Composing Children's Music ▪ It's Here! Alesis QuadraSynth

Electronic Musician

July 1994

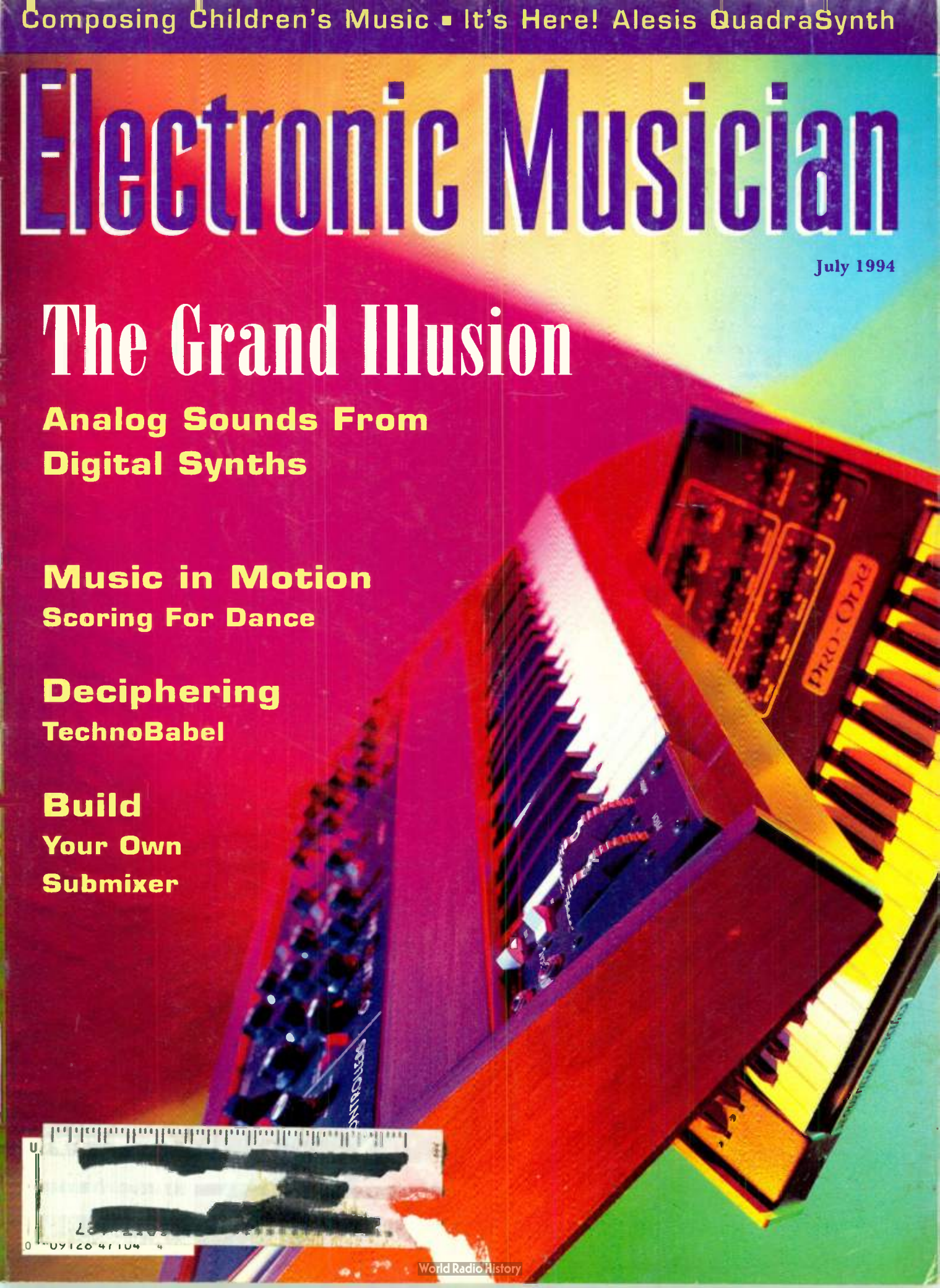
The Grand Illusion

Analog Sounds From Digital Synths

Music in Motion
Scoring For Dance

Deciphering
TechnoBabel

Build
Your Own Submixer



The Truth From Left To Right

The truth...you can't expect to find it everywhere you look, or *listen*. But when mixing music, hearing the truth from your monitors will make the difference between success and failure. You'll get the truth from the **Alesis Monitor One™ Studio Reference Monitor**.

Room For Improvement

Fact: most real-world mixing rooms have severe acoustical defects, with parallel walls, floors and ceilings that reflect sound in every direction. These reflections can mislead you, making it impossible to create a mix that translates to other playback systems. But in the near field, reverberant sound waves have little impact, as shown in the illustration. The Monitor One takes advantage of this fact and is built from the ground up specifically for near field reference monitoring.

The pink area in the illustration shows where direct sound energy overpowers reflected waves in a typical mixing room. The Monitor One helps eliminate such complex acoustic problems by focusing direct sound energy toward the mixing position.

The Truth From Top To Bottom

The Monitor One's proprietary soft-dome pure silk tweeter design delivers natural, incredibly accurate frequency response while avoiding high frequency stridency and listener fatigue–typical of metal-dome tweeter designs. The Monitor One overcomes wimpy, inaccurate bass response–the sad truth about most small speakers–with our exclusive SuperPort™ speaker venting technology. The design formula of the SuperPort eliminates the choking effect of small diameter ports, typical in other speakers, enabling the Monitor One to deliver incomparable low frequency transient response in spite of its size.

Alesis SuperPort™ technology gives you the one thing that other small monitors can't: incredibly accurate bass transient response. No, the SuperPort doesn't have a blue light, but it makes the picture look cool.

The result? A fully integrated speaker *system* that has no competition in its class. You'll get mixes that sound punchier and translate better no matter what speakers are used for playback. The Monitor One's top-to-bottom design philosophy is a true breakthrough for the serious recording engineer.

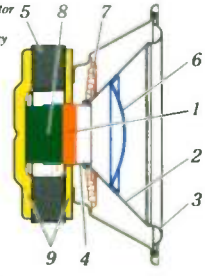
Power To The People

While most near field monitors average around 60 watt capability, the Monitor One handles 120 watts of continuous program and 200 watt peaks...over twice the power. The Monitor One provides higher output, more power handling capability, and sounds cleaner at high sound pressure levels. If you like to mix loud, you can.

The Engine

Our proprietary 6.5" low frequency driver has a special mineral-filled polypropylene cone for stability and a 1.5" voice coil wound on a high-temperature Kapton former, ensuring your woofer's longevity. Our highly durable 1" diameter high frequency driver is ferrofluid cooled. Combined, these two specially formulated drivers deliver an unhyped frequency response from 45 Hz to 18 kHz, ±3 dB. The five-way binding posts provide solid connection, both electronic and mechanical. We even coated the Monitor One with a rubber textured laminate so when your studio starts rockin', the speakers stay put. Plus, it's fun to touch.

A cross section of the Monitor One's proprietary Alesis-designed 6.5" low frequency driver



1. 1.5" voice coil.
2. Mineral-filled polypropylene cone.
3. Damped linear rubber surround.
4. Kapton former.
5. Ceramic magnet.
6. Dust cap.
7. Spider.
8. Pole piece.
9. Front and back plates.

The New Alesis Monitor One™

You don't design good speakers by trying hard. It takes years and years of experience and special talents that only a few possess. Our acoustic engineers are the best in the business. With over forty years of combined experience, they've been responsible for some of the biggest breakthroughs in loudspeaker and system design. The Monitor One could be their crowning achievement. They're the only speakers we recommend to sit on top of the Alesis Dream Studio™.

See your Authorized Alesis Dealer and pick up a pair of Monitor Ones. Left to right, top to bottom, they're the only speakers you want in *your* field.

For more information about the Monitor Ones and the Alesis Monitoring System, see your Authorized Alesis Dealer or call 1-800-5-ALESIS.
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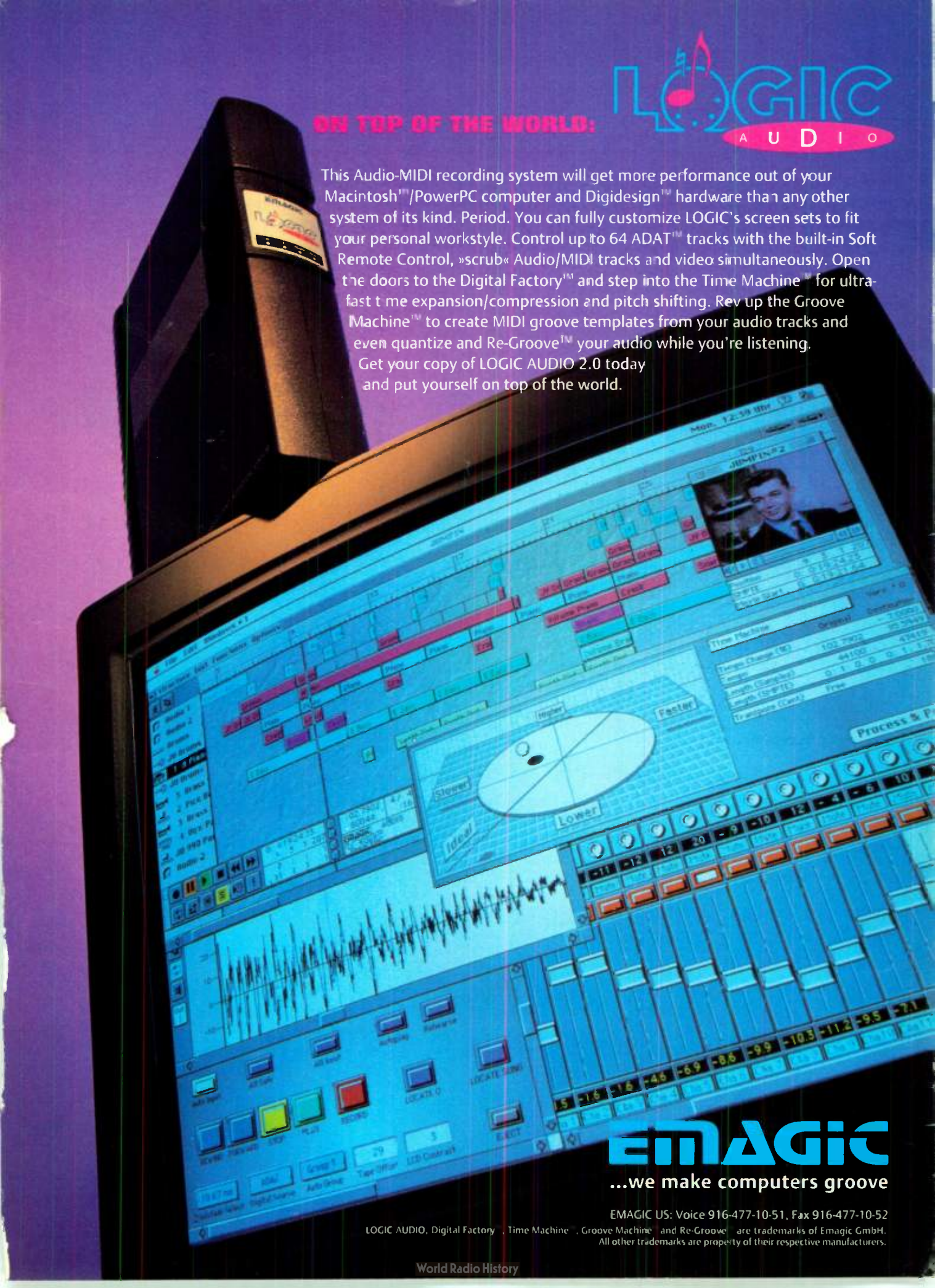

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FEATURES

DEPARTMENTS

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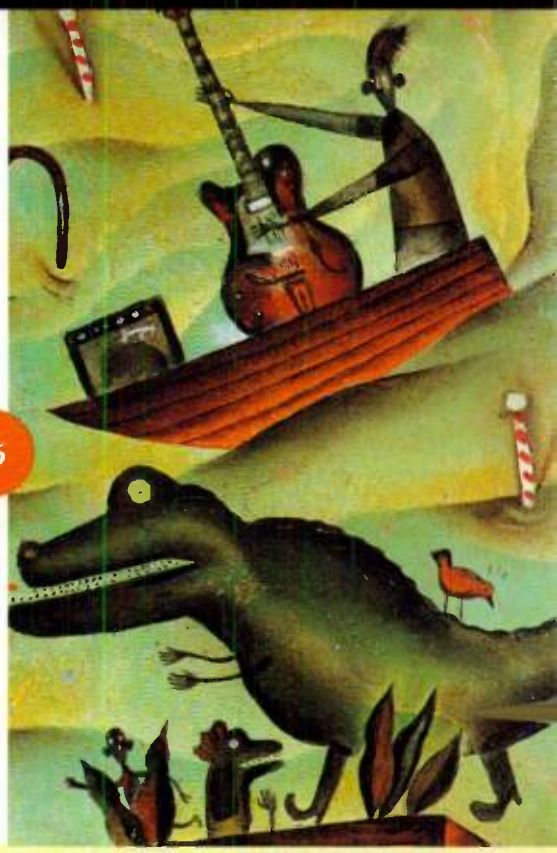
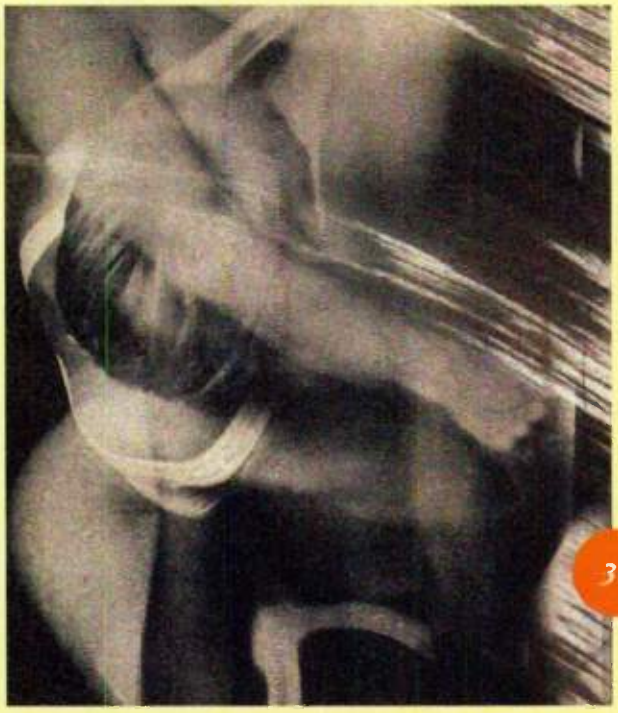
JULY 1994 VOL. 10, NO. 7

COLUMNS





REVIEWS

Cover: Photo by Stan Musilek.

Special thanks to Ric Braden and Peter Hirschfeld.

On The Rebound

The past is like a boomerang, so don't forget to duck.

PEGGY SUE AMISON

The merry-go-round that is Pop Culture spins at blinding speeds, and if you don't hold tight to your horsey, you'll get tossed into a time warp. I know this to be true, because I recently slipped out of the reins after checking out MTV. (I just wanted to see what the kids are doing these days.) My finger had barely left the remote control's channel-selector button, when I was transported back to San Francisco's infamous Mabuhay Gardens. It was 1978, and the West Coast's premier punk club was so thick with leather-clad bodies that sweat ran down the brick walls. The volume was deafening; a violent aural oatmeal of incomprehensible ranting and sledgehammer guitars. I rubbed my eyes. Suddenly, I was back home watching the young Berkeley-based punk band Green Day rage through their music video. They looked and sounded like all the spike-haired wackos (including myself) that embraced the Blank Generation more than fifteen years ago. What goes around, comes around...

Unfortunately, my flashbacks aren't limited to resurrected musical genres. Every time I pick up a fashion or culture mag, my brain is drop-kicked back to my formative years. Ads for revamped Ford Mustangs lead into articles on the perfect martini, which segue into treatises on the James Bond films (starring Sean Connery, of course). *Hair* is back on Broadway, communes are cool again, and everyone who's anyone is wearing khakis. The past is hotter than ever!

Which brings us to music gear. Now that "vintage" is hip, it kills me that I've parted with so many status symbols. I'm a guitar player, and most of the articles and ads in today's guitar mags feature boxes that ended up in my garbage can, circa 1985. Ouch! The vintage fad has also seduced many electronic musicians. Scores of keyboardists have already turned their backs on progress to make noises with ancient, refurbished Moogs, Prophets, Oberheims, and other analog monsters.

But you don't have to shun modern technology to join the retro revolution. "The Grand Illusion" (p. 50) is a fun, yet comprehensive, programming article on how to emulate analog sounds with digital synths. So get out your platform shoes and groove to the fat, blurpy sounds that are hiding inside your favorite digital sound module.

Of course, not everything in this issue is a trip down memory lane. Michael Brown's "Open Borders" (p. 66) explains the Open Media Framework, an alliance dedicated to the free exchange of digital data between all computer platforms. Confused by technical jargon? The murky waters of synth terminology are cleared up by Scott Wilkinson ("Square One: The Tower of TechnoBabel," p. 96), who also reviews the much-anticipated Alesis QuadraSynth (p. 102). And if you're burned out on the pop music world, Mary Cosola's "Working Musician" column, "The Children's Music Market" (p. 80), may revitalize your creative spark. Composers should also check out "Dance Partners" (p. 30) to gain some insights into the art of putting music to movement.

For us "mature" artists, things can get weird when the youth culture revives the past. Some new bands who record in my studio consider themselves groundbreakers, and I'm tempted to be the old curmudgeon who says, "Hey you whippersnappers, I was doing that stuff before you were born." (And seven times out of ten, I was!) But I usually just shut my mouth and hope that whatever they're working on doesn't trigger yet another flashback. I hate remembering how terrible I looked in bell bottoms.

Michael Molenda

Electronic Musician

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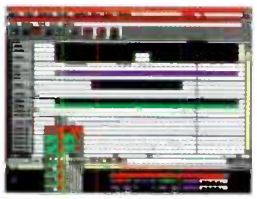

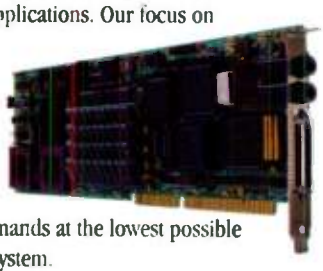

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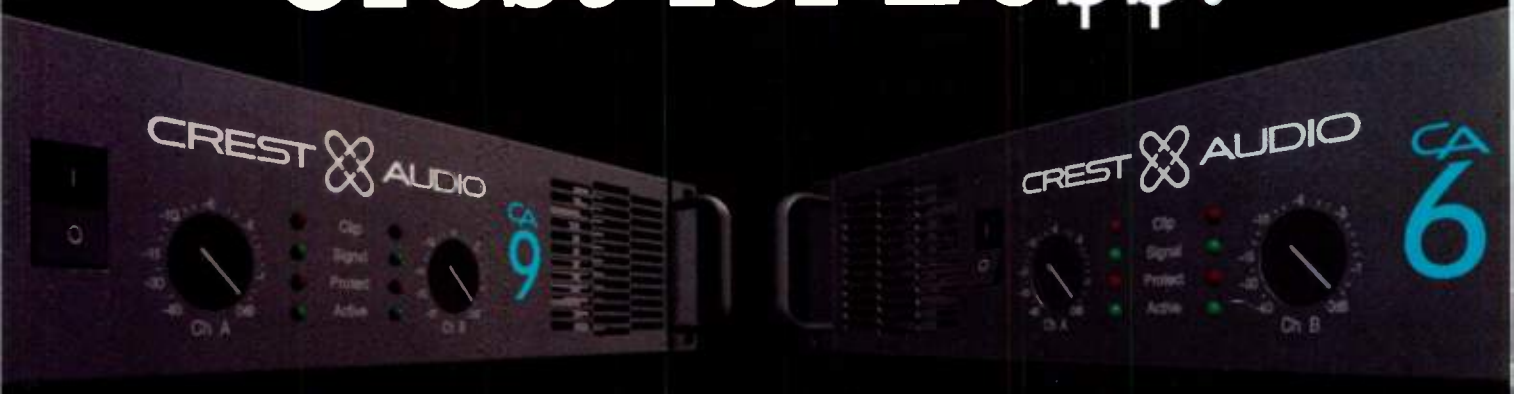

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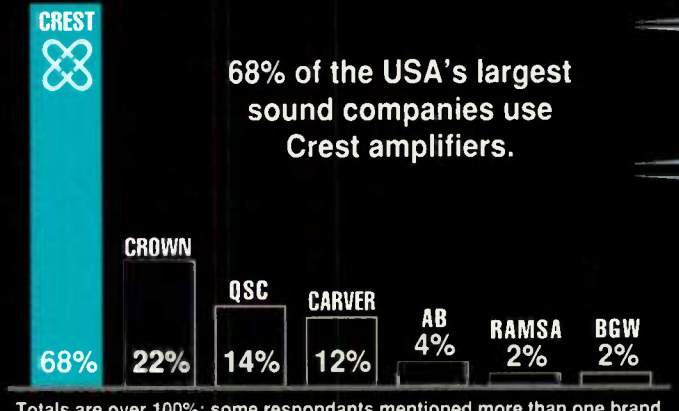

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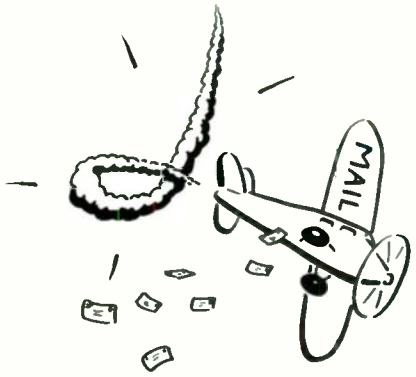


FACE IT

I agree with Michael Molenda's "Front Page" in the April 1994 **EM**. Readers *will* value your next product "face off," but please don't forget the buyer's guides. These guides give us many specs manufacturers don't include in their ads (in some cases because the specs are the weak points of the product). The spec charts let readers easily compare each product. In the sound module buyer's guide ("Modular Music Machines," October 1993), categories such as "Max Poly," "Filters per Voice/Env. per Voice," and "Simul. Effects" were useful in getting a general view of a whole field.

Also, **EM**'s buyer's guides include products not reviewed in your magazine. I hope "face offs" will improve the good work you have been doing, but a multicomparison of many similar products is still very helpful.

Enrique Schironi Mazzei
Caracas, Venezuela

IS THAT ALL THERE IS?

Let me say from the start I don't do television. At least not very much. And especially not formula-driven comedies. Nonetheless, when I read Michael Molenda's article in the April 1994 issue of **EM** ("Creative Space: Jonathan Wolff"), I decided to listen to the opening monolog of *Seinfeld*.

I'm not sure what I was expecting, but based on the article, surely something clever. I heard a guitar, slap bass, and the finger snapping. Some of it actually followed one or two words of the monolog. Twenty seconds later it was over. "That's it?" I thought. Well, I'm not one to jump to a conclusion, so I listened to it the following week and again the week after that. Déjà vu! I heard nothing new, and the monolog was just as short.

Maybe I just don't understand creative genius when I hear it, but I certainly didn't hear anything particularly noteworthy. When I read that Wolff used a hard-disk digital recorder, a DAT, a ¾-inch video, a mixer, four sets of speakers, six mics, three signal processors, nine sound modules, three computers, nine software packages (MIDI, sampling/editing, backup, library management), four synchronizers, and a time processor, the word "overkill" came to mind. Oh well, maybe there's a reason I don't watch television!

Douglas R. Thompson
Hyattsville, MD

SO YA KNOW

After reading "Service Clinic" (April 1994), I thought you might like to know that the easiest way to test an infrared transmitter is to point it at any common video camera. You should see a white spot from the transmitter every time you push a button. No spot, no output.

Mike Frederick
Tampa, FL

TUBE OR NOT TUBE

G. Montalbano inquired where the next generation of audio specialties are hiding ("Letters," March 1994). Recently, I met a gentleman doing some very advanced research. Eric Pritchard has successfully emulated vacuum-tube behavior with solid-state components. I played a prototype guitar amp that not only has the sound but also the *feel* of the classic amplifiers. It re-creates the tube experience accurately and vividly. I realize some readers may not be interested in guitar amplification, but Eric also implemented this technology into other products—including a mic preamp and a compressor—that musicians everywhere (G. Montalbano, in particular) should find both useful and intriguing.

Eric Pritchard can be reached at Deja Vu Audio, Rt. 1, Box 536, Berkeley Springs, WV 25411; tel. (304) 258-9113.

Dean Shumaker
Somerset, PA

BEGINNER'S WISDOM

I'm just a beginner in the world of MIDI, and I have learned a lot through your magazine. I'm the owner of a PC-compatible computer, and I'm looking to buy a MIDI interface. My question is, what are the advantages/disadvantages of purchasing a sound card with a MIDI interface versus buying a dedicated MIDI interface?

I am also responsible for the sound system at our church. We have a mixer/amp combo, and we need the ability to record the sermons. The mixer/amp has a line-out jack, but the level doesn't seem to be high enough to drive the inputs of our Sony tape deck. (The recording meters won't even budge when the recording level is set at maximum.) Is there an inexpensive solution to this problem?

William F. Weaver
Dallas, TX

William—A sound card can provide a tremendous improvement to the audio capabilities of any personal computer, and most sound cards designed for use with PC-compatibles are available with a MIDI interface. If you only need a MIDI interface, buying a sound card can present many limitations. First, there's a hidden cost: You will have to buy a MIDI expansion kit (about $25), in addition to the sound card. Second, many sound-card MIDI interfaces are not 100 percent compatible with Roland's MPU-401 MIDI interface standard, which can cause software headaches. Third, because the 3-foot cables (one MIDI In and Out) will probably be molded onto the expansion kit, you'll need to need to purchase a pair of female-to-female adapters to extend your cable run.

You can spend $400 or more for a high-end sound card-cum-MIDI interface. Low-end cards are available for less than $200. For that price, you will get a 4-operator FM synthesizer and a 16-bit sampler. A dedicated, 100 percent MPU-401-compatible MIDI

ROBERT PRINCE

interface (from Key Electronics, MIDIMAN, Music Quest, and others) will cost about $80 less than a low-end sound card. For about $100 more, you can buy a multiport MIDI interface and patch bay, such as Mark of the Unicorn's MIDI Express PC. This device offers six MIDI Ins and Outs, MIDI merging and data filtering, SMPTE synchronization, and more.

If your MIDI requirements are simple, and you need a sound card anyway, by all means, buy a sound card. If you have only one synth and don't need a sound card, buy a dedicated, single I/O MIDI interface. But if you have more than one or two synths or sound modules and plan to use an editor or patch librarian, you'll be best served by a multicable MIDI interface.

Regarding your second question, a quick fix might be to use the headphone jack, though you might encounter impedance-matching problems. A better solution is an inexpensive preamp.—Michael B.

START ME UP

I started reading **EM** through an offer of one free issue with the option to cancel if desired. When I realized the magazine was way over my head technically, I almost canceled. One thing that kept me hanging on was the pro-quality information on recording techniques. I started my own personal home studio in 1992, and this information has helped me tremendously. I am also trying to learn about MIDI-controlled operations, including their applications. I'm primarily a guitarist, but I can play some keyboard. **EM** has helped me realize what a keyboard with sequencer/virtual tracks could add to my production, as my multitrack recorder has only four tracks. I do want to grow along with technology, and I believe **EM** will help me do this.

Robert E. Scott
Many, LA

ADIOS, AMIGO

I have received a refund of the unused part of my current subscription for the reasons outlined here.

The addition to your staff of two (I'm sure talented) video specialists and the glaring lack of nuts-and-bolts articles on *music* equipment and production are the culmination of a disappointing trend in **EM**'s format. Your present format certainly has appeal for a growing number of self-employed people and small production houses who sell to a burgeoning freelance commercial market. In that sense, you've achieved the status of "trade publication," and I congratulate you for this.

As a dedicated, single-media artist and producer (music, specifically), I find less and less in your magazine of interest to me. Perhaps you will rename your mag *Multimedia Musician* soon, and some aggressive publisher will move to fill the already existing gap for a MIDI-literate magazine for musicians. How I miss the early days, after *Polyphony*, when you published a redundant article on the MIDI spec every few months. (Not really, but it sounds romantic, huh?)

Keep up the good work, in whatever field your endeavors are.

John Carroll
Eugene, OR

COPYCAT

I have a Yamaha Clavinova CVP-55, EMP1 sound module, and DX7 synth, in addition to a Brother PN-4400 notebook computer. I would like to copy music—note for note—from cassette, CD, or PianoSoft disk, display that music on the computer screen, and play it back from the computer. How can this be done?

Dr. Sydney Hornstein
Montreal, Quebec,
Canada

Sydney—You can transcribe the performances on your PianoSoft disks. These performances consist of MIDI sequences. If your computer can accommodate a MIDI interface, as well as sequencing and notation software, you can play the tunes stored on a PianoSoft disk from the Clavinova into the computer via MIDI.

To do this, connect the Clavinova's MIDI Out to the computer's MIDI In, set the sequencer to record as soon as it receives the first note, and start the tune playing on the Clavinova. After the tune is finished, stop recording and save it as a Standard MIDI File (SMF). (If the song has only one part—the piano—save it as a "Type 0" SMF, which has only one track. If it has several musical parts that are played on the EMP1 or other multitimbral sound module, save it as a "Type 1" SMF. That way, the multiple tracks will be saved as separate instrumental parts.) Then import the file into a notation program, which will display the music on the screen and play it on the synths once you connect the computer's MIDI Out to the synth's MIDI Ins. Generally, the transcription is not perfect, requiring you to tweak the notes on the screen. Some software combines both functions—sequencing and notation—in one program, making this process much more straightforward.—Scott W.

PICKPOCKET

Anatek makes a small box named the Pocket Channel. At a music store, I was shown how the Pocket Channel allows the Yamaha SY77 (my only tone module) to play more than the sixteen patches available on the designated Multi (albeit not for recording on the synthesizer's sequencer, but in real time). What are the possibilities using the Pocket Channel in this setup, and does it harm the hardware?

Also, how can I obtain David Foster's SY77 librarian shareware program?

E.O.
San Francisco, CA

E.O.—Anatek's Pocket Channel accepts incoming MIDI messages on one selected channel and sends them out on any other channel (or multiple channels). This was originally designed to improve the MIDI implementation of the Yamaha DX7, which could send on channel 1 only.

I don't understand how this device could be used to play more than sixteen Voices in an SY77 Multi; neither does the Anatek representative with whom I spoke. The Yamaha SY77 is 16-part multitimbral, which means it can play up to sixteen different Voices at a time. If the SY77 is your only controller as well as your only sound module, I see no reason to use the Pocket Channel. However, if you are using an older keyboard or other MIDI controller that sends on only one channel, the Pocket Channel can be a lifesaver. In any case, the Pocket Channel cannot harm the hardware at all.

Unfortunately, I am unable to find any information for David Foster's shareware SY77 librarian. Even Yamaha has no information on this software. If you're reading this, David, please let us know how to contact you; we'll publish the info as soon as we get it.—Scott W.

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

THE STUFF THAT LEGENDS ARE MADE OF.

Talent. Hard work. A little luck. *And the right equipment.* That's the stuff that legends are made of.

Legendary musician, producer, engineer, arranger and songwriter Alan Parsons knows what makes a legend. So we asked Alan to test the new Audio-Technica AT4050/CM5 multi-pattern, large diaphragm studio capacitor microphone.

"To say that the CM5 is a serious microphone would be an understatement," says Parsons. "It's up there with the very best. It gives me a realistic, warm and true representation in the studio."

"My experience with the CM5 and other mikes in the 40 Series has convinced me that Audio-Technica now ranks as one of the very best manufacturers of high quality microphones. The clincher is that the CM5 offers incredible performance for much less than its competition."

Symmetrical direct-coupled electronics in the AT4050/CM5 provide excellent transient response and low distortion.

Featuring three switchable polar patterns (cardioid, omni and figure-of-eight), the CM5 combines warmth and transparency with super-high SPL capability.

Find out for yourself what Alan Parsons has found in the new AT4050/CM5. Write, call or fax for more information. Audio-Technica U.S., Inc., 1221 Commerce Drive, Stow, Ohio 44224 (216) 686-2600 Fax: (216) 686-0719.

audio-technica.

Alan Parsons and the new AT4050/CM5

Alan Parsons will be using Audio-Technica microphones exclusively on his upcoming world tour to promote his latest Arista Records release "Try Anything Once." (CD 07822-18741-2)

8•BUS SERIES

DUE NEW GREG

6 AUX SENDS with Solo and Solo LED.

6 STEREO AUX RETURNS. All have 20dB gain, Solo and can be used in stereo & mono. 1 & 2 are pannable & bussable.

MIX B/MONITOR section can be used as an independent stereo out for PA monitor mix, 2-track recording, video/broadcast feed or assigned to L/R mix.

TWO SEPARATE HEADPHONE SECTIONS can be used totally independently of each other. Each features source selection between Control Room & any combination of AUX 3/4, AUX 5/6, Mix-B or External source. Solo allows control room to hear what musicians are hearing in their headphones.

TALKBACK assigns to all submasters, main mix, AUX 1, AUX 2 or Phones 1&2.

SOLO level adjust and ultra-rude LED.

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

–40 to +10 bar graph LED DISPLAYS for each sub-master & Solo/Main (with main L/R +28dB CLIP LEDs).

EXPANSION CONSOLES let you add channels in banks of 24 to either the 24•8 or 32•8. Expanders have their own internal mix amps so the main board only "sees" one extra channel per expansion console.

Built-in talkback MIC.

Trick BUS SOLO switches send odd-numbered buses to the left speaker and even-numbered buses to the right speaker — unless you've pressed the respective MONO L&R button. When a bus has been mono-ed, SOLO sends the bus to both speakers.

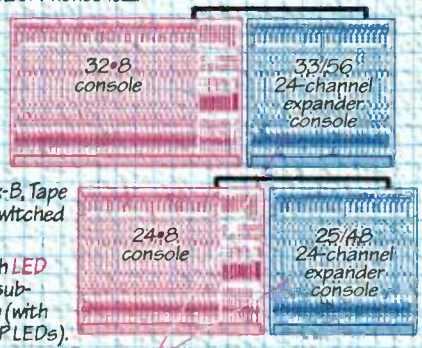
L MIX/R MIX & MONO L & R buttons assign buses to main L/R stereo bus.

All channels have Mackie's renowned discrete, wide-bandwidth MIC PREAMP circuit for ultrahigh headroom & low noise. All mic inputs have RFI choking, ferrite beads and +48V phantom power (switchable in banks of 8 channels).

Optional tilt-up METER BRIDGES are globally switchable to see tape return preamps or channel output and include VU meters for main L/R output. MB•24 meter bridge for 24•8 console is $799*. MB•32 for 32•8 is $899*. Our soon-to-be-released 16•8 16x8x2 console's meter bridge will retail for $699*.

Rugged, non-flexing STEEL CHASSIS.

4-BAND EQ with "Expensive British Console Sound." Includes TRUE PARAMETRIC HI-MID, swept LO MID, shelving HI & LO plus 18dB/oct HI PASS (lo cut) filter at 75Hz. Users are raving about the sound quality.



Optional stand ($295*)

You'll like the increase in both sound quality and versatility.

We paid the same kind of attention to fader quality. Instead of less-accurate D-taper faders, we commissioned a totally new custom 100mm fader with the logarithmic taper found in mega-expensive consoles.

EVEN THE FEATURES HAVE FEATURES. Naturally each channel has in-line monitoring with split EQ. But our MIX-B Monitor section also has a SOURCE switch to tape off the channel (pre-fader) to create independent mixes for taping, broadcast feeds or headphone mixes. Dual independent headphone sections offer the ability to switch between Control Room and any combination of AUX 3/4, AUX 5/6, MIX-B or External sources. Tape inputs and outputs feature internal

YE OLDE ENGLISH SOUNDE. Greg started out by asking "What is it that makes the finest British mixing boards perform the way they do?" For example, "classic," older English consoles have much wider-band midrange EQ than lower-priced consoles — it really has an effect on overall sound quality. So we incorporated the same capabilities on our new consoles. This also enabled us to add the flexibility of a variable bandwidth control for true parametric HI-MID EQ. It wasn't easy to engineer in the expensive circuitry necessary and still keep our consoles affordable, but we did it.

*Suggested Retail Price. Your actual

+4dBU balanced TAPE RETURNS, switchable to to –10dBV unbalanced in banks of 8 returns.

Balanced MIC, bal./unbal. LINE IN, MIC/LINE switch, DIRECT OUT & CH. INSERT on every channel.

Three TAPE OUTPUT jacks per bus (total of 24). +4dBU balanced, switchable in banks of 8 to –10dBV unbalanced.

TO THE UNEXPECTEDLY HIGH DEMAND FOR OUR 8•BUS CONSOLES, WE WON'T EVEN LET MACKIE HAVE ONE YET.

HE WORKED. HE SLAVED. He created the 8-bus console HE always wanted to own. In fact Greg kept adding features until we threatened to whack him upside the head with a rancid salmon. Now the first notices are in from 8•Bus owners: Spontaneous raves from recording studios, PA companies and video post houses. Quotes like "It's so quiet I had to check to see that it was on" and "Blows away my old board that cost $20,000." In other words, Greg really DID succeed at creating the first truly affordable high-headroom, low noise, feature-laden 8-bus consoles. Unfortunately, we can't build them fast enough to meet demand. Unlike our competitors, Mackie can't just order up consoles by the container-load. Instead, we build each 24•8 and 32•8 at our factory in Woodinville, Washington. Even though we're working day and night (and shipping more and more each week), there's still a waiting list at Mackie dealers. Even Greg hasn't gotten one yet! Serves him right for designing so much performance into consoles that retail for $3995* and $4995*. Read on for the deliciously explicit details.

220-watt, Class A POWER SUPPLY with enough juice to also power a meter bridge.

+4dBU to −10dBV level conversion so you can use semi-pro tape decks without the inherent noise penalty found in mixers that operate at −10dBV internal levels.

MACKIE'S SIGNATURE MIC PREAMPS. At the urging of legions of satisfied CR-1604 and MS1202 users, we didn't mess with a good thing. Our 8•Bus consoles' mic preamps deliver −129.6dBm E.I.N. at 0.005% THD with a 300K bandwidth, yet can handle +14dBU inputs without a pad. The consoles' working S/N is 90dBu with 116dB internal headroom. For any application where noise is especially noticeable (such as hard disk or multi-track digital recording), you've found your board — for as little as $3995*!

SOME OF THE FEATURES GREG ADDED SINCE WE FIRST ANNOUNCED OUR 8•BUS CONSOLE LINE*:

- External 220-watt, Triple-Regulated, Low-Ripple Power Supply
- Mic/Line switch on every ch.
- "Triple-bussed" tape outputs
- +4/−10 tape inputs & outputs (switchable in banks of 8)

*Before we threatened to whack him upside the head with a rancid salmon if he didn't stop.

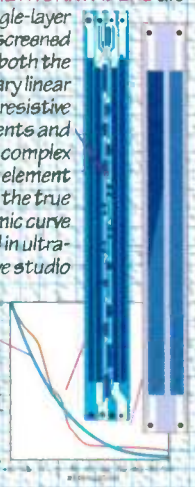
EXPANDABLE AND AUTOMATABLE. Need 24, 48 or even 72 extra channels? Add one or more 24-channel expander consoles (complete with inputs, tape returns and their own power supply) at any time in the future. Just by connecting one cable between the expander and your 24•8 or 32•8 board. External fader and muting MIDI automation will also be available soon.

OPTIMIZED FOR PA AND RECORDING. Along with elaborate monitor capabilities, balanced XLR main outputs and 18dB/octave hi pass filters, you get non-flexing steel construction, fiberglass thru-hole plated, horizontal circuit boards that minimize impact damage, gold-plated internal interconnects, sealed rotary pots and a rugged 220-watt, super-regulated power supply. You won't find more roadable, compact PA boards anywhere.

READ ALL ABOUT IT. Call us toll-free and we'll ship you a comprehensive brochure including application hookups. We think you'll be impressed enough to be willing to wait a little while before you get your 24•8 or 32•8. After all, Greg is still waiting for his.

price, like your mileage, may vary. Prices are slightly higher in Canada.

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



In-line PLIP reverses tape and mic/line inputs between channel strip and Mix-B/Monitor section.

AUX SENDS 1-2 PRE button selects pre-fader/post EQ or post-fader/post EQ.

AUX 3-4/5-6 SHIFT changes 3-4 to 5-6.

SOURCE selects signal source of AUX 3-4/5-6 from channel strip to channel's Mix B/Monitor send so you can build an effects mix (pre or post-MIX-B level) to assign to phones during tracking.

True parametric, 3-control HI MID EQ that has seasoned engineers swooning (quotes and raves on file...we're not kidding). Ultra-wide 500-15k frequency sweep range; bandwidth can be adjusted from a very wide 3-octave width to a very narrow ⅙-octave width. 15dB boost/cut.

LO MID EQ with ultra-wide 45Hz-3K sweep, 15dB boost/cut.

±15dB shelving HI (12kHZ) & LO (80Hz) EQ.

Multipurpose 18dB/oct. LO CUT filter @75Hz. Cleans up "mix mud," cuts PA rumble, creates a "neo-peaking" bass control when used with LO shelving boost.

Independent MIX-B (Monitor) section with pan, level & source. During mixdown, use as extra pre-fader stereo AUX send or double your inputs.

Mix-B SPLIT EQ assigns HI & LO EQ to Mix-B.

MIX-B SOURCE can route the monitor section to an extra stereo output for 2-track taping or broadcast feed during live mixing.

Constant power, buffered PAN pot for rock-solid panning.

Overload LED and Hyperactive −20dB Signal Present LED.

Selectable SOLO with CHANNEL METERING allows soloing in full stereo perspective; displays soloed channel operating level on master L/R meters so input trims can be adjusted for optimum levels.

MACKIE.

20205 144TH AVE NE • WOODINVILLE • WA • 98072 • USA
PHONE TOLL-FREE 800/258-6883 • FAX 206/487-4337
OUTSIDE THE U.S., PHONE 206/487-4333 • MODEM MANIACS: GO MACKIE ON COMPUSERVE OR DIAL OUR 24-HR MACKIE B.B.S. AT 206/488-4586
REPRESENTED IN CANADA BY SF MARKETING • 800/363-8855

WHAT'S NEW

By Steve Oppenheimer

▲ TECH 21 TRI-O.D.

Tech 21 has unveiled the TRI-O.D. guitar preamp ($245). This stomp box offers channel-switching between Tweed, California, and British tube-amp emulations. Each channel offers Drive and Level controls. The Level pots feature a Channel Off position, letting you switch between any combination of the three channels. The master output section includes volume and ±12 dB treble and bass controls.

When all channels are switched off, the speaker simulator and master output section remain active. This lets you use the speaker simulator and EQ to enhance the output of a distortion device for recording direct. The TRI-O.D. operates with a 9V battery or optional DC power supply. Tech 21; tel. (212) 315-1116; fax (212) 315-0825.

Circle #401 on Reader Service Card

▶ BEYER TG-X SERIES

Beyerdynamic is offering four new TG-X series hypercardioid dynamic microphones: the TG-X 20 ($259), TG-X 40 ($329), TG-X 60 ($399), and TG-X 80 ($469). The new mics offer improved transient response, thanks to changes in the neodymium-iron-stainless steel magnet assembly.

The diaphragm's oscillation performance has also been improved. The acoustic resonators and acoustical attenuation have been changed, improving the polar pattern and off-axis rejection. The coil leads have been moved to within the mic body, and a rubber shock-absorbing ring and new internal coil-wiring technique make the mic more resistant to impact damage. The mics are available with or without on/off switches. beyerdynamic; tel. (516) 293-3200; fax (516) 293-3288.

Circle #402 on Reader Service Card

▼ EV/DYNACORD DRP-10

Electro-Voice has introduced the EV/Dynacord DRP-10 stereo reverb and room simulator ($1,250). The unit's presets are grouped by application (e.g., vocals, guitars, bass, drums, and keyboards). There are 30 factory presets and twenty user programs in each of the eight groups, along with a supplemental bank of 99 user programs, for a total of 240 factory presets and 259 user memory locations. The effects groups can be quickly recalled via Speed buttons.

The DRP-10's effects types include reverb, delay, modulation, and pitch shifting. As many as six effects can be used simultaneously, arranged in any order. Each program has up to 23 editable parameters, which are accessed through the front panel or with real-time MIDI control. Programs change instantaneously and in total silence.

The switching power supply operates at any voltage from 90 to 250 VAC at 50 to 60 Hz. The DRP-10 uses internal 24-bit processing and 16-bit converters. Frequency response is rated at 20 Hz to 20 kHz, S/N ratio is >90 dB, and THD is less than 0.03% through the effects chain. Electro-Voice; tel. (800) 234-6831 or (516) 595-6831; fax (616) 695-1304.

Circle #403 on Reader Service Card

(continued on p. 20)

"I've got a major gig: Give me the cheapest guitar you've got."

As a professional musician, you'd never pick out your guitar that way. You know it takes a good instrument to give you the sound you're after. So why choose your sound equipment that way? No matter how good your instrument is, if you don't have a good PA you may as well be twiddling your thumbs.

All equalizers are not created equal. Sure, equalizers all look pretty much the same stacked on a shelf. But a mediocre design can turn your trademark sound to mush.

Choose your sound equipment the same way you choose your ax. Consider sonic quality, reputation, reliability and durability. How will it perform after it's been rattling around in the back of a truck awhile? Ask around. A lot of what you hear will point you to Rane.

A professional sound at a reasonable price. For not much more than the cheap stuff, you can own a piece of Rane gear. Rane has pioneered many of the latest advances in EQ technology including Constant Q, State Variable, Accelerated Slope and more. In plain English that means you get a better sound, with less feedback and minimum fuss.

And Rane delivers years of reliable studio-grade performance, backed up by a two-year warranty and a well-earned reputation for the finest in factory support.

Consider *all* your equipment purchases as if your sound depends on it. Then consider the sound equipment that's already proven itself everywhere from guitar racks to grammy recordings.

Consider Rane.

RANE CORPORATION
10802 – 47th Ave. W.
Mukilteo, WA 98275.
(206) 355-6000

PURITY BY DESIGN

RANE

Made in USA

Automatic Accompaniment has arrived – ...and just got better with Version 5

BAND-IN-A-BOX™

INTELLIGENT SOFTWARE FOR IBM (DOS & WINDOWS), MAC & ATARI

Type in the chords to any song, choose the style you'd like and Band-in-a-Box does the rest...

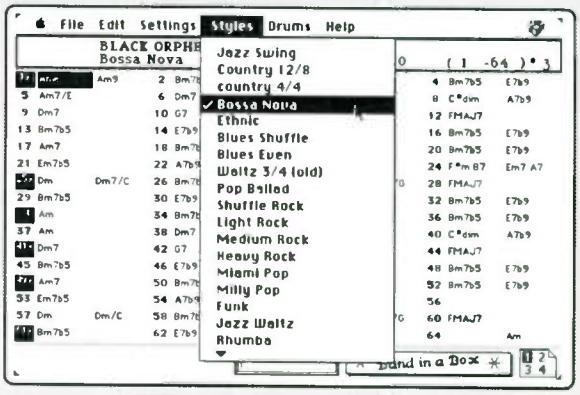
Automatically generating professional quality five instrument accompaniment of bass, drums, piano, guitar & strings in a wide variety of styles

24 Styles built in...

Jazz Swing • Bossa • Country • Ethnic • Blues Shuffle • Blues Straight Waltz
Pop Ballad • Reggae • Shuffle Rock • Light Rock • Medium Rock • Heavy Rock
Miami Sound • Milly Pop • Funk • Jazz Waltz • Rhumba • Cha Cha • Bouncy 12/8
Irish Pop Ballad 12/8 • Country (triplet)

Version 5: 2 more instruments + built-in sequencer...

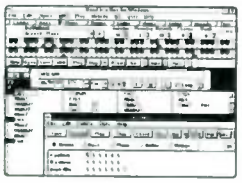
The built-in sequencer lets you record melodies (or buy our MIDI-FAKE-BOOK disks which include chords & melodies). Also make your own 5 instrument styles using the StyleMaker™ section of the program – or edit our styles to your tastes. Now there are 5 accompaniment instruments (including guitar/strings). General MIDI standard implementation (even for old synths). Plus 70 other new features!



NEW! Band-in-a-Box Pro for Windows $88

The award winning Band-in-a-Box automatic accompaniment program is now available for Windows 3.1. All of the features of the DOS version, plus much more including...

- *The "Wizard" (intelligent playalong features)*
- *background playback in other programs*
- *support of all MultiMedia drivers (Roland MPU401, Soundblaster, MultiSound, AdLib, TG100, etc.)*
- *copy MidiFiles to Clipboard to paste into other Windows music programs*
- *onscreen toolbar, full mouse support*
- *fully featured Windows interface*
- *all files fully compatible with DOS, Mac & Atari versions!*



UPGRADE OFFER FOR EXISTING BAND-IN-A-BOX USERS:
Basic upgrade to Band-in-a-Box Pro for Windows – $29
Complete Upgrade including new 5 instrument styles disk #4 – $49

BONUS!! Band-in-a-Box IBM version now includes BOTH the Windows AND DOS version for the same price!!

STYLES DISK #4 (Mac/Atari/IBM) $29

34 Hot new styles for Band-in-a-Box

We've made our best styles disk ever, most utilizing 5 instruments at a time. (bass/drum, piano, guitar and strings) This disk Supercharges your Band-in-a-Box program!!

9 NEW JAZZ STYLES !
(Charleston, Dixieland, Fats Waller, Jazz Quintet, Jazz Fast, Lui Prim Style, Tango, Jaco 5, ChaCha 5)

8 NEW COUNTRY STYLES !
(Chet, Cryin, Country Ballad, Country Contemporary, Floyd Piano, Ozark, Folk, J Cash 5)

7 NEW POP STYLES !
(Breezin, Larry, Grover, Kladrman Piano, St. Elmo, Yesterday, Georgia Style, On BoardWalk)

4 NEW "OLD POP" STYLES
(Supremes, "Sam Cook" Style, J B Goode, Fats D)

6 NEW ETHNIC/MISC. STYLES
(Gumbo, Klezmer1, Klezmer2, March_12, March_16, Mozart)

WE DIDN'T SAY IT... PC MAGAZINE DID!

– FINALIST –
PC Magazine Award for Technical Excellence

AFTER HOURS / ENTERTAINMENT
Band-in-a-Box
PG Music

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

PC Magazine Jan. 15, 1991 – Technical Excellence Awards

DownBeat – the #1 Jazz Magazine says...

"Band-in-a-Box is the most significant contribution to Jazz Education since Jamey Abersold Records."

"Band-in-a-Box is an amazing program"
Keyboard Magazine Aug. 1992

"I am in awe. I didn't think that such an incredible program could even exist. This software is a dream come true."
PC Journal Sept. 1992

Band-in-a-Box Prices

New customers

Band-in-a-Box Standard Edition (24 styles) **$59**
Band-in-a-Box PRO version (75 styles) **$88**
(BONUS!! Band-in-a-Box IBM version now includes BOTH the Windows AND DOS version for the same price!!)

Upgrades & add-ons

Upgrade or Crossgrade (Windows/DOS/MAC/ATARI) **$29**
("CrossGrades" are for users who need a version for a different type of computer)
Midi-FakeBook with melodies (100 songs on disk) **$29**
Styles Disk #2 (25 new styles for Version 5) **$29**
New! Styles Disk #4 ..... **$29**
Any 2 of Above **$49**
Any 3 of above **$59**
(eg. Upgrade to Windows + Styles Disk #4 = $49)

Requirements:

IBM-DOS: *640K, MIDI interface or soundcard (MPU401, SCC1, Midator, SC-7, TG100, Yamaha C1, Voyetra VAPI, Adlib)*
IBM-Windows 3.1: *2mb memory. Any MIDI interface or soundcard.*
MACINTOSH: *2mb memory, system 6 or 7 (reduced version for 1mb available)*
ATARI: *1040ST/STE/MEGA/TT (reduced version for 520 users available)*

From PG Music... *The makers of The Jazz Guitarist, Band-in-a-Box, PowerTracks, The Pianist*
☎ *Phone orders:* ***1-800-268-6272*** *or* ***1-905-528-2368*** *VISA/MC/AMEX/cheque/mo/po# Fax 1-905-628-2541*
(to hear recorded demo 1-905-528-2180)
PG Music Inc. *266 Elmwood Avenue Suite 111 Buffalo NY 14222*

PG Music announces... lots of new software programs!!

(6 Windows programs, 2 DOS programs, 3 MAC programs & 3 Atari programs!!)

Automatic Accompaniment has arrived!

Band-in-a-Box Pro™ (version 5) $88

INTELLIGENT SOFTWARE FOR IBM (Windows/DOS), MAC & ATARI COMPUTERS

- Type in the chords to any song, choose the style that you'd like & Band-in-a-Box does the rest... Automatically generating professional quality five instrument arrangements of bass, drums, piano, guitar & strings in over 75 styles.
- built-in sequencer lets you record melodies (or you can buy our MIDI FAKEBOOK Disks of songs).
- Pro version comes with 75 styles. Including Jazz Swing, Bossa, Blues, Jazz Waltz, Pop Ballad, Reggae, Rock (15 styles), Country, Miami Sound, Funk, Rhumba, Cha Cha & over 60 more!!
- Make your own styles or edit our styles using the StyleMaker section of the program.

Finalist - PC Magazine Award

***DownBeat**, the #1 Jazz Magazine says... "Band-in-a-Box is the most significant contribution to jazz education since Jamey Abersold records."*

ADD-ONS AVAILABLE TO PRO VERSION — AFTER HOURS / ENTERTAINMENT

Midi-FakeBook disk (100 songs) + 25 new styles ..... $30 — Styles Disk #4 (5 instrument, 30 styles) $29

Upgrade to Windows version from DOS (+ styles disk #4) ... $49 — Upgrade to version 5 (complete) $59

Requires: IBM (640K, any MIDI interface/soundcard), Atari 1040, Mac 2 mb RAM

BONUS!!

IBM version now includes BOTH the Windows AND DOS version for the same price!!

The Pianist™ (Windows, Mac, Atari) $49

A MUSIC PROGRAM CONTAINING A HUGE COLLECTION OF OVER 200 OF THE WORLD'S MOST POPULAR CLASSICAL PIANO PIECES, PERFORMED BY WORLD CLASS CONCERT PIANISTS!

Plus... Music Trivia Game, "Guess the Song", Program Notes, Biographies, Music Dictionary (all on disk) & much more.

PERFORMED BY CONCERT PIANISTS!

All the pieces have been recorded "in real time" by concert pianists on an 88 note weighted MIDI piano keyboard. They are never quantized or step recorded. All pieces are complete performances professionally performed, recorded & saved as Standard MIDI files. You therefore hear the music playing with CD-quality through your sound card or MIDI system.

ALL YOUR FAVORITE MUSIC...

Moonlight Sonata, Sonata Pathétique, Minute Waltz, Claire de Lune, Mephisto Waltz, Hungarian Rhapsody, Fantasie Impromptu, Military Polonaise... and over 200 more !!!

SEE THE MUSIC WITH ON-SCREEN KEYBOARD!

Play/Stop/Pause/Rewind/Tempo change/transposition/Volume/panning/patch changes & more.

OUR CUSTOMERS LOVE THE PIANIST...

"Incredible... amazing... terrific... masterful... fabulous... love it... my favorite program!"

NEW! The Jazz Guitarist™ $49

(Windows, Mac, Atari)

THIS PROGRAM MAKES IT "TOO EASY" TO LEARN TO BE A GREAT JAZZ GUITAR PLAYER!

A music program containing a huge collection of over 60 jazz standards played on MIDI guitar by top jazz/studio guitarist Oliver Gannon

RECORDED IN REAL-TIME ON A MIDI GUITAR!

Hear the music with CD-quality through your sound card or MIDI system. Most pieces have bass/drums as well as guitar so you get a full sounding jazz trio for the tunes!

the Jazz guitarist — from PG Music Inc.

LEARN TO BE A GREAT JAZZ GUITAR PLAYER!

On-screen fretboard shows you exactly what notes & chords are being played on the guitar. Slow down the performance or, better still, step through the music chord by chord, so you can learn every note as it's played!

PLUS MANY MORE FEATURES...

- *Jazz Trivia Game & Guess That Song Game, Program Notes, Biographies (all on disk)*
- *Over 60 Top Jazz Standards with Complete Guitar Arrangements*
- *Listen to the music while you work in other programs*
- *Special support for Roland GS or General MIDI Modules*
- *Standard MIDI files can be copied & used in other programs or presentations*
- *Use your existing sound card or MIDI synthesizer*

Sound Canvas Pro Editor/Librarian for Windows $29

Mixing/editing/storage of EVERY feature on Sound Canvas & other Roland GS & GM modules

You'll never need to touch your Sound Canvas front panel or open the manual again! Edit/design new sounds, key scales, tunings... YOU CAN EDIT EVERYTHING. Also plays MIDI files (hear changes as you make them).

Multi-MPU401 Driver for Windows $19

- *allows 8 music programs to use the same MPU401 at the same time!*
- *a "must have" driver for all MPU401 Windows users (Roland, Music Quest, CMS, etc.)*
- *easy to use, installs as a driver in Windows to replace your current MPU401 driver*
- *NEW! Allows inter-program MIDI communication!*

The current MPU401 Driver for Windows only allows one music program to use the port at a time. You need to close down all music applications before running a new one. But the new "Multi MPU401 Driver" allows up to 8 programs to use the MPU401 at the same time. So you can use all of your music programs at the same time.

NEW! Music Printout!

PowerTracks Pro™ $29

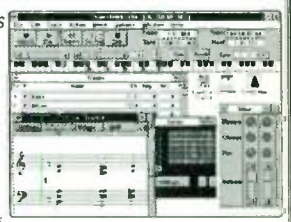
SEQUENCER/NOTATION/PRINTING FOR WINDOWS (IBM)

"Solid sequencing at an unbelievable price" Electronic Musician Sept. 93

PowerTracks Pro 2.1 is a professional full featured MIDI sequencing, notation and printing program, and is so easy to use! And we include versions for Windows AND DOS, so you'll be able to use PowerTracks PRO on all of your machines!

PRO RECORDING, PLAYBACK, SYNCH, EDIT & SYS-EX OPTIONS

48 tracks, real-step/punch record, sound on sound, MIDI File support, sync (SMPTE, Midi Time Code, MIDI), edit (quantize, cut, copy, paste, undo, data filters, transpose), multi-port support, 480 ppq timebase, sys-ex editor-librarian, patch names, banks & much more.



MUSIC NOTATION

Enter, edit, display music in standard Music notation. Intelligent automatic features such as: Correct beaming/tying of notes (maximize rests option / "Jazz Eighth notes" option (this automatically allows jazz swing eighth notes & triplets to be notated properly!)). Reads in any MIDI File & displays it as notation!!

MUSIC PRINTOUT (ON ANY PRINTER!!)

Print any track in standard music notation. Selectable staves per page, and bars per line. Selectable margins and paper size. Portrait or Landscape (sideways) printing. Titles, composer, style, copyright information. Make your own lead sheets! You can also print the piano roll window for even more detailed analysis of a track!

DELUXE WINDOWS INTERFACE

Multiple Windows – Music Notation, Staff Roll (piano roll), Event List, Tracks, Bars, Meter, Tempo, Piano keyboard, Guitar fretboard.

AND MUCH MORE...

- *Juke Box built in to play back sets of songs*
- *Comprehensive guitar support (on-screen fretboard, record/enter/edit/play guitar music)*
- *Built in mixer /sound editor for Roland Sound Canvas/SCC1/GS series.*
- *Comes with Pro quality MIDI files (piano, guitar, combo music by studio musicians)*

POWERTRACKS FOR DOS VERSION INCLUDED FREE. *Yes! We include the DOS version for free in the same package. NOTE: The DOS version doesn't support music notation, or other graphical features.*

EXISTING POWERTRACKS USERS CAN UPGRADE TO POWERTRACKS PRO 2.1 FOR ONLY $10.

NEW! The Jazz Pianist™ $49

(Windows, Mac, Atari)

THIS PROGRAM MAKES IT "TOO EASY" TO LEARN TO BE A GREAT JAZZ PIANIST!

Top jazz/studio pianists play 60 jazz standards in a wide variety of styles.

RECORDED IN REAL-TIME ON A MIDI KEYBOARD!

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the JAZZ PIANIST — from PG Music Inc.

LEARN TO BE A GREAT JAZZ PIANIST!

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- *Jazz Trivia Game & Guess That Song Game, Program Notes, Biographies & Music Dictionary (all on disk)*
- *Over 60 Top Jazz Standards with Complete Jazz Piano Arrangements*
- *Listen to the music while you work in other programs*
- *Special support for Roland GS or General MIDI Modules*
- *Copy the Standard MIDI files & use in other programs/presentations*
- *Use your existing sound card or MIDI synthesizer*

Windows version has piano music notation & chord symbols displayed!

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REQUIREMENTS
(all the above programs)

IBM (DOS versions) 640K, MPU401/MIDIATOR/ SoundBlaster/SC-7, TG100

***WINDOWS** 2mb RAM + any soundcard or MIDI interface*

***MAC** 2mb RAM, system 6 or 7*

***ATARI** 1040ST or better*

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BIG NEWS FOR THE DIGITAL STUDIO ▲ ▲ ▲ ▲ ▲

▶ YAMAHA PROMIX 01

New from Yamaha is the ProMix 01 ($1,995), a full-featured, programmable digital mixer that offers high-end features such as automation, instant reset of all console parameters, and moving faders. The compact mixer also offers two onboard stereo effects processors and three assignable, stereo compressor/limiter/gates. Standard amenities of the ProMix 01 include sixteen balanced mic/line inputs (eight of which have XLRs with phantom power) and one unbalanced stereo line input; four aux sends (two to the internal processors, two to external devices); 3-band parametric EQ on all channel inputs and the stereo output; four fader groups, each controlled by any fader; XLR balanced and unbalanced (RCA and ¼-inch) analog

outputs; 48 kHz S/PDIF digital output; and 60 mm motorized faders.

All mixer settings can be saved to 50 memory locations for instantaneous recall, and console data can be output to any MIDI sequencer for real-time dynamic automation. In addition, a Yamaha spokesman said that several leading sequencer companies are developing software-based systems for controlling ProMix 01 directly from a computer, either as editor programs or as add-on controller screens to existing sequencers.

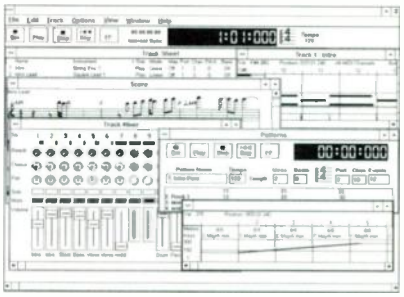
A 240 × 64-dot backlit LCD screen provides displays of equalization curves or dynamics activity, fader groups, and input channel levels. Output is indicated via dual 12-segment LED meters. All analog-to-digital and digital-to-analog converters are oversampled, 20-bit. The mixer is housed in a 26-pound chassis designed for tabletop or rack-mount (eleven spaces) use, and measures 19 × 17 × 5 inches. First deliveries are slated to begin in August 1994. Yamaha Professional Audio Products; tel. (714) 522-9011; fax (714) 739-2680.—*George Petersen.*

Circle #404 on Reader Service Card

▶ BIG NOISE SEQMAX PRESTO!

Big Noise Software's *SeqMax Presto!* ($124.95) is an entry-level sequencer for *Windows* that uses both linear and pattern approaches, allowing up to 64 tracks and 255 patterns per song. The program features graphic and event-list editing and syncs to SMPTE/MTC and MIDI Clock. It supports multiport interfaces and records all messages, including SysEx, in real time. A Score Editor provides full editing of all tracks in standard music notation, with symbols and lyrics.

The 64-channel, General MIDI-compatible track sheet/mixer controls mute, volume, solo, pan, and two user-definable MIDI Control Change messages. Drum patterns can be edited in a graphic window, which uses GM drum names. The program offers event filtering, quantization, and online help, and it uses MCI Command Playback to trigger WAV files. Big Noise Software; tel.



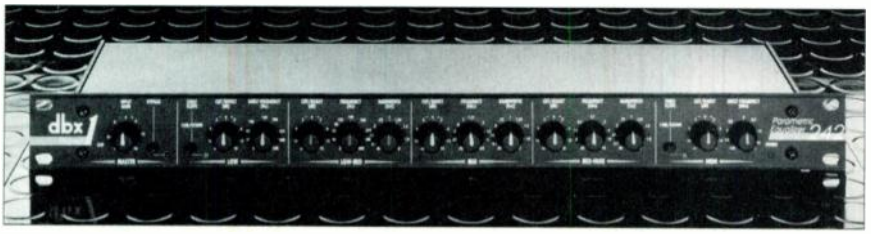
(904) 730-0748; fax (904) 730-0754.

Circle #405 on Reader Service Card

▼ DBX PROJECT 1 MODEL 242

The dbx 242 parametric EQ ($299) has three bands of fully parametric peak/dip EQ, as well as low and high shelving filters with independent, switchable (6 dB or 12 dB/octave) shelf slopes. Each band can be boosted by up to 16 dB or cut by up to 40 dB. The minimum bandwidth is 0.05 octaves, letting you create notch filters.

The unit features balanced, ¼-inch inputs and unbalanced, ¼-inch outputs. Frequency response is rated at 20 Hz to 20 kHz (±0.5 dB), THD at unity gain is 0.005%, and residual noise at unity gain is <-94 dB (20 to 20 kHz bandpass).

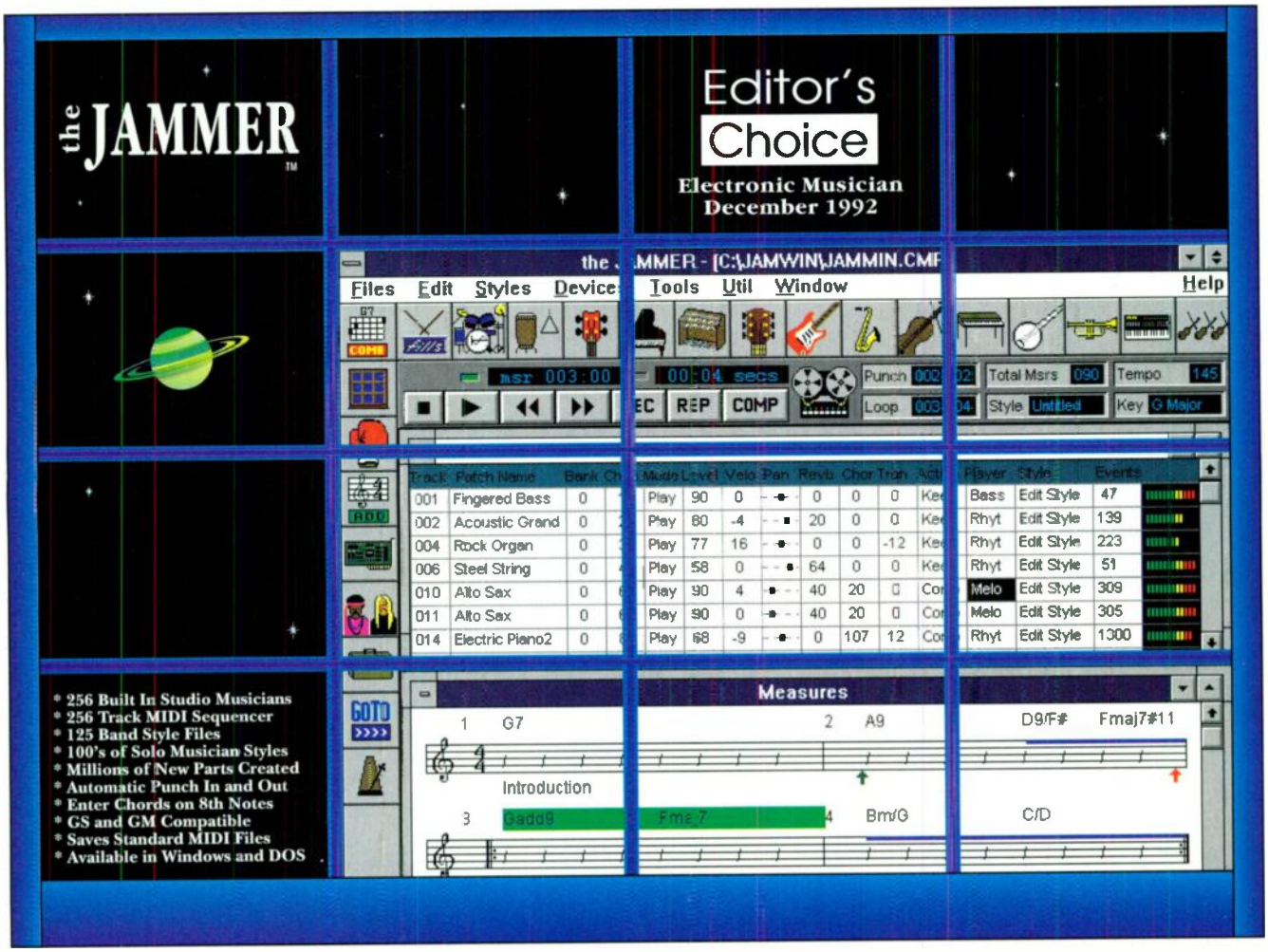


Also new from dbx is the PB-48 ($179), a 48-point audio patch bay with two rows of 24 self-cleaning, ¼-inch, TRS jacks on the front and rear. The jacks are mounted vertically, in pairs, on plug-in cards. Each card has two jacks on the front and two on the rear. By reversing the orientation of the card, the patch points can be normaled or not normaled without using tools. AKG Acoustics; tel. (510) 351-0555; fax (510) 351-0500.

Circle #406 on Reader Service Card

(continued on p. 25)

NOW AVAILABLE IN WINDOWS ...



Take a seat in the Producer's Chair and get ready to create a musical masterpiece. An array of talented Studio Musicians and a 256 track  *MIDI Studio are all at your command. Not to be confused with 'automatic accompaniment' programs which play back 'canned' or pre-recorded parts, the JAMMER combines music theory, artificial intelligence and randomness to create new quality musical parts for you each time you recompose. You bring the musicians in and out, you select the measures to be composed, you control the style of each musician*  *on each track. You set the levels, pans, effects, and do the final mixdown. You control it All ! We took the time-consuming work out of creating music, but when it comes to control ... We saved it all for you.*

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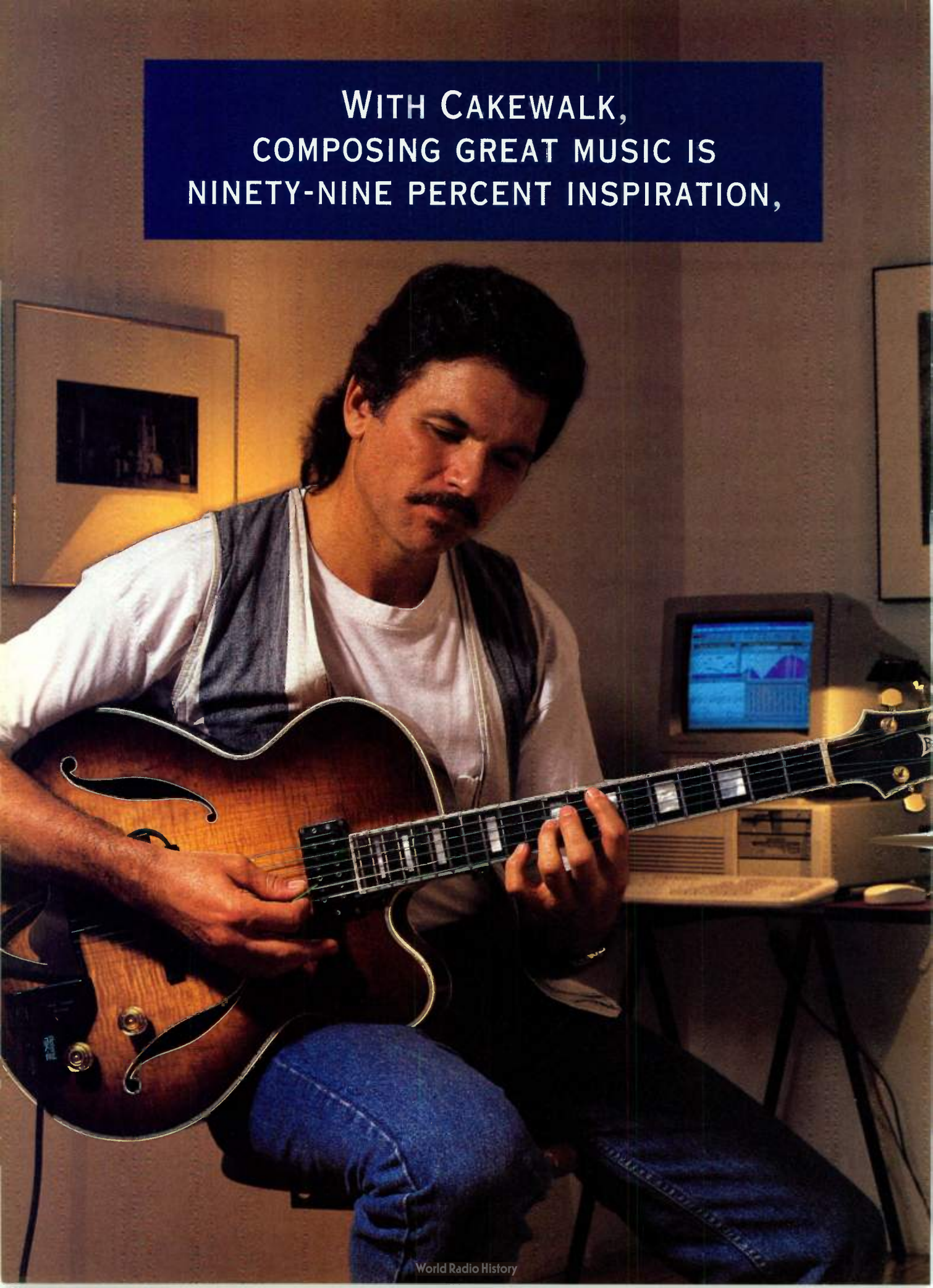


ONE PERCENT PERSPIRATION.

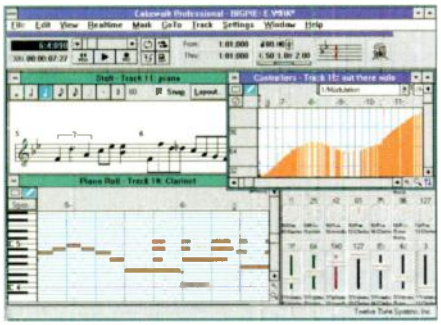
Cakewalk Professional for Windows™ 2.0 is the MIDI sequencer that's powerful enough to transform your inspirations into compositions. Yet it's no sweat to use.

MAKE A NOTATION OF THIS.

Cakewalk Professional works in concert with you every step of the way. In fact, new version 2.0 not only helps you create your compositions, it also prints them. The multi-track Staff view lets you edit and print up to 16 staves in multiple key signatures, as well as title, performance instructions, author and copyright information. It even displays and prints triplets. All in the font size you select.

YOU'LL LOVE THE VIEWS.

With Cakewalk Professional, composing music is an aural and visual experience. You can use the Piano



Roll view to insert, resize and move notes in a grid. The detailed Event List view lets you edit MIDI and multimedia events on multiple tracks at once. Use the Track/Measure view to assign track parameters like MIDI channels, instrument patches and key offsets, even in real-time.

Cakewalk PROFESSIONAL for Windows

Other extraordinary Cakewalk Professional features include a Controllers view, a variable timebase of up to 480 pulses per quarter note, a Markers view for creating text "hit points," an Event Filter and on-line help screens.

NEW WAYS TO COMPOSE YOURSELF.

Cakewalk Professional 2.0 offers other new features like:

- Play List view for live performance
- 48 assignable faders (16 sliders, 32 knobs)
- Real-time editing
- Remote control from MIDI keyboard
- "Hot Key" macros
- Loop record
- Punch record on the fly
- Big Time display

INSPIRED YET?

If you feel inspired to find out more about Cakewalk Professional for Windows 2.0, or to learn the name of the dealer nearest you, give us a call at **800-234-1171** or **617-926-2480.** Cakewalk Professional lists for just $349. If you'd like, we'll send you a demo disk for just $5 so you can see and hear Cakewalk Professional for yourself.

Twelve Tone SYSTEMS

P.O. Box 760, Watertown, MA 02272

System Requirements: IBM PC with 10 MHz 80286 or higher, 2 MB of RAM, mouse; Microsoft Windows 3.1. Supports any combination of up to 16 MIDI ports on devices with Multimedia Extensions drivers (including Roland MPU-401 compatibles and Music Quest MQX interfaces). Cakewalk Professional for Windows is a trademark of Twelve Tone Systems. Other products mentioned are trademarks of their respective owners.

It's time to get serious about laying tracks and making that killer demo you've been talking about. Get your hands on the 488 PortaStudio — the third

THE FIRST.

generation 8-track multitrack cassette available only from TASCAM. The 488 is designed and built like no other 8-track cassette. That's because TASCAM invented 8-track cassette. No short cuts here. We've put the best of everything into the 488. It's the only 8-track cassette using a high-performance servo-controlled transport complete with electronic breaking. Any other deck just can't handle the relentless demands of stop and go multitrack recording. Servo technology also maintains precise and consistent tape tension from the beginning 'till the end of the tape. That's why the 488 delivers the lowest Wow and Flutter of

THE ONLY.

Using standard cassettes, TASCAM has invented the best sounding 8-track recorder in the world. And it's only available from TASCAM.

any 8-track cassette. Which means it sounds better, too. Another exclusive is TASCAM's innovative split head technology. That's why the 488 delivers specs you won't find in any other deck at even twice the price. In fact, the 488 actually outperforms the original reel-to-reel 8-tracks. Of course, the 488 PortaStudio gives you all the important recording features you'd ever need. And with the right recording skills, you can do almost anything. In fact, some have used the 488 to record hit records and movie soundtracks. And that's great. But what you do with the 488 is your business. Check out the TASCAM 488. And let your

THE BEST.

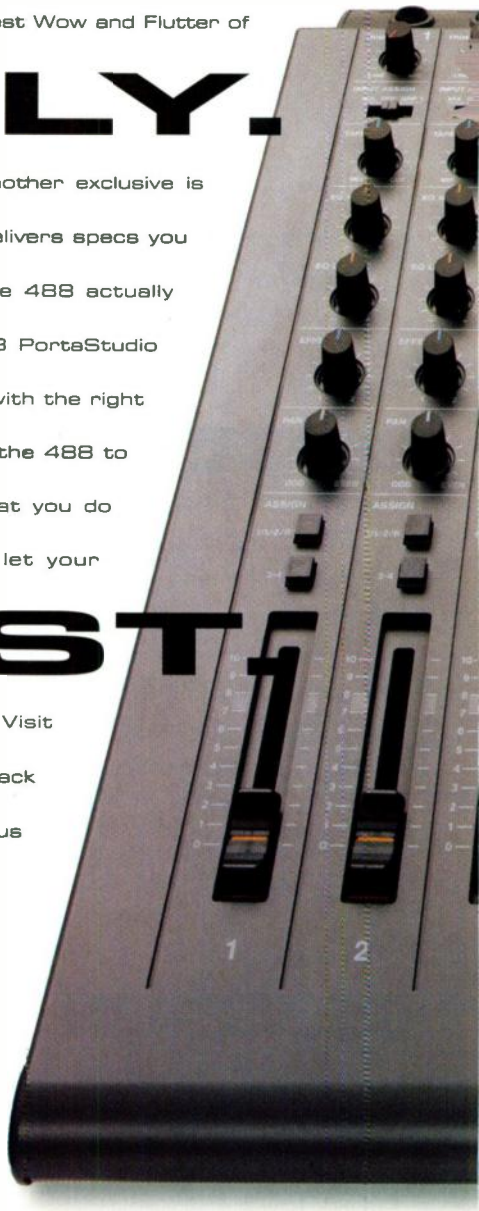
imagination wander. Like any PortaStudio, it's simple to use. Don't wait. Visit your local TASCAM dealer today. Have them set you up with the best 8-track cassette money can buy. The 488 PortaStudio. Because it's time to get serious about recording.

THE 488 PORTASTUDIO.

8 TRACKS ON CASSETTE.

ONLY FROM TASCAM.

ONLY *$1,799.*

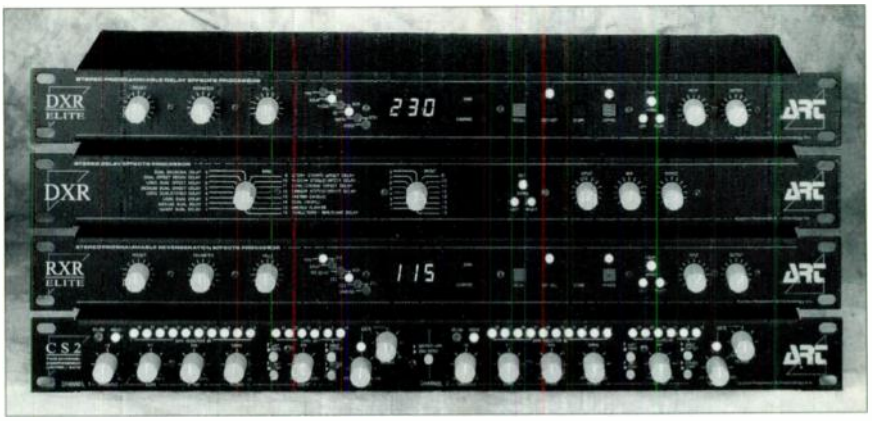


The 488 features a servo-controlled transport and split head technology. It sounds great and is simple to operate. You won't find a better recording studio at this price. It's perfect for recording demos and sketching out tunes. Try it!

TASCAM®

Take advantage of our experience.

▶ A.R.T. DXR/RXR/CS2



A.R.T. unveiled a line of true-stereo, single-function, 1U rack-mount effects processors. The DXR ($279) is a preset-only digital delay that offers sixteen types of effects with sixteen variations of each type. Delays include mono, dual mono, stereo, doubling, ping-pong, and multitap. Other time-based effects include stereo and dual chorusing (independent chorus on each channel) and several types of stereo flanging, such as inverted, Leslie, and tremolo. Delay times range from 3 ms to 2 seconds, with 0% to 75% regeneration. The unit has global input, output, and wet/dry mix controls.

The DXR Elite ($349) is a programmable version of the DXR with eight banks of sixteen memory locations, totaling 128 user programs. Editing is via Parameter and Value knobs, with an LED display. Parameters include delay type and time, regeneration, EQ, Width and Speed for chorus and flange, and wet/dry mix. Bypass and Compare are also included. A Soft Key button or footswitch is used to tap in delay time, operate Repeat Hold, or switch Dry Kill (which eliminates the dry signal, leaving a 100% wet output). Real-time MIDI control is provided for volume, Dry Kill, Wet Kill (100% dry output), Repeat Hold, regeneration, wet/dry mix, and Speed. Presets can be recalled with a footswitch or Program Change messages, and MIDI Program Change mapping is provided.

The RXR Elite ($349) is a programmable reverb processor. Reverbs include rooms, halls, plates, chambers, gated reverbs, dual ambiences, and reverse/inverse reverbs. Programming features are similar to those in the DXR Elite. Parameters include reverb type, decay, predelay, gate time, gate lowpass filter, EQ, damping, and mix. MIDI control is provided over all editable parameters.

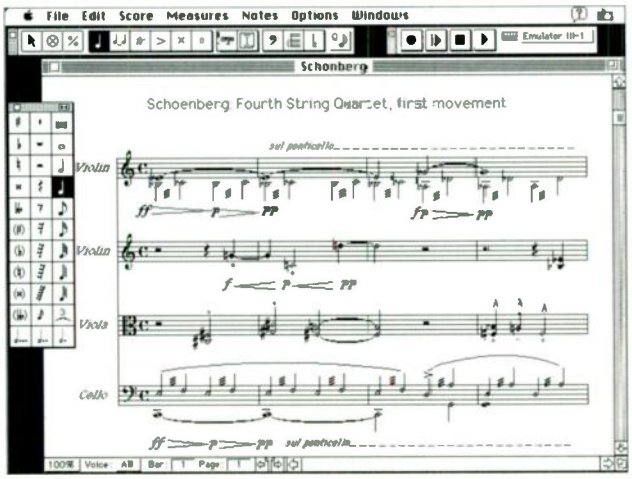
Finally, the CS2 ($279) is a dynamics processor that features two independent, linkable channels of compression and limiting with a noise gate. Each channel features active, balanced inputs and outputs, a detector loop, gain reduction, threshold, and meters. The compressor includes hard- or soft-knee, threshold (with over and under LED indicators), slope, attack time, release, time, and output level. Limiting is activated by a Limit/Comp button, and the controls adjust accordingly; for example, the slope changes to a limiting ratio and the attack time switches to its quickest setting. The noise gate has a release-time control and a threshold control with LED indicator. A.R.T; tel. (716) 436-2720; fax (716) 436-3942.

Circle #407 on Reader Service Card

▼ OPCODE OVERTURE

Opcode Systems has announced *Overture* ($495), a pro music-notation package for the Mac. The user interface includes a toolbar with tear-off palettes and click-and-drag entry. MIDI data can be input in real time, step time, or via Standard MIDI Files. The program has chord recognition and offers both sequencer-style, piano-roll editing and standard notation editing. It plays back all notes, repeats, and dynamics.

Overture lets you scale all objects, zoom to any level, nudge notes one pixel at a time with the arrow keys, and create EPS files from any area of the score. Text features include lyrics, text boxes, rehearsal marks, and footers and headers. A new PostScript music font is also included. The program is *OMS*-compatible and integrates with Opcode's *Vision* and *Galaxy*. It runs on any Macintosh with 4 MB of RAM and System 7.0 or later.



In addition, the company has announced *Studio Vision AV* ($595), which permits at least three channels of 16-bit digital audio on a Mac 660AV and four channels on an 840AV. The program also provides four channels of audio on any Mac with a Digidesign Audiomedia I or II card.

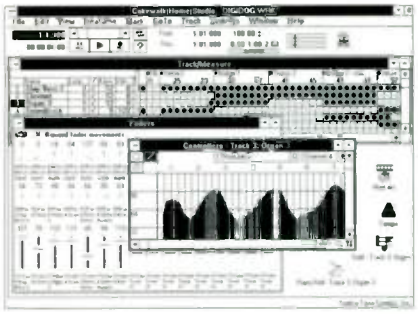
Finally, the company has introduced *Studio Vision Pro* 2.0 ($995; upgrades from version 1.4 $149.95; from version 1.5 $49.95). The new version of *Studio Vision Pro* adds the new features of *Vision* 2.0, including the Track Overview, music notation, groove quantize, and a redesigned, color user interface. The program now supports up to sixteen channels of digital audio with Digidesign's Pro Tools system. Opcode Systems; tel. (415) 856-3333; fax (415) 856-3332.

Circle #408 on Reader Service Card

▶ TWELVE TONE HOME STUDIO

Twelve Tone Systems announced *Cakewalk Home Studio* ($169), a 256-track, entry-level sequencer and notation program for *Windows* 3.1. MIDI data can be entered in real time or step time and edited offline in the multitrack Piano Roll view, Event List view, or Staff (score) view. Up to sixteen selected tracks of notation can be printed on any *Windows* 3.1-compatible printer.

The Faders view lets you edit volume, pan, and effects level in real time, while the Controllers view lets you draw MIDI controller data with a mouse. The Markers view lets you set an unlimited number of labeled song markers. The program supports any *Windows*-compatible MIDI interface with up to sixteen pairs of MIDI I/O ports. Bundled software includes Turtle Beach's *Wave Lite* waveform editor and *Canvas Man* Roland GS patch editor. Twelve Tone Systems;



tel. (617) 926-2480; fax (617) 924-6657.

Circle #409 on Reader Service Card

▼ SOUNDCRAFT SPIRIT STUDIO LC

Soundcraft's Spirit Studio LC (16 ch./$2,995; 24 ch./$3,995; 32 ch./$5,995) is a modular, 8-bus console with up to 82 inputs at mixdown. The board offers an inline design, with both channel and monitor paths on each input strip, and a Fader Flip feature that lets you switch the tape returns between the channel and monitor path.

Each channel offers balanced line and XLR inputs with trim; a highpass input filter (to eliminate rumble and mic popping); a tape send and return; 3-band EQ with In/Out switch, swept mids, and swept lows; pan; solo-in-place; mute; and a 100 mm fader. The channels also have eight aux sends. Aux sends 1 and 2 can be switched pre/postfader. Auxes 3 and 4 can be summed, letting you combine two effects or use the same effect in both the channel and monitor paths. Another switch selects between Auxes 5/6 and 7/8. Seven stereo aux returns are provided.

The master section has two 100 mm faders; the Mix B master has a separate fader, which could be used to submix the monitors or as an additional stereo master send. A balanced Submix input is provided for use with external submixers. Inserts are supplied on every channel, subgroup out, mix out, and Mix B out. A built-in talkback mic is also included.

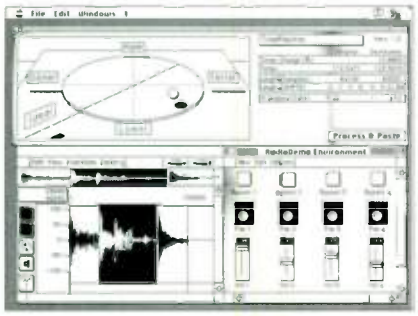
You can monitor any combination of aux 1, aux 2, returns 1 to 4, Mix, Mix B, the 2-track returns, and the submix output. There are peak overload LEDs on each channel, and 12-segment, 3-color, bargraph meters display the master out and group out levels. Frequency response is rated at 20 Hz to 20 kHz, mic EIN at -129 dBu, main output noise at <-80 dBu, THD at <0.006% (at 1 kHz), and typical fader crosstalk at <90 dB. Soundcraft; tel. (818) 909-4500; fax (818) 787-0788.

Circle #410 on Reader Service Card

▼ EMAGIC DIGITAL FACTORY

Emagic has released the *Digital Factory*, a suite of six utilities that work within, and are bundled with, *Logic Audio* 2.0 for Macintosh and Atari Falcon030. The simplest is *Sample Rate Convert*, which automatically converts between all common sample rates.

Groove Machine digitally regrooves by modulating the time base of audio material without changing the pitch or cutting the material. It changes the swing feel of existing digital audio, working on an eighth-note or sixteenth-note time base, and the swing percentage is adjustable.



Audio to MIDI Groove analyzes the timing positions of beats in an audio file, including the rhythmic feel, and creates a MIDI groove template. MIDI sequences will follow the resulting MIDI groove in sync. An Audio Scrub function lets you scrub MIDI, audio, and video. The utility also takes the audio file's pitch, volume level, and note length and turns them into MIDI note, Velocity, and note-length information, which can be applied to a MIDI sequence.

The *Time Machine* offers real-time, audio time-base manipulation, providing time expansion, compression, and transposition. The company claims excellent sound quality with tempo changes ranging from -10% to +15% and good quality with tempo changes from -20% to +30%.

Audio to Score Streamer automatically turns monophonic, tuned audio recordings into a printable musical score and a MIDI sequence that includes the time position, note pitch, note Velocity, and note length. Pitch bend, glissando, and vibrato are not supported.

Finally, *Maximum Mixdown Level* lets you mix audio regions and audio files into a new file without loss of sound quality or level. The Digital Clipscan function examines the audio data for possible clipping and normalizes the gain automatically. Emagic; tel. (916) 477-1051; fax (916) 477-1052.

Circle #411 on Reader Service Card

REV UP ▲ ▲ ▲ ▲ ▲

▶ AKAI

Akai has announced OS version 3.0 for its DR4d hard-disk recorder (upgrades $50). The unit can merge any combination of its four tracks to any destination track, with individual level control, and the operation is "undo-able."

With the optional, updated IB113M interface card ($209; upgrades $60), the DR4d can now send MTC, and MIDI Machine Control has also been added. With the updated IB112T SMPTE card ($249; upgrades $60), it can generate or receive time code while playing or recording. The machine can now start and stop in response to incoming SMPTE time code without hitting the Play button. The SCSI B port can interface with personal computers for use with audio-editing software (when compatible software is released). Akai/IMC; tel. (817) 336-5114; fax (817) 870-1271.

Circle #412 on Reader Service Card

▶ ENSONIQ

Ensoniq's TS-10 and TS-12 are now General MIDI-compatible with operating system 3.0 (upgrades $99.95, installed). The upgrade adds 128 ROM-based, GM sounds, including eight GM and GS drum kits. GM response is 16-part multitimbral, and it can be enabled/disabled for each channel or globally via Universal System Exclusive messages. With GM on, the synth's non-GM functions are disabled. Ensoniq; tel. (215) 647-3930; fax (215) 647-8908.

Circle #413 on Reader Service Card

MARK OF THE UNICORN

Mark of the Unicorn has announced *X-oR* 2.0 for the Atari ($195; upgrades $129.95). The new version adds Get Patch and Get Bank operations; support for Phantom, Unitor, and Export multiport interfaces; and a MIDI monitor that displays transmitted and received data. Windows can be navigated in a Windows menu and selected with function-key equivalents. The size and location of all windows can be saved with the Save Locations command. Pop-up sliders are used to edit parameters in the Instrument Setup and System windows. Envelope times and levels can now be edited numerically. Editing profiles have been added for recent devices from Alesis, DigiTech, E-mu, Ensoniq, Korg, Kurzweil, Mackie, Roland, Sony, and Yamaha. Mark of the Unicorn; tel. (617) 576-2760; fax (617) 576-3609.

Circle #414 on Reader Service Card

◀ YORKVILLE SOUND YSM-3

Yorkville's YSM-3 studio monitors ($499) are said to offer flat frequency response and linear phase response. The 3-way cabinets use a high-powered, 12-inch woofer with a 56-ounce magnet; a 1-inch, hyperbolic dome tweeter; and a 5.5-inch midrange driver that features new polymers designed particularly for mixing vocals. The YSM-3 speakers can handle up to 250 watts per channel (Program) into 4 ohms.

The designers paid special attention to crossover design; the crossover points are 700 Hz and 3 kHz (12 and 18 dB per octave, respectively). Frequency response is rated at 35 Hz to 20 kHz (±3 dB), and sensitivity is 89 dB (@ 2.83V/1m). The enclosure measures 25.75 × 16.81 × 11.5 inches and weighs 45 pounds.

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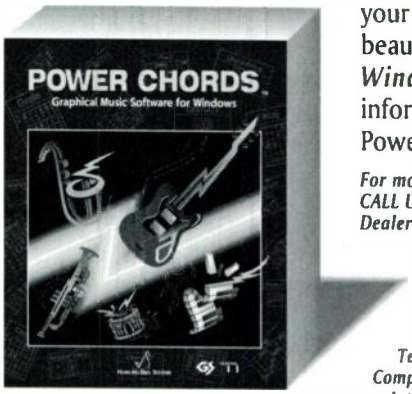

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PRO FILE

Picture This

Julius Vitali voices the visual.

By Ric E. Braden

One look at the song titles on *The Visuals & Music of Avant-Disregarde* by Julius Vitali, and it's clear something is afoot. "Orthogonalphobia: Fear of Right Angles," "Perpendicular Lives," and "Flat Earth Society" not only hint at Vitali's roots as a photographer and videographer, but also his approach to composition, which he calls "visual music."

Visually inspired music is not new. Composers Erik Satie and John Cage and artist Marcel Duchamp used visual referents to inspire composition. Vitali cites Duchamp in particular as an influence. "He was able to see his concepts in different media," notes Vitali, "and was really one of the first interdisciplinary artists."

Vitali began his own synthesis of the visual and aural at the Experimental Television Center in Owego, New York. "They have a lot of audio processors that intentionally interrupt video signals for artistic purposes," he explains. The resulting "liquid" image intrigued Vitali.

When the Center acquired some Amiga 1000 computers, Vitali took his marriage of audio and video in a new direction. Using Aegis' *Sonix* sequencing program, he drew images on the staff with notes, then played the graphically rendered score.

The first projects were simple. "I drew sine, sawtooth, and square waves on the staff, then assigned different instruments [the Amiga 1000 can play up to four internal voices] to each graphic."

Vitali was soon experimenting with more elaborate graphics—a circle, an American Indian motif, and a bird—and his songs became correspondingly more complex. The thin timbres of the Amiga's internal voices were beefed up by incorporating an Ensoniq Mirage via MIDI. The album took shape when Vitali recorded the compositions onto a Yamaha MT2X (4-track) ministudio; adding guitars, vocals, and other sounds at a commercial 8-track studio.

Because the musical figures produced by each graphic are looped, the screen drawings give Vitali's music an underpinning of computer-generated rhythms. They also serve as a thematic base. "Each song has a narrative," he explains. "In the song 'Anymore,' I started with a diamond pattern that produced a crying sound when a sax patch was selected. I wanted to work that into something that had a certain consciousness."

"Anymore" became a commentary on human-induced changes in the environment. The diamond graphic generated a repetitive industrial rhythm, over which Vitali used two Casio SK-5 sampling keyboards to tap out a swirling montage of spoken words and environmental sounds. Above this aural soup, Vitali sings a nasal counterpoint of statement and question addressing environmental concerns.

Although it stands on its own, Vitali's music is designed for live performance. He is joined onstage by his wife, artist and dancer Terry Niedzialek, who creates a moving screen for projected images. During the performance pieces, Niedzialek and the other dancers are costumed in her elaborate hair sculptures, another visual element that serves to complete Vitali's vision.

(Contact Julius Vitali at PO Box 75, Flicksville, PA 18050.)

Ric E. Braden *creates his own visual music as a graphic artist for* Mix.

Julius Vitali

By Michael Molenda

Dance Partners

BEFORE YOU RECOIL IN HORROR AT THE NEXT FEW SENTENCES, LET ME ASSURE YOU that this article is not a love letter to my wife. She is a ballet dancer, and the first time I saw her arms stretch into the aching melody of a violin, all the machismo I could muster couldn't stop a tear from rolling down my face. It was a moment of such sublime beauty that all I wanted to do was lock myself in my studio until I composed something good enough to be caressed and punctuated by the limbs of dancers. Until that moment, I had not realized that the jealous balance of music and movement could create such a devastating alliance.

Unfortunately, the process of inventing this alliance can serve up a bit more frustration than most musicians care to deal with. Many choreographers exercise a large and looming influence over the composer's work, as the needs of the dance often take precedence over musical forms. But letting go of total artistic control can be a small price to pay for seeing your music visualized by human angels who levitate across the stage, giving form and substance to your every note. And at the very least, the dance world offers yet another means for your music to gain exposure outside the ivory tower of your home studio.

Collaborations between musicians and choreographers produce moving performances.

Photograph by Sharon Green

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Raising The Curtain

To many musicians, the dance community seems like a mysterious and secret society. But winning a scoring commission in the dance world is no different than getting a gig anywhere else: You have to network. Go to dance concerts, visit some classes, seek out hot local companies, and ask other composers about their experiences working with choreographers. Like most things in the entertainment business, your people skills are often way more valuable than your musical chops. Composing for dance is an intensely collaborative venture, so it's essential that a choreographer believes you have a feel for dance and an empathy with their work.

In fact, personal contact is probably 99 percent of the reason you'll find yourself working with a dance company. Every commission I've received has happened for one of two reasons: The choreographer was either a client at my recording studio, or someone I met through my wife. The truth is, musicians outside the dance scene seldom end up with scoring gigs.

And here's another dose of truth: Composing for dance is a labor of love. Do it because you are inspired by the beauty of movement, or get a kick out of hearing your music played in a theater, or enjoy the interaction with dancers. But don't expect to make a lot of money. The dance-scoring market for entry-level composers is comprised of young companies battling for dwindling grants and private arts donations. Many choreographers must fund productions out of their own pockets. After rehearsal-studio rentals, publicity costs, costumes, and everything else necessary to drag a production to the stage, those pockets are pretty threadbare.

The best thing to do, then, is to consider dance scores as "multimedia PR" for your composition skills. Many composers have moved on to lucrative film scoring and theatrical careers after distinguishing themselves in their local dance community. Because promotion is often the only career-oriented benefit gained by scoring dance concerts, make sure you are credited in the company program and all press releases relating to the show.

Outside of getting a lucky break with a well-funded company, all you can usually do is recoup your tape and material costs. If you own a home studio, you may be able to charge an hourly rate for the actual time you spend recording the score. (Even the smallest dance companies are aware they must pay a recording studio or engineer to prepare and edit their performance masters.) If you're really ambitious, check with your local grant library and see if any funding foundations offer collaborative grants for composers and choreographers.

Dancer's Desires

Of course, making contact is just Step One of an on-going creative process. The next step is entering into a collaboration with a choreographer. To help musicians understand the dynamics of collaborating with dancemakers, I asked three San Francisco Bay Area choreographers to talk about what they need from a composer.

The Paul Dresher Ensemble in performance.

Alonzo King is choreographer and artistic director of Lines Contemporary Ballet. Since the company's inception in 1982, it has developed into an internationally renowned chamber ballet company. (They were invited to Prague's Modern Dance Festival in 1990 and performed throughout Czechoslovakia.) King has also choreographed works for the Joffrey Ballet, Frankfurt Ballet, the Dresden Ballet, and BalletMet.

Cheryl Koehler founded the Zig Zag Theatre in 1990 as a vehicle for her multimedia dance plays. Her current full-length production *The Fish and the Fire* combines music and movement with storytelling, props, and puppets.

Independent choreographer Kathryn Roszak recently debuted her ecological dance performance, *Anima Mundi,* at San Francisco's Grace Cathedral. She continues to develop earth themes in her work with visual artist and composer Christopher Castle.

Alonzo King. The most important thing about composing music for dance is leaving room for the choreographer to get in. For example, much of Beethoven's music is so powerful that it doesn't need dance. As a choreographer, I don't want to simply illustrate the music, I want to participate with it as an equal. A real collaboration requires the composer and choreographer weave together on the same cloth. You don't want potluck, where the composer brings the music and the choreographer brings the movement.

Music is the environment that the dance lives in, and it's very time- and rhythm-specific. I tend to direct the composer, because choreography often requires music that is exact. If something is choreography-specific, I'll really push for a certain motif, mood, or rhythm. Sometimes I'll even ask for a certain type of sound. I consider my

the Margaret Jenkins Dance Company, I wanted to evoke the feeling of nature and humanity and how living in a city affects people. Therefore, many of the samples were derived from natural elements and industrial sounds. I also sampled a custom-built instrument called The Long-Stringed Instrument—it's 100 feet long and composed of more than 100 strings—that produces incredible harmonics and rich timbres.

Once the orchestra is established, I'll sequence some very quick sketches to flesh out a harmonic language and rhythmic structure. Then I'll make a separate cassette copy of each sketch and play them at rehearsals to see if the dancers develop a relationship with the music. When composing long pieces there's a lot of give and take: The dance determines the shape of the music, and the music determines the shape of the dance. It's funny, the dancers often end up knowing the music better than I do. They listen so closely that they pick up on details that were unintentional, little hits and nuances I took for granted. This is sometimes a problem when I've made a tape of the work for the company to take on tour. When they come home and we can perform the score live, the dancers go nuts because we don't play things exactly the same as they were on the tape. We have to schedule rehearsals to ensure we "re-learn" all the parts they need.

Phil Freihofner. A musician who wants to work with dance should not rely on sequencing, because the music is in a constant state of metamorphosis. The process of working with Cheryl (Koehler) on *The Fish and the Fire* involved tearing pieces down and building them up, so even the thought of sequencing seemed rather cumbersome. The simplest and quickest thing was to just record the parts straight to tape and not assume they were final versions. Of course, nothing stayed the same. Many of the revisions involved phrasing, which is performance-oriented, and I don't believe sequencers are very good at editing phrasing. I'd rather play the part in real time than sit down and edit numbers.

I have a background in sound design, which really helps me visualize sounds and themes for movement. I actually programmed most of the sounds for *The Fish and the Fire* from scratch. To me, an important aspect of playing the synthesizer is making sounds with it. Too many people rely on presets, and it drives me crazy to hear the same (synth) patches over and over on records, film soundtracks, and TV ads. Musicians have gotten lazy. I used a Yamaha DX7 for this piece and incorporated an Alesis QuadraVerb into the programming process. In fact, none of the sounds I programmed—which were gamelon-influenced bells, gongs, harps, and vibraphones—were complete until they were processed through the QuadraVerb. I used the unit's parametric EQ to expand and contract aspects of the formants of each sound, and to smooth out the gritty high-end that's characteristic of FM synthesis.

Jeff Quay. Usually the choreographer sends me home with a video tape of the piece. The choreography is already done, and they've been dancing to something by, say, Steve Reich. But they don't want to use the Reich piece because it's not right for one reason or another, and they'll tell me why. My job is to interpret what elements they were getting out of that music and write an original piece that fits the

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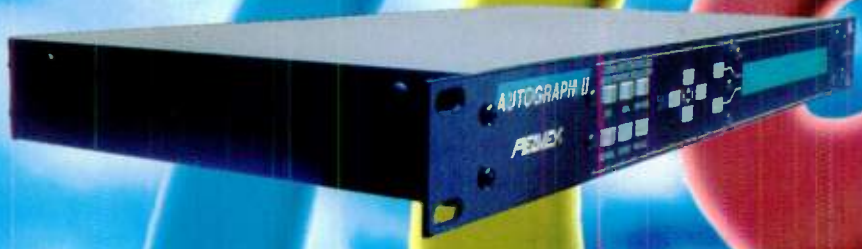

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Dance Partners

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In a typical performance, I keep time with my right foot, using a bell or metallic percussion sound. My left foot controls a sustain pedal for the MIDI channel (and drum pad) to which I've assigned my chords. I hit the appropriate pad, then hold the pedal down to sustain the chord. On another pad, I have assigned eight notes that I know will work with that chord. So as the chord sustains, I can play melodic figures to create a mood.

Drummer/composer Jeff Quay stuffs his drumKAT system into a backpack and rides a bike to Manhattan's dance studios, where he performs for classes and concerts.

What really opens things up is the drumKAT's breath-controller input, which allows me to enter continuous controller information with my Yamaha

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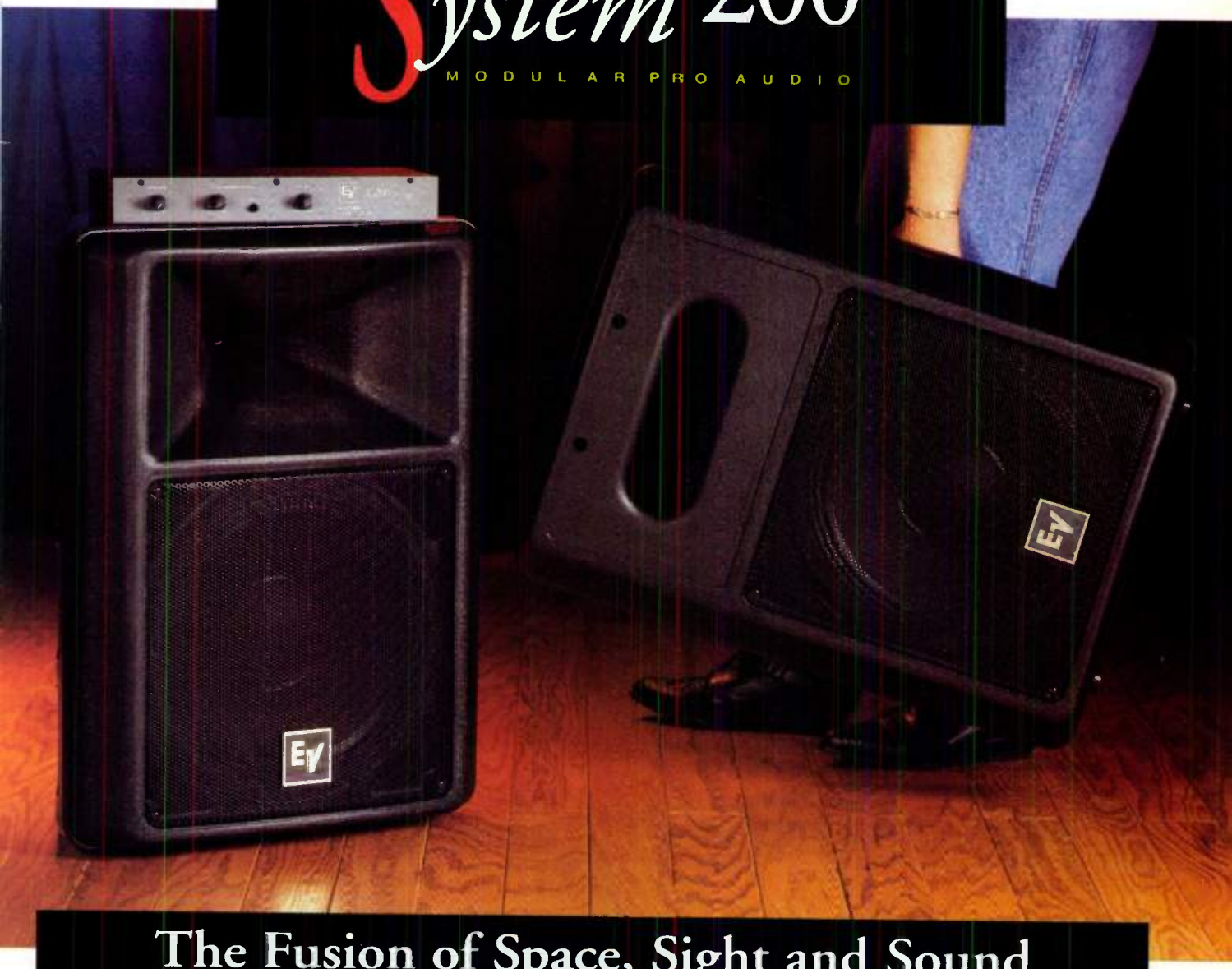

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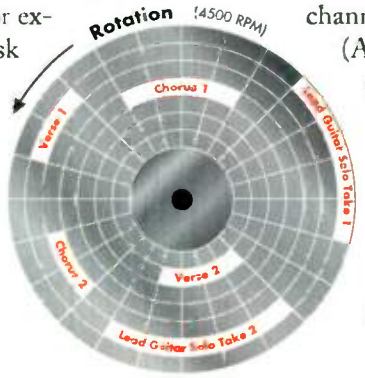

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On tape, the sections of music are physically located far from each other, separated by many feet of the tape itself. Since you have to move all that tape past the heads to get where you want to go, it's impossible to jump instantly from one section to another. It wastes time, and limits creativity!

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BC2. For example, I can assign four notes to a piano sound and four notes to a string sound. The breath controller can be set to control expression for the string sound alone, while the sustain pedal holds down both sounds. I'll strike a pad, holding the sustain pedal down, but I'll only hear the piano chord because the expression level is all the way down on the string patch. But as I blow into the BC2, I can slowly fade in the strings.

This really adds a spontaneous edge to dance performances, because I can change musical environments based on how the dancers are feeling. I can push things a bit if the dancers seem more energized and physical, or ease up if they're more introspective.

Pharoah Sanders. Composing *Ocean* for Lines Contemporary Ballet was different for me, because several of the musical phrases are constructed by playing chords over four to five measures to open up some room for the dancers. I'm used to playing over more chord changes! I worked on the music step-by-step based on (artistic director) Alonzo King's choreography and how the dancers interpreted the movement. It was important to me that the piece was molded from collective ideas, so I could understand what Alonzo really wanted, rather than just handing him a score and then leaving. The scoring process took longer than I'm used to, because there was so much working back and forth. I watched the dancers; he listened to the music and asked for changes; I adapted things based on seeing the dance develop or his requests; and so on.

I based my score on how I felt about

Composer Lisbeth Scott's reputation as a singer/songwriter attracts dance companies who want vocal-oriented scores.

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the people in the company. The dancers are very devotional, very disciplined and spiritual. So I developed a score that evoked grace, intelligence, and spirituality, rather than putting something together based on my being a bebop player or whatever. I drew inspiration from their characters. Middle Eastern modes seemed to express my feelings the best, so I put together a group of people influenced by that music and included some Moroccan musicians and singers. This is not the kind of music that ballet audiences are used to hearing! But I believe it's a good collaboration, because the Moroccans are used to playing rhythms and accompanying dances; they already have the essence of the dance in their souls. Also, you can't teach a musician to understand spirituality, so it was important to find musicians who had a spiritual base. Because Middle Eastern music is polyrhythmic and richly textured harmonically, the main problem was finding rhythms that didn't overpower the dance. I didn't want people focusing on the musicians instead of the dancers.

Lisbeth Scott. My working method is different every time. A company may be in the beginning stages of a work and need some music to choreograph to, or the dance may be already finished, and I'll get a videotape that I can use to write the score. Sometimes the music and movement will develop together. In a typical collaboration, I'm free to do whatever I want and that's usually what I demand. This isn't to say that I don't like constructive criticism or hearing different perspectives, but my reaction is usually tempered by how I feel about the musicality of the person making the criticism. In a positive sense, you may get pushed to do something that you wouldn't ordinarily have done. But if someone says, "We need a big whoosh here," it does nothing but piss me off.

I enjoy writing for modern dance companies, because they usually interpret the music in different ways. In classical ballet, a lot of the choreography "Mickey Mouses" the music. If you hear the big 3/4 waltz with heavy bass, the guy is always leaping around, or the women always follow the violin line. The movement is so attached to the rhythm and texture of the music. That is wonderful, and it often works beautifully, but I wanted to get away from that. Modern choreography uses music in a different way, kind of like a duet with the dance. The music can follow the movement or go off on an entirely different journey. There's a little more freedom for the composer.

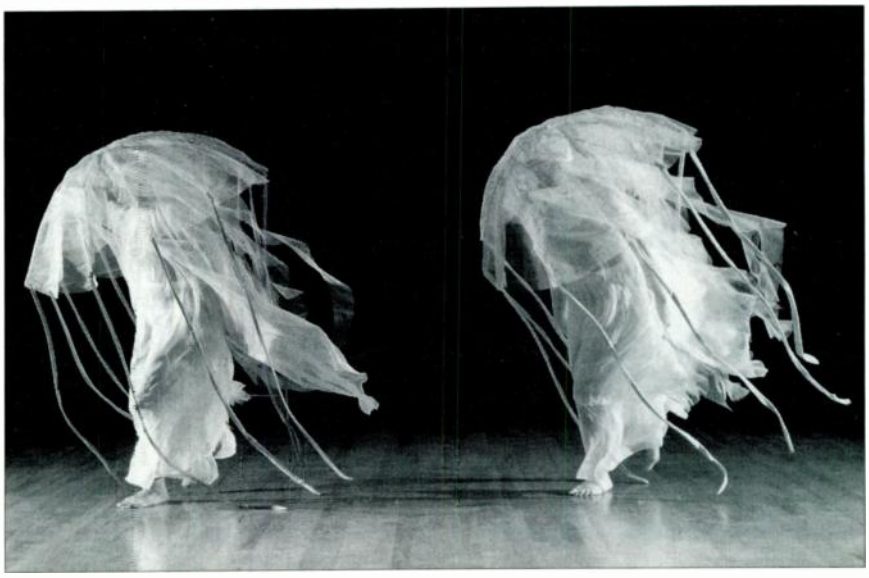
Playback Formats

When the collaboration between music and movement bears fruit, and a piece is completed, the score must find its way from your home studio to the performance space. It's not as easy a journey as you might think.

Local theaters offer a wealth of experiences, but exquisite sound usually isn't one of them. Audio gear is a low priority for dance companies struggling to survive on meager budgets, so most performance spaces are equipped with tired analog 2-tracks or cheap cassette decks. Believe me, few creative disappointments can match hearing your carefully recorded score played through a bad sound system from a cassette master. To help composers brace themselves for the inevitable, here's a list of playback formats used at different levels of the dance arts.

Cassettes. Small dance companies often use cassettes because they're cheap and easy. A choreographer can lug a boom box to a rehearsal studio and have an "instant" (and inexpensive) sound system. In addition, most performance spaces catering to new and developing companies don't pull in enough revenue to warrant high-tech audio installations. What you usually get is a consumer-quality cassette deck amplified by a home stereo system. Don't be shocked, just deal with it. Use superior quality, high-bias tape, and record signals as hot as possible to diminish audible hiss. I've found that recording with Dolby is risky: Many house playback decks don't have noise reduction, or the Dolby circuitry is so out of alignment that it adversely affects audio quality. If you're as finicky as I am, bring some head cleaner and cotton swaps to the theater and personally clean the deck's heads before each show.

Reel-to-reel tape. Analog ¼-inch, reel-to-reel tape remains the standard for most of the dance world. Unfortunately, tape speeds are *not* standardized and are often chosen because of time requirements rather than audio quality. For example, a 10-inch reel moving at 15 ips delivers up to 30 minutes of playback time. If an uninterrupted dance piece is 40 minutes long, the sonically inferior 7½ ips tape speed is your only option. To add to the frustration, many theaters still use semipro 2-track decks that only accommodate 5-inch reels running at 7½ ips. If the program time is under 30 minutes, I typically make two masters for each score—15 ips on a



Phil Freihofner's gamelon-influenced score for Zig Zag Theatre mirrors the company's use of dancers as "living puppets."

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10-inch reel and 7½ ips on a 5-inch reel—to ensure the tapes can be played just about anywhere.

Using high-output tape, such as Ampex 499 and 3M 996, improves sonic quality at both tape speeds by diminishing audible hiss and allowing wider dynamic ranges to be recorded. (Although soft passages still exhibit too much hiss for my taste.) You may also be asked to splice paper leader tape between musical sections to help the soundperson cue the tape to onstage action.

DAT. Falling prices have finally allowed DAT recorders to trickle into the dance community. Lines Contemporary Ballet recently purchased a Panasonic SV-3200, and the sparkling new Center For The Arts at San Francisco's Yerba Buena Gardens boasts two Sony PCM2700A DAT recorders. (Sound was such a high priority for the theater's designers that they also installed Meyer loudspeaker systems, a Yamaha PM 3000-32 mixing console, and Yamaha REV5 and SPX900 multieffects processors.)

However, don't expect every dance company to embrace DAT. Many sound technicians favor the ease and security of visually cueing leadered analog tapes. Also, reel-to-reel transports stop and start on a dime, which isn't the case with DAT transports. The momentary lag before the DAT's rotary transport kicks into action is often just long enough to blow a cue. (To minimize the delay, tell the soundperson to hit Pause between musical sections—so that the DAT tape remains wrapped around the rotary head—instead of

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Yamaha QX5 hardware sequencer
Yahama DX7
Yamaha DX7IIS
Alesis QuadraVerb (3)
dbx 150x noise-reduction system
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Tascam M-30 8 × 4 × 2 mixer

fully disengaging the tape by pressing Stop.) Another drag is the fact that companies using DATs often must cart their deck from show to show, because many theaters don't supply a house DAT machine.

The future. When prices for CD recorders drop into mass-market territory (under $700), the digital revolution should really overrun the dance community. After all, CDs make almost perfect performance masters. They sound great, offer more than 60 minutes of program time, and play back selections almost instantly (no more missed cues due to ornery tape transports). In addition, virtually *everyone* owns a CD player, so if a theater doesn't provide a house deck, someone in the company can simply bring their home or portable machine to the show. Although MiniDiscs could also be a boon, they aren't as wide-spread or familiar as CDs. (If you're interested in using the MiniDisc as a mastering medium, be sure to read "The Digital Debate," in the August 1993 **EM**.)

Good Moves

Squeezing the best possible sound from various playback formats isn't the only way to ensure that your masterpiece wows the audience. Following are some sonic tricks and helpful hints that I've picked up from years of theatrical sound design.

Mix to digital. Although a dance company may require reel-to-reel or (ugh) cassette copies of your final composition, your personal master tape should always sound absolutely pristine. For me, there's no contest: Digital mixes are it. Not only is digital resolution sparkling, it's *clean*. A DAT master also allows you to make "direct-from-digital" performance or safety copies in any tape format that the company requires.

Consider the space. Most theaters and performance spaces are chock full of reflective surfaces: wood floors, metal lighting rigs, concrete stairwells, and high ceilings. In short, you're not mixing for the average cushy living room. Go easy on reverb and delay effects, or the natural ambience of the theater will turn your masterpiece to mush. If possible, visit the space to test room acoustics first hand. Have someone clap their hands from the stage while you move around the audience area, or ask a technician to play a tape through the house sound system. Take note of decay times and the room's general ambience, then mix accordingly. As a rule, dry mixes fare better than signal processing extravaganzas.

Think big. The theater is a visceral experience, so don't be sonically timid. Make sure that your tape's high frequencies snap across the rafters, while the low frequencies shake the seats. I always re-EQ my final mixes when I make performance masters to increase aural impact. A typical enhancement is boosting 5 to 10 dB at 100 Hz and boosting 3 to 5 dB at 7.5 kHz. Clarity is the key, of course, so don't muddy the mix with excessive bass or sabotage it with hurtful mids. However, a few careful EQ tweaks can really help your score leap out of the sound system.

Jazz legend Pharoah Sanders (left, with choreographer Alonzo King) wanted to capture the "spirituality" of the dancers in the piece he composed for Lines Contemporary Ballet.

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Use compression. If your composition employs vast dynamics, consider compressing the stereo master during mixdown. A relatively consistent overall level allows the soundperson to set softer passages at a volume where the dancers can hear their musical cues, without running the risk of loud sections blowing the audience out of their seats. I always compress masters as a courtesy to the performers. I've heard too many dancers complain that they missed an entrance because the score was practically inaudible.

Make safety copies. Performance masters often travel all over the world and are handled (and mishandled) by countless house soundpersons. It's a given that someone will lose, maim, or completely destroy the performance tape just minutes before the curtain rises. Because of these inevitable disasters, never let a client leave your studio without at least one safety copy of your work.

Final Curtain

The great thing about composing for dance is that all sins are forgiven when the curtain rises. The goose bumps that ripple across your body upon hearing the first few notes of your score blossom into the theater are ample compensation for any frustration or creative compromise.

And onstage, as the dancers draw their lines under bursts of light, there's no question that the union of music and movement is truly a marriage made in heaven.

"Music is thought made audible, and dance is thought made visible," says choreographer Alonzo King. "Music and dance are interwoven and inseparable."

(Special thanks to Michelle Goodman, Pam Hagen, David Hyry, and Robert Rosenwasser.)

Although **EM** *editor* **Michael Molenda** *is married to an exquisitely beautiful ballet dancer, her graceful movements have not rubbed off on him. (He remains a deluxe clod.)*

SONY

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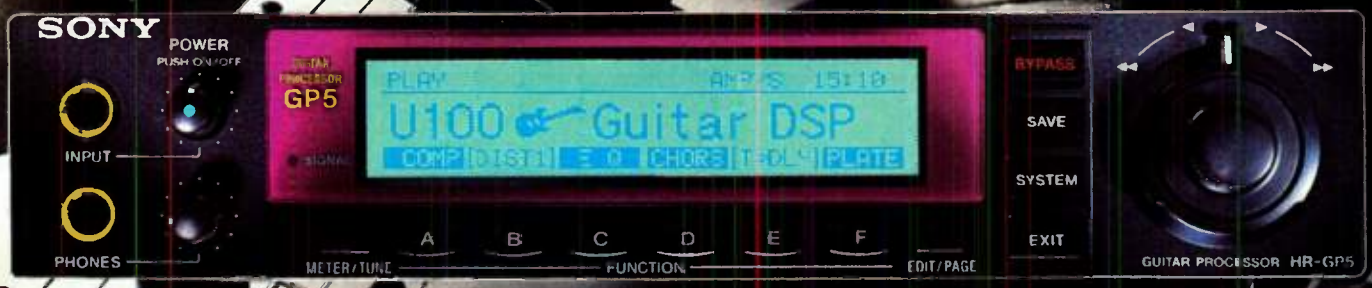

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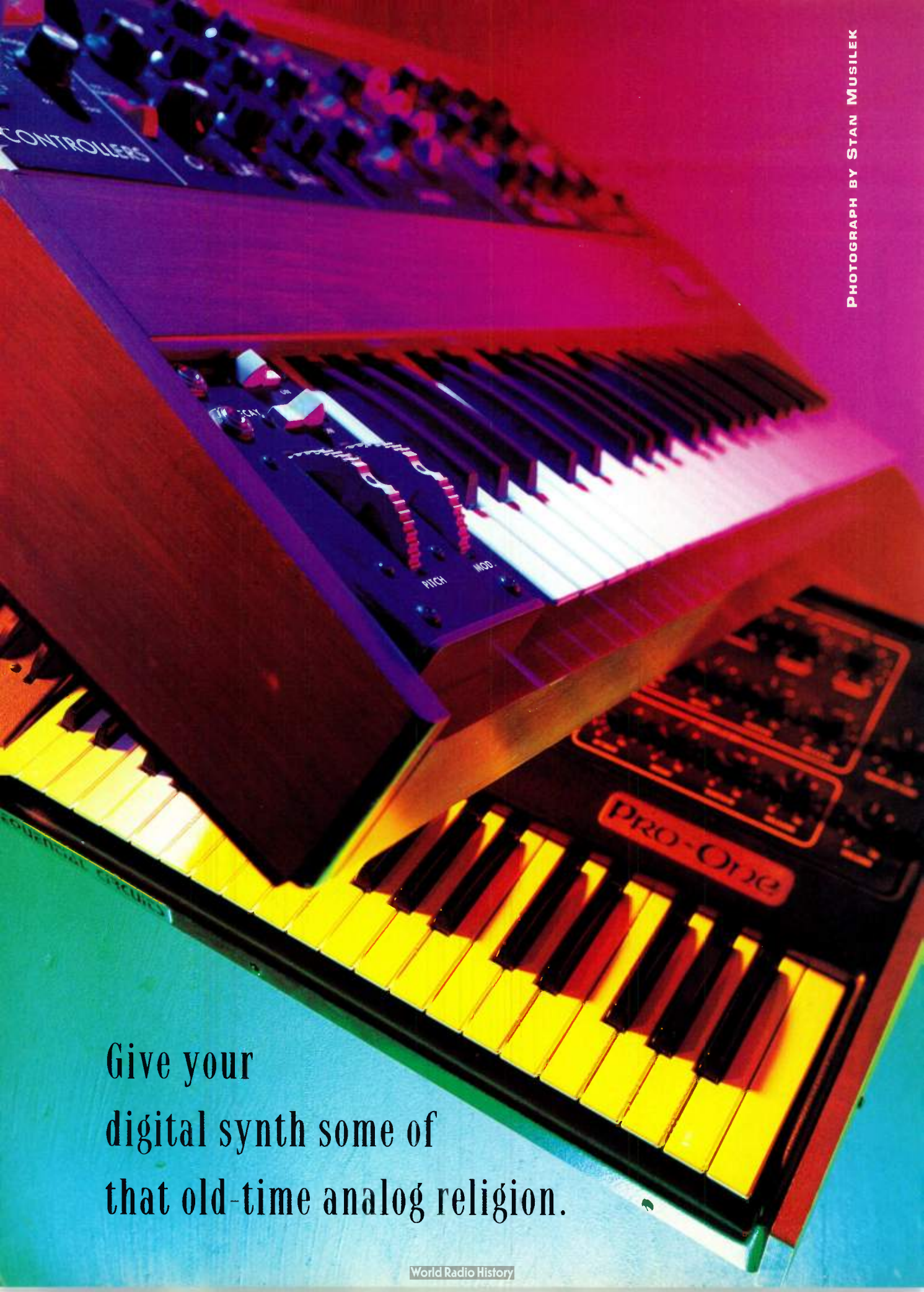

Photograph by Stan Musilek

Give your digital synth some of that old-time analog religion.

The Grand Illusion

WHAT'S OLD IS NEW. WHAT GOES AROUND COMES AROUND. THESE ADAGES RING TRUE when it comes to analog synths. The last few years have seen a marked increase in interest toward older synth technologies, with new manufacturers re-creating analog synth designs from yesteryear. The reason for this newfangled interest in older designs comes down to one important factor: sound.

Analog technologies had a particular sonic characteristic that many describe as warm, rich, and full. Many feel this richness is missing from digital synthesizers, and they're right. The older synths displayed a certain roundness and fullness the new synths just can't match. Sure, the analog machines also possessed anomalies that make me glad to have the newer digital synths: glitchy keyboards, dirty switch contacts, oscillator drift, and so on. But they had The Sound.

BY ANDREW SCHLESINGER

You want that sound, but you no longer own an analog synth. What can you do? If you don't want to buy a used dinosaur, you can try to emulate the characteristics of analog gear on digital synths. You'll never really capture the old sound completely, but with the help of a little sonic hocus-pocus, you can create the illusion of analog.

OSCILLATOR WAVEFORMS

To emulate analog synth sounds using digital technology, you must first understand what was offered in the older synths. Let's start with waveforms.

The voltage-controlled oscillators (VCOs) found in most analog synths offer only four waveforms: sawtooth, pulse, triangle, and occasionally sine. Each type of waveform has a distinct harmonic spectrum (see sidebar, "Riding the Waves"). If you want

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to make realistic analog synth patches on a digital synth, start with the right waveforms. This may be the most important factor in creating analog patches with digital synths.

The waveforms sound different from one analog synthesizer to the next, depending on the oscillator design. Most sample-playback machines offer a choice of sampled waves from Prophets, Minimoogs, Jupiters, Oberheims, and other classic synths. If you want to create a sound that is reminiscent of a particular synthesizer, and you have a bunch of waveforms to choose from, try to pick one that comes from the synth you are trying to emulate. If there is no indication as to the source of the waveform, use your ears to pick the one that is in the ballpark. It will make the rest of your task much easier.

DETUNING AND BEATING

One of the most common sounds on analog synths is made by two oscillators producing the same waveform slightly detuned and mixed. The famous solo in Emerson, Lake & Palmer's "Lucky Man" is essentially a couple of detuned square waves run through a resonant, lowpass filter (discussed shortly), with some portamento thrown in for good measure.

When you take two oscillators with the exact same waveforms and detune them, the relative phase of the waveforms changes, creating a "beating," or

RIDING THE WAVES

The basic, periodic, audio waveforms found in most analog synths are sawtooth, triangle, pulse, and sometimes sine. Each of these has a distinctive harmonic content, which can be expressed mathematically.

The sine wave is the fundamental building block of sound, in the literal sense. That is, a sine wave contains only the fundamental frequency, with no harmonics. A 440 Hz sine wave contains a 440 Hz signal, period.

A positive sawtooth, or ramp, wave exhibits a smooth, linear rise from its lowest to highest level and then drops almost instantaneously back to its lowest level. A negative sawtooth wave (instantaneous rise and smooth, linear fall) has the same harmonic content as a positive sawtooth. Sawtooth waves contain the fundamental frequency, as well as even and odd harmonics, producing a characteristic "buzzy" sound that is great for strings and brass.

Triangle waves have a linear increase in amplitude value, followed by a linear decrease at the same rate, all of which repeats. This gives them a characteristic triangular shape when plotted over time. They exhibit a strong fundamental with weak, odd-numbered harmonics, which is desirable for flute-like sounds.

A pulse wave is a rectangular waveform that alternates almost instantaneously between high (positive) and low (negative) amplitude values. Its duty-cycle is the ratio of the pulse wave's positive period, or pulse width, to its full cycle. Three different pulse waves are shown in **Fig. A**. The first is a 1:2 (50%) pulse wave, also called a square wave. The wave is positive half of the time. Each half of the cycle is the same, so the waveform looks square. Square waves are often used for clarinet-type sounds.

The second waveform is a 3:20 (15%) pulse wave (i.e., the wave is positive 15% of the time), and the last is a 3:4 (75%) pulse wave, meaning the wave is positive for three-quarters of its cycle.

This is important because the pulse wave's harmonic content depends on its duty cycle; specifically, the denominator of the duty-cycle fraction. For example, in a square wave, the duty cycle is 1:2, and every second harmonic has an amplitude of zero; thus, a square wave contains the fundamental and all odd-numbered harmonics. The 3:20 (15%) pulse wave is missing every twentieth harmonic, and the 3:4 (75%) pulse wave is missing every fourth harmonic. (The latter pulse wave contains the fundamental and the second, third, fifth, sixth, seventh, and ninth harmonics, and so on.) Therefore, a 1:20 (5%) pulse wave and a 3:20 pulse wave have the same harmonics, although the amplitudes of those harmonics are different.

In most analog synths, you can change the pulse wave's harmonic content by changing its duty cycle over time, a process called *pulse-width modulation*. This lets you create a rich, harmonically changing waveform, the only such waveform that is available (for the most part) on traditional analog synth oscillators.

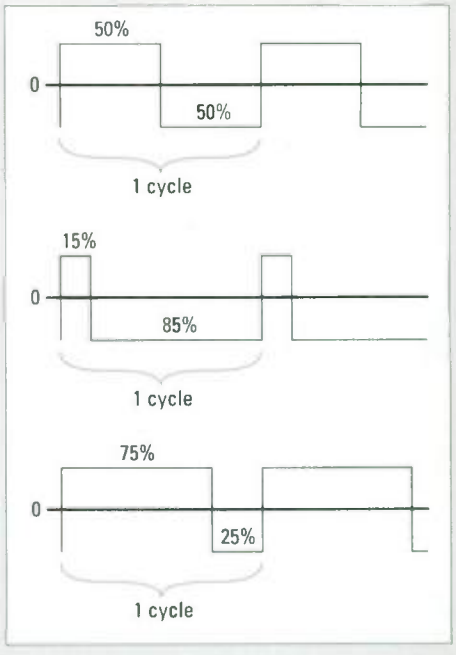
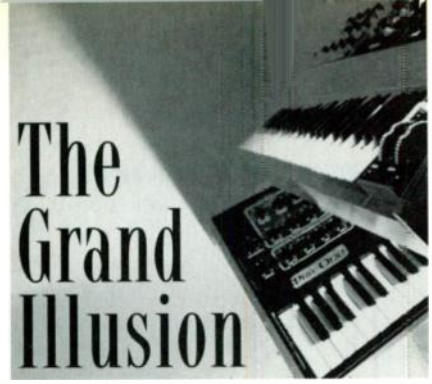


FIG. A: The duty cycle of a pulse wave is the ratio between its positive period (pulse width) and its full cycle. A pulse wave's harmonic content depends on its duty cycle, so modulating the pulse width alters its timbre.

Except for the pulse wave, the classic waveforms are static; there is no harmonic movement or change in harmonic content over time. They sound the same whether you start playing them in the beginning or middle of their cycle. In contrast, samples of real instruments change over the duration of the sample.

—Steve Oppenheimer and Andrew Schlesinger



chorusing, effect over time. The greater the detuning, the faster the beating and the greater the chorusing effect. This is the most common application of detuning. Of course, if you detune them too far, you start hearing two distinct pitches, which is not the effect we're looking for. The chorusing effect is most pronounced if both oscillators use the same waveform. However, mixing different waveforms together also produces interesting results.

There are a few basic methods of detuning. To start out, create a program with two oscillators set to the same waveform. Set the filter cutoff frequency fully open and set the oscillators' outputs to equal levels. Also, set the amplitude envelope to a moderately long sustain, so the sound doesn't decay too quickly.

The first kind of detuning is subtle. Set one oscillator's detune value to zero. Then, detune the other oscillator flat by one or two cents (a minuscule amount). You will hear the oscillators drift out of phase in a slow cycle. This slow beating is good for some Minimoog-type leads and Oberheim OB-X pad sounds, especially when used with sawtooth waves. Try to set up the detuning using the highest note on your keyboard controller; otherwise, when you play high notes, the detuning could become too extreme.

For another type of detuning, take the two oscillators and detune one slightly sharp and the other slightly flat. This gives you a greater chorusing effect, while keeping the pitch a little more centered. You can also add a third oscillator to this example; set its detuning to zero and increase the other oscillators' detuning just slightly. If you use more than three oscillators for a truly fat sound, make sure they are all detuned by different amounts relative to one another. For instance, if you have two of them detuned flat, set one further away from zero than the other.

In the analog world, the oscillator is always "running," and pressing a key simply allows the signal to pass through to the audio output, regardless of where the waveform is in its cycle. If two or more oscillators are detuned, their phase is constantly changing relative to each other, so the patch sounds different each time you press the key.

In contrast, the oscillators in most digital synths play a sampled waveform, which usually starts at exactly the same place in its cycle each time you trigger a note. Unfortunately, this causes the beating cycle to start at the same place each time the key is pressed, which is noticeable with slight detuning. You can regain some of the analog random quality by modulating the sample start point with Velocity.

Be careful about panning. In older analog synths, all the oscillators were mixed to a mono output. Detuning sounds far different if you pan one oscillator to the left and the other to the right. The further apart they are, the more detuning is necessary to achieve the same effect (although this can be useful). To achieve realistic analog emulation, keep both oscillators panned

center. If you modulate the pan position, do it equally for both oscillators. Alternatively, create the whole patch in mono, panned hard left or right in the digital synth, and set the overall pan position in your mixer.

This brings up another important point. In most hard-wired, monophonic, analog synths (including the Minimoog, Sequential Circuits Pro-One, and ARP Odyssey), the signal chain consists of one to three oscillators that are summed in a mono mixer and routed through one voltage-controlled filter (VCF) and one voltage-controlled amplifier (VCA). (Of course, in modular synths, you could set up the signal routing any way you liked.)

In contrast, digital synths are polyphonic and have a signal chain in which each polyphonic voice has its own oscillator with a dedicated filter, amp, envelope generators, etc., all of which feed into a stereo output bus. (A few later, polyphonic, analog synthesizers also have this architecture.) If you are trying to re-create analog synth patches with this architecture, it is important to make consistent edits to the corresponding parameters in each signal chain, so that the sounds of the various chains are all pretty much the same.

MODULATION

Oscillator modulation can also help add an analog feel. Because most analog oscillators are not as stable as their digital counterparts, the pitch tends to flutter a bit and drift slightly in and out of tune. There are several ways to re-create this effect.

The first way is to use a little noise to modulate the pitch of one (or both) of the oscillators. By definition, noise is a random waveform, so you can use it to emulate random oscillator drift. It is important to use just a tiny amount of

ANALOG SOUND BITES

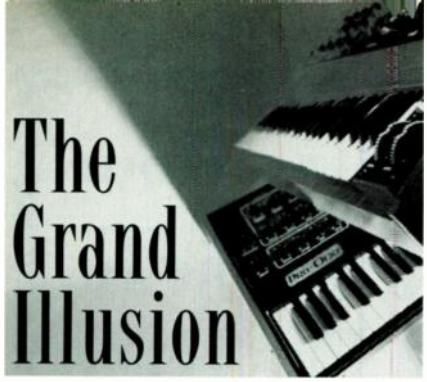
Here are some general tips that you can try on your synth.

Pads. Use one or two sawtooth oscillators or pulse-width modulated waves—better yet, try one of each—with a reasonable amount of detuning between them. Set slow attack times and medium release times on the filter and amplitude envelopes. Use little or no resonance on the filter, and set the cutoff about one third of the way between fully closed and fully open. Apply a little envelope modulation to the cutoff; medium-slow attack and release times work best. In addition, remember to use a gate-type release on the amplifier envelope, as you generally want the sound to sustain for as long as you hold the key.

Clav/comping sounds. For analog clav sounds, stick to pulse waves of less than 45% (try 25%). Otherwise, you end up too square. (Dig?) Set sharp attacks on the filter and amplitude envelopes, with a medium decay to zero on both. The decay time determines the sound's length as it dies away. Use a very short release time on both envelopes. Set the filter to a low cutoff, with a healthy amount of envelope modulation depth. Add a little resonance if you want to accentuate the filter's effect. For other comping sounds, use sawtooths or a mixture of saws and pulses, along with some pitch envelope modulation to fatten things up. Be careful about the amount; keep it subtle.

House sounds. Use a single sawtooth wave, with other settings about the same as in the clav/comping patches. A bit more resonance is commonly used. If you have a multiple signal-chain unit, add a second oscillator tuned an octave below the first, set to a triangle, sine, or thin pulse wave, with a similar filter setting, but no resonance.

Leads. There are too many variations to get very specific. Keep your release times short; otherwise, your licks will get messy when you play fast lines. Use low filter-cutoff settings with a lot of envelope modulation, short decay times, and approximately 50% sustain levels. Resonance levels are variable; set them to your taste. Pitch-envelope modulation is very effective; just remember to adjust your decay times to the speed of your playing, so it doesn't sound out of tune when you play fast. Set the sustain on your pitch envelope to zero.



The Grand Illusion

noise, just enough to cause the pitch to waiver slightly. In most cases, you don't want to tie up your only LFO for this kind of modulation, especially on lead patches that rely heavily on vibrato, so it's better to try this effect if your synth has more than one LFO to modulate the pitch.

Most LFOs on newer digital synths offer a random pattern or noise waveform. You can also use a triangle or sine wave, but this will yield more predictable (thus, less realistic) results. Set both oscillators with no detuning, set the LFO to a slow rate, and if possible, turn off the LFO's key sync. (Defeating the LFO key sync allows the LFO to run freely and not restart at the same place in its cycle each time a key is struck.) Then, increase the depth of the LFO to modulate one audio oscillator's pitch until you hear it go just slightly in and out of tune relative to the other oscillator. Next, detune the oscillators a little bit. When you play, you will get a slight pitch randomization along with the detuning, which adds depth and animation to the sound.

If you have individual LFOs for each voice, rather than a global LFO, set the LFO rate and depth (frequency and amount) to slightly different values for each voice. In addition, try a positive LFO depth on some voices and a negative depth on others. Be careful, though, as too much variation in modulation depth can cause excessive detuning. Use your ears; when the pitch is wavering too much, reduce the depth a little. It's important to note that the perception of pitch and detuning is different on headphones than on speakers, so be sure to check your sounds with both.

Some synthesizers (e.g., the Yamaha DX7II and Roland JV-80 and JD-990) offer a pitch-randomization parameter, as well as an "analog feel" parameter that adds a controllable amount of randomization to each voice whenever a key is struck. This yields similar results to the LFO techniques described previously by adding the random quality characteristic of analog machines.

Another common type of pitch modulation in analog synth sounds uses an envelope generator (EG). That classic Oberheim Toto synth-brass sound is a perfect example of EG pitch modulation, and it is available on virtually all digital synths in some form. Using the previous dual-oscillator example, detune one oscillator slightly flat and the other slightly sharp. Then, determine which envelope is available for pitch modulation; usually an EG is dedicated to pitch. If not, you may have to give up using an envelope for the filter, or use one envelope to control both the filter and amplitude.

Apply the pitch envelope, going in a negative direction, to the oscillator that is tuned flat. This forces the pitch to go flatter and settle back at the preset detuned pitch. Set the envelope to a fast attack and a medium-fast decay, with no sustain and a medium-fast release. You'll have to set the depth of pitch modulation and the speed of the envelope by ear; the exact settings depend on how fast you want to play. The faster you play, the faster the envelope decay should be. If the envelope is too slow, your patch will sound out of tune when you play quickly across the keyboard.

If you are using more than two oscillators, and you have a separate pitch EG for each oscillator, experiment with applying EG pitch modulation to each oscillator. Use slightly different depth amounts and different decay rates for each oscillator. This can create an awesome, fat program, especially if you apply some pulse-width modulation to the oscillators.

Sequential Circuits' Pro-One has a classic hard-wired mono synth architecture. Two VCOs are summed in a mono mixer and routed through a resonant filter and VCA, each with dedicated, 4-stage envelope generators.

PULSE-WIDTH MODULATION

Pulse-width modulation (PWM) is a great way to create classic, fat, analog synth patches. Unfortunately, the Kurzweil K2000 is the only available digital synth that can do this, as far as I know. Although the K2000 performs it in a unique way, using software, the audible results are true to the analog version, and you have a great degree of control.

Modulating the width of a pulse waveform with an LFO dynamically alters the waveform's harmonic content. The speed at which pulse-width modulation occurs is important. If it changes too quickly, the patch will sound out of tune; if it changes too slowly, the effect can be too subtle. Here's a rule of thumb: Set the LFO speed using the lower octaves and, if possible, set it to track the keyboard, so the LFO speeds up as you play further up the keyboard. The higher registers can withstand faster modulation without sounding out of tune. You should also note that it's best to use a separate LFO for pulse-width modulation so you don't tie up your vibrato LFO.

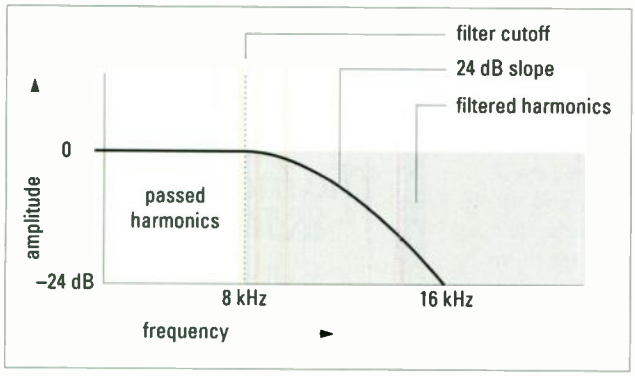


FIG. 1: In a lowpass filter, frequencies below the cutoff point are passed without attenuation. In a lowpass filter with a 24 dB/octave slope, the frequencies above the cutoff are attenuated such that harmonics one octave above the cutoff point are 24 dB down from their original amplitude.

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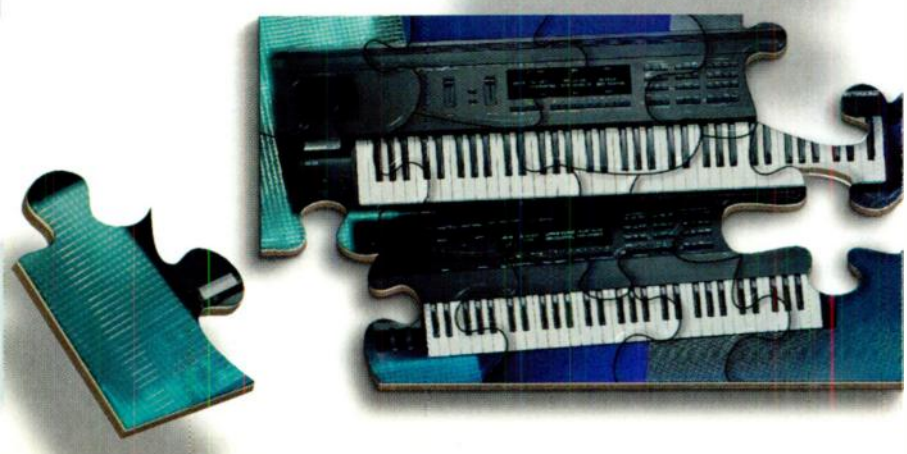

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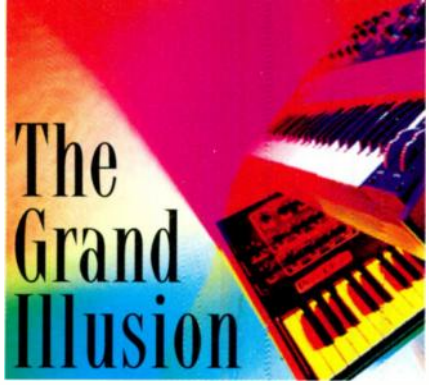

This technique is great for creating rich, lush pads, especially when used in conjunction with some judicious detuning and filtering. Pulse-width modulation also lets you create a fat sound with only one oscillator, and it is a useful starting point for large, fat, bass sounds.

But what if your synth doesn't offer real-time pulse-width modulation? Look in the ROM sample list; you will probably find a sampled pulse-width modulated waveform. It's not as good as having control over the real thing, but it can still be useful. Many of these samples are already scaled to sound great across the entire keyboard. In addition, you can often simulate pulse-width modulation using a square wave and hard sync.

HARD SYNC

Hard oscillator sync is a classic analog technique that was more or less defined by the Cars' "Let's Go!" in the early 1980s. In simple terms, hard sync causes a second oscillator to restart its waveform cycle according to the frequency of the first oscillator. As you sweep the pitch of the second, "synched," oscillator further from the frequency of the master oscillator, you hear its harmonics shift and sweep, while the fundamental frequency remains locked to the pitch of the master oscillator.

Some recent digital synthesizers can sync oscillators in this manner. The Kurzweil K2000, Roland JD-990, and Korg Wavestation do real-time sync sweeps using any two sampled waveforms. This offers a lot of possibilities, but if you want to emulate analog sounds, stick to the tried-and-true sawtooth, pulse, triangle, and sine waves.

You can also fake the sync sweep effect. Some digital synths have sync sweeps as samples in ROM. The new Alesis QuadraSynth is a good example; sync-sweep samples are available in several different versions, including a Velocity cross-switched version. The E-mu Vintage Keys offers similar samples. Although not as versatile as having

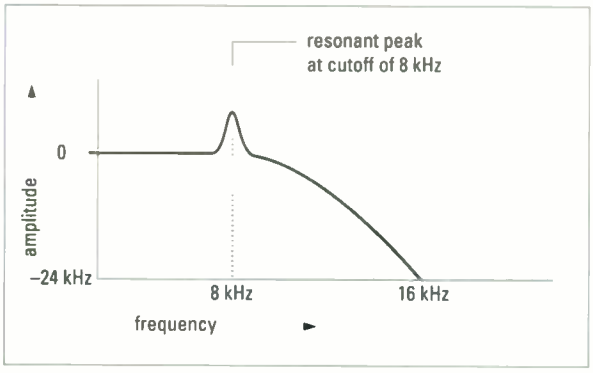

FIG. 2: The output of a resonant filter can be fed back into the input, creating a peak that emphasizes the frequencies near the cutoff point (in this case, 8 kHz). As the resonance is increased, the emphasis of these frequencies is increased.

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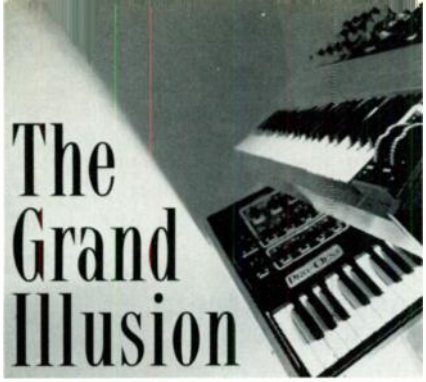


real-time control over the sweep, it does provide a reasonable emulation.

In the Korg 01/W series, you can emulate sync sweeps using the waveshaper, which changes the initial waveform in a wide variety of ways. Set one oscillator to play a sync-like sample and another oscillator to play a simple waveform. Add the waveshaper to the second oscillator with a sweep time that is similar to the sweep in the first oscillator. Adjust the balance of oscillator 2 so you hear it adding a bit of sweep to the original sound. Although this is not as good as the real thing, it approximates the essence of the sync sound.

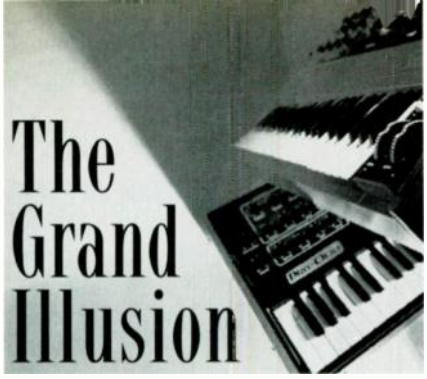
FILTERS

An analog filter has a cutoff parameter that determines the frequency above or below which the sound becomes attenuated. In a lowpass filter, frequencies below the cutoff frequency are passed, and the frequencies above the cutoff are attenuated. The farther above the cutoff frequency, the greater the attenuation. A highpass filter performs in the opposite way; frequencies above the cutoff are passed, and frequencies below the cutoff are attenuated.

Oberheim's Synthesizer Expander Module (SEM) is difficult to emulate because of its state-variable VCF, which can act as a highpass, lowpass, or bandpass filter.

The most common analog filters employ 2-pole and 4-pole designs, with 12 dB/octave and 24 dB/octave slopes, respectively. In a lowpass filter, the slope determines how quickly the filter attenuates the frequencies above the cutoff. With a 24 dB/octave slope, for example, the harmonics that occur one octave above the cutoff are attenuated by 24 dB with respect to their natural level (see **Fig. 1**). As a general rule of thumb, the greater the slope of the filter, the more pronounced the sweep effect will be as the cutoff point is moved across the frequency spectrum.

The resonance of a filter is extremely important. A lowpass filter set to a cutoff of 8 kHz, with a resonant peak, is shown in **Fig. 2**. When you increase the resonance of a filter, you are feeding the output of the filter back into the input, which creates a "peak" at the cutoff frequency. The harmonics that occur near the cutoff frequency are caught in this peak and emphasized. (Remember that the greater the harmonic content of the oscillator waveform, the greater the filter's effect).



The Grand Illusion

The greater the resonance, the greater the emphasis of these frequencies, and the stronger the filter's effect. If you raise the resonance high enough in an analog filter, it begins to oscillate by itself. In some analog synths, therefore, you can use the resonant filter as an extra oscillator. In any case, be careful about amplitude levels with highly resonant sweeps.

For the most part, a resonant lowpass filter is the most commonly used filter in analog synths. The Minimoog has a 24 dB/octave lowpass filter with resonance. On the other hand, one of Oberheim's first products, the Synthesizer Expander Module (SEM), has a multimode filter network that can be set to perform lowpass, highpass, or bandpass duties. It also allows you to combine the highpass and lowpass sections to form a notch filter with a 12 dB/octave slope.

If you are creating a mellow pad, try using very little resonance and set the filter cutoff to a medium value, attenuating some of the higher frequencies. You can use a fairly high resonance setting, a moderately low cutoff, and no envelope modulation to emphasize a particular harmonic and create good organ sounds.

In contrast, if you want a good analog lead sound or house bass, try a decent amount of resonance and sweep the filter rather drastically with an envelope. Experiment with a harmonically rich waveform, such as a sawtooth, and gradually increase the resonance to hear how your particular filter responds. Quite a few of the newer synths (e.g., the Roland JV/JD series; Kurzweil K2000; and E-mu Vintage Keys, Morpheus, and UltraProteus) have resonant digital filters that can effectively approximate the sound of older analog filters.

One of the best machines for emulating analog sounds is the K2000, with its fully controllable and configurable filters. For sheer versatility and filtering power, no other digital synth comes close. You can choose among many lowpass and highpass filter algorithms with varying degrees of preset resonance and modulatable resonance. You can also program various algorithms to have more than one filter, and you can mix their outputs. This allows you to re-create simulations of many vintage synths, including the SEM's mix of lowpass and highpass filters.

Keep in mind that digital filters don't sound very good when overloaded, and you can get some really horrendous digital distortion if you do. It is often necessary to pad down the input level to the filter, especially if you are using high resonance settings. Not only does this help eliminate distortion, it also makes the sweep of the filter sound better.

FAKING IT WITHOUT RESONANCE

There is no way around it: If you want to do a full range of convincing analog emulations, you need a resonant lowpass filter. Sure, you can do nice pad sounds and mellow sweeps with nonresonant filters, but to get down to the nitty-gritty, totally variable, analog sound, you really need resonance on

WHY DINOS SOUND THAT WAY

The first popular, compact synthesizers to arrive in quantity came from ARP and Moog. In general, the technology of the burgeoning "portables" derived from the companies' earlier, modular gear, with several innovations. But the design philosophies and relative strengths of the companies were quite different.

In designs such as the much-loved Odyssey, ARP proffered highly stable, clean-sounding VCOs and a similarly clean, laboratory-type, lowpass VCF with a fairly gentle, 12 dB/octave slope. The Odyssey also included somewhat simplified envelope generators, a sine-wave LFO, and performance controls that—in early models, at least—were anything but ergonomically designed.

Moog, in designs such as the classic Minimoog, countered with less stable, less clean, but more sonorous oscillators and a ballsy, soon-to-be-famous, lowpass VCF with a steeper, 24 dB/octave slope and an input stage purposefully designed to be overdriven. These elements were joined by reasonably complex envelope generators, a third VCO that could be used for audio or as a not-too-clean LFO, and precedent-setting performance controls in the form of pitch and modulation wheels, which would be copied by countless manufacturers.

The combined, disparate characteristics of each synthesizer provided distinctive, instantly recognizable timbres. The Odyssey produced gentle, smooth, open sounds, and the Minimoog offered subterranean bass and screaming lead patches.

Later designs from ARP began to blur these timbral distinctions and culminated in the Chroma Polaris (produced by Fender after ARP's demise), a hybrid polyphonic synth with a warm, sometimes Moog-like, but potentially generic sound. Moog, in contrast, propagated the Minimoog legacy in almost every subsequent design. The company's final glory was the 18-VCO, hybrid, polyphonic Memorymoog. Despite the loss of some sonic individuality through the use of integrated-circuit VCOs, VCAs, and envelope generators, it retained the classic Minimoog filter, based on transistors, and much of the classic sound.

An interesting aside concerns the parallel development of the Oberheim synths, which derive from a reverse-engineered and unwieldy family of early polyphonic instruments designed around (literally) the company's stand-alone Synthesizer Expander Module, or SEM. SEMs incorporated state-variable filters in an innovative and versatile overall scheme that was revered by users.

Subsequent, more integrated designs, such as the fabled OB-X, featured a simplified architecture. Yet, to a large extent, the company tailored the instruments for the most frequently used sounds, such as the famous brass and pads, and created a classic sound in the later designs that was a euphonious compromise between ARP clarity and Moog warmth.

—Alan Gary Campbell

the filter. However, if you simply have no choice in the matter, you can do some decent emulations of resonant-filter effects using the right PCM samples and a nonresonant filter.

Some manufacturers, such as Korg, Ensoniq, and Alesis, do not offer resonance on their filters. Instead, they generally include PCM samples of filter sweeps. Starting with the VFX, Ensoniq gear has Transwaves, which let you sweep through a PCM wavetable that includes a collection of little filter-sweep samples. As you sweep through the wavetable with an envelope or LFO, you get a pretty good approximation of a waveform through a resonant filter. This can be effective in creating filter-sweep sounds.

Try sweeping the nonresonant filter at the same rate as the PCM sample or Transwave for a more convincing real-time analog effect. Again, it is not as good or as versatile as having the real thing, but at least you can fake it. Choose one of the resonant or swept PCM samples and then add additional real-time filtering using the nonresonant filter.

DIGITAL'S COLD HEART

If you stick to analog-type waves and use two or three oscillators with a resonant lowpass filter, it will be difficult not to sound at least vaguely analogish. But what about the "warmth" factor that was so much a part of the old analog sound? Today's synths use digital emulations of analog filters that are created in software or contained within a sound-engine chip. This is very different from a bunch of transistors and resistors soldered to a circuit board, and the resulting products just don't sound as warm.

One easy way to put back some of that warmth is to run the output of your synth through an analog tube preamp, which adds a whole new dimension to the sound. Tubes are legendary for their warm, liquid tone, and there are many, relatively inexpensive, tube-based direct boxes and instrument preamps that add the warmth and even-harmonic distortion our ears find so pleasing. No, it is not quite the same as having a real analog machine, but it sure helps you fake it.

One thing I should mention is the new Peavey Spectrum Analog Filter. This stand-alone, programmable, MIDI-controlled, Velocity-sensitive, analog,

Minimoog-type filter has variable resonance and a programmable EG. Its internal mixer has a programmable VCA with a dedicated, programmable EG. For a superior analog synth emulation, run your digital synth's audio output, with the filters wide open, through Peavey's device. Because it is a monophonic filter, it affects all the notes at the same time, but it works great.

SWEEPING STATEMENTS

In most digital synths, it is possible to produce distortion if you turn things all the way up, and it doesn't sound pretty. It is always a good idea to back the levels down while you are programming and play full chords to see if it is clipping. If not, boost the outputs of the oscillators and play some more until you get the sound to clip, then back off a bit. This helps optimize the signal-to-noise ratio by letting the processor operate at its maximum level without overloading.

I mentioned this point earlier, but it's worth repeating: Remember to make all your changes to each signal chain so that each one sounds identical, except for the detuning and oscillator settings. If the various filters have discrepancies in their cutoffs, envelopes, and resonance characteristics, the sound won't gel as a whole, and it will lose a lot of its strength as an analog emulation.

Although I used the K2000 for many of the examples included here, these patches can be made with most of today's machines. Obviously, every machine has strengths and weaknesses, but all of them can do fairly good imitations of analog sounds. With practice, I think you'll be surprised at how well you can create the grand illusion.

(Special thanks to Alan Gary Campbell and Charles R. Fischer.)

Andrew Schlesinger *is a professional synth programming gun for hire who has designed sounds for all the major synth manufacturers.*

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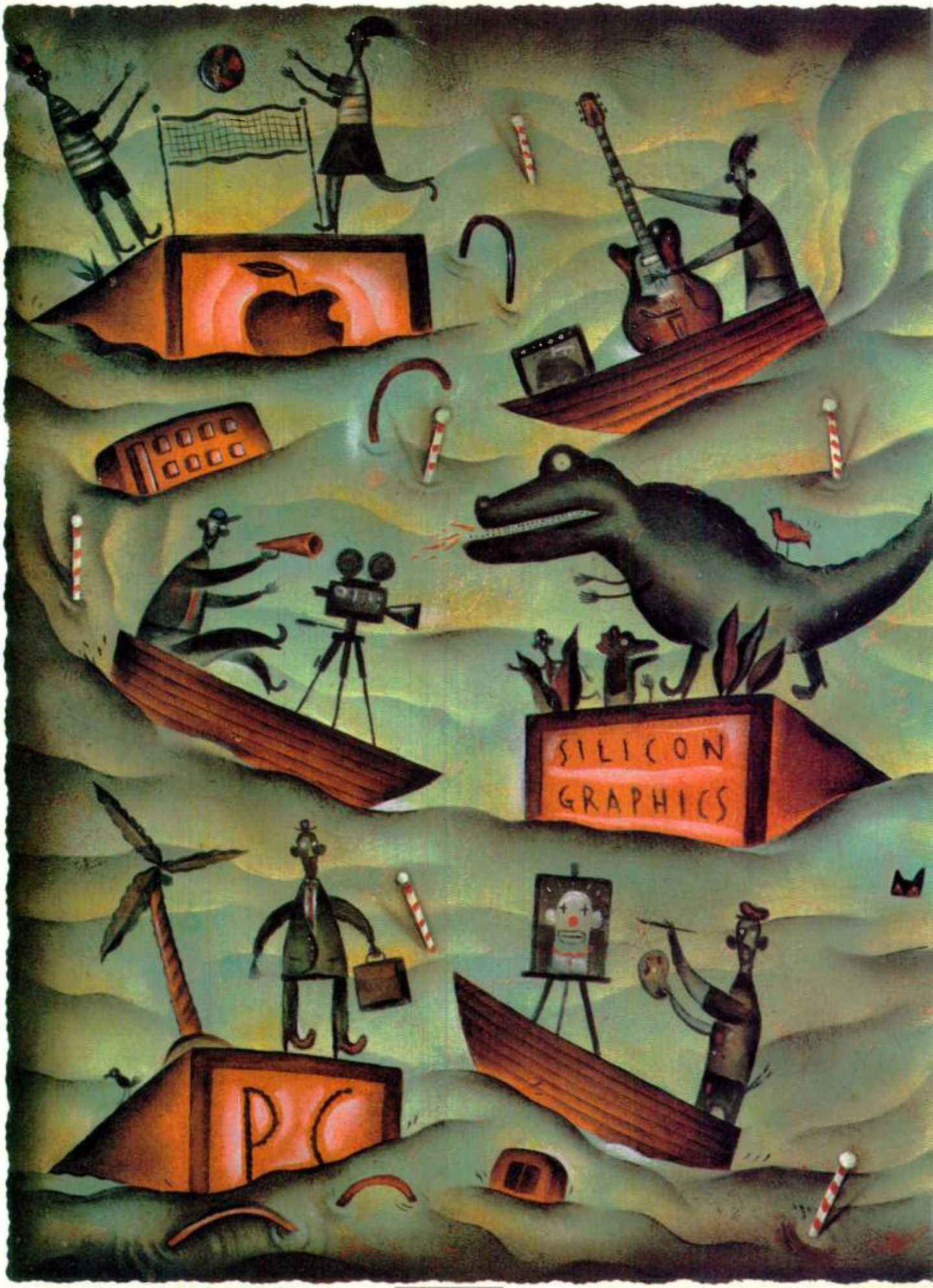

By Michael Brown

Open Borders

There's an old joke that goes "Standards are great! There are so many to choose from!" Jokes notwithstanding, standards *are* great. Imagine the chaos and expense we would have to endure if every synth used a different protocol to communicate with a computer, or if every tape deck used a proprietary tape format. Standards are beneficial because they enable us to create using a variety of tools, whether the tools are musical instruments, computers, tape decks, or software.

However, standards are definitely a double-edged sword. They typically provide a compromise solution that eventually serves to impede the development of new technology. Each time we endorse a new standard, we effectively kill off a whole host of alternatives and quash—or at least delay—the research necessary to develop others. We hope the standard on which we settle is exceptional in every way, but in reality, each alternative we reject is a superior solution in at least one respect.

When technology takes a step forward, the standards that once set us free now hold us back. Eventually, we end up creating a new standard that takes the new technology into account, but once a standard becomes entrenched, it's difficult to discard. That is how we end up with so many of them.

No matter how well formulated, standards are limits. We love them because they provide flexibility and protect us from obsolescence; we hate them because they box us in and impede the advance of technology.

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NEVER SAY NEVER

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Avid Technology, a Tewksbury, Massachusetts, company that manufactures nonlinear, digital, video-editing systems, developed the Open Media Framework to create a universal file format for digital media. In 1992, they announced OMF Interchange and began soliciting industry support. In essence, OMF Interchange encapsulates each of the files created by digital audio, video, animation, and other software programs into a "super file" that can be understood by any other program that supports OMF, even if the programs involved reside on different computer platforms.

As a standard, OMF Interchange is capable not only of incorporating any existing standard format, but any future standard *and* nonstandard proprietary formats. This last item should be of interest to developers of other nonlinear, digital, video-editing systems, who may worry about embracing a standard that has been formulated by one of their competitors. They (and Avid) needn't fret that if they create a hot new compression algorithm, they'll have to share it with the rest of the industry to be compatible with OMF (see sidebar, "The Naysayers").

OMF Interchange is an implementation of Apple's Bento container format. A Bento container can hold many individual objects, such as pictures, animations, audio samples, etc. By reading the table of contents that appears at the end of the Bento, an application can determine what is in the container and where the individual objects are located. The Bento table of contents makes it easy for the application to quickly locate the specific data it needs.

"The first thing an application would read in an OMF Interchange file is the table of contents," says Avid's OMF Product Manager Greg Clukey. "It can find the objects it cares about and then access them directly, versus having to load the whole file into memory and then search sequentially through all of the data in the file looking for things it recognizes."

In addition to support for Bento, two major characteristics differentiate OMF

INDUSTRY SUPPORT

Since they developed OMF Interchange, Avid has signed on more than 160 "OMF Partners," including Apple Computer, Digidesign, Fostex, Intel, Korg, Lexicon, Passport Designs, Sonic Solutions, and Studer Editech. (Avid defines OMF Partners as "vendors participating in the process of developing and revising the OMF specification.")

Many of these OMF Partners have either built OMF Interchange compatibility into their products or are in the process of doing so. However, membership in the Open Media Framework as an OMF Partner does not obligate a company to build support for OMF into its products. OMF Partners who do pledge to support Open Media Framework in their products are eligible to become OMF Champions.

The most widely adopted standards are those championed by the people who are most affected by them. Not wanting to leave anything to chance, Avid recruits studios, universities, broadcasters, corporate A/V centers, and others to become OMF Sponsors. Avid describes Sponsors as "digital media users who share the vision of digital media interchange and are actively encouraging vendors to integrate OMF Interchange" into their products. So far, Avid Technology has signed on 175 OMF Sponsors, including Lucasfilm, Ltd. and NBC.

Interchange from other "universal" file formats. First, OMF Interchange is a true *multimedia* file format. When you think of a file, it's usually an audio, graphics, or video file. However, application software that supports OMF Interchange can produce a file that encapsulates all of those types of data *plus* such information as EDLs (edit decision lists), CG (character-generator) titles, animations, and so on. With OMF Interchange, you have a single, integrated file to work with.

The second unique characteristic of OMF Interchange is its platform-independence. For example, a sequence of digital video created on a Macintosh and saved in OMF Interchange format can be passed to a *Windows* machine for audio sweetening on a digital-audio workstation (DAW), then passed to a Silicon Graphics workstation for adding a segment of computer animation, and then passed back to the Mac for final editing and printing to tape.

IGNORANCE IS BLISS

Applications can support OMF Interchange even if they can't support all the objects contained in the OMF Interchange file. If an application finds objects in the table of contents that it doesn't recognize, it ignores those objects. For example, a DAW may have no need to understand the video overlay component of a video production, so the DAW simply ignores that aspect of the file.

An OMF Interchange file can contain three categories of digital data: common, public, and private. All OMF-compliant applications are capable of reading the common data types for which they are suited (see the table on p. 72). For example, all OMF-compliant applications that work with digital audio must be capable of reading and writing WAV files. On the other hand, applications can ignore data stored in public or private formats.

Public data types are nonproprietary formats that may be available on one or two platforms or in one or two applications, but not all of them. These may be important formats but not as widely

THE NAYSAYERS

"Some people are probably thinking, 'Avid's trying to sit on us,'" says RGB Computer & Video's Director of Research & Development Steven Cummins. Whether or not he has correctly assessed the sentiments of the rest of the video editing-system industry, very few of Avid's competitors have jumped on the OMF bandwagon. "I'm sure there's some marketeering going on," Cummins continues, "but as far as I'm concerned, anything that lets people use their tools together is a good thing."

A company that wants to incorporate OMF support into their product pays no fee to do so; OMF is an open, publicly available format. Avid does offer a development toolkit ($495) that helps expedite the engineering effort to add OMF support to an application. That one-time fee allows unlimited use of the toolkit software with no royalty fees.

Avid Technology does hold trademarks on the names Open Media Framework and OMF, according to Avid's OMF Product Manager Greg Clukey. "We trademarked the name," says Clukey, "only to make sure that some other effort didn't start up using a name that was exactly the same or very close to it. The information itself is publicly available; there is no trademark or patent on the software."

So what benefit does Avid derive from developing OMF? "Avid has a need for this technology to exist," says Clukey. "Without OMF, we would have to write custom links to the many other products that our customers want to use. That's tough to manage from both ends of the custom link. When new products support OMF, they have instant compatibility with all the existing OMF products. Now, it's not just a custom link, it's a common link."

However, this action does not seem to have impressed Avid's competitors. "We don't really have a position on OMF," says IMmix publicist Helen Shortal. IMmix manufactures a competing nonlinear, digital, video-editing system called the Video Cube. "We don't know that OMF is going to be any more viable than any other product that is currently under development."

NewTek, manufacturer of the wildly popular Amiga-based Video Toaster video switcher, recently announced a new nonlinear, digital, video-editing system called the Video Flyer, which is also Amiga-based. Given the demise of Amiga manufacturer Commodore Business Machines—undeniably NewTek's most important strategic partner—you might think that NewTek would be anxious to support a file format that would protect their customers should the Amiga suddenly cease to exist. Asked at the NAB show in March 1994 if the Flyer would support OMF, NewTek President Tim Jennison embraced the concept, if not OMF itself.

"As soon as we ship the Video Flyer," says Jennison, "we'll have a far larger installed base of nonlinear, digital, video-editing systems than anyone else. So we should be a *de facto* standard, but that's sort of a cop-out. I think the real answer is that it will be possible to transcode from any standard to any other standard. Let the format be a header that describes what's in this file. If you can play it, fine. The file header describes what's to follow, but otherwise it's open-ended."

Last March, the Interactive Multimedia Association announced that it had selected OMF Interchange and Bento as the "underlying technologies for its Data Exchange Recommended Practice." The IMA's document is scheduled to be published in December 1994. Whether or not this will prod more developers to support Open Media Framework remains an open question.

adopted as the common formats. OMF-compliant applications may or may not support various public formats.

Private formats are proprietary. Developers using a private format may not wish to make the file structure accessible to other applications, or they may wish to restrict the availability of that data to selected applications.

OMF Interchange is well suited to big studio environments, where an online, nonlinear, digital, video-editing system might be networked with a UNIX workstation for real-time animation work, a personal computer for MIDI sequencing, and a digital-audio workstation for audio mastering (see **Fig. 1**). However, the same work could be performed in a small studio using one or two computers and a tape-based A/B roll editing system.

For example, RGB Computer & Video supports OMF Interchange even though it manufactures no nonlinear, digital, video-editing systems. Many of RGB's customers create their EDLs on a low-end, nonlinear, digital, video-editing system that can't produce broadcast-quality output, then take their OMF Interchange file and make their final cut using one of RGB's systems.

THE STRUCTURE OF INTERCHANGE

Each OMF Interchange file consists of three elements: a composition, an indicator that reveals the physical source of the media data, and the media data itself. Because the media data may require a prodigious amount of storage, OMF provides the option of storing it separately from the composition and physical-source indicator. This way, the material can be edited without having to replicate the entire file. This concept will become more clear in a moment.

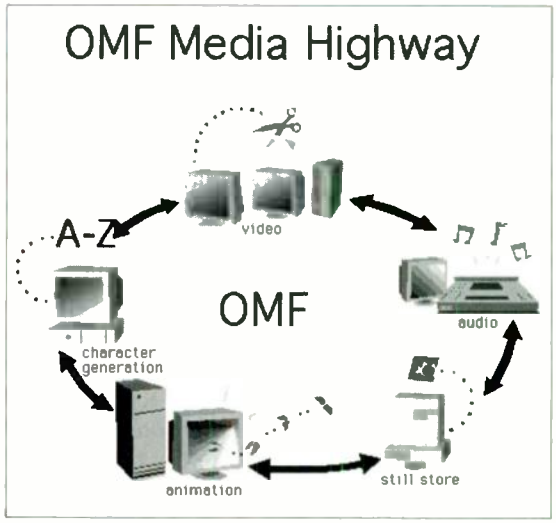


FIG. 1: OMF Interchange provides a single, open file format for all types of digital media data on all computer platforms.

The composition element of an OMF Interchange file includes all the information that is required to play or edit the data contained in the file. When an application reads an OMF Interchange file, the composition points to the media data—audio segments, video scenes, animation sequences, and so on—and tells the application how to combine them together.

For example, a simple video production may consist of several hundred scenes of video, two audio tracks with three or four different pieces of theme

OMF INTERCHANGE DATA TYPES

Types of media data:	Common format:	Public format:
graphics & still images	Baseline TIFF 6.0	None
video	TIFF with extensions	currently
animation	TIFF with extensions	defined
audio	AIFC, RIFF, WAVE	

music, two additional audio tracks of ambient sound, and a series of graphics and titles that are to be overlaid on the video. The decisions made during the editing process build the composition, which "points" to the appropriate data on playback. In addition to the production's obvious audio and video elements, the composition may also point to visual transitions, such as wipes, fades, and dissolves; audio settings, such as digital EQ and fader settings; and video overlays, such as credits.

In the example depicted in **Fig. 2**, the composition tells the application to begin by simultaneously playing 45 seconds of opening theme music and rolling the opening credits keyed over scene 1. It is not necessary for these objects to be stored in a sequential order on the disk, and none of the data are physically rearranged during playback. Instead, the composition merely points to each element of the production as needed. The composition may even point to more than one element simultaneously.

The advantage of this design is that the data can be rearranged and manipulated an almost limitless number of times without duplicating or physically changing the original material. In an audio production environment, for example, the same tracks can be mixed down a number of different ways without affecting or degrading the original source material or suffering any generation loss after the mixdowns.

NO MORE TANTRUMS

Picture, if you will, a phenomenal songwriting duo. They've worked together for many years, but the size of their egos has grown so fearsomely large they can no longer work together in the same studio. So, one now lives in New York; the other in Los Angeles. The Angeleno loves Digidesign's Pro Tools, but the New Yorker won't work with anything other than a Studer-Editech Dyaxis II.

For the past six months, they've been laying down tracks on magneto-optical disks and shipping the disks back and forth to each other. Because each of their workstations is capable of saving files in OMF Interchange format, there's been no need to perform file conversions at either end. Now, they're ready to produce the final mixdown. Because each of the artists has a copy of the final master file, each of them needs only to exchange the composition files containing their individual takes on how the final project should sound.

Each artist can create as many different mixdowns as they like without ever affecting the master file. Because the master files are very large (hundreds of megabytes), overnight delivery is the most economical means of getting that material into their studios.

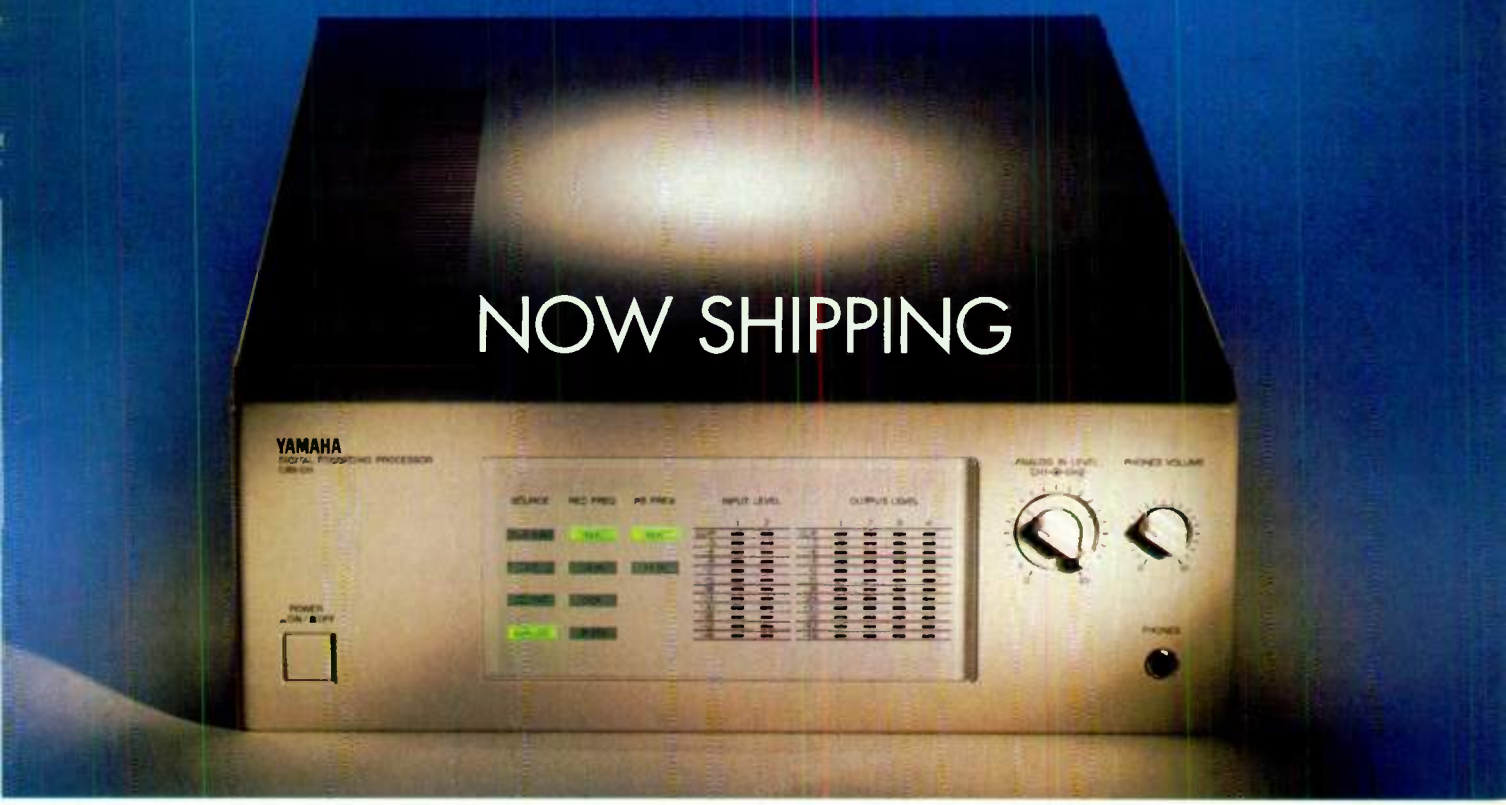
The composition files, on the other hand, are very small (a few hundred kilobytes), so they are exchanged via modem in a matter of minutes. If each of them converted their files from their native format into AIFF, the artists could still trade files even without OMF Interchange. But in that event, they would have to save, convert, and exchange the entire production after each mixdown.

OMF Interchange can't do much to improve the personalities of these prima donnas, but it makes it much easier for them to produce music together without killing each other.

A MATTER OF CLASS

Applications that support OMF Interchange are divided into three classes,

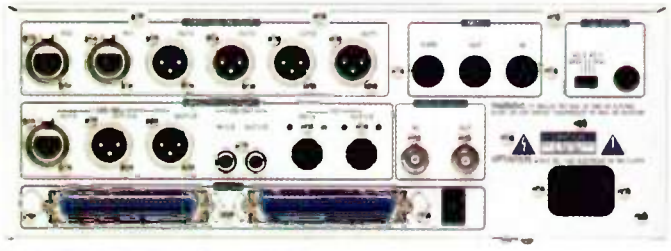
Digital Recording for Computers in the Real World.



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

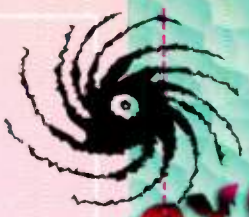
The CBX-D5 system was designed to let your computer compute and your storage devices store while the CBX-D5 handles the processor-intensive work. The CBX-D5 controls digital multi-track recording, analog-to-digital and digital-to-analog conversions, digital audio routing, digital signal processing and 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

VORTEX™
AUDIO MORPHING PROCESSOR



Audio Morphing™ You Haven't Heard This Before!

Vortex is the most radical piece of digital signal processing gear you've ever heard. Among the innovations in Vortex is its ability to "*morph*" from one effect to another, allowing you to create something totally unique along the way.

Lexicon's unique **Audio Morphing™** effects technology creates a complete parametric and algorithmic restructuring of two completely independent stereo effects (*like those ads where the car transforms into a tiger...*). The "*morph*" can be anywhere from 0.01 to 10 seconds. Or, use your expression pedal to morph in real-time. What's more, it all takes place in a very easy-to-use single rack space device. What does **Audio Morphing™** sound like? *Incredible.*

Dial-up any of our **32** built-in stereo effects and the first thing you'll ask yourself is: "***What's going on here!?***" All of the Vortex effects come alive in response to your playing. For example, on some effects, as you play louder the echo level decreases. On others, as the sound fades away, modulation increases. **Vortex's** controls give you fast and easy access to the *dimensional*, *rhythmic* and *dynamic* aspects of each effect – including two LFO's with independently variable *Rate*, *Depth* and *Resonance*. Two independent echoes allow you to set-up polyrhythms which can be synchronized to your music with the *Tap Tempo*. With Vortex's A/B (Morph) switch you can even remotely change channels on your amp!

In addition to our **32 Presets**, you can create **32 User Registers** of your own, morph between any pair and set-up custom register "chains". And, of course, **Vortex** features that crisp, clean Lexicon sound at a price that's nearly as incredible as the effects themselves.

Get into an authorized Lexicon dealer today and check it out. Then listen to what real insanity is like when you hook **Vortex** up to our **Alex** and **JamMan** processors. But, be careful, once you get caught-up in a **Vortex**, you might not want to get out...

Lexicon

HEARD IN ALL THE RIGHT PLACES

Lexicon, Inc. 100 Beaver Street, Waltham, MA 02154 Tel: (617) 736-0300 Fax: (617) 891-0340
A Harman International Company

the first and most basic of which include programs called *media producers and consumers*. These programs, which include audio and video digitizers, draw and paint programs, character generators, and animation programs, either create media data to be used by other applications or accept media data in order to display or store it. However, this class of programs cannot generate compositions that will yield the final production.

The second class consists of programs called *composition producers and consumers*. These programs accept data from media producers and consumers and combine it to create a finished composition. Applications in this category might not make full use of the media data. For example, they might be able to specify that an event (such as a visual transition) occurs, but they might not be able to render the transition itself. Low-end, nonlinear, digital, video-editors that rely on such programs as Adobe *Premiere* for transitions would fall into this class.

The last class of OMF products consists of full-service media applications. These programs incorporate all the characteristics of the first two classes, including the ability to create compositions, but they can also create the finished production. In other words, they both produce and consume OMF files. Avid Technology's own high-end, nonlinear, digital, video-editing systems fall into this class.

IS THAT ALL THERE IS?

In the table on p. 72, you'll note that there's no support for MIDI. Although Avid recently announced that it plans to extend the OMF specification to include MIDI, the current definition supports only digital audio. The obvious drawback to digital audio is that it consumes a lot of storage space, so support for MIDI would considerably reduce OMF's appetite for disk space.

Barring the revelation of some sinister scheme on Avid's part, the Open Media Framework could be the mechanism that frees computer users from the tyranny of proprietary data formats and solves the standards problem in one fell swoop. But it's clear that the user community has to seek such deliverance; developers won't support OMF out of the goodness of their hearts. Many of them undoubtedly share NewTek's sentiment toward OMF. "It's not something we reject," says NewTek's Jud Alford. "We just don't have time to look into it right now. If we get 100 people coming to us and asking about OMF, then we'll start thinking about it."

EM *associate editor* **Michael Brown** *wishes he had a nonlinear, digital, video-editing system to produce the epic home movies he's been shooting for years.*

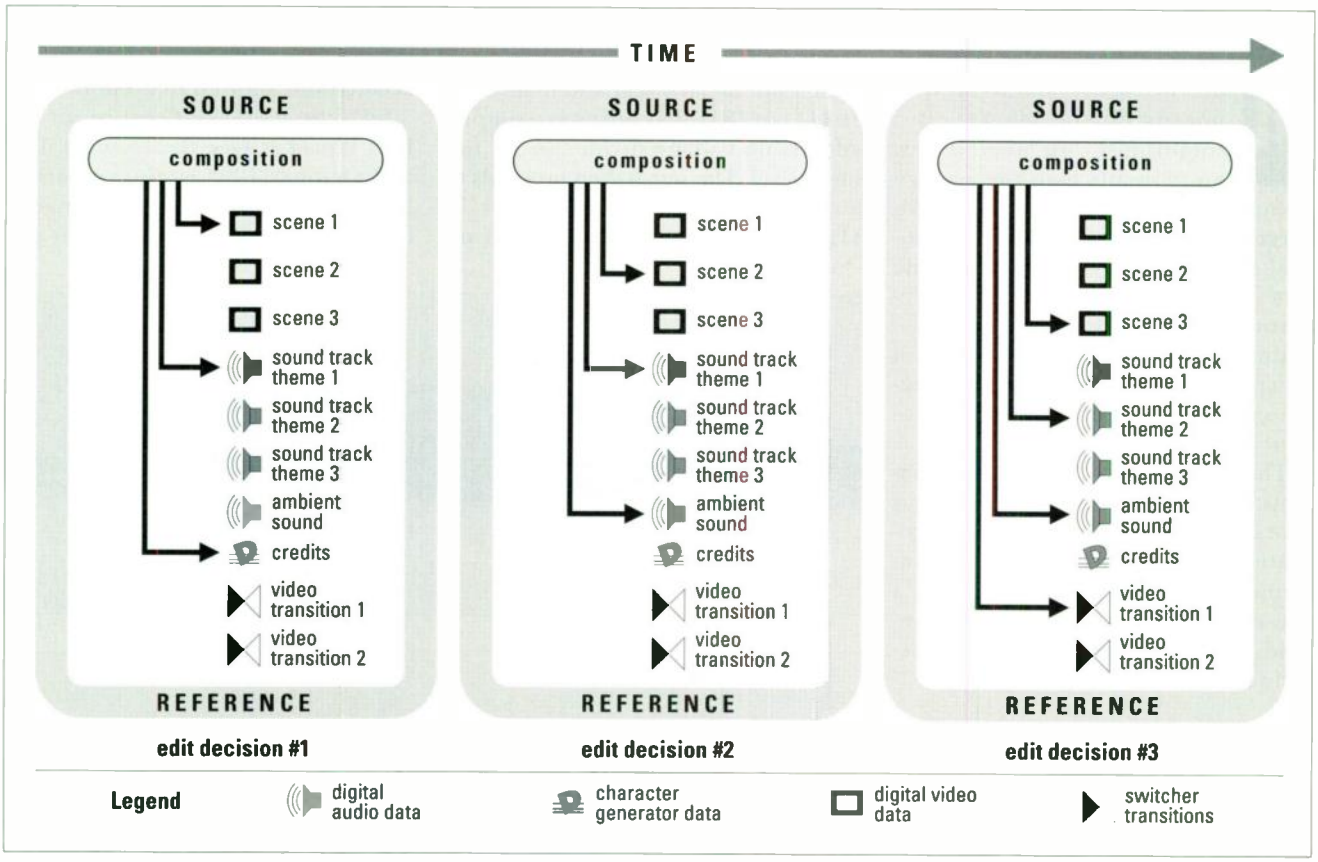


FIG. 2: This is a single OMF Interchange file, viewed at three different points in time, that contains video, audio, CG titles, and switcher transitions. At each of the three edit decisions shown here, the *composition* elements of the file points to one or more pieces of *media data*. The *source reference* stores information as to the physical location of the media data.

DO ✦ IT YOURSELF

Build the EM Submixer

Don't trash that mixer; hand me the soldering iron.

By Jules Ryckebush

Most **EM** readers learn to work their sonic miracles with one of the many small mixing boards on the market. But sometimes you need a few more inputs than the average compact board offers. Moving up to a larger mixing board may be an optimal solution, as it is likely to provide extensive EQ and routing features. Unfortunately, that's also an expensive solution, and it could be overkill. If all you need is a few more line inputs, a little submixer might be the perfect solution.

The EM Submixer has four stereo inputs, two pannable mono inputs, and one stereo output. It is perfect as a dedicated effects-return mixer, a standalone "disco mixer," or for adding a few extra inputs to your existing console. The project is well suited for beginners.

HOW IT WORKS

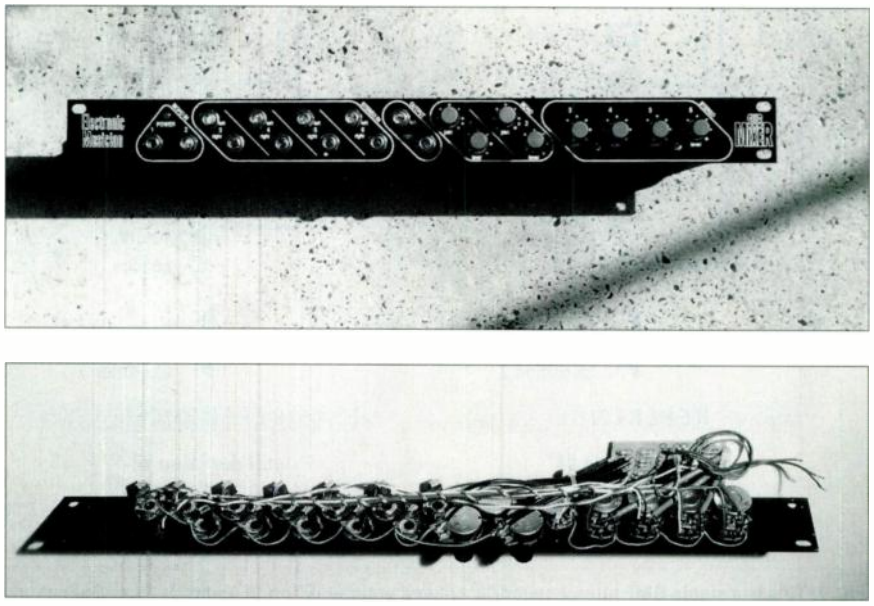
The heart of the circuit is an NE5532 high-performance, dual operational amplifier (op amp), which functions as a summing amplifier for all the inputs. In the schematic (see **Fig. 1**), notice that there are two types of inputs: mono and stereo.

The mono inputs are typified by input 1. The signal enters through a ¼-inch phone jack (J1) and heads to a 10 kΩ pot (R1) that serves as a simple, adjustable voltage divider to set the input level. The signal then proceeds to a resistor network formed by four 15 kΩ resistors (R9 through R12) and another 10 kΩ pot (R2). This is called a *constant-power pan circuit.* When the pan pot is hard right or left, it completely grounds the signal on the opposite side, preventing any output from that side. Centering the pan pot attenuates each channel by about 3 dB (half power). However, the apparent sound level remains constant because there are two channels. The result is a smooth transition as the signal is panned left or right. You might decide to use audio-taper pots to provide the best "feel" for the input-level controls, but the pan pots must have a linear taper.

Input 3 is identical to the other stereo inputs. The left and right signals enter two ¼-inch phone jacks (J3 and J4) and connect to the high sides of a 100 kΩ, dual-section potentiometer (R5). This pot adjusts the level of the incoming audio. The wipers of both sections connect to the right and left summing buses through R17 and R18, respectively.

A value of 82 kΩ for the summing-amp feedback resistors (R25 and R27) was selected to bring the signal back to the nominal input level. The 47Ω output resistors (R26 and R28) protect the op amps in case the outputs are accidentally shorted to ground.

Like the EM Dual Compressor and Hiss Whacker (see the October 1992 and October 1993 issues, respectively), the EM Submixer is designed to use a bipolar power supply that pro-



PETER DIGGS

The EM Submixer is a simple project that is suitable for beginners. It provides four stereo inputs, two pannable mono inputs, and one stereo output.

vides ±15 VDC, which is not a standard configuration for a wall-wart supply. There are plenty of good power-supply designs available from various sources, including *Electronic Projects for Musicians*, by Craig Anderton (available from Mix Bookshelf; tel. [800] 233-9604 or [510] 653-3307; fax [510] 653-5142).

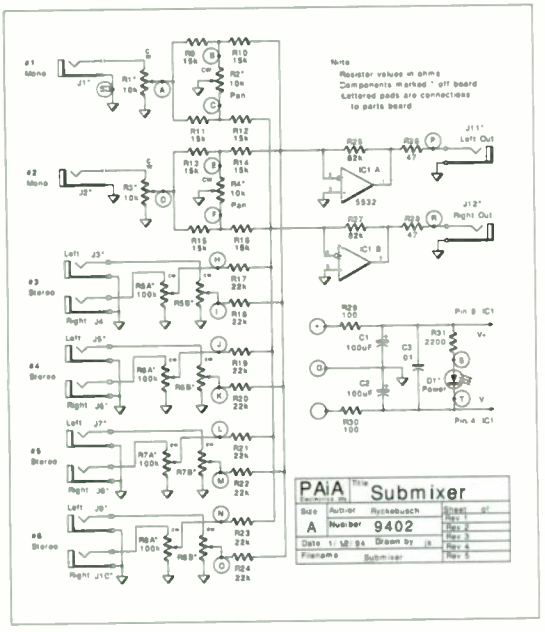


FIG. 1: The schematic of the EM Submixer. Circled letters correspond to labeled circuit-board points.

An appropriate power supply is also available from PAiA Electronics (see sidebar, "PAiA Kits"). Because the EM Submixer draws only about 30 mA of current, even a moderate-size power supply should be able to run the unit and several other projects, too.

The output from the power supply is filtered by R29/C1 and R30/C2, while C3 provides a high-frequency bypass to compensate for the increased impedance of electrolytic capacitors C1 and C2 at high frequencies. C3 should be placed as close as possible to the power pins (4 and 8) of IC1. R31 limits the current to the LED (D1), which indicates that the power is on.

PAIA KITS

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

Complete kit of parts and circuit board except power supply and rack panel (9402k): $68.75.

Punched, anodized, and legended rack panel (9402fp): $17.75.

Drilled and legended printed circuit board (9402pc): $12.25.

Bipolar power supply, ±15 VDC up to 1 amp (BPS-15): $29.95.

Please add $4 to each order for shipping.

CONSTRUCTION

Construction of this project is straightforward. PAiA Electronics offers a full kit of parts and a rack panel (see sidebar, "PAiA Kits"). The foil pattern and component layout are shown in Fig. 2. I

built my prototype on a Radio Shack experimenter's PC board.

Be careful, and always verify that the polarity of the power-supply voltages is correct; 5532s become metabolically impaired (i.e., dead) if you connect the supply backward. I have verified this an embarrassingly large number of times.

Double-check the electrolytic-capacitor polarities, too. Be sure to use shielded wire to connect the jacks and controls to the PC board. This minimizes crosstalk and electromagnetic interference (EMI).

USE

The EM Submixer is simple, but useful, offering no fancy bells or whistles. I use it to bring multiple stereo effects returns into my main mixing board. I also use one of the mono inputs to return a delay line. This lets me pan the delay and still use only two channels on the main console, controlling the master effects-return level with just two faders.

In addition to providing inputs for sound modules and effects returns, the EM Submixer can be used as a small deejay mixer for multiple playback sources. With two CD players and this submixer, you can make some serious party tapes, with actual fade-ins for each song. Add a microphone preamp (see "Build the EM Phantom-Power Mic Preamp" in the April 1993 EM), and you're in business.

SUMMARY

There is one thing you should be aware of: The EM Submixer inverts the phase of the incoming audio signal. This poses no problem if you use the unit for extra inputs or deejay applications. In addition, it's no problem for effects returns if you run all your effects fully "wet" (which you should in most cases).

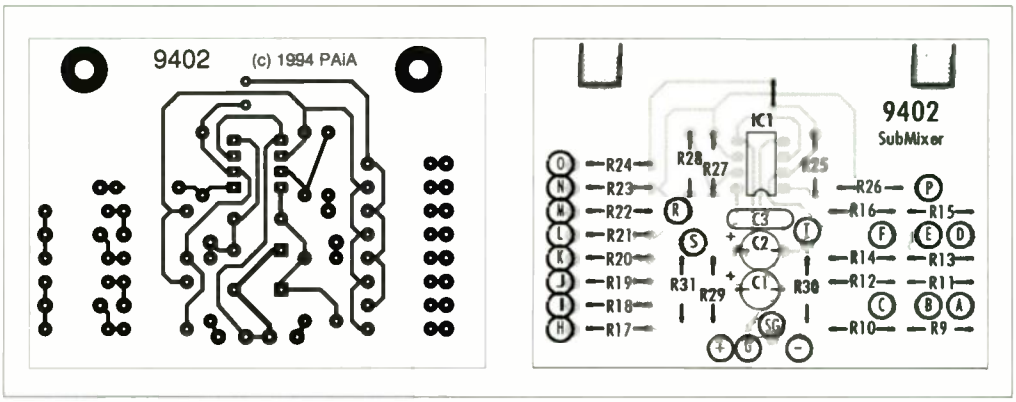


FIG. 2: The printed circuit board of the EM Submixer. The right view shows the location of the circuit elements, while the left view reveals the conductive traces.

PARTS LIST

Capacitors

C1, C2 .....100 µF/16V electrolytic
C3 .....0.01 µF ceramic disk

Diodes

D1 .....Red LED

Semiconductors

IC1 .....5532 dual low-noise op amp

Connectors

J1-J12 .....¼-inch, open-circuit phone jack

Potentiometers

R1-R4 .....10 kΩ (see text)
R5-R8 .....100 kΩ dual-section

Resistors (¼W, 5%)

R9-R16 .....15 kΩ
R17-R24 .....22 kΩ
R25, R27 .....82 kΩ
R26, R28 .....47Ω
R29, R30 .....100Ω
R31 .....2200Ω

Other Components

Component board
Power supply
Front panel
Knobs
Wire

If not, you will notice cancellation in the dry signal as you bring up the level of the effects.

Because the 5532 is such a quiet op amp, you can expect better than 96 dB S/N from the mixer. And direct, rather than capacitive, coupling between stages enhances sonic transparency. You can easily add more mono or stereo inputs; just duplicate the existing circuitry up to the summing amplifier. However, keep in mind that each additional input adds a little more noise to the signal. Good luck; enjoy doing it yourself!

Jules Ryckebusch *spends a lot of time on submarines at sea, slaving over a hot nuclear reactor and designing audio circuits in his spare time.*

The Children's Music Market

Versatile musicians are making careers out of child's play.

By Mary Cosola

We all remember songs that freeze-frame a childhood memory. Maybe it's Mom singing a lullaby while you drifted off to sleep, or Dad teaching you a silly song on that long car ride to grandpa's house. For some of us, the connection to music was so strong in those formative years that it's been a part of our lives ever since. Ever think of creating some of those memories for kids today?

You might think of writing children's music as part of the novelty genre, something to do until the *real* gig comes through. Nothing could be further from the truth. Children's music can pose a challenge to even the most talented songwriter. And better yet, there is a tremendous need for it. If you are considering a career in children's music, be prepared for a part of the music industry that is nothing like the pop mainstream.

Entertainers such as Dennis Hysom, Joanie Bartels, and Bethie, pictured above, enjoy successful careers as children's performing artists.

SEE JANE SING

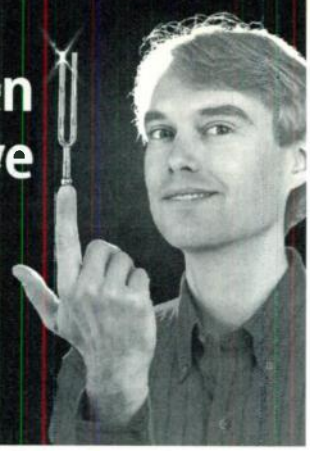
Obviously, children's music targets a much different audience than adult music. But just because the music is intended for children doesn't mean that it is easier to write. Granted, the songs should be relatively short, catchy, and simple enough to invite kids to sing along, but there *are* complicating elements.

Songwriter/producer Robin Frederick specializes in music for characters. ("I only write for things with fur," she says.) Her credits include albums and songs for Walt Disney Records and the Disney Channel, as well as her own children's and adult contemporary albums. She says that producing songs to be sung by Mickey, Yogi, or Bugs is harder than it looks.

"The parameters of character writing are very strict," observes Frederick, "so the songwriter has to be disciplined. When I see a performer fighting just to stay in character while singing a song, it's usually because the

PROVEN at TWO leading universities! Research info included with FREE Lesson!

"They LAUGHED when I said they could have Perfect Pitch ...until I showed them the secret!"



The TRUE STORY

by David L. Burge

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

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

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

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

"What's Perfect Pitch?" I asked.

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

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

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

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

"Yes," she nodded to me aloofly.

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

"OK," she replied cheerfully.

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

My plan was ingeniously simple:

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

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

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

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

I had barely touched the key.

"F♯," she said.

I was astonished.

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

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

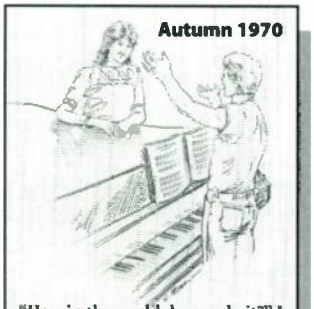
"Sing an E♭," I demanded, determined to mess her up.

With a bare pause she sang the proper pitch. I had her sing more tones (trying hard to make them increasingly difficult), but still she sang each one perfectly on pitch.

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

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

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



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

I couldn't figure it out...

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

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

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

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

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

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

Then came the realization:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

And as for Linda?

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

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

Sweet victory was music to my ears—mine at last!

THESE DAYS, thousands of musicians and two university studies have already confirmed my Perfect Pitch method. *Now I'd like to show YOU how to discover your own Perfect Pitch!*

I hope *you* won't laugh as you picture yourself with various Perfect Pitch skills—like naming tones and chords by ear with laser-like accuracy! I think you may be surprised at just how *simple—and how valuable*—Perfect Pitch really is.

I'll show you! Just call or write TODAY to request your **FREE Perfect Pitch Lesson #1!**

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song wasn't written exactly for that particular character."

Kids aren't stupid. They can pick up a vibe a mile away, so don't even think about messing with their heroes. "I have to check over the songs very carefully for each project. We can't have something in there that Mickey would never say," continues Frederick. "Kids pick up on that in an instant. You can't fool children."

Not all children's music is written for singing critters. Many artists have made names for themselves as children's performers, writing and producing albums and videos just for kids. For these artists, the toughest part of the job is finding a way to keep the kids interested.

"I work hard to make the songs on my albums fun and musically inspiring for kids, with lyrics that relay a message without hitting them over the head," says Joanie Bartels, a singer/songwriter who has worked in the children's music industry for ten years. "It's a fine line to walk, but as a songwriter, it presents a lot of exciting challenges."

Knowing what to write depends on the age group you're writing for. An eight-year-old won't be interested in a song written for a toddler. But that's the great thing about children's music: You have such a wide range of ages and topics to cover, it's an endless source of material. If you are considering a foray into children's music, you should understand children's needs and limitations during different stages of their development.

COMING OUT TO PLAY

Children's music could be the biggest industry no one knows anything about. Listed below are a few organizations, radio shows, and other resources for those interested in the field of children's music. [*Please note that representatives of these organizations requested that only certain contact information be published. Therefore, if only a phone number or mailing address is listed, that is the only way to contact them.—Ed.*]

American Academy of Children's Entertainment (AACE) is a nonprofit association for professionals in the children's entertainment industry, including performing arts, music, video, film, television, toys, museums, and attractions. Their goal is to create a NARAS for the children's end of the industry. AACE, PO Box 1257, Cooper Station, New York, NY 10276.

***Billboard*'s "Child's Play"** column reports on new releases, who's who, and what's what in the world of children's music. Moira McCormick writes the column. Billboard Magazine, BPI Communications, One Astor Plaza, 1515 Broadway, New York, NY 10036.

Children's Concert Calendar, published semiannually, has nationwide concert listings, activities for parents to do with their kids, a children's activity page, recommended music and videos, and feature articles written by educators. A recent addition to the newsletter is a column featuring overviews of children's radio programs and where to find them. Subscriptions are $6.00, and the latest mailing reached 10,000 subscribers. Children's Concert Calendar, Teri Baker, 14431 Ventura Blvd., #285, Sherman Oaks, CA 91423, tel. and fax (818) 342-3253.

Children's Entertainment Association (CEA) is an organization devoted to promoting children's music to consumers and within the music industry. It also serves as a support network for professionals in the children's music industry. Headquartered in New York City, CEA is really a network of regional organizations. Established regions include California and New York-Pennsylvania-New Jersey, but new regional organizations are currently forming. CEA, Howard Lieb, PO Box 75, Rockefeller Plaza, Suite 327, New York, NY 10019, fax (212) 275-385.

Children's Music Network (CMN) is a national, volunteer, educational organization with many regional chapters nationwide. Members of CMN work to foster the development and public awareness of children's songs, especially those that encourage multicultural diversity, self-esteem, respect for environment, and an understanding of nonviolence and social justice. The organization is about ten years old. The CMN annual national conference will convene in Petaluma, California, in October; write to CMN for details. CMN, PO Box 307, Montvale, NJ 07645-0307.

The Kid's Music Seminar (KMS) will be held at the Sheraton New York Hotel and Towers in New York City on July 22 and 23. This is the program's second year and is being held in conjunction with the fifteenth annual New Music Seminar. KMS will feature four panel discussions, "Kids Entertainent '94—Playtime is Over," "On the Road Again—Hitting the Concert Trail," "You're on the Air—Radio and Television for the Kids' Market," and "To Market—Retailing Children's Entertainment Product." Representatives from leading children's music labels, bookstores, and other retailers will participate. KMS also gives attendees the opportunity to meet and network with other industry professionals. KMS, Lina Maini, tel. (718) 897-0980.

Radio Ahhs, a 24-hour children's radio network in Minneapolis, is currently carried in nineteen cities and that list is growing. About 65 percent of the air time is devoted to music and the remaining 35 percent features story hours, games, and consumer reporting that reviews products for children. The network even employs kid deejays for after-school and weekend programing. Radio Ahhs, 5501 Excelsior Blvd., Minneapolis, MN 55416, tel. (612) 338-3300.

The Uncle Ruthie Show is broadcast Sunday mornings from 10:30 to 11:30 on KPFK, a listener-sponsored radio station in North Hollywood, California. Uncle Ruthie Buell, the songwriter/singer/storyteller who has produced the show for 25 years, stresses that the show is for all people of all ages, not just children. In addition to her job as a special-education teacher, Buell tours, has produced three albums, and runs music workshops. The Uncle Ruthie Show, c/o KPFK, 3729 Cahuenga Blvd. West, North Hollywood, CA 91604, tel. (818) 985-2711.

Robin Frederick has produced over 200 songs for the Disney Channel alone and is currently an executive producer for Kid Rhino.

THE AGE OF INNOCENCE

One subset of the children's music market is early childhood music. It is aimed at very young children, mostly those in the first two to four years of life. Songs for children in that age group should incorporate fundamentals in a way that young listeners can follow and participate.

"Early childhood music is instructional, but in a subtle way," explains Ronny Schiff, a music-print publisher and an authority on early childhood music. "It has basic concepts such as shapes, colors, size, rhyming, and movement, but the music is important because it helps the children follow those concepts."

Schiff stresses that composers should always keep their audience in mind. "The music must be contagious, with a good hook. But it shouldn't have such a wide note range that kids can't sing along," she advises. "This is especially important for younger children, because, unlike adults, they are not passive listeners." She also recommends that composers include children's voices in their recordings, a technique that always piques the interest of a younger audience.

Children who are a little older are able to follow more complex word and song structures, opening up a world of possibilities for the creative songwriter. Bartels has written and performed

everything from gentle lullabies to reggae to swing.

"I find that kids respond to anything that is rhythmic and melodic," says Bartels. "Also, they don't have the same expectations and limitations as adults, so they're more open to different types of music. That's why I love doing children's music, I've become much freer to explore musical styles."

Your versatility as a musician can pay off, as well. Children's music typically has a longer shelf-life and is less prone to fads than adult pop. Most of the artists I spoke with indicated that sales of new children's albums start slowly, but tend to build over months and years.

TO MARKET WE SHALL GO

Successful children's artists need to know more than how to write a song; they need to know how it to market it. First of all, the consumers doing the actual listening (kids) are not the ones doing the buying (parents). Also, children's music gets very little radio airplay. So how does one get the word out? If your work is associated with the likes of Disney or Nickelodeon, you're pretty much set. But don't despair if you're an independent performer, there are plenty of ways to get your music heard.

Most parents are very careful about what their kids listen to and watch. When selecting music for their kids, they often go for the sentimental, time-tested favorites, the things they listened to as children. But if they grab a children's album out of a record-store bin and see great graphic design, fun song titles, and a clear sign of the intended age group, they'll take the plunge, without having heard any of the music.

Other than name recognition and catchy titles, how do you actually get them to hear the music? Well, most kids' songs aren't going to hit the "Billboard Hot 100," so you'll have to get creative. Most children's performers do just that: perform.

Bartels tours almost every week, playing mostly outdoor, family-oriented festivals all over the country. She has an agent who books her gigs, but many children's performers set up their own dates at schools, festivals, and malls. This is one way in which the children's market is similar to adult music. *You* are the one responsible for getting your name and music heard. Industrious performers hook up with other artists, set up concerts, tour schools, and try to get on the bill at children's events. (See "Working Musician: The Fine Art of Self-Promotion," in the May 1994 **EM** for some pointers.)

Frederick's career as a producer started when she hooked up with other children's artists to produce a twelve-song compilation album. "The sampler was a great way to establish myself as a producer," she says. "Also, it really paid off for the other artists on the album."

The sampler led to Frederick's stint with Disney, and now she is executive producer of a seven-album project for Kid Rhino, a division of Rhino Records. She also advises that if you want to pursue the more commercial, character-based gigs, you'll need to approach it like a regular record deal: Make your contacts, shop your demo, and so on.

Karan Bunin of Fishkill, New York, has taken a unique approach to marketing. A children's performer with two albums out and two more in production, she has purchased one hour of air time at a radio station in Newburgh, New York, to produce a weekly children's show, Karan and the Musical Medicine Show. Bunin and producer Jeff Waxman have lined up nine regular sponsors for the show, which features a variety of children's artists, as well as guest interviews and performances. She plans to syndicate the show for national distribution.

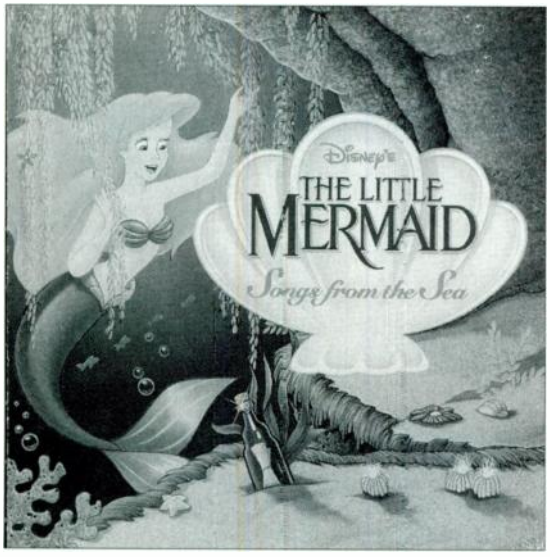
Joanie Bartels and the Discovery Music label are famous for their *Magic* series of CDs and cassettes. Pictured above is Bartel's *Dancin' Magic*. Other titles in the series include *Lullaby Magic, Travelin' Magic, Bathtime Magic,* and *Sillytime Magic*.

HAPPILY EVER AFTER

Whether it's commercial and character-based or independent and artist-driven, most children's music is produced in project studios, even the Kid Rhino project. Schiff notes that this is one benefit of the children's market as a whole. "It truly is a cottage industry. The artists record and produce their own music in their homes, trade cassettes with other children's performers, and set up their own concerts."

Budget cutbacks in schools across the country have all but killed art and music programs for kids. As a result, more teachers have turned to children's music to help educate students and round out their arts curriculum. And like it or not, the second coming of the Baby Boom is upon us, and parents are desperate for ways to educate and entertain their children. Writing music for children gives you the chance to reach out to a huge part of the population. Who knows? Maybe you'll become part of an adult's fond childhood memory.

Though known to have a mean streak, **Mary Cosola** *mercifully refused to mention or run a picture of Barney in this article.*



If you're fortunate enough to hook up with a project such as Disney's *Little Mermaid* series, as Robin Frederick did, your work will be heard by millions.

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Isn't it time you had some serious fun with your music? And at just $699.00 retail, the KC20 is seriously the most bang for a buck you're going to find at your dealer's. Check it out today. Your guitar player may hate you for it, but hey, it's about time they shared some of the limelight.

KAWAI

Digital Magic.

Thomas Dolby's Headspace

Developing a score-generator for interactive entertainment systems.

By Michael Brown

Video-game visuals have improved by leaps and bounds during the past few years. Virtual-reality systems, meanwhile, are pushing the envelope of the interactive experience. Refining the audio elements of computer-based entertainment, however, has occurred only in minor increments. The time has come for a new approach to incorporating music into these systems. Pop-music star Thomas Dolby says he has the answer. He calls it *AVRe*, the Audio Virtual Reality Engine.

"I was very disappointed with the production values of games," says Dolby. "I felt in a way that they were aspiring to be little movies that the player could control, and yet the production values fell way short of what we've come to expect in a movie."

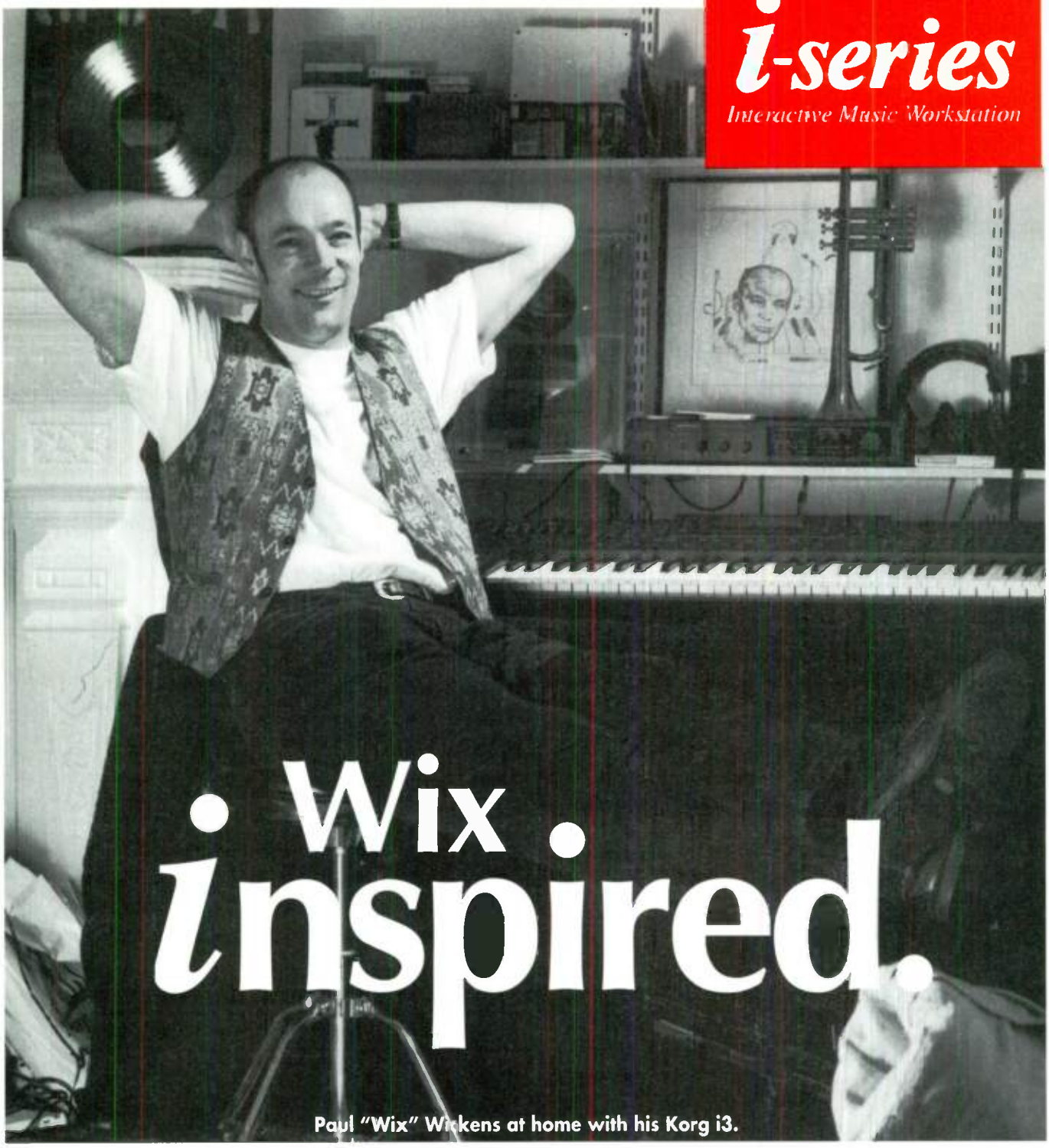
Companies like Sega and Electronic Arts have committed substantial resources to improving the audio content of their software titles, with investments both in studio infrastructure and in stables of talented composers. Building better audio hardware into game and virtual-reality platforms has certainly helped, and software programmers have figured out ingenious new ways of linking audio events to visual events. Interactive soundtracks, however, still employ the same basic linear development pattern used in films. When your character enters the cave, the game plays the cave theme loop; when he encounters the dragon, the game abruptly shifts to the dragon loop; and so on.

"That really sells people short," says Dolby. "I've felt from the beginning that this was not a limitation of the technology, it was just a limitation of the imagination of the people implementing it."

The linear pattern works for film soundtracks, because the contour of the work is already defined, and it's not going to change from one viewing

LESLIE BURKE

Thomas Dolby has developed a real-time composition algorithm that turns video gameplay into an alternative MIDI controller.



Paul "Wix" Wickens at home with his Korg i3.

It can happen without warning. Something triggers an idea in your head and you want to turn it into music. You need access to sounds, rhythms and styles which can help you shape it quickly before you lose it. That's where Korg's i3–the world's first interactive music workstation–comes in.

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If you're not a keyboard virtuoso, the i3 gives you the power to write the music you hear in your head. If you are, it'll take you to a new level of creative expression so quickly you'll love it!

To hear "Wix" play, check out the recently released *Paul is Live* album recorded during Paul McCartney's World Tour. For a video tour of the incredible i3, send $3.95 for shipping & handling to Korg USA, 89 Frost Street, Westbury, N.Y. 11590.

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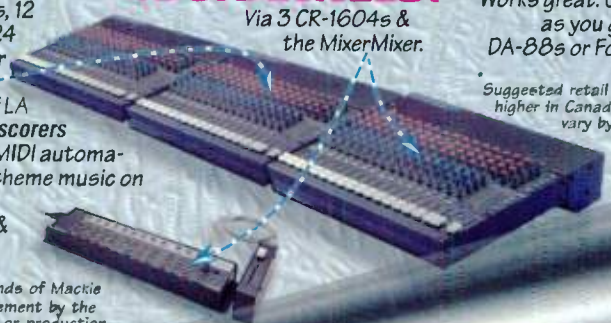

Three CR-1604s give you 30-48 line inputs, 18 mic inputs, 12 stereo effects returns, 24 direct outs & 3 stereo or 6 mono submasters. A favorite configuration of LA "power-user" **film and TV scorers** (often with OTTO-1604 MIDI automation) for incidental and theme music on programs such as "The Simpsons," "Baywatch" & "Days of Our Lives.†"

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ABOUT HEADSPACE

Thomas Dolby established Headspace, his audio production company based in Studio City, California, "to do music and sound for all the cool stuff that I saw," Dolby says. "One of the things I discovered, however, was that I wasn't necessarily the right composer for all that stuff, but I could work with other composers who were—either because their style or approach was different than mine, or because budgets are still fairly small in the games world." Dolby often works with talented new composers who have not yet developed track records.

Headspace, according to Dolby, is now comprised of six composers, three sound-effects designers, a dialog producer, and a programmer. In addition to producing soundtracks for video games, the company designs audio systems for everything from theme-park attractions to museum exhibits.

"One of the first things we try to do," says Dolby, "is to educate clients how worthwhile it is to invest in the audio side of their project at an early stage."

to the next. In a video game or virtual-reality experience, you—as the player—make up the "movie" as you go along. Theme music that loops and loops ad nauseam can drive you crazy, or at least provoke you to tune out or even turn off the game's sound.

"As a composer," says Dolby, "you set out to enhance and sweeten the game's dynamic with musical atmosphere in a way that allows the player to immerse himself in the game experience. Unlike film, you can't just have a piece of linear music playing in the background. If you do, you'll detract from that sense of immersion."

And unlike watching a film, a videogame player's visual—and visceral—experience differs slightly each time he plays the game; that's part of its appeal. Why then, shouldn't the player's audio experience differ each time, as well? *AVRe*, according to Dolby, can accomplish just that.

THAT OLD BLACK MAGIC

"*AVRe* creates—in real time—an underscore that is appropriate to each player's experience within a game or a virtual environment," says Dolby. "The tempo, the key of the instrumentation, and other aspects of the score will automatically change based on each individual's style of play during a given session."

Other game developers have created innovative methods of producing music based on the decisions a player makes during the game (see "Big Game Hunting" in the May 1994 **EM**), but none appear to be as ambitious an undertaking as *AVRe*. Rather than creating a score in advance with musical cues and transitions for every possible event, the composer uses *AVRe* to create only small waveform motifs for each character, room, and object in the game and to establish certain tonal and rhythmic parameters for the music. As game play goes on, *AVRe* creates a unique score based on how these characters, objects, and rooms come together during the game.

"It's creating music from scratch based on context," explains Dolby, "but it's under the constraint of the composer. Think of the *Peter and the Wolf* approach to scoring, where every character has an individual instrument and motif. Depending on the circumstances, if two of the characters interact, you get a combination of the two musical motifs."

However, *AVRe* goes far beyond combining motifs based on serendipitous events. It also takes into account how the player plays the game.

"The score that *AVRe* creates," says Dolby "is based in part on feedback from the player. The computer obviously knows all the time what you are doing with your cursor. It knows where you are going, how fast you are moving, and what objects you are clicking on. And the game knows where you are in a geographical space, how far down you are in the story line, and what kinds of elements are involved in the story at any given point. All of those conditions affect the real-time composition and performance of the game's musical score."

The *AVRe* algorithm captures event data generated by the game, converts it into MIDI, and maps the resulting

The *AVRe* algorithm is capable of producing musical scores in real time, based on events in the game and feedback from the player.

MIDI datastream to musical events. The musical events are under the master control of key, tempo, and instrumentation parameters established by the composer, but even these elements can change according to what happens during the game.

"Wherever you go in the game," says Dolby, "Whatever you do, whatever objects you're carrying or happen to pick up, who you're with, whether you're aggressive or nonaggressive, how successful you are at attaining whatever objectives are in the game's scenario, all of those events affect the musical score that *AVRe* produces."

THE HUMAN MIDI CONTROLLER

In a manner of speaking, *AVRe* can be considered a new form of MIDI controller. Musicians utilize one or more sets of skills—gleaned from playing keyboards, wind or string instruments, or percussion—to play synthesizer modules. Many people haven't acquired any of those skills, but that doesn't mean they're not interested in producing music. What *AVRe* can do, according to Dolby, is turn anyone's personal skill into a MIDI controller.

"People create their own soundtracks for what they do," observes Dolby. "They move and act in a tempo, a beat. And different people have different beats. Often, the music they select as background is appropriate for that beat." *AVRe* essentially harnesses the player's behavioral patterns and uses them to drive its score-generating engine.

"We have one *AVRe* demo," says Dolby, "in which the object of the game is to go into a cave and secure a key from the old alchemist who lives there. Inside the cave is a magical pool, some treasure, a few bats, and a gong. You might go into the cave, browse through the treasure, dip your toes in the pool, stay clear of the bats, and ring the gong. And when the alchemist appears and asks you a riddle, you think really hard, answer the riddle, accept the key, and find your way out.

"Then again, you might run into the cave, throw a rock in the pool, steal the treasure, and frighten the bats. And when the alchemist comes out, you give him a kung fu kick, steal the key, and get the hell out. In a way, those are all kinds of everyday skills, or at least the way we fantasize our everyday skills to be. What *AVRe* really does is turn those skills into a MIDI controller. And the musical score it produces based on the first scenario is going to be quite different than the score it produces based on the second scenario."

Dolby emphasizes that although *AVRe* is a high-tech means of producing music, it doesn't require composers to learn an entirely new set of tools.

"In a way, *AVRe* was created to help me with my particular style of composing," says Dolby. "As it started to evolve, I began to get input from other composers, so it was no longer just a set of tools that worked for me, it became one that would work for other musicians, as well.

"There's no reason you can't take the traditional approach to composing," Dolby continues. "I think learning to use the program is roughly equivalent to when the first MIDI sequencers came out. There was a slight re-think people had to go through to see their music in nonlinear and mathematical terms. But MIDI is just a different representation of music, the same as notes transcribed on a page. *AVRe* is just a different front-end for the same ideas. The nice thing is that it kind of automates the task of providing variations on your themes in a way that is appropriate for different parts of the game. That was really job one for me. I wanted to get rid of the hiccup transitions that have been typical in video-game soundtracks."

THE FUTURE

"Many a taxi driver has told me," says Dolby, "'Well, I don't actually play an instrument, but I can hear a melody in my head. When is there going to be a machine that I can just plug into and the music that I'm thinking of will come out the speakers?' I don't think that's so far off."

Although he says it was not his original intention, as we went to press, Dolby was engaged in negotiations to license *AVRe* to video-game developers. Part of the reason Dolby is willing to license his *AVRe* technology may be that he can imagine more applications for it than he has the time or energy to pursue.

"One type of environment that I can envision building around *AVRe*," says Dolby "is a musical place where people who don't play any instrument could go and create whatever music they like. I'm not talking about little virtual mixers on a screen, or little jukeboxes that say 'Click here for jazz,' or 'Click here for rock.' I'm talking about a fully virtual world that allows you to follow a stream of consciousness and create music appropriately. And it would be brand new music that has never existed before."

That would be a head space, indeed.

SERVICE CLINIC

Q & A's Greatest Hits

Our trusty tech treats SCSI troubles and keeps tools rust-free.

By Alan Gary Campbell

Q. When I hooked up my hard drive, which I got surplus from the Radiation Hazard Survivability Test Facility, to my sampler's SCSI port, it didn't work. I'm sure I plugged it in right. The cable my next-door neighbor found at the flea market was a perfect fit. Am I doing something wrong?

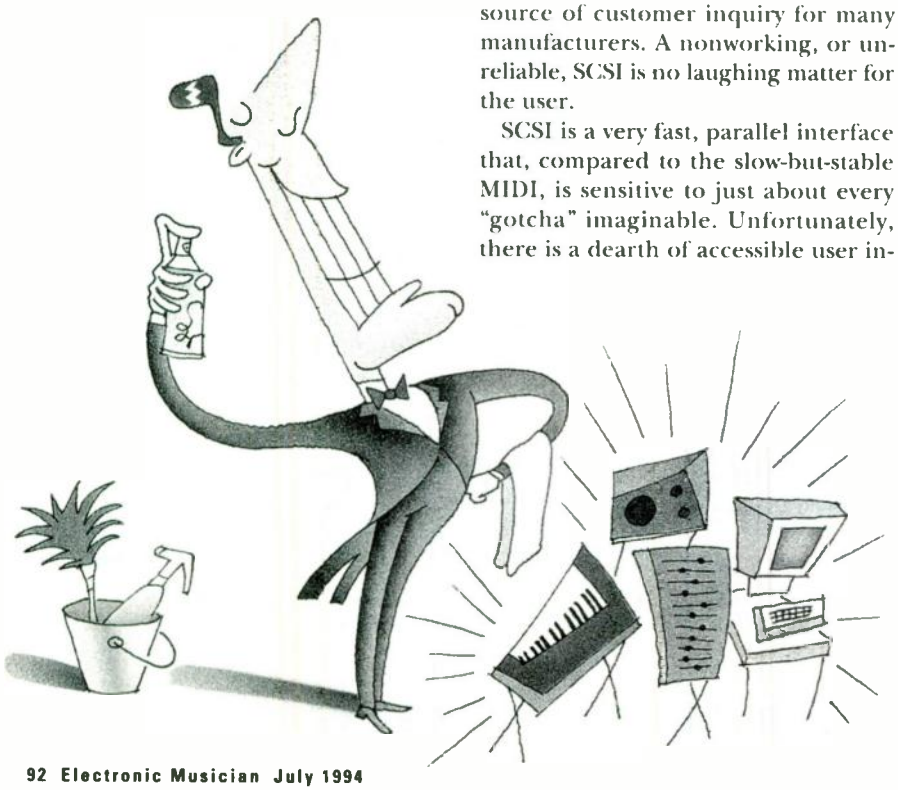
A. Okay, so I embellished the user's question a bit. But SCSI (pronounced "scuzzy") problems are the number one source of customer inquiry for many manufacturers. A nonworking, or unreliable, SCSI is no laughing matter for the user.

SCSI is a very fast, parallel interface that, compared to the slow-but-stable MIDI, is sensitive to just about every "gotcha" imaginable. Unfortunately, there is a dearth of accessible user information regarding SCSI, and there is a plethora of misinformation (a situation frustratingly reminiscent of MIDI's early days).

For a simple SCSI system, e.g., a sampler and an external SCSI hard drive, it is wise to follow to the letter the manufacturer's instructions regarding drive compatibility, proper cabling, and termination. With used equipment, it is well worth the money and trouble to order, if necessary, a replacement owner's manual that provides the needed information. It can be tempting to save a few dollars with a substitute drive or cable, but if you do, good luck!

With multiple SCSI-device installations, things can get really hairy. A case in point: What do you do with a device that the manufacturer says must be last in the SCSI chain, but that only seems to work properly when it's in the middle? Usually, such apparent weirdness has a scientific explanation. In this case, the device intended to be last is almost certainly internally terminated. Long SCSI cable runs often require additional termination in the middle, and the internally terminated device may coincidentally satisfy this particular requirement. With countless possible system configurations, real-world SCSI operation can call for a lot of experimentation.

For the SCSI novice, Rudy Trubitt's practical, pithy "The Story of SCSI" (in



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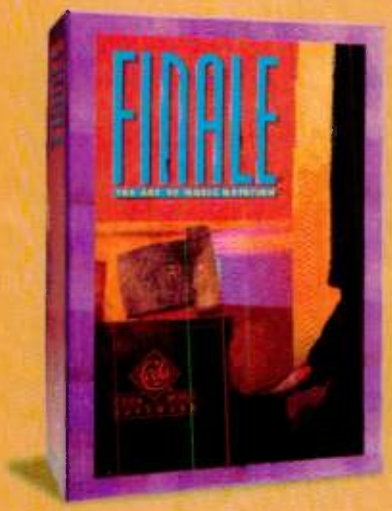

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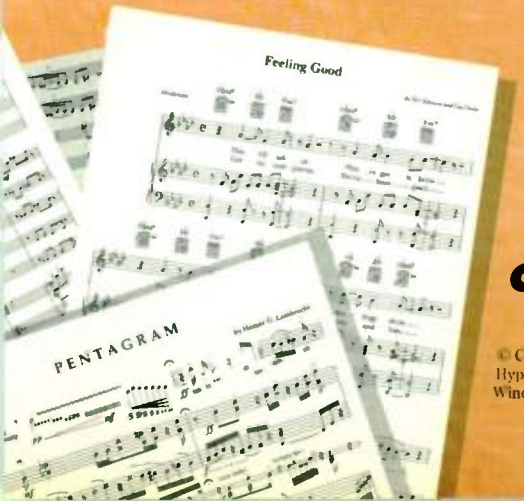

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the June 1991 EM) is a "must read." Matt Isaacson's "What is SMDI?" (June 1993) is a similarly indispensable reference for the SCSI Musical Data a standard for sample dumps via SCSI.

Q. **I have an Oberheim DPX-1 sample player I use pretty regularly, and it still works. But I'm worried about the disk drive, because I've never cleaned it. Should I clean it, and if so, how and with what should I clean it?**

A. Many diskette and accessories manufacturers offer drive-cleaning devices with special, diskette-like carriers that hold cleaning disks impregnated with no-residue, non-water-based cleaner. In most cases, these devices are used simply by inserting the carrier in place of the usual diskette and accessing the drive. The cleaning disk rubs gently against the drive head (double-sided drives should be accessed for both sides) to remove accumulated debris. Generally, the replaceable cleaning disks are used once, then discarded.

Alternatively, the unit and the drive can be disassembled and the drive head cleaned manually, using a special, lintless swab and a commercial head-cleaner (usually fluorocarbon-based). This, however, is a job for a service center.

Drives that see moderate use in a fairly clean environment may not require cleaning often, as this reader's letter attests. Drives taken on club gigs may need cleaning regularly, though an exact cleaning schedule is impossible to predict, because environmental conditions vary greatly. Using only high-quality diskettes can reduce long-time head contamination and offers higher data security.

Note that drive failures are more often than not caused by normal, unavoidable head wear than by head contamination.

Q. **As a service tech, I have some electronics tools that I use only occasionally (though they are important to have when I need them), and, mindful of the cost of tools these days, I was horrified to find that they had begun to rust while stored in a clean, new toolbox, located in a dry, temperature-controlled service area. What is causing this? I know that "Service Clinic" has recommended a light coating of oil as a preventive measure, but it seems that oil could contaminate equipment.**

A. Rust prevention is a necessary precaution with tools in storage or in use. Even some high-tech tool finishes are not impervious to oxidation, which usually occurs at an almost undetectable rate throughout the tool's service life. Tool-surface contamination with sweat and body oils can greatly accelerate oxidation and cause significant damage. Even if you have been careful not to excessively handle the metal surfaces of your tools prior to storage, several people may have handled them before you bought them.

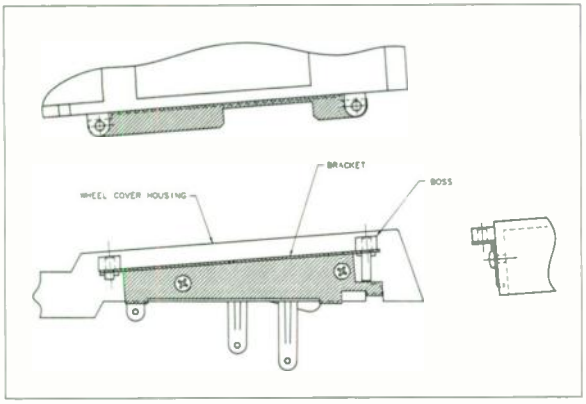


Fig. 1: Ensoniq's "ear bracket" replaces broken support tabs on numerous models.

It is helpful to avoid unnecessary skin contact with a tool's working surfaces and to wipe the tool with a soft, clean cloth after use. A rust-damaged tool can be soaked in light machine oil (metal surfaces only), then rubbed gently with high-quality, very fine steel wool to remove surface oxidation. Be careful; rubbing too hard can deface tool surfaces.

Applying a coating of oil to a precision electronics tool that will later be used in near clean-room conditions probably seems unthinkable to most techs. But to prevent oxidation, the coating only needs to be a few molecules thick. (The tool can be wiped clean before use, in any case.) Many of the commercial preparations sold to prevent rust are intended for long-term storage applications and leave a waxy coating that must be stripped before use. Of the lighter-weight products I have tried, none proved significantly better than simple, light machine oil (i.e., "gun oil"), available from almost any general-merchandise store, such as K-Mart.

Readers who have tried alternative products or methods for rust prevention are encouraged to share their findings in "Service Clinic."

ENSONIQ IS ALL EARS

Plastic structural components—tabs, supports, and receptacles—that become broken are a common problem with equipment. At least one manufacturer has decided, to the relief of service techs everywhere, to do something about it.

Ensoniq has created an "ear bracket," a permanent, screw-on replacement for the protruding tabs, on Ensoniq's plastic-cased instruments (see **Fig. 1**). The bracket supports the top panel (lid) at the left side. (The left tabs are far more prone to breakage than the right.) This useful modification retrofits the Mirage, ESQ-1 (plastic case), SQ-80, EPS, EPS-16+, VFX, VFX^{SD}, and SD-1. It should be installed by an authorized Ensoniq Repair Station, because it requires partial disassembly of the disk-drive housing, precision drilling, and, in some cases, thermal removal of existing, threaded brass inserts.

The kit, part number 9360 0093 01-A, includes one bracket and mounting hardware. Suggested list is $19.95, plus installation. Tech note: The bracket kit and its installation are described in Ensoniq *Service Bulletin #14*.

DIGGING UP DINOSAURS

There has been an enthusiastic response to my plea in the February 1994 "Service Clinic" for information regarding sources for vintage parts. Some of the alternative sources that have come to light are surprising. I am still collecting information for future publication, and those who have, or know of sources for, vintage parts (e.g., ICs, hardware, and accessories) should let me know. Write to "Service Clinic" (a postcard will do) c/o **EM** 6400 Hollis St., #12, Emeryville, CA 94610.

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

The Tower of TechnoBabel

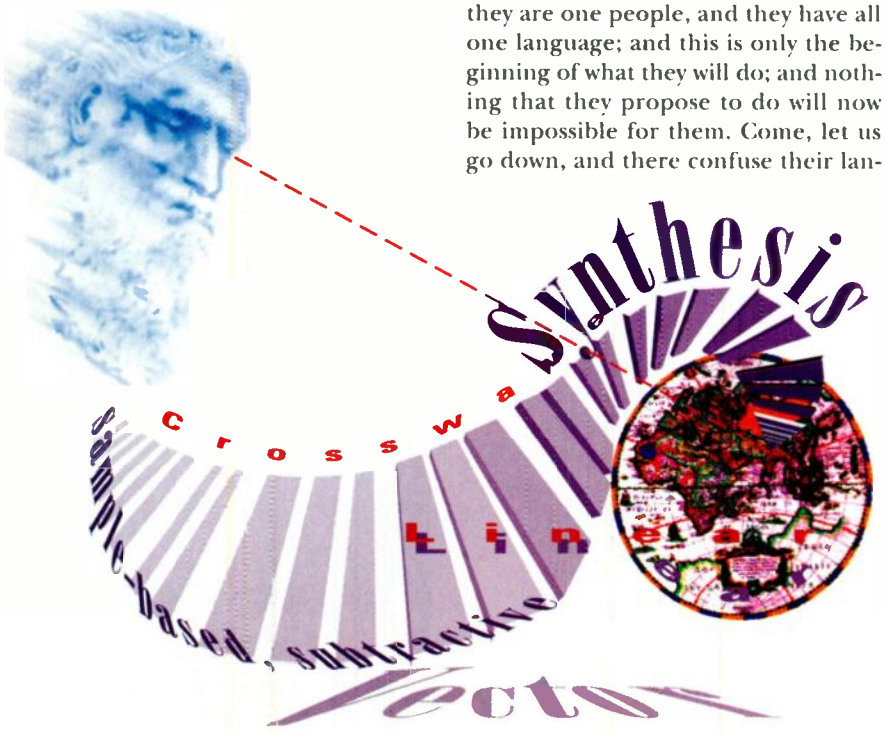
Surviving a synth-terminology plague of Biblical proportions.

By Scott Wilkinson

Most people are probably familiar with the story of the Tower of Babel (Genesis 11:1-9), which explains why there are different languages among the peoples of the Earth. According to the Bible, shortly after the Great Flood of Noah, "The whole Earth had one language and few words."

But when the people started building a tower "with its top in the heavens," God disapproved and said, "Behold, they are one people, and they have all one language; and this is only the beginning of what they will do; and nothing that they propose to do will now be impossible for them. Come, let us go down, and there confuse their language, that they may not understand one another's speech." God then scattered them across the face of the Earth, and they stopped building the tower. The abandoned city became known as Babel, a word that apparently comes from the Hebrew *balal*, meaning confusion.

I'm reminded of this story every time I learn how to operate a new synthesizer. It seems that every instrument has its own language, often using different terms for the same thing. Of course, some parts of a synth are truly new or unique and require their own name. But much of the nomenclature is nothing more than marketing hype designed to impress the consumer. Unfortunately, it can be more confusing than enlightening.



DMITRY PANICH

FOUNDATION

Take the various types of synthesis. Most modern synths make noise in a similar manner, sending sampled sounds and electronically generated, harmonically rich waveforms through various types of filters that reduce or remove certain harmonics. Generically, this is known as **sample-based, subtractive synthesis**. Although they could use this term, most manufacturers seem determined to invent new names for the same basic process.

E-mu came up with a surprisingly meaningful term for the type of synthesis used in the Morpheus: **Z-Plane**

Synthesis. The instrument sends a sampled sound through a filter that "morphs" smoothly between two or more independent filter settings in real time. Filter morphing can occur along three axes in a 3-D depiction, i.e., between two filter settings on the X axis, that pair and two other filter settings on the Y axis, and those four and four other settings on the Z axis. (See the Morpheus review in the May 1994 **EM**.)

Ensoniq used the term **Crosswave Synthesis** in their SQ-80, in which sampled attack transients are combined with sustained waveforms before proceeding through a subtractive signal path. They switched to the term **Dynamic Component Synthesis** for the VFX and subsequent synths. In this scheme, instrument sounds and effects are integrated, and the effects can be dynamically controlled in real time. For example, an LFO can modulate the pitch of a sound to simulate vibrato while also modulating the amount of reverb applied to the sound. More recently, Ensoniq has turned away from giving new names to synthesis technologies. Huzzah!

For the M1 and its offspring, Korg uses the term **Advanced Integrated (AI) Synthesis**, meaning sample-based subtractive synthesis with onboard effects such as reverb, delay, and so on. This was a relatively new feature when the M1 was introduced. The 01/W (reviewed in the January 1992 **EM**) and its offspring use **AI² Synthesis**, which enhances the AI scheme in various ways. In particular, it adds the ability to control and modulate effects in real time. Does this sound familiar?

The term **Vector Synthesis** is used by several manufacturers (starting with the Sequential Circuits Prophet VS) to indicate the ability to combine several sound elements, such as different timbres or effects, in varying amounts by moving a joystick or other 2-dimensional controller in real time. Korg's Wavestation instruments use **Advanced Vector Synthesis**, in which the movement of the joystick can be recorded and played back. The joystick can also be used to pan sounds and control the effects. The Yamaha SY22 and SY35 use **Dynamic Vector Synthesis**, which also includes programmable, repeatable joystick movements.

Kurzweil came up with a meaningful term for their K2000 synth: **Variable Architecture Synthesis Technology (VAST)**. Even the acronym is appropriate. This is more than sample-based subtractive synthesis; the normal filter in the signal path is joined by many other available sound modifiers. You can select one of 31 different algorithms (which determine the signal flow through the instrument), then assign various digital signal-processing (DSP) functions to "black boxes" in the signal path. (See the K2000 review in the March 1992 **EM**.)

The Korg 01/WFD was one of the first synths to use AI² synthesis. Multisamples are called "Multisounds," and LFOs are dubbed "Modulation Generators" or "MGs."

Roland is no stranger to techno terminology. Their early digital pianos use **Structured Adaptive (S/A) Synthesis**. In this process, sounds are painstakingly created by hand from individual harmonics, which is generically called **additive synthesis**. This technique is not used any more, because it's too time-consuming to develop new sounds, and the required hardware is very expensive.

Roland's D-50 and its offspring use **Linear Arithmetic (L/A) Synthesis**, in which analog synth parameters are digitally generated. These are combined with sampled transient attacks and sustained waveforms, then sent through a relatively traditional filter/amplifier chain or a more complex signal path. This is not unlike Crosswave Synthesis in the Ensoniq SQ-80.

The Roland D-70 and U-series instruments use another term, **RS-PCM**, which is straight-ahead, sample-based, subtractive synthesis. Like Ensoniq, Roland has recently shied away from inventing new names for synthesis techniques, simply calling their new models multitimbral synthesizers.

One of the few companies to avoid the sample-based subtractive approach is Yamaha. In 1986, they introduced **Frequency Modulation (FM) Synthesis** in the DX7 and its offspring. In this process, the frequency of one oscillator is modulated (varied up and down) very quickly by another oscillator, which produces a wide range of timbres, depending on the relationship between the frequencies and amplitudes of the oscillators.

The SY77 and its progeny use **Advanced Frequency Modulation (AFM)**, in which the original FM process was refined and enhanced. These instruments also include sample-playback capabilities. Yamaha's sample format was originally called **Advanced Wave Memory (AWM)**, which later became **Advanced Wave Memory 2 (AWM2)**. Sounds generated by both techniques are combined and sent through sophisticated digital filters. The result is **Realtime Convolution Modulation (RCM) Synthesis.** This term actually has more meaning than you might think, as it refers to the mathematical process by which the filters operate. (See the SY99 review in the October 1991 **EM**.)

Yamaha's latest product is the VL1, which uses **Virtual Acoustic Synthesis (VAS)**. This is another departure from sample-based subtractive synthesis; in fact, it doesn't use samples at all. The physical properties of acoustic instruments are simulated directly using DSP technology. (For more on **physical-modeling synthesis**, of which VAS is an example, see "Model Music" in the February 1994 **EM**.)

ARCHITECTURE

Most modern synths use a "building block" approach to create sounds. At the lowest level of the hierarchy are individual **samples**. In the case of drums and percussion, there is usually a single sample of each instrument. However, most melodic and harmonic instruments are sampled playing several different notes. These samples are assigned to the appropriate keyboard ranges to form **multisamples**, which let you play the instrument throughout

the entire musical range without sounding too unrealistic.

Samples and multisamples are combined in various ways to create the basic sound entity that you call up on the front panel and play from the keyboard. This entity is generically called a **patch**, **program**, or **preset**. In many cases, a small number of programs can be combined to create split or layered sounds across the keyboard; these constructs have no common generic name. In multitimbral instruments, programs can be combined into larger entities; again, with no common generic name. These larger multitimbral entities are normally used to play different sounds on different MIDI channels.

At the bottom of the hierarchy in E-mu's Proteus synth line are multisamples E-mu calls **Instruments**. Up to two Instruments are combined to form **Presets**, the basic playable entity. In the UltraProteus and Morpheus, up to sixteen Presets can be combined into **HyperPresets**. Multitimbral entities are formed by assigning Presets and HyperPresets to MIDI channels in a **MidiMap**.

The hierarchy in Ensoniq synths starts with multisamples called **Waves**, which include several custom-built **Transwaves**. These Transwaves consist of several different samples, placed end to end, that you can sweep through with a modulator such as the mod wheel or an envelope generator. Applying various parameters to a Wave or Transwave creates a **Voice**. Up to six Voices are combined to form a **Program** or **Sound** (depending on the specific model), which is the basic, playable entity. Multitimbral groups of Programs or Sounds are called **Performance Presets**.

Korg came up with some interesting terms to describe the hierarchy of the M1 and its progeny. Multisamples are called **Multisounds** (egad!), which are combined to form **Programs** (nothing unusual there). Programs are combined in various ways to form several types of **Combis**; the multitimbral variety is called a **Multi Combi**! In the Wavestation, multisamples are called **Waves**, and up to four Waves are combined to form a **Patch**. The basic playable entity is called a **Performance**, which consists of up to eight Patches assigned to **Parts**. The multitimbral construct is called a **Multiset**, which includes up to sixteen **Performances**.

The hierarchy of the Kurzweil K2000 includes many levels. Individual **Samples** are assigned to different areas of the keyboard in a **Keymap** to form multisamples. A Keymap is sent through a VAST algorithm to form a **Layer**. Up to three Layers are combined to form a **Program**, the basic playable entity; a special type of Program, called a **Drum Program**, can include up to 32 Layers. Up to three Programs can be combined to form a **Setup** of split or layered sounds. The K2000 is always in multitimbral mode, so there is no particular multitimbral entity. All these items are examples of **Objects**, a name applied to anything and everything that can be named, saved, edited, or deleted within the instrument.

Roland instruments are awash with hierarchical nomenclature, so hold onto your hat. In the D-50, the bottom of the hierarchy is called a **Partial**, which includes its own sample-playing oscillator, filter, and amplifier. Each Partial is like a complete sample-based subtractive synth. Two Partials are combined to form a **Tone**, and two Tones are combined to form a **Patch**, the basic playable entity. In more recent synths, Roland dispensed with Partials; each Patch consists of four Tones. For multitimbral applications, each Patch is assigned to a **Part**, which includes its own assignable MIDI channel. Parts are then combined into a **Performance**.

The Roland Sound Canvas and its progeny conform to the General MIDI (GM) specification, which standardizes the program numbers of different

The Roland D-70 uses RS-PCM sample-based synthesis. The Palette on the front panel lets you edit several related parameters by moving one slider.

kinds of sounds. For example, an acoustic-piano sound is always Program Change 1. (For more on GM, see "MIDI For The Masses" in the August 1991 **EM**.) Roland's version of General MIDI is called **GS**; these letters mean nothing according to the official company line, but rumor has it they stand for **General System**. GS includes all 128 GM sounds, and then some, because the original Sound Canvas predated the final GM specification.

The hierarchy of these instruments starts with **Samples**, which are controlled with various parameters to form **Tones**, the basic playable entity. There are two types of Tones: **Capital Tones** and **Sub-Capital Tones.** Capital Tones include the 128 standard GM sounds, while Sub-Capital Tones are variations of the Capital Tones. Tones are assigned to **Parts**, sixteen of which form a multitimbral **Performance**. (The new Sound Canvas P-55 piano module introduces yet more terms; see the review in the June 1994 **EM**.)

The Yamaha SY77 and its direct descendants start with **Elements**, which can be either AFM sounds or AWM samples. In the VL1, an Element is a specific physical model. Depending on the instrument, two or more Elements are combined to form a **Voice**, the basic playable entity. In these instruments, a Voice can be split or layered with different Elements. (In the SY85 and TG500, split and layered sounds are created with several Voices in a **Performance**.) Multitimbral entities are called **Multis**.

TOOLS

Within each synth, there are many functions, parameters, and components with their own names. Although we can't cover them all here, let's take a look at a few of the more interesting examples.

Some instruments offer the capability to play a sequence of samples, one right after another. Generically, this is called **wave sequencing**, a term that was invented by Korg for their Wavestation. In the Ensoniq TS-series synths, it's called **Hyper-Wave**.

When they first appeared, digital filters were limited in their ability to vary over time. Roland soon overcame this limitation, calling their digital filters **TVFs (Time-Varying Filters)**; Korg calls theirs **VDFs (Variable Digital Filters)**. Similarly, digital amplifiers (which control the volume of the final sound) are called **TVAs** by Roland and **VDAs** by Korg.

Some companies like to obfuscate the obvious. For example, Roland calls their oscillators **Wave Generators (WGs)**, while Yamaha calls their FM oscillators **Operators**. (This actually has some meaning: Operators are oscillators with their own dedicated envelope generators.) Korg calls their LFOs **Modulation Generators (MGs)**.

Some instruments include a **Quick Edit** function, which provides several sliders or other controls on the front panel. By moving one slider, you can edit several related parameters at once. For example, a slider labeled "Brightness" might change several filter and envelope parameters. This makes it easy to quickly and intuitively change the nature of a sound without having to enter the dreaded edit mode. The Yamaha SY85 and TG500 call this function **Quick Edit** (amazing!). In the Korg M1 and its progeny, this function is called **Performance Editing**. The Korg Wavestation calls each group of related quick-edit parameters a **Macro**.

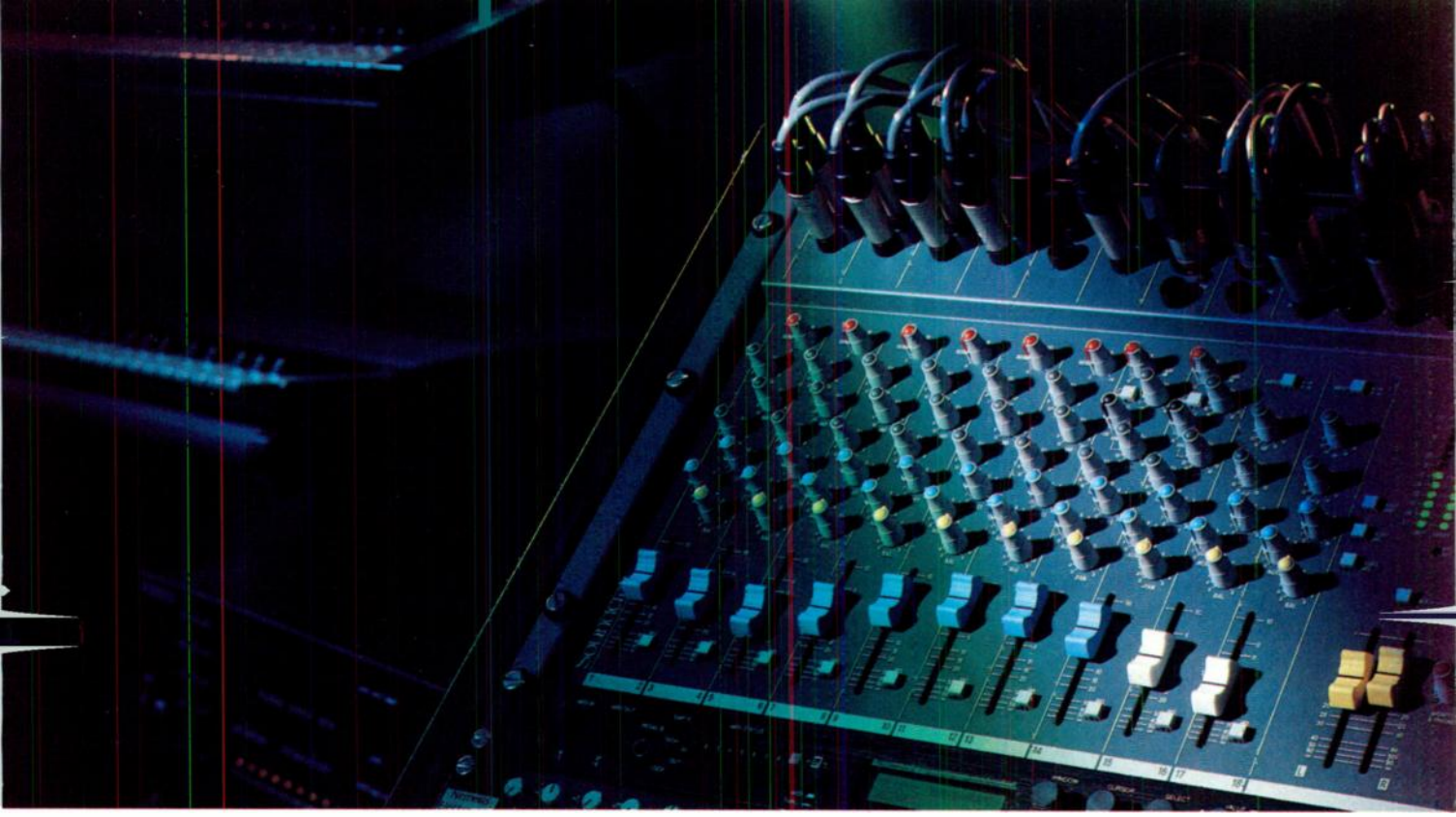
The Roland D-70, JX-1, and αJuno also include a Quick Edit function, with several sliders called a **Palette** on the front panel. The Roland JD-800 and all current synth models also have a **Palette**, but it serves an entirely different purpose. Four sliders edit the last selected parameter for each of the four Tones. This makes it easy to edit the same parameter for all Tones, but it has nothing to do with editing several related parameters with one slider.

The Yamaha VL1 opens a Pandora's Box of new parameter names; see the review in the June 1994 **EM** issue for more on these interesting terms.

AMEN

If you're confused by the bewildering array of terms and phrases used by the manufacturers of synthesizers and samplers, you're not alone. Although this may not be a problem of biblical proportions, it does tend to impede the creative process, and many consider creativity to be divine. Perhaps manufacturers will contemplate this when they sit down to design the next generation of instruments from which heavenly music will emanate.

EM *technical editor* **Scott Wilkinson** *loves learning new languages.*



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Reviews

Alesis QuadraSynth

By Scott Wilkinson

Finally, the synth everyone's been talking about is here.

Famous for their low-cost, high-value gear, Alesis has developed an ever-widening range of products that seems destined to encompass every function of a studio. A product line that started with reverbs and other signal processors now includes a mixer, near-field monitors, a power amp, and, of course, the ADAT 8-track digital tape recorder.

The only thing missing from the Alesis lineup was a synthesizer. With the long-awaited release of the QuadraSynth sample-playback synth, Alesis now offers enough equipment to completely outfit a small studio. Just add your favorite sequencer to complete the picture. (Alesis *did* have this covered, but they no longer make the MMT8 hardware sequencer.)

The QuadraSynth features 64-voice polyphony, 16-part multitimbral capability, 76 keys, 16 MB of sample ROM, and an optical ADAT interface. The volume knob resembles a hockey puck, and all controls are located in a central trough. The design is clean and uncluttered.

The 64-voice polyphonic, 16-part multitimbral QuadraSynth is bound to make a splash. Let's start with the stats for the newest player on the Alesis studio team.

FIRST GLANCE

With 76 keys, the QuadraSynth is big enough to serve as a master controller. The synth-action keyboard is sensitive to Velocity, Release Velocity, and Channel Pressure (aftertouch). You can specify a "weighted" or "plastic" Velocity-response curve in addition to thirteen Velocity curves affecting the overall amplitude. It also has the same problem as the K2000: As you bear down to invoke Pressure, the back of the key rides up and hits the casing, which feels unstable.

The front panel exhibits a clean, uncluttered, attractive design. All controls (except the pitch and mod wheels) are located in a "trough" that runs almost the entire length of the instrument. Rectangular buttons cut across the trough and meet in the middle, forming pairs of buttons.

The pitch and mod wheels are made of a rubbery material. The spring loading on the pitch wheel is quite stiff. The volume knob, which is three inches in diameter and made from a similar rubbery material, resembles a hockey puck. Unfortunately, the volume of the instrument drops out completely when the puck is below the 10% level or so.

Ten numbered buttons to the right of the volume puck select Programs (the basic playable entity) and Mixes (multitimbral setups). If you push any three of these buttons while in any edit mode, your edits are lost as a new Program or Mix is called up. I consider this a serious drawback. In most synths I've used, you can't change Programs while in an edit mode, so losing your edits in this fashion is not an issue.

Eight mode buttons let you select the various performance and edit modes. Two Function buttons scroll through the available editing functions, many of which consist of several pages that are selected with the two Page buttons. To the right of the display, two MIDI buttons select MIDI channels, and two Value buttons increment and decrement the value of the selected parameter.

At the far right of the trough, four Quad buttons and Quad knobs (made from the same rubbery material as the wheels and volume puck) are used to select and edit the associated parameters in the display. The buttons simply select the associated parameter for editing with the Quad knob or the Value buttons. You can also move the desired Quad knob directly, which selects the parameter and edits the value in one step. The Quad knobs are useful for large changes, but the Value buttons are essential for small, incremental changes.

The synth features a large LCD, which displays more information than a fully graphic, dot-matrix design. (The latter wouldn't have the resolution to simultaneously show all the edit functions.) The edit functions appear when needed in the edit modes, as with Ensoniq samplers. The only graphic element of the display is a set of four bar graphs. These indicate the current values of the parameters associated with the Quad knobs.

Above the bar graphs, two lines of dot-matrix characters display labels for the bar graphs and the name of the currently selected Program, Mix, or parameter, along with its numerical value. The upper line is six characters shorter than the lower line. The display's angle of readability is very narrow; if you adjust the contrast for a seated position, you can't read the display while standing, and vice versa.

On the rear panel, MIDI In, Out, and Thru ports are joined by a pair of Main stereo outputs and a pair of Aux stereo outputs, all on unbalanced, 1/4-inch phone jacks. The unit accommodates one sustain pedal and two programmable pedals, which can be configured as switches or continuous controllers. An optical digital output allows you to connect the QuadraSynth directly to an ADAT with a fiber-optic cable, and a BNC connector accepts an external 48 kHz clock signal from a BRC (the ADAT's master remote control). This synchronizes the clock rates of multiple ADATs and the QuadraSynth. A RAM/ROM card slot rounds out the rear panel, except for the cool handle molded into the case, which makes the instrument easy to carry.

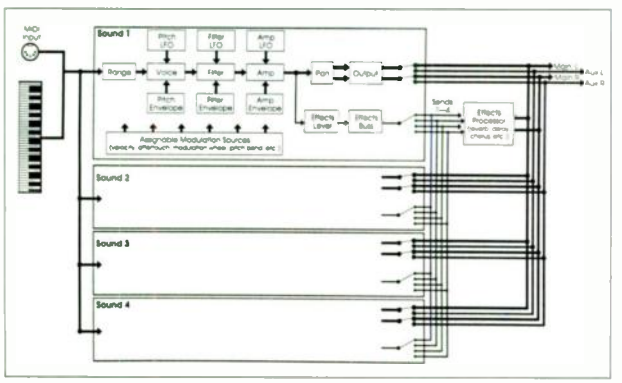


FIG. 1: A Program consists of up to four Sounds, each with a modulated oscillator (voice), filter, and amplifier. Each Sound can be assigned to any one of four effects buses.

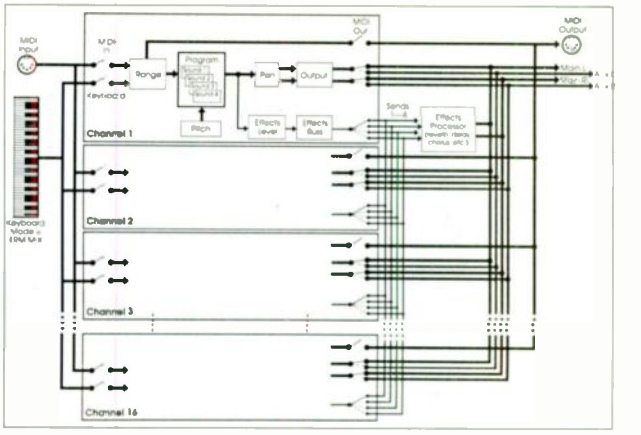


FIG. 2: A Mix consists of up to sixteen Programs, each assigned to a different MIDI channel. Each Program can also be assigned to one of the effects buses.

All Programs, Mixes, Effects patches, and Global settings are stored in nonvolatile RAM. Optional RAM cards provide up to eight times the internal storage capacity. In addition, several third-party developers are creating ROM cards with up to 8 MB of new samples, which is the largest-capacity ROM card yet. These cards conform to the new PCMCIA computer-peripheral format, and initial tests by the company indicate that standard PCMCIA RAM cards should work without problems. There is no floppy-disk drive.

STICK TO THE ROOTS, TOOTS

The QuadraSynth uses sample-based, subtractive synthesis. There are 401 sample roots, including 58 drum samples, in 16 MB of ROM. (As mentioned earlier, additional samples will be available on ROM cards, and Alesis is working on a scheme whereby Flash PROM cards will store user samples imported from a Digidesign SampleCell system via System Exclusive.) Many of the sample roots are multisamples, including some full drum kits. Except for the drum and percussion sounds, almost all of the sample roots are looped after the attack portion, which allows you to envelope them as you wish.

The sample roots are divided into sixteen groups: Pianos, Organs, Keyboards, Synths, Waves, Basses, Guitars, Brasses, Woodwinds, Solo Strings, Ensemble Strings, Ethnic, Voices, Sound Effects, Drums, and Percussion. I like this organization. However, there is a definite predominance of Synth and Wave samples (125 in all) and a paucity of acoustic-instrument samples. In addition, many of the other groups include "wave" samples. There are also a fair number of Velocity-switched samples, which is handy.

Among the Synth and Wave samples are many preset "Filter Sweep" waveforms and pulse waves with various duty cycles. There is no resonant filter or pulse-width modulation. Apparently, to implement a resonant filter at this price, the total polyphony would have to be cut in half.

GET WITH THE PROGRAMS

A sample root is processed through a modulated filter, amplifier, and the effects to create a Sound, and up to four Sounds are combined to form a Program (see **Fig. 1**). There are 128 preset Programs in ROM and 128 user Programs in RAM.

The Sounds in a Program can be layered, split, overlapped, and Velocity switched and crossfaded. Of course, you sometimes sacrifice polyphony when you layer two or more Sounds. Most of the factory Programs include two to four Sounds, most of which sustain throughout each note, reducing the polyphony.

The QuadraSynth's voice allocation is more intelligent than most. If the onset of one Sound in a Program is delayed

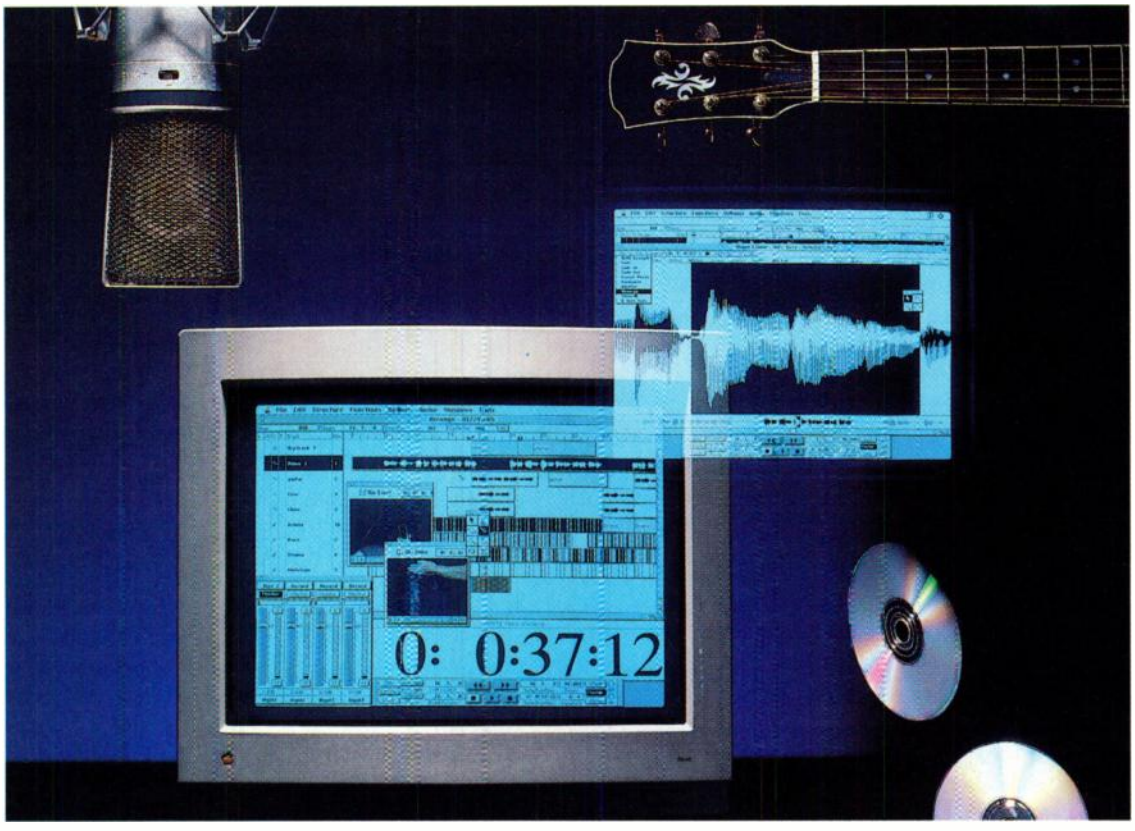
Cubase Audio for Macintosh

Editors' Choice

Electronic Musician January 1994

POWER TOOLS !

TEC TECHNICAL EXCELLENCE & CREATIVITY 1993 NOMINEE



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with respect to the others, or it's shorter in duration, a voice is allocated only while that Sound is active. For example, if a Program includes a sustaining Sound and a layered percussive attack, each note uses two voices of polyphony only during the short percussive attack. This is very cool.

Unfortunately, sustaining notes are cut off when you change Programs. According to Alesis, this is due to the fact that the QuadraSynth "digests" all parameters before it makes a sound, which leads to a lightning-fast MIDI response. This is a good thing, but the abrupt cutoff is disconcerting.

Each Sound can be placed into Drum mode, which lets you assign up to ten samples to the Sound in user-definable keyboard ranges. This allows you to construct your own drum kits. No more than one sample can be assigned to a particular key in a Drum Sound, but up to four Drum Sounds can be assembled into a Program, which gives you up to four drum samples on a particular key. Of course, you can also use one of the preset drum kits in a regular Sound.

The oscillator, filter, and amplifier in each Sound has its own envelope generator (EG) with keyboard rate scaling (called "Time Tracking" in the QuadraSynth) and low-frequency oscillator (LFO) with several waveforms and delay. A Sound Overlap feature lets you specify how many voices are used to play the same repeated and sustained note. This is great for limiting the reduction in polyphony during such passages.

Additional control is provided by a flexible matrix-modulation scheme. Up to six modulation sources are assigned to control several modulation destinations. Modulation sources include note number, Velocity, Release Velocity, Channel and Poly Pressure, Pitch Bend and Modulation, any EG and LFO, MIDI Volume, all footpedals, and any four Control Change messages (labeled A through D). You also can use a random value, a trigger-rate follower (which generates values based on how fast you play), and a tracking generator (a user-programmable response curve with ten breakpoints). The tracking generator can alter the output of any modulation source assigned to its input, which is very nice. The modulation destinations include many pitch, filter, and amplifier parameters, as well as the portamento rate and effects-send level.

In Program Edit mode, you first select the function—Pitch LFO, Filter EG, etc.—you wish to edit with the Function buttons. If there are more than four parameters for a particular function, they are divided into pages, which you select with the Page buttons. In each Page, you can edit four different parameters for one Sound with the Quad knobs, or you can edit the same parameter for all four Sounds. I found this organization to be quite effective.

SOUNDS LIKE...

In general, the QuadraSynth sounds clear and clean, with no noise and no aliasing within an instrument's normal range. I found the synth textures to be excellent, especially the "mood" pads. There are some great Oberheim-type leads, and several Programs are strongly reminiscent of the Roland JX-10 and D-50. In particular, "Obersphere" and "Space Pipes" sound very much like the fundamental sounds from an album I have on which nothing but these Roland synths (and the S-550) are used. It's not surprising that the QuadraSynth is strong on synth sounds, as it was created by the same design team that dreamed up the Oberheim Expander, Matrix-12, OB-8, and many other classic products.

Many of the Programs that emulate electronic and electroacoustic instruments are quite good. The synth and electric basses are full and rich, although "Thump Bass" falls into a loop too quickly. The electric pianos are fine, as well. One exception is "Wurli," which sounds little like the Wurlitzer I had in college. Apparently, the drum sounds are derived from the Alesis D4, and they sound fine in general.

Some of the sounds are less successful, however. To begin with, the QuadraSynth simply lacks sonic guts. This is especially noticeable with the electric guitars, solo brass, and B3-type organs, where an aggressive sound is required. Most of the organ sounds have a nice "pop" in the attack and a clear, bright tone quality, but they don't cut it for down-home blues.

I am also unhappy with many of the sounds that emulate acoustic instruments. For example, many solo strings are timbrally good, but suffer from a somewhat mushy attack. Instruments that were sampled with vibrato, such as "Flute Vibr," have a beautiful basic sound, but suffer from multisamplitis; that is, the vibrato rate changes abruptly as you play across a multisample boundary on the keyboard. Fortunately, the QuadraSynth also includes flutes and other instruments sampled without vibrato.

Many of the acoustic pianos could be used in an ensemble, but their timbral deficiencies become evident in solo passages. The sound is generally fair in the lower octaves, but it deteriorates in the middle octaves. In addition, some pianos have a overly sharp attack.

MIXING IT UP

Up to sixteen Programs can be combined to form a Mix, Alesis' term for a multitimbral setup (see **Fig. 2**). There are 100 Preset Mixes in ROM and 100 User Mixes in RAM. Unfortunately, the QuadraSynth responds like molasses when changing from one Mix to another, taking about half a second to accomplish this task.

Editing Mixes is similar to editing Programs. In Mix Edit mode, one Program is assigned to each MIDI channel, with its own key range. You can also adjust the relative level of each Program and route it to the effects (discussed shortly). In addition, you can edit each Program and the effects from within Mix edit mode, although you must save the Mix, Programs, and effects settings separately. I would like to have the option of saving all items together in one operation, although this would affect other Mixes that use the

Product Summary

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$1,499
MANUFACTURER:
Alesis Corp.
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Los Angeles, CA 90016
tel. (800) 5-ALESIS
or (310) 558-4530
fax (310) 836-9192

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507	526	545	564	583	602	622	641
508	527	546	565	584	603	623	642
509	528	547	566	585	604	624	643
510	529	548	567	586	605	625	644
511	530	549	568	587	607	626	645
512	531	550	569	588	608	627	646
513	532	551	570	589	609	628	647
514	533	552	571	590	610	629	648
515	534	553	572	591	611	630	649
516	535	554	573	592	612	631	650
517	536	555	574	593	613	632	651
518	537	556	575	594	614	633	652
519	538	557	576	595	615	634	653
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same Programs and effects patches.

Most of the factory Mixes are layers and/or splits. The 16-way splits are not very useful, but 2- or 3-way splits of bass, comping sound, etc., are better. For multipart sequencing, I found the best approach was to assemble the appropriate ensemble, set the key range of all Programs to full width, and set the Global Mix Keyboard Mode to Channel Solo, which sends MIDI messages only on the user-selected channel. All the other Programs respond only to MIDI messages from the sequencer. This lets you select the Program you want to record simply by selecting the corresponding MIDI channel.

The QuadraSynth can transmit on up to all sixteen MIDI channels at once, each with its own key range, from a Mix. There are three switches for each Program that determine how the keyboard and internal sound source behave: Local on/off, MIDI In on/off, and MIDI Out on/off. This scheme is a bit confusing at first, but its flexibility is great.

Calling up a new Mix sends a Program Change for each Program that has MIDI Out enabled. MIDI messages from the pedals, wheels, and aftertouch are sent on all enabled MIDI Out channels. It would be even better if the Quad knobs and buttons could be programmed to send different messages on different channels. I guess you can't have it all.

EFFECTIVE EFFECTS

The onboard effects are derived from the yet-to-be-released QuadraVerb 2. Three types of effects are available: modulated pitch, including mono and stereo choruses and flangers, rotating-speaker simulation, and resonator; mono and stereo delay; and reverb. Each type includes many specific effects algorithms.

Each Sound in a Program, or Program in a Mix, can be routed to one of four effects buses. Processed signals are mixed with the Main outputs only; the Aux outputs are always dry. Three configurations determine the specific arrangement of effects on each bus (see **Fig. 3**). Configurations 1 and 3 have three separate pitch effects, four separate delays, and one shared reverb for all buses. Configuration 2 has one delay, two pitch effects, and two reverbs. In addition, you have some control over the exact signal routing.

Many of the effects parameters can be controlled in real time from up to two modulation sources. This is similar to the matrix modulation for Programs. All effects provide a full range of parameters, and they sound fine, in general. The routing is more flexible than most synths; this is one of the first instruments to offer independent effects for several Sounds or Programs. Overall, the effects are one of the nicest things about the QuadraSynth.

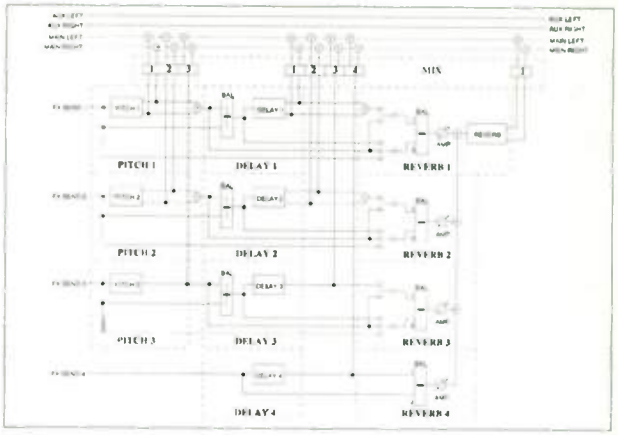

FIG. 3: Effects Configuration 1 includes three independent pitch effects, four delays, and a reverb.

ADAT INTERFACE

One of the most highly touted features of the QuadraSynth is an optical, digital interface that connects directly to an ADAT. The fiber-optic cable carries all four audio outputs, sending them to the first four tracks on the ADAT.

This function works well and offers several advantages. Obviously, it lets you record synth parts to multitrack tape in the digital domain, so you don't have to use converters. But even for those who usually sequence the synth parts and record them at mixdown, the optical interface can be a big plus. If you route the optical output to an Alesis AI-1, you can convert the synth's audio signal to AES/EBU or S/PDIF. This lets you record the QuadraSynth to a hard-disk recorder for mastering, send it to an effects processor with digital I/O, or mixdown to DAT, all without leaving the digital domain.

MIDI, MANUAL, AND MISCELLANY

There is no separate edit function that includes the MIDI parameters. Instead, they are distributed among the other functions. For example, there are two ways to turn Local on or off for each Program in a Mix. This is a little confusing, but the ability to save the Local status for each Program in a Mix is *very* nice. The QuadraSynth does not respond to Bank Select messages to select between the Preset and User banks, which is a bummer.

The 129-page manual provides a good reference to the parameters, but the index is woefully inadequate. There should also be some tutorial examples of multitimbral sequencing. As it is, this is barely mentioned in the "Connections" chapter. In the miscellany department, there isn't a memory-protection switch in the software, although you are prompted to specify the memory location and verify your action before the item is actually saved.

The first unit I received for review was from one of the initial batches, and it had a hardware failure that does not exist on subsequent units. So far, no problem. But in the second unit, the volume puck was wobbly and didn't feel securely seated. I have also played several QuadraSynths elsewhere, and most of them had one minor problem or another. For example, the volume puck on the floor model at one dealer was also wobbly, and it rotated infinitely without stopping at the minimum or maximum setting. In another instrument, one of the Quad buttons did not operate reliably. On yet another QuadraSynth, one Quad knob exhibited excessive jitter when scrolling. These problems are not catastrophic, but they raise questions about quality control. (Alesis assures us that they have fixed these problems on all current units.)

CONCLUSIONS

The QuadraSynth represents a first in several important areas. This is the first synth with a digital output as standard equipment. The flexibility and multiplicity of the effects are unprecedented, and the polyphony is the largest of any instrument to date. The master-controller features are impressive. Piano players may prefer a weighted keyboard, but for them, a rack-mount

version is on the way. And there are various cool features, such as the ways the unit maximizes its polyphony.

Some aspects of the unit seem to be a balance of good and unfortunate. The user interface is a bit confusing in some respects, but I got used to it after a while. The way sustaining notes are cut off by Program Changes is irritating, but according to the manufacturer, it speeds up MIDI response.

On the downside, I'm not happy with the quality and quantity of many of the emulative sounds. If that's what you're looking for, I would look elsewhere. And although it was a conscious decision on Alesis' part to keep the Program/Mix select buttons active in the edit modes, I think this was a mistake. Finally, I recommend you carefully test the unit you intend to buy to ensure it is operating properly.

Alesis provides a generous array of features for under $1,500, and the synth timbres are especially nice. If you want synth-type sounds, and don't mind saving a few bucks, the QuadraSynth may be just what you're looking for.●

(Thanks to Jim Mona and Matt Solomon of Goodman Music.)

Circle #437 on Reader Service Card

Yamaha MT8X Ministudio

By Steve Oppenheimer

Taking analog cassettes to the limit.

Some folks prefer to do things the easy way, and I'm one of them. If I want to record sequenced tracks along with non-MIDI instruments and full vocal arrangements, four tape tracks just aren't enough. Sure, a 4-track could do the job with careful ping-ponging, but it's a hassle, and it sacrifices audio quality. I absolutely *hate* analog ping-ponging. And for many hobbyists (or magazine editors), wider-format multitracks and modular digital decks can be too expensive for one's budget. So what's a demo-dealing, multitracking maniac to do?

Yamaha's latest tabletop ministudio provides a practical answer. The MT8X is the first new 8-track cassette deck in years. True, this isn't the first time eight tracks have been shoehorned onto 1/8-inch-wide tape. TOA had a rack-mount 8-track cassette deck, but it was discontinued long ago. Tascam introduced the rack-mount 238 Syncaset back in 1988, but it's gone, too. The MIDI-automated Tascam 688 Midistudio arrived in 1989, and the 488 Portastudio was launched in 1991. But they and the MT8X are the only such devices still available, making them relatively rare birds.

DESIGN BASICS

The MT8X uses a split-head design (i.e., the record heads are staggered), which helps reduce tape-track crosstalk. Yamaha's unit also resembles the Tascam 488 in that it includes an 8-channel mixer with four subgroups and lets you record four tracks at a time. (The far more expensive 688 lets you record on all eight tracks at once.) But from there on, the features on the new Yamaha machine clearly outstrip its closest competitor.

I was pleased by the smoothness of the 2-motor transport, which operates at 3 3/4 ips, with a varispeed (±12%) pitch control. The transport is a bit less sophisticated than some Tascam ministudios, in that it uses the tape's pressure pad to maintain head contact. Yamaha recommends TDK SA or Maxell high-bias tape, which is great stuff. However, I used Sony UX-series tape and had absolutely no problems. (Be sure to always use brand new, high-quality tape.)

The display is large and easy to read, especially the tape counter, which is clearly readable at nine or ten feet. The LED level meter is divided into 24 closely spaced segments (eight sets of three), so you can get a more precise indication than with most cassette decks. Indicators light up to show the status of the dbx noise reduction, sync defeat, memory locations, and other basic features.

Like most cassette ministudios, the MT8X represents a compromise between price and features. Of its eight mixer channels, the first four are "full-featured." Each of these channels includes a 1/4-inch, unbalanced, mic/line input with mic preamp, trimpot, and clip LED; 3-band, fixed EQ; two aux

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sends; and a fader. Channels 1 and 2 have 1/4-inch TRS insert points; unfortunately, they are the only inserts on the machine. Channels 5 to 8 have 2-band, fixed EQ and lack the mic preamp (and thus, the trim pot), and channel 8 is stereo; otherwise, they are identical to channels 3 and 4.

Except for the headphone, punch I/O, and remote-control inputs, all jacks are on the back panel. The monitor outs, stereo outputs, individual tape track outputs, and 2-track returns use RCA jacks; all other connections use 1/4-inch jacks. Yamaha's odd decision to use RCAs on the monitor outputs means you'll need adapters for use with most power amps.

The minimal number of inserts, the implementation of the aux returns (discussed shortly), and the common use of numerous sound sources—say, a microphone, a drum machine, several analog and digital synthesizers, and one or more samplers—means that many users will require an external submixer.

ASSIGN OF THE TIMES

The mixer channels are assigned to tape tracks via four subgroups. Group 1 routes signals to tape tracks 1 and 5, Group 2 addresses 2 and 6, and so on. Two group-assign buttons route each channel to groups 1/2 and groups 3/4; a pan pot determines the odd-even group assignment. (For example, if the Group 1/2 button is depressed, and you pan hard left, the signal goes to group 1; hard right routes to group 2.) Thus, you can send any channel to any, or all four, group buses. Each group has a rotary level pot.

Another button switches between the tape and line source. There are no solo or mute buttons, but by switching the tape-mic/line button, you can effectively mute the channel. Obviously, you can use the Tape/Line switch for mixing and tracking, respectively. However, all channels and the aux returns also are hard-wired to the stereo bus. With seven tracks recorded to tape (track 8 held SMPTE time code), I took advantage of this to add submixed, sequenced parts during mixdown.

The two stereo aux returns are routed to groups in the same way as the channels, using group 1/2 and group 3/4 assign buttons, with a level pot for each stereo pair. There is a limitation to the stereo aux returns, though: Unlike the channels, they cannot be

panned to just the odd or even bus, which would make them more flexible. As a result, I had to unplug one side of the aux return during tracking and tended to do most processing at the submixer during tracking, using the MT8X auxes at mixdown.

MONITORING

The MT8X's monitoring facilities let you access everything. You can monitor either or both pairs of subgroups, using the seemingly omnipresent pair of assign buttons; the stereo bus; the 2-track tape returns; or the cue mix.

A mono cue section is provided, which lets you create a monitor mix that won't affect the recorded levels when tracking. (During mixdown, of course, you would monitor the groups or stereo bus to hear changes as you make them, including stereo placement.) The cue section provides eight minifaders and automatically monitors the output of the deck, which includes taped tracks and incoming mic/line signals (assuming the appropriate track is armed), depending on the status of the channel Tape/Line buttons.

The headphone circuit can be dangerous, as it outputs quite different levels when you're monitoring different buses. I would have liked a bit more gain while tracking vocals, when I had to keep the group levels low to avoid clipping. When you're monitoring the main bus at mixdown, though, you have a lot of gain. (This is a good thing; you can always trim the mixdown deck's input.) In fact, lulled into carelessness when tracking, I got blasted when I switched to the stereo bus and tweaked the main fader for mixdown. Lesson learned. One rotary pot controls both the monitor and headphone levels.

REHEARSE AND PUNCH

Among my favorite aspects of the MT8X are the various transport and punch-in features. The MT8X lets you switch transport modes while the tape is running, without hitting Stop. For instance, you can switch from Play to Record by merely pushing Record during playback. Of course, tragedy can result if you're careless, so consider this feature a loaded gun and treat it with respect. As you would expect, RTZ sends the transport to the tape-counter's zero point. The counter can be reset, and RTZ triggered, while tape is running.

The machine also offers two memory locations, which can be set "on the fly" during playback or recording. Locate buttons send the transport to the marked point. When you press Repeat, the unit plays from one marker to the next, then automatically rewinds and plays it again until you stop it. In Rehearse mode, you can use the memory features to practice recording parts, without actually committing the parts to tape.

Although this feature is by no means unique to the MT8X—Fostex and Marantz, for instance, have elaborate versions—I can't overemphasize how useful it is. At one point, I punched in a guitar solo and some wild fills at the coda that required extensive rehearsal. Without Repeat and Rehearse, I would have had to replay the parts manually and would have been a basket case at the end of the night. Instead, I was able to relax and take an easy ride.

Once you're ready to repair or overdub parts, you can punch in and out three ways. Thanks to the unit's one-touch record, you can let the tape play and hit Record on the fly. This is preferable when you're engineering someone else's performance, and it is a good approach when punching in a sequenced correction. When working alone, you can use the traditional, if clumsy, footswitch (not included) method. For me, the best option was Auto Punch mode, entered with a dedicated Auto Punch I/O switch.

With Auto Punch, you can choose a preroll point off-line, or with the tape rolling. I found the latter method best,

Product Summary

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as I could hear the music and select my point right *there*. (The preroll point is where playback starts before actually punching into Record mode, giving you a few moments to work up to the punch point.) With the tape rolling, you hit Record to set a punch-in point and Play to mark the punch-out. The machine automatically calculates a 5-second postroll, after which it relocates to the beginning so you can hear your new part.

Although this feature is easy to use, the punch-out leaves a noticeable gap, which is a function of the distance between the erase head and the record head. (The gap is worse on multitrack cassette decks than open-reel decks because the latter run at higher tape speeds.) It took a lot of practice and some trial and error to nail the optimal punch-out points.

THAT SYNCHING FEELING

Judging from the mediocre, but acceptable manual, Yamaha assumes we're still in the era of FSK sync. The Sync button defeats the dbx noise reduction on track 8 and has a lowpass filter to optimize use with FSK. Because of the filter, you shouldn't use this if you're striping SMPTE time code. (The dbx won't affect SMPTE.) Unfortunately, the manual doesn't discuss this.

I striped tapes with 29.97 fps SMPTE code at about +6 dB, and my sequencer chased it faultlessly. Although the meters showed some crosstalk on track 7, the signal didn't bleed onto the tape. For complex technical reasons, recording on track 7 *while* striping time code is okay, but recording on that track *after* striping code can interfere with the time code at playback. I used track 7 on songs where I wasn't synching to a sequencer. When sequencing, I suggest using track 7 as a guard track.

A few times during playback, I could hear the time code chattering faintly in the background, even though the fader appeared all the way down. Bringing the fader up and down again solved the problem. Apparently, what feels like "off" isn't always *off*.

SOUND JUDGMENT

Because so many tracks are jammed onto an 1/8-inch cassette tape, any 8-track cassette machine represents a balance between convenience and audio quality. You unavoidably lose extreme lows and some high end, compared to wide-format analog tape.

In addition, as with any analog machine, you risk losing some audio quality when you ping-pong tracks. And on the MT8X, as with most cassette multitracks, you absolutely should *not* ping-pong to adjacent tracks. That is, unless you enjoy feedback loops and ugly levels of crosstalk. Luckily, with careful planning of tape track assignments and sequenced tracks, I never had to ping-pong except for testing purposes. (As I told you, I hate ping-ponging.)

Overall, the tape tracks sounded clean, even when hammered with synth horn sections and distorted guitars. Some tape hiss is inevitable, but the dbx noise reduction keeps it well within acceptable limits. I prefer Dolby S, but it's a matter of taste.

For the most part, none of these sonic limitations are more problematic in the MT8X than in other cassette ministudios. In fact, the MT8X's audio quality is impressive. You can create fine demo tapes on this unit, especially if you follow the advice in **EM**'s June 1994 cover story, "Masters from Ministudios".

Cassette ministudio lovers will greatly appreciate the performance of Yamaha's MT8X 8-track machine. Its only major flaw is the lack of balanced XLR mic inputs.

Yamaha made one major price/performance tradeoff I really didn't appreciate: The microphone inputs use unbalanced, high-impedance, 1/4-inch inputs. As with Yamaha's assumption that you will use FSK sync, this indicates that some designers are not completely hip to the current state of home recording. Like the vast majority of recordists, I use low-Z mics with XLR connectors, so I had to use an

adapter with a transformer. Even so, the MT8X's mic/line preamps sounded pretty good. But I must confess that after testing the onboard preamps, I ended up using an expensive outboard preamp for vocal parts. Did it make an audible difference? You bet your bottom end (so to speak)!

IN THE MIX

At first, I had mixed feelings about the MT8X. But the more I used it, the better I liked it. The audio quality is very good, considering the medium. The monitoring and most of the routing capabilities are well considered, and the Rehearse and Auto-Punch facilities did everything I needed.

The lack of XLR inputs is the MT8X's biggest drawback. There are other assorted limitations, but for the money, I consider them minor. However, many users will find the need to incorporate a full-featured, outboard mixer. I'd like to see Yamaha introduce a rack-mount, lower-priced version of the MT8X with just the tape inputs and no mixer. Then you could use your favorite mixing console to optimize signal routing and processing, and only face the usual audio limitations of cassette tape.

Compromises? Sure, Yamaha had to make a few, but sensible compromises can lead to success in most things. Consider that there are only three 8-track cassette ministudios currently on the market. The powerful Tascam 688 Midistudio costs so much that it's decreasingly competitive, and the MT8X has more to offer than the Tascam 488 at a comparable price.

Of course, if you already have a great mixer, aspire to make professional-quality recordings, and can spend in the $2,800 range (street price), a modular digital multitrack tape machine is a superior solution. And although prices for open-reel decks are falling, cassette tape is less expensive, more convenient to use, and is available any time, anywhere. So if you want eight analog tape tracks for producing clean demos, without paying big bucks, the Yamaha MT8X is a solid winner.

Having completed his assignments for this issue, **Steve O.** *is taking a vacation. He will leave his coworkers the map coordinates where he can be reached.*

Circle #438 on Reader Service Card

Roland S-760 Sampler

By Geary Yelton

A compact, power-laden instrument at a breakthrough price.

When it comes to designing sampling instruments, Roland is one of the big players. Their rack-mount modules have always done well against stiff competition. If you like Roland samplers, you're going to love the S-760. It's a 24-voice, 1U rack-mount module with a high-density, floppy-disk drive; one SCSI port; and a pair of stereo outputs.

Roland says the instrument is 32-part multitimbral, but because it receives on sixteen MIDI channels, their definition of "multitimbral" is unusual. Up to 32 parts can be loaded at a time, but if you use all 32, it's inevitable that some are going to be assigned to the same MIDI channel.

Two megabytes of RAM are soldered onto the circuit board. The maximum memory configuration, using the same 72-pin SIMMs as recent Macintosh computers, is a whopping 32 MB. That's enough for just over three minutes of stereo sampling at 44.1 kHz. There are just two SIMM slots, and if you install two 16 MB SIMMs, the two megabytes on the board are inactivated, which is unfortunate.

The S-760's documentation includes a list of compatible SCSI hard-disk, CD-ROM, magneto-optical, and DAT drives. Although I used a CD-ROM drive not found on the list, the Apple PowerCD, it worked flawlessly.

A pair of 1/4-inch, unbalanced jacks provide inputs for recording in stereo or mono. The optional OP-760-1 Power Sampling Expansion board ($395) provides a stereo AES/EBU input and two stereo digital outputs. In addition, the expansion board allows you to connect a mouse (included) and a computer monitor or television for a large-screen user interface.

If you have a Roland RC-100 remote controller ($350), the expansion board also lets it control the S-760. The RC-100 also allows you to use a numeric keypad for data entry.

ANGELS IN THE ARCHITECTURE

To understand the S-760, it's necessary to grasp the hierarchy of how sounds are organized in it. At the lowest level are individual Samples, of which up to 512 can be in memory at the same time. Up to four Samples can be combined into a Partial, which specifies layering, filtering, and envelopes, among other parameters. You can have up to 255 Partials, which are arranged into as many as 128 Patches, including keyboard and output assignments, Channel Pressure and modulation settings, and so on.

Each Patch is assigned to one or more Parts (as many as you like), which include a MIDI channel, output level and EQ, and MIDI filter setting. Up to 32 Parts are arranged into a Performance. Finally, the whole kit and caboodle is organized into a Volume, which contains Samples, Partials, Patches, and Performances organized into one file.

MIDI Program Change messages can be used to select Patches and Performances, or to load Volumes. Program Changes can select Patches on each MIDI channel in a Performance. If you want to use MIDI to change Performances, too, the unit's base channel should be different from any of the channels assigned to Patches. Programs 1 through 64, received on the base channel, select Performances; programs 65 through 128 select Volumes.

USER INTERFACE

I highly recommend you use the Power Sampling Expansion board and an external video monitor, which also gives you a mouse-driven interface. It's well worth a few hundred dollars extra. With the stock user interface, the green, backlit LCD panel on the S-760 is only 1 × 2.5 inches, and a lot of information is displayed simultaneously in tiny letters and numbers. It's enough to give someone my age eyestrain. For that reason, four cursor buttons let you maneuver around the LCD. A value knob, along with Increment and Decrement buttons, changes parameter values. The Decrement button is also used to select sounds in a list, and the Increment button can call up file information.

There are three Function buttons, which change identity depending on the current page, and a Shift button for three additional functions. The Mode button reveals the Mode Menu, where you select Performance, Patch, Partial, Sample, Disk, or System mode. Once you're in a mode, the Command button summons a menu of commands for that mode. An Exit button sends you back to the previous page.

When you hold the Shift key, two of the Cursor buttons double as Mark and Jump buttons. These buttons let you mark up to twenty pages, so you can jump directly to them without following a complex path. A marked page shows up in a list, where you choose the page you want to jump to. This feature is handy for going back and forth among the pages you use most frequently.

GETTING LOADED

A direct descendent of the Roland S-750 and S-770 samplers and the SP-700 sample player, the S-760 has a lot in common with those machines, including the ability to read their sound files. Compatibility isn't entirely perfect, though, so certain parameters—mostly output assignments, panning, and equalization—are altered or ignored. Parameters not found in previous instruments are set at their default values. The S-760 can also Convert Load sounds (that is, load a sound and subsequently convert it into the proper file format) from the Roland S-550 and W-30. Like the SP-700, it can also

Roland's S-760 sampler combines the most important features from the S-770 sampler and SP-700 sample player, yet costs less than either instrument.

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BETA Bio

SHURE BETA 87

PROFILE:

A new arrival that sets the world's highest standard for condenser mic performance. Sensitive. Tough. Extremely reliable. A perfectionist. Very smooth in any situation. Shrugs off abuse that would disable an ordinary condenser microphone.

GOALS:

Looking for opportunities to provide outstanding, studio-quality sound for serious musicians in live performance situations. Eager to travel.

SPECIAL STRENGTHS:

A hard worker with an extraordinarily tight supercardioid polar pattern consistent at all usable frequencies. Produces a balanced, natural and detailed sound in both wired and wireless versions. User friendly — rejects irritating feedback and cymbal leakage.

REFERENCES:

M. Jackson, P. Gabriel, D. Bowie, M.C. Carpenter, L. Lovett, B. Idol, T. Tritt, Sade, C. Glover, et al.

AVAILABILITY:

To arrange a personal audition, call 1-800-25-SHURE.

BETA Bio

BETA Bio

SHURE BETA

Convert Load Akai S1000/S1100 sounds from SCSI devices. Unfortunately, it's not possible to read S1000 samples from floppy disk.

Except for one floppy disk, the only sounds I received with the review unit were on the Roland Library Preview disc, a CD-ROM collection of more than enough demo sounds to stimulate your appetite. The demos are a useful collection of single events and musical passages from seven sample houses, including Roland, East-West, and AMG. They range from 1-key symphonic tone poems and techno-groove loops to traditional instruments played from the entire MIDI keyboard.

Sounds can be loaded from floppy disk, from hard disk or CD-ROM via SCSI, or as individual samples via MIDI Sample Dump Standard (SDS). The ability to exchange sample data with SDS means that you can edit samples with a computer program that supports SDS file transfers, and you can export sounds from the S-760 to other types of samplers. If you have another sampler that supports SDS, it also means you can export your current sample library to the S-760, one sample at a time. Because SDS doesn't handle stereo samples, they must be transferred one side at a time, then combined into a stereo file. If the S-760 supported SMDI, samples could be transferred rapidly via SCSI. As it stands, transferring samples via MIDI, as usual, is excruciatingly slow.

Unlike the SP-700, it isn't possible to load new sounds while playing other sounds. It's too bad that this useful feature was omitted from an otherwise new and improved model.

One of the coolest abilities of the S-760 is Listen/Delete, a feature introduced in the SP-700. This allows you to remove from memory sounds that aren't being used, which conserves space when they are saved to disk. Start by loading a Performance. When in the Listen/Delete page, play all the notes that are used in a song (e.g., by playing a sequence), press Execute, and all the unused data is removed. This is a feature that would be welcome on any sampler.

RECORDING AND EDITING

Because it can read S-750, S-770, and SP-700 files, a wealth of sounds already exists for the S-760, from which you can create your own Performances. In addition to straightforward, one-sound-at-a-time sampling, there are options for Quick Sampling, which let you create Performances, Partials, and Patches as you sample.

Quick Sampling is initiated from the Performance, Partial, or Patch pages, so that you can specify part number, note ranges, and the like, before going to the sampling page. Quick Sampling is one of Roland's best ideas, because despite the fact you record multisamples one at a time, the result is a complete Performance, Partial, or Patch. If you'd rather record a bunch of samples and later decide how to assign them, you have that option.

In Sampling mode, you can choose from a slew of parameters before you begin sampling. You can select the sampling frequency (16, 22.05, 24, 32, 44.1, or 48 kHz) and the length of the sample. You can indicate which key will play the sample at its original pitch, and whether you're sampling in mono or stereo from the analog or digital inputs. It's possible to change the gain or equalization of the incoming signal. You can tell the sampler to normalize the sample as soon as it's recorded and automatically name it. If you want to monitor the sound as it's being recorded, the signal can be passed through to the outputs.

Sampling can be triggered manually, or automatically when a signal threshold is reached. There's also a pretrigger setting that either begins sampling a specified period of time before the threshold is reached, or before you press Start. The S-760 can actually record before you initiate recording because it's always "listening" (i.e., streaming digitized audio to RAM) while it's in Sampling mode. There's also a Previous trigger type that records for the period of the sample length before you press Stop. For example, if you set the length for five seconds, the last five seconds before you press Stop will be recorded.

After you've set your parameters, or decided to go with the default settings, press the function key for Ready. You can accept the default name, or enter a new one. At that point, a bar graph displays input levels. Press the Start key and sampling begins. As you sample, you can press the Mark key once or twice to indicate loop points, or the beginning of an event within the sample. When you press Stop, input monitoring is shut off, and a moment later, the waveform is displayed. You have the option to redo the sample, go on to another sample, or start fiddling with the loop.

The S-760 automatically looks for areas of silence at the beginning and end and sets the start point and release-loop end point. You can ignore these if a loop is unnecessary, or go to the Loop display, where you can truncate the sample's beginning and end at the touch of a button. Both a sustain and a release loop are possible (always a cool thing), with coarse and fine tuning adjustments for each. (All editing, by the way, can be done in mono or stereo.) You can search for loop points manually, or scroll through all the zero crossings.

There are five Key On modes that affect how a looped sample is played. It can be played with the loops, only in the sustain or release loop area, or only from the sustain or release-loop end point to the sample end. The sampler's Smoothing function lets you crossfade the loop points to minimize embarrassing bumps.

In the Digital Filter page, wave data is actually rewritten according to the filter settings. Both lowpass and highpass filter modes are available, including resonance, but they can't be combined for bandpass and notch filtering. You can also simply emphasize or de-emphasize high frequencies instead of lowpass or highpass filtering. There's also a Compress/Expand function that works very much like its analog counterpart, also rewriting the sample data.

Other sample-editing abilities include Area Erase, Cut & Splice, and Insert.

Product Summary

PRODUCT:
Roland S-760 Digital Sampler
PRICE:
$2,595
MANUFACTURER:
Roland Corporation US
7200 Dominion Circle
Los Angeles, CA 90040-3696
tel. (213) 685-5141
fax (213) 722-0911

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

• S-760

All three involve chopping the middle portion out of a sample. Area Erase leaves only silence in its place. You can join the two remaining halves together with Cut & Splice. Insert lets you place a different sample in the gap between the two halves, creating a new sample that's a combination of the two. But wait, there's more! Two samples can be Mixed so they play simultaneously, also creating a new sample, or they can be Combined, effectively crossfading one sample into another.

Like other recent samplers, the S-760 provides Time Stretch, which lets you shorten or lengthen a sample from 25% to 400% without altering its pitch. In addition to changing the entire sample, you can specify any portion to be modified. You can also convert a sample's sampling rate and bit resolution. Sample-rate conversion is necessary to match the frequencies of two samples when you combine them.

Envelopes and real-time filter parameters are set in Partial mode. The S-760's Time Variant Filter (TVF) is Roland's traditional synthesizer filter, with lowpass, highpass, and bandpass modes. It's one of the best-sounding, self-oscillating, digital filters I've heard. The cutoff frequency can be affected by keyboard position, by attack and release Velocities, and by an envelope with four time and four level parameters.

Unlike many samplers, the S-760 features filter resonance, making all sorts of synth filter effects possible. By modulating the filter resonance, you can create "wow" effects with short envelopes, or sweep through the harmonic series with longer envelopes. Resonance can also give natural sounds such as human speech an electronic quality you may find interesting. And with the right envelope and resonance settings, almost any sound can become a drum.

The TVF envelope's depth can be further controlled with Velocity. Time values can be modulated by attack and release Velocity and by key position. In addition to controlling the filter, the TVF envelope can be assigned to change pitch. The envelope of the Time Variant Amplifier (TVA) is identical, with times values modulated by key position and both kinds of Velocity.

Like a lot of recent samplers and synthesizers, the S-760 offers templates for filter and amplifier envelopes. In addition to ten preset templates, there are ten user-programmable templates.

These are especially welcome if you find yourself starting with the same kinds of envelopes when you're programming sounds.

The primary reason that Partial mode exists is so that samples can be layered. How they're layered is determined in the Sample Mix Table, or SMT. Up to four samples can be crossfaded, mixed, or switched by Velocity. Of course, creating Partials with more than one sample reduces polyphony.

DOCUMENTATION

Whatever happened to one instrument, one manual? I received four manuals with the S-760. The *Owner's Manual (Basic Operation)* is mainly a tutorial. The *Owners Manual (Advanced Operation)* is a reference book that goes into detail concerning every function and display of the S-760. The books are not well organized, so learning to use the S-760 takes a lot of skipping around. The writing style is dry and occasionally obtuse. It's not always clear how to get to a particular page, or what to do when you get there. Fortunately, the index covers both manuals. I wish it had a glossary for convenient reference, because understanding a concept sometimes takes more effort than it should.

A 12-page *Quick Start Manual* discusses connection to SCSI devices, adding RAM, loading sounds from CD-ROM, creating performances, quick sampling and editing, and the like. It's not actually enough to get you up and running, but it contains information that may be difficult to find in the other two manuals. The fourth manual covers the Power Sampling Expansion and Version 2 of the operating system.

CONCLUSIONS

The S-760 is a complex instrument, with a few new wrinkles, that's fairly easy to use once you learn your way around. A Quick Load feature lets you create a list of frequently used sounds and load them without scrolling through a bunch of displays, which is convenient for onstage use. Quick Sampling lets you sample a bunch of sounds and get them organized in an intuitive fashion. The Listen/Delete feature is a great idea for conserving memory. And the Mark and Jump functions let you customize the operating system to suit the way you like to work.

After a few hours, the operating system easily becomes second nature. I especially like the way it remembers your previous page when you change modes. For example, let's say you're in System mode, changing MIDI control parameters, and you switch to Disk mode to load more Performances.

▼

Quick Sampling is one of Roland's best ideas.

When you go back to System mode, you'll return to the MIDI Control page. Being able to maneuver around, with a minimum of steps, saves a lot of time.

I didn't find a lot to criticize. It would be nice if there were more than two SIMM slots, so you wouldn't have to discard your old SIMMs whenever you upgraded. Onboard effects processing would also be nice. There are only two MIDI ports, with one configurable as an Out or a Thru. I guess sacrifices have to be made when you're designing a single-rackspace instrument.

In terms of price versus performance, the S-760 is a tremendous leap over previous Roland samplers. It's price is similar to the SP-700, which is a sample player, not a sampler. Even though it costs $300 more than the S-760, the SP-700 doesn't have a floppy-disk drive or a means of editing samples. The now-discontinued S-770, Roland's 24-voice sampler, was three times as expensive. Sure, it has bells and whistles like optical digital inputs, but the S-760 offers user-interface refinements that simplify the process of sampling and creating Performances. If you're looking for a sampling module in its price range, you can't go wrong with the S-760.

Geary Yelton *is living the blues with style and grace, watching the world from his office in the world's ninth-tallest building.*

Circle #439 on Reader Service Card

Allen & Heath GL2 Mixer

By Lori Bolender and Mike Cutter

A portable British board delivers affordable versatility.

If you walk the audio fence, jumping between front-of-house sound reinforcement, multitrack recording, and onstage monitor mixing, Allen & Heath's new GL2 can leap right along with you. And even more impressive, this versatile 12 × 4 × 2 console offers gourmet features at a diner price.

The rack-mountable console is compact and portable—it consumes just eleven rack spaces—while delivering ten mic/line inputs, two stereo inputs, 4-band EQ, and six auxiliary sends per channel. In addition, some innovative features allow the GL2 to adapt to just about any gig.

INPUT SECTION

The GL2's ten mic/line inputs offer balanced XLR and ¼-inch tip/ring/sleeve connectors that can be selected by a switch at the top of the input channel. Whichever configuration you choose, a rotary control is used to fine-tune input gain. You can use both the mic and line inputs at once—plugging into one doesn't disable the other—and bounce between them with the mic/line switch. This handy feature saves a lot of repatching. In addition, if you plug into the XLR input alone, selecting Line engages a 20 dB pad, which swiftly tames hot input signals.

Each XLR input also has its own 48-volt phantom power switch on the rear of the console. Although the location of the switch is a bit awkward, it's extremely helpful to be able to defeat phantom power on selected channels. If you've ever used a console with "all or nothing" phantom power and been forced to endure the snap-crackle-pop of a cassette deck plugged into powered inputs, you'll know what I mean. Each input also provides a ¼-inch, tip-send/ring-return insert point that grabs the signal pre-EQ to facilitate inserting signal processing into the channel path.

Below the unit's input-gain control

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is 4-band EQ, with fixed high- and low-frequency controls (shelving at 12 kHz and 70 Hz, respectively) and two sets of sweepable peak/dip midrange controls. The low-mid band sweeps from 35 Hz to 1 kHz, and the high-mid control ranges from 500 Hz to 15 kHz. All four bands can be boosted or cut up to 14 dB, and a center detent marks the flat position. A button activates or deactivates the channel EQ section. We were extremely impressed with the flexibility of the GL2's sound-shaping, especially considering that the unit costs under $1,500. Overall, the board exhibited a clean sound, plenty of headroom, and just a hint of punch.

After taking notice of the extensive EQ, we gawked at the six *simultaneously available* aux sends on every channel. Wisely divided into two sections—auxes 1 to 4 and auxes 5 to 6, both groups switchable pre- or postfader—the configuration serves both recording and sound-reinforcement applications. Prefader aux sends derive their signal pre-EQ and postmute. Signal routing is handled with conventional odd/even pan-assignment switches. You can select groups 1/2, groups 3/4, and the left/right main outputs.

Probably the most grueling decision in designing a console for both recording and sound reinforcement is whether to include a mute button or a channel-on button. Recording enthusiasts prevailed on the GL2, and a mute switch resides next to a red status LED that lights up when the mute is activated. We're primarily sound-reinforcement people, but we got over it. Below the mute switch, a PFL button routes signals to the monitor section (prefader/post-EQ). The peak-level LED does double duty as the PFL status indicator. The LED glows dimly when the PFL button is depressed and flashes brightly when an input signal is within 5 dB of clipping. The 100 mm, long-throw faders are smooth and sturdy, like all the GL2's buttons, knobs, and switches.

Channels 11/12 and 13/14 are line-level, stereo inputs. Each channel has separate pairs of ¼-inch, unbalanced and RCA inputs, either of which can be selected with an A/B switch. Once again, this feature expands the capacity of the board, allowing four stereo sources to be connected at once. A Mono button sums the left and right inputs to mono, or routes a single input to both sides of the stereo path. The remaining features are identical to the other channels with the exception of the EQ, which replaces the two sweepable midrange bands with two fixed peak/dip controls centered at 250 Hz and 3.5 kHz.

OUTPUT SECTION

Although the GL2's wealth of input-channel features is impressive, the true brilliance is the flexibility of its output section. Starting with the basics, the console provides balanced XLR outputs for the four groups and the left/right main outputs. Each output has a ¼-inch, tip-send/ring-return insert point. Besides smooth 100 mm faders and a mute button, you also get an AFL button that routes signals to the monitor section (postfader/premute). The groups (1/2 and 3/4) and the master channel strip provide a dedicated, 3-segment LED for monitoring AFL signals.

This brings us to one of the compromises Allen & Heath made in designing the GL2. The board's main signal meters are two 8-segment LED bar displays that default (postfader) to the left/right main outputs. Although all output signals are not visible at all times, just about anything you need to meter in the input and output sections can be routed to these bar displays by depressing a PFL or AFL button.

The six auxiliary master outputs are

Allen & Heath's new GL2 is a versatile, rack-mount mixer that can juggle studio and live-sound gigs with ease.

¼-inch unbalanced (a balanced option is available), with rotary controls and AFL buttons. The output section also provides four mono return inputs, terminating in ¼-inch, unbalanced jacks. Each return includes a rotary level control and a pan pot. These returns are useful for routing signal processing, but they also can be used as tape returns during multitrack recording. A Return/Group switch allows you to route signals from external effects processors or additional line signals to the left/right mix.

The monitor section includes two ¼-inch stereo jacks, one on the front panel for headphones and the other on the rear panel for feeding monitor speakers. Both output levels are controlled by a single knob. Two pairs of RCA connectors serve as the 2-track sends and returns. The send is fed from the left/right main outputs, and the return is monitored by depressing the 2-Track button next to the monitor level control.

A Left-Right Pre switch enables the monitor output, 2-track send, and the mono output to receive the left/right main signal prefader. This is useful for sound reinforcement when using any of those outputs as an independent matrix for delay speakers, or as a record feed. An added bonus is a balanced, XLR, mono output, which is a sum of the left/right main outputs. This is an excellent feature, as it provides an additional send for front-fill speakers, or can be used as a broadcast feed.

And now, the hippest feature. The four group outputs and the left/right main outputs can be reversed by pressing the Group/Aux Reverse switch.

Product Summary

PRODUCT:
GL2 Rack-mount Mixer
PRICE:
$1,495
MANUFACTURER:
Allen & Heath
8760 S. Sandy Pkwy.
Sandy, UT 84070
tel. (801) 566-8800
fax (801) 566-7005

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

● GL2

When this switch is engaged, the aux outputs and group/main outputs swap positions: aux sends 1 to 4 are routed to groups 1 to 4, respectively, and aux sends 5 to 6 are routed to the left/right main outputs. The auxes now utilize the balanced XLR outputs, insert points, long-throw faders, and all the other group output amenities, creating an ideal stage monitor console with six individual mixes.

Also, the mono output has a recessed switch that converts it to a wedge monitor send that takes its feed from the AFL and PFL signals. When active, this feature routes the group and left/right main output signals to the aux 1 to 6 masters and the ¼-inch, aux outputs. This is one of the most innovative features we have ever seen designed into a console, and the absurd thing is, it's such a simple concept.

EVALUATION

The GL2 is an extremely versatile console, so it was difficult to test *every* application and situation, but we tried our best. As our main business is sound reinforcement for "corporate theater," we used the console as a front-of-house board for a few corporate shows, as well as a stage-monitor mixer for a jazz singer backed by a 15-piece orchestra.

Clear speech-reproduction is critical to corporate theater, so these gigs are a great test for a console's clean audio performance and crosstalk rejection. The GL2 passed with flying colors. The extensive aux sends and other outputs made it simple to feed the myriad speaker positions and foldback sends that are a big part of these shows.

With a few button pushes, the board adapted beautifully to a stage monitor console that offered six separate mixes. Although the gig required 22 microphones—which obviously couldn't be crammed into the GL2's ten mic inputs—we simply used a submixer and returned signals via the Allen & Heath's two stereo inputs. Although we couldn't get the group inserts to work with outboard equalizers that required balanced XLR connections (we have bad karma when it comes to single-connector insert points), the GL2 worked quite well in this application.

Ergonomically, the controls functioned very nicely. Allen & Heath's market research showed that the intended user (that's you) wanted a full-featured, rack-mountable console for

portability. Unfortunately, this design didn't work well for our typical applications, where a tabletop model is best.

Allen & Heath does offer mounting brackets to adapt the console for tabletop operation, but all the connectors end up on the bottom of the console. That's not cool. If emergency repatches were necessary, one of us had to pop a mini-Maglite in their mouth, lift the console with one hand (dragging the spaghetti of cables with it), and try to disconnect one cable and patch in another with the remaining hand. It was not pretty. When we rack-mounted the console, we were constantly dodging our heads back and forth just to see around the formidable box in front of us.

Except for the rack-mount design, we loved this console. Any compromises Allen & Heath made to keep things compact (or to reach a price point) were wisely chosen and well executed. Allen & Heath even has an option that allows you to link two or more GL2s together with a computer cable if you need more inputs. We certainly expected to pay much more for the features and flexibility the GL2 offers.

Contrary to popular belief, **Lori Bolender** *and* **Mike Cutter** *are* not *joined at the hip. They have just worked together for years as live-sound engineers at the San Francisco Hilton.*

Circle #440 on Reader Service Card

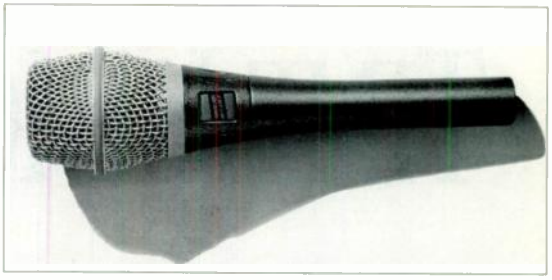
Shure Beta 87 Electret Condenser Mic

By Michael Molenda

Vocal bliss in one word: smoooth.

I have to fess up here. I really wasn't excited about reviewing Shure's new Beta 87 vocal microphone. Although the venerable Shure SM57 is my favorite mic for recording guitar amps, the loud, obnoxious, nasal quality of my singing voice has never been well treated by the Shure Brothers. It's not Shure's fault. Other people sound great on SM58s and other Shure microphones. But stand me in front of a SM58, and tragedy is imminent.

But then I saw Sting singing through a Beta 87 microphone on the David Letterman show, and he sounded great! And even though my voice is nowhere near as good as Sting's, we share the same thin, reedy vocal timbre. I was encouraged. If the Shure Beta 87 could make Sting sound almost as smooth as Nat King Cole, maybe it could even tame my voice. Hmmm.



The Shure Beta 87 is designed as a handheld vocal microphone. This supercardioid, electret condenser produces smooth, clean vocal timbres with a minimum of sound leakage and handling noise.

BASIC FEATURES

First things first: The Beta 87 ($420) is a supercardioid, electret condenser design that requires phantom power for operation. There is no provision for battery power. Frequency response is rated by the manufacturer at 50 Hz to 18 kHz, with Shure's characteristic presence peak brightening up the high midrange frequencies. The dynamic range is 113 dB, and maximum SPL is 142 dB, which allows the Beta 87 to capture everything from whispers to screams with clear resolution.

The Beta 87's tapered, slim-line casing is comfortable to hold, although people with large hands may find the body a bit slippery. An internal pop filter and preset low-frequency rolloff are excellent defenses against plosives and proximity effects. Vocal sounds remained clear even when singers "ate" the mic. Handling noise was minimal whether the mic was handheld on stage, or in the studio. (Some singers are more comfortable doing their live shtick in the studio, so I often toss them a mic and keep my fingers crossed that handling noise doesn't compromise the sound.)

The legendary Shure toughness is maintained with a steel mesh grille around the capsule. I dropped the mic head-first onto a concrete floor from a height of four feet, and it didn't even suffer a small dent. And yes, the mic still worked!

TORTURE TEST

The ultimate torture test for live vocal mics is my band's cramped rehearsal space. Large, Voice-of-the-Theater-style P.A. cabinets and hard, reflective surfaces make the room a virtual feedback farm. No microphone has survived our room without suffering some degree of feedback, but the Beta 87's supercardioid pattern delivered excellent off-axis rejection. Feedback was minimal, and what feedback did exist was diminished further by adjusting the console EQ.

But what really blew me away was that, hey, this mic does make me sound good! Even in a rehearsal with a beast of a P.A. system, the Beta 87 delivered a smooth, but present timbre. Happily,

the presence peak of other Shure mics that often renders my voice unlistenable was not evident. Through the monitor system and main speakers, my voice sounded as if it was being reproduced through a large-diaphragm, studio condenser mic. It was great to get through a rehearsal and actually enjoy the sound of my voice. (I usually sulk home in tears.)

The good reviews didn't stop with me. The Celtic band I occasionally play guitar for used the mics at a St. Patrick's Day concert, and the singers and the soundperson were blown away. The Beta 87 is an amazingly clear mic. For me, jammed into the backline on stage, it was the first time I could actually hear the vocals. As a matter of fact, the vocals were so sharp and clear that they overwhelmed the drums, bass, guitar, and violins in the sound mix. Now, how often does that happen? The mic made it impossible to balance this review with good and bad points; I couldn't find anyone who didn't love the Beta 87.

CONCLUSION

For vocal miking, the Beta 87 has brought me back into the Shure camp. This is a rugged mic that gives live vocals the sheen and clarity of studio recordings. I used the Beta 87 in several live applications—rehearsals, small clubs, big clubs, and bars—with a number of different sound systems, and the always improved the vocal reproduction. The Beta 87 definitely has the chops to double as a live and studio vocal mic. There's really nothing else I can say about this mic except "Go buy one!" ●

Circle #441 on Reader Service Card

Product Summary

PRODUCT:
Beta 87 Electret Condenser Microphone

PRICE:
$420

MANUFACTURER:
Shure Brothers, Inc.
222 Hartrey Ave.
Evanston, IL 60202-3696
tel. (708) 866-2200
fax (708) 866-2279

EM METERS	RATING PRODUCTS FROM 1 TO 5
AUDIO QUALITY	● ● ● ● ◖
VALUE	● ● ● ●

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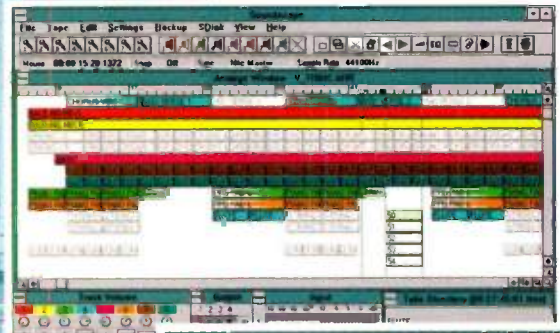
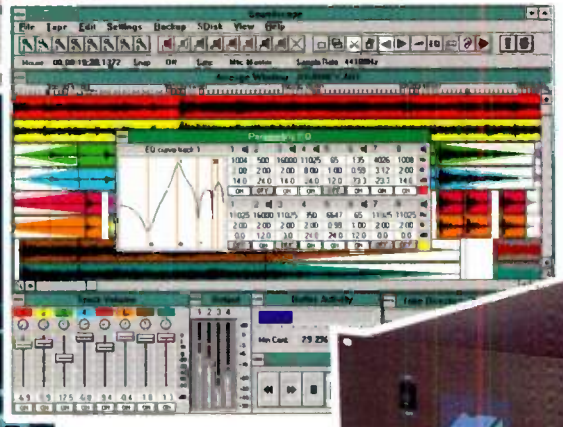
The Soundscape SSHDR-1 is a high quality 16 bit digital audio recording and editing system, and is capable of expanding your studio with 8/16/24 or up to 128 tracks. The system can be used in a recording/composing environment and has extensive non-destructive audio editing facilities.





Operation is from an IBM PC™ or compatible and runs under Windows 3.1™. Software allows up to 64 virtual tracks to be recorded in stereo, edited (non-destructive) and digitally mixed down to four outputs. As the system is modular, several Soundscape units can be synchronised with full sample rate accuracy and used together giving up to a maximum of 32 inputs and 64 outputs.

If you are looking for a Hard Disk recorder/editor with "Open" architecture that can be totally integrated with any Windows™ sequencer or editing package, is random access to the disk, expandable beyond 8 tracks and offers full "chase lock" synchronisation to analog/video or digital tape machines then the next stage of the digital revolution starts here.

2U 19" rackmounted unit.

Physical tracks: 8

Sampling rate: 22.050/32.0000/44.056/ 44.100/47.952/48.000KHz

Data format: 16 bit linear

Signal processing: 24-bit internal

Data storage: IDE hard disk , fitted in the rack unit (not supplied), size depends upon recording time required, e.g. 250MB gives 47min 14sec total @ 44.1KHz, 1GB gives 3 hrs 9 min

2nd internal IDE drive can be fitted giving upwards of 3.4GB allowing 10hrs 42min recording time.

A/D conversion: 16 bit sigma-delta 64 x oversampled

D/A conversion: 18 bit sigma-delta 64 x oversampled

Synchronisation: Master or Slave, MTC with full chase lock, MIDI song pos.pointer + clock

Analog in: 2 x RCA/cinch, unbalanced – 10dBv/+4dBv (2 tracks in)

Analog out: 4 x RCA/cinch, unbalanced + 4dBv (4 tracks out)

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MIDI Solutions MIDI Processors

By Charles R. Fischer

Affordable aspirin for MIDI headaches.

In over a decade of MIDI development, we've suffered with many devices that crash in the presence of certain messages; lack common, desirable features; or malfunction in some way. A number of third-party designs have appeared to put everything in your MIDI rig on speaking terms and keep the musicians out of the medicine closet.

In that tradition, MIDI Solutions offers eight MIDI processors dedicated to aiding or augmenting the operation of MIDI devices. The palm-sized gadgets selected for review include the Footswitch Controller, Mapper, Relay, Router, and Velocity Converter. (The company also produces a 1-in, 2-out Thru box; Merger; and All-Notes-Off Filter.)

COMMON GROUND

At first glance, the MIDI Solutions series closely resemble the Anatek Pocket Products line. They're roughly the same size, address many of the same problems, and receive their power supply from the MIDI line, like the Anatek units. The biggest differences between the two lines are the user interfaces and the number of user-programmable parameters.

The MIDI Solutions processors are packaged in 4¾ × 2¾ × 1¼-inch, black plastic boxes and include MIDI In and Out ports, along with other connectors needed to perform the required functions, such as footswitch jacks.

Each unit obtains its power from the MIDI datastream, coming from the MIDI Out of the previous device. The absence of wall-warts, batteries, or other power supplies is a real plus. In fact, I wish I could power my whole MIDI rig this way.

PUTTING A HEX ON

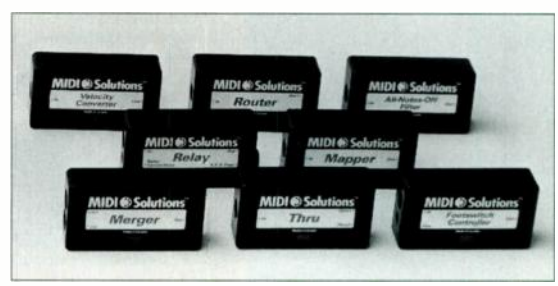
The devices are programmed with System Exclusive messages, which proves to be a double-edged sword. You must first figure out exactly what you want the device to do, then determine the SysEx messages required for the job. This can be done without a computer, but you must have something that sends SysEx; you can't program the boxes by themselves.

While the idea of dabbling in hexadecimal arithmetic frightens most nonprogrammers, it actually turned out to be fairly straightforward after a little practice. (I'm no programmer, but I'm familiar with hex and MIDI.) If this is too much for you to handle, MIDI Solutions will do the necessary programming for a $20 surcharge. Although I have several computer programs that can transmit SysEx, some users might not be as well equipped. I'd like to see MIDI Solutions either bundle, or offer at low cost, basic software that would let their customers program their products.

THE MAPPER

The Mapper lets you convert MIDI Control Change, Program Change, Channel Pressure (aftertouch), and Pitch Bend messages into other MIDI messages. As many as ten user-defined changes can be stored internally, and mapping can occur on one or all MIDI channels simultaneously.

These features can be invaluable if you have an older synth or other device with a hopelessly inflexible or limited MIDI implementation. Let's say your favorite old synth ignores MIDI Channel Pressure, which you rely on for expressive performance nuances, but it recognizes Modulation. With the Mapper, you can convert your master keyboard's Pressure data into Modula-



MIDI Solutions' MIDI processors perform useful tasks such as MIDI-automated analog-voltage switching, remapping MIDI messages, and applying custom Velocity curves. However, you must program them with SysEx.

tion, and the system lives happily ever after. You could also use the Mapper to translate data from Yamaha breath controllers, allowing you to use this expressive device with the many sound sources that don't respond to Breath Controller data.

The Mapper is designed to give the most recent map setting highest priority. For example, let's say you set the Mapper to remap Volume to Modulation on all channels, then set it to remap Volume to Pitch Bend only on channel 3. It will change Volume to Modulation on all channels except channel 3; Volume messages on that channel will become Pitch Bend messages, because that is the most recent setting. This feature allows you to nest maps within maps. Also, if you are careless enough to create conflicting maps, the conflict is resolved in favor of the most recent map.

It didn't take long to find uses for the Mapper. I managed to get some of my oldest pieces of gear to communicate exactly as I had long desired. Having ten maps onboard and the ability to send and receive maps as SysEx messages gives you the room to create custom maps for specific situations, or to trade files with others. I highly recommend the Mapper to anyone looking for a way to cover up the minor shortcomings found in older instruments' MIDI implementations.

FOOTSWITCH CONTROLLER

Another favorite is the Footswitch Controller, which lets you perform feats that aren't usually associated with footswitches. Triggering Note-On messages, sending two different MIDI Volume messages, instantly transposing notes, or bumping the MIDI channels of incoming messages aren't the most imaginative uses of MIDI, but they can make life much easier.

In MIDI Echo mode, the Footswitch Controller simply allows incoming MIDI data to appear at the output. Footswitch Toggle mode causes the attached footswitch to alternate between two states (on and off). All of these tricks can be performed with more sophisticated devices, but the Controller offers a nice compromise between power and simplicity.

The Footswitch Controller works with normally-open or normally-closed footswitches, as it senses the switch polarity when powered up.

RELAY

The Relay contains a switching circuit be turns on and off in response to user-specified MIDI messages. This handy gadget offers creative musicians an automated on/off switch for footswitch-controlled electrical devices. Simply connect the Relay to the target device's footswitch input with a standard guitar cord, and it's ready for the MIDI world.

Many guitar amps and effects boxes offer channel-select, effects-bus in/out, or bypass control from a remote footswitch. With the Relay, you can switch your guitar amp between rhythm and lead settings from your sequencer, or automatically bypass non-MIDI signal processors. With the right rig, you could even play tapes or CDs during breaks at your gigs and turn the music on and off from your onstage MIDI setup. I also used the Relay to control a custom distortion box with a suitable footswitch input. I had a struggle discovering the proper SysEx messages, but I finally programmed the Relay to do tricks such as activating the distortion whenever a certain Note-On command is sent.

The Relay can respond to Control Changes, Program Changes, SysEx, and several other types of messages. As with the other products in this series, the user settings are retained indefinitely in nonvolatile memory. If notes or controllers are used, up to ten settings are available simultaneously. Other message types are limited to one setting at a time.

Product Summary

PRODUCT:
MIDI Processors
PRICE:
Footswitch Controller $79
Mapper $79
Relay $99
Router $79
Velocity Converter $79
MANUFACTURER:
MIDI Solutions, Inc.
816-810 W. Broadway
Vancouver, BC,
Canada V5Z 4C9
tel. (604) 794-3013
fax (604) 794-3396

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

Unfortunately, the Relay's switching circuitry has noticeable limitations. For a start, the current-carrying capacity of its contacts is limited to 0.5A, so MIDI control of the coffee machine will have to wait. Don't try to jump-start your car or control your power amp this way, and you shouldn't have to change the Relay's fuse.

The device has a short delay between the moment the circuitry receives a command and the moment it switches on or off, making it undesirable for triggering an analog synth or drum brain. Fortunately, the delay is short enough to be no problem for a guitar amp or tape deck. (According to the manufacturer, this delay is approximately 2 milliseconds.) It is feasible to build a solid-state switching device that operates in a few microseconds; such an approach would have made the Relay better for triggering non-MIDI events in real time. However, this would have probably driven the price up a bit.

ROUTER AND VELOCITY CONVERTER

The Router has one MIDI In and two Outs, and it can be programmed so that specific user-determined messages are filtered out of, or passed though, one or both outputs. For example, you could use this to route data on just one MIDI channel to an older synth that only receives in Omni mode, while sending only Real-Time messages (e.g., Start, Stop, Continue, and Timing Clock) to a drum machine. I found it useful for keeping Polyphonic Pressure messages away from my Oberheim Xpander and Matrix 6R, which choke on these messages.

The Velocity Converter might be called a mondo version of the Anatek Pocket Curve (reviewed in the January 1992 **EM**). The Anatek box offers 24 alternative curves (enough for most purposes), but it affects all sixteen MIDI channels the same way, making it hard to use with specific MIDI channels or instruments.

The Velocity Converter offers several significant advantages over the Pocket Curve: 40 preset curves and one user-programmable curve, the ability to select a different curve for each channel, and a lower price tag (by $20). The ability to assign different curves to each MIDI channel lets you correct any differences in volume between multiple instruments in your setup. Overall, I found the Velocity Converter to be extremely useful.

COMPLAINTS

Other than the issues already discussed, I have only two minor complaints about the MIDI Solutions products. All five modules reviewed send MIDI Active Sensing messages in the absence of data at their inputs. This was probably implemented because a few MIDI sound sources—mostly antiques—shut down their sound generators unless Active Sensing messages are present, squelching hung notes if the MIDI connection is broken. Although Active Sensing shouldn't present a problem in most situations, the messages could clog the datastream if the output were merged with other MIDI sources. For this reason, I wish Active Sensing could be enabled and disabled. (Apparently, MIDI Solutions is working on this problem.)

My other complaint concerns the extremely brief documentation. The tiny booklet assumes you're already well versed in hexadecimal and MIDI. I had no problems getting the examples working, but the booklet should explain the meaning of each byte in the example more clearly, giving the user more insight about the process. To be fair, there's no way that this booklet could ever cover all the possibilities for everyone. Fortunately, MIDI Solutions offers free technical help via CompuServe or telephone, making things easier in the event of a problem.

CONCLUSIONS

For the most part, these five units met the manufacturer's claims. Even though you must figure out what you want and how to translate it into SysEx (or pay a little extra and let MIDI Solutions handle this step), the products offer a good balance between power and complexity. The price is reasonable, too.

Obviously, these boxes aren't for everyone. However, if you've dealt with the headaches caused by a minor bug in your MIDI rig for far too long, the MIDI Solutions series might be even better than aspirin.

Charles R. Fischer *spends most of his waking hours either fixing, testing, troubleshooting, designing, building, writing about, playing, or swearing at much of the equipment discussed in* **EM**.

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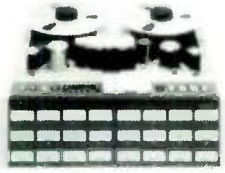

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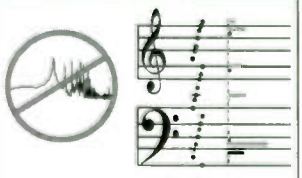

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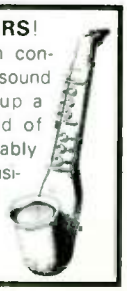

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TECH PAGE

Perfect Pitch

Pitch recognition is one of the final frontiers.

By Scott Wilkinson

Pitch recognition is one of the most difficult tricks to perform in all of electronic music. This is evident in the number of pitch-to-MIDI converters that have come and gone and the fact that the most successful units are very expensive.

Nevertheless, a few brave souls continue to work on this problem. Among them is a small company in Texas called Adams-Fravel, Inc. (AFI). They have created the Pitch Reader, which is a half-size, ISO circuit card for PC-compatible computers. The Pitch Reader has two ⅛-inch mini phone inputs for microphone and line signals and an onboard compressor that acts as an automatic input-level control.

Unlike other pitch-recognition products, the AFI Pitch Reader is exceptionally accurate, fast, and inexpensive. Instead of operating in the frequency domain using Fourier analysis, which is costly to implement, it operates in the time domain using a waveform pattern-recognition algorithm. Once the circuitry sees two similar cycles in the waveform, it extracts the pitch information, giving the Pitch Reader tremendous tolerance for timbral variations. Especially noisy attacks can delay the recognition, but noise is identified as such, which can provide valuable information in certain applications.

The Pitch Reader includes two basic modes of operation. In real-time mode, pitch data are passed to the computer as it is extracted, which involves a slight, inherent delay. This delay can be minimized by providing a clear signal that is not distorted or contaminated with ambient room noise. In non-real-time mode, the notes you sing or play are stored in the computer, where the data can be processed later.

AFI includes a sample DOS application with the Pitch Reader that demonstrates both modes. This program can play Standard MIDI Files (SMFs) while recording additional tracks of MIDI notes from the card in non-real-time mode. It can also act as a pitch-to-MIDI converter in real time. However, AFI's development efforts have not been aimed primarily at real-time applications so far. In the near future, they intend to improve the pitch-to-MIDI capabilities and develop a MIDI input driver for *Windows*-based music programs.

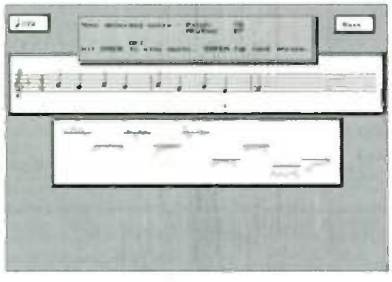

FIG. 1: In this screen from TAP's Music Lab Series, the lines below the staff indicate the accuracy of the student's pitch. The arrow under the penultimate note indicates that the average sung pitch was more than 25 cents flat. Also notice that the student scooped into the last note.

Originally designed for the music-education market, the Pitch Reader is being integrated into several products from Temporal Acuity Products (TAP; tel. [206] 462-1007, fax [206] 462-1057). Among them is their Music Lab Series of computer-aided instruction (CAI) software that tutors the skills of reading and writing music. For example, one module generates and displays melodies in standard notation, which the student sings into the microphone. The display indicates the accuracy of the student's pitch over the duration of each note (see **Fig. 1**). Thanks to the Pitch Reader card, this display is fast and deadly accurate.

TAP is also using the Pitch Reader with *Trigger,* an interesting utility program for their *Music Printer Plus* notation software. Among other modes of operation, this utility steps through MIDI playback of *MPP* files as you sing or play any sequence of notes placed into a special "Trigger Track." This causes the other musical parts to follow you as you perform (as long as the performance matches the notes in the Trigger Track).

These are only a few of the many potential applications for this technology. AFI encourages third-party development and offers a low-cost software development kit for programmers. They invite interested developers to contact them to obtain the development kit and discuss application ideas (tel. [512] 458-8800, fax [512] 467-9724). Who knows? You might create the Next Big Thing in music software and sharpen your singing skills at the same time.

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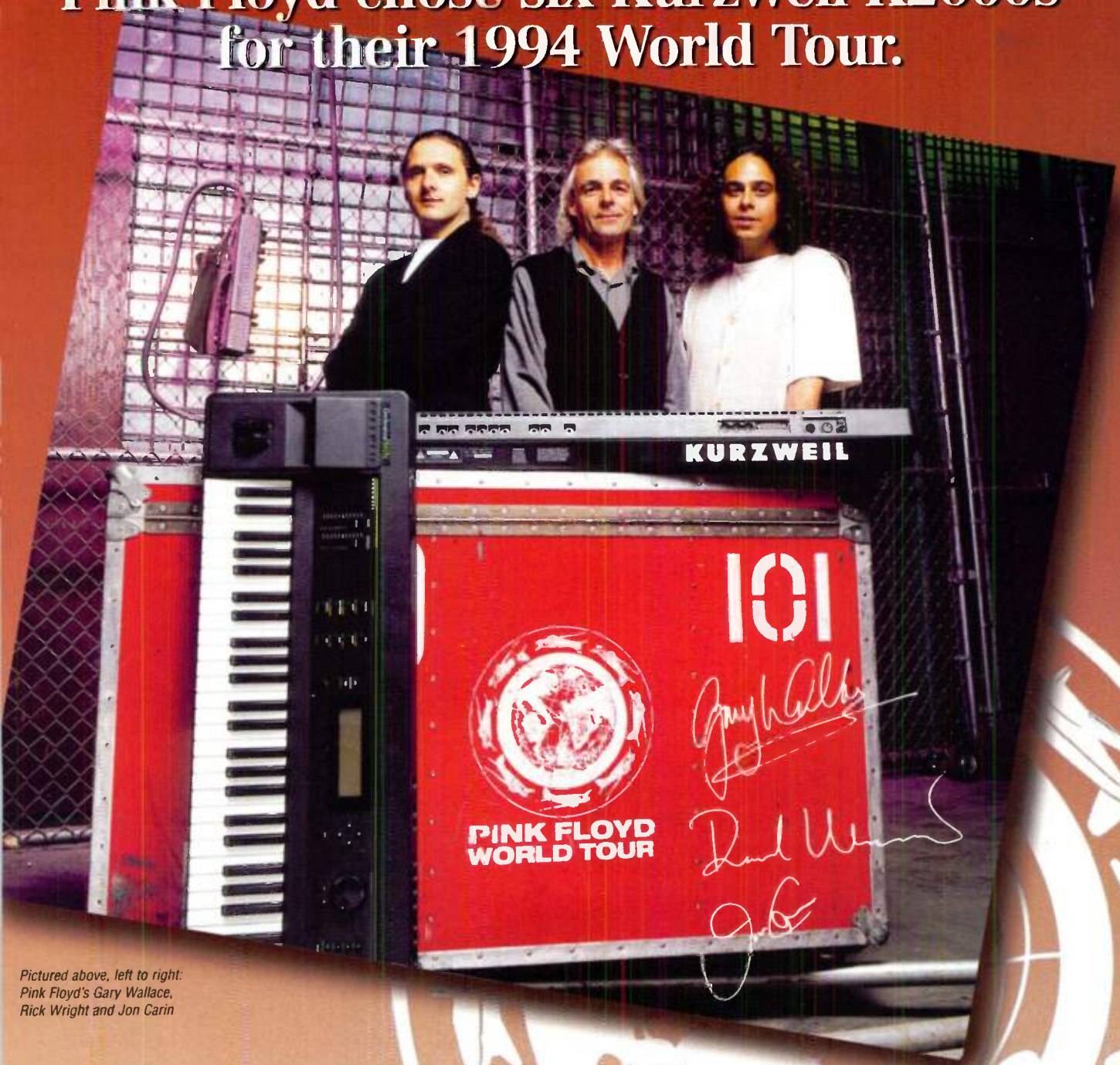

Pictured above, left to right: Pink Floyd's Gary Wallace, Rick Wright and Jon Carin

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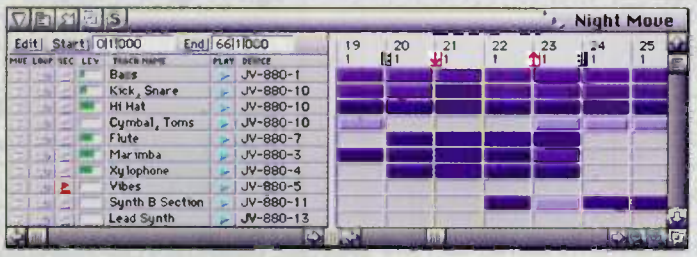

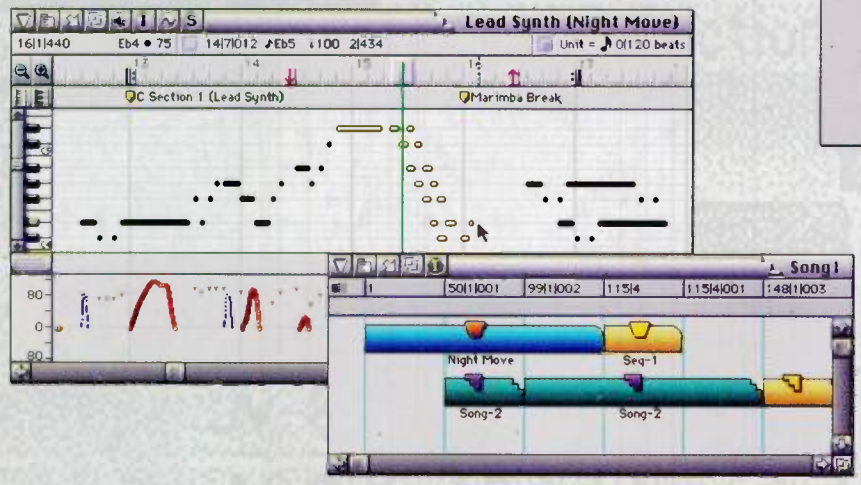

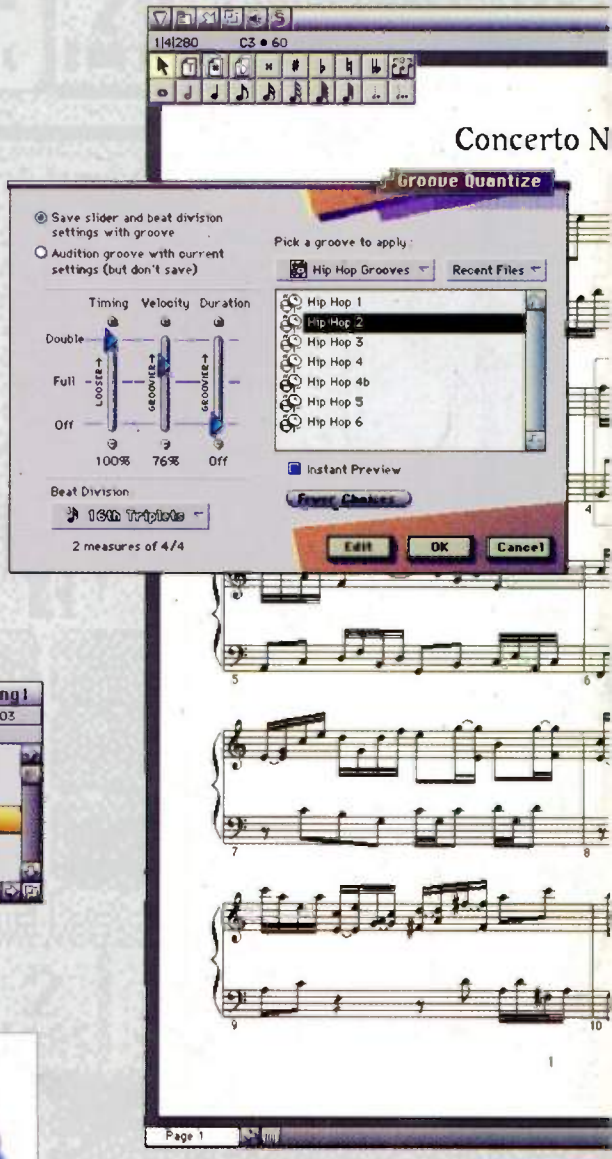

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