Video for Windows • Atari Falcon030

Electronic Musician

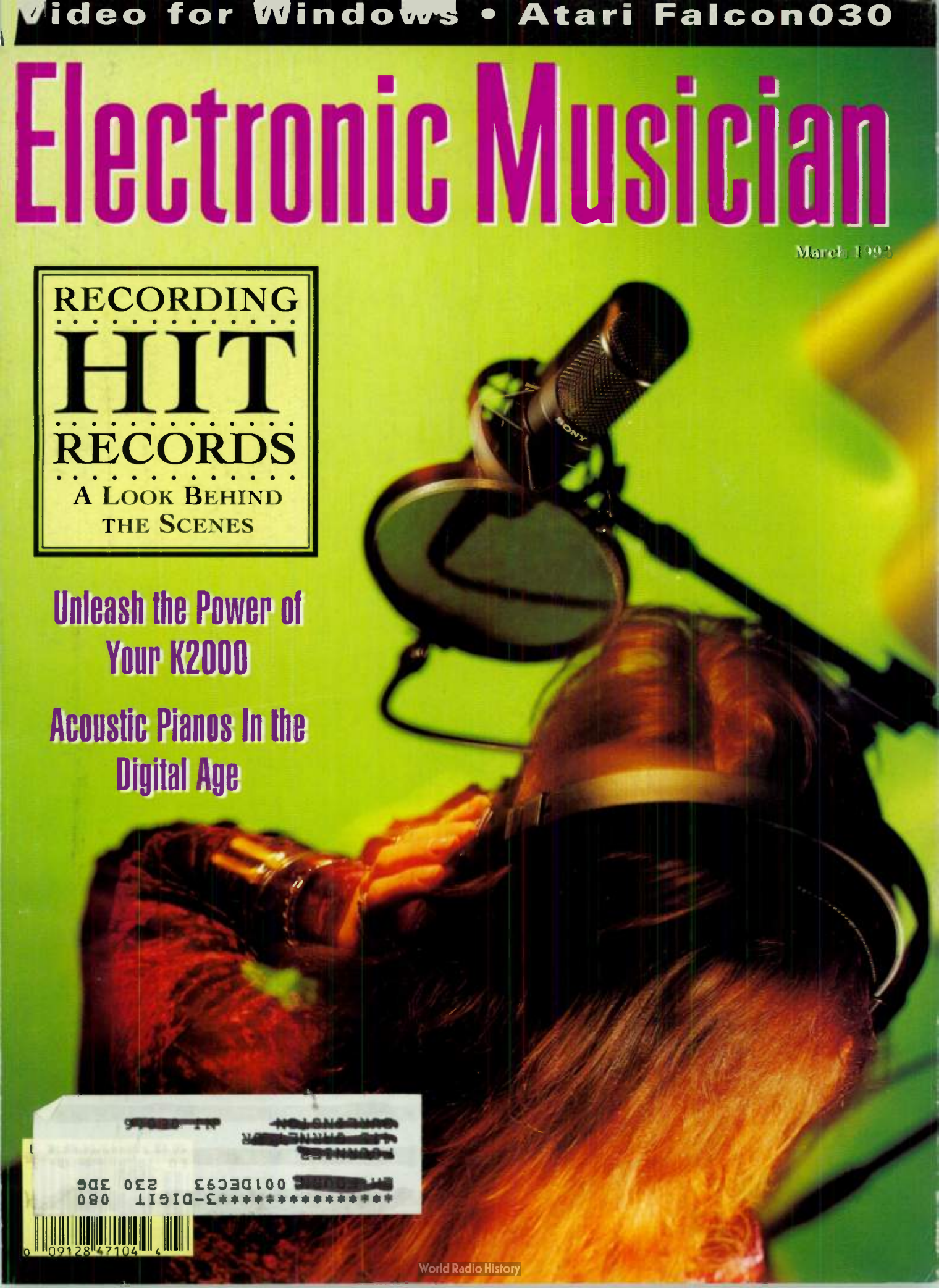
March 1993

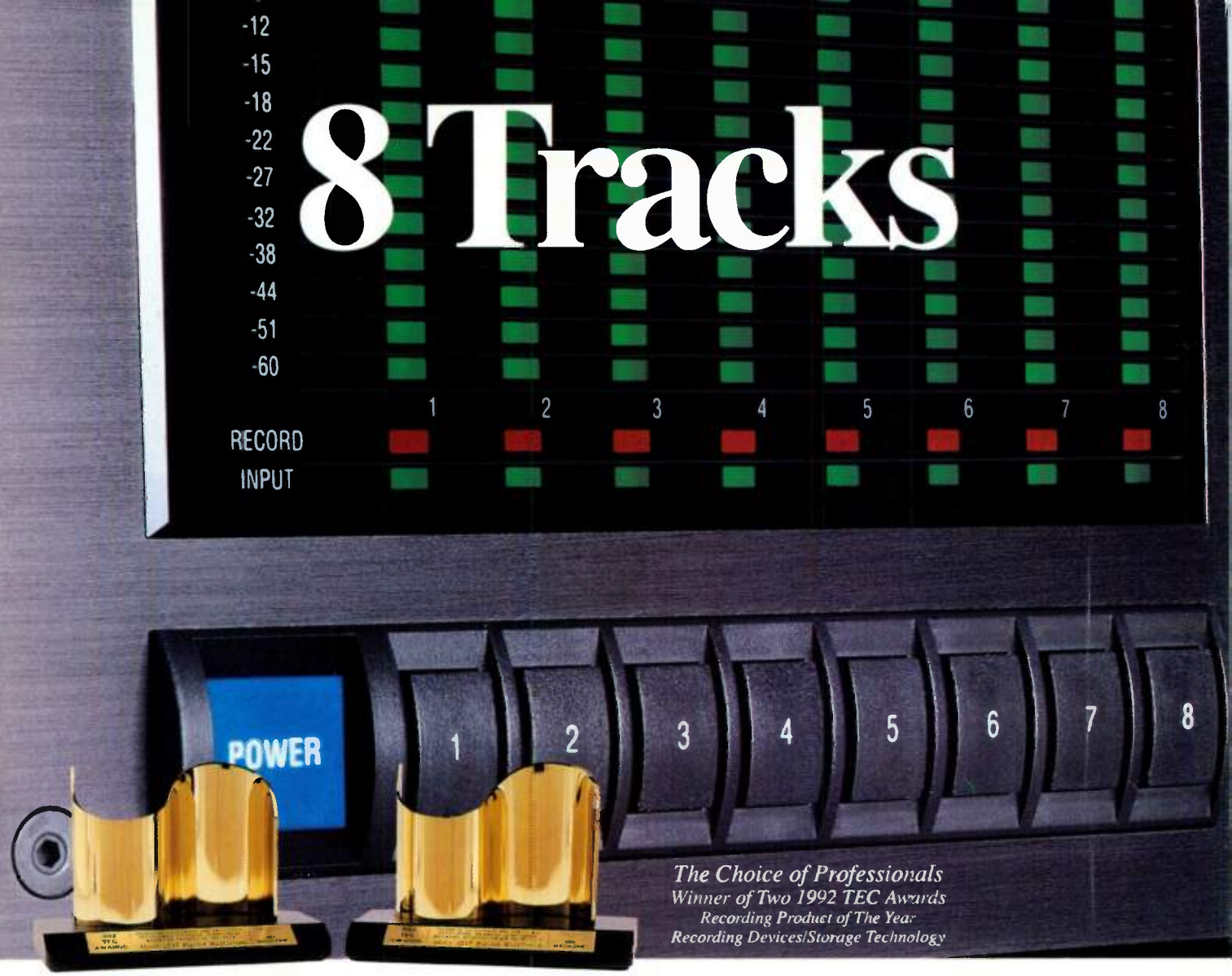
RECORDING HIT RECORDS

A Look Behind the Scenes

Unleash the Power of Your K2000

Acoustic Pianos In the Digital Age





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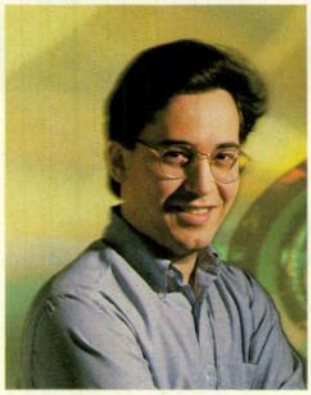
Behind the Scenes

Get a sneak peek behind the scenes with **EM**'s new All-Access Pass.



ANNE HAMERSKY

As much as I enjoy going to the movies, I'm even more intrigued by what goes on behind the scenes. I love seeing how individual shots are filmed, how special effects are created, and how all the pieces come together into a finished product.

I used to attribute much of this interest to my fascination with the creative process, particularly the technical side. But with the proliferation of "The Making of..." videos and television specials, as well as behind-the-camera clips on entertainment shows, it seems that the process of creation has a much more universal appeal.

Of course, this appeal extends to the world of audio production. By working with currently available electronic music gear, most of us have already discovered and used some of the tricks used in pro-level production. But in the back of your mind, I'm sure that many of you want to know more. What exactly goes on in a professional recording session? What specific kinds of equipment are used? What techniques are employed? Who's responsible for what? How much of the final product is assembled after the musicians go home?

To answer these questions, we've come up with a new idea: **EM**'s All-Access Pass articles. Like the much-coveted ticket from which their name is derived, these articles reveal what few people get to see: the inner workings of professional audio projects. Every few months, **EM** will look at a different type of project, from records to film scores to jingles to audio post-production. In addition to sating your curiosity about how the pros do it, we hope you'll pick up a few ideas to apply to your own endeavors (even if you're already a professional). We begin the series this month with "Recording a Hit Record" (see p. 24), an in-depth discussion with professional engineers about how they create the sound of top recordings.

On a more philosophical level, many people wonder about the creative process itself. How and why do we create what we do? Countless books and articles have been written on the subject, but very few address the topic from the perspective of electronic musicians. Specifically, what is the impact of technology on creativity? It's a fascinating question without easy answers, but it requires our consideration if we are to fully realize our potential as musicians in the electronic age.

One of the best ways to examine this issue is by entering into a dialog with other musicians, which is exactly what we've done in "The Microchip Muse" (see p. 48). This article offers individual, and sometimes conflicting, statements rather than definitive conclusions. The goal is to stimulate a discussion in which we hope you will participate by writing to us with your thoughts on the subject.

Finally, for you Atari fans, this month's "Computer Musician" column (see p. 75) offers a hands-on preview of the company's eagerly awaited Falcon030 computer. Although Atari has shifted its emphasis from computers in the U.S. market for the last few years, the Falcon's inclusion of low-cost, hard-disk recording capability raises the stakes for music computers and offers hope that the company may once again become an active force in the music industry.

Enjoy the issue.

Bob O'Donnell

Electronic Musician

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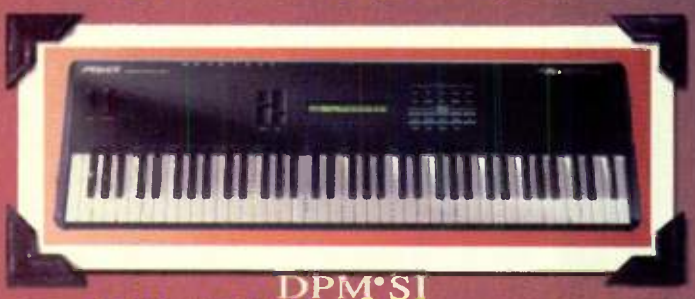

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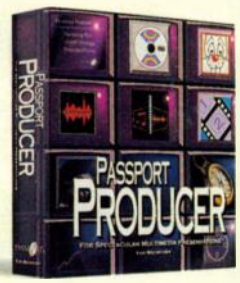

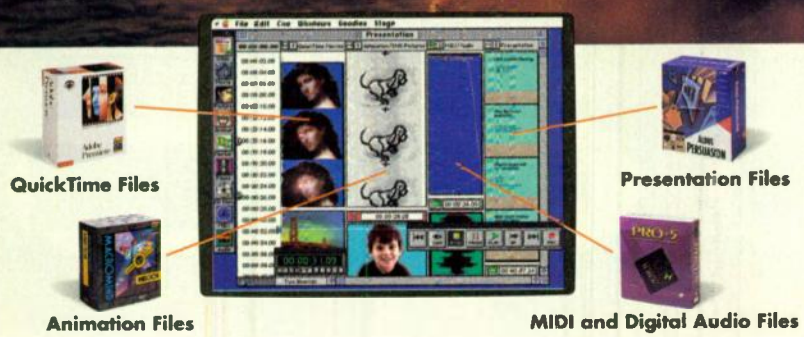

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LETTERS

LIKE GOOD CHOCOLATE

I received the January 1992 issue of EM, and the usual thing happened: I planned to read only one article a day to make it last. An hour later, I had read EM from cover to cover! Oh well, I do the same kind of thing with good chocolate.

I really enjoy your magazine, and in spite of the letter-to-the-editor critics, I feel you have just the right blend of articles. There is something in EM for everyone.

Douglas R. Thompson
Hyattsville, MD

HOLY HYPERCHORD

Your January issue covered a subject dear to my computer heart ("The Musicians's Apprentice"), but I detect a serious oversight that your readers should be aware of. The author's statement "If you're an Amiga owner, your only choice is *SuperJAM!*" is incorrect, as evidenced in my March 1992 review of *Hyperchord* by Hologramophone Research.

I love this program, as it produces sounds from my MIDI equipment that I never knew existed, and it is the only music program I use on the Amiga. As a side note, an even more powerful version of *Hyperchord* is due shortly on the IBM platform. I hope to read a review in EM soon.

Otto von Ruggins
Brooklyn, NY

GOOD, CLEAN COOL

Thank you for the useful article on user's groups ("From the Top," December 1992). Also, thank you for keeping your magazine in good taste. While not wishing to disparage other magazines, I find it disturbing and an unnecessary turnoff to see so much profanity run rampant in *Keyboard*, *EQ*, etc. Someone at EM seems to have the good sense to keep out the bad spirit of people demeaning one another in their letters (particularly in *Keyboard*).

Although you became overly high-tech and specialized in the past (which has limited usefulness for the average reader), you've mellowed out, it seems. And you know how to keep your magazine cool, even without all the gutter talk. Thank you, thank you, thank you!

Todd Fishkind
Pasadena, CA

ANOTHER DIY FAN

I really enjoy your publication and will continue to be a faithful subscriber. I noticed the letter from Carl A. Dennis, the DIY devotee ("Letters," December 1992). I, too, am a fellow DIYer and really enjoy building gear to better equip my studio. I was surprised to see in the index of 1992 articles (located in the back of that issue) there were only three DIY articles for the whole year. Far too few! Not saying they should be in every issue, but one every two months would be enough to keep us busy.

I hope with the help of folks like Jules Ryckebusch, you can at least get in four in 1993. Not only are these projects fun to build, but most work great and often rival the off-the-shelf stuff. You print them, we will forever build them. Thanks, and keep up the outstanding work!

John Brown
Recycled Sound
Afton, TN

John—Thanks for the feedback. We are, in fact, planning four DIYs for 1993.—Bob O'D

THE NAKED TRUTH

With lustful joy, I congratulate you and Mark of the Unicorn for using a deliciously naked male species for its ad (December 1992, p. 53). Women rejoice! We have finally been included in the advertisers' list of seducible buyers. A naked man with a computer: my greatest fantasy. Girls, don't you agree?!

Hayley Moss
Address Unavailable

FATHER KNOWS BEST

Pretending the music business has anything to do with making music presents a contradiction that is very apparent in the two columns by Michael Molenda ("Pro/File" and "Working Musician") in the December 1992 issue.

Artists such as Aaron Copeland, Anthony Braxton, and Sun Ra are underrecorded and virtually ignored by an industry rushing to do anything to maintain high profits. The emphasis on music-as-commodity was obvious in both of Molenda's articles, from his statements regarding style and "market niche," to his comments regarding Kitaro's "battered synthesizers."

Don't go nuts, Mr. Molenda: I'm a 40-year old father, with a mortgage, car note, etc. For the past thirteen years, I have played analog synthesizers in the New York City band Alien Planetscapes. As musical director, I choose musicians on the basis of mutual interest, not age, race, or ethnic or religious origin. Music is all that counts here. A hundred years from now Nirvana will be a footnote, and guys like Sun Ra will be celebrated because it's about the passions, trials, and the complexity of expression. In other words, it's about music.

Doug Walker
St. Albans, NY

Doug—I fully support the belief that music—as opposed to music "business"—should be celebrated for its passion. I consider myself a committed and passionate artist, and I mourn the record industry's

MARK FOX

bottom-line approach to music. (Coincidentally, my band Silhouette opened for Sun Ra at San Francisco's Mabuhay Gardens in the late 1970s.) However, I've also mourned too many burned-out musicians—some of them quite brilliant—who are so devastated by failure that they can't function in society. Unfortunately, squeezing money and fame from a music career usually requires the intrusion of business and marketing realities. And let's face it, few artists seek unfettered devotion to the muse without thought of reward. I've never shied away from showing ambitious musicians what they're up against. I'm tired of seeing business-oblivious musicians smashed against the wall of commerce. I wish music were "all that counts." But beyond the realization of our personal creativity, we also must eat and pay rent. If you want music to pay your bills, I maintain that forewarned is forearmed. (P.S.: I'm on your side, Doug!)—Michael M.

MUSICAL NOTES

Mac MIDI Update

Apple Computer has introduced a new System Enabler to solve the MIDI problems (and a few other anomalies) that plague the IIvx and Performa 600 computers. The updated software is Enabler 001, version 1.0.1, dated Wednesday, November 25, 1992. (To find this information on your software, use command-I.) Performa 600 owners can call Apple at (800) SOS-APPL to receive a copy; IIvx owners must contact their dealer. At press time, the company was still working on a solution to the PowerBook problem.

Healing Through Music

The Musicians Institute in Hollywood is spearheading the "Help Heal L.A....Through Music" songwriting contest. Songwriters are asked to submit material that is positive and inspires a sense of unification among people. A prestigious panel of industry professionals from record companies, music associations, and celebrity songwriters will serve on the judging board. Submissions for songs will be accepted until April 15, 1993, and the winning song will be formally unveiled during a celebrity benefit concert. Money raised will help several charities that support the rebuilding of Los Angeles. For further information contact the Musicians Institute at (213) 462-1384.

BE CREATIVE

Wait! Don't disable the velocity sensitivity of that wind controller or receiving synth as suggested by Scott Wilkinson ("Letters," January 1993). There are plenty of uses for the Velocity messages sent by wind controllers; do not limit your creative options.

Sure, as you state, it isn't appropriate to control the dynamics of a sustaining patch with Velocity, but it can make sense to have the Velocity modulate attack time, either of the dynamic envelope, pitch envelope, or both. The smartest $40 I ever spent was for a Casio DH-200 wind controller out of a close-out catalog. It sends Velocity and Aftertouch and requires far less breath pressure than a Yamaha (which costs, what, twenty times as much?). Sure, the Casio won't allow you to bend pitch by biting the "reed" as does the Yamaha, but here's where using the Velocity to control the pitch envelope attack time can come in handy. Also, it has a Portamento (CC #65) on/off switch, which can, in conjunction with Velocity being routed to portamento time (which some synths can manage), give you good control over pitch bends.

I caution people against using the wind controller Aftertouch (or Breath Control) data to only control Volume (CC #7) because the swells and fades of an acoustic instrument have a good deal more character than a simple potentiometer. Route it to the filter, the "brightening" FM operator, LFO intensity, pulse width, or whatever you have. Experiment!

Jeffry Steele
Turners Falls, MA

Jeffry—I wholeheartedly concur that experimentation is the key to wind-controller enlightenment and that the Velocity value from a wind controller is useful for many things. However, not all instruments let you disable Velocity from controlling initial volume and enable it to control other parameters at the same time (the Kurzweil K2000 is one instrument that does allow this.) I also agree that using Aftertouch or Breath Controller to control volume alone is a serious waste of good MIDI messages; I use them to control volume, timbre, LFO depth, and any other parameters I can find. By the way, the list price of a Yamaha WX11/WT11 wind controller/tone module setup is $995. But you get much more capability than reed-triggered pitch bend, including a 7-octave range, a far broader palette of sounds, and a MIDI In port on the sound module. The list price for a WX11 wind controller without the tone module is $505.—Scott W.

HOLDING THEIR BREATHS

In the September 1992 "Grounding—Power to the People" article, you imply, somewhat vaguely I admit, that if I use balanced cables for my guitar (even with single-coil pickups in a room full of fluorescent lights and dimmers?) that all the unwanted noise will magically disappear from the audio signal. Please try this and answer in the "Letters" column; thousands of guitarist and recording engineers are holding our collective breaths, awaiting the results.

Roshan Kumar
Waialua, HI

Roshan—The two "On Solid Ground" articles were about reducing grounding problems, not eliminating all forms of system noise. The issue of ground loops in balanced versus unbalanced lines was mentioned in Part 2, in the October 1992 issue. We discussed how to minimize ground loops and induced hum in the cabling system, not how to eliminate noise at the source. Most single-coil pickups are inherently noisy devices, and using a balanced cable will not reduce the noise they generate; you need a dedicated noise-reduction device to achieve that. A balanced line should keep the cable from inducing additional hum.—Steve O.

We welcome your feedback.

Address correspondence to "Letters," Electronic Musician, 6400 Hollis St. #12, Emeryville, CA 94608. Published letters may be edited for space and clarity.

Corrections to articles are listed at the end of "Letters." We compile these published corrections annually; to receive a copy, send an SASE to "Error Log Listing" at the above address.

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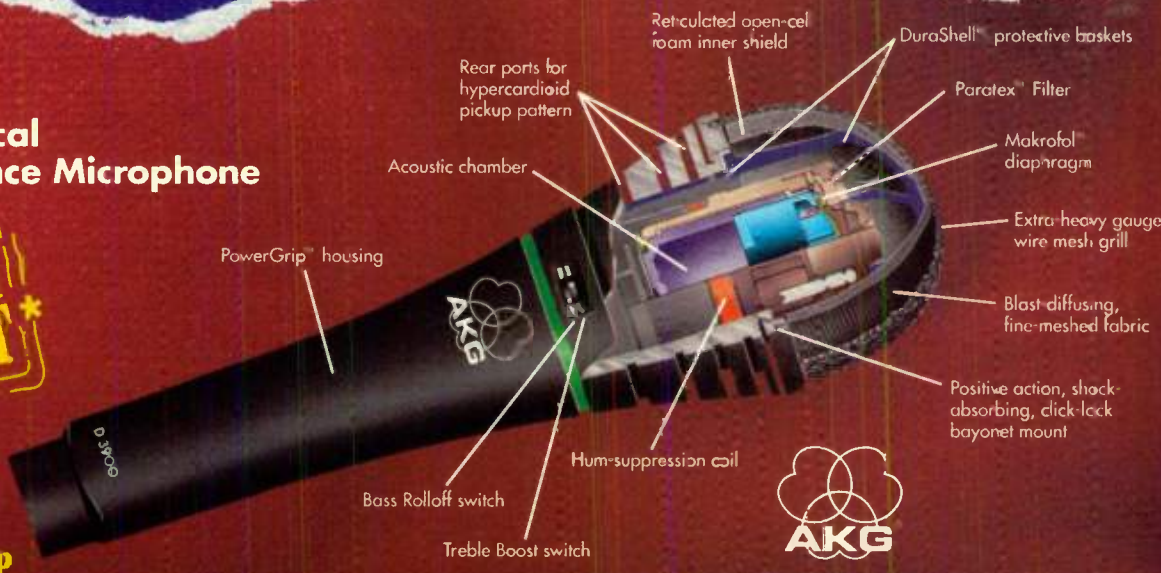

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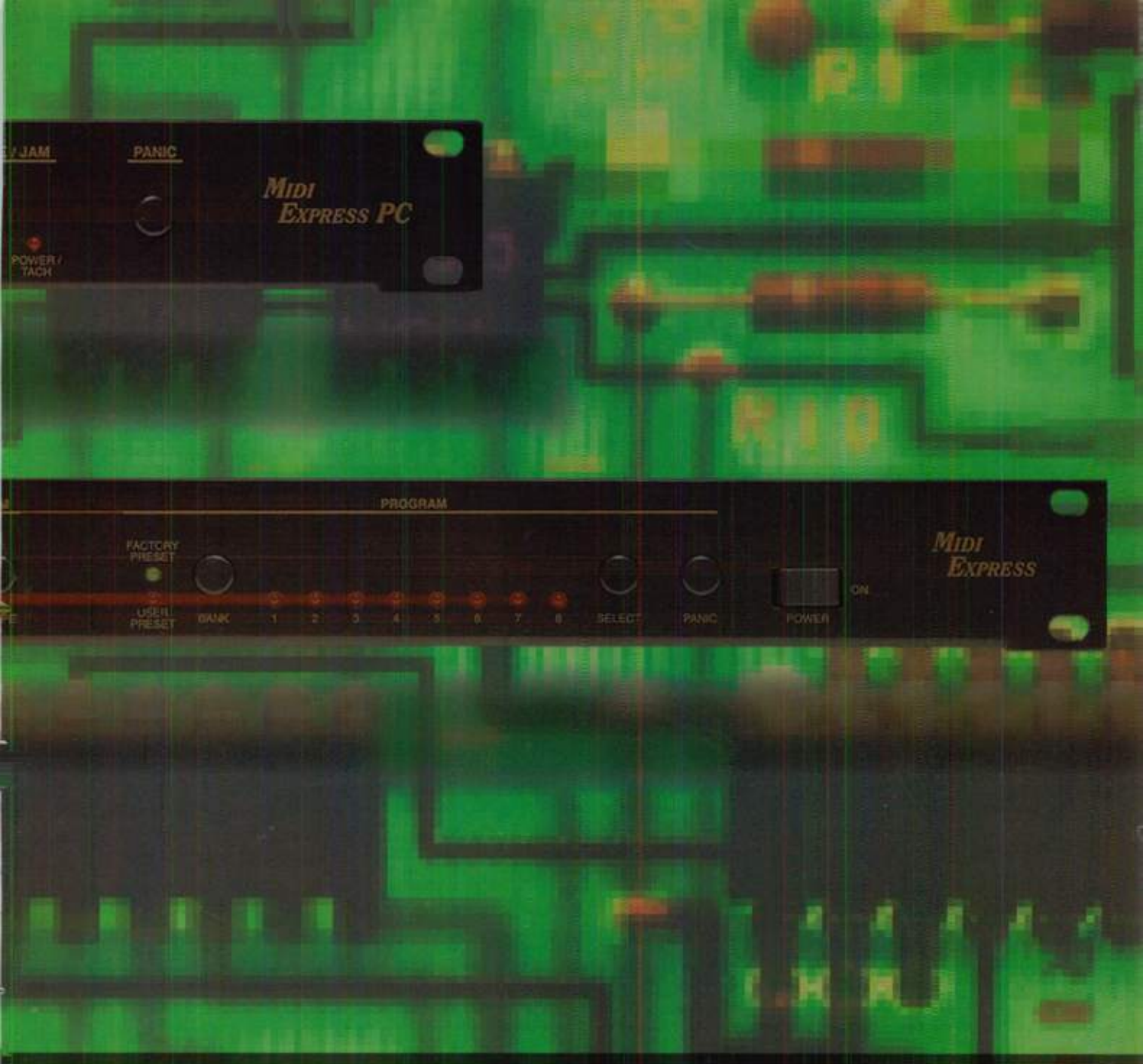

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PianoDisc™
Brings Your Piano To Life

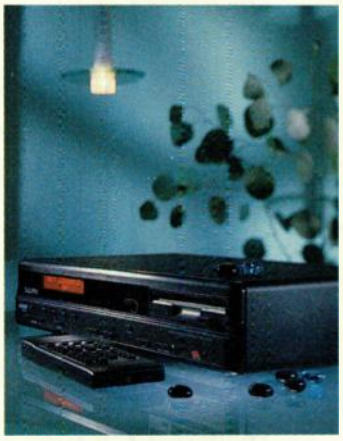
- *Easily fitted to virtually any piano – old or new; grand or upright; European, American or Asian*
- *Full individual note expression – 128 levels of volume per note*
- *Easy one-touch operation, either on the control unit or by remote*
- *Fully MIDI compatible, recording up to 16 MIDI channels at once*
- *Records and exactly plays back original piano performances with record option*
- *Plays solo piano or adds full orchestral accompaniment*

- *Built-in 256-voice, 32-note polyphonic tone generator*
- *Attractive and compact control unit that operates from as far away as 100 feet*
- *Extensive library of pre-recorded music with over 1300 selections*
- *Pre-recorded diskettes offering a full hour of music*
- *Extended play diskettes – up to 2-1/2 hours – available*
- *Volume and tempo adjustment*
- *Key transposition*
- *Random shuffling & repeat of songs*

Passion. Exhilaration. Joy. Serenity. The piano can bring about a full range of emotions, opening up a world of excitement and wonder. Now, the PianoDisc Symphony can be your resident pianist, providing live entertainment any time, any place.

A 21st century version of the player piano, the PianoDisc Symphony is a compact device that transforms virtually any piano into a highly sophisticated music reproduction system. The simple touch of a button – either on the control unit or by wireless remote – can enrich any environment with the drama of live music.

Lush strings. Dynamic brass. Rich textures. And real orchestral sounds. The PianoDisc Symphony combines all these musical wonders in an attractive, low-profile unit. Sleek and versatile, it can be placed as far away as 100 feet from the piano and still maintain optimum sound quality.



The constantly expanding PianoDisc Symphony library offers hours of varied entertainment, with selections to match any mood or suit any style. And when you perform your own arrange-ments, the new TFT record option catures and plays back every nuance of your original musical creation.

Enjoy the many possibilities of the PianoDisc Symphony. Enter the world of musical magic, and bring your piano to life.

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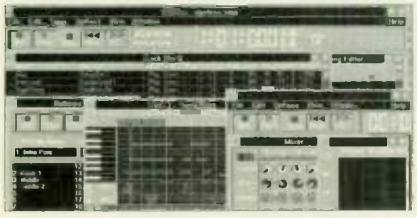
PianoDisc reserves the right to change product design and specifications at any time without prior notice.

WHAT'S NEW

▼ KAWAI GMEGA

Kawai entered the General MIDI-compatible synth market with its 32-voice, 32-part multitimbral GMega ($995). The sample-based synth module features 18-bit DACs; resonant, sweepable filters that can operate in bandpass, highpass, or lowpass mode; 7-stage envelopes; amplitude modulation; and 55 tuning temperaments. It has 384 patch locations, including 128 user locations, and includes seven drum kits, with 128 sounds each. The GMega comes with 6 MB of sample ROM, allocated among 256 Single samples and 256 percussion samples. The onboard effects processor provides six reverbs with individually adjustable decay time, predelay, high-end damping, and depth. The synth also has an onboard Macintosh serial-port MIDI interface with one MIDI Out/Thru, a dedicated MIDI Thru, and two independent MIDI In ports. Kawai America; tel. (310) 631-1771; fax (310) 604-6913.



▲ BIG NOISE MIDI MAXPAK

Big Noise Software combined four *Windows* applications to form the MIDI MaxPak ($179.95). *SeqMax* is a 64-track sequencer that can operate in linear, loop, or pattern mode. The program offers graphic editing of all MIDI data, support for multiple MIDI outputs, and tape sync. Record resolution is 480 ppqn. *LibMax* is a generic SysEx librarian. *MixMax* is a 16-channel, virtual, automated, MIDI mixer with 128 programmable faders, rotary knobs, switches, and LED indicators. Finally, *JukeMax* provides playlist-type sequence playback with looping. The program can hold multiple sequences in RAM and provides a smooth progression between them. It lets you advance through a sequence chain with a MIDI controller and transpose the key of a sequence. The program is bundled with Big Noise's *MIDI Director*, a multitasking MIDI engine for *Windows* that lets up to sixteen of the company's programs run onscreen, in sync, at once. All applications have access to every interface port. Big Noise Software; tel. (904) 730-0754; fax (904) 730-0748.

▼ MACKIE DESIGNS 24 • 8

Mackie Designs is shipping its long-awaited 24•8 24-channel, 8-bus mixer ($3,995). Sixteen- and 32-channel, 8-bus mixers are expected soon. In addition to its eight subgroups, the console includes 100 mm faders that have a custom-designed, logarithmic response curve; six aux sends (two selectable pre/post-fader and four selectable pre/post and assignable from the channel strip or the monitor system); and six stereo, assignable aux returns. It offers a complete Mix-B monitoring section; sixteen tape outs; stereo, in-place solo; two complete headphone monitoring systems, with Solo to Control Room; and a built-in talkback system. The 4-band EQ features a parametric, sweepable high-mid band with Q controls; sweepable low-mid; shelving high and low bands; and an 18 dB/octave highpass filter fixed at 75 Hz. The EQ section can be switched in and out and can be split so the high and low bands are assigned to the monitor section.

All channels have balanced XLR mic and ¼-inch line inputs, insert points, direct outs, and ¼-inch TRS tape returns that can be globally switched between -10 dBV and +4 dBU operating levels. There also are inserts on the subgroups and main mix. The main L/R outputs use balanced XLRs. Internal dynamic range is rated at 116 dB. An optional meter bridge is available. Mackie Designs; tel. (800) 258-6883 or (206) 487-4333; fax (206) 487-4337.

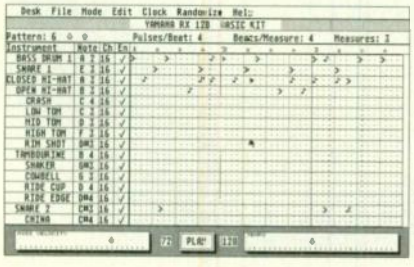
LATE BREAKING NEWS

Singapore-based Creative Technology announced an agreement to acquire stalwart American synth and sampler manufacturer E-mu Systems. E-mu will maintain and develop its product line as an independent subsidiary of Creative Technology, which also owns Sound Blaster-manufacturer Creative Labs.

▼ ZOBOZIAN MIDI MASTER DRUMMER

Zobozian Software has released *MIDI Master Drummer 2.1* ($39.95), the first commercial release of former **EM** author David Snow's rhythm sequencer for the Atari ST/TT. *MIDI Master Drummer* uses a drum machine-style, pattern/phrase/song-chain architecture. Its basic screen resembles the classic Roland drum-machine programming grid. Rhythms can be enhanced with nine levels of accent velocity (with a user-definable range), tempo-change commands can be embedded within phrases and songs, and you can chain patterns with different time signatures. The program exports Standard MIDI Files and recognizes MIDI Start/Stop messages for external sync.

Master Drummer uses configuration files to store MIDI channel and note assignments for each of your MIDI percussion sound sources. Patterns can be quickly converted to any device's note-mapping scheme by loading its configuration, and you can switch configurations "on the fly." You also can create configurations with multiple MIDI channels to combine several sound sources. Zobozian Software, PO Box 6901, Grand Rapids, MI 49516-6901.

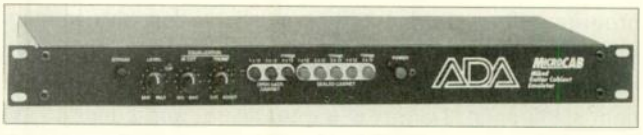


▼ DIGITECH DHP-55

DigiTech released the DHP-55 ($995), a 5-part intelligent harmony and effects processor that replaces the IPS-33B. The unit can shift entire chords and create harmonies based on MIDI note input, and all harmonies and effects can be controlled via MIDI. A dual-DSP design lets certain effects be applied independently for each voice. Effects include steel-guitar harmony, string pad, 12-string/chordal shift, multiband chorus, multiband flanging, distortion, and detuning. A 31-band digital EQ can go anywhere in the chain. Additional features include dynamic filtering (e.g., digitally controlled "wah"), up to six seconds of delay, multitap delay, hold sample, and repeat sample. The input signal's level and frequency characteristics can be used to control several of the DHP's parameters. The unit has 256 user program locations. DigiTech/DOD; tel. (801) 268-8400; fax (801) 262-4966.

▼ ADA MICROCAB

ADA is shipping the Microcab Miked Guitar Cabinet Emulator ($219). The 1U rack-mount, stereo device offers simple controls for emulating 1 x 12, 2 x 12, and 4 x 12 cabinets with open or sealed back and vintage or standard speakers. A variable Thump control "tunes" the low-end resonance, and a lowpass filter adjusts for cabinet brightness. The front panel is completed by a Level control, Bypass button, and Clip indicator. The unit has unbalanced, ¼-inch inputs and provides left and right unbalanced, ¼-inch line outs; a stereo, ¼-inch, "pass-thru" (dry) output; and a pair of balanced XLR outputs. ADA Amplification Systems; tel. (510) 532-1152; fax (510) 532-1641.



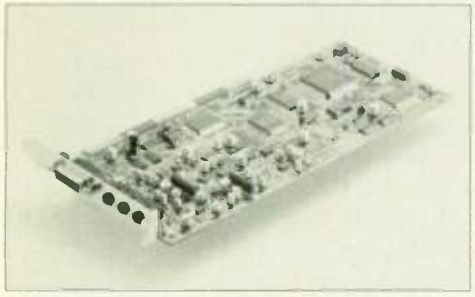
▼ KIRKWALL INTERNAL SCSI DRIVES

Kirkwall Technologies is offering a line of internal SCSI hard-disk drives for the Akai S1000 and E-mu Emax II samplers and Kurzweil K2000 synthesizer. The drives use Sony, Seagate, Quantum, and Maxtor mechanisms and come with a 1-year warranty. Half-height and 1-inch drives are offered, but note that K2000 owners must use a 1-inch drive. S1000's may require an additional SCSI interface ($149), and Emax II users should request a free mounting kit. Kirkwall Technologies; tel. (800) 567-5475 or (306) 584-8030; fax (306) 585-0944.

CAPACITY	ACCESS TIME	SIZE	PRICE
52 MB	17 ms	1 inch	$298
130 MB	15 ms	1 inch	$478
210 MB	15 ms	half-height	$798
240 MB	16 ms	1 inch	$848
340 MB	15 ms	half-height	$1,298
530 MB	13 ms	half-height	$1,498

▼ ROLAND TAP-10

Roland introduced TAP-10: The Audio Producer ($599), a sound card for PC-compatibles with DOS or *Windows* 3.1. The TAP-10 provides 16-bit, stereo or 2-track mono sampling at 44.1, 22.05, or 11.025 kHz (selectable).

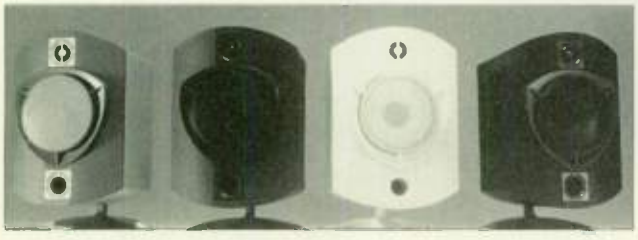


The card also includes a 26-voice, 16-part multitimbral, General MIDI Level 1-compatible synthesizer with 128 sounds and six drum kits. All Parts have independent, real-time level control, panning, and pitch transposition. (Both audio and MIDI tracks can be individually panned.) A built-in effects processor provides reverb/delay and chorus for both the synthesizer and digital audio voices. The device has an MPU-401-compatible (UART-mode) MIDI interface, although an optional connector box is required for use with external instruments. The card also sports a joystick port and audio aux input and is bundled with basic audio recording and *Roland Audio Tool Works* waveform-editing and MIDI File editing software.

Roland also released the SC-7 General MIDI synthesis module ($399), which uses the same synthesis engine as the TAP-10. The SC-7 includes a Macintosh or IBM-compatible interface that operates in RS-422, RS-232C-1, RS-232-2, and MIDI modes. A 2-input stereo mixer admits audio from CD-ROM, laserdisc, etc. The SC-7 is bundled with Dynaware *Ballade GM* and PG Music *Band-in-a Box* for either Mac or PC. Roland Corporation; tel. (213) 685-5141; fax (213) 722-0911.

▼ ROCK SOLID SOUNDS SOLID MONITOR

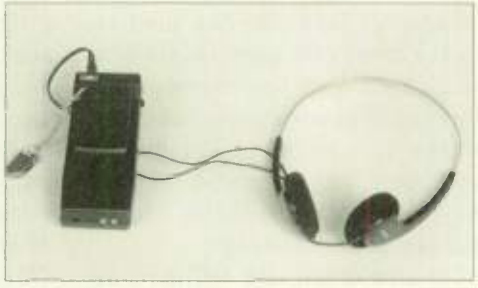
Rock Solid Sounds' Solid Monitor ($299/pr.) is a 1-piece system that utilizes a 5-inch woofer with a fiber-based cone, large magnet, and long-throw coil system. A computer-optimized crossover network matches the woofer to a 1-inch polycarbonate, ferrofluid-cooled tweeter. Each speaker is protected by a fast-acting, electronic overload device.



The vented bass enclosure is of 2-piece, injection-molded polypropylene and is shielded to prevent electromagnetic and radio-frequency interference. Frequency response for the Solid Monitor is rated at 70 Hz to 20 kHz (±3 dB), power-handling at 150W (peak), and sensitivity at 90 dB (2.83V @ 1 meter). Rock Solid Sounds; tel. (416) 771-6608; fax (416) 882-8397.

▼ RE AMERICA D940

RE America introduced the d940 ($485), a portable headphone interface that uses 16-bit DACs to monitor AES/EBU and S/PDIF digital audio outputs. The interface automatically locks to 32, 44.1, or 48 kHz sample frequencies, and the audio output level is limited for listening safety. An LED indicates signal quality. The nickel-cadmium battery-powered unit features low-power circuitry and selectable, automatic on/off switching for long battery life. The company also offers the optional d941 charger ($175). The palm-sized d940 comes with a clip-on case and XLR or mini-XLR lead cable. RE America; tel. (216) 871-7617; fax (216) 871-4303.



▲ ZOOM DRIVER 5000

The Zoom Driver 5000 ($199) is a cast-aluminum stomp box that incorporates analog circuitry for overdrive, distortion, and sustain with digital emulations of six guitar-amp types. According to the manufacturer, the unit's DSP can emulate large and mid-sized amp stacks at full blast; a mid-sized combo amp with warm distortion; light, R&B-style distortion; hard-edged, metal-style distortion; and the Zoom 9002's distortion.

Knobs control analog input gain, high and low EQ, and output level. The noise-reduction circuit includes an adjustable threshold. Zoom Corporation of America; tel. (415) 873-5885; fax (415) 873-5887.

A SAMPLE CD/ROM SAMPLER

OSC announced ***A Poke in the Ear With a Sharp Stick, Vol. II*** ($199), a Macintosh-compatible CD-ROM containing 1,800 stereo and mono, 16-bit, 44.1 kHz samples in AIFF file format. Volume II emphasizes alternative sounds such as hard-edged industrial samples and "mysterious" ambient textures. The collection includes 150 rhythmic loops, 170 ambient textures, over 500 percussion sounds, and over 800 melodic sounds. OSC; tel. (415) 252-0460; fax (415) 252-0560.

Q Up Arts is distributing ***Heavy Hitters Greatest Hits*** ($149 on compact disc; $399 on CD-ROM for Akai S1000, E-mu E-III and E-IIIxp, and Digidesign SampleCell), a series of percussion samples on compact disc produced by Sounds Amazing. Volume 1 contains over 400 drum hits from well-known drummers Tommy Lee, Alan White, and Jim Keltner.

The collection includes two to ten performances of hard and soft hits on each drum, hi-hat, and cymbal. All sounds are 16-bit, sampled at 44.1 kHz, and have been EQ'd for album production. Q Up Arts; tel. (408) 688-9524; fax (408) 662-8172.

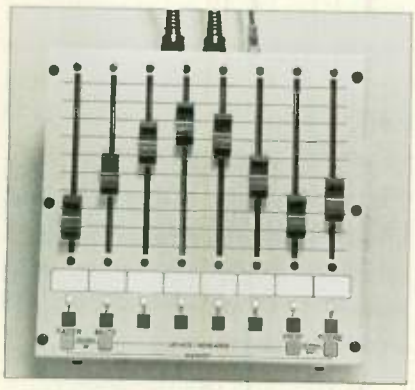
Sound Ideas' ***SFX on CD-ROM, Vol. 1*** ($69.95), provides 300 sound effects designed for multimedia PC applications running under *Windows* 3.0 or 3.1. The collection features animal sounds, comic "boinks," planes, trains, automobiles, guns, explosions, space effects, rain, wind, thunder, and more. All sounds are recorded as mono and stereo, 8- and 16-bit, 22.05 kHz .WAV files and as 16-bit, 44.1 kHz audio. Sound Ideas; tel. (800) 387-3030 (U.S.), (800) 665-3000 (Canada), or (416) 886-5000; fax (416) 886-6800.

Michael Welch has produced ***All Drums*** ($49), a compact disc containing over 70 minutes of loopable, 1, 2, 4, and multi-bar acoustic and digital drum patterns, with various ambiences and effects. Acoustic drum sounds are recorded with brushes, mallets, snare rolls, march cadences, and more. Sampled grooves include jazz, urban, world beat, and bossa nova. There are comedy fills ("ba-ba-booms," "shave and haircut" hits, etc.), solos, and more. Michael Welch; tel. (407) 260-0079.

Music Bank announced ***Blockbuster Sound F/X*** ($69.99), a Mac and PC-compatible CD-ROM disc containing 142 sound effects designed for multimedia developers. The disc includes fireworks, applause, laughter, farm sounds, city sounds, a Muslim prayer call, a cafe, a baby crying, and more. Each sound is provided in nine formats: mono and stereo, 8- and 16-bit, 22 kHz .WAV and AIFF files (for PC and Mac, respectively) and 16-bit, 44.1 kHz audio. The Music Bank; tel. (408) 867-4756; fax (408) 867-0518.

▼ CM AUTOMATION FX-100

CM AUTOmation released two integrated control products for its MX-816 MIDI-controlled, mixer-automation device (described in the July 1992 "What's New"). The FX-100 Automation Control Console ($449.95) provides eight track Mute/Solo buttons and eight 100 mm linear faders that send MIDI Volume messages. The device can recall up to 64 MX-816 "snapshot" fader Scenes and has eight Views, with eight faders and mutes each. Switches control global Record In/Out and Update/Rehearse modes. Tri-colored LEDs indicate mute, solo, record status, Scene, View, and more. The FX-100 can be phantom-powered via MIDI.

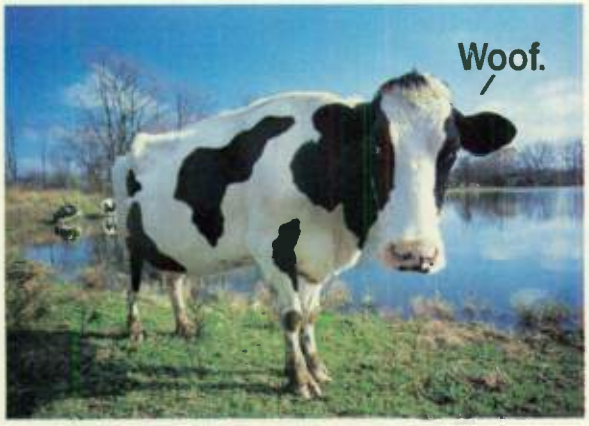


CM also is offering *MIDIcam 32* automation software ($249.95) for the Macintosh and FX-100. The program uses MIDI messages to automate all aspects of the MX-816. You can graphically view and update fader or mute values "on the fly," punch out, and archive your mix. The program chases all automation events and lets you interactively set fader and mute subgroups. *MIDIcam 32* can import and play Standard MIDI Files, tempo maps, and markers while automating. Off-line editing features include copy, clear, erase, merge, and bounce. The software is compatible with System 7, *MIDI Manager*, and Opcode's *OMS*. CM AUTOmation; tel. (800) 238-7010 or (909) 488-0024; fax (909) 247-7868.

Admit it. You get off on the notion of having the world at your fingertips. You, my friend, are what is known as a power freak.

Okay, big guy. Here you go. We're talkin' the A-30 MIDI Keyboard Controller. 76 keys. Weighted piano action. 32 user patches. A slider. A bender. Plus, it works with any system, large or small. The whole shebang for less than the price you'd pay for a decent head of cattle (you'll have to trust us on that one).

For less than 800 bucks, you can have complete control of the world of sound.



Yeah, we could've charged more. Lots more. Because it's preset to work with any of our GS sound sources, and it's just as cool on stage as it is in a garage, and it's a Roland — a big whoop in and of itself. But the way we figure it, you're not Master of the Universe yet, so we'll give you a break. Now get out there and make beautiful music. Or whatever the heck you feel like making.

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Roland Corporation US, 7200 Dominion Circle, Los Angeles, CA 90040-3647 213 685-5141.

FACE IT. YOU NEED

It's enough to drive you crazy.

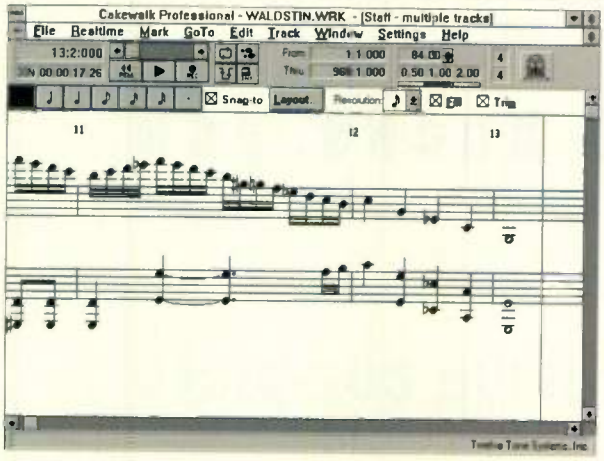
You've been searching for software that will help you turn your musical ideas into polished performances. But the first program you tried wasn't powerful enough. And the other was so complex, you didn't know where to start.

Maybe it's time to see a Professional.

Cakewalk Professional for Windows™ is the 256-track MIDI sequencer that's powerful *and* easy to use.

Express Yourself

The detailed **Event-list view** lets you view and edit all MIDI events on multiple tracks at once. You can even insert non-MIDI "special" events like digital audio waves (voice, special effects) that play back on .WAV-compatible sound cards.



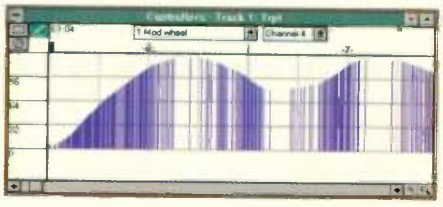
Staff view

Tempo

Take Control

Cakewalk Professional also has a graphic tempo map and **Controllers view** for drawing tempo and Controller changes with your mouse.

Use up to 16 assignable faders to send out MIDI Controller events while recording or during playback. Fader positions update in the **Faders view** during playback to show Controller values.



Controller view

Professional Staff

A multi-track **Staff view** lets you edit up to 10 staves of standard notation. You can insert, delete, and move notes with your mouse. Like all views, the Staff window scrolls during playback.

Use the **Piano-roll view** for inserting, resizing, and moving notes in a piano-roll grid. You hear the notes change pitch as you move them. And you can redraw note velocity levels as well.

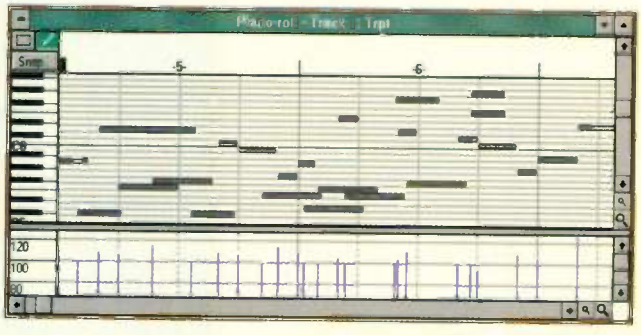
Markers

Get On Track

Use the **Track/Measure view** for assigning track parameters like MIDI channels and patches. And you can adjust parameters in real time, like volume, pan, key offsets, and velocity levels. All Track parameter columns can be moved and sized. Use the Measure pane for fast "drag-and-drop" editing of selected measures.

Professional Experience

Cakewalk Professional works hard to earn its "professional" status: a variable timebase of up to 480 pulses per quarter note; support for all SMPTE/MTC formats; a Meter/Key map; a **Markers view** for creating a text list of "hit points"; and a powerful



Piano-roll view

PROFESSIONAL HELP.

Event Filter for selective edits, like splitting out drum notes onto separate tracks.

Faders view

CAL-
SWING 16.CAL

Cakewalk Professional has a 256-bank System Exclusive generic librarian, for storing and sending your instrument sound banks and presets.

Event-list view

Sysx

Meter/Key

And the built-in Cakewalk Application Language (CAL) even lets you create your own editing commands, like chord generators, drum maps, and "swing quantize" routines. (A free library of CAL routines is available to all registered users.)

Get Help Fast

Unlike some sequencers, Cakewalk Professional has context-sensitive, on-line help available at any time. Just press the F1 key to get help with what you're working on. Examples, definitions, and even a list of answers to common questions are a mouse-click away, supplementing the comprehensive *User's Guide*.

Comments

See A Professional Today

Cakewalk Professional for Windows ($349) is sold at finer music and computer stores worldwide. For more information, or for the name of a dealer near you, call

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

A demo disk is available for $10.

System Requirements: IBM PC with 10 MHz 80286 or higher, 2 MB of RAM, hard drive, mouse; Microsoft Windows 3.1. Supports any combination of up to 16 MIDI ports on devices with Multimedia Extensions drivers (including Roland MPU-401 compatibles and Music Quest MQX interfaces).

Twelve Tone Systems, Inc.
P.O. Box 760 Watertown, MA 02272
Fax: 617-924-6657

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Cakewalk
PROFESSIONAL
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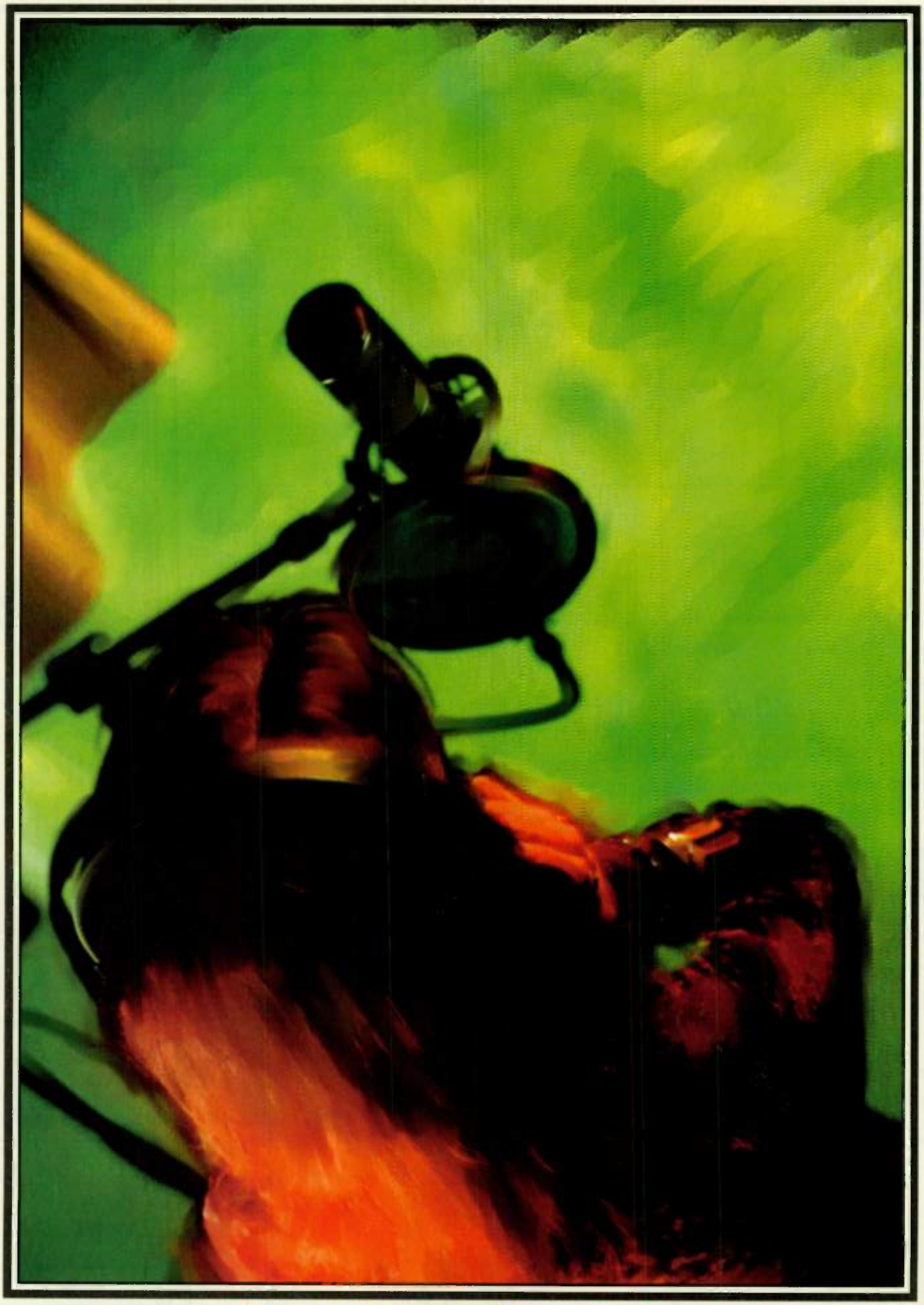

Photography by Mark Johann - Photo-Illustration By Andrew Faulkner

RECORDING A HIT RECORD

A behind-the-scenes peek at the people who make the hits happen.

Walking into a professional recording studio is like making a pilgrimage to Lourdes. You immerse yourself in its sacred mysteries, and, if you're lucky, a miracle happens. For the musician, this usually means a hit record. And although the fabric of real miracles is shrouded in divine secrecy, the machinery of hit records is easily defined. You need an artist, instruments, a recording medium, and someone to document the magic. That someone is a recording engineer.

But what do professional recording engineers do that's any different from a knowledgeable home recordist? How do they engage—or disengage—technology to make great-sounding records that seduce the music-loving masses? Well, because EM *has never believed that curiosity killed the cat, this article is the first in a series dedicated to unveiling the nuts and bolts of creation. We spoke with a number of top engineers who worked on professional projects in a variety of musical styles, from pop to jazz to new age, and got them to reveal the techniques they used in creating those records. We divided their comments into sections analogous to the recording process itself: drums and bass, guitars, lead vocals, backing vocals, etc.*

Admittedly, not every album profiled here sold—or will sell—a million units, but each certainly qualifies as an important work in its genre. So, without further ado, follow us down these dark passages into the citadels of sound.

BY MICHAEL MOLENDA

RECORDING A HIT RECORD

DRUMS AND BASS

Red Hot Chili Peppers, Blood Sugar Sex Magik (Warner Brothers)

Brendan O'Brien, engineer

The band and (producer) Rick Rubin wanted to record the album in a house, so we rented an incredible mansion and brought in a Neve console, an analog 24-track machine, and other necessities. The library became the control room, the grand ballroom was the main studio, an upstairs bedroom was Anthony Kiedis' vocal "booth," and the amps were set up and miked in the basement. All of the basic tracks—drums, bass, and guitar—were recorded live, with the band monitoring their instruments (and Kiedis' vocals) on headphones.

For the song "Give It Away," Chad Smith's drums were placed in this great solarium, which had marble floors and huge glass panes for the walls and ceiling. I used only four mics on the kit: a Shure SM57 on the kick drum, an SM57 on the snare, and two AKG C414s for overheads. Individually, the tracks really didn't sound very good. The kick and snare were thin, and the overheads were pretty washy. But the combination of all the mics sounded amazing.

This arrangement was used pretty much throughout the album. For other songs, I moved the drums back into the ballroom and miked the toms and hi-hat individually, but I ended up erasing the separate tracks and using only the kick, snare, and overheads. Also, there's hardly any (outboard) reverbs used on the record. All the drum reverb you hear is the natural sound of the room. Compression was employed rather sparingly. The overhead mics

were run through UREI LA-4s because the units react slowly and provide a lot of punch without altering the sound too much. I routed the snare microphone through a dbx 160 compressor and left the kick mic alone.

Actually, I recorded everything quite simply. The mic selection wasn't very scientific. If it sounded good we used it. I used an SM57 on the kick drum because it was the closest mic when I was setting up the kit. The reason the drums sound so kickin' is almost completely due to the fact that Chad is a great drummer.

For the bass tracks, Flea played a Gallien-Krueger amp through a Mesa-Boogie cabinet. At least I'm pretty sure that's what he used. I never saw the rig much because everything was down in the basement! I stuck a large-diaphragm Sony condenser in front of the amp and also took a direct line. Both the miked and direct signals were recorded to separate tracks and compressed

to tape with UREI LA-4s. I've found that just about any UREI (compressor) sounds good on basses because they don't pinch the bottom end.

I know this all sounds pretty anti-technology, and I probably know more than I'd like to admit about (recording) technique. But I believe that the best records have been made by engineers who were also musicians, or who had a lot of musical knowledge. Technique is secondary. On this project in particular, I learned that getting a great performance is the key to producing a great record.

For example, if you're recording a guitar track, and the amp sounds good, and the guitarist is playing well, it probably won't matter what microphone you use. Whatever records the performance cleanly onto tape is usually good enough. We even had what we called the "magic mic," a Shure SM57 that sounded great on everything. I'd say 75 percent of the overdubs were tracked with that single microphone. It's kind of funny. The main mic used on this huge multi-platinum record cost about $140.

ACOUSTIC GUITARS

The Rippingtons, Weekend in Monaco (GRP Records)

Russ Freeman, producer/engineer

When recording acoustic guitars, I try to use as much of the organic, unprocessed sound as possible. I strive to achieve the sound of the guitar in the room. Basically, I go by the old adage that if you have to over-EQ, you're not miking correctly.

For the song "Where the Road Will Lead Us," I played a classical (nylon-string) guitar and miked it with an AKG C414 angled toward the sound hole and an AKG C452 "dead on" to capture some brightness. The recording environment in my studio is fairly live, as it's a pretty big room, and the floors are all wood. Luckily, my wife can engineer while I'm playing, which saves a lot of running back and forth to check sounds and operate the multitrack deck. The mic blend was pretty much even.

I used the same miking pattern for the steel-string acoustic on "Moka Java," but I added the direct sound of my Takamine acoustic/electric guitar to the mix. I blended the three inputs together with most of the sound coming from the C414, added a little of the C452 for brightness, and mixed in the direct sound very subtly as it tends to pick-up a lot of string noise.

I've found that the less compression I use on guitars, the better. When I do compress, I use a UREI tube 1176. I also use very little, if any, equalization and all the tonal processing depends on the needs of the song. The ideal tone usually isn't very difficult to figure out because by the time I record the guitar, the track is almost done. It's painfully obvious where to fit the guitar sonically.

RECORDING A HIT RECORD

ELECTRIC GUITARS

Chagall Guevara, Chagall Guevara (MCA)

David Bryson, engineer

Chagall Guevara is a completely guitar-driven band; they all use old Vox AC30 amps with Rickenbacker and Les Paul guitars. Stylistically, it seemed appropriate to go for a simple, straight-up guitar sound. But even so, I'd say that the biggest secret about recording guitars is that there is no secret. Just get a great sound from the guitar and amp, and stick a mic in front of it.

I had the guitar player plug straight in—without any outboard effects—and stand close to his amp. Then I'd position both an Electro-Voice RE20 and a Shure SM57 right near the speaker cone. The RE20 tends to pick up warm tones, while the SM57 delivers brighter timbres. For a room sound, a Neumann U87 was placed about ten feet away from the amp. Tonal selections were based solely on the mic sounds, and often I'd blend all three mics together to get a sound.

The only outside processing was compression, and its use depended on the guitar part. Usually it was employed only to tame dynamics, but compression can also make guitars sound way louder than the actual volume at which they were recorded. Used as an effect, compression can really give you some tough guitar tones.

VOCALS

Whitney Houston, The Bodyguard Soundtrack (Arista Records)

David Frazer, engineer

With Whitney, you basically push Record, and you've got half the track. If you're not set up, you're in trouble. She is incredibly fast at getting her performances down and can ad lib very naturally. Her vibrato is like a little flutter—sometimes you don't even realize it's there—and it really energizes a vocal track. She also can double (her vocal performance) very well. She's so precise that when her doubled tracks are mixed together, it sounds like one voice, only fuller.

To record the song "I'm Every Woman," I set up an AKG C414 with a windscreen in a small room at Ocean Way Studios in Los Angeles. Before we started recording, I worked up some basic EQ and compression settings based on the vocal register Whitney was in. I used a Focusrite equalizer as a mic preamp—they sound good and act as a consistent entity from one studio to another—and limited the signal through a Neve stereo compressor.

We have a pretty consistent system of tracking vocals, and this method was employed on "I'm Every Woman." Narada Michael Walden (the track's producer) works singers pretty hard to find the right attitude and phrasing, so we'll typically record ten to twelve vocal tracks for each section of the song: the verse, chorus, and bridge. The final vocal performance is assembled from bits and pieces of these multiple takes. Of course, with Whitney, any one of these takes could

be the final track. But Narada always looks for that perfect expression of feeling, which may be more pronounced on one take over another (for a particular section or phrase).

We usually give Whitney two tracks to run down the song before Narada starts critically directing her performance. Much of the final track is often composed of these "run down" takes

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because they're fresh and spontaneous. Narada likes to nail the entire vocal track on the first day. Then he'll check the tracks the next day and decide whether to re-record a few sections.

When Narada approves the final composite vocal track, I'll re-EQ and recompress it slightly to get a blend between the varied performances. We'll start from beginning to end to get a good sound, which is sometimes difficult because vocalists sing a little differently from day to day. To make the combined performances sound natural, we often have to match vocal EQ settings line by line, and sometimes we're changing EQ on syllables. All of this probably sounds pretty crazy, but the real trick is matching the song to the singer. If that's right, you just can't mess it up.

GRAND PIANO

Bruce Stark, Song of Hope (Hearts of Space Records)

Bob Hodas, engineer

The critical factor in recording a great piano sound—and this should be pretty obvious—is you have to have a good piano in a good room. My favorite saying is, "You can't make chicken salad out of chicken shit." For this record, we rented a marvelous Grotrian Steinweg and brought it to The Site in San Rafael, California.

The Site has a fairly large room with all wood treatment and a huge glass window overlooking a valley. It's pretty live-sounding. We kept the curtains closed on the valley view, partly for acoustics and partly to keep the sun from causing temperature changes that would cause tuning problems. The piano was set up at the far end of the studio, pointing toward the control room, with the lid open full-stick.

I used four mics: three conventional and one stereo. B&K 4011s have a smooth, tight pattern, so I stuck them inside the piano. The mic positions were determined by sticking my head in there to find spots that produced balanced tonalities. A Neumann SM69 stereo tube mic was put in its XY configuration and placed fifteen to twenty feet away from the piano and about eight feet high. A Beyer MC740 was in Omni mode at the far end of the room, about fifteen to eighteen feet in the air. These room mics were moved around until we found spots that sounded the richest.

Song of Hope was recorded direct to

DAT, so balancing the mic positions was critical. In the end, the SM69 provided the main piano sound, and the

4011s were mixed in for presence. The 740 was fed into a Quantec XL multi-effect, and only the reverb return was mixed in to provide ambience. Stark's producer, Stephen Hill, loves "space music" and had no qualms about mixing reverb in during the performance and recording the effect to tape.

In addition, we used Meyer CP10 and Massenberg equalizers to shape the piano sound. Nothing radical was done; we merely took out some of the top end and also processed the reverb sends to simulate a larger, softer room. The recording console was a Neve 8058 Class A, and I used Massenberg and EAR tube mic preamps.

I like to go into sessions with the attitude that there is no one way to do something. On this record, we changed things to meet the demands of the song. Bruce didn't even use headphones, he performed as if he were giving a recital. This caused us to work out visual cues for certain things, but Bruce's performance was much more relaxed. At the bottom line, it's really the performance that counts. A creative artist, unencumbered by technology and enjoying the touch and sound of a great piano, can deliver an amazing performance.

BACKGROUND VOCALS

Todd Rundgren, Nearly Human (Warner Brothers Records)

Scott Mathews, vocalist

We walked into Studio D at Fantasy [Berkeley, California] without ever hearing the songs we were to record. This was somewhat nerve-wracking because this album was recorded completely live: All the instruments, Todd's lead vocals, and our background vocals were going down together. However, Todd wanted our first impressions to be the last. We were divided into three groups of three, according to vocal ranges (see **Fig. 1**). The vocal arrangement was already recorded on a demo tape, and Todd showed each group their parts, then sent them away to rehearse to the tape. Within one hour after first hearing the song, we were in the studio cutting tracks live with the band.

The experience taught us that the intuitive approach to the song was usually right. The parts were extremely difficult—big lush chords and staggered melodies—and Todd said, "If you're going to make a mistake, make a loud mistake." The idea was to always sing like you meant it. If we messed up during a take we were told to confess. Of course, it took awhile before everyone got everything right, and we recorded a number of takes. There was some pressure to get things down fast, as Todd was singing full out, and the more takes he had to do, the more fatigued he got.

After we knew we had a take bagged, Todd instructed us to do a "mood-altered take." This meant we were free

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to express ourselves without being limited to the written part. In my case, that meant going full combo-plate crazy. The whole experience taught me a lot about how intuition and immediacy can energize a performance. In addition, the feeling of that many bodies in one room singing live

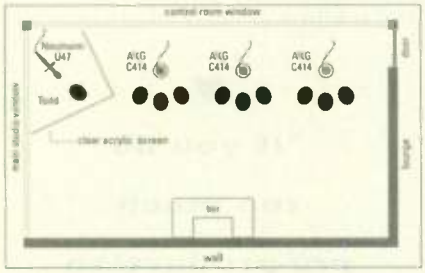

FIG. 1: The live recording setup at Fantasy Studios for Todd Rundgren's *Nearly Human* record included a full bar for "mood altered" takes.

was absolutely thrilling, and it definitely inspired some exciting performances.

THE PRODUCER'S ROLE

Jann Arden, A Time for Mercy (A&M Records)

Ed Cherney, producer/engineer

A&M Records sent me Jann's tape, and I was immediately captivated by her songs and voice. We're coming out of a period where not a lot of great songs were written, and I want to work with people who have something to say. In return, I feel I'm able to help an artist clear the way to get their best work on tape.

The sonic environment (of the record) was left up to me—Jann's demo was just acoustic guitar and voice—but production is always a collaboration. It's important to involve the artist in the process because you certainly want, and need, their support.

I got kind of ballsy and decided to record the project almost completely live. Jann's songs defined the emotional quality of her work, so I put a band together that would be sympathetic to what she was trying to communicate. Jim Keltner played drums. He's amazing; he can actually play "sad," and he's the only drummer who

RECORDING A HIT RECORD

ever asked me for a lyric sheet. David Resnick, who happens to be vice-president of A&R at Chameleon Records, played guitar—it was kind of nice having a record executive on the other side of the [control room] glass—as did Jann's regular guitarist, Bob Foster. Rounding out the group was Kenny Lyon on bass and C.J. Vanston on piano. As I said, everyone was recorded live, including Jann, who sang and played acoustic guitar simultaneously.

The scary thing was that there was no pre-production because I wanted an almost improvisational environment. The idea was to put these characters in the studio and see what they'd do. We'd sit in a circle, and Jann would play the song a couple of times, then we'd set everyone up and start working it out. Three or four hours later, we'd have the song done.

The best part was that everyone was nervous and on their toes, and this is when those wonderful "mistakes" happen. I wanted to document the magic of the musicians and how they related to the artist and her material. I wasn't out to produce a slick record that sacrificed emotion. I believe that if you do too much pre-production, you can overlearn the song. Then, when you start recording, the actual performance becomes a technical exercise, like sawing wood. Working live with Jann, the musicians were forced to communicate more; they had to really listen to the song and react to it and each other. The interplay allowed certain "surprises" that helped to make this record something special.

BRINGING IT ON HOME

Although top recording engineers command state-of-the-art equipment, less-technically endowed home recordists can still cop licks from the pros. For example, using composite vocal tracks—as David Frazer does with Whitney Houston—doesn't require an SSL console with automation. Wily recordists can employ SMPTE to sync analog rhythm tracks to a hard-disk recorder and perform as many takes as the software allows. In addition, anyone with access to two ADATs can use one machine for recording rhythm tracks and the other to stack and submix vocal performances. Even someone limited to a cassette 8-track can "final" mix rhythm tracks to DAT and re-record the stereo mix to two tracks of the multitrack. This procedure frees up six tracks for composite takes.

▼

"If you do too much pre-production you can overlearn the song."

— Ed Cherney

Jann Arden and Ed Cherney at Brooklyn Studios in Los Angeles.

Solo performers can assemble a *faux* background chorus (*à la* Todd Rundgren) by taking some tips from Scott Mathews, a master at tracking one-person choirs.

"To assemble different vocal textures for a group sound, I record a number of takes on separate tracks and combine normal and altered performances," says Mathews. "I'll use the pitch control on my Tascam MS16 multitrack deck to speed up and slow down the tape. If I sing when the tape is sped up, it sounds like I've gained 40 pounds [when the deck is returned to normal speed]. When the tape is slowed down, I lose about ten years. Mic positioning is also helpful in masking the fact that one person is singing all the parts. Mix proximities—stand close to the mic for one take and a few steps back for another—and switch microphones to take advantage of different tonal characteristics."

Recording instruments is often a matter of experimenting with anarchy. Remember, imagination can transform limitations into genius. After all, how many engineers would use a SM57 to record a kick drum? Brendan O'Brien did on the Red Hot Chili Peppers' *Blood Sugar Sex Magik*, and that album absolutely rips it up. (Be honest: how many of you thought a decent kick sound was possible only with an expensive, large-diapraghm microphone?) The trick is, when in doubt, do whatever sounds right.

If you want more specific recording tips, check out **EM**'s past "Recording Musician" columns: "In Good Voice" (February 1992); "Tracking the Bizarre" (December 1992); "Tracking Drums" (October 1992); "Tracking Electric Bass" (January 1993); "Tracking Guitars" (September 1992); and "Tracking Synths" (March 1992). In addition, *Mix Bookshelf* carries a number of recording application books. Call (800)233-9604 or (510)653-3307 for a free catalog.

(Many thanks to Mr. Bonzai [*Mix* magazine] and Michael A. Aczon for their counsel and contacts.)

EM *managing editor* **Michael Molenda** *has engineered and produced countless demos, albums, and soundtracks during his seventeen years in "The Business." Nothing he's ever done has been a hit in the country of his birth.*

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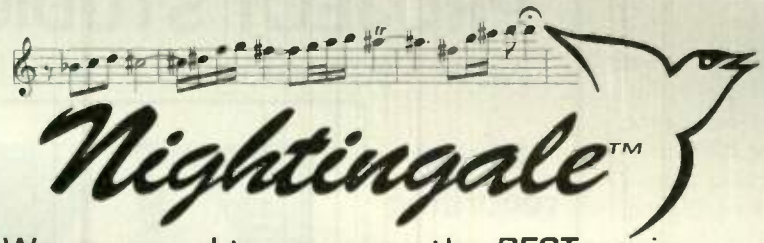

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BY GLENN WORKMAN AND DENNIS MILLER

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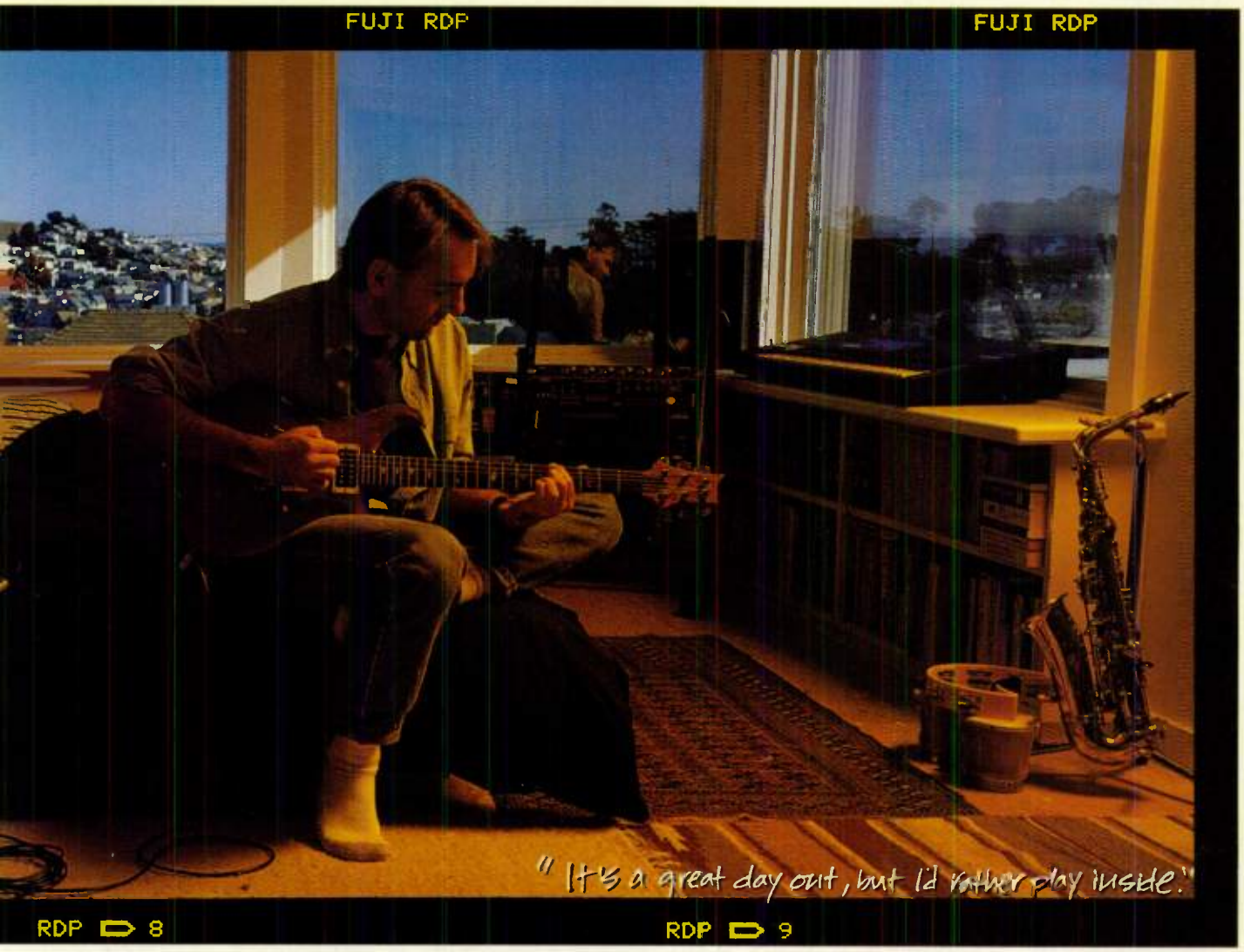

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K2000 PROGRAMMING

HARDWARE

Before discussing specific tips and tricks, let's take a quick look at the architecture of the K2000. (A comprehensive review of the instrument appears in the March 1992 **EM**.) At the most basic level, sounds can be produced from ROM samples, user-loaded RAM samples, noise, or waveforms generated by the K2000's oscillators.

Most of the preset sounds in the instrument begin life as samples that are turned into program objects by first being assigned to keymaps. A keymap can include as many as 384 different sample roots (116 samples with three different velocity ranges per key), each assigned to non-overlapping key and velocity ranges. Once created, a keymap is assigned to a layer, where it is processed according to a DSP algorithm chosen by the user. Up to three layers can be used to create a program, but programs that are assigned to the K2000's user-definable drum channel can have as many as 32 layers, all separately processed by independent algorithms.

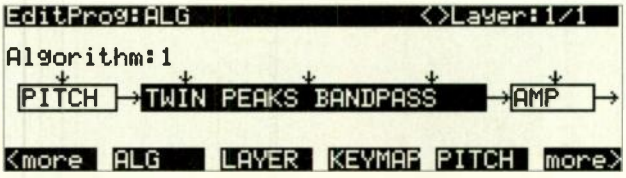

FIG. 1: The K2000's algorithm page, showing one of the instrument's 31 basic sound-design algorithms.

At the heart of the K2000 are the algorithms that determine how the various DSP functions (filters, mixers, non-linear transforms, and the like) are applied to create a sound. Each of the 31 basic algorithms is represented as a block diagram consisting of from three to five stages through which the signal passes. Algorithm 1, for example (see **Fig. 1**), starts with a block that symbolizes the pitch of the sample used by the keymap assigned to this layer. The second block contains the DSP function that is applied to the sample, while the third represents amplitude control.

Within each block are a wide range of editable parameters, including those that represent the initial setting of the block, and other real-time controls that alter the sound as it plays back. The K2000 provides a huge number of control sources to alter the programmable parameters, and because many of them can be used simultaneously, a tremendous range of sound-design possibilities is available.

FILTER SWEEPS

We'll use algorithm 1 as our first programming example. All of the examples assume that you're using the current software, version 1.30, though most of these examples will work fine in release 1.0. If you haven't yet upgraded, run down to your dealer; the upgrade cost is only $10 plus installation. The upgrade offers many enhanced features and a new set of presets.

In this example, we'll create some traditional analog filter sweeps. Start with the Default Program (#199) and

FIG. 2: The frequency of the lowpass filter is edited on the F1 FRQ page.

press the Edit button, followed by the KEYMAP soft button. Next, substitute a Sawtooth wave for the default Piano keymap by pressing 1, 5, 1, Enter. (Most objects, such as sample roots, have distinct numbers that you can find listed in the manual.) The display should now show "Keymap:151 Sawtooth."

Now press ALG or the Prev Pg button to return to the algorithm page, and rotate the alpha dial until the center block of the algorithm, which should already be highlighted, says 4POLE LOPASS W/SEP. This is a 3-stage block, signified by three downward-pointing arrows, with three different associated control pages. (Each arrow corresponds to a single page of parameters.) In this example, the pages correspond to Frequency (F1), Resonance (F2), and Separation (F3). Press Edit to edit the settings for the lowpass filter; your screen should resemble Fig. 2.

Using the four-direction arrow buttons, move the highlighting cursor to the KeyTrk parameter and press 1, 0, 0, Enter, then highlight Src1 and change it from OFF to ENV2 by pressing 1, 2, 1, Enter. This causes the filter cutoff frequency to follow the pitch of the keyboard while Envelope 2 affects the frequency over time.

Next, select the Depth parameter, which affects how much the chosen control source (Envelope 2) affects the cutoff frequency, and set it to 5,000 by either typing that number and pushing Enter, or using the dial. Press the up arrow to highlight Src1 again and press Edit to enter the editor for ENV2. Keep in mind that if a field is highlighted and has its own parameters (such as an envelope or an effect), you can directly enter that object's editor by pressing Edit.

Below each envelope segment in ENV2 are two numbers: time (in seconds) for each segment; and a percentage, which in this example determines the depth of the effect on the filter. Leave Att1 alone, but change the percentage value of all the other segments to 0. If you play a note at this point, you will hear the filter take two seconds to open up, then another two seconds to close back to its original frequency. (Experiment with shorter times for *Switched on Bach* effects or wah-wahs.)

You can add resonance to this sweep by pressing the more> soft button until you see F2 RES. Press F2 and set the Adjust parameter by pressing 2, 4, 0, 0, Enter. Now play a low note on the keyboard; the filter opens and closes like a bad sci-fi movie. The K2000 features a large variety of other filters, each of which can provide different types of timbres.

GET REAL DRUMS

The K2000 has a tremendous range of drum sounds that are suited to many situations, but you can add even more realism by using Velocity to alter a drum's pitch. Start with the Default Program and press Edit, then KEYMAP. Substitute a Drum keymap for the Piano by pressing 2, 0, Enter. Now press the PITCH button and highlight the VelTrk parameter. Press 1, 0, 0, Enter to set the maximum pitch increase with Velocity to 100 cents (one semitone). Play an A below middle C with different Velocities to hear how the pitch of the snare drum changes. Also try playing the tom-toms found on

RESOURCES

Human

One of the best ways to get information about a new synth is to join a user's group. The K2000 is supported by the K2000 Owner's Group (KOG), which produces a free newsletter full of useful tips and tricks and distributes an extensive library of samples for the cost of the disk plus shipping.

Kurzweil maintains a presence on CompuServe in the MIDIAVEN forum and on PAN, MIDILink, GEnie, and America Online. You can leave messages for Kurzweil staffers and other users and get quick replies to questions or suggestions on correcting problems.

Software

If you want an editor for your K2000, you must use a Macintosh, at least for now; the only program that currently supports the K2000 is Opcode's *Galaxy Plus Editors*. Although it doesn't edit sample data, *Galaxy*'s K2000 module is quite comprehensive and includes all other parameters. Support for the K2000 is expected soon from Turtle Beach's *SampleVision*, Dr. T's *XoR*, and Mark of the Unicorn's *Unisyn*, while minimal librarian support presently can be found in programs such as Twelve Tone Systems' *Cakewalk*, Passport's *Master Tracks Pro*, and Mark of the Unicorn's *Performer*.

Another source of support is Sweetwater Sound, which is a developer and manufacturer of many K2000-specific products, in addition to being a Kurzweil dealer. Sweetwater's *K2000-Diskmaker* is a unique program for the Mac that converts sounds from SampleCell and K250 format into completely configured K2000 programs. Sweetwater is also the sole distributor of the largest K2000 sample library, produced by Stratus Sounds, which consists of nearly 200 disks in numerous formats. They will be releasing CD-ROM libraries in the hear future. You'll also find many other suppliers of K2000 sounds throughout the pages of EM.

K2000 Owners' Group (KOG)
5451 Watercress Pl.
Columbia, MD 21045
tel. (410) 964-3548

Sweetwater Sound
5335 Bass Rd.
Fort Wayne, IN 46808
tel. (219) 432-8176
fax (219) 432-1758

Opcode Systems, Inc.
3950 Fabian Way
Palo Alto, CA 94303
tel. (415) 856-3333
fax (415) 856-3332

middle C and up an octave.

Change the VelTrk parameter from 100 to 300 and play the toms again. By experimenting with this setting, you can get a lot of different effects, from a loose-head drum to some strange-sounding cymbals. You can even create a complex drum program and set this parameter independently for each layer, so that each drum is altered in a different way.

Changing pitch with Velocity also can provide a more authentic-sounding guitar, bass, or other string instrument. Start with the Default Program again and choose a keymap such as Acoustic Guitar (#8). Press PITCH, set Src2 to AttVel by pushing 1, 0, 0, Enter; set MaxDpt to 50 cents by pressing 5, 0, Enter; and then select ENV2 to control the depth by highlighting DptCtl and pressing 1, 2, 1, Enter (see **Fig. 3**).

Press Edit to move to the envelope editor. On the envelope page, set Att1 to 0 seconds and 100 percent, Att2 and Att3 to 0 seconds and 0 percent, and Dec1 to 0.10 seconds (0, 1, 0) and 0 percent. Now a very hard strike will make the string twang a bit out of tune, and the envelope will bring it back to true pitch. Try experimenting with different values for MaxDpt and Dec1 time to get different types of pitch transformations.

SYNTHESIS, L/A STYLE

L/A synthesis is a popular technique. By "grafting" two sounds together, you can get similar effects on the K2000. The trick is to use one sound as a short attack segment and the other as the sustaining tone. By putting both sounds on different layers, you can process them independently.

Select Program 199, press Edit, then push the <more button until you see the DupLyr function. Press DupLyr to create the second layer (notice that you're now on layer 2 of two), then more>, KEYMAP, 1, 1, 5, and Enter to put a Bell Wave on layer 2. Push the Layer/Zone button to switch to layer 1, then 6, and Enter, to assign Ensemble Strings to layer 1.

Kurzweil K2000R

To adjust the amplitude envelopes so the bell becomes a short attack section and the strings sustain, press more> three times, then AMPENV, and the "+" button. This changes the envelope from Natural to User programmable. Set Att1 to 0.50 (0, 5, 0) seconds and Rel3 to 5.00 (5, 0, 0). Then press Layer/ Zone to move to the Bell layer, "+" to change its envelope, and set Dec1 to 1.00 seconds (1, 0, 0) and 0 percent. You can also set the Rel3 time to 1.00 so that short notes don't end abruptly.

If you like the effect, try substituting keymaps for both layers to experiment with different combinations of waveforms. For example, change the Att1 setting of the String layer (layer 1) to 0.00 seconds, then change the Bell Wave keymap to either Bow Attack (#103) or Solo Strings (#110); this gives you a string sound with more presence (bow noise) on its attack. You can alter the relative volumes of each layer by setting the Adjust parameter on the F4 AMP page to your tastes.

Try a Trumpet attack with Flute, Conga attack with Piano, Guitar Mutes with Voices, etc. You can add a third layer and continue to crossfade from layer 2 to layer 3, or use the envelope to loop back and forth between sounds. If the fades are long enough, you'll get a sound similar to the vector synthesis used by some Korg and Yamaha instruments.

FIG. 3: The PITCH page contains numerous parameters for adjusting a sound's pitch over time.

ROCK AROUND THE CLOCK

The K2000's A and B Clocks are useful control sources that allow you to trigger pitch, amplitude, effects, and other changes in sync with an external timing source, or the K2000's own internal clock. Let's create a trill for a string sound that changes speed in relation to the tempo of a sequence.

First, press Song, then change the Clock setting from Internal to External. Next, select the Default Program, press Edit, press the PITCH soft button, and highlight the Src1 parameter. Change Src1 to AClock by pressing 5, 6, Enter. Next, change the Depth to 100 cents. Now, hit KEYMAP, 6, and Enter to assign Ensemble Strings to this layer. Using your sequencer, record one very long note—for example, six measures of middle C—and use your sequencer's edit function to change the tempo gradually from 50 at the start to 210 at the end of bar six. Now play the sequence and listen as the strings' trill speeds up in sync with your tempo changes.

You can also use A Clk2 (source 51) and A Clk4 (source 47) if you want more rapid divisions of the timing reference, which by default is a quarter note. Also, try using the clock for tremolo effects by assigning it to the Src1 parameter on the AMP page, then setting the Depth to a low value, such as -30 dB. Keep in mind that even without an outboard sequencer, you can use the Clock as a trigger. Simply assign it as the source for the parameter you want, then go to the Song menu and set the tempo as needed. Leave the Song Mode's Clock on Internal, and you're all set.

EDITING ROM SAMPLES

Not many synthesizers allow you to alter ROM samples, but it's a simple operation with the K2000, even without the sampling option. The following

The Right Connections

DynaTek TRACK Series Rackmountable Data Storage Products available at the following locations:

Sam Ash
New York, NY
(212) 719-2640

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New York, NY
(212) 819-0578

Gand Music
Chicago, IL
(708) 446-4263

Goodman Music
N. Hollywood, CA
(213) 845-1145

Direction Sound
Los Angeles, CA
(310) 276-2063

Westlake Audio
Los Angeles, CA
(213) 851-9800

Sweetwater Sound Inc.
Fort Wayne, IND
(219) 432-8175

Ace Music Center
N. Miami, FL
(305) 891-6201

YRS MIDI Systems
Fern Park, FL
(407) 331-6333

Richard Audio
Montreal, PQ
(514) 733-5131

Adcom Electronics
Toronto, ON
(416) 251-5355

Saved By Technology
Toronto, ON
(416) 928-6434

Steve's Music
Toronto, ON
(416) 593-8888

Annex High Tech
Vancouver, BC
(604) 682-6639

Key Audio Systems Inc.
Chelmsford, Essex. U.K.
0245 344 001

Soundware
Aarhus, Denmark
(086) 11 89 12

Creative Software
Oslo, Norway
(02) 64 14 30

Riverside Music
Antwerp, Belgium
(+32)3/231.56.57

And Music
Wiesbaden, Germany
(0611) 928 050

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example demonstrates how to access the samples in ROM and presents several techniques for modifying them.

We begin with editing loop points. Start with the Default Program, press Edit, then more> three times. Move to the AMPENV page, then change the only parameter on the screen from Natural to User so you hear the loops as you edit them. Press <more three times, then KEYMAP, 5, 2, and Enter to call up 8in (8-inch) Dry Snare.

Next, press Edit to enter the keymap editor, move the cursor to the Sample field, and press Edit again to access the Sample editor. Set the LoopStart parameter to 0; hold down a key, and you'll hear a repeating snare drum. You can change the repeat rate by playing different keys, or by shortening the SampleEnd value, although that also shortens the sample itself.

Here's another trick. Samples in ROM are stored end-to-end, so if you move the SampStart and SampleEnd beyond their default positions, you begin to move into the previous or next sample in memory. While this presents an infinite number of possibilities, you can get some useful effects if you carefully select interesting start and end points.

While you're in the sample editor, try setting SampStart to 567,000, and LoopStart and SampleEnd to 612,000. This plays a small percussive flourish on every key. If you set the LoopStart to the same number as the SampStart, the sound repeats when the key is held, an effect similar to the factory percussion loops. If your numbers are extreme enough (such as -2,500,000 for SampStart and 99,999,999 for SampleEnd), you can hold a key and play through all the samples in ROM.

There's also a way to create hundreds of usable complex waveforms by adjusting a sample's start and end times. On the EditRomSample page, set the PitchAdjust to -2,808 cents. This setting brings the sample's frequency into a usable range. Next, set SampStart and LoopStart to 0, and SampleEnd to 81. Play any key and you'll hear a waveform similar to a rich sawtooth that is correctly tuned across the keyboard. (That was a snare drum a minute ago, remember!)

▼ You can create hundreds of waveforms by adjusting sample start and end times.

Next, we'll turn a trumpet sample into a nice clavinet waveform. Exit the SampleEditor (save any sounds you like), and move back to the KEYMAP page. Change the keymap to #168, Silence. (If you're starting out from Program mode, be sure to change the AMPENV to User.) Press Edit to enter the keymap editor, change the Volume Adjust to 18 dB (1,8,0), and change the Sample to Trumpet–A#3 (#17).

Press Edit to enter the Sample Editor,

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On request, the MT-16X can be optionally upgrated to a combination of a MIDI Matrix/Processor and a Sequencer Player. It uses the universal MIDI File Standard for its internal format. This assures full compatibility to top software sequencers. Its built in 3,5" floppy drive (720 KB/1,44 MB) is PC compatible and allows loading of songs from this computer system.

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Hundreds of songs can be loaded into, if expanded to full 16 MB. Once loaded, any of them can be started instantly by the footswitch, MIDI program change or from the included remote control. Any of the 64 tracks can be assigned to any of the MT-16X outputs simultaneously.

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Recording of MIDI data is possible with high resolution simultaneously on all inputs. With UNIVERSAL DUMP any system exclusive data of different MIDI instruments can be safely stored and archived.

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change the StartSamp to 204 and SampleEnd to 440, and set the loop to start at 0. This example has a smaller usable range than the sawtooth wave, but it gives you another idea of how new sounds can be created from existing ones. One important note: If you try this technique using different keymaps, make sure to adjust the Key Range parameter in the keymap editor so that the keymaps you select play across the entire range of the keyboard. This is especially important if you start with multi-sampled programs.

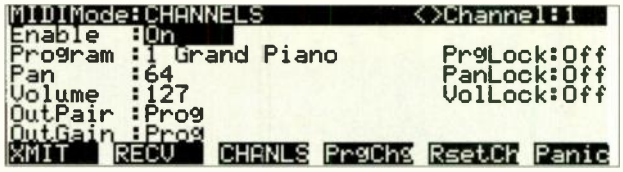


FIG. 4: The Channels screen in the MIDI editor lets you assign various parameters to each of sixteen MIDI channels.

MULTIS WITHOUT THE MULT

Some keyboards have a Combination or Multi mode that includes program settings for up to sixteen MIDI channels. The K2000 doesn't support this concept directly because all channels are potentially active at all times, but there is a quick work-around. If you want a group of programs set to particular MIDI channels with all their volumes adjusted to preset levels and all assigned to the appropriate audio outputs, try the following procedure.

First, enter the MIDI/CHANLS page by hitting the MIDI button and the CHANLS soft button, then use the Chan/Bank buttons to quickly view and change the program settings for all sixteen channels (see **Fig. 4**). Next, enter the DISK page and choose Save, then select Master. Press No in response to the prompt "Save dependent objects?" as this can make your files quite large.

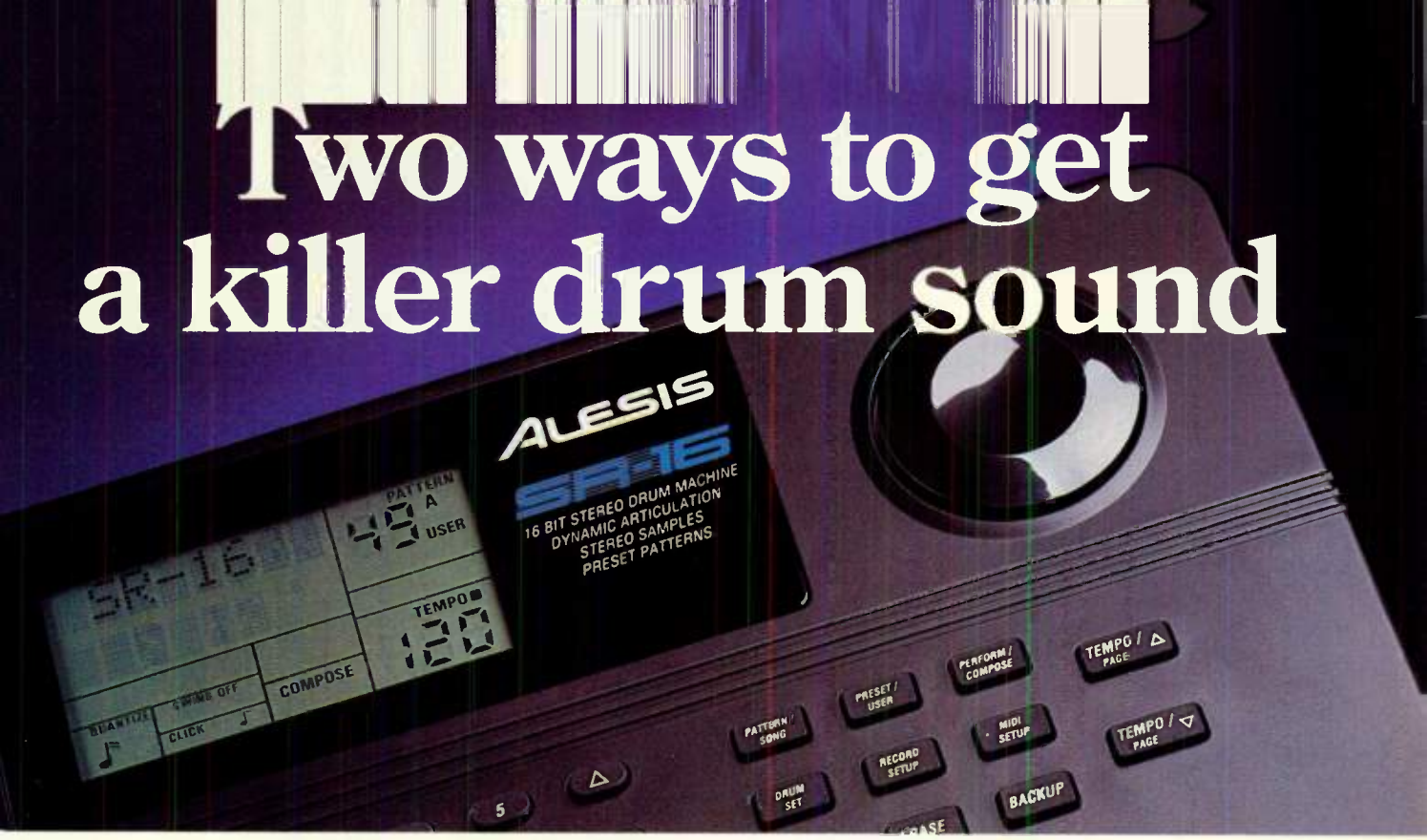
When saved, these Master files occupy only 0.5 KB of disk space, so you can store hundreds of them on one disk and reload them quickly. The other way to store master settings is to record a SysEx dump of them at the beginning of your sequence. (To do this, press the Master button, then press Dump and scroll to Master.)

CONCLUSION

We've barely scratched the surface of K2000 possibilities, but with a little effort, you'll find many useful sounds by experimenting with these examples. Try using different keymaps with all of the examples presented here. If you have any RAM SIMMs installed, you'll discover another realm of possibilities by using the preset programs to process your own sounds. By loading samples from disk, MIDI Sample Dump, or SCSI (via SMIDI), and using your samples in the keymaps of the animated programs (such as 191 or 196), you can easily create hundreds of original sounds and textures. The K2000 truly has tremendous potential, and we hope you'll explore the vast territory it covers.

Glenn Workman *is a musician, professional beta tester, and Mac programmer.* **Dennis Miller** *is on the music faculty of Northeastern University in Boston.*

Two ways to get a killer drum sound



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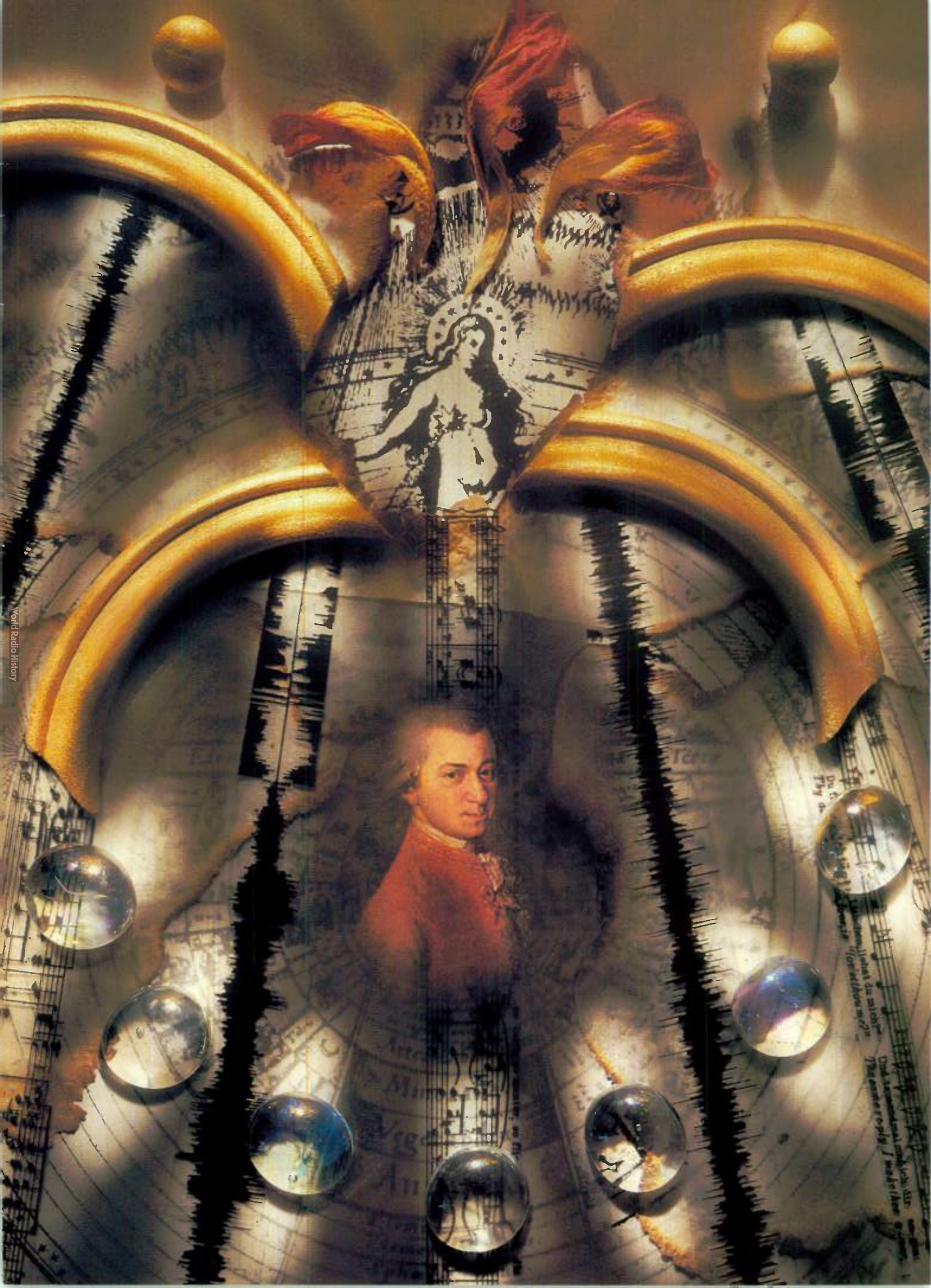

Creative artists discuss the impact of technology on creativity.

THE MICROCHIP MUSE

BY SCOTT WILKINSON

Most *EM* readers probably agree that electronic music technology is a vital component of their creative work. (After all, this isn't Acoustic Musician magazine.) But few of us stop to think seriously about the impact of technology on creativity. That's unfortunate because examining this issue can deepen our appreciation of technology and help us avoid the pitfalls it places in our path.

It's easy to see some of the ways in which technology enhances creativity. With synths, samplers, sequencers, and other gear, an individual can create and record entirely orchestrated pieces without leaving home. There's no need to hire professional musicians (or put up with less-capable, inexpensive ones) and no need to shell out big bucks for commercial studio time.

But this enhancement is a double-edged sword. For example, what about composers who have trouble with personal relationships? When they build

Tetsuji Yoshida

THE MICROCHIP MUSE

a MIDI studio, they might think, "Now I have total control. I don't have to work with people at all." This is a chilling thought. Can a musician who is so isolated truly touch the emotions of an audience?

What kinds of social interactions do we sacrifice, what friendships do we lose by sampling and sequencing rather than collaborating? Does buying a "world music" module mean that someone is more likely to travel and learn about other cultures or stay at home thinking they know it all? Technology can enhance our communication, or isolate us and keep us from recognizing what we still have to learn about each other.

Another important facet of this issue is that technology can be used to transcend our own innate musical ability. In particular, sequences and hard-disk recordings can be microscopically edited and tweaked to render a perfect "performance" that no human could play in real time. While many consider this a significant enhancement to creativity, others worry that it spells the end of musicians who are technically proficient on their chosen instrument.

The ability to produce perfect musical performances affects the live arena as well as the recording studio. In the early days of recording, the purpose of technology was to capture the essence of a live performance. Now, the purpose of many live performances is to recreate recorded material as closely as possible, including the use of sequenced and taped material and lip syncing on stage. What part does live, real-time performance play in the creative process? Is the unique interaction between live performers lost in the forest of technology? How do audiences respond to this trend?

To further explore these and related issues, EM presents an artists' roundtable that includes six creative people discussing the impact of technology on creativity: Jenny Boyd, a psychologist and author of *Musicians in Tune: 75 Contemporary Musicians Discuss The Creative Process* (Simon & Schuster, 1992); Private Music recording artist Suzanne Ciani, an electronic and acoustic keyboardist; Michael Hedges, a guitarist on Windham Hill; Ciro Hurtado, a guitarist and composer who plays progressive Latin American music with his band Huayucaltia on ROM Records; Amy Knoles, a percussionist who performs contemporary electronic and acoustic chamber music with the California E.A.R. Unit; and Joe Sample, keyboardist and co-founder of the Crusaders and now a solo artist for Warner Brothers.

Suzanne Ciani

Define creativity and technology.

JENNY BOYD: In its most basic form, creativity is a universal, innate quality. Its prerequisites are traits we as human beings naturally possess: curiosity and a sense of wonder. These inborn characteristics are essential for exploring our surroundings and thinking intuitively and imaginatively, fundamental aspects of creativeness.

Creativity can also be used in another sense, to describe the creation of artistic and highly specialized pursuits. In addition to that basic sense of wonder and curiosity, creative people also have a prodigiously developed interest in something. The root of this interest could be hereditary; for example, a

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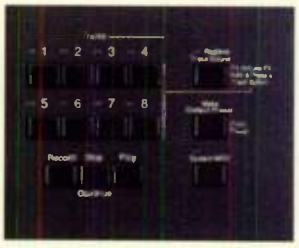

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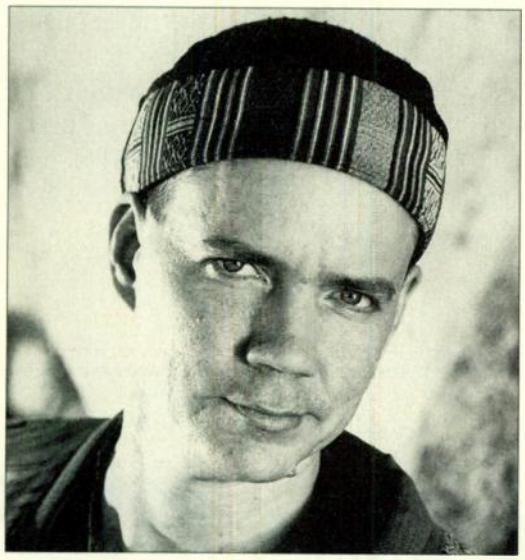
strong capacity for understanding or feeling music, an innate gift for painting or drawing. Such a person has a fixedness of purpose, a complete absorption and passion in doing the things that make up the creative process. (From *Musicians In Tune* ©1992 by Jenny Boyd. Reprinted by permission of Simon & Schuster, Inc.)

SUZANNE CIANI: Creativity needs some form of organization, and the first step is defining your playpen. Limitation is a good thing—it's essential to creativity—and electronic technology lets us choose our limits, rather than having them imposed on us by an acoustic instrument. Actually, both options offer infinite possibilities. It's just that technology offers more options; you have a larger playpen in which to work.

MICHAEL HEDGES: Acoustic and electronic instruments are merely creative tools. If you're doing a job that requires a screwdriver, you'd better have one, or the job's not going to get done. Now, you can use your muscles and a manual screwdriver, or you can get a power screwdriver. My guitar is my screwdriver, and my (recording) studio is my power screwdriver.



Michael Hedges

What is your relationship with technology?

CIANI: My history goes back to the late 1960s, when I worked with Max Mathews at Stanford. I later worked for Don Buchla, and I pretty much thought that the electronic medium was The Future. Recently, I've come around to integrating the acoustic with the electronic.

HEDGES: My first encounter with technology was my father's tape recorder. When I got to the Peabody Conservatory, I started working in the electronic music studio there. They had two Revox half-track tape recorders and an old Moog. Some time later, I went to CCRMA at Stanford. I got to hang out in classes that John Chowning and Leland Smith were teaching.

CIRO HURTADO: As a guitar player, I wanted to try guitar synthesizers, so I got the Takamine GPM6. It opened a new path for me. I have an IBM PC, so I started getting into sequencing with Roland's *MESA*, and later on I got Twelve Tone Systems' *Cakewalk*. After the sequencing software came more sound modules and Quantar and Roland GR-50 guitar synthesizers. I also sample Latin American instruments to create my music.

AMY KNOLES: The first electronic instrument I played was the KAT MIDI mallet instrument. I loved it, so I bought one, and that was the beginning of the end! Now I use computers for all sorts of things: storing voice data for different tone generators, recording and playing sequences, and so on. I also use Opcode's *MAX* in my solo performances. The interactive stuff is the most interesting way to work with a computer.

JOE SAMPLE: I remember seeing my first electric piano on the *Tonight Show* in the 1950s. After playing terrible (acoustic) pianos while touring the U.S. in the 1960s, I began playing the electric piano. In the studio, I always record my basic tracks with an acoustic piano, then I use synthesizers to put the icing on the cake. I don't use synths to emulate or sample acoustic instruments. I only use them for those special sounds that you cannot find in an acoustic instrument.

What is the impact of technology on your creative process?

CIANI: I'm using the Yamaha Disklavier piano these days. It helps me explore certain aspects of composition that have to do with technique. In a way, technology has obliterated the mystique of technique because we can use it to play things that humans can't. It's no longer "Wowee, look what I can do." The emphasis is back on the aesthetic and not on showing off.

▼

When I work with live musicians, I like the feedback, the interaction back and forth. That's the good thing about working with musicians as opposed to machines.

—Ciro Hurtado

HURTADO: I don't get inspired by sound. I have the sounds in my head. However, music software and sound modules have been tremendous tools in orchestrating my compositions. I have all the sounds of the orchestra at my fingertips, so I can experiment. Now I'm able to translate what I have in my head and hear the final result almost instantly.

KNOLES: I was never interested in composing music until I started gathering pieces of technology. When I sample a sound and start playing around with it, I get all sorts of musical ideas. I took a plastic bottle, squished it, let it go, and sampled the sound of it popping back to its normal shape.

(continued on p. 57)

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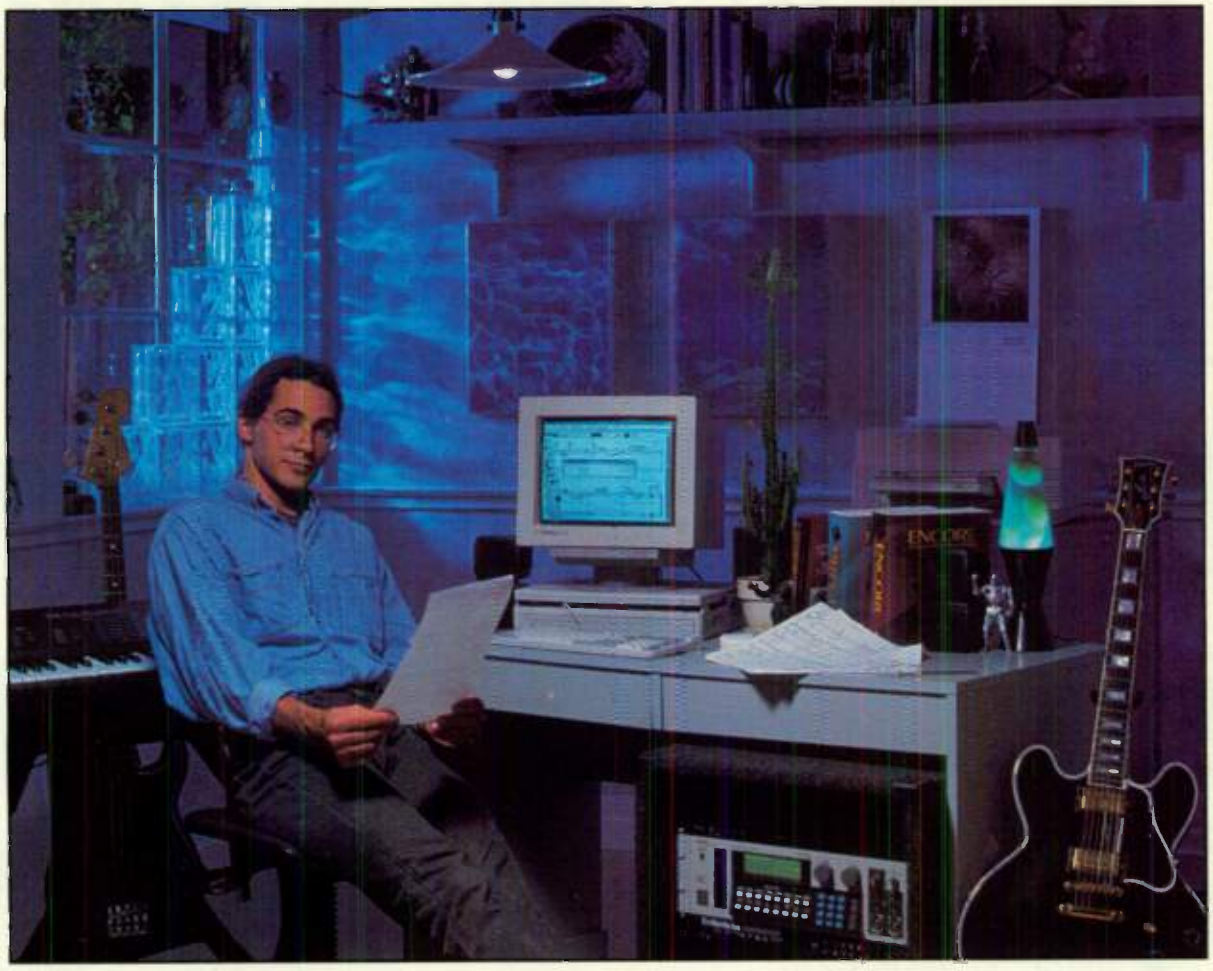

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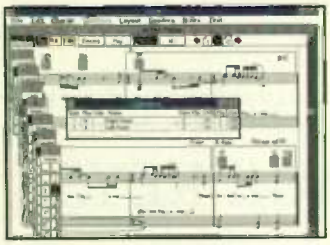

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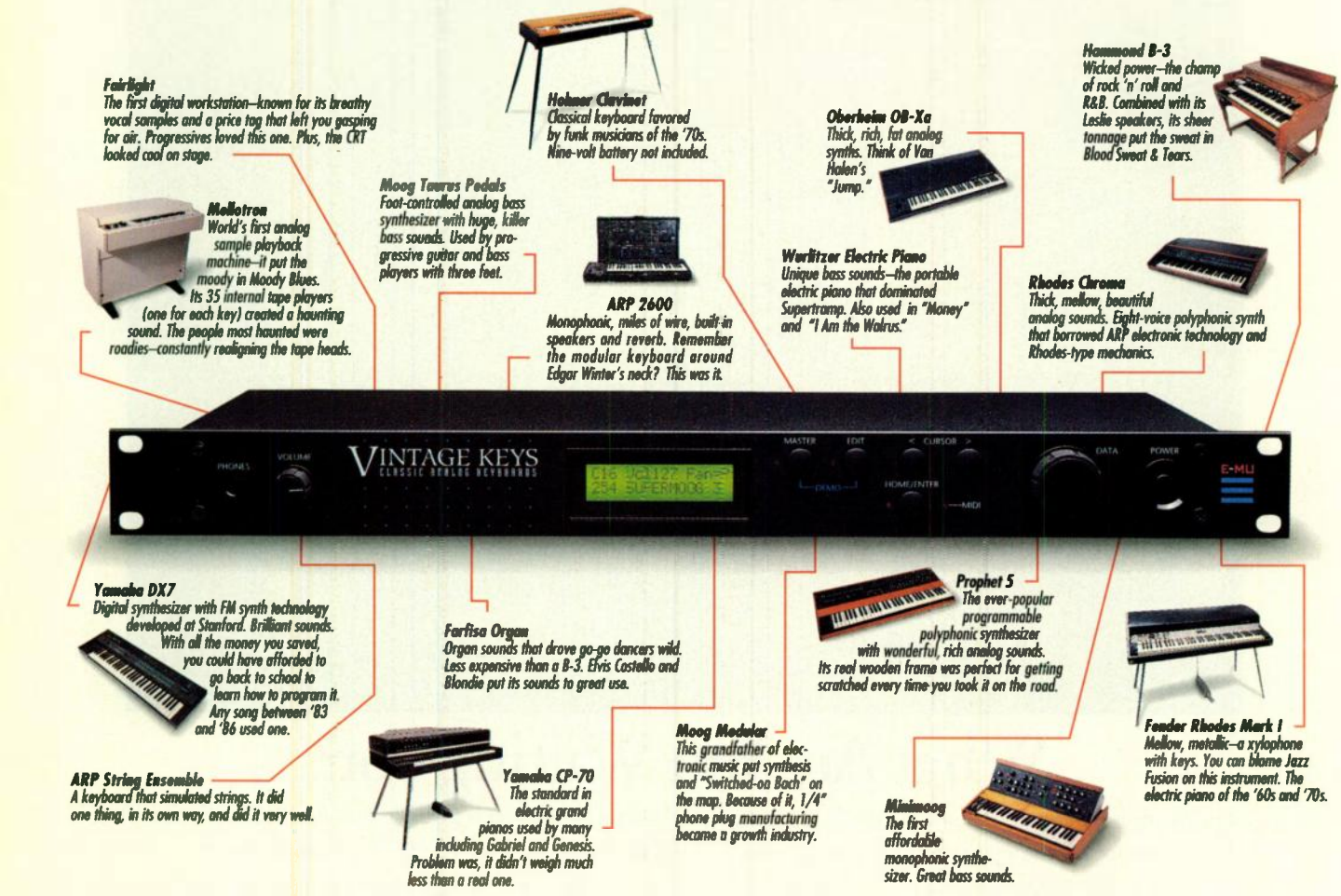

Ahhhh... the warm, rich sounds of classic analog keyboards bring back a lot of sweet memories. And those same fat basses, thick pads and sizzling leads are taking a commanding role in today's music. But how quickly you forget their incredible weight and size, their terrible reliability, and the fact that they would go out of tune at the drop of a hat. To give you the pleasure without the headaches, E-mu created Vintage Keys.

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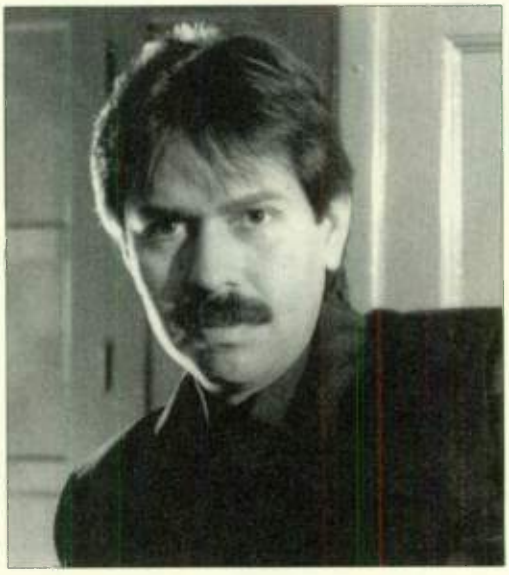
THE MICROCHIP MUSE

That one sample gave me enough material to start a piece. Another time, I sampled spoken words and assigned them arbitrarily to MIDI note numbers. By mistake, the MIDI patch bay was connecting the computer to a tone generator, and I heard pitched material based on the way I had arranged the words. So I wrote a piece based on that mistake.

I always thought that a lot of computer music was rigid and always the same, but *MAX* is taking me in a completely different direction. I use it in a piece for a MIDI drum solo. I play a particular pad that is designated as a trigger, then play a solo on the main body of the drumKAT. When I hit another designated pad, the computer plays back what I just played, but with pitches. I can change the range of what's being played, make it go faster or slower, and do all sorts of things instantly. There's a real dialog with the computer.

SAMPLE: I still compose at the piano. I used to write on synths—and they certainly can put you in another mood by triggering different sounds—but my experience has been that if I come up with a wonderful melody or vocal line at the piano, then it is going to sound fantastic on a synth.



Ciro Hurtado

How does technology inhibit creativity?

BOYD: Spontaneity is what creativity is all about. Suddenly, you can do things you never thought you could do. I think maybe technology limits spontaneity. And what about feeling? You might have a wider palette of sounds, but do you have the intensity of feeling? Surely that's more important than the width of the palette.

CIANI: I disagree. You can seek perfection and still have spontaneity. They're not mutually exclusive. What's important is the artist and what the artist does with the medium. You have a choice. Nothing imposes anything. Technology doesn't emasculate creativity. It's an option.

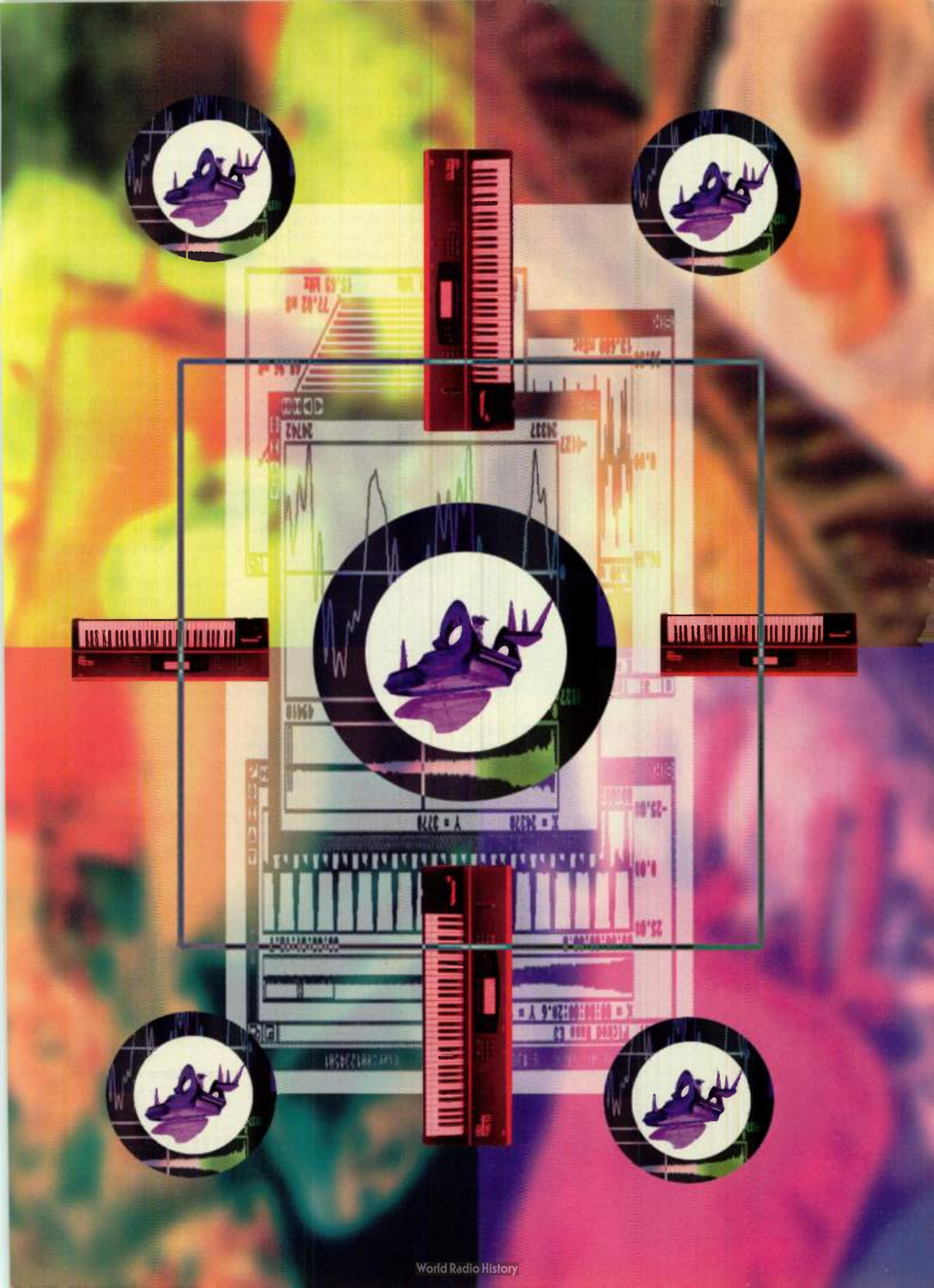
KNOLES: For me, the main inhibiting factor is the time involved. If I'm ready to get an idea down, I invariably run into some sort of technical snag. Usually, I just don't have a complete understanding of what it is I'm working with. I have a bad case of technolust, and I keep getting new things, which means I have to learn how to use them. Unfortunately, I always want to do something with them right away.

SAMPLE: I have seen younger musicians who shuck and jive, as we used to say. Their musical skills are virtually non-existent. They get totally involved with sounds and looping things over and over. I hear a lot of that music in clubs, and most of it turns me off. I really cannot respect it because I don't feel anything from it. I listen to some old gospel records, some Louie Armstrong records from the 1930s and '40s, and that stuff is incredible. There's no way in the world you can program that.

How does technology affect communication between musicians?

HURTADO: When I create music by myself, I'm in control of every single

(continued on p. 97)



ACOUSTIC PIANOS IN THE DIGITAL AGE

BY MICHAEL KREWITSKY AND STEVE OPPENHEIMER

You don't have to sacrifice incomparable touch to reap the benefits of MIDI.

Although digital pianos are good instruments, few pianists find them as inspiring as the real thing. There's no substitute for the way all the wood and metal in an acoustic piano vibrates your entire being when you hit the lost chord exactly right. When you want subtle touch-sensitivity and a magnificent, complex tone, a digital piano made out of plastic and silicon can't compete. But digital keyboards with MIDI offer a way to record and edit your music and perform with an almost infinite sound palette. What a dilemma: acoustic or digital?

ACOUSTIC PIANOS IN THE DIGITAL AGE

Stop. Take a deep breath. If you examine your options, you'll realize you can have both the acoustic piano you want and MIDI. You can retrofit your piano for MIDI, or buy a piano with MIDI capabilities already installed. One instrument even lets you play back your recorded performance with the acoustic piano.

FIG. 1: Gulbransen's KS20 includes a strip of optical sensors installed beneath the keys and a control unit mounted beneath the left side of the keybed that converts the information to MIDI note and Velocity data.

GULBRANSEN MIDI RETROFIT

If you are in the enviable position of owning a quality acoustic piano, consider the Gulbransen KS20 MIDI modification for acoustic keyboards. This unit (which lists for $1,990) is an excellent way to bring your favorite acoustic beast—acoustic piano, Rhodes electric piano, or organ—into the MIDI age. (A few years back, Forte Music offered a piano-to-MIDI retrofit, but the company and product are history.) The modification consists of a strip of optical sensors installed beneath the keys and a control unit that mounts beneath the left side of the keybed of the instrument (see **Fig. 1**). The modification makes no perceptible change in the piano's original keyboard feel.

The KS20's sensors track the movement of the piano keys, and the control unit converts the information to MIDI note and Velocity data. The Gulbransen-enhanced piano only sends MIDI data and does not play back your performance. But the sensors track your playing extremely accurately. When you record the MIDI data with a good sequencer and play it back with a quality MIDI sound module's piano sound, you get an impressive reproduction of your original performance.

The MIDI implementation is quite complete, allowing a wide range of controller functions from the piano's keyboard. You can program four keyboard splits and layers. (Splits are separate zones, or regions, of the keyboard that send data on different MIDI channels. The simplest application of a 2-zone split is to play different sounds with the left and right hands. Layers let you put different sounds on top of each other by sending on multiple MIDI channels in the same zone.)

The KS20 senses key Velocity and Polyphonic Aftertouch (independent Pressure messages for each key) and sends Program Changes to an external MIDI device such as a sound module. You can send just about any MIDI controller message, including Pitch Bend and Volume, from its four sliders and two pedal inputs. This is fortunate, because the unit has no pitch bend or modulation wheel. Note data can be transposed, and the system can send all its MIDI messages on all sixteen MIDI channels.

In addition to the KS20, Gulbransen offers two simpler versions, the KS5 ($1,190) and KS10 ($1,490). These devices don't send Aftertouch messages, but they are Velocity-sensitive and let you send MIDI controller data from programmable footpedals. The KS5 only operates on one MIDI channel, so you can't do splits and layers. The KS10 also sends Program Changes and offers two MIDI channels, but its footpedals are preset for Sustain and Soft Pedal.

The company also sells the Orchestra II ($2,090), a version of the KS sensor that includes a 64-note polyphonic, 128-sound synth module. The Orchestra II has two zones, with a programmable split point, and can produce two sounds at once (for the left and right hands). Each zone has a volume slider as well as an attack slider for use with string and choir sounds. You can assign each zone to any MIDI

QUIET KEYS PIANO MUTE

One big advantage of a digital keyboard over an acoustic piano is that you can play the former through headphones with no concern for the neighbors. If you're an apartment dweller, or maybe you have housemates who don't appreciate your brilliant talent, acoustic pianos present a problem.

Fortunately, if you have a vertical piano, it's not an insurmountable problem. Quiet Keys (Rt. 3, Box 179, Austin, MN 55912; tel. [800] 777-5397 or [507] 433-4835) offers a product of the same name consisting of material that goes between the piano strings and the hammers on a vertical piano, reducing the sound by approximately 70 percent. The product, which can be installed by the user, lists for $79.95 including shipping (in the continental U.S.).

A new version of Quiet Keys for MIDI-enhanced pianos has been developed that uses a special foam/felt material. According to the manufacturer, it can reduce sound by as much as 90 percent. An on/off knob allows you to select muted or normal play.

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ACOUSTIC PIANOS IN THE DIGITAL AGE

FIG. 2: Yamaha's MIDI Grand is based on Yamaha's 6-foot C3 series and 7-foot, 4-inch C7 series pianos. A 40-character by 2-line display shows the status of its many MIDI features.

channel. As with the KS20, the two footpedal inputs can be programmed to send almost any MIDI controller message. The Orchestra II tracks both attack and release Velocity, and you can program simple Velocity curves.

The Gulbransen retrofits should be installed by a qualified piano technician, but the task is by no means difficult, lengthy, or traumatic for your technician or your prized piano.

KAWAI KG-2 PARLOR GRAND

When you hear the term acoustic pianos with MIDI, you probably imagine a great acoustic piano that sends MIDI as an added feature. A second category of these instruments meets this expectation. This option exists for those of us who don't currently own the piano of our dreams.

The Kawai KG-2 Parlor Grand with MIDI ($16,841) is an excellent 5-foot, 9-inch grand piano, based on Kawai's GS series grand, that is fitted with a MIDI Out port. The control box is mounted at the lower left underside of the piano. This instrument will satisfy only the most basic MIDI needs: It is a single-zone controller with no Aftertouch, no display, and only three selectable Velocity curves (none of which track particularly well if you have a feather touch). It sends on just one MIDI channel at a time, but you can select which channel. It has a ¼-inch input that lets you switch the MIDI Out port on and off with a footswitch, and its sustain pedal transmits MIDI Sustain messages.

Some folks will find that this is all they need from a MIDI piano. After all, the KG-2 is a fine piano that lets you send basic note and Velocity data to another MIDI instrument or sequencer using the touch you learned to love. But the lack of a display could be a drawback. Another significant problem that could loom large if you're overdubbing tracks by playing along with a sequencer is that when you release all the piano's notes, the KG-2 sends an All Notes Off command that could cut off your external synths unexpectedly.

The Kawai acoustic piano is beautiful, but the MIDI implementation is flawed. Given the existence of the Gulbransen KS series, you're better off buying the KG-2 without MIDI and adding the Gulbransen retrofit.

FIG. 3: The Yamaha Disklavier is the Rolls Royce of MIDI "player pianos," offering optical sensors and solenoids that record and play back performance nuances with great accuracy. The Disklavier sends and receives MIDI, but with a more basic implementation than the Yamaha MIDI Grand or Gulbransen KS20.

YAMAHA MIDI GRAND

A high-tone alternative to the KG-2 are Yamaha's MIDI Grands ($24,000 to $27,000). Like the Kawai instrument, the MIDI Grand is a superb piano with MIDI transmission capabilities. The grand pianos are based on Yamaha's 6-foot C3 series and 7-foot, 4-inch C7 series, and their size partially accounts for their high price compared to the Kawai KG-2.

Unlike Kawai, however, Yamaha didn't skimp on the MIDI power. The piano includes MIDI features such as 64 programmable performance memories, multiple-zone operation, pitch bend and modulation wheels, a volume slider, and foot-controller and breath-controller input jacks.

The MIDI Grand sports Aftertouch and has a 40-character by 2-line display to tell you what's happening (see Fig. 2). It also offers a sophisticated means of scaling outgoing MIDI Velocity messages. The Yamaha instrument would, by virtue of its MIDI power, appear to

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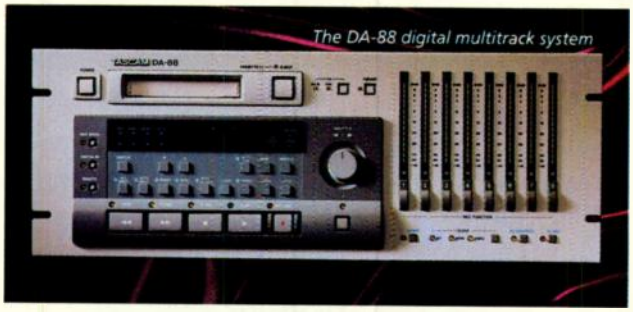
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be a clear winner over the Kawai in this class. However, as you might expect, it's still a you-get-what-you-pay-for world out there; the Yamaha costs considerably more than the Kawai. Surprise, surprise.

YAMAHA DISKLAVIER

The third approach to piano/MIDI combinations is represented by a unique family of instruments, the Yamaha Disklaviers (see Fig. 3). The line includes a 43-inch console ($7,495), a 45-inch studio upright ($7,895), and a 50-inch upright ($10,995). The higher end of the line comprises 5-foot, 3-inch; 5-foot, 7-inch; and 6-foot, 1-inch grands ($23,295 to $25,695).

These truly are MIDI "player pianos." Utilizing a sophisticated system of optical sensors and solenoids, these instruments are capable of recording and playing back performances with extremely faithful reproduction of even the subtlest musical expressions. There is no compromise on the quality of these instruments as acoustic pianos; they measure up to expected Yamaha standards in all respects.

▼ Yamaha's Disklavier is capable of recording and playing back performances with extremely faithful reproduction.

The Disklavier sends and receives MIDI, but with a more basic implementation than the Yamaha MIDI Grand or the Gulbransen KS20. It features a 3.5-inch disk drive, a basic sequencer, and an LCD for programming, adding up to a very potent and easy-to-learn package. You can control the sequencer from a wireless remote in addition to the regular control panel.

A volume button lets you control the level while a sequence is playing back. (The volume button also can affect the MIDI Volume setting of data coming into the Disklavier from an external sequencer, but it doesn't affect data you send out from the instrument.) You can transpose the key of the mechanical playback "on the fly," but not MIDI playback. You can change the tempo in mid-playback, too.

One limitation is that the mechanism can only play back sixteen notes at a time, but unless you're playing very dense music for four hands, this shouldn't be a problem. When you play back a Disklavier sequence, there's a significant physical delay (as much as a half-second, depending on note velocity) before you actually hear your notes. In order to keep the Disklavier's acoustic-piano mechanism from lagging

ACOUSTIC PIANOS IN THE DIGITAL AGE

behind your external sound modules, the onboard sequencer includes a delay function for incoming and outgoing MIDI notes.

In addition to recording and playing back your performances, you can buy a large library of prerecorded floppy disks ranging from superb piano music recorded by professional pianists, to accompaniment disks, to learning aids for beginning students.

The Disklaviers are well-rounded and unique products that bridge the acoustic-digital gap. Although the prices might appear high at first glance, given the quality of the products, they're not out of line. The price tag is the trade-off for the unique combination of a fine acoustic piano, sophisticated mechanical playback, and MIDI.

MANUFACTURERS

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PIANODISC PDS-32

If the idea of a solenoid-driven, MIDIfied player piano appeals to you, but you prefer to retrofit your current piano, consider PianoDisc's PDS-32 system ($4,000 to $5,000, depending on installation costs). The PianoDisc's Velocity-sensitive sensors can be installed by a professional piano technician and, according to the manufacturer, do not affect the action. The keyboard does not support Aftertouch and cannot be split into zones.

FIG. 4: The PianoDisc PDS-32 system is controlled from a VCR-sized box with a 720 KB floppy-disk drive; the programming buttons; MIDI In, Out, and Thru jacks; and a large LCD display. The system includes a 1-track MIDI sequencer.

A VCR-sized control box (see **Fig. 4**) holds a 720 KB floppy-disk drive; the programming buttons; MIDI In, Out, and Thru jacks; and a large LCD. The system can record your performances via MIDI with up to 24-note polyphony, and it plays back (via the solenoid system) with up to 16-note polyphony. It comes with a library of prerecorded songs.

The system's MIDI implementation and editing features are rudimentary. It sends MIDI note, Velocity, and Hold (sustain) messages through its MIDI Out and records to an onboard, 1-track, MIDI sequencer. The sequences cannot be edited, but tempo can be varied from 20 to 250 bpm. Editable playback controls are limited to tempo, volume, mute, and transpose (±2 octaves, in semitone increments), and there are several options for building and moving through a sequence playlist.

The optional PianoDisc Symphony sound module ($1,000) is based on Emu's 32-note polyphonic Proteus/1 and also includes many Proteus/2 sounds, for a total of 8 MB of 16-bit sounds. The Proteus is fully editable, but you can't offload the patches. It attaches to the control box, and a Balance control adjusts the mix between the piano and Symphony sounds.

WHICH TO BUY?

Attempting to compare these products is not possible on a feature-by-feature basis. All of them attempt to reconcile the physical realities of the acoustic analog piano with the virtual realities of the computer-based digital MIDI world. Each manufacturer seems to have a different approach to finding a happy medium between the acoustic and digital needs of people searching for peace, truth, happiness, and the perfect MIDI-enhanced piano.

The only product you should probably avoid is the Kawai KG-2 Parlor Grand with MIDI; but then again, the piano itself is excellent. The KS20 is a superior choice if you want to retrofit an existing instrument (including a non-MIDI Kawai). The Yamaha MIDI Grand is a winner, too, but is larger and more expensive than the KG-2. The Disklavier family, especially the grands, add not only MIDI but superb acoustic player-piano features, albeit at top-of-the-line prices. Finally, the PianoDisc system adds basic MIDI sequencing, solenoid-based playback features, and optional Proteus sounds to your current piano.

Now that you know who the players are, seek an opportunity to check them out yourself. Evaluate the sound and probe the action. Consider whether you want solenoid-based playback, or just MIDI output, and evaluate the extent of your MIDI control requirements. Most of the selection process depends on balancing your budget and desires. As Popeye says, "You pays your money and takes your choice."

Michael Krewitsky *is the owner of Professional Sound and Music/Musicians Repair Service, a MIDI/recording sales and service shop in San Diego, California.* **Steve Oppenheimer** *is* **EM***'s products editor.*

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MIDI Implementation Charts

By Scott Wilkinson

Learn to decipher these daunting tables and maximize your equipment's capabilities.

MIDI has standardized the way electronic musical instruments communicate performance gestures such as playing a note, moving a slider, or stepping on a sustain pedal. But even though all MIDI devices use the same message to represent a particular gesture, there is nothing that says every device must send or recognize all MIDI messages. Some messages are irrelevant to certain devices; for example, a sound module with no keyboard should recognize the Sustain message, but it has no reason to send that message. The specific set of messages that a device sends and recognizes is called its *MIDI implementation.*

Instrument manufacturers created a standardized means for presenting a device's MIDI implementation in a form called, logically enough, a MIDI Implementation Chart. Usually located in the back of the owner's manual, this one-page chart offers a relatively straightforward but very condensed chunk of information about exactly what the device can and cannot do. The ability to read this chart is very important for evaluating the capabilities of instruments and troubleshooting any MIDI problems that may arise.

MIDI MESSAGE REVIEW

Before you can understand a typical MIDI implementation chart, you need to be familiar with the different types of MIDI messages. The two major message types are Channel and System. Channel messages are so called because they include a MIDI channel number; devices that are set to a particular channel usually respond only to Channel messages encoded with the same channel number.

Channel messages are further divided into two groups: Voice and Mode. Channel Voice messages are the most common MIDI messages; they include Note On, Note Off, Program Change, Pitch Bend, Polyphonic Aftertouch, Channel Aftertouch, and Control Change.

There are 128 different Control Change messages, numbered 0 to 127; the first 121 (0 to 120) represent different expressive gestures such as Modulation Wheel, Breath Controller, Damper or Sustain Pedal, Pan position, Chorus Depth, and many others. Each Control Change message is identified by a unique number and a value that indicates the depth of the gesture (e.g., how far the modulation wheel is moved).

The last seven Control Change messages (121 to 127) are more commonly known as Channel Mode messages. The Reset All Controllers message returns all controllers such as Pitch Bend and Mod Wheel to their nominal (untweaked) values. The Local Control message determines whether the receiving device responds to its own keyboard (if it has one); this is important for sequencing applications (see "From the Top: Sequencing Made Simple" in the March and April 1992 EM for more). The All Notes Off message turns off all notes that are sounding on the receiving device, which is great for stuck notes.

The next two Channel Mode messages are Omni On and Off. If Omni mode is turned on, a sound module will respond to all Channel messages regardless of the MIDI channel encoded in them. This mode was included

PAUL DOLAN

in MIDI to make it easy to connect one instrument to another without worrying about which channel they were set to. If Omni mode is turned off, the device will respond only to those Channel messages encoded with a channel number that corresponds to the channel setting on the device.

The final two Channel Mode messages are Mono On and Poly On. If Mono mode is on, the instrument will play monophonically; that is, it will play only one note at a time. If Poly mode is on, the instrument will play polyphonically. These messages are mutually exclusive; if Mono mode is on, Poly mode is automatically off, and vice versa. These modes work in conjunction with the Omni mode to determine precisely how an instrument will respond to incoming Channel messages.

The relationship between Omni mode and Poly/Mono mode is rather complicated, and not necessary for this discussion. It is only important to realize that there are four combinations of these modes: Mode 1 is Omni On, Poly; Mode 2 is Omni On, Mono; Mode 3 is Omni Off, Poly; Mode 4 is Omni Off, Mono. Normally, the default mode for a synth or sampler is Mode 3, in which the instrument responds polyphonically only to Channel messages on its designated channel.

The System messages are divided into three groups: Common, Real Time, and Exclusive. None of the System messages have channel information because they are intended for all devices in the system. System Exclusive (SysEx) messages represent the specific parameters of individual instruments. Unlike the rest of MIDI, SysEx messages are unique for each device and can be of any length. (For more, see "The Secret World of System Exclusive" in the February 1993 **EM**.)

System Common messages include MIDI Time Code Quarter Frame and Song Position Pointer, which represent the passage of time in a sequencer; Song Select, which is used to select one song among several in the memory of a sequencer or drum machine; Tune Request, which was used to tune the oscillators of analog synths (it's pretty useless these days); and End Of Exclusive (EOX), which identifies the end of a SysEx message. (Remember, SysEx messages can be of any length, so there must be a special message to terminate them.)

System Real Time messages include Timing Clock, which is sent from the master sequencer or clock source 24 times per quarter-note to keep all time-based devices in sync, and three commands: Start, Stop, and Continue, which instruct all sequencers and drum machines to start playing from the beginning of the current song, stop playing, and continue playing from the stopping point, respectively. Active Sensing messages are sent about three times per second and shut off stuck notes if a MIDI cable is accidentally disconnected from a device before a Note Off message is received. System Reset returns the receiving instruments to their default just-powered-up condition.

ON THE CHARTS

Now that we have a basic understanding of the various MIDI messages, it's time to learn how to read a MIDI implementation chart. We'll refer to a typical chart as we go (see Fig. 1). At the

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top is the name of the product and possibly the version number of the chart or product, and a brief description of the type of product.

The majority of the chart is taken up by four columns. The first column is labelled Function; it includes a list of the various types of MIDI messages. The next two columns are labeled Transmitted and Recognized. These columns indicate whether each type of MIDI message is transmitted and recognized by the device. The fourth column is labeled Remarks and includes notes and additional information.

Take a look at **Fig. 1**. As you can see, the Korg M1 transmits and recognizes messages on all sixteen MIDI channels. The two categories of basic channels, Default and Change, are relics from the early days of MIDI, when the default channel of an instrument was recalled every time the power was turned on. The "Change" channels could be set on the instrument, but often remained active only until the power was turned off. In the case of the M1, any channel can be memorized as the default power-up channel independently for transmission and recognition, and these can be changed to any other channel at any time.

The M1's default mode at power-up is Mode 3 (Omni Off, Poly). The "x" in the Transmitted column indicates that the M1 does not send a mode message at power-up. The "x" in the Recognized column indicates that the M1 does not recognize incoming Channel mode messages; its mode must be changed from the front panel. Altered modes are substituted by the instrument for those that it cannot recognize; because this is a recognition issue only, the row of asterisks indicates that transmission is meaningless.

The M1 transmits MIDI note numbers 24 to 108 from its 5-octave keyboard and recognizes all 128 note numbers (0 to 127) from a remote source. The "Sound Range" is often called "True Voice" and indicates the actual range of pitches that the instrument can sound. As you can see, the M1 can sound all 128 MIDI note numbers at the correct pitch and octave. This is also meaningless with respect to transmission, so a row of asterisks appears in the Transmitted column. Notice that the M1's sequencer can transmit all 128 note numbers.

The "o" in the columns next to Velocity indicates that the M1 sends and recognizes the Velocity value in Note On messages; it transmits values from 10 to 127 and recognizes values from 1 to 127 (the "9n" is hexadecimal notation for Note On messages, but it's not important for this discussion). Note Off Velocity is not recognized, and the sequencer transmits Note On Velocity values from 2 to 126.

▼

The specific set of messages that a device sends and recognizes is its MIDI implementation.

The M1 does not send or recognize Polyphonic Aftertouch (called "Keys" here), but does transmit and recognize Channel Aftertouch. It also transmits and recognizes Pitch Bend messages. Notice the "*1" in the Remarks column; this leads the reader to the Notes section at the bottom of the chart. Note *1 indicates that Pitch Bend is transmitted and recognized if the Control parameter is set to ENA (Enable) in Global mode.

The next function lists all Control Change messages transmitted and/or recognized by the instrument. The M1 sends and recognizes Control Changes 1, 2, 6, 7, 38, 64, 96, and 97; it recognizes but doesn't send 100 and 101. These Control Changes are identified in the Remarks column. The sequencer sends and recognizes all Control Change messages from 0 to 101. Notes *1 and *2 apply to these messages as indicated.

The M1 can send Program Change messages with values from 0 to 99 and recognizes values from 0 to 127. However, the actual number of memory locations ranges from 0 to 99, which is indicated in the second line of the Program Change section. If the M1 receives a Program Change with a value of 100, it will "wrap around" and call up the sound in memory location 0. Once again, this is meaningless with respect to transmission.

As you might expect, the M1 is able to send and recognize SysEx messages,

and notes *2 and *4 reveal additional information. In addition, the M1 sends and recognizes Song Position Pointer and Song Select (with values from 0 to 19) under the conditions in note *3. It does not send or recognize the Tune Request message because digital oscillators don't need tuning. Timing Clock, Start, Stop, and Continue messages are transmitted and recognized by the instrument under the conditions in note *3.

The Local On/Off and All Notes Off messages are recognized but not transmitted; All Notes Off is also included with the Channel Mode messages 123 through 127. The M1 sends and recognizes the Active Sensing message, but doesn't send or recognize the System Reset message.

ENOUGH!

You should now be able to evaluate the MIDI implementation of just about any device at a glance by looking in the back of the manual. Armed with this knowledge, you can judge for yourself whether an instrument can do what you want it to do, MIDI-wise. Not only will this help you troubleshoot problems with your MIDI system, it will also help you get the most from your gear.

M1 MIDI IMPLEMENTATION CHART

FUNCTION		Transmitted	Recognized	Remarks
Basic Channel	Default	1 ~ 16	1 ~ 16	Memorized
	Change	1 ~ 16	1 ~ 16	
Mode	Default	x	3	
	Messages		x	
	Altered	********		
Note number:	Sound range	24 ~ 108 ********	0 ~ 127 0 ~ 127	Seq. Data is 0 to 127 in transmission
Velocity	Note on	o 9n, V=10 ~ 127	o 9n, V=1 ~ 127	Seq. Data is 2 to 126 in transmission
	Note off	x	x	
After Touch	Keys	x	x	
	Ch's	o	o	
Pitch bend		o	o	*1
Control Change	1	o	o	Pitch MG *1
	2	o	o	VDF modulation *1
	6	o	o	Data entry (MSB) *2
	7	o	o	Volume *1
	38	o	o	Data entry (LSB) *2
	64	o	o	Sustain *1
	96	o	o	Data increment *2
	97	o	o	Data decrement *2
	100	x	o	LSB of RPC for master tune *2
	101	x	o	MSB of RPC for master tune *2
	0-101	o	o	Sending and receiving Seq. Data only
Program Change	Actual No.	o 0 ~ 99 ********	o 0 ~ 127 0 ~ 99	
System Exclusive		o	o	*2,*4
System Common	: Song pos.	o	o	*3
	: Song sel.	o 0 ~ 19	o 0 ~ 19	*3
	: Tune	x	x	
System Real time	: Clock	o	o	*3
	: Commands	o	o	*3
Aux Message	: Local ON/OFF	x	o	
	: All note off	x	o 123 ~ 127	
	: Active sensing	o	o	
	: Reset	x	x	

NOTES:
*1 Transmit/receive if CONTROL is set to ENA in GLOBAL Mode.
*2 Transmit/receive if EXCLUSIVE is set to ENA in GLOBAL Mode.
*3 When Clock is Internal, it transmits but does not receive. When External, the opposite is true.
*4 Dumps and edits the Program data. Compatible with universal exclusive (Device ID).

Mode 1: OMNI ON, POLY Mode 2: OMNI ON, MONO o: Yes
Mode 3: OMNI OFF, POLY Mode 4: OMNI OFF, MONO x: No

FIG. 1: The MIDI Implementation Chart of the Korg M1.

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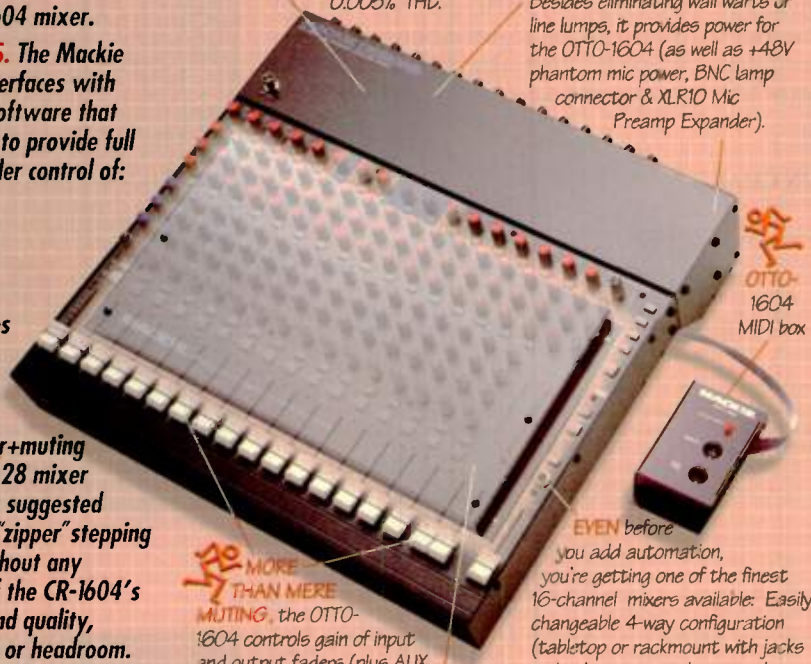

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* Any ad that mentions computer software is bound to have an asterisk or two in it. Ours reads: "Consult individual 3rd party sequencing software manufacturer's for specific information concerning implementation of features, release dates and availability." Oh yeah...we almost forgot: All company and/or product names are trademarks and/or registered trademarks of their respective manufacturers. Blah blah blah. Yadda yadda.

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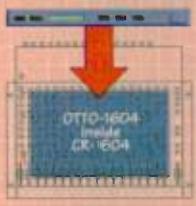

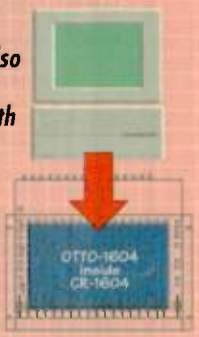

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Atari's Falcon030

By Bob Lindstrom

Atari hopes its latest creation will boost its presence in the music market.

Most computer manufacturers don't take electronic musicians into account when designing computers. Atari Computer has been the exception. By incorporating MIDI jacks and a high-resolution display into the original Atari ST and selling it for a reasonable price, they earned the devotion and dollars of many electronic musicians. Subsequent versions of the design—the Atari MegaST, STe, and TT—were bigger, faster, and more powerful, but were only evolutionary enhancements to that original ST architecture. As a result, they didn't have as much impact as the ST itself, and the company's influence has waned over the years.

With the introduction of the innovative Falcon030, however, Atari seems to be striking back. Scheduled for release in the first quarter of 1993, the Falcon030 is Atari's entry-level vision for a "Personal Integrated Multimedia System." In short, Atari wants a piece of the multimedia computing market that currently is divided among the Apple Macintosh, MPC-compatible PCs (a Multimedia Personal Computer standard developed by Microsoft), and the Commodore Amiga.

Under the hood, the Falcon030 is based on a 16 MHz Motorola 68030 processor and a 32 MHz Motorola 56001 DSP chip. Hardware details are displayed in the accompanying table (see sidebar "Falcon Specs"). Falcon030 benchmark performance should be comparable to an Atari TT030.

Several aspects of the Falcon030 design have proven controversial among Atari users. Among them is the decision to place the Falcon030 in a 1040ST-like case, reportedly to maintain low entry-level pricing. The Falcon030 also lacks Atari's familiar ASCI DMA port for hard drives and laser printers. In its place is the more dependable and technologically up-to-date SCSI-2 port. An Atari spokesperson reports that it should be possible to adapt the SCSI-2 connector to accept ASCI-compatible peripherals. Another early complaint heard from Atari enthusiasts is that the Falcon030 lacks an external floppy-drive port, which currently is necessary for the popular Spectre GCR Mac-emulation product.

The basic Falcon030 configuration includes the CPU with 1 MB of RAM and an internal floppy drive for $799. A Falcon030 with 4 MB and a 64 MB internal IDE hard drive retails for $1,299. RAM can be upgraded to a maximum of 14 MB using Atari's custom RAM-expansion board.

Neither configuration includes a monitor, but with the appropriate adapter plug, the Falcon030 will work with any existing Atari monitor, as well as third-party VGA- and Super VGA-compatible, multisync monitors. Switching monitor cables for low- and high-resolution modes is a thing of the past.

MULTIMEDIA MUSCLE

The primary Falcon030 excitement revolves around three all-new multimedia features: improved graphics with desktop video potential, integral digital audio recording and signal processing, and the *MultiTOS* multitasking operating system.

The Falcon030 advances Atari graphics far beyond low-, medium-, and high-resolution and into Super VGA country with 256-color, 640 × 480 and overscan resolutions. A 16-bit, true-color mode displays high-resolution graphics with over 65,000 colors.

For desktop video work, the Falcon030 has an overlay mode that permits you to genlock computer graphics with

incoming video feeds. An outboard interface box that attaches to the video port is required to use the video overlay capability.

For musicians, digital recording is the Falcon030's most attractive multimedia plumage. The Falcon030's digital signal processor (DSP) port, like the one found on the NeXT workstation, accesses a built-in Motorola 56001. When running at 32 MHz, this powerful chip performs 16.5 million instructions per second (MIPS) and can produce an impressive 144 dB of dynamic range.

The DSP56001 is a remarkably versatile chip that opens the Falcon030 to a wide variety of applications, including voice mail, voice annotation, voice recognition, video compression, fax transmission, and high-speed modem transmission, in addition to hard-disk recording. A number of these applications are being created for the Falcon030 by third-party developers.

As it comes out of the box, the Falcon030's hard-disk recording capability is limited, but impressive. The system can record 8- or 16-bit digital audio, in mono or stereo, at rates from 8 kHz to 50 kHz. Oddly, the available sampling rates exclude 44.1 and 48 kHz. For those rates, you need an outboard interface box with the appropriately timed crystals. Stereo mini-jacks serve as analog audio input and output ports.

The real musical meat of the Falcon030 arrives with the addition of an outboard hardware interface. Up to eight tracks of direct-to-disk digital recording are possible. Singular Solutions (tel. [818] 792-9567; fax [818] 792-0903) has developed the A/D64x Audio Interface, which offers two channels of 16-bit A/D conversion with 64-times oversampling and a crystal that permits the Falcon030 to record at 32, 44.1, and 48 kHz. The device features balanced and unbalanced stereo inputs, an integral mic preamp with 48-volt phantom power, and digital audio inputs and outputs (AES/EBU and S/PDIF).

The A/D64x connects to the Falcon030 through the rear DSP port. Because the DSP operates independently of the 68030 microprocessor, it should not slow down the system, even when recording eight tracks at 48 kHz. The plan, under Atari's new multitasking *MultiTOS* operating system, is to run your Atari-based MIDI sequencer and record 8-track digital audio at the same time. This makes your Falcon030 a complete MIDI and digital-recording workstation. The A/D64x carries a suggested retail price of $1,295. A Falcon030-based, 2-track digital-recording system with computer, monitor, interface box, hard drive, and software should cost around $3,000.

D2D Systems, the company providing software support for the A/D64x, plans to produce the SPDIO interface, with entry-level digital recording at 44.1 and 48 kHz ($299); and 4I/4O, a hardware interface with four analog input/outputs and S/PDIF and AES/EBU digital ports ($599).

Bundled with the Falcon030 is a simple, direct-to-hard-disk recording program, *Falcon030 D2D* from D2D. It provides rudimentary access to the Falcon030's digital-recording prowess, allowing 2-track digital recording with limited editing capabilities. The *System Audio Manager*, also bundled, allows you to record your own digital samples and attach them to system events such as keyclicks, window openings, and system shutdowns.

A third program, cloyingly named *Audio Fun Machine*, demonstrates the DSP's ability to manipulate incoming audio with real-time reverb, multitap delay, flanging, and a few other effects.

DOING IT ALL (AT ONCE)

MultiTOS, which will be bundled with the Falcon030, is a true preemptive-multitasking operating system with interprocess communication through system messages and pipes. Under *MultiTOS*, the Falcon030 can become a full-fledged multimedia workstation, simultaneously running MIDI sequencers, digital recording devices, video-processing programs, animation players, and other presentation tools in fully integrated multimedia presentations.

Unfortunately, when I took a brief

FALCON SPECS

System
- 16 MHz Motorola 68030 processor with memory management and 256-byte cache
- 32-bit data and address bus
- 1, 4, or 14 MB RAM configurations
- 512 KB ROM, 128 KB external cartridge
- Optional 68881 or 68882 floating-point unit

Sound
- Up to eight channels of 16-bit digital recording and playback
- Sampling rate up to 50 kHz
- 16-bit stereo input/output through built-in mini-plug

Digital Signal Processor
- 32 MHz Motorola 56001 digital signal processor rated at 16.5 MIPS
- 32 K-words of zero wait-state static RAM

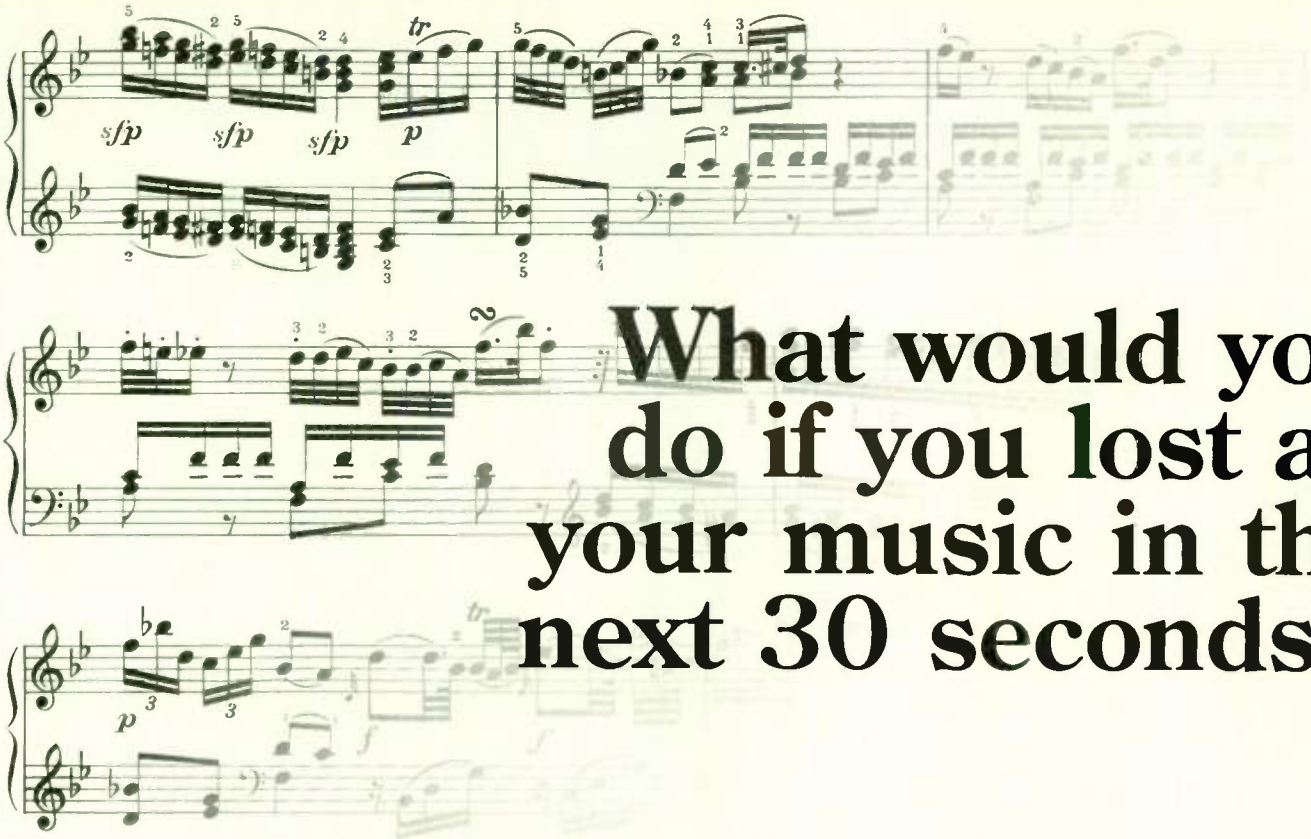
Graphics
- 640 x 480 pixel resolution with up to 256 colors (Super VGA) from 262,144-color palette
- BLiTTER graphics coprocessor
- 16-bit true-color mode with simultaneous display of up to 65,536 colors
- Accepts external video sync signal for genlocking (requires additional hardware)

Ports
- SCSI-2 DMA port
- LocalTalk-compatible LAN port
- RGB or composite video connector port (requires optional adapter)
- RS232-C serial port
- Bidirectional parallel printer port
- 128 KB-capacity cartridge port
- MIDI In and Out ports
- Stereo mini-plug for audio in/out
- DSP connector port (requires optional adapter depending on application)
- Two 9-pin joystick ports
- Two 15-pin enhanced digital/analog controller and light pen ports

Note: No external floppy-disk drive port.

Expansion Bus
- Internal direct processor slot for Intel processor, DMA co-processor, etc.
- Optional processor socket for other co-processors

Storage
- 1.44 MB, 3.5-inch floppy drive
- Optional internal IDE hard drive



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look at the Falcon030, it was not yet equipped with *MultiTOS*, and I was unable to test its compatibility with existing Atari software. According to Atari spokesperson Bob Brodie, the Falcon030 with *MultiTOS* is more STe-compatible than the TT.

Atari intends to make *MultiTOS* available only for the Motorola 68030-based Falcon030 and TT because their microprocessors have built-in memory-management capabilities. However, some beta-testers of the system have reported that *MultiTOS* works acceptably on the ST and the STacy. As a result, Atari may reconsider coding a 68000-based version of *MultiTOS*.

Atari's new *MultiTOS* operating system is a true multitasking system, complete with a 3-D look.

THIRD-PARTY SUPPORT

Although I encountered a "wait and see" attitude from some developers, several new and current Falcon030-compatible music products are available or expected soon.

▼

The Atari Falcon030 offers built-in hard-disk recording capability, thanks to its 56001 DSP chip.

MUSiCOM from Compo Software Corp. (tel. [415] 355-0862; fax [415] 355-0869) is a new digital sampling/recording application designed specifically for the Falcon030. It includes digital editing, as well as harmonizing functions and other digital special effects.

The *D2D-Edit* software from D2D Systems (tel. [310] 398-3993; fax [310] 822-1360) provides stand-alone digital recording at 50 kHz, with non-destructive editing and MIDI Time Code support. D2D Systems' *4T/FX* enables 4-track recording with a real-time mixer, EQ, and digital effects. Both can be used with the A/D64x Audio Interface.

Dr. T's Music Software (tel. [617] 455-1454; fax [617] 455-1460) has completed a major upgrade to its *KCS Omega* sequencer and plans to provide Falcon030-compatible upgrades to its *Tiger Cub* graphic sequencer and The Phantom SMPTE-sync box.

By the second quarter of 1993, Emagic (distributed in the U.S. by Ensoniq; tel. [215] 647-3930; fax [215] 647-8908) intends to ship the ST/Falcon030 version of *Notator Logic*, a significantly upgraded version of the popular *Notator* sequencer/notation program for the Atari. The object-oriented program will include multiple active windows, software-based MIDI signal processing, complete compatibility with Mac and PC versions of *Notator*, and direct-to-hard-disk recording support.

Steinberg-Jones' (tel. [818] 993-4091; fax [818] 701-7452) *Cubase* currently is compatible with the Falcon030 and has been featured in Atari's public demos of the system. Similarly, all Barefoot Software (tel. [818] 727-7143; fax [818] 727-0632) products, including *EZ Score* and *SMPTETrack Platinum*, are Falcon030-compatible.

One matter that remains unresolved is how to use all eight tracks of the Falcon030's digital recording power. At present, no hardware interface supports more than 2-channel recording, and no recording software offers more than 4-channel capability.

With its considerable built-in multimedia computing power and acceptable third-party support, the Falcon030 could be a contender. Certainly, musicians who are considering purchasing an Atari computer for creative purposes should look no further.

Bob Lindstrom *is director of game services at Dynamix, Inc.*

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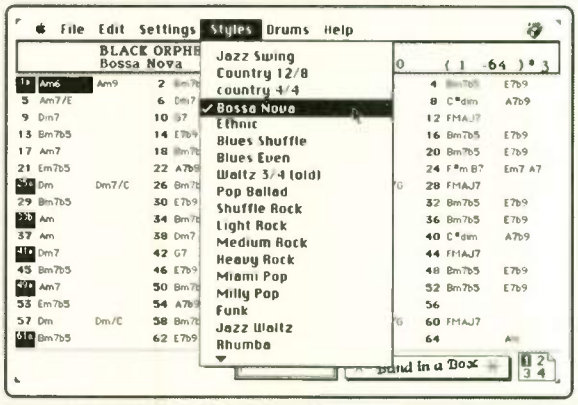

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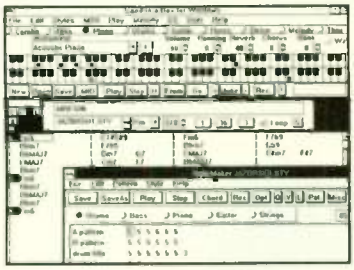

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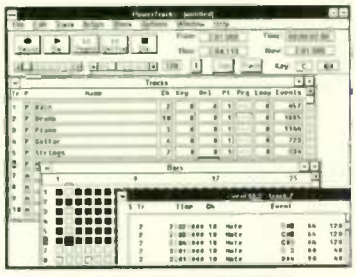

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30 DAY MONEY BACK GUARANTEE

Video for Windows

By Robert Kendall

Thanks to Microsoft's new AVI standard, software-only movies may be coming to an IBM-compatible PC near you.

Movies on an IBM-compatible PC are nothing new. For years, PC users have been able to display motion video on their monitors, but the process wasn't to be undertaken by the faint of heart.

One option was to feed video from a VCR or laserdisc player into a video-in-a-window board lodged in the computer. This made for terrific video quality, but tied you to bulky external video equipment that was hard to control from the PC. The other option was playing a movie from separate digitized video and audio files stored on your hard disk or a CD-ROM, and then watch the sound and images get further and further out of sync.

THE NEXT GENERATION

With the release of *Video for Windows*, Microsoft has taken a big step toward making PC-based movies practical and accessible. The technology closely resembles Apple's *QuickTime* for the Mac and has the same advantages and limitations (see sidebar "*QuickTime for Windows*" for more). You can play and edit synchronized video and audio right on your hard disk with no special hardware apart from a sound board (hence the term "software-only movies"). However, the images are tiny and often rather jerky and grainy—hardly what the MTV generation has grown accustomed to.

The $199 *Video for Windows* package includes playback drivers that let you play movies with *Windows' Media Player* or other programs. You also get various editing tools and a CD-ROM containing a large collection of nearly 250 short sample video clips.

The key to the new technology is Microsoft's Audio/Video Interleaved (AVI) file format. Rather than being stored separately, the audio and video data are interleaved so that each frame of video is connected with a portion of audio, ensuring proper synchronization.

The format also allows the scaling of image quality to match the power of the hardware platform, although the minimum hardware requirement is a '386SX processor. For example, video segments stored in 24-bit color are converted on the fly to the appropriate resolution when played back on 16-bit or 8-bit graphics displays. During playback, the software also drops frames if the hardware isn't fast enough to keep the video fully synchronized with audio. This maintains audio synchronization and continuity at the expense of video quality.

NO THREAT TO MTV

The software-only implementation of *Video for Windows* supports two different image sizes: 160 × 120 or 320 × 240 pixels. To retain the correct resolution, the picture can occupy only one quarter or one sixteenth of the screen, a window only about three or six inches diagonally on a typical 13-inch monitor (see **Fig. 1**).

You can blow this miniscule image up to any size, but at the expense of decreasing the resolution proportionately, giving you an ever-more-grainy picture. The other limitation is that the frame rate ranges from 15 to 24 frames per second (fps), depending on the speed of your machine, rather than the standard 30 fps.

The most encouraging news for musicians is that the audio quality can be excellent. AVI files can include digitized audio in any of the sampling formats supported by *Windows:* 16-bit or 8-bit resolution at 44.1, 22.05, or 11.025 kHz, in stereo or mono. The playback

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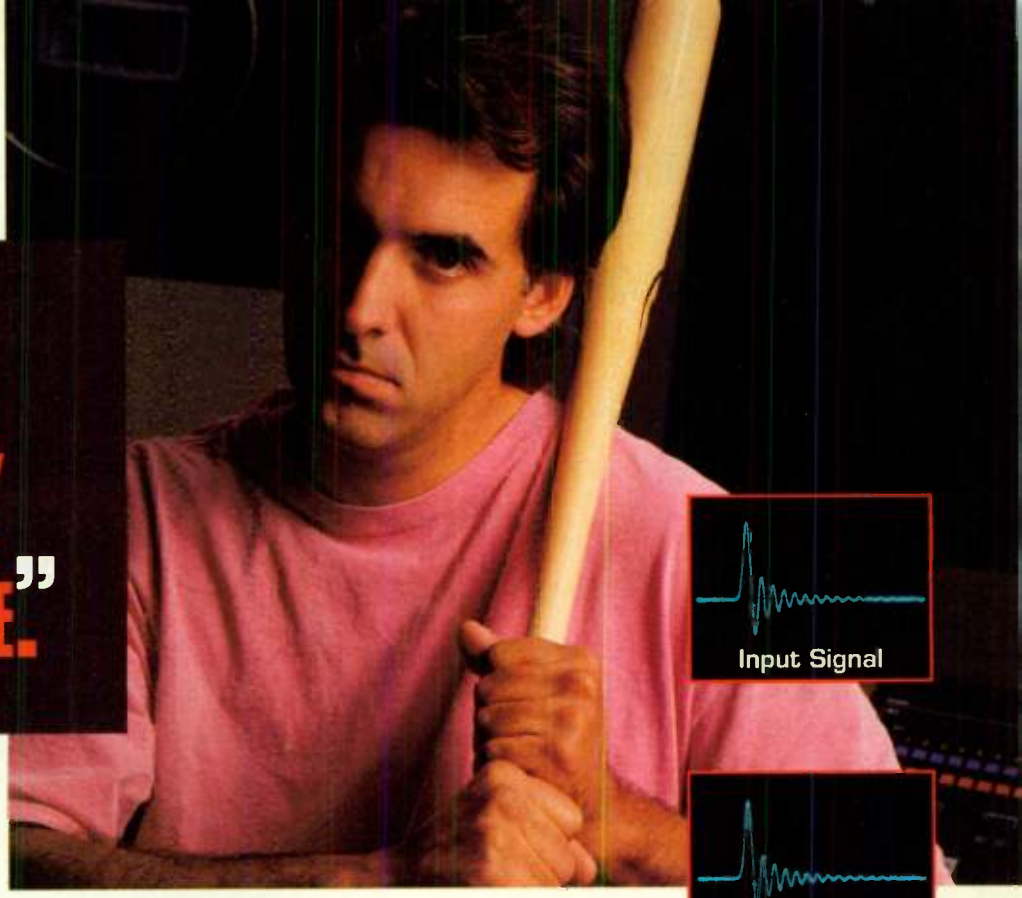

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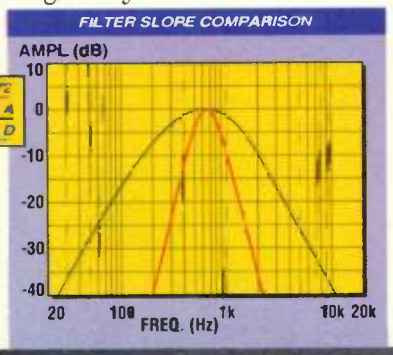

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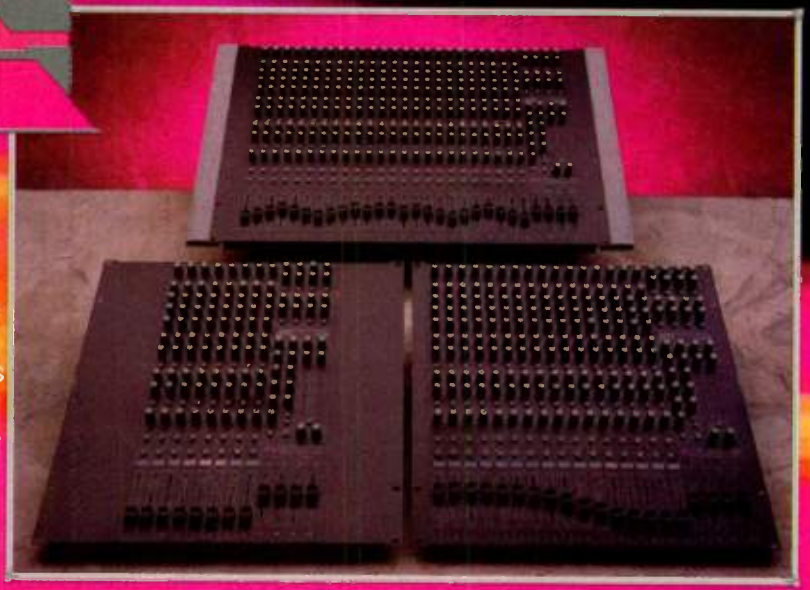

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Every once in a while a product comes to market that offers a brilliancy in design that seems beyond human engineering. The Phantom Series consoles offer the performance and features of mixing boards costing thousands of dollars more. They are rugged enough to take the pounding of steady live use. They are also so transparent and utterly free of noise that they are the first choice for precision multitrack recording! From a four track home studio to 32 channel digital, the Phantom consoles offer a level of performance that is inspiring. A.R.T. has taken the fidelity of world class recording mixers and made the technology available in a professional console that is as silent as its' name implies. Production unit will vary slightly from photo.

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software can't scale audio quality to match your hardware capabilities, though. If an AVI file includes CD-quality audio, you just won't get any sound unless you have a 16-bit sound card.

The AVI format supports three different compression algorithms, each optimized for a different class of hardware. According to Microsoft, Intel's Indeo compression can successfully maintain 24 fps playback in 24-bit color at 320 × 240 pixels on a 33 MHz '486 machine. On a 33 MHz '386, it should be able to handle 15 fps at 160 × 120 pixels. RLE (Run Length Encoding) compression is intended for '386SX machines, but it works acceptably only if there is relatively little movement in the video. Microsoft Video 1 compression falls in between the other two compression methods in terms of its quality and demands on your CPU. The various compression methods are important only when creating your own digital movies. Playing back existing files does not require any choices on your part.

When playing back video clips on a 16 MHz '386, I was rarely able to maintain 15 fps even when reading AVI files from a RAM disk. A very fast computer really is essential for anyone wishing to plunge into this technology. A capacious hard disk is also a must, because just 30 seconds of AVI video (with 8-bit, 22 kHz mono audio) can consume between 3 MB and 10 MB of disk space, depending on the compression method, frame rate, and image size.

CAPTURE, EDIT, DISPLAY

If you want serious video on your screen, you can turn to Intel's RT Video Developer's Kit, an add-in board that uses Intel's i750 Indeo accelerator chip to provide full-screen movies at 30 fps. The board lists for $995, but

QUICKTIME FOR WINDOWS

Recognizing a huge potential market when it sees one, Apple Computer released a *Windows* version of *QuickTime* hard on the heels of Microsoft's *Video for Windows* (see "Computer Musician: Computer Movies" in the November 1991 EM for more on the Mac version of *QuickTime*). This means that the same *QuickTime* movies can now play without conversion on either a Mac or a *Windows* machine. *QuickTime for Windows* is available only as a $295 Software Development Kit, however. It is up to software developers to build *QuickTime* support into their applications and distribute the *QuickTime* player.

QuickTime for Windows supports image sizes and frame rates comparable to *Video for Windows*. According to Apple, you can expect 12 to 27 fps with a 160 × 120-pixel, 16-bit color image, depending on the speed of your CPU. With a 320 × 240-pixel image, the playback rate drops to somewhere in the range of 6 to 15 fps. Intel's $1,495 ActionMedia II accelerator board allows full-screen 30 fps playback using Intel's Indeo compression in version 1.1 of *QuickTime*.

QuickTime currently relies mainly on the Apple video compressor. In the next version, Apple plans to incorporate SuperMac Technology's Compact Video compression algorithm to substantially speed up software-only playback.

During my testing, playback was noticeably smoother with *QuickTime* than with *Video for Windows*. Another advantage *QuickTime for Windows* has over *Video for Windows* is that *QuickTime* can scale audio quality on the fly during playback. For example, if your movie is recorded in CD-quality stereo, and your sound board can handle only 8-bit, 11 kHz mono, the *QuickTime* player converts the audio track as it plays. The *QuickTime* player also provides a slider that you can move with the mouse to adjust the audio volume of each movie.

A number of major developers are working to create software that lets you record and edit *QuickTime* movies under *Windows* and incorporate them in multimedia presentations. Support for OLE is promised for version 1.1 of *QuickTime for Windows*. Currently there's no support for the *Windows* Media Control Interface, but this may find its way into a future release, making the product much easier to use with a wide variety of software.

Intel promises a new version for under $500 by the end of 1993. Don't expect optimum results unless you have a 33 MHz '486 machine in which to install the board.

If you want to create your own hard-disk video recordings from a video camera or VCR, you'll need a video capture board. Intel's RT Video Developer's Kit does double duty as a real-time capture tool, or you can go with cheaper, less-capable products that start at around $350. The *Video for Windows* package includes software for controlling video recording in real time or one frame at a time, and it also lets you record audio.

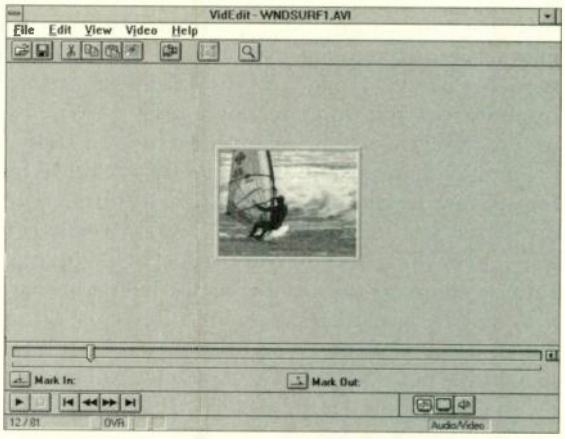


FIG. 1: Without additional hardware, *Video for Windows* images are limited to two sizes: 160 × 120 pixels, or 320 × 240 pixels.

Video for Windows also comes with software for basic video editing. You can't create any special effects, but you can cut, paste, and crop video segments and change the audio synchronization. You can also convert from one compression scheme to another and reduce the color resolution or audio sampling resolution and rate. There's a paint program for touching up individual frames and a palette editor, as well.

As an alternative to creating movies with a video capture board, you can convert animations to AVI format. The video-editing software can import animations in Autodesk's popular Flic format, or bring in animations saved as a sequence of .DIB files. This capability gives computer animators a way to maintain reliable synchronization with audio, something that's impossible to guarantee any other way on the PC.

Last but not least, there's a utility for turning Macintosh *QuickTime* files into AVI movies. Microsoft provides no way to convert in the other direction, but Media Vision's forthcoming Pro MovieSpectrum video board will come with an AVI-to-*QuickTime* converter, and other options are likely to appear.

FOR THE MUSICIAN

For tackling the audio tracks of AVI files, *Video for Windows* includes a simple waveform editor. This lets you cut and paste segments, create fades, adjust amplitudes, and mix different waveforms together. The program provides the usual graphical editing screen with infinite zoom controlled by a slider (see **Fig. 2**). You can also convert audio files to a lower sampling resolution and frequency, or from stereo to mono.

When you're done editing, you must save the sound as a .WAV file, the digital audio format native to *Windows*. To get it back into your movie, you must copy it to the clipboard and paste it onto the AVI audio track from within the video editor. While this may be a little inconvenient, it means you can use your favorite waveform editor to touch up a sound track before bringing it back into the movie. The *Video for Windows* waveform editor also imports Apple AIFF audio files.

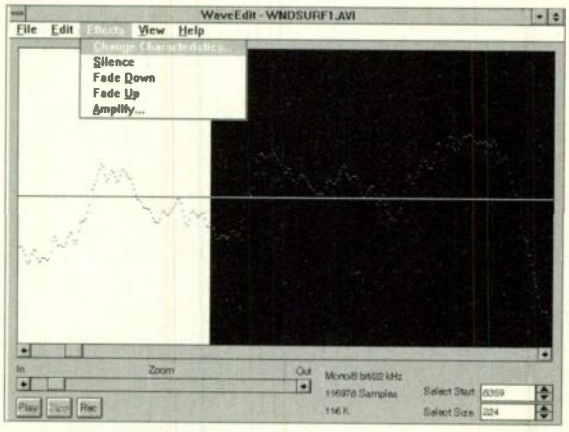


FIG. 2: *Video for Windows* includes a simple waveform editor that lets you edit the audio tracks of AVI video files.

AVI AND YOU

So just what is *Video for Windows* good for? Clearly, it won't turn your PC into a video workstation

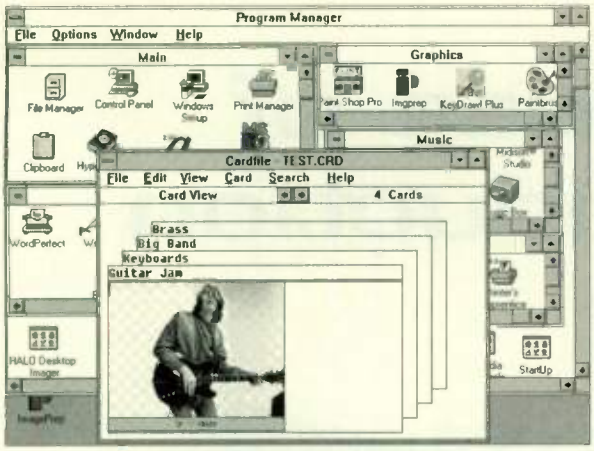


FIG. 3: Thanks to Object Linking and Embedding (OLE), you can paste video segments into database records or word-processing documents. Double-clicking on the video image in this Cardfile record sets the video in motion.

for creating your next MTV offering. But what it lacks in video quality, it makes up for in flexibility.

Because the AVI driver functions as a *Windows* Media Control Interface device, most multimedia packages let you incorporate AVI movies into any presentation or application you might want to create. People typically use these packages to put together presentations that accompany live presentations, self-running advertising demos, and computer-based training applications. You can also concoct multimedia encyclopedias, computer games, educational programs, and multimedia art installations—all replete with mini-movies.

The other way to use AVI is through *Windows'* Object Linking and Embedding (OLE) capability. Applications that fully support OLE let you embed movies in the data files they create. The movie appears as a still image with a caption in your database, spreadsheet, or word-processing document. Double-clicking on the image sets the movie in motion (see Fig. 3).

Computer-based video may seem like a curiosity more than anything else right now. But in the next few years, it will undoubtedly become more viable and widespread as compression technologies improve, CPUs get faster, and local bus standards help alleviate video throughput bottlenecks. Already, manufacturers such as ATI Technologies are incorporating support for Indeo in their VGA graphics boards. Some day, we'll also see fast, cheap, rewritable optical drives that can minimize the data storage problems associated with this medium.

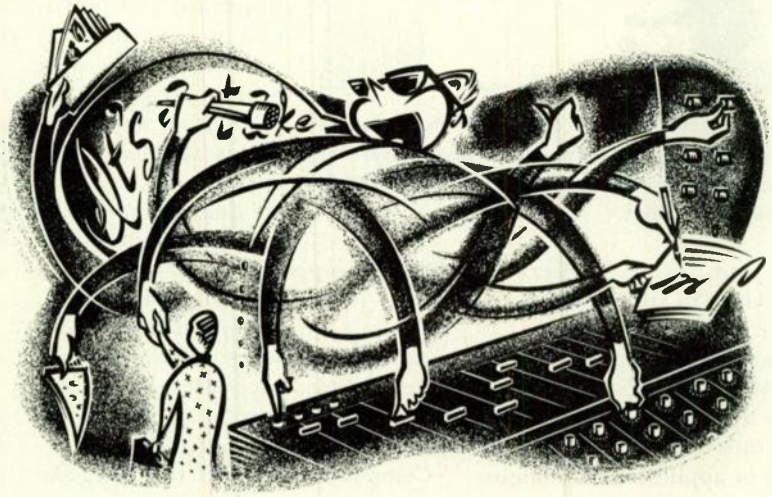
Musicians should keep an eye on this technology. When digital video achieves the quality of digital audio on the PC, the combination of the two will be formidable. And eventually—although it will take a while—analog video is bound to fade into the mists of obsolescence.

Composer **Robert Kendall** *frequently writes about computers and MIDI for several national publications. His computer-based multimedia installations—combining music, interactive literature, and graphics—pop up regularly on the East Coast.*

The Business of Music Production

By Michael A. Aczon

Being a successful producer involves much more than yelling, "It's a take!"



So you want to be a producer? You've just connected the last piece of gear to your home or project studio and changed the message on your answering machine to announce "XYZ Productions." Well, before you aspire to the status of legends such as George Martin and Phil Spector, you'd better take a minute to take care of business. Successful producers usually have more than talent and great equipment going for them. In essence, their personalities are torn between anarchic, creative surges and pragmatic business sense. It's a tough gig, and the more you know, the further you'll go.

WHAT DOES A PRODUCER DO?

Perceptions of the producer's role in recording a master tape vary widely. Artists often assume the producer is a magician who transforms ideas into sound. In addition, the producer is usually expected to be a manager/advisor/therapist *and* be able to exercise dictatorial control over technology.

Record executives have different expectations. Labels look to the producer to mold an artist's talents into a competitive album. In many cases, the producer is asked to interpret the label's interests and is often responsible for nudging the artist in a more commercial direction. Audio engineers will say that good producers tell them which buttons to push, when to push them, how much to push them, and that it's time to break for pizza when tempers flare.

The truth is, if this were a multiple choice test, producers would be "(d) All of the above." I like to sum up the producer's role as that of a painter rendering an audio portrait of an artist, frame and all. Great producers balance egos, songs, instruments, budgets, arrangements, and technical problems with the diplomacy of a politician, the bedside manner of a surgeon, the leadership of a CEO, and the artistry of a sculptor.

THE PRODUCER AS EMPLOYEE

In the beginning, producers were record-label employees. These *staff producers* were paid to work in the label's studio with the label's artists and produce records with the label's "sound." While some labels continue to retain in-house producers, the current trend is hiring outside producers—sometimes called "indies"—as independent contractors. These transactions benefit both sides: The producer is free to work for a (hand-picked) variety of clients, and the labels are not locked into the sound of a single producer.

New or untested producers hired by a record label may be offered a modest fee of $1,000 to $2,500 per track. This production fee "buys out" all of the producer's rights to the final master tape and often must cover all recording costs. On the other hand, superstar producers can demand an incredible $50,000 per track against a four percent producer's royalty from retail sales.

Of course, record labels are not the sole employers of independent producers. Indies are often hired directly by unsigned artists to produce demo tapes that are commercial enough to (hopefully) secure record deals. In this type of relationship, the artist pays the producer for his or her services and retains full ownership of the finished product.

Production fees paid by an unsigned artist to a producer vary according to the artist's budget and the producer's experience (or track record in getting acts signed). I know producers who have

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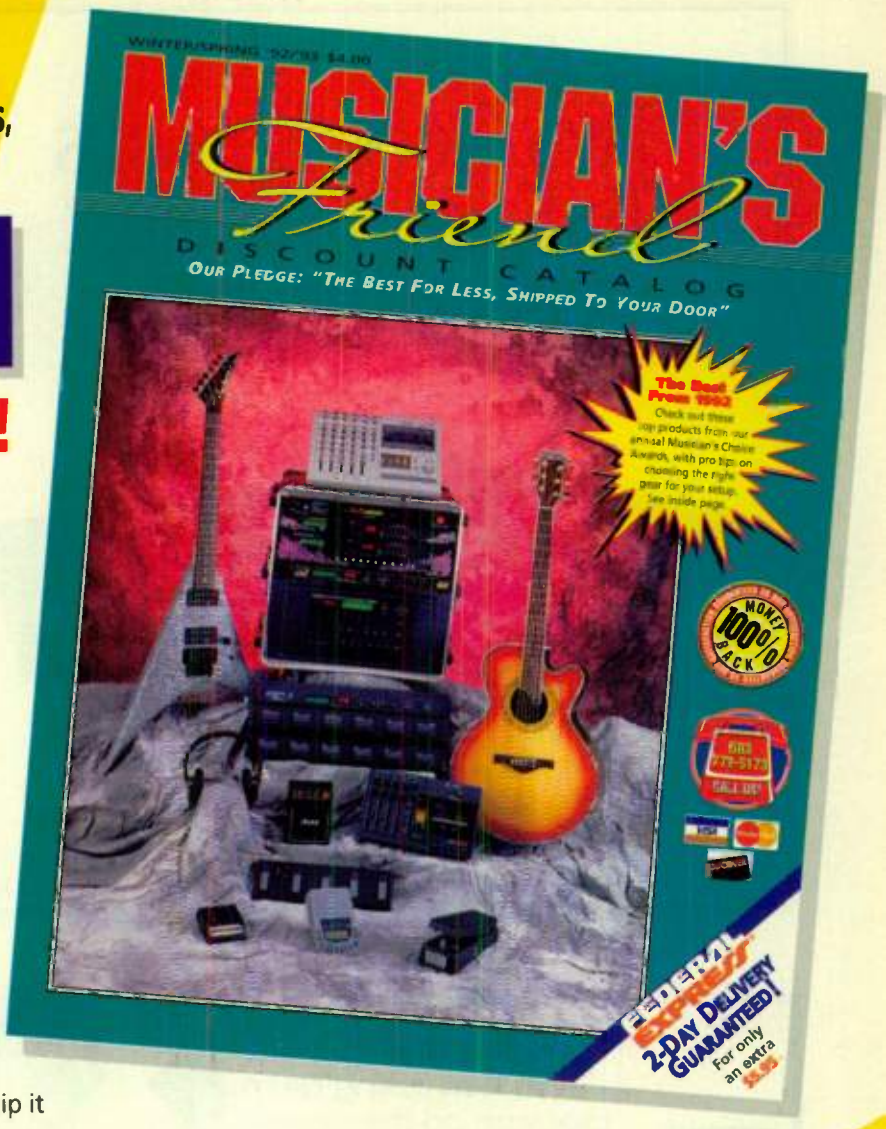

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completed multi-song demos for free and others who have charged several thousand dollars for the same service.

Many producers own their own studios, and cash-strapped artists may ask the producer to provide services and studio time on "spec." In spec deals, payment is deferred until a triggering event—such as a record deal or the sale of a song to a third party—is reached.

I often advise producers to have spec clients hire another studio to determine if the artist really respects their production chops or is simply after a free ride. Also, any producer who agrees to a spec deal can increase his or her chances for recouping the investment by demanding written consideration to produce the commercial album project, should the artist get a deal.

But there are many other reasons why it is good business to secure written agreements between the artist and producer. For instance, sometimes an artist defaults on payments—or the relationship destructs mid-project—putting ownership of the master tape in question. Also, what happens if the producer rearranges a song to the point that he or she is entitled to co-songwriting credit? A simple production agreement helps avoid problems by spelling out the ownership of songs (including copyright), ownership of masters (including copyright), responsibility for fees, time frame, budget, and credits.

THE PRODUCER AS EMPLOYER

Another current role of the independent producer is that of a triple business threat: A&R scout, music producer, and executive producer all rolled into one. In these instances, the producer usually undertakes the responsibility of developing the talent, paying recording costs, and delivering a completed, ready-to-press master tape to interested labels. The benefits of this system to record labels are pretty obvious. They don't spend a penny seeking out, developing, and recording an act. The indie tosses out a finished product, and the labels need only decide whether to buy the act or pass. Also, independent producers—by virtue of being "on the street"—often are in tune with the sound of a particular geographical region or type of music that may become the "next big thing."

In these relationships, the producer is an employer. He or she secures the exclusive recording rights of the artist/

employee and seeks an "all-in" deal with a record company that will manufacture, distribute, and promote the records produced under this arrangement. Unfortunately, staying in the deal can be brutal. Some record labels are quite adept at "stealing" promising acts. Independent producers must be sure to dot all the i's and cross all the t's of their production contracts with artists, or they could be history. It pays to seek legal counsel when preparing a comprehensive contract for your production company. Also, you should evaluate whether you have the time, cash, desire, and stomach to take on the role of a music *business* executive.

Production companies often pay the artist a fixed royalty (i.e., ten percent of the retail price of the record), a percentage of the all-in royalty (i.e., 50 percent of the all-in artist/producer royalty paid out by the record label), or a hybrid of the two (i.e., 60 percent of the all-in royalty, not to exceed ten percent of the retail price of a record.) If a real magic between the artist and producer exists, it can lead to a relationship over several records that allows mutual artistic growth and financial prosperity for all.

CONCLUSION

Independent production is a wide-open field looking for talented and business-savvy visionaries to make good music. The competition is rough, but if you develop your sound, your contacts, and your knowledge of the music business, platinum albums and cherry-red Ferraris can be yours.

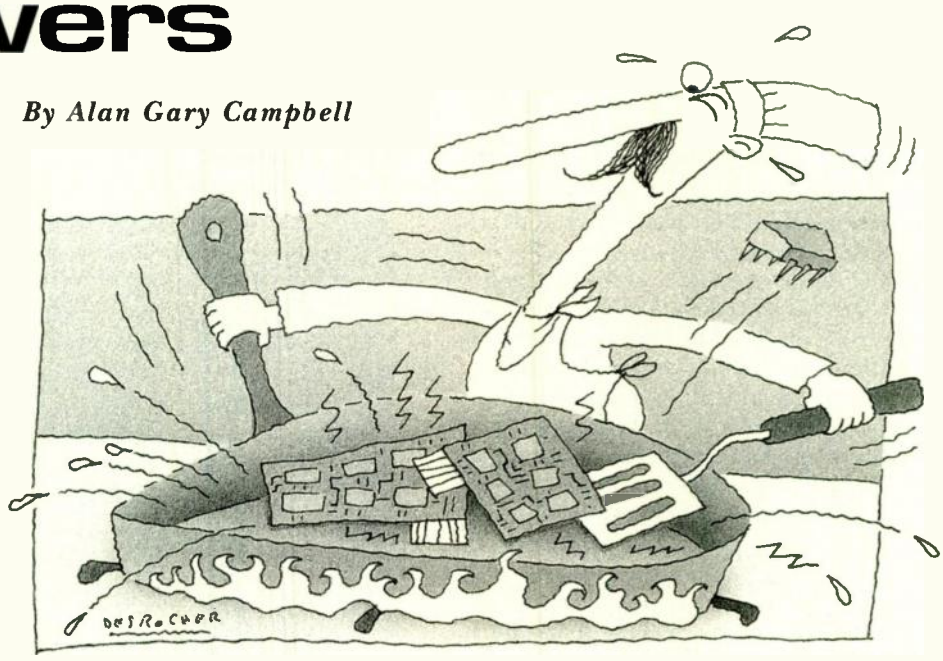
Many successful indies started out as recording artists who used their experience and contacts to launch production careers. But many success stories also began in a home studio. However, be forewarned that the trick to *staying* successful has more to do with business acumen than recording chops. (Jimmy Jam and Terry Lewis turned their platinum records into a recording studio, publishing firm, and production house.) If you can produce records in street clothes and cut deals wearing a suit, you should do alright.

Michael A. Aczon *is a San Francisco entertainment lawyer and artist manager. He teaches in the music industry program at San Francisco State University and has been a partner in a production company with major label clients.*

Questions & Answers

By Alan Gary Campbell

Our service chef offers a recipe for avoiding lemons and fried gear.



Q. Like cars, some keyboards seem to fail right away, while some seem to last forever. How can you avoid getting a lemon? Is it wise to avoid buying gear that has been out on the dealer's sales floor?

A. The average uninterrupted service life of equipment is referred to in techno-speak as the *mean time before failure* (MTBF). This is the time you can expect your gear to last before something breaks. Though the failure modes for analog, hybrid, digital, and electromechanical devices differ, the statistical models that apply to each are similar. Generally, the probability of failure over time follows a Gaussian distribution (the familiar bell curve from statistics class). You can predict from the curve that the majority of units will fail at, or near, the MTBF; fewer will fail earlier or later; and a very few will either fail almost immediately, or work almost forever. Of course, it's the latter you hope to obtain.

Typically, any significantly defective components used in the manufacture of equipment will fail during the initial "burn-in" period (which may be hours, days, weeks, or months, depending upon the design). This type of early failure is referred to as *Infant Failure Mode* (IFM). To combat IFM, manufacturers often run equipment under stressful test conditions for a specified period of time before it is deemed okay for sale.

Equipment is likely to fail early in its service life if a defective, but functioning, component escapes detection during the manufacturer's IFM analysis. Most musicians would consider this a "lemon." But by definition, no unit can contain all perfect parts. If a given percentage of components are assumed to fail over the life of the unit, and one of these fails early and is replaced, then the probability that the unit will work beyond the MTBF is significantly increased. This theory assumes the repair is performed properly (including repair to ancillary circuits that may have been stressed) and that the replacement part does not suffer from IFM.

This may seem like sophistry, but the principle is frequently observed in the service environment. In 1982, I repaired a disk drive that was stressed due to an improper cable connection. (It was an easy job; I just looked for the chips that were smoking.) The drive, used almost daily for ten years with only infrequent cleaning, was still working when I recently removed it from service. That's an extreme, but apt, example of "getting the bugs out."

Some musicians are inflexible when it comes to buying floor models; to them, if it isn't in a sealed box, it's "used" gear. But it's unrealistic to expect small to mid-sized dealers to maintain back-up inventory on big-ticket items, and the matter of reliability of individual units is so complex that the simple act of insisting that gear be offered in a factory-sealed carton, while reassuring, is no guarantee of superior reliability. Most equipment intended for professional musical applications is rugged by design. The only negative effects that might occur on the sales floor would result from line transients, which could just as easily occur on the gig, in the studio, or at home. Certainly, no one would want to buy equipment that was dirty, showed signs of age, or had obviously been abused, except perhaps at a discount. But with floor models that are in new condition and have not been on the sales floor long, the matter seems of little concern.

Q. How does turning equipment on and off affect the mean time before failure?

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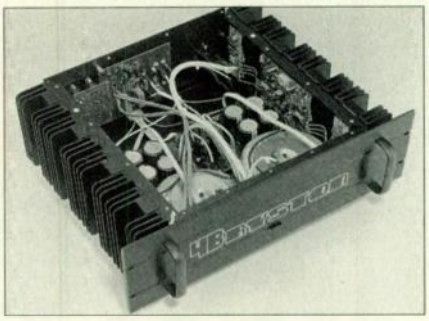
Q. Does it decrease the service life of equipment to leave it turned on during periods of non-use? I'd especially like to preserve my older analog gear, as it is becoming hard to get parts.

A. Some stress occurs when equipment is turned on and off, though the nature and degree of the stress varies with the design. Power on/off cycling is not particularly stressful for low-power transistor- or IC-based equipment (synths, effects processors, etc.), but vacuum tube-based devices and tube or solid-state power amplifiers experience marked thermal effects as their components warm up when first turned on. Excess power-cycling can decrease the service life of such devices.

Inadvertent cycling due to line-voltage fluctuations and interruptions is a special case. Since such on/off cycles are almost always caused by power-line problems and are often accompanied by severe line transients, some damage—often undetectable but sometimes catastrophic—is likely. Unfortunately, such events are difficult to predict. The best protection is to avoid operating equipment in areas known to exhibit such problems and to use surge suppressors or line conditioners to isolate equipment from transients. In any case, equipment should be turned off and unplugged during electrical storms.

There remains a great deal of controversy with regard to the matter of leaving equipment on during periods of non-use. Many audio purists, especially, are adamant on this issue. They insist that once an amplifier or the like is turned on, its components gradually achieve a quasi-stable state as a system, a state that is disturbed if the system is powered down. (I assume these audiophiles have constructed outhouse-sized surge suppressors and nanosecond uninterruptable power supplies to deal with Mother Nature's electrical side.)

Even though some stress is associated with power cycling of even relatively insensitive gear, in most applications the risk of damage from line transients for equipment that remains on constantly is of far greater concern. Some common sense is called for. When breaking from a recording session for a quick lunch, there is little point in powering down equipment unless the studio is located in an electrically suspect area, or a storm is expected. Nonetheless, powering down computers and digital synths and effects during this interval would minimize the risk of memory glitches caused by unforeseen line transients. For an interval of



Heat sinks such as the ones on the sides of this Bryston power amp get quite warm when drawing heat away from the circuitry, but should not cause burns to the skin or scorch paper or cloth.

several hours, powering down the computers and digital gear is highly advisable, though power amps and tube devices might stay on, as might hybrid and analog synths, which require considerable warm-up time to stabilize. (Leslie rotors should be stopped.) Longer than that, turn everything off and unplug the power strips.

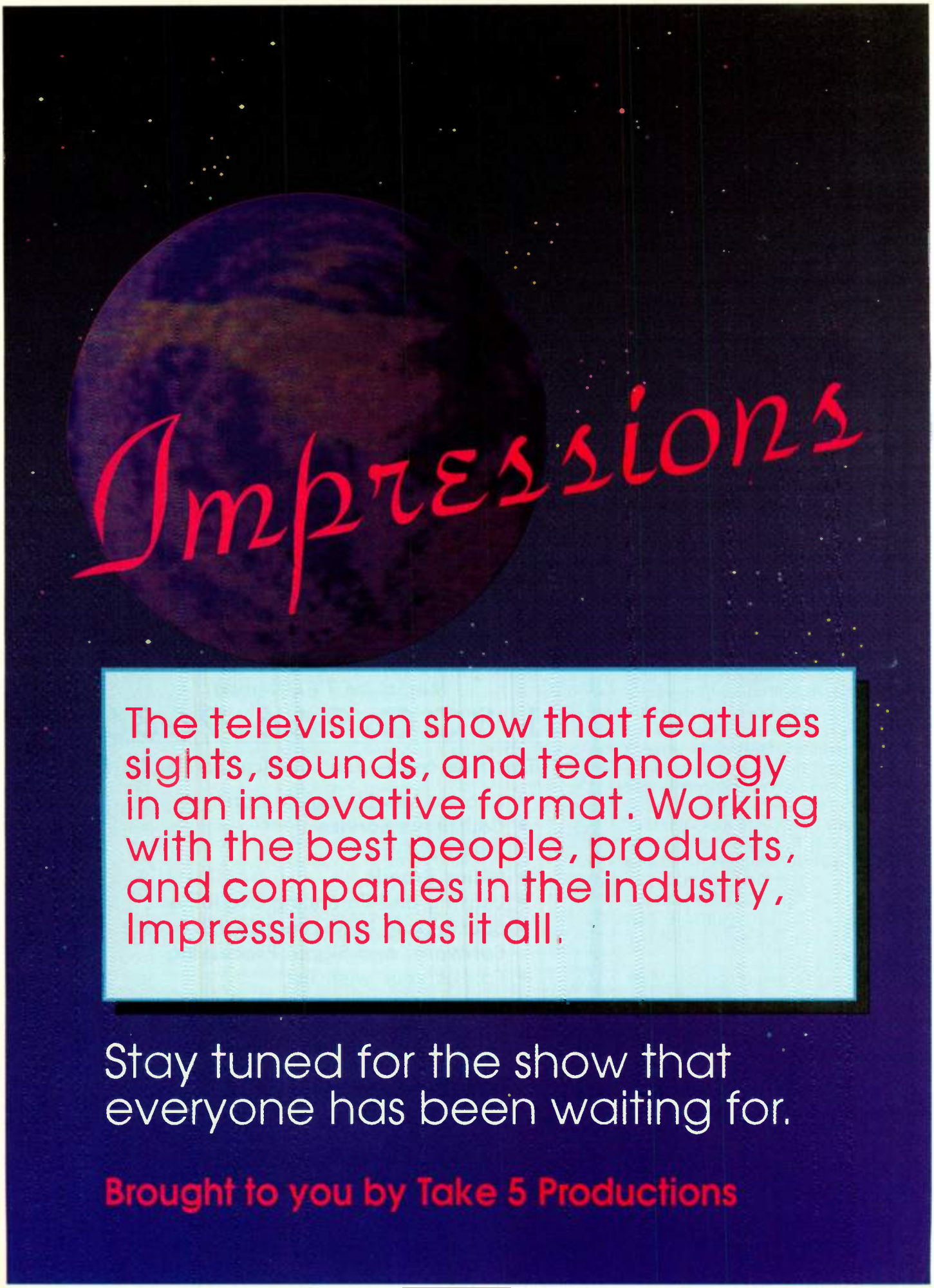
Still, there is an art to knowing when to break the rules. I have a very old receiver that is used frequently and is cranky when first turned on, and I often just leave it running in deference to entropy, which I wouldn't do with a vintage synth. It's a judgment call.

Q. I've noticed that the back panels and heat sinks on some equipment get hot to the touch after the equipment is on for a while. Is this normal, and should I turn the equipment off periodically to let it cool down?

A. It's normal for hybrid synths, power amps, and similar current-hungry devices to give off considerable heat when running, and the heat sinks of such devices (see Fig. 1) can be uncomfortably hot to the touch. There is no need to turn the equipment off, periodically, to let it cool down. It's also normal for such devices to give off a mild "electrical" odor during operation, especially when new. (I have a CD player that is several years old and still becomes odoriferous after it warms up.) But the heat sinks should not become so hot that they cause burns to the skin or scorch paper or cloth that comes in contact with them. (Note that heat sinks should not, under normal conditions, be allowed to contact skin, paper, cloth, or anything else.) Equipment that produces excessive heat or significant odor should be powered down, disconnected, and serviced.

Note that for proper operation, high-current devices that use heat sinks should be kept out of direct sunlight, even indoors, and away from heaters, heating ducts, and heat-producing lights, fixtures, etc. Provisions must be made to keep such devices cool if they are to be used in high ambient temperatures, such as those encountered in outdoor concerts.

EM *contributing editor* **Alan Gary Campbell** *is owner of Musitech, a consulting firm specializing in electronic music product design, service, and modification.*



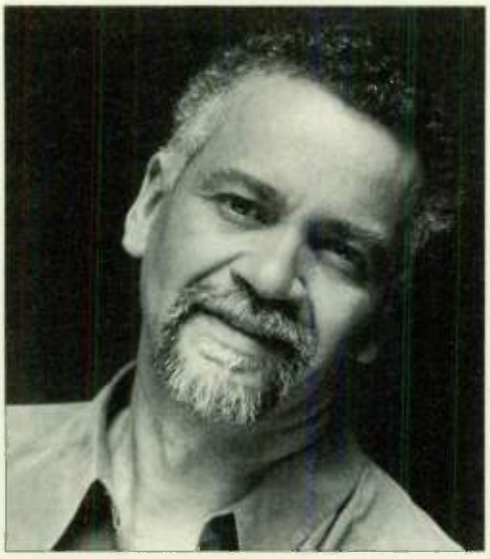
(continued from p. 57)

detail of the arrangement. But after spending a certain amount of time changing things to my whim, I might lose sight of whether the music is taking the right direction. When I work with live musicians, the feedback can help keep things on track. That's the good thing about working with musicians as opposed to working with machines.

SAMPLE: I don't think anything is going to take the place of playing with another musician. I play and feel and think of things on the spot when I am responding to another player. In that wonderful world of interplay, you can't even think about what you're going to do. It's something that just happens. Of course, playing by yourself in a studio is also fine, but I see them as two different worlds.

What is the impact of technology on society?

CIANI: Technology is now in the hands of the masses. When I started out, you could count on one hand everybody who had a synth. But now my little niece has one, and she can play tunes—complete with bass and drums—by holding down one note. This is fantastic. And there are also wonderful music-teaching computer programs available. This type of software enhances how quickly young people are able to absorb musical training.



Joe Sample

HURTADO: There was a time when technology stole jobs from musicians, and you heard more sequencers on records almost exclusively. But I think more and more, you're hearing acoustic instruments again. Acoustic strings seem to be enjoying a resurgence in pop-music orchestrations. I think technology doesn't take away from the real musicians' jobs. Acoustic instruments will never be replaced.

Amy Knoles

SAMPLE: I don't see synthesizers as the culprit when musicians lose jobs; it's the film and record companies. They don't want to pay. I am amazed at how they can put millions of dollars into a film and then say, "Let's get a bargain rate on the music." I reject the use of synthesizers as tools to bring in a film under budget. And I think that all of those musicians who got put out of work should go home and practice and get better and better, until they can prove that their worth is actually priceless.

THE GRAND FINALE

The artists who participated in this roundtable started their musical training on acoustic instruments and later found their way to electronic technology. When asked how their creativity would be affected if the power went out permanently, they invariably replied that they would simply return to their acoustic roots. Their creativity would continue unabated, albeit in a different environment, and they would certainly miss the unique opportunities afforded by synths and modern recording. This seems to indicate that creativity does not depend on technology, but rather is influenced by the tools at hand.

On the positive side, technology can enhance creativity with new sounds, greater resources, and a wider range of options. It is now available to more people thanks to ever-declining costs, which contributes to the democratization of musical production. Working with electronics can also help us achieve a better understanding of sound itself, the most basic building block of musical creativity.

However, there is a real danger that technology is able to obscure, or even destroy, any sense of human "feel," although this is by no means inevitable or even undesirable. Technology can intimidate some people, but encourage others to forsake their own performance skills and real-time human interaction in favor of studio tweaking and canned performances. These influences tend to inhibit the creative process in those who insist on using technology without understanding its deeper ramifications.

Ultimately, each of us is responsible for the way we apply technology to our own creative process. The impact of technology is as individual as the creative process itself. If we keep this in mind and cultivate an awareness of the options available to us, we stand a better chance of realizing our full potential as we use technology to achieve our creative goals.

(Thanks to Joanna Cazden for her contributions to this article.)

EM *tech editor* **Scott Wilkinson** *tries to keep a balanced view of technology, culture, and society in all his creative endeavors.*

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MARCH 1993

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Fostex DCM100 MIDI-Controlled Mixer

By Peter Freeman

Automated mixing in one rackspace.

One of the many useful aspects of MIDI is its ability to allow automated control of various types of equipment, from synths to mixers to lighting rigs. Automated audio level-control devices have been around for years. Boxes such as Niche's ACM plug into the mixer's channel insert points and give you continous control over levels. MIDI-controlled audio patch bays and routers handle effects and other levels, and some (notably the Uptown Flash) offer automated muting. A few companies, including Tascam and Allen & Heath, offer various degrees of MIDI automation in mid-sized consoles, at mid-sized or higher prices.

PETER DIGGS

FIG. 1: Fostex combined solid audio quality with MIDI control in the compact DCM100 mixer. The companion Mixtab provides complete hardware control of the DCM100 and can also be used as a general-purpose MIDI controller.

But until recently, if you wanted a relatively inexpensive, extremely compact mixer with at least a half-dozen channels and real-time MIDI control over levels, EQ, and aux buses, the only solution was Mark of the Unicorn's MIDI Mixer 7s (reviewed in the July 1991 EM). Unfortunately, the MOTU mixer is noisy, uses RCA jacks for the aux buses, and lacks a companion hardware controller.

Fostex has addressed this need with its DCM100 mixer and optional Mixtab controller tablet. The DCM100 is a 1U rack-mount, automated mixer with eight L/R line-level input pairs (sixteen ¼-inch jacks); 2-band (bass and treble) EQ; two stereo aux sends and returns; headphone jack; and ¼-inch left and right outputs. In addition, external signals can be routed through the two aux buses via stereo Aux Buss In jacks. A similar pair of inputs provides direct access to the stereo bus, which is especially useful when cascading two mixers. All the mixer's elements can be controlled via MIDI, providing the facility to automate not only channel and master level changes, but EQ, muting, pan, and aux sends and returns.

The only physical controls are eight level trims on the front panel, a headphone output-level control, and a set of DIP switches for setting the MIDI receive channel. The DIP switches also select between two volume curves for interpreting incoming channel Volume messages. A green LED indicates the presence of incoming MIDI data, and a dual bar-graph LED meter shows audio output level. (I would have liked individual "clip" LEDs for each audio channel.)

Now, Fostex could have developed the DCM100 and stopped at allowing you to control it from software or a MIDI controller. But the company realized that most people want a familiar mixer interface with faders and knobs. That's where the Fostex Mixtab comes into play. (If you already have all the MIDI controllers you want, just buy the mixer.)

THE MIXTAB

The Mixtab (or Mixer Tablet) is a small, desktop remote controller that uses sliders, buttons, and knobs to independently address master and channel levels, EQ, panning, mutes, solo, and aux sends and returns on up to three DCM100s. When using the controller with three DCMs, you simply set them to consecutive MIDI channels and switch between them from the Mixtab's front panel.

The remote box uses MIDI messages to communicate with the DCM100, so

any movement of the Mixtab controls generates MIDI data that can be recorded in real time or step time. This function makes the Mixtab a decent, general-purpose MIDI-control box, although the controllers it sends are fixed.

The Mixtab operates like any simple, straightforward mixing surface. The only operation not controlled from the front panel is MIDI channel selection, which is accomplished with a row of DIP switches on the back.

One particularly powerful Mixtab feature is its ability to store up to 99 different Scenes, which are snapshots of all slider, button, and knob positions. Scenes can be recalled from the unit's front panel, or with MIDI Program Change messages. By employing a MIDI sequencer, complex Scene changes can be triggered during mixdown or live performance.

The device has three main modes of operation: Direct, Preview, and Enable. In Direct mode, the Mixtab controls change the corresponding settings on the DCM100, and the appropriate control's LED lights up amber to indicate the data was sent. But this mode doesn't account for already existing differences between the Mixtab's front-panel settings and the DCM100's actual settings. The DCM values instantly change to match the new Mixtab move, so if there is a large discrepancy between the two, a slight fader move could produce a more radical change than expected. I mostly used Direct mode, with excellent results.

Product Summary

PRODUCT:
DCM100 MIDI-controlled mixer
Mixtab remote controller
PRICE:
DCM100 $799
Mixtab $549
MANUFACTURER:
Fostex Corp. of America
15431 Blackburn Ave.
Norwalk, CA 90650
tel. (310) 921-1112
fax (310) 802-1964

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

In Preview mode, the Mixtab does not send MIDI information; its purpose is to let you match the Mixtab and DCM settings before returning to Direct mode. If the Mixtab's LED blinks green, the Mixtab control is set lower than the corresponding DCM100 setting; if the LED blinks red, the Mixtab value is higher than the DCM. As you bring the Mixtab setting closer to the DCM setting (the "null point"), the LED blinks faster, extinguishing when the values coincide.

Enable mode starts out like Preview mode, enabling you to match the Mixtab and DCM100 settings. When they match (i.e., upon reaching the null point), the LED goes out. If you continue to move the knob or fader, the LED lights up amber, and the Mixtab starts transmitting MIDI data, altering that particular DCM parameter. Although this allows you to make changes more quickly than in Direct mode, it isn't as precise. It's a good concept, but I rarely used it.

USING THE SYSTEM

I tested the Mixtab/DCM100 combination as a submixer for the outputs of my Digidesign SampleCell card. Since the SampleCell only has eight outputs, I used one side of each of the DCM's stereo channels, which worked fine. It only took me a couple of minutes to set up the Mixtab and DCM100, and they worked as expected from the start.

After a few weeks of working with these boxes, I was spoiled. Because my SampleCell's musical role changes drastically from song to song, I constantly have to change the output levels and panning, as well as the EQ and effects applied to each one. The Mixtab/DCM team dovetailed neatly with my setup, eliminating a lot of setup time. I found the convenience of instantly recalling carefully programmed SampleCell submixes addictive.

Automated mixes went smoothly using Steinberg's *Cubase* to record the Mixtab's DCM100 control changes. The only limitations I encountered were those of MIDI's limited bandwidth. The moral of the story: Don't record huge sweeps of multiple controls simultaneously and expect everything to respond flawlessly.

The mixer fared well in terms of overall responsiveness to control changes, thanks, in part, to its Smoothing feature. Smoothing essentially provides MIDI data-thinning to regulate how much MIDI data is sent by the Mixtab. Tweaking this parameter (which is adjustable from slow to fast) to suit the mix definitely helped the DCM100 respond better to Mixtab moves.

Functionally, I encountered no problems with either of the two units. I was, however, disconcerted by the Mixtab's construction. It's a lightweight unit, constructed almost entirely of plastic, and doesn't inspire confidence in its potential roadworthiness. For anyone considering taking this baby on tour, I'd strongly suggest a secure onstage stand for it, as well as a protective case. Nonetheless, the knobs and faders felt quite good.

Sonically, the DCM100 performed respectably, although not up to audiophile specs. The overall sound quality was good, and I heard relatively little background noise. The mixer's summing amps don't appear to have a lot of headroom, though; I initially experienced some clipping in the main mix when several powerful drum samples occurred simultaneously. But lowering the levels of all of the DCM100's channels in proportion completely cured the problem.

CONCLUSIONS

Although you can make good use of the DCM100 alone (especially if you already have a good MIDI fader box), it makes sense to buy the whole package. The DCM100/Mixtab combination's overall design and integration is admirable.

The system is an excellent choice for a home studio, where MIDI-automated mixing or submixing might not otherwise be practical. Its stereo inputs and complete MIDI implementation make it especially attractive to keyboardists seeking a rack-mount mixer for live performance. As a submixer for live sound-reinforcement, its convenience and time-saving potential would be welcome indeed. Fostex has successfully produced an eminently useful pair of boxes for a wide variety of applications.

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

Cool Shoes Drummer 2.0 (PC)

By Allan Metts

Produce premium percussion patterns on your PC.

Ever since I sold my Roland TR-707 drum machine, I've been looking for an easy way to create drum patterns with my computer and MIDI sound modules. The original version of Cool Shoes' *Drummer* (reviewed in the July 1990 **EM**) came close to solving the problem, but it didn't let me "tap in" drum rhythms like I could on my old TR-707.

Happily, version 2.0 of *Drummer* includes real-time recording capabilities and quite a bit more. Cool Shoes threw in external MIDI control, expanded support for Standard MIDI Files, support for a variety of MIDI interfaces (including MPU-401-compatibles, Creative Labs' Sound Blaster, Key Midiator, Music Quest MQX-32, and many more), and a host of other goodies.

For those who missed the initial release, *Drummer* is a pattern-based sequencer based on the model of a typical drum machine. One-bar patterns are created in real or step time and linked together to form a Score. Despite its name, *Drummer* can also be used to create bass lines and other repetitive parts.

Drummer runs on any PC-compatible computer with a mouse and graphics card. It can run under *Windows* in Standard mode and includes preset configurations for many popular drum machines and synthesizers right out of the box.

LET'S MAKE A PATTERN

Patterns are created in a grid; the instruments in the drum kit form the rows, while the columns represent rhythmic divisions (see **Fig. 1**). Each instrument is named and can be assigned to any MIDI port, channel, and note number. Each pattern can include drum kits of up to twenty instruments, and Drummer can save these kits separately as ASCII files.

I seldom needed more than twenty instruments in a pattern, but I grew tired of creating a new drum kit each time I wanted different sounds. However, the alternative is a scrolling list of instruments, which would make it impossible to see the entire pattern on the screen at once.

Notes for each instrument are entered by clicking the mouse on the desired rhythmic position in the grid, or playing a MIDI keyboard. Real-time recording works like a conventional drum machine, but you must set up your drum kit before recording. (All incoming notes not assigned to instruments in the kit are ignored.) *Drummer* records only Note On messages and assigns a fixed duration to each note. This arrangement is fine for drum patterns, but stifling for melodic passages.

During real-time recording, *Drummer* continues to loop through the pattern until you pull down a menu or tell it to stop. One oversight here is the ability to clear an instrument while *Drummer* is still looping (for those of us who don't record perfect takes on the first try). To clear an instrument, you must first stop recording.

You can specify a different meter for each pattern, but you cannot have more than 64 rhythmic positions on the screen at once. For instance, a pattern with four beats allows up to sixteen divisions per beat; this is equivalent to 64th notes, which is fine for most applications. It's also important to note that editing a pattern with 64 positions requires some pretty fiddly mouse work.

With the TR-707, I had the ability to record more than one pattern by chaining them together, which was great for laying down four or eight bars at a time. Unfortunately, this feature is notably absent from *Drummer*. The only workaround is to create patterns with sixteen or 32 beats, which reduces timing resolution considerably.

Drummer's developers stressed simplicity over expressive nuance. The program quantizes all notes to the grid and restricts note velocities to one of ten user-assignable values. There are no features to "humanize" rhythms or make the snare drum rush the beat a little, but there is a swing function that lets you specify a different swing percentage for each pattern. Values lower than 50 percent rush the second half of the beat, while values greater than 50 percent delay the second half.

Up to 50 patterns are available at a time, each of which can be named and edited using *Drummer*'s ten editing functions. These editing functions let you shift notes to different rhythmic positions, assign them to different instruments, or delete them. You can mute or solo any instrument, and you can send as many as sixteen Program Change messages (from any port, on any MIDI channel) as each pattern is played.

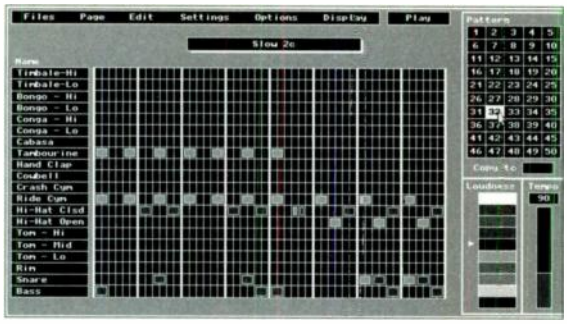


FIG. 1: *Drummer*'s Pattern page is similar to the display on many drum machines.

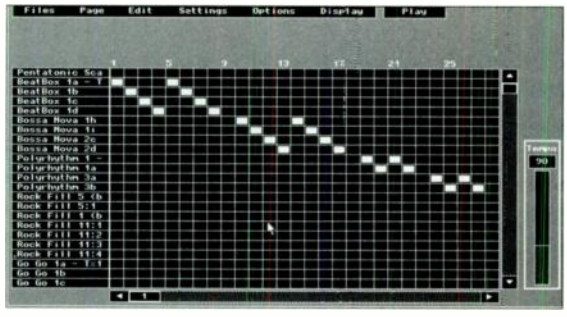


FIG. 2: The Score page lets you link patterns into a complete song.

Each pattern can be transposed, which is handy for repeating the same melodic sequence in a chord progression. You can also specify a tempo scaling factor that changes each pattern's tempo in relation to the master Tempo slider. If different meters are found within the same song (4/4 and 6/8, for example), this feature helps maintain a constant pulse throughout the song.

Drummer includes an Auto Fill function for each instrument in a pattern.

The Auto Fill value is a percentage that represents the probability the program will play a note when it reaches an empty box in the grid; for example, if the value is ten percent, the program will fill in an empty box with a note approximately one in ten times. Auto Fill is useful for adding some spice to your drum parts, but use it sparingly; otherwise, you'll wind up with drum hits in really odd places. Those interested in computer-aided composition can use Auto Fill on empty tracks for random drum rhythms, melodies, or chords.

SCORES OF FEATURES

Each of *Drummer*'s 50 patterns are chained together on the Score page (see **Fig. 2**), forming a score up to 2,000 measures long. *Drummer* provides horizontal and vertical scroll bars to help you navigate, or you can type a measure number into a handy "thumb" box in the horizontal scroll bar. The Score page also provides control over play ranges, editing features, and looping between any two points in the score. The looping function is rather limited, simply repeating the loop until you stop playback.

Drummer can start, stop, and synchronize to external MIDI Clock source (but not Song Position Pointer). I installed *Drummer* on two different computers, synchronized one to the other, cranked up the tempo, and filled the MIDI datastream with all sorts of data. The two computers stayed in perfect sync, even with one computer running *Windows*.

Drummer's support for Standard MIDI Files (SMFs) is extensive, which makes it a valuable sidekick to a conventional sequencer. The program can load format 0, 1, and 2 SMFs and save them in eleven different ways. For example, SMFs in format 1 can be saved as a single track, or multiple tracks, each containing a different pattern, instrument, or MIDI channel. *Drummer* extracts only pattern information from an SMF; it does not attempt to create a score. Each bar in the MIDI file becomes a separate pattern.

SMFs can be filtered by track and MIDI channel when loading (see **Fig. 3**). You can specify meter and drum kit information in advance, but I got excellent results by letting *Drummer* make all the decisions. Unfortunately, the program doesn't check for duplicate patterns, and if you don't weed out duplicate patterns in your sequencer, a typical SMF fills *Drummer*'s 50 patterns rather quickly.

The external control feature lets you start and stop play, change the pattern number, or alter the tempo using a remote MIDI controller. Unfortunately, *Drummer*'s external control and real-time recording features cannot be used simultaneously, which would eliminate many trips between the controller and computer keyboard.

FIG. 3: *Drummer* provides excellent tools for importing Standard MIDI Files.

Drummer also provides a Librarian page (see **Fig. 4**) that lets you audition, mix, and match the patterns in your *Drummer* files. A Notepad page lets you write reminder notes to yourself. Absent from *Drummer* is a "shell to DOS" feature that lets you sneak off to a DOS command line for some quick file maintenance.

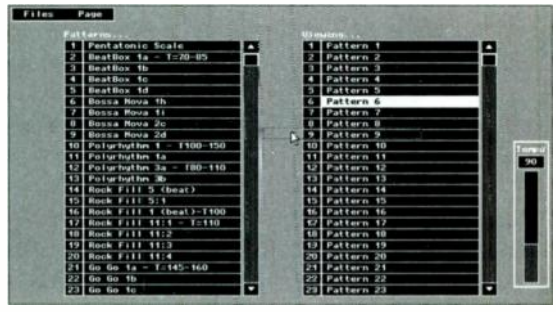


FIG. 4: The Librarian page lets you audition and organize the patterns in your *Drummer* files.

USING DRUMMER

Drummer is remarkably easy to use. The graphical user

interface has the look and feel of a Macintosh or *Windows* program, with a few minor idiosyncrasies. For instance, you must always use the mouse to select an instrument field for editing, rather than hitting a cursor key, Tab, or Enter to move from field to field.

I tested *Drummer* in four different environments: an 80386 machine under DOS, *Windows* 3.1, and OS/2 2.0; and an old XT-compatible. The program performed admirably under DOS on both computers, but occasionally skipped notes under *Windows*. Under OS/2, *Drummer* experienced the same severe timing problems that plague many other MIDI applications.

In several parts of the program the right mouse button can save you some effort, but you must read the manual to learn them (*Drummer* has no online help). The program also provides keystroke shortcuts for commonly used commands.

Drummer's manual is well-written and well-organized. After reviewing both *Drummer* and *Sound Globs*, I'm convinced that Cool Shoes' manuals are among the best in the business. The manual has troubleshooting sections, tons of illustrations, and thorough discussions of complex topics. It has a complete command reference, sections on computer and MIDI basics, and honest explanations of certain limitations in the program. Those who need more help learning about MIDI are referred to an appendix with a comprehensive list of electronic music information sources.

Drummer occupies a specialized niche that provides a truly useful function in the studio. The program's features are well-considered and easy to use. Its consistent user interface invites you to dig deeper without getting bogged down in cryptic keystroke sequences and endless menus. Kids can use *Drummer* as a learning tool, yet professionals will find it powerful enough to use alongside their favorite sequencer.

Allan Metts *is an Atlanta-based musician, electrical engineer, and MIDI consultant. He wants to say "hi" to all his MIDI Roundtable friends on the GEnie bulletin board service.*

Product Summary

PRODUCT:
Drummer 2.0
PRICE:
$99
SYSTEM REQUIREMENTS:
IBM PC-compatible computer with 640K RAM, MIDI interface, mouse
MANUFACTURER:
Cool Shoes Software
PO Box 2359
Kernersville, NC 27285-2359
tel. (919) 722-0830
fax (919) 724-4412

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

Roland AX-1 MIDI Keyboard Controller

By Steve Oppenheimer

A boon for keyboardists who were born to run.

Strap-on keyboards exist for the sole purpose of running amok on stage. A strap-on ought to be easy to play, attractive, and relatively lightweight. A velocity- and pressure-sensitive keyboard and conveniently located Pitch Bend, Modulation, and Sustain controllers are virtual necessities. You should also be able to both send Program Changes and store at least a few dozen presets. The ability to stop and start a sequencer and set the tempo is very helpful, and for doubled pleasure, you'll want at least two key zones.

For most of us, additional features in a strap-on are mostly bells and whistles, albeit useful ones. If you really need more flexibility, you can route the strap-on's output through an outboard MIDI processor.

Roland stayed pretty close to this recipe when it cooked up the AX-1 strap-on MIDI master keyboard. The AX-1's slender, feather-light, LED-embedded, flaming-red body might not satisfy conservative aesthetics, but it virtually screams "rock 'n' roll." When you turn the instrument on, its LEDs light up to indicate how many hours of battery life are left. (The six AA alkaline batteries last about 25 hours, and an optional AC adaptor is available.) Connect it to a synth using your longest cable or a wireless MIDI system, and you're ready to start running.

CONTROLLERS

Like all strap-ons, the AX-1 resembles a solid-body guitar. The main performance controls are located on the instrument's "neck," where you place your left hand. The Pitch Bend ribbon lies approximately in the center of the neck. The Sequencer Start/Stop and Patch increment buttons flank the Pitch Bend ribbon on the left, and the Transposition and Octave Up/Down buttons are on the ribbon's right, where you can get at them quickly.

The AX-1 is the only strap-on keyboard on the market that lacks pressure-sensing keys. It's also the only one without a Mod Wheel. Instead, a broad, spring-loaded Expression Bar beneath the Pitch Bend ribbon sends Modulation Wheel or Channel Aftertouch messages when squeezed. In each of the AX-1's two programmable zones, you can select the type of message and disable/enable the Expression Bar and Pitch ribbon. The Expression Bar and Pitch ribbon are disabled/enabled together with the same toggle.

The Expression Bar has very little travel, which is more of a drag for sending Modulation than Aftertouch messages. It *is* a continuous controller, but it goes from 0 to 127 in a heck of a hurry. I like more continuous in my controllers, even when running amok onstage.

Roland's AX-1 strap-on MIDI keyboard packs a solid set of features into a featherweight package. The Pitch Bend ribbon and Expression bar on the neck are especially noteworthy.

At the upper tip of the neck is a handy-dandy, multipurpose Data Entry wheel. During programming, the wheel is used to set parameters such as the Velocity curve and clock tempo. But you can also use it to send any numbered MIDI controller message (programmable per Patch), such as Volume (controller 7) or Pan (controller 10).

The Sustain button is behind the neck. You can reach the Sustain button, Pitch ribbon, and Expression Bar at the same time, but it's difficult to use them together. It's especially tough to hold the Sustain button (pushing the neck forward) and accurately control the ribbon. With practice, I got the hang of coordinating the three controllers—it can be done—but I don't like it. My solution was to hold down the keys for sustain when possible, and avoid using the button.

Some strap-ons of the past—notably the Yamaha KX5—had miniature keys

that invited more clams than a Maryland clambake. But the AX-1's 45 unweighted, velocity-sensitive keys (from G3/MIDI note 40 to C6/note 84) are the same width and almost the same depth as full-size synth keys. The feel is smooth, and once I had the strap adjusted to taste, the bothersome bivalves were banished.

PROGRAMMING

Almost two dozen buttons are aligned along the top edge of the keyboard. In Patch mode, sixteen of the buttons, toggled by a "17-32" button, call up the unit's 32 user Patches. In Free Panel (programming) mode, these same buttons access most of the important parameters. The other buttons in this section write Patches to memory, switch between Patch and Free Panel modes, switch between the Upper and Lower keyboard zones, and send GS (Roland's version of General MIDI) Chorus, Reverb, and Variation (Bank Select) messages. (The GS features will be discussed shortly.) There is no SysEx support.

The keyboard can be split into two overlapping zones. Each zone has an independent MIDI channel assignment, outgoing Program Change, octave transposition, Volume, Sustain button on/off status, and continuous controller assignments, as well the GS parameters. A Keyboard Mode button lets you activate the Upper zone, Lower zone, or both.

At the Patch level, you can assign the Data Entry wheel, turn the Timing Clock messages on and off, and set the clock tempo (20 to 250 bpm) for controlling a sequencer or drum machine.

Product Summary

PRODUCT:
AX-1 strap-on MIDI keyboard
PRICE:
$795
MANUFACTURER:
Roland Corporation US
7200 Dominion Circle
Los Angeles, CA 90040-3647
tel. (213) 685-5141
fax (213) 722-0911

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

The Octave Up/Down buttons can also be programmed for each Patch. They transpose both zones (together) by any interval up to the full keyboard range (two octaves and a fourth).

Using the Data Entry wheel, you can select between three velocity curves, dubbed Low, Medium, and High. The AX-1's manual doesn't show the actual curves, but they seem more like three different scaling factors than actual velocity curves. There's no display, so you have to guess where the middle setting starts, or use a MIDI data monitor such as Kurzweil's *MIDIScope* for the Macintosh.

Roland opted to save weight and money by sacrificing some user-friendliness when they decided to forgo a display. Many, but not all, programming functions are marked on the instrument, and the LEDs light up as you press each button, remaining lit to indicate the active zones, Patch/Free Panel mode, and current Patch number. But to set the few unmarked parameters, you have to memorize the information in the manual. The user interface is adequate, but not wonderful.

GS FEATURES

Roland included several features optimized for their GS synths such as the Sound Canvas. Since GS is a form of General MIDI, these features work with any General MIDI instrument, and some controls send MIDI messages you might be able to use without a General MIDI device.

A pair of buttons send Reverb Depth (controller 91) and Chorus Depth (controller 93) messages whenever they are pressed or when a Patch incorporating them is recalled. The depth values are independently programmable for each Zone, and the button on/off status is saved with the Patch.

GS and other sound modules can switch between multiple Banks of 128 Programs. In GS, sounds in these alternate Banks are considered "Variations" of the sounds in the main bank. The AX-1 sends the necessary Bank Select messages from a pair of buttons (called "Variation keys") labeled "CC 00" and "CC 32." These buttons actually send a packet of multiple instructions: a Bank Select command in the form of Control Change messages (Control Changes 0 and 32, respectively), a user-selected Bank number, and a regular Program Change. This calls up the

desired Bank and Program. The data packet also includes Reverb Depth, Chorus Depth, and Volume messages. Each AX-1 zone can include either or neither Variation key.

AGAINST THE COMPETITION

Except for lacking Aftertouch, Roland's strap-on keyboard is superior to the elderly Yamaha KX5 on all counts. Roland's main competitor is Lync, whose instruments should battle it all the way. If you need extensive features, such as four zones, the high-end Lyncs are the only game in town. If you want to keep the budget down, though, it's the AX-1 or Lync LN1000. The LN1000 ($695) offers just one zone, but has more of almost everything else than the AX-1 ($795), including a display, key-based Aftertouch, more program memory, more Velocity curves, and a Panic button. (I would love a Panic button on the AX-1, so I could get out of stuck-note hell while far from the synths.)

On the other hand, the AX-1 has a Pitch Bend ribbon, which I prefer to the Lync's Pitch wheels. At three kilograms (about six pounds), the Roland keyboard is slightly lighter than its competition, and it looks a bit less, er, unusual. Those with GS sound modules can even do MIDI tricks not possible with other strap-ons. And it's a lot of fun.

Limitations? Sure, but Roland has issued a strong challenge. Suddenly, one of the AX-1's main competitors looks its age, and the other may be peering over its shoulder.

EM *products editor* **Steve Oppenheimer** *stays up late thinking about Control Change messages. It's a wonderful life.*

Dynaware Ballade 1.05 (Mac)

By Jim Pierson-Perry

Low-cost notation and sequencing for General MIDI synths.

While the advent of General MIDI synths may lay the groundwork for cracking the consumer electronic-music market,

software will provide the wake-up call. Such software must be capable of making MIDI accessible to novice or casual users without overwhelming them with technological babble.

The latest contender for this role on Macintosh computers is *Ballade*, from Dynaware. Originally released for DOS computers, the new version builds on the original's strong graphic style, but has been completely rewritten for the Macintosh. Dynaware dropped the built-in MT-32 editor, added extra sequencing muscle, and retargeted the program for use with Roland GS and General MIDI instruments.

Dynaware put a lot of effort into making *Ballade* easily accessible for beginners. The program primarily uses two display screens: a 16-track mixing console with animated faders and a score-entry/editing display. Both screens are well-designed and offer intuitive, interactive graphical controls. Most operations utilize pop-up menus, icons, and onscreen fader controls. You can make music quickly, with a minimum of learning, and grow into deeper editing and recording features later.

Global-level customization lets you define key equivalents for recording commands, triggered from the computer or the MIDI keyboard. Other settings enable the MIDI metronome and optional external synchronization (MIDI Clock or SMPTE via MIDI Time Code). The collective track and global settings are saved in a Configuration file that can be set to automatically load when you start the program.

ASSIGNING INSTRUMENTS

Ballade has sixteen recording tracks, each locked to the corresponding MIDI channel. All data on a track, regardless of source, plays on the track's dedicated MIDI channel. The user specifies the track type (Synth or Rhythm), target instrument, and either of two *MIDI Manager* virtual output ports.

Synth and Rhythm Templates are central to *Ballade*'s easy-to-use interface. They let you recall synthesizer sounds and drum kits by name, rather than cryptic Program Change numbers. Synth Template files contain preset Tone lists and provide access to Pan, Reverb depth, and Chorus depth. (The Reverb and Chorus depth parameters are for Roland MT-, CM-, and GS-series devices.)

Percussion instruments use Rhythm

Templates that allow you to create separate drum-note maps for playback and score display. This lets you notate drum parts consistently, regardless of the actual MIDI note trigger, a cool feature missing from some pro-level sequencers. Multitimbral instruments with both synth and drum tone generators can use Synth and Rhythm Template files.

Ballade comes with preconfigured Synth and Rhythm Templates for the internal presets of several instruments, predominately Roland GS and other General MIDI modules. If Templates for your instruments are not included, you can create them. While tedious, you need only do it once for the preset patch banks. (The program also allows you to create Templates for patch banks in user RAM.)

RECORDING

The program's main screen (see Fig. 1) features a virtual mixer that lets you record on one or more tracks at a time and manipulate them during playback. Icon palettes control the program's recording operations. An Auto Function palette provides punch-in/out, looping (the entire song, not a single track), and return-to-cue at the end of play. Time is displayed both as a measure count and elapsed time since start. You can specify markers by name throughout a song and jump to them as needed.

Fader moves can affect playback only, or can be recorded and merged into the song data. The only oddball is tempo control. You have to change tempos with a single increment button, rather than a slider, and changes can only be saved within the Score Editor. *Ballade* flashes the menu bar whenever you click on the mixer display or move a fader, which is an annoying trait.

Ballade supports real-time and step-recording, in either normal or overdubbing modes. It also chases controllers, so if you start in mid-song, it will have the valid settings for Pan, Volume, and Program Change.

Unfortunately, the program's recording capabilities are sharply limited. You can only access note number, Velocity, Volume, Sustain, Pan, Pitch Bend, and Modulation; all other MIDI data is ignored. This is at odds even with General MIDI, which supports Aftertouch and Expression (Controller 11). *Ballade* lacks a "panic button" command to stop hung notes during recording or playback, but the program automatically sends an All Notes Off message at the end of a song, or if you stop the transport.

The program's recording resolution is a measly 48 ppqn, the lowest of all commercial Mac sequencers. You can import type 0 and 1 Standard MIDI Files at a higher resolution (up to 960 ppqn, according to the developer), but subsequent editing is at 48 ppqn. Finished song files may either be saved in native *Ballade* format, or exported as type 1 SMFs.

Though *Ballade*'s notation functions are good for entering music, it had problems with transcription of imported MIDI files. For example, repeating sixteenth notes sometimes were displayed as bizarre triplets. Particularly disturbing was invalid notation that should not have gotten through the software, such as simple 4/4 measures containing notes that added up to five beats per measure. There's need for considerable improvement in this area.

I had sporadic recording problems with *Ballade* that did not repeat on demand. Sometimes it took up to twenty seconds to start the count-in after clicking the record icon. This only happened after I had already recorded a couple of tracks, never on the first one, and never during regular playback. I also saw the faders move of their own volition, even though there were no Volume changes on the track.

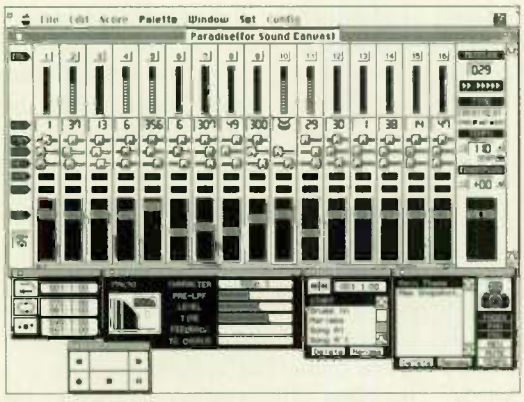


FIG. 1: *Ballade*'s main screen emulates a 16-track mixer board, with faders for Volume, Pan, and (for GS synth modules) Reverb and Chorus Depth. The tear-off palettes shown at the bottom access the Auto Transport, Reverb, Markers, Snapshot, and Transport features.

STEP ENTRY

Ballade provides several ways to step-enter notes: input from a MIDI keyboard, icons for pasting notes onto the onscreen score, or input from the onscreen keyboard. The program automatically pads a measure with rests as you enter notes to match the current time signature. Additional palettes govern note duration and Velocity, either as preset values, or individually tweaked with a slide bar. Attack time can be varied ± 3/48 of a quarter note to compensate for slow synth response or adjust the groove of a part.

A Chord palette provides a fast means to step-enter triads for any of twelve preset chord types in any key. Chords can be taken up and down through inversions and auditioned before pasting them into the score. This is nicely implemented and, besides serving as a sequencing tool, helps your ear training and music theory.

SEQUENCE EDITING

Ballade provides several higher-level editing functions. You can Transpose over a range, track, or entire song by up to twelve semi-tones (chromatic or diatonic). Quantize snaps notes (attack time or attack and duration) and, optionally, controller data to a timing grid, with a resolution up to 32nd-note triplets. Fit Tempo automatically adjusts the tempo of a selected measure range or entire song to fit a specified time interval. The Beat Creator function augments quantization with an adjustable swing feel. Individual notes can be edited through the Micro tool for velocity, duration, pitch, and attack time. You can even click on a note in the score and then move it about the display area, though this cannot be "undone."

Modulation, Pan, Volume, Tempo, and Pitch Bend can be edited as single events, using a screen slider to enter the value, or smoothly varied by a defined function over a selected measure-range. *Ballade* offers three ramp functions: linear, fast curve, and slow curve. While the function works well, its implementation is awkward. You must specify the start and finish ramp values as a percentage of controller maximum, rather than simply entering the desired values. Hitting desired values is more a trial-and-error affair than an exact edit.

While only one song file can be open at a time, *Ballade* can save individual tracks, or a section of one, as a Pattern file. Patterns can be auditioned from the file-selector dialog box before pasting them into a Song file, which is a nice high-end feature. This approach is especially effective when building Rhythm tracks from stock drum patterns.

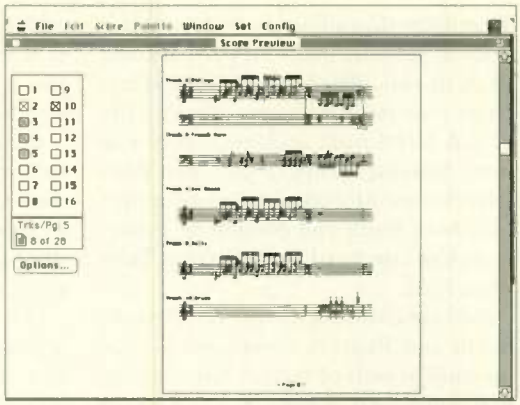


FIG. 3: The control box at the left of the Score Preview window lets you select the tracks to be printed. Note that the Rhythm track uses symbols with an "X" head on a standard G staff.

THE SCORE EDITOR

Ballade's major strength is support of standard notation for music entry, editing, and printout. This greatly reduces culture shock for traditional musicians moving into the MIDI world. It also eases the route to sequencing, as beginners can literally type sheet music into the program.

The Score Editor (see Fig. 2) displays one track at a time. Global controls for Tempo, Master Volume, and markers are shown above the track, while track-specific controls for Modulation, Volume, Program Change, Pan, Sustain, and Pitch Bend are below it. All controls are visible with an Apple 13-inch or larger monitor, but only two track-specific controls can be viewed at a time with a 9-inch screen. This can be a problem when using multiple controllers, such as Pan and Volume because you cannot see them onscreen together.

Synth tracks may be displayed independently on a treble, bass, or grand staff. Spacing is adjustable globally to show from 1.5 to four measures onscreen. (You have no control over printed spacing.) It can be quite tedious to enter and edit music, given the limited score display area, particularly if you must keep flipping between tracks to line up hits and phrases.

Display resolution is 48 ppqn, whether the music was recorded or an imported MIDI file. You can set the window to scroll during recording or playback, but only with the active track; you cannot record one track while displaying another. You can, however, overdub on a track while viewing its current score.

Multiple key and time signatures are supported within a song. Unfortunately, if you apply a new key signature to a measure range, rather than the entire song, *Ballade* fails to add natural signs to cancel the key at the end of the range.

THE RHYTHM EDITOR

Rhythm tracks are edited in a dedicated window. The global controls are the same as for Synth tracks, but the only track controller is Volume. This is a problem with instruments such as the Roland U-220, which uses Program Change commands to select drum sets. *Ballade* ignores such MIDI messages on Rhythm tracks, offering only a special pop-up menu to change drum sets for

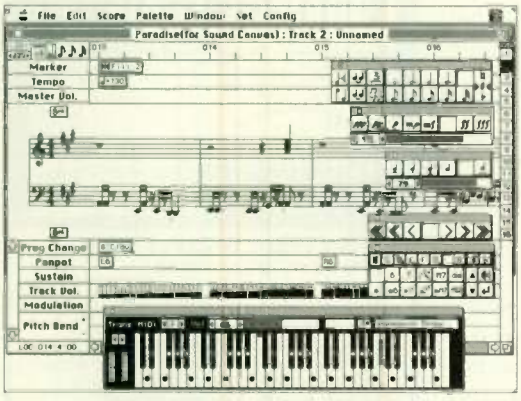


FIG. 2: The Score window provides a view into the song, one track at a time. Global controllers are above the staff, and track-specific controllers are below it. Control palettes for entering note data are, from top to bottom: Note, Velocity, Duration, Attack Time, and Chord. The onscreen keyboard along the bottom can be used to step-enter notes. It also shows fingerings for a variety of scale modes.

Roland GS and General MIDI synths.

Each drum part has a named display line in the Rhythm Editor, with a scroll bar to access all parts in the drum kit. You can audition drum sounds by clicking on their names with the arrow or striker tools. Drum notes are shown onscreen as diamonds, whose size and coloration reflect note Velocity. The actual printout, however, is on a standard G staff, where all notes are printed as identical symbols with an "X" head, using a special font (see Fig. 3). In my opinion, this is not an optimal approach, as the resulting "notation" is nonstandard and difficult to use. It would have been more effective to use Adobe's Sonata font (which is already used for the synth tracks) to produce standard drum notation.

PRINTING

After you create your masterpiece, *Ballade* can print any mix of tracks, or the entire song, through standard Mac print routines. Output options allow you to print the song and track titles, page numbers, and (space permitting) multiple lines of the selected tracks per page.

▼

Dynaware put a lot of effort into making *Ballade* easily accessible for beginners.

Ballade's printed scores are rendered much less useful by a lack of measure numbers or other reference to the screen score. The sole identification is page numbering, which varies depending on the target printer and page setup. You cannot look at a given page of the printed score and directly locate it within the onscreen score.

Although *Ballade* contains the screen version of Adobe's Sonata music font, it seems incapable of utilizing the matching printer font and always makes a bitmap font for printing. Print quality is fine for the hobbyist, but could be readily improved through real PostScript printing. The program uses a different font for printing Rhythm tracks.

• BALLADE

Printing itself is not free of problems (although Dynaware claims that newer versions of the program have overcome these and other difficulties). Several times, simply invoking the Page Setup or Print command locked the Macintosh. This was not a system problem, as I had no problems running other software that used the printer. I could usually correct it by deleting the *Ballade* Preferences file from my System folder, opening *Ballade*, saving a new Preferences file, then quitting and restarting the program. Once or twice the problem resisted this procedure and corrected itself by means unknown.

BOTTOM LINE

Overall, *Ballade* is a mixed call. It has a sound underlying design and makes good use of Macintosh interactive graphics. It seems well-poised for a target market of novice or hobbyist musicians, particularly with its notation capability. Dynaware is committed to meeting the needs of General MIDI users and plans additional program enhancements. A companion GS module tone-editor program is due in 1993, along with a *Windows* version of *Ballade*. The company maintains an online presence on the CompuServe, America On-Line, and AppleLink telecommunication networks.

On the other hand, the program also

Product Summary

PRODUCT:
Ballade 1.05 sequencing/notation software
SYSTEM REQUIREMENTS:
Mac Plus or better, System 6.0.5 or later (System 7-compatible), Apple *MIDI Manager*, hard disk
PRICE:
$195
MANUFACTURER:
Dynaware USA, Inc.
950 Tower Lane, Suite 1150
Foster City, CA 94404
tel. (415) 349-5700
fax (415) 349-5879

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

contains a curious mix of high-and low-end resources, as if the designers were unsure of their focus. The restricted MIDI implementation—especially the lack of Aftertouch support—may be a problem for many users; even General MIDI users cannot fully exploit their instruments with *Ballade*. The program also has a number of sporadic stability problems.

The company has announced version 1.1, which should address most of the feature limitations and other problems mentioned. Hopefully, the stability problems will also be solved. After that, *Ballade* could become a major contender in the entry-level Mac sequencer market.

Jim Pierson-Perry *is a research clinical chemist, musician, and semi-regular* **EM** *contributor.*

Peavey PC-1600 MIDI Controller

By Peter Freeman

This many-faceted box offers virtually complete command of MIDI.

You can escape a plethora of bad situations with a Swiss Army knife. Its ability to function as a variety of simple, but important, tools has made it a commonplace item. In many ways, the Swiss Army knives of the MIDI world are MIDI fader boxes, which let you send a huge variety of MIDI messages under manual control. This type of device first emerged in the late 1980s with the appearance of Lexicon's MRC and gained popularity with the release of JLCooper's FaderMaster.

The newest MIDI fader box, Peavey's PC-1600, is a sturdy, tabletop unit that employs sixteen 60 mm sliders, sixteen buttons, and a data wheel, all of which are programmable. The unit can also accept control-voltage inputs from two separate sources (such as footpedals) and translate them to any MIDI controller messages. Power is supplied by yet another wretched "wall-wart" AC adapter.

PROGRAMMING

Programming the PC-1600 is simple. The unit's yellow, backlit, 2 × 20 LCD and four directional cursor keys let you navigate quickly through the parameters. Beneath these are the Edit, Copy, Enter, Utility, Scene, and Exit keys. It would be nice to have an alphanumeric keypad for quicker access to Presets, Scenes, and specific parameter values, but that would have jacked up the unit's price tag.

You can assign any MIDI continuous controller or switch message (0-127) directly to the PC-1600's sliders and buttons. But that's just the start: You can send user-specified hexadecimal strings of practically any length, representing any MIDI message. The sliders can also be grouped, with one slider as a master controller. You can

In addition to its sixteen programmable sliders, sixteen buttons, data wheel, and two control-voltage inputs, the Peavey PC-1600 MIDI controller can send any MIDI message in user-programmed hex strings.

program the buttons to send one message when pressed and another when released. These capabilities could prove useful not only for electronic music, but for non-musical applications such as lighting effects (e.g., programming hex strings to send MIDI Show Control messages). Unfortunately, two often-used Channel Voice messages—Aftertouch and Pitch Bend—do not have MIDI controller numbers and must be programmed as hex strings. Peavey's C8 master keyboard lets you assign these two message types to sliders by name; why can't the PC-1600?

Scenes—"snapshots" of the instantaneous positions of the PC-1600's sliders—can be stored and recalled from the front panel. An entire PC-1600 setup—a Scene, button and CV assignments, hex strings, the works—can be saved as a Preset and recalled from the front panel, or with incoming MIDI Program Change messages. The PC-1600 comes with 50 editable, named Presets that are configured to control a variety of commercially available devices, including Lexicon effects processors; Yamaha, E-mu, and Korg synths; and a host of Peavey products.

A Cubase Remote preset is provided to remotely control the transport and other functions of Steinberg's *Cubase* sequencer. This served as a perfect method of putting the box through its paces. Because the Cubase Remote preset only uses the PC-1600's buttons, I was free to assign the sliders to a bunch of different functions (such as MIDI Volume and Panning) for most of the synths in my studio and SysEx parameter changes for my Roland JD-800 synth. It wasn't long before I had each slider simultaneously controlling a different aspect of one instrument or another.

That was only the beginning. I had a lot of fun recording various PC-1600 moves into *Cubase,* thus automating simultaneous timbral changes on various instruments while controlling the sequencer's transport from the buttons.

ADDITIONAL FEATURES

Peavey included several handy features that add to the unit's value. The Copy key is especially useful. The PC-1600 includes an edit buffer with which you can copy Presets (there are 50 Preset locations) or Scenes from one location to another. You also can copy and paste setup strings, Preset names, and assignments for the faders, buttons, data wheel, and CV inputs.

The Utility key provides access to nuts-and-bolts functions such as the LCD viewing angle, system MIDI channel, and the unit's three independent Program Change maps. The device dumps and loads SysEx for storing Presets, Scenes, global data, or all parameter data to an external storage device or another PC-1600.

An onboard MIDI data filter can remove Program Changes and most common note and controller messages (e.g., Mod Wheel, Pitch Bend, etc.) from the datastream. The filter can also generically eliminate SysEx, System Common, and System Real Time messages. The filtered data is merged with the PC-1600 data, and then routed to the MIDI Out.

THE WRAP UP

Generally, I was impressed by the PC-1600. Unlike some boxes of this kind, it is built pretty solidly and looks as if it could take a fair amount of abuse. My only complaint in this department regards the buttons: They appear to be rubber pads overlaid with plastic, and they feel cheap. This was apparently a cost-cutting measure by Peavey; positive-action, solid buttons would have been more expensive to manufacture. But I don't think it was a smart place to cut corners, as the buttons are sure to be in hard, constant use. Having said that, the unit's casing (thankfully) is surprisingly heavy, solid metal, rather than plastic, making it less likely to slide around on a desktop or any other surface.

Product Summary

PRODUCT:
PC-1600 MIDI Controller/ Universal Editor
PRICE:
$350
MANUFACTURER:
Peavey Electronics Corp.
711 A St.
Meridian, MS 39302-2898
tel. (601) 483-5365
fax (601) 484-4278

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

I always wish for more features, such as more Presets, a bigger display, and two more CV inputs. But enough carping. The box is simple to learn and use (thanks to a well-written manual), inexpensive, and flexible enough to cover many different situations. It should enjoy a wide audience in studios, sound-reinforcement, live performance, and lighting companies, and maybe even find a few unexpected applications. If you need a MIDI Swiss Army Knife, the PC-1600 is well worth considering.

Sabine FBX 900 Feedback Exterminator

By Lori Bolender and Mike Cutter

This audio engineer's helper keeps a lid on the P.A.

You're perched at the sound console, desperately trying to stay awake through a boring act, when the singer decides to take his wireless mic on an offstage expedition in front of the P.A. speakers. Squeeeeeal! Of course this has *never* happened to us, but we have heard stories of sound engineers experiencing feedback problems. Maybe they need a Sabine Feedback Exterminator.

The Sabine FBX 900 Feedback Exterminator (FBX) automatically senses and eliminates feedback by engaging one of nine independent, 0.1-octave notch filters to attenuate the culprit frequency up to 20 dB. The single-rackspace digital signal processor has two types of filters, fixed and dynamic, which will be explained later. The 900 is the successor to Sabine's 6-filter FBX-M, and offers more filters and improved audio specs.

The FBX is a single-channel device with balanced XLR and unbalanced, ¼-inch connectors. The unit includes an external 27-volt power supply with a 3-pin DIN connector.

Up front, the FBX 900 provides a hard-wired bypass switch with LED status indicators. Input gain is set via a rotary knob and displayed in 6 dB increments on a 4-segment LED meter. The processor also has a reset button, nine LEDs representing filter activity, and a rocker power switch.

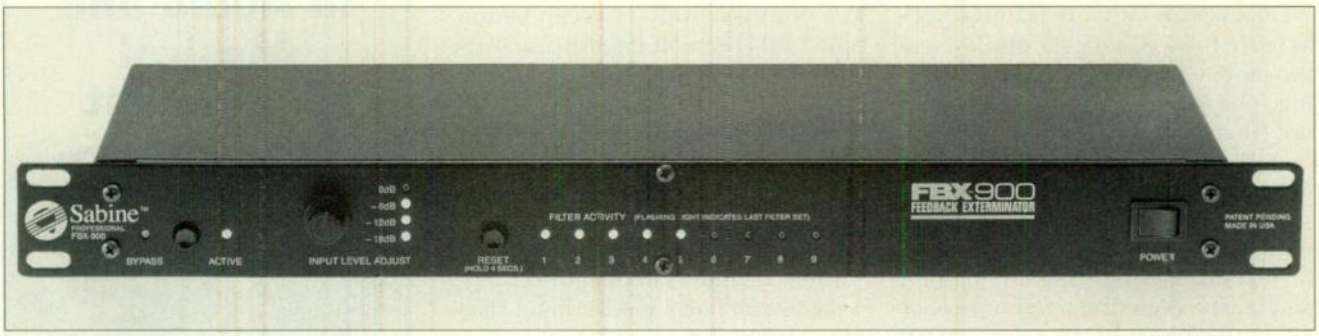
FUNCTION AND OPERATION

The FBX 900 is intended to replace the graphic or parametric equalizer for the purpose of eliminating feedback. For instance, it could go between the console's output and the power amps, or be inserted on a specific input channel or subgroup.

Your first consideration in setting up the FBX is selecting the number of fixed versus dynamic filters. A fixed filter, once activated, won't change its frequency center-point until the unit is reset. These will be the first filters that are activated, "eliminating" the most troublesome frequencies. A dynamic filter searches for sporadic feedback that may crop up during a program, releasing its previous setting and activating at the new feedback frequency. The manufacturer's recommendation of employing six fixed filters and three dynamic filters worked well for us. The procedure to select the combination of fixed versus dynamic filters involves powering down the FBX, so it is important to do this early in the setup, before powering up your amplifiers.

Once your sound system and microphones are in place, you can begin to ring out your system. (To "ring out" a system, the engineer gradually raises the levels up to the feedback threshold, then adjusts the EQ and levels to set the maximum gain before feedback. This process is described in "The Essential Stage Monitor" in the May 1990 EM.) Adjusting the input level of the FBX is critical because the knob serves as both an input attenuator and output amplifier in order to maintain "unity gain" where the knob is set. If the level is set too low, a lot of output amplifier noise is introduced; if it's too high, you clip the input. We discovered a one- or two-o'clock position introduced negligible noise and allowed us to run our console output at a reasonable level.

We found a perfect opportunity to use the FBX during a performance of several different gospel and ethnic music groups. As is typical of hotel scheduling, we had little time to set up the sound system. The front-of-house and monitor systems were mixed from the same console, so the FBX was patched into the monitor system between the



Sabine's FBX 900 actively seeks and destroys feedback.

console output and power amps, *sans* outboard EQ. Ringing out the monitor system consisted of slapping some microphones in front of the monitor cabinets, roughing in the channel EQ, and bringing up the mics until they began to feed back. One by one, the FBX automatically set the digital notch filters to "eliminate" the ringing frequencies. With only one sound engineer for a hectic event, the FBX provided a certain amount of relief that the monitor system was being attended to by the three remaining dynamic filters.

We also used the FBX 900 with a tri-amped Meyer sound system for a corporate show. We inserted the FBX on a subgroup of ten table mics for a panel discussion and rang them out prior to the meeting. While the FBX allowed an additional 2 to 4 dB of gain before feedback, we still relied on the channel EQ to achieve a satisfactory volume in the room. The dynamic filters did not react to low-level ringing, which we had to address at the channel-input controls. We later learned that Sabine offers a version of the FBX that is optimized for lecture halls and conference rooms, which might have given superior results. We did not have the opportunity to test it, however.

Finally, we tried the unit in-line with the main outputs. We used it on a relatively soft musical program, with excellent results.

EVALUATION

The concept of the product is excellent. The filters are extremely narrow (0.1-octave bandwidth), much more so than a ⅓-octave graphic equalizer (which may have actual bandwidths of over an octave), or even many parametric equalizers (which sometimes only produce a ¼-octave notch). This minimizes sound degradation, even with all nine filters active. The 20 dB of attenuation is significantly greater than that of typical outboard EQs. But the most amazing aspect is that the FBX automatically finds and attenuates the feedback frequencies.

If the FBX 900 performed up to all our expectations, we would buy racks of them. However, the product's problems, especially its inherently inflexible design, limit it to specific applications and circumstances. But for these applications, it is excellent.

The FBX is basically idiot-proof. There are only about three functions for which you are responsible: electricity, input gain, and insertion into the signal chain. The flip side is that you have no control over which frequencies the FBX selects, or how much attenuation it provides. The only means of "deselecting" filters is by resetting the entire unit, which, if attempted mid-performance, could be disastrous. Apparently, Sabine is well-aware that some users want a more flexible unit; just before press time, the company introduced the 12-filter FBX 1200, in which the bandwidth for each filter is adjustable from one-twentieth of an octave to one octave, and depth is adjustable from 0 dB to 60 dB. The base version of the new product lists for $1,595.

One problem we discovered was that the FBX slightly colored the sound (removed some high end) *even when no filters were active.* When we were ringing out, the system had to feed back significantly before a filter set. We also noticed that the unit produced "false-positives," meaning it reset dynamic filters even when no feedback had occurred. But neither of these situations were extreme, and we could live with them.

If you have decent console and outboard EQ and a competent engineer, you're already equipped to "exterminate" feedback on the mains; the unnecessary addition of the FBX would only further crowd the signal chain. But as a substitute for an absent monitor engineer, or if the main engineer has more tasks than hands, it's a worthy companion. It showed up on time, wasn't drunk, didn't ask for a T-shirt, and gave us some confidence that the monitor mix was being attended to. There are certainly many other "*sans*-engineer" applications for which the FBX would be a great asset; for instance, it would be fine for a club band that mixes from the stage. When used for this type of application, the product's automated response can make it a gig-saver.

Lori Bolender *has been production manager at the San Francisco Hilton hotel for four years.* **Mike Cutter** *has been a sound engineer at the Hilton hotel for four years and a recording engineer at San Francisco's OTR Studios for seven years.*

Product Summary

PRODUCT:
FBX 900 Feedback Exterminator
PRICE:
$599
MANUFACTURER:
Sabine Musical Manufacturing Co.
4637 NW 6th St.
Gainesville, FL 32609
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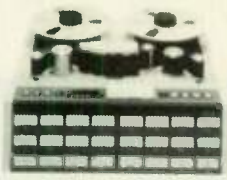

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PRO FILE

Classics Revisited

Mike Oldfield overhauls Tubular Bells.

By Dan Levitin

Neuroscience has taught us that the two halves of our brains—connected by a delicate fissure called the corpus collosum—perform different functions. The left brain is the logical side, the part that uses language to communicate. By contrast, the right brain creates grand, lofty visions and communicates in images. Fortunately, these two sides have the ability to interact; if they didn't, the left brain would become hopelessly mired in details—never seeing the forest for the trees—and the right brain would float through a world of visions without getting anything done.

All artists struggle to balance these two opposing inner drives. The creator must possess the inner vision to know where he or she is going and the sense to realize when the work is finished.

However, novelist Jerzy Kosinski sometimes rewrote his stories even after they were published best-sellers. And in the music world, Michael Oldfield recently released *Tubular Bells 2*, a reworking of his *Tubular Bells*, a long-form rock composition that sold 16 million copies following its 1973 release.

"The original *Tubular Bells* was recorded in a rush, and I wasn't given a lot of time by Virgin Records to do it," says Oldfield. "The playing is ragged and sometimes the tuning is a bit off. These things bothered me over the years."

But rather than re-record *Tubular Bells*, Oldfield decided to write a newer version, incorporating some of the old themes and marrying them with new ideas. In addition, the advances in technology since 1973 imposed their influence on how he recorded *TB2*.

"There's not a lot of real guitar playing on this album," he says. "I'm using my usual collection of guitars, but the difference is now I have an Akai S1100, and most of the guitar sounds are actually samples."

Oldfield's approach to mixing has also evolved, due to the availability of a Sony 3348 digital multitrack and a Harrison Series 10 console with total recall. "*Tubular Bells* took three people three months to mix because the 16-track tape had so many stacked parts," he says. "Now I can make rough mixes of every little section and record them onto the 48-track. Later, I can come back to a particular section, recall it from the console, change one little thing, and stick it back onto the multitrack. It's very easy now to do 30 tracks of vocals and mix them down to two. I can also synchronize two 48-track machines for 96 tracks. These options weren't available twenty years ago."

But regardless of twenty years worth of technology, Oldfield maintains the act of creation really hasn't changed much since 1973. "It's just about the same technique," he says. "You start with some sort of click track, then you compose something recognizable and keep adding things on top of it. Now it's just easier and quicker to get sounds. Sampling is nothing clever, it's just little pieces of other people's performances. Sampling makes it possible to have a string section on something that would be impossible in 1972. But then again, there are some things you can never replace with sampling—like a Hammond organ."

Dan Levitin *is a researcher in cognitive science at the University of Oregon.*

ANDY CATLIN

Mike Oldfield

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