

# Electronic Musician

U. S. \$3.95/Canada \$4.95  
November 1992

## Windows Sequencer Shootout

Keyboard Controller  
Buyer's Guide

Hot Rod Your  
Old Gear

Pro Mixing Tips



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**D**emos to masters. Creativity to tape. Dreams to reality. Magic phrases for those who want to make music that sounds as good as it feels.

The inspiration for these thoughts is the **Alesis ADAT Professional Digital Audio Recorder**, a technological revolution that tears down the walls to your creativity while delivering world class master recordings. Too good to be true?

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Here's some features. ADAT uses the familiar tape recorder controls that you already know how to use so

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# To Megatracks

digital assembly editing via the Digital I/O, SMPTE and MIDI Time Code, Video Sync and more.

What does all this mean? Here's just a few benefits.

It's commonly known that many hours are wasted during expensive album projects while the artist, producer and engineer work in vain to reproduce the rhythmic feel and tonal nuance of demos. Demos that couldn't be used because they suffered from noise, limited bandwidth and overall sonic feebleness. Those days are over forever. ADAT's Sync and Digital I/O perpetually link your demos to your masters making them all part of the same creative process. Every track you record on ADAT is a master track that can be flown into any other ADAT recording, at any time. The best part is that ADAT can be there at any time to catch you at your best, flawlessly stored in the digital domain...forever.

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In time we'll all start taking these little miracles for granted. Before that inevitable event, unpack your first ADAT and track a minute of single notes and chords on your favorite instrument. Play loud, play soft. Play it back and listen really close. It's always a good feeling to have your mind completely blown.

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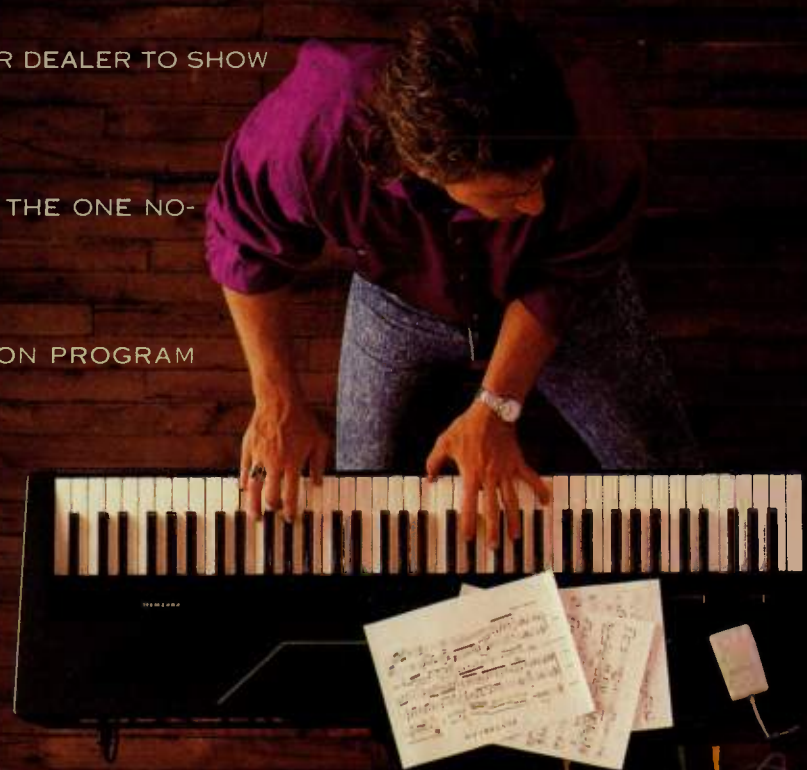
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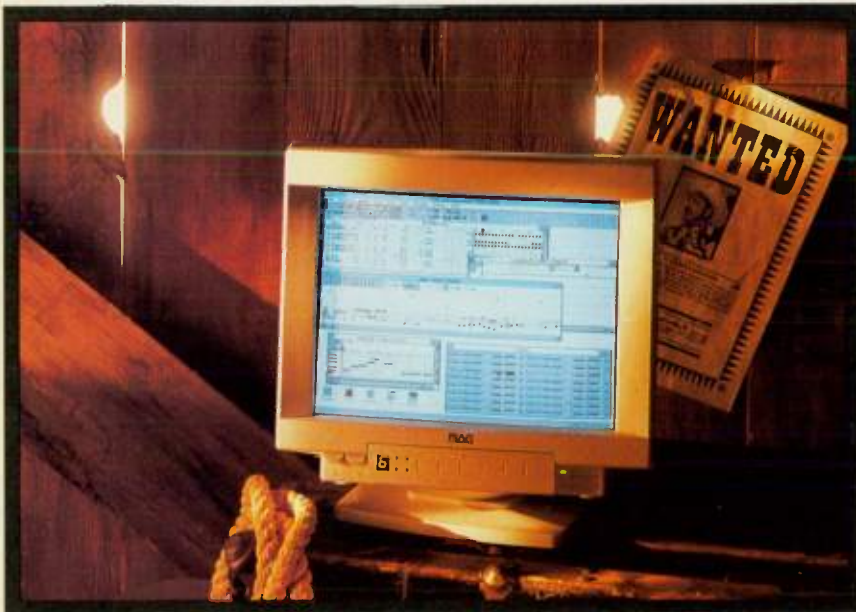
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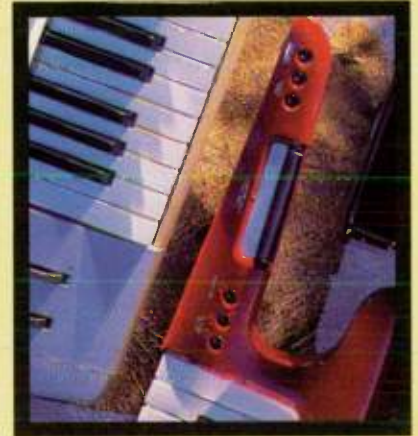
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Cover: Stan Musilek.  
Special thanks to Phil Cochlin.

## Windows Wealth

PC owners are joining the ranks of electronic musicians in droves.

**A**s the editor of *EM*, I stay in touch with manufacturers to discuss the electronic music industry and the trends they consider important. Invariably, I get a variety of viewpoints on the industry, the economy, new products, and more. But lately, one development has become a common topic of conversation: *Windows*.

After a long birthing process, a significant body of *Windows* music software has reached the marketplace, and it seems that budding (as well as seasoned) musicians are gobbling it up. *Windows* software companies report gangbuster business with no apparent end in sight. Customers for their products come from a wide variety of musical backgrounds, but a particularly large segment are newcomers to electronic music.

Software sales on other platforms appear to be steady, but many Mac, Atari, and Amiga developers are porting their applications to run under *Windows*. (Interestingly, some of these companies wouldn't have been caught dead with a PC product even a year and a half ago.) The result is a wealth of software options for musically oriented PC users.

The PC sound-card business also has witnessed an explosion of interest (and sales). The SoundBlaster and its brethren are eagerly competing for the hordes of PC users just discovering how high-quality audio enhances the computing experience. Apparently, even software behemoth Microsoft is getting into the audio-card business. Hundreds of thousands of PC users are being exposed to sampling, hard-disk recording, synthesis, MIDI, Standard MIDI Files, and—thanks to numerous bundling deals—software sequencers and notation programs. Established musicians also benefit from this trend, as manufacturers leverage more expensive, higher-quality parts against larger sales volumes. For example, Turtle Beach's MultiSound card combines 16-bit hard-disk recording with Proteus technology for little more than the cost of a Proteus.

These developments could result in enormous benefits to the electronic music industry. Admittedly, most sound-card buyers use these products with games and have no interest in making music. But even if a small percentage of these people decide to investigate MIDI and electronic music, we could witness a noticeable increase in the size of our community.

In recognition of the importance of *Windows* music software, this month's cover story ("Windows Shootout" on p. 38) offers an in-depth look at the current players in the world of *Windows* sequencers. It explains what to look for, notes similarities and differences, and includes a comparative chart. If you're a PC user who is ready to make the move to *Windows*, you should check it out.

This article presents detailed product comparisons in addition to lists of specs and explanations, both of which many readers have requested. List-based buyer's guides, such as this issue's "The Master Touch" on p. 24, will continue to appear because we—and many of you, according to reader surveys—believe they serve an important role, particularly for product categories with a large number of choices. However, you also can look forward to more direct-comparison "shoot-outs" in upcoming issues of *EM*.

On an unrelated note, I'd like to mention some well-deserved changes in the editorial department: Steve Oppenheimer is taking on the role of products editor, and Michael Molenda is now managing editor. Congratulations, guys.



ALAN HIRSCHFELD

# Electronic Musician

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 Also publishers of *Mix* magazine.



Bob O'Donnell



# On the Streets or in the Studio, EMAX II Delivers Sampling Power.



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...that the basic EMAX II now comes standard with true stereo sampling and 2 megabytes (MB) of sample memory. For power users who need maximum storage and sampling capabilities, EMAX II comes in a Turbo version with 8MB of memory and an internal 100MB hard disk drive fully loaded with sounds.

## You definitely need to know...

...that both the basic and Turbo EMAX IIs are now available at unbelievably low prices. No other comparably priced keyboard can offer so much power. It's not even close.

What you don't know can hurt you. So get out of the studio, off the street and into your nearest E-mu dealer for a demo of the EMAX II.



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## SIMPLY STATED

**G**et simple! Excellent advice, Mr. O'Donnell ("Front Page," August 1992). It is much better to write a great song first and then worry about finding the perfect patch for the bass. I remember hearing an old man playing a beat-up, poorly tuned piano as a kid. Man could he play! He would not have gotten so tasty if he spent his time finding the right EQ on measures 6 through 9.

Also, David Miles Huber is right: *MIDI Mapper* in Microsoft *Windows 3.1* is very powerful and can solve a lot of compatibility hassles by rerouting patches to conform to General MIDI. Would synth makers please wake up and provide a disk to users, or a file to download from CompuServe to use *MIDI Mapper* so we don't have to do it ourselves?

I have a Korg O1/W FD. I called Korg to request a disk for General MIDI and was told that they plan to come out with a ROM card in the fall. Give me a break! Couldn't they just provide a file to load into *Windows 3.1* to create a *MIDI Mapper* setup for patches and drums?

If synth manufacturers were to make this option available, I could spend my time making music instead of frigging with the "system." Who knows, I might even get as good as the old man on the beat-up piano.

**William R. Krause**  
Charlotte, NC

## MIDI VS. THEORY

**I** am writing in response to Phil Radelat's letter comparing the importance of MIDI versus music theory ("Letters," August 1992).

I agree MIDI is the best thing to come along for composers in a long time, but don't discount the importance of knowing harmonically what is happening and more importantly, why something sounds the way it does.

The only way to grasp these things is through ear training and the study of music theory. If you have no knowledge of basic theory, all your songs will start to sound similar.

With this wonderful tool, combined with the forces of MIDI, your compositions will take new directions your ears have always heard, but your brain didn't know how to get on tape.

**Daniel Cipriano**  
Branford, CT

## SOUND SCULPTURE

**I**n the July 1992 article "Beating the System," the author referred to Sound Sculpture's MC-8 MIDI Crosspatch. Do you have an address for Sound Sculpture?

**Richard Williams**  
Address Unavailable

*Richard—You can reach Sound Sculpture at 2805 Wilderness Pl., Suite 800, Boulder, CO 80301; tel. (800) 728-1197, or (303) 442-1954. You also should check out EM's write-up of this MIDI-controlled audio switcher in the the March 1992 "What's New" column.—Anne-Marie P.*

## BIG SOUNDS

**I** appreciated George Petersen's "Guide to Compact Studio Reference Monitors" (June 1992). However, he overlooked an important specification that impacts how the mix sounds when played on good wide-range speakers, or when presented in a theater.

Many popular compact studio monitors only cover the low-frequency

range to 60 Hz, while other monitors claim to go to 40. What sound pressure level can you get at the low end with typical efficiencies of 90 dB SPL for 1 watt at 1 meter? We can only presume the manufacturer measured the speaker with 1 watt at the low end of the spectrum.

To test your speakers, set up your low-distortion digital synthesizer to output a pure sine wave at say 25 Hz (the lowest note on the piano). If you have a volt meter, clip it on to the speaker terminals and go for about 2 volts, if you have typical 4 ohm units, to get 1 watt. If you hear a nice, clean, low-frequency note with no other weird sounds, that's great. Most likely you'll have serious distortion, or hear wheezing from leaks in the enclosure or other rattles that aren't the sound of your marvelous high-tech synthesizer.

If your music requires big sounds with low bass (i.e., your typical movie score), you'll probably boost the bass EQ on those tracks to compensate for the speakers' inability to reproduce the low frequencies. When you play this recording back on a good, full-range speaker system, however, the bass will be greatly exaggerated from your studio reference and the tape noise will probably show even with dbx or Dolby processing. So if you must have big sounds, you should be absolutely sure the monitor speakers can reproduce them at the level they are expected to be heard.

**Ray Jurgens**  
Electronic Arts Research  
Santa Monica, CA

Author George Petersen responds: *Thanks for the additional information. The main point of the article was to emphasize the need to use quality studio monitors—rather than home hi-fi speakers—for recording or mixing. As near-field reference speakers are by nature physically small, the usual tradeoff is bass response. Also, after I mix, I check the results on larger (and smaller) speakers, ranging from car stereos and boom boxes to large audiophile systems. With the increase in popularity of personal stereos, listening to your completed mixes on head-*

## ● LETTERS

phones is also a must. You can't be too careful these days.

### RIPPED OFF

**A** few weeks ago I had the misfortune of having some gear stolen from my car. Like many of your readers, I have invested literally thousands of hard-earned dollars in my musical equipment over the years. I would appreciate any information you can provide on companies that insure musical gear against theft, fire, and other disasters.

By the way, thanks for producing a great magazine. I am in the process of

### THE ELECTRONIC ENVIRONMENTALIST

Many readers have expressed concern that *EM* is printed on non-recycled paper. Like our conscientious readers, our staff wishes to respect the environment. However, this is a complicated issue with many factors to consider.

Unfortunately, the evolution of recycled paper is not complete, and the glitches that remain make it problematic to use as magazine paper. Questions arise regarding the constitution of recycled paper. No standard presently exists that defines exactly what this paper must consist of to be considered recycled. In addition, many question the possible ill-effects that result from using bleach and dioxins to whiten the paper. Cost presents another problem. Recycled paper generally costs 10 to 30% higher than "virgin" paper. Also, our advertisers expect exceptionally high-quality printing of their ads, which, unfortunately, today's recycled paper cannot produce.

*EM* plans to print on recycled paper as soon as it is economically feasible and environmentally sound. In the meantime, we'll continue to print our pre-printed magazine inserts on recycled paper.—Christine Pare, editorial intern

opening my home studio to the outside world, and virtually all of your columns have been of enormous value. I would love to see you do product reviews of old gear that has been discontinued. This would be of great help to anyone who is planning to put together a studio on a tight budget. (Doesn't that include everyone these days?)

**John A. Dalley**  
Brooklyn, NY

*John—We covered the difficult subject of insuring your gear in "Nightmare on MIDI Street" in the November 1990 issue. In the article, author Chris Campos mentioned that Musician's Union members can get insurance through the union, and others should check with their home or renter's insurance companies. Most offer riders that let you cover your equipment. As for your second point, we cover older gear in various feature stories (including this month's "Hot Rod Mods" on p. 58), but we don't have the room to re-review older gear. There are simply too many interesting new products to be covered.*

*Many older products were reviewed in previous issues of EM, most of which are available through Mix Bookshelf (tel. [800] 233-9604, or [510] 653-3307). If you want to find out how to track down older reviews, you should read the next letter.—Bob O'D.*

### BACK ISSUES

**I**t would be helpful to have a department in your magazine that lists features and columns from back issues. I believe such a column would be extremely helpful to both beginner and professional readers who want to make the most of *EM*.

I find that every issue of your magazine is very educational. Keep up the good work.

**Tim Caron**  
Loveland, CO

*Tim—You're in luck. EM's "Back Issue Listing" indexes every issue since the magazine's inception back in 1985. To receive a copy, send a self-addressed stamped envelope to Back Issue Listing, Electronic Musician, 6400 Hollis St. #12, Emeryville, CA 94608.*

*In addition, EM features an annual index of articles in every December issue.—Anne-Marie P.*

### JAZZ CONNECTIONS

**I** am a jazz pianist originally trained at Berklee College of Music (many years ago, when Bill Evans was the man to follow). I subscribed to *EM* to see what is going on with all this techno-stuff.

I am currently setting up the San Francisco Bay Area Jazz Musician's Service Organization, which will offer an alternative to the expensive and notably unhelpful American Federation of Musicians. This grassroots endeavor will provide services most needed by local jazz players and will doubtless have quite a different configuration from the AFM, besides costing far, far less to belong to.

I would like to encourage electronic musicians and home studio enthusiasts to get involved. This is an opportunity to network, to share equipment or space, and jam.

**Clayton C.C. O'Claerach**  
3000 Harper St.  
Berkeley, CA 94703

**M**y associates and I enjoy, study, and teach jazz (American jazz in particular), but we are neglected because of the economic crisis and chaos in our country. The problem is that we have musical instruments, but we have no reeds and no musical literature on American jazz recordings. And our students have no sheet music to play.

Can any readers send us at least some of these things? You are the only hope for us. Please help us spread and teach American jazz. Thank you very much in advance.

**Yuri Zverev**  
House 17, Flat 14  
8th of March St.  
Kirov, CIS (formerly USSR)

*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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**HOW IT DOES IT.** All existing CR-1604s are automation-ready thanks to our modular ribbon cable design and robust internal power supply. The OTTO-1604 mounts inside the main chassis and plugs in between the main board and the CR-1604's pod. MIDI cables connect to a small, external box via ribbon cable. Installation takes about 15 minutes and requires only a screwdriver (other drinks are optional). Do it yourself via illustrated instructions or have your dealer perform the installation for a modest fee.

**WE** couldn't resist a plug for the CR-1604's studio-quality mic preamps with -129 E.I.N. & 0.005% THD.

**ONE** more reason that we designed the CR-1604 with a beefy internal power supply: Besides eliminating wall warts or line lumps, it provides power for the OTTO-1604 (as well as +48V phantom mic power, BNC lamp connector & XLR10 Mic Preamp Expander).

**WHAT IT DOES IT WITH.** Simple hardware controllers can use the OTTO-1604 to

trigger "snapshot" level/mute settings via MIDI commands. Existing

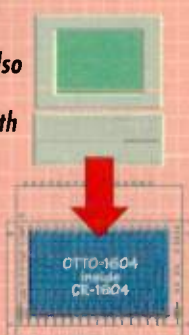
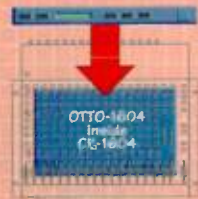
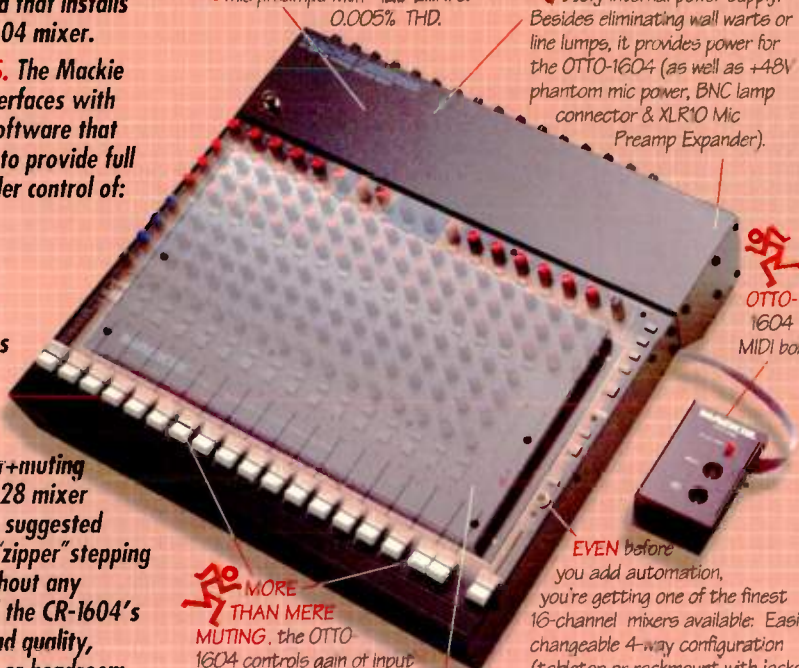
software sequencing programs with MIDI volume control can adjust multiple channels, returns and outputs\*.

Mackie is also currently working with major sequencing software developers including Opcode, Mark of the Unicorn, Steinberg/Jones, Twelve-Tone Systems, Ellisonics, Dr. T Music Software, C-Lab, Passport Designs, Avid Technologies and others to provide on-screen "virtual CR-1604 sliders" for their programs\*.

**BEFORE YOU BUY A SIXTEEN CHANNEL MIXER,** remember that only the CR-1604 lets you own a great mixer now

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free for detailed information on the CR-1604 and OTTO-1604 add-on automation board. Then hear them both together at a Mackie dealer soon.



**MORE** THAN MERE MUTING, the OTTO-1604 controls gain of input and output faders (plus AUX returns and ALT 3/4 bus).

**THE OTTO-1604** mounts inside the main chassis using the mixer's existing ribbon cables. Installation is so simple that a TV game show hostess could do it. We also offer a step-by-step video tape for the even more severely mechanically impaired.

**Meticulously** mouse Mackie CR-1604 mixer mixes via various MIDI Mac, IBM, Amiga or Atari software\*.

\* Any ad that mentions computer software is bound to have an asterisk or two in it. Ours means "consult individual 3rd party, requesting software manufacturers 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.

**EVEN** before you add automation, you're getting one of the finest 16-channel mixers available: Easily changeable 4-way configuration (tabletop or rackmount with jacks to back, top or on the control surface plane), sealed rotary controls, better-than-digital dynamic range, twice the headroom of conventional mixer designs, stereo in-place soloing, constant power pan pots and boo-coo more.

**OTTO's** external box connects via its own ribbon cable, and includes MIDI IN and THRU DIN sockets plus signal present LED.

**EXISTING** add-on MIDI automasters often suffer from zipper noise and/or sluggish response. OTTO avoids these problems with a proprietary, digitally-controlled gain cell.



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## PSR-SQ16.

# WHAT'S

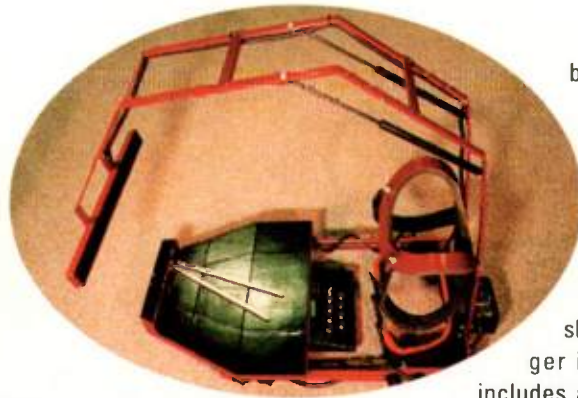
# NEW



## ▲ AUDIX D-SERIES MICS

**A**udix's D-series hypercardioid, dynamic instrument mics feature a full-sized, low-mass diaphragm in a compact body. The D-series mics are designed for both studio and sound-reinforcement applications and have a typical frequency response of 38 Hz to 21 kHz.

The *D-one* (\$249) features VLM Type-B high-gain, transformerless technology, with enhanced upper range. It is recommended for snare drum, guitar amps, and other instruments that would benefit from increased clarity and presence. The *D-two* (\$249) uses a similar capsule, but with enhanced bottom for power and warmth. It is recommended for toms, congas, steel drum, and various brass and reed instruments. The *D-three* (\$289) features a VLM Type-C low-gain, transformerless capsule for a flat, accurate response. It is suitable for high-SPL applications such as bass drum, horns, and guitar amps. Audix Corp.; tel. (503) 692-4426; fax (503) 692-4658.



## ▲ WALKABOUT PERCUSSION SYSTEMS

Walkabout Percussion Systems introduced the Walkabout (Model A \$4,250; Model B \$3,500), a portable electronic percussion system. The Model A version of the wireless, battery-powered instrument mounts a set of twelve trigger pads and an overhead 3-segment

bar trigger (for cymbals) on a large, aluminum-frame, strap-on harness. In addition, triggers are mounted in the heels of a pair of shoes. (You can order pre-wired shoes, or you can send a pair of shoes to Walkabout for trigger installation.) The system includes a Roland PM-16 trigger-to-MIDI converter and a Nady MIDILink and 101GT wireless MIDI system, which are mounted on the frame. Two battery packs are included. The Model B is identical to the Model A, but lacks the overhead 3-segment bar trigger. The Walkabout is available in six colors. Walkabout Percussion Systems; tel. (310) 306-2701.

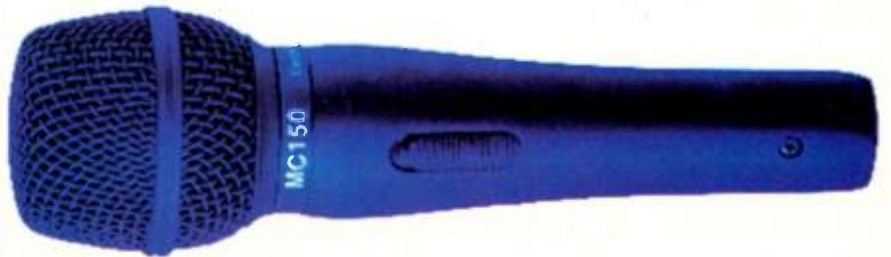
## ZOOM 9001 ►

Zoom Corp. unveiled the 9001 (\$399), a stereo, 16-bit, multi-effects processor that offers twenty effects types, five of which are available simultaneously. The small, wedge-shaped device produces reverb, EQ, flanging, chorusing, vocal-harmony effects, rotary-speaker effects, gating, limiting, and spectral enhancement.

The 40 programmable presets are organized into eight Applications groups: Vocal, Studio, Drums, Acoustic Guitar, Bass, Piano, Keyboard, and



Tone Generator. The stereo inputs can accept signals ranging from mic to -10 dBu line level, and the wet/dry mix level is programmable. Zoom Corp.; tel. (415) 873-5885; fax (415) 873-5887.



## ▲ ELECTRO-VOICE MC150

Electro-Voice debuted the MC100 and MC150 cardioid dynamic microphones (\$70 and \$90, respectively). These low-impedance mics have on/off switches and include a built-in pop filter. The MC150 also has a built-in shock-mount.

The manufacturer specifies close fre-

quency response at 40 Hz to 14 kHz for the MC100 and 30 to 15k Hz for the MC150; the far response specs are 100 Hz to 14 kHz for the MC100 and 90 to 15k for the MC150. The difference in response indicates a noticeable proximity effect. Electro-Voice; tel. (616) 695-6831; fax (616) 695-1304.

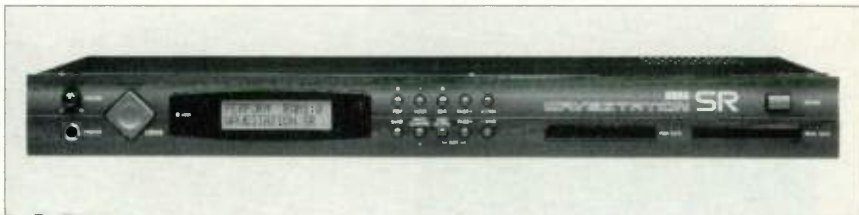




### ▲ ROLAND COMPACT DRUM SYSTEMS

**R**oland's Compact Drum Systems (basic TDB-7 kit \$1,749; expanded TDE-7 kit \$2,595) combine dynamics-sensitive electronic drum pads, foot triggers, and a drum brain with a 16-bit sound source. The TD-7 Percussion Sound Module offers 512 sounds created from 256 drum waveforms, played via the stereo outputs and two independent aux outputs. The module provides nine stereo trigger inputs with trigger-to-MIDI conversion and, when used with a PD-7 pad, can simulate rimshots and cymbal chokes. (For chokes, you simply grab the rim, as with a real cymbal.) An onboard sequencer lets you record and trigger patterns and phrases and can be started and stopped from the pads.

The low-noise, 7.5-inch PD-7 pad has two triggers (the main pad and the rim) and can be used as a snare, tom, cymbal, or hi-hat pad. The KD-7 Kick Trigger works with any common kick pedal. It is dynamics-sensitive and uses a rubber-like cover and an air pocket to protect the trigger mechanism from direct impact. Mix inputs allow two kick triggers to be chained for twin-kick drumming. The FD-7 footpedal simulates acoustic hi-hat open/closed tonal variations, depending on the pedal's position; used with the TD-7 module, it also can send MIDI controller messages. The parts (including the MDS-7 stand) are available separately, or in basic or expanded kits. Roland Corporation; tel. (213) 685-5141; fax (213) 722-0911.



### ▲ KORG WAVESTATION SR

**K**org announced the Wavestation SR (\$1,399), a single-rackspace, 32-voice, 16-part multitimbral, 4-output synth module that has the same Advanced Vector and Wave Sequencing synthesis architecture as earlier Wavestations. (The new unit does not have the Wavestation A/D's analog inputs, however.) All parameters can be edited from the front panel. The SR offers the same 484 PCM-sampled waveforms as the Wavestation EX and A/D, stored in 4 MB of ROM, and the same built-in effects. The new synth supports Korg's new 01/W-compatible PCM card format, which holds four

times the sound data of the old Wavestation card. The synth features 400 ROM-based and 150 RAM-based Performances (split and layered multisounds) selected from the Wavestation sound library and accepts standard Wavestation program cards that provide 50 additional Performances. Each of the Wavestation SR's 32 named Multisets can play a separate Performance on each of sixteen MIDI channels, and each Performance can be individually panned. Unlike earlier Wavestations, the SR recognizes MIDI Pan messages. Korg USA; tel. (516) 333-9100; fax (516) 333-9108.



### ▲ TECH 21 SANSAMP BASS DI

**T**ech 21 has expanded its line of SansAmp tube-amplifier emulators to include the SansAmp Bass DI (\$195). The new SansAmp is an active direct-injection box with tone-shaping circuitry designed specifically for bass-amp emulation. It has adjustable controls for Presence, Drive, Blend, and Level. Connections include a 1/4-inch unbalanced input and parallel output, and a balanced XLR output. The 9V battery-powered unit also has a ground-lift switch and XLR-activation switch. Tech 21, Inc.; tel. (212) 315-1116; fax (212) 315-0825.



### ▲ NADY SYSTEMS NADY 2000 VHF

**N**ady Systems announced its new, top-of-the-line Nady 2000 VHF wireless system (\$1,699). The system's hiss-mute circuitry is designed to maintain the signal's sound quality when the musician moves to the limits of its range. It boasts a 120 dB dynamic range and 110 dB signal-to-noise ratio. The wireless, handheld mic is available with a variety of elements that, once installed in the mic ball, can be changed in the field, without soldering. Stock elements include Shure SM58, Electro-Voice NDYM 257, or Electro-Voice NDYM 757, but Nady will custom-install a mic element of your choice. Nady Systems; tel. (510) 652-2411; fax (510) 652-5075.

## MD vs. DCC

The stage is set for the battle of the century.

By Scott Wilkinson

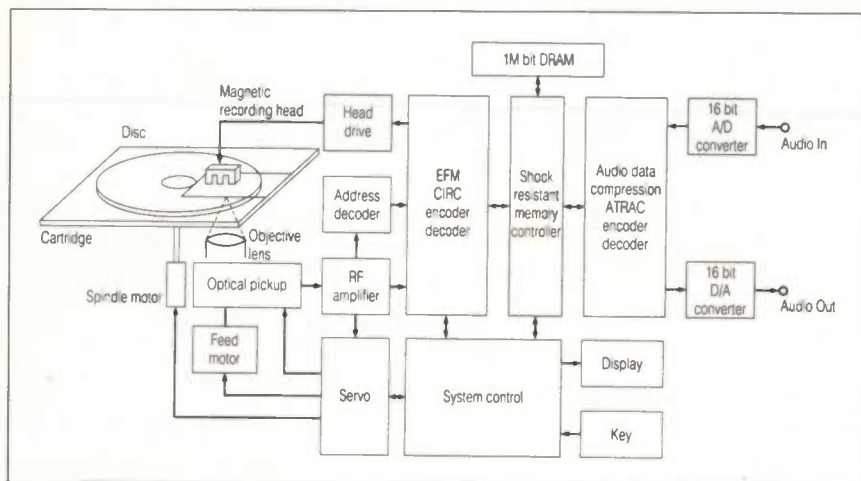


FIG. 1: Block diagram of an MD recorder/player. (Courtesy Sony Corp.)

**L**ike the struggle between doctors and chiropractors, a brouhaha is brewing between the latest contenders in the quest to become the dominant digital audio format for consumers. Sony's MiniDisc

(MD) and Philips' Digital Compact Cassette (DCC) are poised to battle it out for the distinction of replacing the venerable analog cassette as the consumer audio medium of the twenty-first century.

Sony's MD is aimed particularly at the portable and automotive markets. Its small size (2.5 inches in diameter) and rugged casing are only the outward indications of MD's take-along attitude. Within every MD player, a 1-megabit buffer holds enough data to maintain uninterrupted audio output for three seconds, more than enough time for the laser pickup to reposition itself after being jostled.

MDs will be available in two varieties: playback-only and recordable. The playback-only version operates much like CDs: A pickup detects changes in the intensity of the laser light reflected from an interior layer of the disc as small pits in the material pass over the pickup. This means that playback-only MDs can be manufactured in much the

same way as CDs, greatly simplifying the mass production of pre-recorded material.

Recordable MDs rely on magneto-optical (MO) technology. During the recording process, a terbium ferrite cobalt layer within the disc is heated beyond its Curie point of 400°F, and a localized magnetic field that alternates according to the data stream is applied. As the material moves away from the laser and cools, it retains the magnetic orientation of the applied field; areas of different magnetic orientation correspond to the pits in playback-only MDs. During playback, laser light is reflected from areas of different magnetic orientation with different polarization angles, a phenomenon known as the Kerr Effect.

Due to the small size of the MD, it can hold only about one-fifth as much data as a standard CD. As a result, a sophisticated data-compression scheme called Adaptive Transform Acoustic Coding (ATRAC) is used to squeeze

74 minutes of material onto an MD. (For more information about ATRAC, see "The Technology Page" in the September 1991 *EM*.) This scheme analyzes the signal in real time and discards any frequency components below the threshold of human hearing or masked by louder nearby frequencies, resulting in a 5:1 compression ratio. After compression, the signal undergoes "Eight-bit-to-Fourteen-bit Modulation" (EFM) encoding and Cross Interleave Reed-Solomon Code (CIRC) error-correction, as used in conventional CDs (see Fig. 1).

Philips' DCCs take a different approach. Housed in virtually the same casing and duplicated in much the same way as standard analog cassettes, manufacturing is simple. In addition, DCC machines can play analog cassettes, and some might include analog record heads as well.

The data-compression scheme, called Precision Adaptive Sub-band Coding (PASC), is similar to ATRAC, with a compression ratio of about 4:1. Like DAT, Eight-to-Ten Modulation (ETM) encoding is used in conjunction with CIRC error-correction. Like MD, DCC also includes subcode channels for text such as song titles, artists' names, and even lyrics, which can be displayed on a suitably equipped player.

The primary strengths of MD are random access and shock resistance, while DCC offers backward-compatibility with analog cassettes and the endorsement of many major record labels. Preliminary listening tests indicate that the fidelity of both formats is very good despite the use of data compression. However, it is not necessarily equivalent to the CD audio standard. On the downside, SCMS copy protection is included in both specs even though neither format makes a digital clone of the original. It ought to be quite interesting to see how the two formats fare in the consumer marketplace, where dollars rule and technology marches on. ●

# drumKAT™ EZ



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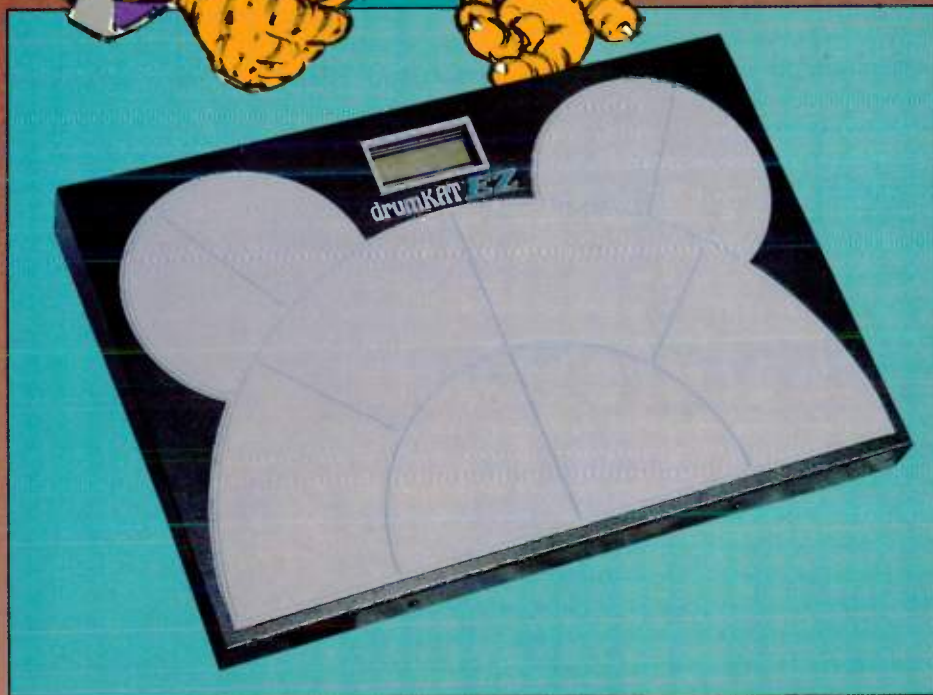
Programmers will enjoy our powerful and intuitive user interface. To suit your individual needs, any of our pre-programmed set ups can be altered and stored. Additionally, you can create and store your own set ups from scratch.

The EZ features multiple note layering, crossfading, switching, as well as expressive breath and foot control inputs. KAT also offers the industry's first position sensitive, multiple note hi-hat control on the EZ for truly expressive playing.

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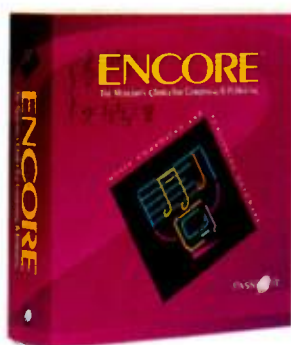


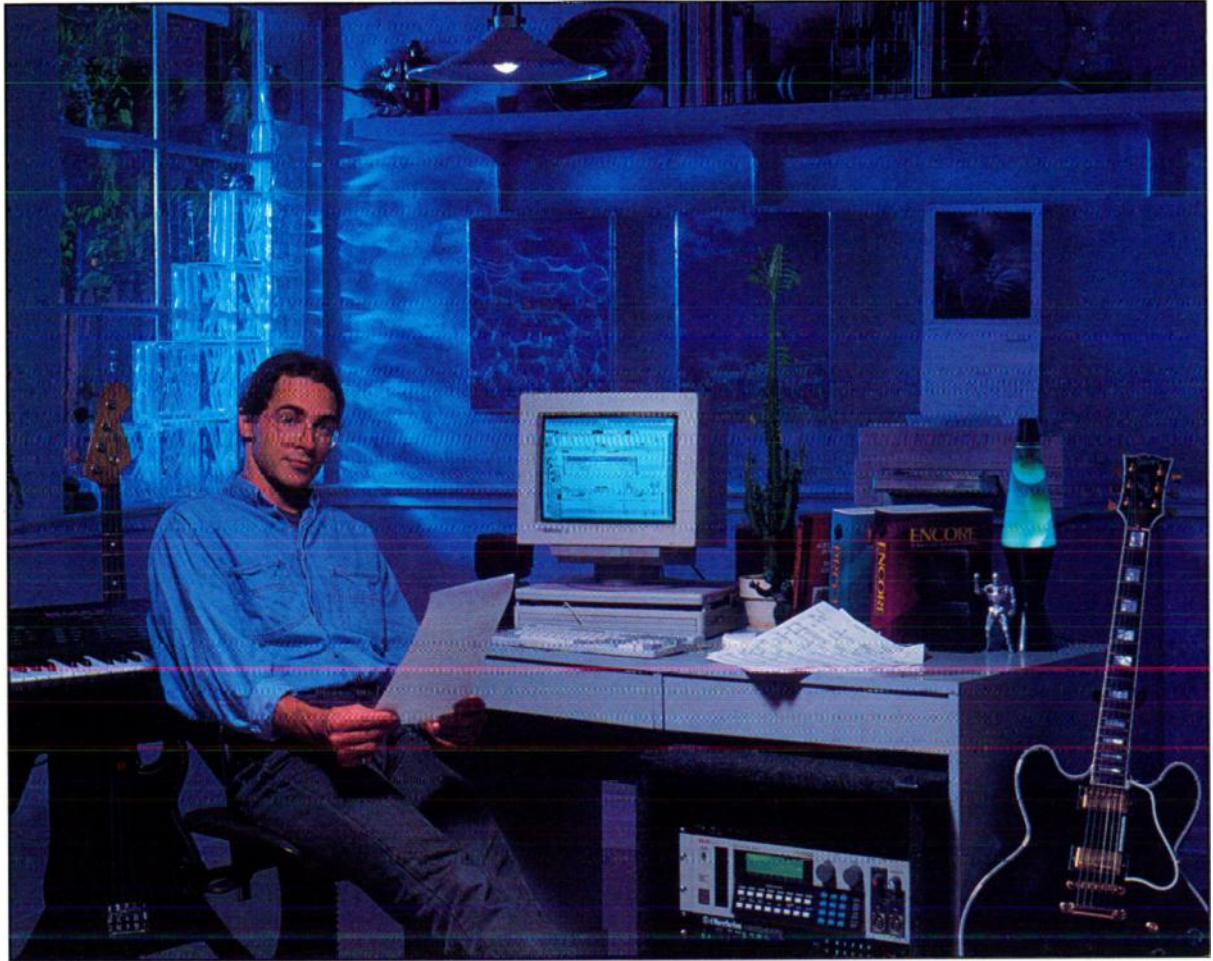
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# The

# MASTER

# TOUCH

Despite my life-long love affair with the piano, for more than two decades I've delighted in applying electronics to my sound. A few years ago, the inevitable day arrived when I was fed up with 5-octave keyboards, unweighted synth actions (or bulky dinosaur synths with weighted actions), single MIDI Out ports, and the limited MIDI control of most electronic keyboards. I needed a relatively portable keyboard with an 88-key, weighted action and lots of MIDI control.

My solution was a dedicated master controller—a MIDI keyboard without a built-in sound module, dedicated to control functions—with multiple MIDI Outs to handle live performance setups. (I still use MIDI patch bay/processors, though.)

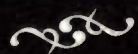
The MIDI master-keyboard market is evolving rapidly. Because some of the units discussed in **EM** as recently as a year ago are no longer available, the chart on pp. 34-35 only includes products that are shipping in the U.S. as of November 1, 1992.

## EVERYBODY'S DOING IT

Some features are common to most of the current master keyboards, so these features are not covered in the chart. Every master keyboard offers Velocity sensitivity, and almost all offer Aftertouch. In my opinion, if you don't get both, you should forget the master keyboard.

A few keyboards offer Release Velocity, a separate Velocity message based on the speed with which you release a key. Of course, this feature only matters if your sound sources understand Release Velocity, so check your MIDI

**EM**  
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By Steve Oppenheimer

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# OPCODE SYSTEMS

## ● BUYER'S GUIDE



The lightweight Roland AX-1 has an Aftertouch/Modulation controller (beneath the pitch-bend ribbon) that is triggered when you pull it down.

Aftertouch.) Most controllers let you turn Aftertouch on and off in each zone, which lets you use Channel Aftertouch without triggering it in all zones. Some controllers also let you program the Aftertouch sensor to send any MIDI Controller message.

### ZONES

Some MIDI keyboards only permit adjacent, non-overlapping keyboard zones. With this scheme, you only select the top note of each zone; zone 2 starts one key above the top key in zone 1. This approach is less desirable because it does not permit zones to overlap, so it's more difficult to layer sounds that are on different MIDI channels. Most controllers allow you to create several completely independent keyboard zones by defining top and bottom notes so you can create as many splits and layers as you have zones.

### INDEPENDENT MIDI OUTS

Except for strap-on controllers, all MIDI master keyboards supply at least two MIDI Out ports. In most cases, the Outs are independent. Usually you can assign any combination of keyboard zones to any MIDI Out, and sometimes you can send the same zones to several Outs. If you have four or more zones and four independent MIDI Outs, you can send up to 64 MIDI channels. Thus, you don't need a Thru box or patch bay to control several multitimbral modules. This is one of the primary advantages of a master keyboard, as most synth keyboards only have one MIDI Out.

### MIDI IN

There are three principle reasons to have one or more MIDI In ports on a master controller. First, it allows you to save and load the controller's



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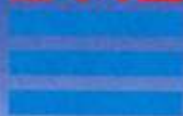


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● BUYER'S GUIDE

onboard memory, using System Exclusive, to an outside storage medium such as a computer. If you have a universal editor/librarian with a programming language, or you know how to use Opcode's *MAX* or Dr. T's *Interactor*, you can take advantage of the controller's SysEx support to program a custom editor/librarian for controller patches.

Second, a few controllers, such as Roland's A-50 and A-80, possess a small amount of RAM so you can load and store SysEx data (e.g., synth patches) onboard the controller. With a single controller command, you can reprogram a modest MIDI setup.

Most important, many controllers merge the data routed to MIDI Ins with the controller's data, which allows you to route sequencer playback through the controller's MIDI Outs and on to your sound modules. It also lets you use your keyboard controller's processing and routing functions to control your rig from external controllers such as strap-on keyboards, MIDI fader boxes (such as the JLCopier Fader-Master), as well as alternative controllers such as Buchla's Thunder and Lightning.

**PROGRAMMABLE SLIDERS**

Sliders have several primary functions on a MIDI controller, and they usually can be programmed to send a variety of MIDI messages. For instance, they can serve as a set of mixer-type faders to set volume levels (Controller 7) on synths. Volume sliders could serve as organ-like MIDI "drawbars" that control the component timbres in a layered sound.

If you want to change a parameter such as reverb decay on an effects processor, or LFO speed on a synth, and you want the values to remain visibly stable until you're ready to change them again, a slider is hard to beat. In many cases, you can program a slider to act as a data-entry device for your MIDI devices, which is great if you hate pressing increment/decrement buttons to scroll through synth parameter values.

**PROGRAMMABLE FOOTPEDALS**

If you have your hands full of keys, the last thing you want to do is reach for sliders and mod wheels. A common alternative is to use one or more continuous footpedals. The most common use of footpedals is to control volume



Introduced in 1984, the Yamaha KX88 is the archetype 88-key weighted master keyboards. It survives because of its popular action.

(e.g., for overall level control or cross-fading), but they're great for sweeping a filter or rapidly incrementing

through parameter values such as delay time. Therefore, it's handy to have two or more footpedal inputs.

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● BUYER'S GUIDE



Peavey's C8 is built into a wooden cabinet for use in home studios, churches, and other installations.

customize keyboard Velocity output for each synth sound. For instance, the Velocity curve and sensitivity/offset can make a big difference if a sound exhibits distinctive timbral variations in response to Velocity, or you have programmed a Velocity switch or crossfade between sounds.

**DISPLAY**

Whether you're programming your master controller at home or making

fast changes on the gig, ease of use equals ease of mind. A large LCD that supports graphics for viewing Velocity curves and keyboard zones makes life sweeter. A small LED that only shows programs, parameters, and values as numbers and cryptic symbols can be a bitter draught. Don't say that I didn't warn you.

**WHEN THE MASTER SERVES**

The *raison d'être* of a MIDI master

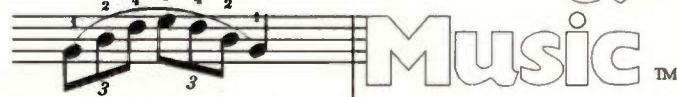
keyboard is to provide central command of your setup with maximum playing enjoyment. As noted earlier, the most important feature is personal and subjective: If you don't like the feel of a master keyboard, don't buy it.

On the other hand, the degree of central control you can achieve with a particular master keyboard depends on quantifiable features. (Of course, if you have a powerful MIDI patch bay/processor, you can compensate for some controller shortcomings.) Programmable sliders, footpedals, footswitches, and modulation wheels can serve complementary purposes and are not necessarily redundant.

With the aid of our buyer's guide chart, you should be in a position to narrow your choices. Then you can search the remaining paths through reviews and hands-on playing tests. The right choice can bring you a giant leap closer to the electronic musician's nirvana.

*EM* products editor **Steve O.** is a keyboard polygamist.

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# Tiny Wunderboxes Descend Into Hands Of Astonished Musicians

**"I Knew I deserved a miracle, but three is beyond Belief!"**

By Mickey O'Callahan

Special Correspondent

Politicians, military, noted scientists, even special plainclothesmen

to

T. arrival digital has the community artists, keyboardists, vocalists and other music abuzz.

The first astonish the appearance of the es," as the press is ca that never before have heard such powers of exp such compact packages, with to match. And wh represents a first own a high-qu processor, many plenty of use for friends.

Equally astonish manner in which appeared — experts that such technology and size was years of from the pre

sent! Yet here we are, in the present. and musicians the world over are ming in with these most ch also provide nee as to the ight of their ee new family. is some as well as ersal and live rmance; another nized for elec acoustic ge the third "dra

**Scientists Baffled by Expressive Quality of Flying Wedge 16-bit Stereo Boxes: "Whoever built these little things obviously knows something the rest of us don't."**

While musicians rejoice the unexpected arrival of these digital processors, members of the world's scientific community are scratching their heads. How can such such tiny parcels produce such expressive tone?

According to Dr. Niels Hartvig-Nielsen, of the Institute of Advanced Intelligence in Ludevisk, Finland: "First we were impressed by the efficient industrial design. Then we plugged in. What we heard was beyond the realm of understanding."

and others most perplexed is sive "expressive" to these is that unable



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## FIRST SIGHTINGS OCCUR ON MERE COINCIDENCE — OR IS THE REAPPEARANCE OF ELVIS' DEATH! A MESSAGE?

Those who remember Elvis Presley fondly tend to dismiss accounts of his recent sightings. But even the most skeptical among us would find it hard to dismiss the miraculous appearance of three different and mysterious boxes — on the occasion of his demise! Chris Albi and Neil Hamilton, long-time bodyguards for the singer, are featured in the new, highly anticipated biography "Viva Las Elvis," which details the electronic wonders. "I can still hear him saying 'I'm not dead,'" says Albi, who is "temporarily" in Mexico. Hamilton, a motorcycle

**WUNDERBOX? PURE UFOs?**  
Rich Schmarco of... Germany, points toward he sighted the first wonderbox, which "zoomed into my hand. It seemed friendly enough, so I just dropped it right in. Never in all of my days have I or my neighbors in Wolfsnarf heard such beautiful sounds."

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# WINDOWS SHOOTOUT

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**Five contenders battle for  
supremacy in the world of  
Windows-based sequencers.**



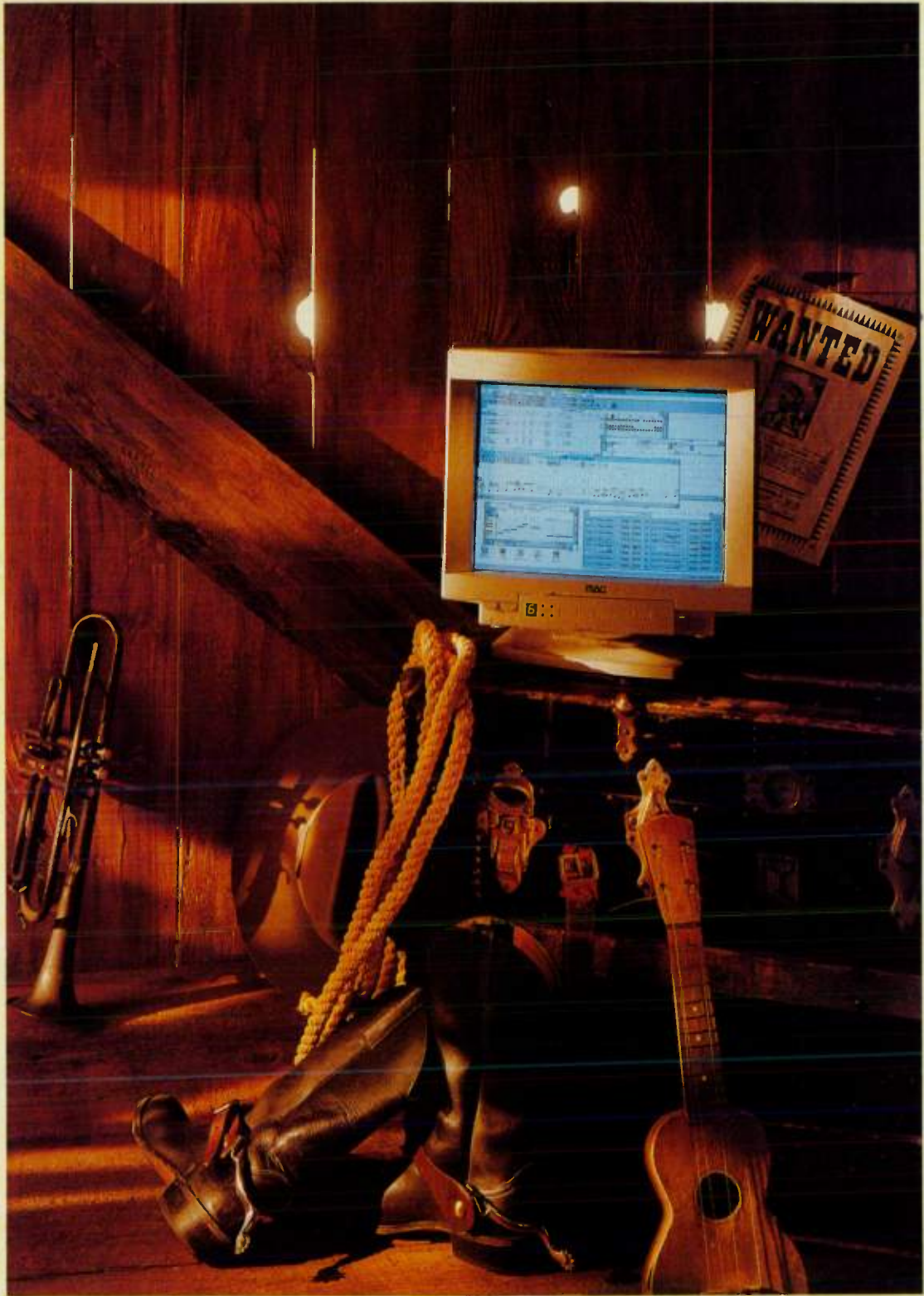
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**A**s a creative PC user, you've probably been enjoying the many benefits of Microsoft's *Windows* 3.1 operating system for some time. If you've looked for music software, though, you know there hasn't been much from which to choose. But the introduction of four new *Windows*-based sequencers and the recent release of yet another dramatically improve the situation.

If you haven't made the move to *Windows*, you may be wondering what the benefits to music-software

users really are. First, the standard *Windows* interface is a pleasure to use. Features such as drop-down menus, mouse support, consistent file management, and, most important, the graphical user interface serve to make sequencing an efficient undertaking. In addition, the ability to customize the appearance of the screen and, in most cases, view multiple windows simultaneously streamlines many editing operations and broadens your overview of the task at hand. Finally, by taking advantage of *Windows*'

**By Dennis Miller**



Photography by Stan Musilek

# WINDOWS SHOOTOUT

memory-management capabilities, you can work with much larger files and have more than one application running at once. With the right drivers, switching between a sequencer and a notation program is no problem.

The *Windows* environment has enabled music-software developers to add new features to their programs, including graphic editing and standard music notation. It also has lessened their worries about hardware compatibility, because *Windows* handles communication with your MIDI interface directly. In other words, any *Windows*-compatible hardware theoretically should work with any *Windows* software.

The current contenders for supremacy among *Windows*-based sequencers are *Cakewalk* from Twelve Tone Systems, *Master Tracks Pro* from Passport Designs, *Cadenza* by Big Noise Software,

and *Midisoft Studio* from Midisoft Corporation. I also took an advance look at a beta version of *Cubase for Windows* from Steinberg (see sidebar). All of these programs are new versions of programs that began life elsewhere, either under MS-DOS or on the Atari ST. Each has much in common with its predecessor; if you've used any of the original programs, you'll be surprised at how many functions and commands in the new version are familiar.

As I discovered, each is also a work in progress. I received at least one upgrade from each manufacturer during the review process. This doesn't mean they are unstable or buggy, but simply that they are evolving into even more sophisticated and robust tools. As a user, you have to pick a program that feels right for you now and trust that each company will add any features or options you feel are missing.

Just as DOS-based sequencers shared many common features, so do *Windows* programs. But as with any category of software, you can expect a great deal of variety in the way the programs

implement various features. What follows is a general overview of the different types of functions each program provides, then a more detailed look at each package. If you want to dig deeper, contact the companies to get demo versions.

## PLAYBACK OPTIONS

While tape recorder-style "transport" controls are a feature of all four programs, there are variations on the basic playback options. For example, Auto Rewind is standard on all four programs, but *Cadenza* and *Cakewalk* also have an Auto Shuttle feature that allows repeated playback between set start and end times. *Studio* provides a unique Step Play feature that progresses through a sequence one note at a time. (It arpeggiates chords, rather than playing the pitches simultaneously.) *Master Tracks Pro* has a sophisticated Remote Control screen that allows you to operate all of the transport controls and determine the step-record durations (in addition to pitch) from your MIDI keyboard.

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Looping also is a standard feature. *Cadenza* and *Master Tracks Pro* loop complete tracks only, with no way to set the number of repetitions. *Cakewalk* adds a selectable number of repetitions, and *Studio* allows you to choose a Destination Range and a Loop Type. The Destination Range setting determines whether a user-defined group of measures loops throughout the entire sequence or for a specified number of repetitions. The Loop Type can be either the conventional Virtual Loop, where the music simply repeats throughout the specified range, or Expanded Out, where data is actually copied and pasted numerous times to fill the range.

### RECORDING OPTIONS

All the programs have sophisticated recording options. *Cakewalk*, *Master Tracks Pro*, and *Midisoft Studio* have multitrack record modes that split incoming multi-channel data into separate tracks. *Cadenza*, *Cakewalk*, and *Studio* allow you to record multiple channels of data onto a single track and split the

data by channel after recording.

Overdubbing is an option with all the programs except *Master Tracks Pro*, though in *Master Tracks Pro* you can easily merge two tracks that were recorded separately. All four programs have automated punch in/out capabilities, and record filters to keep certain types of data from being recorded. After recording, *Cakewalk* and *Cadenza* automatically prompt you to save or discard your take, while *Studio* automatically advances to the next available track for successive recordings.

Because it also displays music as standard notation, *Studio* can split incoming recorded data into bass and treble staves, a feature that *Cakewalk* provides only after recording. *Master Tracks Pro*, *Cadenza*, and *Cakewalk* record System Exclusive messages, but *Cadenza* treats SysEx data like any other data: It simply records SysEx in real time onto a regular track. Step-time recording, in one form or another, is available in each of the programs, with *Cakewalk* providing a handy "Pattern" option that allows the user to create a repeating

rhythmic pattern of up to 64 steps.

### EDIT VIEWS

Of the programs I examined, *Master Tracks Pro*, *Cadenza*, and *Cakewalk* provide the most ways to view music data. Each has a multiple-track, measure-by-measure view, plus a single-track "piano-roll" or "note" view. All four programs also have a MIDI event list, though only *Cakewalk* can merge data from multiple tracks into a single list; the other programs display one track per window at a time. *Cakewalk* and *Studio* also display standard music notation. There's a maximum of ten staves in *Cakewalk*, and no limit other than available RAM in *Studio*. The latter program assigns each track to a staff by default. In both programs, only note information is shown.

A wide assortment of editing options is available in these programs, ranging from simple to esoteric functions. All the programs offer basics such as cut, copy, paste, transpose, and quantize. But beyond that, things vary quite a bit. For example, with *Master Tracks Pro*

## CUBASE FOR WINDOWS

In addition to the four programs covered in the main article, I took a look at a beta version of Steinberg's *Cubase for Windows*, a recent entry in the IBM-compatible world. Currently running on the Mac and the Atari, *Cubase* is a powerful program, though the learning curve is steeper than most programs I've seen. (*Cubase for Windows* is now shipping, and is available for \$299 from Steinberg/Jones. Unfortunately, I received a copy of the shipping version too late for evaluation.)

*Cubase* uses a slightly different working model than the other programs reviewed here. Its primary structural unit is called a Part; by moving, copying, grouping, or deleting Parts, you build tracks (see Fig. A). Up to 64 tracks can be contained in an Arrangement, and sixteen Arrangements can be used to form a Song, the highest level of organization. There's a phenomenal amount of flexibility in the design, assuming you aren't overwhelmed by the whole process.

At the heart of the program are

*Cubase's* edit functions, a massive list of commands that give you tremendous control over your music. *Cubase* appears especially well-suited for rhythm processing; for example, it provides six different types of quantization. Perhaps the most distinctive of these is Groove quantization, where you build a note map (or use one of those provided) that serves as the quantization reference for a selected range of notes. It's a straightforward process, and if you don't like the results

there's an Undo command to get you back to square one.

Another major editing area is the Logical Edit window. Here you can process data using preset criteria or by designing your own rules. Logical edits work somewhat like the edit filters found elsewhere, but rather than just choosing the type of events that will be edited, the actual editing functions also are defined here. There are numerous options for transforming data ranging from simple addition and subtraction to complex mathematical formulae. There's even a list of 21 different musical scales to which you can map your material.

*Cubase* has a number of other useful options, such as support for Foster's proprietary, SysEx-based tape-machine control; color-coded data types in the edit windows; and a versatile zoom feature that lets you view from one to over 200 measures on a single screen. The program clearly raises the stakes for IBM sequencing and should have a major impact.

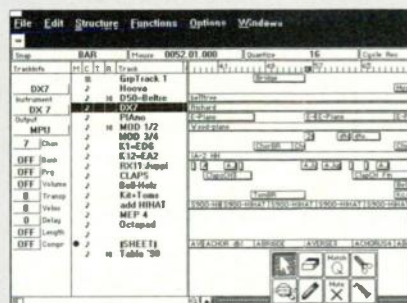


FIG. A: The main screen of Steinberg's *Cubase for Windows*, showing Parts arranged on separate tracks.

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and *Cadenza*, you can "humanize" a passage by subtly randomizing note start times (a similar feature is found in *Cakewalk's* CAL extensions), while *Studio* has a unique feature that allows you to separate all pitches in a single track into independent tracks. *Cakewalk* and *Cadenza* also have a Retrograde option.

*Cadenza*, *Master Tracks Pro*, and *Cakewalk* take advantage of *Windows'* graphic capabilities by providing sophisticated graphic editing of MIDI data. *Cadenza* and *Master Tracks Pro* use dedicated windows for controllers such as Pitch Bend and Aftertouch, while *Cakewalk* provides generic editing windows for any controllers. Using the mouse, it's easy to create broad, sweeping strokes or fine, detailed gestures. Once data is entered, each program also provides numerous ways to edit the information. All but *Studio* also offer versatile edit filters that allow you to determine exactly what type of data will be affected by an edit command, giving you precise control over your music.

"Drag-and-drop" is a hot new buzzword with *Windows 3.1*, but only *Cakewalk* has true drag-and-drop capabilities. You can highlight a range of measures in the Track screen, then drag with the mouse and drop them to a new location, or Control-drag to copy and move the measures. While similar effects can be achieved by cutting and pasting, I hope the other manufacturers will implement approaches as easy to use as *Cakewalk's*.

Before moving into the product-specific descriptions, check out the chart on pp. 46 to 47 for additional comparisons between the programs.

## MIDISOFT STUDIO

First up for a detailed look is *Midisoft Studio*, an entry-level program that should appeal to amateur or semi-professional musicians. Though it doesn't have the full feature set of the other sequencers,

*Studio* offers a well-rounded group of functions and even a few special items that none of the other programs share.

*Studio's* greatest strength is its ability to quickly transcribe sequencer files or real-time recording data into standard music notation. Though only pitch data is transcribed, this is a useful tool for creating lead sheets and small arrangements. *Studio* installs easily and loads to a Studio Panel View that displays numerous track parameters, including name, play status, MIDI port and channel, and Velocity scaling (see Fig. 1). At the bottom of the screen is a movable, resizable window containing the transport controls, and along the top is *Studio's* main menu line. Most of the choices in each menu also can be accessed by keyboard shortcuts, and you can save your screen layout once things are properly arranged.

*Studio's* two main work areas are the Score View and MIDI List View (see Fig. 2). The Score View displays any number of tracks in standard notation, up to the limits of your system's RAM. At 800 × 600 resolution, I could display eight staves by four measures on a single

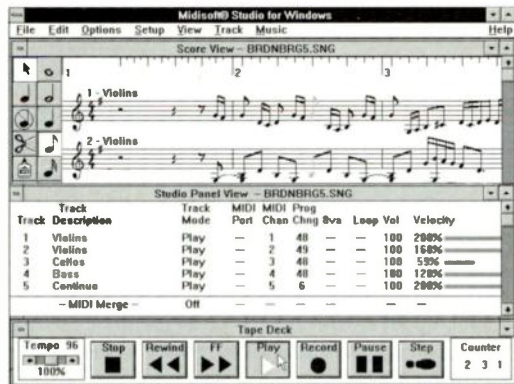


FIG. 1: The main screen of *Midisoft Studio*, showing the Studio Panel View and transport controls.

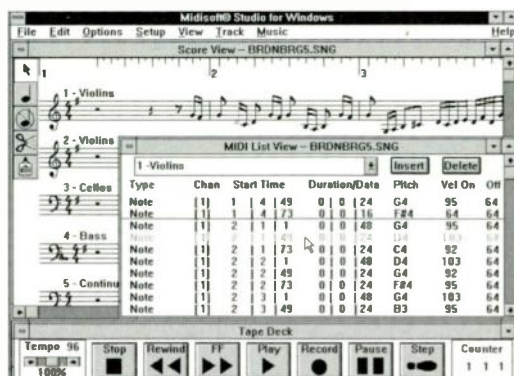
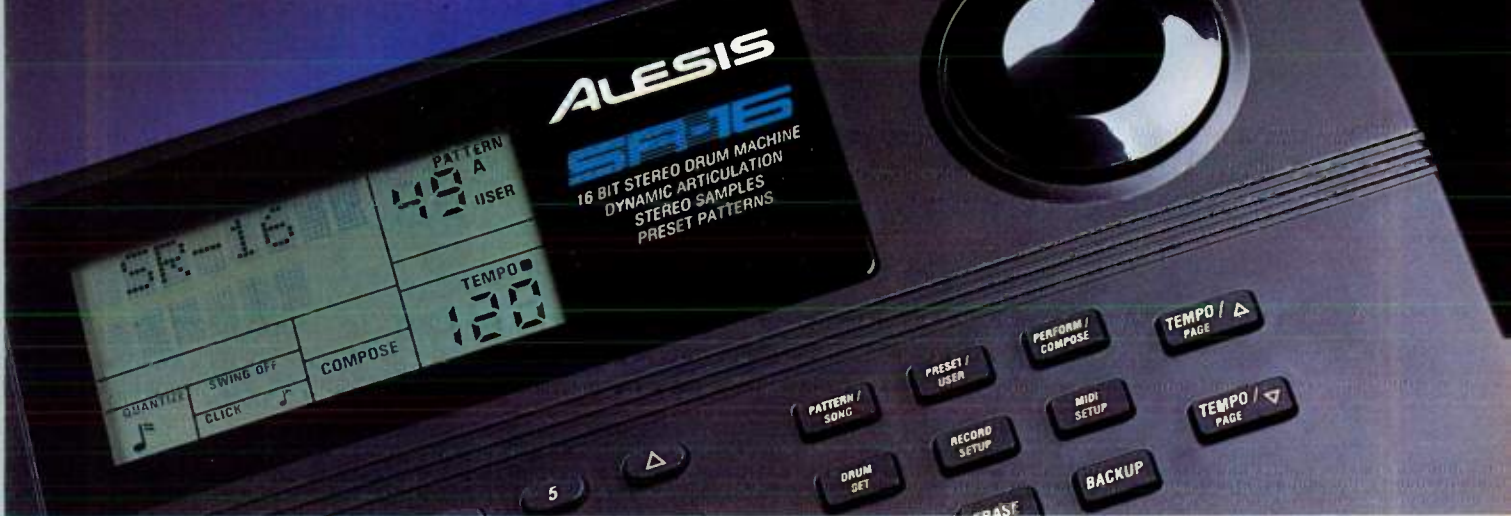


FIG. 2: *Studio* shows MIDI data both in standard notation and as an event list.

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# WINDOWS SHOOTOUT

screen. The program's music font won't win any prizes, but it's adequate. There's no way to adjust the layout of the Score View—you can't move or resize staves—but seeing your music notated is appealing and useful. The program also will print your score and provides you with several

basic page-layout options.

There's a small tool set you can use within the Score View that includes a highlight tool, insert and delete tools, and more. Other types of editing must be done from the Edit menu. These include Splice Pasting, which inserts data at a given point rather than overwriting what's already there. To help position notes, a ruler with sixteenth-note increments appears at the top of the screen. (A forthcoming version will have user-selectable view settings.) If you have a note value selected for inser-

tion, a vertical guideline shows the current cursor position.

As with most integrated sequencing and notation programs, certain trade-offs must be made when displaying note data. *Studio* chooses to abandon certain notation conventions in order to keep the underlying MIDI data intact. Unfortunately, the manual doesn't provide many details on note entry, so you'll have to experiment a bit to get the hang of it.

*Studio* has a unique approach to scrolling, highlighting every successive note as it plays back. This has the advantage of showing you exactly what pitch is sounding at any moment, but it also can be a problem: If a long string of notes is sounding on tracks not currently onscreen, it's easy to lose your place.

The event list is a standard listing of every type of event that can appear in

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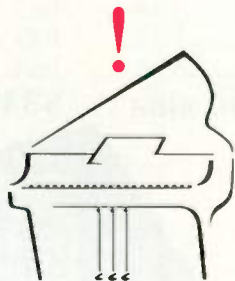
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a track. To increment a value, simply click on it with the right mouse button; to decrement, use the left button. *Studio* uses the standard *Windows* convention allowing you to highlight non-contiguous events, but you can't simply click and drag with the mouse to highlight a large region; you must select events one at a time. Overall, editing operations are consistent. For example, changes made in the event list are reflected immediately in the score. I found one thing rather annoying, however: When you highlight a range of notes in the Score view or the event list, then pull down the Music menu to perform an edit, the highlighted range does not appear as the default start and end points. You have to re-define the region you wish to work on.

*Studio* clearly is headed in the right direction in its attempt to appeal to the mainstream customer who enjoys seeing music notated. While it probably won't be adequate for the serious musician, it's a fast program that's easy to navigate and, with some exceptions, easy to use. The manufacturer claims that several of the problem areas noted here will be improved in the forthcoming version 3.1, which will be sent to users at no charge.

### CAKEWALK PROFESSIONAL FOR WINDOWS

*Cakewalk* for MS-DOS has been one of the top-selling IBM sequencers for many years, and the new *Windows* version was among the most eagerly awaited *Windows* music programs. The program retains many of its DOS-version functions—previous users will recognize the event filter, From/Thru markers, and the options in the Track menu—but there are lots of new features, including a completely redesigned front end. Like the other programs, *Cakewalk* offers numerous

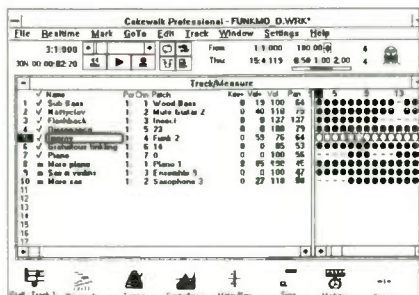


FIG. 3: The main screen of *Cakewalk*, showing track parameters on the left and a track/measure overview on the right.

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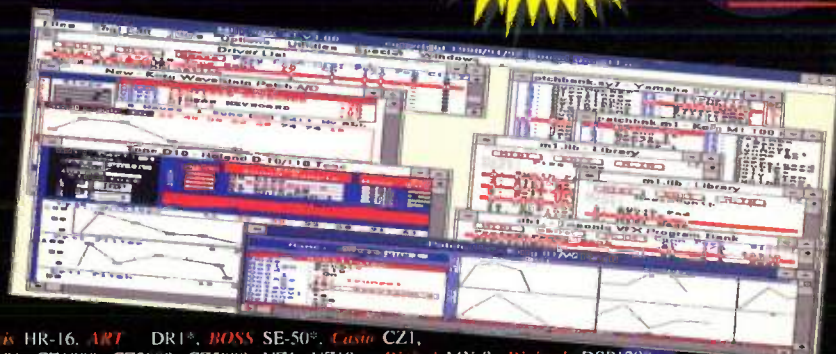
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Support for all listed instruments is included with MIDI QUEST. Support as of November 1, 1992. \* = Librarian/Bank Editor only

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# WINDOWS SEQUENCERS

Product/Version	Tracks	Total Channels	MIDI File Types (Import/Export)	Maximum Clock Resolution	External Sync Options
Master Tracks Pro 4.5	64	32	0,1/0,1	240	MC,SP,MTC
Cakewalk for Windows 1.0	256	256	0,1/1	480	MC,SP,MTC
Cadenza for Windows 1.0	64	256	0,1/1	480	MC,SP,MTC
Midisoft Studio 3.04	RAM-limited >1,000	416	0,1/1	96	MC,SP

views of your data, but it's the only program besides *Studio* in which the event list scrolls during playback.

*Cakewalk's* opening screen consists of an adjustable window that displays track parameters to the left and a track/measure overview on the right (see Fig. 3). At the top of the opening screen are the transport controls and numerous other icons, including those

for step-recording and for setting the current position in a sequence. There also are shortcut buttons for looping, punch-in, and the like. Beneath the icons is a handy message line that displays tips or reminders about the operation of the program while you're working. Because the positions of many icons are adjustable, it's easy to keep the screen free of clutter.

In addition to the previously mentioned drag-and-drop capabilities, *Cakewalk* offers many other unique conveniences. For example, the File/Open menu displays the last four files you worked on, an Auto-Save option backs up your work after a selectable time period, and an Auto-Activate option lets you select any onscreen window simply by moving the mouse into it

## The Ultra Effect Affect:



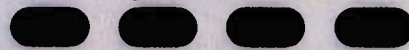
midl  
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20/20

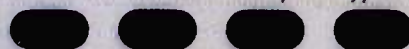
studio effects



play global store exec



edit add/del comp bypass



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is your catalyst for creativity in both the performing and recording environment. There are 21 basic effects such as EQ, Reverb, Chorus, Delay, Distortion, etc., which are totally independent of each other and may be combined in any order. These effects represent the sound cornerstones of the SDR 20/20's amazing possibilities. The innovative capabilities of this processor call for visualization more than explanation. For example, up to eight effects can be strung together in an "effect block" and each may be independently mixed and its level separately adjusted, with the final mix assignable to the preset of your choice. 128 permanent factory presets and 128 duplicate presets which may be altered, changed completely, or saved, give you endless possibilities in creating your own custom sound effects.

In addition to these numerous effects possibilities, the SDR 20/20 offers the ability to focus all processing power to a single "Ultra" effect. An example of this Ultra

Editing Views	Graphic Faders	Graphic Controller Editing	Real-Time Editing	SysEx Editing	Price	Demo
---------------	----------------	----------------------------	-------------------	---------------	-------	------

event list, piano roll, measure, measure view	yes (volume only)	yes	yes	send/receive only	\$395	yes
event list, piano roll, measure, measure view, notation	yes	yes	no	yes	\$349	yes
event list, piano roll, measure measure view	yes	yes	no	yes	\$299	yes
event list, notation	no	no	no	no	\$249	no

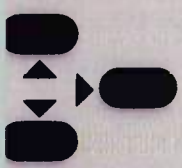
without clicking. I particularly like the ability to edit many parameters on the screen without using dialog boxes. To change a track's play status, for example, simply click on the Status column, and the setting toggles between Play and Mute. Overall, *Cakewalk* is one of the easiest programs to operate that I have seen.

*Cakewalk's* graphic-editing windows

provide tools for drawing, highlighting, or erasing data, but all other editing requires using the pull-down menus. Because the highlighting tool selects all types of data within the defined region, you'll need to use the edit filter if you want to alter only the controller information being displayed; otherwise, every event in the region will be altered.

The event list is a standard view of multiple tracks of events in text format, but it has a few twists. Banks of System Exclusive data, recorded and saved using *Cakewalk's* SysEx librarian, can be sent during playback. Furthermore, in true multimedia fashion, *Cakewalk* can trigger .WAV-format digital audio files if you have an appropriate audio sound card installed. While this

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effect is the "Ultra Reverb" currently included in the palette of selectable effects. With software upgradeability the SDR 20/20 can be customized to meet future studio requirements.

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# WINDOWS SHOOTOUT

option doesn't begin to match the capabilities of an integrated program such as *StudioVision* on the Mac, it's a major first step for the IBM music world.

*Cakewalk* provides up to ten staves of music in its standard notation view (Fig. 4). Though it's not selectable, the default music font is clear and easy to read. The notation-editing features are useful but limited in this release: You can move, insert, or delete notes directly onscreen, or call up a dialog box that adds other parameters such as duration and velocity. Two handy options alter the way music is displayed: Fill extends notes to the next beat or next note, and Trim shortens notes that extend just beyond the next starting note. These two options clean up the appearance of your music without changing the underlying MIDI data used for playback.

Perhaps the most unique feature in

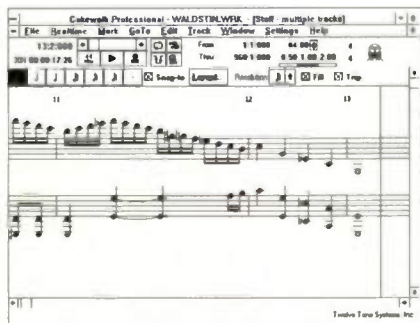


FIG. 4: *Cakewalk* is capable of showing up to ten staves of standard music notation.

*Cakewalk* is the Cakewalk Application Language (CAL), a built-in event-processing language that allows the user to extend the program's feature set. Using CAL, you work with C language-style statements, operators, and functions to create your own editing commands. Once written, these commands can be stored on disk and recalled at any time from the CAL submenu. Even if you've never done any programming, you'll find the examples are clear and easy to modify. An extensive section in the manual should answer any questions that arise.

## MASTER TRACKS PRO

Originally released in 1989, *Master Tracks Pro* is the granddaddy of Windows sequencers, but the recently released version 4.5 has no shortage of up-to-date features. *Master Tracks Pro* is unique in allowing you to enter most types of data even while the program is running. Click on the Play command, then open a Step Edit window and click anywhere to add new notes while the sequence is playing. Or double-click on a note and change its

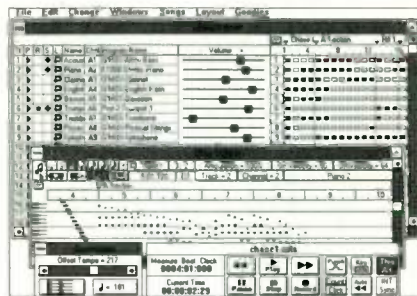


FIG. 5: *Master Tracks Pro's* main screen, showing track parameters, volume faders, and a measure overview.

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# WINDOWS SHOOTOUT

parameters. All of *Master Tracks Pro's* major windows can be accessed with function keys, a real time-saver if you need to continually switch between views.

*Master Tracks Pro's* opening Track Editor screen has two panels: On the left are columns that display information about individual tracks, and on the right is a measure-by-measure

overview of your data (see Fig. 5). Several of the column headings can be expanded or contracted to show more, or less, detail about a particular parameter, providing a convenient way to customize the appearance of your screen. If you click on Track (the first column heading), all track parameters disappear and the measure view expands to fill the entire screen. *Master Tracks Pro* also provides volume faders in the Track Editor that can be used to automate levels during playback. Normally, a single track can contain data from several channels, but if you use the faders you'll need to assign

## BROKEN WINDOWS

Although *Windows 3.1* can be beautiful, beware of hidden cracks. Moving to *Windows 3.1* can be problematic, as it often requires simultaneously investing in a faster computer and upgrading to *Windows*-compatible applications. For example, when I installed *Windows 3.1* on a new 80486-based PC and tried to install the five sequencers evaluated in this article, I had some unpleasant surprises. Listen to my tale of woe, and avoid a similar experience.

Item 1: My computer's SCSI-drive controller card was hardwired to base address 330, the address most MIDI interfaces use. My interface had jumpers allowing me to change its address, but 330 was the only option the MIDI card shared with *Windows'* MIDI-driver setup menu, so I had to use it. A new ROM chip on the card provided the solution.

Item 2: I ordered my computer with a *Windows* accelerator video card that should have provided exceptionally good performance. When I tried to install the *Windows* drivers bundled with the card, I noticed they were written for an older version of *Windows* and were not compatible with *Windows 3.1*. As a result, I had to use the generic Super VGA drivers supplied with *Windows*, which resulted in far less than optimal video performance.

Item 3: I installed all five sequencers onto my hard disk and began to run them through their

paces. Before long, I started getting frequent General Protection Fault errors from *Windows*, which usually means a program is trying to read or write data outside its allocated area. Whose fault is that? The programmer who wrote the software. To be fair, *Windows* development is complicated, and high-quality diagnostic tools have only recently become available. I get the same type of errors in other *Windows* applications, especially word processors.

I learned some valuable lessons from this experience. First, try to buy all your components at the same time from the same manufacturer. Be sure your system-maker is an established company, and if possible, talk to people using the same equipment. When you're set up, try to avoid running music software in *Windows'* Enhanced mode. Enhanced mode puts an additional burden on your system and buys you little or nothing.

If you run into trouble, check and attempt to change both your MIDI hardware's interrupt and base address. These are the first two areas anyone should investigate when things get flaky. In addition, check the recent issues of various PC computer magazines; several have ongoing columns about successfully configuring *Windows*. Finally, relax; such problems plague any type of computer when you install a major operating-system upgrade.

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# WINDOWS SHOOTOUT

a discrete channel to the track.

*Master Tracks Pro's* Step Editor screen is very versatile when selecting notes to edit, because you can define a region vertically as well as horizontally (see Fig. 6). For example, if you want to quantize all notes between C3 and C4 in measures 3 through 7, click and drag with the mouse to highlight those pitches, then pull down the Change menu to perform the edit. Though you could perform the same operation using *Master Tracks Pro's* Change filter, there's nothing easier than sweeping with the mouse to select the appropriate notes. There are other options as well: To select all notes within a region, Shift-drag with the mouse; to use complete measure boundaries as your range, click and drag in the Measure Ruler that appears at the top of the Step Editor window. The program's graphic approach is highly intuitive

and makes editing a simple and precise task.

*Master Tracks Pro* has a fancy step-record option that automatically calculates unusual duration values by adding familiar values together. For example, click on the quarter-note icon in the Step Editor window, then shift-click on the thirty-second note, and the sum of the two values becomes the default step duration. While you could accomplish the same thing in other programs if you knew the exact number of ticks this note value represented, it's easier to let the program do it for you. Using *Master Tracks Pro's* MIDI Keyboard setup, you also can map up to ten keys on your controller to represent standard note durations for step input. This allows you to keep both hands at your keyboard while step-recording.

Navigating around *Master Tracks Pro* is easy, because every main work area can be accessed by a keyboard shortcut. In addition, you can easily change

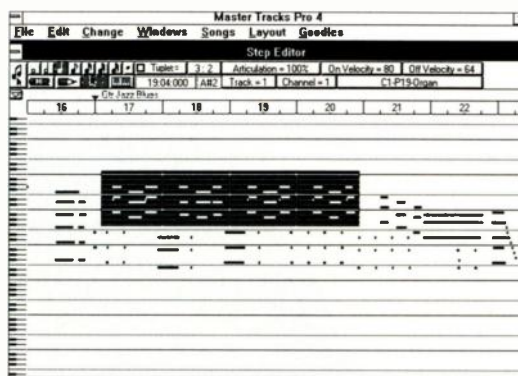


FIG. 6: The Step Editor in *Master Tracks Pro* allows you to adjust individual notes or groups of notes.

tracks while working in any window by entering a new number in the track field. That's much quicker than moving back to the main track window and highlighting a new track. Furthermore, you can copy and paste data from one track to another directly from within the different data windows. For instance, if you've designed a complex graph for pitch-bend data in track 1 that you want to use in track 3, just copy the graph, change tracks, and paste. If you later decide that the graph's contour would work well for another type of data, use the Controller Data window to remap the data to whatever new controller you prefer.

One final feature is the Song Play List that schedules entire sequences for consecutive playback. Open as many sequence files as you'd like, and their names will automatically appear in order in the Play List screen. Then rearrange the sequences in any order and choose from a number of options to determine how they will play back. It's a simple process that should be of use in any live-performance situation.

## CADENZA

*Cadenza for Windows* from Big Noise Software (reviewed in the June 1992 **EM**) owes much to its DOS ancestry. Like its predecessor, this new incarnation offers sophisticated graphic editing, complete with a toolkit customized to suit the needs of different types of data. Click the right mouse button in the Controllers window, for example, and an extensive set of tools appears for scaling, thinning, smoothing, and other data manipulation. The same click in the Tempo Window provides additional options, such as fitting the tempo of a specified region to a certain amount of time. *Cadenza's* work

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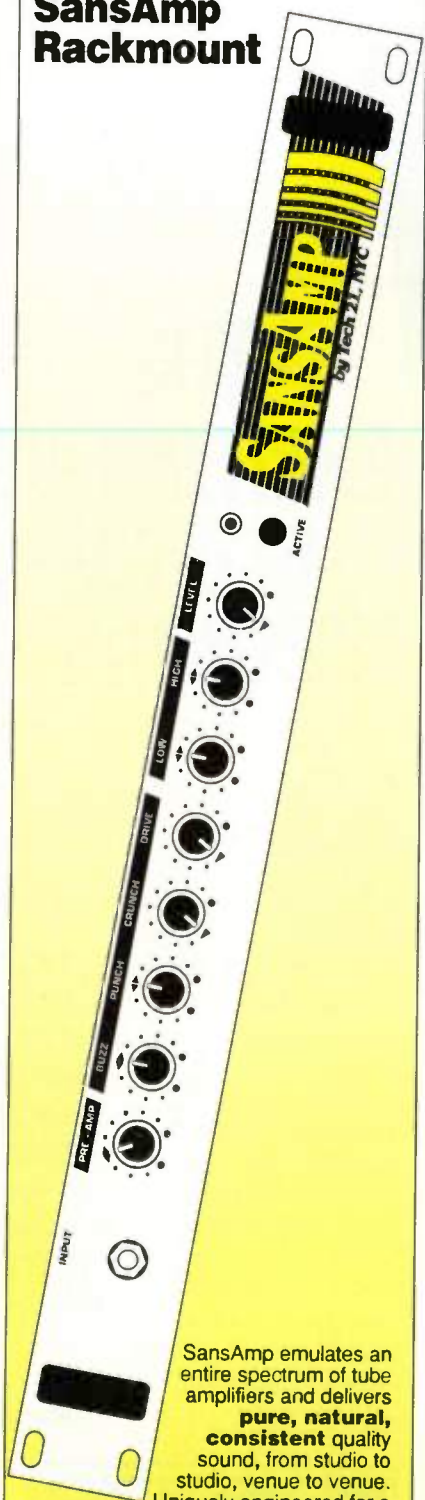


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# WINDOWS SHOOTOUT

areas are well-integrated: A modification made in one is immediately updated in all. The program also is easily customized: There are numerous options that can be selected by the user to control the program's operation, and the ability to save and recall any number of screen arrangements is a real bonus.

*Cadenza* opens to a well-designed Track Sheet window that displays various parameters of each track (see Fig. 7). To change a parameter's values, you can't simply click on a column and move the mouse. Instead, a secondary dialog box appears when you click and values are changed there. Other types of controls are easier to manipulate. For example, to change a sequence's current position, just move the mouse to the measure counter at the top of the screen and push the left or right mouse buttons to advance or retreat the song position. All open windows

immediately move to that point. The same technique works for changing tempo and for altering the global time signature of a sequence.

A separate Song Editor window provides the track/measure overview found within the main screen of other programs. By sweeping with the mouse, you can quickly highlight large blocks of data, including non-contiguous measures. Once you've got a region selected, the Edit menu provides a large assortment of commands to process the data, and with *Cadenza's* event filter you have extremely precise control over the edit. For example, if you choose Notes as the event type to filter, a list of parameters appears that determines which channel, duration, velocity, and pitches are affected by the Edit command. But *Cadenza* goes one step further by giving you a long list of conditional operators that refine the selected range. Rather than simply choosing pitches between a set range, for example, you can select notes inside, outside, greater than, less than, equal to, or not equal to the range. Because you only deal with one type of event at a time, it's a streamlined approach to

filtering.

*Cadenza* offers a unique playback option that allows you to create a "playlist" of complete tracks. Using the Track/Mode parameter, designate one track as the "link track," then select the Link command from the Track menu. A dialog box will appear in which you specify the order in which you want any number of tracks played back (up to 64 increments). Mute those tracks so they don't get played until their numbers come up. Of course, while the linked tracks are playing back in sequence, other tracks can be playing in strict linear fashion. The capability is similar to the Pattern mode found in some DOS sequencers and can be handy for building long spans of music from shorter segments.

Like an automated mixer, *Cadenza* provides a bank of sixteen faders that can be used to manipulate numerous types of MIDI data (see Fig. 8). In addition, numerous Fader windows can be open onscreen at once.

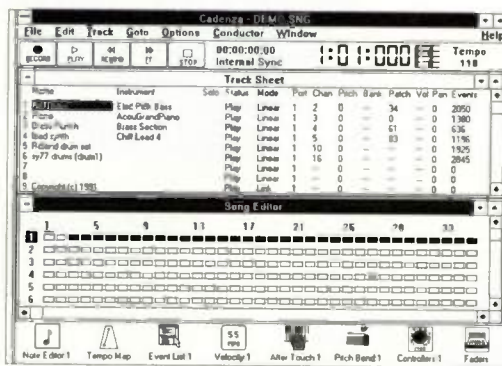


FIG. 7: *Cadenza's* main screen, showing the Track Sheet and Song Editor overview.

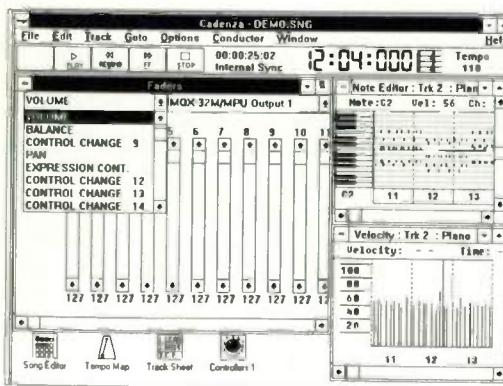


FIG. 8: Up to sixteen faders can be set up to send any type of MIDI data in *Cadenza*.

Like the dinosaur, conventional mixers have bodies that are bigger than their brains. But now there's a leaner, smarter, faster species of mixer for both stage and studio: the DCM-100 Digitally Controlled Mixer and MIXTAB™ Controller.

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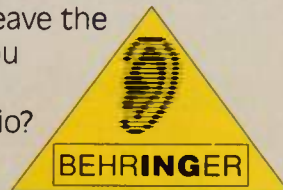
"Consequently, I am—without hesitation—recommending to LucasArts/Skywalker Sound that they buy at least four channels of Behringer Mark III DeNoising for each mixing console here and in Los Angeles; a total of twelve mixing rooms."

**Walter Murch—Film Editor and Music Mixer, LucasArts/Skywalker Sound**

"If the phrase *noise floor* is in your vocabulary and you would prefer that it was not, get a Behringer single ended noise reduction unit to the top of your *got to have one* list." **Robert Scovill—Sound Engineer/Mixer, Rush/Def Leppard**

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# WINDOWS SHOOTOUT

In a number of cases, I found that playing the sliders in real time was as useful as using the graphic controls for achieving a desired effect.

Because Big Noise supplies additional interface drivers with their software, you'll be able to use *Cadenza* with MIDI interfaces not currently supported by the *Windows 3.1* multimedia spec (e.g., the KEY Electronics Midiator and Mark of the Unicorn MIDI Time Piece). *Cadenza* also has the unique capability to run multiple instances at once. In theory, you can load up to eight instances of the program, all of which can be triggered simultaneously. That gives you a huge number of tracks to work with.

## SUMMARY

Despite the radical new look of these programs, it's inevitable that I still found omissions. At the top of my list is a "play only highlighted notes" feature for when you need to hear just a few pitches. While several of the programs have a mouse-button Play feature, none allow you to highlight a region and select just those notes for playback. Next, I'd love a simple way to use MIDI controller data to control tempo, as is possible by mapping data in Opcode's *Vision*. Finally, it would be terrific to have greater integration between MIDI and digital audio, a feature Mac users have been enjoying for some time. Nevertheless, there's an awful lot to like about each of these programs, and I'm excited about the direction they are taking.

Which sequencer is best for you? I tried hard to pick a winner, but as always, different situations demand different solutions. For example, if you don't need a full-featured program but enjoy viewing your music as standard notation, *Studio* would be a good choice. With luck, many of my complaints will be taken care of by the time you read this. If notation is a must, and you also need a potent sequencer, *Cakewalk* is the obvious choice. Hackers in particular will enjoy stretching *Cakewalk* to its limit by using its CAL application language.

Though it doesn't have some of the


high-end options of the other programs (such as support for more than 32 MIDI channels), *Master Tracks Pro* offers excellent everyday editing capabilities, and non-performers should appreciate its fancy step-recording options. On the other hand, power users will love *Cadenza*'s extensive editing functions as well as the ability to customize numerous aspects of the program.


For general-purpose sequencing, you can't go wrong with *Master Tracks Pro*, *Cadenza*, or *Cakewalk*. They share many

features and are well-suited for serious music-making. Based on the beta version (described in the sidebar), *Cubase* also will be a good choice for the serious electronic musician. Of course, if you haven't yet switched over to *Windows*, it's clearly time to do so. You'll be glad you did.

Dennis Miller teaches music at Northeastern University in Boston, where his duties include telling the world about the joys of MIDI.

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## Use third-party modifications to rev up your existing gear.



**E**lectronic musicians have a long tradition of customizing their own gear. Twenty years ago, well-known synthesists rarely used stock instruments due to the poor roadworthiness and stability of many synthesizers built in that era. Modifications also were developed to add features or performance controllers to the basic design. Minimoog pitch and mod wheels were commonly installed on ARP 2600s, for example.

These days, you might think that synth mods are a thing of the past. After all, hasn't MIDI made it possible to combine instruments to get the best of all worlds? Surprisingly, modification is still alive and well, primarily because it's usually more cost-effective to modify your existing gear than replace it with newer equipment. If you're a cash-hungry musician looking for something new, it may be time for you to go mod.

### GETTING MOD

Of course, the easiest way to add new life to any synth is to get some new sounds for it. Running through a new set of patches (or waveforms) can inspire a number of musical ideas. But that only goes so far. If you'd like some new features or functions added to the instrument, a modification is the only way to go.

There are three basic types of modifications for synthesizers and other musical hardware. First, a manufacturer can release an updated version of

the product's ROM software that fixes any known bugs. This type of upgrade often is available at little or no charge. Second, the manufacturer might develop new ROM software that includes entirely new features. Typically, this costs somewhat more than the bug fix. Finally, the manufacturer or a third-party developer might offer a major hardware and/or software upgrade that could include anything from a MIDI retrofit for an older instrument to an integrated sequencer or other cool features. This type of mod, which is covered in this article, can be expensive, but again, it's less than buying all new gear.

Most third-party developers are small and can't afford the full-page ads and mass-marketing techniques used by larger companies. Many were started when someone decided to put together a do-it-yourself kit for their favorite

dinosaur synth. Word spread, business grew, and now it's a full-time operation. Higher price tags are to be expected for this type of upgrade; it's unfair to complain about them. In fact, we should be grateful that someone had the guts to start such a risky enterprise.

If your gear doesn't have any mods available or existing upgrades don't have the features you want, you might look into hiring a specialist to design and



By Charles R. Fischer

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install a one-of-a-kind package. Be forewarned, however, that this type of job tends to be extremely expensive and time consuming.

### GOING SHOPPING

Looking for a suitable mod is considerably different than shopping for a musical instrument. In most cases, you can't go to the local music store and try out a modified unit to see if you like it. Typically, you must make your decision based on ads, spec sheets, and magazine reviews.

Start with the manufacturer of the original product. Many companies provide upgrades, but they can't inform you about them if your name isn't on file (which is another good reason to return those warranty cards). Most companies don't announce all their upgrades, so even if you have sent in a warranty card, it's worth a phone call.

Many mods are supplied by third-party developers, especially those designed for older instruments. While most of these companies are highly reputable, it's wise to be cautious when sending your valuable synth across the country. If you're unable to find someone to do the work closer to home, phone the company and ask a few questions before you ship your instrument.

First of all, find out if skilled labor is necessary to install it, and if so, who should do the work? Some of the mods in this article are simple enough to be installed by almost anybody, while others require the attention of an experi-

enced user or qualified technician. A few are so complex that they require factory installation.

Other questions to ask include: Has their kit been tested on all versions of the instrument (some kits don't work with certain revisions or serial numbers); how many times have they modified the instrument; what kind of warranty do they offer for parts and labor; and what is the typical turn-around time (that is, how much time will pass between the time you ship the instrument and the time it is returned).

If possible, contact the original manufacturer of your gear, and ask if they've heard anything good or bad about the mods in question. Finally, if the modifications must be done at the factory (or any distant location), be sure your axe is securely packaged and fully insured before it goes anywhere.

### RECENT SYNTHS

Perhaps the most popular modifications for sample-based synths and tone modules are sample memory expanders. Because most instruments are designed to allow easy expansion by the manufacturer, it's relatively simple for someone else to reverse-engineer the design. This allows other companies to sell their own expanders with a completely different set of samples. Depending on the sounds in the expander and the quality of the samples, third-party mods often sound better than the factory version.

InVision Interactive offers an expander mod for the E-mu Proteus/1 and Proteus/1 XR (Fig.1). The Protologic board (reviewed in the September 1991 EM) adds 4 MB of high-quality samples along with 128 new ROM Presets and comes with 192 RAM Presets in five different computer formats. The new

### DOING IT YOURSELF

EM has a long tradition of helping readers modify their equipment. In terms of cost and utility, many of these projects are hard to beat, so you might want to go through those back issues and take a look at some of them. Some of these articles include "Secrets of Memory Expansion" (July 1987), "Updating the Dinosaur" and "Synthetica Exotica: New Jobs for Old Dinosaurs" (January 1988), "EM MIDI Channelizer for the DX7" (May 1989), virtually the entire September 1989 issue, and "E-mu Emax Channel Output Modification" (September 1990).

instruments range from pop/rock and rap to new age, jazz, and ethnic. The list price is \$395.

Recently, InVision announced a similar product for the Korg M1 and M1R. The PlusONE Upgrade Kit doubles the number of PCM sounds for both units. It includes samples of digital and analog synths, electric pianos, rock and acoustic guitars, Hammond organs, solo violin, ebony flute, ethnic instruments, and a large variety of drums and percussion. The PlusONE can be installed in minutes at any authorized Korg service center, and it has a list price of \$395.

Cannon Research's Frontal Lobe for the Korg M1 has proved to be one of the most popular synth mods of all time. It provides a number of significant features missing from the stock M1, including increased sequencer

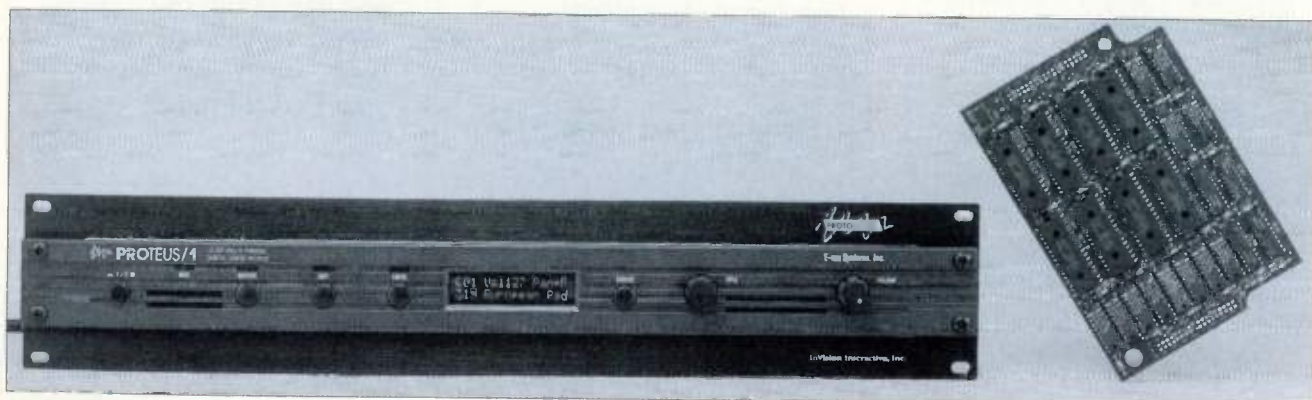


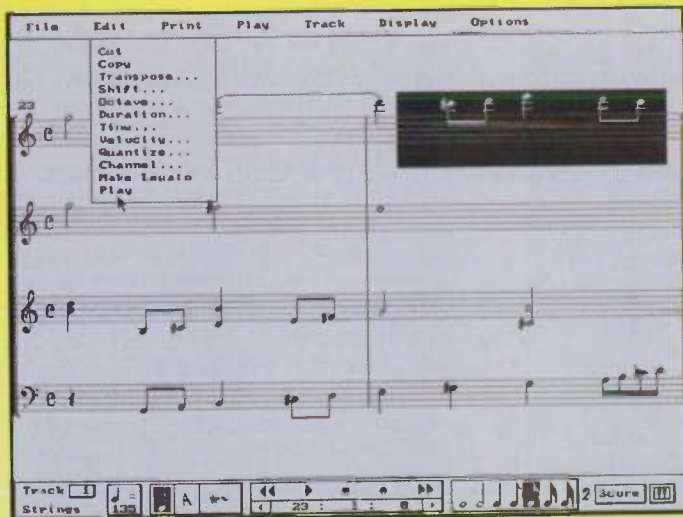
FIG. 1: The InVision Protologic board adds 4 MB of new samples to your Proteus/1.

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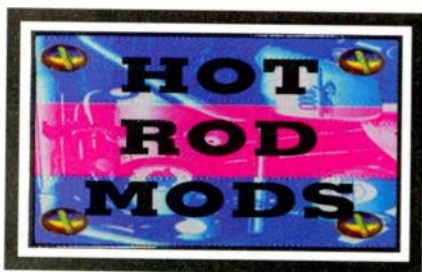
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memory, the ability to import external samples into the M1 (allowing any sample to be used as a sound source), and a 3.5-inch floppy drive for quick mass storage of samples and sequencer data.

The Lobe is easily connected to the M1 using several cables (the instrument itself needs no modifications), and its price ranges from \$599 to \$749, depending on the amount of RAM supplied. For a more detailed explanation of the Frontal Lobe's features, see the reviews in the May 1990 and July 1992 issues of *EM*.

The Roland MT-32 is still widely used, thanks to its multitimbral capabilities and low price. L.A. Custom Instruments offers a modification that improves the sound of the MT-32, as well as providing extras like battery-backed RAM, improved reverb effects, and MIDI control of internal parameter settings, all for \$150. Two additional



FIG. 2: Encore Electronics JP8-MK.

mods add alternative reverb algorithms and four more audio outputs for increased versatility. There are also similar mods for the Roland D10, D20, and D110, which increase the output level and reduce noise.

Although it's no longer available, the Yamaha DX7 is one of the most popular synthesizers ever sold, despite several notorious limitations, such as the ability to send and receive on only one MIDI channel. A company called Grey

Matter Response earned the gratitude of many musicians with their E! upgrade, which greatly enhances the instrument's capabilities. Among other things, E! adds 320 internal Voices, and Performance data is saved with each Voice. In addition, E! offers micro-tuning, voice stacking, and an onboard sequencer, all for only \$169.

There also is a version of E! for the DX7II (\$199), which provides eight-part multitimbral operation, a 16-track sequencer, and a visual MIDI indicator, along with most of the features of the original E!

#### EARLY SYNTHS

Encore Electronics is a leading supplier of MIDI retrofits for older synths. Their present line includes kits for the Oberheim OB-8, OBX, OBXa, and OB-SX; the Roland Jupiter-8; and the Moog Source.

The JP8-MK mod for the Jupiter-8 is a typical example of the features provided by Encore (Fig. 2). This kit lets the Jupiter respond to two MIDI channels simultaneously for splits or layered sounds as well as most of the standard controller messages. It increases the patch capacity to 128, and all of the new features can be accessed from the front panel. The JP8-MK is \$275 (add \$10 for shipping, or \$75 to have Encore perform the installation).

Another company that specializes in pre-MIDI synths is Studio Electronics. Their forte is rack-mounting and adding MIDI to a number of classic instruments, including the Minimoog (reviewed in the September 1989 *EM*), Roland TR-808 drum machine, Sequential Circuits Prophet 5, and the Oberheim OB-8.

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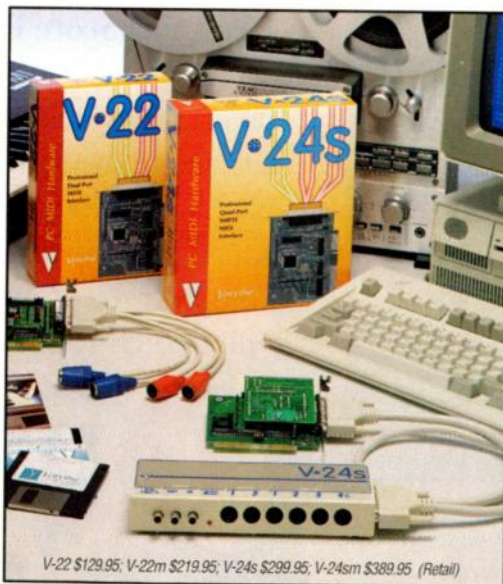
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# Laptop MIDI

By David (Rudy) Trubitt

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**A**ll it takes is hauling a desktop computer to the studio or stage a few times to make you covet a laptop. The thought of folding up a tiny computer and *going*...well, you get the idea. Today's musicians have many choices when it comes to portable computers. All of these machines offer various benefits and tradeoffs—Apple's PowerBooks are particularly problematic with MIDI—but even the worst can make your travels much more musical.

## ATARI STACY AND STBOOK

Keyboardist Starr Parodi is among the most visible STacy users, appearing nightly on the Arsenio Hall show. "We needed a computer to play the first ten seconds of the theme, which is a drum riff, and to play a series of sampled effects that correspond to the picture," says Parodi. "I've always used Atari computers, but I have a very small space on stage."

Enter a compact STacy4 running *SMPTETrack*, *SMPTEMate DA*, and *SysXpress*. "I don't have room for a mouse, but it has a built-in track ball," explains Parodi. "Also, because it has a flat LCD

screen, it doesn't reflect the lights, which could really be a problem on camera. It's easy on my eyes, too, because of the lack of glare. There's no apparent sync-roll [in which the CRT image appears to roll on-camera] either, so they actually shoot it a lot."

Guitarist Lee Ritenour is also an ST fan. Although he does not use the machine for live performance very often, he gets a lot of mileage from notation software. "I'm a huge fan of orchestration programs," Ritenour says. "I find them very useful with the laptop. I usually bring the Atari laser printer and STacy to a session and print things out as I need them."

Ritenour offers an interesting anecdote about a tour when no printer was available. "I was out with my group and we decided to change a couple of songs, but we didn't have the music with us. So, Bob James used his Mac laptop to write out the piece of music and faxed it to himself at the hotel! He made copies at the hotel, and we rehearsed it that day at sound check."

Atari's new STBook notebook computer is scheduled to ship before the end of 1992. The STBook continues

the tradition of built-in MIDI, although an external adapter cable is required.

## THE PROBLEM WITH POWERBOOKS

Apple's PowerBook (PB) line has been a big hit with those seeking portable Macs. However, MIDI PB users have had difficulties—specifically, lost MIDI data resulting in stuck notes or corrupted SysEx. Here's the story, according to Apple: In the PowerBook 140, 145, and 170, a "power manager micro-processor" communicates with the unit's 68030 and screen back lighting at a constant rate of once every 200 milliseconds. Each message causes a brief interrupt blackout (6 ms worst case), which freezes all serial port and timer activity. MIDI data *en route* during the blackout is held in the serial port's 3-byte buffer. If more than three bytes pile up, they are lost. A fix can be implemented by MIDI developers, but unfortunately Apple can't solve the problem. Apparently even the new PowerBook 160 and 180 will suffer the same fate.

Apple's recommended fix appears to solve the lost data problem, but there's



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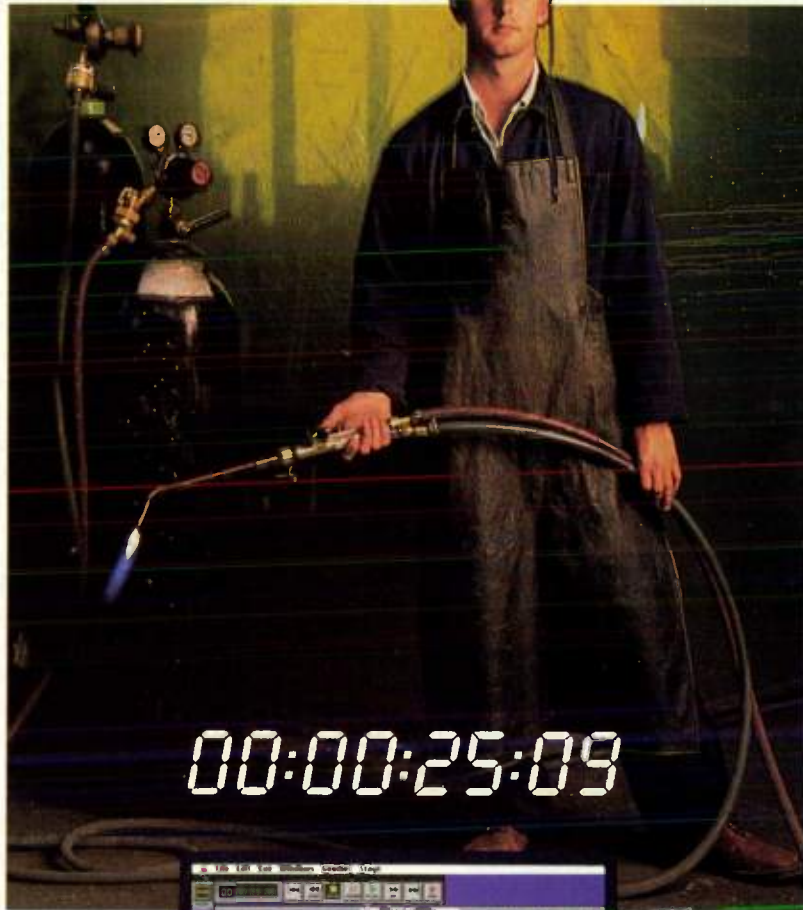
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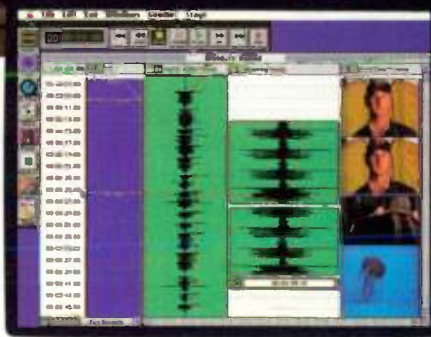
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# Blowin' in the Wind

By Scott Wilkinson

*MIDI wind controllers and pitch-to-MIDI converters let wind players and singers blow their licks in the MIDI band.*



MICHAEL SLOAN

**A**lthough MIDI was developed to represent keyboard performance gestures, it has been adapted to let guitars, drums, and even violins control MIDI sound modules. Wind instruments and vocals, however, pose special problems. Their expressive characteristics are difficult to represent with MIDI messages. For example, a breath-controlled *sforzando-piano crescendo* is a common wind instrument technique that is difficult to represent in keyboard-oriented MIDI terms.

In spite of these difficulties, there are two types of products that let wind players and vocalists control MIDI instruments: *wind controllers* and *pitch-to-MIDI converters* (PMCs). With these devices, wind players and singers can apply the expressive techniques they have so carefully cultivated to an infinite palette of electronic sounds and record their performances into a sequencer.

## BACKGROUND

Wind controllers are designed to imitate acoustic wind instruments. They consist of two basic elements: the *instrument controller* itself and an *interface unit*

(see Fig. 1). The instrument controller usually resembles a clarinet or straight saxophone with one or more keys for each finger.

Notes are fingered much like their acoustic counterparts, although there are some significant differences. For example, each note is fingered identically in each octave, and there are several octave keys under the left thumb instead of just one. Also, there are many more alternate fingerings than you find on acoustic instruments, which can be very convenient once you learn them.

The mouthpiece of the instrument controller often looks like that of a sax or clarinet. There's even a reed in some cases. Of course, the reed doesn't vibrate; instead, it usually sends Pitch Bend messages when it is bitten, simulating the effect of biting an acoustic reed.

Breath resistance is another important factor. Some controllers let your breath flow through the instrument, which feels much more natural than controllers that let no air through. However, controllers that let no air through offer the opportunity to play phrases of any length without running

out of air; simply breathe through your nose while maintaining pressure in your mouth and a tight seal around the mouthpiece.

The instrument controller usually is connected to the interface unit with a special cable. The interface unit receives signals from the instrument and converts them into MIDI messages, which are sent to any MIDI sound source and/or sequencer. In some cases, the interface unit includes its own sound module.

Wind controllers make no sound of their own. When you play, the only sound you hear is made by the sound module, which is great for headphone listening and acoustic isolation. Also, wind controllers offer a much wider pitch range than acoustic instruments. Up to eight octaves or more can be played, and no octave is more difficult to play than any other. However, wind controllers do not feel or play the same as their acoustic counterparts. They must be approached and learned as new instruments that happen to have similarities to familiar instruments.

Pitch-to-MIDI converters (PMCs) can be used by wind players or vocalists to control MIDI instruments with their



**L** leading the world with the most sonically advanced music technology available, the Kurzweil K2000 and K2000R provide infinite possibilities for expressive synthesis and sound design. The K2000 Series instruments are considerably more than just synthesizers; they also feature ROM Sample Playback and Stereo Sampling capabilities. The flexibility is vast; the potential is limitless.

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Today's creative market demands an entirely new level of professionalism, and performance flexibility. The K2000/K2000R, with its inherently flexible and expandable architecture, is the obvious choice. With other keyboards, you'll eventually run into a brick wall when you need better capabilities. With the K2000 Series, you can, at a fraction of the cost of other systems, transform your system from a ROM-based music workstation to a full sampler/audio processor with exceptionally high quality and full bandwidth capabilities.

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The heart of this flexibility is Kurzweil's proprietary V.A.S.T. technology (Variable Architecture Synthesis Technology). While past approaches to synthesis left the artist with a stack of instruments, back problems and MIDI protocol headaches, V.A.S.T. eliminates the mess and unites live performance, digital sampling, sound designing, composing and sequencing, in one compact, portable unit.



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Thirty-one powerful sound shaping algorithms, with a multitude of DSP (Digital Signal Processing) functions per voice are available. They encompass almost every synthesis technique ever devised. In fact, V.A.S.T. is the only technology at this price that provides up to three DSP functions per voice. So, if the job calls for a fat, analog bass sound, the K2000 delivers. If the part calls for a bell sound, the K2000 provides crisp, percus-

sive ringing. If a stereo sample needs re-synthesizing, the K2000 can shape, re-shape and layer multiple samples,

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Wendy Carlos	Fred Mollin
Pat Coil	Patrick Moraz
Michael Dorian	Sammy Nestico
Michael Franklin	Roger Powell
Dominic Frontiere	Freddie Ravel
David Gant	Kenny Rogers
Jerry Goldsmith	David Rosenthal
Tony Guerrero	Frank Serafine
J.J. Johnson	Paul Shaffer
Michael Kamen	Rick Wakeman
Fred Lawrence	Fred Weinberg
Lyle Mays	Stevie Wonder

transforming even the most basic sound samples into thrilling, new experiences.

Eight megabytes of Kurzweil's world-renowned 16-bit ROM samples are on board to start the sonic feast. Two additional 8-megabyte ROM sound blocks will be available for a total of 24 megabytes. Further, samples from many other manufacturers' libraries are compatible and extensive third party software is available.

### Limitless sound storage.

For most keyboards, storage of sound files can be a problem. Boxes of floppy disks are certainly smaller than three pianos and a set of drums, but they are slow to load and cannot hold much material. To address this problem, the K2000 system supports the addition of both internal and external SCSI-compatible hard disk drives, as well as readily-available optical, "floptical," SyQuest, CD ROM readers, etc.

Both units accept up to 64 megabytes of sample memory via standard Macintosh SIMMs, for holding over 12 minutes of sampled sounds at full bandwidth. The system also supports a program memory upgrade.

### Flexible inputs and outputs.

The K2000/K2000R thoroughly covers the ins and outs of sampling and synthesis. The SMP-K/R stereo sampling options (keyboard/rack) offer analog, digital and optical inputs. Digital outputs are also provided, and both are soft-switchable between AES/EBU and SPDIF formats. The K2000 offers six analog outs configured as a stereo master pair and four individual outs (the K2000R offers a stereo master pair and eight individual

outs). Support for MIDI is extensive as the units can transmit on three channels and receive on sixteen. For special effects and sound design use, up to 96 sonic events can be triggered simultaneously, and each MIDI channel supports the stacking of up to nine events.

### A price that's astounding.

The K2000/K2000R can do more than a stack of conventional synthesizers and samplers. No other comparable instruments offer so many ways to configure and upgrade for future applications. Yet, they cost no more than most ordinary synthesizers.

So, if today's creative demands are on your mind, join the stars who have found that the Kurzweil K2000 and K2000R offer the solutions through V.A.S.T. technology for infinite possibilities.

### Specifications

Keys	61 (K2000 only)
Transmit Pressure	Mono-Pressure (K2000 only)
Receive Pressure	Poly, Mono-Pressure
Tone Generation	16-Bit Sampled ROM Waves Digital Wave Generation Noise Generation Optional User Sampling
Polyphony	24 (96 oscillators)
Dynamic Voice Allocation	Yes
Multi-timbral	16 Channels
Filter/DSP	Up to 3 Configurable Per Voice: Sweepable Resonance ("Q") LP/HP/BP/All Pass/Parametric Notch/Distortion/Shaper
Effects	1-Stereo Processor
Effects Types	Reverb/Chorus/Delay/Flanging
Stereo Sampling	Yes (with Sampling Option)
Analog Sampling Rates	29.4/32/44.1/48 KHz Analog
Digital Sampling Rates	All
Sample Playback Rates	All
ROM Wave Sample Rate	Up to 48 KHz
Stereo Analog/Digital I/Os (with option)	Analog In; Optical In; Digital Ins/Outs, (AES-EBU/SPDIF formats)
Disk Drive	3.5 HD/DD
SCSI	K2000: 1 port K2000R: 2 ports
Internal ROM Wave Memory	8 Megabytes, expandable to 24 Megabytes
Internal RAM Sample Memory	Up to 64 Megabytes (SIMMs)
User Program RAM Memory	128K, expandable to 760K
Display	240 x 64 Backlit
Sequencer	16-Channel Record/Play, Type O Play
Audio Outputs	K2000: 6 analog outs configured as a stereo master pair and 4 individual outs. K2000R: stereo master pair and 8 individual outs.
Outs Double as Inserts	Yes
Standard SIMMs RAM Memory	4 Card Slots
#/MIDI Channels/ Simultaneous Transmission	3
Accepts Sample Dump Standard; Complete SYSEX Implementation; SMDI Protocol	
Physical Controllers: 2 Wheels, 1 Slider, 2 Foot Switches, Continuous Controller Pedal, Mono-Pressure (K2000 only)	

# KURZWEIL

*Music Systems*

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## CURRENT PRODUCTS

Manufacturer	Product	List Price
<b>Wind Controllers</b>		
Akai Professional/IMC tel. (817) 336-5114 fax (817) 870-1271 (Reviewed December 1991)	EWI 3000/3000M	\$1,499
Softwind Instruments tel. (617) 969-4798 fax (617) 969-5698 (Reviewed December 1988)	Synthophone	\$3,450
Yamaha AGS tel. (714) 522-9011 fax (714) 739-2680	WX11/WT11	\$995
	WX11 w/BT7 interface	\$505
	WT11	\$540
Yamaha Band & Orchestra tel. (616) 940-4900 fax (616) 949-7721	EW20 Windjamm'r	\$695
<b>Pitch-to-MIDI Converters</b>		
Roland Corporation tel. (213) 685-5141 fax (213) 722-0911	CP-40	\$295
SynchroVoice, Inc. tel. (800) 433-6434 or (713) 326-1888 fax (713) 532-1441 (Reviewed July 1992)	MidiVox	\$1,595

or switch between different sound modules on different MIDI channels, depending on the pitch and volume range in which you play.

### PATCHES AND GLITCHES

The nature of the patches you play with a wind controller or PMC is vital to a good sound. The most expressive patches are those that sustain at full level throughout the duration of the note and respond to Aftertouch or Breath Controller messages in a meaningful way, such as changing the timbre

and volume of the note.

The attack setting also is critical. If it's too slow, the delay between your attack and the start of the note is intolerable. If it's too fast, another problem, called *glitching*, rears its ugly head. For wind controllers, moving from one note to the next as you play sometimes requires several fingers to press or release their keys at the same time. As your fingers move to press or release the keys, they often do not make or break their contact at precisely the same moment. The minute differences

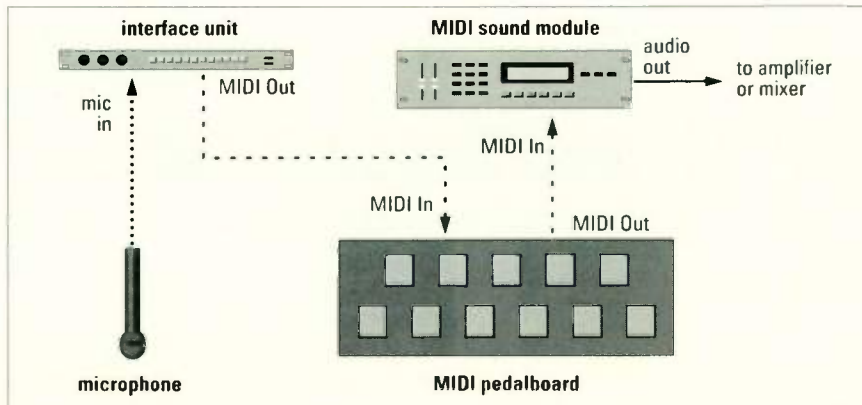


FIG. 2a: A MIDI pedalboard with a MIDI In merges the data from the interface unit with its own Program Change and other messages.

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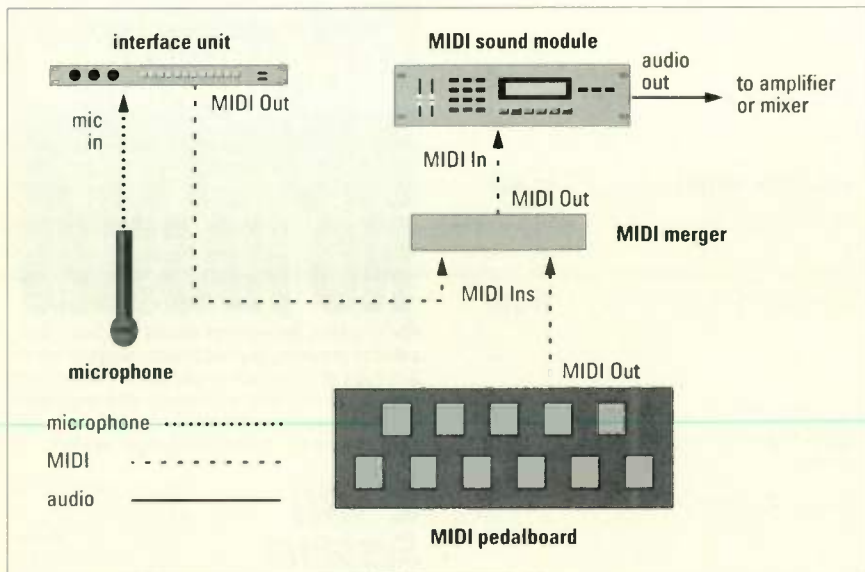


FIG. 2b: A MIDI pedalboard without a MIDI In must use an external MIDI merger.

between the contacts are interpreted as separate notes by the sound module. This results in several very quick "glitches" between the notes you intended to play. PMCs have a similar problem when the pitch bend function is disabled.

Glitching can be reduced by developing the best possible technical accuracy in fingering and articulation. Playing notes with a detached articulation also reduces glitching, which is nearly impossible to avoid while slurring. Some controllers include a special sen-

sitivity control that allows you to specify the minimum duration of a transmitted note. Adjusting the attack of the sound you are controlling is also helpful.

Many wind controller and PMC users disable the LFO in the patches they play. This lets them produce vibrato, tremolo, or wah-wah effects with their breath or jaw as they would on an acoustic instrument.

**TAKIN' IT HOME**

MIDI wind controllers and PMCs have brought the unlimited range of sounds from today's synthesizers and samplers to wind players and vocalists. The development of these controllers provides new opportunities in the fields of live performance, sequencing, and composition. Creative wind players and vocalists can now extend the boundaries of their craft as they explore new musical dimensions.

*EM technical editor Scott Wilkinson plays an Akai EWI with a Yamaha WT11 tone module in live performance and studio recordings.*

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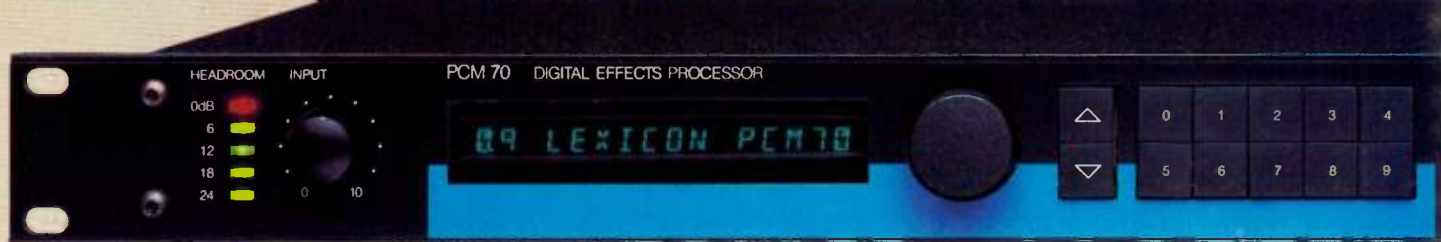
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World Radio History



# Pro Mixing Tips

By Scott Mathews

*Use your head  
to plan great  
mixes, and your  
ears and hands  
will follow.*



Scott Mathews "onboard" at Pachyderm Studios in Minneapolis.

**M**ixing is a fairly recent development in recording. Not until the early 1950s, after Les Paul invented his sound-on-sound multitrack machine, was there a need to even consider the process.

Today, mixing is an art form. The final mix often makes or breaks a recording. A well-known producer (who obviously spent some time in the House of Bitterness) once told me, "If a record shoots platinum with a bullet (one million domestic sales), it's due to the brilliance of the artist; but if the record sinks like an anchor, it's because the producer blew it in the mix."

The pressure is on, folks.

## MUSICAL CHAIRS

Technological advances, as well as the demands of the marketplace, constantly redefine the roles of engineers and producers. Up until the late 1980s, producers usually supervised a project from beginning to end. Today, however, it is not uncommon for specialists to assume control of specific parts of the recording process. Tracking engineers are sought for smoking rhythm tracks, overdub engineers/producers

brought in to enhance basic tracks, and remix engineers hired to cut blistering final mixes.

In some respects, the remix engineer has eclipsed the producer as the major player in commercial productions. A great remix increases the potential for a record's success. And because record companies invest huge sums in projects, they often insist that a proven hitmaker mix the final product. Mix doctors such as Bob Clearmountain demand large fees (and even a percentage of sales) for their services.

A valuable lesson can be learned from such specialization. Talent aside, an outside mixer often improves a project because his or her "fresh" ears are not saturated by the long recording process. Dispassionate critical listening is an important tool that all mixers should utilize.

## MATHEWS' MANDATES

Producing great mixes requires more than an objective mindset. I like to approach mixes with a few general guidelines to ensure competence, if not outright success. (I don't call them rules because there are no such things in our biz.)

**Know the artist.** It's essential to ascertain where artists are coming from and where they want to go. In short, don't make your Wilson Phillips mix sound like your Sonic Youth mix. (On second thought, please do!) Remember that the record you're mixing belongs to the artist, unless it's the 1960s and your name is Phil Spector.

**Make an equipment list.** If you're mixing in a commercial recording studio, be sure any equipment you need is available on the day of the session. In multi-room facilities, outboard signal processors tend to move around. Don't assume that the sexy reverb you fell in love with at a previous session is always available.

**Mix with fresh ears.** Morning mix sessions are optimum because your ears have not been abused by a typical day's activities. Ear fatigue is a real thing. After a few hours of near-field monitoring, the ears start compressing. You may feel like you're still ready to rock, but your hearing has turned to stone. Tragically, you often don't realize this fact until you review the sonically butchered mixes at a later date.

**Monitor at reasonable levels.** Occasionally it's good to blast the speakers

to check bass frequencies, but for the most part, soft playback levels tell the truth. Since audio careers are ear-based, it's not an insignificant task to protect your hearing.

**Use familiar monitors.** Make sure you have an aural relationship with the playback speakers. If you know how a certain model sounds, you'll make better mixing decisions. Only when a mix is completed should you use unfamiliar (and non-traditional) monitors to check how the sound translates to the outside world. The mix should work on cheap stereos and expensive audio-

phile systems. I often check mixes on my car stereo and portable boom boxes.

**Take short breaks.** If you give your battered ears an occasional rest, they'll reward you with better results.

**Reference mixes to commercial CDs.** You can learn a lot by comparing the sonic spectrum of your mix to CDs by artists you respect. Check if your highs are clean, lows pumping (not muddy), and vocals well-situated in the mix.

Commercial CDs already have benefited from mastering (the final tweak of EQ, compression, overall level, etc.

applied before mass duplication); if your mix sounds even close, the final product should be sonic heaven.

It also helps to keep running notes on rough mixes that possessed certain balances, equalization settings, or effects that deserve consideration during the final mix. Rough mixes often have exciting qualities (see sidebar

## FRACTURED MIXES

A while back, a pal (who must remain nameless) produced a legendary country singer. When it came time to mix the first single, the record company president demanded five different mixes so he could pick the version suitable for release.

Of course, the producer—who had many successful records to his credit—wasn't about to let anybody but himself pick *the* mix. Fortunately, the producer was no stranger to record company politics and realized the chances for the record's success would increase if the president took a personal interest.

The president got his five mixes. However, every mix was exactly the same; not one note was changed between number one and number five. In addition, the producer sent a note saying "Here are the requested five mixes. I know a hit record when I hear it, so I'm sure you'll agree that number four is the one."

The next day, the president called and said, "Great work, babe, but I've chosen number five as the stronger mix."

"Are you crazy," barked the producer. "Number four is a smash. I refuse to allow any other version to be released with my name on it. If that is your decision, you only have yourself to blame if the record is a flop."

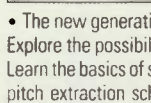
The record bombed. However, because the producer knew which version was *really* the hit, he remained in good standing with the label. He even received a personal apology from the president, who took full responsibility for choosing the "wrong" version.

# GUITAR BOOKS+VIDEOS

FROM MIX BOOKSHELF



3641C) GETTING GREAT GUITAR SOUNDS, *Michael Ross* • Take control of your effects and learn how the pros achieve their trademark tone colors with this concise guide. Discover practical, non-technical ways to use the guitar, amp and effects chain to build your ultimate sound. ©1988, 63 pp. (P) \$10.95

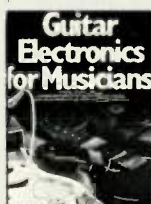


3565C) GUITAR SYNTH & MIDI, *Edited by Bradley Wait*

• The new generation of guitar controllers has expanded the fretboard frontiers! Explore the possibilities with this fine guide to the essentials of guitar synthesis. Learn the basics of synths, samplers and MIDI, evaluate the various triggering and pitch extraction schemes, and get expert help on choosing and using gear for recording and live work. ©1988, 134 pp. (P) \$14.95



3657C) GUITAR ELECTRONICS FOR MUSICIANS, *Donald Brosnac* • A clear and in-depth explanation that follows the sound signal from the vibrating strings, through the pickups, gain and tone-control circuits, switches and jacks, out to the amp. Pickups are described in detail. Includes a large section of specific instrument schematics and instructions for customizing and troubleshooting. ©1983, 128 pp. (P) \$19.95



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## ● RECORDING MUSICIAN

### WHY ROUGH MIXES SOUND BETTER

During the course of recording, it is common to run off board mixes or "roughs" as quick audio snapshots of the work-in-progress. Roughs usually are only for the benefit of artist and producer, allowing them to assess the day's recorded tracks, plan overdubs, and work out future arrangement ideas.

More often than not, these simple mixes possess desirable qualities that are lost when the magnifying glass is put over each and every track during the final mix. And more often than most producers admit, an artist (or even the producer) ends up preferring the rough mixes over the aurally majestic final mixes. Having personal experience with "The Rough Mix Sounds Better Syndrome," I've discovered a few reasons for the phenomenon.

The rough mix is a clear window into an artist's passion, where

the fire is not watered down (or "smoothed out") with compression, multiple reverbs, and other signal processing. Because roughs seldom involve more than a basic balance of the recorded tracks, the raw truth of a performance is exposed, and that's often an exciting and beautiful thing.

From the mixer's standpoint, roughs are fresh and intuitive. The process involves shooting from the hip, rather than obsessing over details. A direct approach often reveals an artist's distinctive personality, and that's what a good producer strives to document on tape.

I can't tell you how many times (earlier in my career, thank God) I spent hours—or days—sweating over the minute components of a final mix, only to discover that the rough mixes represented a truer vision of the artist's music. Sometimes "basic" is better.

"Why Rough Mixes Sound Better") that should not be ignored.

**Know when to quit.** When the fatigue factor reaches the point of diminishing returns, bail out. There's no sense forcing yourself to finish something that probably will be remixed later, when you've come to your senses.

**Set the mood.** Ten minutes before running the final mixdown, I have been known to soak my fingers in asses' milk, fire up some candles and incense, and chant to my velvet Elvis painting.

**Be open to remixing.** Producers must take criticism from the powers that be (see sidebar "Fractured Mixes"). You may have mixed your classic track, but if the people who hired you don't dig it, it's history.

Producers are in the unenviable position of keeping all factions happy with the end result, and everyone from the label president to the band manager has a vision of how the record should sound. It's a fact of life that producers sometimes must compromise their artistic visions to serve commerce.

Rick Nelson was right when he sang "You've got to please yourself." Unfortunately, so was Bob Dylan when he wrote "You got to serve somebody."

### FADE OUT

Today, the average home recordist has more toys than almost any studio that produced a classic record in the 1960s. So don't let equipment limitations prevent you from mixing your own classics. You don't need an automated Neve console to make great records. Never underestimate the power of a great artist matched to a brilliant song.

Primitive recorders and mixers didn't stop Brian Wilson from producing a banquet of tonal colors on *Pet Sounds*. And during the production of *Sgt. Pepper's Lonely Hearts Club Band*, the Beatles had to make final mixing decisions with every overdub because submixing was the only way they could fit all the parts. The fact you can still hear Ringo's kick drum amidst the orchestras, psychedelic sound effects, and stacked vocal harmonies is a testament to brilliant mixing.

If you have imagination, anything is possible.

**Scott Mathews**, an independent producer with tons of credits, just returned from Prince's Paisley Park Studios, where he produced Trip Shakespeare's latest A&M Records release.

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World Radio History

# Questions & Answers

By Alan Gary Campbell

*Hi ho, hi ho,  
it's off to  
work we go!*



JACK DESROCHER

**Q.** What sort of educational background is needed to become a tech? How much do techs earn, on average? What is the potential for career advancement in service?

**Q.** Are correspondence degrees in electronics worthwhile?

**Q.** How does one obtain a position with a manufacturer of electronic musical instruments? I am soon to graduate with a bachelor's degree in electronics engineering. Is this sufficient?

**Q.** I've been working as a part-time service technician for a music store for over a year while I finish an associate degree in electronics technology. Though I'm learning a lot, I find that the "tough dogs" still elude me, and it's discouraging. The service manager—the other tech—seems to spot problems instinctively. Are some people just born with this ability, or can you acquire it?

**A.** Technicians come from an extraordinarily diverse range of educational backgrounds, ranging from high-school dropouts to Ph.D.'s. In many respects, a Bachelor of Science degree in electronics technology is the ideal preparation for a career in music-technology service, as it provides more laboratory time and less abstract theory than the

traditional electronics engineering degree. (For those who are concerned about the difficulty of the advanced mathematics required, many technology programs are comparatively less demanding.) No doubt many service managers would argue that an Associate of Science degree in electronics technology is adequate. In many respects it is, but it does not prepare the aspiring technologist as thoroughly for career advancement.

Correspondence courses from reputable institutions can offer educational benefits similar to those of two-year ("community") colleges, including associate degree programs. These courses often are the only option for those who live in rural areas or have jobs that prevent class attendance. However, the advantages of a conventional on-campus program are many, including interaction with instructors and students and access to library materials, equipment, and professional societies. Moreover, it can be difficult to remain motivated when studying on your own. Correspondence-course attrition rates are relatively high, and the courses are *not* cheap.

Degree requirements vary greatly

with position. A bachelor's degree in electronics technology is acceptable for many service, customer-support, and manufacturing positions, though an electronics engineering degree is a more appropriate prerequisite for design work, and specialized areas require degrees in other fields. Some advanced positions require a master's degree or a Ph.D.

Regardless of formal educational preparation, outside interest and study in the many interdisciplinary subjects that comprise the technician's "tool-kit" is vital. Electronics, computer science, physics, chemistry, mathematics, and psychology play important roles, as do music theory, composition, performance, and history. Anyone put off by the prospect of continuous education in these disparate subjects should consider seeking another career. Some excellent techs come from backgrounds seemingly unrelated to music technology.

Service work environments range from independent, one-person shops to multi-bench regional service facilities, manufacturing plants, and touring companies. For the technician who branches into modifications, custom

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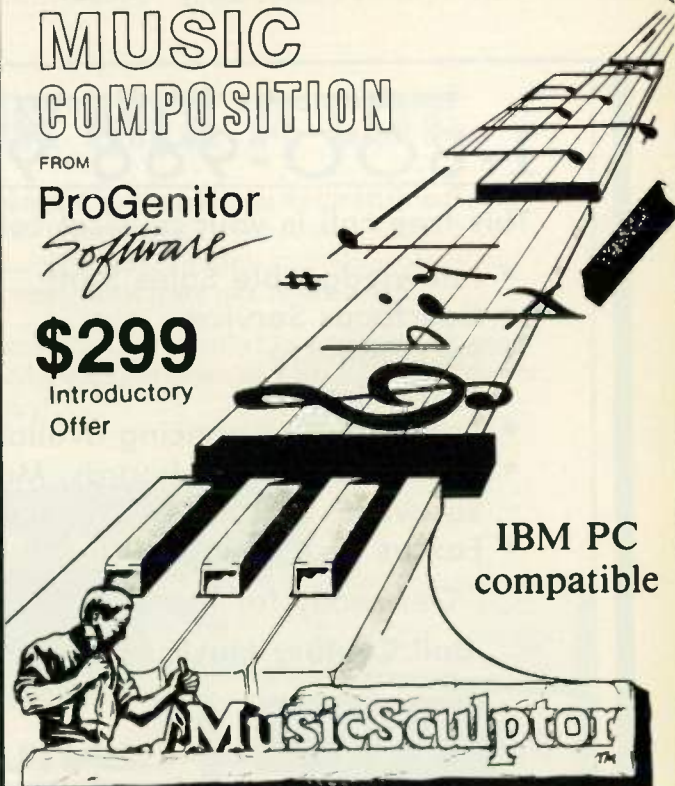
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# Reviews

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- 124 • Five Pin Press Drum Machine Patterns

## GeneralMusic S2/S3 Music Processor

By Scott Wilkinson

**Another super synth throws its hat into the ring.**

**G**eneralMusic's S2 and S3, which are identical except for the size of the keyboard, are the first professional products to bear the name of one of Italy's oldest electronic instrument manufacturers. Up until now, they have supplied instruments and parts to other companies. With the introduction of this multi-

timbral, sample-based synth with integrated sequencer, master keyboard functions, onboard DSP, and high-density 3.5-inch floppy disk drive, GeneralMusic hopes to emerge from its role in the background and become a bonafide leader in the electronic music industry.

### FIRST GLANCE

The S2 features 61 keys (76 on the S3) with a "lightly weighted" action that feels better than just about any other synth action I've played. The keyboard is sensitive to attack and release

Velocity, as well as Channel and Polyphonic Aftertouch. The pitch and mod wheels are oddly shaped in the form of upended flattened spheres, and the mod wheel has a center detent.

The large, graphic LCD boasts a resolution of 240 x 64 pixels. Backlighting provides the brightest synth display I've ever seen, which is well-suited to dark stages. The rest of the front panel

includes over 90 buttons and eight sliders. This might seem like an excessive number, but the buttons and sliders provide almost instant access to many functions.

On the rear panel, two independent MIDI Ins and Outs provide 32 channels of operation. The six audio outputs include a stereo master and four assignable mono outs, all of which use 18-bit DACs.

The S2 features a "multitasking" operating system. Among other things, it can load files from disk while playing a Song and responding to the keyboard and incoming MIDI data. In addition, you can jump from one edit page to another and return to the page and parameter you left.

### MAKING TRACKS

The S2 offers 32 oscillators with 16-note polyphony and 16-part multitimbral capability. Parts are called "Tracks" whether or not the sequencer is used, with independent key and Velocity ranges for each Track. The dynamic voice allocation can be defeated by assigning Priority status to a Track.

Each Track is independently controlled by up to four Sources: Local, MIDI In, Song, and Option. The Local Source is the keyboard plus incoming MIDI data on the common channel (if it's enabled). MIDI In refers to MIDI data on any channel other than the common channel (if it's enabled). The Song Source is the sequencer. Option refers to additional software features that will be available on floppy disk in the future. The ability to control each Track can be enabled or disabled for each Source.

There are 208 Waveforms (root samples) and 350 Sounds in 6 MB of ROM. The instrument's sample-based subtractive synthesis combines two copies of a Waveform and processes them through two resonant filters, an amplifier, a panner, and two DSPs to create a Sound (see Fig. 1). At the highest level of the hierarchy, Performances consist of one to sixteen Sounds that are



The GeneralMusic S2 synth has a good 61-key action, an outstanding sequencer, plenty of continuous controllers, and an adequate effects processor, but its ROM Sounds are of inconsistent quality.

PETER DIGGS



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● GENERAL MUSIC S2

assigned to Tracks, which are numbered from 1 to 16. In addition to the onboard ROM, there are 4 MB of user RAM, which are divided into two equal parts: 2 MB for imported samples and 2 MB for user-created Sounds, Performances, Songs, etc.

Sounds are organized according to the General MIDI Program Map, although the S2's 16-note polyphony is less than the GM minimum of 24 notes. There are 2,048 Sound locations in sixteen banks of 128 Sounds; 350 of these locations are occupied by the ROM Sounds. With this many locations, it's fortunate the S2 responds to the Bank Select message (Controller 0). The architecture resembles that of Roland's Sound Canvas, in which there are 128 Capital Tones and one or more Variations of some Tones. Having 1,698 Sound locations in RAM sounds great, but you will run out of RAM long before you fill all these locations.

There are also RAM locations for 100 Performances (in ten banks of ten) and ten Songs. Ten default Performances in Bank 1 are stored in ROM, but they can be replaced with user Performances.

**MEMORY LOSS**

Unlike virtually every other electronic keyboard on the market, *none* of the RAM is battery-backed, meaning that no user Sounds, Performances, Songs, DSP settings, or any other data are retained when the power is turned off. If you want to keep your work, you *must* save to floppy disk before powering down. To use your data, you must load it in from floppy every time you power

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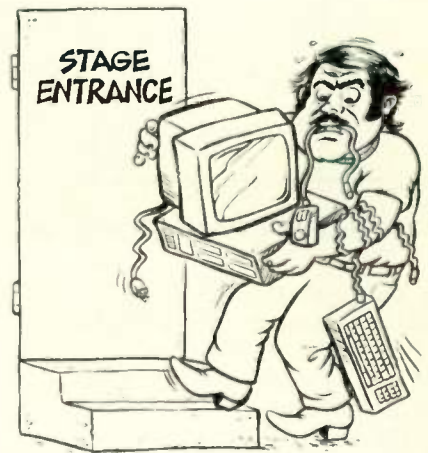
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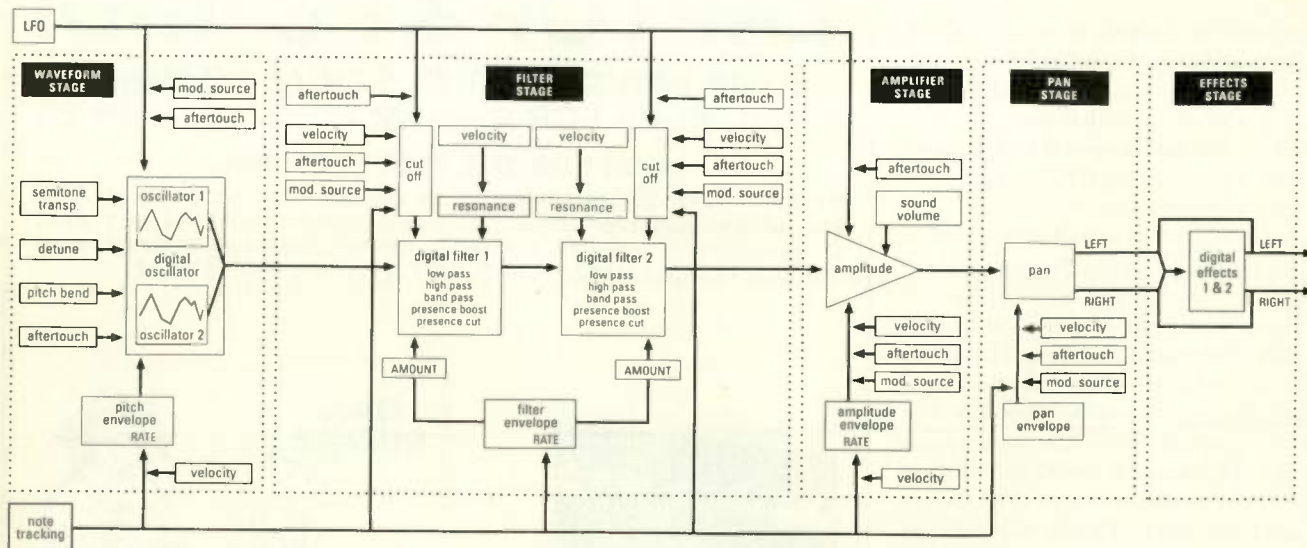


FIG. 1: The voice architecture of the S2 provides many opportunities for control. (Courtesy GeneralMusic Corp.)

up. Under these conditions, a SCSI port is absolutely essential; unfortunately, it isn't available on the S2. Not only that, the RAM is not expandable, and the half-and-half partition can't be altered. To top it off, I was astonished and dismayed to learn that there is no

SysEx dump/load facility. The manufacturer expects to add SysEx support as a software option, but its omission in the basic unit is absurd.

The floppy drive is compatible with PC and Atari formats. GeneralMusic originally intended to ship the S2 with

the ability to read Roland and Akai sample disks directly, but that feature has been delayed. This capability should be available as a software upgrade in the near future. An option for importing Sample Dump Standard files over MIDI also is expected. For

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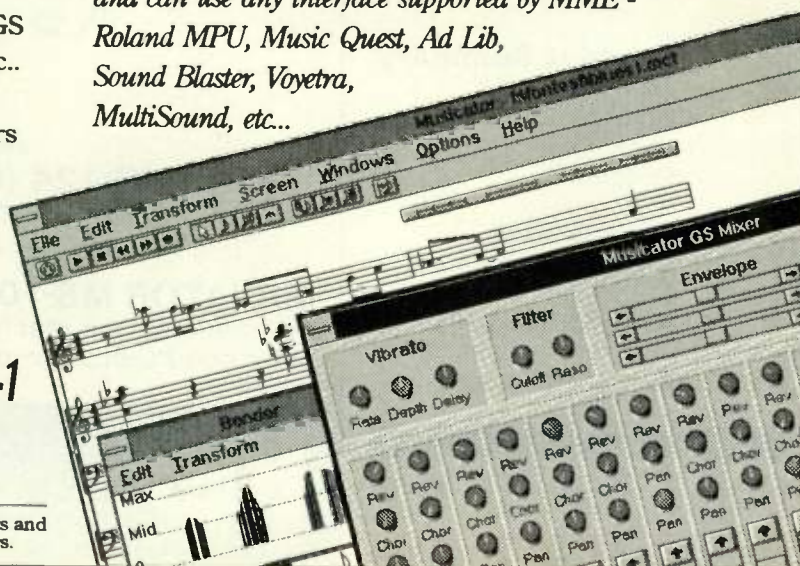
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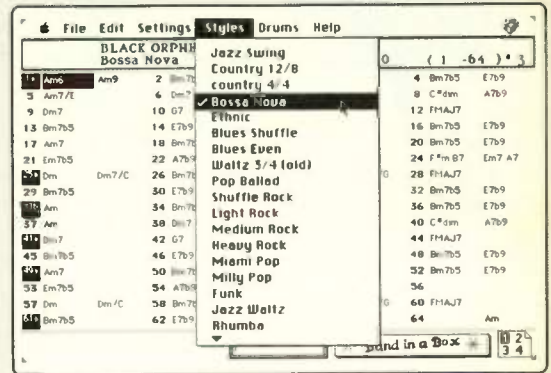
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## ● GENERALMUSIC S2

the moment, only samples on GeneralMusic disks can be loaded into the S2. On the other hand, PC and Atari disks can be used to load and save Standard MIDI Files directly.

### USER INTERFACE

Although the front panel includes over 90 buttons, they are organized into several logical groups. To the left of the LCD are nine "soft buttons": seven triangular Track Select buttons marked A through G and two rectangular Track Scroll buttons. The Track Select buttons select, and enable or mute, the Track that appears in the column along the right side of the display. If more than seven Tracks are in the current Performance, the Scroll buttons shift the column up or down to reveal additional Tracks.

To the right of the LCD is an identical set of soft buttons. These triangular Function buttons, marked A through G, activate functions indicated at the left side of the display. The buttons serve several functions, which are not always consistent. For example, Function button F aborts a Sound edit, while Function button G aborts a user tuning edit.

Unfortunately, the labels in the display are closer together than the Track Select and Function buttons, which means the buttons and labels are not fully aligned. The triangular shape and staggered positioning of the buttons allows them to be crowded together, but this makes it difficult to visually connect them with their labels.

Controllers include seven sliders and buttons that can be programmed to send a wide variety of MIDI messages. The pitch and mod wheels and foot-switch controllers also are programmable.

The sliders and buttons operate in one of two modes. In Panel mode, each button selects a different parameter of the sound, and each slider controls the parameter's value for its corresponding Track. For example, if the Volume button is activated, slider A controls the volume of the Track in position A in the display, slider B controls the volume of the Track in position B, etc. In User mode, each slider and button is programmed to send a specific MIDI message.

However, the use of the sliders in Panel mode is very confusing because each slider controls the Track that hap-

pens to be in the corresponding position in the display. For example, if Track 1 is in position A, it is controlled by slider A. If you then scroll the Track list so that Track 2 is in position A, Track 2 is now controlled by slider A.

To make Panel mode less confusing, I would have used eight sliders and enlarged the LCD to accommodate eight Tracks at a time with a Page Up/Down button that toggled the display between two sets of eight Tracks. That way, slider A would only control Track 1 or 9, slider B would only control Track 2 or 10, etc.

As with many keyboards today, data entry is accomplished using an infinite-rotation parameter wheel with detents, increment/decrement buttons, and/or an alphanumeric keypad. The position and unusual shape of the Enter button allows easy thumb activation as the fingers rotate the parameter wheel. I became quick at selecting and changing parameter values once I got the hang of the routine.

The Master Transpose buttons shift the entire instrument up or down by semitones. Unfortunately, the number of semitones is not indicated in the Normal display; you must enter the Track Transpose display to see it. Transposing a Track by an octave is easy, and each Track can be transposed by as much as five octaves up or down. The Master Transposition can be defeated for each Track independently, which is invaluable for drum parts.

The Clipboard function is way cool. All parameter values in any Edit page can be copied into one of six Clipboards, which can be named and saved. These Clipboards can then be "pasted" into any other appropriate Edit page, eliminating repetitive editing procedures. Unfortunately, the process of creating and pasting a Clipboard is roundabout and non-intuitive, but it's worth learning for the value it provides.

I found the user interface and editing process cumbersome and confusing at first, although I got used to it after awhile. Although it is usually consistent, it has some definite quirks. For example, none of the increment/decrement or scroll buttons continue to scroll when they are held, and the parameter wheel doesn't "wrap around" from the end of a list to the beginning. On the plus side, the Undo button is a wonderful addition; I wish more synths included this feature.

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Most of the Waveforms are looped with no inherent decay; exceptions include the percussive and other obviously short sounds. The decay is provided by the amplitude envelopes in a Sound. In general, the loops are relatively seamless, with few obvious glitches or hiccups.

The quality of the ROM Sounds is widely inconsistent. I really like some of the acoustic and electric pianos and basses, but others are entirely off the mark. When there are two or more variations of a particular type of sound, one of them often sounds excellent while the other is disappointing.

The S2 has no sample editing, as the Kurzweil K2000 does. Generally, only one Waveform is assigned to both oscillators in a Sound, although they can be detuned and affected by different pitch envelopes. I'd like to see the ability to assign two different Waveforms to any Sound.

There is a special case in which many Waveforms can be assigned to a Sound. Some of the ROM Sounds have a small keyboard symbol next to their name. This symbol indicates a Sound Patch in which one of two different Waveforms is heard, depending on the Velocity of the keystroke. In fact, two different Waveforms can be assigned to any region or even each individual note in the entire MIDI note range. This works well with a standard bass Waveform at low velocity and a slap bass Waveform at high Velocity.

Drum kits are assembled in a Sound Patch, as well. Each drum Waveform is assigned to its own note. One cool feature of a Sound Patch is the Exclude function, in which a value of 0 to 3 is set for each note. A value of 0 disables the function, but all notes with the same value of 1, 2, or 3 cut each other off. This feature is particularly useful for open and closed hi-hats.

The envelopes for each Sound are the most flexible and comprehensive I've ever seen. Amplitude, pitch, filter cutoff, and panning are controlled by

two envelopes each. The first envelope is triggered when a key is pressed, and the second envelope is triggered when the key is released. Key-on envelopes consist of two to ten segments (the number of segments is user-specified), each with its own time and level values. Key-off envelopes consist of one to ten segments.

The two filters in each Sound are arranged in series, and each one operates in one of five user-selectable ways: lowpass, highpass, bandpass, presence boost, or presence cut. The presence settings are most useful when placed after one of the first three types of filters; after the first filter removes some frequencies, the presence filter boosts or cuts the remaining frequencies. Presence cut is particularly useful for removing the whine or squeak from a resonant sound without weakening it.

An edited Sound is placed in a special buffer, isolating it from the rest of the instrument. This led to some confusion when I tried to edit a Sound and return to Normal mode to hear the results of my edits in context; instead of my edited Sound, I heard the unedited Sound. To hear the edited Sound in Normal mode, you must save the Sound first.

After changing Sounds in Normal mode and returning to Sound Edit mode, the original edited Sound is still there; this is true even if you make no changes. To edit a new Sound, you must save the current Sound (or abort the edit altogether), confirm your action, select a new Sound in Normal mode, and reenter the Sound Edit mode. It's a pretty convoluted process. This design is intended to maintain the paradigm of separate devices (keyboard, sound module, sequencer) within the S2, but how often do you edit a patch on a sound module that you don't want to hear in context before saving it to memory?

Sounds are saved in the Sound Library, which is organized into sixteen families, such as guitar, strings, and brass. This extremely useful feature lets you search for any Sound name containing a specified character string and jump from one family to the next instantly. Also, you can move Sounds from one location to another and delete Sounds.

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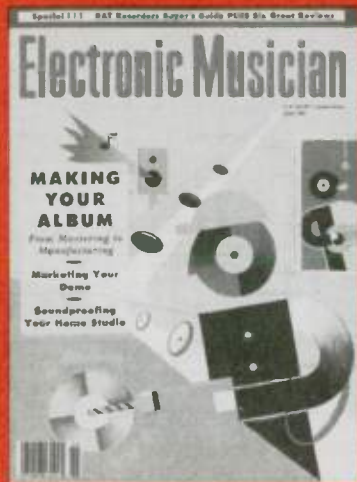
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Sounds assigned to Tracks in a Single, Layer, Split, or Multi configuration. Each Track can be enabled or muted independently for each Source (Local, MIDI In, Song, Option). For example, you can quickly disable sequencer control of one Track and play it from the keyboard as the other Tracks continue to respond to the sequencer.

The Track Configuration defines the number of Tracks in a Performance. Each Track can be independently connected to the Local and MIDI In Sources, the internal sound generator, and either MIDI Out. Each Track also is assigned a separate MIDI receive and transmit channel (see Fig. 2).

Among the Edit Performance parameters are seven MIDI In and Out filters for each Track. Unfortunately, the maximum pitch-bend range is three semitones; this is unforgivable. In addition, the seven velocity curves are not editable, or even displayed in the LCD.

**SEQUENCER**

The S2's sequencer is among the most sophisticated I've seen in a "workstation" product. The basic specs include a 250,000-note capacity, a resolution of 192 ppqn, and full editing capabilities. Type 1 Standard MIDI Files are fully supported, as well.

The sequencer provides sixteen Tracks and a Master Track that records changes in tempo, master volume, and effects settings. Each Track records in Replace or Overdub mode, and the manipulation of the user sliders and keys also is recorded, providing automated mixing.

The procedure for selecting a Track to record is somewhat problematic. First, make sure the Track you wish to record is visible in the display. Press Record, which fills the entire display screen with the message: "SELECT TO RECORD, <enter> to confirm, <exit> to abort." The next step is to select the desired Track and press Enter; however, the message obscures the Track list, so you must remember which Track you wish to record by its number rather than the name of its Sound. This message could easily fit in a smaller portion of the display.

Once a Track is selected, recording is relatively easy. I sequenced several internal Tracks from the keyboard and several additional internal Tracks from an Akai EW1 wind controller, processed through a Yamaha MEP4, which is pro-

grammed to add MIDI Volume messages to the Breath Controller messages sent by the EW1. This results in a lot of data, which the S2 handled without a hitch. I also sequenced a number of external modules from the S2 keyboard with no trouble. Loading disk files while playing a sequence posed no problems either.

The editing capabilities are comprehensive and well-organized. Specified events can be erased in any section of a Track. Bars can be inserted and deleted. Any section of a Track can be shifted in time by clock ticks, transposed within a specified note range, and copied to another Track. Note On and Off messages can be quantized separately. And a Microscope event-list editor plays each entry as you scroll through the list. All in all, these capabilities surpass any other workstation sequencer I've seen.

**MIDI**

The MIDI implementation of the S2 is thorough and thoughtful for the most part. The programmable sliders, wheels, and foot controllers can send any MIDI Control Change message from 0 to 31; the user buttons and

Changes on the common channel select a Performance, while Program Changes on any Track's receive channel select a Sound on that Track. A Bank Select (Controller 0) value from 0 to 15 lets you remotely select any Sound in the Sound Library.

The Panic Button sends All Notes Off, Pitch Bend 0, Channel Pressure 0, and Damper Pedal 0 on all sixteen channels. It also should send Note Off 0 to 127 and Reset All Controllers on all sixteen channels; not all synths respond to All Notes Off. In addition, the S2 sends Active Sensing, but there is no way to turn it off.

**EFFECTS**

The two effects processors are arranged in a fixed parallel configuration. Effect 1, Static Effects, provides 23 reverb algorithms in ROM, four of which are stereo. Effect 2, Dynamic Effects, provides 24 ROM algorithms including various delays, chorusing, flanging, phasing, a rotary speaker simulator, and several others, all of which are stereo. The signal from the effects is sent only to the stereo master outputs.

The effects presets are stored in the Effects Libraries, which are similar to

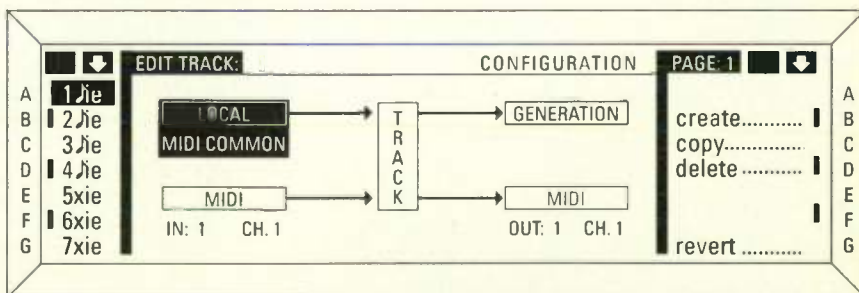


FIG. 2: Each Track in a Performance can be controlled by the Local (keyboard)/MIDI Common and MIDI In Sources. Its output can be directed to the internal sound generator and/or either MIDI Out.

footswitches can send any Control Change message from 0 to 31 and 64 to 79, with a programmable value. In both cases, the message is transmitted on a programmable MIDI channel. Also, these controls can be programmed with messages specific to the S2 such as FX1/2 Level and Rotary Simulator Slow/Fast.

Selecting a Performance sends a Program Change message on the transmit channel of each Track. Unfortunately, the S2 doesn't send Bank Select messages; only the assigned Sounds' program numbers are sent. Program

the Sound Library; there is a separate library for Effect 1 and 2. The effects are edited within the Libraries, and the parameters change according to the selected algorithm. Edited effects settings can be named and saved in the Libraries and used in Performances.

Overall, the reverbs sound fine at low levels, but they tend to get a bit harsh and grainy at high levels. The delays seem to diffuse sharp attacks a bit, and I don't hear much difference between the various delays, flangers, and phase shifters, although the quality of these effects is generally good. Given the lim-

ited selection of effects and the fixed configuration and routing of the processors, the effects capabilities are adequate, but not spectacular.

### CONCLUSION

The S2 is an extremely powerful and deep instrument that provides a lot of musical muscle. It is bound to be compared with the Kurzweil K2000, and rightly so. At the same price point, both instruments have strengths and weaknesses that make them worthy contenders. While the K2000 has expandable RAM to 64 MB, a SCSI port, a superior user interface, and more flexible synthesis and effects, the S2 offers a full-featured sequencer, two MIDI Ins and Outs, seven programmable sliders and buttons, and a superior keyboard. Depending on your particular requirements, the S2 is worth serious consideration.

*Neither rain nor sleet nor dark of night could keep EM technical editor Scott Wilkinson from finishing this review (more or less) on time.*

## Ensoniq KS-32 Synthesizer

By Charles R. Fischer

**An established synth family gets dressed up for heavy action.**

**U**ndaunted by the glut of keyboard synthesizers already on the market, Ensoniq has developed a synth it hopes to market to several "special interest" groups without losing the rest of us. (If that sounds like political thinking, well, this is an election year.) The company has put some thought into how certain groups of musicians use their instruments, added the resulting ideas to the SQ-1/2/R synth architecture, and created the KS-32. After working with the new instrument, I'll testify that in this case, both the "special interests" and

the common citizen benefit.

According to Ensoniq, the KS-32 was developed for performing pianists, church musicians, and educators. The conservative-looking unit is tastefully designed so that it's right at home in a church, living room, or hotel lounge, without calling undue attention to itself or announcing loudly, "Hey folks! This is a synthesizer!" But don't get the impression that only members of these groups will like the instrument; the KS-32 has a lot to offer a wide range of electronic musicians.

### CHIP OFF THE OLD CHIPS

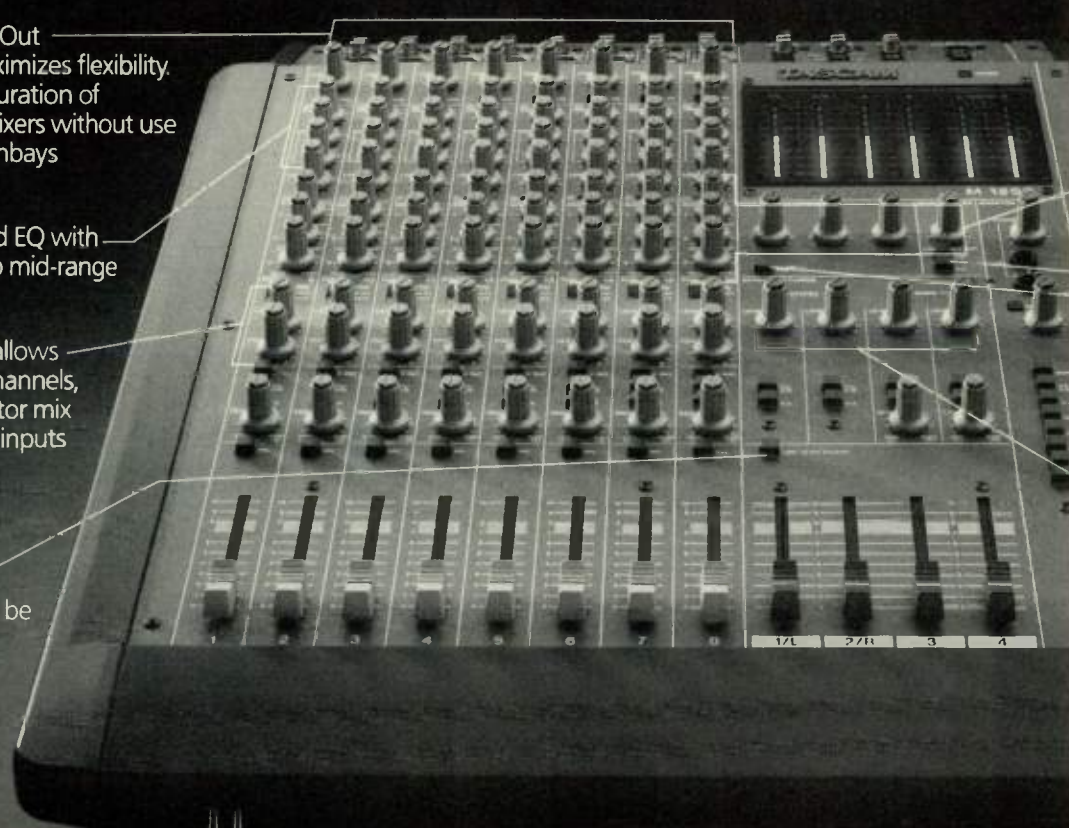
In many ways, the KS-32 closely resembles its older siblings, the SQ-1 (reviewed in the October 1990 EM) and SQ-2 (co-reviewed with Ensoniq's SD-1 in the November 1991 issue). The SQ instruments and KS-32 are 8-part multitimbral, have the same sample-based synth engine, use the same set of samples (but different presets), are equipped with the same onboard digital effects processor, and include a 16-track sequencer. Both SQ and KS

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synths include a sustain footswitch, a jack for an optional footpedal, and the expected mod and pitch wheels. In addition, the KS-32 can use any of the program cards for the SQ-series synths.

After the release of the SQ-1, Ensoniq expanded the instrument to 2 MB of samples by adding 1 MB of new piano samples. Shortly after EM's review of the SQ-2, Ensoniq expanded all SQ-

series synths (the SQ-1, SQ-2, and SQ-R tone module) from 21- to 32-voice polyphony and added a megabyte of new 16-bit ROM samples for a total of 3 MB. Ensoniq made a smart move with these upgrades; they keep the SQ line competitive, at least for awhile. The KS-32 inherited these features, too.

The biggest changes from the upgraded SQ-2 are the KS-32's new

weighted-action keyboard and an enhanced user interface. The KS-32 also comes equipped with a new collection of factory patches.

### THE KEYBOARD

The most noticeable difference between the KS-32 and its brethren is a 76-key, velocity-sensitive, channel pressure-sensitive, weighted keyboard in place of the SQ-2's semi-weighted action. The KS-32's keyboard (designed and built by well-known Italian MIDI keyboard manufacturer Fatar) should be suitable for anyone coming from a traditional piano background, as the feel is unusually good.

The keyboard's velocity response is shaped by fourteen onboard velocity curves. The curves are not the typical linear and exponential shapes and provide a slightly more musical response. Two curves offer fixed MIDI velocities of 64 and 127. The remaining dozen comprise two versions each—referred to as "Piano" and "Synth" responses—of six basic velocity curves. The difference between the two versions is that a



Ensoniq's KS-32 carries on the wavetable synthesis tradition of the SQ series, but adds a 76-key weighted-action keyboard and a friendlier user interface.

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## ● KS-32

Piano response includes a preprogrammed velocity offset so that it does not produce a sound when you depress a key using an extremely soft touch. This is an attempt to emulate the mechanism of an acoustic piano. A Synth response does not have an offset, so it responds to minimal velocities.

### AROUND THE TRACK

The other new item of interest is the user interface. The SQ-2 provides powerful features, but moving between parameters involves lots of button-pushing, taking care to press exactly the right buttons in the right order. With the KS, the difficulty of performing this delicate ballet is greatly reduced. Many of the most-performed tasks (such as changing between MIDI instruments and onboard sounds, layering sounds, and setting MIDI parameters) can be performed with one or two keystrokes, using clearly labeled parameter buttons. There are far fewer parameter pages hidden behind other pages than with the SQ-2.

A big part of the KS-32's power is its ability to easily create Performance Presets with up to sixteen independent Tracks with up to sixteen independent Tracks (Ensoniq's parlance for "instruments," as they also are used for sequencer tracks). The synth can hold up to 100 Performance Presets in user memory, 70 of which use up to eight Tracks (controlling internal or external sounds) and thirty of which can use sixteen Tracks using Ensoniq's Song Track structure.

Each Track can control MIDI sound modules, onboard sounds, or both, and possesses such programmable attributes as MIDI channel, key range, sustain pedal status, receive MIDI Pressure status (Channel, Key, or off), effects bus assignment, transpose, volume, pan, Timbre (MIDI Controller 71), and release time. This lets you create up to eight independent layers and splits, each controlled from its own Track button. As with Ensoniq's

SD-1 and EPS sampler, you can double-click the Track buttons to simultaneously activate as many Tracks as you wish. Owners of these instruments can testify to the excellence of this system.

One of the best new editing features is Layer Lock. Say you created a Preset with four layered sounds, and you want to edit the sounds one at a time while hearing the whole 4-layer Preset. First you hit Select Seq/Preset to call up your Preset. Then, while holding Select Seq/Preset, press Edit Track; this locks the four layers together and puts you in Edit Track mode. At this point, you can hit any Track button in the Preset and edit just that Track while hearing all four Tracks. It's an immensely useful feature.

The user interface changes make things much easier for the MIDI newcomer or the busy pro. Unfortunately, the manual makes things harder than they have to be. It offers too few practical "quick start" examples, some procedures are unnecessarily wordy, and the index occasionally refers you to non-existent pages. This is a complex instrument with many sophisticated features, and it deserves better documentation.

### SOUNDS

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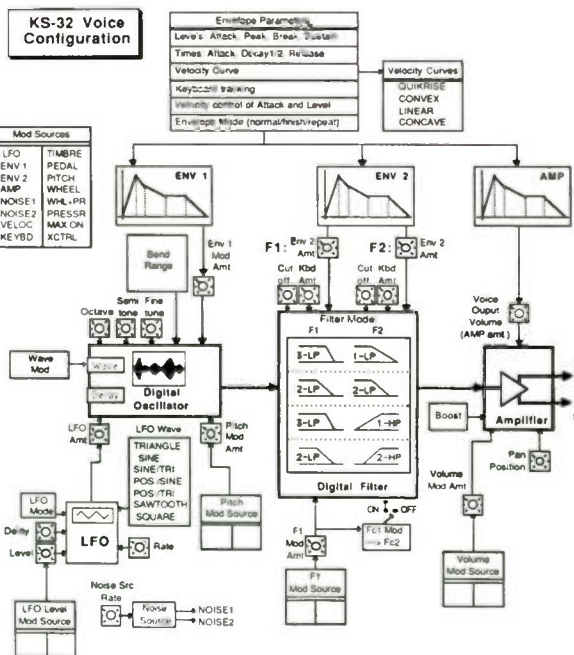


FIG. 1: Each KS-32 voice consists of a digital oscillator, two multi-mode filters, one LFO, three envelope generators, and a modulation scheme that routes up to fifteen modulation sources. (Courtesy Ensoniq Corp.)

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## ● KS-32

arrangement of sounds. Each bank is dedicated to a specific sound group (e.g., horns, keyboards, strings), which minimizes hunting for the right patch between songs.

Because the voice architecture (see Fig. 1) and onboard samples of the KS-32 are based on those in the SQ series, the sound is similar. The KS-32 comes equipped with 80 internal RAM patches, 100 ROM patches (including twenty drum kits), and a slot for optional patch-memory cards.

The onboard patches are predominantly "meat and potatoes" sounds for the working musician, including acoustic and electric keyboards, guitars, basses, horns, and strings. A substantial number of patches are dedicated to orchestral and traditional pop timbres, along with a few synthetic sounds (mostly basses and pads) and twenty drum/percussion kits. Surprisingly, many of the kits are tailored for Hip Hop and dance styles and don't seem to match the rest of the sounds.

The KS-32 is particularly strong in two categories of sounds: basses and electric pianos. You'll find an especially nice collection of acoustic, electric, and electronic bass sounds for just about every situation. But the KS really shines at reproducing electric pianos, ranging from the classic Fender Rhodes to contemporary digital sounds. I was impressed by the quality and variety offered. With nine acoustic and twelve electric piano programs alone, there are plenty of variations for the pianist.

Many of the KS-32's sounds are especially appropriate for religious and classical music. There is a wide selection of pipe organs that sound especially good for liturgical use, and the onboard reverb helps them sound impressive, even in a small room. The other traditional keyboards also should be acceptable to all but the most conservative of congregations. The numerous acoustic piano and the Hammond organ sounds varied tremendously in quality. The acoustic pianos are not the greatest; several (most noticeably "KS Grand Piano") suffer from a slightly reedy sound quality in their middle octaves. But both piano and Hammond groups offer plenty of variations for differing tastes.

Overall, most of the patches are decent or better; only a few are exceptionally good or bad. One of my

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favorite KS patches was an incredibly expressive pedal steel guitar that worked well with a number of musical styles. Another winner was a "Rich Solo Violin" that sounds especially impressive when played with convincing pitch-bending and modulation techniques.

#### EFFECTS

The KS has one onboard signal processor that runs a total of thirteen effects algorithms, each of which offers from one to three effects at a time. About half are dedicated reverb programs, or reverb combined with chorus, phase shifting, distortion, and compression. Ensoniq defined six preset effects combinations (e.g., flanger plus reverbs 1 and 2, chorus plus reverb, and compression plus distortion plus reverb), but you cannot change the order of effects. There's a rotating-speaker simulation, too. But there's not one algorithm for producing delay effects, which is puzzling.

Because one effects processor must be shared among all the instruments, the output of every voice (with volume and pan control) can be assigned to one of three buses: Dry (bypass), FX1, and FX2 (see Fig. 2). By using an algorithm with several effects (say, chorus and reverb), each sound or voice can have just reverb, reverb and chorus-ing, or be left dry. A preset can call up a global effects algorithm that overrides the effects programmed for the various sounds. But you'll have to process all the sounds with the global effects or none.

Understand from the start, the effects processor is no baby DP/4 in

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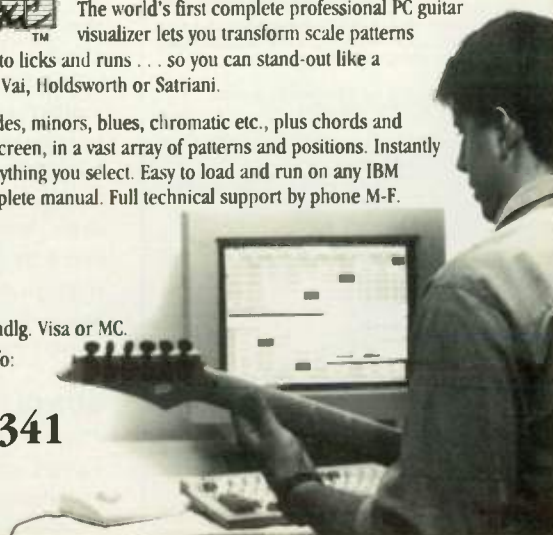
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## ● KS-32

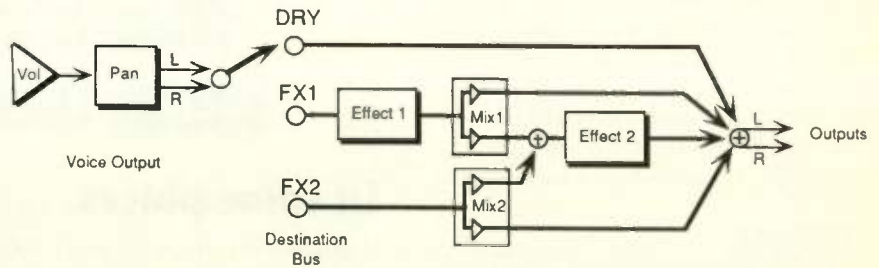


FIG. 2: The effects processor can produce two separate multi-effects algorithms at once. Each voice within a patch can be routed to either bus or can be left dry. (Courtesy Ensoniq Corp.)

disguise. The reverbs are good enough for a keyboard. The dedicated reverb algorithms are much more realistic than the reverbs paired with another effect. The distortion is the familiar, slightly gritty, DSP-chip type; I'd use it if I didn't want to haul outboard gear to a gig. I spent some time trying to edit the distortion on an electric guitar patch, but I could never get an acceptable emulation. And the rotating speaker sounds more like a phase shifter than a Leslie. But the sound quality of the effects is okay overall, and for most sounds, they get the job done.

Most of the common effects parameters are available, including seven reverb parameters (Decay Time, Diffusion, Detune Rate and Depth, etc.). The parameters can be modulated from the various wheels, pedals, and any of six envelope-type modulators called "Ramps."

### SEQUENCER

The onboard 16-track sequencer can hold up to 30 songs and 70 sequences. It offers a 96-ppqn timing resolution and up to 8,500 note capacity (which can be increased to 58,000 notes with the optional SQX-70 memory expander.)

The KS/SQ sequencer offers a good assortment of editing features for a hardware box, including MIDI-controller scaling and editing individual MIDI events. There is no onboard disk drive, but songs and sequences can be saved to RAM cards or via SysEx. The sequencer's features are described in more detail in the SQ-1 review mentioned earlier.

### CONCLUSION

The KS-32 has an excellent keyboard, a good sound module, a decent effects processor, and a good sequencer. A lot of powerful features lurk just beneath

the surface, where they're easily accessed. The sounds are well-chosen for the instrument's intended market, and the product is well-designed for live performances. And it looks good no matter where it's used.

Because of its excellent action and flexible Track assignment and editing scheme, the KS-32 is the first Ensoniq synth you could consider as a serious master keyboard, albeit with some caveats. Unlike a top-notch dedicated master keyboard, you can't rescale or remap a given controller (say, the mod wheel) to send different control messages on different tracks. There's only one MIDI Out, and incoming data at the MIDI In port is not merged and routed to all track destinations. But if you combined the KS with a good MIDI patch bay/processor, you'd have a superb MIDI control system.

As much as I like it, I have a few reservations about the KS-32. It lacks the ability to add new samples (using memory cards, ROMs, MIDI Sample Dump, or other methods), a feature found in quite a few other instruments these days. In addition, having more than a pair of audio outputs is mandatory for most serious users. Even a second pair of stereo outputs would have made a big difference.

So the KS-32 isn't the ultimate synthesizer. But it is a well-designed instrument that offers a fine action and an excellent combination of features. The price is more than reasonable considering what you get. Besides, when I sit down and play it, I feel good, and that's more important to me than its technical capabilities.

*Charles R. Fischer is a test technician for AKG Acoustics, Inc. He also writes for several magazines, designs custom MIDI controllers, and plays keyboards professionally.*

## Coda MusicProse for Windows

By Robert Kendall

**Finale's younger sibling tackles music notation, with eye-catching results.**

When Coda Music Software brought *Finale* from the Mac to Microsoft *Windows*, it made true desktop music publishing a reality on the IBM-compatible PC. Here at last was relatively accessible notation software that could turn just about anything you threw at it into engraver-quality output. *Finale* still demanded a hefty investment of both money and learning time, though. Now Coda's *MusicProse* has made the Mac-to-*Windows* journey, offering high-quality notation in a much simpler package for \$249, about a third the price of *Finale*.

To come up with *MusicProse*, Coda stripped away *Finale*'s panoply of specialized features and completely reworked the interface into something more manageable, though some elements are still recognizable. The two programs share the same file format and robust functionality, and both generate professional-quality printed output using the Petrucci music font.

Whether you're scoring for large ensembles, or creating lead sheets with lyrics, you'll find *MusicProse* covers most of the bases, but some notational complexities are over its head. The program usually does a good job of automating layout to keep manual note alignment chores down to a minimum. It also offers some rudimentary features for turning Standard MIDI Files or real-time MIDI input into notation and playing your scores on a MIDI instrument.

*MusicProse* provides a toolbox of eight icons for selecting different editing modes, such as note entry, changing staff attributes, adding musical expressions, creating lyrics, and so on. While you work, you can view your music either as it will appear laid out on the page or in a linear view that presents one long, scrollable system for easier editing. In either view, you can zoom in and out by any percentage.

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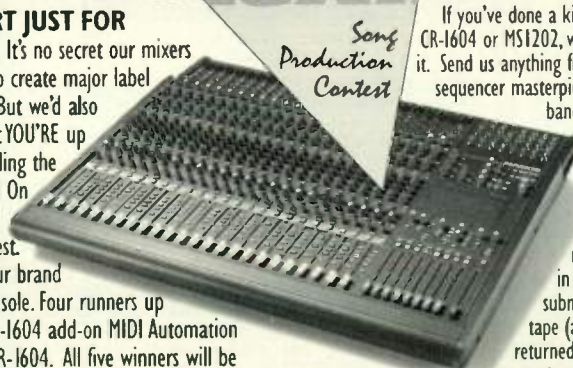
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disposal every method you could ever want. You can position notes on the staff with the mouse, selecting from a floating palette of note durations. You can use the numeric keypad for entering durations and use the letter keys or cursor keys for selecting pitch. (The latter method can prove fast and efficient with practice.) You can also step-enter notes with your MIDI keyboard, but this can be more awkward than in other programs because you must type in a duration for every note you play, even when they're all the same value.

### MIDI LIMITATIONS

*MusicProse* can also turn Standard MIDI Files or real-time MIDI input into notation. In this area, it invites comparison with Passport Design's *MusicTime* for *Windows*, a scaled-down version of that company's high-end notation/composing program, *Encore*. *MusicProse* and *MusicTime* are nearly identical in price and share most of the same features, but *MusicProse* comes up short in its MIDI implementation.

Though *MusicProse* lets you select a quantizing duration during import, this often isn't enough to keep expressive tempo inflections from introducing notational inaccuracies. *MusicProse* lacks *MusicTime*'s ability to quantize different sections or tracks of a song to different durations and try out alternative quantization settings after import. You may end up having to quantize some music in your sequencer before you import it to *MusicProse*, especially if it's highly syncopated or contains very different rhythms in different tracks. This limitation aside, MIDI import is highly accurate, though not infallible.

A HyperScribe option in *MusicProse* will transcribe, in real time, whatever you play on your MIDI controller. You can play to a metronome beat, or if you don't like metronomes, you can provide your own tempo by tapping the beat on the keyboard's sustain pedal while you play. This lets you vary the tempo during recording without sacrificing accuracy. As you record, HyperScribe will split your music onto two staves if you wish to transcribe a keyboard part. *MusicProse* also plays scores back on your MIDI equipment.

*MusicProse* lacks most of the MIDI recording and playback sequencer functions that make Passport's *MusicTime* a good all-around composer's

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tool. While you record with *MusicProse*, you can't simultaneously listen to the music on other staves. The program will assign different MIDI channels to different staves but won't send program numbers or MIDI controllers to your synthesizer, and you can't include tempo changes in a piece.

Particularly annoying is that *MusicProse* won't scroll your music to follow playback unless you compile your score as a separate playback file. Even then, I found that on my 16 MHz '386 with 6 MB of RAM, the screen redraw was so slow it rarely kept up with the music.

### KEEPING UP APPEARANCES

When it comes to dressing up your music, *MusicProse* can accommodate all but the most specialized expression marks. You select them from several different floating palettes, which you can show or hide at will (see Fig. 1). You can add to the contents of the Text Expression palette should you need something more descriptive than directions such as *Andante* or *Presto*. You create slurs and crescendos by dragging them to the correct shape.

Unfortunately, *MusicProse* won't automatically position articulation marks for you, which can make for some tedious manual alignment if you want,

### Product Summary

#### PRODUCT:

*MusicProse 2.0* for Windows

#### PRICE:

\$249

#### SYSTEM REQUIREMENTS:

IBM-compatible 80286 with 2 MB RAM (80386 with 4 MB recommended); 1.2 MB or 720 KB floppy drive; hard disk; EGA, VGA, or Hercules graphics display; mouse; DOS 3.0 or higher; Windows 3.0 or higher

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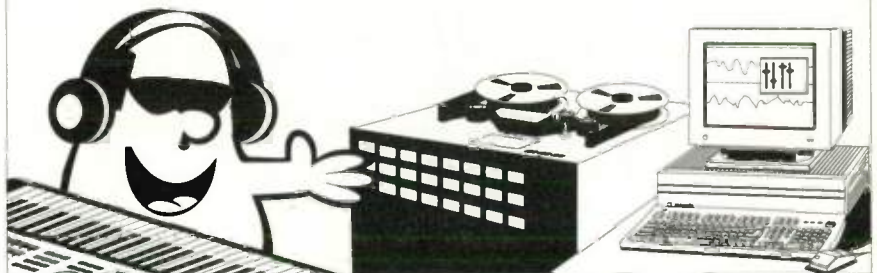
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say, to add staccato dots to twenty measures. The program will, however, keep articulation and other expression marks attached to the correct notes when you cut-and-paste or shift notes horizontally.

Adding multiverse lyrics is no problem. Typing in the complete lyrics (with spaces or hyphens between syllables) is one step and anchoring them to the music by clicking on notes is another (see Fig. 2). This can be easier and quicker than the usual approach of typing in, and then positioning, each syllable. If you change your mind about positioning, you have options for shifting several syllables at once to new notes.


The program is particularly good at adding chord symbols to lead sheets. You can select them from a library using a dialog box by clicking on the root and then a suffix (see Fig. 3). If you're uncertain of chord names, *MusicProse* will analyze chords you play on your MIDI keyboard and add the appropriate symbol to your music. You can even click on a chord in your score, and the program will name it.

The package comes with a set of guitar fingerboard symbols that you can also use to indicate chords, but you'll have to add these manually to your chart. (Unfortunately, you're stuck with the fingerings they offer; you can't create your own chord charts.) There are options for notating strumming patterns, too.

*MusicProse* has a respectable number of features for tackling highly complex music. For contrapuntal compositions, you can have two independent voices on the same staff, with options for controlling stem directions and rest positions automatically in each voice. *MusicProse* lets you create any time signature you want and can handle nearly any tuplet relationship (such as 23 in the time of 8) you throw at it. You can add grace notes singly or beamed together to form short "cadenzas." It can also handle some percussion notation.

Don't expect too much, though. There's no support for durations shorter than 64th notes, polymeters, clef changes in mid bar, cross-staff beaming, and other conventions commonly encountered in classical music.

Anyone scoring for large ensembles will find *MusicProse* a capable tool. It handles up to 32 staves per system and extracts any number of parts you want



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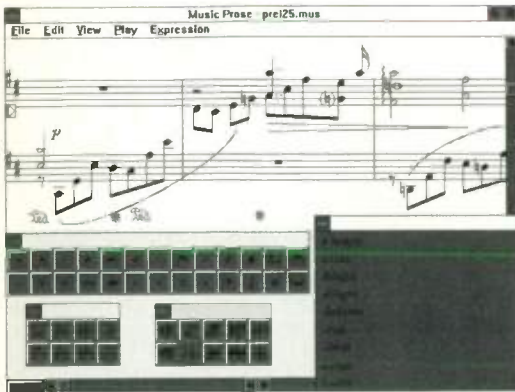


FIG. 1: *MusicProse* offers four floating palettes from which you can select expression marks to place in your score.

from a full score in a single, simple operation. It can accommodate multi-staff parts and will reduce any long section where an instrument doesn't play to a single bar containing a block rest.

Once you've entered or imported your music, *MusicProse* does a pretty good job of automatically realigning it to avoid overlaps of notes, accidentals, and bar lines. To eliminate crowding, it allots less space to long notes than to a series of short notes that take up the same amount of time. On top of this, it affords you complete control over the number of measures per system and over the size of each system (see Fig. 4).

As in any notation program, the auto-alignment options aren't enough to tidy up all the visual infelicities. *MusicProse* lets you make manual adjustments by shifting notes horizontally, resizing individual bars, or flipping stems. You'll be stuck, however, if you want to change the distance between an accidental and its note head, or alter the length of a stem.

When you're ready to add the finishing touches to your music, *MusicProse* obliges with flexible options for titles, headers, footers, annotations, and page numbers. It automatically numbers bars, though sometimes in a rather unorthodox fashion. (For example, if you decide to number every tenth bar, it will number bars 1, 11, 21, and so on, rather than the conventional 10, 20, and 30.)

The package comes with no text fonts of its own but lets you use any TrueType or PostScript Type 1 font for any

sort of text in the score. Its music fonts also are compatible with *Adobe Type Manager*.

Printing with a Hewlett-Packard LaserJet III yielded superb output in both PCL and PostScript mode, with no unpleasant surprises. The only noticeable blemish was a slight jaggedness to crescendos. With a PostScript printer, you can even shrink the page down to any size to create pocket scores. Twenty-four-pin dot matrix output was as attractive as could be expected.

### NOT THE GREATEST OF EASE

The *MusicProse* documentation is generally clear and well-indexed, comes with a quick-reference card, and includes a useful tutorial to get you started. Online help would be a big asset, though.

The program may be easy to use compared with *Finale*, but when placed beside Passport's *MusicTime*, or even *Encore*, its interface seems overly complex and rather inconsistent. When performing tasks, I found myself too often trying to remember whether I should Shift-click on an object in my score; first select an icon, then Control-click on the staff, and then click on a handle; or just pull down a menu option.

When you want to move a note, expression mark, bar line, staff, or anything else to a new position in *MusicTime*, you just click and drag. In *MusicProse*, you must first enter the correct editing mode, and then figure out how to select the object you want. Some

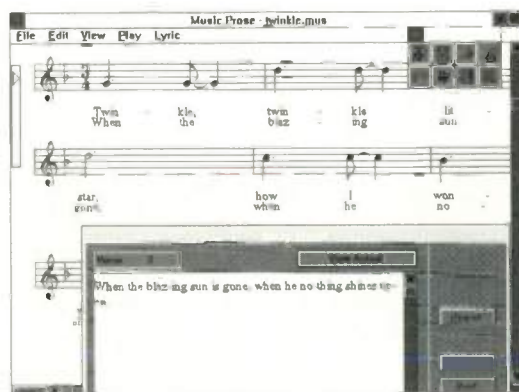


FIG. 2: To add lyrics to a song in *MusicProse*, you first type them into this window, then attach them to your music one syllable at a time by clicking on notes.

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other editing procedures are less flexible in *MusicProse* because you can select only whole measures, rather than any group of adjacent or non-adjacent notes, for cutting-and-pasting or transposing.

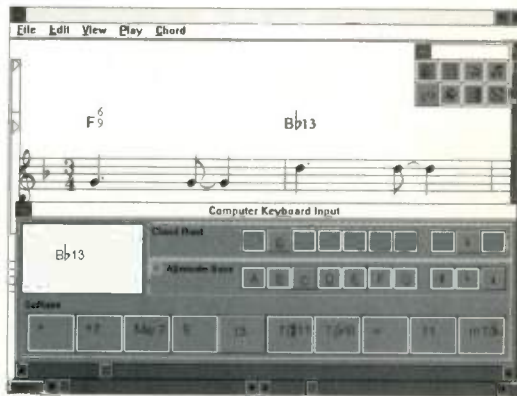
*MusicProse* has a number of confusing and undocumented quirks. For example, if a chord contains the interval of a second (and thus has noteheads on either side of the stem), you can't attach an accidental to the note on the "wrong" side of the stem with the usual method of clicking on the notehead; you must click on the stem instead.

There are also a few bugs, though not as many as I've come to expect in new *Windows* products. The only serious one I encountered was that when importing a MIDI file, I couldn't assign staves to different channels unless I first added and deleted a blank staff. Coda promises a fix for this in the next release.

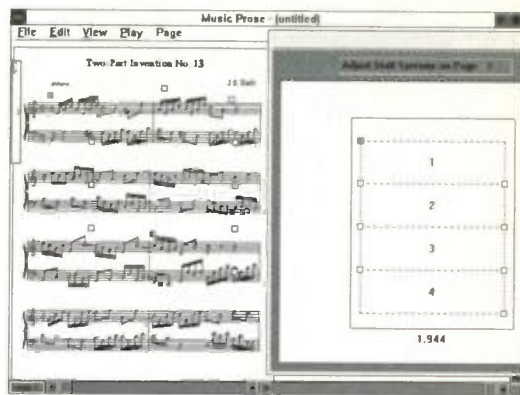
One of *MusicProse's* biggest liabilities is its sluggish performance. Even on a 25 MHz 80386, screen redraws are frustratingly slow. On a slower machine, they can be downright exasperating, especially in full-page view. The problem is compounded by the program's insistence on redrawing the entire screen, even when you change just a single note. I had to depend heavily on the Interrupt Redraw option, and I even turned off note-redrawing when I was positioning text. Loading, and especially importing, files also can be very time consuming.

**MUSICPROSE OR MUSICTIME?**

In the final analysis, how does *MusicProse* stack up against Passport's *MusicTime*, its closest competitor? If you're working with music for large ensembles, *MusicProse* is the clear choice, because the Passport program limits you to six staves per system and can't extract parts. *MusicProse* also is better at analyzing chords to create chord symbols and at handling tuplets. It often does a slightly better job of auto-aligning notes and provides a zoom function that *MusicTime* lacks.



**FIG. 3:** One option for creating chord symbols with *MusicProse* is this dialog box, which lets you select each chord's root and suffix by clicking on buttons.



**FIG. 4:** *MusicProse* lets you position and size each system individually by dragging the outlines that appear in the window on the right.

If you're a composer or arranger and want to hear your music while you create and notate it, go with *MusicTime* and its superbly integrated sequencer functions. *MusicTime* also offers more flexibility in quantizing imported MIDI files and comes bundled with *Adobe Type Manager* and several text fonts. Overall, *MusicTime* is the more satisfying program to work with because of its superior user interface and speedy screen redraws and file loading.

Despite its flaws, *MusicProse* is an impressive program for its price, and it is a welcome addition to the *Windows* world. Musicians working in nearly any style will find *MusicProse* a reliable and valuable tool for turning their work into professional-looking printed scores.

*Robert Kendall is a composer, multimedia artist, and writer. Over 100 of his articles and reviews on computers and MIDI have appeared in various national publications.*

## Allen & Heath GS3-16 Compact Mixer

By Neal Brighton

**This clean, compact console mutes on cue.**

**T**he increased audio quality produced—and demanded—by home/project studios has pushed mixer companies to design compact mixers with the versatility and power of expensive, large-frame mixers. But it hasn't been easy developing an ideal home-studio mixer.

First, the compact mixer must offer professional features at semi-pro prices. Then it must cram in an abundance of line inputs to accommodate all the sound modules and signal processors needed for MIDI production. And finally, it must produce killer sound.

So it's quite a nice surprise when a manufacturer offers all of the above and more. Allen & Heath's GS3 series of compact mixers offers an expandable in-line console format; comprehensive EQ; six aux buses; four stereo effects returns (with EQ!); automatic dubbing between master recorders; talkback; LED bargraph metering and peak LEDs; insert points for channels, subgroups, and the stereo bus; 100 mm faders; and a frequency (test tone) oscillator.

But the big news is that the GS3-16 also includes an onboard sequencer that automates muting of channels, monitors, and effects sends/returns.

### SETTING UP

The obvious byproduct of a compact mixer is space conservation. It seems there's never enough room for a recordist's endless collection of audio toys, and the GS3-16 leaves a sensible footprint. The 16 x 8 x 2 model tested is approximately 31 x 28 inches and weighs about 48 pounds. I carried the GS3-16 between the main recording rooms and upstairs MIDI studio at my 16-track production facility without breaking a sweat; the lip under the console's forearm rest makes a great handle. This easy portability is an advantage. Location recordists could

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## ● GS3-16

mate the GS3-16 with an ADAT and transport an entire live-recording system in the back seat of a Toyota Tercel.

However, Allen & Heath didn't limit the GS3 series to the conquest of space. Well-designed inputs and outputs effectively elevate the GS3-16 to a "plug-in and play" console. All connections (inserts, line inputs, aux sends, aux returns, etc.) are available at the top rear of the unit. Such accessibility allows the top rear panel to act as a simple patch bay. Therefore, the average home recordist can save hundreds of dollars in patch-bay parts and escape hours of wiring.

Microphone inputs are standard XLR, with variable gain from +10 dB to +70 dB. Line inputs can be configured as either balanced or unbalanced and offer variable gain from -10 dB to +20 dB. All input channels have switchable 48V phantom power.

Our review model was factory-set at a -10 dBV operating level. The GS3 series can be configured for +4 dBu operation, so be sure to alert your local dealer to your preference. Although changing operating levels is simply a matter of cutting the appropriate resistors, the modification should be done by a qualified technician.

Likewise, the 1/4-inch tape sends and returns can be set up to run either +4 dBu balanced or -10 dBV unbalanced. To maintain proper levels, be sure to match the configuration of the GS3-16 to that of your tape deck. All input channels and subgroups have 1/4-inch TRS insert points. The stereo bus insert is unbalanced.

The only design feature I wasn't thrilled about is the GS3-16's integrated construction. A non-modular design means the entire board must be brought in for repairs, rather than a single malfunctioning input (or master) module. In addition, all maintenance must be done via the bottom panel. Although most home recordists do not replace their own pots and faders (I do), it's still inconvenient to lose the whole console to fix a scratchy fader.

## SIGNAL ROUTING/PROCESSING

The GS3 mixers offer a highly flexible signal-routing and processing scheme. Even without mute automation (which I'll discuss shortly), you can do a surprising amount with the aux buses,

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patch-bay functions, and especially the EQ.

The GS3-16 offers four post-fader aux sends with a versatile switching system. Aux 1 can be routed to both the input channel and the monitor channel. (Remember, the GS3-16 is an in-line board, so the channel and monitor sections share the same module.) During mixdown, this option allows an environmental reverb set up for your guitar on channel 10 to also process the virtual synthesizer track returning on monitor channel 10. Aux sends 2 and 3 are dedicated to the input channel only. However, aux 4 can be switched between the input channel and the monitor channel.

Each section (channel and monitor) also has a dedicated pre-fader aux send for cue (headphone) feeds. These aux sends also function as additional effects sends during mixdown, if it's appropriate to run the desired processing pre-fader.

Allen & Heath has provided another function that could save the recordist the expense of a patch bay. Typically, routing signals direct from the input channel to tape requires outboard patching. However, the GS3 offers a handy direct-to-tape switch on every input channel that automatically routes the signal to the tape deck.

The subgroups are accessed in the standard manner, via an assignment button on each input channel. The channel pan pot routes signal to groups 1, 3, 5, and 7 with a twist to the left and to groups 2, 4, 6, and 8 with a twist to the right. In addition, the subgroups feed the tape outputs in banks of eight, so if you have a 24 x 8 board (three banks of eight), subgroup 1 feeds tracks 1, 9, and 17 simultaneously.

The board utilizes PFL, rather than the preferred—albeit more expensive—solo-in-place (which allows stereo imaging in solo mode). However, the flexible muting scheme allows one function key to mute unwanted tracks on the board, initializing *faux* solo-in-place.

The GS3-16's EQ is well-designed and flexible, with practically every signal path (input channels, tape monitors,



Allen & Heath's GS3 mixer offers extremely flexible signal routing; a clean, warm equalization section; and automated muting that can be controlled via MIDI.

and effects returns) receiving some level of dedicated tonal processing. The input channels offer 12 kHz shelving equalizing, followed by sweepable mids (300 Hz to 12 kHz). The low-frequency band is sweepable between 20 Hz to 600 Hz. Each monitor channel and the stereo aux returns have 10 kHz shelving EQ, followed by a 100 Hz lowpass filter. Each band cuts or boosts by 14 dB.

#### MUTING

The big feature of this board is its automated muting. On its face, mute automation alone doesn't sound like much; higher-priced mixers such as Tascam's 3700 offer much more complete automation packages, as does the low-priced Mark of the Unicorn MIDI Mixer 7s line mixer. But the former costs a lot more, and the latter has few features and inferior audio quality. You can do some nice tricks with the GS3's auto-muting and enjoy a quality mixer, with less chance of bankruptcy.

The GS3-16's onboard, non-MIDI sequencer controls the muting functions of every input channel, tape monitor, stereo effects return, and send. Muting configurations can be stored as snapshot patches in the GS3-16's 32 user-programmable memories. (There also is a default patch that turns all mutes off.) A sequence of mute and patch events can be saved as a Song. The Songs and patches can be dumped via MIDI System Exclusive to a computer or SysEx recorder.

In addition, each of the seven Learn (function) keys, F1 to F7, can be programmed to recall a specific internal

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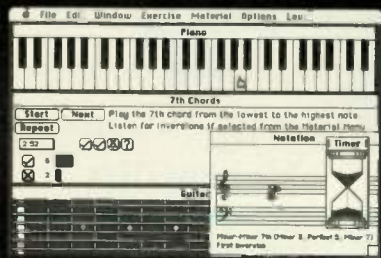
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mute patch. You can manually scroll through a number of muting schemes during mixdown, or use a footswitch (which activates F7's function) for "hands-off" scrolling through muting scenes and functions. The Learn keys supposedly can be programmed to output a MIDI message, too, but this function was not operative in the review unit. According to an Allen & Heath representative, a software upgrade is now available that corrects the problem.

The most obvious way of using the GS3-16's muting functions is to have the mixer's internal sequencer trigger the muting scheme while synched to tape, just as you would trigger virtual MIDI tracks. The GS3-16 allows real-time muting during mixdown, as well as the ability to update mutes when

needed, and I had no trouble getting the sequencer to chase time code striped to tape. (The GS3 understands MIDI Clocks with Song Position Pointer, so if you use SMPTE, you'll need a converter box.)

But if your recording includes MIDI virtual tracks from a computer-based sequencer, you may wish to store the mute settings within the main sequence. (Besides, if you want to back up your settings, you must use MIDI, as there is no other way to offload GS3 patches.) Controlling the mutes from a computer-sequencer is even more powerful if your sequencer and tape deck support some form of machine control (e.g., Steinberg's *Cubase* with a Fostex G16S or R8 tape recorder).

If MIDI is enabled, the GS3 sends and receives mute on/off instructions in either of two forms, depending on the console's mode: as MIDI Note On/Off events, or as Controller 116 and 117 events. In the former mode, specific MIDI Note Ons unmute the channels, monitors, sends, and returns, and the corresponding Note Off messages mute them. (For example, Note On 32 unmutes mixer channel 1, and Note Off 32 mutes it; Note On/Off 33

controls monitor send 1; and Note On/Off 18 controls stereo return 1.) A chart is provided that shows which MIDI note numbers switch which console channel mutes.

Why did Allen & Heath provide both MIDI Note and Controller modes? It's easier to edit notes, but if you need to put the mixer on the same MIDI channel as a synth, the Controller messages won't cause a problem by triggering unwanted synth notes.

▼

**The flexibility  
of the cue  
system makes  
it possible to  
offer cranky  
musicians three  
headphone mix  
choices.**

Recordists fearing a HAL-type mutiny (the renegade computer that took over a spacecraft in the movie *2001: A Space Odyssey*) can bypass automation and utilize manual muting. A simple Mute button kills the audio signal on the selected input channels.

The GS3 can change mute patches with the Incre-

ment and Decrement keys or the footswitch, but it also sends and receives MIDI Program Change commands. The console supports Local On/Off so you can send Program Change messages from the onboard sequencer to outboard MIDI gear without changing the console patch.

### MASTER SECTION

Allen & Heath's commitment to versatility continues with two master-control features. First, the two tape returns offer "automatic dubbing" between two master recorders. When a mix is completed, you can run signal from your DAT deck to your cassette recorder by pushing a button. Once again, this helpful feature makes a patch bay superfluous.

Second, the GS3-16 allows switching between two separate monitor systems. Although you'll need two power amps and two speaker systems to exploit this feature, it allows a comprehensive critical listening environment to be configured within the means of your budget. An inexpensive dual system can be created with your conventional monitor amp and speakers and a boom box or home stereo.



## TEST DRIVE

I hooked the board into our MIDI studio, which utilizes a Crown DC300A power amp and Yamaha NS10M monitor speakers. Immediately, I could tell the GS3-16 was a clean board. The stereo bus exhibited minimal audible hiss, even with all the channel faders full up. Confident of a "clean house," I used the GS3-16 on a variety of conventional and MIDI production sessions.

**Equalization.** For the most part, the GS3-16's EQ was clean and smooth. On a subjective analysis, the tonal quality seemed better suited for keyboards, guitars, and percussion, than for vocals, however. I just couldn't shape pleasing mid frequencies for most of the singers I recorded, and I ended up using an outboard graphic equalizer in those situations.

Also, the crowded layout of the knobs (a side effect of any compact mixer design) was a constant bane to my stout fingers. In addition, the GS3-16 has no LED to announce whether the EQ is on or off, and I often tweaked "dead" pots wondering if I was going deaf.

**Recording.** The versatile routing structure of the GS3-16 is quite welcome when recording basic tracks. You can even use the four stereo effects returns to assign effects to the subgroups. This means you can record tracks with effects without losing an input channel to initiate the dry signal and effect submix.

The flexibility of the cue system makes it possible to offer cranky musicians three headphone mix choices: a

## Product Summary

### PRODUCT:

GS3 Mixing Console

### PRICE:

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GS3-24 \$6,995

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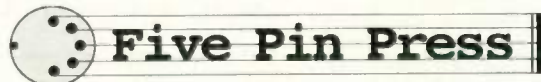
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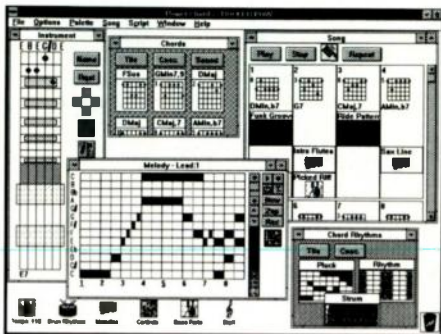
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## ● GS3-16

mono cue mix from the pre-fader aux sends, a stereo mix off the stereo bus (this may require a separate amp, as the GS3's headphone amp is too weak to be heard over loud instruments such as drums), or a combination of the stereo bus mix and pre-fader aux sends off the GS3-16's stereo headphone jack. (Admittedly, the last option is a bit weird, but it allows a stereo cue mix without a separate amp.)

**Mixing.** Of course, the real test of a board comes during mixdown, and the GS3-16 performed well during a variety of real-world mixes. The flexibility of being able to run the tape monitors as line inputs was great. I could mix sixteen channel lines, sixteen line inputs (the tape monitors), and four stereo returns, all with dedicated EQ. I also got eight more returns by feeding signals into the subgroup inserts and using the subgroup faders as volume controls. That's 44 total tape and/or effects returns, a ton of mixing power in any arena.

## CONCLUSION

This is a well-constructed, well-designed board for the home or project studio. The muting features are wonderful, but the way the muting schemes are translated into MIDI is pretty strange.

Unfortunately, the GS3 manual is wretched, especially with regard to the MIDI implementation. Written in Great Britain, the manual's language is dense and was not adapted for an American reader. The MIDI section is much more difficult to understand than it should be considering the mixer's minimal MIDI functions, and even those few features (e.g., what control messages are sent) are not clearly explained.

Even without automation, the GS3-16 would be a top-notch conventional mixer. But the MIDI-controllable mute automation features are the key to the console's real power. Just think; if you added MIDI-controlled, VCA-based level automation to the GS3-16 (a feature that is under development at Allen & Heath), you might give those smug SSL jockeys a scare. Hey, it could happen!

*Studio owner and independent engineer/producer Neal Brighton is all for downsizing, so long as the practice doesn't extend to record-label production budgets.*

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## SongWright Software SongWright 5.1 (PC)

By Allan Metts

### Low-cost music notation and sequencing for PC-compatibles.

When I first saw the ads for SongWright Software's *SongWright 5.1*, I envisioned a sequencer that displays and prints sequences using standard music notation. But *SongWright* is first and foremost a notation program; its basic sequencing features are secondary.

*SongWright* is a collection of ten program modules for the MS-DOS environment that let you enter, edit, play, and print music in standard music notation (see Fig. 1). A capable graphics editor lets you create your own musical symbols for use with the program. For those without MIDI equipment, this program works with an AdLib-compatible sound card or the PC speaker.

### GETTING STARTED

*SongWright's* installer copied all necessary files to my hard drive, but I had to complete the process manually by specifying the MIDI interface, printer, and monitor settings in the Utility module. I ransacked my stack of owner's manuals to find the default address and interrupt settings for my MIDI interface, only to discover in the program's manual that these settings weren't necessary for my situation. A more user-friendly installation process and configuration routine would eliminate many headaches, especially for

the first-time MIDI user.

There should be more monitor options, as well; I reviewed the program on a gray-scale monitor and had trouble finding a screen setting I liked. I finally settled on EGA Mono, but the notes were still hard to see in some modules.

After installation and setup, the first thing to do is get some music into the program. *SongWright* offers several options for accomplishing this task. For starters, you can input notes, rests, and other musical symbols, one at a time, in the Compose module (see Fig. 2). Each musical element has several parameters that are normally entered from the computer keyboard, but a MIDI instrument can be used to enter pitched notes. (Alternate noteheads, such as drum notes, must be entered manually.) Plenty of shortcuts are available to save keystrokes, and the program does a good job of anticipating the next note's parameters.

*SongWright's* notation capabilities are pretty complete. Six different clefs and a wide range of tuplets are available. Accidentals are placed intelligently; *SongWright* doesn't display any accidentals that appear in the key signature or earlier in the same measure. You can enter time and key signatures at any measure boundary, and clefs, dynamics, and metronome (tempo) settings can be entered anywhere.

Slur placement is flexible, but I had trouble getting slurs high enough on one song. Note-beaming is supported, but beams are visible only when you print your music. Other notation features missing from the program include notes shorter than thirty-second notes, key signatures that contain both sharps and flats, complex time signatures (6/8 + 3/4, etc.), and note-beaming across staves.

*SongWright* lets you place five lines of text with each staff (one line above, four below). You can enter chord symbols in these text lines, and the program correctly transposes them. However, fretboard symbols must be created and entered one at a time. Using the graphic editor in the Symbol module, you can create any symbols that aren't

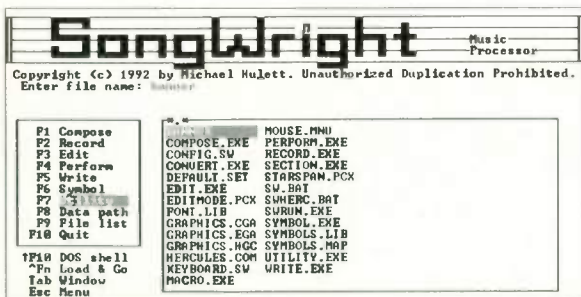


FIG. 1: *SongWright's* main menu provides access to all ten program modules.

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● SONGWRIGHT

built into *SongWright*.

If entering individual notes isn't for you, move over to the Record module to record notes in real time or step time. *SongWright* has an unusual step-time recording procedure: Notes are first recorded into the computer's memory, then placed in the score by tapping out the part's rhythm on the computer keyboard.

Real-time recording is more intuitive, although the MIDI channel for real-time recording is displayed in the step-

time screen. As you record, *SongWright* draws horizontal "piano-roll" bars on a musical staff. When you're satisfied with the recording, pressing a function key transcribes the recording into musical notation. Subsequent recordings can begin at any measure in the song, allowing you to build up a song by adding a measure or two at a time.

If you jump to the Compose or Edit modules to alter your recording, all the Record module's configuration settings (key and time signatures, metronome settings, etc.) are reset to their default values. Having to reconfigure the Record module every time you enter it is extremely aggravating to say the least. According to the company, this problem will be fixed in a future version of the program.

If you've already recorded your song in a sequencer that supports Standard MIDI Files

(SMFs), the Convert module imports your music into *SongWright*. This module reads Types 0, 1, and 2 Standard MIDI Files and writes Types 0 and 1. You can map each of the sixteen MIDI channels to eight staves, with no more than two polyphonic sequencer tracks per staff.

*SongWright* converts SMF notes using either staccato or legato mode, which determines how rests are notated. Unfortunately, the program applies a single mode to the whole song. I wanted the ability to specify this parameter separately for each MIDI channel; legato mode worked great for my string parts, but the punchy brass parts that went with them needed staccato mode. You can work around this limitation by converting the legato tracks and staccato tracks separately, then merging them in the Edit module.

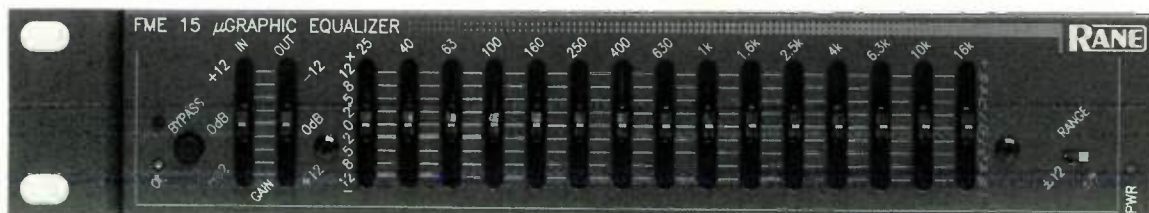
**EDITING**

Individual notes and symbols can be edited in the Compose module by altering the parameters attached to each object on the screen. I found this to



FIG. 2: The Compose module allows you to notate a wide variety of musical notes, rests, and symbols.

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be a bit cumbersome, and I began to crave a "drag-and-drop" interface that would let me alter the notes and symbols by highlighting and changing them with a mouse. In addition, the Compose feature works with only one line on one page at a time, which is stifling; a scrolling "endless staff" would be more flexible. Cut-and-paste operations are available, and the Undo feature remembers the last ten changes in case you mess something up.

If you need to see a bigger picture, the Edit module lets you work with groups of measures. This module can handle only eight staves at once, but it isn't restricted by page boundaries.

▼

**Notes are  
recorded into  
memory, then  
placed in the  
score by tapping  
out the rhythm  
on the computer  
keyboard.**

In the Edit module, you can cut, copy, and paste measures to any other location within the song.

The Section module enables you to work with your music in even larger pieces. It lets you cut-and-paste vertically across measure boundaries, or horizontally across staff boundaries. Also, you can work around the 8-staff restriction in the Edit module by breaking your song into more manageable pieces. For instance, if your score consists of sixteen staves, you can use the Section module to break it into two 8-staff sections, which can then be brought into the Edit module. In addition, the Section module can extract individual parts from chordal harmonies or combine individual parts into chords.

Even with three different editing modules, it is not possible to shift an entire song in time by one or more beats from within the program. The

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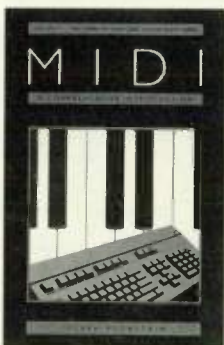
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## SONGWRIGHT

Compose module cannot work with anything longer than one line on a page, and the Edit module can't work with anything shorter than one measure. Your only option is to save the song as a Standard MIDI File and reload it, specifying the beat on which it is to start. Unfortunately, this causes you to lose all information except notes and rests.

### HEARING AND SEEING

*SongWright's* Perform module provides two ways to hear your music. The Sing function plays an individual part on the PC's speaker. In the case of chords, you can select whether Sing plays the top note or arpeggiates. In this mode, *SongWright* displays note names, solfege (do-re-mi) syllables, or lyrics that are synchronized to the music.

MIDIots will find Perform's Play function more useful than Sing. Up to sixteen parts (eight staves times two parts per staff) can be assigned to any MIDI channels, each with its own transposition. However, the Play function does not display the music on the screen as it is played.

If you intend to use *SongWright* as a sequencer, keep in mind that the pro-



FIG. 3: You can obtain impressive-looking output with *SongWright* and a laser printer.

gram is designed primarily for notating music. *SongWright* sends Velocity values based on the dynamic symbols on the staff, not the performance that you recorded. You cannot record and edit MIDI controller information, although you can embed individual 3-byte MIDI commands into the file. Scaled-down versions of the Sing and Play functions are present in the Compose and Edit modules, too. Unfortunately, MIDI playback in these modules is always on channel 1.

The Write module prints your composition. *SongWright* is not PostScript-compatible, but you can produce impressive-looking scores with a laser printer if you take the time to reposition and tweak the individual elements of your music (see Fig. 3). The text elements on the page can be formatted individually, but you must enter individual printer escape sequences to select fonts and print characteristics.

### SUMMING UP

The user interface is somewhat inconsistent, and very little online help is available. You can switch between menus using the Space bar, Tab key, or Escape key, depending on where you are in the program. The Escape key lets you out of some sections, while the F10 key performs this function in others. *SongWright* supports a mouse, but using it can get complicated (especially in the Compose module); different procedures use different mouse-button combinations that quickly

## Product Summary

### PRODUCT:

*SongWright 5.1*

### SYSTEM REQUIREMENTS:

PC compatible with 384 KB RAM; DOS 2.1 or higher; VGA, EGA, CGA, or Hercules graphics adapter; one floppy drive; supports most MIDI interfaces

### PRICE:

\$119

### MANUFACTURER:

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

become difficult to remember. Fortunately, a Macro module allows you to define up to 48 macros of up to fifteen keystrokes each, which helps alleviate some of the deficiencies in the user interface.

The modularity of the program is both a blessing and a curse. On the positive side, each module can be executed independently under DOS, using its own set of command-line parameters. This opens up some interesting possibilities for users who are willing to write simple batch programs. For instance, you might create a batch file to transpose your music into several different keys and print out each transposition. On the other hand, the modular approach requires that you save

▼  
**I was surprised to find warnings of potential bugs and program crashes.**

your song each time you leave a module and reload it when you enter the next module. This is a real drag.

I was surprised to find warnings of potential bugs and program crashes in the user manual and "READ.ME" file. Fortunately, the manual describes two temporary files that might contain some or all of your song data if the program crashes, but I can't imagine why a program would be released before it was known to be stable. I experienced several program crashes and noticed a few other minor bugs. Hopefully, these problems will be resolved as the program matures.

*SongWright's* manual is organized into four major sections: Introduction, Tutorial (written as if you were attending a class on the program), Reference, and a catch-all section called "Topics." The manual describes the program in adequate detail, but it needs better organization, better layout, and more illustrations. I had difficulty following

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● SONGWRIGHT

the manual's organization; as a result, I had a hard time understanding the organization of the program.

I am concerned about an entry-level program with a cumbersome user interface, minimal online help, bugs, and a steep learning curve. But those who take the time to master this program will find that it provides a useful tool for music creation and notation. Overall, *SongWright 5.1* provides a solid list of notation features for the money.

Allan Metts is an Atlanta-based MIDI consultant, musician, and electrical engineer. He is anxiously awaiting the development of a lawnmower that can operate under MIDI Machine Control.

## Five-Pin Press 200/260 Drum Patterns

By Michael McFall

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Two packages are currently available: 200 Drum Machine Patterns and 260 Drum Machine Patterns. Each package consists of a book in which all 200 or 260 patterns, breaks, and fills are written out in music notation and in drum-machine grid notation for entering into your drum machine in step time.

The best part is that a disk (IBM, Mac, or Atari) is included that contains the patterns in Standard MIDI File format. You just load the patterns into your sequencer, click on Play, and away you go. Note-number assignments default to the General MIDI Percussion Map. Each drum sound is on an individual track, which makes transposing note assignments easy in the

event that your drum machine or sound module does not conform to the General MIDI map. A separate users manual includes convenient MIDI drum-note assignment charts for several popular synths and drum machines.

A broad range of styles is represented, from rock, pop, and blues to reggae, ska, R&B, disco, Afro-Cuban, swing, shuffle, Latin, ballads, and marches, each with fills to match. Rap and hip-hop grooves are conspicuously absent, though.

The patterns are well-crafted and definitely usable. Unfortunately, the differences between certain patterns are slight. For example, the Funk and R&B patterns sound so similar stylistically as to be cut from the same cloth. Other patterns, such as Swing, wouldn't fill the bill for me if I were programming a jazz or swing tune. In other words, don't get too hung up on the pattern labels; you still have to use your ears in the end.

The breaks and fills are interesting, but they sound a bit stiff, as they are 100% quantized. I would like to see the patterns "swing" a bit more. Even so, most of the patterns groove, particularly the Samba and some of the other Latin and Funk varieties.

My other complaints are relatively minor. There are instances where patterns that appear on the disk are not documented in the book and vice-versa. And you'll have to edit the flams; quantizing produces too much space between the grace note and the principle note it's supposed to emphasize (although some of the fills sound kind of neat like that).

The idea is to use the drum patterns

## Product Summary

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EM METERS	RATING PRODUCTS FROM 1 TO 5			
PATTERN QUALITY	●	●	●	●
DOCUMENTATION	●	●	●	●
VALUE	●	●	●	●

as templates, starting points from which you can edit to your heart's content, adding and subtracting, accenting, swinging, and switching sounds until you've tweaked yourself into drum-track heaven. For instance, adding further elements of "humanizing" is up to you and the capabilities of your drum machine or sequencer. (For "humanizing" ideas, see "The Feel Factor: Humanizing Your Sequences" in the October 1987 *EM*, and "Make Your Drum Machine Swing" in the May 1992 issue.)

Overall, the 200/260 Drum Machine Patterns packages have a lot to offer the non-drumming programmer. And by not having to start from scratch, even drummer/programmers can save time and come up with some new ideas.

Michael McFall is the former editor of *Rhythm magazine*. Currently, he heads *VDO Productions*, a video production company specializing in music instruction videos.



FIG. 1: Rhythm & Blues 1 (a) is one of five R&B patterns in *200 Drum Machine Patterns*. Each pattern includes a break (b).



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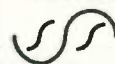
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# PRO FILE

## Rap Kick Drums

### *Kid Sensation's Big Boom Theory*

By Michael Molenda

For a nation of immigrants raised amidst the crowded, clanging rhythm of the streets, Americans have a tough time getting down to their roots. In the 1950s, a cross-cultural musical gumbo called rock 'n' roll amplified the fears of the righteous, who heard sex and the devil in every beat. The Feds shut down rock 'n' roll radio, hipster deejay Alan Freed, and Chuck Berry, and shipped Elvis off to Europe.

It wasn't until shrewd record men forged a pact with the "devil's music" that the abomination was allowed to flourish. (A Faustian intrigue that turned these entrepreneurs into millionaires within months and created formidable American entertainment conglomerates.)

Today, rap music is experiencing a historical *déjà vu*. Once again, the rhythm of the streets is rising to swallow misguided youth, and middle-class America is not amused. Rap is the ethnic literature of modern urban society, a scating bravado that fuses violence and hope and frustration and joy with the biggest beat pop music

has ever produced. And the foundation of rap's mythic groove is the booming kick drum defined by the Roland 808 drum machine.

"The TR-808 became a standard about the same time car stereos evolved into more powerful systems with subwoofers," explains producer Al Eaton, who remixed Kid Sensation's "Ride the Rhythm" for a 12-inch vinyl single release on NASTYMIX Records. "The detuned 808 kick was perfect for showing off a (car stereo) system. You'd pull up next to somebody and let the rumble say, 'I've got more beat than you.'"

Eaton's remix of "Ride the Rhythm" used only the vocals from the original 24-track master tape. A completely new backing track was constructed atop a rhythmic stew of sampled TR-808 kicks tuned differently for specific sections.

Building the track wasn't easy. Kid's 1-inch master tape had to be transferred to the professional 2-inch format before Eaton could work with it. During this procedure, the SMPTE time code was not refreshed, and

when Eaton received the tape, he couldn't sync up his MIDI gear. Ultimately, the vocals were sampled section-by-section and "flown into" the new rhythm track.

In addition, the lengths of the drum samples were manipulated in *Sound Tools*. All the samples were triggered dry—without signal processing—to ensure that the beats "hit real hard."

"A lot of times I prefer not to use the big boom 808 kick, because now it's like putting catsup on everything you eat," admits Eaton. "Sometimes, to get an early 1980s sound, I'll use an actual 808 drum machine. However, because the 808 is analog, the sound is unstable. Every time it hits, the tone changes a little. For more contemporary tracks, it's better to use samples because they're always right there."

However, Eaton's remix did more than just slam a better groove. His rearrangement earned him songwriting credit on the track—a measure of clout usually reserved for proven hitmakers.

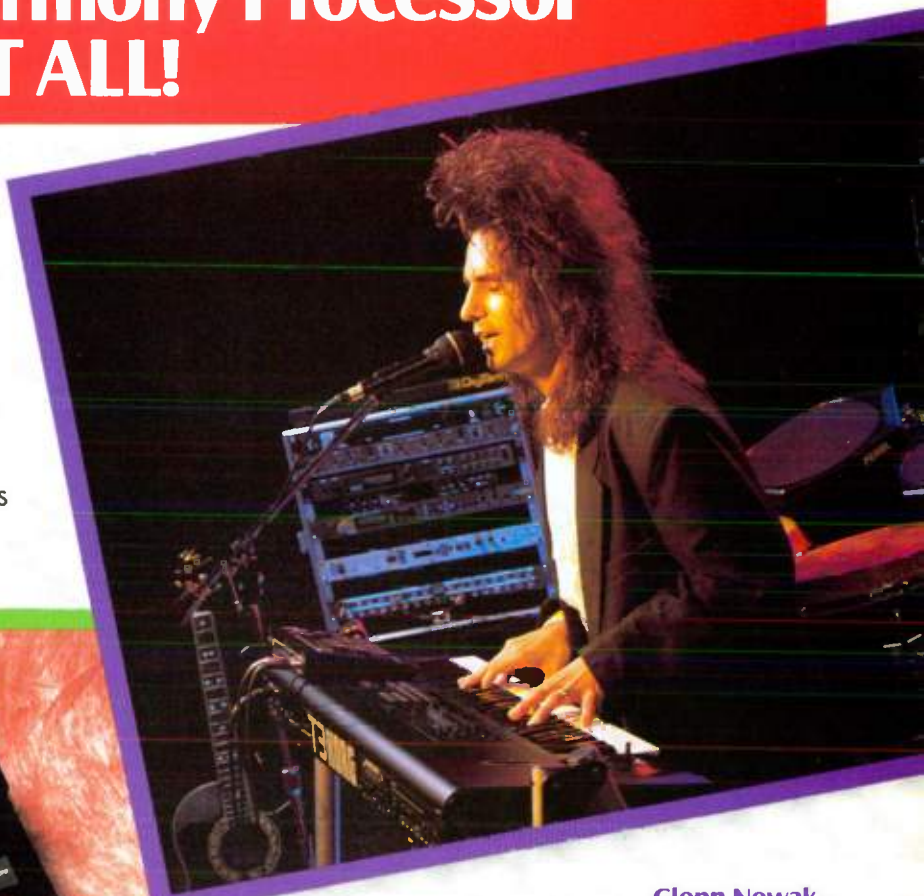
"I was grateful NASTYMIX offered me a writing credit," says Eaton. "They feel my remix makes the track more accessible to radio and video. It has the 'Oakland Sound,' a slower, more laid-back style that's real hot now."



Producer Al Eaton

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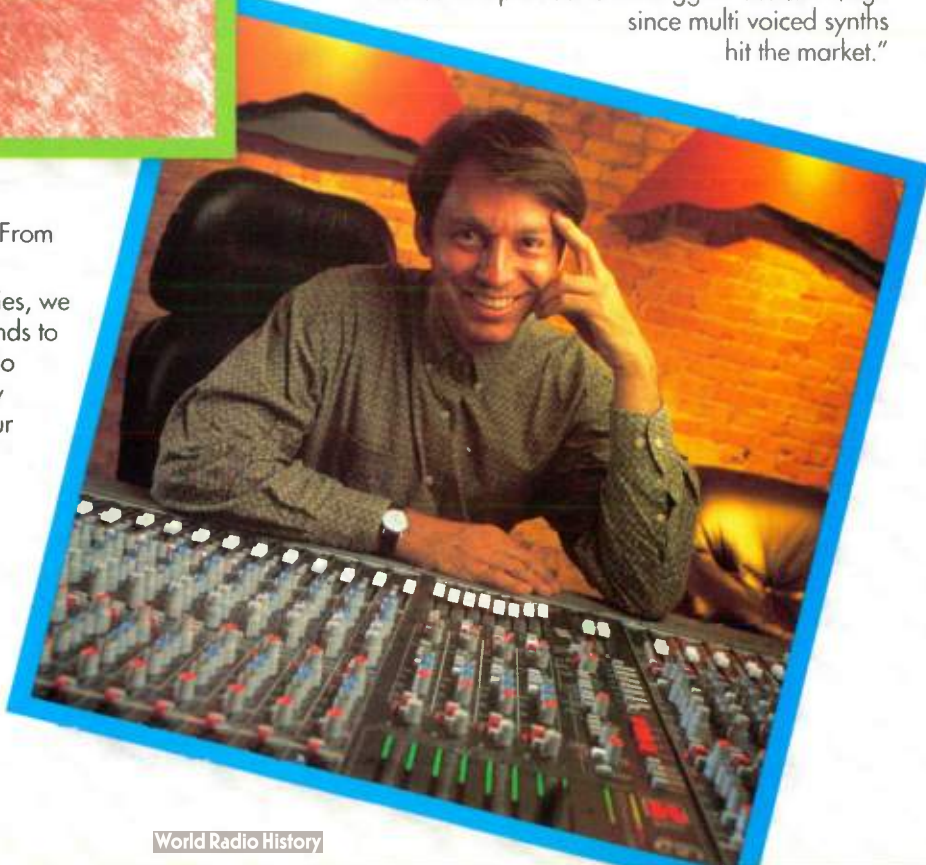
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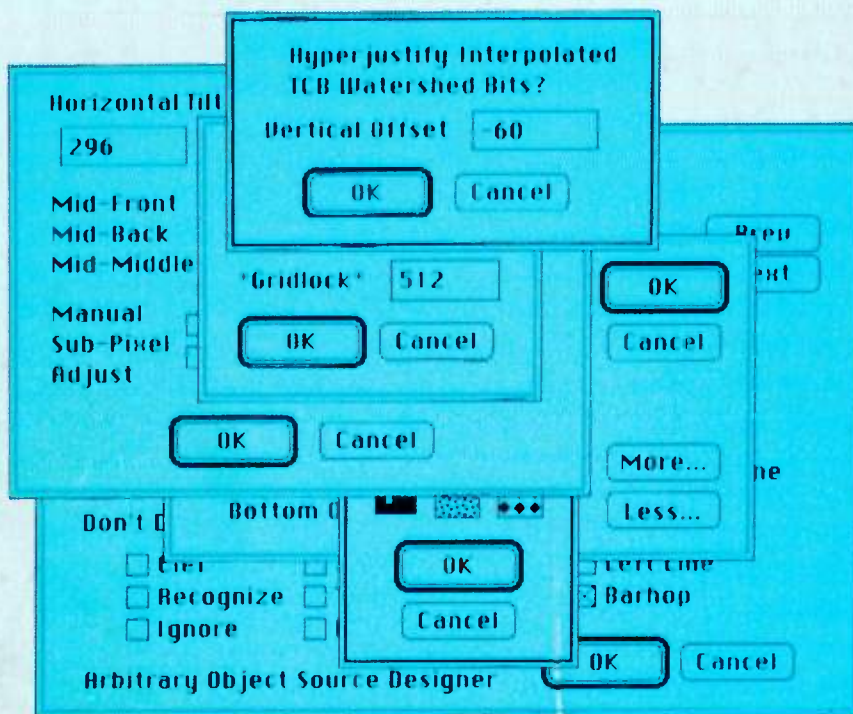
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