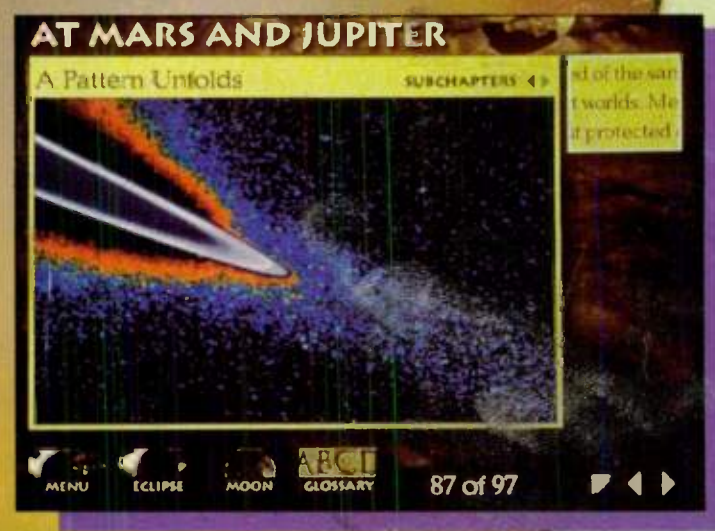


Electronic Musician

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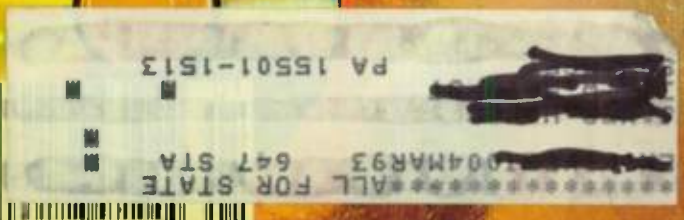
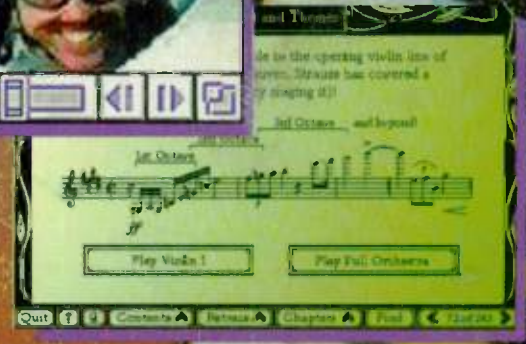
Music! Computer! Action!



Producing Multimedia Soundtracks

Jam With Your Computer *Exploring Music Creation Programs*

Making Connections *EM Guide to MIDI Patch Bays*



-12
-15
-18
-22
-27
-32
-38
-44
-51
-60

8 Tracks

RECORD INPUT

1	2	3	4	5	6	7	8
RECORD	RECORD	RECORD	RECORD	RECORD	RECORD	RECORD	RECORD
INPUT	INPUT	INPUT	INPUT	INPUT	INPUT	INPUT	INPUT



Demos 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?

Here's the concept. ADAT fuses a supersonic Alesis-designed very large scale integrated chip set with the proven reliability of an industrial grade S-VHS* tape transport and a logical, sensible user interface. The result is a digital tape recording system that exceeds the most demanding requirements of professional audio and that can be used by literally anybody. Hard to believe?

Here's some specs. Bandwidth 20Hz to 20kHz ± 0.5 dB. Total Harmonic Distortion plus Noise 0.009%. Wow and flutter unmeasurable. ADAT uses the professional standard 48kHz sample rate and delivers better than 92dB dynamic range.

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

recording is fast, intuitive, effortless. Connections are provided for balanced +4dBu levels on a single 56 pin ELCO** connector and unbalanced -10dBV signals on 1/4" jacks. And ADAT uses S-VHS tape because it's a proven, robust recording medium with wide 1/2" tape to solidly support ADAT's 8 recording tracks while delivering 40 minutes of recording time.

The best part. ADAT's Proprietary Synchronization Interface (Patent Pending) locks multiple ADATs, independent of the audio tracks, to single sample accuracy $\pm 5\%$ of 1/48,000th of a second! In other sciences this is referred to as 'air tight'. So multiple ADATs function in perfect mechanical and electronic unison: up to 16 ADATs without an external controller. That's 128 tracks!

More best part. ADAT's Proprietary MultiChannel Optical Digital Interface (Patent Pending) simultaneously sends all 8 tracks of recorded information out the Digital I/O for perfect safety tapes and perfect track bounces.

Even more best part. The optional BRC Master Remote Control opens a whole other door to the ADAT miracle. With it you can control up to 16 ADATs (128 simultaneous tracks) with full transport functions, track offsets, machine offsets,

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Also available: The AI-1 ADAT to AES/EBU and S/PDIF Digital Interface with sample rate converter.
RMB 32 Channel Remote Meter Bridge.
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To Megatracks

AUTO INPUT MONITOR

FORMAT

PITCH

ALL INPUT MONITOR

DIGITAL IN

PITCH



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.

Need more tracks? ADAT studios can be expanded at any time. The cost of a single ADAT is remarkably inexpensive and new ADATs can be added as budgets permit. Add the BRC at any time for more control and advanced editing. Producers please note: with ADAT, Megatrack™ recording is a reality.

Your favorite sax player lives in Idaho? No problem. Send 'Supersax' a formatted tape with a guide track of your song. You'll get back 7 tracks of burning solos you can fly back into your production. All in perfect sync, all in the digital domain. All dripping with soul. Want more tracks? Just send more tapes.

ADAT is not only a new recording medium, it is the new recording standard. Imagine a network of ADAT users from bands, composers and project studios to professional studios, video editing suites and broadcast production studios. All recording master quality tracks with full compatibility and no barriers between their creative disciplines. In fact, we're launching the ADAT Worldwide Network™ multitrack recording group to facilitate communication between ADAT studios.

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.

See your Alesis ADAT Dealer today and start Megatracking on ADAT.

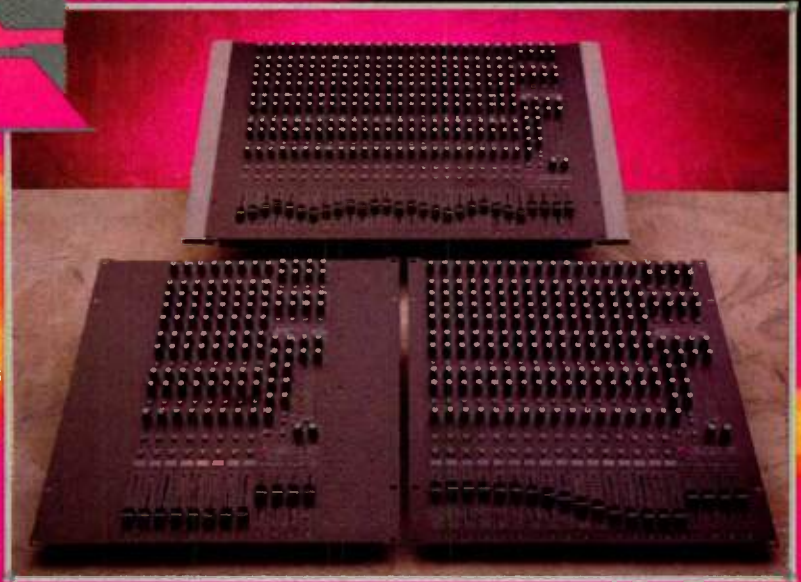
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A.R.T. SHATTERS THE PRICE OF PROFESSIONAL MIXING TECHNOLOGY!!!

THE PHANTOM PROFESSIONAL SERIES CONSOLE

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



- 16/24/32 CHANNEL VERSIONS
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- NEW DESIGN AND ASSEMBLY TECHNIQUES PROVIDE THE TRANSPARENCY OF CONSOLES COSTING THOUSANDS OF DOLLARS MORE.
- AUTOMATED ASSEMBLY AND COMPUTERIZED TESTING MAKE THE PRICE UNBELIEVABLY LOW.

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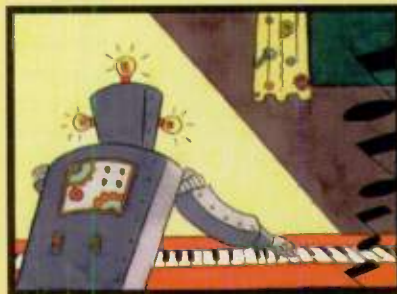
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Cover: Robin Ginsberg.
Screen shots: courtesy of Warner New Media
and Apple Computer

Computerized Collaboration

Computers are taking a larger role in the creative process.



ANNE HAMERSKY

As electronic musicians, we're all familiar with using computers as tools to assist in the creative process. Sequencers, notation programs, and editor/librarians have become as common as pencils and manuscripts were to composers of an earlier era.

If you've taken any interest in academic computer music, you may also be familiar with developments in algorithmic composition, a process in which the computer actually composes music. Since the late 1950s, music researchers have worked to define and refine algorithms for generating musical material. Several software developers even released commercial products, such as Intelligent Music's *M* and *Jam Factory*, and Dr. T's *PVG*, that brought algorithmic composition to a much wider audience. Unfortunately—but not surprisingly—none of these products met with much success. In general, such programs were not particularly intuitive, and the music they created was not pleasing to most tastes.

Now, a new generation of "computer-assisted" composition programs have hit the market, and they're being greeted with much more enthusiasm. PG Music's *Band-in-a-Box* is the frontrunner in this category of music-creation programs, but recently it's been joined by a variety of new products for all the major computer platforms (see "Musician's Apprentice" on p. 38 for more).

These programs operate in different ways, but they share the ability to go beyond the "blank slate" of sequencers and notation programs to function as musical collaborators. They're commonly used to provide a backup band for individual practicing, real-time accompaniment in live gigs and on recordings, and even as compositional partners.

As you might expect, these programs have forsaken the "algorithmic" title of their predecessors, and generally avoid the "computer-music" sound of earlier programs. Instead, they offer straightforward user interfaces and focus on popular music styles. The result has been success in the marketplace and a great deal of satisfaction to skilled and unskilled musicians looking for a quick and easy way to make music with their gear. These programs even have managed to successfully draw non-musicians into the electronic-music community.

However, the popularity of such programs begs an important question. If you use a program like this as a compositional aid, how much must the computer compose before a composition isn't yours? A lot depends on how much input the program requires before doing its thing, but the answer is far from clear.

Laurie Spiegel's *Music Mouse* program raised this question years ago. Spiegel requested that any music created directly or indirectly with the program include a credit to *Music Mouse*. Reaction to this request was mixed, but because much of the material generated with the program sounded similar (a common trait of algorithmic-composition programs), there was never an overwhelming outcry.

New developments in computer-assisted composition are much better, allowing computers to generate impressive-sounding pieces in the style of classical composers, so the issue is bound to get stickier.

Regardless of these and related questions, the new generation of music-creation programs will likely open the world of electronic music to a wider audience. With more and more consumers being introduced to synthesizers, MIDI, and digital audio through the rapid growth of multimedia computing, there is a tremendous opportunity to show how exciting and rewarding music making can be.

Bob O'Donnell

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— Jim Aikin, *Keyboard Magazine*



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World Radio History

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Built-in, test-instrument-grade, ultra-low radiation POWER SUPPLY with toroidal transformer and external heatsink.

Two TAPE OUTPUT SUBMASTER jacks per bus (total of 16). Balanced or unbalanced.

+48V balanced TAPE RETURNS, switchable to -10dBV unbalanced.

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6 STEREO AUX RETURNS with 20dB gain. 1 & 2 are pannable; all have Solo and can be used in stereo or mono.

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TWO SEPARATE HEADPHONE SECTIONS can be used totally independently of each other with source selection between Control Room & any combination of Aux 1, Aux 2, Mix-B or External source. Solo allows control room to hear what musicians are hearing in their headphones.

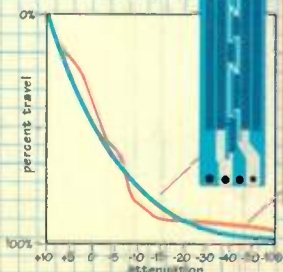
SPEAKER section with separate Control Room & Studio levels. Source selection between L/R mix, Mix-B, Tape & External. Can be switched to Mono.

TALKBACK with assign to all Tape outs, Aux 1, Aux 2 or Phones.

-40 to +10 bar graph LED DISPLAYS for each submix channel & Solo/Main (with +28dB CLIP LEDs).

ALTHOUGH there are 8 buses, 16 tape outs are created by a second set of output jacks. Built-in talkback MIC.

Conventional faders are overscreened with a second layer of resistive material in an attempt to create a logarithmic taper. Our PRECISION NETWORK FADERS are single-layer screened with both the primary linear resistive elements and also a complex auxiliary element to create the true logarithmic curve found in ultra-expensive console faders (blue line on graph).



MIX-B/MONITOR section on each channel effectively doubles number of inputs during mixdown.

THANKS TO ADVANCES in component technology and quality, our ability to buy parts in large quantities — and a lot of fanatical Mackie engineering — you can “have it all” without hocking the proverbial farm.

BECAUSE WE SPECIALIZE IN MIXERS (and because we're probably a little crazy), we began the design of these consoles by first asking ourselves, “What is it that makes the finest British consoles perform the way they do? — And how much of that can we duplicate (using modern materials and methods) on far less expensive boards?”

8 YE OLDE ENGLISH SOUNDE. For example, older Neve consoles have much wider-band mid EQ than lower priced consoles — it really has an effect on overall sound quality. So we incorporated the same capabilities on our new 8-Bus Series (along with our trademark low noise and high headroom). This also enabled us to add the flexibility of a variable “Q” control for true parametric Hi Mid EQ. It was an expensive proposition, but well worth it in terms of sound quality. We also wanted the same kind of true logarithmic taper found only on mega-

* Meter bridge additional. Equally phenomenally-low prices for the 16-8 (under 3000) and the 32-8 (under 4800). Neve is a trademark of Neve, a Siemens Company.

ADN'T THREATENED TO HIT GREG PSIDE THE HEAD WITH A RANCID SALMON, PROBABLY STILL BE ADDING FEATURES TO 2, 24 & 16-CHANNEL 8-BUS CONSOLES.

24 channels under \$3900! Finally, the "quality gulf" between \$20,000+ imported consoles and more affordable boards has been eliminated. No longer must budget considerations force you into compromise over questionable sound quality, poor EQ, hard-to-use layouts or unreliable mechanical designs. Only Mackie Designs could spawn values like these!



Full SUB-MASTER and MASTER inserts.
Rugged STEEL CHASSIS.
SEALED rotary potentiometers resist dust and liquids.
Two independently assignable HEADPHONE monitoring sections plus separate TALKBACK and SPEAKER sections.
DIMENSIONS (H x W x D):
16" 8, 6" x 26.7" x 28"
24" 8, 6" x 35.5" x 28"
32" 8, 6" x 44.3" x 28"

Retrofit FULL-FADER/MUTING AUTOMATION, via MIDI or external fader packs, available in the future.

they have the sonic quality that's contributed to our smaller mixers' success. For example, our acclaimed discrete mic preamps that deliver -129dBm E.I.N. at 0.005% THD with a 300K bandwidth, yet can handle +14dBu inputs without a pad. The consoles' working S/N is 90dBu with 116dB internal headroom. Bottom line: For hard disk recording, ADAT or DAT, you've found your board.

OPTIMIZED FOR PA AND RECORDING. Along with elaborate monitor capabilities, balanced XLR main outputs

and 18dB/oct. hi pass filters, you get non-flexing steel construction, fiberglass thru-hole plated, horizontal circuit boards that minimize impact damage, gold-plated interconnects, sealed rotary pots and a built-in power supply. You won't find more rugged, compact PA boards anywhere.

READ ALL ABOUT IT. This ad can't possibly tell the whole story of the design innovations we've packed into these consoles. Call us right now toll-free for a comprehensive 8-page brochure, the name of your nearest Mackie 8-Bus Dealer... maybe even info on the type of salmon that we threatened Greg with.

expensive faders - instead of the commonly used, less accurate "D" taper. So we commissioned a totally new custom 100-mm fader with the same taper as the most expensive British faders, yet at a fraction of the cost.
DOUBLE THE INPUTS & MORE. Each channel has in-line monitoring that effectively doubles the number of inputs (48 on our 24-8, for example). We also added features we personally find useful such as dual

independent headphone systems and separate MIX-B monitor section with Split EQ. The consoles' internal -10dBV to +4dBu level conversion allows use with semi-pro stereo decks without the inherent noise penalty found in semi-pro mixers that operate at -10dBV internal levels.
BEST OF THE CR-1604. Though we designed these consoles from the ground up,



In-line FLIP reverses tape and mic/line inputs. Incredibly nifty feature but hard to explain in an ad, so read our brochure to appreciate it.
AUX SENDS 1-2 PRE button selects pre-fader/post EQ or post-fader/post EQ.
AUX 3-4/5-6. SHIFT changes 3-4 to 5-6.
SOURCE selects signal source of AUX 3-4/5-6 from ch. strip to ch. Mix B/Monitor send so you can build an effects mix to assign to phones during tracking.
True 3-control parametric HI MID EQ with ultra-wide 500-10K frequency sweep range. Bandwidth can be adjusted from a very wide 3-octave width to a very narrow 1/2-octave width. 15dB boost/cut.
LO MID EQ with ultra-wide 45Hz-3K sweep, 15dB boost/cut.
±15dB shelving HI (12KHz) & LO (80Hz) EQ.
Multi-purpose 18dB/oct. LO CUT filter @75Hz. Cleans up "mix mud," creates a "neo-peaking" bass control, cuts PA rumble, etc.
MIX-B (Monitor) section with pan, level & source. Functions as independent monitor section, extra stereo Aux send during mixdown or doubles number of inputs during mixdown.
Mix-B SPLIT EQ assigns HI & LO EQ to Mix-B.
Constant power, buffered PAN pot for rock-solid panning.
Selectable SOLO with CHANNEL METERING not only allows soloing in full stereo perspective but also displays soloed channel operating level on master L/R meters so input trims can be adjusted for optimum levels.
At last! HIGHLY ACCURATE 100mm FADERS on an affordable console. (See explanation at left).
L/R MIX assigns channel directly to master L/R mix for ultra-quiet mixdown.

MACKIE.

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CR-1604 & MS1202 OWNERS!
WIN THIS CONSOLE!
SEE PAGE 42

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.

THE DINOSAUR MIXER IS ABOUT TO BECOME EXTINCT.

Say goodbye to the dinosaur's big footprint. The DCM-100 packs a full-featured, 16 channel (8 channel stereo) mixer in a single rack space. Cascade three of them for up to 48 inputs.

Say goodbye to high cost. With MIDI parameter automation you don't pay for zillions of knobs and switches, most of which you set and forget anyway.

And say goodbye to mixing with a mouse. The MIXTAB human interface provides 8 channels of hardware knobs, switches, and faders for level, muting, EQ, panning, and more. It works and feels like a traditional mixer. Use it to program your sequencer quickly and painlessly, change selected parameters in *real time* to add spontaneity to your mixes, or to control the DCM-100.

There's more: 100 "snapshots" you can recall with MIDI program changes. LED null indicators for easy level matching before you record new moves. Exceptional sonic integrity. And a mercifully short learning curve.

The DCM-100/MIXTAB combination is a whole new kind of animal – after all, dinosaurs belong in museums. To find out more about the latest evolution in mixers, see your favorite Fostex dealer.



Fostex



HIT AND RUN

This is the last straw. I've watched *EM*'s quality improve and wane for years. However, for the last year it's been hard to find an article I could get interested in. When I opened the mailbox today to find *EM*'s cover touting a Windows sequencer "shootout," I was excited as hell. Unfortunately, it didn't live up to its billing.

Why accept an article from an obviously avid Mac user supposedly reviewing an MS-DOS/Windows product? If Dennis Miller (a) had ever used non-Mac hardware before, or (b) checked with any decent sources, he quickly would have discovered his errors in hardware selection (noted in the "Broken Windows" sidebar).

In addition, he successfully followed *EM*'s new noncommittal style by concluding that everybody had their drawbacks, everybody had their good bits, and other mealy-mouthed non-conclusive conclusions. *EM*, wake up! If you have a "shootout," somebody dies. Some of the programs Miller reviewed stink! Just say so!

A few other misnomers:

- "If notation is a must, and you also need a potent sequencer, *Cakewalk* is the obvious choice." Oops. Most people like to print music notation. No such luck with *Cakewalk Pro for Windows*. It is solely a sequencing tool in this application.

- Miller's idea that Enhanced Windows gains you nothing over Standard mode is wrong. It's true that low-powered systems will be taxed by Enhanced mode. But if your CPU can take it, Enhanced

is the place to be, offering: CPU in protected mode, better protection on hardware device usage, fewer crashes, better use of memory, and easier application switching.

As I said, this is the last straw: Cancel my subscription immediately.

Stan Sawyer
Oakland, CA

Author and IBM-enthusiast Dennis Miller responds: *An avid Mac user? I find this comment particularly ironic because I cut my teeth on the IBM and in many cases find myself the only IBM user in the crowd. I will never be a Mac user, and I can't understand what led you to believe that I am.*

Regarding your first point: While Cakewalk doesn't print notation, it provides the ability to view and edit standard notation, which I believe appeals to many users. Regarding Enhanced mode: In Standard mode, Windows gives your MIDI drivers immediate access to all your system's hardware (meaning a program can write directly to a port or respond to an interrupt with no delay). Because Enhanced mode adds additional layers between the application and the hardware, there is by nature a slight lag, easily measurable on slower machines, though not as serious on fast '486s. While the "virtual machine" capabilities that Enhanced mode provides might be useful if you need to run a spreadsheet and word processor simultaneously, it is of little value in real-time applications such as MIDI; you simply cannot afford to have your notes come out late.

Finally, though my editor pushed me to try, I was simply unable to pick a winner. Each of the three higher-end programs provides distinct advantages for different working styles. Couldn't we just call it a draw and go home?

WORKING WELL

It would be helpful if you would devote one or two of your "Working Musician" columns to aspiring solo artists.

It also would be helpful if you could comment on music business seminars. Are they just scams to get money from naive musicians? Or are these seminars

actually helpful?

By the way, I noticed your November 1992 issue didn't have a "Working Musician." I hope this doesn't mean you've discontinued the monthly column. I've subscribed to *EM* for almost a year and have found each "Working Musician" column very informative.

Also, I have an IBM-compatible (a Vendax) with no hard drive. I am interested in using a sequencer for arranging some of my music. Can all IBM sequencers, such as *Cakewalk*, be used on all IBM compatibles?

Dan Mullins
Long Grove, IL

Dan—The majority of "Working Musician" columns provide career information that equally serves bands and solo artists. I'm glad you find the column useful. (To paraphrase Ross Perot: After all, we're doing it for you.) The November column "disappeared" solely because of space limitations. Regarding business seminars, some are quite good, while others are merely revenue opportunities for the producers. Good Business Rule #237a: Always seek referrals before spending money on seminars. Also, Twelve Tone Systems confirms that Cakewalk and all other MIDI software runs on all IBM compatibles, provided you have DOS 3.0 or higher and a MIDI interface.—Michael M.

EM'S NICHE

I'm a Macintosh-oriented, home studio-owning, *EM*, *Keyboard*, *Home & Studio Recording*, *Mix*, and *Pro Sound News* reading, aspiring professional electronic musician. I'm writing about the changes in *EM* that seem to have it drifting toward *Keyboard*.

Articles like "Pro Mixing Tips" (November 1992) don't apply to all electronic musicians. Besides, there weren't any mixing tips, only monitoring ones and producing ones. I pay for *H&SR* for those.

Electronic Musician should think about its name when it considers what to print. Maybe get in touch with some electronic musicians (Tim Story, Patrick O'Hearn, Robert Rich, Michael Brook, Steve Roach): people who use

● LETTERS

electronics creatively for a living. *Keyboard* doesn't really touch these people. **EM** used to have a long time on my reading table, but lately I breeze through...what's going on?

One more thing: Before I buy anything, I make sure its signal path is pristine. Please at least print manufacturers' S/N ratios and dynamic ranges so we know whether it's even worth going to hear in the first place.

Thanks for the ears. Be creative.

Tom Eaton
Newburyport, MA

Tom—EM's broad-based charter has always been (and continues to be) to fill the informational needs of musicians and music enthusiasts using electronic equipment to compose, record, and perform music. To that end, we cover MIDI, computers, home recording, and whatever other topics we think electronic musicians are interested in. Over the last few years we've started several columns to address the specific needs of beginners, computer enthusiasts, home recordists, and working musicians on a monthly basis. We differentiate ourselves from other magazines by consistently emphasizing the equipment and its applications, primarily as a mandate from our readers. Your desire for interviews notwithstanding, most EM readers don't want to read personality profiles in our pages, they want more reviews and more applications. Regarding your suggestion for signal-to-noise and dynamic-range info, we've included that information in mixer reviews. Even there we've found that manufacturers don't use consistent standards while taking measurements, making A/B comparisons difficult. Nevertheless, it's a good suggestion.—Bob O'D

CROSSWINDS

Articles about alternative MIDI controllers, such as "Blowin' in the Wind" ("From the Top," November 1992), are always welcome, but Scott Wilkinson is slightly confused on the issue of wind controllers and Velocity. He first notes correctly that wind controllers measure how hard you are blowing, then they digitize that information and transmit it as a stream of Breath Control messages (or some other continuous controller, such as Volume or even Aftertouch). He then informs us that "there are good reasons for sending a fixed, maximum Velocity value for each note from a wind controller or PMC." Expanding

on this, Wilkinson continues, "Note On Velocities that change based on initial breath pressure can lead to problems when combined with Volume [or Breath Control, or whatever the controller uses to transmit your continuously varying breath pressure] messages. If a Note On has a low Velocity value, the note remains soft no matter what the subsequent Volume values are."

This is a problem only if you are trying to play keyboard-oriented patches—which typically control the amplifiers, and therefore the volume, of a note—with Velocity and an Envelope Generator. The typical wind-instrument-like patch, designed to be controlled with a wind controller, modulates the amplifiers exclusively with Breath Control (or whatever), ignoring Velocity altogether.

The Yamaha wind controllers, such as the WX7 and WX11, do transmit a meaningful Velocity with each Note On, and this feature is very useful when using the wind controller to control patches that should and do control volume with Velocity, such as bass, piano, and percussion patches. The failure of the Akai EW1 to transmit a meaningful Velocity with each Note On makes it less useful for controlling non-wind-like patches.

Kenneth R. Beesley
Cupertino, CA

Kenneth—I agree that sending Velocity makes sense for sounds such as piano, bass, or percussion; these "keyboard-oriented" sounds are normally not played with wind-instrument articulation. (Just to set the record straight, the Akai EW11000 and EW12000 do send variable Velocity in response to initial breath pressure if it isn't disabled.) The statements you cite were concerned with the loudness of patches that sustain until a Note Off is received.

MIDI represents loudness in two ways: Note On Velocity and Volume. Velocity determines the initial and maximum loudness of a note, while Volume continuously varies the loudness from silence to the maximum level determined by the Velocity. For example, you can't start a sustaining note with a low Velocity value and then crescendo to a loud dynamic using Volume (or any other continuous message) to control the amplifier; if a Velocity value of 20 is followed by a volume value of 127, the note remains soft. A fixed Velocity of 127 allows the entire dynamic range of all notes to be controlled by Volume or other continuous messages.

Notes still can be played softly, while allowing a full-range crescendo, if needed.

Therefore, I recommended that wind-controller players control the loudness of sustaining patches with Volume rather than Velocity. This can be accomplished either by fixing the Velocity from the wind controller at 127, or disabling the Velocity sensitivity in the receiving sound module and using Volume, Breath Controller, or another continuous message to control both the amplifier and other parameters.—Scott W.

ERROR LOG

December 1992, "Editors' Choice," p. 42: Due to a printer error, the screen shots for *Cakewalk Pro* and *Cubase Audio* were transposed.

December 1992, "DIY: Build the Headphone Distribution Amp," p. 52: The list price for PAiA's Headphone Distribution Amp kit is \$62.50 (\$59.50 + \$3 shipping).

December 1992, "The Blue Ribbon SoundWorks SuperJam!" p. 118: The Product Summary was accidentally omitted from the review. Contact info for Blue Ribbon can be found in the sidebar on p. 47 of this issue.

MAC MIDI PROBLEMS

As we went to press, we learned that the Performa 600 and Mac IIvx have problems with MIDI software due to a change in the way their serial ports operate. Apparently the problem is different than the one that affects the PowerBooks. Apple is currently investigating the issue, but we suggest you look at other Mac models if you're planning on doing a lot of music work. Apple's PowerBook Duos (with the Mini-Dock and Duo Dock) apparently do work with MIDI software.

We welcome your feedback.

Address correspondence to "Letters," Electronic Musician, 6400 Hollis St. #12, Emeryville, CA 94608. Published letters may be edited for space and clarity. Corrections to articles are listed at the end of "Letters." We compile these published corrections annually; to receive a copy, send an SASE to "Error Log Listing" at the above address.

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MIDI routing with no compromise for professional use including a single edit facility for all MIDI channels through MULTI CONVERTING

16-FOLD PROCESSING

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ROUTING:

All of the sixteen MT-16X inputs can be merged without limits and they can be distributed to any outputs. The programs can be recalled either via MIDI, remote or the foot switch. Every input has its own separate MIDI on/off function with an integrated ALL NOTES OFF generator.

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OPTIONAL EXPANSIONS:

On request, the MT-16X can be optionally upgraded to a combination of a MIDI Matrix/Processor and a Sequencer Player. It uses the universal MIDI File Standard for its internal format. This assures full compatibility to top software sequencers. Its built in 3.5" floppy drive (720 KB/1,44 MB) is PC compatible and allows loading of songs from this computer system.

PLAYBACK:

Hundreds of songs can be loaded into, if expanded to full 16 MB. Once

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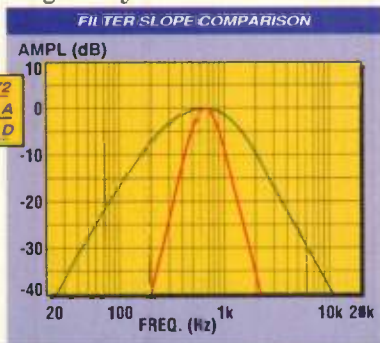
Until every facility and touring system gets one, you'll want to keep your SuperGate nearby. That's

“NOBODY TAKES MY SUPERGATE.”

because dbx's real engineering advances mean your 172 will pull sparkling, clean output from material other gates can't touch. You won't want to let go of your SuperGate because it sounds better, sets up faster and does more for you than those other gates can.

You'll be more selective with Voltage Controlled Filters.

The SuperGate uses sophisticated VCFs to produce steep slopes that are TWICE as selective—dramatically reducing false triggering. They're also faster to set up because the PARAMETRIC design lets you zoom in on exactly the instrument or part of the attack you want to catch.



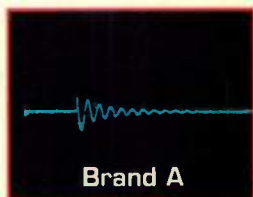
You'll stop time with Transient Capture Mode.

You can see and hear the difference TCM makes compared to other gates. With real-world filter and threshold settings, it attacks so quickly you'll actually catch those critical transient wavefronts that give percussive signals their life and definition.

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In One-Shot mode, the 172 gives muscle tone to that drummer

with the not-so-steady hand or foot, so you get solid, even output from erratic input. There's more—we'll fax you the whole story. But with all of the people who want to get their hands on a SuperGate, it may be awhile before you can test one for yourself. When you do get yours, you may find yourself going to extremes to hang onto it.



172 SUPERGATE

FOR AN INSTANT 172 DATASHEET AND WHITE PAPER, CALL THE dbx FAX HOTLINE AT 415-694-3991

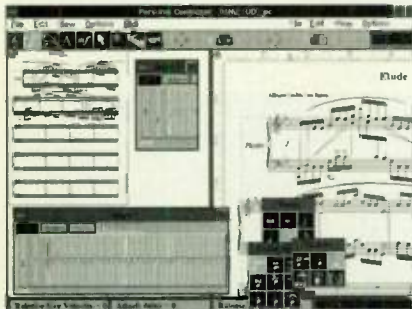
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WHAT'S

NEW



▼ PERSONAL COMPOSER FOR WINDOWS

Personal Composer has released *Personal Composer for Windows* (\$395), an all-new version of the company's well-known notation program for PC-compatibles running *Windows 3.1*. The program gives you global control over spacing of all elements; automatic beaming; a Split Screen mode that lets you simultaneously edit two sections or different files; and a drag-enclose selective zoom. You can click-and-drag to reposition elements, reshape staff systems, or resize measures. Music can be input from a MIDI instrument, and you can have multiple onscreen mixers, with up to 32 virtual faders each, which operate in real time. Dynamic and tempo markings affect MIDI playback. The program imports and exports Standard MIDI Files and supports most multimedia sound boards. Personal Composer; tel. (800) 446-8088 or (206) 778-9266; fax (206) 284-3898.

▼ KRK MODEL 7000 AND 9000

KRK is shipping a new series of close-field monitors. The Model 7000 (\$989/pr.) contains a 7-inch woofer that has a copper-wire edge-wound voice coil for increased power handling and a long excursion for better transient response. The woofer is made from honeycomb polyglass and Kevlar, a synthetic material said to provide an optimal ratio of strength to weight. The 1.5-inch inverted-dome tweeter is made of pure, stamped Kevlar and is designed to produce very low distortion and superior off-axis response. The enclosure is made of 3/4-inch MDF, a rigid, heavy-duty composite said to provide minimal resonance and box distortion. Frequency response is rated at 50 Hz to 15 kHz (± 3 dB). KRK recommends from 100 watts to

150 watts of amplification.

The Model 9000 (\$1,750/pr.) features a 9-inch, poly-composite woofer and massive magnet for superior lows. It uses a Kevlar tweeter and has a Time Aligned enclosure. Frequency response is rated at 45 Hz to 19 kHz (± 3 dB). The 9000 handles 150W of power, can be biamped, and produces up to 115 dB SPL. KRK Monitoring Systems; tel. (714) 841-1600; fax (714) 375-6496.



▼ SONIC SOLUTIONS SONICSTATION II

Sonic Solutions is shipping the SonicStation II (\$4,995) and Sonic Quattro (\$6,995) hard-disk recording and editing systems for the Macintosh. The SonicStation II offers real-time playback of twelve to sixteen audio channels (internally mixed) at sample rates of 44.1 and 48 kHz, with background recording on two input channels. The SSP-3 signal-processing NuBus card is based around four Motorola 56001 DSP chips and includes two channels of AES/EBU or S/PDIF digital I/O, with optical connections; 12 MB RAM; a SMPTE time-code reader/generator; and an onboard SCSI controller

for direct data retrieval from hard drives. The Sonic Quattro has four channels of digital I/O and supports background dumping and archiving, as well as loading. Multiple cards can be combined for up to 24 inputs and outputs.

The software offers waveform and playlist editing of 16- to 24-bit audio files. All editing is non-destructive, with multi-level Undo and Redo. Processing includes variable crossfades and an internal mixer with shelving and presence filters. Level and panning are automated, and the system automatically generates project logsheets.

Sonic Solutions; tel. (415) 485-4800; fax (415) 485-4877.



● WHAT'S NEW

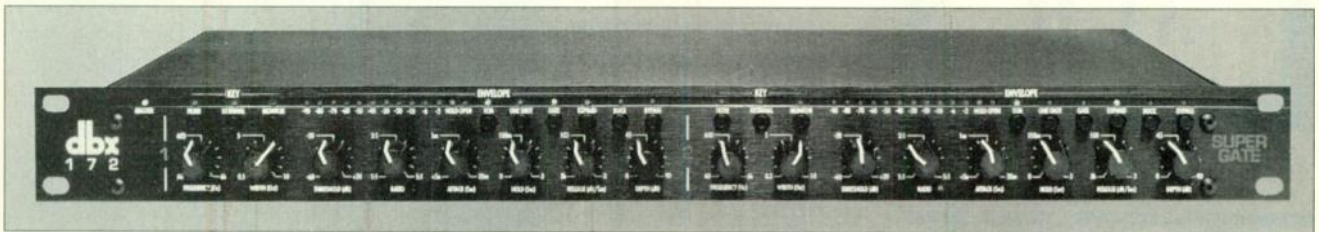
▼ **DBX 172 SUPERGATE**

The dbx model 172 SuperGate (\$869) uses quasi-parametric, 4-pole, 24 dB/octave voltage-controlled filters (rather than the more common 2-pole, 12 dB/octave voltage controlled filters) for more selective isolation of the signal being gated. The expander has a dedicated Ratio control scaled for commonly used expansion ratios (1:1 to 1:5). Ducking also is provided. The com-

pany's Transient Capture Mode is a precision, linear-phase, all-pass filter that inserts 0.3 ms of delay in the main signal path, allowing the gate to completely capture the leading edge of complex transient waveforms such as percussion hits.

The Hold timer, when used with non-percussive signals, delays the action of the release circuitry a selected amount of time after the trigger signal

drops below the (selectable) threshold, preserving some of the signal's natural decay. For percussive sounds, One-Shot mode can be used to create consistent drum hits from irregular signal levels. In this mode, the Hold timer is activated when the signal exceeds the threshold, instead of when the signal falls below it. dbx/AKG Acoustics; tel. (510) 351-3500; fax (510) 351-0500.

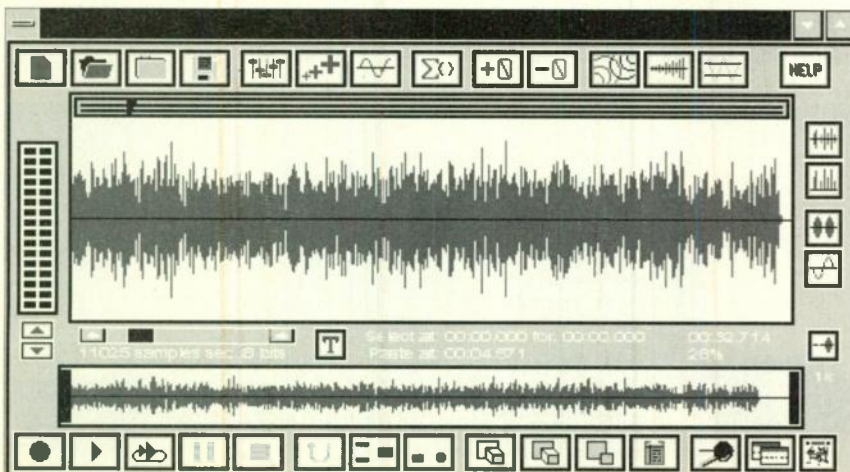


▼ **DIGIVOX SOUND IMPRESSION**

DigiVox's *Sound Impression* (\$149) for Windows 3.1 provides sixteen internal tracks of digital audio recording, editing, and mixing when used with any 8- or 16-bit hard-disk recording sound board that has Windows multimedia drivers. The software supports variable sampling rates (as allowed by the sound board) and sample-rate conversion.

Sound Impression contains four basic components. The Title Panel provides buttons and a menu bar for file and screen management functions. The Mixing Panel has virtual volume and pan faders for audio inputs, .WAV soundfiles, MIDI tracks, CD-ROM tracks, and

the master outputs. The Wave Recorder/Player records and plays .WAV files and includes a Waveform Editor, a Wave Composer, and a loop feature for continuous play. The Waveform Editor provides cut-and-paste editing; converts waveforms between mono and stereo; and offers programmable effects such as delay, pitch shifting, pan, fade, and crossfade. The Wave Composer can mix up to sixteen internal tracks (including files at different sample rates) into a single track, saved as a .WAV file. Finally, the MIDI Player plays and records Standard MIDI Files, and the CD Player plays audio from a CD-ROM. DigiVox Corp.; tel. (800) 344-4869 or (415) 494-6200; fax (415) 494-2351.



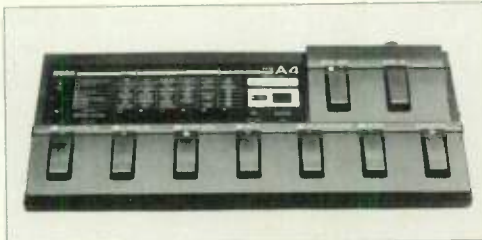
▲ **HUGHES & KETTNER TUBEMAN**

Hughes & Kettner is shipping the Tubeman (\$369), a 4-channel tube amp-expander preamp lifter that offers separate recording, instrument-level, and preamp outputs for driving mixers, guitar amplifiers, and power amplifiers. The recording output simulates the sound of a miked cabinet, much like Hughes & Kettner's Red Box.

You can select among four independent preamp channels that produce classic tube sounds for rock, blues, funk, and jazz. Other controls include a 3-band equalizer, mid-boost switch, gain, and master volume. The device measures just 8.5 x 5 x 2.25 inches. Hughes & Kettner; tel. (215) 558-0345; fax (215) 558-0342.

▼ KORG A4 BASS

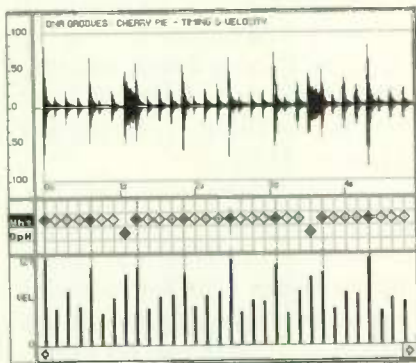
Korg is shipping two versions—Bass and Guitar—of its A4 multi-effects processor (\$499). The A4 Guitar provides up to nine simultaneous effects, and the A4 Bass can produce up to eight at a time. Each can store 30 presets and 30 user programs. A4 Guitar effects include a compressor, distortion/overdrive, 3-band EQ, pitch shifter (± 1 octave), delay (up to 999 ms), stereo chorus/flanger, stereo reverb, amp simulation, and noise reduction. The A4 Bass



features a compressor, Dyna Exciter, 6-band EQ, SynthBass (Wave Shaping), delay, stereo chorus/flanger, reverb, and noise reduction. Both units include a chromatic tuner. Korg U.S.A.; tel. (516) 333-9100; fax (516) 333-9108.

▶ WC MUSIC DNA GROOVE TEMPLATES

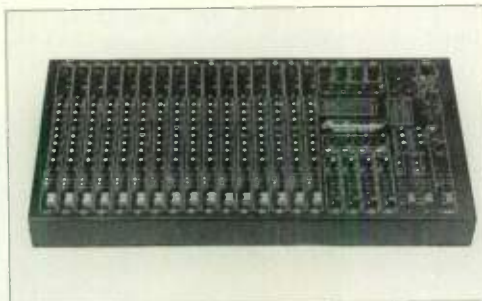
WC Music is offering DNA Groove Templates (\$110) for Steinberg's *Cubase* sequencer (Mac, Atari ST, and PC versions). The company uses special techniques on an NED Synclavier both to create over 400 variations and to capture the rhythmic relationships ("feel") of various great musical performances of the last 30 years. The results are transferred into *Cubase* Grooves. In *Cubase*, the user can apply the Groove to any sequence, giving the sequence the same rhythmic "feel" as the source performance. You also can view a Groove's rhythmic data in a printed Feel Chart. Each DNA diskette contains over 2,000 Grooves,



organized in six Song Groups. Each Group contains ten different beat divisions (e.g., eighth-note triplets, 3 against 4, etc.). WC Music; tel. (416) 496-9905; fax (416) 496-2884.

▶ STUDIOMASTER DIAMOND PRO

Studiomaster is producing the Diamond Pro 1642D, a 16 x 4 x 2 x 1 sound-reinforcement mixer (\$1,495). The board has mic and line inputs on all sixteen channels and offers balanced (+4 dB, switchable), XLR L/R and Mono outputs. Each of the four subgroups can be assigned to the main L/R mix, Mono out, or unbalanced (+4 dB) Subgroup out. There are inserts on all channel inputs, groups, and the L/R output bus. Other features include two pre-fader and two post-fader aux sends, two routable (to the subgroups or L/R outs) stereo aux returns, 3-band fixed EQ (± 16 dB



at 60 Hz, 2 kHz, and 12 kHz), phantom power, and PFL monitoring. A pair of 12-segment, 2-color LED meters display the left and right output levels. A 24 x 4 x 2 x 1 (\$1,995) version also is available. Studiomaster; tel. (714) 524-2227; fax (714) 524-5096.

KEY CHANGES ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲

Digital F/X (tel. [415] 961-2800) announced the purchase of Hybrid Arts' Atari-based, 4-track Digital Master EX (\$4,995) hard-disk recorder and WaveFrame's, PC-based hard-disk recording products....**Emagic** (distributed by Ensoniq; tel. [215] 647-3930; fax [215] 647-8908) is a new company that emerged from the dissolution of C-Lab. The company will carry *Notator SL*, *Creator SL*, *Unitor 2*, *Export*, and *Notator Alpha* and will continue to develop *Notator Logic* for the Macintosh.



▲ FOSTEX MC-102

Fostex announced the MC-102 (\$695), a 12-channel, rack-mount, integrated mixer and 2-track cassette recorder. The first ten channels have 1/4-inch, line-level inputs; rotary level pots; two aux buses (controlled from the same knob); pan; and solo.

The other two channels, designated "A" and "B," also have the two aux buses, pan, level, and solo controls, but also include 2-band EQ, a trim pot, and 1/4-inch balanced TRS inputs. The inputs for channels A and B are located on the front panel. A single aux return knob controls both aux buses.

The cassette deck features Dolby C noise reduction, a pitch control, and standard transport controls. The monitor controls access tape, mixer output, aux send 1, or aux send 2. A pair of 11-segment LEDs indicate recording and playback levels. The recording level is not affected by the monitor level control. Fostex Corporation; tel. (310) 921-1112; fax (310) 802-1964.

FRESH BATCHES OF SAMPLE PATCHES ▲

Pro-Rec (tel. [212] 675-5606; fax [212] 627-3148) is offering synth patches on ROM card (\$69.90) and floppy disk (\$46.90) for the Roland JV-80, D-70, JD-800, and Sound Canvas; Korg M1, T-series, 01/W, 03/R, and Wavestation; Kurzweil K2000; Yamaha SY22, SY77, and SY99; and Peavey DPM-2 and DPM-3.

Livewire Audio (tel. [908] 222-1227; fax [908] 229-6599) has released over 30 disks of sampled sounds (3 disks/\$19.95; 21 disks/\$249) for the Yamaha SY99. Sounds include analog and D-50 synths, grand piano, bells, organs, brass, strings, guitar, and various other acoustic instruments. The sample disks also are available for the Ensoniq Mirage, EPS, and EPS-16 Plus; Casio FZ; and Korg T-series instruments.

Sound Source Unlimited (tel. [800] 877-4778 or [805] 494-9996; fax [805] 495-0016) introduced three new sound banks for the E-mu Proteus 1/XR. The Acoustic Collection features acoustic emulations; The Classic Synth Collection includes vintage synth re-creations and contemporary electronic-sounding patches; and FM Textures re-creates the sounds of the DX7II, SY77, and other FM instruments. Sound Source Unlimited also has two new banks for the

Proteus MPS. The Acoustic/Synth collection emphasizes natural-sounding timbres plus classic synths, while Classic Synth/ FM Emulations focuses on electronic timbres. Sound Source Unlimited also has new collections for the Roland D-50 ("Acoustic/Folk"), Sound Canvas ("Hybrid/Alternative"), JV-80 ("Country/Folk/Acoustic"), and D110/20/10/5 ("Multi-Timbral Artist," containing tones for multitimbral layering). Finally, the company has new sounds for the Korg M1 ("Acoustic/ Folk") and Kurzweil K2000 ("Stage and Studio" and "Radical Film Textures"). Sound Source Unlimited provides sounds on RAM/ROM cards (starting at \$54.95) or floppy disk (starting at \$9.95).

Digital Informative Data (tel. [613] 738-2898) is shipping the 2-volume Orpheus collection of sounds for the Roland D-70. The collection contains two sets of 64 Patches and Performances taken from the company's other three volumes, including a variety of classic analog (Oberheim Expander, Minimoog, Korg Polysix) and digital (M1, D-50, DX7) synth emulations, in addition to experimental and new-age sounds. The company also introduced a set of studio- and video-oriented, non-standard, original sounds for the Korg Wavestation

EX/AD. All Digital Informative Data sounds are available on Mac, PC, or Atari disk (\$24.95/disk), or on user-supplied RAM cards (\$19.95/card). Note that the Orpheus collection requires two RAM cards.

Stoklosa Productions (tel. [412] 279-8197) has a new sample library containing 50 sample disks for the E-mu Emax (\$29.95/four disks) and 39 disks for the Emax II (\$29.95/two disks). Custom disks also are available (\$19.95 ea.). The library includes Atmospheres, Synth, Soundtrax, Industrial, New Age, Acid House, Rap/Funk, Orchestral, and more. Emax disks average 40 different presets, and Emax II disks average 70 to 90 different presets.

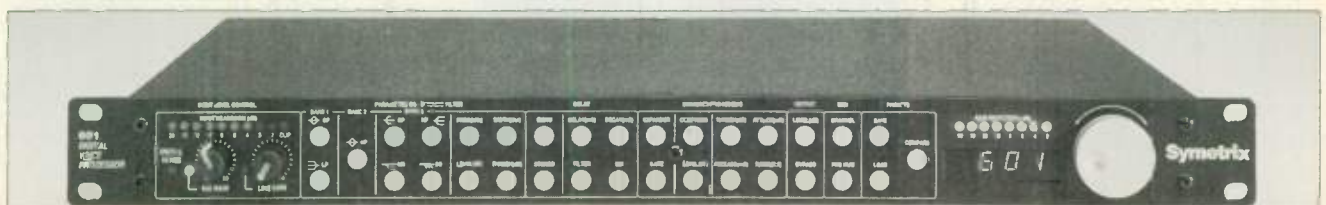
Kid Nepro Productions (tel. [212] 629-3708; fax [212] 947-0027) introduced sample libraries for the Akai S900/950 (\$10/disk; \$350/56 disk library), Casio FZ1/10M/20M (\$10/disk; \$12/expanded 2-disk set), and Ensoniq EPS/EPS-16 Plus (\$10/disk, \$300/40-disk library). The sounds vary from Roland TR-808 drums kits to Korg Wavestation and Yamaha SY77 samples. The company also announced a new 100-patch library for the Korg DS8 and 707 synths, available on RAM/ROM cards (\$85 ea./\$50 ea.) or floppy disk (\$30).

▼ SYMETRIX 601 DIGITAL VOICE PROCESSOR

Symetrix introduced the 601 Digital Voice Processor (\$1,995), a programmable mic processor that combines digital-to-analog and analog-to-digital conversion, a fully parametric EQ, shelving EQ, notch filter, de-essing, first-reflection delay, gating, expansion,

compression, stereo synthesis, and automatic gain control. The unit is controlled with dedicated buttons and an alpha wheel, rather than display pages of parameters. Analog inputs use balanced XLR connectors, and both AES/EBU and S/PDIF digital I/O are supplied. The device uses 18-bit, 64x oversam-

pling, Crystal Semiconductor digital converters that sample at 44.1 or 48 kHz (selectable). The manufacturer rates frequency response at 12 Hz to 20 kHz (± 1.5 dB) and THD at <0.01% (@ 1 kHz, 1V_{RMS}). Symetrix; tel. (800) 288-8855 or (206) 282-2555; fax (206) 283-5504.



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you to get right to making music faster than ever before, or how about the fact that it's **G**loriously Easy to Program **G**azillions of your own sound creations into the 128 User Programs. Or how about the **G**RRRRREAT Panel Layout featuring an easy to read **G**reen Back-lit display. But then again, maybe it's for the **G**alactically Huge Sounds, or the basic fact that you've never **G**otten so much sound out of one (reasonably priced) module before. Convinced? Okay, mabe the **G** Mega is really named after a **G**iant **G**reen-skinned **G**oliath who likes to **G**round cities underfoot. But please don't tell him. His head's big enough.

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KAWAI

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Professional Staff

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

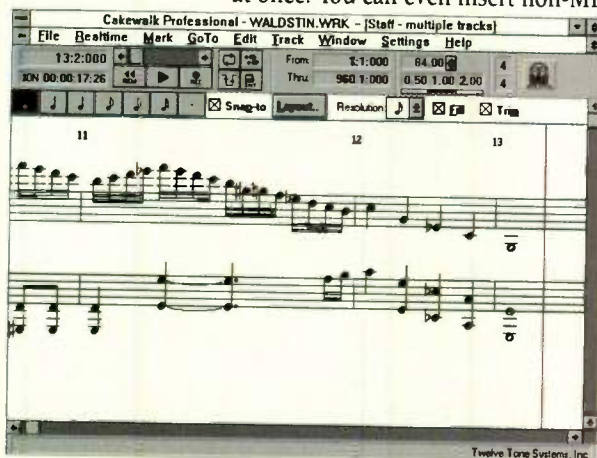
Use the Piano-roll view for inserting, resizing, and moving notes in a piano-roll grid. You hear the notes change pitch as you move them. And you can redraw note velocity levels as well.



Markers

Express Yourself

The detailed Event-list view lets you view and edit all MIDI events on multiple tracks at once. You can even insert non-MIDI



Staff view

“special” events like digital audio waves (voice, special effects) that play back on .WAV-compatible sound cards.



Tempo

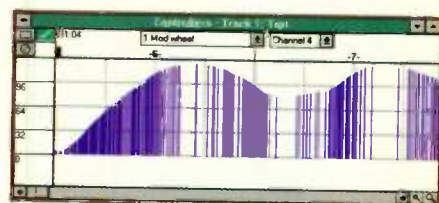
Get On Track

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

Take Control

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

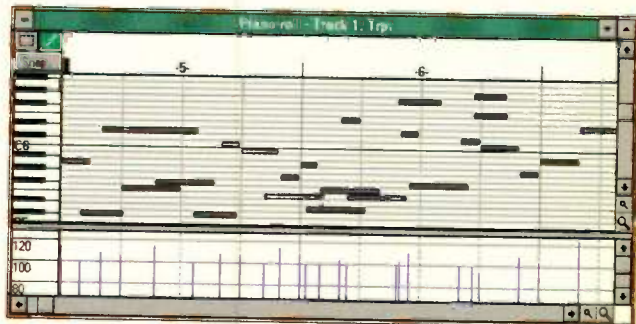
Use up to 16 assignable faders to send out MIDI Controller events while recording or during playback. Fader positions update in the Faders view during playback to show Controller values.



Controller view

Professional Experience

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



Piano-roll view

PROFESSIONAL HELP.

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



CAL-SWING 16.CAL



Faders view

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

Trk	Hr:Min:Sec:Fr	Meas:Beat:Tick	Chn	Kind	Values
5	00:00:03:01	5:4:081	10	Control	7 108
5	00:00:03:01	5:4:081	10	Control	7 123
7	00:00:03:01	5:4:082	10	Note	D 7 127 32
7	00:00:03:01	5:4:082	n/a	Text	scream WAV on Multisound card
5	00:00:03:04	6:1:001	n/a	Wave	1.25 sec @22KHz 8-bit Mono, 27K
1	00:00:03:05	6:1:012	1	Note	D 5 100 1:000

Event-list view

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



Sysx



Meter/Key

Own Another Sequencer?
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See A Professional Today

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

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

A demo disk is available for \$10.

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

Cakewalk Professional for Windows is a trademark of Twelve Tone Systems. Other products mentioned are trademarks of their respective owners.

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

Cakewalk

PROFESSIONAL
for Windows

Get Help Fast

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



Comments



When you set out to unearth some strange and startling sounds, start with a tape that's truly out of this world.

That's the philosophy of Mark Mangini who, as the head of Weddington Productions, created the sound effects for major science-fiction thrillers such as *Star Trek*, *Gremlins* and *Poltergeist*, just to name a few.

Mark now relies on Sony Pro DAT

Plus tape for recording and archiving his one-of-a-kind sounds and hauntingly beautiful melodies.

"The low error rate and consistent reliability of Sony Pro DAT Plus is critical in our search to capture and preserve the unusual sounds used in fantasy and horror films," says Mangini.

People like Mark put Sony's engineers in the right spirit to

continually expand the boundaries of our digital audio tape technology. The proof is found in our new Pro DAT Plus.

Ultra fine metal particles help deliver improved playback output in addition to a superior S/N ratio, while special binders and surface treatments help to achieve error free performance in any natural or supernatural environment.

You'll also discover a heat-resistant shell, anti-static lid and new

two-tape album case to protect your tapes from things that go bump in the night. And an erasure prevention tab to make sure you won't accidentally lose your "voices".

As Mark Mangini knows, a quality tape library is the lifeblood of any post sound company. He also knows that with new Sony Pro DAT Plus, life at Weddington Productions is a lot less scary.

SONY.
SONY RECORDING MEDIA

**SONY'S NEW
PRO DAT PLUS HAS
EVERYONE HEARING
GHOSTS.**



The new Sony Pro DAT Plus, and unique album case.

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ON
SONY
RECORDING MEDIA**

Motorola DSP56004

The newest member of a well-known chip family shines in digital audio applications.

By Scott Wilkinson

Anyone who has read EM for any length of time has heard of the Motorola DSP56001 digital signal-processor chip, which was introduced in March 1987. The 56001 is a general-purpose DSP chip with a wide range of applications in and outside the music industry. This

powerful, dedicated microprocessor is used in a variety of electronic music devices to perform all sorts of digital audio manipulations, which relieves the main CPU from the burden of signal processing.

The 56001 is part of Motorola's 56000 family of DSP chips, which uses a word size of 24 bits for internal processing. The 56002 is an updated version that was introduced in March, 1992. Its instruction set is a superset of the 56001, making it fully code-compatible with the original.

The company's other DSP families include the 16-bit 56100 and 32-bit 96000, but the 56000 family is the most cost-effective for digital-audio applications. With 24-bit accuracy, arithmetic overflow errors are avoided when operating on data from 16-bit analog-to-digital converters (ADCs).

Motorola introduced the Symphony DSP56004 in October 1992. The newest member of the 56000 family, the 56004 is optimized for audio applications. This chip provides low-cost DSP for professional and consumer audio products, while remaining fully code-compatible with the 56001.

All members of the 56000 family are based on a similar architecture (see Fig. 1). The 56001 operates at an internal clock speed of up to 33 MHz, while the 56002 and 56004 operate at 40 MHz and above, resulting in a processing rate of 20 million instructions per second (MIPS). A phase-locked loop (PLL)

in the 56002 and 56004 converts virtually any frequency from an external clock to 40 MHz, which reduces clock noise and allows the entire system to rely on a single clock source.

The on-chip memory is organized in separate program (PRAM) and data areas. This organization is called "Har-

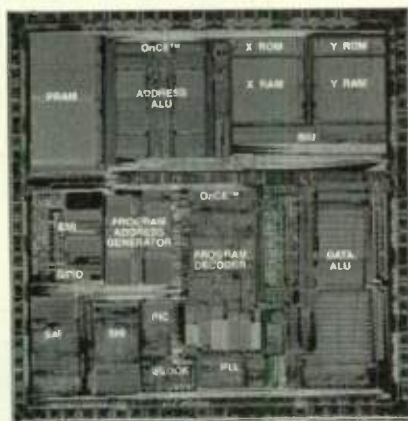


FIG. 1: A photomicrograph of the DSP56004 reveals the functional units within the chip. (Photo courtesy of Motorola Microprocessor and Memory Technologies Group, Austin, TX.)

vard Architecture." The data memory is further divided into X RAM and Y RAM. Unique to the 56000 and 96000 families, this organization is called "Dual Harvard Architecture." For example, many filter algorithms include polynomial equations in which values are calculated using variable data and fixed coefficients. The data and coef-

ficients are stored in separate RAM areas, which reduces processing time and improves operating efficiency. Two additional data-memory areas, X ROM and Y ROM, store sine wave and logarithm tables in the 56004.

Instead of the general-purpose, synchronous serial interface found on the 56001 and 56002, the 56004 includes a serial audio interface (SAI). This "on-chip peripheral" can be directly connected to as many as four mono or two stereo ADCs, and six mono or three stereo DACs. No external "glue" logic circuitry is required to connect the SAI to the converters, which greatly simplifies product design. Multi-channel audio applications are especially well-served by this interface.

An external memory interface (EMI) allows up to 4 MB of dynamic RAM to be addressed and refreshed directly, again without the need for glue logic. This is ideal for digital audio files and special delay lines for acoustic effects such as cathedral and stadium simulation. Four general-purpose I/O (GPIO) lines provide an interface for LEDs, front-panel buttons, etc.

Unlike Motorola's 56001 and 56002, the 56004 has no asynchronous serial interface, making it less straightforward to implement MIDI. This can be done using one stereo I/O channel of the SAI (which combines two audio channels on one pin) and/or the GPIO lines, but it would require some additional software.

As the 56004 becomes available in quantity, it will be integrated into many types of audio products. We might see things like multichannel multi-effects units, multi-output synths with digital I/O, 3-D sound systems, and digital amplifiers and patch bays. Whatever happens, it seems certain that the 56004 will bring us a big step closer to the affordable all-digital home studio. ●

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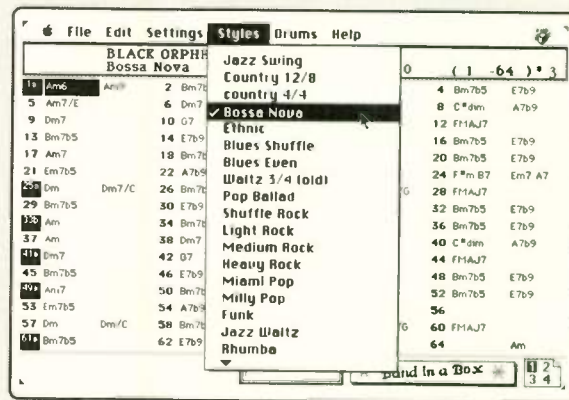
**Automatically generating professional quality five instrument accompaniment of
bass, drums, piano, guitar & strings in a wide variety of styles**

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1990
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"This amazing little program from PG MUSIC creates "music-minus-one" accompaniments for virtually any song any style. You simply type in the chords, pick a tempo and one of 24 styles, and the program creates nicely embellished chords, a bass part, and drums to be played on a MIDI synthesizer. **Band-in-a-Box understands** repeats, choruses and verses, and even varies the accompaniment, just as human musicians would. Peter Gannon, the author of the program makes no claim to artificial intelligence, but Band-in-a-Box is software that repeatedly surprises and delights you, especially in its jazz styles."

**PC Magazine Jan. 15, 1991
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MACINTOSH version REQUIRES 2 mb RAM (reduced version for 1 mb included)

ATARI 1040ST / 1040STE / Mega / TT - reduced version for Atari 520 included

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And if that weren't enough, we've included the PowerTracks sequencer for Windows and DOS - free! The Roland SCC1 is a half sized card that contains a built in General Midi (GS) compatible synthesizer, MPU401 MIDI interface, and RCA audio output to stereo or headphones. The state-of-the-art quality of the sounds on this card makes it the hottest piece of MIDI hardware on the market!

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Making

The EM Guide

By Geary Yelton

Connections

to MIDI Patch Bays and Processors

Organization is a top priority in most MIDI studios, but administrating data isn't always easy. When you've got a bunch of MIDI gear linked via a twisting clutter of MIDI cables, it's difficult to figure out what's doing what and what's going where. If you're not careful, portions of your MIDI datastream can get lost in traffic.

You need a strong hand to impose order on

this digital anarchy. Meet your enforcer: the MIDI patch bay.

A MIDI patch bay serves as a central connecting point for all your MIDI gear. Patch bays also optimize signal flow, allowing you to send independent datastreams over each cable. When integrated into a multi-port MIDI interface and used with compatible software, this gives you access to more than sixteen MIDI channels.



RON MILLER

THE BASICS

The simplest device that routes MIDI data is a MIDI Thru box. A Thru box directs a single MIDI input to a number of MIDI Thru ports, allowing a master controller to drive several slaves without daisy-chaining.

A true MIDI patch bay has at least two MIDI In ports and multiple MIDI Out or Thru ports. A patch bay blurs the distinction between MIDI Out and MIDI Thru, because it's not actually a MIDI source, although it may change the data it receives. Signals received at a MIDI In are routed to one or more MIDI Outs.

A MIDI processor, however, alters MIDI data received at its input before passing it to the output. Velocity levels, Program Changes, controller values, and pitch transpositions are among the types of data appropriate for processing.

Patch bays and processors work well together, and it was only a matter of time before enterprising manufacturers combined the two in a single unit. Some manufacturers went even further,

adding these capabilities into full-featured computer MIDI interfaces.

To give you an overview of the current state of the marketplace, we've compiled a list of all the various patch-bay/processor/interface devices on pp. 36 and 37. Only those products with at least two independent MIDI Ins and three or more MIDI Outs were included. The chart columns list the most relevant features. Be sure to check out your finalists at a local music store, where you can critically audition each unit.

COMPUTER INTERFACE

Several of the units surveyed in this article function as MIDI interfaces and time-code synchronizers for specific types of computers, with patch-bay and processing features thrown in for good measure. These devices feature direct interfaces to PCs, Macs, and Ataris via serial, parallel, or expansion bus connections. (The Atari ST has MIDI built-in, so external interfaces add extra MIDI ports.) Some of the other processors and patch bays can connect to computers via MIDI, allowing you to

control them with editor software without a platform-specific hardware interface. The maximum number of independent MIDI channels each device supports is shown in parentheses.

MIDI IN/OUT

The number of physical input and output connectors is listed here.

MERGING

Sometimes it's desirable to combine MIDI sources. Two players may want to record an improvised jam into a sequencer or play a rack of instruments at the same time. Or you may want to perform on instruments at the same time they're being played by a sequencer. You can't use a Y-cord to merge two sources into one because MIDI data is a series of digital bits, and it's essential that these bits are kept in order.

A merger quickly alternates MIDI messages from multiple sources and ensures that the data remains intact and intelligible. Most of the units listed here are capable of merging two or three inputs into a single output. A few

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and



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The Zoom 9120 Advanced Sound Environment Processor.

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fax (604) 980-6711

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Agoura Hills, CA 91301
tel. (818) 991-3881
fax (818) 991-4185

Ensoniq
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Malvern, PA 19355
tel. (215) 647-3930
fax (215) 647-8908

JLCooper
12500 Beatrice St.
Los Angeles, CA 90066
tel. (310) 306-4131
fax (310) 822-2252

Lone Wolf
1509 Aviation Blvd.
Redondo Beach, CA 90278
tel. (310) 379-2036
fax (310) 374-2496

Mark of the Unicorn
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Cambridge, MA 02142
tel. (617) 576-2760
fax (617) 576-3609

MIDITEMP
Corrigan Marketing
114 Lakewood Circle
Smyrna, TN 37167
tel. (615) 459-2960
fax (615) 355-8756

Music Quest
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tel. (214) 881-7408
fax (214) 422-7094

Opcode
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Palo Alto, CA 94303
tel. (415) 856-3333
fax (415) 856-3332

Peavey
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Meridian, MS 39302-2898
tel. (601) 483-5365
fax (601) 484-4278

Polyphonics
71 Fairway Dr.
North Kingstown, RI 02852
tel. (401) 295-7659

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Goodman Music
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(213) 845-1145

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

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

West L.A. Music
Los Angeles, CA
(213) 477-1945

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

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

Richard Audio
Montreal, PQ
(514) 733-5131

Adcom Electronics
Toronto, ON
(416) 251-3355

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

Steve's Music
Toronto, ON
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(604) 682-6639

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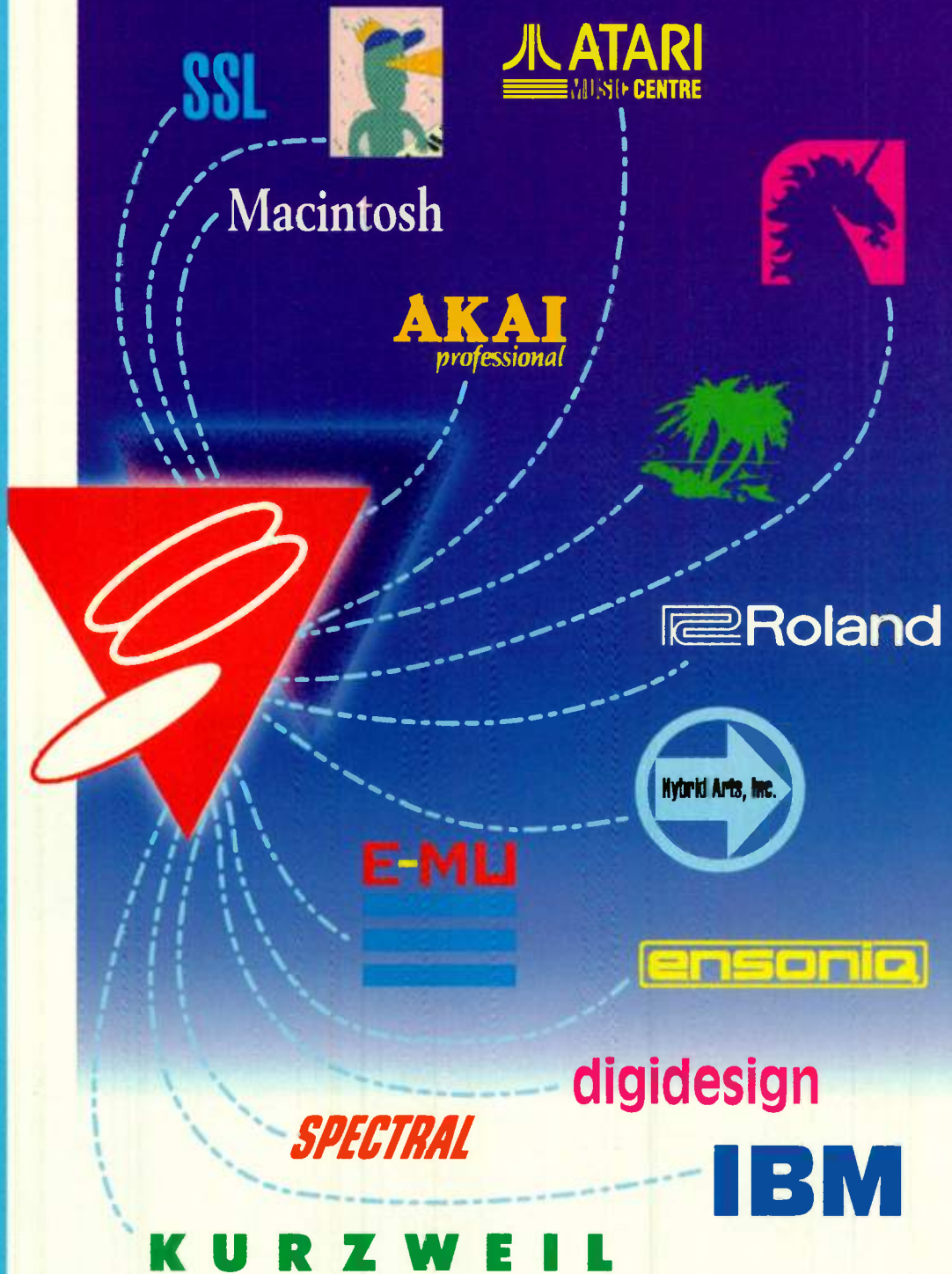
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● BUYER'S GUIDE

can merge all their inputs to any output or combination of outputs.

FILTERING

MIDI controllers often generate huge amounts of data. As a result, instruments and other MIDI devices with underpowered microprocessors can get overrun, causing noticeable delays or data dropouts. Most MIDI processors overcome this problem by allowing you to filter out specific types of MIDI messages. Filtering cleans up the MIDI data stream and also reduces the size of sequencer files.

RECHANNELIZING

Rechannelizing allows you to redirect MIDI messages to other channels. For example, incoming messages on channel 3 can go out on channel 5 or channels 4 and 13. If you have an old synthesizer that transmits only on channel 1, such as an original Yamaha DX7 or Sequential Prophet-600, rechannelizing is invaluable.

TRANSPPOSITION

A transposition function allows you to



The Anatek SMP-7 and SMP-16, with the optional RT-120 remote MIDI fader box.



MIDITEMP's MP-44, distributed in the U.S. by Corrigan Marketing, adds a Standard MIDI File player/recorder to a four input/output patch bay and processor.

shift the pitch of a track up or down an octave, or from one key to another. Most MIDI processors can transpose each input channel independently. Processors that split a controller key-

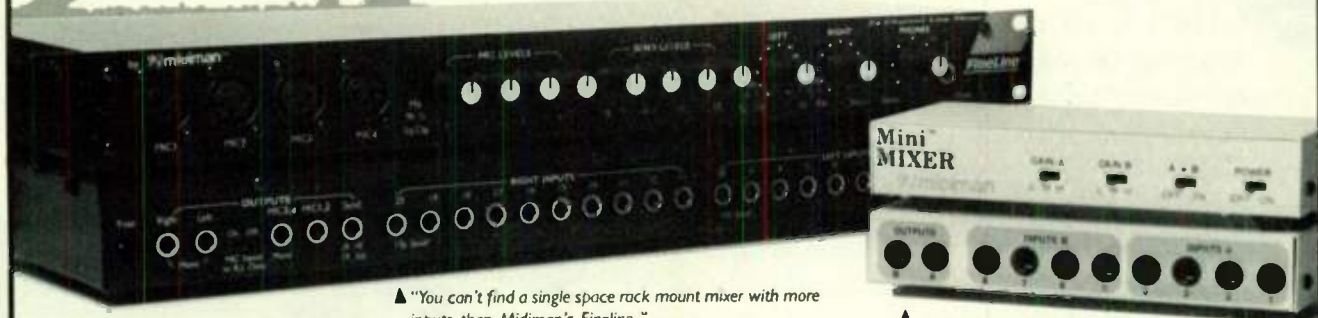
board into different zones frequently can transpose each zone independently.

Both Opcode's Studio 5 and Peavey's MIDI Master II also offer note

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remapping, which is similar to "intelligent transposition." This feature allows you to remap incoming notes to user-defined scales or notes. For example, you could set up a map that transposed all incoming G#'s down to G's, but left all F#'s unaffected.



The Polyphonics Merge 3 x 3 offers rudimentary MIDI processing.

CONTROLLER REMAPPING

It would be nice if all MIDI controllers had switches, wheels, and sliders that addressed every continuous controller, or at least allowed assignment of a group of sliders to any controller number. Unfortunately, many controllers

only send Mod Wheel, Volume, and Sustain. MIDI processors can overcome this problem by converting one controller number to any other. By doing so, a modulation wheel can be used to control Pan, Portamento Time, Sostenuato, Tremolo Depth, or whatever you desire. Often, a

processor also can scale controller values so that the range of effect produced is appropriate for the sound you're controlling.

KEYBOARD SPLIT

Many keyboard instruments can be split into two (or more) zones, so that each section plays a different sound. A keyboard's lower octave could trigger drum samples, while the next octave ran bass lines, and the remainder played choir voices. Many MIDI processors have the ability to split any MIDI controller into zones. The maximum number of zones is shown in parentheses.

NUMBER OF PATCHES

Like other MIDI gear, many MIDI patch bays and processors store their setups in memory and respond to MIDI Program Changes. Each time you send a Program Change, the processor could switch the routing of data, turn filtering on or off, and so on.

SYNCHRONIZATION

Several of the devices (particularly



The Peavey MIDI Master II includes eight MIDI Ins and Outs and a powerful MIDI processor.

CONTROL FREAK



The DC 24 is the first dynamic controller with a built-in 24dB/octave crossover to allow separate dynamic control of high and low frequencies. This *bandsplit dynamic processing* delivers tighter control more transparently than conventional compressor/limiters. It reduces "pumping," "breathing" and other annoying side effects that can result from a single side-chain trying to accommodate both high- and low-frequency demands simultaneously. The DC 24 gives you the choice of re-combining the split program to a single output for studio/broadcast applications, or leaving the highs and lows separate for biamped live sound performance.

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EM GUIDE TO MIDI PATCH BAYS AND PROCESSORS

Manufacturer/Model	Computer Interface (channels)	MIDI In/Out	Merging	Filtering	Rechannelizing
Anatek SMP-7	Mac (16)	7/8	yes	yes	no
Anatek SMP-16	Mac (16)	7/8	yes	yes	no
Digital Music Corp. MX-28M	none	2/8	yes	no	no
Digital Music Corp. MX-28S	none	2/8	no	no	no
Digital Music Corp. MX-8	none	6/8	yes	yes	yes
Ensoniq KMX-8	none	8/8	yes	no	no
Ensoniq KMX-16	none	15/16	yes	no	no
JLCooper MSB Plus Rev 2	none	8/8	yes	yes	yes
JLCooper Nexus	none	3/8	no	no	no
JLCooper Nexus Plus	none	2/8	yes	yes (channel)	yes
JLCooper Synapse	none	16/20	yes (3 inputs)	yes	yes
Lone Wolf MIDI Tap	Mac and PC (64)	4/4	yes	no	no
Mark of the Unicorn MIDI Time Piece II	Mac and PC (128)	8/8	yes (8 inputs)	no	no
MIDITEMP MIDI Player MP-44	none	4/4	yes	yes	yes
MIDITEMP MIDI Player MP-88	optional PC (128)	8/8	yes	yes	yes
MIDITEMP MT-16Xpandable	optional PC (256)	16/16	yes	yes	yes
MIDITEMP PMM-88E	optional PC (128)	8/8	yes	yes	yes
Music Quest MIDIEngine Array	PC (128)	8/8	no	yes	yes
Opcode Studio 3	Mac (32)	2/6	no	no	no
Opcode Studio 4	Mac (128)	8/10	yes	yes	yes
Opcode Studio 5	Mac (240)	15/15	yes	yes	yes
Peavey MIDI Master II	none	8/8	yes	yes	yes
Polyphonics IMS-200	none	3/9	no	no	no
Polyphonics Merge 3x3	none	3/3	yes	yes	no
Polyphonics PEX-1	none	3/3	yes	no	no
Steinberg MIDEX+	Atari ST (64)	2/4	yes	yes	yes

computer MIDI interfaces) read and write SMPTE time code. These units can lock sequencer playback to tape playback, allowing you to work simultaneously with tape and sequencer tracks.

Synchronization is accomplished by converting the SMPTE code to a digital form that the music software can understand. The most common format for conversion is a combination of standard MIDI Timing Clocks and Song Position Pointer. MIDI Time Code, or MTC, is a more accurate alternative. Mark of the Unicorn's Macintosh programs also support an alternate type of time code called Enhanced Direct Time Lock, or DTLc.

BONUS FEATURES

MIDI patch bay/processors are versa-

tile tools and often are capable of performing many other important functions. Following are descriptions of some of these extras.

Velocity Processing. It's no secret that different sounds respond to velocity differently. A velocity range that's perfect for piano might be too extreme for percussion. Most MIDI processors can scale velocity so you can define its total dynamic range, customizing it for each sound in a performance.

In addition, older Yamaha instruments (most notably the DX7) max out at a Velocity level of 114 and sound overdriven if played with velocities exceeding that value. Velocity processing solves this problem by either compressing or expanding the range of possible MIDI Velocity values to compensate.

Another type of processing limits Velocity so that it never exceeds or falls below a given value. Reverse Velocity turns harder playing into softer notes.

Program Change Remapping. At its simplest, remapping Program Changes means that when you send a Program Change from your MIDI source to the patch bay, the latter translates it to a different Program Change number. Instruments that contain more than 128 internal patches usually can remap program changes internally, so that any 128 programs you specify can be selected over MIDI.

It's more useful to be able to change programs for all your instruments at the same time. Many MIDI patch bays can translate a single program change into a different program change for every channel on each MIDI Out port.

Transposition	Controller Remapping	Keyboard Split (zones)	Number of Patches	Synchronization	Notes	Price
no	no	no	50	SMPTE	optional MIDI fader box	\$449
no	no	no	50	SMPTE	16 audio inputs and outputs; optional MIDI fader box	\$799
yes	no	yes (4)	0	no	allows overlapping ranges	\$149
no	no	no	0	no	"off" switch for each output	\$89
yes	no	yes (4)	50	no	patch-chain; compander; dual MIDI digital delays	\$395
no	no	no	30	no	ships with Mac and Atari visual editing software	\$295
no	no	no	99	no	ships with Mac and Atari visual editing software	\$579
yes	no	no	64	no		\$389
no	no	no	0	no		\$99
yes	no	yes (3)	2	no		\$159
yes	no	yes (12)	64	no	displays incoming MTC; expandable to 192 in/240 out	\$1,195
no	no	no	99	no	MediaLink optical connector	\$1,595
no	no	no	128	SMPTE	4 assignable controllers	\$595
yes	no	yes (4)	256	MIDI Clock	includes Standard MIDI File player	\$1,099
yes	yes	yes (8)	256	MIDI Clock	includes Standard MIDI File player and remote	\$1,440
yes	yes	yes (8)	256	SMPTE (optional)	includes Standard MIDI File player and remote	\$1,499
yes	yes	yes (8)	256	SMPTE (optional)	includes remote	\$779
no	no	no	0	SMPTE		\$499
no	no	no	1	SMPTE		\$319
yes	yes	yes (unlimited)	128	SMPTE	networkable (up to 4 boxes for 512 MIDI channels)	\$495
yes	yes	yes (unlimited)	128	SMPTE	networkable (up to 6 boxes for 1,440 MIDI channels)	\$1,295
yes	no	yes (4)	50	no	2 assignable controllers	\$349
no	no	no	0	no		\$189
no	no	no	0	no		\$149
no	no	no	0	no		\$169
						(\$229 for rack)
yes	no	no	1	SMPTE		\$699

One patch change sent to your MIDI processor can send different program numbers to each instrument in your system, setting them up for the next song in your set without undue button pushing.

MIDI Delay. By repeating every note you play, a MIDI processor can simulate digital delay, creating a distinct echo in real time. To sound realistic, you need multiple repetitions with decreasing velocity. The disadvantage is that your polyphony is reduced with each repetition.

Panic Buttons. About half the models mentioned have a panic button, which is useful in case of stuck notes and other emergencies. Panic buttons usually send All Notes Off and Reset All Controllers commands over every MIDI channel. This feature eliminates the

need to track down exactly which note on which channel caused a problem.

CONCLUSION

The best MIDI patch bay/processor for you depends entirely on your needs. If you just want to play your MIDI rig with two different controllers, a simple merger or a Thru box with switching capabilities does the job. High-level sequencers like *Vision* and *Sequencer Plus* are perfectly capable of remapping program changes, transposing, splitting keyboards into zones, scaling velocity, and so forth. For this reason, a lot of multiport MIDI interfaces for computers don't duplicate these functions. For live performance without a sequencer, though, these may be just the functions you find essential.

If you require more than the stan-

dard sixteen MIDI channels, look for a patch bay or computer MIDI interface capable of receiving and sending sixteen channels from each MIDI port (or cable). Ideally, you'll want to get something with separate inputs and outputs for each device in your studio. If you expect your system to grow, you may be interested in models that can be networked to duplicate units for additional Ins and Outs.

Mergers, patch bays, processors, and multi-port interfaces simplify life onstage and in the studio. Though setting up these devices can be complicated, once everything is properly configured, they turn MIDI traffic jams into a series of perfectly timed signal lights.

Geary Yelton writes, composes, and draws with computers in Atlanta, Georgia.

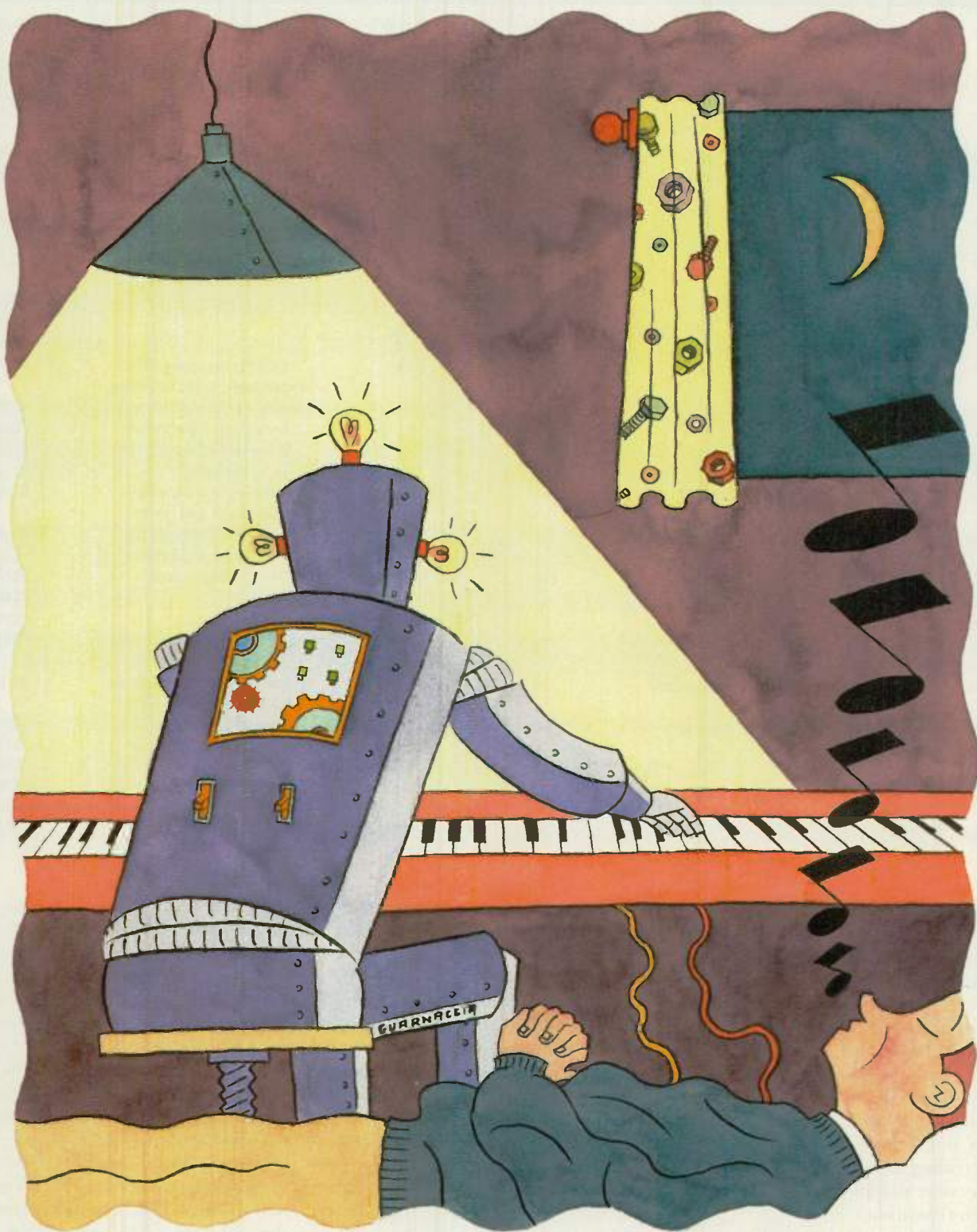


Illustration by Steven Guarnaccia

The Musician's Apprentice

If you've spent a lot of time churning out your next hit song with a sequencer or notation program, you might be singing something like *What Have You Done for Me Lately?* While today's music-production software provides plenty of killer features and options, you may find yourself wanting more. Wouldn't it be nice if the computer took a more active role in musical collaboration during composition and performance?

Over the past year or so, a number of inexpensive collaborative programs have been introduced on all major computer platforms. These programs include a database of musical information—a sort of musical “intelligence”—that amateur and experienced musicians can manipulate to create or perform music easily in a variety of popular styles.

These “music creation” or “algorithmic composition” programs take a small amount of input from the user (usually chord changes and a preferred musical style) and automatically generate music. Typically, this music consists of background parts that accompany your melody, but some programs even take a crack at generating melodies.

Performance-oriented programs help musicians with limited skills play along with existing music.

The results can be impressive, but don't expect one-button Mozart (although some academic research apparently is moving in that direction). The result usually is an adequate backup band for practicing or just fooling around. Some musicians even use the results as starting points for further composition. Most of the products mentioned in this article can save their files in Standard MIDI File format, allowing

the output to be refined in another sequencer. For many inexperienced musicians, these programs provide an enormously satisfying means of creating their own music.

Not surprisingly, many traditional musicians are horrified at the thought of a computer composing its own music. However, academic computer-music enthusiasts have worked with algorithmic composition programs for years.

In order to address a wider audience, today's programs have more intuitive user interfaces and generate more popular styles

With the right software your computer can become a musical collaborator.

By Steve Peha and Ben Hippen

● MUSICIAN'S APPRENTICE

of music, such as rock, pop, jazz, and country (see sidebar "How They Work" on p. 48).

Whether you are a budding composer, an experienced pro in search of a back-up band, or a musical neophyte eager to jump into electronic music, several programs are available that can transform your computer into a worthy musical collaborator.

PG MUSIC

Band-in-a-Box 5.0 (\$59 Standard Edition; \$88 Professional Edition)

MACINTOSH, IBM (DOS AND WINDOWS) ATARI

Because it is available on IBM, Atari, and Macintosh platforms, *Band-in-a-Box* is probably the most popular of the products in this overview. The basic metaphor of the program is that of a lead sheet (see Fig. 1). The user creates a song by entering chord changes with the computer keyboard into a lead-sheet screen. Getting around the screen is easy, and a full range of chords (including extended chords) is supported.

After entering the chords, select a musical style, and *Band-in-a-Box* plays your chord progression with a combo consisting of bass, piano, drums, guitar, strings, and horns. The program comes with a large variety of popular music styles, and additional styles can be purchased from the publisher. The program also comes with a number of well-known songs already entered. This convenient combination makes the program instantly accessible to anyone who can invoke a few simple menu commands. You also can record a melody or solo track from any MIDI instrument.

If you want an affordable and accessible introduction to this type of pro-



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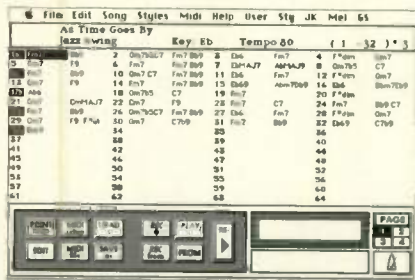


FIG. 1: The main screen from PG Music's trend-setting *Band-in-a-Box*.

gram, *Band-in-a-Box* is a good choice. The program is simple to use and provides hours of enjoyment. It is best-suited to musicians working in standard styles who want to realize a song in the least possible amount of time.

MIBAC MUSIC SOFTWARE

MiBAC Jazz Improvisation 1.5.8 (\$125) MACINTOSH

This product is constantly compared to *Band-in-a-Box* because it works in a similar way. Chords are entered into a lead sheet, and the program generates music based on the selected musical style. But *Band-in-a-Box* includes a large number of styles, while *MiBAC Jazz* concentrates all its energies on one type of music: jazz.

Not surprisingly then, *MiBAC Jazz* produces convincing results in various jazz styles. These include Jazz 4/4, Jazz 3/4, Slow 4 (12/8 feel), and Latin, each with different grooves that change according to the tempo. For example, *MiBAC Jazz*'s "piano player" comps quite differently in a burnin' bebop tune than in a medium swing tune. You also can tweak bass, piano, and drum parts by altering velocities and timing

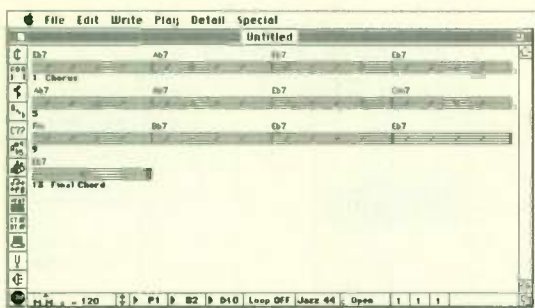


FIG. 2: In addition to generating a background band, *MiBAC Jazz* can print simple lead sheets.



FIG. 3: Soundtrek's *The Jammer* lets you set individual "composers" for each drum sound.

globally to make subtle changes in the groove. The program's lead-sheet creation, editing, and printing features are fairly sophisticated (see Fig. 2). Without much work, you can get nice-looking and usable results.

If you're into jazz, you'll like *MiBAC Jazz*. While certainly not as versatile as *Band-in-a-Box* or *The Jammer*, *MiBAC Jazz* does what it does better than anything else. It is intended to be used as your own personal jazz rhythm section for practicing improvisation, but it may be useful as a composition/lead sheet-creation tool as well.

SOUNDTREK

The Jammer 1.4 (\$175)

IBM (DOS)

The Jammer also takes a lead-sheet approach to creating music. Like *Band-in-a-Box*, *The Jammer* is a general-purpose program that can be used to create a wide variety

of music. But *The Jammer* takes a more sophisticated approach by allowing you to create your own styles one instrument at a time. The styles you create are then applied to the chord progression in the lead sheet.

The Jammer calls each part a "composer" and includes composers for bass, rhythm (which could be piano or guitar), and the standard set of drum kit and percussion instruments (see Fig. 3). It also features a composer for chord progressions, so you can get started immediately, even if you don't have a progression in mind. In addition, *The Jammer* lets you record up to 256 tracks of your own material from any MIDI instrument.

While similar to *Band-in-a-Box* and *MiBAC Jazz* in its use of a lead-sheet metaphor, *The Jammer* offers a level of creative flexibility not found in either of these programs by providing a relatively simple way to create custom styles. Its ability to create its own chord progressions helps inexperienced composers. In addition, *The Jammer's* instrument-based approach to style creation can produce some highly individual results.

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● MUSICIAN'S APPRENTICE

choice is *SuperJAM!*. Luckily, it is an excellent one (see Fig. 4). *SuperJAM!* functions a bit like *Band-in-a-Box* and *The Jammer*; you simply enter chord progressions, choose a style, and let it rip. Like *The Jammer*, *SuperJAM!* encourages you to develop your own styles by recording short patterns for each of the different instruments and assigning certain characteristics to the variations you create.

In addition to playing MIDI instruments, *SuperJAM!* can use the Amiga's internal sound chip, although the quality is not stunning. The program offers an easy-to-use interface and a great deal of flexibility in creating your own styles. (*SuperJAM!* was reviewed in the December 1992 *EM*.)

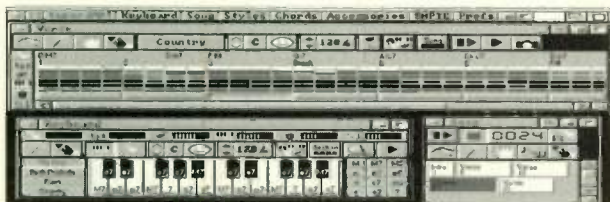


FIG. 4: *SuperJAM!* can play back its music using MIDI or the Amiga's internal sound chip.

HOWLING DOG SYSTEMS

Power Chords 1.0 (\$85)

I B M (W I N D O W S)

In *Power Chords*, the background rhythm grooves are created by working with individual elements like bass lines, chord progressions, chord rhythms (such as strumming patterns), and drum patterns. These elements are then combined into a song by dragging and dropping them into a graphic song window (see Fig. 5). You also can record your own lead parts.

Drum parts, melodies, and bass lines are created using a Rhythm Editor that resembles some sequencers' step-edit modes. You also can record these elements in real time directly from a keyboard. Chords are created with a guitar fretboard-based editor, although you also can build chords by specifying the chord notes in a dialog box.

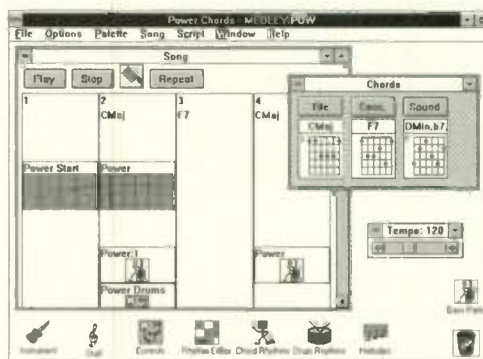


FIG. 5: The Windows-based *Power Chords* uses a guitar metaphor for entering music.

In its building-block approach to the compositional process, *Power Chords* offers a high degree of control over every measure. Not really a style-oriented music generator, *Power Chords* is a free-form composition environment that may provide beginning musicians and even non-musicians with the tools necessary to create some very unusual music. And in its simplest application, the program can create standard musical styles like *Band-in-a-Box* and *The Jammer*. Its use of the guitar metaphor

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PROGENITOR SOFTWARE

MIDI Jukebox Arcade 1.0 (\$99)

I B M (D O S)

MIDI Jukebox Arcade is an automatic composition program in the truest sense of the term. Using its style generators, the program can create complete pieces in any of several styles. Currently available styles include New Age, Jazzer, and Minimal. Only the New Age style ships with the program; the other styles must be purchased from the publisher. The product is actually a combination of a Style Generator that creates pieces and a Mixer/Player with automated mixing and song list capabilities for listening to and interacting with the results (see Fig. 6).

ProGenitor makes another product called *MusicSculptor* (\$299; see the review in the October 1992 *EM*). *MusicSculptor* and *MIDI Jukebox Arcade* share elements of the same automatic music-generation technology, but *MusicSculptor* is a much deeper, more complex environment for algorithmic composition. Both programs were developed in connection with The Center for Interdisciplinary Research in the Arts and Sciences at the University of North Texas. *MusicSculptor* is better-suited to people who want to pursue algorithmic composition in a more formal and rigorous manner.

MIDI Jukebox Arcade provides an introduction to algorithmic composition. While the New Age style generator supplied with the product doesn't tend to produce a lot of variety, the automated mixer, with its ability to send many different types of MIDI data, provides an opportunity for users to "massage" the music.

ARTIC SOFTWARE

Nkey 1.0 (\$39)

I B M (W I N D O W S)

Rather than an automated composition environment, *Nkey* is designed for music performance. The computer keyboard is used to improvise a melodic solo over any MIDI file. *Nkey* ships with several sequences to use as backing tracks for your performance.

To perform with *Nkey*, you load a MIDI file, select a scale type (major, minor, blues, etc.), select a key, press the Play button, and tap out notes on

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your computer keyboard (see Fig. 7). *Nkey* cleverly maps the keys on your keyboard to notes in the chosen scale and key. As long as the MIDI file stays in the same key and basic harmony, just about anyone can jam to their heart's content without playing a wrong note. The program also includes a simple MIDI mixer that lets you select patch changes, pan positions, and volume levels.

We looked at version 1.0, but just as we were wrapping up, version 2.0 was sent to us. This version, which should be out by the time you read this,

includes several significant improvements, such as the ability to record your performance and save it as a Standard MIDI File, a much larger selection of scales, the capability to select patches in the mixer by name, and other features. Version 2.0 will retail for \$79.

Because *Nkey* is a performance program that makes its music with the computer keyboard, it may appeal to the thousands of *Windows* users who have internal sound cards like Creative

Labs' Sound Blaster Pro and MediaVision's Pro Audio-Spectrum. It is easy to use and should provide non-musicians with a simple and satisfying entry into MIDI music-making.

MARTIN SHAWN, INC.

Instant Pleasure 1.0 (\$149)

MACINTOSH

Like *Nkey*, *Instant Pleasure* is a performance-oriented program. But *Nkey* concentrates

its effort on melodic elements, while *Instant Pleasure* focuses on rhythm. This program is a MIDI file playback environment with a twist: You interact with the product and "perform" a piece of music by tapping out its rhythm on a MIDI or computer keyboard. This allows musicians who may not have much technical facility to play complicated pieces. In this sense, the program is both an entertainment/performance tool and a learning tool. The program also allows

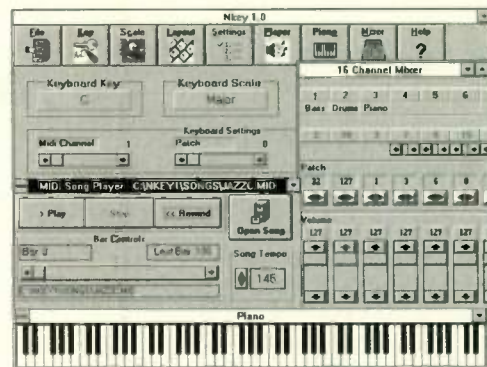


FIG. 7: *Nkey* lets you jam along with Standard MIDI Files using only a computer keyboard.



FIG. 6: The Mixer/Player page from ProGenitor's *MIDI Jukebox Arcade*.



more experienced musicians to add nuance to existing MIDI files and record the results.

Song files can be accompanied by rhythm and lyric files that help you perform correct rhythms and learn lyrics. During playback, lyrics highlight in time to the music (see Fig. 8). The program comes with 25 pieces to get you started. You also can use your own pieces; *Instant Pleasure* will import MIDI files. The publisher offers a large selection of pieces that can be purchased in

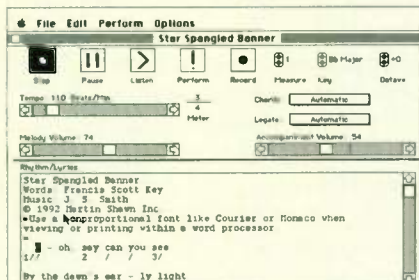


FIG. 8: The Mac-based *Instant Pleasure* lets you follow song lyrics as you tap out the appropriate rhythm.

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• MUSICIAN'S APPRENTICE

HOW THEY WORK

For the most part, these programs take one of two approaches to music generation. Programs like *Band-in-a-Box*, *MiBAC Jazz*, and *SuperJAM!* assemble their songs by drawing on a relatively large number of short pre-recorded patterns.

You get a feel for this approach if you spend some time with the *Band-in-a-Box* style maker. Styles are created by recording a few beats of music for each instrument in a given style. Typically, many different patterns are recorded and each one is assigned a number that represents the likelihood it will be played at any given time. The program builds its songs by selecting patterns that match the harmonic rhythm (how often the chords change) in your leadsheet. For example, if a certain style has three different 4-beat patterns in it and each of these patterns is just as likely to be used as the others, *Band-in-a-Box* will select one of the patterns each time it comes across a chord change that lasts four beats.

A contrasting approach is used by *MIDI Jukebox Arcade* and, to a greater extent, by *MusicSculptor*. These programs generate music by processing values for certain important musical parameters and applying mathematical principles to them on a note-by-note or phrase-

by-phrase basis. Melodies and accompaniment parts are generated by rules or algorithms rather than drawing upon an existing library of pre-recorded material.

This approach lets these programs generate melodies in addition to background rhythm parts. The drawback is that it often produces less-than-spectacular results. Although it is ultimately less flexible, the pattern-based approach produces more consistent and often more useful results. If you've built up a library of hot patterns, the program that selects them can't go wrong.

These two approaches are not mutually exclusive. This is best illustrated by *The Jammer*, in which each "composer" (instrument) starts with a small library of very short motivic ideas. These motives are then altered by selecting different parameters of the playing style (like how often the bass player plays a fill as opposed to just sticking with the basic beat). Because of this dual approach, *The Jammer* is the only program covered here that lets you create true hybrid styles. In the bass composer, for example, if you select two or more styles (such as country, jazz, and funk), *The Jammer* will produce a part that is a combination of the selected styles.

collections.

Instant Pleasure makes it possible for even the most inexperienced musician to perform fairly complicated pieces in a satisfying way. If you've always wanted to perform your favorite Christmas carols at the piano but never had time for lessons, this may be the product for you. Or, if you're a singer who has always wanted to accompany yourself, *Instant Pleasure* may be the product that saves you from years of piano practice.

WRAPPING UP

Each of these packages has its strengths and weaknesses. When determining which is best for you, first decide what

kind of music you want to make and how you want to make it. Regardless of your musical background, any of these programs provides an excellent practice tool, a compositional assistant, or simply another way to learn more about music. They won't take the place of sequencing and notation packages, but you'll find they do make an excellent addition to any music software library.

Steve Peha and Ben Hippen are partners at Music Technology Associates, a Boston-based group of music and computer professionals that provides consulting and product development for the music technology industry.



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Inside the Score

Compare the previous example to the opening of *Don Juan*. In three brief measures, Strauss has a span of over three octaves (try singing it!)

1st Octave, 2nd Octave, 3rd Octave, and beyond



ff

Play Violin I Play Full Orchestra

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media

Minus

One

As buzzwords go, *multimedia* has been buzzing a lot lately. It's a hot concept on Macintosh computers; a CD-ROM player is built into Apple's latest model. It's a hot concept on PCs; Microsoft recently dreamed up MPC, a

By David Pogue

The technology is there. standard PC configuration for multimedia. There's only one little problem: If you ask musicians what multimedia actually is, few can give you a straight answer.

That's odd because more musicians are doing multimedia projects every day. They're recording the sound effects for self-running trade-show presentations. They're composing

The jobs are there. the music and recording the vocals for interactive shopping-center kiosks.

They're producing the audio for CD-ROM discs, those 600-megabyte silvery CDs that can play music, video, speech, and text on a personal computer. Some musicians are hired to come up with the clinks, clanks, and vocal prompts used in interactive training software.

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● MULTIMEDIA

So, how exactly should we define the term "multimedia"? Given the above examples, we can say that multimedia refers to any computer-based audio/visual presentation that is usually interactive (audience-navigated). This can be practically anything from home-made *HyperCard* stacks to automatic teller machines.

OUTSIDE HELP

"Interactive media is creating an explosion in demand for original music," says Barry Schuller, who runs Medior, a busy Princeton, California, CD-ROM production company. "We're producing a lot of interactive CDs, and every one of them has a score. They're extremely audio-intensive; there's more music on a CD-ROM than in a film. A whole new medium is being born that has the potential to be mass-market."

Becoming a musical "multimediac" requires a little specialized gear and a lot of knowledge. "Few multimedia producers are as savvy about music as they are about authoring and graphics," points out Jeff Burger, multimedia guru and author of *The Desktop Multimedia Bible* (Addison-Wesley). "There's a lot of *Director* [interactive presentation software] jockeys out there. But their idea of music is kind of weird."

"Multimedia producers prefer to have a person on the outside take the responsibility for sound," agrees Mark Waldrep, composer/sound engineer for Warner New Media's interactive CD-ROMs and owner of Pacific Coast Soundworks, a digital recording and editing company. "It's about doing the homework; finding out what the file formats are, what the technologies are. As long as you understand what the 'deliverable' is going to be, there's not that much magic to it."

MIDI

The "deliverable" is all-important: It refers to the form, format, and packaging of the tracks you ultimately hand over to the client. In the world of computerized multimedia, you'll be trafficking in two non-tape sound formats: MIDI files and digital audio.

Standard MIDI Files are great because they take up only a tiny amount of disk space to represent the musical information for an entire orchestration. Until recently, however, every MIDI instrument's patches have been arranged differently. The MIDI file you

prepared on your Korg M1 using piano, bass, and strings might play back on your client's synth with zither, bongo, and SpaceTweezer.

That's where General MIDI comes in. Among other things, a General MIDI-compatible synthesizer must offer 24-voice polyphony and have its patches arranged in a specific order: a piano sound is always patch 1, acoustic bass is always 33, and so on. The General MIDI spec guarantees that the orchestration you tweak to perfection at home will use the same sounds when played on any other General MIDI-compatible synth. (See "Generating General

MIDI" in the September 1992 EM.)

At the moment, only a few synths conform to the General MIDI spec: Roland's Sound Canvas and related products, Korg's 03R/W, and Yamaha's TG100. But as more synths subscribe to this convenient standard system, the market for ready-made MIDI files will blossom.

With the hassle removed from the MIDI equation, multimedia producers of every kind will be more inclined to buy MIDI files—which they can easily manipulate in a sequencer—instead of taped music. "MIDI files let you mess around with tempos, looping, even the

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● MULTIMEDIA

orchestration," notes Burger. "The production can be in flux up until the last minute." None of this control is possible with taped production music (or even digital audio).

This real-time flexibility is an important element of clip music collections, which consist of generic pieces that can be used in many different projects. According to Paul Potyen, music producer, associate editor of *Mix*, and multimedia music composer, "If you like the sound of a MIDI file, you can go into a sequencer and do things like create a fade-in starting on bar 5 that lasts ten seconds, and decide to loop bars 11 to 15 three times, and make the whole cut exactly 60 seconds long."

There is no need to feel high-tech anxiety over the fact that your existing gear doesn't support the General MIDI spec. You can make *any* multitimbral synth resemble a General MIDI device, all by yourself, for free (if you've got the necessary programming chops). Just rearrange the current patches and create whatever sounds are missing. (For a list of the GM patch and drum note assignments, see "MIDI for the Masses" in the August 1990 *EM*. You also can get the General MIDI spec for \$7 from the International MIDI Association; tel. [310] 649-6434.)

For example, Potyen used Opcode's *Galaxy Plus Editors* software to make his Roland D-110 and CM-32 conform as closely as possible to the General MIDI spec. If you're not up for programming, many synth manufacturers and third-party sound companies are developing GM sound sets for existing instruments.

DIGITAL AUDIO

The other major multimedia-sound format, digital audio, has some powerful advantages of its own. A digital recording sounds exactly the same on any user's system because it doesn't rely on a synthesizer. It can reproduce a sound effect, speech, or music that's been processed to within an inch of its life, none of which is possible with MIDI files alone. Of course, digital audio files exact a serious price in disk space. Even medium-quality 8-bit recordings eat up around 1.5 MB per minute. You're not going to be sending *that* presentation out on floppies.

To an extent, you can control how much of your hard disk gets consumed by these files. Stereo files take up more space than mono. Stereo, 16-bit, 44.1 kHz recordings are huge (10 MB per minute) compared with thinner-sounding 8-bit, 22 kHz files. Sounds sampled at 11 kHz take even less space (but their quality is too poor for most music applications).

You must understand your options, clearly explain them to your client, and make sure you both know what's required for the final product, and that goes for digital sound-file formats, too. On the Mac, there are numerous sound-file formats (AIFF, SND, System 7, *Sound Designer*, and so on). On the PC, .WAV is the standard file format. The emerging standard on the Macintosh is Apple Interchange File Format (AIFF), so named because an AIFF file can be ported to other platforms. AIFF files can be any resolution, including 44.1 kHz.

Of course, you can use MIDI files *and*

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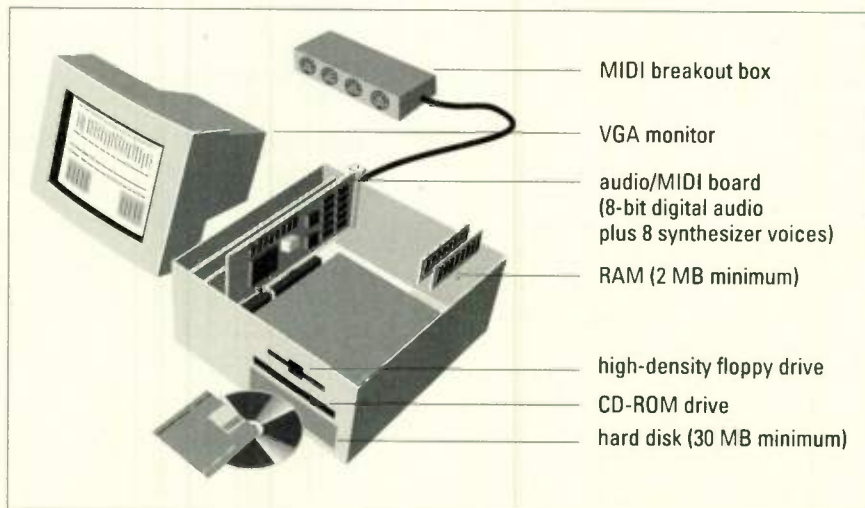


FIG. 1: The required components for an MPC.

digital audio to good effect. "The presentation is going along, with MIDI music underneath," says Burger. "Then, if it's an interactive show, the user pushes a button to navigate somewhere else. You might want aural feedback, maybe a voice-over saying 'Thank you for navigating to this new segment.' By separating the audio and MIDI, you have them doing different functions."

YOUR SYSTEM

Most Macs come equipped with built-in 22 kHz digital sound capabilities, a microphone, a speaker, a port for a MIDI interface (no card is needed), and support for digital movies (*QuickTime*). Therefore, the Mac is a standardized, all-in-one multimedia platform that's attractive to multimedia producers. To similarly equip a PC, you must purchase and install a number of add-ons.

In an effort to level the playing field, Microsoft has introduced a standard configuration it calls MPC (Multimedia Personal Computer). It specifies a minimum setup, which includes an 80386SX machine with 2 MB of RAM, 30 MB hard drive, CD-ROM drive, and a sound card that supports 8-bit recording and playback, eight synth voices, and MIDI ports (see Fig. 1).

Still, most of the commercial multimedia music-and-sound action today is on the Mac. "All CD-I sound development is done on the Mac," says Waldrep, who works extensively with Philips in creating CD-I (Compact Disc-Interactive) titles. Gary Levenberg runs Interactive Audio, a San Francisco-based music production house that creates the audio for a number of interactive CDs. "We do a lot of PC audio, but we actually create it on the Mac, where we have eight channels to work with in Pro Tools. Then we generate AIFF files that we take over to the PC."

No matter which platform you use, you'll need special gear if you want to get into digital audio. The Mac can record at 22 kHz, but no software is provided to edit the files, and there's no line input. To get around these problems, you need a Mac Recorder (from Macromedia) or a Voice Impact Pro (from Articulate Systems). Both have mic inputs, miniplug line inputs, and software that lets you record at 22 kHz or 11 kHz, creating 8-bit sound files. If your project is destined for a CD-ROM, 16-bit quality is a must. In

that case, you will need a Digidesign AudioMedia II or Sound Tools II system and a *large* hard disk.

On the PC, there are numerous choices. The most popular are the Creative Labs Sound Blaster 16 ASP, Media Vision's Pro Audio Spectrum 16, and Turtle Beach's MultiSound, as well as more expensive dedicated hard-disk recording systems such as the Spectral Digital Studio. (For more on 16-bit MPC cards, see this month's "Computer Musician" column on p. 68.)

Amiga users should look into the

SunRize Industries' AD516, and Atari users should investigate the Digital Master EX, which is now available from Digital F/X. (For a complete overview of hard-disk recording systems, see "Tape Killers: The EM Guide to Hard-Disk Recording Systems," in the October 1992 EM.)

Before you go digital-sound nuts, a note of caution: The legal issues surrounding sampling are still murky. But it's a safe bet that if you're digitizing sounds intended for distribution, you'll get into trouble if you use anything

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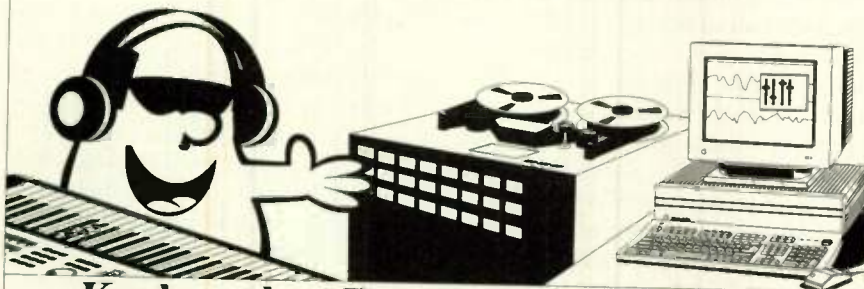
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• MULTIMEDIA

created by another artist, particularly if you sample from the TV or another recording. Likewise, create MIDI files of your own works, not copyrighted material (like pop songs or show tunes). More than one MIDI-file production company has been shut down by the lawyers of angry copyright holders.

BECOMING MULTI (MEDIA) TALENTED

Writing for audio/visual presentations isn't the same as writing for audio alone. First of all, interactivity means that the music isn't played linearly from start to finish. Second, the music usually isn't the main medium; your listeners also have things to look at.

"Find out as much about the project as possible, so you know how you fit into the scheme," suggests Jonathan Brielle, who runs one of New York's



"Interactive media is going to create an explosion in demand for original music."—

Barry Schuller

largest multimedia live-show music production houses. "Producers respond really well when you understand the overall concept. Understand what else is happening, and your piece will be more effective. Know that it's theater."

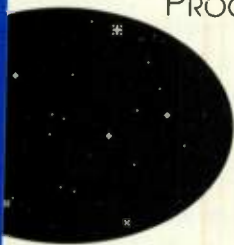
"In terms of aesthetics, apply the same mentality to multimedia soundtracks as you do to video," says Burger. "For every visual segment, 99 kinds of music won't be appropriate. And consider the juxtaposition of narration and music. They can't conflict, either in content or volume. You have to do ducking, just as you do in video."

In the film and video worlds, software can help you synchronize your music to the visuals. No such luck when it comes to multimedia. *QuickTime* 1.5, Apple's digital movie technology, doesn't support MIDI at all, only digitized sounds (22 kHz maximum), and there's no equivalent of SMPTE or Song Position Pointer messages to help you make precise alignments. (*Premiere* 2.0, a *QuickTime* movie-editing program

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from Adobe, can send a Start message to any listening MIDI sequencer, but that's the only message it sends; if you start playing a movie from the middle, the sequencer still starts playing at the beginning.) Scoring for *QuickTime* video involves placing hit points the old-fashioned way, with educated guesses and a lot of tweaking.

In most other multimedia formats, you don't have to worry about synchronization; you'll be working with a technical person responsible for assembling the various components of the presentation ("authoring" it). This also means that you don't necessarily have to buy an expensive copy of *Director* or *Authorware* to be prepared to work in this business. Until Apple and other software developers place as much emphasis on audio as they do on video, be glad that synchronization often won't be your worry.

If you strive for the widest possible dynamic range, you've got some unlearning to do if your presentation is to be played on a tiny computer speaker. For example, Warner New Media's *Desert Storm* CD-ROM features dozens

of sound bites from key moments in the Gulf War (see Fig. 2). Sound engineer Waldrep tailored the sound files to the system he knew would be delivering the sound. "I had to normalize every file, changing levels, changing the EQ, limiting them to the max. Dynamically, they had to be flat as a pancake when played through a Mac speaker at a volume level of 5 or 6."

The final product's environment matters. If you're creating a self-running trade-show presentation, forget about subtlety; any music or sound you put in the background will turn to mush in a noisy exhibit area. The final product's computer matters, too. The music that works great on your MPC-compatible '486 machine at home might not sync to the visuals properly on a '286 in Chagrin Falls, Ohio. "You have to work backward from the delivery platform," says Burger. "Will it be played back on a crummy TV speaker?



FIG. 2: Warner New Media's *Desert Storm* CD-ROM for the Mac and PC includes numerous audio clips that add a great deal to the overall presentation.

Will it be played back on an MPC? MPC is limited to 8-bit digital audio, and it has MIDI limits, too."

Potyen ran into this type of problem during the creation of a CD-ROM music collection. When he played the digital-audio music clips from within *HyperCard* on certain Macs, some files didn't play. It turned out that *HyperCard* can only play a sound that fits completely into RAM. But the CD is

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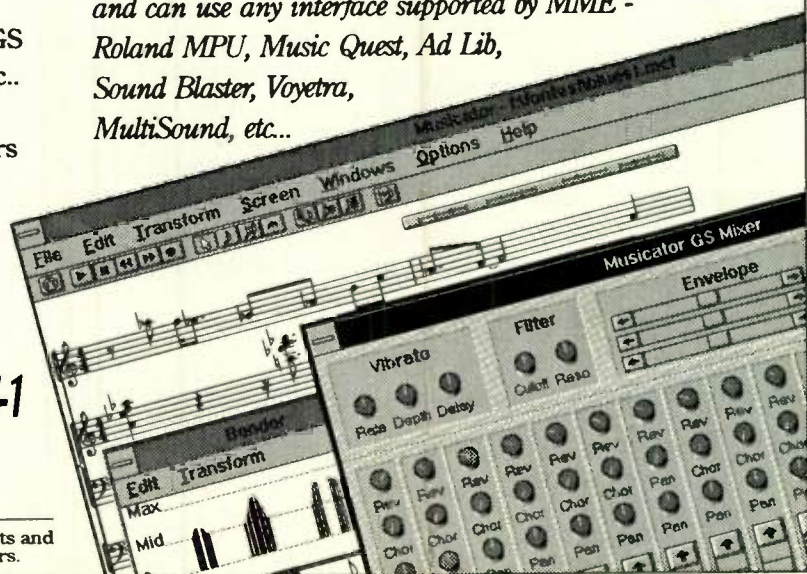
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destined for distribution to all kinds of Macs; Potyen needed an unconventional solution. "I converted each file into an audio-only *QuickTime* movie, which plays one part while another is being loaded from the hard disk."

If your definition of multimedia is more traditional—live corporate shows, or "industrials," that involve multiple projections synchronized to tape and sometimes live performers—life is both easier and tougher. According to industrial-show composer Brielle, "Slides are very forgiving; the music doesn't have to be frame-accurate, as it does in video." On the other hand, going live means the threat of unforeseen disaster. Brielle sees to it that everything, *everything*, has a backup. "On a live show, the less that can go wrong, the better. Because it will go wrong. What you sell to the client is assurance. This is like their wedding; they only get to do it once. You don't get to fix it."

THE MARKET

You've got the gear, you've mastered the art of multimedia scoring. Now you want the work. The pros offer plenty of advice for getting into the biz.

"There's a lot of room in this business for people who are experts in translating and preparing audio files in the proper format," says Potyen. "There's also a need for background music that is sold on a royalty-free basis for production purposes." He mentions Macromedia, Prosonus, Opcode, and Passport as some of the companies actively creating new production music for multimedia. "There are also lots of interactive *HyperCard* stack developers looking for sound effects or music; you could present yourself as a producer of little music stingers or sound effects.

"And then there's the business world: corporate events and sales presentations. A lot of musicians are getting into the business of designing kiosks for shopping centers or amusement parks. There are video-game companies such as Sega and Activision. People are putting out programs that help auto mechanics diagnose and repair cars; they see a video clip of how a part works, where it is, and hear how the engine should sound." All of these companies need reliable, computer-savvy music and sound jocks.

Burger suggests that your best asset is your talent. "The equipment is the least of your worries. To market yourself,

the issue is the same as it is in the industrial video racket: how to make yourself unique. If you're a Guns N' Roses clone, you'll only get the kind of work that requires Guns N' Roses-clone music. To be successful, you either have to be a musical chameleon, or have a style that's in demand."

Learn *HyperCard* or *ToolBook*. Contact the companies now producing multimedia projects. Be open-minded. Read a lot. Say "yes" to anything. Get a CD-ROM player and look at some discs to see what's being done. Make a demo

tape or *HyperCard* stack. One day soon, you may find yourself up to the neck in multimedia, like Jonathan Brielle. His latest project involves live musicians playing in sync to an elaborate sequence, with an actress dancing in clouds of smoke onstage while a laser-light show flickers and pulsates. "As multimedia goes," says Brielle, "it just doesn't get any hipper than this."

David Pogue is a columnist for *Macworld* magazine and the author of *Macs for Dummies* (IDG Books, 1992).



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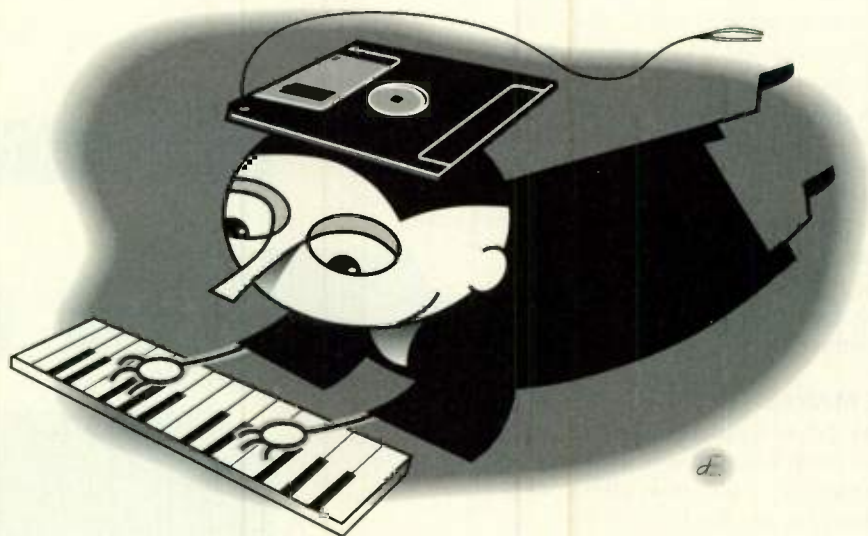


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A Disk for the Teacher

By Scott Wilkinson

*A beginner's
guide to music
education
software.*



Some argue that computers and MIDI have dealt a fatal blow to traditional music skills. Sequencers don't require music to be written down, so musicians needn't learn how to read or write music notation. In addition, a mediocre musician can tweak performances on the computer until they are better than the musician's actual performance ability.

However, these critics overlook the fact that computers and MIDI can help keep traditional music skills alive. Music-education software on a personal computer offers users the opportunity to learn about virtually any area of music, regardless of their musical background.

Music-education software has several advantages. For example, there are plenty of titles appropriate for all ages and experience levels. Students can proceed at their own pace without the embarrassment of performing in front of a teacher or class. Classroom teachers can use cost-effective computers to supplement their regular instruction, which might be suffering from the budget cuts affecting many school music programs.

COMMON CHARACTERISTICS

Most current music-education or computer-aided instruction (CAI) software uses a MIDI instrument for student input. For example, a program might ask the student to play a C major chord on a MIDI keyboard. MIDI also is used to play musical examples back on the keyboard or other external sound modules. Of course, this means that you must have a MIDI interface for your computer.

Many PC programs can use an internal sound card, such as the Sound Blaster, and virtually all can use the computer's internal sound generator. However, this option is generally less satisfying due to the relatively poor sound quality. Under these conditions, an onscreen keyboard or guitar fretboard is often used to interact with the program, but this does nothing to develop instrumental skill.

Most CAI software is interactive, allowing users to customize the learning process. The material usually is presented in one of several formats, which are often combined within one program. The *lesson* format presents information in a series of screens organized

into conceptual groups. Users can often steer their way through these lessons in any order they choose, but most software or documentation recommends a sequence for maximum effectiveness, particularly the first time through the material.

The *drill-and-practice* format presents a series of interactive exercises designed to reinforce the material in a lesson, which might have been presented by the program or in a book. Users respond to the exercises on a MIDI instrument or the computer keyboard and mouse. Finally, the *game* format provides another way to practice skills such as note and chord recognition in a fun and engaging manner.

WHAT TO LOOK FOR

The various exercise formats usually accommodate different skill levels. As users become more proficient at a particular skill, the level of difficulty is automatically or manually increased. For example, once a student is able to easily recognize the difference between major and minor chords, augmented and diminished chords can be added to the exercise. Another option is decreasing

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the time limit or increasing the length of an exercise. This allows teachers or students to select the appropriate material and tailor the exercises to concentrate on specific skills that need work.

The opposite scenario also must be considered. If a student starts with an exercise that is too difficult for him or her, the skill level should be automatically or manually reduced. Most programs keep track of a student's progress over time; some even keep track of several students separately, which is a handy feature for families and teachers. The

ability to monitor a student's progress is invaluable to the learning process. If multiple students are tracked, access to those records should be restricted with a password.

Most programs come with a manual that is often accompanied by a workbook of some sort. Aside from system requirements, installation procedures, and instructions for use, this documentation should include the program's specific objectives, prerequisite skills, and expected time needed for successful completion. In addition, programs

typically include classroom activities, suggestions for using the program in various instructional settings, additional tests and note-taking areas, as well as additional references and resource materials.

BASIC MUSIC CONCEPTS/THEORY

If you know nothing about music, theory is a good place to start. There are a number of programs designed for children and adults who want to learn *something* about music. Long known for their professional MIDI software, Dr. T's offers *Adventures in Musiland* (\$79; Macintosh). This program consists of four multi-level games that introduce basic musical concepts. *Music Mentor* by Midisoft (\$149; Windows) includes units on reading music, melody, rhythm, harmony, timbre, texture, and form (see Fig. 1). It also includes a MIDI sequencer called *Recording Session* for those who want to do some of their own musical exploring.


Alfred Publishing has been in the music-education business for a long time. They have a complete catalog of software for all computers including the Apple II series, Commodore 64/128, PC, Atari ST, and Macintosh. *Music Made Easy* (\$29; Apple II, C-64) offers basic music concepts in a lesson format, making it a good choice for beginners. *Practical Theory* (\$299 for Apple II, C-64, MS-DOS, and Atari ST; Mac version \$399) offers six disks of comprehensive drill-and-practice that cover everything from the staff and clefs to harmonization and introduction to composition.


MUSICIANSHIP

The term "musicianship" refers to a wide variety of skills. Among the most important is ear training, in which students learn to recognize scales, chords, and harmonic progressions. Many programs foster this skill, including Ibis Software's *Play It By Ear* (\$99; MS-DOS), which offers drill-and-practice exercises and multi-student progress reports. *Take Note* from Take Note Software (\$79; Atari ST and Amiga; coming soon for Windows) displays standard notation, piano keyboard, and guitar fretboard on the screen and presents exercises in drill-and-practice format.

Imaja's *Listen* (\$99; Mac) offers drill-and-practice with matching and multiple-choice exercises, and displays a piano keyboard and guitar fretboard

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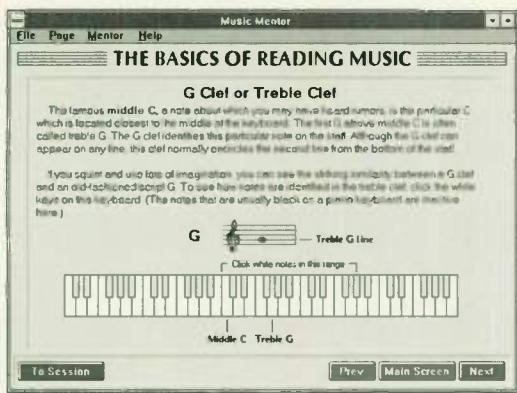


FIG. 1: Midisoft's *Music Mentor* offers instruction from the ground up.

on the screen (see Fig. 2). Ars Nova's *Practica Musica* (\$125; Mac) offers rhythm training as well as ear-training games and exercises. Rhythm training also is provided by Ibis Software's *RhythmAce* (\$99; MS-DOS), which uses drill-and-practice, and *RhythmPlay* (\$49; MS-DOS), which offers exercises in a game format.

Sight reading involves the immediate recognition of notes on a staff, as well as the ability to sing or play them. Ibis offers two programs that help students improve their sight-reading skills by displaying notes on the screen and identifying those that are played incorrectly. *NotePlay* (\$49; MS-DOS, Windows) uses a MIDI keyboard, while *AcousticPlay* (\$49; MS-DOS) uses the audio input of a Sound Blaster card to sample notes from a microphone or guitar.

KEYBOARD SKILLS

Most people interested in learning music want to play an instrument, such as keyboards, and many programs exist to help in this endeavor. Most of them also provide instruction in different aspects of musicianship as well. Three such programs were reviewed in the April 1992 **EM**: Temporal Acuity Products' *PianoWorks* (\$129; MS-DOS), Fast Fingers Music Software's *Fast Fingers* (\$49/module; MS-DOS), and Software Toolworks' *Miracle Piano Teaching System* (\$479; Mac, Amiga, MS-DOS, and Nintendo).

Alfred offers two software

products that supplement their book-based piano methods. Designed for children, *Alfred's Basic Piano Theory* comes in two volumes (\$49/vol. for Apple II, C-64, MS-DOS, and Atari ST; \$59/vol. for Mac) and presents exercises in a game format. *Alfred's Basic Adult Piano Theory* (\$49 for Apple II, C-64, MS-DOS, and Atari ST; \$59 for Mac) offers drill-and-practice for adult students. Both products cover many aspects of theory and musicianship along the way.

MUSIC HISTORY

This subject is the bane of most music students, but CAI programs make it fun and interesting. Aside from basic music concepts, Midisoft's *Music Mentor* also includes sections on early, Baroque, Classical, Romantic, and modern music. Dr. T's *Composer Quest* (\$99 for Windows MPC) plays compact disc

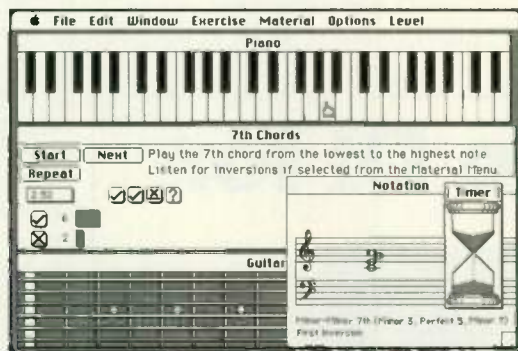
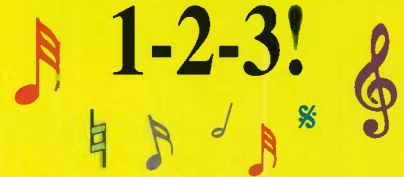


FIG. 2: Imaja's *Listen* can display standard notation, piano keyboard, guitar fretboard, and a timer in addition to instructions, controls, and the number of correct and incorrect responses.



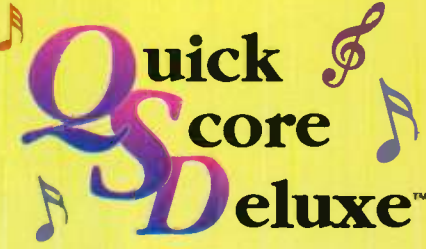
FIG. 3: Warner New Media's *Britten: The Orchestra* CD-ROM illustrates the compositional technique of theme and variations.

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Several companies offer CD-ROM titles that are dedicated to specific pieces of music. These exhaustive studies include information about the music, composer, and appropriate historical period. High-quality recordings of each piece are accompanied by information that can be displayed on the screen while listening to the music.

The Voyager Company's CD Companions (\$59 to \$99 each) are available for the Macintosh (some also are available for the MPC). They include *Beethoven: Symphony No. 9*, *Schubert: The Trout Quintet*, *Stravinsky: The Rite of Spring*, *Mozart: The "Dissonant" Quartet*, and *Richard Strauss: Three Tone Poems*. A new series called "So I've Heard" (\$24.95 each) currently includes *Bach and Before* and *The Classical Craft*, soon to be joined by *Beethoven and Beyond*, *Romantic Heights*, and *Here and Now*.

Warner New Media is another company offering interactive CD-ROM titles. Among the wide range of subject areas is the Audio Notes series, which includes *Beethoven: The String Quartet*, *Mozart: The Magic Flute*, and *Brahms: German Requiem* (\$66 ca.; Mac),

as well as *Britten: The Orchestra* (\$79; Mac; see Fig. 3).

MIDI

In an ironic but not unexpected twist, there are at least two CAI products designed to teach users about MIDI. Opcode Systems offers a Macintosh HyperCard stack called *The Book of MIDI* (\$24.95, available direct from Opcode; included free with EZ Music Starter Kit). This product provides interactive instruction in everything from basic MIDI concepts to classic synthesizer sounds and MIDI studio design. EduACTIVE's *MidiSchool* (\$119; Mac) presents MIDI in an interactive lesson format and includes an 8-track sequencer. The program can be used by individuals or in classroom settings.

CLASS DISMISSED

There are an astonishing number of music-education programs available today; only a few have been used as examples in this article. However, no survey of such software would be complete without mentioning Electronic Courseware Systems (ECS). This company has the largest and most comprehensive catalog of CAI software for music in the business, including dis-



**An astonishing number
of music-education
programs are available
today.**

tributed titles from Alfred, Ibis, Temporal Acuity, Dr. T's, and others.

Many people have an inherent interest in music that may have been stifled in boring music-appreciation classes or frightening private lessons. With the help of your computer, you can rekindle that interest by learning what you want to learn, at your own pace. Thanks to modern technology, music can take its rightful place in the hearts, minds, and hands of everyone who dreams of a harmonious world.

EM technical editor Scott Wilkinson teaches at several music technology seminars for educators.

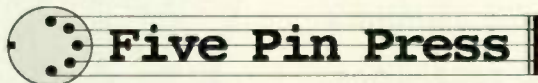
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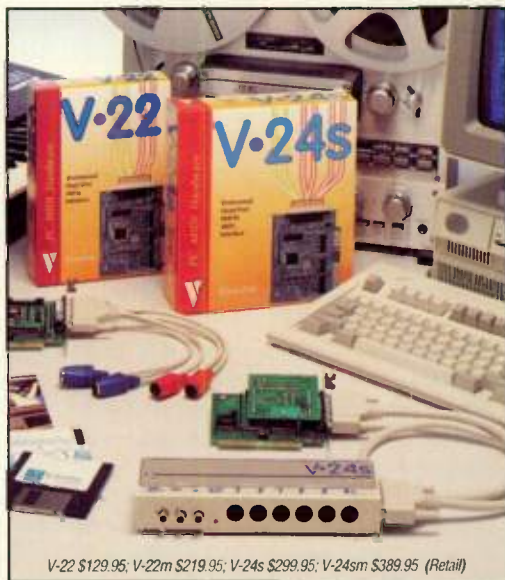
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Multimedia PC Sound Cards

By John R. Quain

The proliferation of sound cards for PC-compatibles continues to improve the platform's audio capabilities.



IBM PCs have always been considered the "serious" computer choice. The Macintosh computer, with its cute icons and superfluous sound effects, was fine for doing music, but not for doing business.

But PC users, like envious children, secretly desired the same ergonomics and abilities for their own computers. Finally, thanks primarily to Microsoft *Windows*, their wishes are being granted.

SOUND ADVICE

As many PC owners have discovered, it takes more than *Windows* to make a PC friendlier; you need additional hardware, as well. One type of friendly hardware is sound-generation circuitry. The Macintosh computer was designed with fairly sophisticated sound capabilities to start with, while PC clones have been conspicuously silent (except for a few beeps). But recently, the popularity of computer games created a market for PC sound cards.

Unfortunately, the initial sound cards offered poor music reproduction. They were better at recreating the sounds of crashing asteroids and laughing demons

than the music of Debussy or Bartok. Many musicians chose alternate platforms, and business users grumbled. Within the past year or so, however, the PC-compatible world has gotten serious about sound.

The main impetus for this trend was the Multimedia PC Marketing Council. Spearheaded by Microsoft, and including the likes of NEC, NCR, Philips, and Zenith, the MPC Council banded together with the aim of creating a standard on which to develop and market multimedia products. According to the MPC Council, the bare minimum for such a multimedia PC platform is an 80386SX-based, IBM-compatible PC with a 30 MB hard drive, 2 MB of RAM, a mouse, a VGA graphics adapter and monitor, a CD-ROM drive, *Windows* 3.1 (or *Windows* 3.0 with *Multimedia Extensions*), and a sound card. (For more information on the MPC spec, contact MPC Marketing at [202] 452-1600.)

Aside from some colorful graphics and popular CD-ROM software, multimedia has meant one thing for PCs: the addition of sound capabilities. Currently available sound cards include connections for various sound sources,

in addition to MIDI ports.

Internally, a connector for audio from an internal CD-ROM drive generally is provided. External connections usually include a joystick connector (which can be connected to an external box with MIDI In and Out ports), a stereo line output (for powered speakers, headphones, or an external amplifier), a line input (for a CD or tape source), and a microphone jack.

FIRST GENERATION

Initially, all MPC-compatible audio boards sounded terrible. This was partially due to the MPC specification. With an eye to low-cost systems rather than an ear to high-fidelity sound, the MPC spec outlines the bare minimum requirements for *Windows* multimedia software. By and large, first-generation MPC sound cards such as Creative Labs' Sound Blaster Pro are updated game sound cards with a few added features. (Creative Labs now offers the Sound Blaster 16 ASP, with greatly enhanced features; see Fig. 1.)

To be MPC-compatible, a sound card must provide a minimum sample resolution of eight bits, which results in a

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"They laughed when I said they could have Perfect Pitch

...until I showed them the secret!"



The TRUE STORY
 by David L. Burge

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

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

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

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

"What's Perfect Pitch?" I asked.

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

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

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

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

"Yes," she nodded to me aloofly.

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

"OK," she replied cheerfully.

Now I couldn't wait to make her eat her words...

My plan was ingeniously simple:

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

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

Nervously, I plotted my testing strategy. Linda appeared serene.

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

I had barely touched the key.

"F#," she said.

I was astonished.

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

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

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

Without hesitation she sang the proper pitch. I had her sing more tones (trying hard to make them increasingly difficult), but still she sang each one perfectly on pitch.

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

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

The dazzle of Perfect Pitch hit me hard. My head was dizzy with disbelief, yet from that moment on I knew that Perfect Pitch is real.



Autumn 1970

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

I couldn't figure it out...

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

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

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

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

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

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

Then came the realization:

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

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

I began to notice faint "colors" within the tones. Not visual colors, but colors of pitch, colors of sound.

They had always been there. But this was the first time I had "let go"—and listened—to discover these subtle differences within the musical tones.

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

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

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

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

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

"You don't understand how Perfect Pitch works," I explained. "It's easy!"

I showed her how to listen. Timidly, she confessed that she too could hear the pitch colors. Soon Ann had also acquired Perfect Pitch! We became instant school celebrities. Students tested us in great amazement. Everyone was awed by our virtuoso ears.

Back then I would not have dreamed I would later explain my discovery to college music professors. When I did, many of them laughed at me at first. You may have guessed it—they told me you had to be born with Perfect Pitch.

But once I revealed the secret to Perfect Pitch—and they laughed for themselves—you'd be surprised how fast they'd change their tune!

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

And as for Linda?

...Oh yes—well, time found us at the end of our senior year of high school. I was nearly 18, and it was now my final chance to outdo her.

Our local university sponsored a high school music festival each spring. That last year, I scored an A+ in the most advanced performance category. Linda only got an A.

Sweet victory was mine at last!

TODAY, thousands of musicians and two university studies have confirmed the effectiveness of my Perfect Pitch method. Now I'd like to show YOU how to discover your own Perfect Pitch—whatever your age!

I hope you won't laugh as you picture yourself with various Perfect Pitch skills—like naming tones and chords by ear with laser-like precision! Of course, you might be surprised at how simple—and how very valuable—Perfect Pitch really is!

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dynamic range of about 48 dB. Furthermore, many 8-bit cards use relatively low sample rates. The MPC spec calls for a minimum rate of 11.025 kHz for mono recording and 22.05 kHz for playback.

The first MPC sound products also have limited synthesis capabilities. The minimum requirement for MPC synthesis is support for 6-note polyphony with three simultaneous voices and a percussion track with 2-note polyphony. In addition, most first-generation MPC cards include an onboard synthesizer based on Yamaha's 2-operator FM chip, which severely limits the realism of instrumental sounds.

ONE EXCEPTION

The first all-in-one MPC-compatible sound product that didn't suffer from these limitations is Turtle Beach's MultiSound. At first it was received by the PC community as a high-end sound card for folks with finicky tastes and golden ears. But many of the company's ideas are now being adopted in second-generation audio cards.

First and foremost, Turtle Beach employs Sigma-Delta, or "one-bit," converters with 64x oversampling. The

MultiSound uses 18-bit DACs and records direct to hard disk in stereo at 44.1 kHz, with 16-bit ADCs, yielding a wider dynamic range and frequency response.

Even more important, the company implemented wavetable synthesis instead of FM synthesis in order to provide more realistic instrumental sounds. Turtle Beach licensed the technology behind the Proteus/1 XR from E-mu Systems as the basis for this sound source. The wavetable includes 383 16-bit samples of 126 actual instruments in 4 MB of ROM.

The sound quality is a welcome relief from the 2-operator FM synthesizers on other sound cards. Those familiar with the E-mu equipment will be pleased to discover that Turtle Beach has replicated much of the Proteus/1 XR's control panel in a *Windows* software interface. Composers will appreciate the card's 32-voice polyphony and ability to control all sixteen MIDI channels with individual volume and pan controls.

When the MultiSound was the only

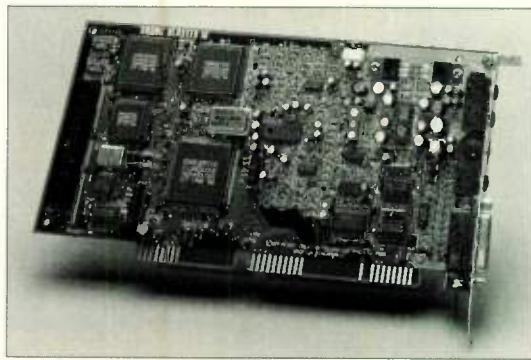


FIG. 1: Creative Labs' Sound Blaster 16 ASP.

PC game in town, the card was priced at \$995. Now, with others nipping at its heels, Turtle Beach has brought the price down to a more moderate \$599.

Sound Blaster 16 ASP owners will be able to add the same Proteus ROM via the Wave Blaster daughter board Creative Labs plans to release.

SECOND GENERATION

If this price range is still too rich for your budget, other 16-bit audio cards have now made their way to market (see "PC Sound Cards" chart). Learning from Turtle Beach's approach, these products offer much of the

PC SOUND CARDS

Manufacturer/Product Name Phone Numbers	Maximum Sampling Rate	Resolution	Synthesis Type	Polyphony	MIDI Interface	Price
Ad Lib Gold 1000 (800) 463-2686 or (418) 529-9676	44.1 kHz (stereo)	12-bit (recording); 16-bit (playback)	FM	20	yes	\$299
Advanced Gravis UltraSound (604) 431-5020	44.1 kHz (stereo)	8-bit recording (16-bit optional); 16-bit playback	GF1 wavetable	32	yes	\$199 (approx. \$150 for 16-bit recording)
Antex Z1 (310) 532-3092	50 kHz (stereo)	16-bit	FM; optional synth upgrade (approx. \$400)	20	optional (\$69)	\$595
Cardinal Technologies SOUNDstudio (717) 293-3000	44.1 kHz (stereo)	12-bit	FM	20	yes	\$259
Creative Labs Sound Blaster 16 ASP (800) 998-LABS or (408) 428-6600	44.1 kHz (stereo)	16-bit	FM; optional Wave Blaster (\$249; Proteus/1 wavetable)	20	optional (\$69; includes sequencer)	\$349
Ensoniq SoundScape (215) 647-3930	44.1 kHz (stereo)	16-bit	Ensoniq Otto wavetable	32	yes	\$349
Focus Information Systems 2 the Max SoundMedia SLCD (800) 925-2378 or (510) 657-2845	44.1 kHz (stereo)	12-bit	FM	20	yes	\$249; \$299 for SCSI
Media Vision Pro Audio Spectrum 16 (800) 845-5870 or (510) 770-8600	44.1 kHz (stereo)	16-bit	FM	20	optional (\$69)	\$349
Microsoft Windows Sound System (800) 426-9400 or (206) 454-2030	44.1 kHz (stereo)	16-bit	FM	20	no	\$289
Omni Labs AudioMaster 1.2 (818) 813-2630	44.1 kHz (stereo)	12-bit recording; 16-bit playback	Ensoniq DOC II wavetable	24	optional (\$69)	\$299
Roland TAP-10 Sound Card (213) 685-5141	44.1 kHz (stereo or two independent mono)	16-bit	Sound Canvas GM wavetable	26 (+2 digital audio voices)	optional (extra charge for breakout box)	approx. \$600
Turtle Beach Systems MultiSound (717) 843-6916	44.1 kHz (stereo)	16-bit	Proteus/1 wavetable	32	yes (\$24 for MIDI connectors)	\$599

MultiSound's quality by cutting a few corners.

Typical of this category is Media Vision's Pro AudioSpectrum 16 (\$299, see Fig. 2). It performs 16-bit playback and recording at 44.1 kHz. This sampling rate all but eliminates the aliasing distortion that frequently emanates from cards with lower sample rates.

Smaller improvements are evident on the synthesis side. Media Vision uses the Yamaha 4-operator, 8-waveform OPL3 Magic FM synthesizer. Although this form of FM synthesis (first heard in Yamaha's TX81Z) is less accurate in reproducing instruments than a wavetable, the newer chip offers improved sonic realism over the 2-operator design. The OPL3 offers 20-note polyphony with up to twenty simultaneous instrument sounds. MIDI In and Out allow simultaneous playback and sequencing.

On the horizon are sound cards based on a new fleet of processor chips. For example, Turtle Beach uses a Motorola 56001 digital signal processor (DSP) to perform tasks usually handled by the PC's CPU, such as recording and playing sounds. Although most of the products listed in the chart use proprietary chip sets, the availability of general-purpose DSPs promises to improve the capabilities and speed of future sound cards.

PC PROBLEMS

For all the improvements in PC sound cards, adding one to your system is still far from painless, and the products still have some important limitations. In order to handle a wide variety of speakers, most MPC-compatible sound cards include a 4-watt amplifier. Normally, an amplifier is a welcome addition, but when it's installed on a small circuit board in a PC, it can cause headaches. The gain at the stereo output of some boards can actually overload sensitive speakers and create distortion.

Moreover, there is the problem of internal electrical interference to consider. The proliferation of PC clones has led to affordable computing power, but the inconsistent quality of these computers can make upgrading your system an aural nightmare. Often, a card in one PC sounds smooth and quiet, but it clicks and pops as if it were possessed when it is moved to another system.



FIG. 2: Media Vision's Pro AudioSpectrum 16.

If you encounter the common problem of low, hissing background noise, there are several things you can try. First, move the sound card as far as possible from other expansion cards in your PC. If your system is filled to capacity, make sure the sound card is located as far as possible from the video adapter.

One hurdle left to overcome is an audio-compression standard. Many of the PC-compatible products rely on ADPCM (Adaptive Differential Pulse Code Modulation) for digitizing and compressing sound files. Typically, this process results in a compression ratio of 2-to-1. However, the deterioration in sound quality usually is audible. As yet, the PC-compatible world hasn't settled on a standard or created a superior audio-compression technique for storing sound on a PC.

Ironically, some members of the MPC Council seem to have lost interest in the MPC spec. For example, Microsoft recently released the *Windows Sound System* (\$289) that includes a "business audio" software package, but the accompanying sound card lacks a joystick port and MIDI capabilities. Nevertheless, the number of sound cards for PCs continues to grow, and it looks like there's no turning back to those antiquated business-only computing workhorses.

John R. Quain is a freelance writer who works with DOS-based PCs—despite the frustration—and writes extensively about products in the computer, audio, and video arenas.

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Tracking Electric Bass

By Michael Molenda

Pumping up the bass can backfire if the tone falls flat.



Here's the scoop on rhythm tracks. A crummy guitar timbre can be distorted, flanged into respectability, or hidden far beneath the sonic textures of a mix. Likewise for lame keyboard pads. But attempting to foist a wrecked bass tone upon a recording is like trying to hide a buffalo inside a baggie. It can't be done.

The bass is part of the holy rhythm section. Obviously, the bass and drums must lock together in a passionate *danse du beat*, or you've got no track. But many recordists forget that the sound of the rhythm section can be just as important as its performance. A wimpy bass tone sabotages the impact of a relentless beat. In short, if it doesn't pump, it's junk.

THE SOURCE

Ugly bass tones spring from compromised signals. Classic instruments, such as the Fender Precision and the Hofner "Beatle bass," often have poorly shielded electronics that add annoying hums, hiccups, and RF waves to the signal. If the audible level of the malady is tastefully discreet, the unwanted noise may be hidden in the sonic wash

of the overall mix. There's no sense obsessing over a minute detail that's fated for obliteration under 40 tracks of distorted guitars.

For instance, audible hiss seldom is an issue because the critical frequencies for meaty bass tones lie far below the hiss strata. Simply use your console EQ to cut frequencies above 10 kHz, and the hiss factor should disappear without compromising the fundamental bass sound.

RF waves are a more virulent problem, because they can be as audible as the bass signal itself. Noise gates or manual signal muting can't eradicate RF engine whines if the anomaly appears when the instrument is playing. (Obviously, muting the RF signal also kills the bass signal.) Positioning often is the only cure. The idea is to find a spot where the instrument is less effective as an RF antenna. Have the bassist turn in different directions until the whining stops. Then, tape the floor to identify the "safe zone," and threaten physical violence if the bassist moves off the mark during his or her performance.

If RF waves invade every position, find a better shielded bass.

THE DIRECT ROUTE

The easiest way to record an electric bass is through a direct connection to the recording console. If you're running a -10 dBV unbalanced system, you can plug the 1/4-inch cable from the bass right into a mixer line input. However, a more robust signal can be gained by utilizing a direct box—an essential tool for interfacing with +4 dBu balanced systems—to run through a microphone input. (Mic inputs often provide more gain than line inputs.)

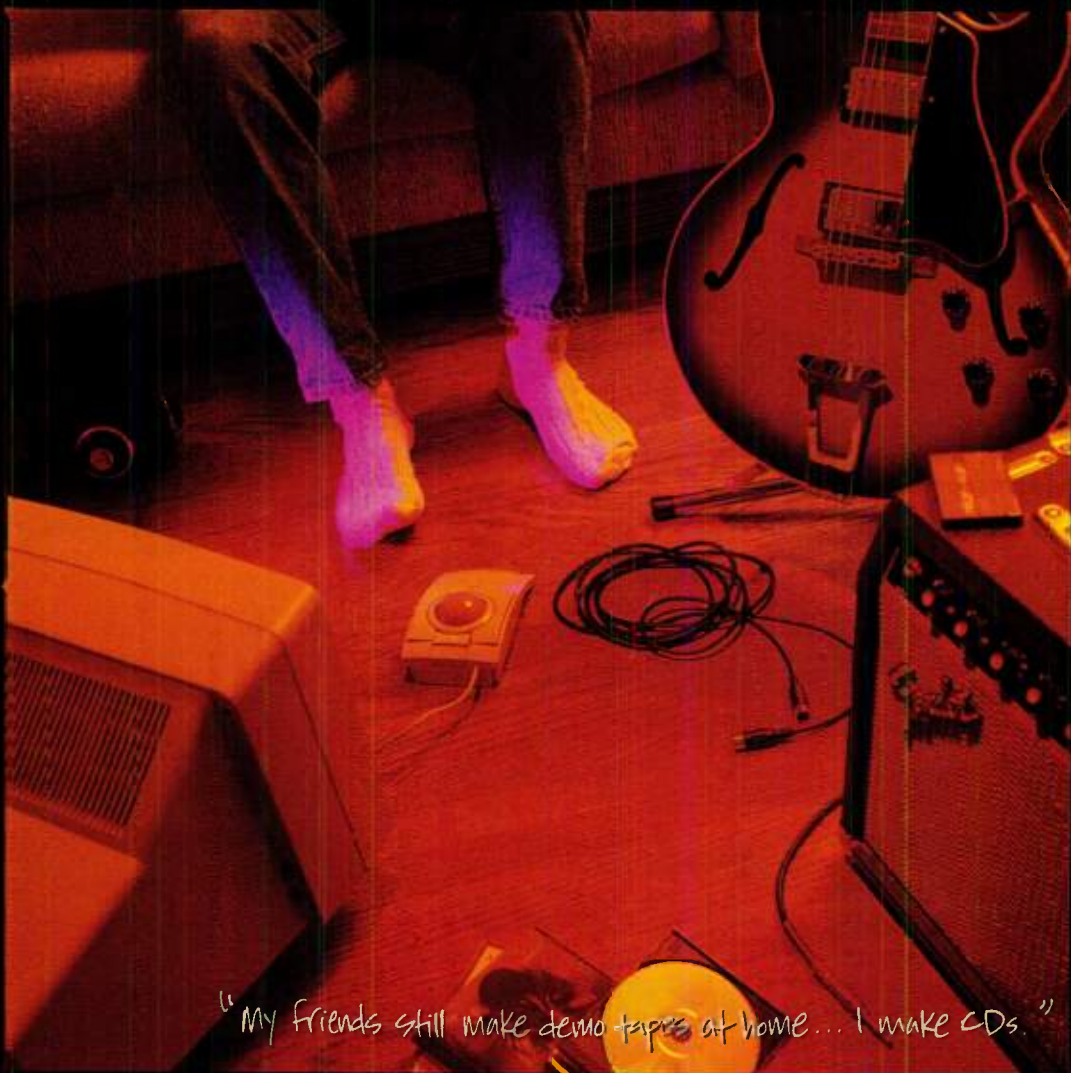
For demo projects, the "naked" direct method provides a good enough sound to document sonic and musical arrangements. However, the tight, visceral punch of professional bass tracks is difficult to achieve without compression. There are a number of great compressors on the market. Some of my favorites (applicable to home or project-studio use) include the dbx 166, the Symetrix 425, and Urei's tube 1176. In addition, many bass amplifiers have built-in compressors and line outputs to facilitate direct recording.

Because direct recording tends to highlight performance blemishes—there's no amp/speaker/room environment to cloak fret noise and sloppy

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For today's creative demands.

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.

V.A.S.T. - A new beginning.

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.



Sounds never before imaginable.

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,

Partial list of K2000 Users.

William Bolcom	Jimmy McGriff
Wendy Carlos	Fred Mollin
Pat Coil	Patrick Moraz
Michael Dorian	Sammy Nestico
Michael Franklia	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") L²/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 0 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; SMIDI Protocol	
Physical Controllers: 2 Wheels, 1 Slider, 2 Foot Switches, Continuous Controller Pedal, Mono-Pressure (K2000 only)	

KURZWEIL

Music Systems
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another input on your mixer. *Voilà!* Two sound sources on two separate mixer inputs. You can submit the two sounds to a mono track, or record both bass tracks and postpone sonic decisions until the final mix. The two tracks also can provide a stereo effect.

Combining an amp and direct sound can revitalize lackluster bass tracks. This approach virtually saved the rhythm tracks during my production of a label development tape for San Francisco's Bolshoi Rodeo, a new wave country-western act. The group's bassist had great musical ideas, but her tentative technique produced an indistinct and dynamically erratic signal.

I was loathe to hire a session player, because Bolshoi's bassist obviously had a special understanding for the band's material. As a "last chance," I tried using a direct signal and an amp signal miked via the bass trap configuration with close and room mics. For maximum effect, I treated each of the three signals differently: The direct signal was flat (no EQ), the close mic was cut at the low-mids and boosted at 100 Hz, and the room mic was drastically cut at 10 kHz, left flat along the low-mids, and boosted at 100 Hz.

The three signals were submixed to mono with a compressor in-line at the subgroup insert point. Fader levels for the direct and room mic signals were almost equal (favoring the room sound) with the speaker mic mixed in to add subtle midrange frequencies. The compressor was set to ruthlessly tame dynamic levels, posting a -25 dB threshold with a slow release at a ratio of 10:1.

What resulted from all this trouble was a huge, booming Phil Spector rumble devoid of (noticeable) fret squeaks, yet punchy enough to articulate harmonic movement. The thick bass sound complemented the sharp attack of the drums and provided a perfect foil for the band's acoustic guitars and delicate vocals. I had stumbled upon one of those rare marvels of sonic design: a sound so rooted in the individual personality of a recording that it transcends its primary function of masking a player's technical foibles.

HOME BASS

As revealed in *Rock on the Road*, a British book about the music industry that was published in the 1970s, the "genius" of glam-rock band Slade was that their

records were produced to feature the bass lines when the tracks were played at loud volumes. Supposedly, the enhanced bass made Slade records a hot commodity in discos.

Let's forget the fact that even a James Taylor record played at extreme dance club volumes will produce deep bass tones. (The human ear's sensitivity to bass frequencies increases with volume.) The point is, the *perception* of a driving bass tone is crucial to the rhythmic ideals of rock, rap, dance, salsa, and other popular music styles. Slade's

"historian" knew this, even if he did mistake physics for audio wizardry.

But never let a music critic understand more than you about the magic of making records. The majority of cool records *do* have great-sounding bass lines, while the pop graveyard is chock full of lifeless rhythm sections. Don't spare the intensity as you struggle to produce a killer bass tone. Remember, the public can deliver hard and fickle judgments, and there's always people standing in line to bite the hand that bores them. ●

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Getting Down to Business

By Michael A. Aczon

*Four words
can forever change
your musical and
business life:
Let's start a band!*



A Day in the Life: Poor business planning helped the Beatles' legal problems outlive the band.

A casual jam session at a night club, a chance recording session, or a productive songwriting collaboration often seduces a few individuals to team up and conquer the music business. Unfortunately, the quest for the killer record deal requires creative partners to become entangled in business dealings.

One of the less-attractive consequences of these contractual obligations is illustrated by a tragic occurrence in the history of pop music: The Beatles broke up.

The marriage of an artistic and business vision is finite. An effective union requires an understanding by all parties that their responsibilities stretch far beyond what is captured on tape or on stage. Those involved in such a union are accountable not only to each other, but also to third parties, such as record labels and managers. For example, litigation to clear up the financial morass of the Beatles' Apple Corps froze certain assets for almost two decades.

There are a number of critical issues brought to the table when creative teams decide to do business. Familiarity with these issues can help you avoid unpleasant surprises if your act attains some success.

GROUP AWARENESS

Before taking any real steps toward that platinum album, it's essential that creative partners evaluate the type of group being formed. Defining the group in this way allows everyone to decide if it's in their best interest to join. It also sets roles and responsibilities for each member.

Examples of these groups include recording and performing acts, songwriting teams, publishing companies, production houses, and studio- or equipment-sharing concerns. Each of these groups has different requirements and varied rewards, so carefully evaluate the ramifications of every option. Music business books are available that provide detailed information on these creative combines. A reputable music-industry professional or entertainment lawyer also can offer valuable insights.

In addition, keep in mind that your group's name is a substantial asset. The ownership and licensing of a group's name and/or logo can generate more revenue than record sales. To protect a name's potential market value, certain formalities are required to ensure it can be used without harming others.

When the supergroup Asia under-

took its first U.S. tour in the mid 1980s, a bar band with a federal trademark registration for the "Asia" name slapped the big boys with a cease-and-desist order. In order to perform in the bar band's geographical area, the supergroup had to pay the club act a sizable fee. Although it's doubtful a near-anonymous band could stop a successful recording act from touring, the fact that the situation was resolved in the bar band's favor illustrates the power of a registered trademark.

Be sure to research your group's name within your area to ensure it's yours alone. Club acts can do this through word of mouth or by checking band listings in the local media. If a band intends to exploit national or international markets, the name search must be expanded. Firms that undertake trademark searches can be found in your local yellow pages under "Trademark."

SELECTING AN ENTITY

Music business is conducted in one of three major types of entities. A *sole proprietorship* is an individual doing business. Often a "band" actually is made up of a few musicians hired by the sole proprietor to give the public the

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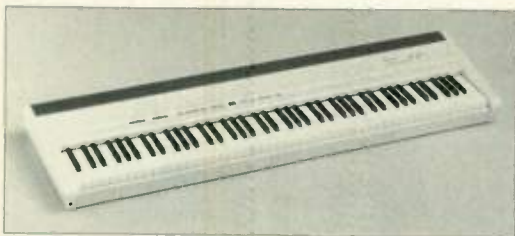
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Roland FP-8 Digital Piano

symptoms, including any or all of those mentioned above.

The simple solution to this problem is to remove the factory tape, then reseal the ribbons and apply a dab of silicone sealer to fix them in place. This makes the ribbons more difficult to subsequently remove without damage, but that should rarely be required, as the cables easily disconnect for service at the sturdier sockets on the mainboard. Cables sometimes become crimped

at the cable clamp located just behind the exit point at the center of the keyboard. While membrane cables of this type are reasonably resistant to crimping damage, excess crimping is undesirable and should be corrected while the unit is open.

Regarding the technician's facial expression, I think they all look like that. (It's the fumes.)

It's not that easy to glue rubber bumpers, as the optimistic factory glue demonstrates. If you're serious about sticking rubber where no mastic has gone before, try 3M Scotch Grip 1300 Rubber & Gasket Adhesive (available from industrial rubber suppliers). I guarantee that stuff will glue it.

Before you go through the trouble of finding some Super Grip, though, try some plain silicone sealer. I've had good results adhering FP-8 bumpers with it. (At least, they haven't come off yet.)

That brings us to the next question:

Q. What's the difference between regular, white silicone sealer/caulk and the clear type sold for electronics use?

A. Not much. The clear type is sometimes spec'd for a higher dielectric breakdown voltage, but not always, and sometimes it has different curing characteristics. I use the clear type around line-voltage components (switches, fuse holders, transformers, etc.), but use whatever's handy for everything else. Obviously, cosmetic considerations may dictate one over the other. FYI: The stuff also comes in black.

Q. What type of lubricant should be used for synth joysticks, control levers, etc.?

A. The best general-purpose lubricant for such applications is white lithium-based grease (LubriMatic, or equivalent), available from auto parts stores and K-Mart, All-Mart, *et al.* The non-aerosol type is best, as it can simply be applied where needed with a toothpick, avoiding wasteful, messy overspray and the release of environmentally damaging gases. A well-stocked hardware store would carry all of the above products, but unfortunately such stores are fast becoming an endangered species.

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

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Choose a Cheetah MIDI musical instrument and you've found the answer.

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Fat analogue sounds are found in abundance on the multi-timbral MS6 (\$599) synthesizer module. No wonder the MS6 is used by some of the elite of professional musicians for bass lines, sync leads, filter sweeps and warm pads, because the MS6 offers all these and more in a compact 1U high case.

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For even more control, try the MQ8 (\$499) interactive performance sequencer. It allows you to control your sequences in real-time from your keyboard, so that the music plays along with YOU rather than you playing along with the music.

To do justice to this and all the other instruments in the Cheetah range, you really need to visit your local Cheetah Dealer. When you do, the best feature of all Cheetah instruments will be clear - AFFORDABLE EXCELLENCE.

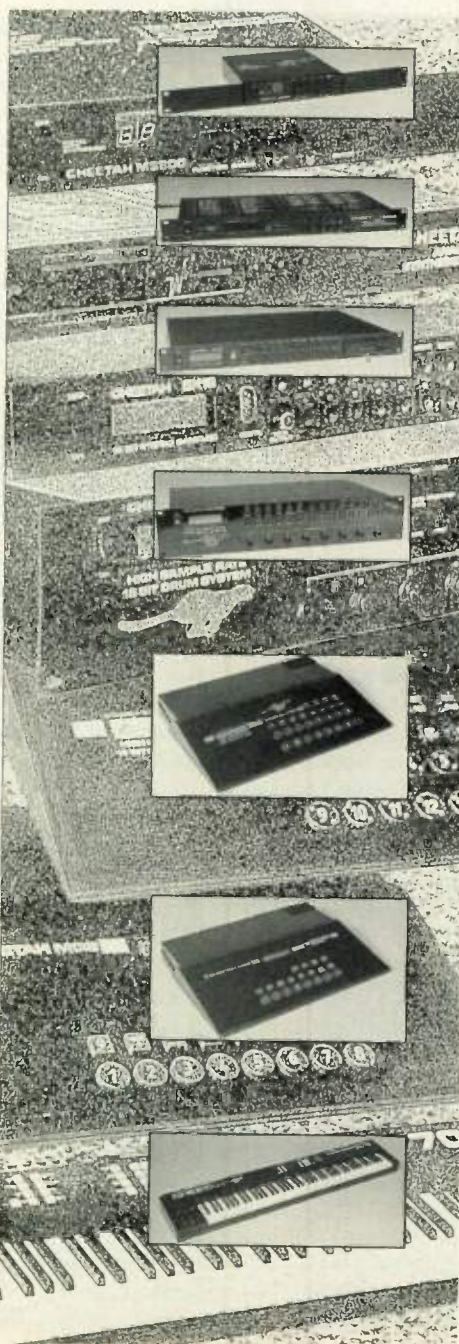
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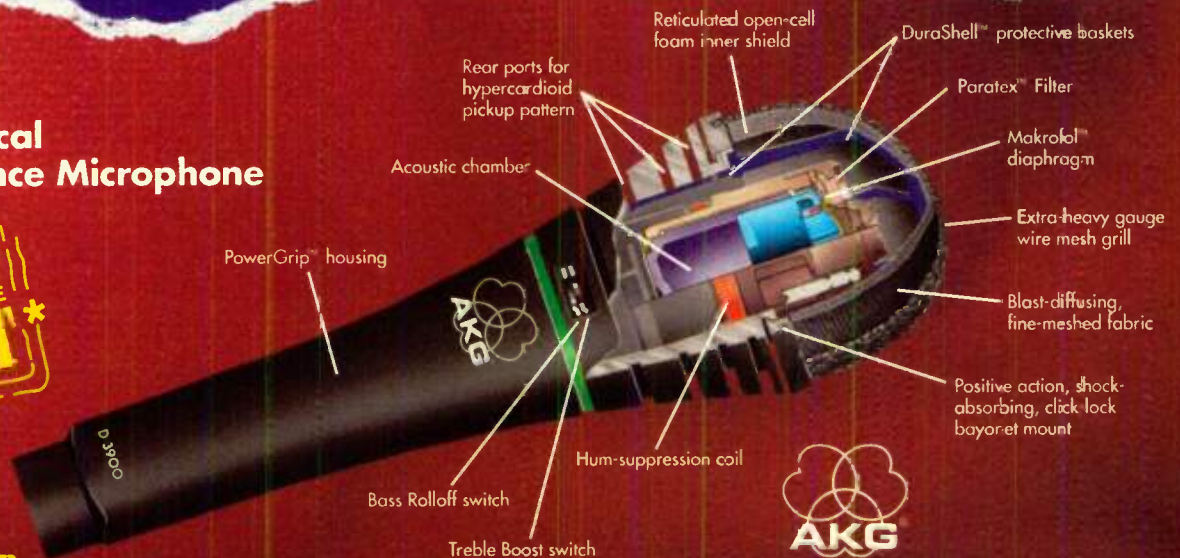
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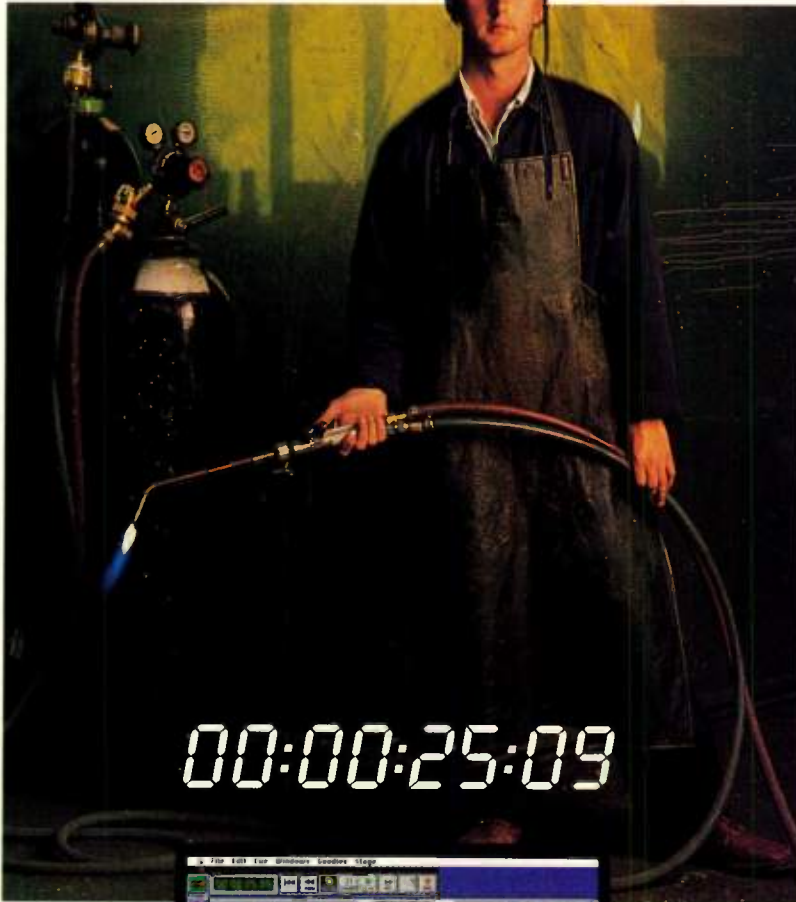
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Roland DM-80 Hard-Disk Recorder

By Larry "the O" Oppenheimer

Roland may have a winner in the Digital Multitrack Stakes.

"Run old Molly run
Run old Molly run
Tenbrooks gonna beat you
To the bright shinin' sun"
—"Molly & Tenbrooks" (Bill Monroe)

The Kentucky Derby has one advantage over the Digital Multitrack Stakes: The Derby's contestants are all horses. Although the first heat of digital multitracks has left the starting gate, the bookies are still trying to make sense out of a field where a personal computer-based workstation runs side-by-side with a stand-alone, random-access hard-disk recorder/editor and a multitrack digital tape recorder.

And if that isn't confusing enough, the digital contestants often compete on different racetracks: music recording, post-production, radio, and advertising.

Roland's steed, the DM-80, has been eagerly awaited since it was first shown more than a year ago. The DM-80 is a stand-alone, multitrack, hard-disk recorder/editor/automated mixer trained to gallop on all four tracks mentioned above. The question is: How well can it cover all that ground?

Available in a 4- or 8-track configuration, the DM-80 is built around a 4U rack-mount master unit that also contains one (for a 4-track system) or two (for 8-track) 100 MB

hard disks. Four-track systems can be expanded to eight tracks with the DM-80-E expansion kit (\$4,495). The system is controlled with either the DM-80-R remote controller (\$1,995), or the Macintosh-based *DM-80-S Multitrack Manager System* (still under development as of this writing; see sidebar). The 8-track review unit also came equipped with the optional DM-80-F fader unit (\$1,295; see Fig. 1).

AND THEY'RE OFF

The front panel of the master unit has LED ladder meters (seven segments plus Clip) and a Status LED (Record/Play/Mute) for each channel. Also included are meters for the master L and R buses, indicators for sample rate and hard-disk accessing, and the power switch.

The rear panel is filled with gazintas and gazoutas. There are balanced 1/4-inch TRS analog inputs and outputs for each track (which also accept unbalanced 1/4-inch plugs), balanced analog mix outputs (1/4-inch TRS), and a stereo digital input and output (switch-selectable AES/EBU or S/PDIF).

Other ports include a Click output; SMPTE LTC in and out jacks; MIDI In, Out, and Thru; a BNC connector for video sync; Roland's proprietary DM Buss connector; and a footswitch input. SCSI connectors service each of the two disk chains and backup systems. Even with all these ins and outs (Holy patch point, Batman!), a ventilation fan, and a jack for the detachable AC power cord (2-wire, not the IEC standard shown in the manual), the rear panel is roomy enough to allow access to everything.

The 8-track system also has a second digital input. More than simply another AES/EBU or S/PDIF port, this input can perform real-time sample-rate conversion to 44.1 kHz or 48 kHz. Don't underestimate the value of this utility.

IMPORTANT ACCESSORIES

The DM-80-R (see Fig. 2) is a remote control box from which all recording,



FIG. 1: The complete Roland DM-80 system includes the optional DM-80-R remote control and optional DM-80-F fader box, in addition to the main processing unit. Additional SCSI-based disk drives (not shown) are a must if you need more than a few minutes of recording time.

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DM-80

editing, and mixing operations can be performed. The DM-80 cannot be operated without it (at least until *Multitrack Manager System* is released), so be sure to factor in its cost from the outset.

The top panel has the essential tools: cursor keys and a parameter-adjust dial, flanking an LED time-code display. An 8-line LCD shows menus and command information and graphic representations of the mixer and the material being played back. Below the cursor arrows on the left side of the panel are twelve buttons dealing with markers and locate functions, while the display is supported by a row of function buttons (five of them soft), a row of mode buttons, a row of track status buttons, and tape machine-style transport buttons. Beneath the parameter dial is the 10-key pad used for entering alphanumeric information.

In addition to the DM-80 Bus Out connector, the rear panel of the DM-80-R has an input for a standard, PC-type ASCII keyboard for easier alphanumeric entry. The uncluttered layout of the DM-80-R makes it easy to reach important controls.

The DM-80-F fader unit is a small mix controller that offers a fader, pan control, and two bands of EQ (sweepable LF and HF shelving) for each of the eight channels. There also are faders for two stereo pairs of auxiliary inputs, plus master left and right faders. The rear panel is limited to DM Bus in and out ports.

The internal 100 MB disks provide only 32 track/minutes (four minutes of eight tracks), which was not sufficient for my needs. Roland kindly provided a DynaTek unit containing two 600 MB drives and a DAT backup drive. (Don't forget to include disk drives and tape or removable backup media in your budget.) The DM-80 passes channels 1 to 4 over SCSI bus A and channels 5 to 8 over SCSI B, so drives must be added to an 8-track system in pairs.

AROUND THE TRACK

The DM-80 organizes recordings into Projects. Each Project contains raw recordings, which are called "Takes," and a Playlist arrangement of Phrases, which are pointers to

portions of Takes. A Project has a defined sample rate and therefore contains only Takes recorded at that rate. Takes are tracked in Record mode, but Phrases must be created from Takes edited in Playlist mode. Mix automation and basic, manual mixer-control functions (in case you don't have the DM-80-F) are accessed via Mixer mode.

In Record mode, the DM-80 offers a flexible routing menu that allows selection, for each track, of any of the analog or digital inputs, or the REC bus for internal bouncing. You also can select any of the analog outs, mix outs, or the REC bus as a track's output. When recording from a digital source, you can clock from it by plugging it into Digital A and then selecting that as the sampling-clock source in the System mode.

Once tracks are armed for recording, they are monitored through the mixer. (I found it simplest to leave the mixer under manual control at this point.) A graphic meter display can be found by pressing the Menu button in any mode. From there, the DM-80 works just like a tape recorder: Record and Play buttons to start, Stop button to stop. While recording, the display moves along a time line, with black bars indicating which tracks contain material. The device also generates a black bar for the material being recorded.

Only four tracks at a time are shown on the DM-80-R display screen. The other four tracks can only be viewed by moving the cursor when the DM-80 is stopped. In fact, the DM-80 won't change screens at all during recording. I couldn't even switch between the meter display and a screen showing time remaining on the disk.



FIG. 2: All functions of the DM-80 are controlled from the DM-80-R remote box. Although it is not included in the system's list price, the remote box is a mandatory purchase.

RON MILLER

Takes can be listed, auditioned, and their non-audio information (name, in and out times, etc.) edited in both the Record and Catalog modes. However, be careful deleting Takes in Catalog mode. Pressing the "SCSI A" or "SCSI B" soft key does *not* select all of the Takes on the chosen bus for display, it marks them for deletion.

Besides manual recording, the DM-80 has a punch-in/out feature and a loop function. Loop recording tracks the same section repeatedly, keeping each take (if you wish) and allowing you to record or "not record" on each pass. Unfortunately, the operation of the Loop Record feature was not entirely clear to me, and the documentation didn't dispel my confusion. I had to call Roland for help.

COINING PHRASES

In the DM-80, Phrases exist only within the context of a time line, and must have in and out points. Additionally, no listing of Phrases is available. (You can view a list of Takes.) Phrase information is displayed only when a Phrase is selected, and even then, only when the unit is not playing.

Given the four-tracks-at-a-time display limitations of the DM-80-R, if you don't already know where a Phrase is, you may have to step through the entire project to find it. (Mitigating this limitation is one of the primary purposes of *Multitrack Manager System*.) This also means you cannot assemble a project from a library of Phrases: a frustrating restriction for sound effect, sound design, dialog, and music editors. A renowned audio-post production facility decided not to acquire a DM-80 expressly due to this limitation.

It is fairly easy to edit Phrases by locating the Now Line (current location) and track cursor to select the Phrase, then accessing the desired commands through the menu structure. Moving a Phrase is achieved by placing the Now Line at a convenient sync point within the Phrase, selecting the Move function, then relocating the Now Line to the desired new location for the sync point. This simple method makes back-timing and hit points easy, which is great for post-production applications.

The SCSI bus-to-track link restricts playback of Phrases made from Takes residing on SCSI bus A to Tracks 1 to 4, unless the take is copied to SCSI B,

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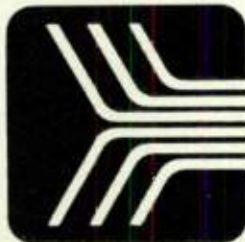
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● DM-80

which doubles the amount of system disk space it uses. The DM-80 has no scrubbing ability, so tight editing is achieved through the use of a RAM preview buffer that can be defined to contain from 100 ms to 5 seconds of audio. The preview buffer can be played up to the Now Line, from the Now Line, or through the Now Line. You can find your edit point by moving

the parameter dial and repeatedly pressing the Preview button.

I found this method workable, but decidedly inferior to scrubbing. The Preview function appeared to be disabled when I was in the Phrase Edit screen, making it impossible to trim a value and immediately hear the result. The situation is further compounded by the lack of a waveform display in

DM-80-S MULTITRACK MANAGER SYSTEM FOR THE MACINTOSH

Roland created the DM-80-S *Multitrack Manager System* application to address some of the limitations of the DM-80-R and to integrate the DM-80 with other Macintosh software (such as sequencers). The program is in beta testing as of this writing, although Roland hopes to release it by the time you read this.

Multitrack Manager is a comprehensive front end for the DM-80, allowing control of all functions. It provides several major benefits. For a start, it takes advantage of the Macintosh's graphics capabilities to show all eight tracks (for an 8-track DM-80, of course) onscreen simultaneously; a feature the DM-80-R doesn't have. Furthermore, a graphic overview of the entire Project resides above the Track display (see Fig. A). The overview uses color-coding to show different Phrases and reflect the Takes from which they were made. Users can jump to any part of the Project for editing. The Project also can be simultaneously viewed, edited, and

printed in an EDL-type display, with the same color-coding as the graphic representation. Other windows display every parameter of the DM-80's operation.

The program can generate waveform displays of Phrases, as well as allowing multiple Phrases to be moved as a group. Most common DM-80 functions are available as Mac keyboard equivalents. In contrast to the DM-80-R's paltry eight markers, *Multitrack Manager* allows up to 40. On a large-screen monitor, the program lets the user view a great deal of information at once.

Now the downside. *Multitrack Manager* costs \$650 and requires the Apple *MIDI Manager* and a DM Bus-to-MIDI interface box (the IB-1), which costs another \$99. Unfortunately, it is not possible to have the DM-80-R remote box and *Multitrack Manager* connected to the DM bus at the same time. Switching between them requires shutting down the DM-80, changing the DM bus connection, and restarting.

This is a complex piece of software, and Roland has been working on it for some time. The preview I saw seemed very far from release. It took an extremely long time to boot or quit on a plain-vanilla Mac SE (serious digital recordists should have a more powerful computer), and I never got it to work with the DM-80. To be fair, Roland made it quite clear that the program was still in beta testing (the version number was 0.316). Like the DM-80 itself, I believe that *Multitrack Manager* will be extremely useful when it is ready, but there are definitely some idiosyncrasies that need attention.



FIG. A: Roland's DM-80-S *Multitrack Manager System* software for the Macintosh shows all tracks onscreen simultaneously and has a graphic overview of the entire Project above the Track display. The program's release date has not been announced.

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the DM-80-R. (*Multitrack Manager System* will offer extensive waveform displays.) Editing also was complicated somewhat by having only eight markers. The dearth of markers constrained my straight music work and posed a severe limitation upon post-production editing. Again, this is something *Multitrack Manager System* is supposed to cure.

MIXING AND MIDI

The DM-80's automated mixing capabilities are a great boon. I could add fades, EQ changes, level moves, and so forth, at the same time I placed and edited phrases. This feature allowed me to get an idea of the finished work much faster than if editing and mixing were separate processes. I roughed in the phrases and mixing, then went back and refined both, easily switching between Playlist and Mixer modes (or between automated and manual mixer operation).

In the DM-80-R, stepping through the mixer pages takes you through screens for each group of functions (faders, EQ, etc.), then brings you to

the Playlist display. This function lets you watch activity on the tracks and anticipate mix moves, which is a nice touch. Mixing without the fader box would be considerably more hassle. And because the DM-80 does not accept MIDI commands to control the mixer, I recommend buying the DM-80-F, unless you already own a better automated mixer.

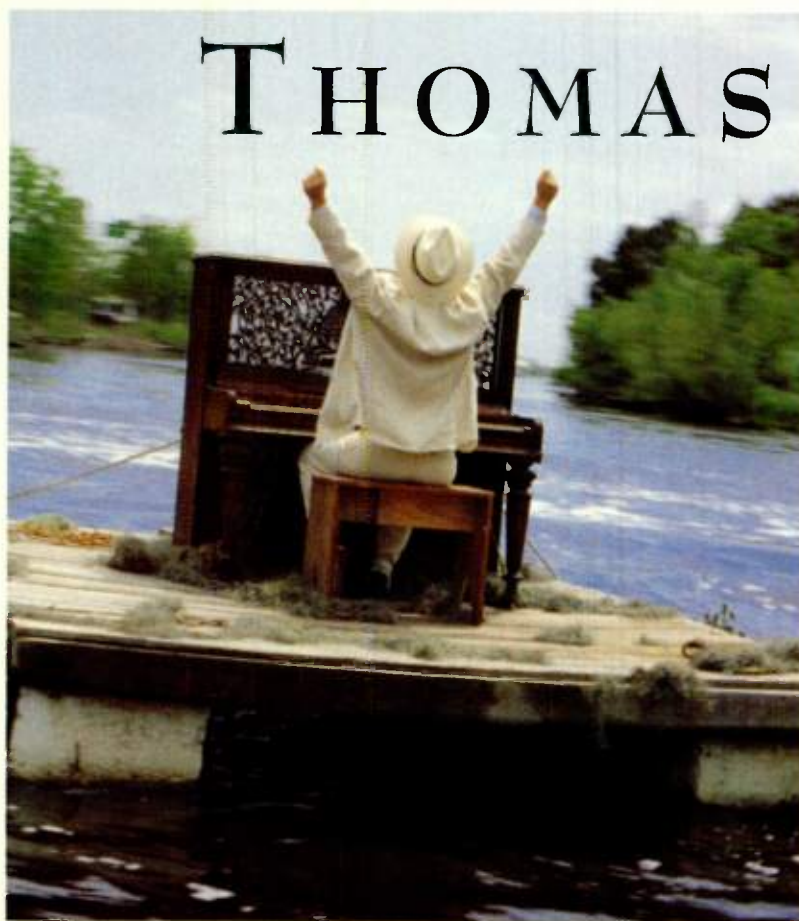
Speaking of MIDI, the DM-80's MIDI implementation is limited, but useful. The only MIDI controller the DM-80 accepts is Controller 4, for punching in and out of Record. The main MIDI feature is Trigger mode, which allows the unit to act like a sampler by triggering playback of Phrases from specified MIDI notes.

However, if you're considering using it as a sampler, though, keep in mind that there is no pitch-transposition, time-compression, or varispeed playback. In addition, the DM-80 must be in the Trigger mode screen for the feature to work, meaning that you cannot view the bar display of the playlist while triggering.

THEY'RE NECK-AND-NECK

Synchronization to SMPTE or MTC, with a start time, is supported. You also can output the time code or MIDI Clocks and Song Position Pointer. Roland recommends using the DM-80 to stripe the time code it will be expected to read, as it likes its own code best. I ran code from a 1/2-inch, analog 8-track to the DM-80, and it locked up quickly and consistently. The only hassle was the need to amplify the code signal considerably before the DM-80 could read it reliably. This is a problem I have encountered with many code readers. Unfortunately, you can't slave the DM-80 using a SMPTE offset.

Those locking the DM-80 to video sync will be happy to know that the unit will pull down the sample rate to match the sync reference (e.g., from 44.1 kHz to 44.056 kHz). The DM-80-L Locking Resolver (\$995) converts incoming SMPTE time code to video sync and locks the DM-80's sample clock directly to the time code. The Resolver allows the DM-80 to maintain accurate lock to a fluctuating or off-speed source of



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time code, such as a tape machine. In essence, it makes the DM-80 act like a tape deck in which the capstan speed is varied to follow time code.

A tempo map allows a different tempo to be assigned to each beat. To add guitar tracks to a sequence I created in Opcode's *Vision*, I first put the DM-80 into Tempo Map Learn mode, then played my sequence while transmitting MIDI Clocks. (Tempo maps also can be constructed by tapping, and then edited list-style in the Tempo screen.) That done, I placed *Vision* into External Sync mode and slaved it to the DM-80. At that point, I made a curious discovery: The DM-80 sends a Song Position Pointer when it stops or locates, but only sends a Continue message when Play is pressed. As long as all my locating was done on the DM-80-R, everything was fine. But when I stopped the sequencer to do some audio editing, then put it back in play, *Vision*, receiving only a Continue message, picked up where it had stopped.

A SLIP, BUT NOT A FALL

I encountered several problems with the system-administration functions. One was that every time the DM-80 is powered, it automatically loads the last Project you worked on. If the previous Project was a big one—and is not the one you currently wish to work on—it's frustrating to sit and wait for the old Project to load, only to flush it and load the desired Project. Furthermore, early in the review process I developed a problem with the external disk drives. The DM-80, unable to load the project from these disks, refused to stop trying and simply locked up into the load

routine. Conclusion: The autoload function should be switch-selectable.

Another flaw is the way the system performs tape backups: Only one project can be put on each data DAT, regardless of the length of the project or tape. In the case of the guitar overdubs I put on my sequence project, this meant dedicating a \$15 tape (data DAT is considerably more expensive than audio DAT) to four track/minutes of audio that fill a mere fraction of the DAT's capacity. Not only is this inefficient, it's counter to the concept of tape backup as an inexpensive mass-storage media.

Finally, the documentation I received with the DM-80 contained some significant differences from the software. Even with the included manual addenda and applications notes, it was difficult to figure out some important things. For example, the DM-80 and DM-80-R manuals state that tape-backup devices should be set to a SCSI ID between 3 and 6. But an undated page of corrections to the manual states the ID must be set to 1 or 2. In this case, the manuals were correct. Hopefully, Roland plans to overhaul the documentation when they finish tinkering with the software.

AND THE WINNER IS...

I could cite more quibbles, but it's time to get to the finish line. Looking at the list of complaints I have enumerated, it may surprise you when I say that I would not hesitate to buy a DM-80. The unit has solid multitrack digital recording and editing capabilities at a price that is quite reasonable for a random-access system. Most important, it sounds excellent. The 64x oversampling, Sigma-Delta converters sound smooth and free of artifacts, and the real-time sample conversion is virtually undetectable.

On one project, I used the DM-80 to make a cassette duplication master of some mixes I had on DAT. Unfortunately, some of the mixes were recorded at 48 kHz and others at 44.1 kHz. No problem. I set the Project up in the DM-80 at 44.1 kHz, transferred the 44.1 kHz cuts through the Digital A input (using that as the sample clock source), and then repatched to Digital B and sample rate-converted the 48 kHz cuts. The hassle of repatching was entirely forgotten in the joy of having all the cuts at one sample rate on the duplication master.

Product Summary

PRODUCT:

DM-80 hard-disk recorder

PRICE:

4-track \$7,295

8-track \$10,750

MANUFACTURER:

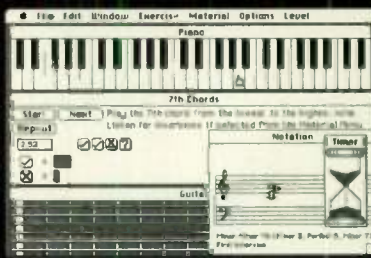
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● DM-80

Considerations such as these offset my feeling that the DM-80 suffers from a number of limitations, awkward implementations, fuzzy design decisions, and a lack of market focus. The DM-80 proved to be a robust performer, crashing only when confronted with faulty external disk drives. I can accept some limits as a reasonable tradeoff for a low price, as long as the system in question actually works well. The Roland DM-80 certainly meets that criterion.

Larry "the 0" Oppenheimer believes in pin 2 hot.

Yamaha SY85 Synthesizer

By Scott Wilkinson

This keyboard reaches new heights of user-friendliness.

I've always liked Yamaha synthesizers; the precision of their all-digital technology results in a clean, crisp, controllable sound. With the recent combination of FM, sample playback, resonant digital filters, and onboard effects, that sound can be as fat and sassy as you please.

However, these instruments have a reputation for being less than user-friendly. This reputation stems from the conceptual difficulty many people have with FM synthesis, but it also is apparent in the user interface of many Yamaha products. Page after page of parameters, cryptic abbreviations, and multi-function buttons have made it hard to fully realize the potential of these musical tools.

In an attempt to address these concerns, Yamaha recently introduced the SY85. This "workstation" instrument offers a keyboard, multitimbral sound module, sample RAM, sequencer, effects, and floppy-disk drive with a redesigned user interface and some very cool features, all in a reasonably priced package. But can it dispel the bad reputation?

FIRST GLANCE

Like most instruments in this price range, the SY85 includes a 61-note keyboard with velocity and channel aftertouch and an unweighted synth action. The front panel sports the requisite pitch-bend and modulation wheels and a 40 x 2 LCD display with eight soft buttons and sliders directly below it. An unusual arrangement of buttons to the left of the display form a matrix of options that we'll get into later.

The rear panel includes MIDI In, Out, and Thru, as well as two pairs of 1/4-inch audio outputs and a headphone jack. Three foot-controller inputs for volume, sustain, and assignable control round out the connections.

ARCHITECTURE

The SY85 offers 30-note polyphony and 16-part multitimbral operation with dynamic voice-allocation. Dispensing with FM altogether, the sound engine is based on Yamaha's AWM2 16-bit sample format. There are 244 Waves in 6 MB of ROM, most of which are multi-samples, except the oscillator waveforms and some of the percussion and drum sounds. The Drum Waves include 35 drum sounds, nineteen auxiliary percussion, and nine tuned percussion sounds.

These Waves are assigned to Voices, of which there are 256 in battery-backed RAM. (Unlike most Yamaha instruments, which offer too few RAM locations for my taste, there are no Voices or other constructs in ROM.) The Voices are organized in four banks of 64, and the Bank Select message is fully supported.

In most of the Voices, one Wave is



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processed through a standard subtractive signal path (see Fig. 1). However, there are four special Drum Voices at the end of each Voice bank that consist of different Waves assigned to the first 49 notes on the keyboard. The highest octave is reserved for a single Wave, usually tuned percussion or bass.

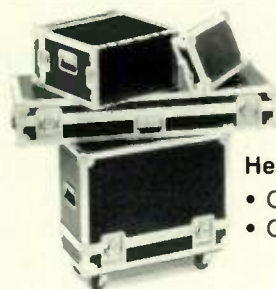
Up to four Voices can be assigned to Layers in a Performance. These Layers have their own settings, such as volume, pan, transposition, etc. Separate note and velocity limits allow layers, splits, and velocity switching. The 30-note polyphony allows layered Performances to play thick chords without undue voice-stealing. Unfortunately, any lingering sound is cut off when a new Voice or Performance is selected.

At the top of the hierarchy, 16-part Multis consist of Voices and/or Performances on different MIDI channels. Each part has its own set of parameters, including volume, pan, detune, transposition, and effect-send level. Multis are integrated with the sequencer and can be stored as Songs. Up to ten Songs can reside in the Sequencer memory, although they can't be selected with remote Program Changes.

The factory Voices and Performances have been further organized into sixteen groups of related sounds, identified by a two-letter prefix in their name: AP (acoustic piano), KY (keyboards), ST (strings), BR (brass), SP (synth pads), and so on. These prefixes are optional, but they are useful when selecting Voices and Performances for a Multi. A Multi Search mode lets you search for all Voices and Performances with a particular prefix, which makes the process of assigning parts much easier.

Like many recent keyboard "workstation" instruments, the SY85 offers expandable sample RAM. It comes with 512 KB of volatile RAM standard and provides sockets for two 1 MB SIMMs and two 512 KB non-volatile RAM expanders (SYEMB06; \$165 ea.) This proprietary, battery-backed RAM is less than half the price of the previous model for the SY99, but still many times more expensive than standard SIMMs.

The two types of memory are completely separate and independent, providing 2.5 MB of volatile memory and 1 MB of non-volatile memory when fully installed; a sample cannot cross the boundary. You might be tempted to



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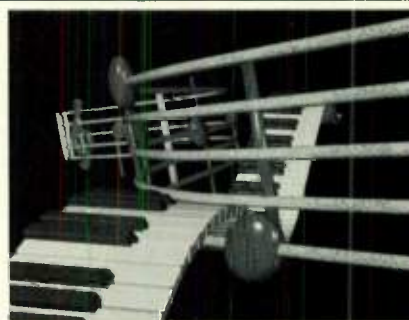
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● SY85

install larger SIMMs, but Yamaha doesn't recommend it. Besides, without SCSI, imported samples must be saved on floppy or via MIDI Sample Dump, so installing more than 2.5 MB of volatile RAM is impractical.

The Voice/Performance RAM can be expanded with an MCD64 RAM card (\$120), which holds 256 Voices and 128 Performances. Since all Voices and Performances are in RAM, the SY85 comes with one blank MCD64. This lets you store edited sounds without overwriting the factory presets. ROM waveform cards also are available, including the RY30 drum sound library.

A 3.5-inch, double-density floppy disk drive is used to store Voices, Performances, Songs, SysEx dumps from other MIDI instruments, and imported samples (except those from Yamaha ROM cards, which are protected from piracy). The drive will read disks in PC format, but disks in SY85 format load and save much faster.

USER INTERFACE

The 40 × 2 LCD is small, but this is understandable considering the price of the instrument. Unfortunately, it fails to solve the problem of cryptic abbreviations.

The front-panel controls are organized into functional groups, most of which are self-evident. The navigation controls include eight soft buttons that select the parameter appearing above them in the LCD. Data entry is accomplished with the +1/-1 buttons, rotary dial, and/or sliders under the soft buttons. Unfortunately, you can't scroll from the end of one memory bank to the beginning of the next.

The sliders are well-designed (see Fig. 1). In Voice or Performance Play mode, they adjust certain parameters (some of

which are programmable) without going into an edit mode. In any edit mode, they immediately adjust the value of the parameter above them in the display.

Aside from the sliders, the most obvious group of controls is the Mode Selection Matrix (see Fig. 1). Pressing one of the five buttons in the horizontal row selects the desired Play mode: Performance, Voice, Song, Pattern, or Utility. An LED indicates which mode has been selected.

Pressing one of the five buttons in the vertical column activates the "sub mode" indicated by the label appearing at the intersection of the selected row and column. The sub modes are primarily edit modes, each consisting of several pages. As you move from one sub mode to another and back again, you are returned directly to the page and parameter you left. However, the cursor does not remain where it was when returning to one page from another within a sub mode. This logical design works well to eliminate confusion when you face myriad pages of parameters. The current sub mode is indicated in the display, but I wish the sub-mode buttons had their own LEDs, as well.

I'm happy to report that the manual is far better than any I've ever seen from Yamaha. It's divided into two parts: *Getting Started* (68 pp.) and *Feature Reference* (320 pp.). *Getting Started* includes introductory material and basic operational procedures with plenty of examples and step-by-step procedures. *Feature Reference* covers all features and parameters in a well-organized manner. Both parts have an index and appear to have been written by native English speakers, which certainly is a strong advantage in the American market.

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FIG. 1: The sliders under the LCD provide instant access to displayed parameters, as well as certain parameters in Play mode. The Mode Selection Matrix to the left removes much of the confusion inherent in myriad pages of parameters.

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SYNTHESIS

As mentioned earlier, the SY85 sound-generation scheme is straight-ahead, sample-based subtractive synthesis (see Fig. 2). The digital filter can act as a low-pass, highpass, bandpass, or band-reject filter, with a slope of 12 dB/octave. (The lowpass is switchable between 12 and 24 dB/octave.) All types have a variable cutoff or center frequency that can be controlled by a variety of sources, and variable resonance that can be driven into oscillation. Overall, the filters sound clean and fat.

There are three levels of Voice and Performance editing. As mentioned earlier, the sliders adjust certain parameters from Play mode, which is handy. The next level is called Quick Edit mode, which provides easy access to certain parameters. It's important to understand that changes made in Quick Edit mode do not affect the Voice and Performance parameters directly; instead, they add or subtract *offset* values to these parameters. This lets you change a Voice or Performance in one situation without affecting it in other contexts, which is a big plus.

In the Voice Quick Edit mode, you can select one of 21 preprogrammed amplitude envelopes, including Piano, Brass, Sfx Brass, and several string and bass envelopes, in addition to editing attack time, sustain level, release time, and velocity sensitivity. Fourteen pre-programmed filter settings, such as Sweep and Synth Bass, can be selected. You also can edit cutoff frequency, resonance, and cutoff velocity-sensitivity. The LFO can be applied to pitch, timbre, or volume in a single step. In addition several effects parameters are

available. In Performance Quick Edit mode, each Layer can be edited separately. In addition, all Layers can be edited simultaneously; the edits offset the parameter values for each Layer. Available parameters include several amplitude envelope rates and velocity sensitivity, LFO speed and depth, and the same filter and effects parameters found in Voice Quick Edit.

Of course, the Full Edit modes provide access to all parameters. All Voice parameters are available for each Layer in Performance Edit, which is handy, and all effects parameters are available in Voice, Performance, and Song Edit, which also is handy. Of particular note are the Copy Data functions that eliminate the need to enter redundant settings more than once.

FACTORY SOUNDS

Overall, I found most of the factory sounds excellent. To my surprise, many of the brass and sax sounds are far better than usual, and I'm a pretty hard critic in this regard. However, a few of the brass sounds are pretty wimpy, and some of the acoustic pianos and other sustaining sounds have a static quality during a long sustain. This is obscured in thick chords and complete sequences.

The drum and percussion sounds seem to concentrate on rock, pop, and rap styles, although a few unusual sounds such as excellent handbells, tubular bells, and steel drums are included. On the negative side, the timpani seem to go flat at the end of each note, and the glockenspiel sounds more like a celeste.

SEQUENCER

The sequencer has a capacity of 20,000 notes; Yamaha claims that this figure includes a "reasonable" amount of Continuous Controller data. In practice, this capacity is inadequate for serious sequencing and song-chaining. The sequencer memory was completely filled with two demo songs, one with 85 bars and the other with 60 bars; another demo song with 67 bars filled the memory to 63 percent capacity.

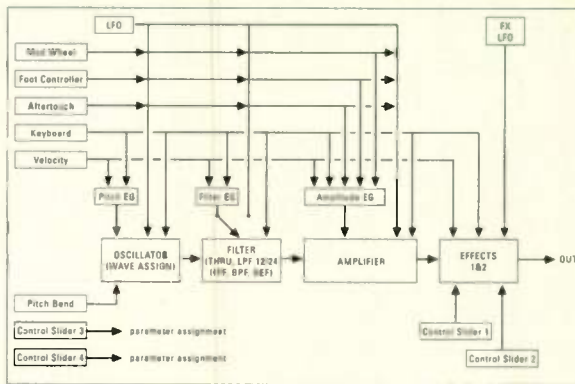


FIG. 2: The SY85 voice architecture is standard sample-based subtractive synthesis.

On another occasion, using a Yamaha MEP4 to add MIDI Volume to the Breath Controller messages from an Akai EWI quickly filled the sequencer memory. The result was a stuck note that lasted several seconds while the instrument sorted itself out, which led me to wish for a "panic" button. Without the flood of data, everything worked well. But if the SY85 is supposed to be a practical workstation, there should be sufficient memory for several complete Songs.

The sequencer includes eight linear tracks and one pattern-oriented rhythm track. Once again, it is apparent that Yamaha worked hard to make the sequencer easy to use. There are 100 rhythm patterns in memory, each of which ranges from one to four bars long. Although they are relatively simple, the preset patterns include a good selection of styles such as funk, rock, R&B, fusion, Latin, and jazz, with a verse, chorus, and fill for each style. These preset patterns can be replaced by your own patterns if you wish.

The Rhythm track consists of Parts, each of which is assigned a Pattern, start repeat, end repeat (with number of repeats), volume, programmed tempo change over a user-specified number of beats, or a marker. Up to sixteen markers can be placed to indicate sections of a Song.

Patterns and tracks can be recorded in real time or step time, with a resolution of 48 ppqn. Real-time recording can overdub or replace existing material in a track, and automated punch-in/out is provided. During playback, the sliders can be used to mix the song, but these movements are not recorded.

A full complement of editing features

Product Summary

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SY85 Music Synthesizer

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VALUE	●	●	●	●

includes velocity and gate-time scaling, as well as programmed crescendo/diminuendo. The event-list editor plays as you scroll through the contents of any linear track, and it's organized and well-labeled.

MIDI

The SY85's MIDI capabilities are somewhat limited. It responds to Bank Select, which can be used to select banks of Voices and Performances. Program Change messages select the appropriate item in the current bank. In addition, user-specified Bank Select and Program Change messages can be sent whenever any Voice or Performance is selected.

You might think the sliders should be programmable to send any MIDI Continuous Controller messages, but they aren't. Sliders 1, 2, 3, and 4 send Control Change 16, 17, 18, and 19, respectively, but these undefined messages cannot be changed. You can assign any incoming Control Change message from 0 to 120 to control various effects parameters, but I wish these messages could be assigned to control other parameters, as well.

most keyboards (including tunnel, canyon, and basement). The pitch shifters work well, although the sound starts getting squirrely about a third from the original pitch; a delayed pitch shifter plays arpeggios. All of the effects algorithms have a wide range from subtle to way outside.

EFFECTS

Two stereo effects processors offer a wide variety of configurations. Each processor can produce one of 90 effects, including 30 single, 30 cascade (serial), and 30 dual (parallel) algorithms.

The single effects include an excellent selection of reverbs, delays, and pitch shifters, as well as an exciter, flanger, chorus, phase shifter, ring modulator, and rotary-speaker emulator. The cascade algorithms consist of many of the single effects (including distortion), followed by a reverb or delay. There are several in which a high/low shelving EQ is followed by different effects. The dual effects consist of different effects combined with reverb or delay and some double effects such as double chorus, flanger, or phase shifter.

The two processors are arranged in a

serial or parallel configuration (see Fig. 3). When applied to a single Voice, the effects are routed to stereo output 1 only. However, when applied to a Drum Voice, Performance, or Multi, each element has its own send switch and level, and the signal is sent to both outputs. This represents outstanding flexibility.

The reverbs sound excellent in general, and the selection is better than

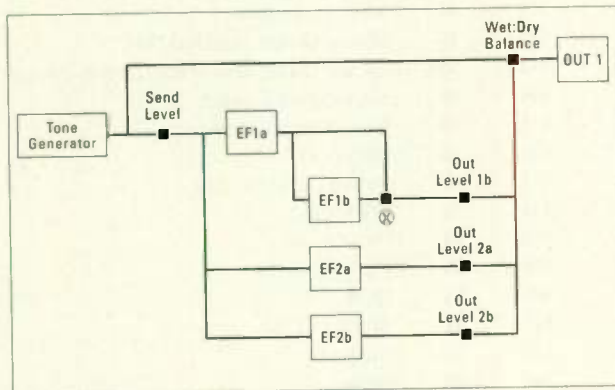


FIG. 3: In this Voice effects configuration, effect 1 is a cascade while effect 2 is a dual algorithm; the two processors are in parallel. In a Drum Voice, Performance, or Multi, the signal also is sent to output 2.

CONCLUSIONS

As you can probably tell by now, I like this instrument. It sounds great, and the three levels of editing address different users' needs. The overall organization is excellent, making it easier to use than many keyboards, including those from Yamaha.

The small display and cryptic abbreviations are an exception, but they are probably unavoidable at this price.

The only significant limitations are the sequencer capacity and lack of SCSI and massive sample RAM. The latter is understandable in view of the price, but the former is not. Nevertheless, this is a dynamite keyboard and an excellent value.

EM technical editor **Scott Wilkin-**
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World Radio History



Mark of the Unicorn Composer's Mosaic 1.1

By Bob O'Donnell

**Stability problems plague
the new version of this intui-
tive Mac notation package.**

Creating notation on a computer has always been a bit of a good-news/bad-news experience. Generally, the output you generate is impressive, rivaling even the most prestigious music publishing houses, but the process can be a tortuous journey.

Recognizing this difficulty, several companies have produced notation programs that claim to be easy-to-use, yet powerful. *Composer's Mosaic*, from Mark of the Unicorn, is the most recent Macintosh entrant to this category. Though it has a somewhat similar name to the company's previous notation package, *Professional Composer*, *Mosaic* is an entirely new program. (The company is offering an upgrade for *Composer* users, however.)

Mosaic offers a straightforward, click-and-drag-type interface and a decent set of features, including real-time MIDI input and MIDI playback. But the current version (1.1) lacks some essential functions and is flawed by serious instability.

BASIC STRUCTURE

The program's organization appears complex at first glance, but it's easy to figure out and proves quite flexible in use. The basic hierarchy consists of Voices, Staves, and Views. The notes you enter into the program are stored in Voices. Voices are assigned to Staves, and Staves are placed into one of two types of Views: a Page View, or a continuous Galley View (see Fig. 1). This structure allows you to put multiple Voices onto a single staff and assign any combination of Staves to different Views. Each *Composer's Mosaic* file can have as many different View windows as you need.

Using this structure, you could, for example, assign all the Staves to a Page View and a Galley View to create a score, then reassign each staff to its

own Page View to create individual instrument parts. The note data can be independently transposed for each staff, so the same note data from a single Voice can be used in concert pitch on a conductor's score and can be transposed for individual parts. Each View can have its own characteristics, so the staff spacing, note size, etc., can be adjusted to fit the needs of each part. In addition, the program allows you to create and store page-layout templates that you can use as a starting point for new parts or as a style sheet to apply to existing parts. For example, you could adjust the layout of one instrumental part, save it as a template, and then apply that layout to the other individual parts.

ENTERING MUSIC

To get music into *Mosaic*, you need to work in either Page View, or Galley View. Galley View is easiest when you first enter your music, but Page View is more appropriate for final tweaking. (Any changes made in one View are immediately reflected in the other.) To start working on a particular Voice, you either click in its staff, or, if there are multiple Voices in the staff, type in the Voice name at the bottom of the window. (A pop-up menu of available Voices would have been much easier.) You also can use the Command-up or Command-down arrows to switch between Voices.

Once you select a Voice, you can either click-and-drag notes and other symbols from *Mosaic's* collection of palettes, use the computer keyboard, or use a MIDI keyboard or other controller to enter notes in step time or real time (see Fig. 2). *Mosaic* also imports and exports Standard MIDI Files and can import *Professional Composer* files. Each input method has its pluses and minuses, so it's nice to be offered a variety of options. My only complaint is that when you click-and-drag notes into place, the program doesn't show you ledger lines for placing notes above and below the staff; it does show them when you place notes using the computer keyboard.

Some of the program's more advanced capabilities include cross-staff beaming, grace notes, support for guitar tab-

lature and percussion notation, and complex meters (e.g., 2+3/4).

MIDI input was added to *Mosaic* in version 1.1, but the current implementation is quite limited. *Mosaic* discards Velocity information, Program Changes, and all controllers, making it unsuitable as a sequencer replacement. According to Mark of the Unicorn, the program incorporates an intelligent quantizing algorithm borrowed from *Performer*. However, nothing about the subject is mentioned in the manual, and I ended up with a mess when inputting very simple lines from a MIDI guitar in real time. Things improved when I switched to a keyboard, but it still required a fair amount of cleanup. A straightforward Quantize on Input function would make things much nicer.

MIDI playback is a little better. You can assign each Voice to its own MIDI channel, but you can't set an initial Program Change. Also, because the program doesn't record anything other than note data, it doesn't provide any MIDI editing features. Even imported SMFs are reduced to a string of notes with a Velocity of 64. A few of the symbols have musical intelligence, however (a fact not mentioned in the manual). Dynamic markings (such as *p* and *f*) and accents adjust the Velocity values of notes, and the staccato and marcato markings affect note length. At the moment, all of these adjustments are preset and unalterable. While this arrangement is better than nothing, it would be great if the program used the symbols to add or subtract an offset to existing Velocity values, instead of having them all come out the same.

Other features that affect playback

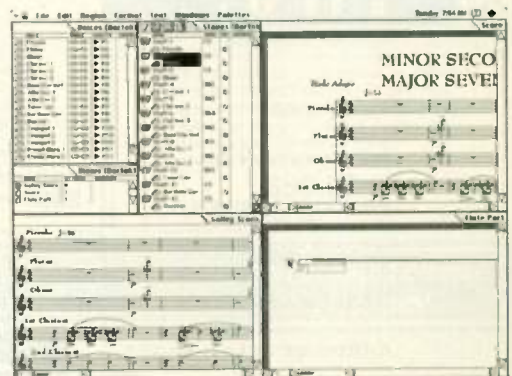


FIG. 1: *Mosaic's* basic structure consists of Voices, Staves, and Views. Voices are assigned to Staves, and Staves are placed into Views.

● MOSAIC

information you need to get started. I also found myself wishing for some kind of online help or support for System 7's Balloon Help.

CONCLUSION

Mosaic's elegant structure and intuitive interface offer great promise for the future, but in its current incarnation, the program is hard to recommend. With its limited MIDI support, restricted spacing options, and other limitations, the program's functionality can't compare with Coda's much less-expensive (though less-user friendly) *Music-Prose*. Also, *Mosaic's* instability makes it a poor choice compared to Passport's equally intuitive, but more solid *Encore*.

Mark of the Unicorn is dedicated to making *Mosaic* a solid platform for notation, and I have no doubt that future versions will be both more full-featured and stable. (Early versions of *Finale* and *Encore* also were notoriously buggy.) For the moment, however, I suggest you wait for a new version.

Bob O'Donnell is editor of *Electronic Musician*.

ART SGX T2 Multi-Effects Processor

By Buddy Saleman

This guitarist's tonal tool is hip to many sonic demands.

Guitarists are far from monogamous regarding signal processors. These sonic Casanovas often plug a Brand X chorus into a Brand Y delay into a Brand Z distortion to achieve a desirable balance of sound and processing power. So it's hardly surprising that shrewd manufacturers took the hint and focused production on multi-effects processors.

But old habits die hard. Unless a multi-effects device delivers a bountiful menu of great-sounding processing options, guitarists often revert to mix-and-match effects chains.

ART's SGX T2 strikes a blow for audio morality by offering just about everything guitarists (and other pro-



ART's SGX T2 provides up to eleven simultaneous effects, including killer reverbs and a variety of excellent modulation effects. The X-15 Ultrafoot MIDI foot controller integrates well with the SGX T2.

cessing wackos) crave. You can combine up to eleven simultaneous effects from a generous selection that includes reverb, chorus, delay, flanging, phase shifting, graphic equalization, compression, distortion, pitch transposition, short sampling, and even an onboard guitar tuner. Programming options are abundant, and the SGX T2 offers 200 memory locations (115 factory presets and 85 user-configurable).

ON THE BOX

The SGX T2 is a single-space, rack-mount device with left and right 1/4-inch input and output jacks; a 1/4-inch headphone jack; a foot-controller jack; MIDI In, Out, and Thru; and a 9-volt adapter plug. The two inputs are summed to mono, for pseudo-stereo signal processing.

The front panel has a 32-character LCD display (with contrast control) amidst the pink, silver, and black decor. An encoder knob allows rapid changes to presets, parameters, and parameter values, while ten control buttons toggle between patch selection and edit functions. Four function buttons, input and output sliders, and a 3-stage input level LED complete the panel controls.

IN THE BOX

Programming the SGX T2 is fairly straightforward and will be familiar to dedicated ART users. You just dial up a preset with either the encoder or parameter knob, hit the Edit button, scroll to a parameter, and use the Value button to make desired changes. When you're happy with your tweaks, hit Store.

In addition, the SGX T2 offers a solid MIDI implementation, allowing up to

eight parameters per preset to be controlled simultaneously. All Performance MIDI features are designed to be stage-controlled via ART's X-15 Ultrafoot MIDI foot controller (see the sidebar "Under Foot").

The menu is broken up into five Effects sections and a Utility section. The Utility feature contains the guitar tuner, programmable level settings, and a unique effects crossover that allows an audio signal to be split into high and low frequency paths.

For test purposes, I used the SGX T2 as my sole guitar processor during rehearsals and performances with my band, Danse Orkestra. I also spent a day or two playing the unit on studio sessions and even employed it as a signal processor for mixdowns. Here is my assessment of the main effects programs.

Analog effects. Analog effects include compression, expansion, distortion, an envelope filter, and a noise gate. On the fun factor, the envelope filter transported me back to the early 1970s with its wonderful wah-wah sound.

The compressor sounds smooth and includes the parameters most audio engineers demand: Drive (input), Slope, Attack, Release, and Output. The expander offers only Range and Ratio parameters because it shares Attack and Release controls with the compressor. Although a full-featured expander would be nice, the shared arrangement still allows you to diminish any signal hiss or crackles accentuated by compression.

The SGX T2's wide selection of distortion programs offers generous programming options. Unfortunately, I

PETER DIGGS

didn't really like the sounds. Many of the timbres exhibited some "edginess" and sounded like obvious digital representations of amp overdrive. However, most guitarists should be able to dial in a cool roar, due to the unit's sound-sculpting power. Be sure to double-check your gain stages and compression ratios when programming distortion parameters, because audible hiss rears its ugly head if levels are maxed out.

Noise wasn't a problem during live performance; in addition to the expander, the SGX T2 offers a simple (signal threshold range only) noise gate to tame runaway hiss. In the studio, direct recording was compromised by the audible hiss produced by some distortion programs. Again, watch those gain stages!

Signal frequency-shaping. I love the 7-band graphic equalizer and the low-pass filter. Frequency shaping is easy, and the sound is sharp and clean. The acoustic environment simulator (AES) is supposed to re-create natural environments (e.g., dead room, wood/rug mix, stone ceiling), but it isn't convincing to my ears. When I chained the AES to reverb programs it reacted like a tonal filter, rather than evoking a true sonic environment. This wasn't bad by any means—sometimes popping a tile room into a chain sharpened up the overall sound—but I was more comfortable relying on amp controls or the SGX T2's 7-band graphic EQ to enhance clarity.

Although the pitch transposer (Single and Dual options are offered) is clean and precise, its timbre is ragged for serious vocal applications. I got the

Product Summary

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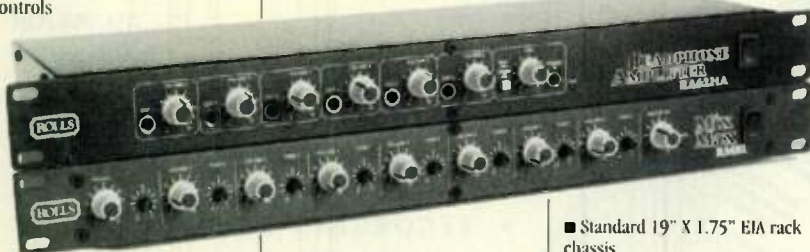
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THE INS & OUTS

ROLLS has 3 new rack units the RA62HA headphone amplifier, RM81 and RM83 mixers. The RA62RH will power 6 pairs of headphones with six 1/4" headphone outputs, 1/4" stereo input on the front, right and left 1/4" inputs on the rear, and 6 bypass jacks. The front panel controls

include 6 VOLUME, and 1 PAN controls, MONO/STEREO and power switches. The RM81 is an 8 ch mike line mixer with phantom power. The controls include 8 VOLUME, 8 TONE and MASTER VOLUME controls. The RM83 is a basic stereo mixer with all 1/4" ins and outs.

The controls are 8 VOLUME and MASTER VOLUME. There is a channel muting feature for remote muting of any or all channels. The RCA jacks can bridge several RM81s or RM83s together. All this at a cost of \$200, \$290, and \$290.



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ROLLS RM81 MIXMAX Features

- Aux/Buss INs and pre-fade OUTs

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- Wide range tone controls on each channel

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● SGX T2

UNDER FOOT

It's great that signal processors such as the SGX T2 allow real-time parameter changes via MIDI. But for the guitarist, controlling the changes during live performance can be difficult. How do you smoothly adjust the reverb decay in the middle of a smoking riff without invoking telekinesis?

ART suggests their X-15 Ultrafoot MIDI controller (\$269). The X-15 integrates fourteen footswitches and two pedals in a flat, stomp box-style floor panel. LEDs announce which effects are active in a given preset and an LCD displays all MIDI messages sent to the SGX T2. The X-15 has MIDI In, Out, and Thru jacks and an adapter plug for a 9-volt external power supply.

Communication between the X-15 and the SGX T2 is bidirectional—you have to run MIDI cables both ways between the units—and relatively seamless. SGX presets and effects click right in when the buttons are stumped, and the expression pedals offer near-glitchless parameter adjustments. Several SGX presets are designed specifically for X-15 control.

Unfortunately, the X-15's buttons are spaced together so tightly that it takes some concentration to hit the right one. My foot easily spans two buttons, and I don't even wear the cool footwear of the moment: stubby Doc Martens and unwieldy cowboy boots. Because musicians often are not the most coordinated of human beings—especially in the heat of performance on a dark stage—ART should have taken this into account.

The stingy spacing also applies to the expression controller pedals, which are too close together to permit error-free operation. In a research lab, a designer might be able to hit the desired pedal every time, but onstage you could hit a pitch-shift value when you want to change an envelope sweep.

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Modulation effects. This is the best-sounding section. Every program—flangers, choruses, phasers, and tremolos—produces lush, shimmering sonics. In addition, the programs are clean enough to pass the most stringent studio applications.

Reverbs. Another great section! Three basic reverbs are offered with varying degrees of density and complexity. Within each reverb algorithm, you can select a hall, room, plate, or vocal type. In addition, the SGX T2 offers three gated reverb algorithms with flat and reverse gate types. I found the Reverb-3 (or Gate-Verb-3) algorithm the best choice when utilizing a reverb program by itself, but all the reverbs possess good sonic quality.

Delays. Here we have an entire menu of delays: tapped, regenerated, stereo types, and sampling. The amount of parameter control for each algorithm is comprehensive, and every delay program performed impressively throughout a number of live and studio applications. The sampler has limited appeal because it allows only 1.58 seconds of recording (in 20 ms increments) and cannot be played simultaneously with the source. When the sample is triggered, the source signal is cut off, so you can't do any "Frippertronics." Also, triggering from an external controller proved somewhat erratic.

THE FINAL ASSESSMENT

The SGX T2 is a strong unit, with a lot to offer. ART always seems to take the processing needs of guitarists to heart, and the unit shows a lot of thought about how most guitarists set up and play effects. Though I wasn't a big fan of the distortion presets, the other attributes of the box—the wonderful reverbs, delays, modulation effects, large algorithm chains, and real-time parameter controls—more than compensate.

I also used many of the SGX T2's programs to enhance studio mixdowns and was never disappointed. The SGX T2 is a versatile musicians tool, not just a guitarist's sonic paintbox, and should be a welcome addition to any signal-processing rack.

Buddy Saleman is head staff engineer at Sound & Vision Studios in San Francisco.

Dr. T's QuickScore Deluxe 2.05 (PC)

By Robert Kendall

This user-friendly program weds quick-and-dirty notation with sequencing.

Combining conventional music notation and MIDI is the rage among software developers.

It's hard to find a notation program these days that can't at least import Standard MIDI Files, or play your scores with MIDI instruments. Conversely, more and more sequencers are sprouting music-notation editors. *QuickScore Deluxe*, Dr. T's Music Software's \$149 notation package for PC-compatibles, presents an interesting example of this hybridization under an easy-to-use graphical interface.

With its low-resolution printing and decidedly limited notation capabilities, *QuickScore Deluxe* can't match some other low-end PC programs (such as TEACH Services' slightly less-expensive *Laser Music Processor*) in the quality of its printed output. Its strength lies in its sequencing features, which go beyond those found in many pricier notation packages.

With *QuickScore Deluxe*, you can create a score of up to sixteen staves by importing a MIDI file, entering notes with the mouse, or playing them on a MIDI keyboard. As you edit your work, you can play it back on your synthesizer as easily as if working with a sequencer.

THE MIDI TOUCH

QuickScore Deluxe can't take the place of a low-end sequencer, unless you never want to view or alter Continuous Controllers and Pitch Bend, Aftertouch, or Modulation Wheel messages; such control is beyond the reach of the program's editing functions. However, it provides enough basic sequencing capabilities to serve as a useful tool for sequence-smiths who would prefer to work with conventional notation rather than a piano-roll or event-list editor. They could rough-hew their music in *QuickScore Deluxe* and bring it into a sequencer for the finishing touches.

Importing and exporting MIDI files is a breeze; importing large Standard MIDI Files takes only a few seconds on a 16 MHz 80386DX machine. The program is DOS-based, which means the size of files you can load depends on how much DOS memory is available. I had no trouble bringing in a 300-bar, 7-track sequence, though. The program preserves and plays back everything in the Standard MIDI Files it imports, even the data it won't let you edit (such as controllers).

QuickScore Deluxe provides up to sixteen tracks (one per staff) and lets you assign channels and initial program numbers to each. You can't select patches by instrument name, though, as you can in most *Windows*-based MIDI programs, and there's no way to change program numbers in the middle of a track. You can mute tracks, edit key velocities, and change tempos on any beat.

The program supports a broader range of MIDI interfaces than some sequencers. In addition to the ubiquitous Roland MPU-401, it accommodates the KEY Midiator, AdLib card, Creative Labs Sound Blaster, Media Vision Pro Audio Spectrum, and ATI SFX card.

STEP TIME AND REAL TIME

To enter notes in step time with the mouse, you first select the correct duration from a palette of notes. Then you left-click to set the note's horizontal position and right-click to set its vertical position on the staff. This isn't as intuitive as just clicking once on the staff where you want to place the note—the method used by many other programs—but I soon got used to it. Alternatively, you can enter pitches in step time from your MIDI keyboard.

You can enter triplets and durations as short as 64th notes, but the program can't mark notes as triplets or handle other tuplets. On the other hand, it can accommodate unusual time signatures and transposing instruments, and it can split piano tracks onto two staves.

In addition to importing files and step-entering notes, you can record tracks in real time from a MIDI keyboard. Recording starts wherever you've placed the cursor within your score. However, all the new material is overdubbed onto any notes already in the track, so you can't punch in and

out to just replace a measure or two.

The program had no trouble accurately transcribing MIDI files or real-time input in straightforward rhythms. Unquantized syncopations sometimes yielded strange results, but I have yet to see a notation program at any price that can unerringly transcribe something that really swings. A couple of times I encountered a rather disturbing anomaly: A note that was audible during playback would be inexplicably missing from the score as it appeared onscreen.

KEEPING UP APPEARANCES

The key to *QuickScore Deluxe's* usefulness is its success in reconciling the rhythmic flexibility of good playing with the rigidity of staff notation. When it displays the music you've recorded or imported from a MIDI file, it can tidy up the appearance of the notation without changing the sound of the music. All your subtleties of rubato and



FIG. 1: *QuickScore Deluxe* lets you set the key velocity of selected notes graphically by positioning a marker along a numeric scale.

articulation will still be there during playback.

You can quantize the notation to durations as short as 64th notes and to various triplet values. You can clip each note duration to the start of the next note so that slightly overlapping notes will appear as a single voice. You also can extend durations to the beginning of the next note to keep staccato passages from becoming cluttered with rests. These options affect only the way the music is displayed, not the way it sounds when you play it back. Best of all, you can toggle the options on and off whenever you want and apply them either individually to different tracks, or to the entire score.

RESPECTABLE EDITING

QuickScore Deluxe offers a respectable array of editing features, including Undo. You can't move notes by dragging and dropping, but you can cut and paste them. Moving expression marks, or text attached to notes, is a separate step.

You can select an entire track for global editing, or select a group of notes by drawing a box around them with the mouse. Unfortunately, you can't select music on several tracks at once. When you've defined a block of notes to edit, a menu drops down presenting the global editing options.

In addition to cut, copy, and paste, the global editing options include chromatic or diatonic transposition and altering note durations (with or without adjusting starting times accordingly). You can alter key velocities, though the only choice is to set all selected notes to the same velocity—not the most practical way of dealing with dynamics. A nice legato feature slides Note Off's forward or back so that they immediately precede the next Note On; both of these affect the sound of the music as well as its appearance onscreen.

The program provides some convenient graphical editing aids. For example, to transpose a passage, you move a notehead vertically on the staff to indicate the interval of transposition. Moving markers along numeric scales

lets you select duration and key velocity values (see Fig. 1).

While editing, you can display five staves at once onscreen and scroll the score up and down. Screen redraws in full-score view are annoyingly slow and unnecessarily frequent, however, so you'll want to take advantage of the option to display only one staff at a time whenever possible. The display scrolls during playback, but redraws can't always keep up with the sound. A Print Preview shows how the systems look laid out on the page (see Fig. 2).



FIG. 2: The Print Preview shows you how your music will look on the page.

THE ROUGH EDGES

When it comes to fine-tuning a score once the notes are entered, *QuickScore Deluxe* has some serious limitations. Stem directions and beaming are handled automatically, but they can't be overridden, which can make it impossible to notate counterpoint correctly. If notes and accidentals overlap, the only recourse is to decrease the number of bars per system until the notes are spaced widely enough to avoid the problem. The program doesn't always space notes evenly.

To add an expression mark, you select it from a palette and place it on the staff as you would a note. Unfortunately, the palette includes little besides common dynamic marks and a few ornaments (see Fig. 3). There's no way to create slurs or hairpins, and the palette lacks any articulation marks. You can add staccato dots to notes by typing in periods in Text Annotation mode, but this is cumbersome, at best. The text-entry tool is useful but quite rudimentary. You can place only a few



FIG. 3: Dr. T's *QuickScore Deluxe* lets you place ornaments and expression marks by selecting them from a palette, but your choices are quite limited.

words at a time, making it a chore to add lyrics, and there's no control over fonts.

Once you've laid out your music, don't expect professional-quality printed output. *QuickScore Deluxe* supports PostScript and the Hewlett-Packard LaserJet, as well as a handful of inkjet and dot-matrix printers. But even on a laser printer, it prints scores as bitmaps, at a low resolution of about 100 dpi. The results are legible, but far from pretty. On the positive side, there's an option to print only a selected part from a full score, which is a serviceable method for extracting parts.

WHAT'S THE SCORE?

QuickScore Deluxe should appeal greatly to amateur musicians who want to try their hand at a little sequencing and notation without investing a lot of learning time and money. Sometimes seeing your work in staff notation can bring a new perspective to it, suddenly unraveling a knotty compositional problem. For one thing, you can see all the parts at once, something that few piano-roll editors allow. The program's minimal hardware requirements (a PC XT-compatible with 640 KB RAM) are also a big plus for this group.

Composers and performers might find *QuickScore Deluxe* a useful complement to their existing software.

Product Summary

PRODUCT:

QuickScore Deluxe 2.05

PRICE:

\$149

SYSTEM REQUIREMENTS:

IBM PC XT-compatible or better, with MS-DOS 3.0 or higher; 640 KB RAM; mouse; MIDI interface; EGA, VGA, or Hercules graphics display

MANUFACTURER:

Dr. T's Music Software
100 Crescent Rd., #1B
Needham, MA 02192
tel. (617) 455-1454

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

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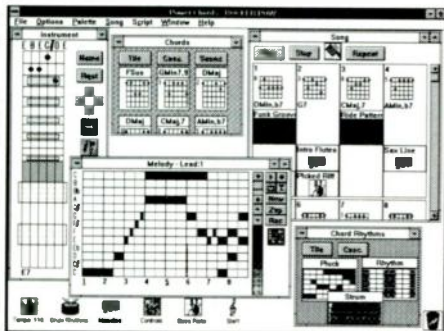
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● QUICKSCORE DELUXE

Serious musicians with a *Windows* system, however, should keep in mind that both Coda's *MusicProse* and Passport's *MusicTime* offer MIDI-aware, professional-quality notation for about \$100 more than *QuickScore Deluxe*. On the other side of the coin, Midisoft *Studio for Windows* provides a full-blown sequencer with a staff notation editor for \$249. Ultimately, the greater power of these alternatives may prove well worth the slightly higher cost.

If the MIDI features of this program appeal to you, but you demand professional-quality printed output, *QuickScore Deluxe* alone won't do your job. However, the program can export files in Dr. T's *The Copyist* format—in fact, if you buy the \$450 *Copyist Professional-DTP*, Dr. T's throws in a free copy of *QuickScore Deluxe*—so you can load your work into *The Copyist Professional-DTP*, touch it up, and print it in high resolution.

Only musical hobbyists with highly limited needs will find *QuickScore Deluxe* an all-in-one notation/sequencing solution. Serious MIDI musicians, however, could find it a helpful addition to their software arsenal.

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

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Boss DR-660 Drum Machine

By David Crigger

Dr. Rhythm prescribes serious sounds, friendly features, and a sweet price.

When most people think of Roland's Boss Dr. Rhythm line, they imagine a stripped-down drum machine or metronome, rather than something that lays down serious tracks. But with the DR-660, the "doctor" has come of age. This is a serious, budget-priced (just under \$500) drum machine that not only sounds good,

but has a number of features aimed at the needs of low-end drum-machine users. Nobody's going to mistake the DR-660 for a funky metronome.

With 52 buttons—two big knobs (volume and alpha-style data-entry) and an LCD display—few controls have to do double or triple duty. This makes the machine easy to learn and use. In addition, Roland fit everything on the front panel of a case measuring only 8.5 × 6.5 × 2.25 inches, so the DR-660 packs a lot of drum machine into a small package. The rear panel includes four audio outputs, configured as a stereo pair, plus two individual outs, an 1/8-inch stereo headphone mini-jack, MIDI In and Out jacks, a jack for the wall-wart power supply, and the on/off switch.

PLAYING WITH PADS

Unlike most DR-660 buttons, the sixteen playing pads have two functions. The pads are velocity-sensitive, *and* they respond to pressure, providing After-touch messages for adding dynamics when using the automatic roll button. The buttons are a little small and close together, sometimes demanding extra dexterity, but their rubbery texture and cushioned feel make for comfortable playing.

The whole group of sixteen pads can be alternated between two different Pad Banks (A and B) providing access to 32 sounds when programming patterns from the front panel. If desired, you can layer the two banks, making sixteen composite sounds, rather than 32 individual ones. Using an external MIDI controller, you can simultaneously access 23 more sounds, bringing the total to 55.

SEQUENCING

The sequencer section of the DR-660 is straightforward. There are 100 preset patterns, ranging in quality from usable to moderately cheesy, and 150 user-programmable pattern locations. Any pattern can be strung into one of 100 Songs, which can then be strung together using the Song Chain function.

There is not a hint of Roland's older drum-machine programming scheme, with its confusing array of scales, ending steps, etc. Gone also is the graphic rhythm display, which some people will miss. On the other hand, trying to show rhythms on such a limited display caused a lot of confusion.

In the new version, sixteenth notes are called sixteenth notes, triplets are called triplets, and the length of patterns is determined by the number of quarter-note "beats," which is much less confusing. The flip side is that measuring length by beats prohibits the use of time signatures with denominators other than four (e.g., 5/8, 11/16), which is a real drag for some users. I don't understand why some manufacturers insist on this approach. (Alesis drum machines work the same way.) Is it technically that much cheaper and easier to im-

plement, or have the designers concluded that the average drum-machine user is too dense to understand the concept of bars *and* beats?

Getting past the minor complaints, the programming aspect of the machine works really well. There are some nice touches, such as being able to jump in and out of Record without pressing Stop. Equally nice, and more unusual, is the ability to change the Quantize setting with a single keypress while you record. These kind of touches allow you to work more quickly and spontaneously.

REAL-TIME PATTERN CHANGE

One interesting new feature is Real-time Pattern Change. All of the 100 factory-preprogrammed patterns work together in groups of four. The group's first pattern is called the "Original" pattern, the second is called the "Variation," the third is the "Fill-to-Variation," and the fourth is the "Fill-to-Original." Typically, the Fill-to-Variation pattern is a copy of the Original pattern that has been modified with some sort of drum fill at the end. A similar relationship occurs between the Fill-to-Original and Variation patterns.

While playing the Original pattern, pressing the Forward button on the front panel causes the Fill-to-Variation pattern to play once, transitioning to the Variation pattern, which will loop indefinitely. If the Forward button is pressed before the last beat of a bar, the DR-660 switches immediately to the Fill-to-Variation pattern, finishes the bar, then switches to the Variation



MELODIE GIMPLE

The Boss DR-660 offers a host of single-function buttons and sixteen velocity- and pressure-sensitive pads, but its main attraction is a wide variety of quality sounds.

pattern on the next downbeat. If the button is pressed after the last beat of a bar (but before the next downbeat), the DR-660 waits until the next downbeat to begin the transitional pattern, playing the whole thing before beginning the Variation. The Backward button works in a similar fashion, using the Fill-to-Original pattern as a transition back to the Original pattern.

Used with the preprogrammed patterns, Real-Time Pattern Change turns the DR-660 into a nice "verse/chorus-with-fills" rhythm box. But what's really cool is that the same function can be applied to the user-programmed patterns. It's easy to set up, and the four patterns need not even be the same length. As an alternative to locked-to-one-form song programming, this feature not only offers ease of use, but opens up creative potential. Sadly, there seems to be no way of controlling this feature except by the front panel. Adding footswitch jacks would raise the hardware cost of the unit, so not including them is understandable. But the unit needs some form of MIDI control.

SWINGING

The swing function, which is extremely important to a lot of rap and hip-hop grooves, is only adequately implemented. The available swing percentages are 50, 54, 58, 62, 67, 71, 75, and 80. (It seems to me that settings above 67% are nonsensical.) These percentages can be applied during playback to a pattern's thirty-second, sixteenth, eighth, and—for the life of me I can't

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● **DR-660**

imagine why—quarter notes.

Of course, as with most drum machines, any even rhythm faster than the swing value gets trashed; fortunately, triplets are left alone. Considering the DR-660's 96 ppqn recording resolution, it's too bad they left out some of the finer "in-between" swing percentages, at least for eighth notes. I also found it disconcerting that the machine records in straight time, but plays back with a swing feel; not hearing the swing while recording is a drag.

SONIC SATISFACTION

When selecting a drum machine, sounds are at the heart of the matter. Let's start with the facts: The 14-voice polyphonic DR-660 contains 255 16-bit PCM sounds that can be configured into 39 drum kits (seven preprogrammed, 32 user-programmable). These include 50 kick drums, approximately 75 snare drums, nine sets of four toms (plus some extras), twelve hi-hat sounds, seven cymbals, 25 acoustic percussion sounds, 27 electronic percussion and effects sounds, eleven reverse sounds, five different reverb and ambience returns, and the obligatory slap and synthesizer basses. Included in these sounds are samples taken from some of Roland's hit drum machines of the past: the TR-808, TR-909, CR-78, and DR-55. It also features a complete kit played with brushes, including hi-hat and ride cymbal.

Some sounds are dry, while others have varying degrees of ambience. All can be tuned to varying degrees and have adjustable decay. Many DR-660 sounds can change timbre in direct

response to varying dynamics, while others are adjustable using the Nuance control. Nuance adds harmonic content by crossfading between samples and can give the impression of an instrument being struck at different positions. On some sounds you can modulate Nuance values with Velocity messages.

Each sound can be set to play monophonically or polyphonically. This determines whether repetitive notes of the same sound cut off their own

▼
Stylistically, the

**sounds cover a lot of
ground from
dance/hip-hop to rock
to country.**

decays or are allowed to overlap each other. There also are seven monophonic Groups and seven polyphonic Groups. In this case, the Mono/Poly setting determines how voices cut off other voices in the Group, which is necessary for applications such as creating convincing hi-hats. In Poly Groups, triggering a sound cuts off other sounds (as in Mono Groups), but doesn't cut off previously triggered versions of itself. For instance, triggering a closed hi-hat cuts off an open hat, but if you keep triggering closed hats, they are allowed to ring and overlap each other. This feature is especially welcome.

Each sound can be assigned a sensitivity curve to accommodate different playing styles. There are also fixed curves and crossfade curves for using the special Pad Bank Layer mode (referred to earlier), which allows the sounds assigned to Pad Bank B to be layered with Pad Bank A's sounds. It's a bit of a pain to set and adjust, but some nice effects can be created.

All the parameters involved with the sounds (including tuning, MIDI assignments, and panning) are remembered as a drum kit. Unlike single-kit machines such as Roland's R-8, you get 39 factory-preset drum kits, 32 of which are user-programmable. Any kit can be

Product Summary

PRODUCT:

Boss DR-660

PRICE:

\$499

MANUFACTURER:

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

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

assigned to any pattern.

Stylistically, the sounds cover a lot of ground from dance/hip-hop to rock to country. Overall, the unit features many good choices, with little dead weight. The cymbals are quite bright. The low end isn't as tight as some higher-end machines such as the R-8, but it's decent.

A PAIR OF PROCESSORS

Different parts of a drum set need different amounts of reverb. Using one global reverb setting either gives you a muddy, distant bass drum with diffused, splashing hi-hat, or a dry, in-your-face backbeat, with too little toms. You could use a sound that has built-in ambience, but only if you can find the right sound with the right wet/dry balance.

To help alleviate this problem, the DR-660 has two effects processors: one for chorusing/flanging and one for reverb/delay. For every kit, you can choose the kind of effects being used and adjust the settings, overall level, and send amount for each sound. The chorus/flanger section has four parameters: depth, rate, feedback, and delay. Its effects aren't amazing, but they're adequate.

The reverb/delay can be one of five types: Hall, Room, Plate, Delay, and Pan (ping-pong) Delay. Reverb time and lowpass filter amount are adjustable, while the delay simply allows the adjustment of feedback amount. The reverbs are somewhat grainy and generally less than phenomenal. But the prices of better-sounding effects units aren't much lower than the price of this whole drum machine. If the only other option were to slap a real good processor globally across the left and right outputs, I'd rather use these internal ones so I could set the correct balances.

INDIVIDUAL OUTPUTS

Fortunately, there is another option: The DR-660 has two individual audio outputs in addition to the left/right main outs. But there is a tradeoff: Each individual output shares a processor with one of the effects, so you can't use the individual outs and the effects simultaneously. Using individual output 1 turns off the reverb processor, and using output 2 turns off the chorus processor.

Also, the individual output/effects

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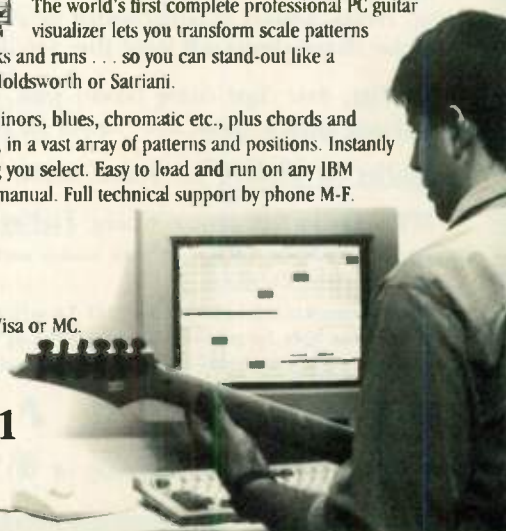
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Given its intentionally bare-bones approach and great sound, it is hard to complain about much in the JMP-1, except for the price. At \$999, the JMP-1 is considerably more expensive than some MIDI tube preamps with more features. On the other hand, those products don't have the JMP-1's sound. The only drawback I can find—and it's minor—is that if you use your preamp for anything other than an electric guitar, such as an acoustic-electric guitar or an electric violin, you may find the four tone controls limiting.

The JMP-1 is what it is, with no apologies: a hard-rocking, Marshall-lover's Marshall. For those of us who love that sound, it is not just the best choice; it's the only choice.

Peter McConnell is a music-a-holic who lives in Berkeley, California. When he isn't composing and designing music software for LucasArts Games, he plays electric violin, guitar, and keyboards in the Bay Area band Lotus Eaters.

**PS Systems
Power Tool**

By Michael Molenda

**This black box lets
guitarists whip up a quiet
storm.**

I am so tired of guitarists claiming their wondrously bitchin' live sound evaporates in the recording studio. I'm also tired of lugging amps around to find optimum room positions, dangling mics from stairwells, giving lectures on psychoacoustics, and twisting the life from innocent EQ knobs.

And I'm tired of these fretted whiners being right. In a perfect world, the sound blaring from your amp *should* translate to tape exactly as you hear it. But it's an extremely difficult task wrestling room acoustics, mixer gain stages, and a microphone's view of the audio maelstrom to match a guitarist's

perception of divine tone.

Thankfully, PS Systems Power Tool has saved me from slouching towards madness. The Power Tool lets me give a guitarist the sound he or she desires, and I don't have to use a single microphone.

WHAT IS IT?

The Power Tool is a speaker-emulation system that allows any amplifier to be connected directly to a mixing board *sans* microphones. Basically, the device utilizes a reactive load to supply different impedances at different frequencies (as a speaker does), redirecting energy so that an attached tube amp compresses and expands just as if it were interacting with a speaker. The result is a truer reproduction of the amp's sound than you would get with a miked cabinet (without the room ambience, of course).

But the Power Tool offers more than just speaker emulation. The unit includes post-distortion active EQ (± 18 dB at preset bass, mid, treble, and presence frequency bands); an internal, solid-state 50-watt amplifier; an emulation circuit that simulates either an open- or a closed-back, 4 x 12 speaker cabinet; an Instigator circuit on the amp section that cancels an open-back sound and replaces it with a closed-back, 4 x 12 sound; an effects loop; and a headphone jack with its own level control.

The full-featured system allows several applications beyond recording a raging timbre from your own amp directly to a mixer. You can route your amp through the Power Tool's internal amp (then back to your speaker cabinet) to produce "full up" sound at low volume levels, run a balanced direct signal from the unit to a house mixing console simultaneously with a line for onstage speaker outputs, and transform your open-back combo amp into a half-stack.

EASY INTERFACE

The Power Tool is a minimalist's dream machine. All front panel controls are well-labeled with large, white type. In addition, each control section—Input, Tone Control, Line Out, (Internal) Amp Out, and Headphone—is outlined with a blue box, making it difficult to twist the wrong knob in panic situations.

Back-panel connections are similarly

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clear and concise. Everything is so well-laid out that, even in the shadows of a stage's back line, I didn't need a flashlight to see what I was doing. This readability is welcome given the Power Tool's comprehensive I/O: balanced (XLR) line out, unbalanced 1/4-inch line out, two 1/4-inch Amp Out lines for the internal 50-watt amp, 1/4-inch effects send and receive connections, a 1/4-inch line in, and a 1/4-inch Amp In (8 ohms/100-watt maximum) line that is the main link to your amp's output.

THE REAL WORLD

In a commercial recording studio, quickness is rewarded more often than not. I'm all for experimenting with sound if the project demands it (and the client has the budget and personality to watch the studio clock tick, tick, tick away), but sonic sculpting is truly a tedious process. With the Power Tool, a guitarist can be riffing within five minutes.

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PRO

FILE

Ambient Recording

Kyuss evokes the vastness of the desert.

By Michael Molenda

Every once in a while, an album bubbles up from the quagmire of sonically cloned record productions to remind us that the roots of pop music are regional. Years ago, all the sweat and soul of places like Motown, Memphis, Phillie, and L.A. were forged into record grooves. The music evoked the cities that spawned it, and you could pinpoint an artist's zip code by the sound of his or her record. Today, it seems as if all the big-hair bands on MTV live in the same house (or at least share one guitar and a snare drum).

Such homogenization makes *Blues for the Red Sun* by Kyuss (Dali Records) one of those rare regional records; a sonic document of a band and its environment. The kick is, this is not an urban translation of rock 'n' roll angst. Kyuss hails from the upscale suburban desert community of Palm Springs, California. And making desert music in the closed, controlled environment of the recording studio meant rethinking the conventional method of close-miking instruments for

optimum tone and separation.

"The desert has a strange effect on our music, because there's no sense of boundaries," says Kyuss guitarist Josh Homme. "When we discussed making the album with (producer) Chris Goss, ambient recording seemed the only way to get the expansive sound we wanted. To achieve this, we turned entire rooms into 'speakers,' and took over the whole studio from the hallways to the coffee room. It was hell working there when Kyuss was around."

Blues for the Red Sun was tracked with the rhythm section playing together—singer John Garcia recorded his vocals in an isolation booth—in the main studio at Sound City (Van Nuys, California). The room is a perfect environment for ambient sonics, measuring 40 x 40-feet with a 25-foot high ceiling and wood floors. Kyuss drummer Brant Bjork set up his kit in the middle of the studio, and room mics were positioned to take full advantage of the space's natural reverb. As insurance, the kit also was close-miked. However, except for

adding a touch of the snare mic to add some punch, only the sound of the room mics are on the record.

Homme's guitar rig was blocked off inside a 10 x 10-foot hallway alcove that normally served as a rest area. His two Ampeg V4 speaker cabinets were placed on top of a couch and five mics were placed wherever "they picked up the best sound." The mic positioning proved so ideal that the guitar timbre on the record is a virtual document of the amp and the natural room acoustics; minimal EQ was employed to further process the source sound. Finally, the bass cabinet was baffled inside a 15-foot doorway with three mics positioned around the space. Once again, the miked sound was so good that a direct signal recorded as a "safety" was not used.

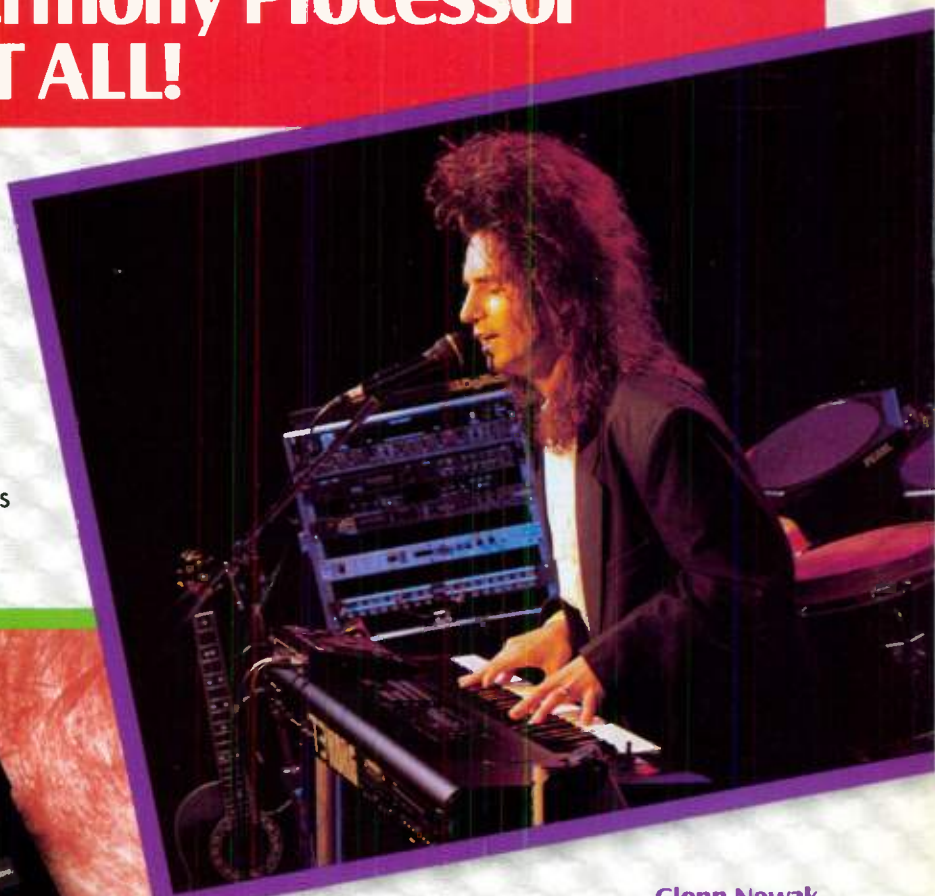
"We approached *Blues for the Red Sun* the way a rock 'n' roll record should be made," contends Homme. "We finished the record in fourteen days, and most of the tracks are first takes. Some critics hate the record's production because it sounds too live, but that sound *is* Kyuss. This is a band that started out playing 'generator parties' in the desert. The wide open spaces are as much a part of our music as the instruments we play."



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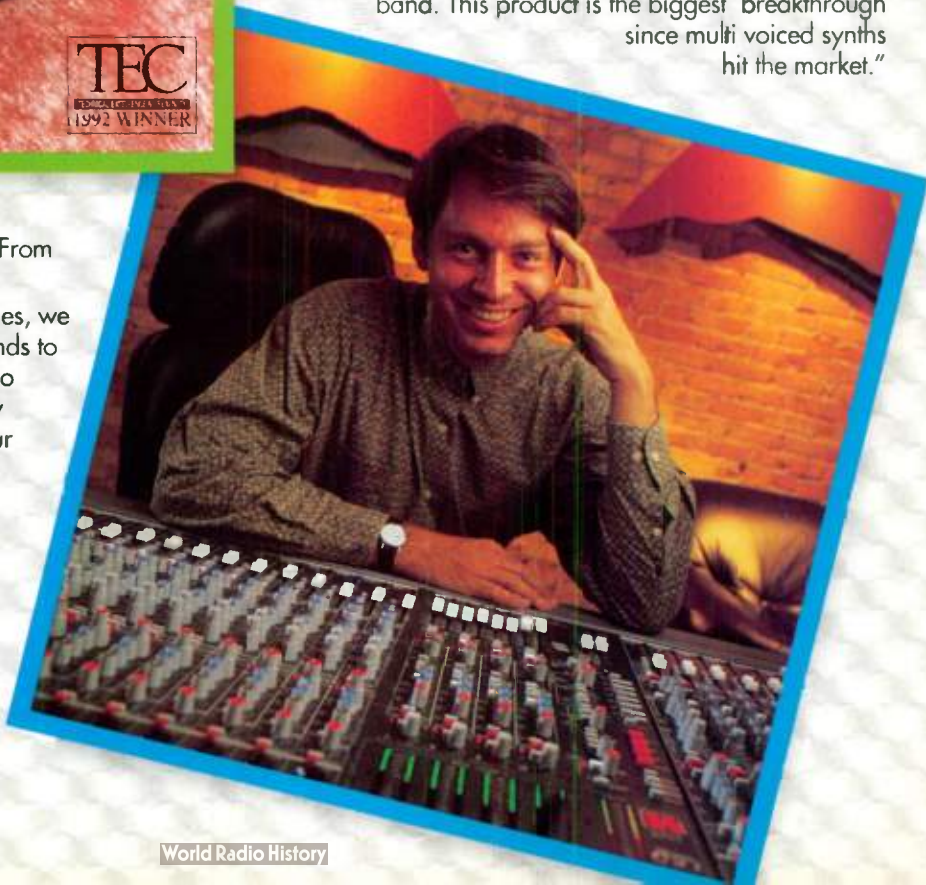
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