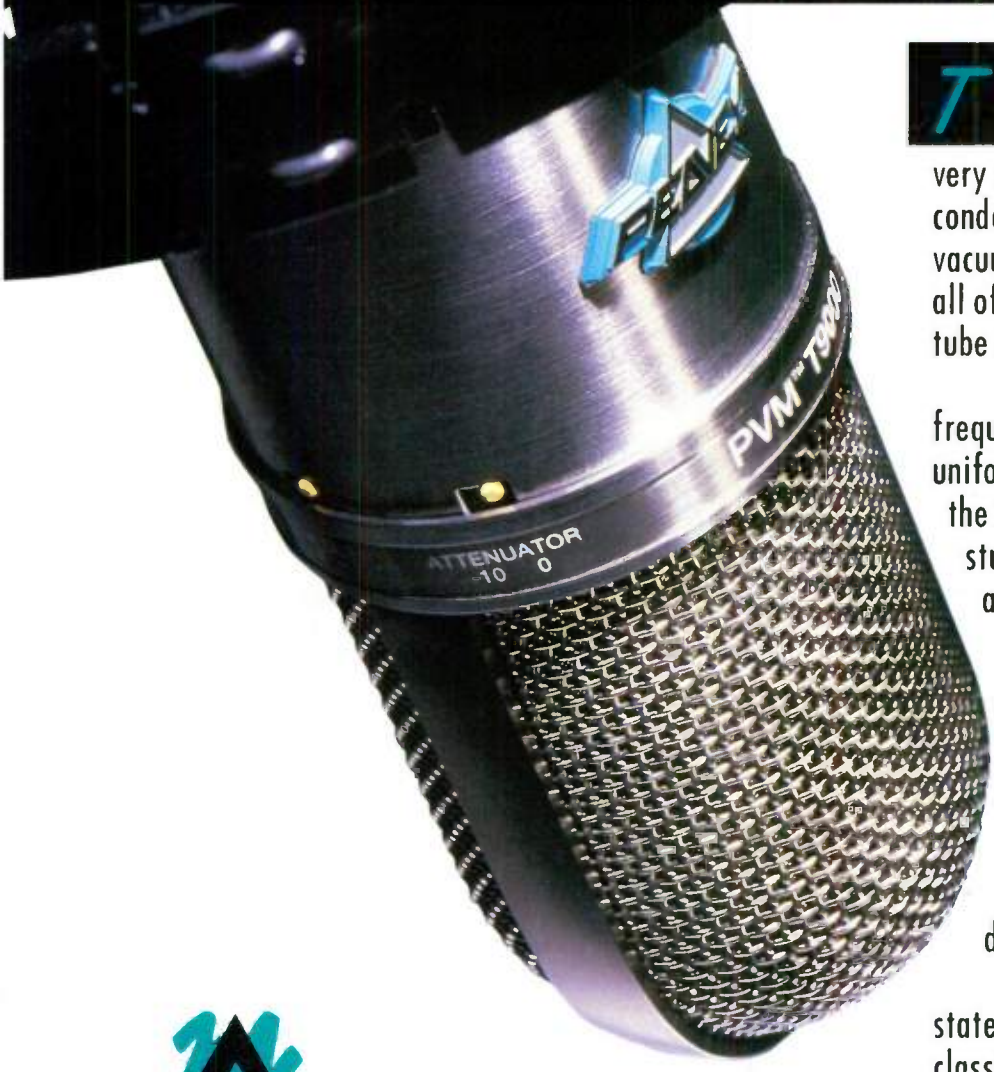

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We converted a vocal scat line to MIDI notes and then assigned the MIDI track to a sax sound. The result was some killer tandem jazz riffs between the MIDI sax and the vocalist. Overall, the conversion process seemed to go pretty smoothly with Opcode's default settings. However, if you need to tweak the process for better results, there are plenty of parameters to fiddle with. Audio-to-MIDI converts monophonic performances; it doesn't recognize chords.

MIDI-to-Audio is the flip side of the coin; it converts MIDI data into audio. Its primary application is to let you convert an audio track to MIDI using the Audio-to-MIDI function, manipulate the data, and reconvert back to audio using MIDI-to-Audio. For example, this lets you correct a few notes in an audio track that are out of tune using Pitch Bend or add harmony parts by copying and transposing the MIDI note data and then converting the data back to audio.

We found that drawing a new MIDI Pitch Bend curve and converting the data back to audio was effective in fixing slightly out-of-tune vocals. Moreover, we created harmony parts from a single vocal by inserting new MIDI notes. However, if the vocals are too far out of tune or the harmony parts exceed a third above or below the original, the results are very synthetic and unpleasant. This is not the software's fault; it's the laws of physics.

▼

The pitch shifting sounded as good as the best hardware processors.

The Adjust Audio Tempo function is a remixer's delight. This DSP function executes a clean tempo change on any audio segment while keeping the pitch or length of the segment intact. You can execute a tempo change by assigning a new tempo to the selected audio region or forcing the selected audio to follow the sequencer's tempo map.

We used this feature when making a dance remix of a midtempo tune. It was easy enough to speed up the sequenced tracks, but then the vocal tracks lagged behind. Using Adjust Audio Tempo, we were able to match the tempo of the vocals to the new sequence tempo. It was fast, easy, and accurate—in short, it opens up a whole new avenue for remixers.

SYNCHING THINGS UP

Studio Vision Pro sends and receives MIDI Clock, MIDI Time Code (MTC), and MIDI Machine Control (MMC). It can also send MIDI Song Position Pointer. Available SMPTE formats are 24 and 25 fps, 29.97 and 30 nondrop, and 29.97 drop-frame.

Most of the time, we had *Studio Vision* synchronized to a TimeLine Micro Lynx, which provided the master clock. This synchronizer is the heart of our system, keeping an Otari MTR902 24-track, the Pro Tools interface, and 24 tracks of ADAT (hooked up to an Alesis AI2) in sync. With this system, *Studio Vision* locked to time code with subframe accuracy. The SMPTE rates we

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commonly used were 29.97 nondrop and 30 nondrop.

However, we are aware that not everybody can afford a Micro Lynx (which costs about $2,800), so we also tried locking *Studio Vision* directly to SMPTE using the software's Lock-to-Tape option. The 29.97 nondrop SMPTE time code was striped on one track of an ADAT and then routed to a JLCooper PPS-100, which converts SMPTE to MTC. The MTC was then sent to the computer via an Opcode Studio Plus Two MIDI interface. Once again, everything locked up tightly.

Next, we tried MMC in a closed-loop configuration with the Alesis BRC, which was controlling 24 tracks of ADAT. We were able to control basic transport and record functions on the BRC from *Studio Vision*'s new AV Control window (see **Fig. 5**), but we were unable to get a really tight lock. This was evident when the consonants of a vocal track, which had been accurately locked with the Micro Lynx, flammed with MMC. We also found that *Studio Vision* had to be rebooted after creating a new MMC device in OMS to make the AV Controls properly address both the internal sequencer and the external machine.

We don't attribute the inaccurate lock with MMC to *Studio Vision*. Instead, we believe it was due to the fact that we were not locking Pro Tools and the BRC to a single master clock. We tried this because we think most people expect MMC to work in this fashion, which it does, more or less. However, for a frame-accurate lock, the correct way to sync multiple digital machines together is with a master clock. MMC only tells the machines what to do (e.g., play, stop, locate, etc.); it does not send out a reference signal to which all machines resolve. After an MMC command is sent, each machine syncs to its own internal clock, and the clocks eventually drift apart.

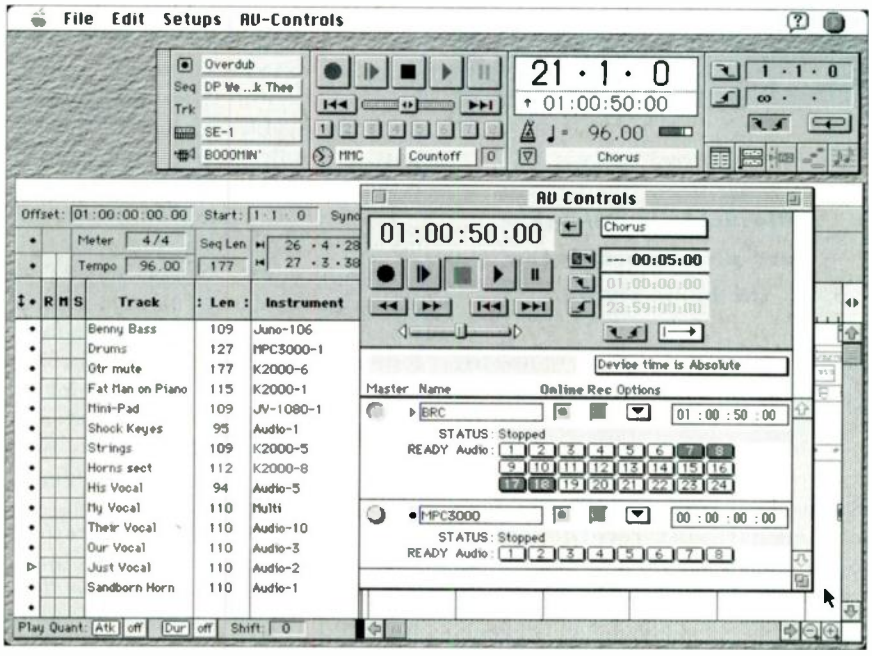


FIG. 5: *Studio Vision*'s new AV Control window is a virtual control surface for any MMC device. Below the transport and locate section, several MMC devices can be created with their own record-enable buttons.

WISH LIST

We would like Opcode to implement vertical zoom in the Overview window. Currently, there is only horizontal zoom. When you zoom into an area, only events within the tracks get bigger, not the tracks themselves. Vertical zoom would make life easier when you only need to see the tracks you are working on; you don't need to see tracks 3 through 32 when you are working on tracks 1 and 2. With vertical zoom, the Overview window would work more like the Graphic window.

It would also be wonderful if Opcode would let you customize key commands. It is often confusing to remember all the different transport and locate keystrokes for different sequencers, and custom key commands would make the program more user friendly to people who are thinking about switching to *Studio Vision* from another program.

IN THE END

All in all, *Studio Vision* works better than ever. The code feels solid; indeed, the program never crashed during the entire time we used it. It sometimes appeared to freeze up when we applied the new DSP functions, but we think it was just trying to scare us. After a few seconds, the program resumed operation.

Studio Vision's learning curve is average in the digital audio sequencer world. Once you get up and running, however, you'll find that many of its more unassuming features actually enhance productivity. For example, the program's colors (which are fully selectable) act as visual cues to let you know what's going on at a glance. Every Audio Instrument and MIDI Instrument can be assigned its own color, which makes squinting at track names a thing of the past. What's more, the DSP and general editing capabilities of *Studio Vision* are nothing short of awesome.

There is clearly enough power in this program to take you to new audio frontiers if you feel like exploring them. Yet, these power-user features don't interfere with the program's basic recording and playback operations. As a result, you can get to the important stuff first—making music—and save the tweaking for later. The program is even easier to use when you take advantage of its integration with Opcode's *Galaxy* patch editor, which is bundled with *Studio Vision Pro* 3.0 or *Vision* 3.0 (see the sidebar "They Don't Call It Opcode Systems for Nothing").

When considering the purchase of any digital audio sequencer, the first criterion is its user friendliness and transparency in the midst of creative inspiration. Does it hinder your inspiration or help it? The second criterion is its power. Does the program have the necessary features to tackle any situation, from MIDI to audio to DSP to synchronization? *Studio Vision Pro* 3.0 meets both of these criteria very well.

Michael Denten *is a producer, an engineer, and the owner of Infinite Recording Studios.* **Erik Hawkins** *is a producer and musician in Los Angeles County and the San Francisco Bay Area.*

Fostex DMT-8 Digital Multitracker

By Geary Yelton

Affordable multitrack, hard-disk recording for the home studio.

Fostex earned much of its early reputation with its cassette-based Multitrackers, which combined a multitrack recorder with a simple mixer. The DMT-8 Digital Multitracker is Fostex's first budget-minded hard-disk recorder and is intended to bring the portable, multitrack home studio into the digital age. At about 16.5 pounds, it's not as lightweight as most cassette Multitrackers, but it still tucks neatly under one arm.

The DMT-8 provides eight tracks of 44.1 kHz, 16-bit, random-access audio, along with an 8 × 4 × 2 mixer and an internal 540 MB hard disk. The system is designed for MIDI studios, offering MIDI Machine Control of transport functions and synchronization via MIDI Time Code or MIDI Clock and Song Position Pointer. Alas, there's no MIDI Thru jack, which is often a bother. To paraphrase the old axiom, the availability of a particular port is inversely proportional to its need.

CONSTRUCTION

The construction of the DMT-8 isn't really shoddy, but it isn't precise military engineering, either. Its exterior is computer-colored plastic, though it's not as tough as a computer's hide. The only metal parts showing are the RCA jacks on the back panel. Most of the controls feel a little flimsy, but they're at least as good as those on cassette-based portable studios.

Occasionally, the review unit vibrated audibly, at times even making the table resonate in sympathy. Resting my palm on the palm rest just made it vibrate more loudly. Most of the time, though, the DMT-8 was as unobtrusive as the purr of a typical hard disk. The DMT-8's power supply is internal, eliminating the need for a wall wart.

INPUTS AND OUTPUTS

The DMT-8's various connections are divided between the front, top (main control surface), and rear panels. All eight audio inputs are on unbalanced, ¼-inch phone jacks, located on the front of the unit; there are no low-impedance XLR or balanced TRS inputs. The only other front-panel jack is the ¼-inch, TRS headphone output.

The first four channels have trim sliders with 6 dB gain to accommodate microphone levels. Nevertheless, the absence of a balanced input means you may have to use an adapter with a transformer if you want to record with a low-Z microphone and run normal-length mic cables. This design is common in low-cost multitrack cassette decks, but I was disappointed to find it in a digital machine at this price.

The good news is that the first four channels also offer ¼-inch TRS insert points, located on the top panel. This lets you patch to an outboard signal processor, such as a reverb, dynamics processor, or EQ.

Four rear-panel, RCA inputs bypass the mixer section completely. These inputs allow you to route signals from an external mixer or another recording device directly to the recorder. Also on the rear panel are a ¼-inch footswitch jack that permits hands-free punch-in and punch-out and eight direct outputs for routing the eight tracks to an external mixer or recorder. The direct outs and all other DMT-8 audio outputs except the ¼-inch TRS headphone output are on RCA connectors.

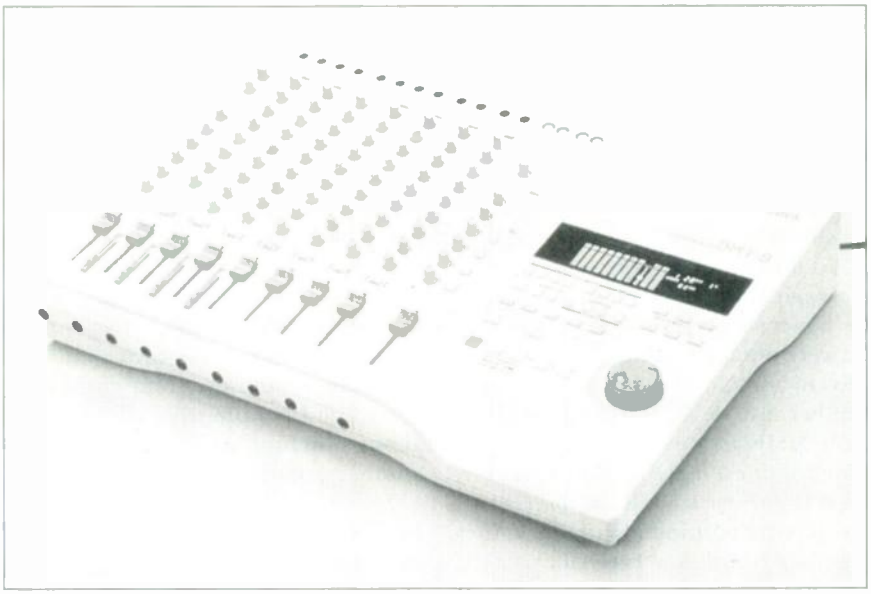
Easily accessible on top are the left and right monitor outs, a pair of RCA inputs for connecting to an external mixer, and a pair of outputs for mixing down to an external recorder.

S/PDIF digital I/O is provided on optical connectors and can be used for 2-track mastering or for backup to an audio DAT. Optical cables are not included, and I had to call several music and audio stores before I found a pair. The S/PDIF input is used only for restoring archived tracks and not for real-time recording; you must record via the analog inputs.

MIXER FEATURES

Each input channel of the DMT-8's analog mixer has nine knobs, two switches, and a nicely damped volume slider. A switch selects between an incoming audio signal and a recorded track. This switch sees a lot of action when you're continually recording and playing back. Another switch and a pan pot direct the input to one or two of four channels. Each channel has two auxiliary sends and separate gain and pan pots for the submix send.

There are two bands of semiparametric equalization. The low EQ can be swept from 60 Hz to 1 kHz and the high band from 1 kHz to 16 kHz, with 15 dB boost or cut. However, you cannot adjust the bandwidth (Q). Two



Fostex's DMT-8 Digital Multitracker brings the company's line of 8-track recorder/mixers into the age of hard-disk recording. The unit offers up to 12.5 minutes of CD-quality recording, but it doesn't support SCSI or removable media.

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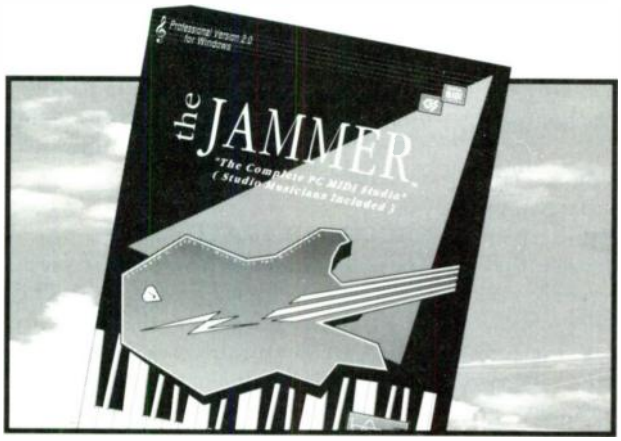

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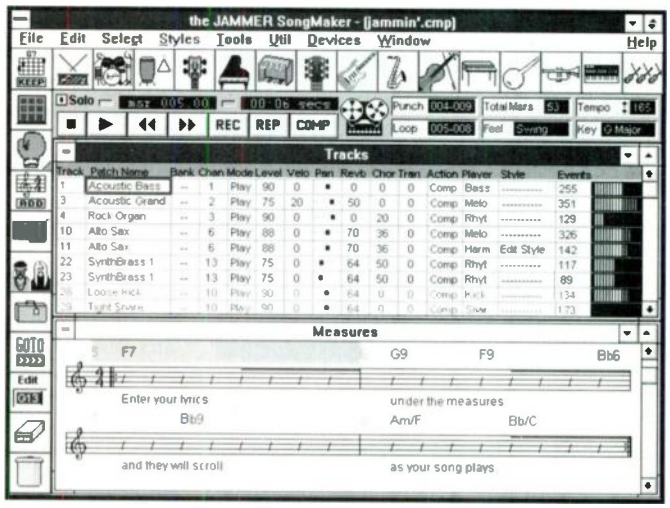

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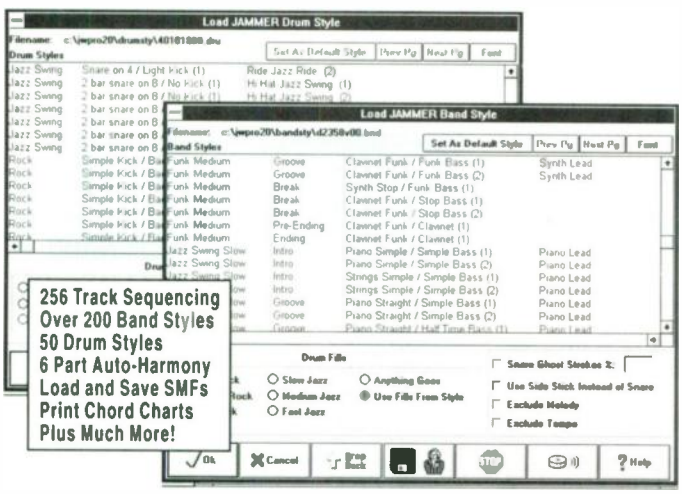

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bands of EQ don't seem like a lot, even if they are semiparametric, but I don't use a lot of EQ during mixdown, so I found two bands adequate. Fortunately, the insert points on channels 1 through 4 let you add outboard EQ during tracking.

Each channel has a Submix section consisting of a gain pot and a pan pot. When the Input Select button is set to Input, the eight audio inputs go to the main channel fader and the disk tracks are on the Submix pots. If you switch the Select button to Track, the functions are swapped so that the recorded tracks are on the channel faders and the audio inputs are controlled from the Submix section. This makes it possible to mix eight live inputs and eight recorded audio tracks.

Signals going to the Submix section do not have EQ. However, Fostex's aux-send design provides an interesting alternative. On each channel strip, when either of the two aux-send knobs is rotated to the left, the Submix signal goes to the appropriate aux bus; when the aux-send pot is set to the right, the signal at the channel fader (with EQ) is routed to the aux bus. Thus, you can send any eight of the sixteen sources to the aux sends, which allows you to apply outboard signal processing to any of them.

The mixer's output section contains monitor-output and headphone level controls, four subgroup sends, and the L/R master-level slider. The master slider controls the level to both the ¼-inch main outputs and the ¼-inch, stereo headphone jack. It also changes the level of the monitor out. This design does not provide a lot of monitoring flexibility, but presumably it keeps the price down.

You also get two stereo auxiliary returns. One return can be routed to Group 1/2 or the main L/R bus, and the other can go to Group 3/4 or the L/R bus.

Because the mixer is analog, mixdown is in the analog domain even when mastering to the S/PDIF outputs. That's okay as long as the A-to-D conversion is better than that of your DAT machine; otherwise, you might be better off using the analog outputs.

In addition, when you bounce tracks, the source tracks have to be converted from digital to analog going to the mixer and then reconverted to digital when recording back to the destination track on disk. Fortunately, the DMT-8's converters do a reasonably clean job. But even if the conversion and reconversion scheme isn't the best you've heard, you'll still experience less signal degradation than you would when bouncing tracks on a multitrack cassette deck.

RECORDER FEATURES

The controls and displays of the recorder section are logically organized. The 5.5 × 1.5-inch fluorescent display shows the eight channel/track levels, the stereo out levels, the time readouts, and any messages necessary for interacting with the DMT-8. The level meters are 16-segment displays that conveniently hold the peak level for a second.

Dominating the rows of buttons is the jog/shuttle dial, which is a concentric, rotary knob used to scrub and cue audio tracks and change numerical values. The transport buttons are arranged exactly like those on a tape recorder.

Up to four channels can be recorded simultaneously. Unless you record large sections or live performances where you want to keep multiple vocal parts and instruments (such as drums) separated, this shouldn't be a problem.

Fortunately, it's possible to mix eight inputs onto four tracks. Nonetheless, in most situations, an external mixer is a necessity; even if you don't need low-Z mic inputs, you may want to record more than four stereo instruments at the same time.

DMT-8 Specifications

Dimensions	22.4 × 4.75 × 17 inches
Weight	16.5 lbs.
Number of Tracks	8
Number of Inputs at Mixdown	22
Number of Groups	4
Internal Drive Capacity	540 MB
Recording Time	12.5 minutes/8 tracks
Sampling Resolution	16-bit linear
Sampling Frequency	44.1 kHz
Frequency Response (mixer)	20 Hz-20 kHz (±1 dB)
S/N Ratio (mixer)	-81.5 dB
Operating Level (mixer)	-10 dBV

MISSING IN ACTION

Unfortunately, some of the features Fostex omitted are as noticeable as the features it included. Especially painful is the lack of a SCSI port, and Fostex has no plans to make one available as an option. An onboard removable disk drive would have helped ameliorate the lack of SCSI, but this option is not available, either.

Once you've recorded about 12.5 minutes of uncompressed, 8-track audio, the hard disk is filled to capacity. If you have no reason to save original multitrack recordings once they're mixed down and you never need more than 50 minutes of stereo recording time (25 minutes of 4-track, 12.5 minutes of 8-track) at any given moment, this will pose no problem. For most potential buyers, however, a simple SCSI interface would make a tremendous difference.

As it is, your only option is to offload your recordings to an audio DAT recorder using the optical S/PDIF connectors. Backing up to DAT takes four times as long as the length of the recording, so it takes 20 minutes to back up a 5-minute song. This is because tracks are backed up and restored two at a time. An idiot light lets you know your backup was successful.

Restoring data from DAT replaces the contents of your entire hard disk, so it's impossible to back up separately songs that are simultaneously stored on the DMT-8. For many recordists, this design will simply be unacceptable.

MMC AND SYNC

Fostex has featured computer-based control of its 8-track recorders at least since their R-8 open-reel deck. The standardization of MIDI Machine Control (MMC) establishes a common feature set that can be accessed with commands from a MIDI sequencer. This means you can play, stop, record, punch in and out, and locate by simply sending a command from a MIDI sequencer that supports MMC. This makes it possible to control much of your recording environment from your computer or workstation.

I'm especially disappointed the Fostex DMT-8 can't be synchronized to an external source. Though you can control an external sequencer by sending MIDI Time Code or MIDI Clock and Song Position Pointer, the DMT-8 can't be slaved to the sequencer or to time

code streaming from a tape deck.

MTC can be generated by the DMT-8 at all the usual frame rates, including 30 fps drop-frame. MTC can be offset from absolute time by up to six hours. The counter can display absolute time (minutes, seconds, and frames from the beginning), MTC, or bars, beats, and MIDI Clocks.

Unless your sequence never changes meter or tempo, you have to manually create a tempo map in the DMT-8, re-creating any changes in meter and tempo. This product screams out for a tap-tempo feature, but there is none.

If your song keeps a steady beat, you just select a time signature and a tempo for the first measure or record at the default of 120 beats per minute in 4/4 time. A different tempo may be inserted on any beat, with a maximum of 32 tempo changes in a song. That's not enough to tap tempo throughout a song, anyway. Meter changes are limited to sixteen per song. A built-in metronome keeps your ear in sync while you're recording.

LOCATE POINTS

Up to nine location points can be memorized for instantaneous retrieval. Six locations are stored in memory using the Clipboard In and Out, Punch In and Out, and Auto-Return Start and End buttons. The Locate button can also find the beginning of the first recording (ABS 0), the end of the last recording (ABS END), and one point defined by the Locate button itself.

However, when you use the Locate button to find any other points, you lose its stored locate point, so it really isn't very useful. If you record two or three songs on the hard disk, there aren't enough locate points to store the beginning and end of each song unless you define them as Clipboard, Punch, or Auto Return locations. Another half-dozen locations would be welcome.

EDITING OPERATIONS

Part of any track can be cut from, copied from, or pasted to any other part of the same track. The start and end points can be displayed in any of the three time bases (absolute time, MTC, or MIDI Clock). Unfortunately, you can't copy material from one track to another, which is a drag. When you copy and paste multiple tracks, data copied from each track is pasted to the same track.

Copied data remains on the clipboard until it's replaced, so you can paste the same material as many times as needed. The clipboard is actually recorded onto the hard disk, so you must have enough free disk space for its contents.

After copying something, you can listen to the contents of the clipboard by pressing the Play button while holding down the Stop button. You use the Auto Punch-In button to define where you want to paste. Again, there must be enough free disk space.

Punches via footswitch are seamless and simple, unlike punching with an analog deck and mechanical transport. A Rehearsal mode lets you practice your punch without actually recording the new data. The real punch-in/out action happens in Take mode. In addition, the DMT-8 features Auto Punch, which allows the machine to start playback from a locate point and punch in and out at selectable locate points. If you wish, the unit will allow an adjustable preroll time (from 0 to 10 seconds) before punching in.

Other edit operations include Cut, which removes data from a track and places it on the clipboard, and Erase, which creates silence between the auto punch-in and punch-out points. Any cut, erase, or paste operation can be canceled or retrieved with dedicated Undo and Redo buttons (hooray!), but only if the transport is stopped. When you record anything new or turn the power off, you can no longer undo your last edit.

Because there's an undo function, Fostex says the DMT-8 is capable of "nondestructive" editing, but this is not true in the usual sense of the term. Nondestructive editing generally means that the original data is always intact and all edits manipulate pointers to the data, not the data itself. In the DMT-8, all edits alter the original data; only the most recent cut, erase, or auto-punch operation can be undone.

FINAL THOUGHTS

The DMT-8 seems like a good gadget for the home recordist who's ready to make the jump into digital multitrack recording. Its operation is straightforward and smooth, and the sound quality is quite good.

If you work in a MIDI sequencer environment, the DMT-8's synchronization options should be adequate even though the tape recorder can't lock to an external clock source. Other problems include cost-cutting workmanship and the absence of low-impedance, XLR mic inputs.

You're definitely going to need a DAT recorder, not just for recording your mixes, but for archiving 8-track recordings should you ever want to record more than 12.5 minutes of music during the DMT-8's lifetime.

Fostex's representative claims there are expansion options in the DMT-8's future, but specifics were not released. That's not a good sign. If Fostex does nothing else, it should provide a SCSI option as soon as possible, because the competition is heating up. For example, at the 1996 Winter NAMM show, Roland debuted the VS-880, an impressive 8-track hard-disk recorder with a built-in Iomega removable drive, SCSI, and automated digital mixer. However, at same show, Fostex announced it was slashing about $800 off the DMT-8's list price, which should help its sales considerably.

Obviously, the DMT-8 was intended for the hobbyist or semiprofessional, not for the professional project studio. It offers good sound quality, and it's less expensive than an Alesis ADAT XT or TASCAM DA-88. Someday the DMT-8 might grow up to be just what the common musician needs. But if you're looking for a digital multitrack recorder that's ready to grow when you are, not to mention one that offers pro features, you should probably look elsewhere.

Some people live in the past. **Geary Yelton** *lives far in the future.*

Product Summary

PRODUCT:
DMT-8 Digital Multitracker
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CIRCLE #438 ON READER SERVICE CARD

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

Cakewalk Pro Audio 4.01 (Win)

By Dennis Miller

At last, digital audio sequencing arrives for Windows.

Windows users are finally learning what Macintosh owners have known for some time: MIDI and digital audio belong together. Integrated programs that combine the two are finally showing up on the PC, and they are tremendous time savers for the desktop musician.

Cakewalk Pro Audio 4.01, from Cakewalk Music Software (formerly Twelve Tone Systems), is the first professional, integrated program that supports generic Windows sound cards. With its powerful sequencer engine and solid multitrack audio features, the program supplies most of the basic tools you need to create a wide range of music projects.

Even more powerful audio features will be added sometime this summer, including a DSP plug-in architecture and the ability to exchange digital audio with such powerful audio editors as Sonic Foundry's *Sound Forge*. The plug-in architecture will be an open format, so third-party developers can freely support it without having to license the technology as the Mac-based Digidesign Development Partners do. But there's no need to wait; the current version 4.01 is already brimming with many new and exciting features for PC users.

WE HAVE CHOICES

Cakewalk Pro Audio 4.01 comes in two flavors. The floppy-disk version sells for $399 and includes the main program, a virtual-keyboard application you can "play" with any Windows MIDI program, and a sound-card setup program that scans your audio hardware and automatically determines optimal settings.

The Deluxe CD-ROM edition adds more than 600 MB of multimedia files (such as audio and MIDI clips), PowerJam Systems' *CanvasMan* patch editor for the Roland Sound Canvas, numerous DNA groove templates, and sixteen animated tutorials. It sells for $479, which is a great bargain.

Upgrades from *Cakewalk Pro for Windows* 3.0 are $99 for the floppy-disk version and $129 for the Deluxe CD-ROM. A native Windows 95 version should also be available by the time you read this, though the current version works just fine on that platform.

EM has reviewed *Cakewalk* several times in the past, most recently in the September 1995 issue (see the sidebar "**EM** Covers Cakewalk"), so I will focus mainly on the new functions. Before jumping into the features, however, a little background about using audio on the PC is required.

THE RIGHT STUFF

All programs that deal with audio on the Windows platform suffer from the same curse: developers simply have no way of knowing what types and combinations of hardware their users have.

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The new features move *Cakewalk* ever closer to a full-blown, integrated production environment.

Innumerable variations in configuration files, both at the system level and under Windows, also make life miserable for manufacturers. An out-of-date video driver can really ruin your day.

Because of these variables, it's difficult to predict the performance of an audio-recording program. Fortunately, some basic guidelines can help you set up your system for audio recording. If you want more than two tracks of audio in a project, you'll need at least an 80486/66 processor with 8 MB of RAM. A fast Pentium and hard drive and at least 16 MB of RAM could net you as many as twelve or more simultaneous audio tracks. (Unless you're using Digidesign's Session 8 hardware, all audio is mixed down to your sound card's stereo output.) The sidebar "Your Mileage May Vary" describes the results I got while doing this review.

If possible, you should create a separate partition on your drive for the audio files. It's essential to have a drive that does *not* perform thermal recalibration (T-CAL). Most so-called "A/V" drives meet these requirements.

When ascertaining your storage requirements, you should also consider how much recording time you're going to need. Although the standard formula of just more than 10 MB per stereo minute of audio applies to recordings you make in *Cakewalk Pro Audio*, you must double that number

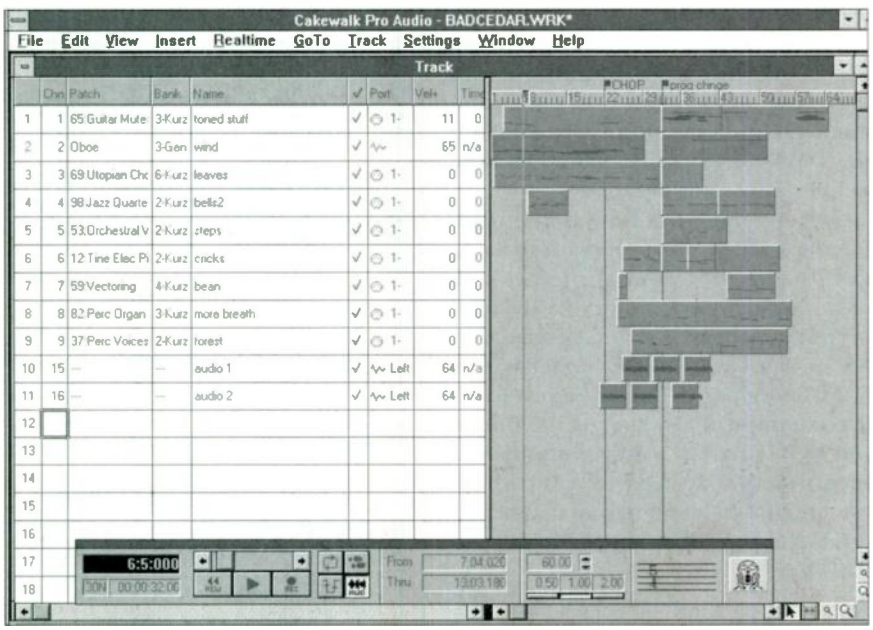

FIG. 1: Cakewalk's main screen now includes a Clip View in addition to the Track Setup area.

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when importing preexisting files. That's because *Cakewalk Pro Audio* makes duplicates of those files for its own use. (Of course, you can always delete the duplicates when your projects are finished.) Beyond these specifications, any speedy Windows PC should be suitable for working with the program.

GET READY

Cakewalk Pro Audio launches to a familiar-looking Track View screen that shows track names and parameters on the left and a new Measure/Clip overview on the right (see **Fig. 1**). The arrangement and appearance of the screen is completely configurable; not only can the two panes be resized, but you have total control over the size and position of each individual column. The track parameters (including Channel, Patch, Key Offset, Velocity Offset, and Volume) can be changed in real time, and a new option lets you pan the audio eight positions to either side of center.

If you've worked with *Cakewalk* before, you'll immediately notice that the traditional Track/Measure grid is gone from the main view. In its place are small, color-coded Clips that represent the audio and MIDI data in each track. (I'll discuss Clips in more detail later.) You can display vertical grid lines to mark measure boundaries if you wish, but I felt most comfortable with the uncluttered look that the default screen layout presents.

It's easy to navigate to any point in the program. Using the GoTo feature, you can move instantly to any measure, beat, or tick, and the Search command lets you find an event that meets any criteria (e.g., the next B4 with Velocity between 20 and 40).

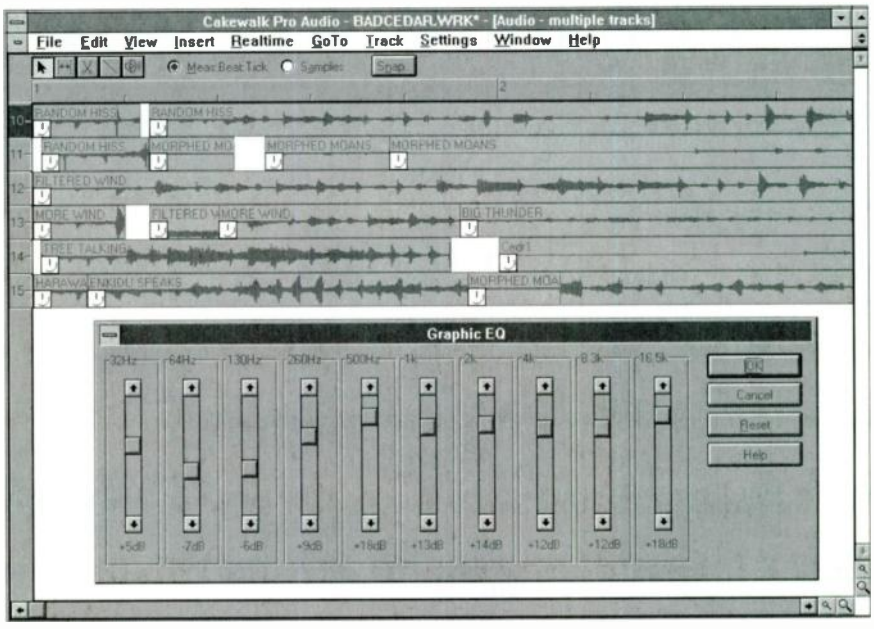

FIG. 2: Multiple tracks of audio can be viewed and edited within a single screen.

On the other hand, it's not always so easy to move from some work areas to others. For example, you can't jump instantly from the Event List to the Audio screen without going to the View menu and selecting the Audio View. Although you can easily create a macro that performs the necessary keystrokes, it would be even better if the right mouse button brought up a selection of other work areas here the way it does in the main view.

RECORDING

Cakewalk Pro Audio has numerous recording options, including loop recording and the ability to record MIDI and audio simultaneously. Record modes include Sound-on-Sound, Replace, and Auto-Punch for both MIDI and audio. The program offers meters for checking audio levels before recording, but unfortunately, they don't function in real time during playback. (They do operate during real-time recording.)

If your sound card is "full duplex," you can record and play back audio simultaneously. (Surprisingly few cards have this capability, although cards from Digital Audio Labs and Turtle Beach, among others, should work fine.) Even without this feature, you can record audio and play MIDI at the same time.

If you're a Session 8 user, you can record multiple audio tracks at the same time. Support will soon be added for other multitrack hard-disk recording hardware, including Digidesign's Audiomedia III, Yamaha's CBX-D5/D3, Soundscape's SSHDR1, Roland's VS-880, and DAL's V8. All users can record multichannel MIDI data and map each channel to a different track using the Channel Table function.

The program handles recorded audio files very efficiently. You don't have to worry about file names or where your files are stored; the program takes care of that automatically. You can use segments from any number of audio files on the same track, and if you need to reuse the same track in another

EM COVERS CAKEWALK

Cakewalk Music Software started life as Twelve Tone Systems. The company's *Cakewalk* sequencer family has long been a popular choice on the PC platform, and **EM** has reported on its progress in numerous features and reviews.

FEATURES

"Windows Shootout" (*Cakewalk for Windows* 1.0)..... November 1992
"Musical Windows" (*Cakewalk Pro for Windows* 3.01)..... September 1995

REVIEWS

Cakewalk Professional 3.0 (DOS)..... December 1990
Cakewalk Pro for Windows 2.0..... March 1994
Cakewalk Home Studio 1.0 (Win)..... August 1994
Cakewalk Pro for Windows 3.0..... May 1995

sequence, you just copy the track to the Clipboard, open the new sequence, and paste it in. You can even "bundle" all the MIDI and audio data used by a sequence and back it up or transfer it to another computer.

An elaborate step-record function is available if you don't want to record MIDI in real time. Step sizes range from a whole note down to a single tick. (The sequencer resolution is adjustable up to 480 ppqn.) Step durations, which are set independently, cover the same range. An Auto-Advance feature keeps things moving forward as you record, and a Pattern option lets you build a repeating sequence of notes and rests up to 64 steps long. However, each note or rest in a Pattern must be of the same duration.

WORKING WITH CLIPS

Cakewalk has always offered a full crop of MIDI editing features. Version 4.01 includes most of the functions you would expect from a high-end sequencer, including Velocity and time scaling, quantization (normal and groove), transposition, and time offset.

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The results are as good as any I've achieved with dedicated wave editors.

Users of *Cakewalk* 3.0 and earlier will notice several new MIDI features in this major upgrade. Nearly all the new editing features operate while a sequence is playing. However, the most important change is an entirely new way to structure your sequences. Previous versions of the program were heavily oriented toward measure-based segments, but version 4.01 lets you work with Clips, which can be of any length. Clips contain audio or MIDI data and can be cut, copied, pasted, and otherwise edited like any other range of data.

You can automatically split long stretches of music into Clips of one or more measures using one of several different Split options. You can also combine contiguous or noncontiguous

Clips into a single Clip, making copy and move operations much easier. I recorded a long MIDI improvisation into *Cakewalk Pro Audio* and then used the Split Repeatedly When Silent option to break it into several phrases. This made it simple to rearrange the music and make Velocity and quantization adjustments to specific sections.

You can even display a Clip's contents, which provides miniature representations of the data. And you can also select a Snap To value for aligning Clips to a particular note duration. There's no easy way to snap a Clip to a SMPTE time, however.

Although Clips are a tremendous improvement, I would like to see an Auto-Create feature that takes a highlighted range from the Piano Roll screen and turns it into a Clip. Equally useful would be the ability to automatically break a long track into Clips that are smaller than one measure in length. This can be done manually, but an automatic feature would be helpful. A function that lets you boot the program with a visible measure-by-measure grid would be handy for those who are more comfortable with a measure view.

MORE MIDI

If you discover something missing in the program, you'll most likely find a Cakewalk Application Language (CAL) function that provides what you need. CAL, which did not ship with the original 4.0 release but is now part of the package, is an extension that allows users to create their own functions or add functions created by other users. Using the included functions as models, it was fairly easy to for me build little applications that created complex harmonies from single notes and randomly altered preexisting controller data. I also found numerous CAL functions in CompuServe's MIDI forum, which add a huge range of new features.

Additional new editing features are found within each of the main work areas. New in the Piano Roll view is the ability to select any arbitrary group of notes within a range, not simply all pitches within a given time period. For example, if you want to select the notes between C2 and C4 in the middle of a measure, just click and drag over that area with the mouse.

This same capability is available using the Event Filter, which lets you set detailed conditions for determining range selections. Although I had always found this function to be a bit intimidating, I quickly got the hang of it this time around. It's excellent for such applications as changing all notes in a track to fit a certain key or mapping the Velocity values of one range of notes to another range.

AUDIO EDITING

Many common audio-editing features are provided, including the ability to normalize and reverse an audio segment. A handy Scrub feature lets you hear one or more tracks of audio as you pass the mouse over them. You can apply parametric and graphic EQ (see **Fig. 2**) and create fades and crossfades using the default curves or custom, multisegment curves. I particularly like the real-time fade-in and fade-out options, even though real-time fades must be linear.

All these processes are nondestructive and work quickly, and the results are as good as any I have achieved with dedicated audio editors. Nevertheless, it still makes sense to keep a dedicated waveform editor on hand for more elaborate processing effects. Using such an editor with *Cakewalk Pro Audio* will become especially simple with the promised upgrade that will allow the two programs to exchange digital audio data.

PLAYBACK

Audio control has been well integrated into the program's playback functions. Not only can you alter audio volume

YOUR MILEAGE MAY VARY

One of the key issues in using digital audio on a desktop PC is the number of simultaneous tracks you can play. I've used a dedicated multitrack hard-disk recorder for years, and I was curious to know how well *Cakewalk Pro Audio* compares with the performance I'm used to getting from a dedicated system.

To find out, I created two test files: one with long stretches of continuous, stereo tracks (file A) and the other consisting of numerous small, mono audio segments scattered throughout (file B). The results were really impressive. On my Pentium 133 computer with 24 MB RAM, using an MTU MicroSound digital audio card and a fast SCSI II Conner drive, I managed to play sixteen simultaneous audio tracks with file A and fifteen with file B. By comparison, my dedicated Spectral Digital Studio, which admittedly uses older drives, provides ten or twelve tracks, and that's with a 2-drive system.

Because the MicroSound is not a traditional sound card—it's part of a dedicated hard-disk recording system—I switched to a Creative Labs Sound Blaster AWE32 and ran the tests again. I got the same performance with the Blaster as I did with the MTU card.

My next move was to hook up Glyph's new Improv system, which is a rack-mountable, custom housing containing a 1 GB Iomega Jaz removable drive. Right out of the box, I was able to play seven tracks with both test files, configured as three stereo pairs plus a mono track. After turning off Smartdrive and changing some of the buffer settings in *Cakewalk Pro Audio,* I managed to squeeze an eighth track out of file B, but I couldn't do the same with file A.

To run the tests on a more traditional system, I moved to a '486/66 with 8 MB of RAM, a modest IDE hard drive, and a Turtle Beach MultiSound Classic sound card. I got six stable tracks with both files and managed to get a seventh track to play on one occasion with file B.

The moral of the story: audio performance varies greatly on different systems because many hardware and software variables affect performance. If you're willing to tweak a bit and follow the recommendations of the manufacturer, you can probably improve the results on your system. You may end up with a dual-boot configuration, which lets you boot the computer with the optimal setup for the task at hand.

If you're just starting out, be sure to get the fastest computer CPU, quickest hard drive, and most RAM you can afford. In any case, it's certain your mileage will vary!

and pan settings during playback from the Track View screen, but you can control them with MIDI Control Changes 7 and 10 for perfect sync with MIDI events. (MIDI data is always synchronized to the clock rate of your audio hardware, so you can expect tight sync throughout a sequence of any length.)

For even finer control, individual fader knobs appear with each Clip in the Audio View, letting you set its level independently. Multichannel, multitrack mixdowns of MIDI and audio data can be automated by recording the movements of faders in the Fader View, and faders from two tracks can be ganged and inverted for a quick-and-dirty linear crossfade between tracks. You can save a setup of up to 32 faders for use in different sequences or take a "snapshot" of a particular configuration and reuse it anywhere in a sequence.

Auto-shuttle and auto-rewind are both available, but track looping is gone from this version, which is too bad; it was a great convenience. However, it's a trivial matter to copy and paste a Clip repeatedly. For MIDI data, this will increase the file size slightly, but *Cakewalk* uses pointers to the audio

Product Summary

PRODUCT:
Cakewalk Pro Audio 4.01

PRICE:
$399
Deluxe CD-ROM: $479

SYSTEM REQUIREMENTS:
80486/33 or better PC with 8 MB RAM (80486/66 with 16 MB RAM recommended); Windows 3.1 or Windows 95; MIDI interface; sound card

MANUFACTURER:
Cakewalk Music Software
tel. (800) 234-1171
or (617) 926-2480
fax (617) 924-6657
e-mail 76023.1402@compuserve.com
CompuServe: go cakewalk (section 3)

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FEATURES	● ● ● ●
EASE OF USE	● ● ● ●
DOCUMENTATION	● ● ● ●
VALUE	● ● ● ●

data to determine what and when it should play back, so copying an audio Clip won't affect the file size.

ALL TOGETHER NOW

Several sync options have been added, including the ability to sync a sequence that contains digital audio to an external SMPTE clock source. This makes the audio timing more reliable and greatly improves the program's usefulness on audio-for-video projects. If the external clock drifts, *Cakewalk Pro Audio* shrinks or stretches the audio tracks' time base in real time to maintain sync.

Some of the new editing features are designed to ease the task of synching audio with MIDI. For example, you can quantize a MIDI track to an audio track by scanning for peaks in the audio data and shifting the MIDI data to coincide with the peaks. If you have an audio kick-drum part, you can highlight the track and select the Extract Timing option to create a groove map that is stored in the Windows clipboard. Next, select the MIDI tracks onto which you want the groove mapped, and the MIDI data will assume the rhythmic and Velocity characteristics of the audio.

Quantizing audio to MIDI is a bit trickier. First, split all the audio segments you want to quantize into individual Clips either manually or using the Remove Silence function. Then, extract a groove from the MIDI data and apply it to the audio track containing the Clips. After some experimentation with the Granularity setting, which determines the sensitivity of the Remove Silence algorithm to volume levels, I got an audio track containing piano chords to line up perfectly with a MIDI bass line. I was even able to take a funky drum track and quantize it to straight eighths! Fortunately, *Cakewalk*'s more than 100 levels of undo let me revert to the original.

OTHER COOL STUFF

There are many other new features in this upgrade that move *Cakewalk* ever closer to a full-blown, integrated production environment. In the notation area, new expression and dynamic markings make *Cakewalk* far more useful for creating high-quality printed output. The program finally supports enharmonic spellings and accidental symbols, and it provides numerous new expression marks and other symbols.

The program's library of hundreds of editable chord grids, along with the ability to create your own chord grids, should make every guitar player happy (see **Fig. 3**). I found a bug, though: if a track is split into two staves (treble and bass), you can't add dynamic marks to it unless it contains lyrics. (According to the manufacturer, this will be fixed in the next version.) The problem is annoying, but the workaround is simple: just convert the parts to a single staff, add the marks, and then reconvert it to two staves.

Cakewalk Pro Audio also provides more than 140 instrument definitions you can use when working with specific MIDI hardware. These definitions include not only patch names but percussion-note names, bank selections, and correct controller references for instruments that use unique assignments.

Patch setups can be automatically transmitted before a sequence begins to play, and SysEx data can be retrieved and stored in one of 256 bank locations. Banks can be transmitted at any

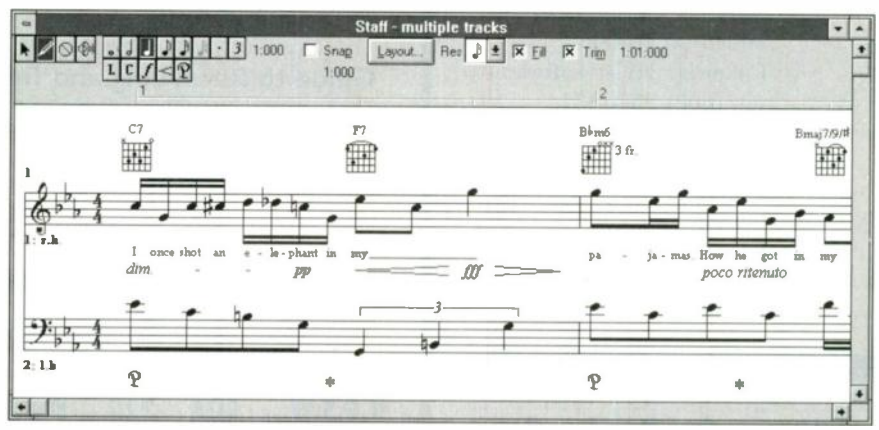

FIG. 3: New notation options make *Cakewalk* useful for creating lead sheets and other types of printed output.

time during playback, but don't attempt this with a large bank; it will clog the datastream and upset the timing of other data.

LIFE IS A CAKEWALK

Even though the Windows-sequencer world is getting more crowded by the day, this new version of *Cakewalk Pro Audio* will do much to keep it at the top, at least for the moment. The program offers a well-balanced feature set and can serve users at all levels.

Is *Cakewalk Pro Audio* the most powerful sequencer anywhere? In a word, no. It has neither the real-time processing capabilities of Steinberg's *Cubase Audio* nor the advanced audio

▼

It's easy to navigate to any point in the program.

editing and notation features found in some Macintosh digital audio sequencers. In addition, *Cakewalk* may encounter stiffer competition when Steinberg adds standard sound-card support to *Cubase Audio* and EMAGIC ships the Windows version of its powerful *Logic Audio* 2.5. However, these products will probably be more expensive than *Cakewalk Pro Audio* and, although these products are promised for the near future, they are not shipping as of press time.

Future competition notwithstanding, *Cakewalk Pro Audio* is the first fully professional digital audio sequencer that can use any Windows-compliant sound card, and it's available now. The program is a very good choice for professionals who work on deadline and demand top performance. With an excellent manual, thorough online help, and the program's flawless operation—I did not experience a single crash in literally hundreds of hours of usage—*Cakewalk Pro Audio* is a pleasure to work with. Long-time users may find that some of the new features take some getting used to, but they will soon discover that MIDI and digital audio really do belong together.

Dennis Miller *is a composer living in a suburb of Boston.*

Korg i4S

By Julian Colbeck

An interactive synth for lounge rockers.

Korg has been a leading manufacturer of pro synths for decades, but the company is still a relative newcomer to the world of home keyboards. The company first entered the fray in 1993 with the 61-key i3 and its 76-key partner, the i2. In 1994, Korg expanded the i series, introducing the i4S Interactive Music Workstation. Although it's not a brand-new instrument, the success of the i4S to date impelled **EM** to take a closer look.

You don't need to be a keyboard player to sound impressive on the i4S. For that matter, you don't even need to be a musician. With its built-in speaker system and Styles (automatic backup parts), the i4S has all the trimmings of a home keyboard.

A home keyboard it may be, but the i4S is about as far from the world of Costco Casios as you can get. This home keyboard has the mindset of a serious synthesizer. First of all, the i4S has a fully programmable, professional synthesis engine along the lines of Korg's X-series synthesizers. Second, the aforementioned Styles are punchy, rock-guitar oriented, and superbly programmed. And far from imposing straitjacket arrangements and instrumentation, as is so often the case with home keyboards, the i4S positively encourages you to customize sounds and parts.

The package includes several supplemental goodies, including a custom video manual, a songbook, a music rack, an external footswitch controller, and a set of additional Style disks. Until recently, Mark of the Unicorn's *Unisyn* and *FreeStyle* software were also bundled with the i4S, but the MOTU/Korg agreement has expired. Even without the software, however, the i4S package appears to be a good deal. Let's take a closer look.

FIRST GLANCE

Operationally, the i4S has the brains of an i3, but with a slightly trimmed front panel and the addition of speakers. However, with its freshly programmed Styles and the previously mentioned sackful of "value added" products, the i4S manages to feel new and exciting. It also feels quite weighty (40.8 pounds), even though it has a standard 61-note, unweighted keyboard. The unit's weight is due, at least in part, to the built-in sound system, which includes two 5-inch midrange speakers, two 1.5-inch high-frequency speakers, and a 15W/side stereo amplifier.

Korg packed a lot of features into the front panel. Fortunately, the i4S presents this wealth of opportunity clearly and without resorting to the impenetrable jargon that is the scourge of many home keyboards. The front panel is busy but not cluttered. Dotted around a modest LCD display are soft buttons, a data wheel, and Increment/Decrement buttons. To the right of the Inc/Dec buttons are two rows of eight Arrangement buttons, which activate the 64 available auto-accompaniment parts. Beneath these lie two rows of eight Program buttons for accessing groups of 64 sounds. Four mode buttons call up GM Banks A and B, ROM Bank C, and RAM Bank D.

To the LCD's immediate left are the basic mode buttons with which you select your current activity. These buttons include Arrangement Play, Backing Sequence (explained shortly), Song Play, Program, Disk, and Global. Strategically placed under the screen are all the main performance parameters relating to the accompaniment parts and Styles, such as Start/Stop, Intro/Ending, Fills, and Variations. Another group of controls affect the instrument's chord scanning, i.e., how the i4S examines the notes you play and converts them into accompanying patterns.

To the left of the keyboard is a dual-function pitch/mod lever, beneath which lurks a disk drive and the headphone jack. The pitch/mod lever is a blissfully responsive contraption that lets you slur and slide away with great precision and delicacy. The unweighted keyboard responds to Velocity and Channel Pressure.

STYLES AND ARRANGEMENTS

Interaction is the name of the game in the i4S. As soon as you switch it on, you can't resist flipping through the auto-accompaniment patterns to see what Korg's Style programmers have been up to recently.

"Style" is normally a blanket term for a home keyboard's complete accompaniment track of chords, bass line, and drums, controlled by the chords

The Korg i4S Interactive Music Workstation may look like a home keyboard, but it has a powerful synthesis engine, outstanding accompaniment parts, and impressive sounds.

WHEN IS A PIANO MORE THAN A PIANO?

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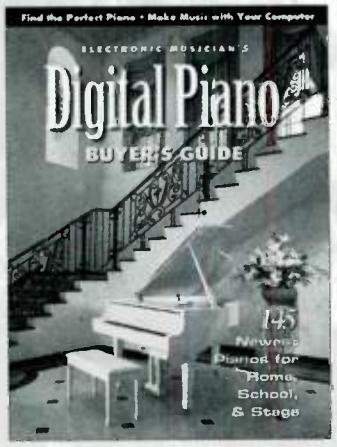

Electronic Musician's 1996 *Digital Piano Buyer's Guide* is filled with information about this year's upright, grand and portable digital pianos and acoustic MIDI pianos, including comparative charts and advice on choosing the right keyboard for your musical needs. You'll find information on:

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- Playing Along With Song Disks
- Fun Educational Software
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Electronic Musician

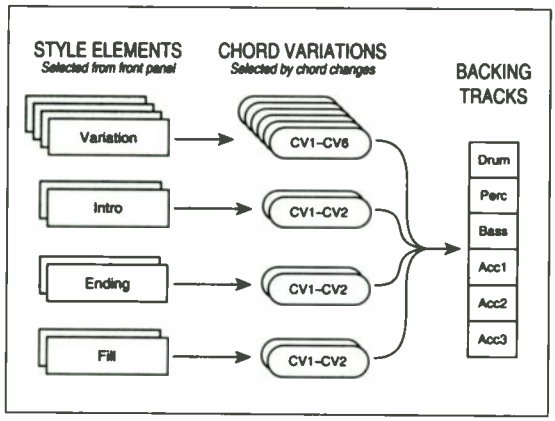

FIG. 1: A Style is a collection of musically related sequences, including four Variations, two intros, two endings, and two fills. The actual sequence data for the backing tracks resides in the Chord Variations. Each Style Variation contains six Chord Variations, and each intro, ending, and fill contains two Chord Variations. (Courtesy Korg USA.)

you play in the left hand. On the i4S, though, a Style is something more specific. There are two levels of automatic-accompaniment parameters: one is called a Style, and the other is called an Arrangement. A Style concerns the actual notes and phrases played by the i4S (see **Fig. 1**); an Arrangement represents a performance, complete with instrumentation, output assignments, effects, pan position, etc. To clarify the hierarchy, an Arrangement is the item you dial up from the keyboard. Within each Arrangement is a current Style. The i4S includes 48 Styles stored in ROM and four stored in RAM.

This separation of notes from instrumentation allows you to interpret, interact with, and customize the accompaniment parts to a level that is only touched upon in most other home keyboards. To use a fairly radical example, this division of labor lets you, say, play a hard-rock groove using the instrumentation of a big band.

Korg's audience for the i series is the twenty- to fortysomething rock player. To this end, a large number of the factory Arrangements are gutsy, guitar-based grooves with names like "Mick & Keith" (if you don't know who this alludes to, you're obviously not twenty- to fortysomething), "Prog Rock," "Riffin'," and "AOR Rock." Fortunately, Korg and various third parties offer additional Arrangements in other genres.

Each Arrangement includes four Variations, which can be recalled via dedicated panel buttons. These are not like the sort of gratuitous nonsense you often find on a home keyboard. Instead, they are genuine developments of a basic Style.

For example, consider the instrument's homage to the '70s disco era, "Mirror Ball." In this Arrangement, the standard pattern (Variation 1) includes straight drums with a sixteenth-note feel, a simple bass line, straight keyboards, a little high-strings flourish at the end of its 8-bar phrase, and a plucky, single-note guitar riff. In Variation 2, the guitar develops into a choppier, fuller part. The bass becomes more insistent and riffy. The strings part is still sparse but now interjects two or three times during the phrase. The drums are still straight but are joined by the ubiquitous, '70s-style, offbeat hand claps.

Variation 3 introduces a nice shuffle tambourine. There's also some chord movement in the keys, and the high strings play constantly, which smoothes out the groove. The bass is pumping along in octaves: down-up, down-up, down-up, down-up. Yes, you can really see those bat-winged collars and bell-bottoms. Variation 4 is also smoothed out by a steady string presence, but the other instruments are very rhythmic, with good interplay between the keys and guitar.

Each Style (remember, Styles determine the actual notes of the auto-accompaniment parts) comes with a choice of two fills, plus an intro and an ending. Making sure that every fill, intro, and ending works logically with every Variation would be impossible, and some combinations do leap out rather incongruously. In addition, some are rather long, which could be a problem if the item is harmonically at odds with the piece you are playing.

CHORD CHANGES

For a home keyboard to be satisfying to play—especially one like the i4S, which is aimed at a more musically advanced, grown-up market—it must recognize your chords instantly and interpret them in a way that makes musical sense. The i4S passes both tests with flying colors.

The i4S can scan just the lower part of the keyboard, just the upper part, or the whole keyboard in order to produce its chord-specific parts. Most of the time, you'll probably use the first mode, whereby you can finger a chord in the left hand and whiz about with lead or melody parts in the right.

The chord recognition is peerless. If you play, say, a low C and then hit the B eleven semitones above, the chord produced will be Cmaj7, with C in the bass. (The unit assumes you want a major chord if you don't play a minor third, e.g., E♭ in a C chord.) If you activate the Bass Inversion feature, play a higher C, and then hit the B one semitone below, the chord will be Cmaj7/B, which helps when creating a descending bass line. In other words, the system recognizes that the position of the bass note is important in producing a musically valid result. This Bass Inversion feature can be turned on or off independently for each Arrangement.

As for the chords themselves, how many of you have ever felt the need to groove on G7♯9/F? Or B aug maj7/D♯? Or the terrifying C♯♯9/F? The i4S will dutifully and instantly provide an accompaniment track on such chords. This is what I call a super sideman!

The drum parts are not affected by the chord changes, which is absolutely right. Meanwhile, the bass note changes on the nearest downbeat (again, as it should), but the chord parts respond instantaneously, even if you are flailing about like some lunatic. The unit responds to your playing in real time, without the auto-accompaniment parts lurching about in a drunken stupor as is often the case on home keyboards.

Of course, you can latch (hold) chords and freely alter the tempo. You can tap out a new tempo, and you can call up an automatic chord-harmony feature called Ensemble. These functions are immediately available without having to dive into anything remotely resembling an edit page. Simply press the Page+ button while you are in the Arrange mode, and a world of customization opens up.

On this and subsequent pages, you can see and change the instrument playing and adjust the volume, pan, and effects settings for every instrument that makes up your current accompaniment track. You can substitute not only an entire drum kit, but even the bass drum or snare drum within a

kit. You can choose your own bass or chord voice or obligato line. Essentially, you can completely revoice the entire track without skipping a beat. Frankly, it's inspirational.

One of the more unusual parameters in this series of edit pages is Wrap Around, which determines the pitch at which each part will drop down an octave rather than continuing to rise into the harmonic stratosphere. As the manual diplomatically points out, if all parts within an Arrangement are set to the same Wrap Around point, the resulting octave drop by the entire band would have a potentially comic effect.

Another slick feature is the ability to control damper assignment selectively for each instrument part. This is extremely handy because you might want the piano sound, but not the organ sound, to respond to the damper.

This goody bag of features may be a breeze to figure out, but there are two even simpler quasi-edit pages. The Mute and Mixer pages let you mute and balance parts within an Arrangement in real time, on the fly. Interacting with this virtual band is great fun, and unless you're a complete knucklehead, you'll quickly come up with song ideas.

BACKING SEQUENCES

On most home keyboards, the average user needs a two-week crash course in sequencer operation. But not with the i4S. All you have to do is scoot over to Backing Sequence mode and record chords, fills, sound and tempo changes, drum kits changes, mutes, etc. All these items are entered in real time, and all can be recalled for further editing. This performance can form the basis of a more detailed recording subsequently built up in real time or in step time. The final Backing Sequence includes the auto-accompaniment parts (an Arrangement and associated Styles) together with your own sequenced tracks.

The onboard sequencer doesn't rival Mark of the Unicorn's *Performer* or even *FreeStyle*. But with eight "extra" tracks to help bolster a Backing Sequence that has been recorded on the fly, and with adequate event editing, you can certainly generate the bones and some of the flesh of a song.

I found two things helpful here. First, each track within your sequence can be set to trigger either an i4S voice or an external MIDI instrument. This lets you quickly overcome the sonic limitations of one set of sounds.

Second, you can save your sequencer data in Type 0 Standard MIDI File (SMF) format, which lets you share song ideas or even embryonic arrangements between systems or with fellow musicians. (In Type 0 SMFs, all data is saved on one amalgamated track.) Fortunately, the i4S Song Play feature plays both Type 0 and Type 1 SMFs directly from disk without loading a file. In addition, the unit uses PC-format, double-density floppy disks, which is very convenient for transferring SMFs to a computer.

Korg i4S Specifications

Synthesis Method	AI² wavetable
Polyphponic Voices	32
Multitimbral Parts	16
Waveform Memory	6 MB (PCM)
Programs	ROM Banks A & B (GM): 128 Programs + 1 drum kit ROM Bank C: 64 Programs + 5 drum kits RAM Bank D: 64 user Programs + 2 user drum kits
Styles	48 in ROM; 4 in RAM
Arrangements	64 in RAM
Backing Sequences	10 in RAM
Backing Sequencer Capacity	40,000 events
Amplifier	15W/side
Speakers	5-inch (2), 1.5-inch (2)
Dimensions	46.5 × 15 × 5.5 inches
Weight	48.8 lbs.

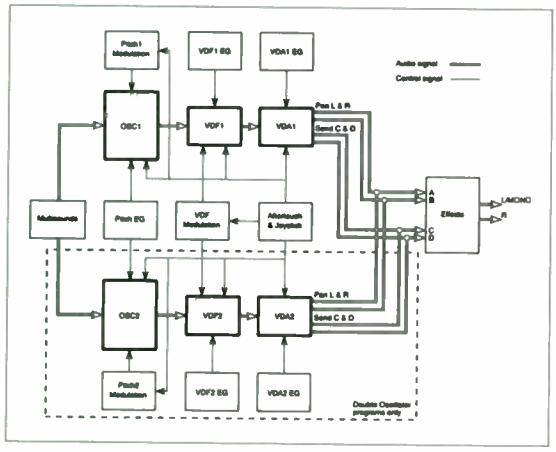

FIG. 2: The tone generator in the i4S uses Korg's AI² wavetable synthesis. Each Multisound uses at least one oscillator, Variable Digital Filter (VDF), and Variable Digital Amplifier (VDA). Note that double-oscillator Programs halve the polyphony for that Program. (Courtesy Korg USA.)

SERIOUS SOUNDS

With many home keyboards that try to offer instant gratification, you can quickly get bored with the sounds and Styles; and when you do, there is precious little you can do about it. So it is important to realize that the i4S is a full-fledged, programmable synthesizer that uses Korg's AI² synthesis technology. As in regular Korg synths of this ilk—specifically the X series, with whom the i4S shares its sound engine—the basic currency is a Program. There are 128 Programs in GM Banks A and B, plus another 64 in Bank C, and 64 user Programs in Bank D.

Among musicians, General MIDI finally seems to be gaining acceptance as a handy about-town vehicle. The i4S GM set is average to good. The drums are particularly punchy—far better than on the GM king, Roland's Sound Canvas—but many of the Programs come across a little thin. In an A/B test of Standard MIDI Files between a Sound Canvas and i4S, the Korg electric guitars shine, but the acoustics are a bit dull. The pianos are a little disappointing, especially Piano 1, the sustain of which tends to render its sound noticeably electronic.

But GM is only a fraction of this keyboard's sonic capability. The C bank of presets is loosely grouped by instrument type. For example, the first eight are a collection of pianos, including my personal favorite, "Whirly," a Wurlitzer electric piano that Korg has cunningly constructed out of a clarinet sample. Bank D comes loaded with a different set of Programs, which you can replace with your own sounds if you want.

The Programs are all constructed from Multisounds, a collection of samples (single hits, loops, multisamples) and synth waveforms plundered from such Korg workhorses as the DW8000. Any two of these Multisounds can be combined to form the basis for a Program. If you use just one, the i4S can play 32-voice polyphony; if you use two Multisounds, you'll halve the polyphony for that Program. There are some 340 Multisounds to choose from, stored in 6 MB of waveform ROM. The Multisounds cover as wide a range as you'll find on any synth.

Korg has always been strong on drums, and the i4S includes eight very nice drum kits, including a GM kit, analog kit, brush kit, dance kit, power kit, jazz kit, percussion kit, and orchestral kit. There are no fewer than 164 drum/percussion sounds, each with independent tune, level, decay, pan, and effects send-level parameters. The drum sounds are assigned to kits by placing them in discrete locations called Indexes. Frankly, remapping drum sounds ranks up there alongside reroofing your house, but it's good to know the facility exists.

PROGRAM EDITING

The i4S offers page after page of programming tools, including a pitch EG with rates and levels, nonresonant lowpass filtering with separate EG rates and levels, and a standard ADSR EG with Velocity control (see **Fig. 2**). A similar arrangement is provided at the amplifier stage. You also get a multiwaveform LFO with separate pitch, filter, and controller (joystick and Pressure) pages and parameters.

If in-depth programming is too daunting, you can take advantage of a trick Korg has employed since the days of the M1. The i4S provides instant access to eight Program parameters in the main display via the Performance Edit buttons. These eight soft buttons beneath the LCD select the corresponding parameter, letting you alter the octave, filter cutoff, effects depth, filter EG intensity, attack time, release time, level, or Velocity sensitivity.

For even greater interaction, try plugging in a continuous-control pedal and setting it to Data Entry. Then, every time you hit one of the Performance Edit buttons, you can change the value in real time without taking your hands off the keys. For analog enthusiasts, who will rightly bemoan the lack of resonant filters, this is a wonderful performance trick in true analog fashion.

EFFECTS PROCESSING

At the end of the Program Edit pages are the effects, which offer 47 algorithms, including single and double effects. There are two identical effects processors, which provide reverb, delay, exciter, chorus, distortion, rotary speaker, and parametric EQ. Some effects are doubled (e.g., delay plus reverb). Each effect offers its own set of parameters, which are perfectly adequate for most programming tasks.

Also much appreciated is the ability to modulate the effects from controllers such as the mod lever or a footpedal. You can select what you wish to modulate and how. One of my favorite techniques is to change from slow to fast rotary speaker (Leslie emulation) with a footswitch. To set this up, you assign the footswitch to Effect Control in the instrument's Global pages, which is no big deal.

NOTHING'S PERFECT

Before I end this review on a suitably lofty note, there are some reservations and limitations I should point out. To begin with, the i4S is particularly reliant upon a distorted guitar sound that

Product Summary

PRODUCT:
i4S Interactive Music Workstation
PRICE:
$2,799
MANUFACTURER:
Korg Inc.
tel. (516) 333-9100
fax (516) 333-9108
CIRCLE #440 ON READER SERVICE CARD

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

is extremely impressive on first listening. Many of the Arrangements use this sound, though, and it can become wearing.

In addition, the maximum polyphony is 32 voices. Bear in mind that many Programs use two Multisounds; if you use these Programs regularly, the polyphony can go down to sixteen voices before you start creating songs. That's tight. (Most of the GM Programs use just one Multisound, but the GM sounds are the weakest in the unit.) And although the synthesis engine is the same as the one in the X series, the i4S only deals in Programs, not in multitimbral Combinations. This means you can only have one multitimbral setup in memory at a time, rather than being able to save multiple setups for instant recall.

Finally, the sticker price is not insubstantial. True, there are added-value extras in the box. But the MOTU software is no longer included, and the songbooks and pedals are not enough to make me consider the package a bargain. That said, the i4S is still a reasonably good deal.

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At the end of the day, the i4S is a well-rounded instrument, offering almost everything to anybody. As a scratchpad writing tool, it is a joy. Viewed simply as a synth full of sounds, the i4S is a powerful and seductive performer.

Korg's representatives also see the i series as gigging instruments. Although judicious use of the Backing Sequence function makes for impressive demos, I'm not so sure I'd want to be hardwired to all these intros and endings (Style Elements) onstage as if they were my ideas. As mentioned earlier, some of them do not fit together as well as others. Fortunately, you can turn the Style Elements off and use the extra eight tracks to do your own parts. The i4S even offers a few bells and whistles that enhance this capability.

Korg may not have entirely removed the stigma from automated accompaniment, but the i series in general, and the i4S in particular, should be viewed as a serious alternative for anyone looking for a pro synth in the GM class.

Julian Colbeck *is himself highly interactive, being a working keyboard player, author of far too many books, part-time vidiot, and cocreator of the interactive Twiddly Bits MIDI files.*

Digidesign Session 2.0 (Mac)

By Jim Pierson-Perry

Low-budget, high-class hard-disk recording from the masters.

Few companies enjoy the widespread recognition in their market that Digidesign has built with its digital audio software and hardware products. The Pro Tools and Session 8 systems are favorites among audio professionals who can afford them, and they are envied by the rest of us who make do on far more restricted budgets.

With the release of *Session*, Digidesign brings its digital audio expertise to the masses. The program provides a powerful and affordable introduction to multitrack hard-disk recording on the Macintosh.

UP AND RUNNING

Given the processor demands of hard-disk recording, it's not surprising that *Session* requires a relatively beefy system. The program runs in native code on Power Macs and uses the computers' built-in audio ports. Power Macs can also run *Session* using Digidesign's Audiomedia II or Audiomedia III card for better audio quality. Mac IIci, IIvx, IIfx, Centris 650, and Quadra users must have an Audiomedia II card, assuming their models accommodate full-length NuBus cards. Operation with other audio cards is not supported. At least 16 MB of physical RAM is required; the software is incompatible with virtual memory.

Session provides two recording tracks; the number of playback tracks is determined by your system. Macs with a 680x0 CPU and Audiomedia II can play four tracks. Power Macs running at 60 MHz can play eight tracks, 80 MHz machines can play twelve tracks, and 100 MHz models can play sixteen tracks. To reduce processing overhead, it's best to use the minimum number of tracks required for a project.

You need System 7.1 or later and Sound Manager 3.1 to run *Session*. QuickTime 2.0 or later is required for multimedia work, and OMS 1.2.3 or later is needed to integrate *Session* into a MIDI system. When you install *Session*, several system extensions are also installed: DigiSystem, Digidesign Audio Engine (DAE), QuickTime, and OMS.

DAE provides digital audio system resources used by *Session*, other Digidesign software, and third-party software such as Opcode's *Studio Vision* and Steinberg's *Cubase Audio*. *Session* uses hard-drive authorization for copy protection and provides two installations. If you send in the registration card, you'll get a backup disk with two more installs.

I recommend using OMS 2.0 (available from Opcode or at various Internet sites) for its improved capabilities and ease of use. Digidesign has standardized on OMS and does not support MOTU's FreeMIDI or Apple's MIDI Manager system extensions.

I evaluated *Session* on a Mac IIci with Audiomedia II and a Power Mac 7100/80, both running System 7.5.1 with Sound Manager 3.1, QuickTime 2.1, and OMS 2.0.1. *Session* ran flawlessly on both systems, even with a slew of additional control panels and extensions. The only conflict occurred with Digidesign's own Sound Drivers extension, which lets Sound Manager route the Mac's internal sounds (e.g., system beeps) through an Audiomedia II card instead of the internal speaker and built-in output. Under this condition, both extensions needed to use the same DAE resources. Using Sound Manager to route the Mac audio back to the built-in output corrected the problem.

OVERVIEW

Session uses four windows for its operation (see **Fig. 1**). You usually start a project by recording new audio files with the Mixer and Transport windows, which emulate a multitrack tape deck. One nice aspect of *Session* is its animation-quality, continuous screen redraw; the program never has to stop to redraw the screen when recording or playing back audio.

Switching to the Edit window provides a multitrack pasteboard where you can graphically slice and dice the audio files into Regions, selecting the pieces you like and arranging them as desired across the tracks into Playlists.

You can apply 2-band EQ, panning, and fades to each track in real time from the Mixer window and bounce the final mix to a stereo output file to create a master. For multimedia projects, the Movie window shows a QuickTime movie synchronized with *Session*'s audio tracks. All four windows operate smoothly together; changes made in one are immediately reflected in the others.

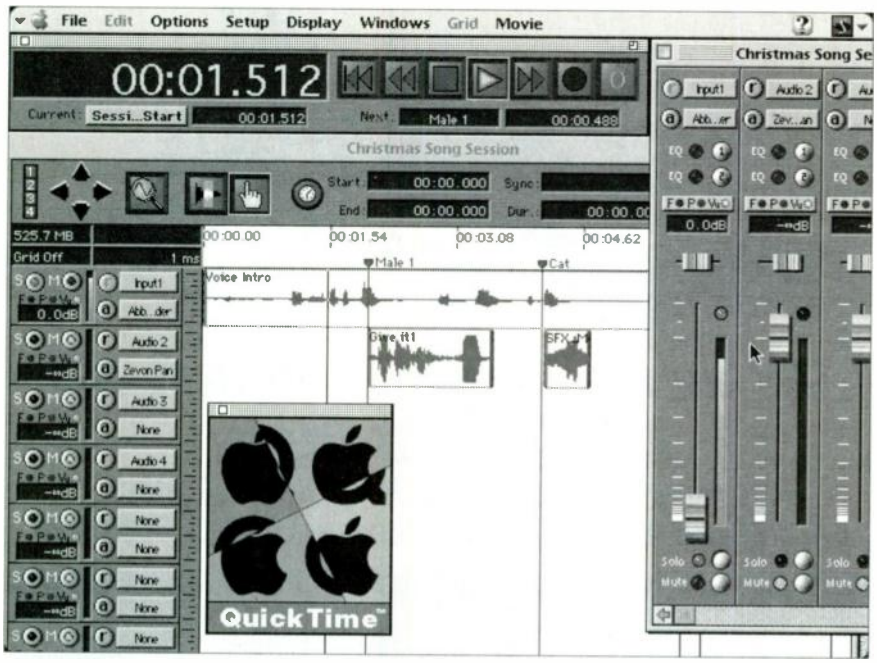

FIG. 1: *Session*'s user interface includes four windows: Transport, Mixer, Edit, and Movie. This Edit window shows two tracks with waveform displays of audio Regions and a pair of Markers for dialog spotting in the QuickTime movie.

Although Digidesign has done an excellent job with the layout and aesthetics of *Session*'s windows, even a 17-inch monitor has insufficient real estate to view them all together. Fortunately, important track information, such as record-enable indicators, Playlist names, and fader and mute status, appears in both the Edit and Mixer windows.

When it's active, the Transport window floats above the other windows and provides transport controls, the Counter, and the Markers bin. Markers are handy flags to identify specific points in the recording (see **Fig. 1**). You can place these carefully with a dialog box or drop them on the fly during playback. The Transport window provides a pop-up menu that lets you jump to a specific Marker and rename or delete it.

RECORDING

Recording is a breeze in the Mixer window (see **Fig. 2**). Enter a name for the new track, activate the track's record-enable button, select the input source, and go. You can adjust the pan and level faders for monitoring, but they do not affect the recorded audio signal; you must adjust that at the source. Clip indicators for each track turn red if an input signal is too hot. Once triggered, an indicator stays lit until you reset it, which ensures you don't overlook clipping in the heat of a take.

Session remembers separate level-fader positions for record and playback on each track. You can switch between them by toggling the record-enable button. This lets you switch between one mix for monitoring while recording and another for listening to your tracks during playback, which is extremely handy.

Hit a few clams in the take? No problem. While the track is record-enabled, go ahead and record as many takes as you want (as long as disk space holds out). Each take is automatically saved to a new audio file. No files are erased; they are just "stacked" on top of each other. Later, you can go into the Edit window and move each take to a separate track, cut out the best parts from each, and assemble them into a single, pristine track.

Session imports audio tracks from QuickTime movies, files from another *Session* project, snippets from an audio CD, or any audio data in Sound Designer II, AIFF, SND, and WAV formats. Importing files is accomplished through a well-designed dialog box (see **Fig. 3**) that lets you audition files as they are selected and import a batch of files from different locations in one operation, which is very handy and a real time saver. If necessary, *Session* converts the sample rate of imported audio files to match the rate used by your project. You select the quality of the conversion process from five available levels, with a rapidly increasing time penalty as the conversion quality increases.

Importing from an audio CD requires an Apple CD-ROM drive. If you have an Apple drive, you can snag a segment with predefined start and stop times from any track on the CD in its original digital format. If you don't have an Apple CD-ROM drive, you can transfer the audio in the digital domain via SCSI using a program such as OMI's *Disc-to-Disk*, assuming your CD-ROM

FIG. 2: In this Mixer window, EQ is active on tracks 1 and 2, controlled by the dialog boxes on the left. Also notice that the clipping indicator on track 2 is lit.

drive is supported by that program. Then you can import the resulting audio file into *Session*.

Alternatively, you can import analog audio through Sound Manager using the CD Playthrough setting. This would have been very nice, except that my CD-ROM drive is an old 1× drive that is not from Apple. Luckily, the freeware program *Simple CD Audio Player* 1.0a (by Philip Trauring, available from http://hyperarchive.lcs.mit.edu/HyperArchive.html) ran just fine with *Session*. I used it to start playing an audio track that I recorded from the drive's RCA out jacks into *Session*. I took a larger sample than needed and trimmed the excess in *Session*'s Edit window. This is not graceful, but it works.

EDITING BASICS

The Edit window (see **Fig. 4**) acts as a pasteboard in which you can create Regions and assemble them to build your masterpiece. Horizontal bars representing available tracks are stacked vertically on the screen. A Time Line spans the top of the display and can be set to units of time, SMPTE (all flavors), feet and frames, or bar and beat. Track height can be set globally to one of four fixed values; unfortunately, these values rarely provide optimal use of the limited screen area. I would like to be able to drag individual track boundaries up and down like a spreadsheet cell to customize the layout.

Track assembly is performed with a smooth, graphical interface that includes three intuitive, mouse-based tools: Zoomer, Selector, and Grabber. *Session* keeps a list of all audio files and Regions in a project along the right side of the Edit window. Building a Playlist is a snap: just use the Grabber tool to select these audio building blocks, and place them in a track at the desired start time.

You can pull as many copies of a Region as you like from the list; each is independent of the others. Want to try some changes? Grab Regions and move them around, delete unwanted ones from the tracks, or even drop them on top of others. You only hear the parts of a Region that are visible. Those who have used *Sound Designer II* or other text-based approaches to building Playlists will love how easy *Session* makes it.

For exact placement, a Grid Lock option forces Regions to align with the Time Line, which is analogous to MIDI quantization. Minimum grid resolution is 1 ms (time units), 1 subframe (SMPTE and feet/frame units), or 1/64 note (bar/beat units). Normally, Regions snap to the grid at their start time, but you can also define a sync point within a Region and use that as the grid reference. This makes it much easier to align cue points instead of tweaking Region start times to get a good sync. A third alternative uses the existing Regions as grid points, which ensures that Regions are placed precisely end-to-end. This approach is especially useful for punches.

SLICE AND DICE

When you first open the Edit Window, the Region List contains only the audio files you have recorded or imported and a generic Silence Region. You can make new Regions by using the Selector tool to highlight a segment of an audio file. Regions are single-track entities. You can make selections across multiple tracks, but you get a group of independent Regions, not one multitrack Region. Once a Region is created, its name is automatically added to the Region List. You can add or delete entries, but that's it. This is rather limited and particularly awkward for finding Regions in large lists. I wish the Region List had alphabetical sorting, at least.

Several zoom options let you magnify waveform displays. These options include four user-adjustable presets, scroll bars to expand or contract the display along the time or amplitude axis, and the Zoomer tool to blow up a selected segment of the waveform. Maximum zoom shows 1 millisecond of waveform data across 0.75 inches of the screen.

Audio scrubbing is a surprising and annoying omission, especially because it is standard in other Digidesign and competitive offerings. Your only recourse is to highlight and audition small audio segments with the Selector tool, which is tedious when hunting for a particular soundbite in a large audio file.

Manipulating Regions in *Session* is easy: simply cut, copy, paste, delete, duplicate, and move them around. Numeric fields over the Time Line reveal the start, stop, sync point, and duration times for a selected Region. You can type new values into these fields to move the Region or trim its duration. Dragging a Region's side boundaries inward hides the audio data, which is great for fast edits. (Remember, only visible data is played.) However, there's no visual indication that a Region is partially hidden.

I was surprised not to find an automated punch-in and -out command. But I discovered the action is so basic to Edit window operations that a separate command would be superfluous. You

simply create a Region at the desired location and record into it.

My approach was to make a new Region within the punch area and slip it down to a vacant track, leaving blank space in the original track. I highlighted the punch Region, added some preroll time, record-enabled a blank track, and muted the punch Region's track. This let me record new takes in context and do A/B comparisons with the original by toggling track mutes. I slid the best take back to fill the gap in the original track and trashed the leftovers. This approach assumes that you have enough available working tracks. If not, you can record new takes over the punch area in the original track, but comparing them takes requires shuffling through the layer of Regions.

Apart from 2-band EQ on each channel for mixing, *Session* offers no DSP functions, not even the basic reverse, invert, or normalize operations provided by most competitors. Your only option is to export the Region as an audio file, use an external waveform-editing program, and then import the altered audio file back into *Session*. Given *Session*'s budget price tag, I don't have a problem with this, but it is tedious.

It's a shame there is no internal link to Digidesign's *Sound Designer II* that lets you pass audio selections between the programs. Of course, you can use any waveform-editing program that handles *Session*'s audio-file formats. Those of you on a budget should check out Alberto Ricci's shareware program, *SoundEffect* ($15, available from http://hyperarchive.lcs.mit.edu/Hyper Archive.html), which provides even more processing options than *Sound Designer II*.

Fortunately, *Session* offers a wealth of options for creating fade-ins, fade-outs, and crossfades. These operations use the Fades dialog box (see **Fig. 5**), a classy graphical tool for adjusting fade length and profile. There are 25 preset fade profiles with different amounts of curvature from a straight line to an abrupt jump. Crossfades use two independent profiles, so you have 625 choices to find the ideal transition between Regions. However, you can't edit these preset fade curves.

Fades and crossfades are created nondestructively. The operation was immediate and very responsive on the Power Mac. The IIci took a couple of minutes, and editing profiles was difficult because graphic updates lagged behind mouse movements. It's too bad you can't just type a value into the numeric field. Although they are displayed as separate areas, fades are retained as part of the parent Regions. You can always click on a fade to change its duration and profile or delete it entirely.

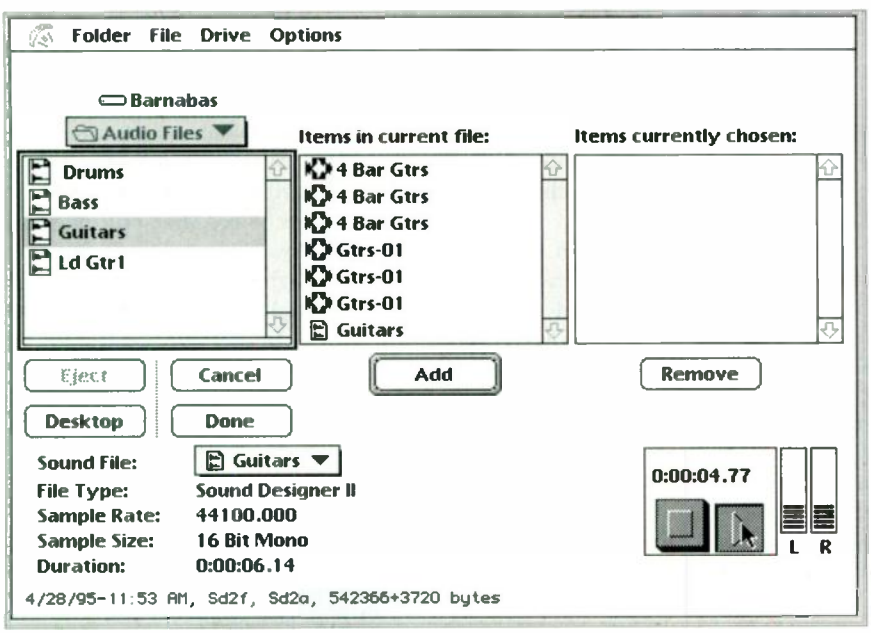

FIG. 3: The Import Audio dialog box helps you to find audio files in multiple locations and storage devices using the left and center columns and to audition them (lower right corner) before loading. All files to be loaded are staged in the right column and then loaded in a single batch operation.

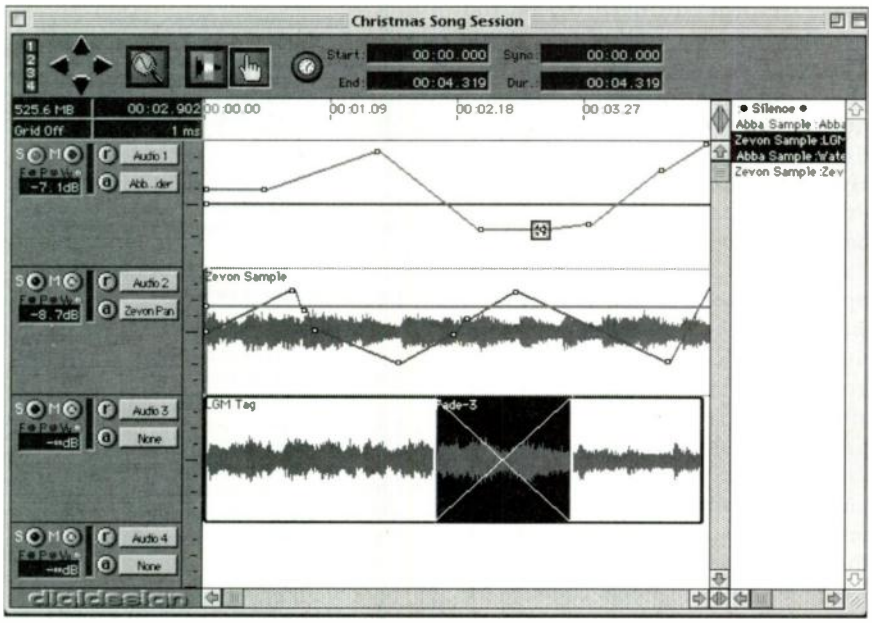

FIG. 4: The Edit window includes waveform displays for individual tracks. Fader automation profiles are shown in tracks 1 and 2. Selecting the crossfade Region in track 3 also selects both parent Regions in the list to the right. The numeric fields above the Time Line reveal the start, stop, sync point, and play duration for the highlighted Region.

MIXDOWN

When your tracks are assembled, it's back to the Mixer window to set up the final mix and perhaps add some EQ. Pan, level, and EQ faders can be operated individually or in groups with the mouse or an external MIDI controller. Up to four groups can be defined with any combination of these faders. Even better, the faders in a group preserve their relative offsets when moved as a group. This lets you adjust the overall level of a mix without disturbing the relative balance between tracks.

The mouse works well enough for rough work, but you get much better resolution using an external MIDI controller to move faders or groups. *Session* lets you assign a device and MIDI channel to a fader from your OMS studio setup document; move a controller on the device to complete the assignment. Only controllers that send Control Change (CC) messages can be used. This is ideal for dedicated controller units, such as the JLCooper FaderMaster or Peavey PC 1600.

Depending on your needs, this external control might be mandatory. I was able to differentiate only sixteen pan settings between center and hard left or right using the mouse. Assigning the fader to a synth's mod wheel increased the resolution to 96 steps on either side of center. Oddly, I could never set the fader to the center position with the mouse or mod wheel. However, holding the Option key and clicking on a pan fader resets it to center.

Level and pan fader movements can be recorded independently into automation Playlists. These movements can be copied and loaded between tracks, which is important for stereo tracks because they are treated as two separate tracks. Unlike with audio Playlists, you cannot record multiple takes of fader movements on top of each other. Each new take erases the earlier automation data, although you can create a new Playlist each time to keep multiple takes.

Pan and level automation Playlists can be viewed and edited graphically in the Edit window as profiles superimposed over the audio data. Each profile is a series of breakpoints connected by lines. You can change their shape, delete them, or add new breakpoints (see **Fig. 4**). Although contiguous breakpoints can be scaled up or down, there's no provision to move or scale profiles along the time line. If you had a great mix for a Region and later move the Region, you can't bring the mix with it.

Like other graphical editing tasks, I had great success with the Power Mac and some difficulty with the IIci when recording real-time fader movements. *Session* tried its best on the slower machine, never compromising audio playback, but the fader responses were jerky and lagged behind the mouse. I also got a lot of gratuitous breakpoints when recording fader moves. It would be nice if *Session* could automatically thin the number of breakpoints like some sequencers can thin Aftertouch and other controller data.

I'd also like to see commands to save and load "snapshots" of fader and mute/solo settings for all tracks in one step. You can store an initial setting for each track's pan and level faders in automation Playlists, but these must be loaded separately for each track and do not include mute/solo status.

Session provides two EQ modules per track. Each module can be set to perform one of five functions: low shelf, high shelf, lowpass, highpass, or single-band parametric. Each function provides real-time control of frequency and gain, and the parametric EQ bandwidth can be set to one of five values from ½ octave to three octaves.

The EQ is applied to playback only. It isn't recorded unless you are bouncing tracks to a final audio file. Overall, I liked the sound and customization of

Product Summary

PRODUCT:
Session 2.0
PRICE:
$199
SYSTEM REQUIREMENTS:
Mac IIci, IIvx, IIfx, Centris 650, Quadra, or Power Mac; 16 MB of RAM; Audiomedia II (required for 680x0 Mac, optional for Power Mac); System 7.1 or higher; OMS 1.2.3 or higher and QuickTime 2.0 or higher (optional)
MANUFACTURER:
Digidesign
tel. (415) 842-7900
fax (415) 842-7999
e-mail digimkt@digidesign.com
CIRCLE #441 ON READER SERVICE CARD

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

the EQ, particularly at *Session*'s price. If you need more extensive EQ capabilities, you could route the playback through an external EQ or other effects processor and record the processed output back into *Session*.

You can synchronize playback to begin at a given SMPTE time, triggered externally with MIDI Time Code (MTC) and delivered via OMS. The trigger can come from a device capable of sending MTC, such as a tape deck with a SMPTE-to-MTC converter, or a sequencer on OMS' IAC bus. This is trigger sync only; *Session* does not periodically resync while playing. If the master drifts after triggering *Session*, the two can slip out of sync. This is not good for professional applications, but it's acceptable for a low-cost entry level program.

Triggering from sequencing software lets you incorporate audio-file playback within a larger MIDI system. I had no problems doing this with *Vision* 2.0.8, but I failed miserably with *Cubase Score* 2.0.7, crashing the Mac in the process. *Cubase* is not yet fully OMS 2.0 compliant for IAC bus operations. Steinberg expects to solve this with the next release, which should be available by the time you read this.

When you are happy with the mix, the Bounce command writes all active tracks to an output file, applying the current EQ settings. *Session* offers a number of options for file format, sample rate, and resolution to accommodate a variety of applications. Audio formats include 8- or 16-bit AIFF, SD II, SND, WAV, and QuickTime. The files can be mono or stereo. The current project sample rate is taken as default, but you can change it as needed from 1 to 48 kHz.

You can bounce your entire project down to a final stereo master, or you can just deal with pieces of it. The Bounce command starts from the current Counter position and uses only unmuted tracks. This allows you to create projects with EQ changes in different sections. To do so, first create separate output files with the desired EQ for each section; then import them back into *Session*. Finally, assemble these new Regions into stereo tracks and bounce the overall project into a single output file. This is also the only way to export audio segments as files for processing with external waveform-editing programs.

THE QUICKTIME CONNECTION

Session is a natural for composing audio tracks to QuickTime movies. Not only can you import and export audio in QuickTime format, but you can marry your work to existing movie video. The Movie window (see **Fig. 1**) shows imported QuickTime movies. You can use the Selector tool to jog through a QuickTime movie frame-by-frame, dropping Markers at cue points.

Assemble your audio tracks in the normal manner, ensuring that critical Regions are aligned with the appropriate Markers. Set up the final mix and let *Session* "flatten" the file, combining the video and audio tracks into a new QuickTime movie. This can take awhile with 680x0 Macs because you typically drop from 16- to 8-bit resolution and decrease the sample rate for most multimedia work.

You can specify an offset time to begin the video at some point after the audio starts to play back, but *Session* is not capable of flattening movies with such an offset. In this case, you must create the final audio file with *Session* and use a movie-editor program to match it with the video.

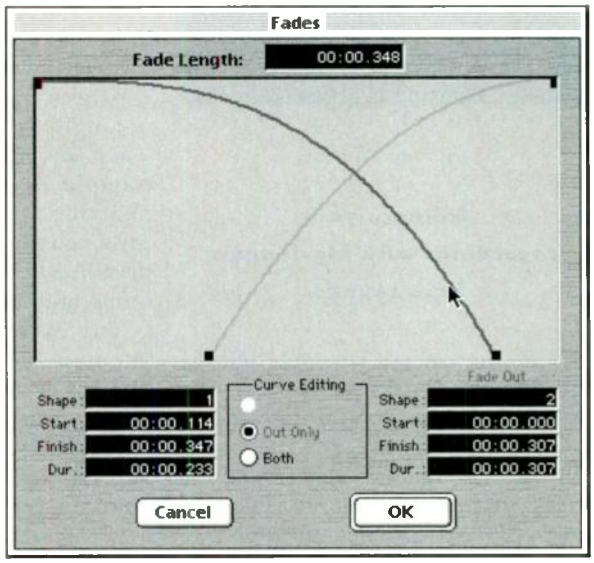

FIG. 5: The Fades dialog box lets you establish fades and crossfades. You can vary profiles individually or together with the mouse, affecting the curve shape and length of the fade interval. The numeric fields are for display only; you cannot type values into them.

WRAP-UP

Session looks like a winner for digital audio hobbyists, students, and multimedia authors. Digidesign has applied its years of professional experience to provide an entry-level program that packs a lot of capability within an easy-to-use and aesthetically pleasing framework.

I'm particularly impressed with the program's reliability; I experienced no crashes during weeks of testing with two computer systems and had no problems with the output sound quality. Although I'd like to see improvements in some aspects of the program, these are mostly enhancements of a good existing feature set.

The documentation is well written and includes many helpful screen shots. It also comes with a laminated, fold-out summary of *Session*'s keyboard commands.

Session's major competition is Macromedia's (formerly OSC's) *Deck II* 2.5, which provides the audio scrub, mixer snapshots, plug-in architecture, and integration with *Sound Designer II* that *Session* currently lacks. However, *Session* is half the price of *Deck II*, and it has digital EQ, which *Deck II* lacks. (Then again, you can run a Waves EQ plug-in within *Deck II*.) In addition, Digidesign will offer an upgrade path to its *Pro Tools PowerMix*, a new Pro Tools software that can run on a Power Mac using Sound Manager.

Current sequencer owners looking to add digital audio capability are probably better off upgrading to the audio version of their sequencers rather than buying Digidesign's *Session*. The upgrade cost is typically about the same as *Session*'s price tag, and these programs have many additional features to address audio/MIDI integration (for example, Opcode *Studio Vision*'s Audio-to-MIDI and MIDI-to-Audio; see the review on p. 112). But if you just want to add effective, easy-to-use hard-disk recording to their toolkit, *Session* is an excellent way to get your feet wet.

Jim Pierson-Perry *is the pseudonym for a group of malcontent dwarves of dubious pedigree. Fond of cheap sunglasses and cheaper beer, they can be found wiring MIDI ports to whoopee cushions and pranking the occasional troll.*

Spectrasonics Bass Legends, Vol. 1

By Dan Phillips

Enhance your recordings with big-league bass sounds.

The concept is simple but demanding: take several top-notch bass performers; record them using the best instruments, studios, and equipment; and sample the results. That's the approach taken by sound designer Eric Persing and bassists Abraham Laboriel, Marcus Miller, and John Patitucci in Spectrasonics' *Bass Legends*, vol. 1.

Bass Legends is really two products: a collection of bass phrase loops and a library of multisamples matching the tone and style of each loop. The audio CD contains the loops only, and the CD-ROM features both the loops and the multisamples. The CD-ROM version supports Roland S-700 series, Akai S1000 series, Digidesign SampleCell, and Kurzweil K2000/K2500 samplers. I auditioned the Roland S-700 series version.

BASS-IC LOOPING

The documentation devotes two pages each to bios of Laboriel, Miller, and Patitucci. Even if you're not familiar with their names, you've heard their work, as each boasts a long list of high-profile credits.

Performed by three such magnificently talented, multifaceted players, the phrase loops are naturally superb. The styles span a wide range, from funk, rock, and reggae to swing and acid jazz. Overall, though, the selection of 39 patterns favors dance and hip hop production. My favorites are John Patitucci's "Inner City" and "Acid Swing," two very funky acid-jazz lines played on acoustic bass.

Spectrasonics has made the phrase loops in *Bass Legends* easy to use by recording each pattern twelve times, one for each key. (They call this the "Chromazones concept.") Not only does this save you from worrying about transposition, it means that you get a subtly different performance for each key, which can help to alleviate the sometimes static nature of phrase looping. Occasionally, an alternative version of a pattern is provided for a single key. Because each loop has a multisample that precisely matches its tone and style, you can create your own breaks, ornamentations, and so on.

The excellent documentation lists all the phrases by tempo, which is practical, along with a brief description of musical style and playing technique (in case you're looking for, say, a Cajun funk riff or an acoustic groove). Also included is a handy pitch-to-tempo-change chart that explains how to alter the phrase tempos while retaining the tuning by using half-step tuning adjustments.

Spectrasonics' *Bass Legends* sample library offers a variety of phrase loops and bass tones from master bassists Marcus Miller, John Patitucci, and Abraham Laboriel. The performances are brilliant and the sampling quality superb.

Spectrasonics proudly proclaims *Bass Legends* to be "100% copyright clean," so no additional licensing fees are required to use the grooves or multisamples in commercial productions. The license does, however, mandate giving credit to both the bassist (Laboriel, Miller, or Patitucci) and Spectrasonics.

THE SCHEME

Although the phrase loops are great, *Bass Legends* is worth purchasing for the multisamples alone. There are about 30 different bass sounds, including picked, fingered, slapped, popped, and muted clean electrics; half a dozen fretless basses; a couple of overdrive-colored electrics; and one sterling acoustic bass. Many bass sounds use Velocity-switched layers for greater expressiveness, and some include extensive samples of special effects, such as slides, string hits, and scrapes.

Using the standard Roland patch-variation scheme, *Bass Legends* offers several—sometimes a dozen or more—different versions of each sound. Each is based on the same samples, ranging from those that use all of the samples (often edging memory usage right up to the 16 MB mark) to less memory-intensive patches that stretch just a few samples across the keyboard. For the sounds that make use of Velocity switching, the individual layers are also provided as separate, smaller patches.

The patch variations are distinguished with a well-organized labeling system that uses short suffixes for each file name. (This system, which Eric Persing helped develop, was first introduced in the Roland libraries.) The labels make it easy to tell which patches use relatively greater or lesser amounts of memory, which ones use Velocity switching, which use detuning for a chorus effect, and so on.

The combination of memory-usage options with clear, consistent labeling makes using the library a pleasure.

Product Summary

PRODUCT:
Spectrasonics *Bass Legends*, vol. 1
PRICE:
Audio CD: $99
CD-ROM: $299
DISTRIBUTOR:
Ilio Entertainments
tel. (800) 747-4546
or (818) 883-4546
fax (818) 883-4361
e-mail info@ilio.com
CIRCLE #442 ON READER SERVICE CARD

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

Spectrasonics' efforts here are definitely appreciated.

THE SAMPLES

Short of describing all of the samples in detail, here are a few of the highlights. To start with, the Patitucci "JP Ac.Bs" patch is probably the best sampled acoustic bass I've heard. Using a 3-way Velocity switch, the main patch employs 52 samples to create an outstandingly realistic sound. Accessory patches offer more than 30 "noise" samples (string noise, slaps, etc.), more than twenty slides, and liberally multisampled harmonics.

"JP Funk/x3" is an incredible 3-way, Velocity-switched funk bass with a round tone at low Velocity values, a hard tone at medium-high Velocities, and then a pop at the top of the range. The samples and programming work together exceptionally well, making the sound wonderfully satisfying to play. "JP Funk" is also accompanied by a patch with nineteen different "noise" samples, mostly of percussive string hits, which help greatly when creating a realistic rhythm part.

Laboriel's "AL Samba" serves up a deep, round tone with a subtle Velocity switch bringing in a slight edge. "AL V. Funk" is a hard, bright slap/pop Velocity switch that should cut clearly through any mix, and the "Latin" bass uses a 2-way Velocity switch with a delicate, slightly hollow tone.

▼

The styles span a wide range but favor dance and hip hop production.

Marcus Miller's "MM Warm Fretless" is a truly wonderful fretless-bass sound: warm, thick, and filling, like hot cereal on a cold morning. It has replaced my previously favorite ballad bass. "MM HipHop" is a tight, muted picked bass, clean and punchy, whereas the harmonics of "MM Ultronix" are unexpectedly bell-like and ethereal.

In addition to being cool and fun to play, these sounds are useful in the real world. While I was just starting to get into this library, my production partner and I got a call to create some alternative music for a television show. The Patitucci "Grunge" bass, an overdriven sample with dynamics courtesy of Velocity-controlled lowpass filtering, proved to be perfect for the job.

LOW-END BOOST

Bass Legends, vol. 1, is superb. The phrase loops are well organized, exquisitely recorded, and brilliantly performed. The bass multisamples are flawlessly looped and expertly programmed, and they lend themselves to expressive playing. I'd encourage anyone who owns a sampler supported by Spectrasonic's CD-ROMs to go for that option rather than the audio CD; you *don't* want to miss out on those multisamples.

Dan Phillips *occasionally wishes that he played a stringed instrument. He's generally content, however, with the more primitive musical activities of banging on things and chanting.*

Alesis ADAT XT

By Michael Molenda with Buddy Saleman

Better,
better,
you bet!

The machine that made an indelible mark on recording history and changed the sonic lives of home recordists forever is stepping into adolescence. Say goodbye to the *noir* ADAT; the handsome aluminum chassis of the ADAT XT identifies the next generation of Alesis MDMs. And guess what? Even with a new look, improved converters, a whippet-quick transport, and some twenty new features and functions, the XT is $500 cheaper than the ADAT's original $3,995 list price. Now, *that's* progress!

No sophomore slump here! The new Alesis ADAT XT syncs faster, sounds better, and offers more features than the original ADAT.

Of course, cutting costs is a whole different ball game than cutting tracks. As the digital recording revolution enters an era of innovation and economy, a simply more affordable ADAT is not much of a bargain. Happily, ADAT disciples will be cheered that the XT resolves many of the common beefs of pros and power users, whereas skeptics may finally be seduced by the XT's enhancements. Let's check out just how well this youngster has grown up.

THE NEW LOOK

Big-studio owners who are forced to rack up ADATs next to their expensive SSL consoles will be happy that the XT affects a more professional appearance. A sophisticated, brushed-aluminum faceplate houses the unit's well-organized function and transport controls as well as a beautiful, vacuum-fluorescent display.

The multicolored display is a monster, serving up tape-locate points, editing parameters, signal levels, and other status meters. You even get a helpful sync indicator that illuminates the very instant a slave machine locks to the master deck. The improved display also monitors the XT's advanced functions, such as individual track delay and internal digital routing, which used to be reserved for the Alesis BRC controller.

A glance at the back panel betrays that the ¼-inch, unbalanced, -10 dBV connectors have been removed in favor of RCA jacks. Although audio pros often state that RCA jacks maintain better connections than ¼-inch plugs, those who have set up their studio for the old ¼-inch connectors will probably grumble about replacing jacks or wiring adapter cables. Recordists going the balanced, +4 dBu route—a move I advocate if you want to ensure robust signals—are home free because the XT uses the same 56-pin ELCO/EDAC connector as the ADAT. As an added bonus, the XT's balanced outputs are servo-balanced to stop signal-level losses when a balanced XT output is hitched to an unbalanced mixer input.

Also missing in action is the ADAT's remote meter-bridge connection. This deletion is really no big deal, however, as the metering capabilities of most mixers render the feature superfluous. Everything else about the XT's rear panel I/O is the same as the ADAT's. The "hook-up harmony" of the new machines is so obliging that I was able to replace my three ADATs with three XTs in less than ten minutes—and that included the time it took to remove and replace the rack screws.

SYSTEM REVIEW

I probably don't have to mention this stuff, but I will for those who are entering the modular digital multitrack (MDM) revolution a tad after the call to arms. The XT uses S-VHS tape to record (and play) eight tracks of pristine digital audio. Anything recorded on an XT is completely compatible with anything recorded on an ADAT or the other players in the ADAT franchise: Fostex's RD-8 and CX-8 and Panasonic's MDA-1. The ADAT is a modular system—hence the MDM tag—and up to sixteen ADAT transports can be synched together to produce a mammoth 128-track studio.

An LRC remote, an optical cable, a "starter" S-VHS cassette, a manual, and a power cord are included with every XT. As a multimachine system can be efficiently run from the LRC's transport controls, I didn't even bother using my BRC to control a 24-track XT system. The only drag was that the LRC doesn't offer the ergonomic luxury of the BRC's track-arming buttons. Other than that, I didn't miss the BRC at all—especially given some of the BRC and XT compatibility problems that I'll discuss shortly.

THE XT IN SESSION

To test the XT in real-world situations, I shuttled between two studio environments. At my new studio (Tiki Town), we set up a 24-track, XT-only system, but at Buddy Saleman's Studio 684, we mixed and matched XTs, original ADATs, and a BRC.

The first thing I discovered is that the XT's rewind and fast-forward speeds are blindingly fast compared to the ADAT's. Alesis claims that the XT's wind speed is four times faster than the ADAT's, and I don't dispute that spec. When using ADATs, if I needed to fast-forward from the beginning of the tape to a song starting at approximately 25 minutes, I could finish a healthy tea break before the machine finally chugged to its destination. I can see that the XT will seriously cut into my tea consumption: fast-forwarding twenty minutes into a tape took just 30 seconds. Whew!

However, the XT's extremely swift transport is also extremely loud. The noise factor is a slight annoyance, but it's compounded by the fact that a LRC-controlled system cannot be placed into a machine room—or even moved further away from the mix position—to gain a little peace and quiet. In an LRC configuration, the XT's front-panel controls are your only access to most functions, so you must keep the machines close at hand. The BRC system at Studio 684 allowed us to position the XTs seven feet behind the console, but the noise level remained obtrusive. My recommendation is to learn to live with the rattle and hum. I maintain that waiting for slowpoke ADATs to zero in on a locate point is much more frustrating than the Boeing 747 whine produced by the XTs.

Another obvious improvement is that the XT lets you punch in and out on any track *while* you're recording. The original Alesis ADAT did not allow you to do this, which effectively killed its penetration into the post-production field. (In film and video work, multiple sound editors must be able to punch in assorted audio elements "on the fly" while the tape machines are locked to picture.) This feature is actually a big deal to me because I often punch in and erase boo-boos from various tracks while I'm recording something else. Of course, now that all tracks are "record ready," an errant finger (or shoulder) can easily zap a great performance. Be careful. Don't operate an XT when you're fatigued unless you want to risk singing that once-in-a-lifetime vocal twice.

LOCKING UP

The really big news about the XT is its dramatically improved lockup times in multimachine systems. Ask a recording engineer about the ADAT quirk that constantly frosted them, and I'm sure that he or she will complain about the accumulated light years spent waiting for one machine to lock to another. Although the XT still isn't as fast as a single-reel, analog multitrack or a hard-disk system, it's pretty screaming for a modular machine. From a dead stop, a 24-track XT-XT-XT combo took just two seconds to lock after the Play button was pushed. By comparison, locking up three ADATs can take anywhere from four to twelve seconds. It's no contest!

It gets even better when you rewind two minutes to a locate point while in Auto Play mode. With three ADATs, plan on waiting twenty seconds before the machines can rewind to the locate point, lock, and play. Three XTs, however, will do the job in four seconds max. Trust me, this is heaven.

Unfortunately, things are not quite as rosy if you're incorporating an XT or two into an ADAT system. The young punks just don't play very nicely with the veterans. For one thing, the XT transport is so fast that an ADAT hasn't a prayer of following it step-for-step.

Want to talk about lock times? Starting the ADAT-XT-ADAT system from a dead stop meant waiting four to seven seconds for a lock. If the tape was being shuttled forward to a punch point, the machines would chatter about for nearly sixteen seconds before they all locked up.

Alesis is aware of the lock-up problems this "age difference" causes, and states that, for best results, a mixed system should be configured with ADATs that have a software version of at least 4.03 or higher. If you also wish to use a BRC controller in a mixed setup, the BRC version should be at least 2.04.

Obviously, if you want to take full advantage of the XT's super-lock, don't saddle an XT system with ADATs. But if you have no choice, try switching the position of the master deck with the slaves until you discover which configuration produces the fastest, surest lock times. All of us who tested the XTs—myself, Buddy Saleman, producer Scott Mathews, and Tiki Town engineer Tom Luekens—found that switching masters and slaves had a definite effect on sync performance. Alesis recommends that the XT should be the master in a mixed system because of its intelligent transport control.

Unfortunately, we could not develop a conclusive formula, as success varied from system to system. In a mixed configuration, putting the XT first in line wasn't always the best move. And even in an all-XT system with matched software versions, some XTs still proved to be better followers than leaders. So when in doubt, move 'em about!

THE SOUND OF MUSIC

The XT benefits from five years of advancements in digital-converter technology and totally smokes the ADAT in sound quality. Four, 2-channel Philips chips maintain strict separation of signals between tracks and effectively

TWENTY AND COUNTING

Alesis claims the XT logs twenty new features and functions, so of course, I just had to count for myself. The following list may not be the same as the manufacturer's tally, but at least prospective XT buyers can rest assured they'll get all the promised goodies.

1. Improved ADCs
2. Improved DACs
3. Faster transport
4. Intelligent transport control
5. Vacuum-fluorescent display
6. Servo-balanced outputs
7. Ten locate points
8. Absolute/Relative time display
9. Arm/disarm any track during recording
10. Digital track-routing
11. Digital assembly-editing
12. Track delay
13. Auto punch
14. Rehearse mode
15. Multimachine offset
16. Clock select button (44.1/48 kHz)
17. Peak-hold meters
18. Error counter
19. Write-protect override
20. One-piece, aluminum chassis

ADVERTISER INDEX

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APRIL 1996

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Please select ONE rating number per article	Very Helpful	Somewhat Helpful	Not Helpful	Didn't Read
A. "Field Trip," p. 30	701	702	703	704
B. "Cover Story: The Sophisticated Mix," p. 48	705	706	707	708
C. "Production Values: Listen to the Music," p. 66	709	710	711	712
D. "Master Class: Freewheelin' with FreeStyle," p. 74	713	714	715	716
E. "Recording Musician: Mini Mic Cabinet," p. 88	717	718	719	720
F. "Working Musician: The Taxman," p. 104	721	722	723	724

eliminate crosstalk. The ADCs are 18-bit with 128 times oversampling and the DACs are 20-bit with 8 times oversampling. Although I'll be the first to admit that the "new and improved" tag is often overused and overhyped, these converters are truly superior.

The original ADAT exhibited a touch of graininess on high-frequency material that increased as tracks were added. Sixteen or 24 tracks chock full of music typically produced subtle, yet distinguishable artifacts that permeated the upper-frequency spectrum. Cymbals might sound cranky rather than shimmering, and guitars and vocals often felt a little "fuzzy." The XT, however, delivers a beautifully transparent high end that just doesn't get down and dirty—even after I splattered it with 24-tracks of noisy rock 'n' roll.

I was even more impressed after a critical listening test with *Mix* magazine Editor George Petersen. Petersen simultaneously recorded some jazz, rock, and classical cuts to a sample-locked ADAT and XT combo, allowing us to instantly A-B the program material. It was no surprise that the XT exhibited superior clarity in the high end, but the new kid also sounded slightly *warmer* than the ADAT. Minute bass-frequency details were evident in the XT's soundstage, which added a nice punch to the sound. By comparison, the ADAT sounded a tad thin. In fact, the XT's more robust sonics finally helped me convince Mathews—a dyed-in-the-wool analog advocate—that you can track fat, slamming drum sounds on MDMs. (Now I don't have to make space for a 2-inch, analog 24-track deck in our cozy, but crowded, control room!)

Just so that someone doesn't write me a nasty letter, let me clarify that I'm discussing extremely subtle differences here. The XT's cleaner, clearer, warmer sound is not an astounding advancement over the ADAT's, but it's certainly enough of an improvement to merit a boisterous ovation.

OOPS!

On the downside, I managed to trash an XT during the test. I was doing guitar overdubs for the debut CD by the Weeds, and after two hours, the master XT decided to stop locking to the slave ADAT. Stepping back to look at the XT proved I had a problem. Instead of the usual tape times, level meters, and other data, the display was showing a bizarre mishmash of electronic hieroglyphics. Reinitializing the XT didn't clear up the problem.

Alesis' Jim Mack revealed that a defective front-panel microprocessor was causing the problem. Alesis dutifully stopped the assembly line as soon as the situation was discovered, but Mack estimates that two percent of the 7,000 XTs shipped to date may have the faulty processor. The defect usually makes itself known in multimachine systems after they have been running for two to four hours.

Service memos regarding this problem have been shipped to all Alesis dealers, so if you experience the same fun and games I did, call your local dealer immediately. Obviously, if you've been running a multimachine system for days without any problems, you're probably in the clear.

In addition, just before we went to press, two of my XTs munched tapes. Only one tape was backed up, but we managed to save the other tape by opening the S-VHS cassette and splicing the torn ends together. Pretty scary! (This is where I should remind digital recordists that it's essential to back up your work after *every* session.) A little follow-up research cruising online pro audio forums and user groups confirmed that some other recordists have reported XTs devouring tapes.

Mack reported that this situation was also traced to the faulty microprocessor. In all, three problems can be attributed to this beast: the display malfunction, the tape munching, and the propensity of the XTs in a mixed system to suddenly take off and run in opposite directions from the ADATs during chase-lock. (I also experienced this malfunction when running a BRC-XT-ADAT-ADAT mixed system.)

According to Alesis, the microprocessor debacle will be solved by the time you read this. All XTs currently shipping should not exhibit any of the aforementioned "troubles." If you experience any problems, however, contact your dealer immediately.

X-T-C

I can't help admiring people who are passionate about their work. For example, I saw Sammy Hagar at the recent Winter NAMM Show signing autographs at the Washburn booth. He was goofing with fans and pumping the flesh like a hungry young artist promoting a debut album, instead of a certified superstar who has sold a bazillion records and wields enough clout not to have to care what the kids think anymore. To me, the fact that Hagar still *does* care (at least publicly), is class personified.

I feel the same way about Alesis. There are 70,000 ADATs out in the world, so the machine is a certified smash hit. The company could have rested on its laurels, but it didn't. It took the hits from ADAT users about transport problems, sync grievances, reliability concerns, and other complaints and made the XT a better, stronger, faster machine. Not only is this true class, but it states in big, capital letters that Alesis is committed to supporting and improving the ADAT format. Bravo!

Having said that, I must express my concern about the reliability of the first wave of XTs. However, Alesis publicly addressed the microprocessor problem—yet another example of the company's sense of responsibility to their customers—and the XTs now available should be running just fine (although we'll check the situation again when we do an MDM status report in our next issue).

The XT's improvements in sound quality, transport speed, and lock-up time alone are worth the price. Given that you also get some nifty BRC controller functions in the bargain, I believe that the XT makes recordists an offer they just can't refuse. And I'm walking it like I'm talking it, here: I just bought three XTs. ●

Product Summary

PRODUCT:
ADAT XT
PRICE:
$3,495
MANUFACTURER:
Alesis Corp.
tel. (310) 558-4530
fax (310) 836-9192
e-mail alecorp@alesis1.usa.com
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FEATURES	● ● ● ● ◖
EASE OF USE	● ● ● ● ◖
AUDIO QUALITY	● ● ● ● ◖
VALUE	● ● ● ●

Eventide DSP4000 Ultra-Harmonizer 2.0

By Peter Freeman

A top-of-the-line choice for creative effects processing.

Eventide has been around since the early 1970s, when its revolutionary Harmonizer first appeared. This powerful effects processor had a far-reaching impact on the way records sounded from then on, especially because of its pitch-shifting prowess. When the company's H3000 and H3500 Ultra-Harmonizers were introduced, they garnered high praise from industry pros and quickly became standards. (**EM** reviewed the Eventide H3000S in January 1989, the H3000SE in April 1990, and the H3500 in February 1993.)

Last year, the company introduced the latest incarnation of the Ultra-Harmonizer, the DSP4000, which represents a significant increase in power and sophistication. Version 2.0 firmware added more presets, algorithms, and DSP objects. Based on its history, this promised to be a monster unit, and I was eager to learn whether it fulfilled its promise.

FRONT-PANEL LAYOUT

On the surface, the design of the DSP4000 is similar to that of the H3000. The 2U rack-mount unit sports a large, brightly backlit LCD display with the familiar Eventide row of four soft keys beneath it. The LCD's top line shows the current Program name and display area in which you are working, and the bottom line reveals the labels for the soft keys. A Levels button switches the LCD to the unit's Level settings.

The Program, Parameter, Patch, Setup, and cursor keys sit to the right of the LCD, along with a 16-key numeric keypad and a large alpha wheel. Two user-definable buttons are located to the right of the keypad, and a PCM/CIA card slot for RAM cards lies below it. A pair of 10-segment LED ladders monitor the input levels. The Bypass button and Bypass and Mute indicators complete the front panel.

REAR-PANEL LAYOUT

The DSP4000 is a discrete stereo unit, i.e., the left and right channels are handled independently throughout. It has both balanced XLR (+4 dBm) and unbalanced ¼-inch (-10 dBm) stereo inputs and outputs on the rear panel, a

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I was floored by nearly all of this unit's effects.

welcome and far too rare combination. By including both types of analog I/O, Eventide has made it easy to use the DSP4000 in any studio or live-performance application. (There also is a guitar-specific version of the DSP4000, the GTR4000, which I'll discuss later.) The ¼-inch and XLR inputs can be used simultaneously; the two left-channel inputs are mixed, as are the two right-channel inputs.

Also on the rear panel are the MIDI In, Out, and Thru jacks; ¼-inch footswitch and footpedal inputs; a Relay output for controlling external devices, such as channel switches on instrument amplifiers; RS-422 in and out; and both AES/EBU (XLR) and S/PDIF (RCA) digital I/O. Eventide even left rear-panel space for future expansion. The entire interfacing

The DSP4000's presets deliver outstanding effects, but you won't begin to grasp the awesome power of Eventide's high-end multi-effects processor until you dig into its editing features.

scheme reflects careful planning for maximum flexibility.

GOING TO THE BANK

Version 2.0 of the DSP4000 OS includes a large selection of effects Programs, which are grouped into named categories and stored in Banks of various sizes (up to 128 Programs). You can create your own Banks and fill them with Programs until the available internal user Program memory is used up. The DSP4000 has about 122 KB of user Program RAM; Programs generally take up 400 to 8,100 bytes, so 122 KB of P-RAM is more than adequate.

The unit also can accept RAM cards in sizes ranging from 32 KB to 4 MB. Banks and Programs can be given long, descriptive names that employ both uppercase and lowercase letters, punctuation, and symbols, which can be extremely useful.

PARAMETER BASICS

The process of editing Programs is simple and quickly learned, particularly if you have previous experience with the H3000 family of devices. As soon as a Program is loaded, it can be edited. Hitting the Parameter button moves the LCD display to the first page of user-adjustable parameters. The four soft keys select other parameter groups for editing, and the alpha knob is always used to alter values.

Some of the DSP4000's parameters have more than one page. These parameters are displayed in the LCD as "stacked" icons above the soft key, with one button icon placed on top of another. The other "layers" in the "stack" are accessed by repeatedly pressing the soft key.

Throughout the factory Programs, parameter values are expressed in meaningful units such as decibels, hertz, and percentages. Occasionally, a few parameters in a Patch have more fanciful names, but they are always intuitively easy to grasp.

One very useful addition in version 2.0 is a Remote parameter, which is available in most Programs. This parameter provides an easy method of setting up external-controller routings (MIDI or footpedal/switch) to a desired parameter without a lot of button pushing. All you have to do is select the parameter you want to control and hit the Parameter button until the word *remote* appears above one of the soft keys. Pressing that key invokes a display prompting you for the desired controller. (The knob scrolls through the entire list of available controls, both within the DSP4000 and via MIDI and footpedals and switches.) Once chosen, the controller is routed to the parameter you selected. It's that simple.

THE PATCH EDITOR

You can plug in the DSP4000, connect it, turn it on, and immediately get great-sounding results with just about anything you send through it. It is conceivable that a musician could use the unit's factory Programs (aka Patches) exclusively, with some tweaking here and there, and get excellent results without ever creating a Patch from scratch. But it would be a great waste to ignore the unit's creative potential by just using the presets.

The real power of the DSP4000 lies in its Patch Editor, where the user can work at the most elemental level of effects creation. With an object-oriented environment similar to Opcode's *MAX* or Digidesign's *Turbosynth,* the Patch Editor provides a graphic display and working area in which individual DSP modules (building blocks) can be connected in a practically unlimited number of ways. In essence, this means you can actually create your own effects algorithms from scratch, according to your creative whim.

To this end, the Patch Editor provides a selection of 132 different digital signal processing objects (modules) to work with while creating effects Programs. These range in function from math and process-control modules—such as logical AND, OR, and NOT objects, envelope generators, sample-and-hold, and comparator objects—to prefabricated, dedicated pitch shifters, delays, and reverberators. (The range of modules is huge; see the sidebar "DSP4000 Categories.")

Admittedly, this sophisticated architecture sounds a bit daunting, and the unit is indeed quite deep. Fortunately, the DSP4000 manual is well written, detailed, clear, and generally concise. Eventide provides fairly complete descriptions of each preset Program and module, including its function, inputs, outputs, and recommended uses.

Tutorial examples aid in learning to construct Patches from scratch.

Furthermore, it is not necessary to be completely familiar with the inner workings of each object to program effectively. A general idea of their capabilities will suffice, as many of the more esoteric objects tend to come into play when one needs to accomplish a specific programming task.

One important feature of the Patch Editor is that entire Patches, not only DSP objects, can be inserted into a new Patch, DSP resources permitting. Practically speaking, this means you can create fairly simple Programs (which don't use a large percentage of the available DSP horsepower in the unit's two Motorola 56001 engines) and use them repeatedly within more complex Patches. This presents mind-boggling possibilities.

If you try to insert too complex a Program, however, you are presented with a "Patch too big" message. Perhaps some day Eventide will upgrade the unit to add more 56001s in parallel so you can use more sophisticated Patches within other Patches. As it stands, the unit already has more than enough "oomph" to create unbelievably lovely and complex Programs.

The specifics of using the Patch Editor have been substantially improved since version 1.0. The basic process works like this: If you wish to start from a completely blank slate, you first must load the "empty Program" Patch. Hitting the Patch key puts you in the Patch Editor, where you see only two objects—In and Out—which represent the DSP4000's A-to-D and D-to-A converters.

You can then insert any object from the available list by pressing the Insert soft key. This brings up the list, which is subdivided into the different categories of modules for easy access. After locating the desired module, you press the Select key, and the module appears as a rectangular box with its name inside in the display. You can keep inserting modules this way as long as you don't exhaust the DSP resources.

Connecting modules is simple. Hitting the Connect soft key yields a "connect what?" prompt. You answer by scrolling to the desired source module's control or audio input or output and pressing Select. The DSP4000 then displays a "connect to which output?" message, which prompts you to scroll to the destination input or output and press Select again. The display is immediately updated to reflect the new connection. Patches such as this are displayed as solid lines running between the modules.

As an aid to clarity, the Patch Editor allows the display to be "filtered" so only audio objects, control objects, audio and control objects, or miscellaneous objects (such as the Header and Menupage objects) are displayed. This gets more useful as your Patch becomes more complex because it's easy to create a dense forest of modules and connections and the DSP4000's LCD can only display a portion of the entire Patch at any given time.

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It would be a great waste to ignore the unit's creative potential by just using the presets.

Eventide has come up with a fairly good solution to the problem of limited LCD real estate: bidirectional scrolling. The Scroll soft key toggles between horizontal and vertical scrolling, accomplished using the cursor keys and the knob, for the entire Patch display. Thus, the entire Patch, including all connections, can be viewed a portion at a time. Of course, a computer-based graphic editor would be great, but this is a reasonable solution.

Objects can be deleted with the Delete soft key, and specific connections can be removed with the Unplug soft key. The biggest addition to these object-management keys in version 2.0 is the Modify key, which allows the currently highlighted module's parameters to be displayed and edited. Hallelujah! In version 1.0, no modifications to an object were possible once the object was inserted after the initial setup. If you decided later that you wanted to change something about a particular object, tough luck; you had to delete it and reinsert the module again, going through the whole object-setup process. That headache has been alleviated.

Furthermore, virtual knobs are automatically created for user-adjustable parameters in any object as soon as it is inserted. You also have the option of not using these knobs and instead creating knobs and menu pages for the module from scratch. (This is necessary if you want the module's parameters to be addressable by the Remote function; automatically created knobs won't work here.) But the Autoknob feature often saves immense amounts of time and effort.

Being an effects-control freak and incurable knob twiddler, I found working with the DSP4000 an engrossing experience. To a considerable extent, you can let your imagination dictate what a Patch will do and how its interface will look and behave. This is a real innovation in outboard processing equipment; no comparable piece of gear gives you this level of detailed control over both the effect you are creating and the ways in which it will be controlled and adjusted.

Delving deeply into this unit requires focus, patience, and lots of time. You'll have to get acquainted with the Patch Editor's concept and the behavior and function of the individual modules. If you are mainly interested in sifting through presets, you might be better off with a less powerful (and less expensive) device. On the other hand, if you enjoy creating effects programs from the ground up and crave an extremely high degree of control, this is *the* box to get.

HEAVENLY SOUNDS

One expects top-notch sonic quality from an Eventide processor (particularly in this price range), and the DSP4000 delivers it. I was floored by nearly all of this unit's effects.

The DSP4000's pitch-change algorithms rule supreme. In particular, I loved the ability to create eight (!) different, simultaneous pitch shifts, including diatonic shifts. The DSP4000 tracks pitch exceptionally well and provides a user-adjustable pitch "window" that focuses the pitch-detection circuitry on a specific range of pitches to aid in speedy harmonization. This feature first made its appearance on the H3000, and I find it is equally helpful (sometimes essential) here.

One area in which the DSP4000 is clearly superior to its predecessors is harmonizing low-frequency sounds. As a bass player, I am often disappointed that most harmony/pitch-change devices (including the H3000) seem optimized for higher-register sources, such as guitar, keyboards, and voice. Although not surprising, this makes it hard for bass players to explore these boxes. I was extremely happy to find that the DSP4000 can handle bass and other low-frequency sources very well indeed—better, in fact, than any other unit I've tried.

I also loved many of the Reverb and Ambience algorithms in the DSP4000, particularly a long, expansive, concert hall-type reverb called "Black Hole." Delays are handled exceptionally well. Especially noteworthy is the unit's capability to create delays adjustable in 0.001 ms increments, thanks to the use of sample interpolation.

The factory presets include many useful filtering Programs, from straightforward EQ to envelope-following

DSP4000 Categories

Effects Categories	Reverb, Pitch, Delay, EQ/Filters, Chorus/Flangers, Small Spaces, Room Reverbs, Hall Reverbs, Plate Reverbs, Alternative Verbs, Vocal Processors, Drum Processors, Guitar Effects, Dynamics, Distortion, Mastering Suite, Mixdown Suite, Post Suite, H3000 Emulation, Bizarre, Curiosities, Multiple Effects
Module Categories	Bridge, Control Math, Control Process, Delay, Detector, Dynamic, External, Filter, Interface, Math, Miscellaneous (e.g., a control-signal sequencer object), Mixer, Oscillator, Pitch Shift, Reverb

filters and such exotica as formant generators (my favorite). The dynamics Programs include an assortment of compressors, limiters, and duckers.

Another category of the factory presets, called "Bizarre," highlights some of the more unusual and esoteric possibilities of the DSP4000. I found these interesting not only sonically but as good examples of unusual patching configurations. For example, the "Fantasy Backgrounds" Program uses the unit's noise module, patched through filtering, to actually transform the DSP4000 into a sound source, with parameters provided to control its sweeping, gliding, ambient textures.

One nice aspect of the Patch Editor design is that you can reverse-engineer a Program you particularly like simply by hitting the Patch button and examining the way the various modules are interconnected. This is a good way to learn the intricacies of creating Patches from scratch.

TYPICAL APPLICATIONS

To get an idea of the DSP4000's power in practical terms, consider the following example. Within a single project I was working on during the review period, I needed (on different occasions) high-quality long reverb, stereo multitap delays, multiple simultaneous pitch shifts, and envelope-controlled multiple filters. The DSP4000 handled all of these effects effortlessly, and I never even had to use the Patch Editor. I started with existing factory Programs and twiddled parameters to get the exact results I wanted.

In the case of envelope filtering, I wanted two filters that would sweep in opposite directions in response to the amplitude of the input signal. All I had to do in this case was load the "Envelope Filter" Program, which contains two independent filters, and adjust the modulation on one of them into the negative range while leaving the other's modulation setting positive. *Voilà*—quick 'n' dirty envelope formants.

Later during the same project, I thought it would be interesting to have a pair of distortion devices and filter each independently with different filters using different sweeps. I used the Patch Editor to create simple (and crude) distortion by putting a few Gain modules in series. Then I placed two MultiFilter modules after the Gain modules to get the filtering effects. I added LFO modules to sweep the filters and was soon working with the nearly finished Program.

MIDI IMPLEMENTATION

In addition to having the Remote parameter used in many Programs, the unit has the ability to send and receive MIDI System Exclusive messages when any parameter is adjusted in any Program. With this feature, an external sequencer can be used to automate DSP4000 effects-parameter changes. Of course, System Extension Program dump and load (single Programs only) is provided. The unit can also send and receive setup information (e.g., LCD display settings, digital/analog I/O configuration, and MIDI configuration) via MIDI.

Output levels, wet/dry mix, and bypass/mute are all MIDI controllable. MIDI Program Change is supported, and the unit can operate in Omni and Poly modes, so specific Programs can have their own MIDI channel.

Two other special functions can be addressed via MIDI: Next/Previous Program works like a Program advance/decrement footswitch, and Trigger Event is intended for DSP4000 Programs that require an external trigger event. For example, many of the Programs in the "Post Suite" Bank generate sound without any audio input and require an external trigger.

According to Eventide's technical department, a promised subrelease of version 2.0 will include the ability to "learn" incoming MIDI messages to make setting up remote control of effects parameters easier. This is already implemented in the GTR4000 and will be a welcome addition to the DSP4000.

DSP4000 Specifications

Dimensions	3.5 × 19 × 15.5 inches (2U)
Weight	12 lbs.
Sample Rates	32, 44.056, 44.1, and 48 kHz
Distortion	0.005% nominal (@1 kHz); 0.003% typical
Frequency Response	5 Hz-20 kHz (±<1 dB)
S/N Ratio	>96 dB (A weighted)
THD + N	87.5 dB (@ -40 dB)

ENHANCEMENTS

There are a number of important hardware and software options for the DSP4000. First on the list is the Sampling board, which provides greatly expanded sampling time. This board comes in three flavors. The basic ($995) version adds 23 seconds of sampling time at 44.1 kHz and 22 seconds at 48 kHz. A second version ($1,995) adds 95 seconds of sampling at 44.1 kHz and 87 seconds at 48 kHz. The top-of-the-line board ($2,995) expands the sampling time by 190 seconds at 44.1 kHz and 174 seconds at 48 kHz.

All varieties of this board include a firmware update containing presets specific to the Sampling module, and this extra sample memory can be used by certain other modules. For example, it can be used with the Delay module to provide extremely long delay times.

Eventide plans to offer a ROM card (price tba) containing 50 effects presets created by Flood (producer for U2, Depeche Mode, Smashing Pumpkins, and many others). Yet another card, which is already available for $249, contains a Mastering Lab package of presets—including compression, EQ, full dynamics processing, and de-essing—with graphic metering.

The company also offers the GTR 4000 ($3,995), which is basically the DSP4000 with a different set of guitar-specific presets and without the digital I/O capability, which can be added as an option. This unit is a great choice for guitar and assorted live-performance applications.

I CAN'T GET ENOUGH!

Great as it is, I still have a wish list for DSP4000. First, I'd like to have an add-on coprocessor board to boost the amount of DSP horsepower. Occasionally, when trying to create very complex Patches, I ran out of resources. Admittedly, this happens pretty rarely, but it would be great to be able to expand the unit's capabilities in this area.

Second, a computer-based, software front end for the Patch Editor would be extremely welcome. There is currently a text-based one (written by Richard Zvonar and available from Eventide), but a *MAX*- or *Turbosynth*-like graphic editor would be the best solution. Working on the LCD for long periods of time can be fatiguing due to the physical nature of the process and the small size of the LCD relative to the size and complexity Patches can achieve. According to Eventide, such a graphic editor is under development by an unnamed third-party software developer. However, it has yet to materialize.

RISING TIDE

My feelings about the DSP4000 could be summed up in this statement: "This box is the greatest; get one now." I have no doubt that it represents some of the best professional effects-processing technology commercially available.

Being state-of-the-art, it is not cheap. However, this is a lifetime investment. Reverberation, pitch change, delay, compression, and the like will always be in demand, and the DSP4000 does these things (along with many others) extremely well.

No other commercially available hardware device combines great sound with anywhere near this much power and control. I've never heard better pitch change, and I use the reverb Programs even more than those on my trusty Lexicon PCM 70 (which is a great reverberator). For a musician/producer or mixer who wants in-depth and creative effects processing, the DSP 4000 is simply the best choice.

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

Product Summary

PRODUCT:
DSP4000
Ultra-Harmonizer 2.0
PRICE:
$4,995
MANUFACTURER:
Eventide, Inc.
tel. (201) 641-1200
fax (201) 641-1640
e-mail 75300.2463@compuserve.com
Web http://www.eventide.com
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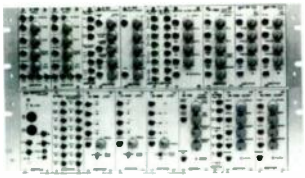

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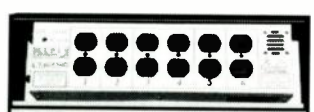

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TECH PAGE

In Hot Water

A new instrument makes a splash at NAMM.

By Scott Wilkinson

One of the best things about going to the NAMM show is trying out all the new gear. However, this fun is not without its price: tired, aching feet. After the first day on the floor, the most common reply to the question "How are you doing?" is "My dogs are barking!"

This year, a new company introduced an amazing product that addresses both of these issues: the SpaSynth. Developed by NepTunes, Inc., of Oceanside, California, the SpaSynth combines a revolutionary synthesizer workstation and a hot tub, which lets you make music while you're in the tub.

The primary designer of the SpaSynth is Noah Wasserman, an audio engineer whose credits include the soundtracks for such notable films as *Splash, WaterWorld,* and *Hot Tubs, Part Deux.* He has spent a lot of time in various studios, where he got the idea for SpaSynth. "The studios I used had hot tubs," Wasserman recalls, "but once the musicians got in, I couldn't get them out, which delayed the release of several projects."

The SpaSynth's primary control interface is a waterproof keyboard with water jets instead of modulation and pitch-bend wheels. Internal sensors measure the variable water flow and hydraulic impedance as you move your hands and feet near these jets. Matching transformers convert between line level and water level, which is measured in glugabytes (gB). The information from the sensors is used to modulate the sound in various ways as determined by a series of Dual Redundant Inline Package (DRIP) switches.

The synth engine uses several techniques to generate sound, including wavetable and waveguide synthesis. In addition, a number of pulsating jets are actually water-controlled oscillators (WCOs), which help to generate the increasingly popular timbres of Whirled Music. As you might imagine, the CPU uses floating-point arithmetic.

The water-controlled filter (WCF) can be highpass, lowpass, or bandpass, but it must be cleaned once a month to prevent the loss of unintended frequencies in the accumulating goo. If you don't keep the entire spa clean, you could have SCSI problems, and you must keep it clean to defeat SCMS. The effects include a wet/dry mix, which can be controlled by how much of your body is in and out of the water.

The SpaSynth is fully compatible with MIDI, and it implements a newly proposed addition to the MIDI spec:

FIG. 1: The SpaSynth can be played from an external MIDI controller, such as this keyboard.

MIDI Hot Tub Control (MHTC). For example, one of the new messages within MHTC is Water Pressure, which is converted to Channel Pressure for external MIDI devices.

MHTC also lets you play the SpaSynth from an external controller (see **Fig. 1**). In fact, one person can play the controller while another person modulates the sound from within the hot tub. The only problem with this approach is deciding who gets to be in the spa. There were several loud disputes over this during the demos I saw; when one particularly haggard fellow lost his bid to be the in-tub modulator, he muttered, "It's time for a sea change around here." Of course, he was a bass player.

The SpaSynth's sequencer records all MIDI data, including MHTC messages. This lets you synchronize the water jets to the music, providing a multisensory experience that goes way beyond simple sound and light coordination. The demo disk includes such favorites as Handel's *Water Music,* Debussy's *La Mer,* "Bridge Over Troubled Water," "Old Man River," and "Sea Cruise."

A prototype SpaSynth was set up in the company's hotel suite. They tried to limit demos to the press and potential venture capitalists, but the word soon got around the show. By the second day, the line of people wanting to try the new instrument stretched around the hotel. Being a member of the press, I was allowed to cut in front of the waiting throngs despite their noisy protestations. My feet were happily doing the dog paddle as I jammed along with "Splish Splash."

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*KB-3 Harmonic Synthesis Mode available 1996.

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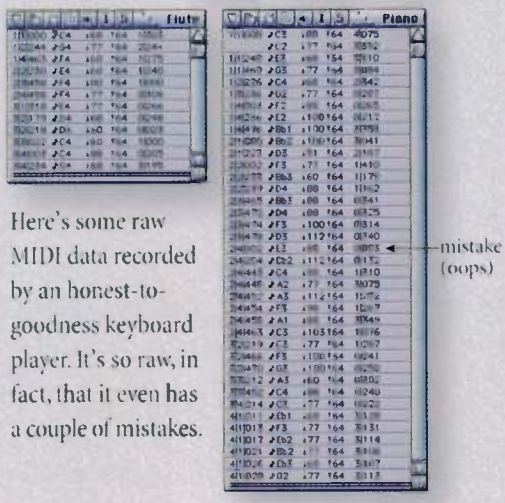
The bait

"FreeStyle's automated transcription abilities are the best we've ever seen!"
—Keyboard Magazine

The switch

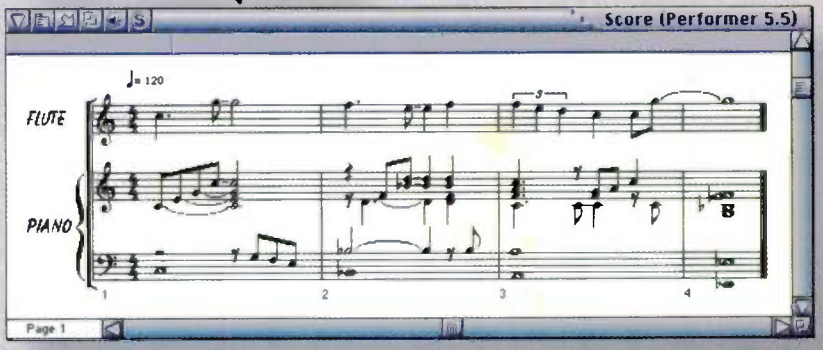
Keyboard was so impressed with the notation transcription in FreeStyle that we decided to put the same technology in Performer 5.5. Floating split points. Multiple voices per staff. Correctly notated swing eighths. N-tuplet recognition. It looks great — more readable than ever before.

The MIDI file



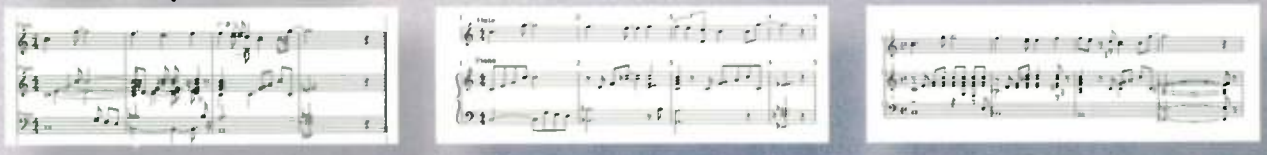
Here's some raw MIDI data recorded by an honest-to-goodness keyboard player. It's so raw, in fact, that it even has a couple of mistakes.

The transcription



Here's how Performer 5.5 transcribes it. Notice the arpeggio that's tied into a chord. The polyphonic voicing. And how the mistake in measure two is ignored. Just think how nice it would be to get notation this readable — instantly.

The competition



Here's what we got when we transcribed this MIDI file in some other sequencers. Seems we've lost a few items in the crowd. One of these examples is even a popular music notation program. Try sitting down and playing one of these ditties.

The taste test

Download this standard MIDI file from our web site and try it with the program you're using now. Does it look as good as it should?

The upgrade

PowerPC native. New Tracks Overview. New Notation Transcription Engine. Multiple Takes. Non-destructive Output Processing. MIDI Arpeggiator/Harmonizer/Echo. Mixing Board. Multiple Mixdowns. MIDI Scrubbing. Smart Selection™. Global Selection. Built-in QuickTime Movie Window. Built-in QuickTime Instruments.

:Performer 5.5

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