Universal Editors • Reviews: Ensoniq ASR-10 and 6 More

Electronic Musician

April 1993

Hot Keys!

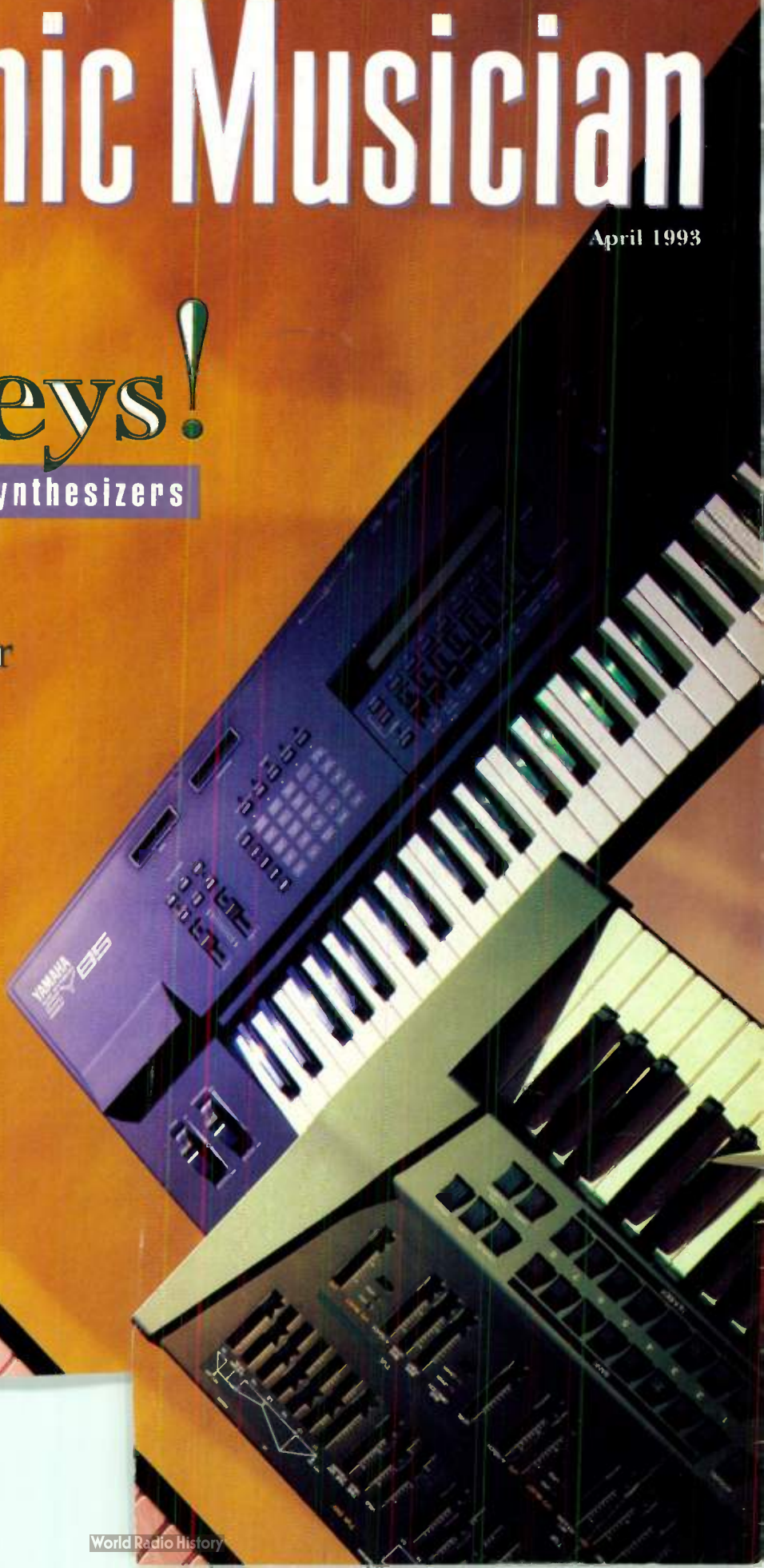
EM Guide to Keyboard Synthesizers

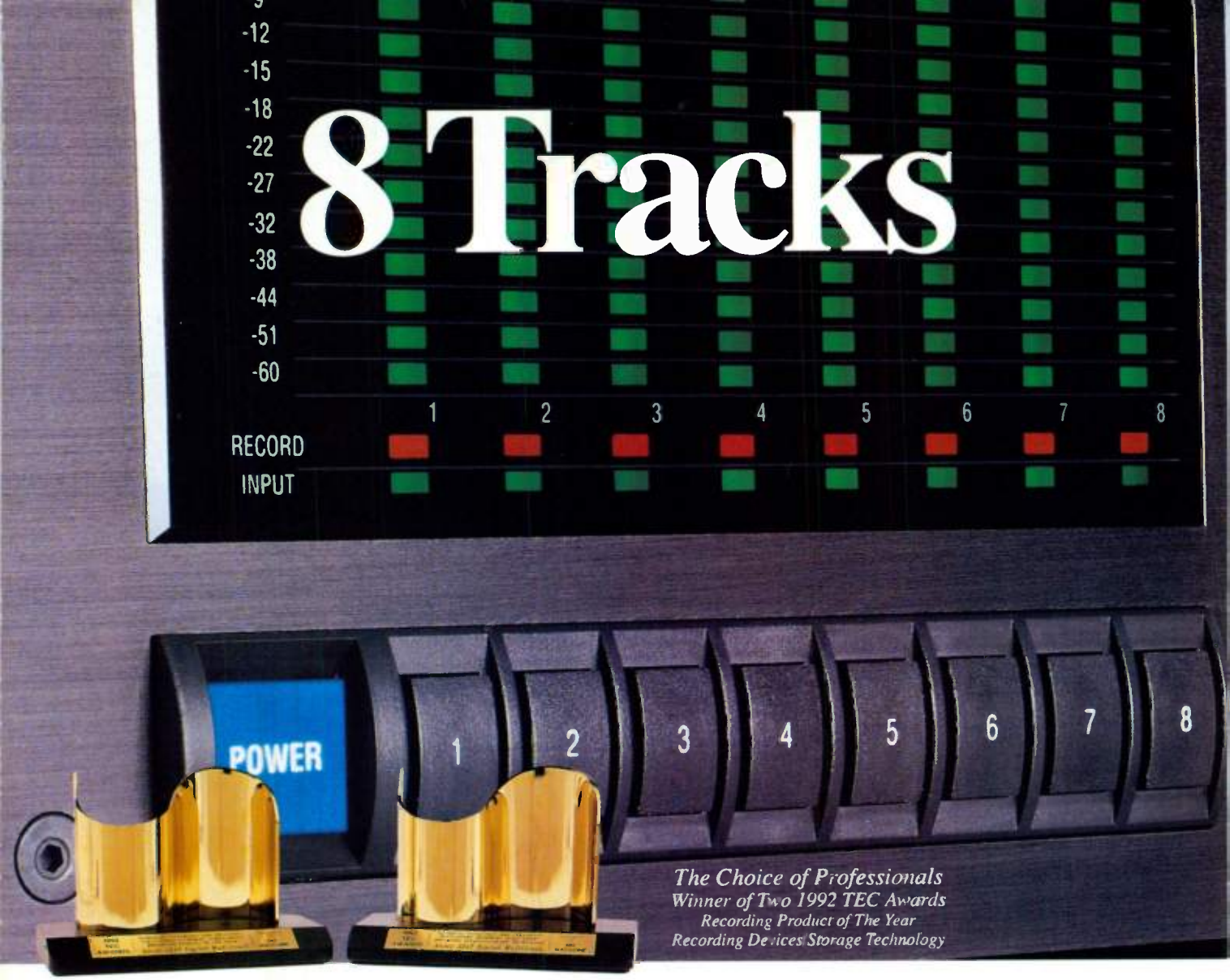
Building A Better Sound Trap

How Synths Are Made

Crystal Clear Mixes

Techniques for Transparent Sound





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 ±0.5dB. 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.

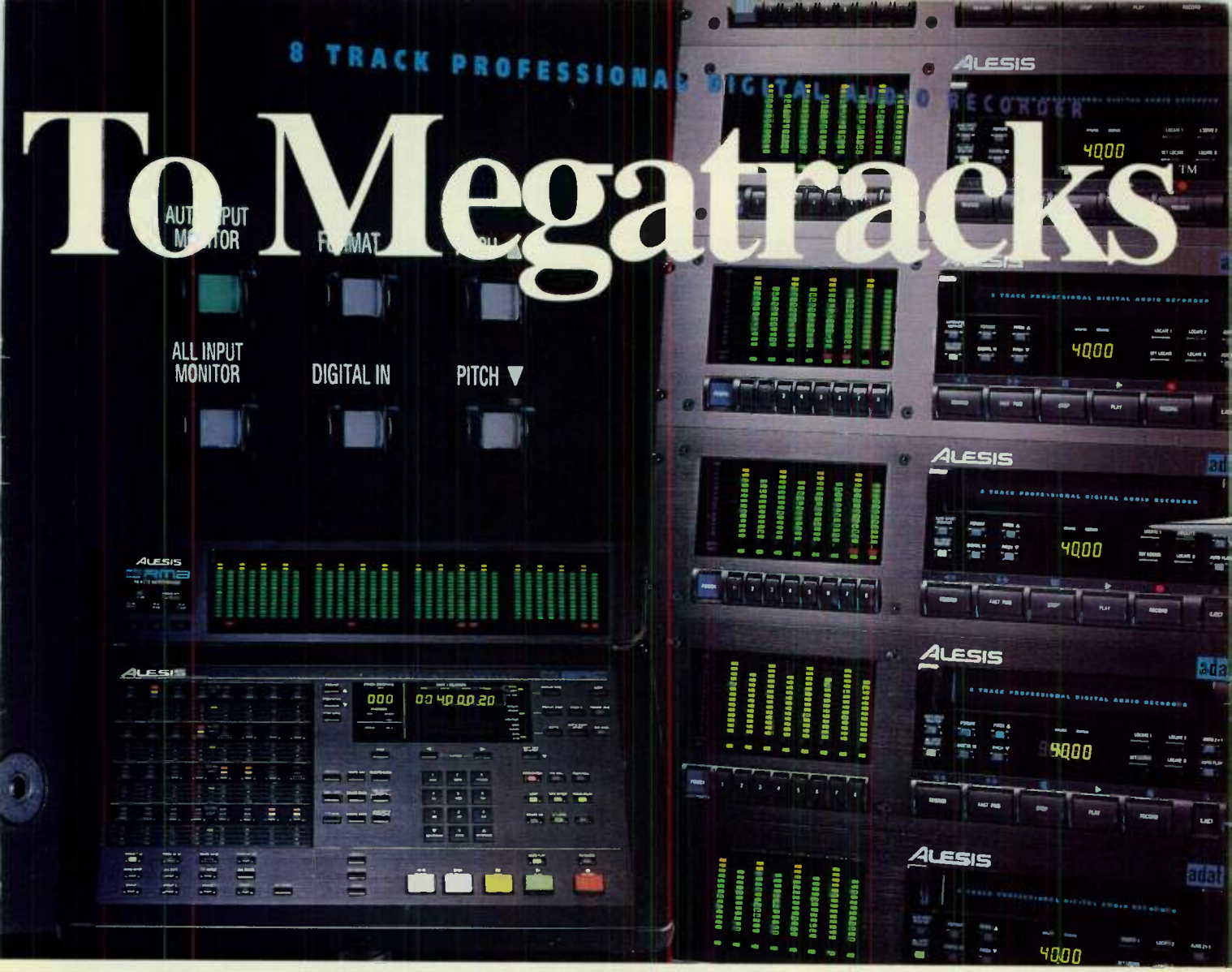
The best part. ADAT's Proprietary Synchronization Interface (Patent Pending) locks multiple ADATs, independent of the audio tracks, to single sample accuracy ±5% of 1/48,000th of a second! In other sciences this is referred to as 'air tight'. So multiple ADATs function in perfect mechanical and electronic 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)

8 Tracks to Megatracks, Megatrack and ADAT Worldwide Network are trademarks of Alesis Co
**VHS is a registered trademark of JVC **ELCO is a registered trademark of Elco Corporation*
Also available: The AI-1 ADAT to AES/EBU and S/PDIF Digital Interface with sample rate co
RMB 32 Channel Remote Meter Bridge.
Call 1-800-5-ALESIS for information about the ADAT Worldwide Network

To Megatracks



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

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

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

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.

ALESIS
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Your music will never be the same.

The ENSONIQ DP/4 is one powerful parallel effects processor (well, actually it's four!). So it takes a powerful demonstration to fully show-off all of its capabilities. How did we do it?

We took drums, guitars, horns, voices, strings and more. And recorded them dry. Then we processed them with a multitude of effects from the DP/4.

But that wasn't enough, so we recorded some of the world's most exciting artists and processed them entirely with the DP/4.

Then we put it all on two CDs — so you could hear for yourself what the DP/4 can do for your music.

By bending sounds virtually any way you want. With more ambiance, or less. With four separate inputs and four separate outputs. Four discrete 24-bit effects processors. With 46 effects algorithms that you can tailor to your liking — to process 1,2,3, or 4 different signals at the same time. 400 Presets. Plus a digital patch bay and digital submixing for incredible flexibility.

In fact, the DP/4 gives you more sound variation potential than any other signal processor available. For about half the price.

Equipment reviewers are raving about it. Musicians are singing its praises. But you have to hear it for yourself.

Disc One contains a complete product description, and a variety of wet-vs.-dry comparisons so you can hear most of the DP/4's effects algorithms and Presets.

Disc Two has 17 songs recorded by top artists, mixed exclusively with the DP/4.

To hear the two CD set just stop into your local Authorized ENSONIQ Dealer. For the one nearest you call 1-800-553-5151. Or to order a set for yourself, mail a check or money order for $5.00 to ENSONIQ. And then kick back and listen to what the DP/4 can do for your next recording. Who knows, maybe we'll be featuring you on our next CD...

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☐ Send me the two CD DP/4 demo set. Enclosed is a $5.00 check/money order (payable to ENSONIQ Corp) to cover shipping and handling. ☐ Please send me information on the ENSONIQ DP/4.

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REVIEWS

DEPARTMENTS

Cover: Photo by Stan Musilek. Special thanks to Korg, Roland, and Yamaha

Moving Forward

NAMM highlights suggest the industry is on the right track.

Taking the pulse of an industry is never easy because of all the disparate elements that form its core. But almost everywhere you looked at last January's National Association of Music Merchants (NAMM) show (the annual gathering of musical instrument manufacturers and dealers held in Anaheim), the mood was high. Manufacturers, dealers, and the press all felt a pervading sense of optimism for the first time in years.

This is especially interesting because there weren't many revolutionary product announcements at this year's show (see the Winter NAMM report in "What's New" on p. 19 for more). In general, major electronic-music equipment manufacturers introduced fewer new products than they had in years. However, several other important long-term trends did surface.

First, many companies announced significant developments in digital recording. The hard-disk recording phenomenon that began several years ago seems to have reached critical mass, as demonstrated by the number of large companies entering the market. Yamaha, Roland, Korg, ART, Digidesign, Spectral Synthesis, Akai, and many more companies now produce disk-based recording products. In fact, current and upcoming products are remarkably diverse in form and function for systems that perform the same basic task. Regardless of your computer platform (or lack thereof), or your available card slots, there are several product options, each with a unique set of features. If you've been thinking about taking the plunge, now may be the time to do it. (Just don't forget to make room in your budget for some type of backup system.)

Second, and equally important, many companies announced strategic alliances with other manufacturers. This is a sign of a maturing industry. Many companies are recognizing that their long-term growth can be enhanced by working with other manufacturers and developing useful standards based on existing products instead of relying on the constant turnover of short-lived products. Consumers benefit because these agreements can prolong the viability of current devices.

For example, Alesis announced it is licensing its 8-channel digital-audio interface standard to Digidesign, while Digidesign announced an interface to transfer files digitally between the ADAT and their Pro Tools and Session 8 hard-disk recording systems. This provides users of these products with an integrated means to achieve the best of both worlds: tape-based digital recording and random-access editing.

Intra-company standardization is also becoming an important issue. For example, Roland's JD-990 synthesizer module is the company's first to accept waveform and patch data from another line of products.

By creating much-needed standards, these agreements and developments give users a powerful incentive to invest in products they can live with for years to come. In conjunction with renewed industry confidence and a rebounding economy, this has the potential to create an even rosier future. With manufacturers confident that the market is on the upswing, they'll be more willing to invest in R&D. This should lead to even more powerful tools down the road.

Many similar agreements must be reached before we can look forward to a more compatible, standards-based future, but the prospects are enticing indeed.

On another topic, I'm sorry to announce that art director Andrew Faulkner will be leaving us after this issue. However, I'm happy to note that current associate art director Linda Birch will be filling his shoes.

Bob O'Donnell

Electronic Musician

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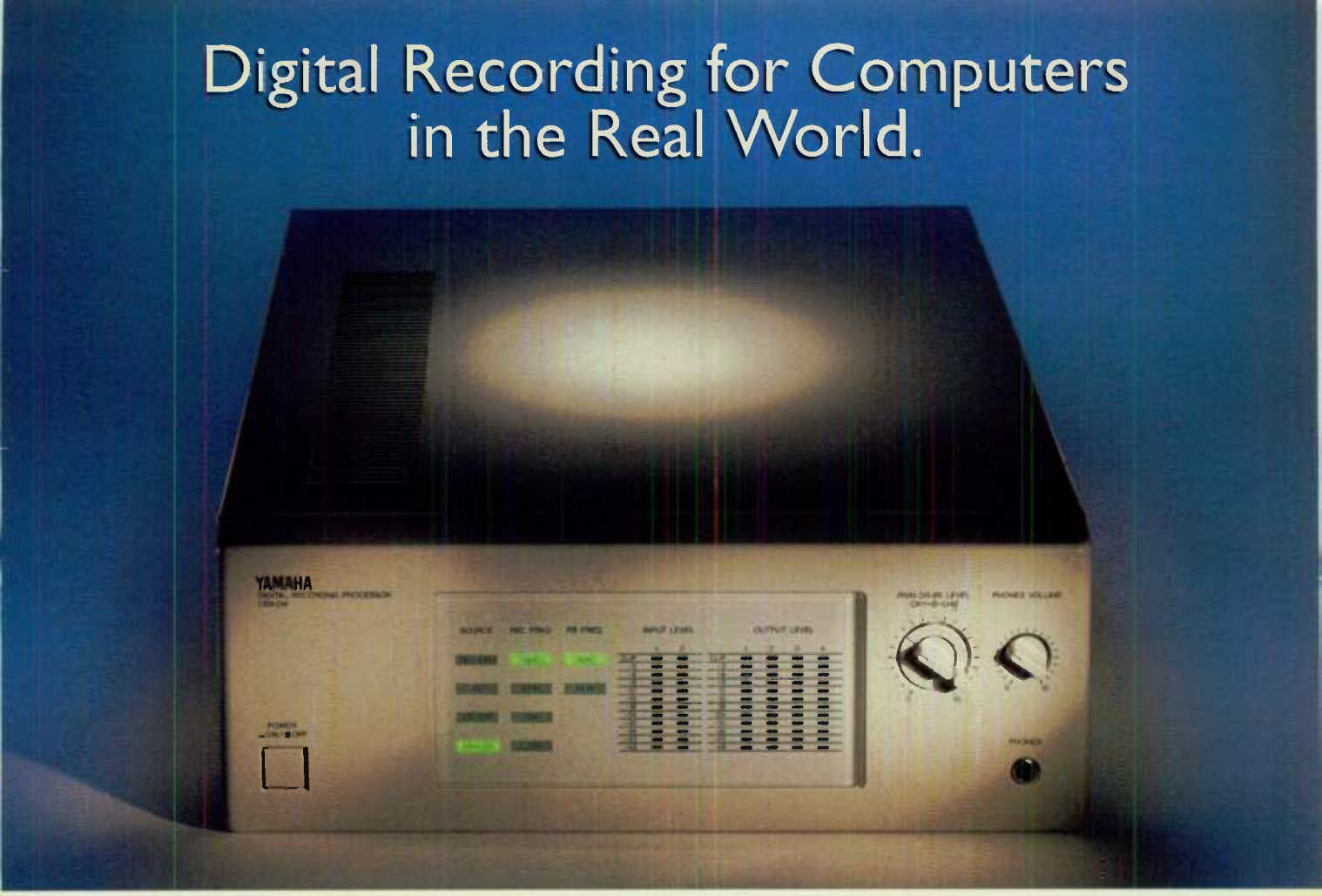
Consumer Audit BPA

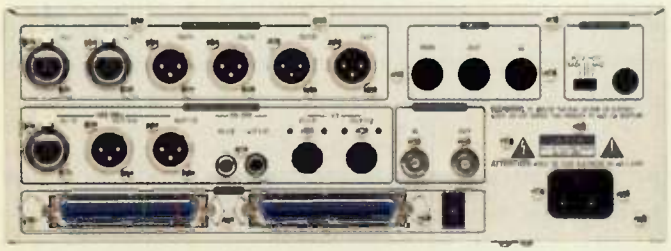
Digital Recording for Computers in the Real World.



If you're thinking about hard disk recording, you've probably heard that you'll need to buy a bigger, faster computer, with more slots and accelerators, that will end up costing you a whole bunch of money.

Until today!

The new Yamaha CBX-D5 Digital Recording Processor, developed in cooperation with premier hardware and software designers throughout the world, can be immediately interfaced with the most popular and affordable computers being used today. This impressive list includes Atari (ST, TT, and the new Falcon), Apple Macintosh (SE30, all II models, Quadras, and PowerBooks), IBM PS2, and even clones running Microsoft Windows 3.1.



detail of back panel

The CBX-D5 system was designed to let your computer compute and your storage devices store while the CBX-D5 handles the processor-intensive work. The CBX-D5 controls digital multi-track recording, analog-to-digital and digital-to-analog conversions, digital audio routing, digital signal processing and digital equalization, digital inputs and outputs in all standard formats, word clock synchronization, MIDI, and much more.

Cooperative design input from companies such as Mark of the Unicorn, DynaTek, and Steinberg made this all possible. The CBX-D5's modular format also provides a logical upgrade path with the ability to add more tracks, more storage, and more computing power without disrupting, scrapping, or obsoleting the rest of the system.

See the Yamaha CBX-D5 Digital Recording Processor in action at your local Yamaha Dealer or call 1-800-932-0001, extension 500 for more information.

YAMAHA

THINK OF IT AS A PRO STUDIO FOR

PRESENTING THE NEW SESSION 8. IT'S EVERY

Just because you record at home doesn't mean you have to make "home recordings."

At Digidesign, we firmly believe in making professional digital recording technology available to everyone. In this spirit, we proudly present the Digidesign Session 8™, the first completely integrated digital studio for personal music recording.

Session 8 brings together virtually every cutting-edge recording technology available today. We're talking about direct-to-disk multitrack recording, digital mixing & bouncing, random-access editing, digital signal processing and MIDI. One no-compromise system for professional-quality recording in the privacy of your own home.

And you'll be glad to know that Session 8 integrates your existing gear into the picture, too. Plug in your synths, effects, and other devices, and Session 8's intelligent software-controlled patching and mixing will put it all in line. From there, it's digital all the way to your final master.

THOSE WHO'D RATHER STAY HOME.

THING A PERSONAL STUDIO WAS MEANT TO BE.

The Digidesign Session 8. It runs on Windows. It runs on the Mac. And it runs circles around tape.

If you think the Session 8 sounds good here, you haven't heard anything yet. Call 800-333-2137 extension 225 for more information and the name of your local Session 8 dealer. We'll send along our free direct-to-disk recording primer "The Integrated Digital Studio." Session 8. Because recording at home, and home recording are definitely not the same thing.

SESSION 8 FEATURES

- 8-channel direct-to-disk digital recording
- Multichannel digital mixing and computer controlled routing
- Sequencer-style digital audio editing
- 10 x 2 analog submixer for connecting outboard gear
- 4 effects sends, 8 returns, separate cue mix
- Unlimited digital track bouncing with no generation loss
- Integration with popular MIDI sequencers
- Parametric digital EQs
- Optional control surface for fast, real time mix control

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Uses the newly developed dbx AutoDynamic™ attack and release circuitry which delivers classic dbx compression for a wide range of applications—plus an advanced new gate circuit which overcomes the functional limitations of traditional "utility" gates. Both compression and gating provide superior versatility and sonic performance.

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Four independent channels of high-performance gating or downward expansion in any combination of stereo pairs or mono channels. Patented dbx VCA and RMS detection circuitry provides ultra-fast attack times to preserve the character of percussive sounds and an incredibly smooth release that won't chop off reverb tails or hanging guitar chords.

Now, with the dbx Project 1 series of signal processors, there's no need to settle for second-tier equipment to save money. Those ever-abundant budget brands have touted great pricing but have never matched dbx quality, reliability and experience.

dbx PROJECT 1

dbx Project 1 is ideal for both studio and sound reinforcement applications. Each unit delivers real dbx sound and reliability, plus innovative new performance enhancements—at the same price of other models with fewer features.

By using the latest technologies, we've streamlined the manufacturing process to reduce production costs. At last, you don't have to forego the quality and features you want to stay within budget.

So now that we've talked price, isn't it time you talked to your nearest dbx dealer and asked for a demo?

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LETTERS

REALITY CHECK

The reality of a home studio is out of reach for most bands, let alone a dream studio ("Dream Home Studios," February 1993). Please use your print space and product knowledge to provide complete package studio information on instruments, sequencing, recording, and how and where to find the best possible prices. We need reachable goals; we don't need dream and wish studios.

James Ray
Greensboro, NC

James—*I'm sorry you didn't enjoy the focus of "Dream Home Studios." Personally, I've always been curious about the workshops of other professionals, whether I could afford the same tools or not. Regarding your concerns about information on affordable gear, each and every month our reviews and "What's New" sections report on various types of equipment across all price lines.—Michael M.*

Having just completed producing the tape portion of a recently commissioned chamber opera in my own "dream home studio" (tired, outdated Mac SE notwithstanding!), I settled down to read your February 1993 cover story ("Dream Home Studios").

The article began on a promising note, emphasizing that we were to meet "five diverse artists." While I applaud you on the stylistic variety of musicians you presented, I was shocked by your exclusion of women.

I assure you there are several of us who work extensively in our home environments making serious musical inroads into what has never been a "man's profession" in this country.

Pauline Oliveros and Jean Eichelberger Ivey are only a few of the women who helped establish some of our most prominent North American electroacoustic music and research studios. More recent examples include Laurie Spiegel and Sylvia Pengilly (director of the electronic music studios at Loyola University, New Orleans), who produces award-winning music videos entirely in her home studio setup. These are only a few of the many women you could have featured.

Such a blatant oversight relegates **EM** to the status of the macho four wheel-drive magazines my husband reads. I await the ad in which a bikini-clad nymph stretches seductively on top of an SY99.

Dr. Elizabeth Hinle-Turner
Division of Contemporary Music
Oberlin College
Oberlin, OH

Elizabeth—*You'll have to trust me on this, but I attempt to compose a racial/sexual/stylistic balance into every article I write. Unfortunately, the deadlines inherent in the publishing trade sometimes force writers to go with the contacts at hand. That's what happened with "Dream Home Studios," and I apologize that women recordists were not included. Please do not judge either my own, or* **EM***'s, commitment to women artists on the basis of a single article. My recording studio has always hired and/or trained female engineers in a conscious crusade to break up the "Boy's Club" in the studio world. And I am consistently proud that the* **EM** *staff does not subscribe to the macho ethic that often plagues our industry. Whereas "Dream Home Studios" missed the mark, the same issue included the "Pro/File" on singer/songwriter Nancie De Ross. Also, in Scott Wilkinson's piece "The Microchip Muse" (March 1993), three of the six artists featured are women. Just as* **EM** *is committed to acknowledging the human face of technology, we are equally concerned with promoting the creative ideas of all our planet's musicians.—Michael M.*

APPLE POWER

First, let me say I love the magazine. As a high-end multimedia producer, your magazine speaks to us, and I look forward to it every month.

However, you did mislead people a bit in "The Power Within" (February 1993) on the matter of "blessing" the Macintosh System Folder. You are incorrect when you say that the System Folder can be disabled by placing it one level down in the directory. A System Folder is disabled *only* when the Mac icon no longer appears on it. You can achieve this by moving the *System* and the *Finder* to separate places.

If, as you describe in the article, you have difficulties with certain applications and you want to maintain two System Folders, you must disable one System Folder using the method described above and restart while holding down the Option, Command, and P and R keys. This blows away the PRAM contents and ensures that you're using a System Folder without any attachments to the one you've tried to hide. (Note that the first time you do this, the reboot won't work. The second restart will.)

A better, and less disk space-hungry, solution we've adopted is to place two additional folders inside the System Folder, labeled "***Hold Extensions" and "***Hold Control Panels." Elements we want to disable are placed inside these folders, and then we do a clean reboot.

Happy writing, and keep up the good work.

Peter Jensen
Magical Media
Eastern Pennsylvania

MUSICIAN PROGRAMMERS

I read with interest the "Computer Musician" article "Musicians As Programmers" (December 1992). I often thought it curious that out of a small engineering group of 50 people [that I worked with], there were

MARK FOX

enough good musicians to create a small ensemble.

It was also curious that many of these same people programmed in a similar way. Once given a task, they knew in an instant how to create the program from beginning to end. The programs always worked algorithmically; the only errors were language-oriented or typos. In an analagous way, many musicians know exactly what a song will be when it first comes to mind. They can write music as fast as they can put it down on paper (or in the computer).

Another comparison in this group was programming style. The musicians were more adept at structured programming and documenting. The nonmusicians mainly wrote top-down, straight line, poorly documented programs. This phenomenon was also explained by the article.

Musicians must understand the importance of the structure within music to write good music. They also must be able to express the objective and meaning of the written note to the player who will later play the piece. This is much like the importance of subroutines and structured coding in programming and the ability to express the objective to the programmer who will later use the code.

Many more words could be written on this subject, but I'll stop for now. I do know that on my engineering resumé, I will include the profession of musician.

JBMUSIC
(letter sent via PAN)

SOUNDS AND POETRY

After reading "Sounds for Sale" (December 1992), we thought it appropriate to write and remind people of our existence. Electron Artistries (tel. [513] 746-4283) has been designing sounds for keyboard equipment for as long as anyone in the business.

The article mentioned some of the challenges facing third-party manufacturers, and we could extend the list by about ten-fold. Piracy, the economy, and so forth are major concerns, but the politics of trying to function in the music industry is about the same for sound designers as it is for all struggling musicians trying to gain some kind of headway or recognition. To put it bluntly, the road to glory is paved with money, hard work, money, diligence, money, the buddy system, and money. Or in poetic terms: The gains from pain lay mainly on sustain. (Fear not, our sound designs are better than our poetry!)

Ron Crosby
Electron Artistries
Franklin, OH

FEEDBACK

I enjoy the book, except it seems someone is telling you to focus on readers who are new to the field, rather than those of us who have been at it awhile and need some deeper info. In short, the book is becoming less useful to me, sadly so.

Steve Johnson
Address Unavailable

Steve—That's sad for us to hear, as well. We try to bring a balanced blend of articles for beginners and more knowledgeable readers every month. Features such as "The Virtuoso

THINK OF IT AS THE WORLD'S LARGEST COLLECTION OF CLASSIC ANALOG KEYBOARDS.

Fairlight
The first digital workstation—known for its breathy vocal samples and a price tag that left you gasping for air. Progressives loved this one. Plus, the CRT looked cool on stage.

Hohner Clavinet
Classical keyboard favored by funk musicians of the '70s. Nine-volt battery not included.

Hammond B-3
Wicked power—the champ of rock 'n' roll and R&B. Combined with its Leslie speakers, its sheer tonnage put the sweat in Blood Sweat & Tears.

Oberheim OB-Xa
Thick, rich, fat analog synths. Think of Van Halen's "Jump."

Moog Taurus Pedals
Foot-controlled analog bass synthesizer with huge, killer bass sounds. Used by progressive guitar and bass players with three feet.

Mellotron
World's first analog sample playback machine—it put the moody in Moody Blues. Its 35 internal tape players (one for each key) created a haunting sound. The people most haunted were roadies—constantly realigning the tape heads.

ARP 2600
Monophonic, miles of wire, built-in speakers and reverb. Remember the modular keyboard around Edgar Winter's neck? This was it.

Wurlitzer Electric Piano
Unique bass sounds—the portable electric piano that dominated Supertramp. Also used in "Money" and "I Am the Walrus."

Rhodes Chroma
Thick, mellow, beautiful analog sounds. Eight-voice polyphonic synth that borrowed ARP electronic technology and Rhodes-type mechanics.

Yamaha DX7
Digital synthesizer with FM synth technology developed at Stanford. Brilliant sounds. With all the money you saved, you could have afforded to go back to school to learn how to program it. Any song between '83 and '86 used one.

ARP String Ensemble
A keyboard that simulated strings. It did one thing, in its own way, and did it very well.

Farfisa Organ
Organ sounds that drove go-go dancers wild. Less expensive than a B-3. Elvis Costello and Blondie put its sounds to great use.

Prophet 5
The ever-popular programmable polyphonic synthesizer with wonderful, rich analog sounds. Its real wooden frame was perfect for getting scratched every time you took it on the road.

Fender Rhodes Mark I
Mellow, metallic—a xylophone with keys. You can blame Jazz Fusion on this instrument. The electric piano of the '60s and '70s.

Yamaha CP-70
The standard in electric grand pianos used by many including Gabriel and Genesis. Problem was, it didn't weigh much less than a real one.

Moog Modular
This grandfather of electronic music put synthesis and "Switched-on Bach" on the map. Because of it, 1/4" phone plug manufacturing became a growth industry.

Minimoog
The first affordable monophonic synthesizer. Great bass sounds.

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

Think of it as a truckload of the world's coolest analog keyboard gear—all in a single sound module.

Vintage Keys delivers 8 megabytes (expandable to 16) of the highest quality, digitally sampled classic analog keyboard sounds from the past 30 years. Look no further for dozens of Hammond B-3 organs, Wurlitzer and Rhodes pianos, ARP, Prophet, Moog and Oberheim synthesizers, Mellotrons and much more. 384 sounds in all!

Vintage Keys features the same great sound quality you've come to expect from E-mu, but that's only the beginning. We've added 32 of our dynamic analog-sounding digital filters to give you the kind of expressive control these instruments were famous for. Combined with special features like polyphonic portamento and our unique MIDIPatch™ modulation system, Vintage Keys lets you recreate the analog mood and feel. And just try to find a classic analog keyboard that offers you 32-voice polyphony, 16 channel multi-timbral capability and 6 assignable polyphonic outputs.

Of course, like most of those great analog keyboards, Vintage Keys is incredibly easy to use and designed and built in the U.S.A.

So visit your E-mu dealer and listen to a demo today. Get ahold of your dream sounds without the nightmare.

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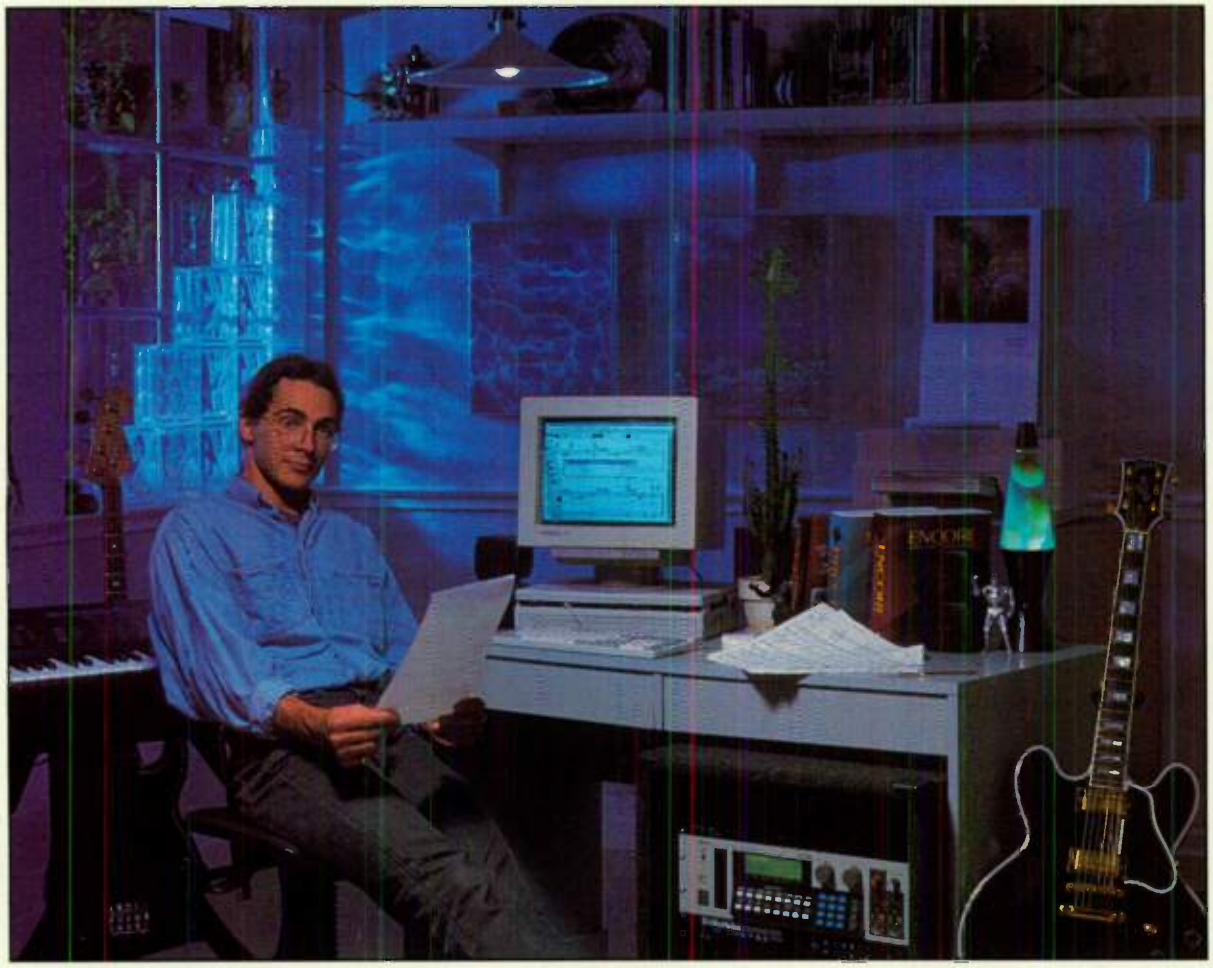

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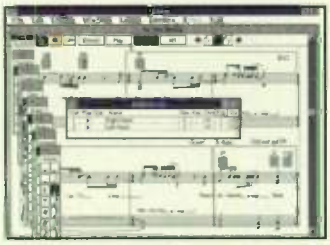

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Synthesist" in the February 1993 issue, columns such as this month's "Recording Musician" on transparent mixing, and many other features and columns are particularly focused toward high-end readers. In addition, our product reviews go into a great deal of technical detail. We're sorry you don't feel the same way.—Bob O'D

I'd like to commend you for articles like those by Michael Molenda. As a dedicated, yet very MIDI-oriented guitarist, I appreciate their attention to guitarists' concerns. Keep up the reviews of amp simulators and other analog devices. Also, the demo recording, submittal, and development articles are appreciated. Oh yes, keep up the "no rock stars and no foul language" policy and I'll be around for years.

R. Miller
St. Louis, MO

Congratulations on a fine magazine. You have interesting and insightful articles every month, although I wish there were more to read. I seem to read it cover to cover within a couple of days, and that leaves me impatiently awaiting the next issue. I have a few suggestions for future articles: buyer's guides on hardware and software MIDI File players, sound modules, and speakers. I'd also like to see more DIY articles, such as a MIDI merger or splitter, or a multi-tap, multi-voltage power supply that can power multiple effects units. These would be easy projects to make.

Bruce Rickerd
Le Gardeur, Quebec
Canada

Bruce—Thanks for the feedback. We'd like to be able to include more articles every month as well, but unavoidable space and time limitations only permit us to do so much. Regarding your requests, we've actually already filled a number of them in previous issues. We ran a buyer's guide on hardware sequencers (which, of course, function as MIDI File players) in the April 1991 issue, sound modules in the February 1991 issue, and monitor speakers in the June 1992 issue. We covered Windows-based PC sequencers in the November 1992 issue and will cover Mac sequencers in the next issue (May 1992). A DIY MIDI merger was featured in the November 1990 issue, and an 8-in/8-out MIDI patch bay project was described in June 1988. You can purchase back issues or article reprints from Mix Bookshelf (tel. [800] 233-9604 or [510] 653-3307).—Bob O'D

ERROR LOG

January 1993, "The Front Page," p. 6. Dr. T's still distributes Intelligent Music's *M* and *Jam Factory* programs.

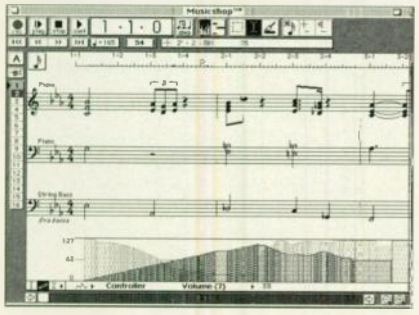
January 1993, "Making Connections," p. 36. Mark of the Unicorn's MIDI Time Piece II does provide filtering and rechannelizing of all MIDI data types.

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.

WHAT'S NEW



▲ OPCODE MUSICSHOP

Opcode Systems introduced *Musicshop* ($149.95), an entry-level, integrated, 16-track sequencing and music-notation program for the Macintosh based on the company's *EZ-Vision*. Music can be entered in real time or step time, from a MIDI instrument or the Mac keyboard and mouse. The program has dual editing screens, so you can toggle between standard music notation and graphic piano-roll editing. Edits in one screen are updated in the other, and although the standard notation is quantized, the MIDI File maintains the original feel when played back.

In addition to note editing, the piano-roll editor's Pencil tool lets you draw in nuances such as pitch bend and vibrato. The notation editor displays common durations from sixteenth notes to whole notes and supports dotted notes and triplets. *Musicshop* includes Adobe's Sonata music font, requires a Mac Plus or better with 2 MB of RAM, and is System 7-compatible. Opcode Systems; tel. (415) 856-3333; fax (415) 856-3332.

▼ YAMAHA MT8X

Yamaha introduced the MT8X ($1,599), an 8-track cassette recorder with built-in mixer and wired remote control. Channels 1 through 4 have unbalanced, ¼-inch line inputs; trim pots with clip indicators; and 3-band, fixed EQ. Channels 1 and 2 also offer insert points. The other four channels offer line inputs (channel 8 accepts stereo sources) and 2-band EQ. Each channel has volume faders and pan pots, can access the two aux sends, and can be switched between line and tape sources. A pair of RCA inputs accept input from an external 2-track source.

Rotary pots control the four subgroups, and there are two stereo aux returns and one master fader. You can monitor any of the subgroups, or the main bus. The cue section offers short-throw faders for each channel. The LED includes a counter and level indicators for the channels and stereo bus.

The 3-motor transport offers dual-speed fast-forward and reverse, with a ±12% pitch control. Other features include auto-locate, with two locations and return-to-zero; auto punch in/out; and dbx noise reduction (defeatable on channel 8 for sync). Yamaha Corp.; tel. (714) 522-9011; fax (714) 739-2680.

▼ E-MU VINTAGE KEYS

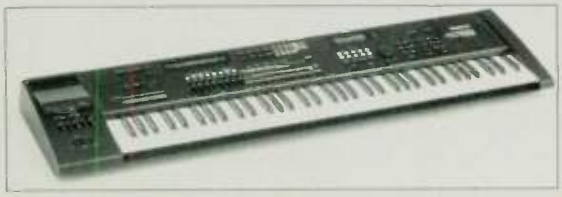
E-mu is shipping Vintage Keys ($1,095), a single-rackspace, 16-bit sample-playback sound module that features an assortment of classic analog synthesizer samples and other keyboard sounds of yesteryear. The 32-voice polyphonic, 16-part multitimbral instrument boasts 8 MB of ROM-based sounds (384 presets), user-expandable to 16 MB. Famous keyboard sounds include the Hammond B3 with variable Leslie, Fender Rhodes, Wurlitzer electric piano, Minimoog, ARP 2600, Mellotron, and Sequential Circuits Prophet-5. The voice architecture is similar to E-mu's Proteus series, but includes portamento and 32 resonant, digital lowpass filters. Like the Proteus, Vintage Keys has six independent audio outputs and alternate tuning tables. E-mu also announced downloadable preset sound libraries for Vintage Keys ($29.95/vol.), available on a 3.5-inch floppy disk (in Macintosh and PC format). Each of the three volumes contains 64 unique presets. E-mu Systems; tel. (408) 438-1921; fax (408) 438-8612.

1993 WINTER NAMM REPORT ▲ ▲ ▲ ▲ ▲

Following on the heels of the inauguration of our 42nd president, this year's Anaheim gathering of musical equipment manufacturers displayed all the signs of a hopeful, rejuvenated industry. Record crowds, expanded exhibit space, and reports of significant order-writing buoyed hopes of manufacturers and dealers for a prosperous 1993.

Like other recent shows, this year's convention offered relatively few new product introductions, though there were some pleasant surprises. Hard-disk recording systems were hot, as were low-cost mixers and other recording gear, but synths, surprisingly, were not. Arguably, the most interesting developments at the show were a number of strategic alliances.

Alesis, for example, announced agreements with **Digidesign**, **D2D**, **Steinberg**, and **TimeLine** (in addition to existing arrangements with Fostex and JLCooper) for licensing certain aspects of its ADAT technology. Similarly, **Yamaha** reiterated their development agreements with **Mark of the Unicorn**, **Steinberg**, and **DynaTek** for the **CBX-D5** hard-disk recorder. **Lexicon** announced it will support Digidesign's TDM digital bus system for Pro Tools with a NuBus version of their Model 300 signal processor. In addition, several Macintosh software companies began discussions on developing a platform standard for data sharing between applications. Finally, **Lone Wolf** announced the establishment of a MediaLink interest group and revealed that a growing legion of manufacturers—including **Peavey**, **Rane**, **QSC**, **Carver**, **TOA**, **Fender**, and **JBL**—will be supporting the MediaLink fiber-optic networking protocol.



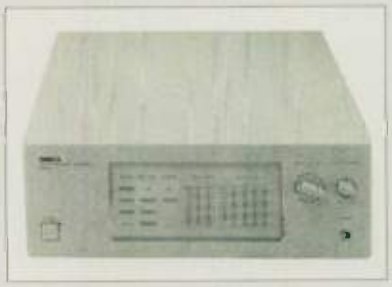
Roland JV-1000

Ultimately, of course, the steel, silicon, and source code of new products are the main focus of the show. What follows are highlights from some of the more intriguing products on the floor. Look for additional information on new products introduced at NAMM in this and future "What's New" columns.

THE GOODS

At the company's annual pre-show dealer meeting, Roland announced the **JD-990** ($2,095), one of the few new synthesizers on display. The rack-mount, 24-voice, 8-part multitimbral device features 6 MB of sample ROM and accepts 8 MB SR-JV80-series expansion boards, as well as 1 or 2 MB PCM cards. The synthesis architecture incorporates resonant filters and oscillator sync and reintroduces Structures and ring modulation from the D-50. The 990 is compatible with waveform and patch data from the JD-800 and the JV-80. Roland also showed the **JV-1000** ($2,795), which combines a 28-voice, 8-part multitimbral JV-80 sound source with a 76-key keyboard and an MC-50-compatible sequencer. Roland also offers the **VE-GS1-01** expansion card for the JV-1000 ($395), which gives you the equivalent of a GS sound module (like the Sound Canvas) inside the keyboard. It includes a 28-voice, 16-part multitimbral sound engine; sample ROM; and stereo outputs. This gives the instrument a total of 56-note polyphony and 24 multitimbral parts. The JD-990 is expected to be available sometime in the second quarter of 1993, and the JV-1000 should be shipping by the time your read this.

Digital recording systems were not hard to find at the show, but the most surprising announcement came from ART. The **DR-8000** (approx. $4,000) is a stand-alone, 8-track system for computer-phobes that will function like a tape recorder. You simply plug your sources into the rack-mount main unit, utilize its transport controls, and offload your recordings onto a built-in tape-backup drive. By adding a color VGA monitor, mouse, and keyboard to the device (it has a proprietary graphical operating system), it becomes a full-blown, disk-based recording environment, complete with cut-and-paste and graphic waveform editing. The DR-8000 is expected to ship by the end of 1993 or early in 1994.



Yamaha CBX-D5

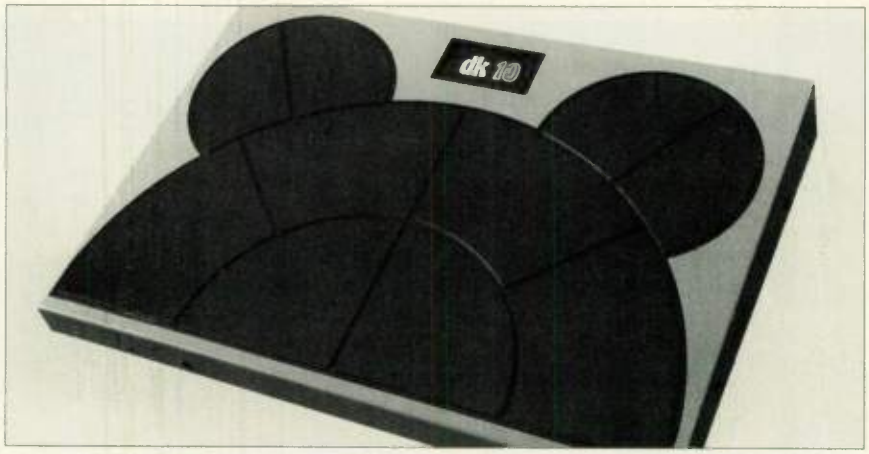
Over in the Akai booth, the company's new **DR4d** ($1,995) 4-track digital recorder looked like a rack-mount tape multitrack, but actually records to a SCSI drive. Optional Mac software allows you to do graphical cut-and-paste editing. Unlike the ART system, the Akai unit does not come with a storage device; you must add your own hard disks. However, Akai will offer systems bundled with hard drives. Delivery is anticipated in late July.

Many showgoers were especially enthralled with Digidesign's **Session 8** 8-track hard-disk recording system for the PC and Mac ($3,995; covered in the February 1993 "What's New"). Yamaha's **CBX-D5** 4-track hard-disk recording system with built-in digital EQ and SPX1000-quality signal processing ($2,995; covered in the June 1992 "What's New") also made its first major public appearance.

Given these developments, and the upcoming release of Tascam's 8 mm digital tape recorder and Fostex's ADAT, it looks like 1993 could be the year digital recording breaks loose.—*Bob O'Donnell*

▶ KAT DK10

KAT introduced the dk10 ($499), a 10-pad MIDI percussion controller played with drumsticks. Inputs are provided for a bass drum trigger and high-hat trigger. Programming is simple, consisting mostly of creating note/sound assignments and setting the MIDI channel. The dk10 supports Velocity, though not Aftertouch, and features four user memory locations. KAT, Inc.; tel. (413) 594-7466; fax (413) 592-7987.



▲ SOUNDCRAFT SPIRIT FOLIO

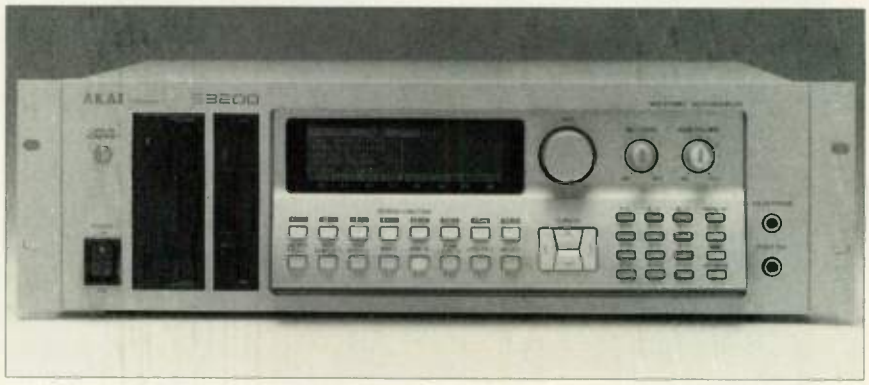
Soundcraft has added the compact Spirit Folio mixer to its line. The Folio is available in a 10 x 2 configuration (six mono and two stereo inputs; $495), or as a 12 x 2 (eight mono and two stereo inputs; $625). The latter also is available as a 8U rack-mount unit. Every input has a 60 mm fader, as do the left and right master outputs. Each mono channel includes a balanced XLR mic input with phantom power, a balanced line input, 3-band EQ with sweepable mid, pan, and a high-pass filter. The two full-featured stereo inputs are intended for use as effects returns or stereo sources such as keyboards. The mixer has two aux sends, with Aux 1 switchable pre-fader from the master section. The board also offers dedicated monitor outs, an oscillator, stereo tape returns, a momentary-switch for PFL monitoring, and a built-in handle. The Spirit Folio weighs less than nine pounds. Soundcraft/JBL Professional; tel. (818) 893-4351; fax (818) 893-0358.

▼ AKAI S3200

Akai introduced four new 32-voice samplers. The S2800 ($2,995) and S2800 Studio ($3,595) feature 16-bit, 64x oversampling A/D converters and 18-bit, 8x oversampling DACs. The S3000 ($4,995) and S3200 ($6,394) offer 20-bit DACs. All four machines offer 16-part multitimbral operation, resonant filters, and matrix-modulation routing of MIDI controllers. They include built-in stereo effects processing, with chorus/flanging, single and multi-tap delays, and pitch-shifting algorithms.

The S2800 comes with 2 MB of RAM and the S2800 Studio comes with 8 MB; both can be upgraded to 16 MB. The S3000 and S3200 come with 8 MB of RAM and can hold up to 32 MB. All except the basic S2800 come with SCSI and digital I/O ports; the ports are optional for the basic machine. The S3000 and S3200 are 3U rack-mount and have eight independent, polyphonic outputs in addition to the L/R main outs; the S2800/S2800 Studio are 2U rack-mount, with two polyphonic outputs in addition to the mains. The S3200 offers SMPTE time-code read/write, with integrated cue-list programming; SMPTE is optional on the S3000. More impressively, the 3200 has stereo, direct-to-SCSI-disk recording functions, and a soundfile on disk can be played simultaneously with samples loaded in RAM, without loss of polyphony.

Akai's CD3000 ($3,995) is a truly new product, a sample-player with a built-in CD-ROM drive. The machine plays directly from disc, but with the same program-editing features; matrix modulation; 18-bit DACs; and 16-part multitimbral, 32-voice architecture as the S2800/3000/3200. It supports sampling rates of 44.1 and 22.05 kHz. The CD3000 includes a SCSI port and 8 MB of RAM, expandable to 16 MB. An internal mixer with variable effects send is supplied, and there are eight polyphonic outputs in addition to the L/R main outs. The CD3000 comes bundled with five CD-ROM discs from East-West Communications, InVision Interactive, The Hollywood Edge, and Akai. Akai Professional; tel. (817) 336-5114; fax (817) 870-1271.



Continued on p. 25

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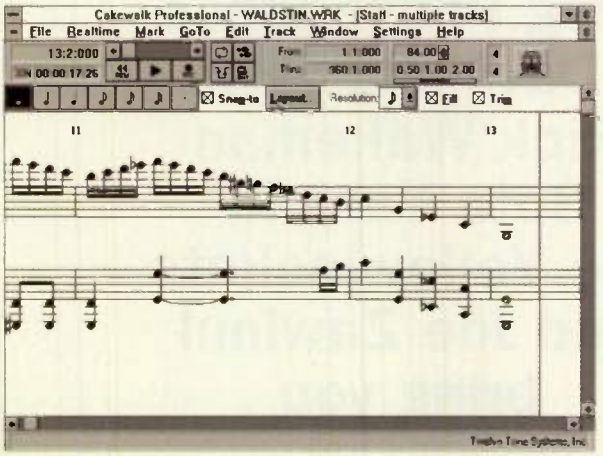
You've been searching for software that will help you turn your musical ideas into polished performances. But the first program you tried wasn't powerful enough. And the other was so complex, you didn't know where to start.

Maybe it's time to see a Professional.

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

Express Yourself

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



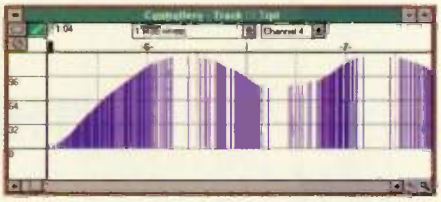
Staff view

Tempo

Take Control

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

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



Controller view

Professional Staff

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

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

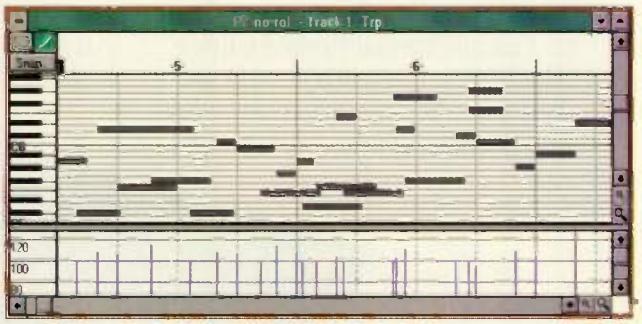
Markers

Get On Track

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

Professional Experience

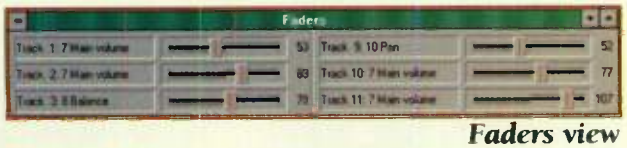
Cakewalk Professional works hard to earn its "professional" status: a variable timebase of up to 480 pulses per quarter note; support for all SMPTE/MTC formats; a Meter/Key map; a **Markers view** for creating a text list of "hit points"; and a powerful



Piano-roll view

PROFESSIONAL HELP.

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



Faders view

CAL-
SWING 16.CAL

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

Event-list view

Sysx

Meter/Key

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

Get Help Fast

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

Comments

See A Professional Today

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

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

A demo disk is available for $10.

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

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OTTO-1604

TOTAL RECORDABLE CONTROL OF YOUR MIX VIA OTTO-1604!

Finally, you can have real-time, free flowing control of mixer levels, stereo AUX sends and mutes. Create mixes far more complex than you ever could by hand — and then store, recall and tweak them at any time.

OTTO-1604 responds instantly to commands without adding noise or in any way degrading the CR-1604's superb specifications. It controls —

- All 16 input faders
- Master faders
- AUX return 1, 2, 3 & 4 levels
- ALT 3/4 Bus levels (a feature not possible on non-automated CR-1604s)
- Muting of individual input channels, AUX returns, ALT 3/4 & main outputs
- Pre-programmed fades & cross fades in 1/10 of a second increments.

The OTTO-1604 retrofit kit consists of an INTERNAL GAIN CELL BOARD which easily installs inside the CR-1604 mixer's chassis below its main circuit board an external, rack-mountable MIDI CONNECTION BOX. Computer-style ADB connection cable is included.

FADER UPDATE MODE lets you control OTTO from external fader packs that generate MIDI continuous controllers

BAR and BEAT counters

MARK for cue points

ARCHIVE SECTION can automatically save your work to a different file name after each mix

OTTO ASSIGN switches the screen between up to 3 OTTO-ed CR-1604s.

TOOL BOX for global editing.

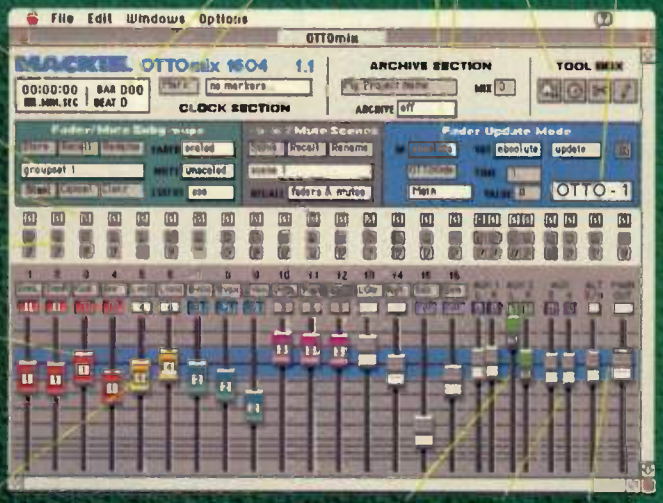
TIME CODE INDICATOR

Assign unlimited fader and mute SUB-GROUPS.

SOLO buttons

FADER & MUTE activity indicators.

FADERS with real time control. Assign un-limited scaled or un-scaled Submixes across up to three OTTO-ed CR-1604s for 48-ch. automation!

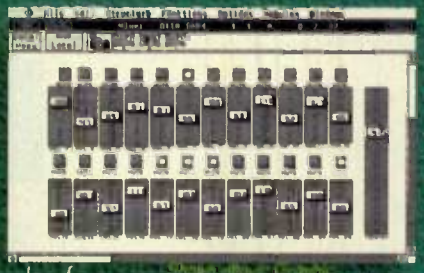


AUX 1 thru 4 LEVELS.

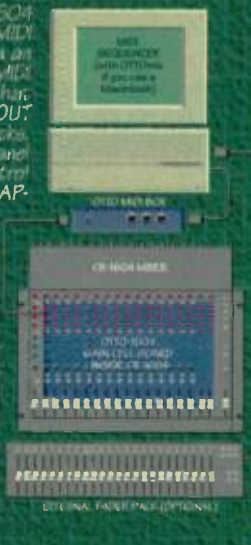
ALT 3/4 LEVEL.

MAIN L/R OUT LEVEL.

OTTO-1604 can be controlled with ANY MIDI sequencer that offers on-screen virtual faders & continuous controller messages. Whether you have a Macintosh, PC, Atari or Amiga you can make full use of the OTTO-1604's power. Mac sequencers offering on screen virtual faders include: Steinberg's Cubase, Mark of the Unicorn's Performer & Digital Performer, Opcode's Vision & Opcode Beyond. PC Windows software that include or will include OTTO-1604 support are Big Noise Software's Max Pak, 12 Tone Systems' Cakewalk, & Master Tracks Pro by Passport Designs.



OTTO-1604 connects to MIDI sequencers via an outboard MIDI connection box that includes IN, OUT and THRU jacks. Front panel buttons control LEARN, SNAP-SHOT MUTE and BYPASS functions. You can also add an external fader pack for hands-on control... and daisychain up to three OTTOed CR-1604's (via MixerMixer) for 32 or 48-channel automation!



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We designed the CR-1604 to re-define compact 16-channel mixers by packing it with features and endowing it with "big board" sound quality. Today it's the small mixer of choice for top TV and feature film soundtrack composers, session keyboard and electronic percussion musicians and thousands of home project studio enthusiasts. CR-1604s are used by members of the Arsenio Hall & Tonight Show bands, and have logged millions of miles on superstars' world tours.

Not surprisingly, this level of acceptance has inspired a number of "imitation CR-1604s." When comparing them to the original, remember that only the CR-1604 lets you add full fader MIDI automation at any time. Hear the OTTO-1604 and CR-1604 at your Mackie Dealer today.

FREE MACINTOSH SOFTWARE!

OTTO works with any sequencer that includes graphic faders. But if you work on the Mac, you get an added bonus: OTTOmix™ dedicated mixer automation software that runs along side your current sequencer using MIDI Manager or OMS.

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 Continued from p. 20

▲ BEYERDYNAMIC M 54

Beyerdynamic has combined a small, hypercardioid, dynamic mic with a direct-mounting system that acts as a vibratory transducer. The result is the M 54 gooseneck-mounted percussion mic ($189). According to the manufacturer, the mic adds a new dimension to the drum sound and is especially beneficial for rim shots. It can handle sound-pressure levels up to 140 dB, and frequency response is rated at 40 Hz to 12 kHz. Beyerdynamic; tel. (516) 293-3200; fax (516) 293-3288.

▼ MIDIMAN PORTMAN PC/P

MIDIMAN presented the Portman PC/P ($119.95), a 1-in, 1-out, parallel-port MIDI interface for PC-compatibles. The interface attaches to and is powered by the parallel printer port (Centronics connector); thus, the Portman PC/P does not require a card and is well-suited for laptop PCs. Driver software is included for DOS and *Windows*. The company also introduced the Portman PC/S ($119.95), a serial-port MIDI interface for the PC that is otherwise identical to the Portman PC/P. MIDIMAN; tel. (818) 449-8838; fax (818) 449-9480.

▼ DBX PROJECT 1 MODEL 266

The dbx Project 1 series consists of the model 266 Dual Compressor/Gate, 274 Quad Expander/Gate, and 296 Spectral Enhancer. The model 266 ($299) features two independent channels of compression and gating, which can be coupled for stereo operation. The company's new AutoDynamic circuitry constantly adjusts the attack and release times to optimally match the program material. The attack and release controls give the classic dbx sound when in the center position, but the full control range varies the process from slow leveling to hard peak limiting. The gate features a wide threshold range (-60 to +10 dBu), extremely fast attack (100 µsec), and new timing algorithms designed to get a smooth, musical release. The unit uses ¼-inch balanced inputs and ¼-inch unbalanced outs, and a sidechain insert is provided. Flat frequency response is rated at 5 Hz to 40 kHz (+0, -0.5 dB); noise <-94 dBu, unweighted; and dynamic range 114 dB, unweighted.

The 274 Quad Expander/Gate ($449) offers four independent channels (in any mono/stereo combination) of user-selectable, downward expansion or gating, with a sidechain for each stereo pair. It uses the same AutoDynamic features and has the same basic specs as the 266. The 296 ($349) is a dual-channel spectral enhancer that features controls for gain, hiss reduction, low-frequency detail (adds to the bottom end while reducing the mud in the mids), as well as high-frequency detail, which is program-dependent and dynamically interactive with the hiss-reduction circuitry. AKG Acoustics; tel. (510) 351-3500; fax (510) 351-0500. ●

Scanning the Horizon

The dream of music scanning is alive and about to reach fruition.

By Scott Wilkinson

Ever since personal computers became musically inclined, musicians have longed for the ability to scan a piece of sheet music and convert it into a MIDI sequence or music notation file for transposition and other modifications. After all, optical character recognition (OCR) for the written word has been around for a long time; why not for music?

The answer is simple: As a written language, music is far more complex than words. Although several organizations are working on such systems, there have been no products available—until now. In fact, two companies were the first to announce music OCR technology at the recent NAMM show.

Musitek (tel. [800] 676-8055 or [805] 646-8051; fax [805] 646-8099) introduced *MIDISCAN for Windows*, a software product for PC compatibles that should be available in its initial version by the time you read this; the list price is expected to be $379. The primary goal is to convert scanned graphic images of sheet music into Standard MIDI Files (SMFs). Each page of music must be scanned into a separate TIFF (Tagged Image File Format) file, which the program concatenates into a single SMF.

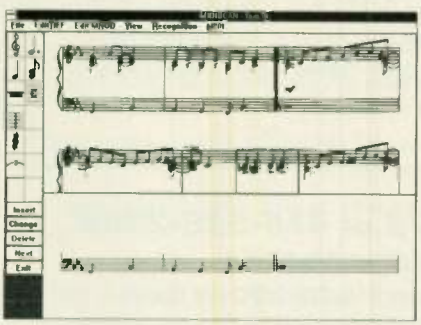

FIG. 1: The MNOD editor of Musitek's *MIDISCAN* displays the graphic TIFF image above the converted information. The toolbox on the left provides a wide variety of musical symbols.

Before any conversion takes place, the TIFF image can be cleaned up with a mouse-based graphic editor. After specifying whether the music is an individual part with one staff per system, or an ensemble score with multiple staves per system (including piano parts), any skew angle up to ±8° is corrected.

Next, the pre-processing algorithms eliminate any symbols that are not directly represented in MIDI, such as lyrics, guitar tablature, fingerings, articulations, and slurs. Tuplet markings and ties are also discarded in the initial version of the program. Automatic recognition of ties and tuplet markings is extremely difficult, but Musitek is working on implementing it in a future version. For now, ties and tuplet markings are easy to add in the editor, which is described below.

The important elements to recognize are note pitches (including accidentals), note and rest durations, clefs, key and time signatures, and bar lines. The recognition algorithms identify all pertinent symbols staff by staff, taking about five minutes per page with up to 98% accuracy, according to the company.

After the recognition process, the file is saved in Musitek's proprietary MNOD (Music Notation Object Description) format. It can then be edited on the screen, with the original graphic image and MNOD file appearing simultaneously (see Fig. 1). Objects can be inserted, changed, deleted, or moved with point-and-click procedures, and a graphic toolbox provides access to a full range of musical symbols.

Once editing is complete, the file is converted into SMF Type 1 format. Each staff is assigned to a separate track and MIDI channel; a Program Change number can also be assigned to each staff. The file can then be imported into any sequencer for playback and further manipulation.

Although they showed no product per se, Coda Music Technology (tel. [800] 843-2066 or [612] 937-9611; fax [612] 937-9760) announced the acquisition of music OCR technology from the University of Surrey in England. This technology takes a different tack than *MIDISCAN*. Instead of MIDI playback, the Coda system is primarily concerned with converting scanned TIFF images into *Finale* files in order to manipulate the notation data. It is said to recognize a wider range of musical symbols than *MIDISCAN*.

Coda is planning a three-stage development cycle. First, they will offer a service bureau to music publishers; send them your sheet music (and the appropriate fee), and they'll return a disk with a *Finale* file. Next, they will introduce an add-on product for *Finale* users as an alternative method of data entry. Finally, they intend to develop a stand-alone product with a simple user interface and limited editing capabilities for those who want to quickly transpose a piece of music.

Neither of these companies offer flawless OCR from printed sheet music; even word-based OCR is far from perfect. However, they have taken the first commercial step toward the realization of a dream shared by musicians everywhere. It's a harbinger of a new era in which computers will play an even greater musical role than ever before.

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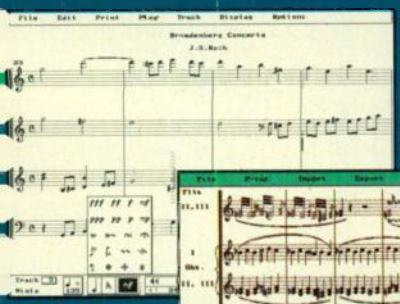

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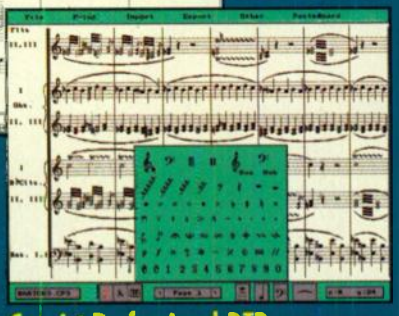

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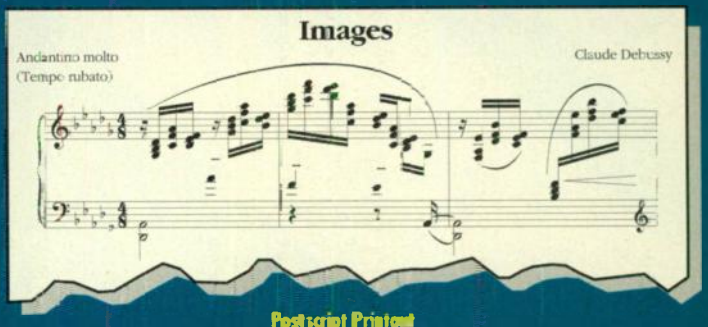

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KEYS TO THE SONIC KINGDOM

By Scott Wilkinson

One-note nirvana. With today's instruments, it's never far away. Probably just a poke or three of the inc/dec button. Indeed, the timbral lushness and complexity that modern synths allow have captured the attention and fancy of musicians at every ability level and musical persuasion. From classical to metal, new age to country, synths have gone mainstream.

Of course, it's not a surprising development. Keyboard synthesizers have always been considered the sexiest devices in the electronic musician's arsenal. Who can resist the lure of those black-and-whites surrounded by wheels, sliders, buttons, and LCD displays?

Interestingly, as synths have reached into a wider, more diverse audience, they've become more similar in basic functionality. Most of today's instruments are built around the concept of sample playback, where a large selection of digital samples stored onboard are played back through a fairly traditional subtractive synthesis architecture. Of course, there are important variations on the theme, but it's getting harder to tell instruments apart. (For more information on how synthesizers are designed and produced, see "Electronic Artisans" on p. 54.)

If you're in the market for one of these instruments, that makes your job much harder. It

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also increases your need for accurate information on current choices. To address that need we put together a large chart (see pp. 42-45) comparing all of today's current models. Along the top of the chart are the feature categories EM editors deemed to be most relevant for a purchasing decision.

The most important feature of all can't be quantified in a chart: how the keyboard sounds. No matter how impressive the specs or how good the deal, if *you* don't like the sound of an instrument, don't buy it. Certain feature limitations can be overcome with the addition of other accessory devices, but the sound of an instrument is basically immutable. So, once you've narrowed your choices, go down to a music store and listen.

The criteria for an instrument's inclusion in this guide are simple. First, the device had to be considered a professional keyboard synthesizer. Dedicated samplers and rack-mount synths are not included. Also, the distinction between "pro," "semi-pro," and "home" synths has become somewhat fuzzy in the last few years, but EM editors determined that instruments with internal speakers, an "auto-accompaniment" function, and/or non-editable sounds are considered "home" keyboards and thus, were omitted. Second, the keyboard must be shipping by April 1993. Of course, because this article was written in late January, we had to trust that the manufacturers' predictions were accurate. (Last-minute production snafus could cause a delay.) Instruments that are not expected to ship by April are described in the sidebar, "On the Horizon."

The GeneralMusic S2 offers eight sliders, a built-in disk drive, and a flexible digital filtering system.

BASIC SPECS

Maximum Polyphony/Multitimbral Parts. The first number in this category lists how many notes an instrument can play at once. Most synths can play at least sixteen notes, and some instruments can play up to 32 notes or more simultaneously. General MIDI instruments must have a polyphony of at least 24 notes.

The second number refers to the number of different sounds, or *timbres*, such as strings, piano, bass, and drums, that an instrument can simultaneously produce. Typically, each part is played by MIDI messages on different channels. Because there are sixteen MIDI channels, most instruments have 16-part multitimbral capability.

Remember that the polyphony does not apply to each multitimbral part; it's global for the entire instrument. If an instrument is 16-note polyphonic and 16-part multitimbral (indicated by 16/16 in the chart), and all sixteen parts are playing at once, each one can only play a single note. Of course, it's rare that all sixteen parts play all the time, so most instruments allocate notes to each part as needed; this is called *dynamic voice allocation*.

Synthesis Method. This category reveals the manufacturer's name for the synthesis method used in each instrument. Unfortunately, these catch phrases weren't created for clarity of meaning, so this may be less than illuminating. At their core, virtually all modern instruments use some form of sample-based subtractive synthesis in which one or more digital samples are passed through one or more filters, amplifiers, and effects processors before reaching the outputs.

Here are translations of the non-obvious synthesis methods:

• **AI and AI^2:** Advanced Integrated. Korg's name for sample-based subtractive synthesis in the M1 and subsequent instruments. AI^2 refers to the addition of a "waveshaper" module between the oscillator and filter in the 01/W family.

• **AFM:** Advanced Frequency Modulation. Yamaha's term for the second generation implementation of FM in the SY series of instruments.

• **AWM and AWM2:** Advanced Wave Memory. Yamaha's proprietary sample

E-mu's Proteus MPS melds a Proteus/1 synth engine with a built-in effects processor.

playback format. AWM uses 12-bit samples; AWM2 uses 16-bit.

• **DPM:** Digital Phase Modulation. Peavey's term for sample playback with digital filters.

• **RCM:** Real-time Convolution Modulation. Yamaha's term for combining AFM and AWM with variable digital filters in the SY series of instruments. This term is actually more descriptive than it sounds.

• **VAST:** Variable Architecture Synthesis Technology. Kurzweil's term for the sample-based DSP synthesis on the K2000.

• **Vector:** Vector Synthesis. A sound generation technique in which a joystick is used to dynamically combine up to four elements (sounds, modulators, etc.) in real time. It's found on the Yamaha SY35 and Korg Wavestation.

• **Wavetable:** Wavetable Synthesis. Another name for sample-based synthesis.

Total Oscillators/Oscillators per Voice. Samples are played by oscillators within the instrument whenever a key is pressed or a Note On message is received. This category indicates the total number available in the instrument and the maximum number that can be used in a typical patch. In most cases, oscillators are directly tied to polyphony, so an instrument with 32-voice polyphony may only be able to play sixteen notes of a patch using two oscillators.

Filters per Voice. One of the fundamental elements of subtractive synthesis is the filter, which alters the harmonic content of a sound by reducing or removing certain frequencies in the spectrum. Typically, each multitimbral

ON THE HORIZON

Although they probably won't be shipping by April 1993, there were several instruments at the Winter NAMM show that should be mentioned. These are preliminary specs that could change by the time the instrument actually appears.

Alesis QuadraSynth. This keyboard was first announced at the Winter NAMM show one year ago, although it was no more than a wood model carved to look like a synth at the time. This year, it actually made sound, and the specs are impressive. With 16 MB of sample ROM, the QuadraSynth utilizes what Alesis calls QS Composite Synthesis, which is a combination of additive and subtractive techniques. Among the most noteworthy features is 64-note polyphony. Even with the maximum of four layers per patch this still provides 16-note polyphony. The 76-key instrument includes master MIDI controller functions and a digital output to interface directly with the ADAT digital multitrack tape deck. Up to seven simultaneous effects can be assigned to any of four independent effects busses. With an expected list price of $1,495, this instrument is likely to be a big hit.

Peavey PCX 6/688. Later this year, Peavey should start shipping the PCX 6. This instrument is a sampling keyboard workstation with 10 MB of ROM samples and the DPM si synthesis engine. The instrument comes with 2 MB of sample RAM standard, which is expandable to 16 MB, and includes 61 keys, 32-note polyphony (16-note polyphony with stereo samples), a full-featured sequencer, and dual effects processors. In addition, a SCSI port allows fast sample transfers from a hard disk, which can also be mounted internally. The PCX 688 is an 88-key version of the same instrument. The PCX 6 carries an expected list price of $2,695, while the 688's list price has yet to be determined.

Waldorf Wave. Based on the MicroWave rack-mount sound module, the Wave is a behemoth instrument with a massive front panel that slants upward from the keyboard. Using what Waldorf calls Dynamic Spectral Wavetable Synthesis, this instrument offers a flexible configuration including 61 or 76 keys, 16 to 48 notes of polyphony, and 8-part multitimbral operation. In fact, it's always in multitimbral mode, storing 256 Performances that use up to eight of the 256 Sounds in memory. Almost all parameters are adjusted by dedicated single-purpose controls, and two independent MIDI Outs provide 32-channel addressing. This looks like an incredible instrument, and at an expected base price of $7,900, it had better be.

Waldorf Wave

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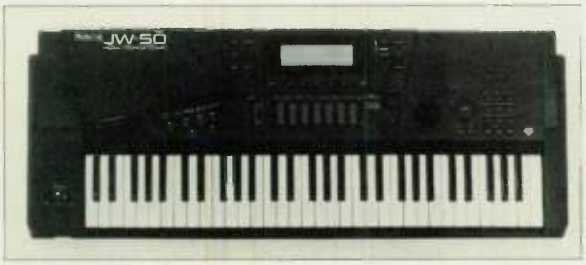
part or single preset (which is sometimes called a voice) uses one or more filters to alter the sound; the filter behaves in the same way for each note played by the voice. The number of filters that can be applied to each voice is listed in this category.

Controllers: Sliders/Wheels/Footswitches/Pedals. MIDI provides numerous ways to represent expressive gestures. Aside from Velocity and Aftertouch, these gestures are usually made in real time with physical controllers operated by the hands or feet. They're used to control many different aspects of the sound, including timbre, vibrato, panning, volume, and balance. They can also be used to send various MIDI Control Change messages to external devices, adding master controller functions to the instrument. We've divided the controllers into four categories: front-panel sliders; wheels, such as pitch bend and mod wheels; footswitches, such as sustain switches; and footpedals, such as volume pedals.

Sliders are generally programmed to send the MIDI Control Change message of your choice; for example, sending MIDI Volume from several sliders to a sequencer lets you automate the mix during a song.

Many instruments let you program the mod wheel to send any one of a variety of Control Change messages; some instruments, such as the K2000, let you program the pitch-bend wheel to send different messages as well. Yamaha's SY99 and a few other instruments include additional programmable wheels.

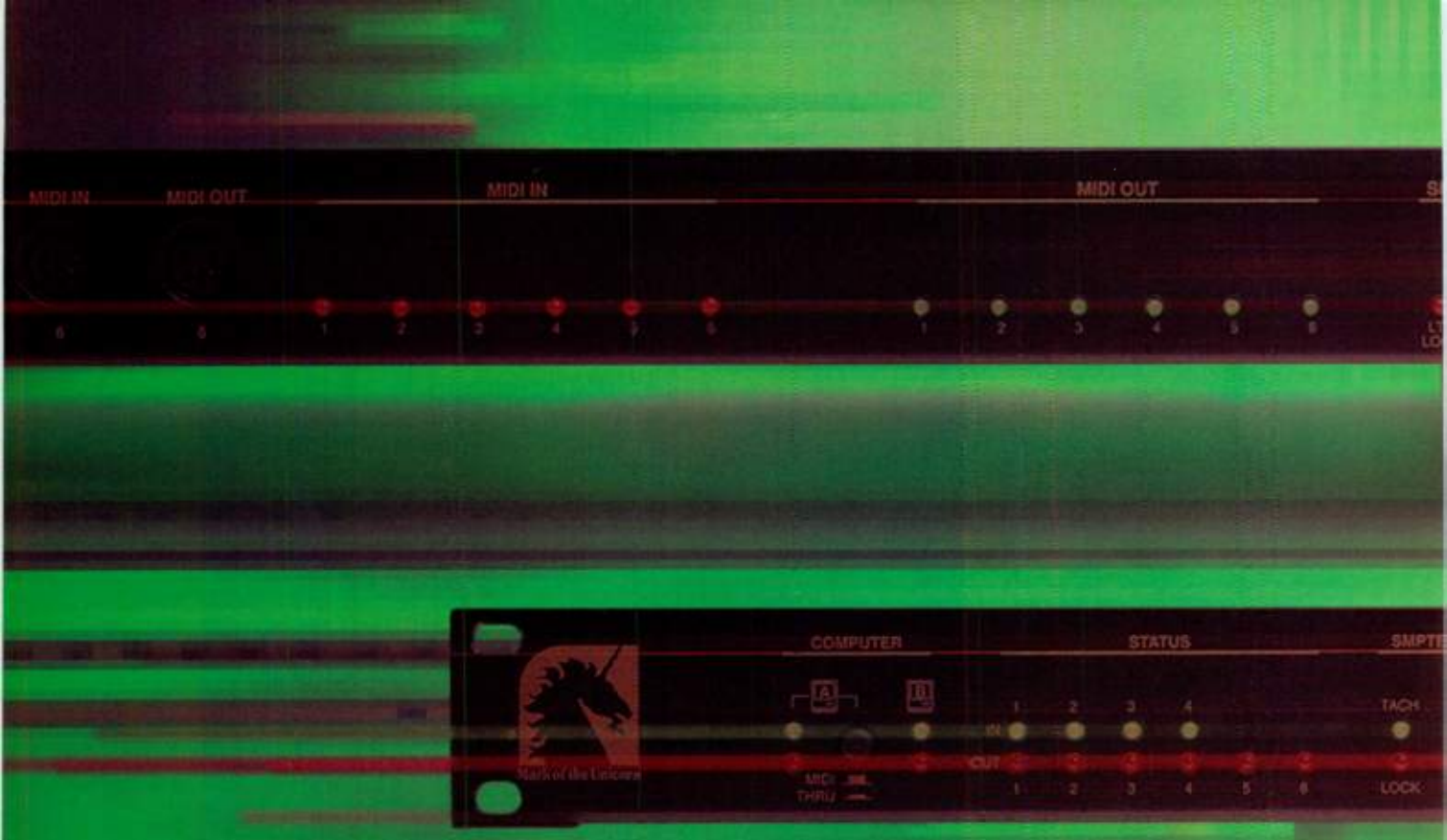


Roland's JW-50 combines a Sound Canvas synth engine with a sophisticated sequencer and numerous real-time controllers.

Footswitches have only two values: on or off, which makes them perfect for devices like sustain pedals. In addition, many instruments include footswitch inputs for advancing through patches and other programmable functions. Footpedals are continuously variable, making them better suited for continuous controllers and other similar applications.

Display Size. Most instruments have a display to show patch numbers and names, parameter values, and other information. On some instruments, such as the Kawai K4, the display is relatively small and includes only alphanumeric characters. In this case, the chart entry consists of two small numbers, such as 40 × 2, which indicates the display is 40 characters by two lines. Many newer instruments include large graphic displays capable of depicting envelope shapes as well as characters. The chart entries for this type of display consist of larger numbers, such as 240 × 64, which indicates a graphic resolution of 240 pixels horizontally by 64 pixels vertically.

Program Change Map. Some instruments let you create an independent relationship between internal patch



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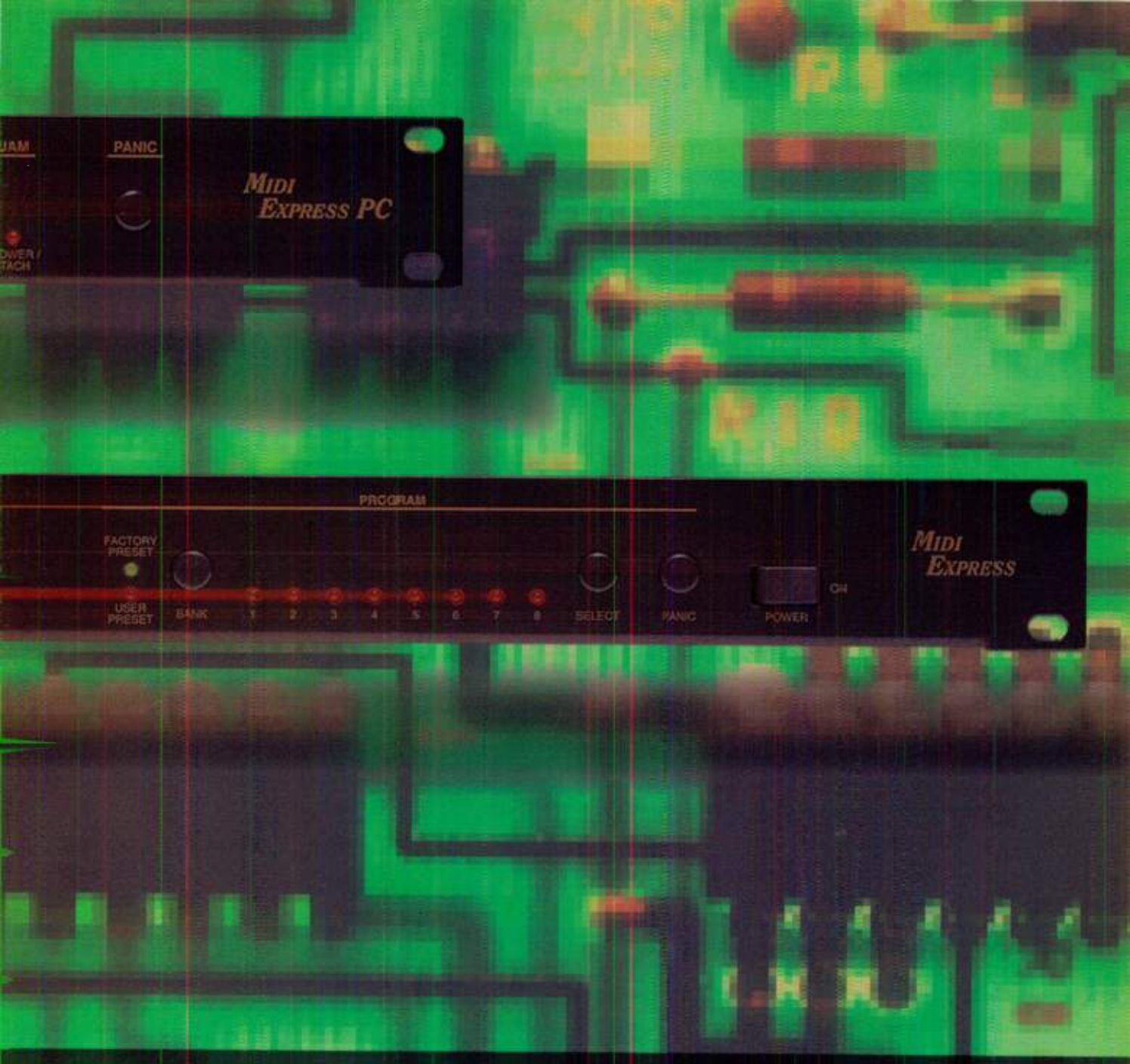

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numbers and MIDI Program Change numbers. A Program Change message can then call up any patch regardless of its internal patch number, which is useful for setting up an entire system with one Program Change. For example, the next song might need patch 15 in one synth and patch 67 in another. By assigning patch 15 to Program Change 67 in the map of the appropriate instrument, you can prepare both instruments with one message. This category indicates whether or not each instrument has this capability.

Yamaha's SY99 includes an advanced version of FM synthesis along with sample-playback capabilities.

The Ensoniq SQ-2 32 Voice offers a 76-key keyboard and 3 MB of built-in ROM samples.

Audio Outputs. Virtually all instruments have at least two audio outputs organized as a stereo pair. Many instruments also include additional outputs so that different parts can be routed separately for independent signal processing.

STORAGE

Waveform ROM: Standard/Maximum. The heart of all sample-based synthesizers is the ROM (Read Only Memory) that stores the different instrument waveforms. The size of the ROM determines the quantity and length of samples that an instrument has to work with (but not necessarily the quality). All instruments have a fixed amount, but several instruments, such as Roland's JV-80, have the option of adding additional waveforms through a ROM expansion board. This is a nice feature

that really prolongs the life and capabilities of an instrument.

Waveform RAM: Standard/Maximum. Along similar lines, many instruments, such as Peavey's DPM 4, now provide RAM (Random Access Memory) in which users can store their own samples. These samples can then be processed through the synthesis engine. By taking advantage of this RAM, you get all the benefits of a dedicated sampler, such as completely original sounds, with the convenience and flexibility of a synth.

ROM Multisamples/Drum Samples. As nice as it is to know how much ROM there is in an instrument, it's even better to know how many instruments are included. The first number in this category lists how many different multisampled instruments are included in the standard ROM, and the second number indicates the number of different drum samples.

Single Presets: ROM/RAM. Although most of these instruments are multitimbral, they are often used to play a single sound across the entire keyboard. Many of them have various factory-programmed single presets permanently stored in ROM and room for user-programmable single presets in RAM (which is usually separate from any sample RAM that might be present).

Multi Presets: ROM/RAM. This provides the same information for multitimbral presets.

Card Slots: Waveform/Program. Many instruments allow for additional memory via card slots that can accept one of two types of memory cards. Waveform cards contain additional samples that can be used as raw material for new sounds (like mini ROM-expansion boards). Program cards, on the other hand, contain new presets that use the instrument's existing samples (or samples on a companion waveform card). Most synthesizers have slots for one of each type.

Disk Drive Type/SysEx Buffer. Floppy disk drives have become common on today's instruments. They're used for off-line storage of programs, sequences, and other types of data. The first part of this category indicates whether the drive is double density (DD) or high density (HD). Floppy disks are also used to store System Exclusive (SysEx) dumps from other instruments. The second part of this category indicates the size of the SysEx buffer, which determines the largest SysEx dump that can be stored on a disk.

MANUFACTURER LIST

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

Roland Corporation
7200 Dominion Circle
Los Angeles, CA 90040
tel. (213) 685-5141
fax (213) 722-0911

Waldorf Electronics
(dist. by Steinberg/Jones)
17700 Raymer St., Suite 1001
Northridge, CA 91325
tel. (818) 993-4091
fax (818) 701-7452

Yamaha Corp. of America
6600 Orangethorpe Ave.
Buena Park, CA 90620
tel. (714) 522-9011
fax (714) 739-2680

KEYBOARD

Number of Keys/Weighted or Unweighted. Most instruments include 61, 76, or 88 keys. The keys are sometimes "weighted" to simulate the feel of an acoustic piano, while others instruments have "unweighted" keys, which is often called a "synth" action.

Aftertouch Type: Send/Receive. Virtually all keyboard instruments send and recognize Channel Aftertouch messages, which apply to all sounding notes equally. A few instruments send and/or recognize Polyphonic Aftertouch, which affects each note individually. For example, the K2000 synthesizer sends Channel Aftertouch and recognizes Channel and Poly Aftertouch. This category indicates the type(s) of Aftertouch sent and recognized by each instrument.

Splits/Layers. Splits let you assign different sounds to different ranges on the keyboard. For example, you can play a bass sound with the left hand and a piano part with the right hand. Most instruments let you split the keyboard by assigning different sounds to each key; this is particularly useful for drum kits.

Layers consist of two or more sounds played by the same range of keys. This allows you to create massive sounds, but it typically reduces the overall polyphony of the instrument. The numbers included in this category indicate the instrument's maximum number of splits and layers.

Microtuning Tables: Keyboard/Octave/User. Microtuning lets you explore tunings other than 12-tone equal temperament by making minute adjustments to the pitch of different

EM Guide to Keyboard Synthesizers

Manufacturer/Model	Maximum Polyphony/ Multitimbral Parts	Synthesis Method	Total Oscillators/ Oscillators per Voice	Filters per Voice	Number of Controllers: Sliders/ Wheels/Footswitches/ Pedals
E-mu Systems Proteus MPS	32/16	sample playback	32/8	1	0/2/1/1
E-mu Systems Proteus MPS Plus	32/16	sample playback	32/8	1	0/2/1/1
Ensoniq KS-32	32/8	wavetable	32/32	2	1/2/2/1
Ensoniq SQ-1 Plus 32 Voice	32/8	wavetable	32/32	2	1/2/2/1
Ensoniq SQ-2 32 Voice	32/8	wavetable	32/32	2	1/2/2/1
General Music Corp S2	32/16	PCM, wavetable/multiloop, crossfade, multiwave, and subtractive synthesis	32/32	2 (resonant)	7/2/2/2 (7 buttons, plus volume pedal)
General Music Corp S3	32/16	PCM, wavetable, multiloop, crossfade, multiwave, and subtractive synthesis	32/32	2 (resonant)	7/2/2/2 (7 buttons, plus volume pedal)
Kawai K1II	16/9	sample playback	32/32	0	2/2/1/0
Kawai K4	16/9	sample playback/subtractive	32/32	2 (resonant)	2/2/1/0
Kawai K11	32/32	sample playback/subtractive	32/32	2 (resonant)	1/3/1/0
Kawai KC-10 Spectra	14/5	sample playback	28/5	0	1/2/1/0
Korg 01/W	32/16	AI^2 synthesis, subtractive, and waveshaping	32/32 Seq. Mode; 16 Combi; 2 Prog. Mode	1	1/0/2/1 (+ joystick)
Korg 01/WFD	32/16	AI^2 synthesis, subtractive, and waveshaping	32/32 Seq. Mode; 16 Combi; 2 Prog. Mode	1	1/0/2/1 (+ joystick)
Korg 01/W Pro	32/16	AI^2 synthesis, subtractive, and waveshaping	32/32 Seq. Mode; 16 Combi; 2 Prog. Mode	1	1/0/2/1 (+ joystick)
Korg 01/W Pro X	32/16	AI^2 synthesis, subtractive, and waveshaping	32/32 Seq. Mode; 16 Combi; 2 Prog. Mode	1	1/0/2/1 (+ joystick)
Korg M1	16/8	AI synthesis, sample playback	16/16 Combi, 2 Prog.	1	0/0/2/1 (+joystick)
Korg Wavestation	32/16	Advanced Vector synthesis	32/32	1	0/2/3 assignable footswitches/pedals
Korg Wavestation EX	32/16	Advanced Vector synthesis	32/32	1	0/2/ 3 assignable footswitches/pedals
Kurzweil K2000	24/16	VAST	96/96	3 (resonant)	1/2/2/1
Peavey DPM 4	32/16	PCM sample-based	32/8	1 (resonant)	2/2/3/2
Peavey DPM 488	32/16	PCM sample-based	32/8	1 (resonant)	2/2/3/2
Peavey DPM si	32/16	PCM sample-based	32/16	1 (resonant)	2/2/3/2
Roland D-70	30/6	Super L/A synthesis	30/4	1 (resonant)	6/2/2/1
Roland JD-800	24/6	PCM	24/4	1 (resonant)	59/2/1/1
Roland JV-30	24/16	PCM	24/4	1 (resonant)	3/2/1/0
Roland JV-80	28/8	PCM	28/28	1 (resonant)	10/2/1/2
Roland JV-1000	28/8 56/24 (w/VE-GS1-01)	PCM	28/28 56/28 (w/VE-GS1-01)	1 (resonant)	11/2/3/2
Roland JW-50	24/16	PCM	24/2	1 (resonant)	8/2/1/0
Yamaha SY35	32/8	Dynamic Vector	32/32	0	1/2/1/1
Yamaha SY77	32/16	Real-time Convolution and Modulation (RCM)	28/24	8 (resonant)	3/3/2/2
Yamaha SY85	30/16	AWM2 sample playback	30/4	1 (resonant)	10/2/1/2
Yamaha SY99	32/16	Real-time Convolution and Modulation (RCM)	16 AWM2, 16 AFM/4	8 (resonant)	3/3/2/2

Display Size	Program Change Map	Audio Outputs	Waveform ROM: Standard/ Maximum	Waveform RAM: Standard/ Maximum	ROM Multisamples/ Drum Samples	Single Presets ROM/RAM	Multi Presets ROM/RAM
16x2 characters	yes	4	4 MB/8 MB	n/a	125/31	100/100	0/100
16x2 characters	yes	4	8 MB/8MB	n/a	200/31	300/100	0/100
16x2 characters	no	2	3 MB/3 MB	n/a	168/70	100/80	0/100
16x2 characters	no	2	3 MB/3 MB	n/a	168/70	100/80	0/100
16x2 characters	no	2	3 MB/3 MB	n/a	168/70	100/80	0/100
240x64 pixels	yes (128x16; 2048 total)	6 (4 individual plus stereo pair)	6 MB/6 MB	2 MB/2 MB	209/61	350/1,398	10/100
240x64 pixels	yes (128x16; 2048 total)	6 (4 individual plus stereo pair)	6 MB/6 MB	2 MB/2 MB	209/61	350/1,398	10/100
16x2 characters	no	2	512 KB/512 KB	n/a	256/32	0/64	0/32
16x2 characters	no	2	1.5 MB/1.5 MB	n/a	256/43	0/64	0/64
16x2 characters	no	2	6 MB/6MB	n/a	256/256	256/128	0/64
3-digit LED	no	2	1 MB/1 MB	n/a	128/43	64/32	0/16
240x64 pixels	no	4	6 MB/6 MB	n/a	255/119	0/200	0/200
240x64 pixels	no	4	6 MB/6 MB	n/a	255/119	0/200	0/200
240x64 pixels	no	4	10 MB/10 MB	n/a	256/128	0/200	0/200
240x64 pixels	no	4	10 MB/10 MB	n/a	256/128	0/200	0/200
40x2 characters	no	4	4 MB/8 MB (EX)	n/a	100/44	0/100	0/100
240x60 pixels	yes	4	2 MB/4 MB (EX)	n/a	365/0	50/100	0/16
240x64 pixels	yes	4	4 MB/4 MB	n/a	484/25	50/100	0/16
240x64 pixels	yes	6 (4 individual plus stereo pair)	8 MB/24 MB	0 MB/64 MB	109/41	200/1000	100/1000
40x2 characters	no	2	10 MB/12 MB	512 KB/1 MB	186/68	0/100	0/100
40x2 characters	yes	2	10 MB/12 MB	512 KB/1 MB	186/68	0/100	0/100
40x2 characters	yes	4	10 MB/14 MB	n/a	186/68	200/200	200/200
40x8 characters	no	4 (2 stereo pairs)	4 MB/4.5 MB	n/a	91/28	0/128	0/64
22x2 characters and 16x2 characters	no	4 (2 stereo pairs)	4 MB/5MB	n/a	108/0	0/64	0/1
16x2 characters	no	2 (1 stereo pair)	(not published)	n/a	(not published)	317/128	0/8
40x2 characters	no	2 (1 stereo pair)	4 MB/14 MB	n/a	83/46	128/64	32/16
40x2 characters and 20x2 characters	no	4 (2 stereo pairs)	4 MB/16 MB	n/a	83/46	128/64	32/16
240x64 pixels	no	2 (1 stereo pair)	(not published)	n/a	(not published)	317/128	0/1
16x2 character LCD; 2-digit LED	no	2 (1 stereo pair)	3 MB/3 MB	n/a	128 AWM/256 FM/ 61 drum	64/64	16/16
240x64 pixels	no	4 (2 stereo pairs)	4 MB/4 MB	n/a	92/20	128/64	16/16
40x2-character LCD; 2-digit LED	yes	4 (2 stereo pairs)	6 MB/6 MB	512 KB/3.5 MB	191/53	0/256	0/128 plus 10 songs
240x64 pixels	no	4 (2 stereo pairs)	8 MB/8 MB	512 KB/3 MB	207/60	128/64	16/32

EM Guide to Keyboard Synthesizers

Manufacturer/Model	Card Slots	Disk Drive/ SysEx Buffer	Number of Keys Weighted/ Unweighted	Aftertouch Type: Send/Receive	Splits/Layers
E-mu Systems Proteus MPS	1 program	n/a	61 unweighted	channel/channel & poly	8/8
E-mu Systems Proteus MPS Plus	1 program	n/a	61 unweighted	channel/channel & poly	8/8
Ensoniq KS-32	1 program	n/a	76 weighted	channel/channel & poly	16/16
Ensoniq SQ-1 Plus 32 Voice	1 program	n/a	61 unweighted	no/channel & poly	16/16
Ensoniq SQ-2 32 Voice	1 program	n/a	76 unweighted	channel/channel & poly	16/16
General Music Corp. S2	0	HD	61 weighted	channel & poly/channel & poly	16/16
General Music Corp. S3	0	HD	76 weighted	channel & poly/channel & poly	16/16
Kawai K1II	1 program	n/a	61 weighted	channel/channel	8/8
Kawai K4	1 program	n/a	61 weighted	channel/channel	8/8
Kawai K11	0	n/a	61 weighted	channel/channel	32/32
Kawai KC-10 Spectra	0	n/a	61 unweighted	n/a	4/4
Korg 01/W	1 waveform/1 program	n/a (SysEx buffer sends only)	61 unweighted	channel/channel	16/16
Korg 01/WFD	1 waveform/1 program	DD/65 KB	61 unweighted	channel/channel	16/16
Korg 01/W Pro	1 waveform/1 program	DD/65 KB	76 unweighted	channel/channel	16/16
Korg 01/W Pro X	1 waveform/1 program	DD/65 KB	88 weighted	channel/channel	16/16
Korg M1	1 waveform/1 program	n/a (SysEx buffer sends only)	61 unweighted	channel/channel	8/8
Korg Wavestation	1 waveform/1 program	n/a (SysEx buffer sends only)	61 unweighted	channel/poly	8/8
Korg Wavestation EX	1 waveform/1 program	n/a (SysEx buffer sends only)	61 unweighted	channel/poly	8/8
Kurzweil K2000	0	HD/32 KB	61 unweighted	channel/channel & poly	128/32
Peavey DPM 4	1 program	DD/64 KB	61 unweighted	channel/channel	4/4
Peavey DPM 488	0	DD/64 KB	88 weighted	channel/channel	4/4
Peavey DPM si	1 program	n/a (256 KB)	76 unweighted	channel/channel	16/16
Roland D-70	2 waveform/1 program	n/a	61 unweighted	channel/channel	4/4
Roland JD-800	1 waveform/1program	n/a	61 unweighted	channel/channel	4/4
Roland JV-30	0	n/a	61 unweighted	no/channel & poly	2/2
Roland JV-80	1 waveform/1program	n/a	61 unweighted	channel/channel	8/8
Roland JV-1000	1 waveform/1program	DD	76 unweighted	channel/channel	8/8
Roland JW-50	0	DD	61 unweighted	channel/channel & poly	0/0
Yamaha SY35	1 program	no	61 unweighted	channel/channel	8/8
Yamaha SY77	1 waveform/1 program	DD	61 unweighted	channel/channel	4/4
Yamaha SY85	1 waveform/1 program	DD/50 KB	61 unweighted	channel/channel	4/4
Yamaha SY99	1 waveform/1 program	DD/512 KB	61 unweighted	channel/channel (zoned)	16/16

Microtuning Tables: Keyboard/ Octave/User	Onboard Sequencer: Number of Tracks/ Maximum Events	Number of Effects Algorithms/ Simultaneous Effects	Additional Features	EM Review	Price
8/0/4	n/a	27/2	matrix modulation; Quick Keys MIDI system control	Apr. 1992	$1,495
8/0/4	n/a	27/2	4 MB of orchestral samples from Proteus/2		$1,695
n/a	16/25,500	13/3	transmits release velocity; make default preset command; audition all sequencer edits	Nov. 1992	$2,195
n/a	16/25,500	13/3	audition all sequencer edits; sequencer expandable to 174,000 events	Oct. 1990	$1,595
n/a	16/25,500	13/3	audition all sequencer edits; sequencer expandable to 174,000 events	Nov. 1991	$1,795
12/0/4	16/250,000	128/2	GM voice map & load SMF; complete master keyboard functions	Nov. 1992	$2,995
12/0/4	16/250,000	128/2	GM voice map & load SMF; complete master keyboard functions	Nov. 1992	$3,395
n/a	n/a	16/1		Sept. 1989	$995
n/a	n/a	16/2	release velocity	Mar. 1990	$1,445
0/55/0	n/a	6/1	GM-compatible; built-in Mac MIDI interface (serial port; 32 MIDI channel capability)		$1,249
n/a	n/a	1/1	onboard arpeggiator, and drum machine w/preset drum patterns		$849
0/4/12	16/7,000	47/4	GM-compatible w/WPC-15 card; dynamic digital multi-effects; waveshaping	Jan. 1992	$2,399
0/4/1	16/48,000	47/4	GM-compatible w/WPC-15 card; dynamic digital multi-effects; waveshaping		$2,799
0/4/1	16/48,000	47/4	GM-compatible w/WPC-15 card; dynamic digital multi-effects; waveshaping		$3,599
0/4/12	16/48,000	47/4	GM-compatible w/WPC-15 card; dynamic digital multi-effects; waveshaping		$4,998
0/8/1	8/7,700	53/4	4 MB PCM memory expansions: M1EX; M1 Plus One	Nov. 1988 Apr. 1993 (Plus One)	$1,795
0/4/12	n/a	46/4	dynamic digital multi-effects; wave sequencing	Nov. 1990	$1,795
0/4/1	n/a	55/4	dynamic digital multi-effects; wave sequencing		$1,995
1,000 (assembled in Key Mass)/16/255	1/7,500 per song, 15,000 total	27/4	release velocity; upgradable to full-feature sampler, sequencer expandable to 90,000 events with PRAM	Mar. 1992	$2,885
0/5/2	9/40,000	39/4	GM-compatible		$2,299
0/5/2	9/40,000	39/4	GM-compatible		$2,699
0/5/2	16/80,000	39/2	GM-compatible		$1,799
n/a	n/a	13/2	4 transmit zones; edit palette	Sept. 1990	$2,895
n/a	n/a	23/8	release velocity; sliders transmit SysEx	Sept. 1991	$2,995
0/16/16 via SysEx	n/a	16/2	GM-compatible; 3 continuous controller sliders		$1,250
n/a	n/a	11/2	GM-compatible w/expander; release velocity, 8 MB RSM expansion series	May 1992	$1,850
0/16/16 w/GS expander via SysEx	8/80,000	11/2	GM-compatible (w/expander); release velocity; 8 MB RSM expansion series; GS expander		$2,795
0/16/16 via SysEx	16/98,000	16/2	GM-compatible; release velocity; Compumix SMF compatible		$2,195
n/a	n/a	16/2	real-time, vector control		$899
64/0/2	16/32,000	44/4	breath controller input/3rd assignable wheel	June 1990	$2,995
n/a	9/48,000	90/4	8 real-time sliders, SIMM-supported wave RAM	Jan. 1993	$1,895
64/0/2	16/54,000	63/4	master controller features/zoned aftertouch	Oct. 1991	$3,895

notes played by the instrument. These tunings, often called tables, come in two varieties: keyboard and octave. Keyboard tables allow each note in the instrument's range to be adjusted independently without regard for octaves; this is useful for tunings that consist of many notes per octave. On the other hand, octave tables adjust each of the twelve notes by the same amount in each octave; this works well for European historical tunings. Some instruments also allow you to construct your own tables and store them in memory.

MISCELLANEOUS

Onboard Sequencer: Tracks/Events. Most instruments include a MIDI sequencer, which is used to record performances from the internal keyboard and/or external MIDI sources. If a sequencer is included, this category indicates the maximum number of tracks and events in its capacity. It's important to remember that each note in a MIDI sequence consists of two events: Note On and Note Off. Some manufacturers determine the sequencer capacity by the number of notes, while others use the number of events.

Effects Algorithms/Simultaneous Effects. Digital signal processing is another common feature of today's keyboard synths. Most instruments include one or more multi-effect processors, which reduces the need for external processing. To give you an idea of the onboard signal processor's power, we've listed the number of different effects algorithms it can produce and the maximum number of simultaneous effects that it can process.

Additional Features. Unique features of an instrument that don't fit anywhere else are listed here in this catch-all category. Among the most common is General MIDI compatibility.

EM Review. The EM issue in which each instrument was reviewed is listed in this category.

Price. This category indicates the manufacturer's list price.

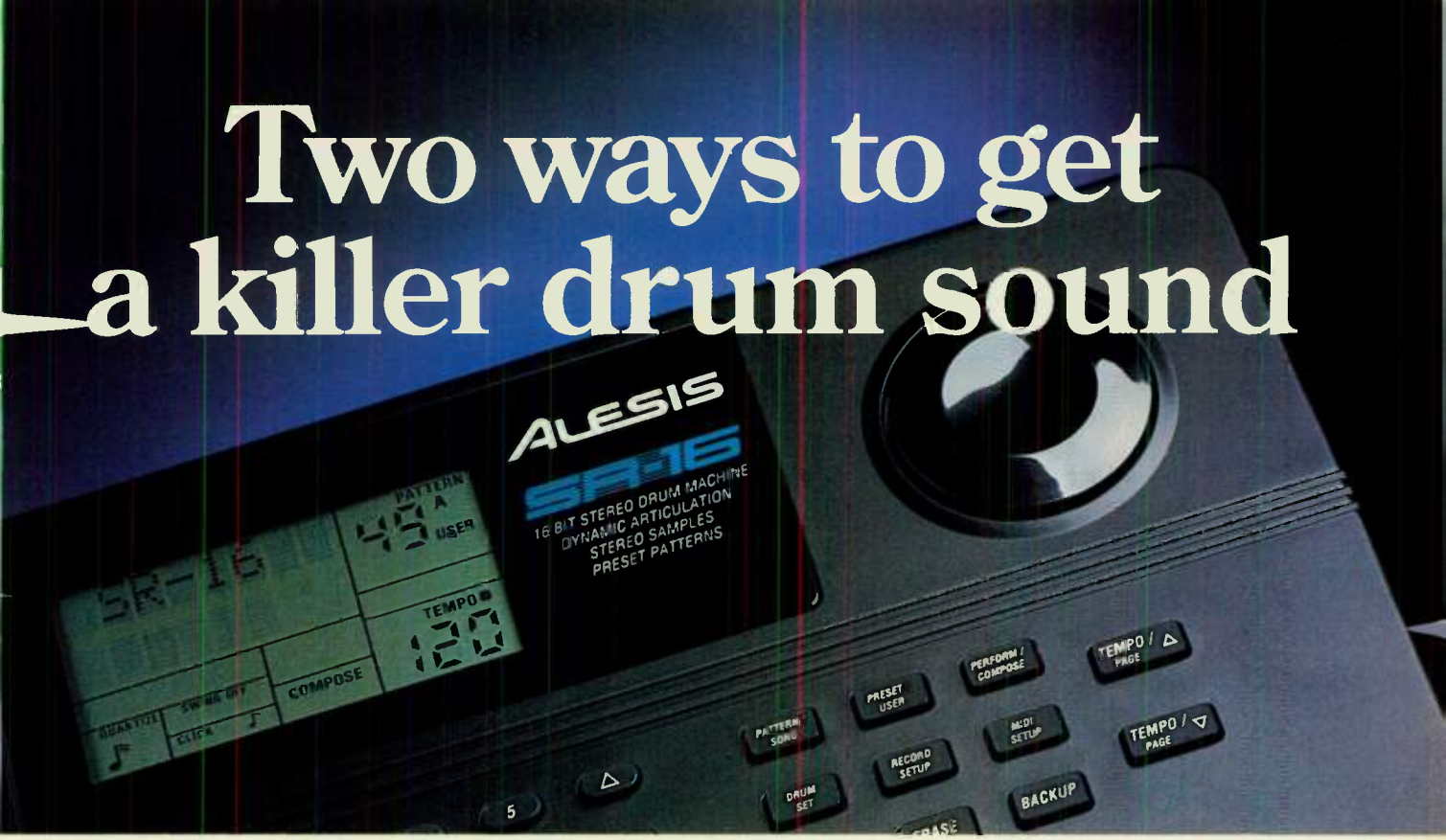
THE CHOICE IS YOURS

Manufacturers are designing keyboard instruments with capabilities that far exceed the previous generation at prices that are no more, and often less, than in the past. Such is the legacy of digital technology. At this rate, we'll all have keyboard synth workstations with integrated digital audio recording and mixing costing no more than today's instruments by the end of the decade. Until then, the current generation of keyboard synths offer generally excellent value for musicians of all stripes.

The information in this guide is meant as a starting point. After giving careful consideration to your needs and the features presented here, the final (and most important) analysis is yours. Sit down with the most likely candidates and give them a good, long try. How do they feel? How do they sound to your ears? How well can you get around the user interface? The answers to these questions will determine the winners in your own search for the perfect keyboard synth. Happy hunting!

EM *technical editor* **Scott Wilkinson** *enjoys going to the NAMM show for some rest and relaxation—NOT!*

Two ways to get a killer drum sound



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ALESIS STUDIO ELECTRONICS

DO ✦ IT YOURSELF

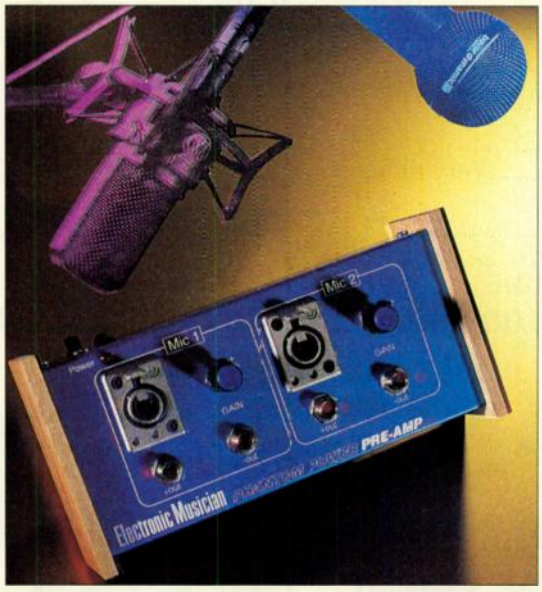
Build the EM Phantom-Power Microphone Preamp

A quality preamp is a must for mastering microphones.

By Jules Ryckebusch

Your home studio is complete—or is it? The sequencer is locked to tape, MIDI messages are conducting a full-blown digital orchestra, and stereo effects are flying left and right. Now, it's vocal time. But your board only has line-level inputs. More likely, it has mic inputs, but there is no phantom power for your new condenser mic, or the onboard mic preamps sound like Niagara Falls. What to do? You can spend an arm and a leg for a new mixer with high-quality preamps, or you can build the EM Phantom-Power Microphone Preamp. This do-it-yourself project costs much less than a new board and is easy to build.

To start with, it's important to understand the basic theory of sound, microphones, and phantom power. Sound is nothing more than fluctuating changes in air pressure that travel from the sound source outward in "waves," much like the ripples on the surface of a pool into which a stone is dropped. When sound waves reach our ears, the eardrums vibrate in response to the changing air pressure. This physical vibration is converted into electrical nerve impulses, which results in the perception of sound. Microphones operate much like the eardrum, converting a physical vibration into an oscillating electrical signal.



Finished EM Phantom-Power Microphone Preamp.

PETER DIGGS

MIC TYPES

Microphones come in two flavors: dynamic and condenser. All mics have a thin diaphragm of one sort or another within a protective screen. In dynamic mics, the diaphragm has a small coil of wire attached to it, and the whole assembly is mounted so the coil is located near a magnet. When sound waves reach the diaphragm, it vibrates in response. This causes the coil to vibrate near the magnet, which in turn causes a small, oscillating electric current to flow in the coil. This oscillating current corresponds to the original sound wave. (For more on microphones, see "Basic Studio Series: Microphone Primer" in the March 1990 **EM**, "From the Top: Microphones Made Easy" in the November 1991 issue, and "EM Guide to Microphones" in the December 1991 issue.)

Condenser microphones work by varying a capacitance value, which is how this type of mic got its name; capacitors used to be called condensers, or so Grandpa Ryckebusch tells me. Once again, a diaphragm vibrates in response to an incoming sound wave. But instead of attaching anything to it, a film of gold several hundred atoms thick is sprayed on the diaphragm. The diaphragm must be conductive while remaining as light and flexible as possible.

An electrical capacitor is formed by placing the diaphragm next to a flat, metal plate. The capacitance is proportional to the area of the two plates and inversely proportional to the distance between the plates. The closer the plates, the higher the capacitance. When the diaphragm vibrates in response to sound waves, the capacitance changes. By placing a charge on the capacitor, a small current flows as the capacitance changes. As with a dynamic mic, this current corresponds to the original sound wave. The charge on the capacitor is supplied by a battery or remote DC supply, often built into the mixer, which transparently delivers power through the mic cable. The latter method is referred to as "phantom power."

Unfortunately, the current in a condenser microphone is smaller than a dynamic mic, and the impedance of

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Scott Wilkinson
Electronic Musician
December 1992

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PC Magazine, October 27, 1992

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INFO WORLD, September 1992

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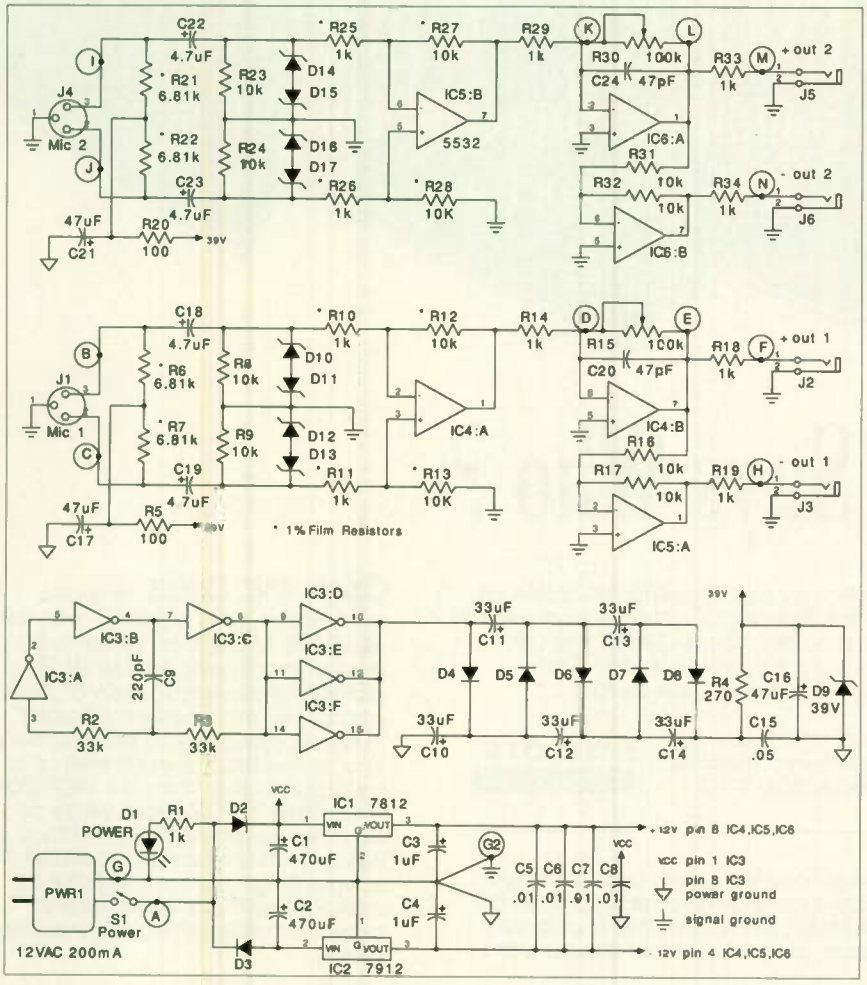


FIG. 1: The schematic for the EM Phantom-Power Microphone Preamp. The lower half of the diagram depicts the power supply with its voltage tripler, which supplies phantom power. The upper half depicts the two preamps with their associated output-phase inverters.

the condenser element is very high. Attaining a usable signal level requires an internal preamp, which also serves to bring the signal level up a little higher. Older condensers used tubes for this purpose, while newer ones use FETs (Field Effect Transistors). Aside from charging the capacitor, phantom power is used to power the internal preamp. Thanks to their lighter diaphragms, condenser mics exhibit a better frequency response and sound better in general. They are also more delicate, so don't use one to close-mic a kick drum.

HOW IT WORKS

The EM Mic Preamp actually includes two input channels to accommodate two microphones. The circuit is relatively simple (see **Fig. 1**). There are three basic blocks: the power supply, the preamps themselves, and the output phase inverters. Each input has two outputs, one of which is 180° out-of-phase with respect to the other. These can be used as a balanced output, or for some neat miking techniques. (More on this in a moment.)

The power supply took more time to devise for this project than the gain stages. John Simonton of PAiA Electronics deserves credit for its final form. I did some experimenting with a variable supply and discovered that most condenser microphones work down to about 10 volts, and I heard no difference in sound quality from 30 to 50 volts. Most professional mixing boards provide 36 to 48 volts of phantom power. In the EM Mic Preamp, the phantom power is 39 volts and comes from a voltage-tripler circuit.

The first three stages of a 4049 CMOS hex inverter (IC3) form a 20 kHz oscillator. The last three stages are arranged in parallel, for more current, and drive a voltage-tripler circuit consisting of capacitors C11 to C14 and diodes D4 to D8. Look Ma, no transformer! The output is filtered and regulated by zener diode D9. The supply can deliver about 12 ma of current at 39 volts, which is plenty for two microphones. The rest of the supply is a standard, half-wave regulated, split supply—just what op amps like.

The preamps each include two gain stages, with some input coupling circuitry to get the phantom power to the microphones. Since the preamps are identical, I'll describe only the lower one in the schematic. The 6.81 kΩ resistors (R6, R7) couple the phantom power to both active input lines (XLR pins 2 and 3). This is the AES standard. The 47 µF capacitor (C17) and 100Ω resistor (R5) provide additional filtering, while the two 4.7 µF capacitors (C18, C19) couple the audio input to the first gain stage. The 10 kΩ resistors (R8, R9) provide a ground reference, while the four zener diodes (D10 through D13) provide protection to the amplifier circuitry. Note their back-to-back wiring. If a voltage at the input exceeds the reverse conduction voltage of the diodes, the signal will be shorted to ground, protecting the op amps.

Two gain stages are used to improve the bandwidth and frequency response of the preamp. Op amp IC4:A and the associated 1 kΩ (R10, R11) and 10 kΩ (R12, R13) resistors form the first gain stage, a true differential amplifier. It has a voltage gain of about 20:1, and with 1% resistors, an acceptable common-mode rejection ratio.

The second gain stage consists of op amp IC4:B and the 1 kΩ resistor (R18) and 100 kΩ gain-adjust potentiometer (R15). The 47 pF capacitor (C20) in the feedback path rolls off the high-frequency response above 30 kHz at full gain. This second stage provides an additional voltage gain of up to 100:1. The total available gain is in excess of 60 dB, more than enough for most applications.

The inverter stage built around IC5:A provides an output that is out of phase from the normal output. As mentioned earlier, this is handy when using multiple mics, or wiring balanced outputs.

CONSTRUCTION

The circuit is pretty simple, but due to the high gain levels, some care must be taken. Grounding is of the utmost

importance. To prevent ground loops, all grounds should return to one central point, preferably as close to the regulators (IC1 and IC2) as possible. Also, pay attention to the layout of the circuit's input and output wiring. Keep the wires as far apart as possible. Use shielded wire for the input lines. AC signals have a way of coupling themselves to places you don't want them, especially with high-gain amplifiers.

Many of the resistors for this project are 1% metal-film. They generate as little noise as possible and are not as expensive as you might think. The op amp is the Signetics NE5532, the standard audio op amp to which others are compared. I also tried the OP-275 from Analog Devices. It has better specs and works well, but it's difficult to find in small quantities. The Analog Devices AD-712 should also work well. *Do not use Radio Shack op amps;* they simply do not perform well. The small bypass capacitors (C5, C6, C7) located near the op amps on the circuit board (see Fig. 2) are required for stability. These have a frequency response extending into the megahertz range.

Caution should also be taken around the 39V power supply. Large sparks will fly if you short it to ground, possibly damaging the circuit. Please check all your wiring twice before plugging in the wall wart. I like to take a short break between the time the final wire is connected and the visual inspection. It really helps.

USING THE PREAMP

Once you've checked the wiring again

PAIA KITS

Complete kits for this project are available from PAiA Electronics, 3200 Teakwood Ln., Edmond, OK 73013; tel. (405) 340-6300; fax (405) 340-6378.

Phantom-Power Mic Preamp (9215k): $65.25 (includes all components, circuit board, instructions, no case)

Preamp case (9215c): $17.75 (punched, anodized, printed)

Please include $4 s&h per order. For circuit-board foil patterns, please send a 2-ounce SASE to PAiA.

and plugged it in, connect one of the positive outputs to your mixing board or tape recorder and set the channel faders and masters to nominal settings. Connect a condenser microphone and bring the gain up just enough to get the job done. This keeps the signal path as clean as possible. All too often, people turn up the gain on the mic pre-amp too much and then either over-compress, or turn the channel fader down to compensate. This limits the dynamic range and brings you closer to clipping, which distorts the signal. This circuit can provide more gain than you should ever need for most situations.

▼

Capacitors used to be called condensers, or so Grandpa Ryckebusch tells me.

Now let's take a look at those inverted outputs. They are perfect for MS (mid-side) stereo miking. If you have never tried this, you should; it sounds awesome. You need three input channels on a mixer and two microphones, one of which must be a dual-capsule condenser. This means it actually has two mic elements inside and a switch for different pickup patterns (AKG 414s are perfect for this).

Set the dual-element mic for a figure-eight pattern; this lets it pick up signals from both sides equally well. Place the pickup faces perpendicular to the sound source so the mic catches all the side sounds but not the direct signal. Place the other microphone right next to the first, pointing toward the sound source to pick up the direct signal. If it's another AKG 414 (I should be so

PARTS LIST

Capacitors		**Connectors**	
C1, C2	470 µF/25V electrolytic	J1, J4	Panel-mount female XLR
C3, C4	1 µF/16V electrolytic	J2, J3, J5, J6	¼-inch phone jacks
C5-C8	0.01 µF ceramic disk		
C9	220 pF ceramic disk		
C10-C14	33 µF/16V electrolytic		
C15	0.05 µF ceramic disk	**Potentiometers**	
C16, C17	47 µF/50V electrolytic	R15, R30	100 kΩ
C21	47 µF/50V electrolytic		
C18, C19	4.7 µF/35V tantalum	**Resistors (1/4W, 5%)**	
C22, C23	4.7 µF/35V tantalum	R1, R14, R18, R19	1 kΩ
C20, C24	47 pF ceramic disk	R29, R33, R34	1 kΩ
		R2, R3	33 kΩ
Diodes		R4	270Ω
D1	Red LED	R5, R20	100Ω
D2, D3	1N4001	R8, R9, R16, R17	10 kΩ
D4-D8	1N4148	R23, R24, R31, R32	10 kΩ
D9	39V/400 mW zener		
D10-D17	6-12V/400 mW zener	**Resistors (1/4W, 1%)**	
		R6, R7, R21, R22	6.81 kΩ
Semiconductors		R10, R11, R25, R26	1 kΩ
IC1	7812 +12V voltage regulator	R12, R13, R27, R28	10 kΩ
IC2	7912 -12V voltage regulator	**Other components**	
IC3	4049 CMOS hex inverter	PWR1	12 VAC/200 mA wall-mount transformer
IC4-IC6	5532 dual low-noise op amp	S1	SPDT switch
		Circuit board	
		Case	

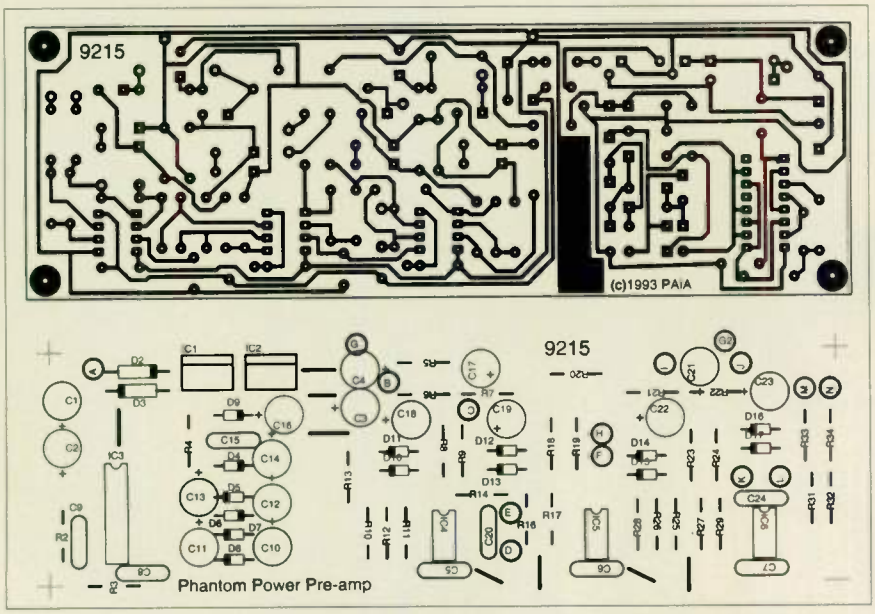


FIG. 2: EM Phantom-Power Mic Preamp circuit-board foil pattern (top) and component layout.

lucky), set it for a cardioid pattern. From the dual mic, take the two outputs (in-phase and out-of-phase) into two mixer channels, and pan them hard right and left. To achieve correct levels on the input faders, listen to the mic in mono and slightly adjust one input level to minimize the signal. Bring in the second mic panned center.

I have used this technique with my Tascam Porta One with superb results. It also works well on overhead drum-miking. Listen to any acoustic guitar on Windham Hill Records, and you will probably hear MS miking. The inverted outputs are also useful with other stereo mic configurations.

For balanced outputs, wire up a male XLR jack: pin 1 to ground, pin 2 in-phase, pin 3 out-of-phase.

The EM Phantom Power Mic Preamp is a quiet, functional piece of studio gear. It was tested with an AKG 414, AKG 451 (several variations), Shure SM81, and a couple of electret condensers, which only use phantom power for their internal preamps. If you have always wanted that condenser clarity, but didn't want to buy a new board just to get phantom power, or you do a lot of location recording with less-than-adequate mic preamps, this project is for you.

(Thanks to Greg Rike Productions for the use of their microphones and console comparison checks.)

Jules Ryckebusch *teaches nuclear science at the Naval Nuclear Power School in Orlando, Florida.*

Electronic Artisans

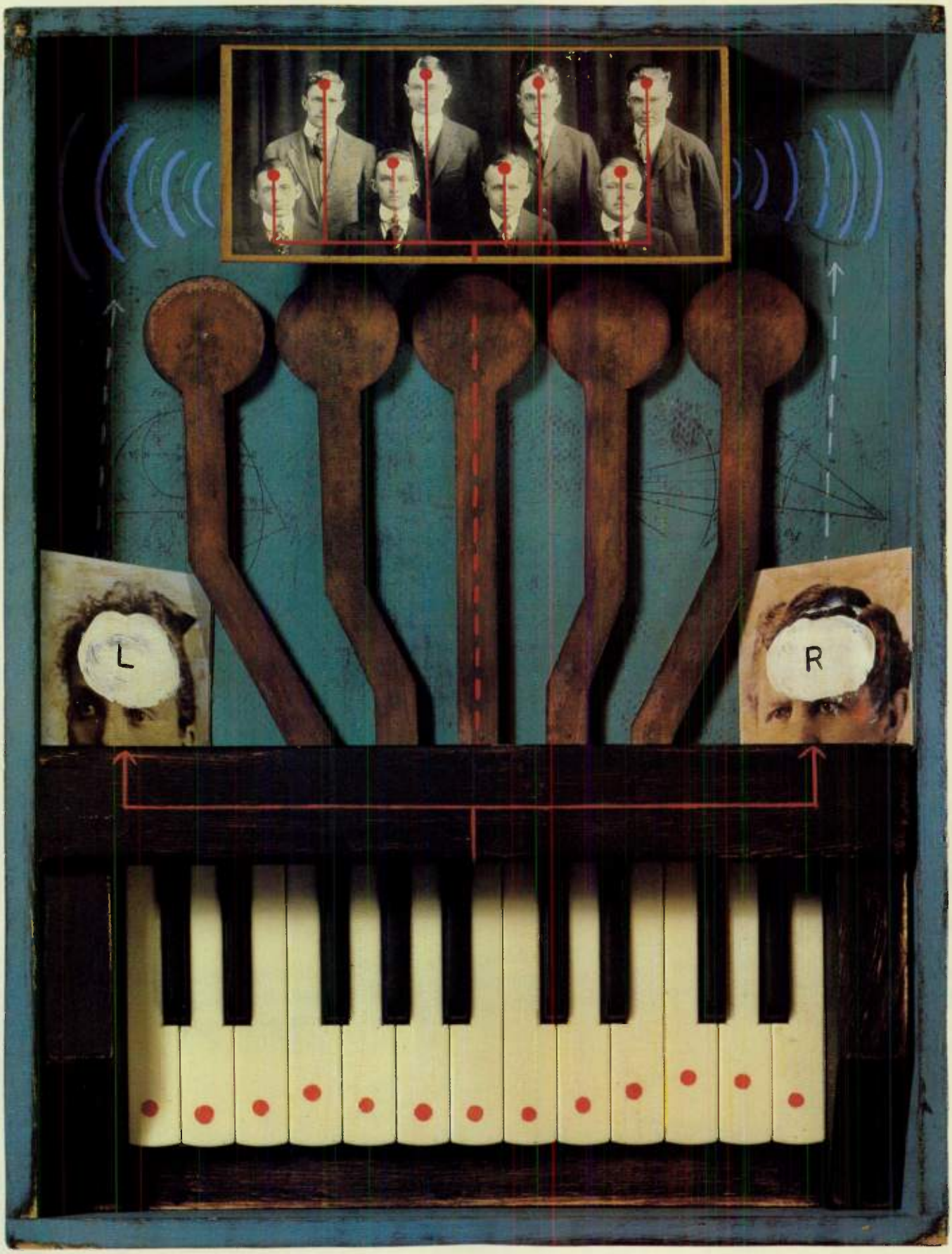
By Edward Tywoniak

A behind-the-scenes peek at how synthesizers are made.

Across the Pacific Ocean in a pastoral Japanese location, a large Yamaha manufacturing plant lies comfortably nestled in a beautiful, wooded valley. Inside the plant, from an observation platform high above a cavernous building, you look down at a visionary world of countless robotic devices performing every conceivable task, from circuit board assembly to parts delivery and inventory management. Let your gaze peer further into this manufacturing labyrinth and you will see juxtaposed against the *dance mechanique* of these high-tech automatons the flesh and blood of highly skilled artisans, painstakingly carving a harp for a soon-to-be piano or finely etching a filigreed pattern on a just-completed saxophone. This is the realm of the dream makers; the place where visions are crafted into products. It is here that silicon meets flesh and artificial intelligence meets human creativity.

Although U.S. manufacturers such as ARP, Moog Music, E-mu Systems, and Buchla & Associates were the first to develop the electronic family of musical instruments, Japanese competitors quickly grabbed a major share of the marketplace through innovative manufacturing techniques and clever utilization of available technology. Yamaha's release of the DX7 in 1983 heralded a

Illustration by Gary Tanhauser



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JIM CHECK THIS OUT! DALE

November 17, 1992

Dale Kauffman
Crown Service

Dear Dale,

Reliable Music is a warranty service center for over 30 brands. As service manager, I spend quite a bit of time arguing with manufacturers about their warranty policies. So many of them want me to jump through all kind of hoops to service their equipment, and then pay me so little that I lose money on every repair. They want receipts, they want old parts, they won't accept NARDA forms, they provide me with miserable schematics (and no training), their parts departments constantly mess up my orders, and they expect me to put up with all this for virtually no money.

The last time I was on the phone fighting for some semblance of fairness, it occurred to me that I'd never, ever had this sort of conversation with Crown. I mentioned the thought to the person on the other end of the line (customer service manager of one of your competitors), and his reply was "yeah, but that's Crown !" End of discussion. As I hung up, having had my simple request refused, I thought about what that meant. Apparently, your competition considers your level of service an unreasonable, unattainable standard that they can't possibly match, and, so they think, still be competitive. The week before, I had told yet another manufacturer about your policy of letting me charge you list price for warranty parts."That's crazy", he said."Why would they do that?" Both these men are smart guys in upper positions in their companies, but they just don't get it.

And I'm giving up trying to tell them. I'll tell you instead what your fairness and support buys you; when a potential customer walks in my shop to ask my opinion on what type of amp he should buy, I answer without hesitation "Crown". If someone asks me how Crown amps are from a service standpoint, I tell them quite honestly they rarely break, and if they do, the customer will be taken care of. Quickly. At no charge. To their satisfaction. I'm confident about that, just as I'm confident a new Crown product will work well, that I'll be able to get parts and service manuals for it and that if it can't be repaired, you'll replace it.

What I'm trying to say is that my shop has your unqualified support, and customers know it, which is only one reason we sell so much Crown. If every company I dealt with understood this, my life would be so much simpler, but no one else shows signs of getting it so totally, completely right. My loss, your gain, I guess.

Thanks, guys.

Steve Stoeckel
Service Manager
Reliable Music

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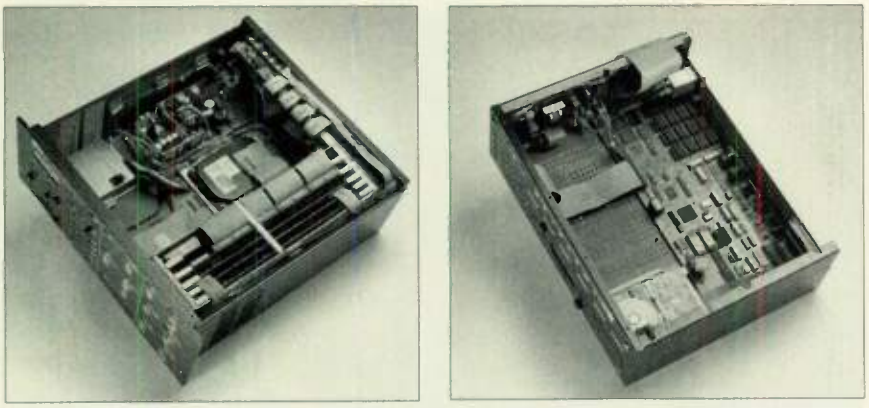


FIG. 1: Developments in integration allowed E-mu to dramatically reduce the part count of the vintage-1988 E-III ($13,995) to the more powerful vintage-1992 E-IIIxs ($4,495).

watershed period for electronic instruments and opened a floodgate of imported Japanese instruments into the U.S. market.

A decade later, the competition between manufacturers is as fierce as ever. Many of the manufacturing pioneers of yesterday are now just footnotes in the historical evolution of the industry. The surviving companies have made it by implementing unique strategies that ensure both a satisfied end user and a healthy bottom line. The key to both goals is designing and building good products.

INITIAL DESIGN CONCEPTS

Most of today's top manufacturers concur that the first phase of product development—the inception of the initial product idea—is one of the most crucial. It's at this "think tank" stage that intellectual concepts begin to find roots as potential products. "At Ensoniq, we have a fundamental rule in each new product we design, which is to not just put out another keyboard, signal processor, or whatever, but to try and go in and make a difference," comments the company's director of marketing for musical instruments, Jerry Kovarsky. "We don't want to make 'me too' products."

Kovarsky adds that the ultimate question is, "How do we make products that people want at a price they can afford? At Ensoniq, we always start out with a target price for a new instrument. Then we assess what features people want and balance that with what our engineers tell us is possible at the targeted price point. The goal is always bigger, better, and cheaper."

Jack Hotop, keyboard product manager at Korg USA, echoes this feeling. "There is always a series of demands and compromises when designing a new instrument, but ultimately we are all dream-machine junkies. The problem is that it's easier said than done."

Indeed, ideas are cheap and plentiful. The difficult task is deciding which ones to incorporate. Gone are the days of building an instrument just because you can. Instead, most manufacturers look to customers to determine important features. "To ensure that our instruments are reflecting the needs of the world market and not just our own engineering desires," states Hotop, "it is paramount that we get as much input as we can from working musicians. You must listen to what people want."

Focus groups play a key part in most companies' assessment of the needs and profiles of their targeted group of users. At Ensoniq, Kovarsky says that "Our strategic analysis includes our interaction with the dealer personnel that attend our twice-monthly Ensoniq training school. Artists from all walks of life also provide us with input, and we rely on traditional market-assessment techniques."

Rod Revilock, product development manager of Korg USA, says that "marketing and management people provide valuable input on prototype feature specs, as well as initial price-point structures." Hotop adds that "feature specifications are developed in part from ideas that we want to see in a product, in part from feedback we receive from our installed user base, and in part from our reaction to what our competition is doing with their products."

Pete Hayes, vice-president of marketing for E-mu Systems, adds, "Often manufacturers get trapped into images: 'All a company does is make samplers, or effects processors, or whatever.' If we only listened to the perceptions of what people think we do, we might never expand into new product areas."

Hayes concludes, "When all is said and done, you still must rely on your gut feeling and ultimately trust in your own experience."

PRODUCT DEVELOPMENT

In many ways, the second stage of product development is the most strategically important. It is in this phase that tough questions have to be answered on virtually every aspect of the instrument's design, from packaging to interface and beyond.

Often referred to as the "alpha stage," this intermediary step allows the engineering teams to assemble early prototypes for testing and evaluation. Jack Hotop comments that "at this point in development, people in the voicing group begin to develop a unit's ROM. We work closely with the design engineers to provide constructive feedback on what works and what doesn't in terms of the feature spec.

"Teamwork is critical at this stage," he continues, "although many engineers are not receptive to initiating design changes midstream in a product's development cycle."

"In order to build a quality product," says Jerry Kovarsky, "manufacturing

The keyboard assembly at Yamaha's Toyooka, Japan, factory, where electronic musical instruments are manufactured.

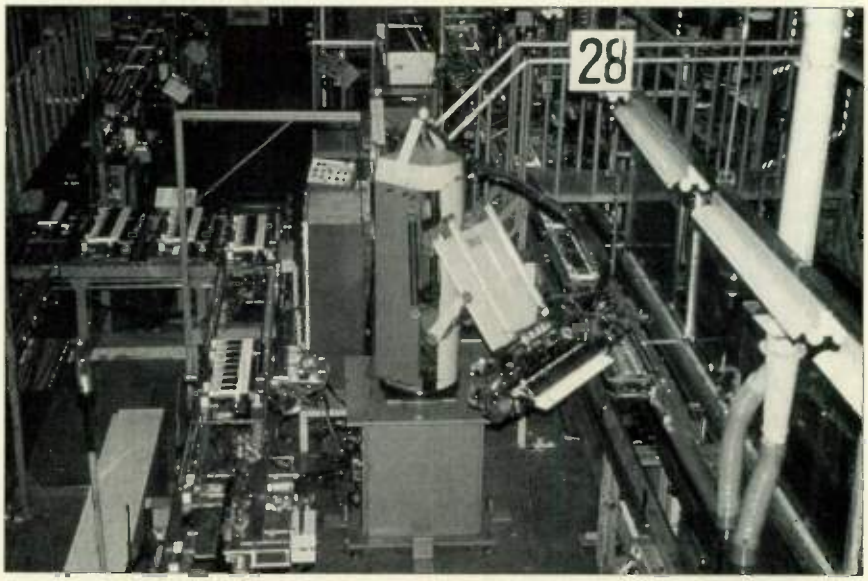
and engineering must work hand in hand from the outset. A partnership all along the way is critical to guarantee maximum throughput at product release."

MANUFACTURING PROGRESS

To maintain the impressive price/performance ratio that all synthesizer manufacturers have employed over the last few years, they've needed to rely on circuit integration. By shrinking numerous components into a single chip or two, manufacturers can offer more power at a lower price. The implementation of this principle is impressive (see Fig. 1). "A look at the inside of an E-IIIx virtually underwhelms you in its simplicity of design and form," comments E-mu's Hayes.

David Fox of Kurzweil also points out that simplicity of design lies at the heart of most of his company's products. "We have gone to a custom VLSI chip set with software-definable hardware, which allows for future product expansion while minimizing the obsolescence factor."

Achieving large-scale integration is an expensive process. Consequently, most manufacturers amortize the development costs of new custom chips over several products. Japanese manufacturers, in particular, often use similar technology in many different models. The usual reasoning is that different applications require different types of products. According to Roland vice president Nancy Kewin, "The sound is the most critical aspect, of course, but there's a lot more that makes up the



The roboticized assembly lines used in Yamaha's electronic factories are a major part of the company's Computer Integrated Manufacturing system.

character of an instrument. An instrument's human interface, for example, is a key factor in a product's overall design philosophy. Plus, even though instruments might share a similar sound chip, different wavetables are voiced for unique applications. So in the end, not that much is shared between products."

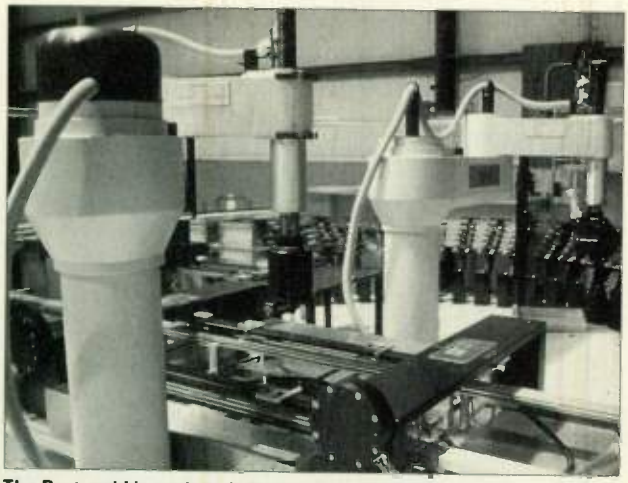
Developments in integration are also time-consuming. The typical gestation period for most new synths is about two years, if it's based around a new technology, or several months, if it's an improvement or upgrade to an existing product. During this development period simultaneous design processes must parallel each other every step of the way in order to ensure that all aspects of the instrument are completed at one time.

When all is said and done, it is the sound of a synthesizer that represents its heart and soul. While hardware and software engineers are still collegially engaged in arguments over subleties in editing parameters and user interface, voicing experts are already developing the sound set for the new product. To this end, synthesizer manufacturers spend a great deal of time and research dollars studying current research in sound-generating techniques and then deciding what, if any, should be included in an instrument's synthesis engine. As Jack Hotop puts it, "Music is the priority, and the stuff has to sound good if people are going to buy it."

According to Hartley Peavey, "The same instrument may have to be voiced differently for different countries in order to meet preconceptions about what a certain type of instrument should sound like."

E-mu's Pete Hayes adds, "A tremendous amount of time is spent on creating the sound sets. This is where science and alchemy come together. This is the real magic."

Not all aspects of synthesizer manufacturing are automated. Here a worker hand assembles a wire harness for a Yamaha electronic keyboard.



The Bart and Lisa robots in Peavey's keyboard factory.

FINAL PRODUCTION

The Yamaha plant described at the top of this article reflects how many of the newly built manufacturing centers are designed. Mike D'Amore of Yamaha remarks that, "As expected from a massive manufacturer like us, a tremendous amount of cutting-edge technology is utilized in the fabrication of our products." Kenji Unno, of Yamaha's corporate office in Japan, goes on to say, "Industrial robotics play a significant role in all facets of Yamaha's massive manufacturing infrastructure, and further research in this area continues to be a high priority for us." D'Amore adds, "Our industrial design group is currently handling research in integrated production systems, which result in everything from raw materials to parts being supplied on premises at the plant."

Korg Inc., founded in 1962, is now owned by Yamaha's parent company, Nippon Gakki, and while the two are still fierce competitors, Korg has gained from its Yamaha alliance. This is reflected in the recently completed construction of a new Korg manufacturing plant headquartered in Hanazono just outside of Tokyo.

Like its Yamaha sister plants, the new Korg facility, completed in April 1992, boasts mechanized assembly lines and advanced research tools for future product development. Korg's newest plant was built with the aim of providing a turnkey system that incorporates production and sales distribution. Based on the CIM (Computer Integrated Manufacturing) concept, Korg's factory includes such innovations as free-flow production lines with classified product dispatch, allowing for greater flexibility in product-line integration; line-control automation with data carriers and barcodes, to meet the needs of multi-specification production; and common use of sales-control system data by all units in the manufacturing plant to allow for greater utilization of "just-in-time" parts procurement.

The CIM manufacturing system also lies at the core of Peavey Corporation's massive manufacturing empire, which now employs two thousand people spread out over 1.3 million square feet in a twenty-building complex. Hartley Peavey recounts, "It was only a couple of years after I started the company that I brought a copy lathe over from Europe, which we retrofitted to make guitar necks." It was this leap into automated manufacturing that embarked Peavey on a three-decade crusade to develop the latest in industrial technology.

Skip Taylor, Peavey's director of digital development, says, "Computers now play a major role in every facet of Peavey's operation. Two giant IBM mainframes serve the computing needs of the company; we have an IBM 3090 and a newer, more powerful IBM ES9000 Model 520. Sun workstations are found throughout the company, as well as a variety of other, smaller PCs, and over three hundred terminals link into the IBM mainframe system."

The use of computers in the manufacturing process has also been an evolutionary process. Starting with CAD (computer-assisted design) programs that allowed engineers to mock-up potential product ideas on a computer screen, Peavey then advanced to the next level of automation: CAM (computer-aided manufacturing). CAM systems integrated manufacturing processes into the design elements, allowing for a more streamlined and efficient way of bringing products to fruition.

STUFF WE TAKE FOR GRANTED

Even though we buy musical instruments for their features and sounds, we actually get much more when we take final delivery of the unit.

The owner's manual, for example, is a major undertaking. Japanese companies, in particular, have a difficult time with the development of technical publications due to their tremendous number of exports throughout the world. Roland Corporation, for example, ships 80 percent of their units abroad, which means four out of every five manuals need translation. Because of delays due to translation, documentation can become obsolete before the unit even ships.

Even without language problems, the

Peavey's circuit-board assembly lines are highly sophisticated.

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techno-jargon usually associated with user manuals is enough to daunt even seasoned professionals. For this reason, Kurzweil and others have begun to produce video manuals as another means of providing product support. These types of multimedia formats for owner's guides—while often more expensive and more time-consuming to produce—may become the rule rather than the exception in future generations of instruments.

Quality-control assurance is another aspect of manufacturing that's often taken for granted. "Burn-in" time for each unit manufactured is a standard industry practice, but can be time-consuming and costly. Thankfully, developments in testing equipment coupled with advances in materials fabrication, allow manufacturers to provide a degree of ruggedness, durability, and portability that was virtually unheard of just a few years ago.

Although it may not be high on the priority list of essential features, companies such as Peavey are also packaging their products with recycled cardboard and other reusable materials.

CONCLUSION

The instruments once thought to be merely flights of fancy have become the everyday tools of the trade. And as each generation of instrument matures, quantum leaps of progress in design and cost effectiveness are made. But the companies responsible for bringing these ingeneous instruments to market have had to make tough decisions every step of the way. In the face of economic hardships, an overwhelming acceleration of technological advancements, and an ever-increasing wariness on the part of today's knowledgable buyer, they're now forced to tread even more lightly.

But it's still safe to say that as long as there are dreamers with visions of how things ought to be, we will never find ourselves short of the tools that allow us to realize our own creative and artistic visions. After all, as "dream-machine junkies," it's all that we can do.

Edward Tywoniak *is an educator, author, composer, and performer living in the San Francisco Bay Area. When time permits, he raises a family and takes his dog for walks.*

STOP, LOOK, LISTEN!

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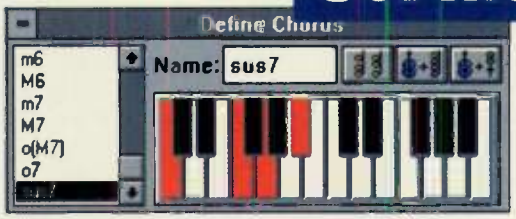

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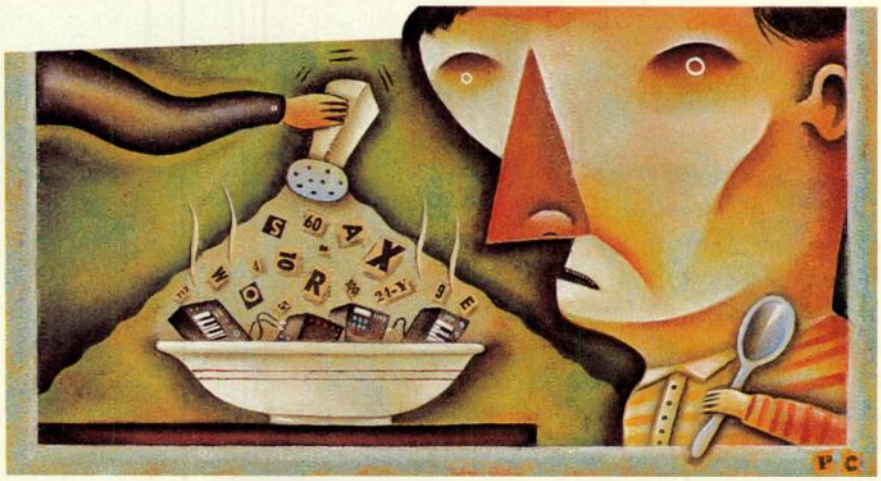
Alphanumeric Soup

By Scott Wilkinson

Where do they get those wacky model numbers?



Have you ever wondered how electronic music manufacturers come up with model numbers? Sure, some seem clear enough, but others are straight out of left field. Perhaps those letters and numbers don't mean anything and the manufacturers are just trying to drive us crazy.

And why are products identified with letters and numbers instead of regular names we have some chance of remembering? Some generational products simply add letters and numbers to an already cryptic moniker, while others sport a completely new name altogether. You can't even tell the players anymore without a score card. It's time to unravel the name puzzle.

WHAT'S IN A NAME?

Clearance presents a big problem. Names like Spatializer or Eliminator are easy to remember, but companies that have already used a particular name for a product take a dim view of seeing it on something else. After all, they don't want potential customers to buy a super-soaker water gun called The Eliminator after seeing an ad for a synthesizer of the same name.

The clearance problem is bad enough in the U.S., where similar products cannot legally use the same name. In Japan, however, the law applies to *all* products. When Korg was trying to come up with a name for the 01/W, they considered the name Genesis. But the Japanese clearance search was so frustrating that Korg gave up on using a real name and opted to use letters and numbers.

Real names were more common in the early days. Remember the Moogs (Mini, Poly, and Memory)? Lovely family. There are even a few instruments that use real names today, such as E-mu's Emulator, Proteus, and Vintage Keys; Korg Wavestation; and Waldorf MicroWave (is dinner ready yet?). Some instruments avoid the clearance problem by using made-up or creatively spelled names, such as the Oberheim Xpander and E-mu Emax, ProFormance, and ProCussion. Another instrument with a real name was the Ensoniq Mirage. It began shipping in 1984, but the final clearances for the name in all world markets were not obtained until 1989.

The story of Roland's J-series of instruments begins over 2,000 years ago. According to Roman mythology, Jupiter was the most powerful god and the ruler of heaven, and Juno was his wife. If you're old enough, you might remember that Roland once used the name Jupiter for their most powerful instruments and Juno for the lower end of the line, following long-standing gender roles. Although these instruments have long since vanished, the legacy of their names lives on in model numbers based on the letter "J".

Sometimes, a model number actually reflects a fundamental aspect of the instrument. Many of Roland's model numbers have followed this idea. For example, the DEP-5 was a Digital Effects Processor with five different effects. Their Synchronization BoXes are designated by the letters SBX. The DM-80 is an 8-track Digital Multitrack hard-disk recorder (although the use of the number 80 instead of 8 is somewhat mysterious). Ensoniq also adopted this concept with the DP/4, which stands for Dynamic Processor with four independent effects processors. (The official product designation is Parallel Processor, but the model number PP/4 wasn't a viable option.)

THE NEXT GENERATION

The idea of evolution and generations within a product line is mind-boggling. What do they do, breed instruments in the back room? One of the most complex family trees comes from Ensoniq (see **Fig. 1**), which has three major branches: samplers, low-end synths, and high-end synths. The naming conventions in this tree follow two completely different philosophies: names that mean something and names that don't.

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In general, the samplers have meaningful acronyms, while the synth names may or may not mean something.

The sampler that followed the Mirage was the EPS, which stands for Ensoniq Performance Sampler. The next generation was the EPS-16 Plus, so called because it used 16-bit resolution and included a bunch of other new features.

In the current generation, Ensoniq decided to change the family name to ASR-10, which maintains the tradition of meaningful acronyms. ASR stands for Advanced Sampling Recorder, while the number was selected because it's nice and round. However, people began to ascribe meaning to the number after the fact; the instrument was made during Ensoniq's ten-year anniversary, the onboard sequencer has eight tracks in addition to two audio inputs for processing external signals, and so on. Ensoniq representatives just smile and say, "Yep, that's what the number means, all right."

The low-end synth line started with the ESQ-1. The letters ostensibly denote the fact that this Ensoniq instrument included a Synthesizer and seQuencer. Yamaha had already begun to associate the letter Q with sequencers in their QX line of hardware MIDI recorders, and Ensoniq decided to maintain that convention. Coincidentally, ESQ also evokes the company name quite well.

The ESQ-1 evolved into a higher-end instrument called the SQ-80 (synthesizer and sequencer; no meaning in the number), which led to the VFX (cool combination of letters, absolutely no meaning). This high-end branch of the tree grew to include the VFX^{SD}, which indicated the addition of a sequencer and disk drive. Apparently, they abandoned the convention of denoting sequencers with the letter Q. Otherwise, the instrument would have been called the VFX^{QD}, which would have quickly been dubbed the VFX-Cutie throughout the industry. To avoid the trap of ridiculously long model numbers, the next generation was called the SD-1, followed by the SD-1 32 Voice (it's getting long again).

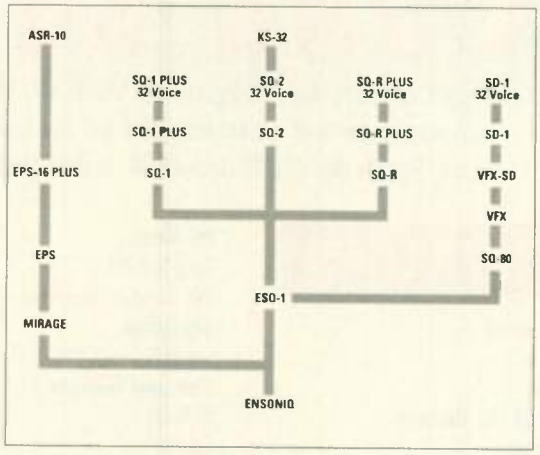


FIG. 1: Ensoniq's synth and sampler family tree.

Meanwhile, the low-end product line was discontinued for a while and then later resurrected with the SQ-1 keyboard and SQ-R rack-mount instruments. The next generation included the SQ-2, SQ-1 Plus, and SQ-R Plus, all of which included improved piano samples among other enhancements. As technology marched inevitably onward, all of these models added the designa-

tion "32 Voice" to their already lengthy monikers to indicate their increased polyphony. The current member of this line is the KS-32, which avoids the tangled web of model numbers while continuing to indicate 32-note polyphony.

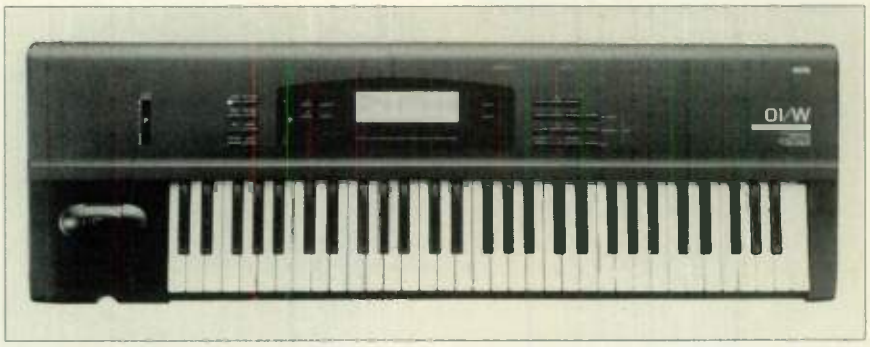
I've always wondered how the Korg 01/W got its name; most electronic music products start with letters followed by the numbers. It turns out that the model number M10 was one of the top candidates for the new instrument. This makes sense, considering it represented the next generation of M1 technology. But there was dissention among the ranks; not everyone liked the idea. In a flash of creative insight, the founder of Korg, Tsutomu Katoh, turned the model number upside down, and the 01/W was christened.

The evolution of the Yamaha DX7 also can be traced by numbers. Unfortunately, Yamaha seems to avoid spaces and hyphens like the plague, sometimes resulting in model numbers like DX7IIFD (translation: second-generation DX7 with a floppy disk drive). The low end of the second generation was the DX7S, making it impossible for journalists to write about the instrument in the plural. ("There were seven DX7Ss on stage.") The second generation of the Kawai K1 is called the K1II, which creates all kinds of confusion, especially if the font exhibits very little difference between "1" and "I."

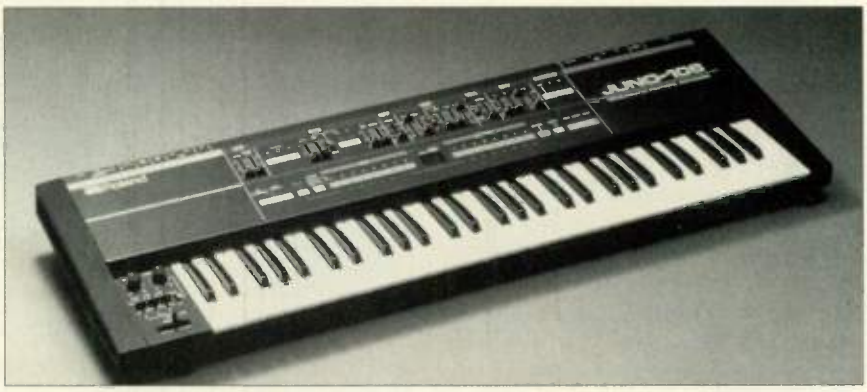
MODEL NUMBER DERBY

Regardless of their meaning (or lack thereof), some letters and numbers are used more often than others. I'd wager that X is the most common letter. What's so special about X? I suppose it suggests power, mystery, and adventure (Malcolm X; X marks the spot). Consider Yamaha's long line of products with model numbers that begin

Many people think the Akai EWI is a small, flightless bird from New Zealand.



After considering the model number M10, the founder of Korg turned it upside down, and the 01/W was christened.



Roland named its Jupiter and Juno analog synths, including the Juno-106 shown above, after the Roman pantheon's First Family.

with DX, KX, QX, RX, and TX, not to mention Roland's JX models, Ensoniq's VFX, Korg's Wavestation EX and 01/W Pro-X, and Peavey's upcoming PCX 6. Unused X-based model numbers are becoming scarcer than hen's teeth!

Apparently in response to this, Casio decided to use the letter Z as the primary letter for their pro products. This included the AZ-1 strap-on keyboard controller, CZ and VZ synths, DZ MIDI drum kits, FZ samplers, and RZ sampling drum machines. Meanwhile, Yamaha moved on to the letter Y. Their newer products have model numbers that start with SY, RY, and QY.

What about numbers? Unless they're related to a specific aspect of the product, most numbers are multiples of 10, 100, or 1,000. Why is this? Perhaps these numbers convey a greater sense of importance. People place greater emphasis on decade birthdays, and just wait till you see the parties on December 31, 1999 (and the resulting hangovers on the morning of January 1, 2000).

Interestingly, Yamaha has a long history of using odd numbers; many of their newer numbers are odd multiples of eleven and five. Why has Yamaha consistently bucked the trend of numbers ending in zero? Could it be that they are counting on the psychologically dynamic quality of odd numbers?

My favorite model numbers form interesting words. Of course, there's the Akai EWI (Electronic Woodwind Instrument). Whenever I mention it, most people think I'm talking about a flightless bird from New Zealand, or small, furry creatures dancing in their treehouses on a distant planet after the Empire's Death Star was destroyed.

Korg's SQD-1 sequencer always gives me a chuckle. How can you find the disk drive amongst all those tentacles? Mr. Potato Head loves banging on the Roland SPD-8 percussion controller, and Peavey's CH8FD keyboard controller requires application of a topical ointment to eliminate chafing. This model number would make the perfect license plate for a keyboard-playing dermatologist.

The family lineage of the Yamaha DX7IIFD is clear enough, but the model number is among the longest without a space or hyphen.

OUTTA HERE

In general, I'm sure manufacturers try to come up with model numbers that are germane to the products whenever possible. Otherwise, they try to use something that is memorable, looks nice, and speaks well.

Ultimately, products succeed or fail based on what they are and how well they work, not what they're called. But the importance of model numbers and names must not be underestimated. After all, where would we be without the Aphex Aural Exciter Type C^2 with Big Bottom? ☻

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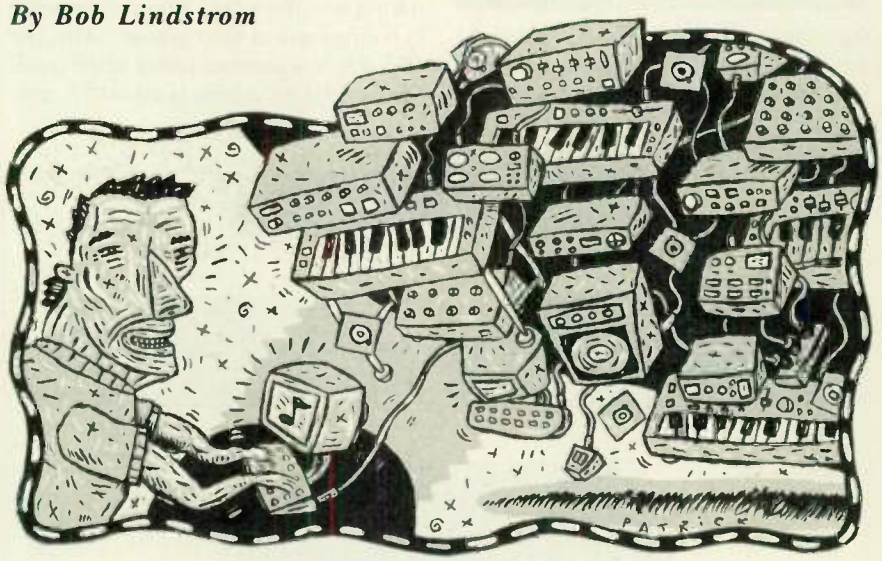
Universal Editor/Librarians

By Bob Lindstrom

UE/Ls turn your computer screen into a virtual front panel for your entire studio.



Power is pain.

If you don't believe it, take a look at your typical expanding MIDI setup. What starts as a keyboard and amp becomes a couple of keyboards, a few sound modules, some effects units, and multiple MIDI ports. In the quest for more sounds, more flexibility, and more creative power, that comfortable but limited little setup becomes an electronic musician's heaven and hell. The room is scattered with hundreds of synth patches on floppy disk. Each expander boasts dozens of squinty little programming buttons and LED screens that only remind you of how great it was to program analog synths. And there are hours of pushing and pulling and loading and plugging in search of that perfect sound.

Pretty soon you're on a brainless MIDI assembly line, slavishly tending the machines and suffering their limitations when you should be commanding all the creative power you've accumulated.

Thankfully, there is a solution: the universal editor/librarian (UE/L), a one-stop software toolkit that brings graphic editing and programming to all your synths, patch bays, signal processors, and other MIDI devices. It also stores and organizes your patches and integrates the collective power of your MIDI setup into a single, smoothly functioning "mega-instrument." A good UE/L can turn a no-win system into a no-sweat system.

GETTING THE BASICS

The concept of the UE/L is simple, although the "universal" claim is slightly misleading. No universal editor/librarian is actually capable of programming *every* synth. Instead, UE/Ls are integrated patch librarian/editing environments supplied with customized modules that can edit patches for the most popular hardware. A typical universal editor/librarian comes with support for several dozen synths and other MIDI devices.

Because of their modular design, their versatility doesn't end there. Additional modules can be added later as your system grows and as the UE/L publisher develops software for new devices. Thus, you can enhance your editing prowess without buying an entirely new program; just install a few new modules. Publishers typically make these modules available at little or no additional cost to registered owners. Some UE/Ls even provide the power to program your own editors and librarians (if you know SysEx).

Editing modules generally have a mouse-driven, graphic user interface that represents the arcane buttons and digits of digital synths with somewhat more inviting onscreen sliders and envelope graphs. Most patch programmers agree that a graphic editing interface is more accessible than "front-panel" programming and inspires a higher degree of experimentation.

EXTRA ESSENTIALS

What makes a universal editor/librarian essential is the extra features that ingenious programmers have added to the basic concept. For example, random patch-generation utilities create all-new patches and patch banks by randomizing or combining elements from two or more existing patches.

Another essential feature of UE/Ls is system setup support. A UE/L helps set up your system by saving the state of every device. When you have a multiple-synth system customized for a particular song, a single mouse click

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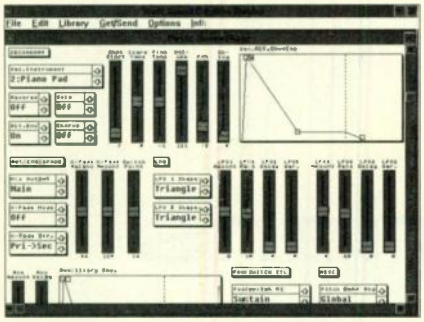

FIG. 1: Sliders, pop-up menus, and envelope graphs provide a data-rich patch editing environment in this *X-oR* module for the E-mu Proteus/1.

tells the UE/L to individually poll each device in your rack and save every patch, every MIDI connection, every channel mute—*everything*—to hard disk. Restoring the configuration is as easy as loading the file and transmitting it to the system.

Furthermore, UE/Ls often have a comprehensive driver-list display that lets you see at a glance all the patch names and devices as they are currently configured in your system. With the addition of a programmable MIDI patch bay, the UE/L manages all MIDI cable connections (although you must first program them into the patch bay), making this high level of system setup virtually transparent.

UE/Ls typically maintain databases of patch information that let you attach keywords to all your patches and search for those keywords. When you need a distorted guitar with sweep oscillation, just ask the UE/L to find all patches that match the description. Instead of flipping through dozens of floppies, the UE/L searches the hard disk and displays a list of all possible matches, then uploads your choice to the appropriate synth in seconds.

In addition, programming multiple synths with a UE/L is somewhat easier than individual front-panel programming because the UE/L modules tend to be similar in appearance, although they still vary according to the internal architecture of the synth.

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...WinSong™ is like a Player Piano. It plays music on any MIDI compatible instrument. So it is not limited to just being a Player Piano; it is also a Player Guitar, a Player Organ, a Player Synthesizer, a Player Drum set, a Player Saxophone, and a Player Clarinet.

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WinSong works with any standard MIDI song file. WinSong comes with MIDI songs so that you can immediately begin having fun with music. WinSong works with any commercially available MIDI music. There is a wealth of WinSong compatible music on many public Bulletin Boards Systems (BBS), such as Compuserve.®

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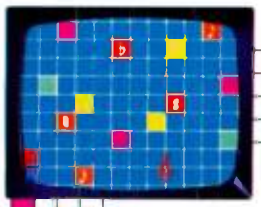
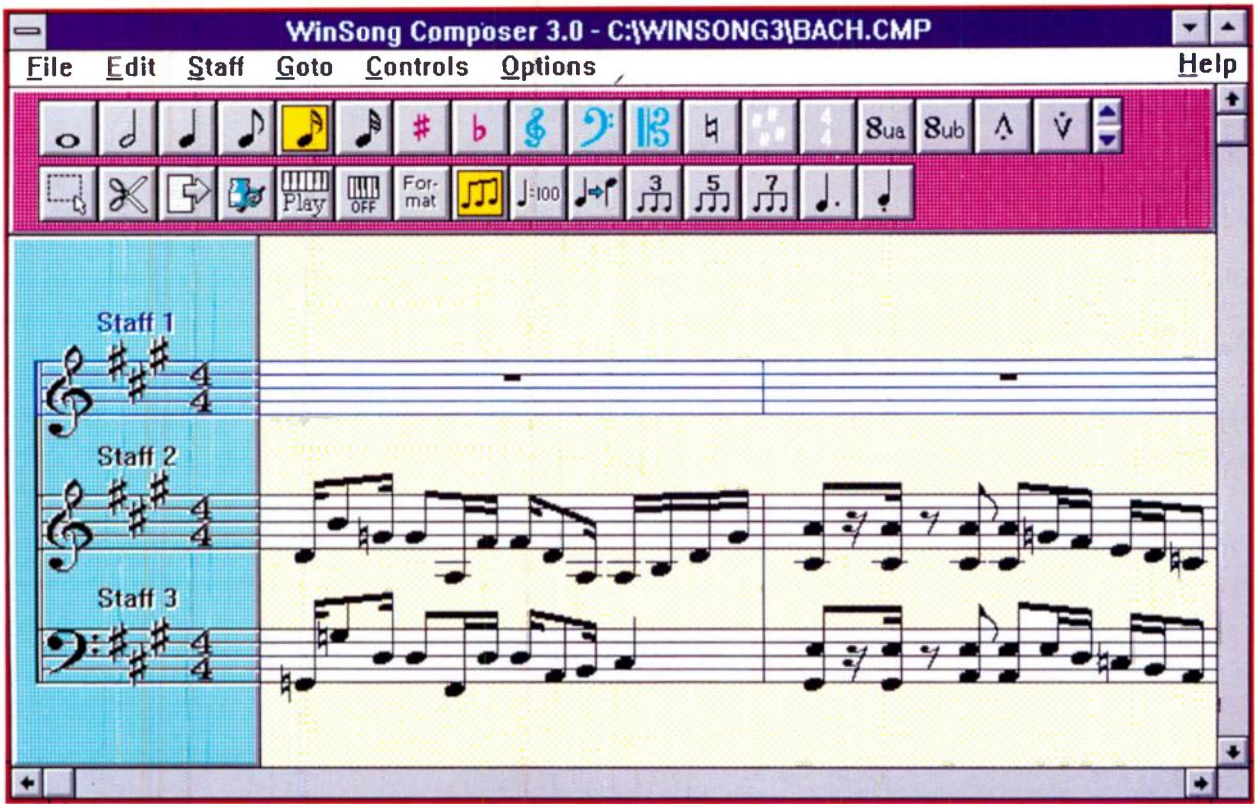


WinSong is a Composer, Sequencer (Tape Deck), and Juke Box all in one.

WinSong Composer

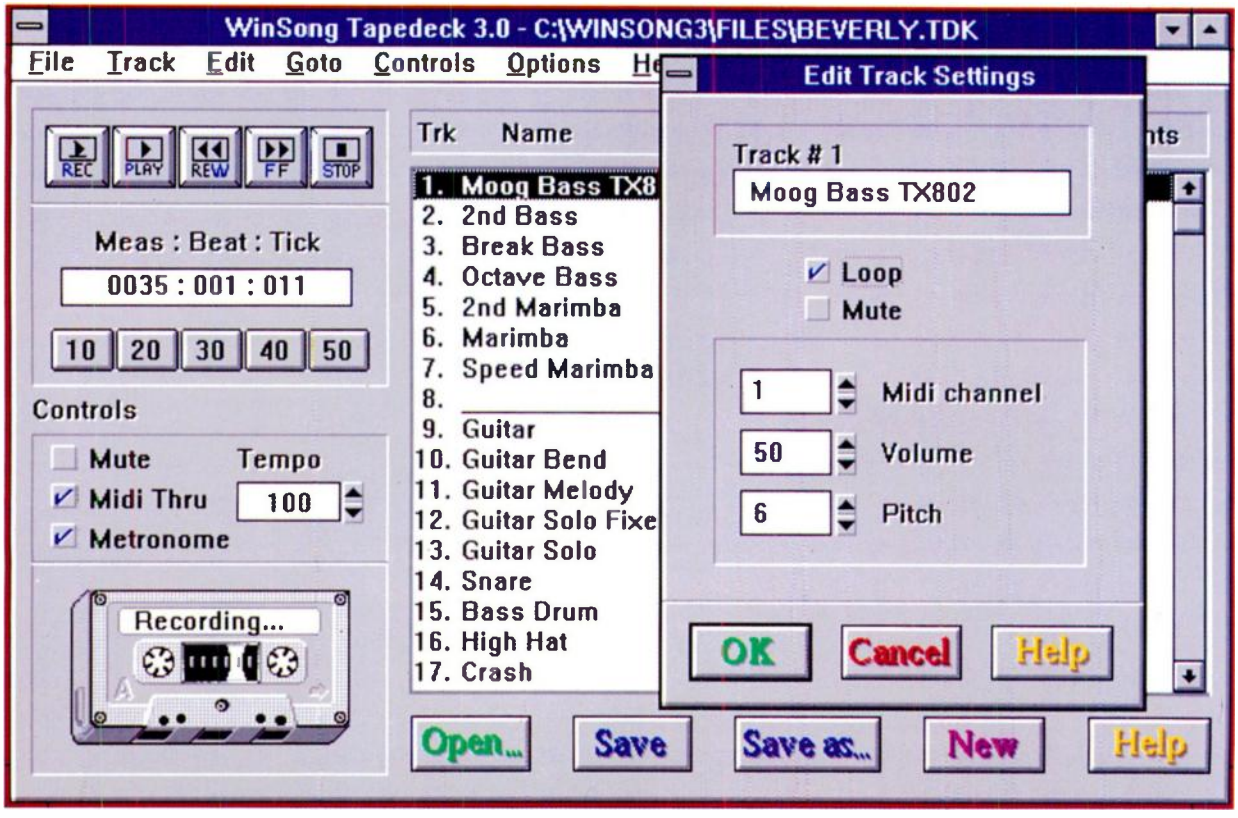


Look at how easy-to-use and fun WinSong is. Just push the button for the musical symbol you want, and drag-and-drop that symbol on the staff. As WinSong plays back your song, the musical notation horizontally scrolls on the computer display. You see the notes as they are being played.

- With no musical training and minimal computer skills, you can immediately write professional compositions
- Play music that you compose through any MIDI compatible instrument
- Print sheet music from your musical compositions
- Great for learning music, yet fully-featured for any professional musician
- Input songs from printed sheet music and play
- Singers can create their own accompaniment
- Select musical symbols, such as notes, time signatures, sharps, flats, and others, from the note palette and position them on the staff with the mouse
- Watch your music scroll by as it is played
- A great teaching tool and incredibly fun to use
- Cut, copy, paste, insert, merge, erase, clear portions or whole compositions
- Transpose whole pieces of music between any keys
- WinSong offers unique control of computer operations from the MIDI keyboard
- Lyrics can be added to the music using mixed fonts, sizes and styles
- Includes four pre-defined clefs: Treble, Alto, Bass, and Percussion
- Supports multiple clefs per measure
- Includes rests within beam groups
- Performs global rebeaming of notes

- Supports different meters and varied tempos in a single composition
- Highest rhythmic value supported: Dotted Whole Note
- Lowest rhythmic value supported: 32nd Note
- No limit to the maximum number of measures in a composition
- Maximum number of staves in a composition: 64
- Supports user configurable note palette
- Supports multiple MIDI channels per staff
- Adjustable margins for individual stave systems, page margins, and page sizes
- Can place any symbol, character, graphic shape, text, or block of text on the page

WinSong Tape Deck

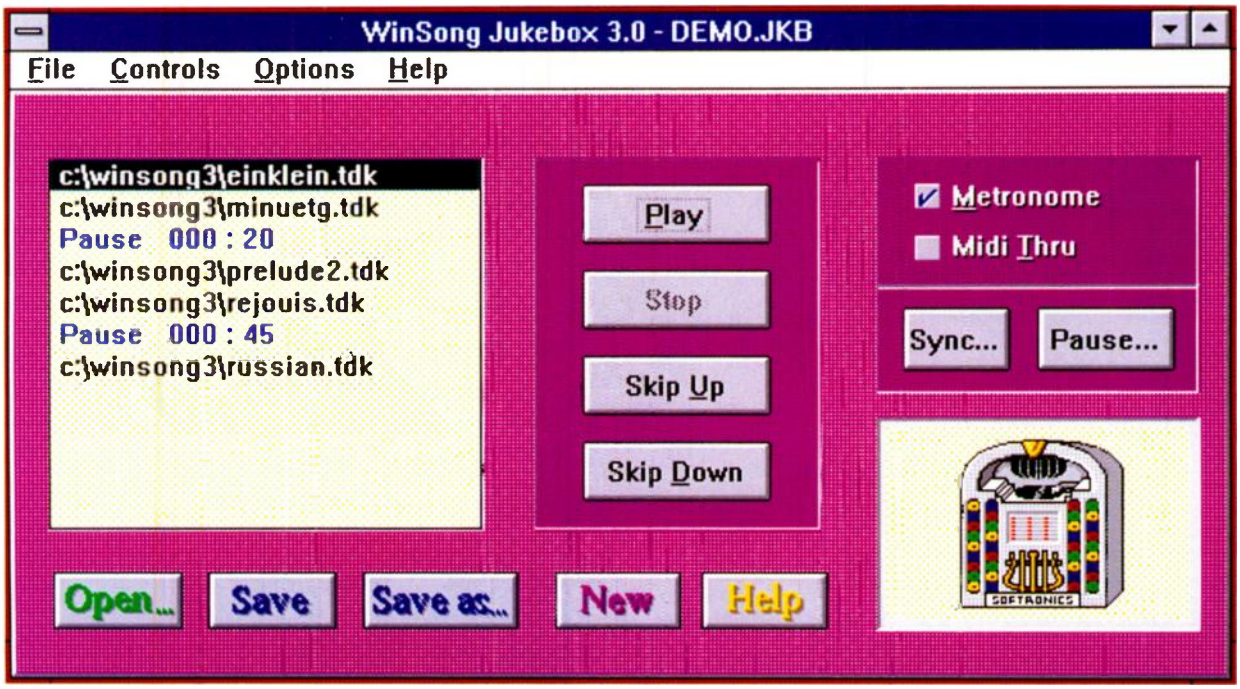


The Tape Deck is a full-featured 64 track MIDI Sequencer and a complete recording studio. As you can see, arranging music with WinSong is a guided path. You don't have to memorize computer or musical commands. WinSong will not let you make mistakes.

- Record music as you play on any MIDI compatible instrument
- A fully functional easy-to-use MIDI sequencer
- A MIDI music studio that will have you instantly creating and playing your own orchestra, band, or single instrument arrangements
- Transcribes any performance into standard notation with a click of a button
- Reads external sequencer files that support the standard MIDI file format
- Record step-time via a MIDI instrument
- Supports complex time signatures and time signatures up to 256 over a 64th note
- Supports standard and user-definable, non-standard key signatures
- Sends MIDI start, stop and continue commands
- Move, Loop, Transpose, and adjust the volume of entire tracks

- Program time signatures and tempo changes
- Read and Write standard MIDI files
- Sends and receives MIDI Clock data
- Note resolution equals 120 ticks per quarter note
- Overdubbing each of the 64 tracks
- Edit individual events
- Quantize, Cut, Copy, Paste, Transpose, Change Volume, Length, Pitch, for each MIDI Channel

WinSong Juke Box



The Juke Box is a fun-to-use player piano. It will give you hours of enjoyment. Just tell the Juke Box what songs – from one to 100, from Jingle Bells to Bach – you want to hear, and it plays your songs for you.

- If you're a musician, use the Juke Box to queue up your song sets
- Pick music to suit your mood
- Play your own song lists
- Great for sing-alongs with family and friends

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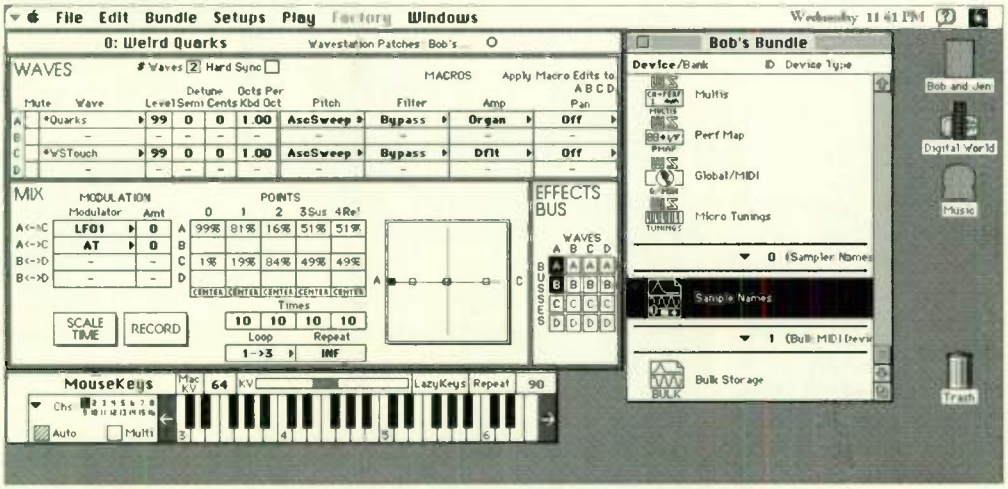

FIG. 2: Opcode's *Galaxy Plus Editors* uses the concept of Bundles to create files containing data from multiple instruments.

The computer display is also larger than the few characters of the typical front-panel LCD screen, making it much easier to see what you are doing.

CROSSED WIRES

Although there are disadvantages to UE/Ls, most of these drawbacks are one-shot bummers that disappear after you have the system working.

If you have several MIDI devices, UE/Ls are generally more cost-effective than individual computer-based patch editors because new modules are usually distributed free or at low cost. However, it may take several months for editing modules to be programmed for the latest and greatest hardware. Some less-popular devices may never receive support at all.

The initial setup of a UE/L can be extremely frustrating because MIDI device manufacturers tend to "go their own way" when it comes to device ID numbers and SysEx channels. Expect a few hours of pounding and cursing as you wade through manuals to determine whether SysEx is sent on the basic MIDI channel, a separate MIDI channel, or a device ID number. Fortunately, online help is usually available within the program.

Finally, if you don't have one, buy a programmable MIDI patch bay. Without it, you'll be swapping MIDI cables every time you poll your system. With it, sending and receiving data is completely automated. Unfortunately, organizing the performance of the patch bay adds more time to your initial configuration efforts. Still, don't even *think* of using a UE/L without a programmable MIDI patch bay. It's far better to add another few hundred bucks to your start-up costs than endure the agony of constant cable swapping.

In short, if you're a computer musician with a few synths to your credit, consider a UE/L an essential part of your home or project studio. If you have a professional, computer-based MIDI studio without a UE/L, you don't have a fully equipped professional studio.

To help you become familiar with UE/Ls, here's a quick rundown on the major players in the marketplace.

X-OR

Dr. T's Music Software

($325 for *Windows*, Atari, Amiga)

Programmer Bob Melvin became one of the pioneers of UE/Ls with *X-oR* (see **Fig. 1**). This program pretty much defined the form with graphic editing (now available for about 135 devices), librarian, a full keyword database, system setup support and, on the Atari, an optional developers' package, *E-oR*, to program your own editing modules. (Dr. T's has no current plans to update the *E-oR* package.) New modules are offered about twice a year to registered owners for an upgrade fee.

The Atari and Amiga versions are fully compatible with Dr. T's *Multi-Program Environment (MPE)* and can multitask and share data with other Dr. T's products, such as *Tiger Cub* and *KCS*.

UNISYN

Mark of the Unicorn

($395 for Macintosh)

X-oR creator Melvin's latest achievement in UE/L technology is *Unisyn*, a reinvented version of *X-oR* for the Macintosh published by Mark of the Unicorn. The program's specs include a complete feature set: keyword database, graphic editors and librarians for over 120 devices, system setup, and, like *X-oR*, a very informative system status screen.

Unisyn also can access *X-oR* files (editors, libraries, banks, performances, and patches) as well as *Galaxy* banks and libraries. MOTU is considering releasing a developers' kit that would allow users to program their own modules.

GALAXY PLUS EDITORS

Opcode Systems

($399 for Macintosh; $249 for *Galaxy* librarian only)

Opcode's universal librarian *Galaxy* (see **Fig. 2**) is now bundled with their *Vision* and *Studio Vision* MIDI sequencers. Registered *Vision/Studio Vision* owners can upgrade to the full UE/L power of *Galaxy Plus Editors* for $150. *Galaxy Plus Editors* has graphic editing for about 55 MIDI devices and librarian support for almost 300 devices. In addition, it boasts a full keyword database, complete system setup support, and a scripting language, PatchTalk, for programming new librarian modules.

Opcode librarian modules are available at no charge on several BBS services (including PAN and CompuServe) and from some Opcode dealers, or directly from Opcode for a modest fee. New editor modules are released periodically by Opcode for an upgrade fee of $49 per module, or in cost-effective upgrade bundles. The latest upgrade bundle has five editing modules, including one for the Kurzweil K2000, for $99. All editor module purchases include librarian upgrades at no additional charge.

MIDI QUEST

Sound Quest Inc.

($250 for Macintosh, Amiga, Atari, MS-DOS; $300 for *Windows*)

Broad-based support characterizes this UE/L from Sound Quest (see **Fig. 3**). *MIDI Quest*'s librarian supports over 140 instruments and has graphic editors for more than 100 devices. It offers full system setup support and a key-

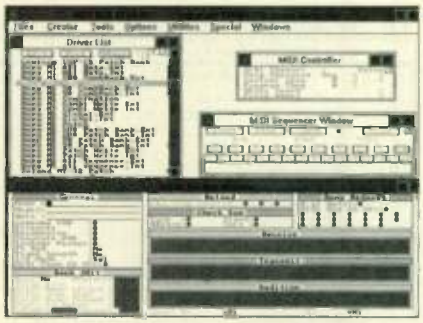

FIG. 3: *MIDI Quest* includes a comprehensive list of synths online, a librarian creator, and several MIDI utilities.

word database. New instrument modules are available at no charge to registered owners through Sound Quest's BBS, or they can be sent out on disk for a small service charge.

MIDI Quest can export system setups as MIDI files for use in any MIDI sequencer, and its random patch-generating capabilities are superb. Users can also program their own librarians for new synths using only the *MIDI Quest* software. To develop your own editors, you must purchase the *Tech Quest* developers' package ($100, available for all *MIDI Quest*-compatible platforms).

GENEDIT

Barefoot Software

($199 for Atari ST/Falcon030)

Barefoot's entry in the U/EL market has been available for several years—previously from Hybrid Arts—and in some ways shows its age (the most recent version is 2.0). The program doesn't offer a keyword database, nor can it poll devices to determine the current state of all your instruments. On the other hand, it can store and transmit multi-instrument files that you create. The program currently offers 67 editors and supports 78 MIDI devices with librarian modules. Additional modules can be obtained directly from Barefoot for $5, or downloaded for free from GEnie or the company's own MIDIWorld BBS.

Unlike the other UE/Ls, *GenEdit* offers the ability to create your own editor and/or librarian modules from within the program. The available construction tools also let you build templates for sending MIDI continuous controller messages.

Bob Lindstrom *is the director of game services at Dynamix.*

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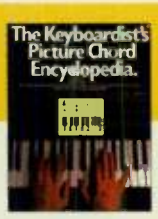

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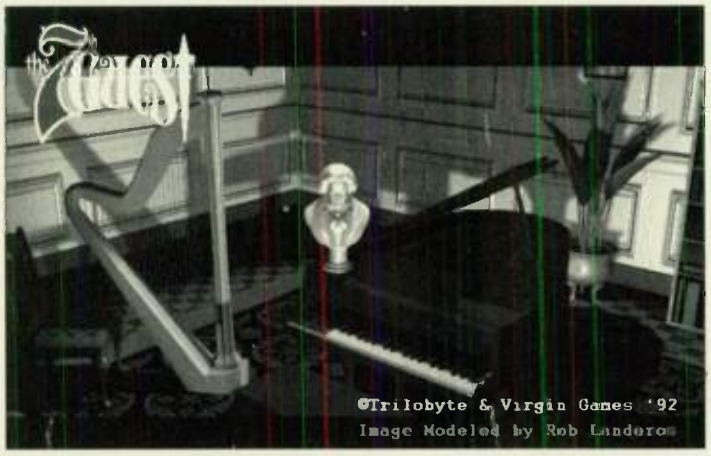
The Seventh Guest

By Daniel Kumin

Video-game audio blasts off with CD-ROM: It's not just Space Invaders anymore.



Virgin Games' CD-ROM-based *The Seventh Guest* is an MPC-compatible mystery/adventure game.

The electronic music composer must sometimes feel like a solution in search of a problem. It's unlikely that Madonna is begging you to pen her next single; the Boston Symphony hasn't commissioned an electronic work for, oh, 103 years or so; and the jingle biz isn't exactly beating a path to your door. There is, however, a venue crying out for original electronic scores: video games.

Of course, these days the game market takes the more elegant moniker of multimedia. Games, hyper-adventures, infotainment, and hard-to-pigeonhole hybrids are exploding across platforms ranging from original 8-bit Nintendos (Nintendi?) to SPARCStations. And as power, speed, and storage capacities expand, so do the quantities and qualities of exploitable audio/video materials. The current Rolls Royce of video-game delivery is CD-ROM. Thanks to a long-awaited descent to affordable price levels, these silvery discs are bringing the new generation of 16-bit games a 540 MB hit of data storage—just what the doctor ordered to upgrade visuals and sound.

A leading example of the medium's development is *The Seventh Guest*, an audio-video exploratorium from Virgin Games. Created by U.S. developer Trilobyte, Inc., and slated for release by spring 1993, the much-ballyhooed *The Seventh Guest* is a vast—it comes on two CD-ROM discs—interactive landscape. The game exploits fully rendered graphics, "morphing" 3-D forms, full-motion video, and elaborate special effects. It runs on MPC Level 1 PCs, requiring an 80386 DX or better with 2 MB minimum memory; SVGA graphics; a CD-ROM drive with 150 KB-per-second sustained access performance; 10 MB of free hard-disk space; and one of several popular PC sound boards. To truly sing, *The Seventh Guest* requires a fast 80486 setup. (Virgin demos the program with a 16 MB 80486 machine.) According to the publisher, *The Seventh Guest* will be ported to both the Mac II series and Nintendo's CD-ROM-equipped Super-NES systems by the end of this year.

THE GAME UNFOLDS

Virgin calls *The Seventh Guest* an interactive drama. The game is basically a ghost story/mystery in which the player is the seventh guest at a Victorian house party in the home of "the late Henry Stauf, an evil toymaker whose work holds a sinister secret." By weaving through 22 of the old mansion's rooms and solving various puzzles, the player can uncover Stauf's secret.

The entire production was realized on DOS-OS/2-platform hardware, using both commercial and proprietary tools. *The Seventh Guest* was written in screenplay form by Matthew Costello and is performed by a cast of more than a dozen live actors. The action was videotaped (using S-VHS cameras) in front of a blue screen. The footage was then digitized into JPEG frames and compressed with proprietary software. All of the sets—the mansion's rooms—were real 3-D models, rendered and digitized using *3-D Studio* from AutoDesk.

The program's visuals and deep, complex design are stunning: The game includes 36 minutes of fifteen frames-per-second video and numerous quasi-3-D effects. All footage was computer-rendered from real-world models or live-action video and includes some mind-bending visual-effects.

But what sets *The Seventh Guest* even further apart from standard game fare is its soundtrack. The score consists of more than an hour of music produced

One of the many 3-D modeled rooms in *The Seventh Guest*.

by game sound-maven "The Fat Man," world-renowned (in game circles, anyway) as creator of the *Wing Commander* track. Because the game was conceptualized as sophisticated family entertainment, the music is a stylistic potpourri. The compositions are a far cry from the moronically repetitive, T2-style sequences heard on most "shoot 'em ups" aimed at the twelve-year-old set.

In addition, the sound recipe includes loads of sound effects and dialog. Oregon-based Staunton Studios handled the location dialog recording. Foley, ADR, and additional sound effects—the game is big on screams—were added to the location audio and mixed down to DAT. Back at Trilobyte, *The Seventh Guest* production team transferred the DAT master to hard disk using Turtle Beach's MultiSound PC audio card. Additional editing was done using *Wave for Windows* (Turtle Beach). The finished audio track was converted to 22 kHz, 8-bit mono audio for the PC version. (According to Trilobyte software manager David Luehmann, the Mac II version should be 22 kHz, 8-bit stereo, with the Super-NES setup 16-bit stereo.)

Most of the music for *The Seventh Guest* is stored on disc as MIDI data for reproduction by a General MIDI-compatible accessory sound card or module. The production standard was Roland's Sound Canvas, with the MT-32, or PC-card equivalents (LAPC-1 or SCC-1) directly compatible. Typical players, however, will probably have only a MIDI-compatible PC sound card, such as the SoundBlaster, Pro Audio Spectrum, or AdLib Gold boards. Here, MIDI data is performed by a set of auto-loading synth patches to drive the FM-synthesis chips common to these boards. The results are quite good, but a genuine Sound Canvas or compatible MIDI module/board delivers the best sound.

All of the effects and dialog are on disc in compressed form, from which they are spooled via a DMA channel to the PC sound card for reproduction. Data decompression is done on the fly. This compression/decompression scheme is necessary because the game's visuals demand every iota of processing power. This process also exploits proprietary Trilobyte software. Normal "Red Book" audio (CD-standard, 16-bit stereo, sampled at 44.1 kHz) is also included during the credits, opening sequence, and the "outro." In both instances, all video is spooled to the hard disk to free up disc access for sound. There's also an album-style remix of The Fat Man's *The Seventh Guest* music on disc 2.

PRODUCING THE MUSIC

The Seventh Guest's composer, The Fat Man (alias composer/producer George Alistair Sanger), was assisted by "Team Fat": Joe McDermott, David Govett, and Kevin Phelan. According to Sanger, the team "has a five-year plan to become the Beatles of multimedia music." Sanger and his crew currently have more than 70 games to their credit, including mega-hits *Loom* and *Star Trek 25th Anniversary*.

All of the game-play music was MIDI-composed using the Sound Canvas as the sole source. Team Fat went so far as to design their own Sound Canvas emulations of FM patches to maintain compatibility with the FM synth tones used on PC-sound cards. Overall sound quality and General MIDI compatibility was tested by auditioning all compositions through in-house software drivers on popular cards.

The compositional style runs the gamut from neo-classical to barrelhouse (and includes pretty much everything in between). "I like a salad," says Sanger, "so I included all sorts of different feels. But the instrumentation stays pretty cohesive because each character has his or her own characteristic theme, style, and instrumental association."

Sanger kept his writing setup extremely simple: an Ensoniq EPS functioning as

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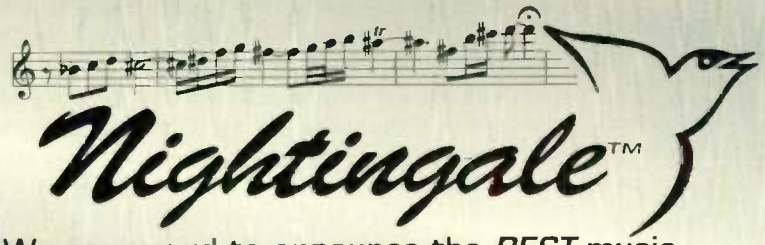

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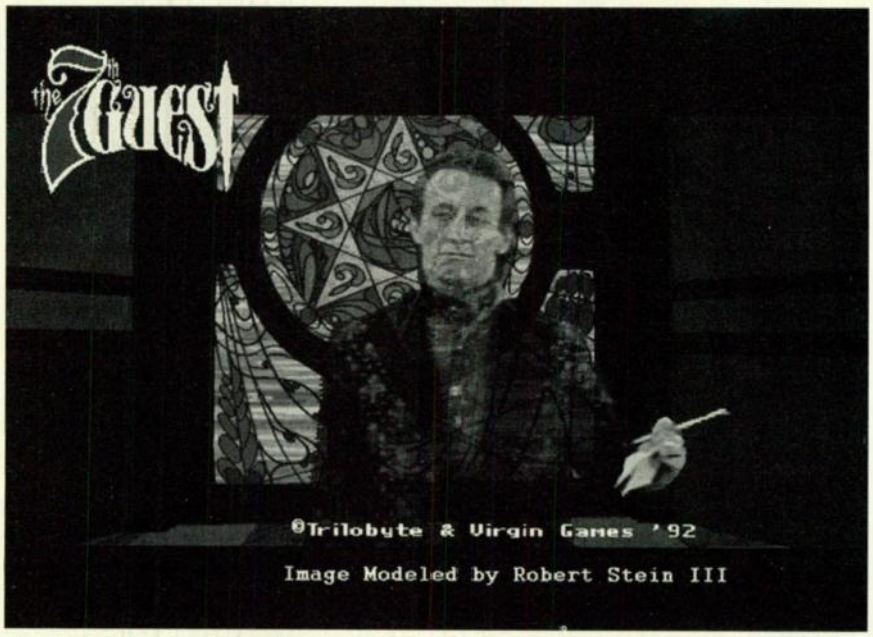

The Seventh Guest **combines live actors with computer-generated backgrounds.**

keyboard controller driving the Canvas. (He occasionally employed a Yamaha G10 guitar controller as well as drum pads.) He sequenced the music with MOTU's *Performer* on a Mac SE.

"In spite of all the technology involved," Sanger says, "the music for *The Seventh Guest* is still about pulling heartstrings and emotions. I used lots of old operatic tricks—a theme and instrument for each character—and wrote by reading the script, looking at game video clips, and trying to experience what the player would be going through at each juncture. I'd then imagine I was watching a really good movie with a great soundtrack. When I'd start to feel things happening, I'd run and slam down the musical elements quickly, then work out the details later. I didn't tweak sounds much at all. I wanted to keep things straight, mostly to ensure that end users would get the best music, regardless of their hardware."

For the live CD audio songs, Team Fat employed guitars, bass, keyboards (driving a Proteus and the Sound Canvas), and two Austin-based singers, Robert Harrison of the Cotton Mather band and Kris McKay. Renowned keyboard player Floyd Domino (formerly of Asleep at the Wheel)—who also tracked some of the keyboards for the game music—was on the live sessions, as was Sanger's brother David, a Grammy award-winning drummer.

The tracks were recorded on a single Alesis ADAT. Six tracks were used, with the remaining two tracks reserved for submixes. "The ADAT was great," enthuses Sanger. "I bounced tracks repeatedly to add processing and such—I don't know how many generations—and never heard the least bit of (audio) degradation. We often sub-mixed down to DAT, rerecorded the stereo mix onto a fresh ADAT tape, then added more tracks and effects. We've recently upgraded to a 24-track system."

The finished project was delivered in two forms. The live audio selections were mixed to DAT and sent to Trilobyte for CD mastering. The gameplay music was delivered as Format 0 Standard MIDI Files, via the simple expedient of posting them to Team Fat's private electronic bulletin board. That way, Trilobyte's team could audition new material on a day-by-day basis and integrate music into the game as they went along.

The Seventh Guest is an innovative project, and its release is sure to make a lot of noise in both the computer and multimedia worlds. The game is a paragon of integrated production, with extremely high visual and sonic values. Check it out at your local teen hangout, or ask your kids. (They might already have it by now.) *The Seventh Guest* is bound to open some doors in your head.

Journalist/composer **Daniel Kumin** *recently acquired a keyboard with tuning tables. He fell into the crack between the major and minor thirds two weeks ago and hasn't been heard from since.*

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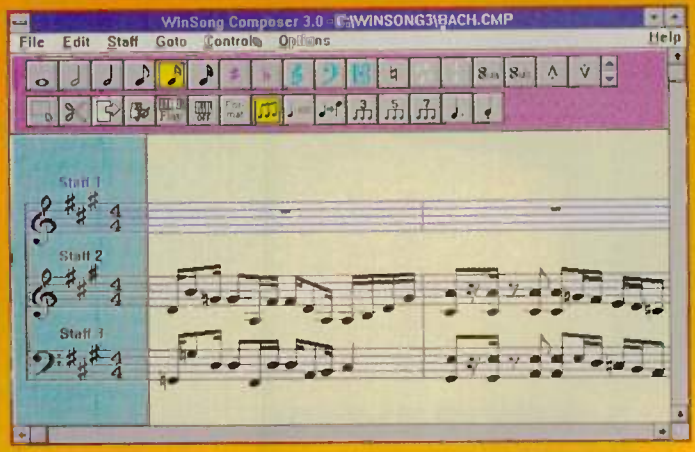

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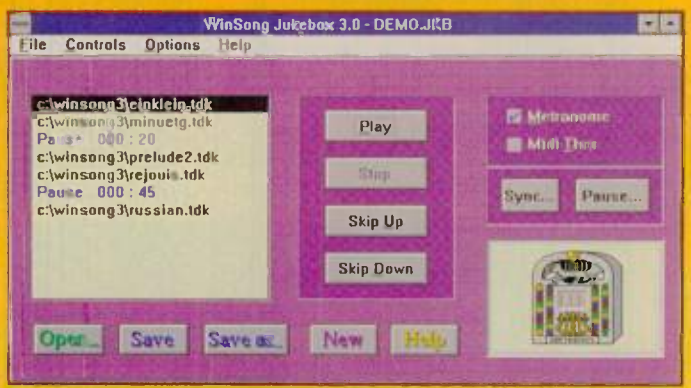

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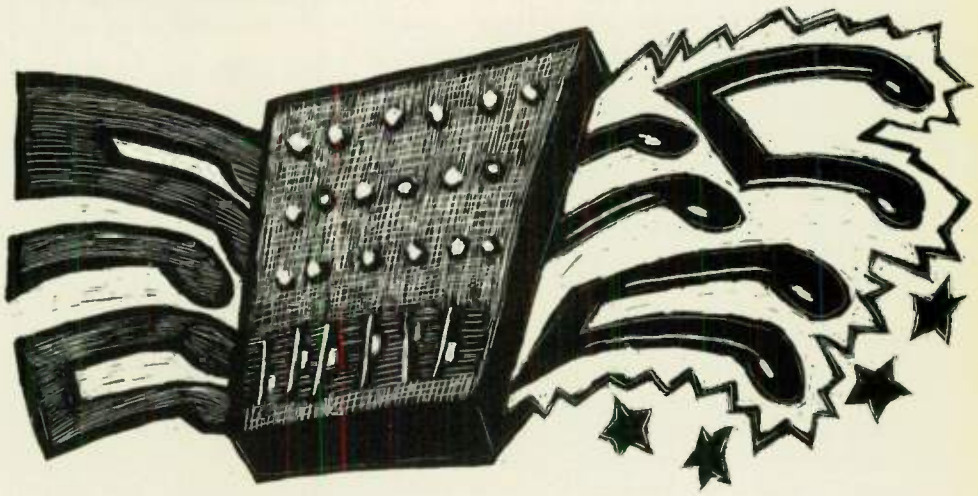
Transparent Mixing Techniques

By Michael Molenda

You can't make a slick mix out of a sonic quagmire.



The current obsession with family values is all well and good for the moral majority, but what's in it for musicians? Well, I'll tell you. Clarity. For better or worse, liberal ideologies have obscured the definition of family. Society is confused. In short, it's a bad mix.

If the ebb and flow of social psychology could be mixed by someone like famous remix deity Bob Clearmountain, human strife might be little more than a memory. Clarity is essential for understanding, and a final mix needs coherence just as badly as humanity does.

Professional mix masters routinely mold disparate elements into an integrated, cohesive statement. Such clarity often marks the difference between a major-league master tape and a minor-league demo.

Producing pristine master tapes requires what I call "transparent mixing." It's a conceptual mindset that involves keeping all the elements of a recording sonically well-defined and subservient to the demands of the music. In other words, it means keeping a clean house so the neighbors can marvel over your new sofa.

STUDY HALL

What defines a good mix? Unfortunately, there are no absolute guidelines. Music is a wonderfully subjective medium, and arguments regarding a production's sonic quality—or lack thereof—can rage for hours. However, a *professional* mix is easy to identify: You can hear e-v-e-r-y-t-h-i-n-g. The rhythm section punches through, the vocals are crisp, and even the sweetening (keyboard pads, psychoacoustic elements, counterpoint lines) is clear and well-articulated.

In addition, the ear is drawn to certain elements deemed by the artist or producer to be the work's focal points. On a pop record, these elements are often the lead vocal, rhythm section, and instrumental hook(s). Jazz producers typically highlight the soloist. In any case, a professional mixer ensures that the appropriate musical hooks are loud, clear, and unfettered by competing sonic elements.

Sadly, unprofessional mixes continue to be a hot commodity. My theory for this tragic state of affairs is that everybody believes they know how to mix a record. Give me a break! Unless you're a certified mixing genius, it often takes years of practice, ear training, and intensive study before you start churning out "hot" mixes. Some people never get it right. I've met a lot of talented 40-something session monsters with years of studio experience who wouldn't dare mix their own demos. (At least they've acknowledged their limitations; few musicians seem willing to take a good look in the mirror.)

The first trick to producing transparent, professional mixes is to admit you don't know everything. Instead of inflating your ego with unearned bravado, listen to classic and current recordings. Try to identify the elements that comprise a sharp, clean mix: What sounds are generally mixed up front; how many different instrumental and/or vocal "parts" are featured and what tonal ranges do they fill; and what is the basic sonic personality of the mix (a full tonal spectrum, predominant midrange frequencies, etc.)?

Once you've developed an ear for the components of professional masters, reference your own mixes to commercial CDs within your stylistic genre. Critically assess how your mixes stack up against professional products. If your

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tape sounds like pea soup compared to the latest Quincy Jones production, go back to study hall.

THE BIG PICTURE

Savvy producers conceptualize the final mix while the project is still being recorded. It's infinitely easier to construct a glistening master from scratch, rather than sweating it out on the mix date trying to decide which one of fifteen different keyboard lines best energizes the track. The "fix it in the mix" scenario is a myth. The geniuses who can doctor a butchered master tape are rare and command fees commensurate with their miracle-making. In short, you can't afford them. But more importantly, you shouldn't need them. A little planning can save you hours of mixing frustration.

An often-overlooked factor of transparent mixes is the recording medium. A few simple test runs can reveal volumes about your deck's audio personality. Record insane amounts of bass and see how much bottom you can groove with before everything turns to mud. Likewise, track sizzling high-end information (cymbals, bright guitars, synth bells, etc.), and take note where the sounds begin smearing. Then, throw the kitchen sink on tape—record drums and multiple guitar, keyboard, and vocal tracks up to the limit of your multitrack deck—and critically assess the clarity of your audio stew. Keep in mind that your deck's electronic and mechanical health—as well as your engineering chops—also influences optimum sonic performance.

TRACK BY TRACK

The transparent mixer's primary mission (should he or she decide to accept it) is to put the track's money-maker in your face. This means that every mix decision is committed to turning the track into a supportive milieu for the lead vocal, solo instrument, or other musical hook. When you start playing with track levels and EQ environments, make sure that nothing interferes with the critical elements.

Only after you've identified a production's musical focal points, should you risk obsessing (a little) over the individual components of your multitrack master. A transparent mix can only be achieved with slavish attention to detail. I've done countless remixes where most of the work was keeping tracks clean, rather than developing nifty sonic tricks or equalization tweaks. For those engineers who share my compulsion for neatness, here are some audio hygiene tips.

Drums. One of the major causes of slaughtered drum tracks is the high-end wash produced by machine-gunned cymbal crashes. Some drummers just *have* to smash a cymbal (or two) on every beat. This constant high-frequency overload is not only uncomfortable to listen to, but often smears the top end until it sounds like static.

▼

Every mix decision should turn the track into a supportive milieu for the musical hook.

Ideally, the producer should have helped the drummer develop a tight, sonically pleasing performance before the drums were recorded. Oh well. Unfortunately, most home studios lack the expensive equalizers that a pro studio or mastering facility would employ to tame the sizzle. An affordable option is to assign the individual drum tracks to a stereo submix and run the two channels through a (stereo or dual) de-esser. The de-esser often diminishes harsh treble frequencies to the point where basic mixer EQ can finish smoothing out the top end.

Snare drums often pose two problems: The player's dynamics can produce uneven tone (a hard thwack sounds quite different from an inadvertent rim shot or weak stroke), and the high-hat, kick drum, and cymbals leaking through the snare mic make it difficult to add reverb without also affecting the other sounds. To produce a well-defined snare, I send the track through a noise gate or expander to cut out everything except the actual snare hit. Then, I route the signal to a compressor to even out the dynamics and produce an impact that's more "in your face." (It's important that the noise gate eradicate any stray cymbal crashes, as compression can raise their levels to the pain threshold.) The processed snare is now isolated enough to cut through a thick mix and allow optimum reverb enhancement.

Bass. I always compress the bass track to tame flabby dynamic levels. Low tones can fade into indistinct woofs if the player's picking or fingering technique is imprecise. A compression ratio of 2:1 or 4:1 at a threshold level of -10 dB usually tightens up the low end quite nicely. If I'm going for a "big bottom," I usually boost 100 Hz (+5 to +10 dB). However, I'll also cut the low mids to avoid too much bass information from muddying up the track. If a funkier bass tone is warranted, 100 Hz is cut approximately by 7 dB, and the mids are boosted to taste. Generally, if a noise gate is available, I'll use it to clean up the introduction, amp/ preamp hiss, and instrumental breaks.

Guitars. The six-stringed demon is probably the preeminent nemesis of the transparent mixer. Electric guitars are temples of hum, hiss, and assorted audio belches. Even the stately acoustic guitar can produce sympathetic harmonics that sabotage clarity. A noise gate or expander is essential for electric guitar tracks. For acoustics, I often cut the low mids if the track seems muddy.

Keyboards. Just because the front panel says it's "digital" doesn't mean the audio is clean. Sloppy samples and cheap output electronics are just two reasons why some keyboards exhibit audible hiss. To be safe, I usually employ a noise gate to kill any stray ugliness.

Vocals. Usually, the lead vocal is the most important element of a mix. It helps if the sonic quality is worthy of its vaunted position. I always compress the vocal to get the voice more "up front." Compression also smoothes out performance dynamics and renders lyrics more readily understandable. In many cases, a de-esser is necessary to kill annoying sibilance. I usually try to maintain the integrity of a singer's tone by leaving the EQ flat, but often the necessity of clarifying the voice within a dense track requires cutting some lows and boosting the mids at about 7.5 kHz.

Group background vocals should also be compressed to balance the dynamics of the individual singers. For "light" arrangements, an airy timbre can be produced by setting the compression ratio at 2:1 with a threshold of approx-

Combined expander/gates, such as the model 274 from dbx's Project 1 Series, allow the mixer to choose between subtle or extreme methods of noise termination.

imately -5 dB. To "toughen up" a big rock 'n' roll chorus arrangement, increase the compression ratio to 10:1 and set the threshold at -10 dB. In both instances, the attack parameter should be in the median setting between slow and fast.

Don't forget that group sections often cough, clear their throats, complain about the producer or engineer, and tell jokes when they're not singing. Protect your master tape's overall clarity by either erasing the extraneous chatter before you mix, or by muting or gating the appropriate inputs during the mix. I still receive demo tapes where I can hear someone coughing just before the chorus kicks in.

Effects returns. Many engineers forget that signal processors can be brutally noisy. Once, an outside engineer complained that our studio was inundated with hiss. Confident that our system is about as sterile as an operating room, I traced the problem to a processor in the engineer's personal effects rack. When I muted the offending effects return, the silence was deafening. (Don't you love it when you can totally embarrass obnoxious "yes-I-know-everything-and-this-is-*your*-problem-not-mine" types!) The moral of this story is obvious: The vigilant transparent mixer always gates his or her effects returns.

THE SOFT FADE

Okay, we've spent hundreds of words expounding the concept of audio cleanliness: now prepare for one of those confusing little caveats. Some producers *like* lip-smacking noises, horn-player breaths, and the whine, hum, and feedback of a guitar about to rip into a solo. They leave these sounds in the mix to promote a human factor, or maybe just because they sound cool. I've certainly been guilty of mixing in these so-called audio imperfections to capture a rough-and-ready vibe. Hey, you do whatever it takes to make the track bust loose.

However, the operative phrase here is "you do." An artistic choice is a conscious decision. Unplanned noise is simply poor craft. A transparent sonic landscape puts the track's emphasis where it should be: on the performance. The public yearns to hear something special; an incendiary sax solo or an impassioned vocal. They won't waste their time listening to audio muck. And while you can't send your master to a 12-step "clean-up" program any more than Bob Clearmountain can mix out the world's ills, a pristinely detailed transparent mix can make your productions shine.

EM *managing editor* **Michael Molenda** *is currently a major player in paranoia-induced remixes.*

The Management Dossier

By Michael A. Aczon

Are personal managers overpaid baby sitters with Rolexes and car faxes, or invaluable mentors?

It happens at least once during every music awards show. A beaming artist cradles a trophy and gushes, "I'd like to thank my manager." Thanks for what? We often hear horror stories about the manager who absconded with the lion's share of a client's pot of gold, or moved on to greener pastures after the artist had been put *out* to pasture.

Managers with smarts and ambition often use—and sometimes abuse—the clout they gain from representing high-profile talent as an express ticket to the industry's powerful executive positions. But whatever an artist's reservations regarding a managers's ultimate motivation, personal and business managers are integral components of the music industry. Managers help turn bar bands and struggling songwriters into corporate monoliths and foment the deals that change the way the industry does business. (Witness the recent mega-contracts tossed to Madonna, the Rolling Stones, Aerosmith, and Teddy Riley.)

Is the manager a saint, advocate, and trusted advisor, or one of the seemingly bottomless den of vipers waiting to pounce on the next royalty-generating victim? While the answer depends solely on the individuals involved, a basic understanding of the artist-manager relationship helps you determine whether your own professional "marriage" is a union forged in heaven or hell.

ROLE PLAYING

Successful management requires a balanced menu of creative, business, and administrative skills. However, in the early stages of an artist's career, a manager's most important task is creative development. As an artist hones his or her craft, the manager must perform the varied roles of motivator, priest, coach, critic, and teacher. It often takes vast amounts of nurturing before an artist graduates from bar gigs to the top of the charts.

But to secure even a remote chance of success, the manager must identify his or her client's strengths and weaknesses and remove any obstacles to artistic growth. For example, if an artist is a brilliant songwriter who lacks stage presence, the manager might recommend that he or she attend drama classes or perform at casual "open mic" clubs to develop confidence.

In addition, it is crucial that the artist and manager objectively plot career goals and determine what the artist is willing to do to achieve them. Believe it or not, spending six months recording an album, another six months doing personal appearances, and then touring non-stop for a year is not for everyone. Guiding an artist to face commercial realities is a laborious and often thankless task.

MANAGEMENT MATERIAL

Managers come from various backgrounds, from ex-roadies to marketing wizards to former record-label executives. Successful managers are often "people-oriented" because the job requires constant interaction with others on the artist's behalf. Critical attention to detail is another trait of a good manager, as is integrity. This level of honesty doesn't end with "Thou shalt not steal," but extends to the manager being able to level with his or her client. A caring manager is not a yes-person and must be able to tell the artist when a performance is sub-par, or when an attitude or career direction is potentially damaging.

Ambitious artists often seek well-established high-profile managers. At

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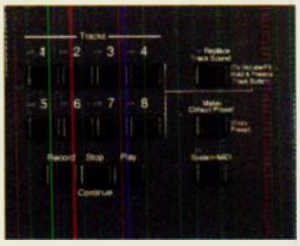

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this level, a manager should be judged on his or her industry contacts and relationship with retail, radio, and other media. Because successful management companies usually represent many clients, they need a staff that can keep the artist in contact with the main manager. Co-management relationships, in which a less-experienced manager (who has a history with the artist) teams up with a seasoned veteran, are common in the industry. In this scenario, everyone wins because the artist gets the personal attention of their own manager *and* the clout of the veteran. The less-experienced manager also benefits from the contacts he or she makes through the veteran.

DOING BUSINESS

When a manager decides it's time to expose a client to the industry, he or she undertakes a critical business role that includes packaging the artist's talents, marketing or selling those talents to the right people, being the artist's advocate in business dealings, raising capital, and accounting for revenues and expenditures. This is where the relationship between inexperienced artists and inexperienced managers is either made or broken.

If the manager is not business-savvy, or is unable to do the handshaking, phone-calling, and shmoozing required to open the doors of opportunity, a gifted artist can drift into obscurity. Likewise, untested managers can be crushed by uncooperative artists secretly on the lookout for more prestigious representation. Budding artist/manager relationships are often built on little more than trust and can be severely tested when the artist's career accelerates.

In a professional relationship, the manager, armed with demo tapes and press packages, seeks out the right combination of record companies, producers, booking agents, and publishing companies. Basically, the manager is a salesperson, and the "product" is the artist's talent. Once a prospect (hopefully several prospects) bites, the manager becomes an advocate and negotiates basic deal points on the artist's behalf. An entertainment lawyer—who often educates the manager in the subtle points of dealmaking—usually joins the management team at this time.

Once a deal is made, the manager's role shifts again, this time to helping the artist deliver the contracted services. Many managers get quite cozy with the label (or publishing) staff and work side-by-side to promote the artist's record (or songs). When the artist tours, the manager may act as a road manager to coordinate logistics. Managers don't take on these duties because they need a few more things to do. Such dedication helps ensure that the artist doesn't get lost amidst the countless other acts administered by record labels, publishers, and concert promoters.

When the money starts coming in, proper accounting is a must. Headlines revealing a famous artist's rift with management can usually be traced to a misappropriation of funds. If the manager doesn't have money-management chops, it is imperative he or she hire a reputable accounting or business-management firm with experience in the entertainment industry. Not only is the day-to-day business management of an artist's career important, but since financial security in the business is relatively low, prudent investment strategies can make up for leaner times in the future.

Now that we've determined what a manager is, it's time to point out a few things a manager *isn't*. A manager is not a bank. Many young artists carry the misguided hope that getting a manager spells the end of financial worries (and responsibility). Unfortunately, it's not the manager's job to invest anything but time and effort in the artist's career. In short, you'll still have to buy your own guitars and picks until you're famous enough to command endorsement deals. (And it's often your manager who seeks out and acquires those coveted "freebie" deals.) Also, a manager is not a booking agent. While managers often seek long-term relationships with promoters, their primary concern is not booking gigs. In some jurisdictions (such as California), it is against the law for managers to book clients without a license.

MINING FOR MANAGERS

Finding the right manager is like finding the right spouse: You just have to get out there and network. Ask other artists, club owners, and local booking agents for leads. Look for established managers on record-label credits and in industry publications such as *Billboard* and the annual *Billboard Buyer's Guide* that list personal managers and their clients.

Because a manager often earns from 10 to 35% of your gross revenue, make sure that you determine whether the price you're paying is worth what you're getting. A "heavy" with a proven track record and superstar clients may increase your net worth and notoriety to the point where 35% seems rather insignificant. Obviously, an inexperienced manager asking for the same percentage should come under heavy scrutiny.

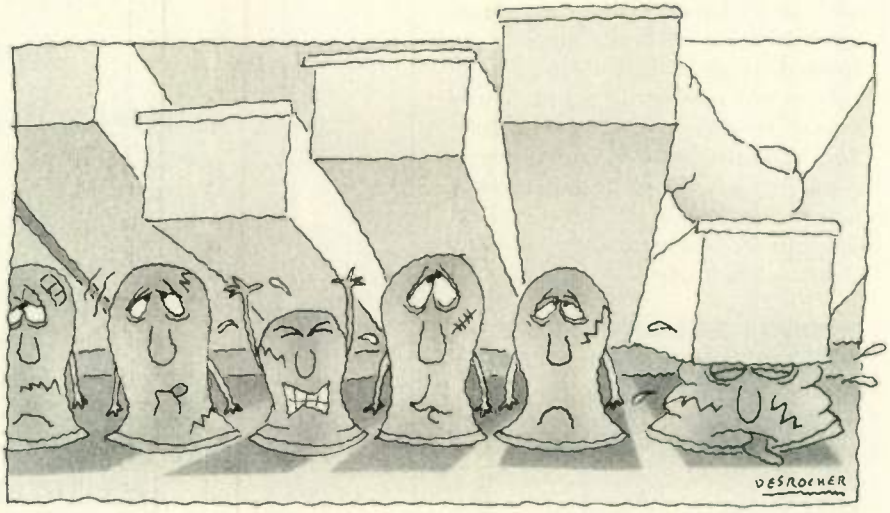
The best way to seduce a powerful manager is to hone your act. Commercial talent—that is, focused ambition mixed with craft and individual style—often attracts suitable management sooner or later. The right management relationship is out there if you are willing to work hard and let them know what you can do.

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

Questions & Answers

By Alan Gary Campbell

Our fix-it philosopher pores over life-extension for keyboard contacts, designing dummy loads, and unrepairable speakers.



Q. Is there any way to extend the life of rubber keyboard contacts? They don't last more than a year or two on a five-night-a-week club gig, and I expect better service from keyboards that cost over a thousand dollars.

Q. I'm considering buying a MIDI master keyboard controller to simplify my onstage life. Does the kind of key contacts make a difference in reliability?

A. Many keyboard designs use a conductive rubber button mounted inside a hollow rubber dome or membrane. The button makes contact with traces on a PC board below as the key mechanism is engaged and "squashes" the dome. This scheme, commonly referred to as a *membrane switch*, was developed decades ago to replace the infamous "J-wire" type contacts used in products such as the Moog Minimoog and Sequential Circuits Prophet 5. It was intended to provide low cost and long life. Resilient, synthetic-rubber compounds are used for the membranes, which (at least in theory) seal out dust and grime that might contaminate the PC contacts.

Unfortunately, membrane switches are far from ideal in practice. Rapid cycling of the membranes (i.e., playing a repeated note or trill) causes minute, but significant, heating of the membrane material, which eventually leads to fatigue. This is aggravated by the buildup of heat inside many instruments and inadvertant exposure of the material to environmental contaminants. Thereafter, the contact is no longer springy enough to respond to rapid playing and becomes loose around the perimeter of the dome, allowing dirt and grime to invade the PC contacts. This results in intermittent keys, stuck notes, mistriggers, repeating notes, etc.

This inevitable wear generally is not harmful to the instrument and can be rectified by cleaning the PC board and replacing the worn membranes, but it is a periodic nuisance. Membrane-switch service often requires disassembly of the instrument and is not a good do-it-yourself project unless you have considerable experience and access to a service manual.

More recent, even cheaper variations on membrane-switch technology, such as the tube-type membranes used in the Yamaha Pf85 digital piano, are even less reliable. But for manufacturers to offer the wonderful bells and whistles expected even on basic keyboards, incorporating expensive, metal contacts is often not feasible. In an effort to improve reliability, Roland now uses an updated version of the membrane switch that has adhesive dome-edges and an improved and rugged design in its FP-8 digital piano.

The only practical precautions you can take to extend the service life of membrane switches involve isolating instruments from environmental effects as much as possible. Turn instruments off during extended periods of non-use and cover them with a non-porous cover. Always keep instruments covered when not in use. Strategically placed air-cleaning units and negative-ion generators can reduce atmospheric contaminants in the immediate area. These precautions can help, but the main factor in membrane-switch reliability is still wear from use.

Metal keyboard contacts of modern design make a considerable difference in reliability. The spring type, used in some Ensoniq keyboards (such as the SQ-1, but unfortunately not in the KS-32) is a good bit better, and the leaf-switch type, used in the Yamaha DX7

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and DX7II synths, the KX88 controller, the Korg SGX digital piano, and Korg M- and T-series synths (to name a few) is noticeably better. All other factors being equal, the Yamaha/Korg leaf-switch will outlast the other types. Note that this type of switch is sensitive to damage when keys are accidentally pushed in along the long axis of the key, so take care when loading, transporting, or jumping around in front of such keyboards.

Q. Is it safe to test an amp by connecting it to a dummy load? Are the simple power resistors sold for this purpose adequate? Is it practical to build your own dummy load?

A. Though a dummy load does not present the complex load characteristics of a speaker to an amplifier under test, it is a safe and necessary device for static testing, especially when troubleshooting suspected output offset voltages that can decimate speakers in seconds. A power resistor intended for this purpose (e.g., an 8-ohm, 20-watt, ceramic type, such as Radio Shack 271-120) can be used, but only within its power rating. Considerable caution is called for; even though the average continuous power drawn from a studio monitor amp is often only a few watts, the peak power can exceed a few hundred watts.

Several power resistors combined in a series-parallel network provide more

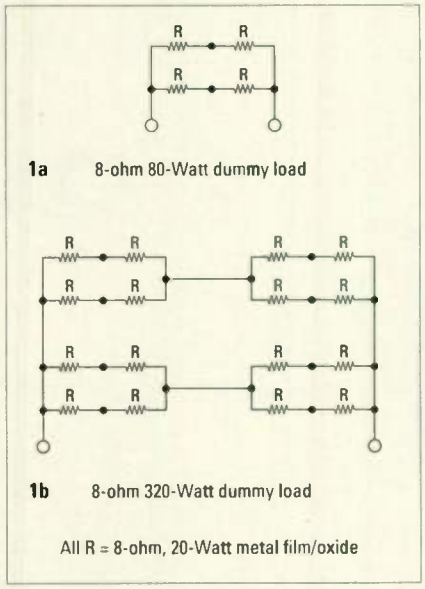
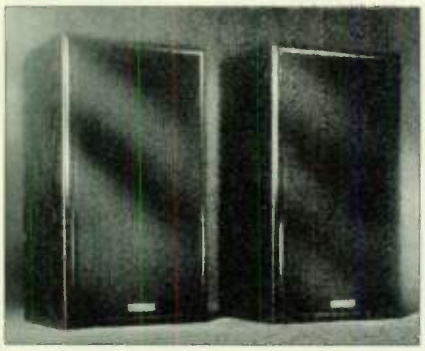


FIG. 1: (a) Four 8-ohm, 20-watt resistors combine to form an 8-ohm, 80-watt equivalent circuit; (b) sixteen 8-ohm, 20-watt resistors form an 8-ohm, 320-watt equivalent circuit.



Yamaha S8M speakers.

power-dissipation capability at a given impedance. This can provide the basis for a useful do-it-yourself project. For example, four 8-ohm, 20-watt resistors combine to form an 8-ohm, 80-watt equivalent circuit, and sixteen 8-ohm, 20-watt resistors form an 8-ohm, 320-watt equivalent circuit (see **Fig. 1**).

Alternately, garden-variety, larger-value, low-wattage power resistors can be used by soldering the resistors between two lengths of solid, bare hookup wire (14- or 16-gauge) to form a parallel "ladder" network. Since resistors usually come taped in a long, ladder-like roll for use with parts-insertion machines, wiring them this way is easy. The ladder can be rolled in a loose spiral to conserve space. Allow sufficient clearance between adjacent layers for proper heat dissipation.

Two-watt, metal-film or metal-oxide resistors are a good choice for this scheme. The total power dissipation of the ladder is simply the rated resistor wattage times the number of resistors. Use the following formula to determine the number of resistors required:

$N = P/2$

Where N is the number of resistors, and P is the total power dissipation required. (Note that this formula works only with 2-watt resistors.)

Once you have determined the number of resistors, use the following formula to find the closest standard resistor value that will work in the ladder:

$R = N \times Z$

Where R is the resistor value, N is the number of resistors, and Z is the desired equivalent impedance.

For example, to construct a 100-watt dummy load, the number of resistors needed = 100/2 = 50. For an equivalent 8-ohm impedance, the resistor value $R = 50 \times 8 = 400$. The nearest standard value is 390 ohms, which yields an equivalent impedance of 7.8 ohms. This is close enough for most purposes.

Don't forget that you'll need twice as many resistors for a stereo dummy load. Stereo amplifier outputs should, under normal conditions, be equally loaded during testing. A good source for metal-film resistors is Mouser Electronics; tel. (800) 346-6873; fax (817) 483-4422.

The dummy load can terminate in standard, multi-way connectors. Any enclosure is fine as long as it provides adequate clearance and ventilation.

Q. I have a bad driver or crossover in one of my Yamaha S8M speakers. How do I get the thing open to replace it?

A. Without considerable difficulty, you don't. The S8M was not designed for field service and is glued together. Return the unit to your dealer or a Yamaha service center.

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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MIDI MUSIC WITH THE HUMAN TOUCH

Reviews

Ensoniq ASR-10

By Geary Yelton

The scion of affordable sampling produces a workstation for the 1990s.

In my never-ending quest for the perfect MIDI instrument, I've discovered one that, in terms of price vs. performance, comes close to the sampler of my dreams. The Ensoniq ASR-10 (ASR stands for Advanced Sampling Recorder) is a sampling workstation—a sampler, sequencer, effects processor, and master keyboard rolled into one—that significantly reduces the cost of high technology.

Ensoniq's ASR-10 is a chip off the old EPS-16 sound block, but with significant new features. Noteworthy additions include expandable dynamic RAM, stereo sampling, and an effects processor derived from DP/4 technology.

A direct descendant of the EPS-16 Plus—it reads EPS samples, but not Mirage samples—the ASR-10 utilizes 16-bit, 64× oversampling, and Sigma-Delta A/D converters at sample rates of 29.76 and 44.1 kHz. (Interestingly, the EPS-16 supports seven sampling rates, ranging from 11.2 to 46.6 kHz.) At the lower sampling rate, it has 31-voice polyphony, with 23 dynamically assigned voices at the higher sampling rate.

The ASR-10 comes with 2 MB of RAM, expandable to 16 MB via four standard SIMM slots. That's plenty by current standards, although I wonder if it will be enough in the near future. (The Kurzweil K2000 and E-mu E-IIIxs sampler can access 64 MB of RAM.) But even if Ensoniq has upgraded its sampler line just enough to get back in the RAM race, the ASR-10 still supplies sufficient memory for most users.

The ASR-10's 1.4 MB floppy drive is an improvement over the EPS-16's 800 KB drive and can be supplemented by an optional SCSI port (model SP-3, $349.95, including installation) for mass storage. As with earlier Ensoniq samplers, the operating system loads from floppy or SCSI disk, so you can update it without replacing a chip. A SCSI port is essential for adding hard-disk storage or a CD-ROM drive and makes it possible to quickly transfer files to and from a computer. (Unfortunately, the review unit required a ROM update, without which the SCSI port wouldn't operate. The original EPS had a reputation for SCSI problems, but the EPS-16 is much better, so I am optimistic.)

The unweighted, 5-octave keyboard feels good and offers sixteen levels of Velocity and Pressure response. Like the EPS, the ASR-10 features Polyphonic Pressure (Aftertouch), which lets you modulate a single note in a chord by pressing harder on the key. Sounds can be programmed to respond to Channel or Polyphonic Pressure.

USER INTERFACE

The new instrument's basic operating system and major features are similar to its predecessor, and EPS users will quickly feel at home. The front panel has 38 buttons that access plenty of editable parameters. The lower half of the front-panel LED display shows 22 alphanumeric characters, while the upper half reveals illuminated words indicating mode, page, and sequencer status. The is much easier to read on a dark stage than the back-lit LCDs you find on most MIDI instruments.

Basic operation involves choosing an activity (Load, Command, or Edit mode) and deciding where to direct it (Instrument, Sequence/Song, Effects, or System/MIDI). Dedicated buttons access the Wave, Layer, and Track parameters (e.g., envelopes, filter, amp, LFO, and track select). Left and right cursor buttons scroll through the various pages; up and down cursor buttons

PETER DIGGS

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APRIL 1993

We want to know what you think of the articles in *Electronic Musician*! Now you can use your reader service card to give us feedback about *EM*'s editorial coverage. We have assigned a rating number to each of the main articles in this issue. Please select a rating for each article and circle the appropriate number on your reader service card:

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and a data-entry slider alter the values. Other buttons control the sequencer, activate Instruments and effects, initiate sampling, and monitor the inputs.

Files are loaded from disk in Load mode, which also doubles as Performance mode, the normal mode for playing the ASR-10. Files are saved, copied, and manipulated in Command mode, and Edit mode is used to define and modify most parameters.

I've never been a big fan of Ensoniq's user interfaces, but this instrument provides tremendous depth of control. Until you become really familiar with its inner workings, however, it may take awhile to find the page you need.

ARCHITECTURE

Although it's complex, the ASR-10's architecture is highly versatile. The highest level in the hierarchy is a Bank, which consists of up to eight Instruments with their associated mix levels, output routings, and effects parameters. It also includes all the Sequences that make up one Song. A Bank can be loaded from disk with a single command, but all Instruments and Sequences in a Bank must be saved separately before saving the Bank.

Up to eight Performance Presets can also be included in each Bank. A Performance Preset specifies which Instruments are selected and stacked, as well as defining their key range, Patch Select status, volume, pan, transposition, and Program number. These Presets make it possible to reconfigure the keyboard at the touch of a button, a real time-saver.

On the surface, an Instrument is just what you expect: cello, drum set, choir, or other sound. Individual Instruments can be stacked for live keyboard performance, played by the sequencer, or controlled via MIDI. As with previous Ensoniq samplers, you can play an active Instrument on the keyboard while another Instrument loads from disk. (However, you cannot load any kind of data while the sequencer is playing.) Each Instrument can be assigned a name, MIDI channel, program change number, transposition, and keyboard range.

Each Instrument can also include as many as eight Layers, each of which combines a number of individual Wavesamples, with up to 127 Wavesamples per Instrument. A Wavesample is an individual recording, the ASR-10's basic unit of sound. Each Wavesample has its own set of parameters: root key, pitch range, filtering, envelopes, modulation, loops, and so on.

Any combination of Layers can be active. In fact, you can play one or more Layers by pressing a key (Keydown Layers) and others by releasing it (Keyup Layers). Layer parameters include Velocity range, portamento time and mode, tuning table, and how keyboard technique affects envelope triggering. For velocity switching, simply define two Keydown Layers with different Velocity ranges. A dropping-bomb sound can be effectively delivered by triggering its descent with a Note On (Keydown) and the explosion with a Note Off (Keyup). It's a blast.

As in the EPS and VFX series, each Instrument can include up to four Patches that define which Layers are active. Patches are temporarily enabled with the two Patch Select buttons to the left of the keyboard. One Patch is played with no buttons pressed, another with the right button, a third with the left button, and a fourth with both buttons. You can "lock in" a Patch so you don't have to hold its button(s), by pressing the Instrument button as you hold the Patch Select buttons, or by defining an Instrument or preset with only the desired Layers. You can also select a mode that retains the Patch whenever you hold down the desired Patch Select button(s) and then play a note. Pressing the Patch Select buttons sends MIDI Control Change 70 with a value of 0, 32, 64, or 127, so any sequencer can easily record Patch Select changes.

Making it possible to momentarily change Patches solves a long-standing performance problem. For example, if you're playing violin samples, it's more realistic to switch from playing legato to marcato to pizzicato as you move from one note to another, rather than playing an entire phrase with a single articulation, as most samplers require.

MIDI PARAMETERS

The ASR-10 can receive on eight MIDI channels at once. The usual MIDI modes are supported, including two Mono modes and a special Multi mode for using the sampler as a remote, multitimbral sound module. A MIDI status parameter lets you define whether an Instrument responds to the keyboard only (Local On), MIDI only (Local Off), or both. Because you can create MIDI Instruments that include control information but not Wavesamples, the ASR-10 can serve as a master keyboard.

By defining Program Change numbers, Instruments can be loaded from disk during performance via MIDI command. Songs can be loaded into the sequencer with Song Select messages. There are a few unfortunate system limitations, though. For instance, pitch-bend range and footpedal assignment are global parameters; they would be more useful as Instrument parameters.

SAMPLING

The ASR-10 is Ensoniq's first foray into stereo sampling. It offers a pair of independent audio inputs (see **Fig. 1**) and lets you simultaneously record onto two Layers, linked as a stereo pair and panned hard left and right. True stereo makes a big difference in image placement at mixdown, and with a full load of RAM, you can afford to use large stereo multisamples.

Sampling with the ASR-10 is straightforward enough: Just plug in a source, press the Sample/Source button, tell the sampler which input to record, and select an Instrument button. The display turns into a VU meter, allowing you to change the sampling threshold. When you press the Enter button, or the signal exceeds the threshold level, sampling begins and the display counts down the remaining seconds left in memory. (Unlike some samplers, you can't specify a sampling time before you sample.) Sampling is complete when you press the Cancel button. At

FIG. 1: Unlike its predecessor, the EPS-16 Plus, Ensoniq's ASR-10 has left and right analog audio inputs with an input-level pot. Options (center) include S/PDIF digital I/O and SCSI.

that point, you're asked to choose a root key that will play the sample at its original pitch.

There are a variety of level controls, including a Mic/Line switch (not available on the rack-mount version) and an Input trim. Levels are monitored with left and right signal-present LEDs and clip LEDs that light up at 6 dB below clipping.

Multisampling on the ASR-10 couldn't be easier. As soon as you record your first sample, press the Sample/Source button again. Before sampling again, a screen appears that lets you change Layers, redo the previous sample, or create a new Wavesample in the existing Layer. Once you've sampled a new sound and assigned a root key, the ASR-10 automatically adjusts the split point halfway between the new root key and the root key of the previous sample. You can do this all the way up the keyboard, never having to manually indicate the keyboard range unless you want to.

When sampling is complete, you can truncate your recordings and define loops. If Auto-Loop Finding is on, you can only choose loop points at zero crossings. Auto-looping doesn't ensure a good loop; it just rules out loop points that aren't at zero crossings. Forward, backward, and alternating loops are available. I've never seen such an assortment of crossfade looping options, including reverse, ensemble, bowtie, bidirectional, and synthesized (radically smooth) crossfade loops.

A significant feature of the EPS-16 is expanded in the ASR-10: the ability to re-record a sample in RAM, with or without the onboard effects. You can stack Layers and Instruments and create a new Instrument by resampling them. You can sample phrases played on the keyboard. You can even sample what the sequencer plays. This feature has amazing implications; you can load eight Instruments in memory, play them from the sequencer, and resample them in stereo. Now two oscillators play a sound that took many oscillators to create. By sampling with effects, the stereo effects processor becomes available to process other sounds or add more effects. Combined with the Layer and Patch Select features, this is a potent capability.

The ASR-10 can also convert sample rates. Converting to a lower rate makes samples smaller. Sample-rate conversion may also be useful if you want to import samples originally recorded at a rate between 6.25 and 48 kHz.

SHAPING SOUNDS

Although it's not really a synthesizer, the ASR-10 offers enough parameters to reshape any sampled sound into something new. Each Wavesample has three sets of envelope parameters: pitch, filter cutoff, and amplitude. These are 6-stage envelopes with a definable time between each stage. Unlike the EPS-16, the envelope generators are hardware-based, eliminating the "zipper" noise typical of software-based envelopes. As a Wavesample is played, its envelope parameters are applied to the envelope generators.

You can define completely different envelopes for hard and soft Velocities, interpolating between envelopes for Velocities in between. If you program synthesizers much, you should appreciate just how fantastic this is. To make programming as easy as possible, there are fourteen predefined envelopes, such as Full On, Slow String, Piano Decay, Short Blip, and Brass Filter.

Each voice has two digital filters, connected in series. These can be lowpass or highpass filters. By combining them, a bandpass filter can be created. Their rolloff curves can be single-pole, 2-pole, 3-pole, or 4-pole, just like the best synthesizer filters. Unlike many synth filters, though, these aren't self-resonating; there's no resonance control to emphasize the cutoff frequency. The filter parameters of each Wavesample are applied to the filter hardware when

Product Summary

PRODUCT:
ASR-10 Advanced Sampling Recorder
PRICE:
$2,695
MANUFACTURER:
Ensoniq Corp.
155 Great Valley Parkway
Malvern, PA 19355
tel. (215) 647-3930
fax (215) 647-8908

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

the sample is played.

The sound-modulation capabilities are superior to many samplers, but fall short of sophisticated synthesizers. Among the modulation sources for each voice are an LFO, a noise generator, two envelopes, Velocity, Pressure, keyboard tracking, pitch and mod wheels, a footpedal, and an external MIDI controller. As with the envelopes and filters, each Wavesample has its own set of modulation parameters.

I had great fun with the Portamento function. The ASR-10 is the first affordable sampler with the ability to glide between notes. You can glide monophonically when you play legato, or polyphonically when you press a footpedal. I found the Portamento especially useful for playing samples of old analog synthesizers.

SIGNAL PROCESSING

The ASR-10's real-time effects-processing capabilities are outstanding. It uses the same 24-bit chip found in Ensoniq's critically acclaimed DP/4 effects processor. (The DP/4 contains four such chips.) Fifty algorithms include an assortment of reverbs, multitap delay, chorus, phaser, flanger, parametric EQ, distortion, and speaker-cabinet simulation. Effects parameters can be modulated in real time by sources such as Aftertouch, Velocity, Pitch Bend, Mod Wheel, and Footpedal, but regrettably, not by the envelope generators. Effects can be stored as part of an Instrument or a Bank, although you're limited to one stereo effect at a time.

One of the most exciting features of the ASR-10 is the ability to process external audio sources with the onboard DSP. It's extremely helpful if a sampler lets you monitor sound sources as you sample them, but this one lets you monitor sound sources through the effects, even if you aren't sampling them! The two live inputs, called audio tracks, have their own output levels, pan controls, and effects buses.

Another type of signal processing included in the ASR-10 is time compression and expansion. This function shortens or lengthens a Wavesample without changing its pitch, and it works well. You can reduce time by as much as 50 percent, or increase it by up to 250 percent. When you alter time, you're asked to specify the quality of the result as a number from 0 to 99. Of course, higher quality takes longer. At low-quality settings, pops and weird

flanging noises may be introduced. While the unit crunches numbers, the display offers a continuous update of its progress, but you can't play it. When the process is complete, you can compare the new Wavesample with the original one and decide which to keep.

SEQUENCING

The sequencer is the same as the EPS-16's: basic, but better than many. It's fine for small arrangements, or as a MIDI scratch pad. The ASR-10 can store up to 80 Sequences in memory, which are chained together to form one Song in a logical and reasonably intuitive manner. Each Sequence includes up to eight Tracks and 999 measures. Tempos range from twenty to 250 beats per minute. I wish the beat resolution were greater than 96 pulses per quarter note, though.

As mentioned earlier, a Song consists of chained Sequences, with settings for Sequence repetitions, muting, and transposition. In addition, as with the EPS-16, the ASR-10's sequencer offers eight linear Song Tracks that extend the full length of the Song. Naturally, Song Tracks must use the Instruments loaded in RAM. But the ASR-10 maintains a 1-to-1 relationship between Song Tracks, regular Tracks, and Instruments; that is, Song Track 1 always plays Instrument 1, and regular Track 1 also plays Instrument 1.

For recording, you can enable a countoff click for one measure. All performance data is recorded, including Program Changes. If you decide to re-record the Track, the latest take can be compared to the previous version. If you initiate playback and press Record, you can punch in whenever you begin to play.

Instruments are directly assigned to Tracks, and the same buttons select both. If you want to record an additional Track with the same Instrument, you must copy that Instrument to another Track. Fortunately, you don't actually copy the sample, just a new set of Instrument parameters that access the same sample, which saves memory. Tracks can also be assigned to MIDI output channels, so you can play external instruments with the ASR-10 sequencer.

A SAMPLE OPINION

Taken simply as a sampler, the ASR-10 is nothing short of wonderful. It sounds exceptionally good and greatly simplifies the process of sampling. Although it's a bit difficult to grasp at first, the architecture of Wavesamples, Layers, Instruments, and Banks makes good sense and allows maximum flexibility. The stereo effects processor is especially useful because you can resample sounds through it. And the ability to process external sounds is icing on the cake.

▼

A dropping-bomb sound is delivered by triggering its descent with a Note On and the explosion with a Note Off. It's a blast.

To take advantage of the ASR-10's subtler features, you must navigate a few dark paths. For your enlightenment, the system disk includes a tutorial Bank to accompany a short, separate tutorial manual. This combination got me up and running from the beginning. The nearly 400-page main manual covers virtually every concept and parameter of the ASR-10. It's well-written, but it could have done a better job of explaining the hierarchy of Banks, Instruments, Layers, and Wavesamples and how they relate to Performance Presets and Patches. There's a 5-page index, but I couldn't find what I needed half the time, and there are numerous mistakes. Even more annoyingly, pages kept falling out of the spiral binding.

The ASR-10 is a superb tool. I know of no other keyboard instrument in its price range that makes it possible to produce records without additional synths and effects, and even without a mixing console. Thanks to its long sampling time and ability to play sounds from RAM while loading new samples from disk, you can load all the Instruments you need for a song and still have enough memory left for vocals. It is lightweight (40 pounds), and if its sequencer synched to time code, it would be an ideal portable post-production workstation.

Several options add even more flexibility. An optional output expander (model OEX-6sr) gives you six outputs—three stereo pairs—in addition to the main stereo outputs. For $249.95, the expander is worth serious consideration. Still under development is a digital I/O board that provides an S/PDIF interface using an RCA connector (price not available).

In addition, access to the EPS sample library assures a large base of users who may be ready to trade up. The wide variety of factory samples makes Ensoniq samplers appropriate for most popular styles of music.

All this gives the ASR-10 a good head start. To top it off, Ensoniq offers a rack-mount version, the ASR-10R ($2,895), which includes the SCSI interface and extra analog outputs. Given its sound quality, feature set, and $2,695 price tag, the ASR-10 may become the standard by which sampling workstations are judged.

Geary Yelton *is a musician, writer, and artist living in Atlanta. In eight years of reviewing products for* EM, *he's had more fun with the ASR-10 than anything he's ever reviewed.*

Passport Producer 1.0 (Mac)

By Bob Lindstrom

Coordinate digitized audio and video, MIDI, animation, and graphics.

Like other multimedia authoring programs, Passport *Producer* is the mortar and framework of your multimedia presentation. It is designed to be the "assembly shed" where you bring together graphics, sound, animation, digitized video, and MIDI music created in other application programs and connect them into a tightly synchronized multimedia spectacular.

Unlike authoring systems intended to produce interactive multimedia results, such as courseware, training, materials, or tutorials, *Producer* was created primarily as a means of preparing non-interactive multimedia pre-

sentations. Within this intended purpose, *Producer* is a potent and welcome addition to the Macintosh multimedia arsenal.

For musicians, *Producer* also allows you to integrate MIDI sequences and multiple digital audio files, all synched to MIDI Time Code.

OF CUES AND CUE SHEETS

You'll need a relatively powerful Mac to do serious work with *Producer*. Passport recommends a Mac IIci or faster, with at least 8 MB of RAM, a color monitor, and a large, fast hard disk. I recommend you get the biggest, fastest Mac you can afford (more about that later). *Producer* also supports a variety of add-on devices, including audio digitizers such as Macromedia's MacRecorder, MIDI synths, CD-ROM drives, video capture and playback cards, multiple monitors, and printers (for printing out multimedia scripts).

Producer uses a timeline grid called a "Cue Sheet" for the coordination of media events, or Cues. To assemble a presentation, you click and drag Cue icons of various types from the Cue Palette and place them into a Cue Sheet Track (see **Fig. 1**). *Producer* provides a number of Cue transitions, both visual and audible, including fades, wipes, iris in/out, blinds, and dissolves. You can adjust the location and length of any Cue within a Track to fine-tune your presentation. And, surprisingly, that is virtually the entire concept of *Producer*. For all its depth and flexibility, *Producer* is a relatively simple product.

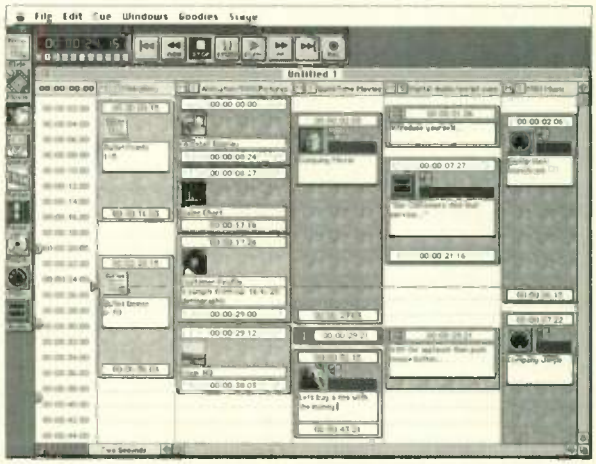


FIG. 1: *Producer*'s main screen offers Cue icons on the left, individual Tracks to the right, and transport controls across the top.

EM regulars should feel right at home in the Cue Sheet because it resembles a SMPTE-synched sequencer interface. The left column of the sheet contains a timeline that can be configured to adhere to the usual reference standards: 24 fps, 25 fps, 30 fps, 29.97 fps drop frame, and real time (hours:minutes:seconds). Presentations may be synchronized internally, or to external MIDI Time Code. (*Producer* does not read SMPTE unless it has been converted to MTC.)

The timeline's display resolution can be altered to the value of your choice. The default value places a time readout at two-second intervals. Smaller values have the effect of "zooming in" on

the display, providing finer visual resolution. Larger values will display a larger section of your Cue Sheet. Display resolution does not change the accuracy of Cue placement, however, just the amount of information within the display.

The rest of the Cue Sheet consists of unlimited tracks, each with individual Mute and Solo buttons that work just as they would in a MIDI sequencer. To work with the program, you click and drag Cue icons from the Cue Palette into a Cue Sheet Track. As you place Cues in a Track, their start time is indicated by the Counter display. An additional display within the Cue window shows start and stop times, or start and duration, according to your preference.

As you click and drag a Cue within a sheet, the time displays change to reflect current placement. Similarly, you can drag just the end of a Cue in order to change its length (or tempo, in the case of a MIDI file). A number of editing facilities enable the manipulation of Cue playback. Among them are the ability to type in specific start/stop time values, group and relocate several Cues on different Tracks, group and synchronize the start/stop times of several Cues, backtime a Cue (set Cue start time by dictating its stop time), align multiple Cues to play sequentially without pause, and loop and crop single Cues.

You can group Cues of a similar type within a single Track. For example, you could place all the audio samples devoted to narration within one track and all of your text slides in another. Then, if you want to isolate the narration, you can solo the narration Track or mute the narration to view the presentation without the voice-over. If you decide to lose the narration altogether, you can just delete the contents of that Track, rather than ferret through your Cue Sheet looking for every audio Cue that contains a voice-over. If you're doing music only, you can have individual digital audio tracks on each Track of the Cue Sheet and mute and solo as you please. You could also use this Track architecture to play back multiple, overlapping MIDI Files.

FORMATS

The essence of Passport *Producer*'s versatility is its support for several Cue type and file formats. Virtually all of the common Macintosh multimedia file types are supported, so *Producer* can boast compatibility with a wide variety of art, animation, sound, and MIDI applications. Cue types and supported file types are:

• **Slide:** Text slides using ASCII or Mac text format, or created within *Producer.*

• **Movie:** Digital video saved as a *QuickTime* movie or PICT, PICS, or AIFF files converted to *QuickTime* in *Producer.*

• **Picture:** Any still graphic in PICT format.

• **Animation:** PICS standard animations. Because playback of PICS files depends on processor speed, Passport suggests PICS files be converted to *QuickTime* movies to ensure accurately synchronized playback. Conversion can be done within *Producer.*

• **Marker:** Marker Cues may be inserted into a Track as place-holders. Being able to insert them into a Track during playback is useful for identifying a specific time position on the fly. It's a great way to find just the right time for a bump cue (a cue point used for slightly moving—"bumping"—a track in time) in the middle of a presentation.

• **Pause:** This Cue pauses the presentation for a specific number of seconds, until a mouse-button or key is depressed, or until any MIDI event appears at the MIDI interface. The Pause Cue provides a limited level of interactivity, mainly to provide breathing space in a non-interactive show.

• **CD Disc:** Initiates playback of a specific, Red Book audio CD track by a CD-ROM drive attached to the Mac. This is an excellent way to add music to a presentation because it takes no computing overhead to play the CD.

• **MIDI:** Will play any Type 0 or 1 Standard MIDI File. The *Producer* MIDI editor provides a number of ways to alter playback.

• **Audio:** Plays 8- or 16-bit AIFF or *Sound Designer* samples through the Macintosh speaker, or through one of several add-on audio devices supported by *Producer,* including Digidesign cards, the RasterOps MediaTime card, and Media Vision's new Macintosh Pro Audio Spectrum 16 sound board.

EDIT THAT CUE!

You have all your music, graphics, movies, and audio, and the pieces are ready to go—or so you thought. It turns out there's been slippage along the way, and your closely tailored multimedia presentation looks a little loose around the seams. If only you could do

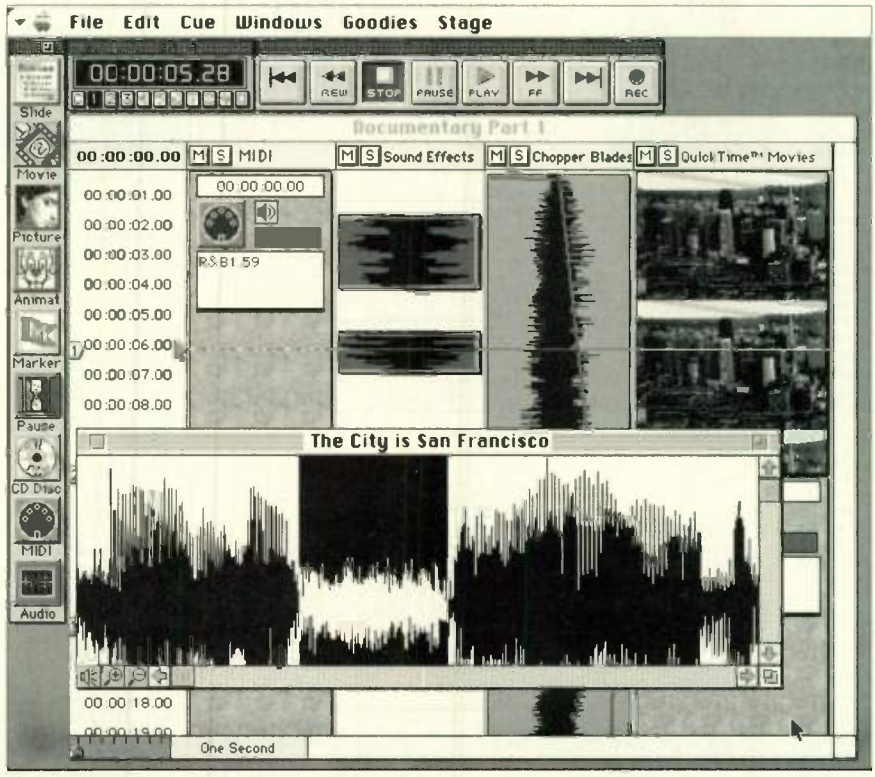


FIG. 2: The Audio Editor built-in to *Producer* allows you to make simple tweaks to your existing files.

some last-minute tweaking without going back to Square One.

Passport *Producer* addresses that reality of multimedia development with an effective, though limited, group of Cue editors. In general, these little editors offer what you commonly need to polish the various types of data files.

For those occasions when the built-in features are inadequate, *Producer* allows you to define any application as the default editor. So, if you need Passport's *Alchemy* to refine a AIFF sample, you can select it as the default editor for that Cue; when you select Edit, *Alchemy* launches and opens to that Cue. (You will need plenty of RAM for this because you'll probably have much of your presentation already loaded into memory.)

The capability of each editor varies considerably. The two least-capable are the editor for Animation, which only allows you to change the playback frame-rate of a PICS file; and the Picture editor, which only enables pasting of a PICT file from the clipboard, or copying into the clipboard.

In the mid-range of capability are the Slide and Movie editors. The Slide Editor lets you create Slides in a variety of font colors, styles, and layouts and select from about twenty transitions between slides (e.g., Wipe, Blind, Curtain, and Iris). You can resize a text slide, manipulate its position on the screen, and alter the rate of transition and the length of time each slide is displayed. You can also create backgrounds for slides by copying in PICT files or selecting a color from the Apple Color Picker.

The Movie Editor might seem less capable because its prime function is to cut-and-paste individual *QuickTime* frames or groups of frames. However, because you can cut between *QuickTime* movies, this simple editor is actually a wealth of power for trimming, extending, looping, and even merging *QuickTime* files. PICT files can also be copied into *QuickTime* movies.

AUDIO AND MIDI

Coming from Passport, it is not surprising that *Producer*'s most extensive editors are for audio samples and MIDI. The Audio Editor (see **Fig. 2**) provides elementary cut-and-paste capability within a zoomable graphic display of the waveform. You can also create new waveforms by cutting and pasting fragments to the clipboard.

However, because *Producer* uses a proprietary clipboard, you cannot cut and paste between the Audio editor and other audio applications.

Other features include changing the master volume of a sample and drawing a master-volume envelope that will duck sections of the sample, or change its relative volume as it plays. Volume envelopes also work on *QuickTime* movies and MIDI Files.

The MIDI Editor (see **Fig. 3**) provides master volume and track volume control, as well as the ability to mute/solo individual tracks, change MIDI channels, shift the stereo pan of a track, alter track names, transpose an entire sequence (with transposition protection for a drum track), rearrange track order, change patch assignments, edit MIDI program and drum maps, scale the Pitch Bend range, and transpose single tracks at the octave. For more complete editing, you'll have to use another MIDI sequencer.

For quick additions to audio or MIDI files, you can record audio samples and MIDI sequences from within *Producer*. Audio Cues may be recorded using the Mac's audio input jack, or an outboard digitizer you've identified in the Macintosh's Sound control panel. Similarly, MIDI recording can be initiated from within *Producer*, albeit at a standard setting of 125 bpm in 4/4 time. (No click track is provided, however.)

THE STAGE AND THE PLAYER

With a Cue Sheet script created and all Cues in place, the actual presentation takes place on the Producer's Stage. This videoscreen area, defined by the user, can occupy all or part of a single screen, or stretch across several screens. The ability to spread a multimedia presentation across monitors is intriguing not only because it allows multiple displays, but because it could permit you to assign, for example, one monitor as a computerized teleprompter that feeds lines to a live narrator or cues to a stage manager. Once you've defined what areas your Stage will cover, you can position Cues to appear anywhere on the Stage. In this arena, *Producer* boasts outstanding creative versatility.

With your presentation completed, you may use the *Producer Player* to distribute your creation. The *Player* is a playback utility that replays Cue Sheets saved in *Player* format. Passport licenses you to produce up to 100 copies of

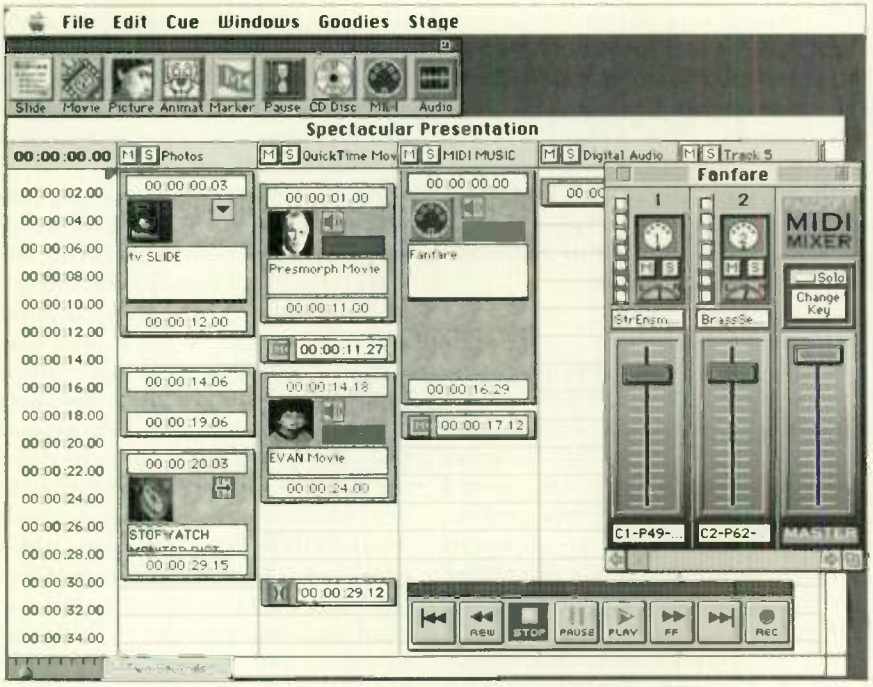


FIG. 3: The *Producer* MIDI Editor provides a familiar, mixer-style interface.

Player at no charge. Details on *Player's* legal use are included with *Producer*.

Two volumes of documentation are provided: a *Getting Started* guide that includes some walk-through tutorials and a *Reference Guide* with clearly organized and well-illustrated details on all the *Producer* features.

MULTIMEDIA DRAMA

Above all, a multimedia authoring program is a work environment, so the convenience and effectiveness of its interface is almost everything. If a sequencer has unique features you deem indispensable, you'll probably tolerate stupid hot keys and awkward mouse/menu combinations. But if a multimedia authoring program doesn't work the way you do, you'll move on to other options.

I've always admired Passport's skill with interface design in its MIDI products. While some of the competition gets bound up in nested menus or arcane mouse stunts, Passport seems constantly aware of the realities of work flow, of the importance of making common activities the easiest to accomplish and the need to display a maximum amount of information on screen without confusion.

Significantly, that interface design talent is all over Passport *Producer*, from the clean, yet info-packed, execution of the Cue Sheet, to the ease with which you can copy onscreen text and generate animated slides. *Producer* is a terrific work environment, powerful enough to get your ideas into action, yet so flexible that you'll be encouraged to refine, rethink, and redo those ideas as you're putting them together.

The same goes for the data you're assembling. The concept of *Producer* is that most of your data prep work will be completed by the time you get

Product Summary

PRODUCT:
Producer 1.0
SYSTEM REQUIREMENTS:
Mac II or faster, with 5 MB RAM (IIci or faster, with 8 MB RAM recommended); System 7.0
PRICE:
$495
MANUFACTURER:
Passport Designs, Inc.
100 Stone Pine Rd.
Half Moon Bay, CA 94019
tel. (415) 726-0280
fax (415) 726-2254

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

to *Producer*'s Cue Sheet. Yet, as mentioned, the individual editing modules have the capability to make last-minute alterations. Whether you want to slice a few minutes out of a *QuickTime* file, combine two movies into one, or move your MIDI percussion track from channel 10 to channel 16, *Producer*'s suite of editors will be ready to make that eleventh-hour alteration.

THE BOTTOM LINE

Given the time allowed to prepare a review for publication, it was impossible to test *Producer* in every context. With more time, I suspect that I'd have a wish list of features that might have been. I can imagine having more wipe options, for example, or slightly improved options for increasing the interactive elements of a presentation, or a more direct way to change the tempo of a MIDI File. Even so, on its first appearance, *Producer* steps out of the gate with an impressive array of features.

Good as it is, there remains one significant "gotcha" that, to be honest, is beyond Passport's control. Heretical though it may be to say, the Macintosh, the current darling of multimedia computers, may not be the best possible platform for this powerful program; at least, not a Mac with less than the maximum amount of computing power.

The Macintosh graphical interface, not to mention the *QuickTime* and MIDI support, make *Producer* the potent authoring environment that it is. But I often ran afoul of the computing limitations of my Mac IIcx. *QuickTime* frames would skip because I was pushing the Mac past its pain threshold. Text animation would chunk along due to interference from some other piece of system activity.

The *Producer* manual devotes several pages to hints and tips on optimizing the performance of your presentations, including such suggestions as opting for 8-bit instead of 24-bit color, and preloading large parts of your presentation into a RAM buffer, rather than constantly accessing the hard drive. But the overall key to optimizing *Producer* performance is simply to buy a more powerful Mac with a lot more RAM. Then, put the whole show in RAM, and let 'er rip.

You can run *Producer* effectively on a less-powerful Mac with modest amounts of RAM if you are cautious about what you do and how you're doing it. But if you're like me, a powerful tool leads to more powerful (and more ambitious) creative ideas. So, unless you want to constantly be concerned with work-arounds, you're going to want to run *Producer* on the biggest, brawniest Mac you can afford.

For those without Macintoshes, Passport has planned a *Windows*-based version of *Producer* for release in the fall of 1993.

With the right horsepower, though, *Producer* is sure to release your mind-power. This is an excellent work environment, the kind of product with so much power and potential that you'll find yourself fantasizing about projects that will tap its talents. I've been thinking about a multi-screen multimedia presentation for my company that coordinates CD-ROM, MIDI synths, three projection TVs, and separate monitors providing a teleprompter for a live narrator and time-sensitive lighting and sound-cue instructions for the technical director. Now, how much do those Quadra 950s go for these days?

Bob Lindstrom *is director of game development at Dynamix.*

Digital F/X Digital Master EX (Atari)

By Larry "the O" Oppenheimer

While promising, this multi-track hard-disk recorder is not ready for prime time.

Over the last few years, the number of digital audio workstations based on the Macintosh or PC have swollen into a horde, but the offerings on the Atari platform have remained slim. The introduction of the company's new Falcon030 may change this situation, but if you're looking to do serious digital audio work now, the Digital F/X Digital Master EX is one of the few candidates that stand ready.

Developed by Hybrid Arts from its ADAP hard-disk recorders, a 2-track Digital Master system was briefly marketed by that ill-fated firm. Just before Hybrid Arts went belly-up, it announced the 4-track Digital Master EX. Video-workstation manufacturer Digital F/X then

acquired the product as part of a larger strategy that included the acquisition of the higher-end WaveFrame workstations.

The Digital Master EX (DMEX) offers four audio channels with discrete inputs and outputs, sixteen internal tracks, a host of signal-processing algorithms, and the standard repertoire of recording, editing, and playback functions. The system can import and export files to and from *Sound Designer I,* 8- and 16-bit AIFF, and 8- and 16-bit .WAV file formats. Sample rates of 48, 44.1, 44.056, 32, 31.25, and 22.05 kHz are supported. DMEX does not provide direct sample-rate conversion, but you can simulate it in real time with the varispeed feature. It also has no MIDI features.

THE INS AND OUTS

Digital Master EX consists of a software package, three 1U rack-mount boxes that mostly provide I/O functions—a Digital Module and two Analog Modules—and a cartridge-port buffer box. The system requires a SCSI hard drive, so you'll need a DMA interface box to mate with the Atari's hard-disk port.

Each Analog Module has two balanced, 1/4-inch analog inputs and outputs on its rear panel and a 9-pin D-sub connector that passes information to and from the Digital Module. The front panel sports an input level pot and 19-segment LED ladder-type meter for each channel.

The Digital Module has naught but the power switch on its front panel, but the rear panel (see **Fig. 1**) is filled with several connectors, including a 50-pin D-sub that connects, through the supplied buffer box, to the computer's cartridge port; two 9-pin D-subs that connect to the Analog Modules; a 9-pin D-sub marked "Ext Sync"; and SMPTE time-code in and out (oddly enough, on RCA jacks). Another 9-pin D-sub, RS-232 connector runs into the Atari's modem port, which requires an adapter on some STs.

The Digital Module also includes the digital inputs and outputs. Though labeled "AES/EBU," the RCA jacks appear to be in S/PDIF format, a consumer format that is similar to, but significantly different from AES/EBU. Another unlabeled optical, digital-audio interface connector turned out to be a digital input.

● DIGITAL MASTER EX

The Ext Sync connector is identified in the specifications as sending and receiving a sample-rate clock but is not explained anywhere in the preliminary manual. A call to the manufacturer revealed that the feature is not implemented.

The SMPTE output level from the system was far too high. I was forced to pad it considerably just to feed it into my multitrack tape deck.

Setup of the system was not as simple as one could hope. The buffer box plugs directly into (and hangs off of) the cartridge port, blocking the keyboard connector and fitting precariously enough that mine came disconnected on several occasions. I had similar problems with the RS-232 cable and adapter.

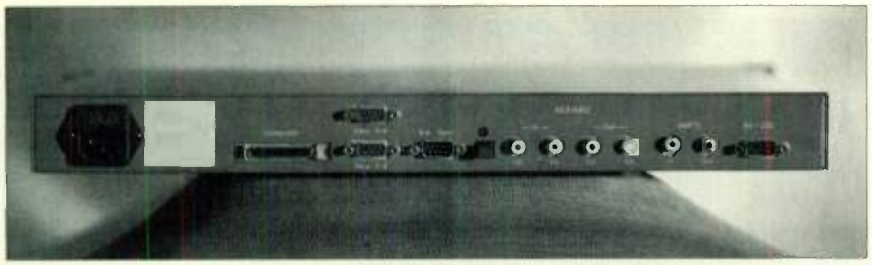
The setup instructions in the manual, although given in a step-by-step fashion, are short on detail, especially graphics. I needed to call Digital F/X to be sure I was setting up the system correctly.

SOFTWARE OVERVIEW

The Digital Master software uses a custom shell, written to circumvent constrictions of Atari's GEM graphical environment that precluded using GEM for digital recording and playback. The shell's Applications menu reveals a choice of the *Editor, SFS Utilities, SMPTE Utilities, Hardware Setup, Control Panel,* and *File Constructor.*

The *SFS Utilities* application provides file- and volume-management facilities (Delete, Rename, Copy, Check Info, DAT Backup, etc.). The DAT Backup command converts a multitrack file into a 2-track file by stringing pairs of tracks consecutively and attaching a header at the beginning. This file can then be played back from the *Editor* and recorded onto a standard audio DAT. It's not a particularly efficient backup scheme, but it is practical and cost-effective. With only a few exceptions (which may have been caused by my error), it also proved reliable.

The *SMPTE Utility* gives access to the DMEX's time-code reader/writer and includes "Dub" (presumably meaning "regenerate") and "Jam" functions. This last term is usually used to mean a regenerator that flywheels over dropouts; but jam synching is a family of techniques in which outgoing code differs from what comes in. The manual does not elaborate on what form of jam synching the DMEX performs.



PETER DIGGS

FIG. 1: The Digital Module rear panel (from left to right): a 50-pin D-sub connector that indirectly attaches to the Atari cartridge port; two 9-pin D-subs that connect to the Analog Modules; a 9-pin D-sub Ext Sync connector; an unmarked optical digital audio input; four RCA connectors for digital I/O, SMPTE I/O, and an RS-232 port.

The *Hardware Setup Utility* is where selections are made for input sources (analog or digital) and clock sources. The *Control Panel*, which is designed to replace the GEM *Control Panel*, has the regular clock, mouse, and other basic system functions. Changes made to these two utilities are not automatically saved; they must be manually saved to disk, or they vanish when the system is powered down.

File Constructor is DMEX's playlist editor. This window allows you to select any previously marked range from any file on the disk and insert it into the playlist, specifying start and stop times, playback channel, level, and fade-in and fade-out times. Overlapping ranges on the same channel cause the *File Constructor* to automatically calculate the necessary crossfade and store it when it compiles the playlist. This easy-to-use application functioned well.

THE SOUND OF FRUSTRATION

The *Editor* is the heart of the DMEX, where recording, playback, and editing are performed. Recording appears straightforward: create or select a track for recording, specify the area to be recorded, and click the Record button.

Unfortunately, it's not that simple. For a start, when running on a 8 MHz Mega2, DMEX was abysmally slow, taking nearly 30 seconds just to prepare for recording a 6-second space on a single track. This adds up to an appreciable amount of time spent waiting. (Digital F/X now recommends using a 16 MHz computer to run Digital Master; more about this later.)

In addition, if you click the Record button and then change your mind, there is no way to abort the recording. You have to start it and stop it immediately, wait for it to digest what you just "recorded," then wait for it to prep the space again.

The system supplies a wealth of other frustrations. The 64× oversampling Delta-Sigma analog-to-digital converters and 8× oversampling D/As sound just fine, but the DMEX emits pops and digital garbage under some circumstances. Some of the pops even made it into the recordings.

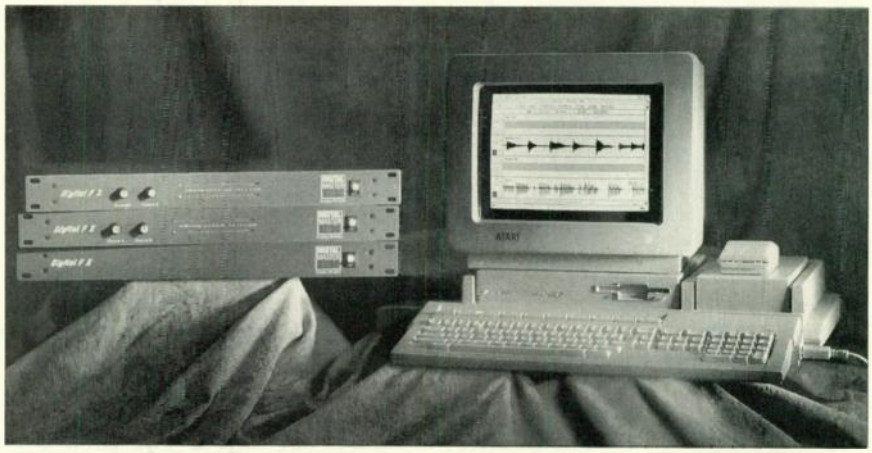
DMEX does not provide pre- or post-roll on punch-ins, meaning that it doesn't play until the actual punch-in point. Punching in is further hindered by DMEX's inability to monitor the input while playing, rendering it impossible to rehearse punches.

There is also no easy way to reclaim disk space. Deleting material doesn't do it, nor does deleting material and saving the file. The material must be deleted and the file actually closed before disk space is reclaimed. Of course, closing the file and reopening it takes a good bit of time.

CHANGING TIMES

DMEX offers a number of unusual features, including the ability to perform varispeed recording and/or playback. This is great for recording vocals off-speed, among other things. The audio quality during varispeed is quite good; no objectionable artifacts appear until you try to record or play back very far off speed.

Recording and playback can also be performed to SMPTE time code. Generally, this worked well, but it had glitches. Although the *SMPTE Utility* has jam sync capability, DMEX did not seem to handle small dropouts or speed variation gracefully. (I fed it code from an analog tape machine.) Small dropouts seemed to make it quit Record, or lose sync in playback and be unable to resync. Speed variations made it attempt to varispeed to match, which is wonderful, but several times the machine simply ran away and got wildly off speed.



PETER DIGGS

Digital Master EX, from Digital F/X, provides four audio channels and sixteen internal tracks of hard-disk recording for Atari computers, but has many flaws.

Also, when recording a range (as opposed to the whole piece) to SMPTE, it was necessary to make sure to start playback of the master before the beginning of the range. Starting in the middle of the range brings up a dialog box stating that the time code was beyond the starting point. There is also no simple mechanism for back-timing or synching to hit points.

EDITING FEATURES

Editing, the core of DAWs, is where the Digital Master's greatest strengths and weaknesses lie. Each track can be viewed either as a stripe indicating activity, or as a waveform. Waveform displays can be at 1x, 2x, 4x, or 8x, and you can zoom in to the sample level. Time can be displayed in SMPTE form or hours:minutes:seconds:milliseconds. These features made waveform editing a breeze. Recalculation time for the display was an oft-endured pain in the neck, however, as was the teeny type used for showing window, range, and cursor times.

Some nice features emerge in the editing section. You can define an unlimited number of markers, which can designate a single point or a range, and ten markers can be assigned to the Atari's function keys. Simultaneous cut-and-paste of multiple tracks is supported. Standard cut-and paste editing can be augmented with a Smoothing command, which brings up a dialog offering several smoothing curves and a box for specifying the time these curves should take. I found that a 10 ms log curve worked excellently in almost all cases. The Smoothing command can also be used on a selected range to eliminate a pop in the middle of a waveform.

There are less-than-graceful aspects of editing on DMEX, too. For example, the display does not scroll if you attempt to select more than what is shown onscreen. More important, the Scrub feature is not really scrubbing; it just starts playing and looping a section of sound, without direct manual control. You can control the speed and direction it plays the selected range, but there is no way to take the mouse and move it back and forth by hand to find an exact spot.

I used the Insert Silence and Slip Range commands often and successfully, especially as there is no pencil-editing of waveforms. (This forced the use of Insert Silence to eliminate unwanted noises and pops.) But waiting 30 seconds to a minute to slip a range (i.e., select a range and move it in time by a specified amount) proved annoying, especially when repeated attempts were necessary to slip a range by the right amount. On a few occasions, slipping caused the audio in the affected area to play back with some hesitations.

If you goof up, you usually rely on the Undo command. Unfortunately, the DMEX's Undo command has a peculiar habit of completing its task and leaving you nowhere near the area where you were working.

The Process menu is where DMEX performs its glitziest tricks. Level can be adjusted (but there is no gain-normalization function), fades of any length created, notes retuned, and non real-time mixing performed. Ranges of audio can be reversed, phase-invert-

ed, and time-scaled.

All these functions sound good, especially the retuning. The biggest limitation is the time it takes to perform them; DMEX took a minute and a half to retune a single 750 ms note on one track. Although the Retuning function allows specification in semitones and cents, I was unable to get the DMEX to retune downward less than a semitone, forcing me to retune down a semitone and then up some number of cents.

NO CIGAR

I used the DMEX extensively for a variety of common recording and editing tasks, producing about an album's worth of material. Accomplishing this required far more time and effort than should have been necessary, though.

The preliminary manual was of little help, listing several features with minimal or even no explanation. The explanations that are there are often incomplete or unclear, and graphics are few.

Toward the end of the review period, I experienced an increasing amount of instability, including disastrous crashes and corrupted files. At the eleventh hour, Digital F/X shipped me a new STe, running at 16 MHz, to continue

Product Summary

PRODUCT:
Digital Master EX hard-disk recorder

PRICE:
$4,997

SYSTEM REQUIREMENTS:
Atari ST, STe, or TT (Falcon030 version under development), with 4 MB of RAM; hard-disk drive; TOS 1.4 or higher; SCSI hard drive; SCSI-to-ASCI adapter

MANUFACTURER:
Digital F/X
755 Ravendale Dr.
Mountain View, CA 94043
tel. (415) 961-2800
fax (415) 961-6990

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

my work. The faster computer accelerated certain procedures, such as screen redraws, but not all. The system became somewhat more stable, but crashes and file-corruption problems persisted to the point that one tune was rendered unusable. This level of instability is unforgivable.

Digital F/X representatives point to the dance-music market as one for which the DMEX is well-suited. Given its interesting selection of processing, looping, and easy playlist capabilities, it could be good for that. But considering the system's current limitations—slow operation, SMPTE time-code problems, lack of preroll and true scrub, etc.—I don't think it would function well in an audio post-production environment.

It appears Digital F/X bought a poorly designed product from Hybrid Arts and is working hard to fix it. Digital F/X representatives acknowledged many of the problems I reported. At January's NAMM show, Digital Master EX was shown running on the Atari Falcon030, and it looked much faster than the version I had. The company promised that after getting DMEX up on the Falcon, their next priority is implementing improvements and bug fixes.

With competent efforts and the superior Falcon030 platform, Digital Master EX could mature into a powerful tool for the studio. Right now, though, its strengths are mostly obscured by its flaws.

Larry "the O" Oppenheimer *plays drums, vibes, guitar, electronics, and acoustic wok and is a non-commissioned officer in the rock 'n' roll army.*

Zoom 9120 Effects Processor

By E. D. Menasche

An intuitive interface puts effects-processing at your fingertips.

Like Ahab hunting for Moby Dick, musicians and recording engineers are often relentless in their pursuit of the perfect sound. If a signal-processing parameter can be adjusted by even one percent, these

Zoom's 9120 delivers 22 basic effects and 99 user memory locations, and it allows intuitive parameter adjustments via good, old-fashioned knobs.

golden-eared listeners claim they can hear the difference. Unfortunately, scrolling through countless parameter pages can be as frustrating as tracking mythical white whales. Usually, only the adventurous (and the stubborn) are hardy enough to venture beyond factory presets.

Enter Zoom, a company that built its reputation on unconventional but useful devices. Their latest box, the 9120 Advanced Sound Environment Processor ($599), invites even the most timid tweaker to cut through editing mazes with an array of intuitive control knobs.

▼

Three data entry knobs are provided for "organic" tweaking of parameter values.

The 9120 offers 99 factory presets (all user editable) constructed from 22 basic effects types. With the exception of a chorus/delay/reverb algorithm and a mono pitch shift with reverb, all algorithms produce one effect at a time. The effects menu includes: reverb (hall, room, plate, early reflection, and gate); delay (mono, ping-pong, stereo 2-channel, stereo crossfade, and hold); chorus; several modes of pitch shifting (including a pedal-sweep pitch-shift that evokes Roxy Music-era Eno); sweep flanger; karaoke (which filters out vocals from a mix); and Stereoize (which broadens the stereo image).

ON THE FACE OF IT

The front panel has a piggyback input-level control (the inside dial adjusts the left channel; the outside dial adjusts the right channel); a 3-color input-level LED for each channel (green or amber announces suitable input levels, while red warns of imminent clipping); a wet/dry balance dial; and an output-level dial. Increment/decrement keys allow front-panel program selections, and an LED displays the current program number. An effect-selector dial is surrounded by LEDs that display the basic effect type, and an easy-to-read amber LCD offers detailed parameter information (more on this later). Three data-entry knobs are provided for "organic" tweaking of parameter values.

Also on the front panel are dedicated keys for specific editing functions: Page, Utility, Effect, Compare, Store/Execute, and a dual-purpose key for Cancel (Utility mode or Store function) and Program Change Learn (normal operation mode). In addition, a trigger key offers tap-trigger control of some parameters, and a control-in jack allows footswitch/footpedal program changes.

The rear panel includes a jack for a "wall-wart" AC adapter; an LCD Contrast dial; MIDI In and Out ports (unfortunately, the Out port does *not* double as a Thru); and unbalanced, left/right input and output jacks. (Input/output level gain is switchable between +4 and -20 dBm.)

GETTING AROUND

Presets are selected from the front panel, or via MIDI Program Change. When a preset is chosen, an LED denotes the basic effect type: Hall, Room, Plate, Gate, Early Reflection, Chorus, Delay, Pitch, SFX 1, or SFX 2. The LCD displays a handy graphic showing how many pages of parameter adjustments are available for the chosen effect. Hitting the Page key reveals the next layer of parameters (from a maximum of three pages), eventually scrolling back to page 1. Each page offers three parame-

ters, and each parameter is assigned to one of three data-entry knobs.

The LCD depicts parameter adjustments in conventional numerical values and with a graphic that shows the relative position of the data-entry knob. Saving an edit is as simple as hitting the Store key, selecting the desired preset number, and hitting Store again. If you try leaving an edited program without saving it, the 9120 politely asks if you're sure. The Compare key allows you to check your edited program against the original.

Certain algorithms that demand less juice often allow more editing parameters than larger programs. For instance, the mono delays offer control of both high damping (the attenuation of high frequencies over time) and high cut (the overall tone), while their stereo counterpoints allow access to neither. Program memory is also somewhat limited. An effect balance can't be stored as part of a preset, but must be set manually by the front-panel balance knob. Finally, there's no room to store program names. If you like to name your presets, you'd better grab a notebook.

One of my favorite mixing and performance techniques is to manipulate effects parameters in real time. The 9120's three knobs seemed like the perfect vehicle for such ministrations. Unfortunately, twisting the knobs while audio passes through the 9120 produces a *loud* ripping effect, the digital-audio equivalent of a raspberry. This zipper noise is most noticeable in the pitch shift and delay modes, but it also occurs in certain reverb parameters.

Product Summary

PRODUCT:
9120 Advanced Sound Environment Processor
PRICE:
$599
MANUFACTURER:
Zoom Corporation
385 Oyster Point Blvd., #7
South San Francisco, CA 94080
tel. (415) 873-5885
fax (415) 873-5887

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

The 9120's MIDI implementation is a mixed bag. Lacking a MIDI Thru, the 9120 cannot be part of a series of MIDI devices without an external switcher. There is only limited provision for real-time parameter control via MIDI. You can open and close the gate via Control Change messages, control the pitch shifter from any MIDI continuous controller, and start and stop the sample-and-hold delay. But if you like to automate effects level, reverb time, and the like, you're out of luck. The 9120 can dump and load its memory over MIDI, a utility allows Program Change mapping, and that's about it.

THE SOUNDS

Although the 9120 offers a wide sonic palette, its main focus is its reverbs. The owner's manual—which is clearly written and well-illustrated—even includes detailed explanations on the applications of various reverb types.

Each reverb is distinguished by overall character and specific editing parameters. Some reverbs share common elements: Hall, Room, and Plate each have two modes—Dark and Bright—and share reverb and pre-delay times. (A high-damping control tames the metallic gangling that is common among low-cost digital processors.) However, Room offers an attack parameter, but no density control. Hall delivers the opposite. And while Plate has a tone parameter, the others do not. Although this individuality took some getting used to, the different editing templates avoided reverb algorithms that differed in name only.

Sonically, I found the Dark modes smooth and natural; Dark Hall is especially good for embellishing huge guitar and synth lines. The Bright modes delivered a crispness that was effective on vocals and dense percussion.

The Early Reflection program delivers a crisp spatial dimension without "reverb wash." The Size parameter emulates different room sizes (in place of a reverb time setting), and the Shape control can be inverted for reverse-reverb simulations. Early Reflection also offers a parameter that is absent from most other 9120 algorithms: 2-band EQ.

Gated reverbs can be triggered by a number of external sources, including MIDI note or Control Change message, trigger/control input jack, or a right-channel input signal. The program also allows reverb time, pre-delay, density, and tone to be set to zero, which turns

the 9120 into either a conventional (manual) or MIDI-automated noise-gate.

Unfortunately, the 9120's reverbs exhibited more audible hiss than those produced by comparably priced units. Bright settings were particularly troublesome. In addition, when I monitored the effects return on a long-decay reverb I was using to spice up some percussion samples, I distinctly heard an internal noise suppressor cut the tail off the hiss.

The pitch-shifting programs performed well when changing signals a few cents either way. Actual transposition is a different matter. The 9120 added some coloration to the sound in the form of reduced midrange, and it tracked low notes lazily. However, having a pitch-shifter is still a plus.

The chorus and delay programs sounded solid. The delays offer the added (and useful) bonus of a delay-time calculator, which is called up by hitting the Utility key during editing. Simply input a tempo (between 40 and 240 beats per minute) and a note type (eighth-note triplet to half note) and the 9120 automatically sets the correct delay time. Delay time can also be determined by MIDI Clock or a tapped tempo (via the Trigger/Control input), which is an excellent feature.

CONCLUSIONS

I was disappointed that one of the highlights of the 9120—the ability to grab a knob and adjust a parameter in real time—was compromised by zipper noise. This, coupled with the audible hiss exhibited by some programs, makes it tough to recommend the 9120 for critical professional applications. However, the basic sound quality of the 9120's effects is very good. The delays and reverbs are especially mellow, and the Early Reflection and Chorus algorithms produce a lush, but subtle sense of space.

In addition, the simple, intuitive user interface—not to mention the user-friendly list price of $599—makes the 9120 an ideal choice for the musician who wants to expand his or her processing options beyond factory presets.

(Special thanks to Bill Philbrick of Thus and Such Productions for help in testing this product.)

E. D. Menasche *is a guitarist/songwriter/producer in the New York area. His band Fonolingus has just released its debut album, "Heart/Beat."*

● AUDIX

Audix PH-5 Powered Speakers

By Neal Brighton

Satisfying sonics with portable punch.

Almost all of us have occasions where we need a decent sound system, but space is at a premium. For example, some computer-based multimedia authors like to keep all their music-making gear on a desktop. And if you're into low-budget mobile recording, a mini-system can save time and money. Also, let's not forget the road warriors who cut demo tracks in motel rooms.

There are tape decks small enough for such applications, and portable synths have been around for years. (Remember the CZ-101?) But until recently, if you wanted Lilliputian monitors, you had to settle for headphones. Manufacturers such as Foster, Yamaha, and Boss started putting out small, low-cost powered speakers, but some of the early efforts sounded mediocre at best.

Luckily for mini-recordists, the entire genre has improved considerably. Audix has a reputation for good pro-audio gear, so I was delighted to check out the company's new low-cost ($289/pair) PH-5 powered speakers. The PH-5s are 2-way and feature a 5-inch woofer and plastic cabinet. The company also offers two other powered-speaker systems: The PH-3 ($199/pair) is a 2-way system with

Product Summary

PRODUCT:
PH-5 powered speakers
PRICE:
$289/pair
MANUFACTURER:
Audix Corporation
10439 SW 90th Ct.
Tualatin, OR 97062
tel. (503) 692-4426
fax (503) 692-4658

EM METERS	RATING PRODUCTS FROM 1 TO 5
SOUND QUALITY	● ● ●
VALUE	● ● ● ●

PETER DIGGS

Audix PH-5 powered monitors deliver good sound quality and better punch than their 25 watts/side rating implies.

a 3.5-inch woofer and plastic cabinet, and the PM-5 ($429/pair) is similar to the PH-5 but has better specs and an MDF wooden cabinet. All three systems use the same 25-watt power amp.

TESTING THE PH FACTOR

Wiring the PH-5 system is effortless. One speaker cabinet has the power amp, volume knob, two RCA input connectors, and a ¼-inch power amp output for the satellite cabinet. The satellite offers a standard speaker terminal. The power supply is a separate unit that can sit almost anywhere, which is good because it's hefty. Mounting brackets for the speakers can be bought separately for about $40.

I started by plugging the PH-5s into a CD player and listening to a few familiar pop, jazz, and rock CDs. Then I plugged in synths and other instruments to see what kind of speaker damage I could do. I was surprised to find that these little speakers have quite a kick to them, especially considering they handle only 25 watts per channel. (Don't be confused by the big 50-watt built-in stereo amplifier pictured on the shipping box; the onboard power amp delivers 25 watts per side.) Finally, I listened to DAT mixes of a string band and a pop band. I was pleased to discover that the amp performed well on everything I tested and added very little hiss.

Audix did a prime job designing the amplifier, and the PH-5s certainly can deliver thunderous sound, but what about the overall sound quality? It's not fair to expect the PH-5s to have flat response, or compete with unpowered speakers in the same general price range. (Audix has a separate series of unpowered speakers for conventional monitoring.) So I mostly compared the PH-5s to powered speakers by Fostex and Boss. Still, as a benchmark, I also A/B'd them with a pair of Yamaha's popular NS-10s.

Compared to its immediate competition, the 2-way speakers sounded quite good. There was noticeable coloration in the low and high mids, and the lows had a tendency towards muddiness. But overall, they did a nice job, even when I was pumping in heavy synth-bass notes. For the record, Audix rates the PH-5's frequency response at 60 Hz to 20 kHz (±3 dB).

My main design concern is the lack of speaker protection. There is no protection in the event of a simple mistake such as a feedback loop. It would be good to have fuses, at least, to protect the woofer and tweeter from serious damage.

CONCLUSION

The market for powered speakers is growing rapidly. However, it is important to buy them for the right reasons. The PH-5s don't offer a flat response and are not intended to serve as a project or pro studio's main near-field monitors. But for computer multimedia workstations, small bedroom studios, and compact, mobile recording rigs, they save space, require minimal wiring, and can be quickly and easily transported.

Along with these advantages, the PH-5s provide good, clean sound and surprisingly more punch than most budget powered systems. And to top it off, they're an above-average value. If portability and efficiency are prerequisites, then by all means check out the Audix PH series. They might be just what you are looking for.

Neal Brighton *is co-owner of Sound & Vision studios in San Francisco.*

Harmonic Systems StudioPal 1.0 (Mac)

By Chris Meyer

Add a math whiz to your studio staff for under $70.

Unwittingly and unwillingly, we recordists have learned that running a modern studio often requires becoming a math major to resolve the conflicts and creative challenges that occur when we combine different worlds. For example, if the film for which you are composing music has been tagged in the original feet and frames, at what SMPTE time are you? If you find the difference between two important cuts in SMPTE time, how many milliseconds long is this scene?

Once you know that time, at what tempo should you set the sequencer so the downbeats line up? If you have a drum loop the length of which you know in samples, how long is *that*? At what pitch do you need to play that loop to make it match up with the sequencer? And how many megabytes of hard-disk space will be required to digitally record this?

If you can't calculate all of the above in your head, anticipate you might need to, and have a Macintosh, then you should check out Harmonic Systems' *StudioPal.*

THE MECHANICS

StudioPal is a small program (less than 150 KB) for the Macintosh that serves as a multi-unit calculator and converter. If you're running under System 7, you can treat it like the standard calculator desk accessory by placing it (or its alias) in the Apple Menu Items folder inside the System Folder. If you're running System 6, you'll need to run it as a separate application under *MultiFinder.* To use it as a normal calculator, just type away, or click the onscreen buttons. *StudioPal* does not contain higher-order math functions such as square roots, or calculate how much interest you are paying on your equipment, but it does feature a memory function.

If you want to perform a conversion from one unit to another—say, from SMPTE time code to milliseconds—simply enter in the first value, select its unit of measure from the Units drop-down menu, type or click on "=" and select the destination units. *StudioPal* will display your original and converted numbers (see **Fig. 1**). If you are going to be doing a string of similar conversions in a row, you can set "From" and "To" units to use for each successive calculation.

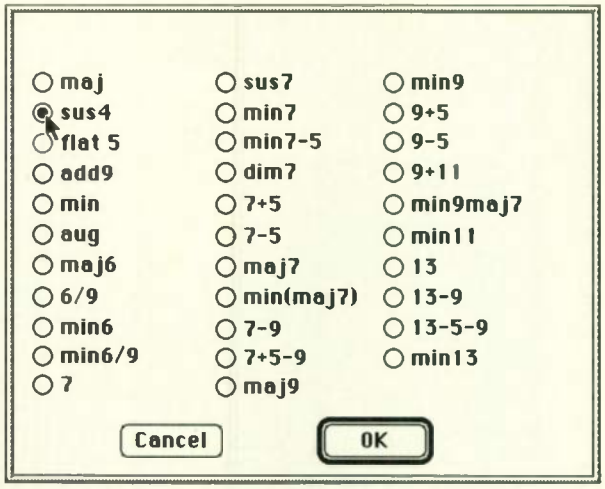


FIG. 2: Chord types handled by StudioPal.

In addition to time-oriented conversions, *StudioPal* is well-versed in the musical domains of notes and pitch. For example, it can tell you what notes are in a chord, or the frequency of a certain note. (**Fig. 2** shows the chord types it handles.) It can also convert pitches to other arcane, but useful, numbers, such as varispeed percentage or capstan speed.

The table in **Fig. 3** displays the many units of measure *StudioPal* understands. You can even customize the conversions used for many of these units. For example, you can select the real frequency of Concert A (no, Virginia, it's not always 440 Hz), musical key, tape-deck capstan frequency (typically 9,600 Hz in the U.S. and 8,000 Hz in Europe), tape speed, film type, sample rate, time signature, tempo, and ticks per beat.

But wait; that's not all! (I feel like I'm reviewing a Ginzu knife set.) You can set the resolution (i.e., how many decimal places *StudioPal* displays, including hundredths of SMPTE frames), produce a huge chart showing the length of various rhythmic divisions at the

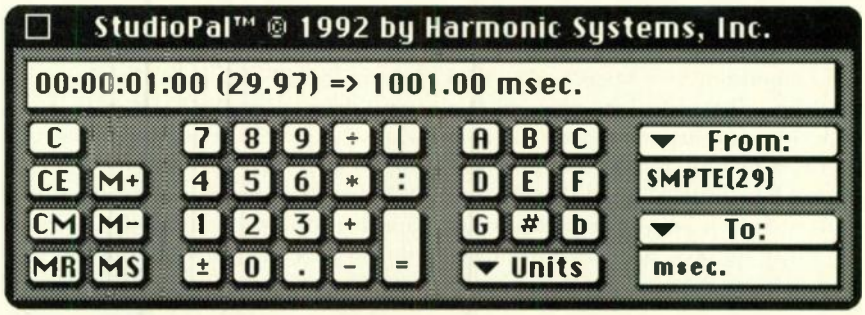


FIG. 1: A typical SMPTE-to-milliseconds conversion in *StudioPal.*

Distance	Time	Time Code	Musical	Frequency	Computer
inches	milliseconds	SMPTE 30 fps non-drop	cents	hertz	bytes
feet	seconds	SMPTE 29.97 fps non-drop	interval	kilohertz	kilobytes
millimeters	minutes	SMPTE 29.97 fps drop-frame	note(s)	megahertz	megabytes
centimeters	hours	SMPTE 25 fps	chord	inches per second	
meters	minutes/seconds	SMPTE 24 fps	rhythm	feet per second	
	hours/minutes	feet/frames	beats per minute		
		frames	frames per beat		
		bars/beats/ticks	varispeed percentage		
		ticks	capstan frequency		

FIG. 3: *StudioPal* can convert between many units of measure commonly required in the recording studio.

tempo you've chosen, and even pop up a compact reference of MIDI-message hex codes and basic groupings of General MIDI sounds. *StudioPal* also offers a few shortcuts for entering SMPTE times and song positions by auto-detecting the colons or bars that normally divide these units.

THE TEST DRIVE

I spend a good deal of time editing either digital audio or digital video on a computer, so most of my work revolves around frames, seconds, and bytes. *StudioPal* came in particularly handy for calculating the differences between SMPTE times and converting that result into the number of milliseconds a crossfade, effect, etc., should last. I also used it to calculate how much to stretch or pitch-shift a sample to make sure it was an exact number of frames long. (*StudioPal* assumes all samples are 16-bit, which sometimes is inconvenient for multimedia production, where they are often 8-bit.) Recently I tried to teach someone (over the phone, in the middle of a session) how to convert the length of a drum loop to a drum-machine tempo; *StudioPal* could have done it painlessly.

However, *StudioPal* is not the fastest program in the world to use. If you need to make a lot of conversions using different units, you'll quickly find yourself making a lot of mouse clicks, pulling down menus, and editing dialog boxes to change units. *StudioPal* does not allow copying or pasting of values to and from its screen, which would have cut down on transcribing answers between it and dialog boxes in other programs. It's also a little fussy about entering SMPTE numbers and song positions. For instance,

you can't get away with typing just frames or beats, even if all the other units would have been zero.

Of course, as soon as I receive a Ginzu knife set like this, instead of being happy at the variety received, I start grousing over why they didn't throw in a spare kitchen sink. A few "missing" units that come to mind are arbitrary frame rates (because animation and *QuickTime* programs often let you choose—or worse yet, foist upon you—non-SMPTE frame rates), direct conversions between MIDI note numbers and musical notes, and even pitch bend to cents. Some people are never satisfied.

CONVERT: BANG => BUCK

StudioPal is not the most polished, most complete program ever written. Version 1.0 also has a couple of subtle bugs in its time-code conversion that should be fixed by the time you read this. However, it did not crash once under System 6 or 7, even with 32-bit addressing on and a ton of inits (extensions) installed. That's not bad for version 1.0 of *any* program. The customer support (direct from program author Jim Wheaton) was friendly, honest, and thorough. In addition, version 1.1 (a free update that should be shipping by the time you read this) will address several of my concerns. It adds the ability to copy and paste text between *StudioPal* and other programs, supports arbitrary frame rates (e.g., for *QuickTime*), and permits quick entry of SMPTE time-code numbers, including partial numbers.

It's important to consider the alternatives to *StudioPal:* confusion; trial-and-error; a normal calculator, pad, paper, and a lot of head-scratching; and expensive hardware time-code and units conversion calculators. I've tried them all, and *StudioPal* is faster, easier to use, more complete, and often more trustworthy than any of them. It's a worthwhile addition for any studio or musician with a Mac close at hand.

Chris Meyer *studied engineering so he could afford lots of high-tech toys. Little did he suspect that his degree would come in handy when using them.*

Product Summary

PRODUCT:
StudioPal 1.0
PRICE:
$69.95
SYSTEM REQUIREMENTS:
Any Macintosh with System 6.x or later; Mac SE or faster recommended
MANUFACTURER:
Harmonic Systems, Inc.
PO Box 488
Fairfax, CA 94978-0488
tel. (415) 485-5242
fax (415) 485-6018

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

InVision Interactive PlusOne

By Christopher Patton

A 4 MB memory-expansion board renews the Korg M1/M1R.

I've recorded nearly every Korg M1 pad and drum sound, from factory preset to third-party ROM card, patch sheet, and editor/librarian. Surely, I thought, the M1 couldn't be extended much further.

I should have known better; after all, InVision designed the well-received Protologic memory expansion for E-mu's Proteus synths (reviewed in the September 1991 EM). This time out, the northern California firm is offering a 4 MB ROM expansion board that doubles the M1's memory. Dubbed the PlusOne, the board adds 46 new Multisounds and more than 40 percussion sounds. In addition to the 46 Multisounds, the upgrade includes a ROM card with 100 new Programs and 100 Combinations. The PlusOne board can be installed in an existing M1 or M1R by an authorized Korg service shop, and Korg is shipping a factory-modified instrument called the "M1 PlusOne."

ONBOARD SOUNDS

InVision provided a wealth of goodies, and the electric pianos are a worthy starting place. Bright highs and muddy lows used to typify electric pianos, but people now realize that tonal balance is the key to a good recording. Piano 3 has excellent tonal balance, with a low range as crisp as the highs. It rivals any DX7 electric piano and records quite well. Piano 4 is a reasonable facsimile of a classic Wurlitzer.

Organs 3 and 4 share the same drawbar settings, but Organ 4 was sampled with a Leslie rotating speaker. They're good samples, though not earth-shattering. Organ 3 is Steve Winwood-ish and works well with the M1's factory string patches.

The guitar collection consists of four multisamples, including a Gibson Les Paul with DiMarzio pickups (played through a Mesa/Boogie amp), a Martin Concert 6-string, an unidentified acoustic guitar, and a clean Fender Stratocaster. All are fine samples, but the one that blows me away is the Les Paul (Rock Guitar), which really has bite.

Along with these mainstream pop sounds are a harp, a good Steinberger electric bass, marimba, a glockenspiel, dance bells, metal and noise waveforms, and analog and digital synth samples. This group includes several interesting sounds. The crystalline Harpeleik is similar to a zither, with a full, digital sound. The Solo Flute is a particularly good ebony flute, sampled with natural vibrato. It works well with Eastern music, and I loved it in combination with the M1 Choir. The Solo Violin also was sampled with natural vibrato, and, as with the Solo Flute, no aftertouch control is available. Solo Violin is a wonderfully rich sound and is even better in a string section. Although in my opinion, Aftertouch control of vibrato would have been more expressive.

Some striking percussion samples and sync waveforms round out the new Multisounds. Madal is a sample of a 15-inch, 2-headed drum from Nepal that has a narrow, barrel-shaped body. It sounds like a big conga or talking drum. The northern Chilean Rainstick could have been sampled longer, though the loop point is hardly noticeable. There are also tablas, arabian dumbeks, a "rap" clave, a full TR-808 kit, and various drums from Africa.

Along with the abundance of ethnic percussion are some pretty bizarre body and voice sounds. The InVision folks must have been inspired by Bobby McFerrin.

THE ROM CARD

The PlusOne upgrade comes with a ROM card containing 100 Programs and 100 Combinations, created by InVision. Some are really imaginative; InVision has provided solid building blocks for sound construction.

Product Summary

PRODUCT:
PlusOne upgrade for Korg M1

PRICE:
$395

MANUFACTURER:
InVision Interactive
269 Mt. Hermon Rd.
Suite 105
Scotts Valley, CA 95066-4029
tel. (800) 468-5530
or (408) 438-5530
fax (408) 438-6784

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

My favorite ROM-card Program is the layered UnderSee. This beautiful sound has an aquatic quality to it; you virtually speak whale language by playing staccato with a mix of pianissimo and legato phrases. This sound is so soothing, you could probably meditate to it.

InVision's version of an electric 12-string guitar, 12 String Wave, is not as warm as I would like, but it worked well anyway. On the other hand, I sequenced some really outrageous grooves with Funk Comp, a clav-like sound with Velocity modulation of volume and timbre. Dreamweaver is a cool layered sound with 2-octave glide, a square-wave pad underneath, and a brassy sine-wave release.

The claim that all 100 ROM-card sounds are "brand new" is true, but somewhat misleading. Some combine new sounds with standard M1 presets. But before the consumer advocates start a war dance, let me assure you that many new Multisounds work even better when layered with a standard sound. For example, String/Violin Mix combines PlusOne Solo Violin layered over M1 Strings, creating a full-sounding string section. Or check out Theatre Organ, a mix of M1 and PlusOne organs that sounds like an old-fashioned theater or ballpark organ.

CONCLUSION

Obviously, I am impressed with the PlusOne. Only a few things bothered me. I would have liked a few more creative synthesized waveforms. More important, where are the pianos? You would think that with 4 MB of ROM, the PlusOne would have at least one piano sample. But these are minor complaints.

InVision's PlusOne upgrade should be a welcome addition for M1 users who are always searching for new sounds. With the new Multisounds and percussion samples, you have a lot of creative tools. For $395, the PlusOne gives the M1 new life.

Christopher Patton *has played keyboards professionally for over seventeen years. He is the owner/operator of Synesthesia Music (BMI) and Ars Nova Productions, an 8-track, MIDI pre-production studio in Oakland, California.*

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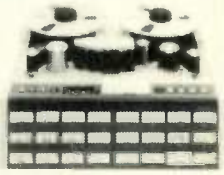

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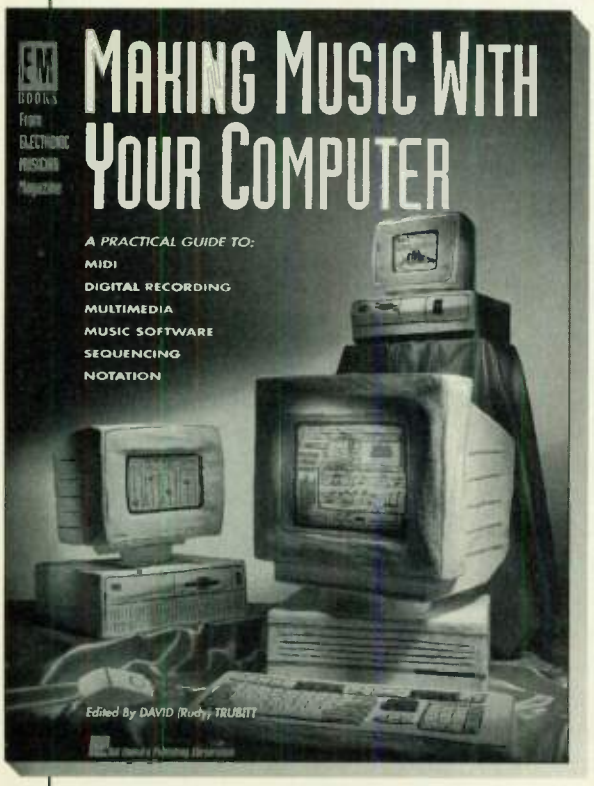

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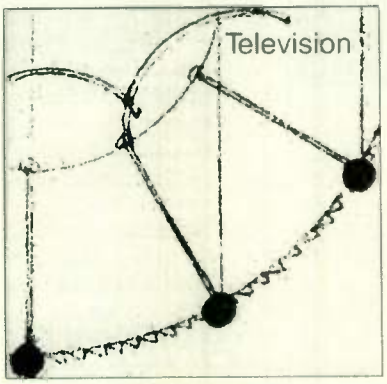

PRO FILE

The Guitar Undressed

Television keeps it simple.

By Adam Beyda

In the late 1970s, the first wave of punk rock engulfed New York's Lower East Side, where the hordes at CBGBs pogoed furiously to Talking Heads, The Ramones, Blondie, and The Patti Smith Group. It was a happening scene, and the band Television was in the thick of it. Its contributions to the over-mythologized era were two highly influential albums of quirky rock, highlighted by Tom Verlaine and Richard Lloyd's intertwining guitars.

Last fall, after a 14-year hiatus, Television reformed and recorded their third, eponymously titled LP. No, they aren't trying to cash in by refashioning themselves as a speed-grunge or dream-pop band (although they're progenitors of both). Instead, the band has reaffirmed its brilliance by casting the hallmark guitar jams of Verlaine and Lloyd in a more straightforward vein.

In spite of the digital revolution that has occurred since their first incarnation as Television, the band went analog as much as possible on its newest album. Everything was recorded analog, although they did mix to digital.

"It's actually almost a 1950s approach," says songwriter/vocalist/producer Tom Verlaine of the recording of the new album. "There's no racks of stuff on the guitars. It's just a mic and one stomp box. I use tube mics, mostly Neumann U67s, placed about a foot away from the amp. Most of the tracks were recorded straight up in one take with just a bit of EQ and some compression."

In the early days, the band achieved its trademark angular melodism by stacking guitar tracks. However, this technique was adopted less for deliberate effect than to cover up inexperience.

"On the first record *[Marquee Moon]*," says Verlaine, "the guitars were so out of tune that [engineer] Andy Johns said 'Why don't you double track them?' Almost all Richard's solos were double- or triple-tracked. My solos didn't get the same treatment, but I think they got a little tape delay in the mix. Ultimately, everything worked out well because the lead sounds were very different.

"But later on, when I recorded my solo albums," he continues, "I thought, 'Does it really need all this?' Doubling is definitely a cool effect, but I got tired of it. I decided not to do any stacking. I came to like that [raw] sound because each instrument speaks more clearly."

Although decidedly more spare, the new LP's guitar sounds retain the strong presence and power of the early albums. Now, the incendiary guitar work of the Verlaine/Lloyd team derives more from soulful performance, rather than clever recording techniques and processing.

"To tell you the truth, if someone gave me 100 grand to buy signal processors, I'd buy reverb plates," says Verlaine, confirming his allegiance to organic sounds. "There's this thing you can do with the adjustment screws of the old EMT plates. Most people just adjust it to the specs and it sounds okay, although it's a little boingy. But if you start pushing those screws until the (reverb) springs almost snap, you can get your plates to sound really good. To me, they sound cooler and much more spacious than any digital reverbs."

Adam Beyda *is assistant editor of* **Mix** *magazine.*

ANDY CATLIN

Television (left to right): Fred Smith, Richard Lloyd, Tom Verlaine, and Billy Ficca.

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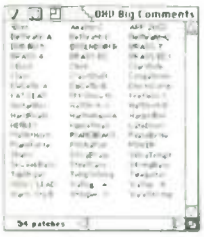

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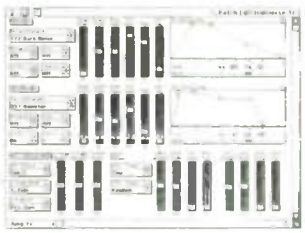

Performer sequencer, Unisyn lets you fine-tune your sounds while your music plays. And for a limited time, Unisyn is available at a very special price to all Mark of the Unicorn users, and as a competitive upgrade.

For more information about Unisyn and the Unisyn special purchase offer, please contact Mark of the Unicorn or the authorized dealer nearest you.

Mark of the Unicorn

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